

No. 847,808.

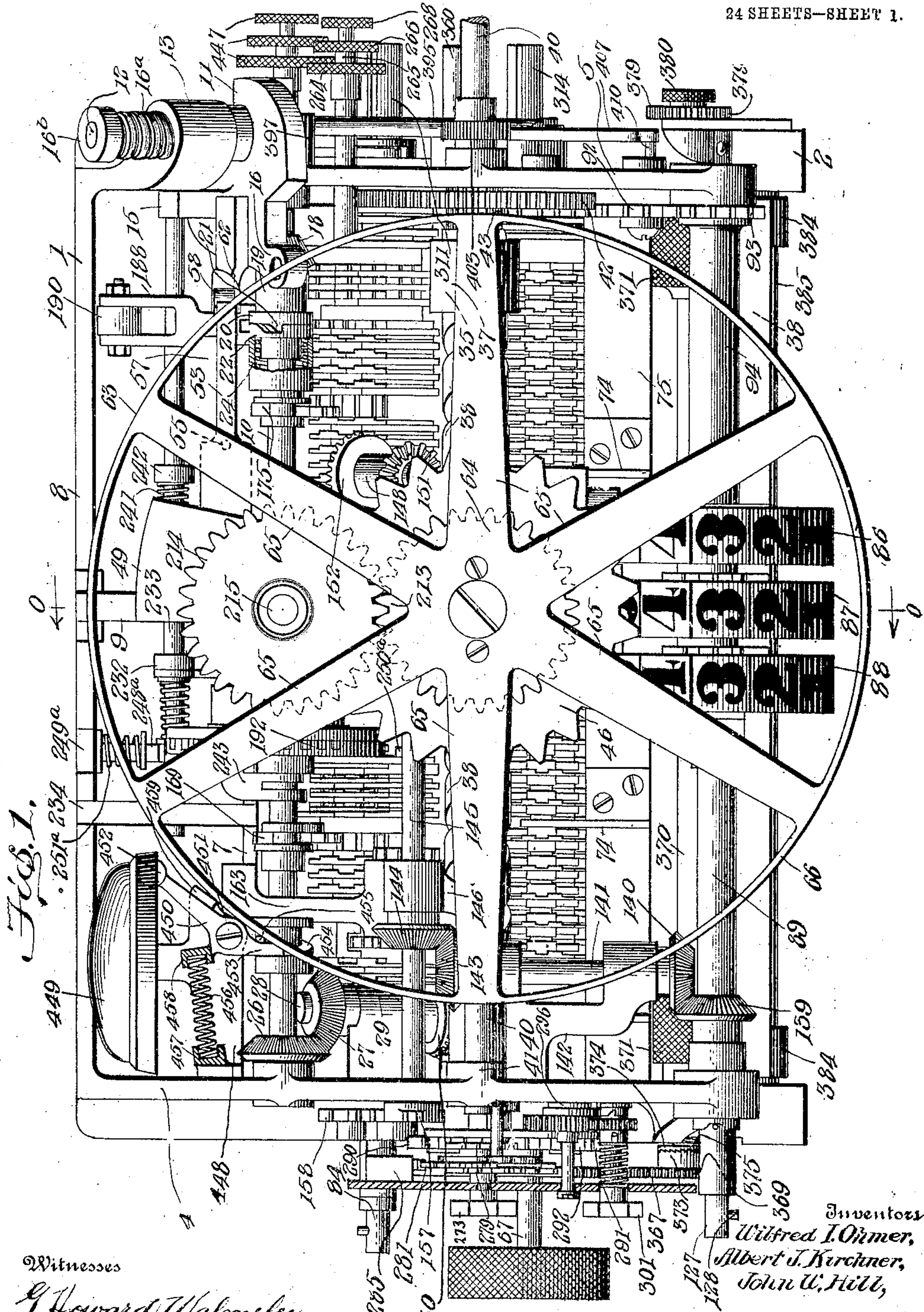
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FARE REGISTER AND RECORDER.

APPLICATION FILED DEC. 16, 1905.

24 SHEETS—SHEET 1.



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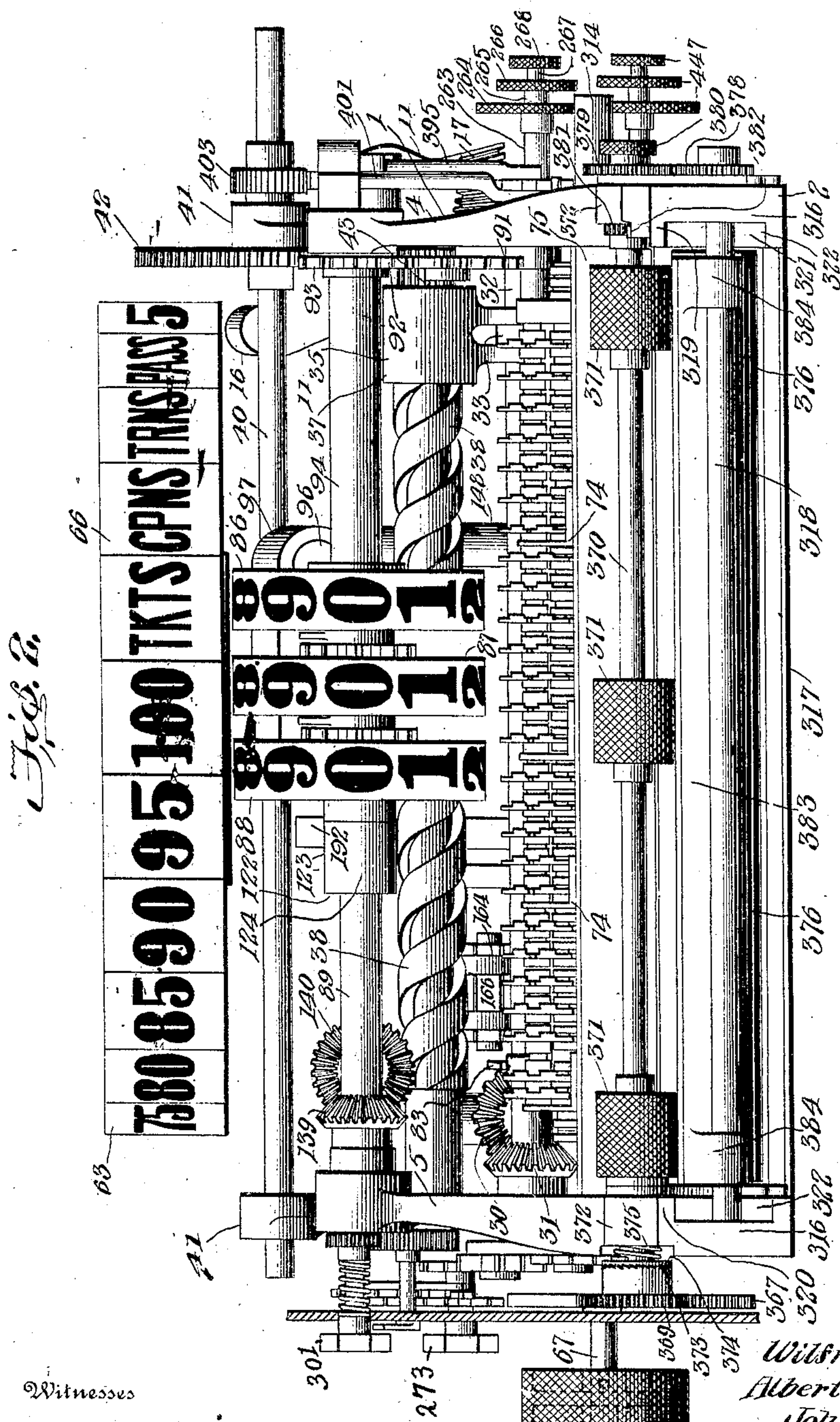
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FARE REGISTER AND RECORDER.

APPLICATION FILED DEC. 16, 1905.

24 SHEETS—SHEET 2



Witnesses

G. Howard Walmsey.
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Inventors

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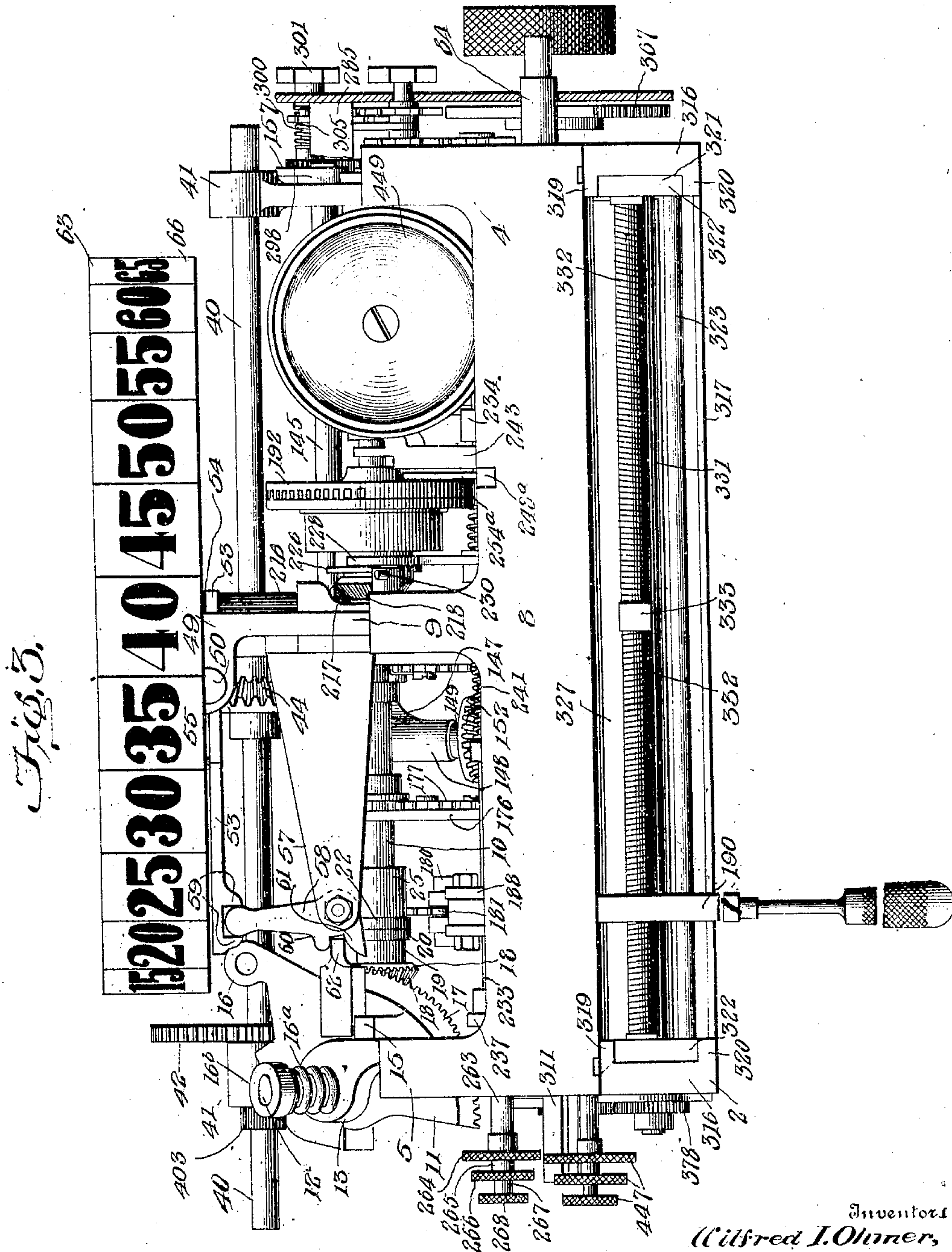
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W. I. OHMER, A. J. KIRCHNER & J. W. HILL.

FARE REGISTER AND RECORDER.

APPLICATION FILED DEC. 16, 1905.

24 SHEETS—SHEET 3.



Witnesses

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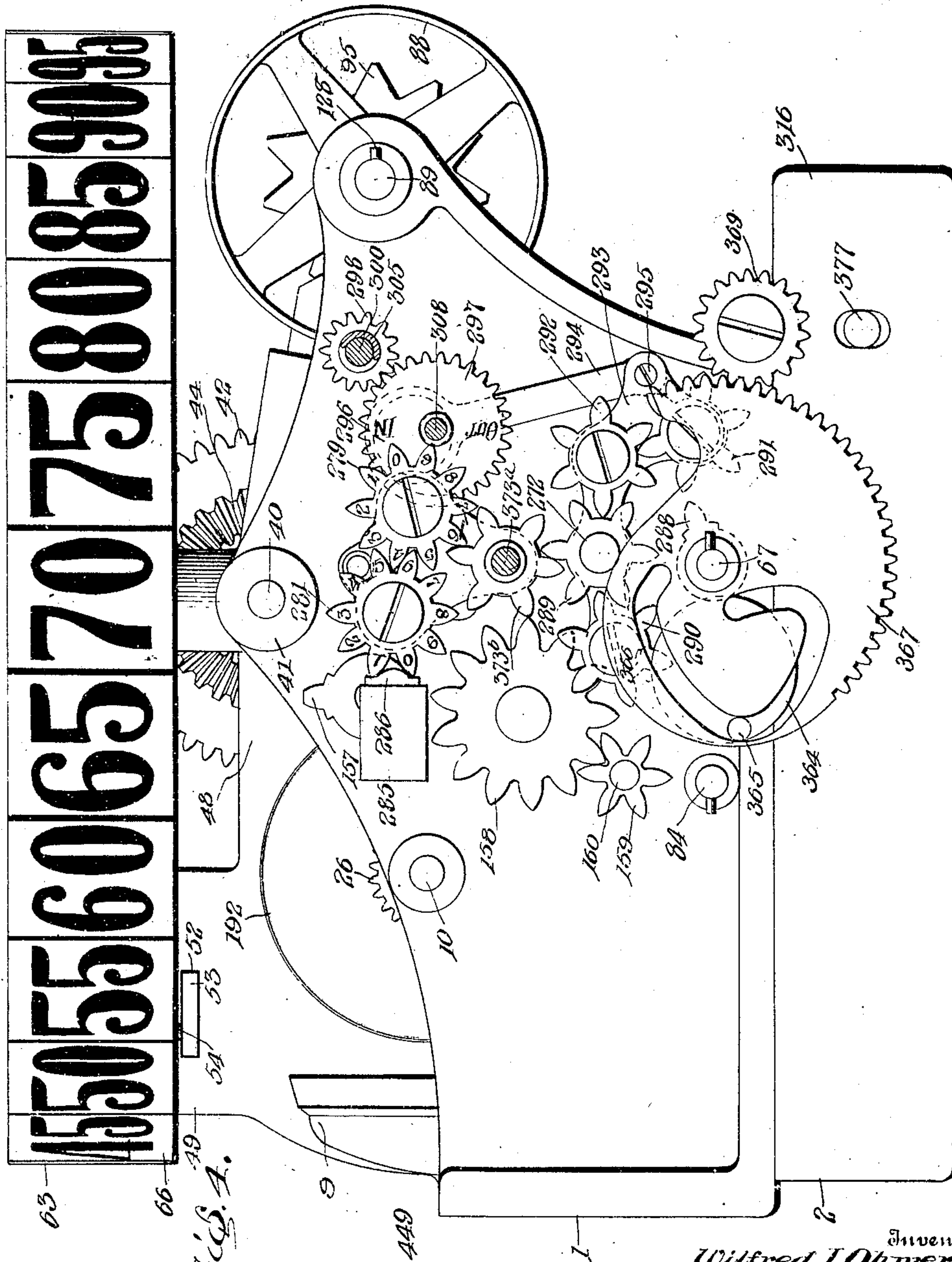
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PATENTED MAR. 19, 1907.

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FARE REGISTER AND RECORDER.

APPLICATION FILED DEC. 16, 1905.

24 SHEETS—SHEET 4.



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FARE REGISTER AND RECORDER.

APPLICATION FILED DEC. 16, 1905.

24 SHEETS—SHEET 5.

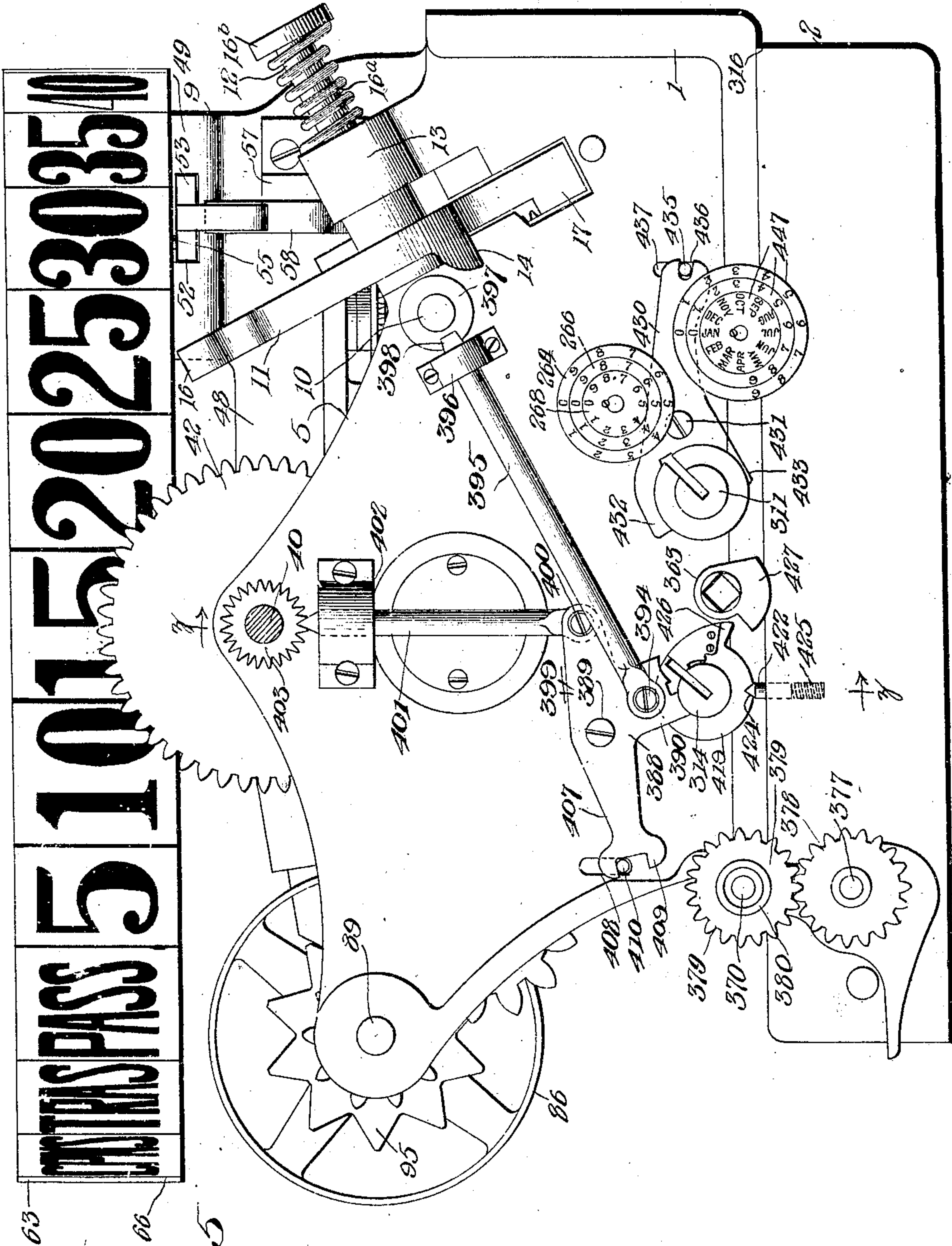


Fig. 5

Witnesses

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Inventors
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PATENTED MAR. 19, 1907.

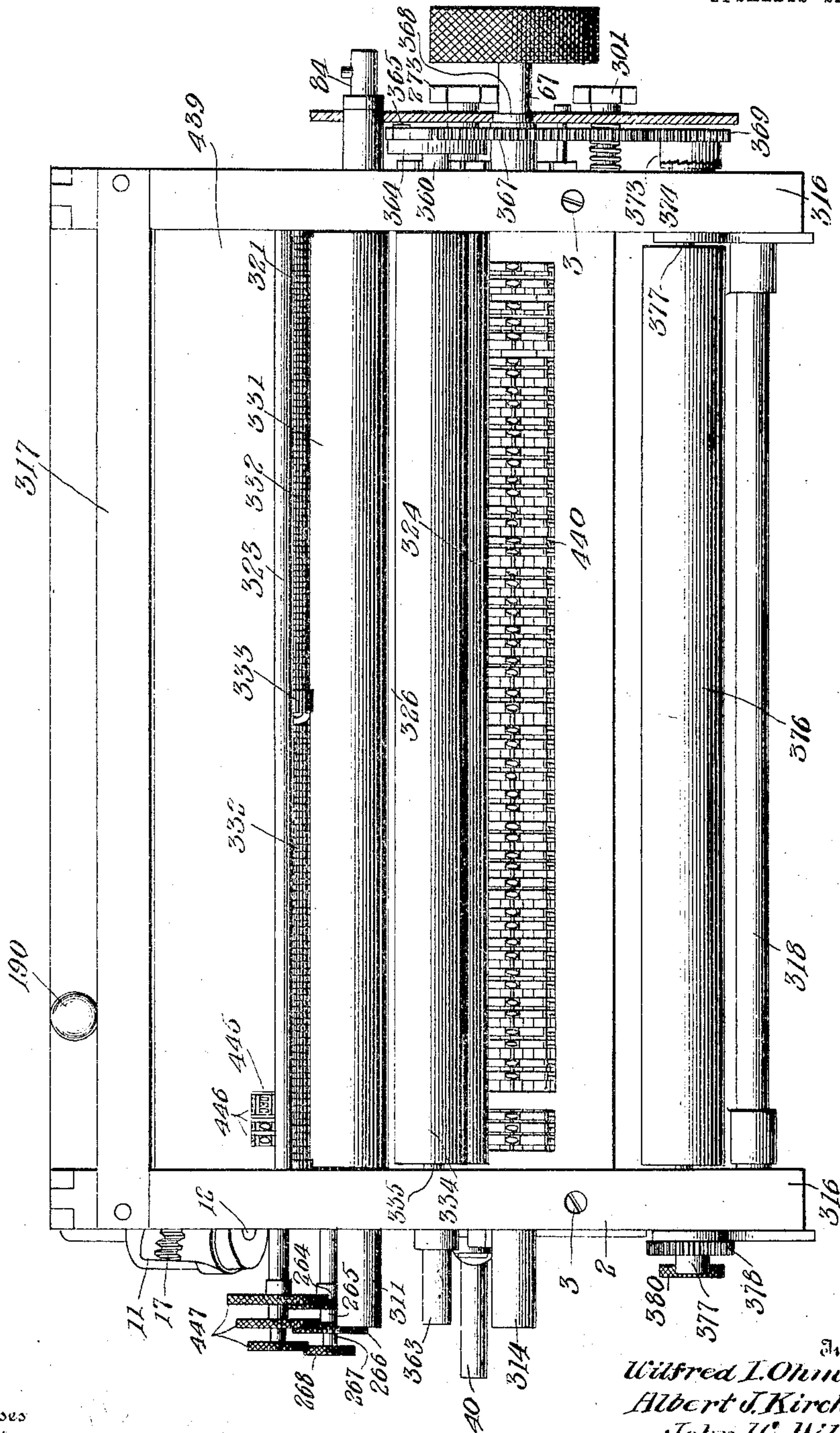
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APPLICATION FILED DEC. 16, 1905.

24 SHEETS—SHEET 6.

Fig. 6.



Witnesses

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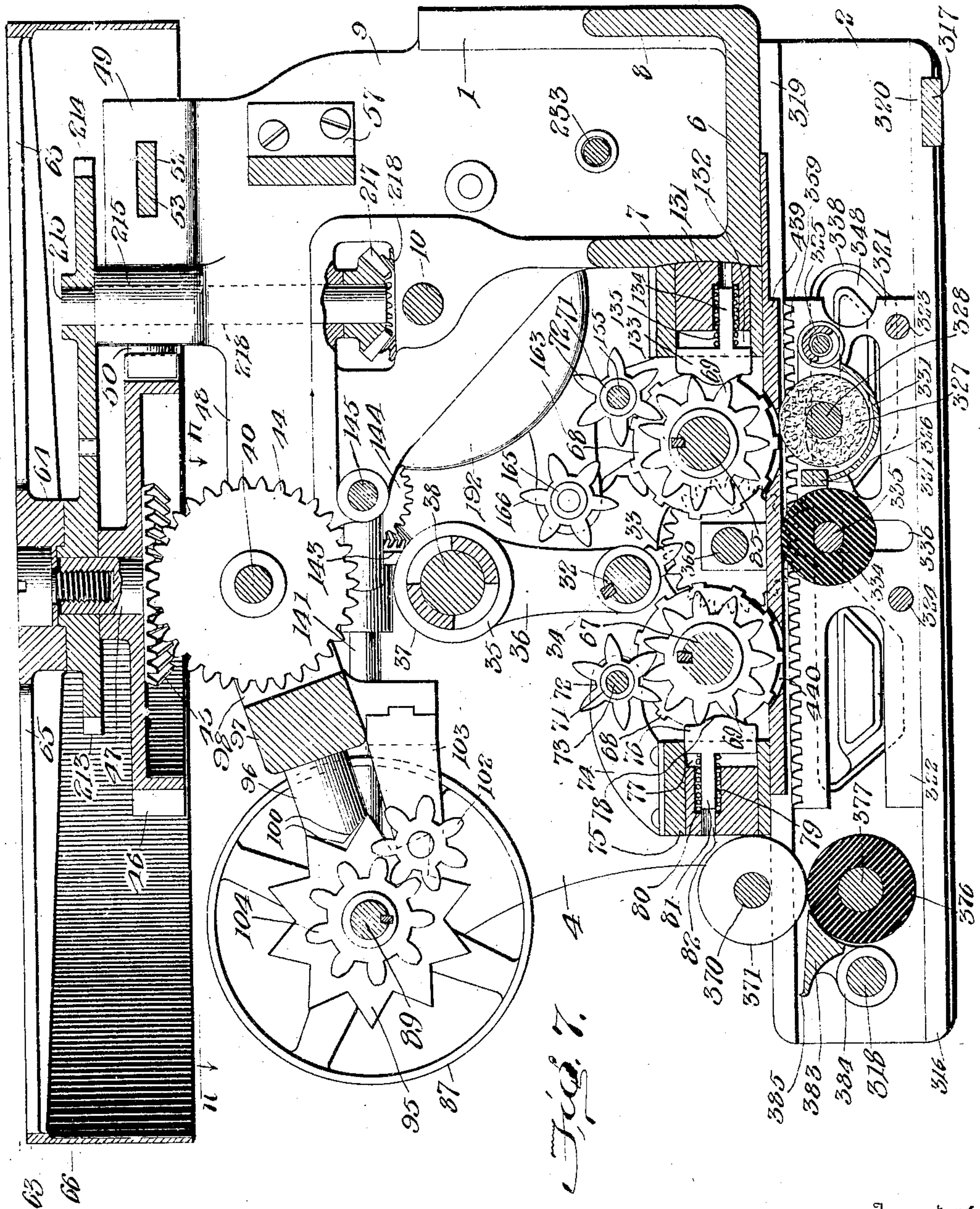
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FARE REGISTER AND RECORDER.

APPLICATION FILED DEC. 16, 1905.

24 SHEETS—SHEET 7.



Witnesses

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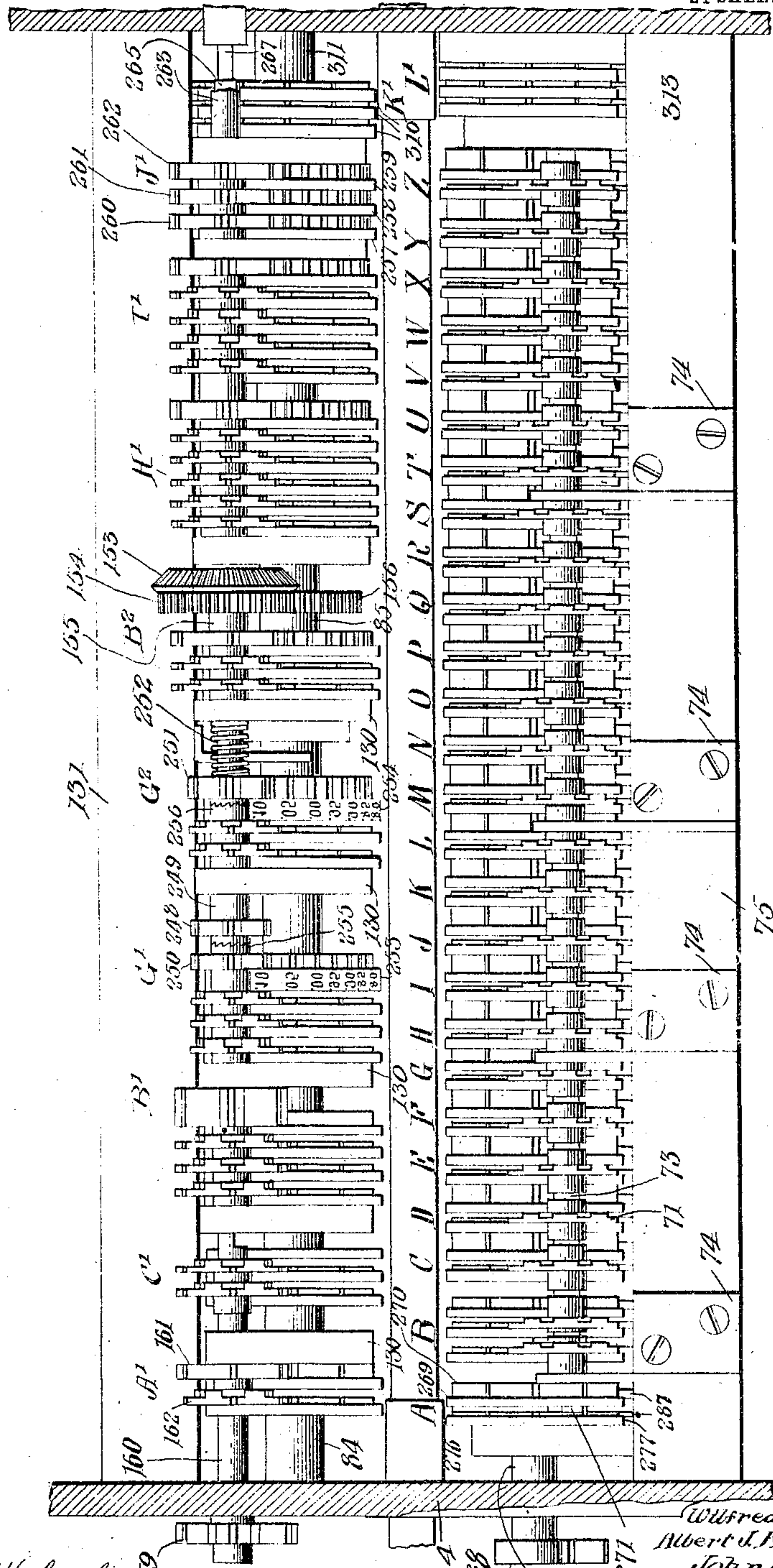
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APPLICATION FILED DEC. 16, 1905.

24 SHEETS—SHEET 8.



Witnesses

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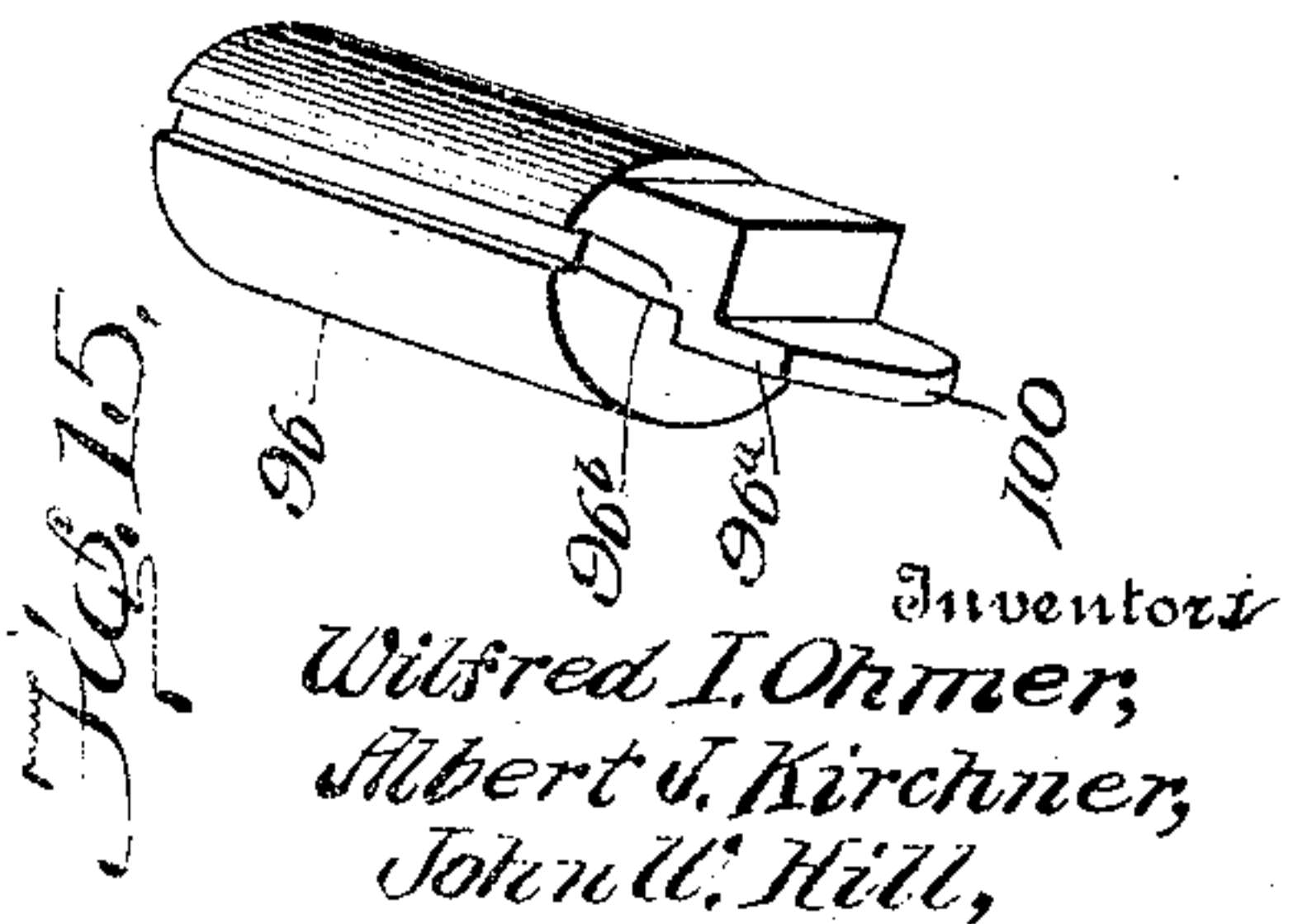
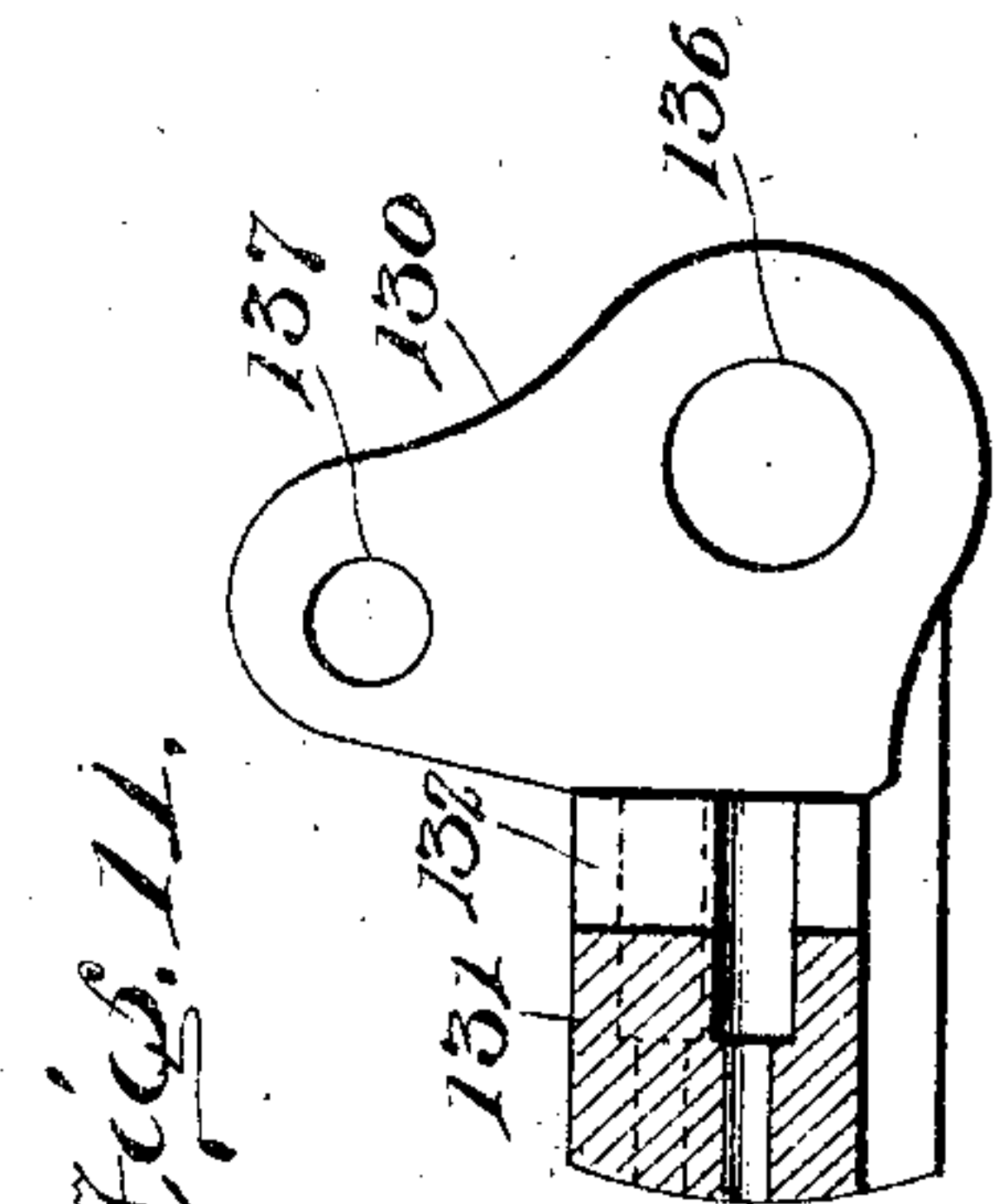
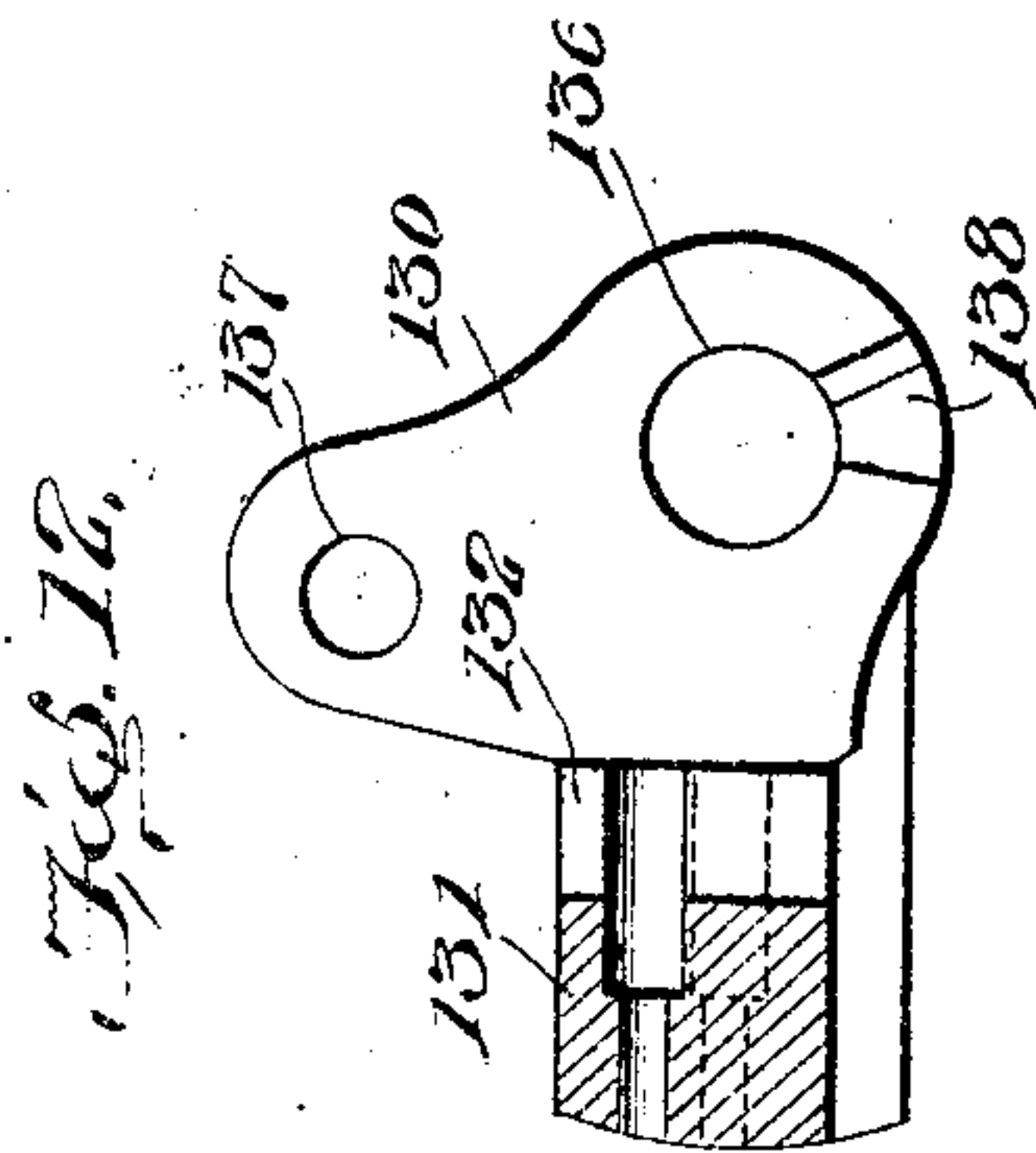
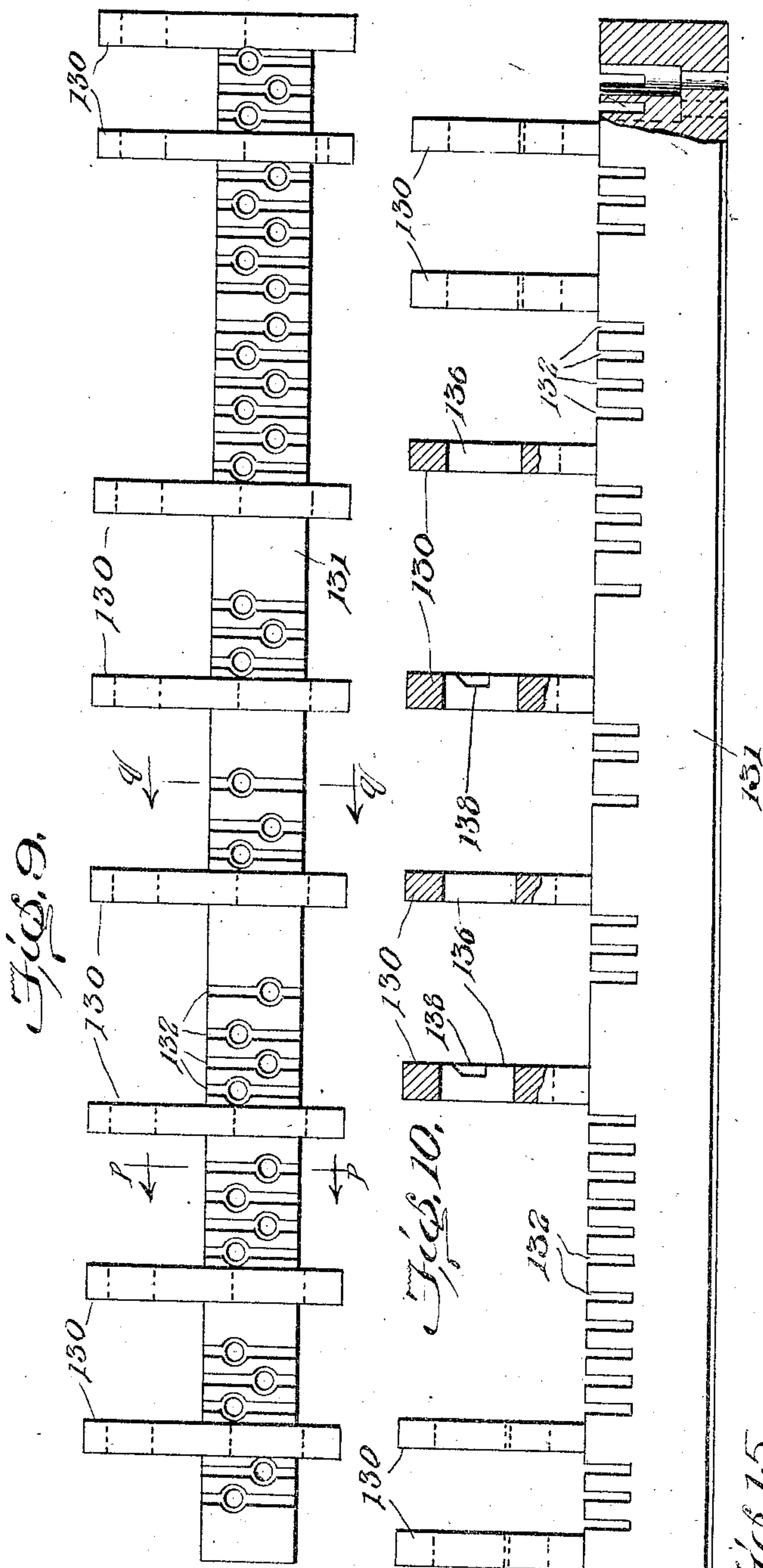
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APPLICATION FILED DEC. 16, 1905.

24 SHEETS—SHEET 9.



Witnesses

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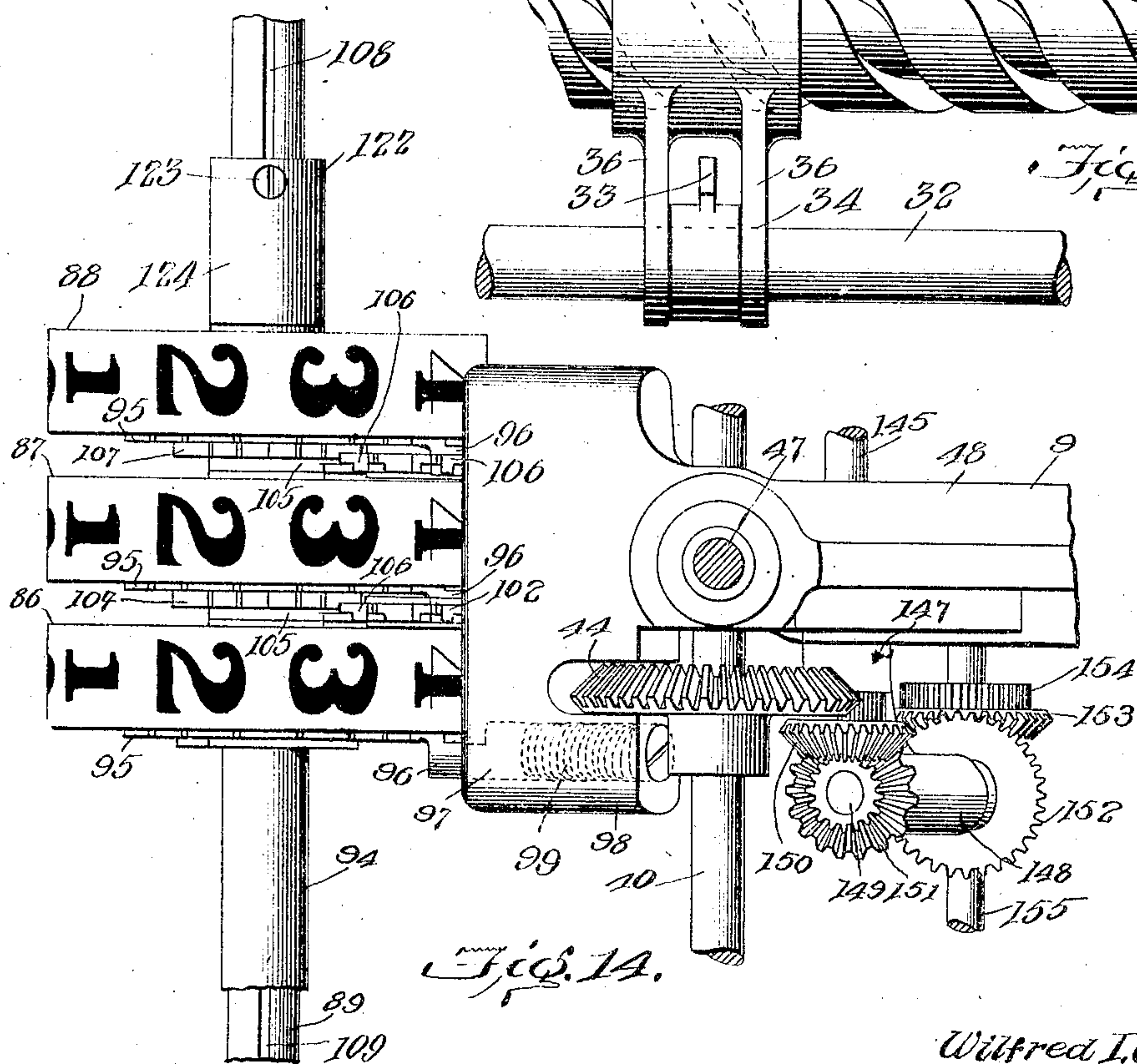
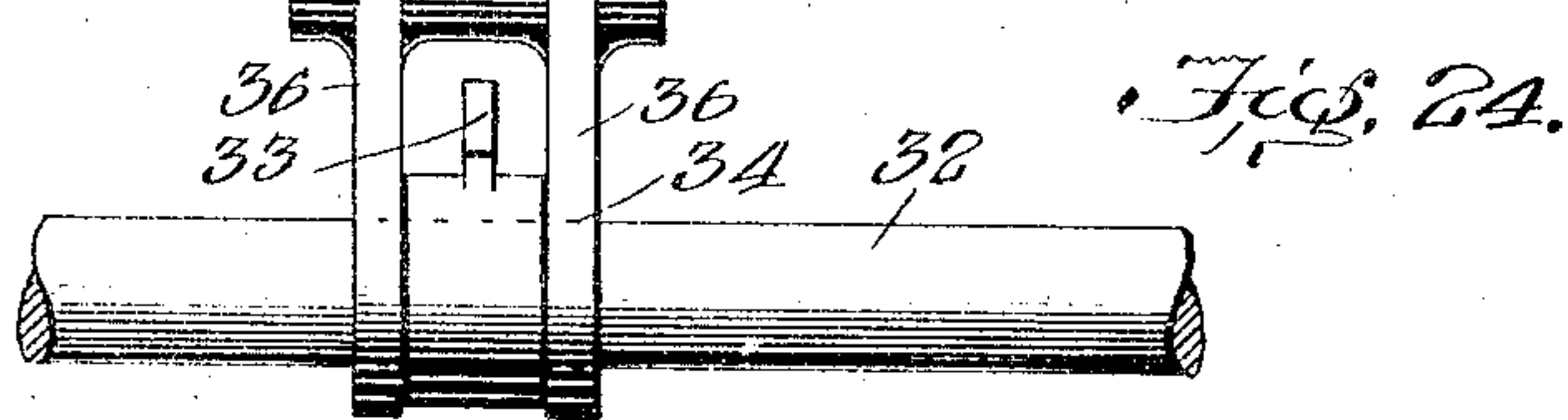
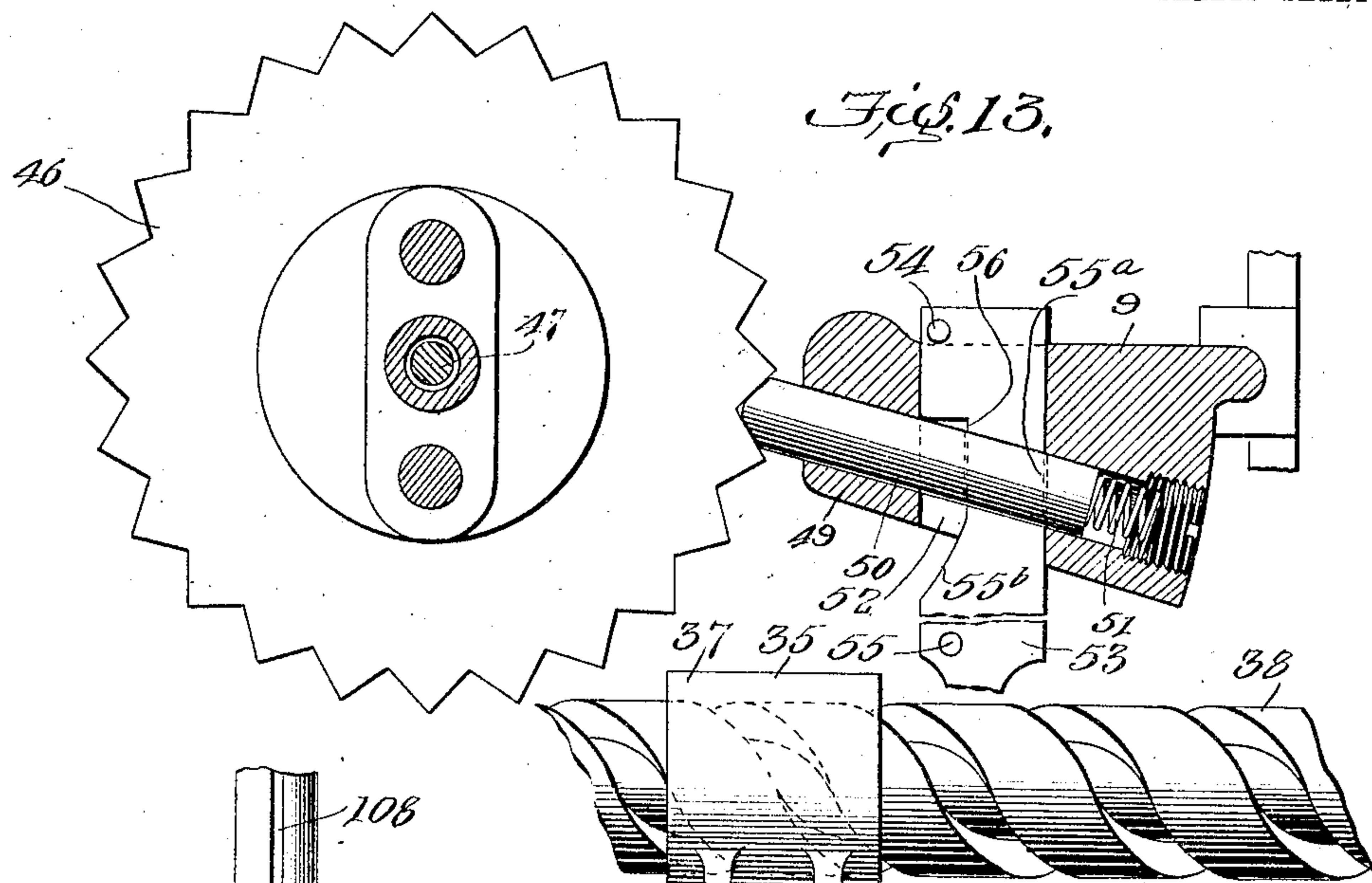
PATENTED MAR. 19, 1907.

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FARE REGISTER AND RECORDER.

APPLICATION FILED DEC. 16, 1905.

24 SHEETS—SHEET 10.



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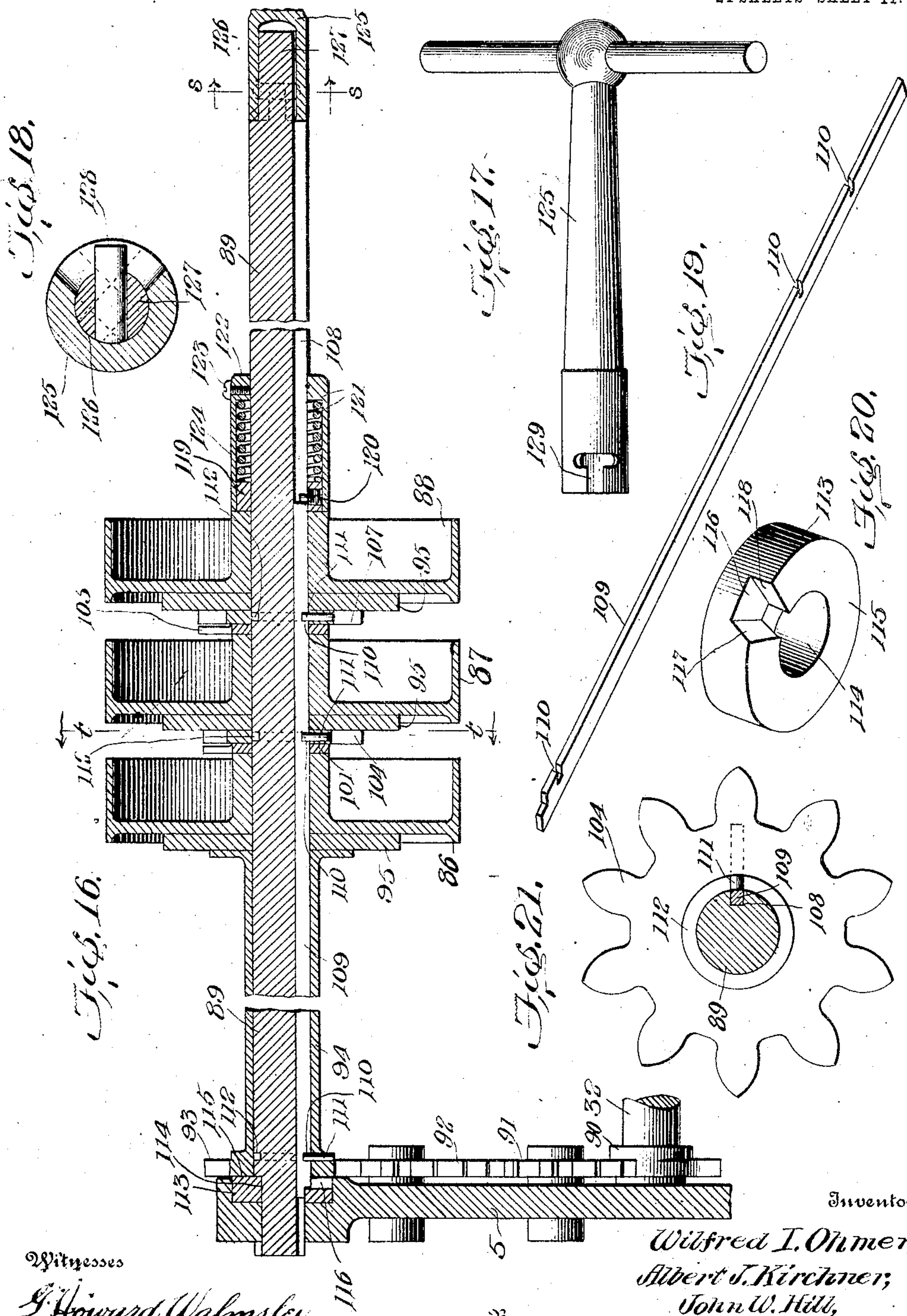
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APPLICATION FILED DEC. 16, 1905.

24 SHEETS—SHEET 11.



Witnesses

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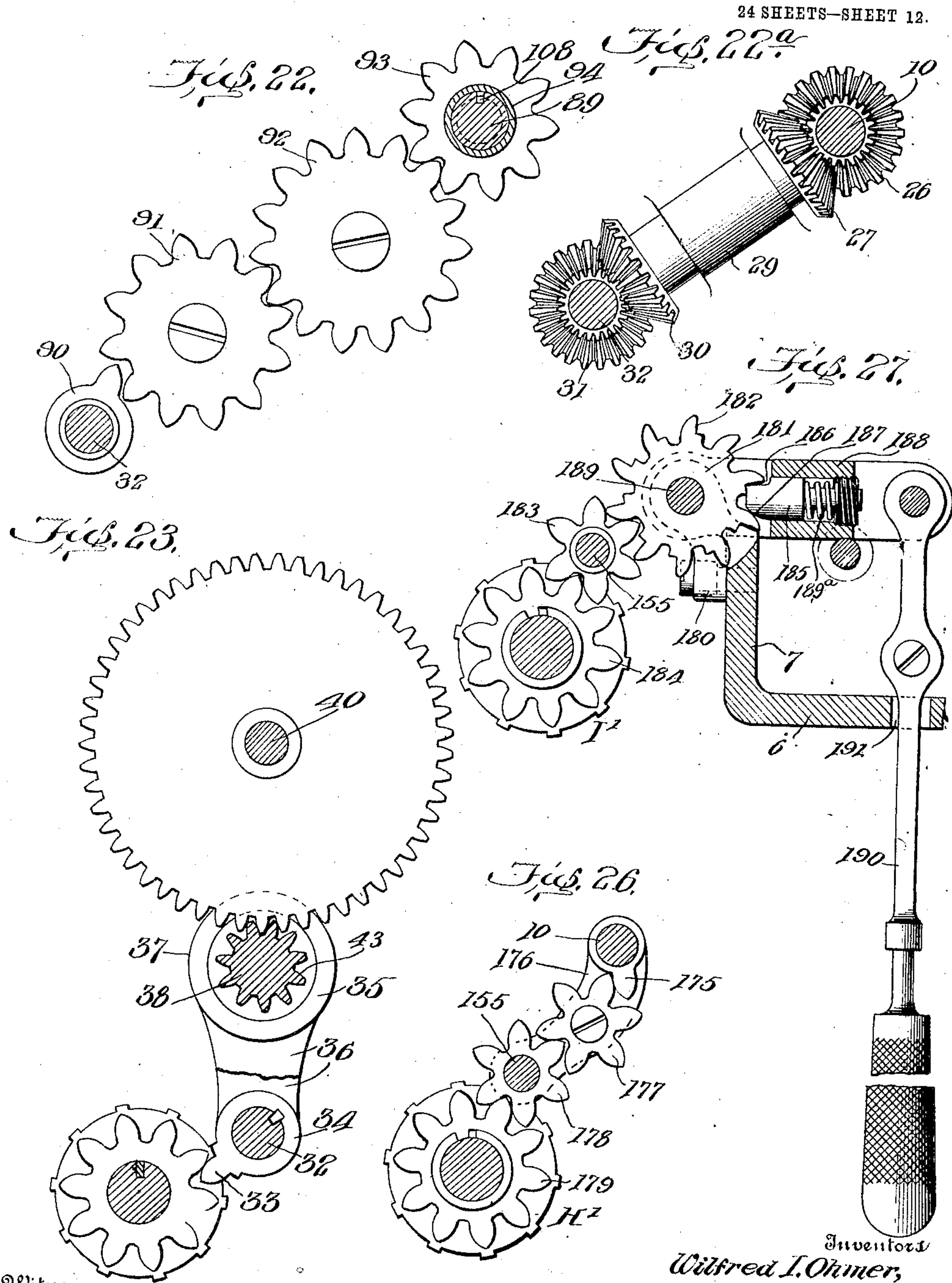
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FARE REGISTER AND RECORDER.

APPLICATION FILED DEC. 16, 1905.

24 SHEETS—SHEET 12.



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24 SHEETS—SHEET 13.

Fig. 25.

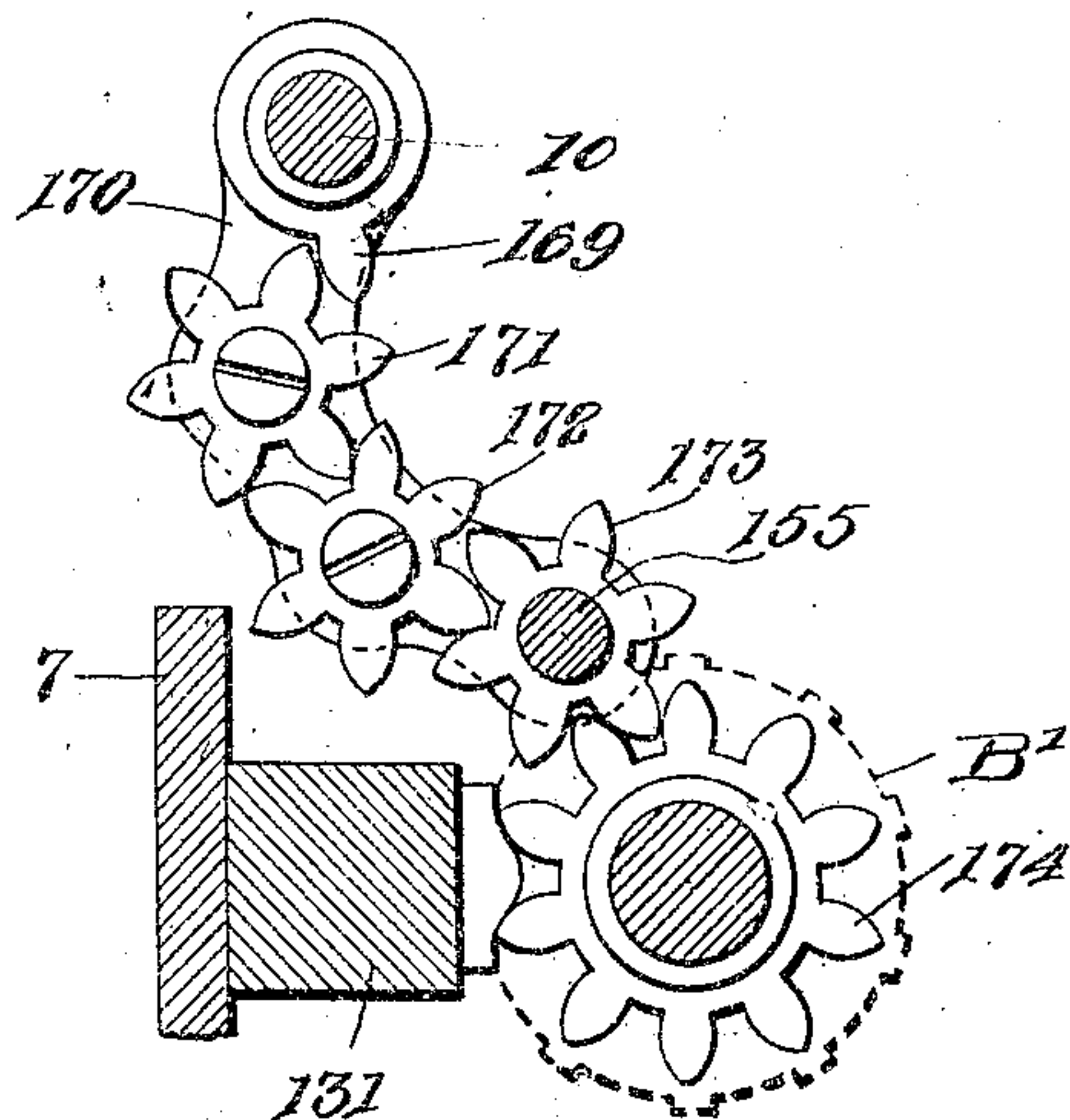


Fig. 46.

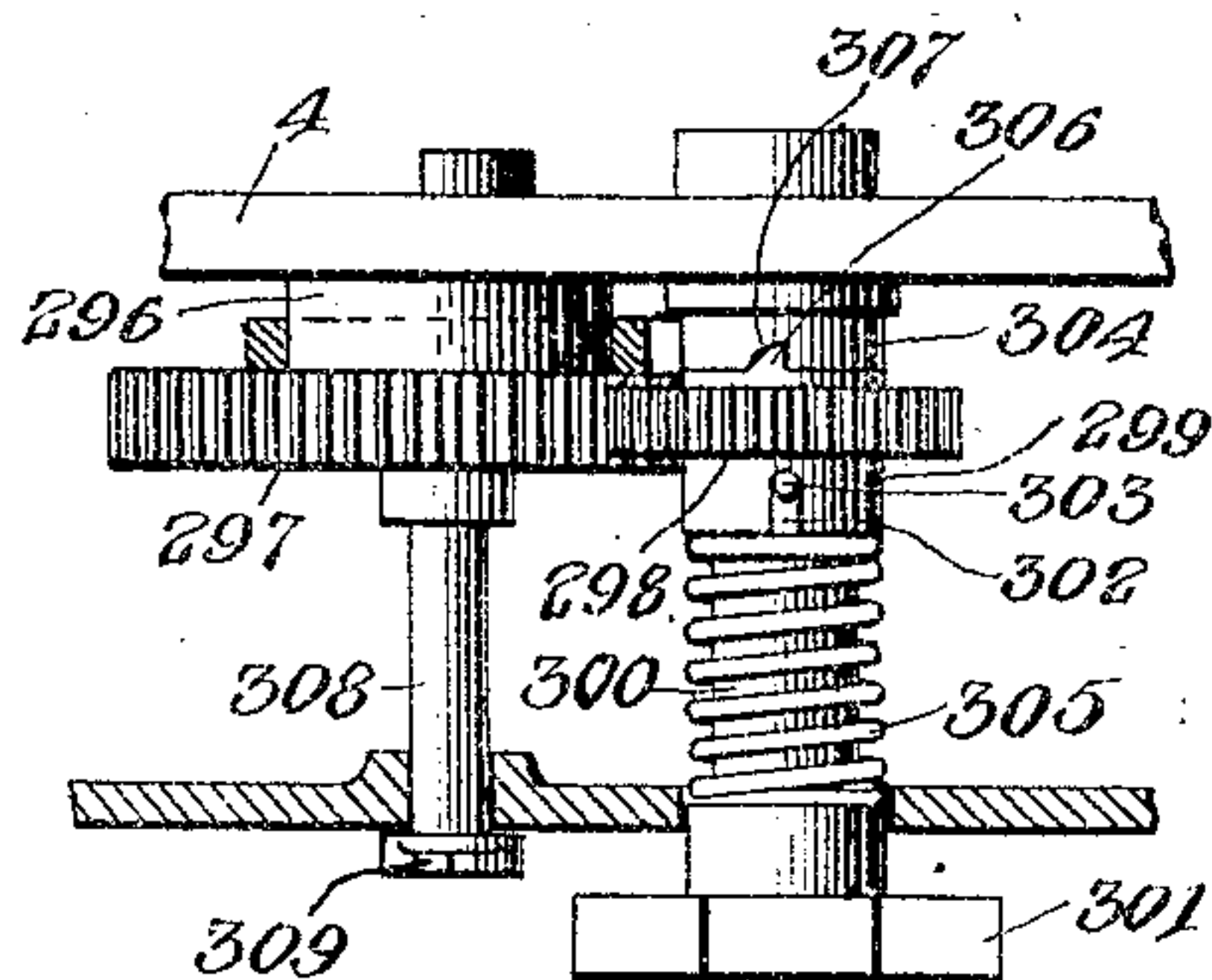
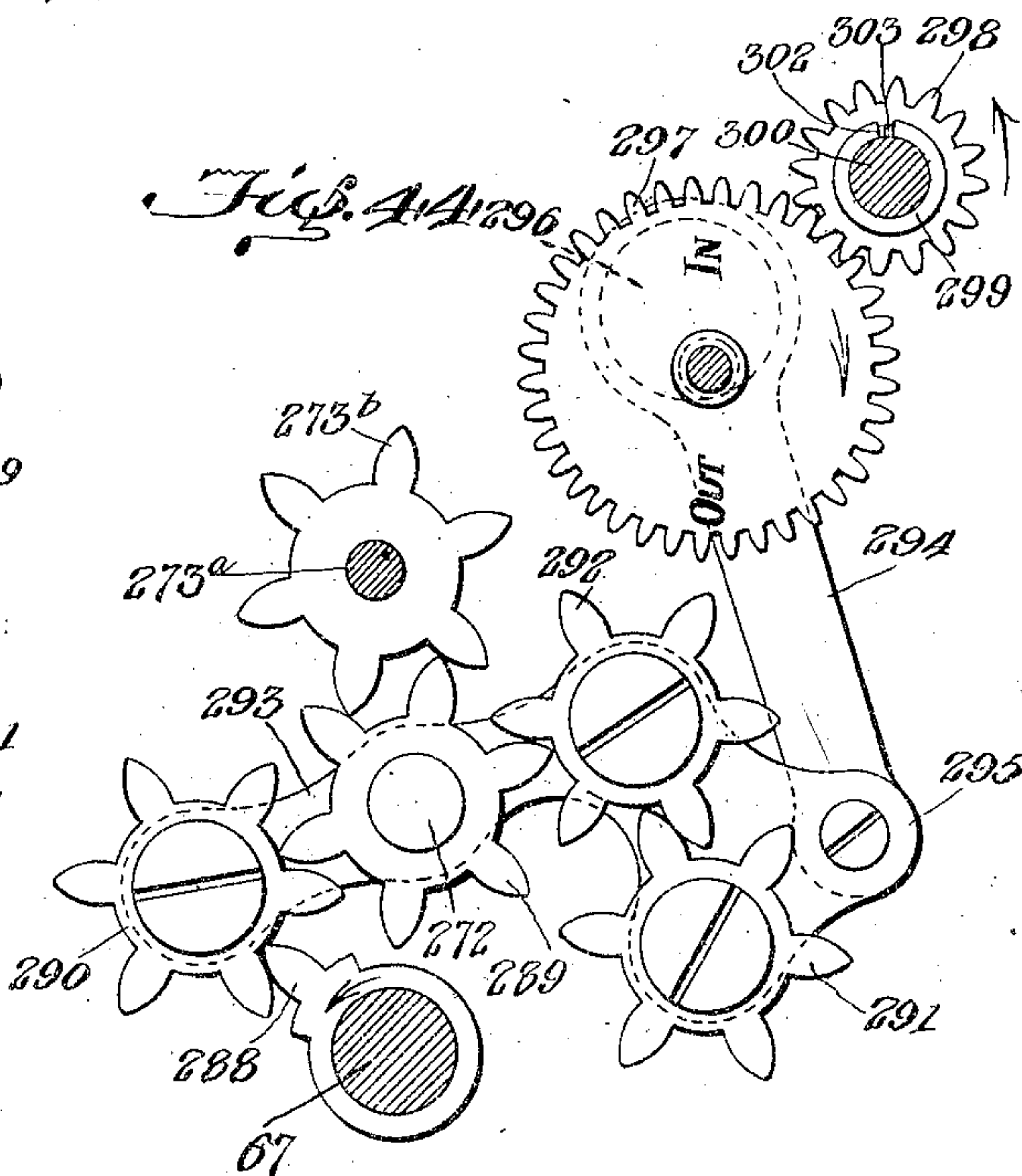


Fig. 44.



Witnesses

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W. I. OHMER, A. J. KIRCHNER & J. W. HILL.

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24 SHEETS—SHEET 14.

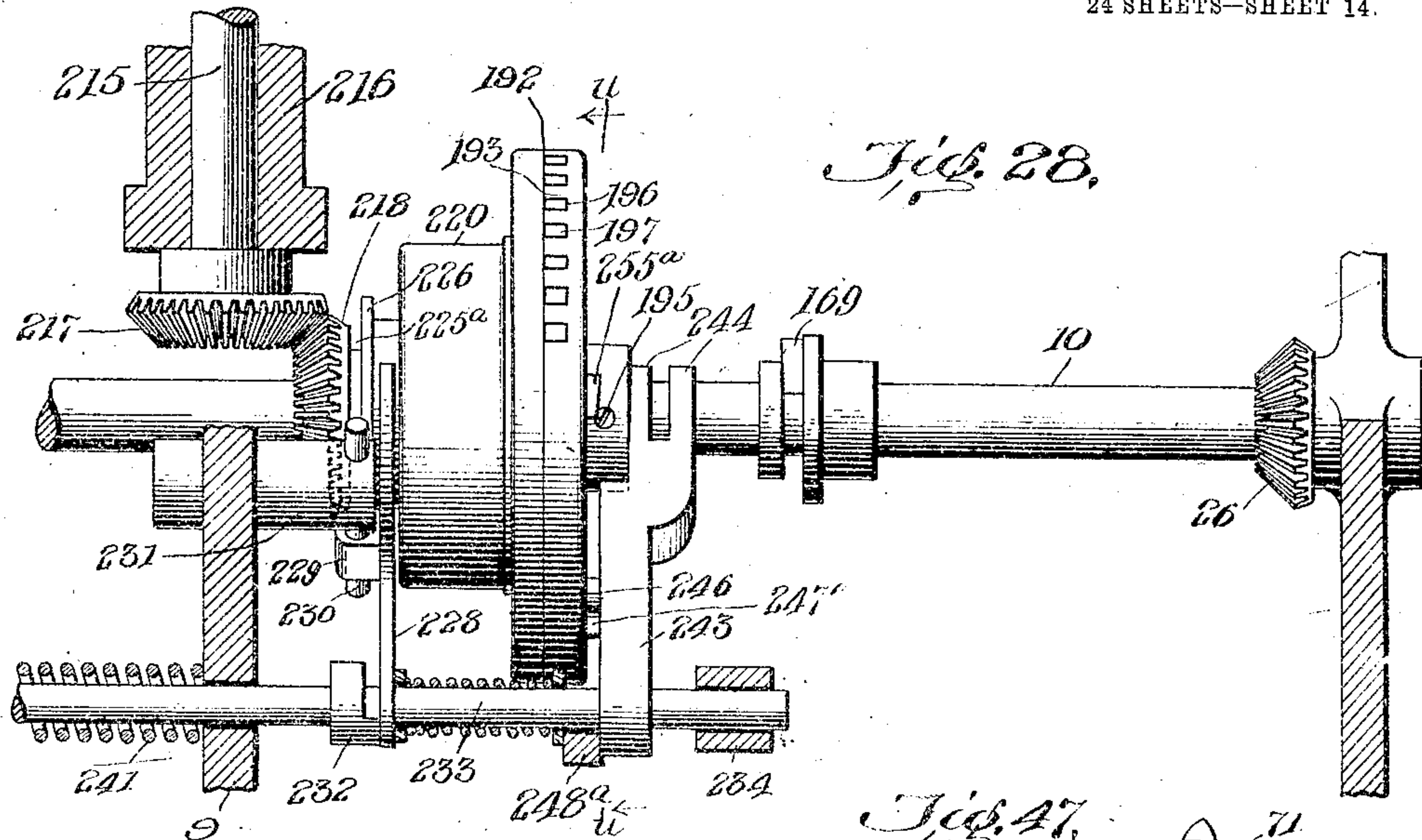


Fig. 28.

Fig. 29.

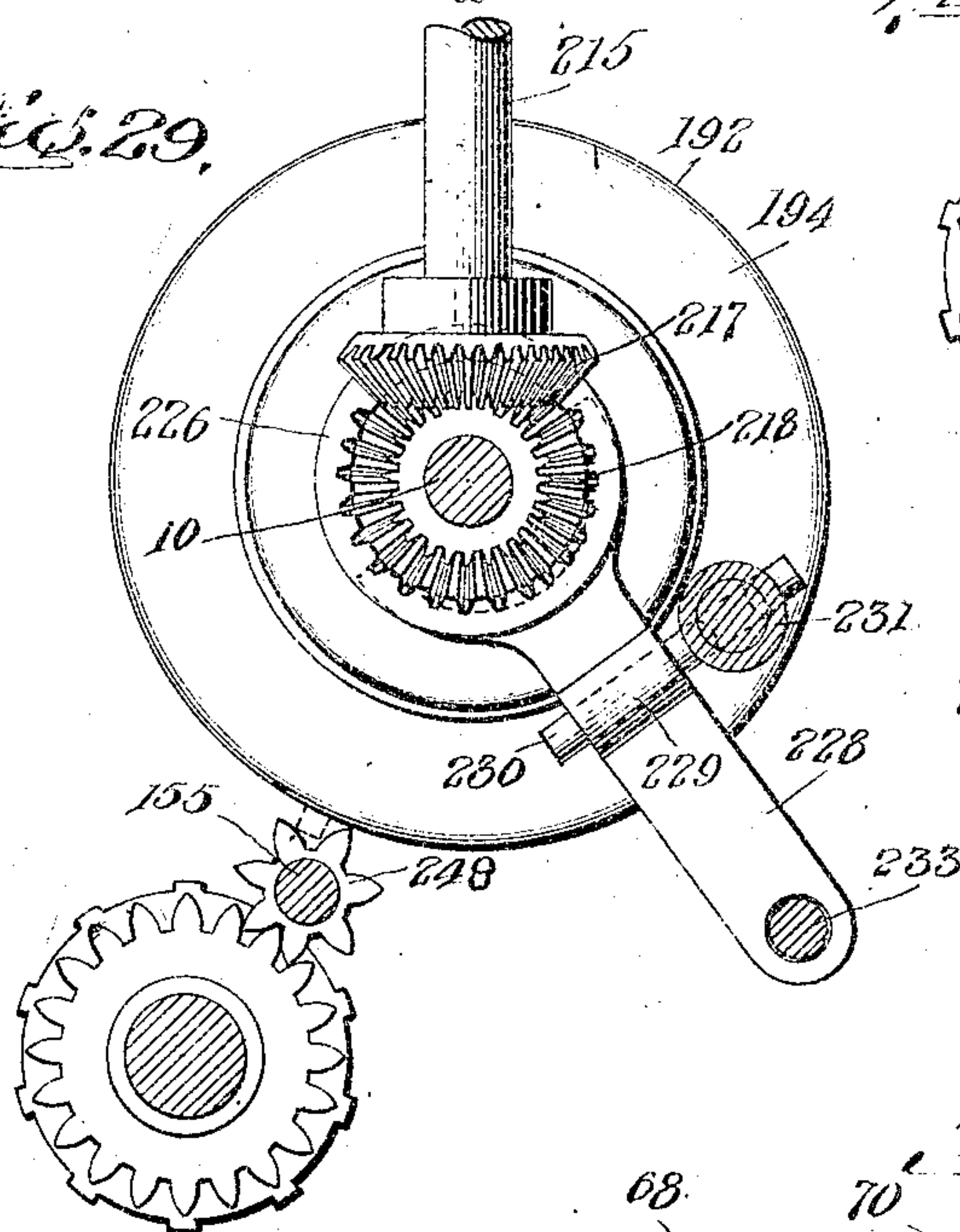


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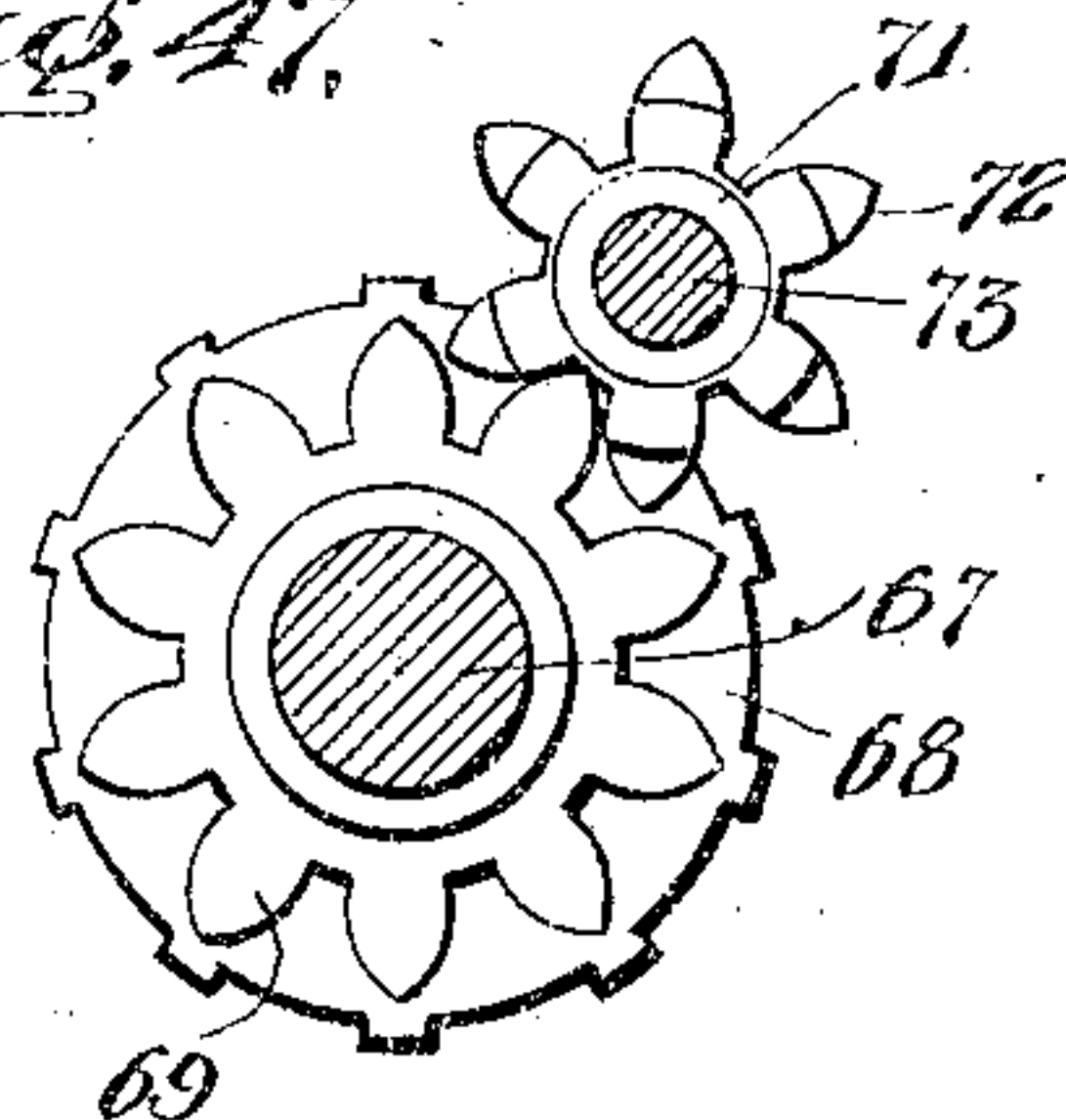


Fig. 48.

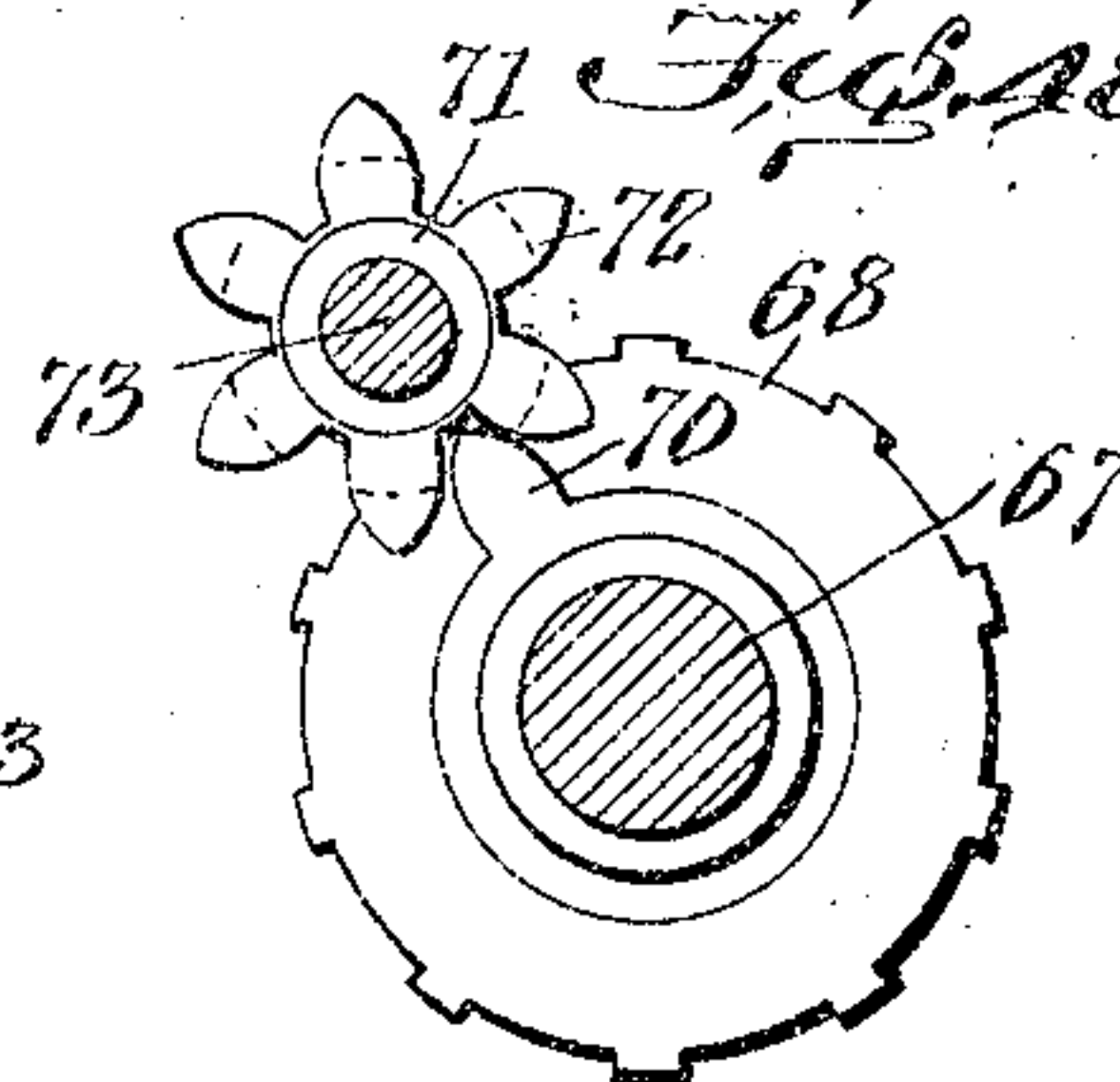
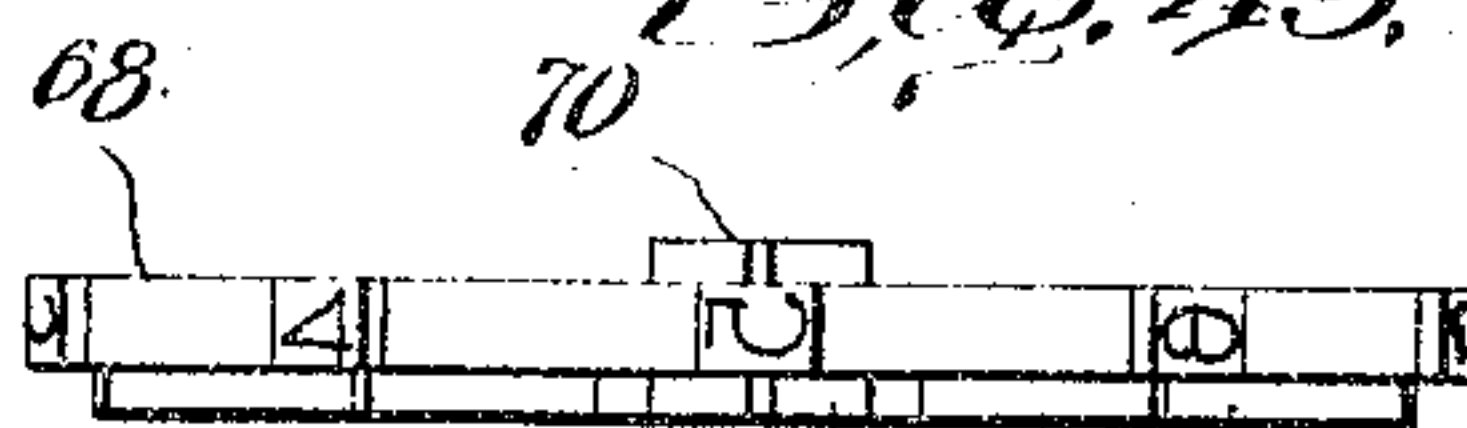


Fig. 49.



Witnesses

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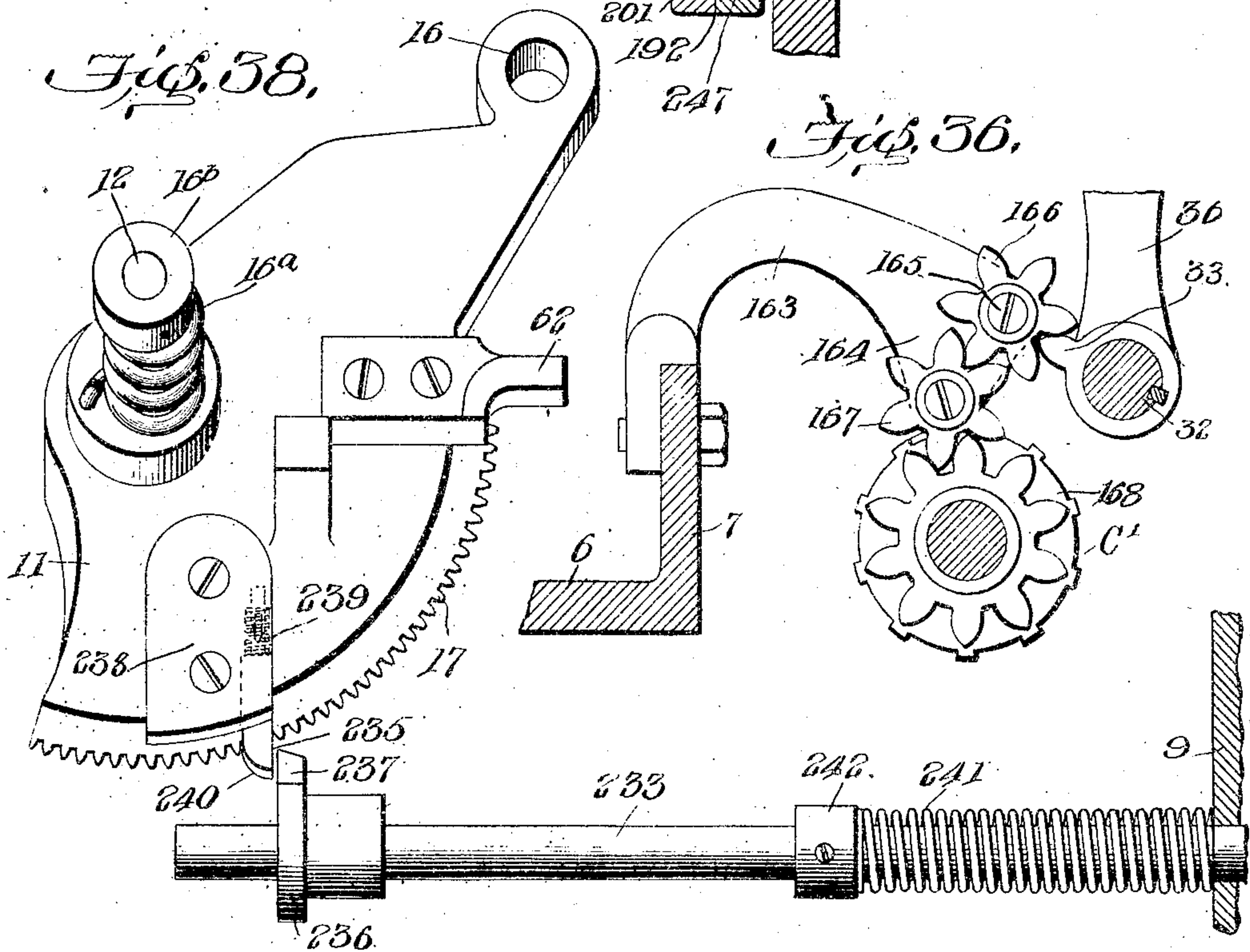
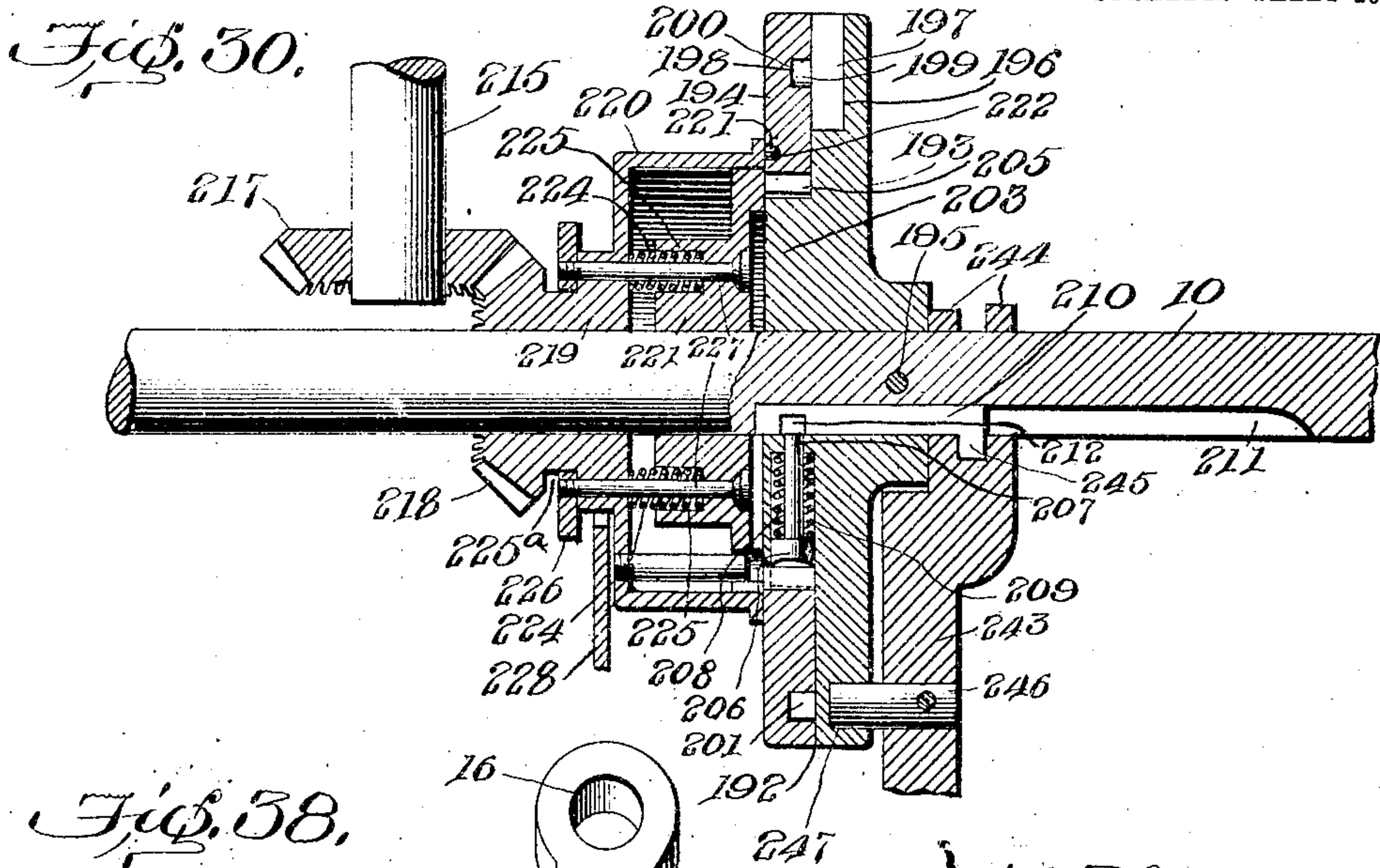
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FARE REGISTER AND RECORDER.

APPLICATION FILED DEC. 16, 1905.

24 SHEETS—SHEET 15.



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W. I. OHMER, A. J. KIRCHNER & J. W. HILL.
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24 SHEETS—SHEET 16.

Fig. 31.

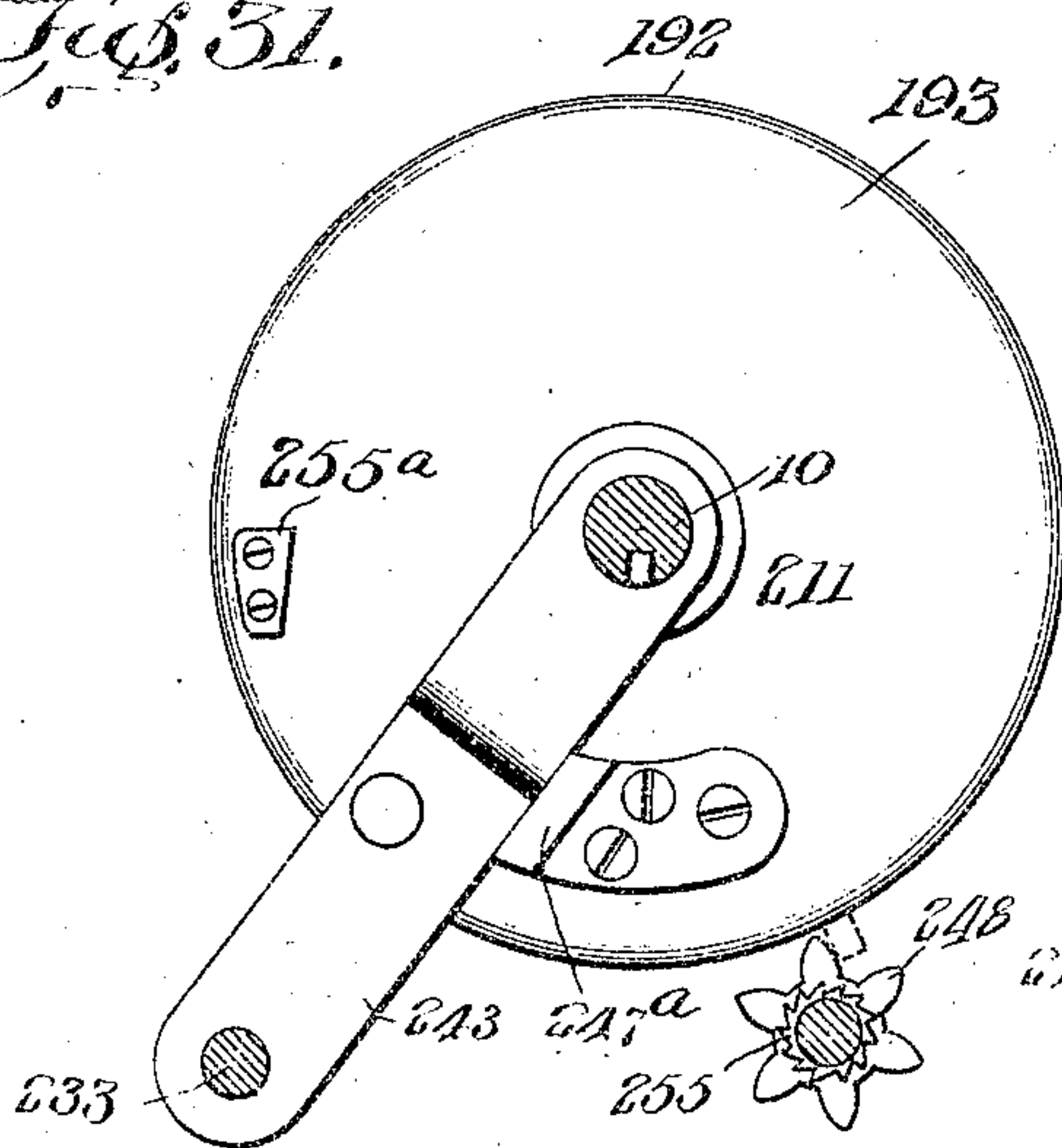


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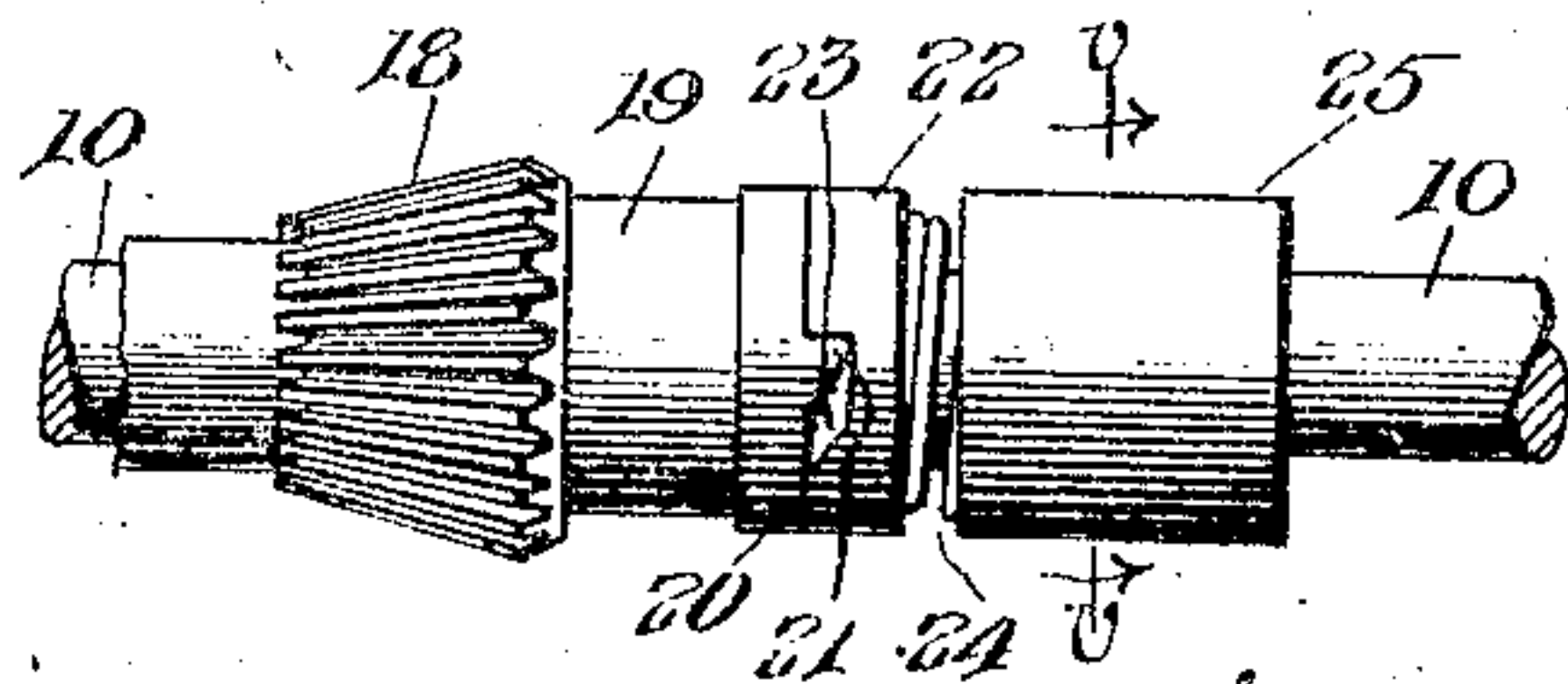


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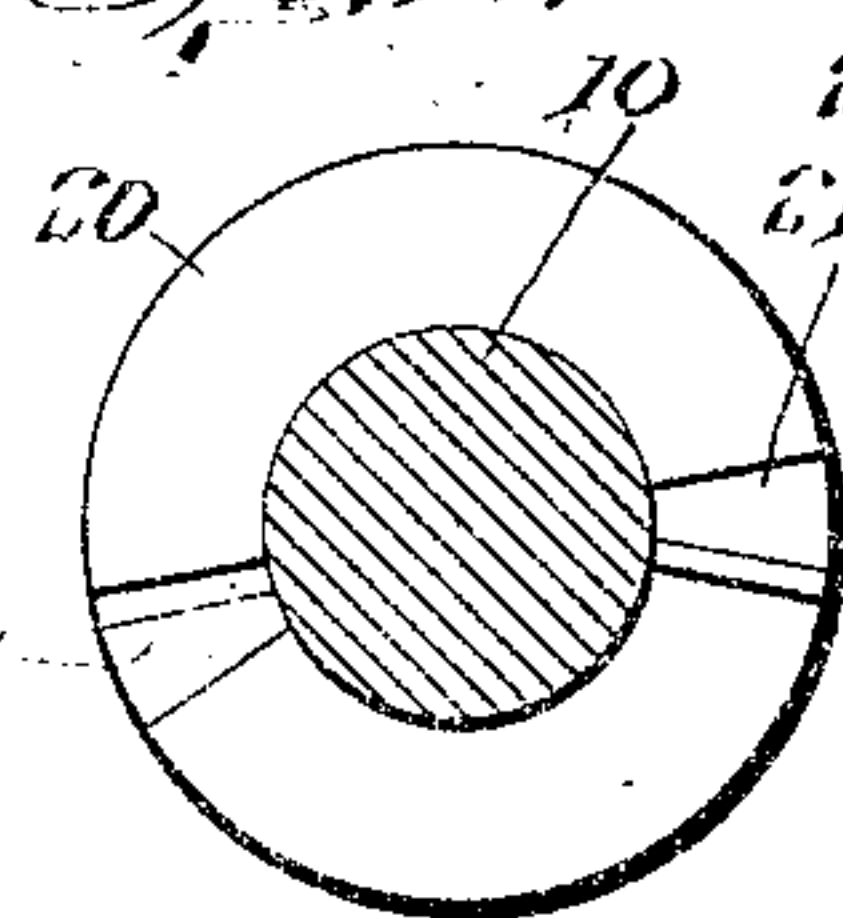


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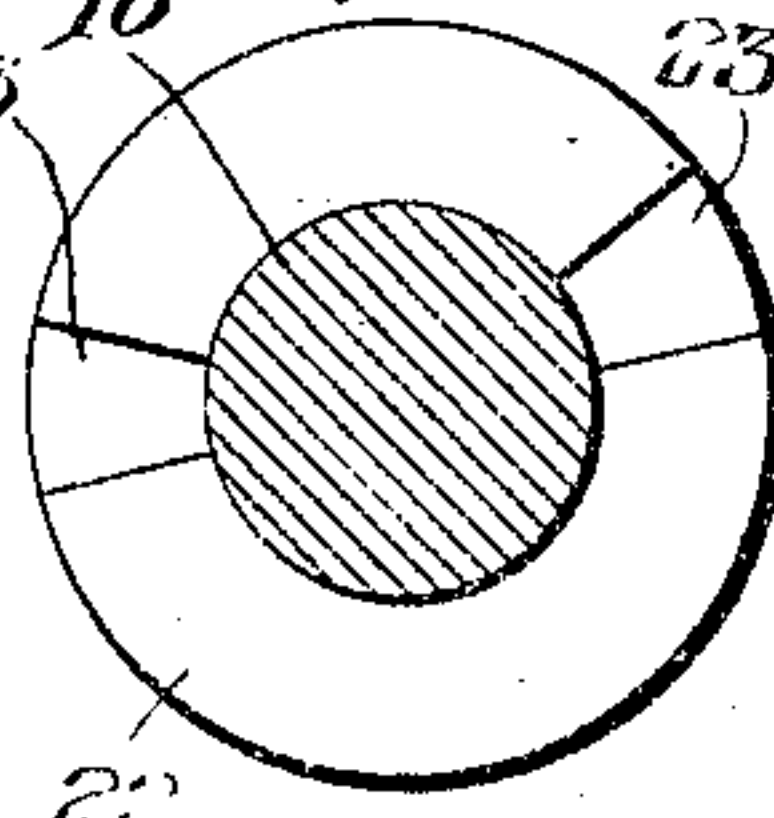


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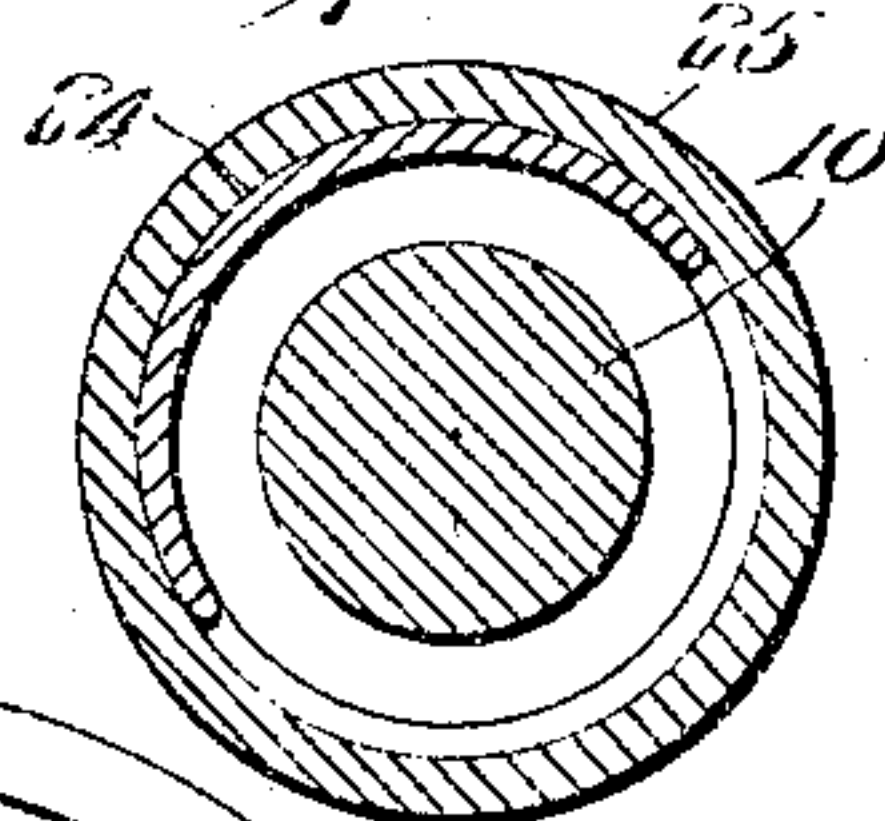


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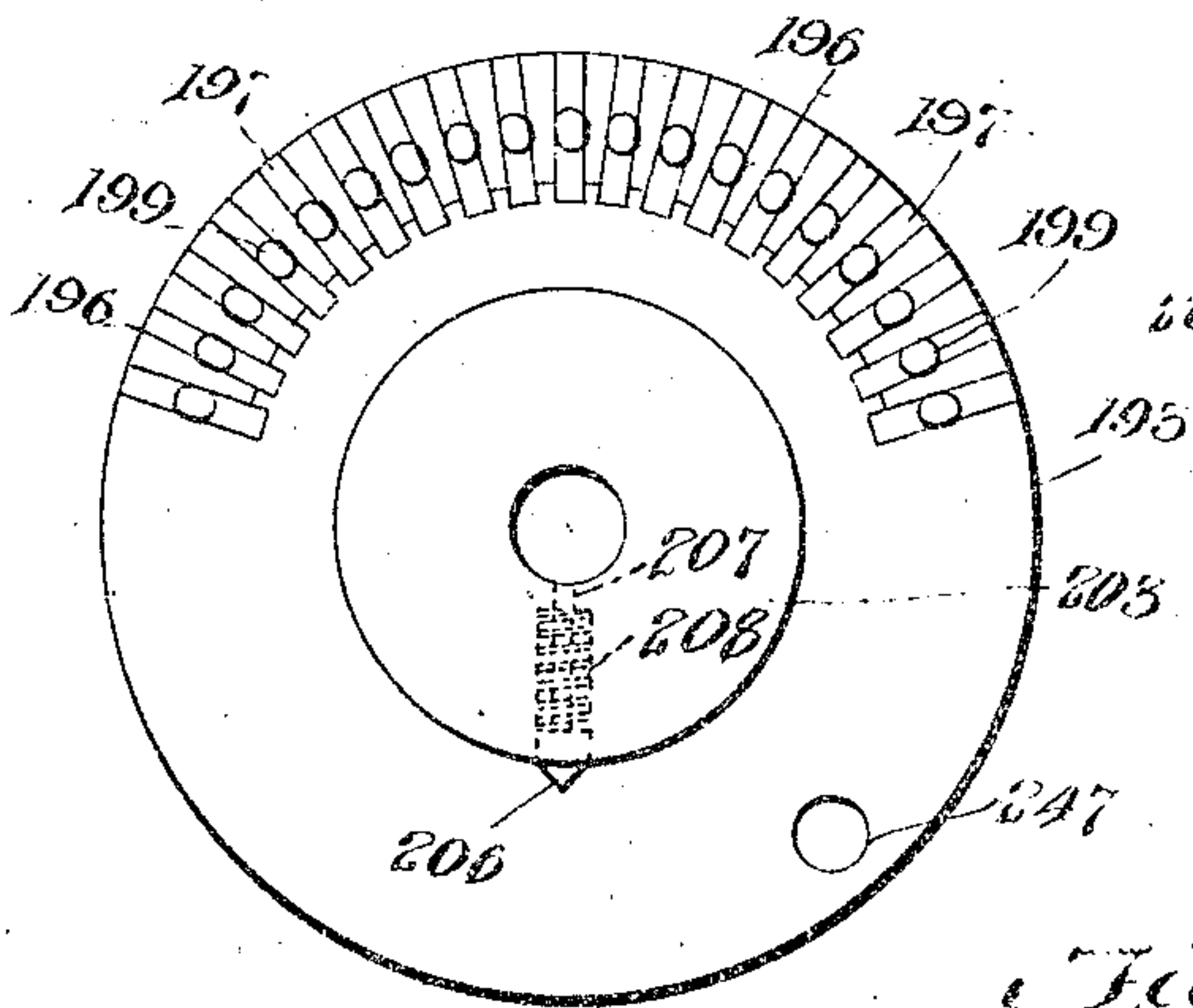


Fig. 33.

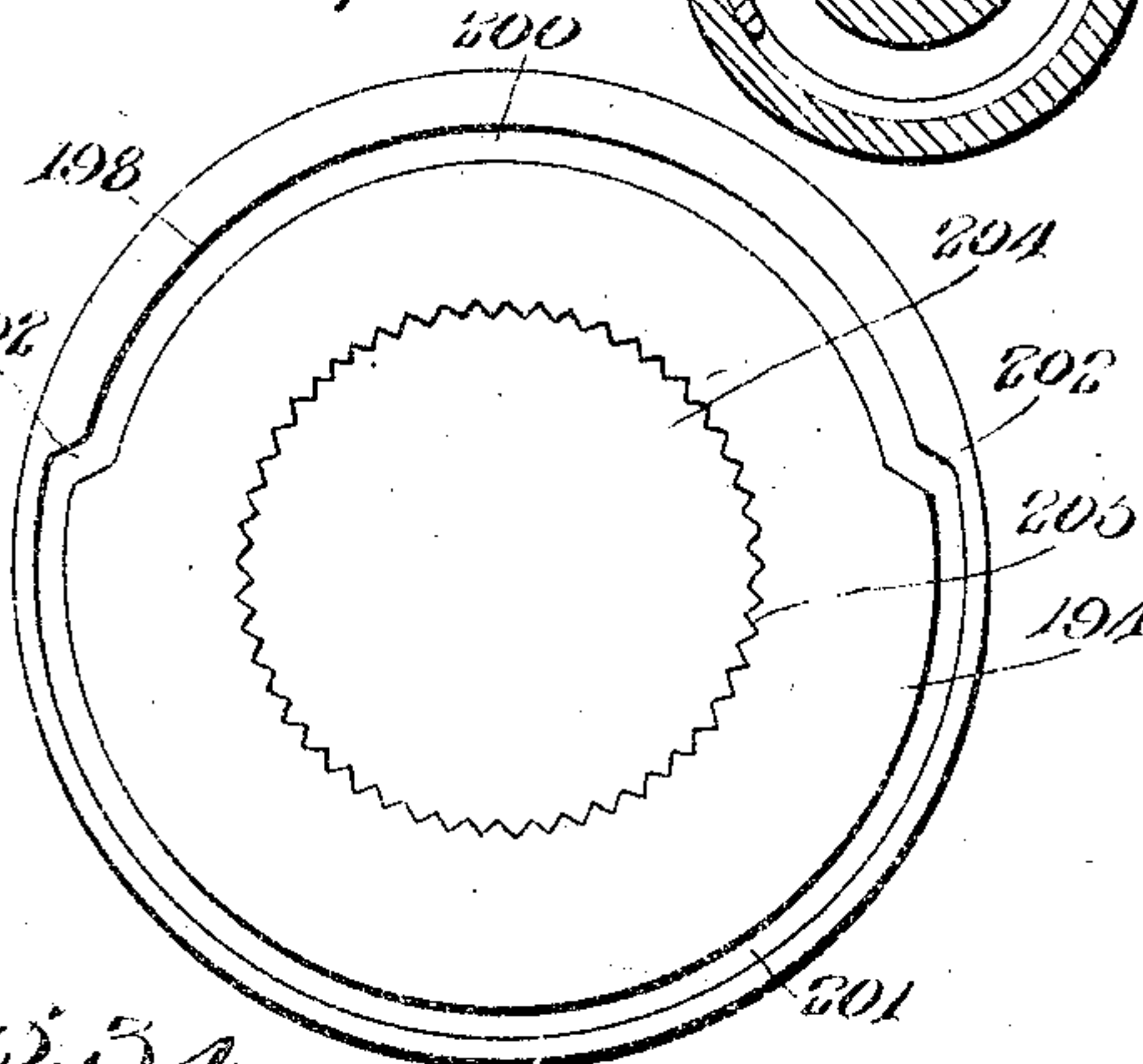
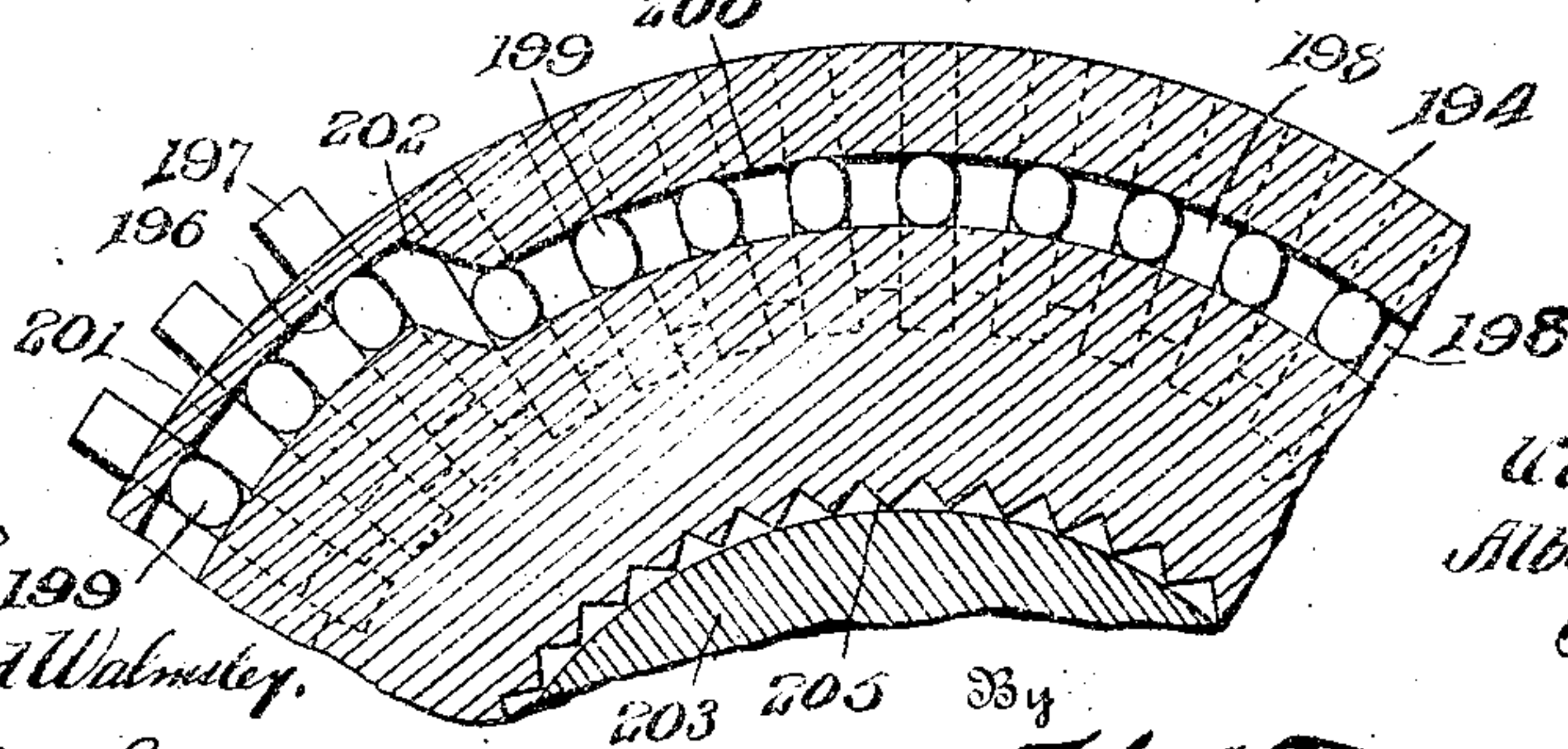


Fig. 34.



Witnesses

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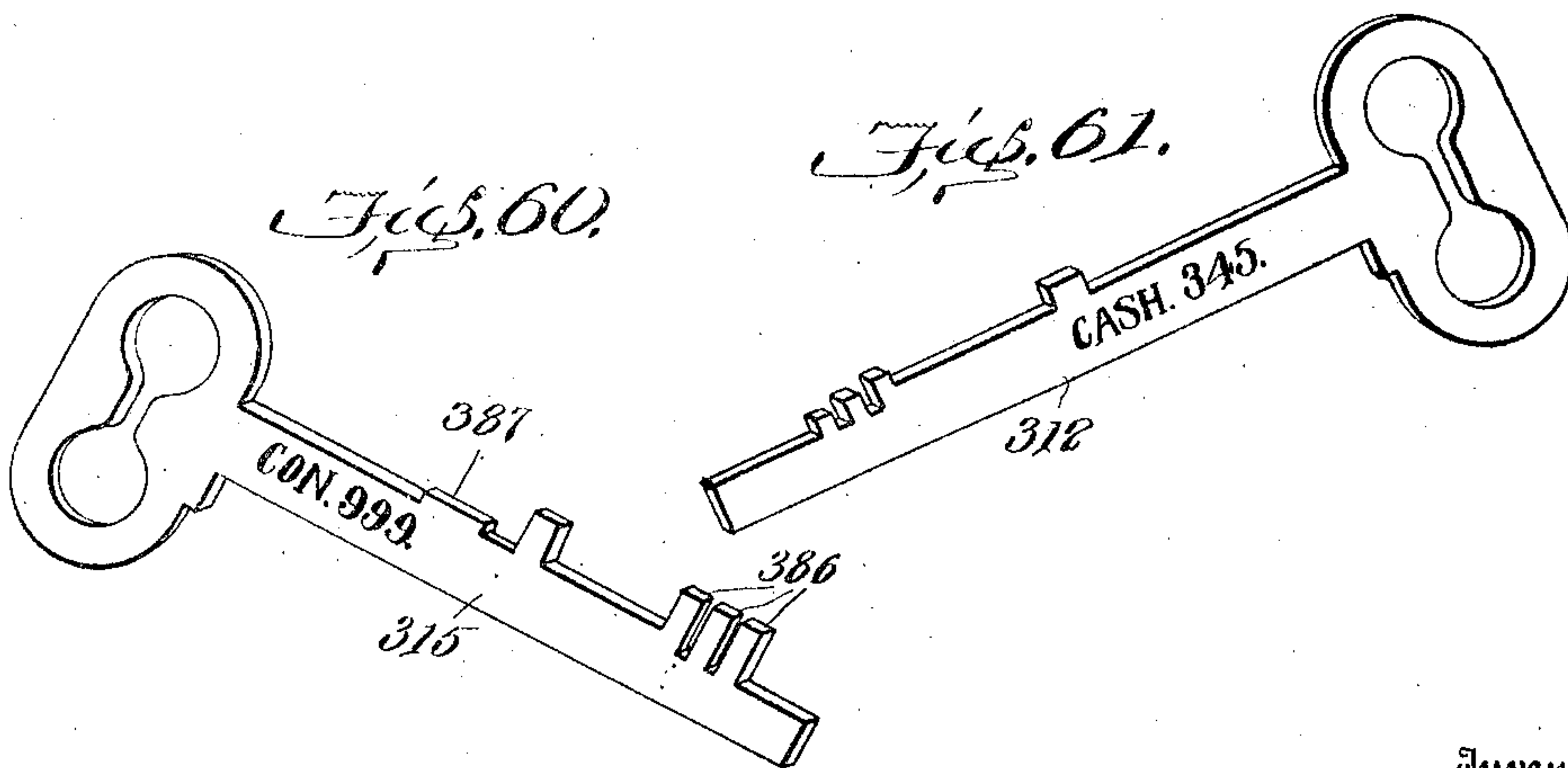
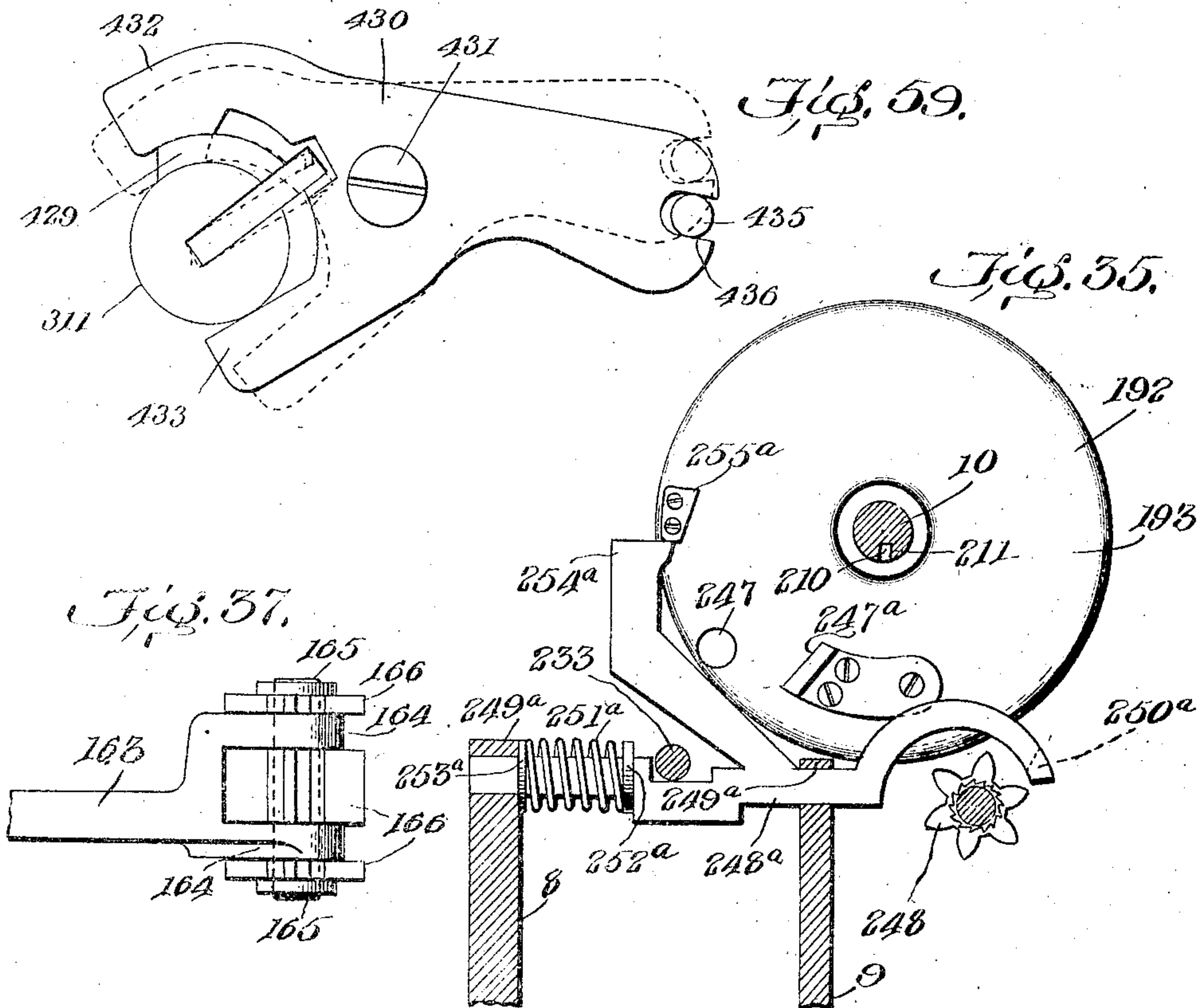
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FARE REGISTER AND RECORDER.

APPLICATION FILED DEC. 16, 1905.

24 SHEETS—SHEET 17.



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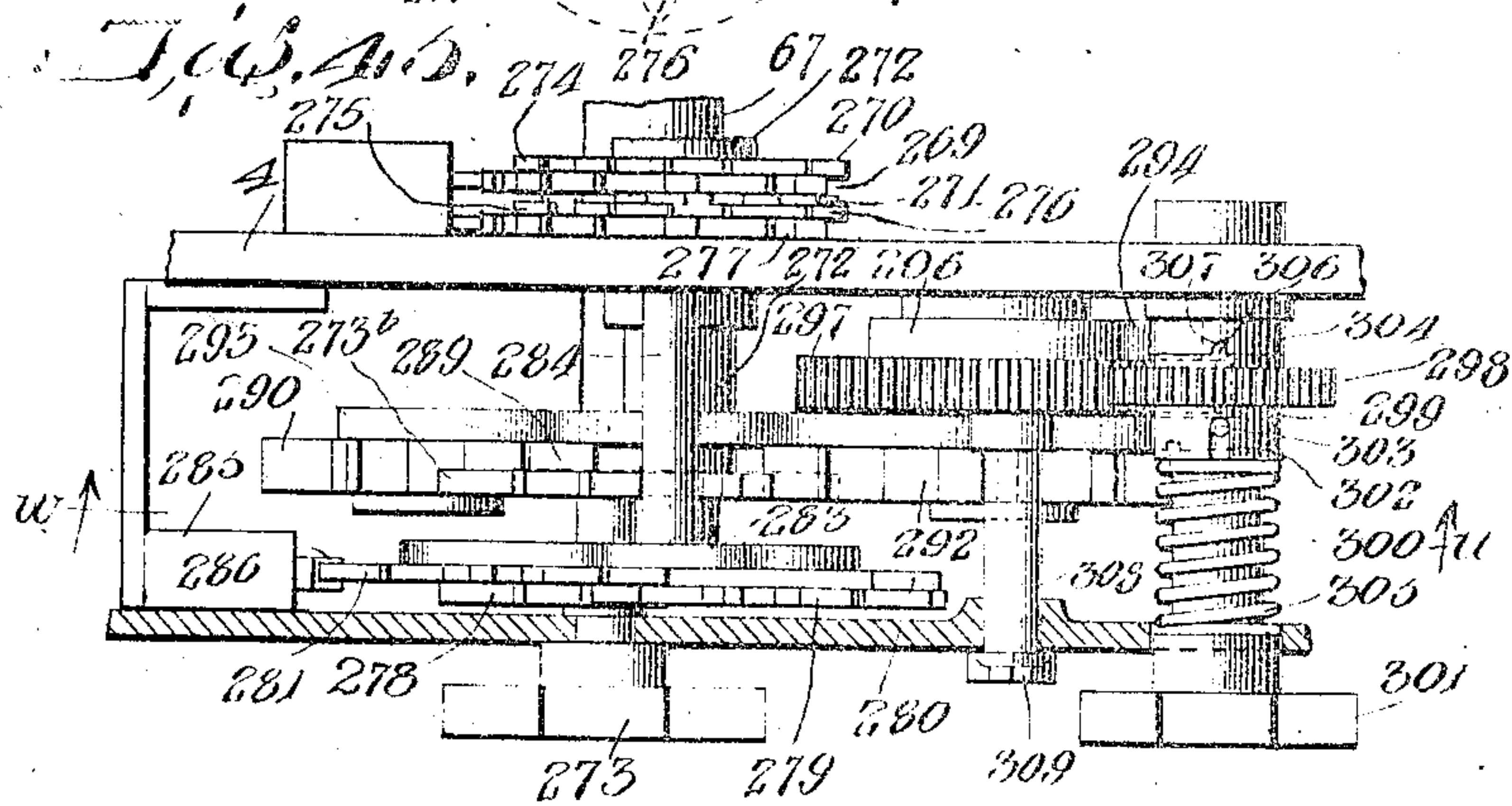
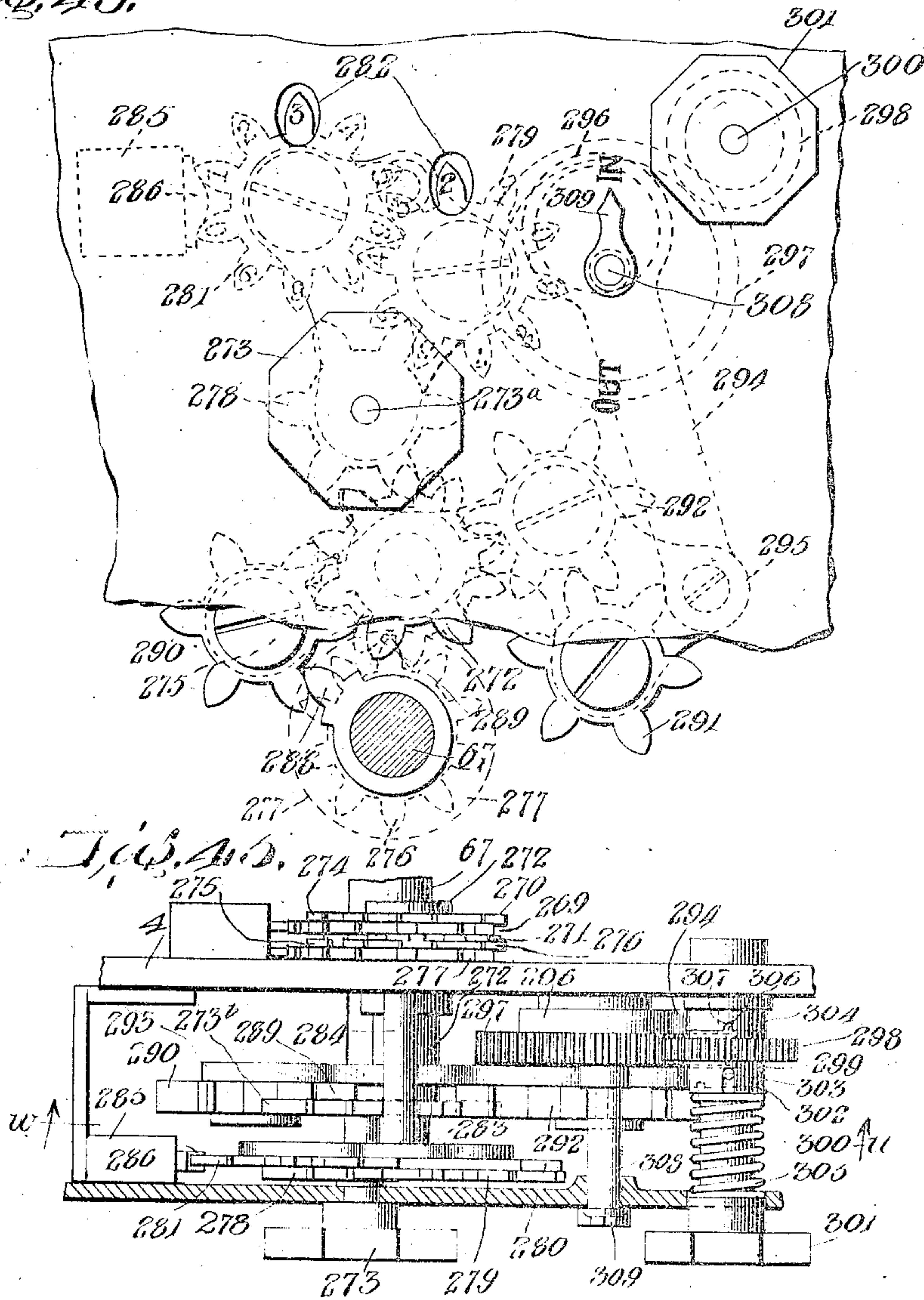
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FARE REGISTER AND RECORDER.

APPLICATION FILED DEC. 16, 1905.

24 SHEETS—SHEET 18.

Fig. 43.



Witnesses

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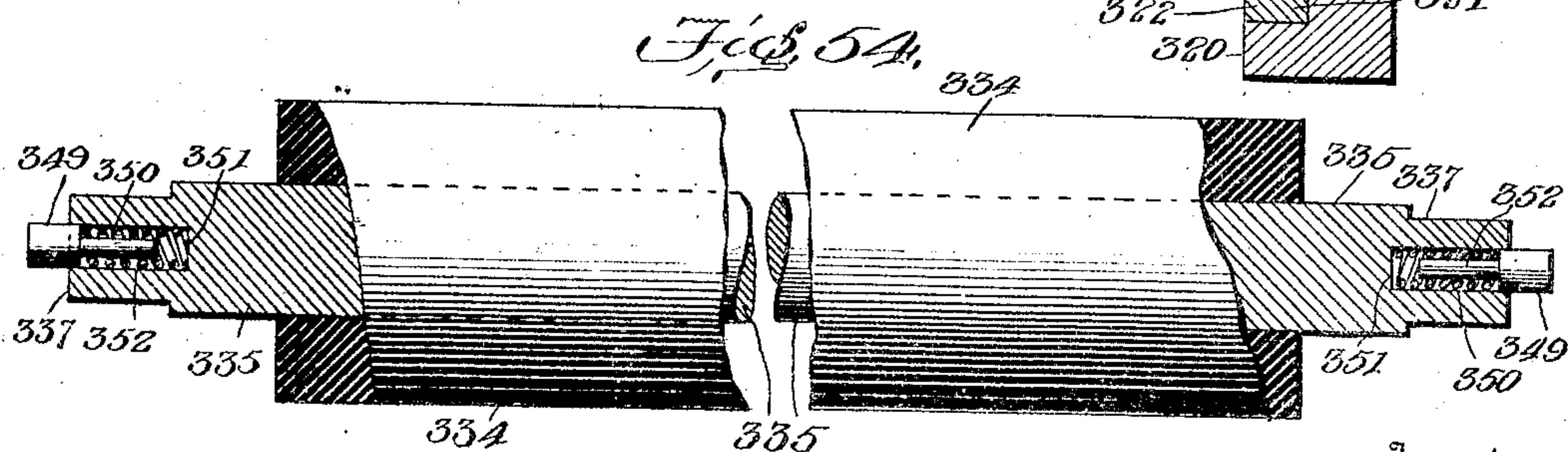
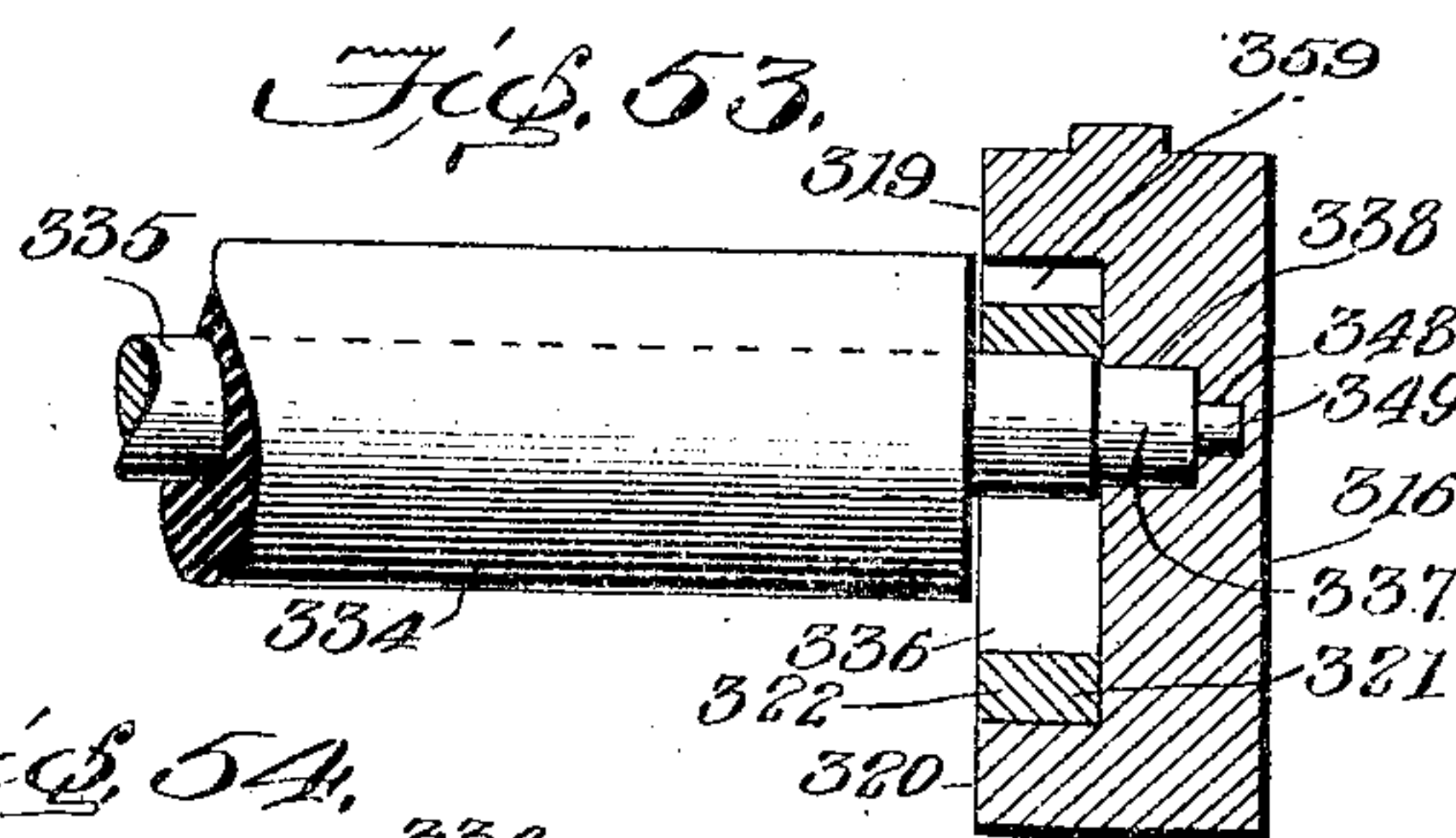
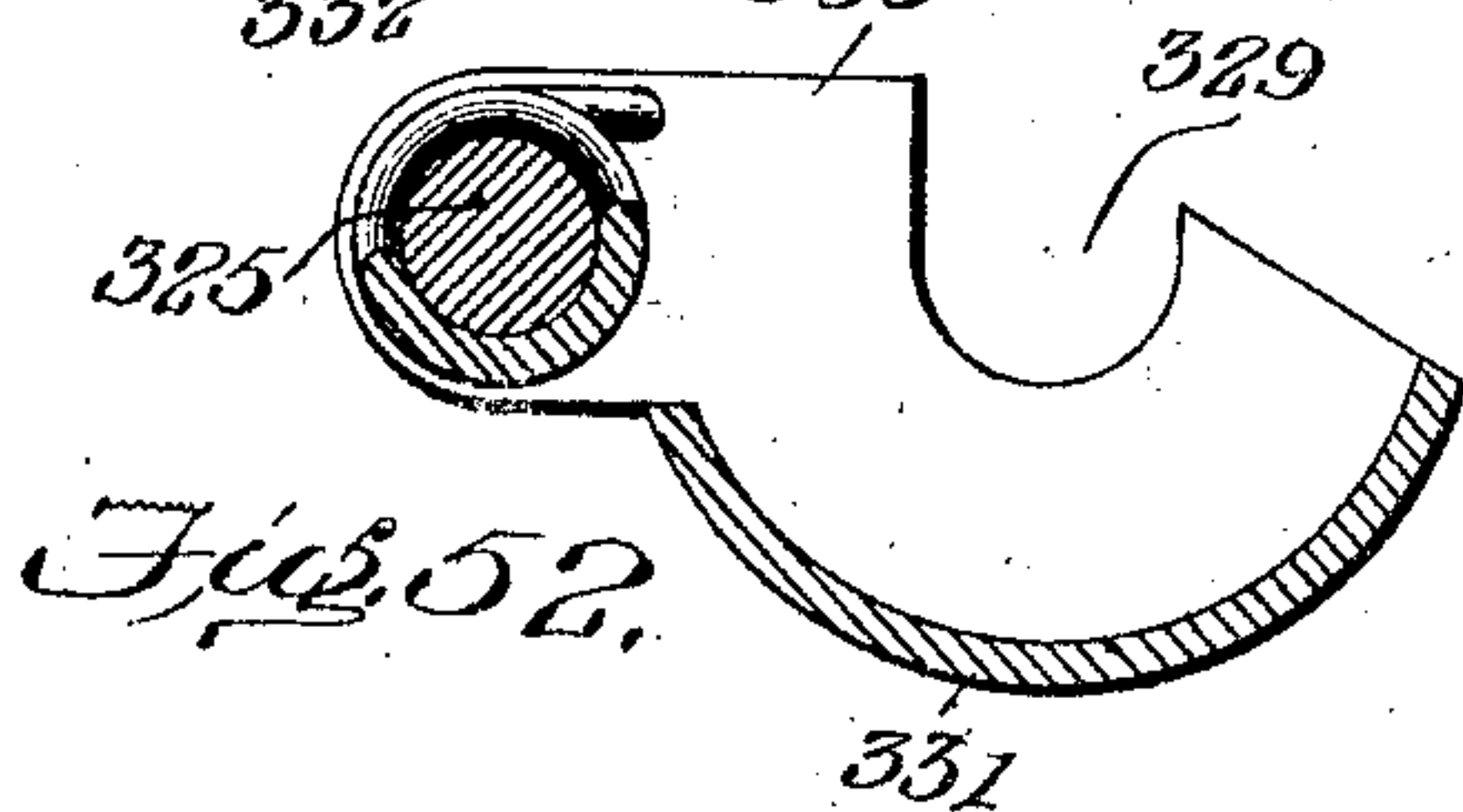
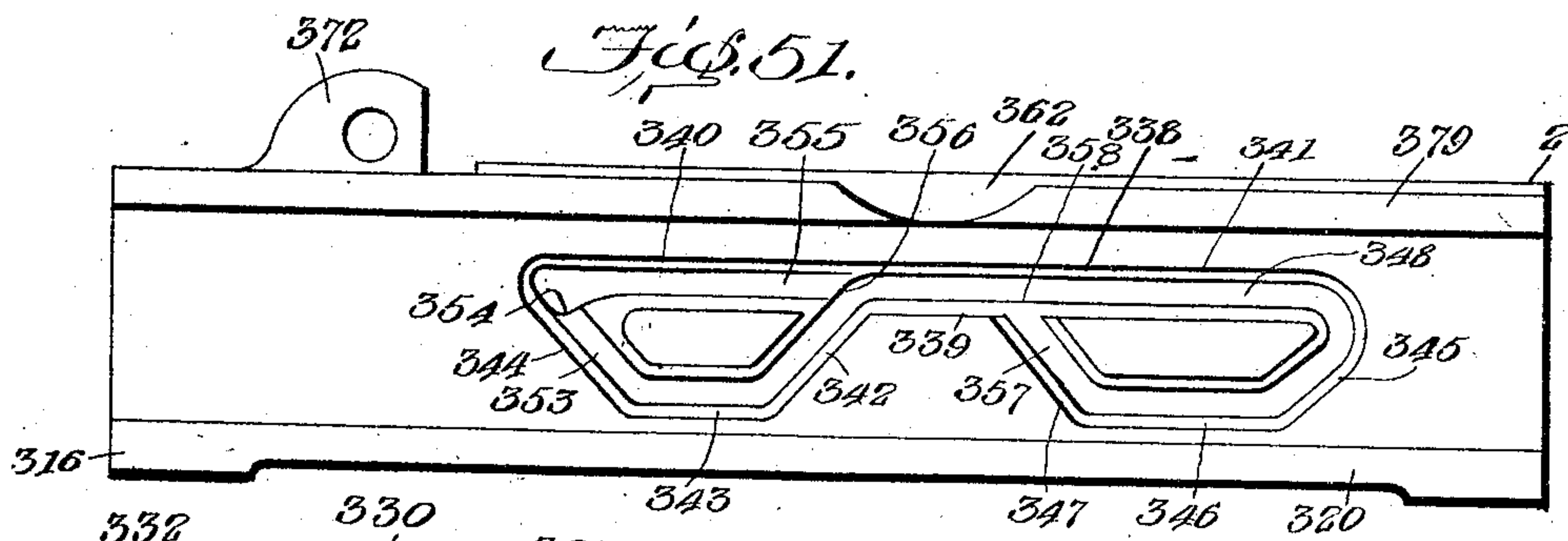
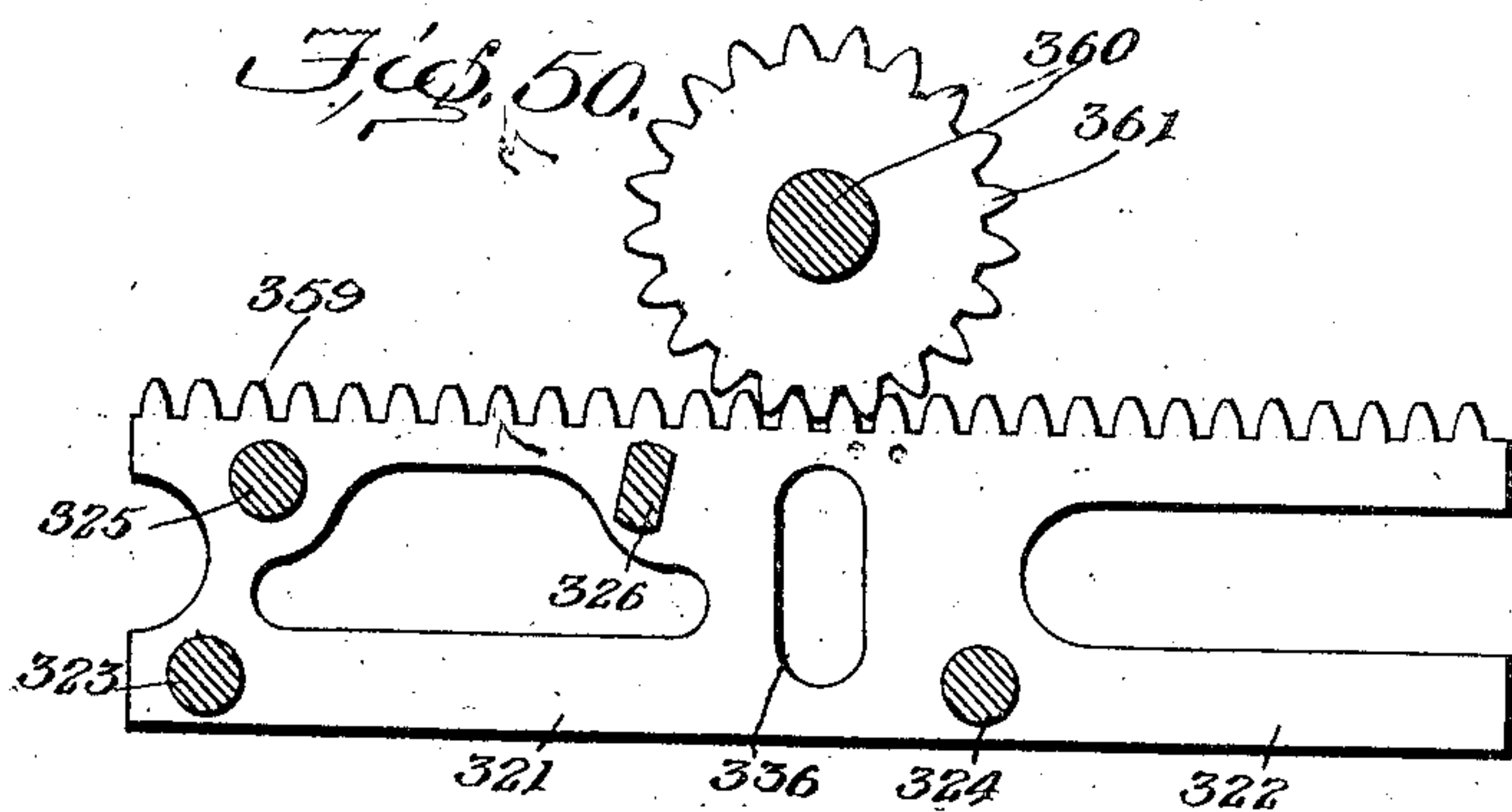
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FARE REGISTER AND RECORDER.

APPLICATION FILED DEC. 16, 1905.

24 SHEETS—SHEET 19



Witnesses

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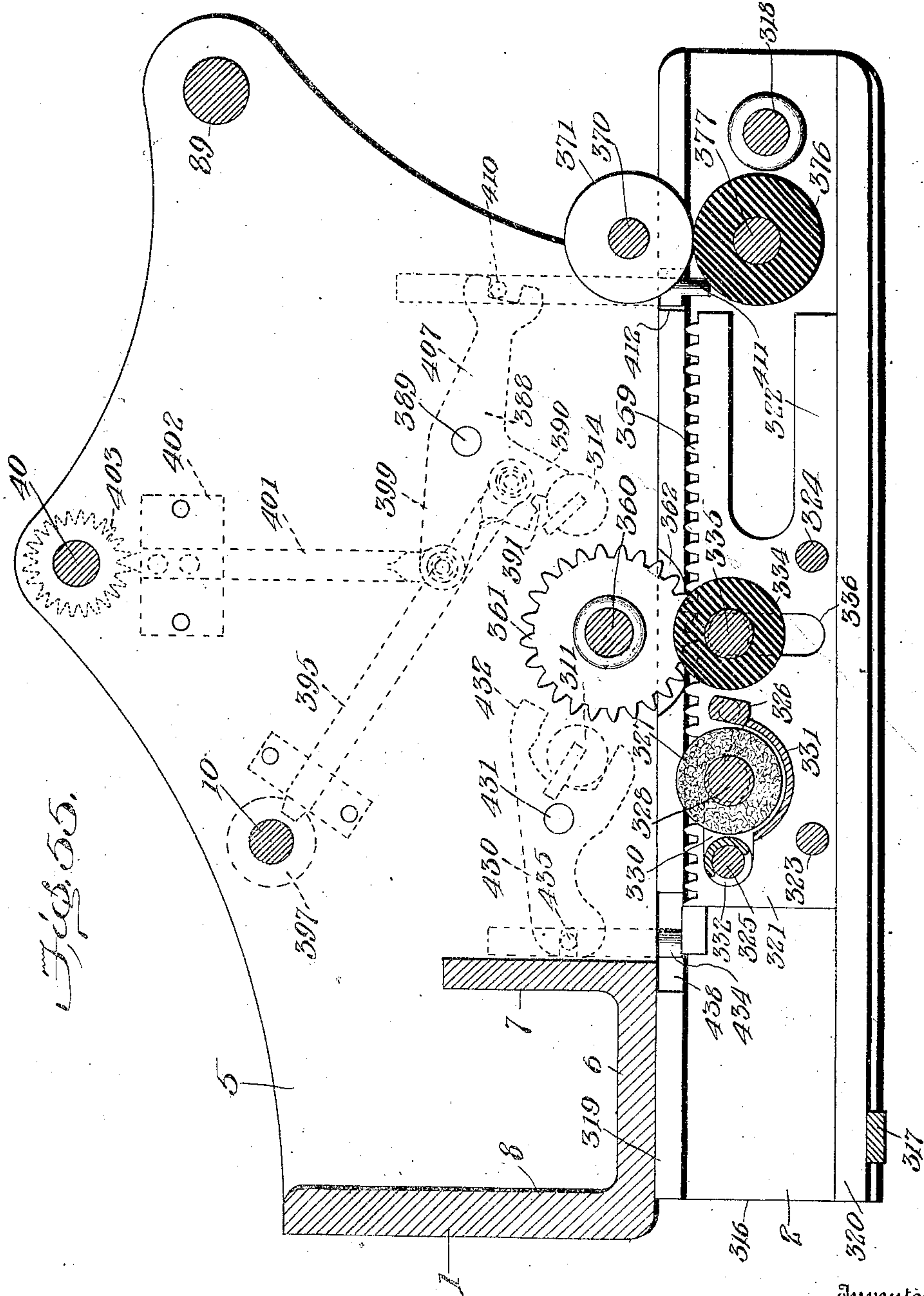
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FARE REGISTER AND RECORDER.

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24 SHEETS—SHEET 20.



Witnesses

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PATENTED MAR. 19, 1907.

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FARE REGISTER AND RECORDER.

APPLICATION FILED DEC. 16, 1905.

24 SHEETS—SHEET 21.

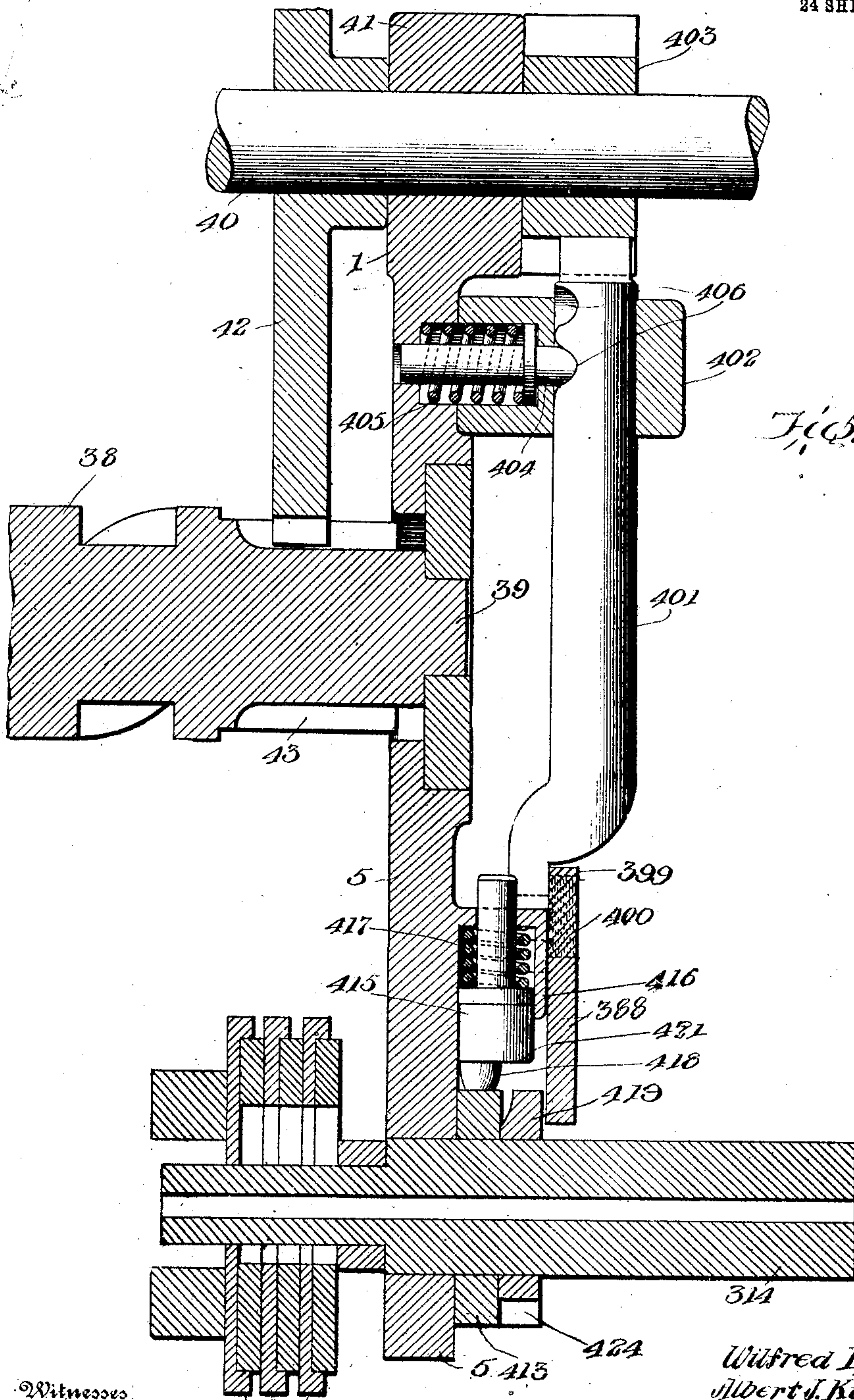


Fig. 56.

Witnesses

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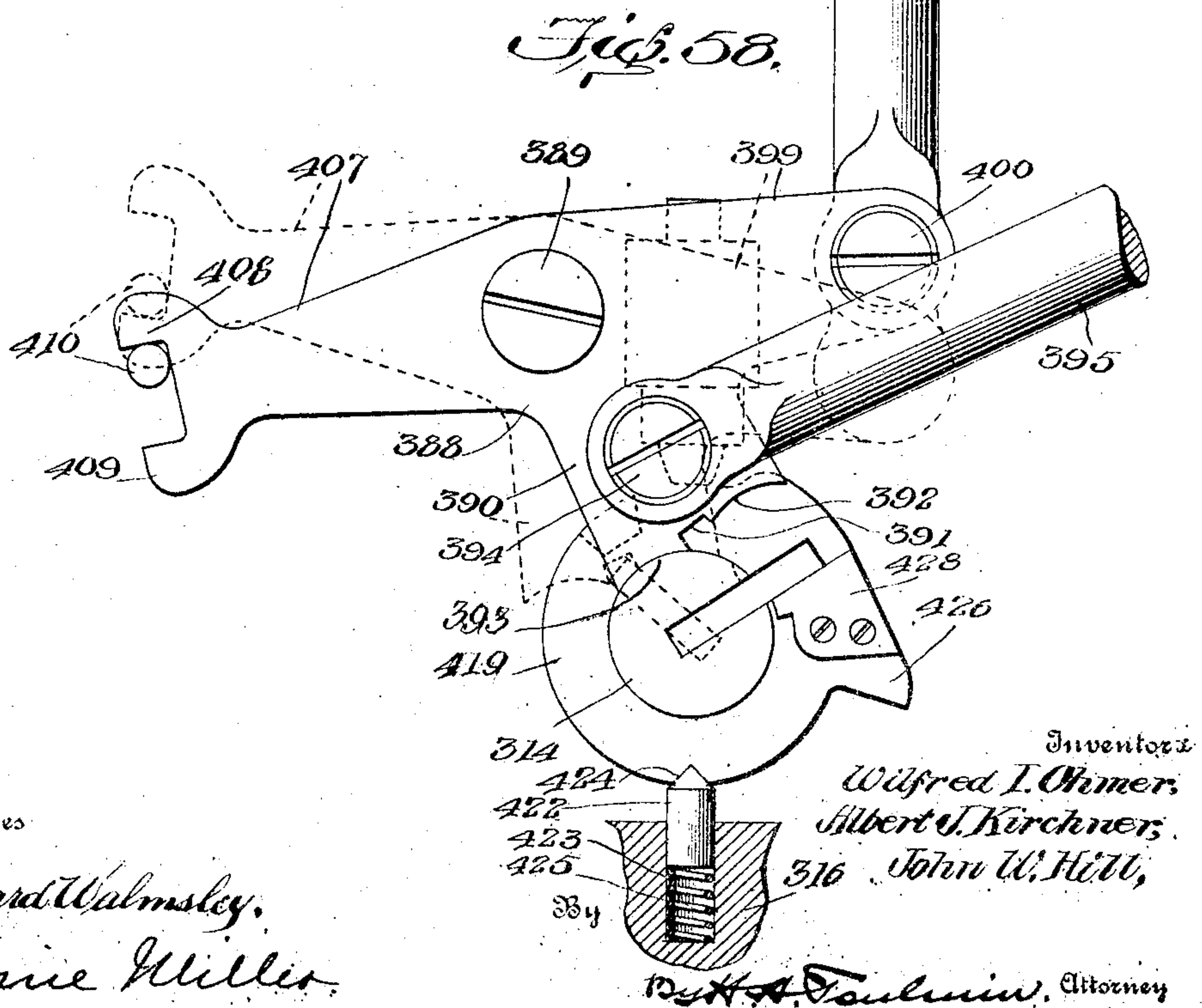
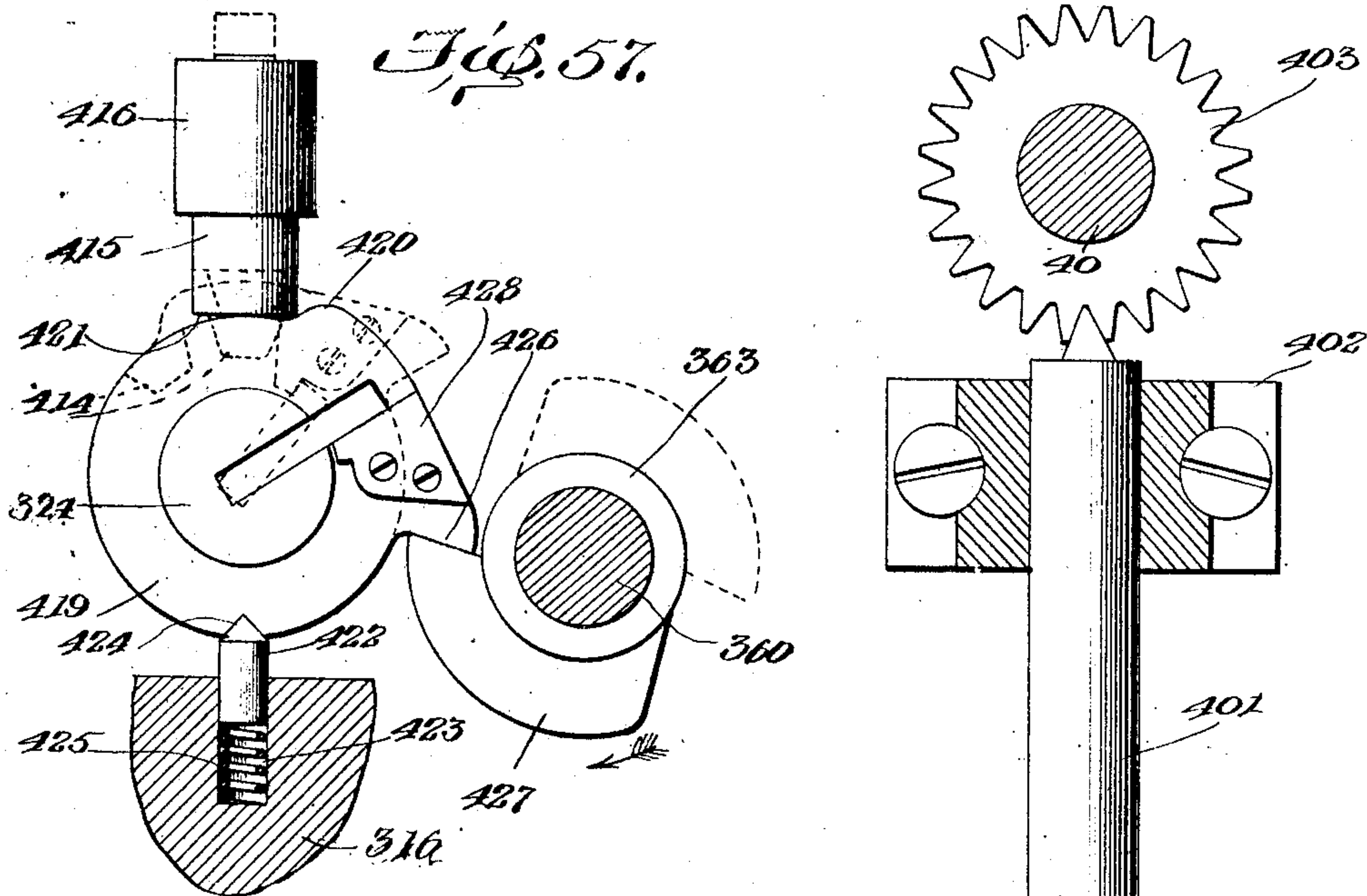
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PATENTED MAR. 19, 1907.

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FARE REGISTER AND RECORDER.

APPLICATION FILED DEC. 16, 1905.

34 SHEETS—SHEET 22.



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FARE REGISTER AND RECORDER.

APPLICATION FILED DEC. 16, 1905.

24 SHEETS—SHEET 23.

Fig. 6?

RECORDER NO. 450.

CINCINNATI DAYTON & TOLEDO TRAVEL CO., DAYTON, OHIO

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No. 847,808.

PATENTED MAR. 19, 1907.

W. I. OHMER, A. J. KIRCHNER & J. W. HILL.

FARE REGISTER AND RECORDER.

APPLICATION FILED DEC. 16, 1905.

24 SHEETS—SHEET 24.

File 63.

RECORDER NO. 420.		CINCINNATI, DAYTON & TOLEDO TRACTION CO., DAYTON, OHIO.																				OCT 10				
TRIP No.	DAILY TOTALS					TRIP CASH	TRIP PASSENGERS	GRAND TOTAL PASSENGERS	CITY PASSENGERS	CAR No.	CASHIER No.															
	This Copy Trip & Passes	PASSENGERS	CASH																							
04	0132	0861	455.35	203	104.80	006974	00865	448	345																	
STATION No.	TOTAL PASSENGERS	TICKETS	GENS & MILES	TRNS	PASS	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	CONDUCTORS No.
01	005	02	000	000	020	1	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	0999
02	003	00	000	000	000	000	030	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	0999
03	004	00	000	000	010	000	000	003	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	0999
04	012	01	020	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	0999
02	003	00	010	000	000	000	000	000	000	000	001	000	000	000	000	000	000	000	000	000	000	000	000	000	000	0999
01	083	10	080	040	010	040	020	000	000	005	001	000	000	000	000	001	030	000	007	020	000	004	000	003	13	0999

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UNITED STATES PATENT OFFICE.

WILFRED I. OHMER AND ALBERT J. KIRCHNER, OF DAYTON, OHIO, AND
JOHN W. HILL, OF PROVIDENCE, RHODE ISLAND, ASSIGNORS TO THE
RECORDING AND COMPUTING MACHINES COMPANY, OF DAYTON, OHIO,
A CORPORATION OF OHIO.

FARE REGISTER AND RECORDER.

No. 847,808.

Specification of Letters Patent.

Patented March 19, 1907.

Application filed December 16, 1905. Serial No. 292,068.

To all whom it may concern:

Be it known that we, WILFRED I. OHMER and ALBERT J. KIRCHNER, both residing at Dayton, in the county of Montgomery and State of Ohio, and JOHN W. HILL, residing at Providence, in the county of Providence and State of Rhode Island, citizens of the United States, have invented certain new and useful Improvements in Fare Registers and Recorders, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to fare registers and recorders, the general type of machine to which the invention refers being illustrated in Letters Patent No. 764,494, granted to Wilfred I. Ohmer July 5, 1904.

More specifically the present invention is in the nature of an improvement upon the machine set forth in an application filed by Wilfred I. Ohmer December 27, 1904, Serial No. 238,396, and has for its object to simplify and render more compact the machine therein set forth, at the same time increasing its capacity—that is to say, the number of different kinds or species of fare of which the machine is capable of making a record.

To these and other ends our present invention consists in certain novel features, which we will now proceed to describe and will then particularly point out in the claims.

In the accompanying drawings, Figure 1 is a plan view of a machine embodying our invention in one form, it being here noted that in this and all subsequent views the outer casing in which the machine is inclosed when in practical use is omitted, a small portion thereof being shown in Figs. 1, 2, 3, 6, 43, and 45. Fig. 2 is a front elevation of the same. Fig. 3 is a rear elevation. Fig. 4 is an elevation of one side of the machine. Fig. 5 is an elevation of the other side of the machine. Fig. 6 is a bottom plan view. Fig. 7 is a vertical sectional view taken on the line *o o* of Fig. 1 and looking in the direction of the arrows. Fig. 8 is a horizontal section taken immediately above the printing-counters and showing these latter in plan view, the associated mechanisms being omitted. Fig. 9 is a front elevation of the bar or cross-piece which supports the rear row of printing-wheels. Fig. 10 is a plan view of the same,

partly in section. Fig. 11 is a detail sectional view taken on the line *p p* of Fig. 9 and looking in the direction of the arrows. Fig. 12 is a similar view taken on the line *q q* of Fig. 9 and looking in the direction of the arrows. Fig. 13 is a detail plan view, partly in section, showing the detent-wheel of the fare-indicator and its cooperating pawl. Fig. 14 is a detail plan section taken just below the mechanism shown in Fig. 13 on the line *r r* of Fig. 7 and looking in the direction of the arrows, said view showing the passenger-indicator and a portion of the resetting mechanism. Fig. 15 is a detail perspective view of one of the detent-pawls of the passenger-indicator detached. Fig. 16 is a vertical sectional view taken centrally through the passenger-indicator and its shaft, showing also the gearing by which it is actuated, the resetting-key being shown in position on the end of the shaft. Fig. 17 is a detail view of the resetting-key detached. Fig. 18 is an enlarged detail sectional view taken on the line *s s* of Fig. 16 and looking in the direction of the arrows. Fig. 19 is a detail perspective view of the slide-bar which is mounted in the shaft of the passenger-register. Fig. 20 is an enlarged detail perspective view of the cam which actuates said slide-bar. Fig. 21 is a detail sectional view taken on the line *t t* of Fig. 16 and looking in the direction of the arrows. Fig. 22 is a detail view of the train of gearing by which the passenger-indicator is driven from the secondary operating-shaft. Fig. 22^a is a detail view of the gearing connecting the primary and secondary actuating-shafts. Fig. 23 is a detail view of the gearing connecting the setting-shaft and screw-shaft. Fig. 24 is a detail front elevation showing portions of the screw-shaft and secondary actuating-shaft, the actuating-gear, and the carriage which positions the same. Fig. 25 is a detail view of the chain of gearing by means of which the daily-total-passenger-printing counter is driven from the primary actuating-shaft. Fig. 26 is a detail view of the gearing by which the grand-total-passenger-printing counter is driven from the primary operating-shaft. Fig. 27 is a detail sectional view illustrating the city-passenger counter and its operating mechanism. Fig. 28 is a detail rear elevation of the variable

gear and its associated mechanism. Fig. 29 is a side elevation of the same. Fig. 30 is a vertical sectional view of the same. Fig. 31 is a view of the opposite side of the gear from that shown in Fig. 29. Fig. 32 is a detail view of one member of the variable gear when the two members are separated. Fig. 33 is a similar view of the other member. Fig. 34 is a detail sectional view illustrating the operation of the cam in throwing out the teeth of the variable gear. Fig. 35 is a detail sectional view taken on the line *u u* of Fig. 28 and looking in the direction of the arrows, showing the means for preventing overthrow of the cash-counters. Fig. 36 is a detail view of the gearing whereby the several specific fares other than cash fares are totalized on a single daily-total-printing counter. Fig. 37 is a detail plan view of a portion of the same. Fig. 38 is a detail rear elevation showing the operating-sector and a portion of the cooperating rod which controls the clutch-lever and lock of the variable gear. Fig. 39 is a detail view of the pinion and clutch upon the operating-shaft. Fig. 40 is a face view of one of the clutch members with the shaft shown in section. Fig. 41 is a similar view of the other clutch member. Fig. 42 is a detail sectional view taken on the line *v v* of Fig. 39 and looking in the direction of the arrows. Fig. 43 is an enlarged view of the mechanism whereby the printing-wheels which print the station-number are operated, a portion of the outer casing being shown in dotted lines. Fig. 44 is a vertical sectional view of the same, taken on the line *w w* of Fig. 45 and looking in the direction of the arrows. Fig. 45 is a plan view of what is shown in Fig. 43. Fig. 46 is a sectional view taken on the line *y y* of Fig. 43 and looking in the direction of the arrows. Fig. 47 is a detail section view through one of the counters, showing one of the printing-wheels and transfer-wheels viewed from one side. Fig. 48 is a similar view from the opposite side. Fig. 49 is an edge view of one of the printing-wheels detached. Fig. 50 is a detail sectional view taken vertically from front to rear through the printing-carriage and through the printing-shaft, illustrating the gearing by which the carriage is operated, the parts carried by the carriage being removed. Fig. 51 is an inner face view of one of the side members of the printing-mechanism frame, showing one of the cam-grooves by which the printing-roller is guided. Fig. 52 is a detail sectional view through the ink-trough and its supporting-rod with the inking-roller removed. Fig. 53 is a detail sectional view through one end of an impression-roller and the adjacent side member. Fig. 54 is an elevation of the impression-roller, partly broken away and the extremities being shown in longitudinal section. Fig. 55 is a sectional view taken in a

vertical plane from front to rear through the printing-carriage, illustrating also the locking mechanism which controls both the printing mechanism and the registering mechanism. Fig. 56 is an enlarged detail sectional view taken on the line *z z* of Fig. 5 and looking in the direction of the arrows. Fig. 57 is a detail view illustrating the locking mechanism for the barrel of the conductor's lock and the associated cam on the printing-shaft. Fig. 58 is a view illustrating that portion of the locking mechanism controlled by the conductor's key. Fig. 59 is a detail view of the locking mechanism controlled by the cashier's key. Fig. 60 is a perspective view of a conductor's key. Fig. 61 is a similar view of a cashier's key. Fig. 62 is a view of the printing-plate which fits over the printing-wheels shown in Fig. 8, and Fig. 63 is a view of a record such as is printed by the machine illustrated in the preceding figures.

In the said drawings we have illustrated a machine in which our present invention is embodied in one form.

The various parts of the machine are mounted upon a frame which is preferably made in two parts, the upper part 1 supporting the various printing counters and wheels and their setting and actuating mechanism constituting the register proper and the lower part 2 supporting the printing mechanism by means of which impressions are taken from said printing counters and wheels, the printing being effected along the horizontal plane dividing the two main portions 1 and 2 of the frame, which may be detachably united by screws 3 or in any other suitable manner. The upper or main portion of the frame comprises two parallel vertical side members 4 and 5, connected at their rear ends by a horizontal portion 6, from which rise transverse vertical flanges 7 and 8, these parts being preferably formed integral. This integral upper portion of the frame also preferably comprises a central bracket 9, the arrangement of which is vertical, said brackets extending forward from the rear of the machine midway between the parallel side members 4 and 5. However, it will be understood that the frame may be of any suitable construction to receive and support the parts. Extending transversely across the machine, near the rear thereof, and supported in suitable bearings in the frame members 4, 5, and 9 is a main or primary operating-shaft 10, from which all of the registering movements of the various fare and cash counters are derived, as well as those of the counters which indicate and which print the number of passengers. These results are accomplished by the rotation of the shaft 10, which whenever a fare is received is given one complete revolution. The mechanism which we prefer for imparting such movement to this shaft is that shown, in which 11 indicates a

gear-sector mounted on an inclined shaft 12, supported in a suitable bearing 13 on the frame member 5. The movements of this sector are limited by means of stop projections 14 and 15. An oscillating movement is imparted to the sector 11 by any suitable means—such, for instance, as the operating mechanism set forth in either one of Wilfred I. Ohmer's prior patents, No. 764,738, of July 12, 1904, or No. 769,398, of September 6, 1904, the segment being shown as provided with an apertured lug 16 to receive the operating connection. The stop projections 14 and 15 by their contact with the opposite sides of the frame member 5 will limit the movement of the actuating-sector to the extent desired. The sector may be returned to its normal position by means of a spring 16^a, coiled upon the end of the inclined shaft 12 and engaging a collar 16^b on said shaft at one end, its other end engaging the bearing 13. The spring may, however, be omitted when the operating mechanism, which is mounted in the car, is provided with a spring or the like to serve the same purpose. The gear-teeth 17 of the sector 11 mesh with a pinion 18, which is mounted on the shaft 10 so as to revolve freely thereon. The hub or sleeve 19 of said pinion is provided with a clutch member 20, having projecting teeth 21, inclined on one side and straight on the other so as to form practically ratchet-teeth. With this clutch member there coöperates a clutch member 22, splined on the shaft 10 so as to rotate therewith and move longitudinally thereon. This second clutch member is provided with recesses 23 to receive the teeth 21, said recesses having one wall inclined and the other straight, corresponding to the teeth 21. These recesses are longer circumferentially than the teeth 21. A spring 24, coiled around the shaft 10 and inclosed in a sleeve or casing 25, secured to said shaft, bears against the clutch member 22 and tends to force it into engagement with the clutch member 20. The construction is such that shortly after the beginning of the operative movement in one direction of the actuating-sector 11 the ratchet-clutch members engage in such a way as to impart one complete revolution to the shaft 10. During the return movement of the actuating-sector the clutch member 20 is pressed back and slides past the clutch member 22 and the shaft remains stationary. The details of this mechanism are more particularly shown in Figs. 39 to 42, inclusive.

The shaft 10 is provided at that end thereof farthest from the end on which the pinion 18 is located with a bevel-pinion 26 secured thereon. This bevel-pinion meshes with a similar pinion 27 on a short connecting-shaft 28, mounted in a bearing 29, secured to the inner face of the frame member 4. The shaft 28 is provided at its other end with a bevel-

pinion 30, which meshes with a bevel-pinion 31, secured on a shaft 32, which extends across the machine parallel with the shaft 10, some distance in front of the same, having its bearings in the side members 4 and 5 of the machine. This shaft may be termed the "secondary" operating-shaft, since it is driven from and moves in unison with the primary operating-shaft 10, some of the printing-counters being driven directly from one of these shafts and other of said printing-counters being driven directly from the other shaft. Referring to Fig. 8 of the drawings, it will be seen that there are there shown two rows of printing-counters. All of the printing-counters in the row nearest the front of the machine, with the exception of the counters at the ends of the row, are actuated from the secondary operating-shaft 32, which lies parallel with and in close proximity to said row. All of the printing-counters which are directly actuated from the primary operating-shaft 10 are located in the other row nearest the back of the machine, although all of the counters in the rear row are not actuated directly from the shaft 10.

Referring now to the secondary operating-shaft 32, provision is made for the mounting upon said shaft of a gear, preferably a one-toothed gear, which rotates in unison with said shaft and which may be moved along said shaft so as to bring it into position to actuate any desired one of the counters of the front row. To this end the shaft 32 has splined thereon a single-toothed gear 33, the same being shown in the form of a sleeve-like body 34, splined on the shaft, from which body the single tooth 33 projects radially. To effect the movement of the gear 33 along the shaft 32, we employ a carriage 35, having parallel arms 36, between which the body 34 of the one-toothed gear 33 fits, said arms 36 being apertured for the passage through them of the shaft 32, on which they fit, so as to be guided thereby. The upper end of the carriage 35 is in the form of a sleeve 37, threaded internally to fit upon and engage a screw-shaft 38, extending across the machine above and parallel with the shaft 32 and having its bearings in the side members 4 and 5 of the main frame. One of these bearings is shown in detail in Fig. 56, where the end of the screw-shaft 38 is shown as reduced, as indicated at 39, this reduced end being cylindrical in form to fit within the bearing. As the screw-shaft rotates without moving axially, it follows that the carriage 35 will be caused to travel longitudinally of said shaft and of the operating-shaft 32, carrying the actuating-gear 33 along with it. The movement of the screw-shaft is controlled by means of a setting-shaft 40, mounted in bearings 41 on top of the frame members 4 and 5 and operated by any suitable operating mechanism—such, for instance, as in the prior Letters Pat-

ent, No. 764,738 and No. 769,398, hereinbefore referred to. This setting-shaft has secured on it a gear 42, which meshes with a pinion 43, formed on the end of the screw-shaft 38. These parts are shown considerably enlarged in Fig. 56 of the drawings. It will be seen that by rotating the setting-shaft in the desired direction and to the desired extent (one revolution or less) the actuating-gear 33 may be given any desired position upon the operating-shaft 32 and may be thus brought into position to actuate that one of the printing-counters which it is desired to actuate.

Provision is made for insuring the stoppage of the actuating-gear 33 in proper relation to each of the counters which it actuates by means of a suitable detent mechanism, which we will now proceed to describe, which detent mechanism, in its preferred form, so acts as a positive locking mechanism to hold the actuating-gear locked against movement on the operating-shaft in an axial direction relatively thereto during the operation of registering or actuating a counter. To this end the setting-shaft 40 is provided with a bevel-gear 44, with which meshes a bevel-gear 45, formed in one piece with or secured to a detent-wheel 46, the two being mounted on a stud-seat 47, extending upward from a forwardly-extending arm 48 of the central member 9 of the frame. Said frame member 9 is provided with a housing 49, in which is mounted to slide a pawl 50, arranged to engage the detent-wheel 46. This pawl is backed by a spring 51, which throws its forward end into engagement with the teeth of the detent-wheel, so as to tend to hold the same against motion. The number of teeth of the detent-wheel corresponds with the number of counters with which the actuating-gear 33 coöperates, and as said gear is successively brought into operative relation with these counters the detent mechanism acts to hold it in such position and prevent accidental displacement and also requires a positive application of force to the setting-shaft to move the actuating-gear onward to the next counter. While this device is sufficient to hold the parts in adjusted position under ordinary circumstances, we prefer to employ a positive locking mechanism, whereby the pawl 50 becomes a positive locking device during the actual operation of registering a fare. To this end there is formed through the housing 49 and bracket 9 a slot 52, in which slides a locking-bar 53, provided with stops 54 and 55 to limit its motion. The slot 52, in which the locking-bar travels, intersects the lower portion of the chamber of the housing 49, in which the pawl 50 fits, and said pawl is notched or recessed on its under side, as indicated in dotted lines at 55^a in Fig. 13, for the passage of the locking-bar, which thus engages the pawl. The

locking-bar is of the full width of the notch in the pawl, except that its forward edge is cut away for a portion of its length, as indicated at 56, this portion of the locking-bar being of less width than the notch in the pawl. When the locking-bar is in a position such that the stop-pin 54 is in contact with the bracket 9, the narrower part of the locking-bar lies within the notch of the pawl and the pawl is free to yield to permit the detent-wheel to turn. When the locking-bar is moved to a position such that the stop-pin 55 is in contact with the housing 49, the wider portion of the locking-bar is within the notch of the pawl and the pawl is positively locked against movement. The locking-bar is actuated from the actuating-segment 11, so that as soon as said segment begins its actuating movement the locking-bar is moved into locking position, in which position it remains until the actuating-segment returns to its original position, such return shifting the locking-bar and leaving the pawl free to act. One side of the recess 56 is inclined, as indicated at 55^b, so as to positively force the pawl into full engagement with the detent-wheel at the end of the locking movement and insure the proper registration of the actuating-gear with the desired counter. This is accomplished by the mechanism shown, in which a bracket-arm 57, extending laterally from the frame member 9, carries at its free end a pivoted arm 58; the free end of which extends up and engages between lugs 59 on the locking-bar 53. The arm 58 is provided on its lateral margin with projections 60 and 61, which in the former position of the parts lie on opposite sides of a projection 62, carried by the actuating-segment 11. This position of the parts is indicated in Fig. 3 of the drawings. As soon as the actuating-segment begins to move the projection 62, acting against the projection 60, swings the arm 58 over and carries the locking-bar into locking position. It remains in this position until the return of the actuating-segment causes the projection 62 to come into contact with the projection 61, whereupon the arm 58 is swung back into the position shown in Fig. 3 and the locking-bar is moved back into its free position, releasing the pawl 50.

The machine is provided with fare-indicating mechanism to indicate to the passengers and others the particular kind or amount of fare which is being registered. To this end the detent-wheel 46 and gear 49 have connected thereto, so as to rotate therewith, an indicating-wheel 63. This wheel, rotating around a vertical axis, lies in a horizontal plane and comprises a central hub portion 64, spokes 65, and a vertical rim or periphery 66, on which latter the numerals and other characters indicating the different fares are exhibited in proper order or succession. It will be understood, of course, that the outer

casing, in which the machine is inclosed, will have a suitable sight-opening at the front, so that the only indicating characters visible will be those borne by that portion of the wheel which registers with said sight-opening, thereby indicating the amount of fare for which the register is set. The wheel 63 is preferably made as light as possible, the preferred material therefor being aluminium. Said wheel being located at the top of the machine and lying in a horizontal plane, it is possible to give it a size sufficient to enable it to carry the large number of indicating characters necessary with a machine of the capacity of the present one without unduly increasing the size of the machine.

Referring now to the groups of counters shown in Fig. 8, and particularly to the front group, it may be stated that all of these counters, with the exception of the group of printing-wheels to the extreme right, which is not, properly speaking, a counter, but an identifying device, are mounted upon a common shaft, (indicated by the reference-numeral 67.) The printing-counter to the extreme left (designated by the reference-letter A) is not actuated from the operating-shaft 32, but by means of a different mechanism, which will be hereinafter described. This printing-counter is a station-number-printing counter. The remaining printing-counters on said shaft 67 (indicated by the reference-letters from B to Z, both inclusive) are employed to print a record of all fares received between two stations on the line, and are therefore hereinafter referred to as the "station-record-printing" counters. The printing-counter B is a counter printing the record of the total number of passengers paying fare between the two stations. The printing-counter C gives the total number of ticket fares received. The printing-counter D gives the total number of fares paid by coupons, mileage, or the like. The printing-counter E gives the total number of fares paid by transfers. The printing-counter F gives the total number of fares paid by passes. Thus the four counters C, D, E, and F constitute a group of counters relating to "paper" fares, or fares other than cash, and these are separately summarized or totalized together by another mechanism, to be hereinafter referred to. The remaining printing-counters of the group from G to Z, inclusive, relate to cash fares, each printing-counter giving the total number of fares of a fixed amount, the amounts beginning with five cents and proceeding at intervals of five cents up to the largest fare of which the present machine is capable of making a record—to wit, one dollar. Thus these counters are all cash-fare counters, counter G giving the total number of five-cent fares received, counter H the total number of ten-cent fares received, counter I the total number of fif-

teen-cent fares received, and so on to counter Z, which gives the total number of one-dollar fares received. It will be understood, of course, that the precise number of these specific cash-fare counters is controlled by circumstances and may be greater or less, as desired.

The counters themselves may be of any approved construction, the particular form shown being illustrated in detail in Figs. 47, 48, and 49 of the drawings. It may be noted in this connection that all of the counters of this row, except the counter B, which gives the total number of passengers, are composed of two printing-wheels only, although their number may of course be increased as desired. In the construction shown each printing-wheel comprises a body portion 68, on the periphery of which the printing characters of the several numerals from "0" to "9" are formed in regular order. This body is provided on one side with a corresponding number of teeth 69, one for each of the ten numerals. Upon its opposite side the body 68 is provided with a single tooth 70. Between each pair of printing-wheels there is located a transfer-wheel 71, having teeth 72, which not only mesh with the teeth 69 of the second or tens wheel of the counter, but also lie in the path of the single tooth 70 of the units-wheel, so that for each complete revolution of the units-wheel the tens-wheel will be advanced one step, as is usual in counters of this description. The teeth 69 of the units-wheel of each counter from C to Z are so located that when the actuating-gear 33 is brought into proper position relatively to said counter the teeth of said gear will engage the teeth 69 of the units-wheel of said counter and advance the same one step. The transfer-wheels 71 are mounted loosely upon a common shaft 73, lying above the shaft 67 and supported by brackets 74 from a cross-bar 75 at the front of the machine. The printing-wheels are held in position against accidental displacement by means of detent-pawls 76, one for each printing-wheel, mounted to slide in slots 77, formed in the rear face of the bar 75. Each detent-pawl 76 has a cam-face 78, with reversely-inclined surfaces adapted to bear against the adjacent teeth 69 of the printing-wheel and pressed against the same by a spring 79, located in a recess 80 in the bar 75. Each pawl has a shank 81, which slides in a recess 82, formed in the bar.

The specific fare-printing counters from C to Z are, as hereinbefore stated, actuated by the one-toothed gear 33. The counter B, printing the total number of passengers, is actuated by a single-toothed gear 83, secured on the shaft 32 in a position such that at each revolution it will engage and actuate the units-wheel of the printing-counter B. Since the shaft 32 revolves once for every fare reg-

istered, the register B will show the total number of passengers whose fares have been registered or, what amounts to the same thing, the total number of fares received irrespective of their character or value.

Referring now to the second row of counters illustrated in Fig. 8, which is the row of counters lying nearest the back of the machine and may be referred to as the "back" or "rear" row, the first printing-counter to the left of this row, (indicated by the reference character A') is a trip-number-printing counter, actuated in the manner herein-after described. The next printing-counter (designated by the reference character C') prints the daily total of paper fares or fares other than cash, giving the total of the several different classes of fares counted on the counters C, D, E, and F of the front row. The next counter (indicated by the reference character B') is a daily-total-passenger-printing counter and gives the total number of passengers for the day. The next printing-counter (indicated by the reference character G') is a daily-total-cash-printing counter and prints in dollars and cents the total amount or value of all of the cash fares added during the day on the specific fare-counters of the front row from G to Z, inclusive. The three counters C', B', and G' are all mounted on a common shaft 84, together with the printing-counter A', the three counters C', B', and G' printing daily totals, which are derived from the station-record-printing counters of the front row. The next two counters of the rear row—to wit, the counters indicated by the reference characters G² and B²—are mounted on a separate shaft 85 and give trip totals, the counter B² being a trip-total-passenger counter, printing the total number of passengers or fares received during each single trip, while the counter G² is a trip-total-cash counter and prints in dollars and cents the total amount of cash which has been added on all of the specific cash-fare counters of the front row. The next counter of the rear row (indicated by the reference character H') is a grand-total-passenger-printing counter, printing the total number of passengers whose fares have been registered by the machine, the same adding continuously to within one of a million and being never reset, its purpose being to act as a check upon the other counters by indicating any attempt to run them up to their limit and over the same, so as to cause them to show figures which are too low. The next printing-counter of the rear row (indicated by the reference character I') is a city-passenger-printing counter, designed for use where a car in interurban service runs over city tracks and is required to keep a separate record of fares collected from traffic over said tracks. The remaining two groups of printing-wheels to the right

of the rear row are not printing-counters, properly speaking, but number-printing wheels, the one group (indicated by the reference character J') serving to print the car-number, while the other group (indicated by the reference character K') serves to print the cashier's identifying-number, being similar to the extreme right-hand group of printing-wheels of the front row (indicated by the reference-character L') and printing the conductor's identifying-number.

Before considering the manner in which the several fare-counters other than the specific fare-counters of the front row are actuated it will be advisable to describe the passenger-indicator, which is a counting mechanism having indicating-wheels visible through a suitable aperture in the casing and serving to indicate the number of passengers who have paid fare. This is now described, because one of said counters is actuated by the operation of resetting to zero the passenger-indicator. The indicator is shown as comprising three indicating-wheels, although the number may be varied, those shown consisting of a units-wheel 86, a tens-wheel 87, and a hundreds-wheel 88. These wheels are all loosely mounted on a shaft 89, which has its bearings in the frame members 4 and 5. These wheels have the numerals from "0" to "9" placed upon their periphery, as shown. The units-wheel 86 has motion imparted to it from the secondary operating-shaft 32 by means of the train of gearing shown more particularly in Fig. 22 of the drawings. The shaft 32 is provided with a one-toothed gear 90, which, through a train of gears 91 and 92, drives a gear 93, secured on a sleeve 94, which fits loosely upon the shaft 89 and forms an extension of the hub of the indicator-wheel 86. Each indicator-wheel is provided with a detent-wheel 95 on one of its sides, with which coöperates a detent-pawl 96, mounted in a housing 97, formed in a bracket 98 on the front end of the frame member 9. Each detent-pawl is backed by a spring 99, which normally throws it forward into engagement with the spaces between the teeth of the corresponding detent-wheel. One of these detent-pawls is shown in detail in Fig. 15 of the drawings, and it will be seen that its working extremity 96^a is connected with the body of the pawl by an offset neck 96^b, so that it may pass around the rim of the indicator-wheel and engage with the detent-wheel 95 while this latter lies close to the body of the detent-wheel, thus rendering the indicator more compact. From an examination of Fig. 7 it will be seen that the pawl 96 has its working extremity formed into two similarly-inclined faces 100, meeting at an angle which is more obtuse than the angle between the adjacent teeth of the coöperating detent-wheel. By reason of this construction wear of the parts will not

affect the accuracy of the bearing of the pawl upon the sides of the adjacent teeth, so that the engagement of the pawl with the detent-wheel will remain a firm and efficient one in spite of wear. The units-wheel 86 has upon the side thereof opposite to the side on which the detent-wheel 95 is located a single-toothed gear 101, which meshes with a transfer-wheel 102, carried by a bracket 103, supported from the bracket 97. The transfer-wheel 102 meshes with a gear 104 on the indicator-wheel 87, so as to advance said wheel one step for each complete revolution of the indicator-wheel 86. The indicator-wheel 87 is provided with a similar one-toothed gear 105; which meshes with a transfer-wheel 106, carried by the bracket 103, said transfer-wheel meshing with a gear 107 on the indicator-wheel 88. Thus it will be seen that each time that the operating-shafts are given a rotation to register a fare one will be added upon the indicator-wheels, so that the indicator will visibly show the total number of passengers who have paid fare. The rotation of the shaft 89 in the proper direction resets the indicator-wheels to zero and at the same time resets to zero certain of the printing-counters and actuates the trip-number-printing counter, all in a manner to be hereinafter described. Any suitable construction of the shaft and indicator-wheels may be employed for this purpose, but we prefer the construction which we have illustrated, which is one which we have devised for the purpose. In this construction the shaft 89 is provided with a longitudinal groove 108, in which fits so as to slide longitudinally a key-bar 109. (Shown in detail in Fig. 19 of the drawings.) This bar lies in the groove 108 with its outer edge flush with the outer surface of the shaft 89, and said bar is provided with a plurality of notches 110, corresponding to the number of wheels in the counter, three in the present instance. Each wheel is provided with a pin 111, and the shaft 89 is provided with a circumferential groove 112 for each wheel and its pin, said pin extending inward and fitting within the circumferential groove when the wheels are in position on the shaft. It will be seen that when the bar 109 is in such a position that its notches 110 register with the grooves 112 the wheels are free to turn upon said shaft, and it will also be seen that when the bar 109 is in such a position that said notches do not register with said circumferential grooves then the turning of the shaft will cause said bar to come into contact with the pins 111 and will carry the indicator-wheels around with the shaft. The pins 111 are so arranged relatively to the characters on the indicator-wheels as to bring the same characters into alignment when the key-bar has engaged all of the pins, and by arresting the motion of the shaft at the proper time all of the wheels

may be readily returned to zero. This is effected by means of a suitable cam 113, through which the end of the shaft 89 passes, and which is secured in position in the frame member 5, said cam being shown in detail in Fig. 20. 114 indicates the aperture for the passage of the reduced end of the shaft, and 115 indicates a flat annular cam-surface on which the end of the bar 109 travels during the greater part of its rotation. When the bar bears against the surface 115, it is moved over so that its notches do not register with the circumferential grooves, and rotation of the shaft therefore causes it to pick up the wheels. 116 indicates a depression in the cam 113, having an inclined wall 117 and a right-angle wall 118. The bar 109 is pressed toward the cam 113 by a spring hereinafter described, and when the rotation of the shaft 89 brings the bar to the depression 116 the bar is forced by the spring into the depression 116, said bar moving over so that its notches 110 register with the grooves 112, leaving the wheels again free to revolve on the shaft 89 after they have thus been returned to zero. Continued rotation of the shaft 89 in the original direction will not affect the wheels, because when the bar in its rotation approaches the pins its end drops into the depression in the cam, thus bringing the notches into line with the pins, so that the wheels remain stationary. The normal position of the shaft is that in which the bar engages the depression of the cam, the wall 118 preventing rotation of the shaft in one direction, while the wall 117, being inclined, acts as a detent, but permits the shaft to rotate and at the same time forces the bar over into position to engage the pins of any of the wheels which may not be in zero position. In practice in setting the wheels to zero the shaft 89 is rotated in the proper direction for one full rotation, whereupon the end of the bar drops into the recess 116 and indicates that the resetting parts are in proper position to permit the register to operate. The spring which forces the key-bar 109 into contact with the cam 113 is preferably arranged as shown in Fig. 16. In this construction 119 indicates a collar mounted to slide on the shaft 89 and having a pin or projection 120, which extends into the slot 108 and bears against the end of the key-bar 109. This pin is pressed against the end of the key-bar by means of a spring 121, coiled around the shaft 89 and bearing at one end against the collar 119. The other end of the spring 121 bears against a collar 122, secured on the shaft 89 in any suitable way—as, for instance, by means of a set-screw 123. Preferably the collar 122 is provided with a sleeve-like extension 124, which extends over and incloses and protects the spring 121 and collar 119. The resetting-shaft 89 may be rotated by any suitable means. We have shown for that

purpose a key 125 having at its end a socket 126 to receive the reduced end 127 of the shaft 89. Said reduced end is provided with a pin or projection 128, which engages with a slot 129 in the barrel of the key 125, so as to cause the shaft to rotate in unison with the key when the two are engaged.

It may be well to here note that we prefer to employ this resetting mechanism throughout the entire machine, so that the shafts 67, 84, and 85 and the printing-wheels mounted thereon are constructed in the manner just described in connection with the shaft 89 and indicator-wheels 86, 87, and 88. In this connection it may be stated that the shafts 84 and 85 are supported in bearing-brackets 130, formed upon or attached to a cross-bar 131, extending across the machine in front of the flange 7, to which it is secured in any suitable manner. The cross-bar 131 is provided with slots 132, corresponding to the slots 77 of the bar 75, and detent-pawls 133 are mounted in said slots and engage with the teeth of the printing-wheels of the rear row, said pawls corresponding with the pawls 76 of the front row and being guided by stems 134 and acted on by springs 135 in suitable recesses in the bar 131. The brackets 130 have bearing-apertures 136 for the resetting-shafts of the rear counters and bearing-apertures 137 for the counter-shafts on which the transfer-wheels are mounted. Two of the bearing-brackets 130 are provided with cam depressions or recesses 138, as illustrated in Fig. 12, to operate the key-bars of the shafts 84 and 85, respectively, said brackets being those supporting said shafts at one end. The shaft 84 extends outward beyond the frame member 4 at one end—as shown, for instance, in Fig. 3—its projecting end being adapted to receive a suitable resetting-key by which it may be rotated. The shaft 85 is rotated to reset to zero the counters mounted thereon by means of a mechanism to be hereinafter described.

Referring next to the means for actuating the printing-counters other than the specific fare-printing counters of the front row, we will first describe the operation of the trip-number-printing counter A'. This is operated from the resetting-shaft 89 of the passenger-indicator. The shaft 89 has secured thereon a bevel-gear 139, which meshes with a similar gear 140 on the front end of a connecting-shaft 141, extending toward the rear of the machine and supported in a bracket 142 from the frame member 4. This shaft has at its rear end a bevel-pinion 143, which meshes with a similar pinion 144 on a transverse shaft 145, supported at one end by an arm 146 from the bracket 142 and at the other end by a bracket 147, secured to the frame member 9. The said bracket 147 has an extension supporting a bearing-sleeve 148, in which is mounted a shaft 149, extending

downwardly and rearwardly from the end of the shaft 145, the shaft 145 having a bevel-pinion 150, which meshes with a bevel-pinion 151 on the upper end of the shaft 149. The shaft 149 has at its lower end a bevel-gear 152, which meshes with a bevel-gear 153, formed in one piece with or attached to a spur-gear 154, mounted loosely on the counter-shaft 155, which supports the transfer-wheels of the counters of the rear row and which is in turn supported in the apertures 137 of the brackets 130. The spur-gear 154 meshes with a corresponding spur-gear 156 on the shaft 85. It will thus be seen that rotation of the shaft 89 to reset to zero the passenger-indicating wheels will at the same time rotate the shaft 85 and reset to zero the counters G² and B². It is during this operation that the trip-number-printing counter A' is actuated, the result being obtained in the following manner: The shaft 145 is extended through and beyond the frame member 4, and its projecting end has mounted thereon a one-toothed gear 157. This gear meshes with an idle gear 158, supported on the outside of the frame member 4 and meshing with a pinion 159 on the end of a short shaft 160, which shaft extends through the frame member 4 and has its inner end supported in the bearing-aperture 137 of the end bracket 130. The shaft 160 has secured thereon a pinion 161, which meshes with the gear of the units-wheel of the counter A', and said shaft 160 also supports the transfer-wheel 162 of said counter, which is loosely mounted thereon. It will be seen from this description that each time the resetting-shaft 89 is operated, which operation occurs at the end of each trip, the shaft 160 will be advanced one step in rotation by the one-toothed gear 157, and the counter A' will have one unit added thereon. The trip-number-printing counter is thereby advanced one unit at the end of each trip.

Referring next to the daily-total-printing counter C', which totalizes all of the fares other than cash, which may conveniently be designated as "paper fares," this counter is actuated in unison with each one of the four counters C, D, E, and F of the front row. The construction by which this result is effected is shown more particularly in Figs. 36 and 37. The rib 7 has secured thereto a bracket-arm 163, which extends forward to a position adjacent to the operating-shaft 32 and is provided with bearing-lugs 164, in which is mounted a shaft 165. This shaft has secured on it a gear 166, made in three parts to accommodate the bearing-lugs 164 and extending along adjacent to and parallel with that portion of the shaft 32 which lies immediately back of the four counters C, D, E, and F. The arrangement of the parts is such that when the actuating-gear 33 is moved to a position on the shaft 32 such as

to cause it to operate any one of the four counters mentioned the rotation of said gear will not only operate the desired counter, but will also engage with some part of the elongated gear 166 and will also rotate said gear. The gear 166 meshes with a pinion 167, supported on a downward extension of the bracket-arm 163, and the pinion 167 meshes with the gear-teeth of the units-wheel of the counter C', the same being designated by the reference-numeral 168 in Fig. 36. It will thus be seen that each time a fare is registered upon any one of the four counters C, D, E, and F of the front row one unit will be added on the counter C', the total of which will therefore be the sum of the totals of the four counters in question.

Referring next to the daily-total-passenger-printing counter B', it is actuated directly from the primary operating-shaft 10, so that one is added thereon every time said shaft is rotated. The means for effecting this is shown more particularly in Fig. 25 of the drawings. A one-toothed gear 169 is secured on the shaft 10, which shaft passes through the upper end of a bracket 170, lying adjacent to said gear and supported from the rib or flange 7 and cross-bar 131. There are mounted on this bracket two intermeshing idle gears 171 and 172, of which the former lies in the path of the one-toothed gear 169, while the latter meshes with an idle gear 173, loosely mounted on the shaft 155. The gear 173 meshes with the gear-teeth of the units-wheel of the counter B', (here designated by the reference-numeral 174.) Thus each revolution of the operating-shaft adds one upon the daily-total-passenger-printing counter B'.

Passing by for the present the cash-counters G' and G² and considering next the grand-total-passenger counter II', this counter is actuated from the primary operating-shaft 10, the mechanism being shown in detail in Fig. 26 of the drawings. The shaft 10 is provided with a one-toothed gear 175, and a bracket 176, supported on the shafts 10 and 155, serves to support a gear 177, with which the one-toothed gear 175 meshes. The gear 177 meshes with a gear 178, supported on the shaft 155 and meshing with the gear-teeth of the units-wheel of the grand-total-passenger-printing counter II', (here indicated by the reference-numeral 179.) This counter is not reset to zero, but runs continuously, counting up to within one of a million and then beginning over again.

The city-passenger-printing counter I' is operated by the mechanism shown more particularly in Figs. 3 and 27. Upon the rib or flange 7 of the frame there is secured a housing 180, in which is mounted a combined ratchet and gear wheel 181, having gear-teeth flattened on one side, as indicated at 182. This gear-wheel meshes with a pinion 183, mounted loosely on the shaft 155 and

meshing with the units-wheel 184 of the city-passenger-printing counter I'. The wheel 181 is operated by a spring-pawl 185, having one of its faces squared, as indicated at 186, to engage the similarly-squared faces 182 of the wheel 181. The other face of the pawl 185 is inclined or curved, as shown at 187, to slide over the correspondingly-inclined opposite sides of the teeth of the wheel 181. The pawl 185 is mounted to slide in a yoke 188, hung upon a shaft 189, on which the wheel 181 is mounted, said shaft being mounted in the housing 180, and both wheel and pawl-yoke being loosely mounted on the shaft. 189^a indicates a spring mounted in a recess in the pawl-yoke and acting on the pawl 185 to engage it with the teeth of the gear 181. To the free end of the pawl-yoke 188 there is connected an operating-handle 190, which extends downward through an aperture 191 in the base 6 of the main frame, extending below the register-casing a distance sufficient to permit it to be readily grasped by the conductor. It will be understood that, as already stated, this register is to be used for fares collected on traffic over city-railway lines, separately accounted for to the owners of such lines and constituting an account entirely separate from that of the traffic arising upon the interurban line, being frequently collected by a conductor of the city railway, it being customary to turn the entire car over to a crew of city railway employees upon entering upon this part of the run. This printing-counter is therefore entirely independent as to its actuation of the remaining counters and of the setting and operating mechanisms of the machine; but a record is printed therefrom in order to make the record of the machine complete.

The total-cash-printing counters G' and G² are both operated from the same source and to an equal extent, but are separately reset to zero, the counter G' being mounted upon the shaft 84 and being reset at the end of the day, while the counter G² is mounted on the shaft 85 and is reset at the end of each trip. They are actuated in the manner hereinafter described from the primary operating-shaft 10; but the extent of their movement at each actuation is variable, since they may be required to register any amount of cash between the lowest cash fare, five (5) cents, and the highest cash fare, one dollar (\$1.00) in the present instance. This variation in the extent of their operation is controlled by the setting mechanism through the medium of a variable gear, (indicated as a whole by the reference-numeral 192 and shown in detail in Figs. 28 to 34, inclusive.) The gear proper consists of a two-part body comprising the members 193 and 194. The member 193 is rigidly secured to the shaft 10 in any suitable manner—as, for instance, by a pin 195. Said member 193

is provided with a series of grooves 196, in which are arranged to slide gear-teeth 197, the arrangement shown in the present instance being such that the grooves and teeth are radial. The teeth correspond in number with the number of different species of cash fares which the machine is adapted to register, in the present instance twenty. The grooves are shown as formed in the face of the member 193 which abuts against the face of the member 194, and this latter is provided with a cam-groove 198, which receives projections 199, extending outward from the teeth 197. From an examination of Fig. 33 it will be seen that the cam-groove 198 has a portion 200 of relatively small radius and a portion 201 of relatively large radius, the two connected by inclined portions 202. It will be seen that if the member 194 be rotated relatively to the member 193 the teeth 197 will be projected or withdrawn, according as their projections 199 lie in the part 201 or in the part 200 of the cam-groove. Thus each tooth as its projection is operated upon by the inclined part 202 is either projected into operative position or withdrawn into inoperative position, and the number of teeth so projected is determined by the extent of revolution of the member 194 relatively to the member 193. The member 193 has a hub 203, on which the member 194 is mounted to rotate, and said member 194 has the margin of the aperture 204 which receives the hub 203 provided with detent-teeth 205. The member 193 has mounted in the hub 203 a detent-pawl 206, adapted to engage the detent-teeth 205 and hold the two members against accidental displacement from any position to which they may be turned, so as to project a definite number of teeth. This pawl also serves as a locking means to rigidly lock the two members of the gear together when it is in operation. To this end the pawl is provided with a shank 207, which extends to the inner surface of the bore of the hub when the pawl is in engagement between two of the teeth 205, in which position it is held by a spring 208, coiled in a recess 209, in which the pawl is mounted. 210 is a key-bar arranged to slide in a longitudinal groove 211 in the shaft 10 and lying with its face flush with the outer surface of the shaft. This key-bar has a notch 212 cut therein and so located that when the key-bar is in the position shown in Fig. 30, which is its normal position, said notch registers with the end of the shank 207 of the pawl 206. The pawl is therefore free to move inward to permit the teeth 205 to slip past the same when the member 194 is turned, and it is therefore possible to turn said member relatively to the member 193 when the parts are in this position. By means provided for that purpose, which we will hereinafter describe, the key-bar is moved longitudinally of the shaft just before rotation of said shaft begins, and this movement of the key-bar brings the unnotched portion thereof into line with the stem of the pawl, locking the pawl in position, since it cannot then recede, and thereby locking the two members 193 and 194 together in such a way that they must rotate in unison.

The setting of the variable gear by the rotation of the member 194 relatively to the member 193 is effected by means of a clutch which is automatically released when the shaft 10 rotates, but which is normally in engagement with the member 194, said clutch being driven from the setting mechanism. This driving is effected by means of a gear-wheel 213, secured to and turning with the detent-wheel 46 of the setting mechanism. The gear 213 meshes with a gear 214, mounted on the upper end of a vertical shaft 215, which rotates in a suitable bearing 216 in the frame member 9. This shaft carries at its lower end a bevel-gear 217, which meshes with a bevel-gear 218, loosely mounted on the shaft 10. The gear 218 has a hub 219, to which is attached a housing 220, which fits against the outer face of the member 194. Within this housing 220 is arranged a clutch-ring 221, mounted to slide and rotate freely on the shaft 10 and provided with a pin 222, which is adapted to enter a recess 223 in the opposed face of the member 194. The clutch-ring 221 is moved toward the member 194 to effect this engagement by means of springs 224, mounted in recesses 225 in the clutch-ring 221 and bearing against the end of the hub 219 of the gear 218. The hub 219 is provided with a grooved or reduced portion 225^a, on which is mounted a ring 226, which is free to slide longitudinally of the hub on said reduced portion and which extends radially outward beyond the body of the hub 219. This ring is connected to the clutch-ring by means of screws 227, so that said clutch-ring and the ring 226 move in unison. 228 indicates a clutch-lever, the forked upper end of which fits in the groove or space formed within the ring 226 and the adjacent space of the housing 220, said clutch-lever bearing against the ring 226 and acting thereon to disengage the clutch-ring 221 at the proper time. It will be seen that when the clutch-ring is in engagement with the member 194 said member rotates in unison with the setting mechanism, and the arrangement is such that when the setting mechanism moves the actuating-gear 33 to a position such as to actuate the five-cent-fare counter a single tooth will be projected from the variable gear 192. Similarly when the setting mechanism is so moved as to operate the ten-cent-fare counter two teeth will be projected from the variable gear, and so on throughout the range of cash-fare counters, the number of teeth projecting from the gear

being always equal to the number of times five cents will go into the cash fare which the actuating-gear is set to operate. When the actuating-gear is set to operate any of the paper-fare counters, no teeth are projected from the gear 192.

The clutch-lever 228 is provided with a pivot-lug 229 between its ends, by means of which it is pivoted on a stud-shaft 230, mounted in a projection 231 from the frame member 9. The lower end of the clutch-lever 228 is operated on by a collar 232, secured on a push-rod 233, mounted to slide transversely of the machine in suitable bearings in the frame members 5 and 9 and in a cross-piece 234, mounted on the flanges 7 and 8. This push-rod is actuated in one direction by the operating-sector 11, as shown more particularly in Fig. 38 of the drawings. The sector is provided with a projection 235, and the push-rod 233 is provided with a collar 236, having a projection 237, which lies in the path of the projection 235. The projection 235 is a yielding projection, being mounted to slide in a suitable housing 238 and being backed by a spring 239, while its rear side is beveled off, as indicated at 240. It results from this construction that upon the beginning of the operative stroke of the sector 11 the projection 235 will engage the projection 237 and move the rod 233 to the right in Fig. 38. Upon the return stroke of the sector the projection 235, which is, in fact, a yielding tooth or pawl, will recede, so as to permit it to pass the projection 237 on the push-rod. The push-rod is normally forced toward the sector, or to the left in Fig. 38, by means of a suitable spring, and I have shown for this purpose a spring 241, coiled around the rod 233 and bearing at one end against a collar 242, secured upon said rod, the other end of said spring bearing against any suitable fixed abutment—as, for instance, the frame member 9. Thus it will be seen that as soon as the sector begins its operative stroke the clutch-lever 228 will be operated in such a way as to disconnect the setting mechanism from the gear member 194. At the same time the key-bar 210 is moved longitudinally in the manner hereinbefore described to bring the unnotched portion thereof into line with the stem of the pawl 206 to lock the two gear members together. This is effected by means of an arm 243, secured to the push-rod 233, so as to move in unison therewith, and having at its upper end two collars 244, mounted to slide on the shaft 10, which rotates freely within them. The key-bar 210 is provided with a radial projection 245, which lies between the collars 244, so as to be engaged and moved thereby, and it will thus be seen that the position of the key-bar is controlled by the position of the push-rod 233, said key-bar act-

ing to lock the two members of the variable gear together when the push-rod is moved over by the actuating-sector and releasing the two members to permit rotation of the member 194 relatively to the member 193 when the push-rod returns to its normal position. By means of this same arm 243 provision is made for locking the gear member 193 against rotation, while the gear member 194 is rotating or free to rotate. To this end the arm 243 is provided with a pin 246, while the gear member 193 is provided in its outer face with an aperture or recess 247, adapted to be engaged by the pin 246. In the normal position of the parts, as shown in the drawings, the pin 246 is in engagement with the recess 247, and the gear member 193 is locked against rotation, while the gear member 194 is free to rotate. As soon as the actuating-sector 11 begins its stroke the push-rod 233 moves the arm 243 away from the gear member 193 and disengages the pin 246 from the recess 247. As soon as this disengagement occurs the shaft 10 begins to rotate and the variable gear rotates along with it. In the meanwhile the projection 235 has passed clear of the projection 237, and the spring 241 tends to return the push-rod 233 to its normal position. This is prevented, however, by the fact that the pin 246 bears against the outer face of the member 193 of the variable gear, thus holding the push-rod in the position to which it was moved by the actuating-sector until the variable gear has made one complete revolution, whereupon the recess 247 again comes into alinement with the pin 246, and the push-rod is free to move back to its normal position. While thus held by the bearing of the pin against the variable gear, the push-rod holds the clutch connection from the driving mechanism to the gear member 194 open and also holds the pawl 206 locked. As soon as the push-rod is released by the entry of the pin 246 into the recess 247 the connection between the gear members is unlocked and the clutch connection between the gear member 194 and the setting mechanism is reestablished. A stop projection 247^a is formed upon the outer face of the gear member 193 and is so arranged as to come into contact with the arm 243 at the completion of the revolution of the variable gear, thus forming a positive stop independently of the pin 246.

The teeth 197 of the variable gear 192 mesh with a pinion 248, carried by a sleeve 249, mounted loosely on the shaft 155. This sleeve has ratchet connections at its ends with two pinions 250 and 251, also mounted loosely on the shaft 155, the ratchets being held in yielding engagement by a spring 252, coiled on said shaft. The pinion 250 meshes with the gear-teeth of the primary wheel of the counter G', (here indicated by the reference-

numeral 253,) while the pinion 251 meshes with the primary wheel of the counter G², (here indicated by the reference-numeral 254.) Thus the two cash-counters are actuated simultaneously from the variable gear, and the extent of their revolution corresponds to the extent of the cash fare which is being registered by the machine, while the printing characters carried by their printing-wheels are such as to print in dollars and cents the total amount of cash registered by the machine up to the time of printing the record. The ratchet connections between the sleeve 249 and the gears 250 and 251 (shown in Fig. 8 at 255 and 256, respectively) cause said gears to rotate in unison with the pinion 248 in one direction to actuate the counters, but permit the counters to be separately reset by the resetting mechanism hereinbefore described without causing the resetting of one of said counters to effect the other.

In order to prevent overthrow of the total-cash-adding counters, we provide means for locking the pinion 248 against movement at the end of the operative period of the variable gear 192. For this purpose we employ a sliding bar 248^a, mounted in suitable guides 249^a in the flanges 7 and 8. This bar is extended in an arched form over the counters, its end being provided with a tooth 250^a, arranged to engage between the teeth of the pinion 248. Said bar is held normally out of engagement with the pinion 248 by means of a spring 251^a, which bears against a collar 252^a on the bar 248^a and against a washer 253^a, which in turn abuts against the flange 8. The arm 254^a extends upward from the bar 248^a and is arranged in the path of a cam 255^a on the outer face of the member 193 of the variable gear 192. As said variable gear approaches the end of its stroke said cam engages said arm and moves the bar rearward against the action of its spring, so as to cause the tooth to engage with the pinion 248 just as the last tooth of the variable gear passes clear of said pinion, locking it against movement until the cam passes clear of the arm just at the completion of the revolution of the variable gear.

The group of number-printing wheels (indicated by the reference character J') comprises a plurality of printing-wheels 257, 258, and 259, there being three of these wheels shown in the present instance. Each wheel has the printing characters from "0" to "9" on its periphery, and the group is used to print the car-number on the record, any suitable number of wheels being employed. These wheels are provided with gear-teeth at their sides, with which mesh pinions 260, 261, and 262. The pinion 262 is mounted on a sleeve 263, which has a suitable bearing in the frame member 5, outside of which it extends, and is provided with a combined operating and index wheel 264 outside of the casing. The

pinion 261 is mounted on the end of a sleeve 265, which fits within the sleeve 263, extends outward beyond the same, and is provided with a combined operating and index wheel 266. The pinion 260 is mounted on a shaft 267, which has its bearing within the sleeve 265, and which extends beyond the same and receives a combined operating and index wheel 268. By means of these wheels and the pinions which they operate the printing-wheels may be set so as to print any desired number, that number being the number of the car in which the machine is located for the time being.

The number-printing wheels K' and L', which serve to identify the persons operating the machine, will be hereinafter referred to in connection with the locking mechanism with which they cooperate.

Referring now to the printing-counter A of the front row, which prints the station-number, the same is operated from the shaft 67, which is the resetting-shaft for the front row of counters, the construction being such that each time said shaft is rotated to reset to zero the counters thereon the wheels of the printing-counter A will be advanced one unit. This resetting operation occurs at each station, so that the act of resetting these counters to zero at the station sets the station-printing counter to print the proper number for the next station-record. In this connection we have made provision for causing said printing-wheels to rotate in either direction, since it is obvious that if the stations are numbered in regular order for the trip in one direction, which may be termed the "out" trip, then these stations will occur in the reverse order during the return or "in" trip. We have also made provision for setting these number-printing wheels to any desired station-number for the beginning of the trip, since the car may sometimes begin its run at a station lying between the terminals of the line. Furthermore, provision has been made for indicating to the operator the particular station-number which the wheels are at any time set to print. The mechanism by which this is accomplished is shown more particularly in Figs. 43 to 45, inclusive. The printing-wheels are mounted loosely on the shaft 67, the units-printing wheel (indicated by the reference-numeral 269) having a gear 270 on one of its sides and a single tooth 271 on the other of its sides. A shaft 272 is mounted in a suitable bearing in the frame member 4, being operated from a hand-wheel 273 outside the casing, mounted on a shaft 273^a, carrying a gear 273^b, which meshes with a gear 289 on the shaft 272. The shaft 272 has at its inner end a pinion 274, which meshes with the gear-teeth 270, carried by the units-wheel 269.

275 indicates a transfer-wheel mounted loosely on the shaft 272 and meshing with a

gear 276 on the side of the tens-wheel 277 of the printing-counter, said transfer-wheel also lying in the path of the single tooth 271 of the units-wheel 269. The printing-wheels 269 and 277 have the printing characters from "0" to "9" on their peripheries, and by reason of the construction just described said wheels may be so turned as to print any desired number within their capacity, such turning being effected from the exterior of the casing by means of the hand-wheel 273.

In order to indicate the position of the printing-wheels, we employ the following mechanism: On the shaft 272 there is mounted a pinion 278, which meshes with a gear-wheel 279, having ten teeth, one of which (indicated at 280) is a double tooth. 281 indicates a second gear-wheel, also provided with ten teeth, said teeth lying in the path of the double tooth of the gear-wheel 279. These wheels have upon their outer faces, preferably on their teeth, the numerals from "0" to "9," inclusive, and the casing is provided with slots or sight-openings 282, (shown in Fig. 43,) through which one of the numbers of each of the said wheels is visible. The wheels 279 and 281 turn in unison with the wheels 269 and 277, respectively, so that whatever numbers on the printing-wheels are turned to printing position the same numbers will be visible on the indicating-wheels 279 and 281 through the sight-openings 282, thus showing the operator just what the position of the printing-wheels is at any time and also enabling him to set them by hand to any desired position. The indicating-wheels are mounted on a plate 283, supported from the frame member 4 by a stud 284. A housing 285 contains a spring-actuated detent-pawl 286, which, engaging the teeth of the wheel 281, holds the same in position against accidental displacement. It will be understood, of course, that the printing-wheels 269 and 277 are provided with similar detent-pawls 287, mounted in the cross-bar 75.

The operation of the printing-wheels from the shaft 67 is effected by the mechanism illustrated more particularly in Fig. 44 of the drawings. In this construction, 288 indicates a one-toothed gear, secured on the shaft 67. The gear 289 on the shaft 272 may be driven from the one-toothed gear 288 either through a single intermediate gear 290 or through a train of two gears 291 and 292, so that rotation of the shaft 272 will be in one direction when it is driven through the gear 290, which meshes directly with the gear 289, and will be in the opposite direction when it is driven through the gear 291, which meshes with the gear 292, which in turn meshes with the gear 289. We provide means whereby either the gear 290 or the gear 291 may be moved into the path of the one-toothed gear 288, and this means com-

prises a yoke or support 293, pivotally mounted on the shaft 272 and carrying on one side the gear 290 and on the other side the gears 291 and 292. This yoke or support is vibrated by means of a connecting-rod 294, pivoted at its free end to one end of the yoke, as indicated at 295. The other end of the connecting-rod embraces an eccentric 296 on the inner side of the gear 297, mounted on the frame member 4. The gear 297 is actuated by a pinion 298, carried by a sleeve 299, mounted to rotate in unison with a shaft 300, which extends out through the casing and is provided on its outer end with an operating hand-wheel 301. The sleeve 299 is free to slide longitudinally on the shaft 300, being provided with a slot 302, which receives a pin 303, projecting from the shaft 300. The sleeve 299 abuts against a fixed collar 304, against which it is held by means of a spring 305, coiled around the shaft 300. The sleeve is provided with a tooth 306, while the collar is provided with a corresponding notch 307, the tooth and notch being preferably beveled or inclined on one side and straight on the other side. The normal position of the parts is that shown, with the tooth in engagement with the notch, where it prevents rotation of the shaft 300 in one direction, but permits its operation in the other direction, while acting as a detent to hold the parts in position and prevent accidental displacement thereof. The gear 297 has an outwardly-extending shaft 308 projecting from its central portion through the casing, and said shaft carries at its outer end an index-finger or pointer 309, while the casing has on its exterior the words "In" and "Out," arranged on opposite sides of the path of the pointer 309, as shown in dotted lines in Fig. 43. The gear 297 has double the number of teeth of the pinion 298, so that each complete revolution of the shaft 300 will give to the gear 297 and pointer 309 a half-revolution. Assuming that the parts are in the position shown, with the pointer directed to the word "Out," the parts are then in such a position that the gear 290 lies in the path of the gear 288, and each rotation of the shaft 67 will increase by one unit the number in printing position on the printing-wheels 269 and 277 and on the indicating-wheels 279 and 281. When the end of the trip is reached, the shaft 300 is given one revolution by means of the hand-wheel 301, the sleeve 299 being slid outward along said shaft against the action of the spring 305 by reason of the tooth 306 riding upon the inclined portion of the recess 307 and around the flat face or end of the collar 304 until it again registers with the recess 307 and, dropping into the same, notifies the operator by its resistance to further rotation of the completion of the rotatory movement of the shaft 300. This complete rotation of the pinion 298 imparts a half-rotation to the gear 297, and the latter

through its eccentric 296 and connecting-rod 294 swings the yoke 293 around into a position such as to move the gear 290 out of the path of the gear 288, at the same time moving the gear 291 into said path. A further rotation of the shaft 67, always in the same direction, at the times when the counters of the front row are reset to zero at the several stations during the return trip will cause the number which is in printing position on the printing-wheels 269 and 277 to be diminished by one unit for each rotation of the shaft 67, thus printing the station-numbers in reverse order, which is the order in which they recur during the return or in trip. At the same time the half-revolution of the gear 297 shifts the pointer 309 around to the word "In" on the exterior of the casing, and these indicating words on the casing, in conjunction with the pointer, show the conductor whether the mechanism is arranged to print the station-number for the out or in trip, or, in other words, whether the mechanism will actuate the counters in a forward or reverse direction.

The two groups of printing-wheels K, and L' are identifying devices of the character set forth in Letters Patent No. 797,598, granted August 22, 1905, upon an application filed by Wilfred I. Ohmer. The reference to said prior Letters Patent will suffice for an explanation of the details of their construction and mode of operation. It is sufficient for the present to state that the identifier K' is operated by the cashier or inspector and is alined and prints with the printing-wheels of the rear row, while the identifier L' is operated by the conductor and is alined and prints with the printing-wheels of the front row. The identifier K' consists of a plurality of printing-wheels 310 and a longitudinally-slotted rotating shaft or barrel 311, which receives the cashier's key 312. The identifier L' consists of a plurality of printing-wheels 313 and a longitudinally-slotted rotatable shaft or barrel 314, which receives the conductor's key 315. The keys of each set differ among themselves in such a way that each key turns the printing-wheels in position to print a distinctive identifying number or group of other characters. The rotation of these keys not only serves to turn the identifying printing-wheels into proper operative position, but also controls certain locking mechanisms, whereby not only the actuating and setting mechanisms of the machine, but also the printing mechanism, are controlled. For a proper understanding of the relations of these parts it is therefore necessary to first describe the printing mechanism, which, it may be stated, is in the nature of an improvement upon the printing mechanism set forth in Wilfred I. Ohmer's prior Letters Patent, No. 764,494, of July 5, 1904.

The lower part 2 of the frame supports, as

already stated, the "printing mechanism," by which term we designate the means for inking the printing-surface, taking an impression thereof upon the web of paper, and feeding the paper. The lower portion or base of the frame comprises two parallel side pieces 316, suitably connected together by transverse connecting rods or bars 317 and 318, so as to form a rigid frame having the side members 316 parallel. These side members are provided on their inner faces with flanges 319 and 320 at the top and bottom, said flanges forming guideways to receive the printing-carriage 321, which slides therein. This printing-carriage consists of two side members 322, fitting and sliding in the guideways of the frame members 316 and connected by cross-bars 323, 324, 325, and 326, so as to form a rigid carriage which supports the inking and impression rollers. The former of these (indicated at 327) has the ends of its shaft 328 mounted in bearing-recesses 329 in the end plates 330 of the ink-trough 331. These end plates are hung loosely upon the cross-piece 325 and are pressed upward, so as to press the inking-roller against the printing-surface by means of springs 332. These springs are coiled upon the cross-bar 325, their inner ends being engaged with a fixed collar 333 on said cross-bar, while their outer ends are engaged with the end plates 330. The cross-bar 326 operates as a stop to limit the upward movement of the ink-trough and inking-roller, the forward edge of the trough contacting with said cross-bar for that purpose, as shown in Fig. 7. The impression-roller (indicated as a whole by the reference-numeral 334) is mounted on a shaft 335, which is free to move vertically in slots 336, formed in the carriage members 322. Said shaft 335 has its extremities reduced, as indicated at 337, and these reduced extremities travel in guide-grooves 338, formed in the inner faces of the side members 316 of the lower portion 2 of the main frame of the machine. From the central part 339 of each groove 338 said groove has a horizontal portion 340 extending toward the front of the machine and a horizontal portion 341 alined with the horizontal portion 340, but extending toward the rear of the machine. The said groove has a downwardly and forwardly inclined portion 342 connecting with its central portion 339 and with a lower forwardly-extending horizontal portion 343, which is connected by an upwardly and forwardly inclined portion 344 with the front end of the portion 340. Similarly there extends from the rear end of the portion 341 a downwardly and forwardly inclined portion 345, which is connected by a lower horizontal portion 346 with an upwardly and forwardly inclined portion 347, which leads to the central portion 339 of the groove. In the bottom of each guiding-groove 338 there is formed a cam-groove 348

in which fit pins 349, mounted to slide axially in the reduced ends 337 of the shaft 335, said pins being backed by springs 350, which act to force the pins outward. Said springs are located in recesses 351 in the reduced ends of the shaft 335, in which recesses the pins fit and slide, said pins being provided with shanks 352, extending into the coils of the springs. Each cam-groove 348 is provided in the portion 344 of the guiding-groove 338 with an incline 353, which terminates in a shoulder 354 where the portions 344 and 340 of the guiding-groove 338 unite. Each cam-groove 348 is further provided with an incline 355 in the portion 340, terminating in an abrupt shoulder 356 where the portions 340 and 342 of the guiding-groove 338 unite. Each cam-groove 348 is further provided with an incline 357 in the part 347 of the guiding-groove 338, said incline terminating in a shoulder 358 where the portions 347 and 341 of the guiding-groove 338 unite. It follows from this construction that, assuming that the parts are in their normal position, with the impression-roller so located that its shaft is central with respect to the guiding-grooves 338, movement of the printing-carriage in a forward direction will cause the impression-roller to first move downward, since the spring-pins 348 at the end thereof cannot pass the shoulders 356, and the ends of the shaft are compelled to follow the portions 342 of the guiding-grooves 338, thus moving the impression-roller downward. The ends of the shaft of the impression-roller then pass along the lower or depressed horizontal portions 343 of the guiding-grooves and thence upward and forward along the portions 344. During this portion of the movement the inking-roller is supplying ink to the portion of the printing-surface consisting of the printing-wheels of the front row, and the impression-roller is held clear of said printing-surface during this operation. As the impression-roller moves upward and forward the cam inclines 353 press back the spring-pins 349 until the shoulders 354 are reached, when these pins are projected outward and by their contact with said shoulders prevent the impression-roller from returning by the same path. Therefore during the return movement of the carriage the ends of the impression-roller shaft travel in the portions 340 of the guiding-grooves, pressing the impression-roller against the paper and this latter in turn against the printing-surface, so as to take an impression thereof upon the paper. Before reaching the central or original position again the pins 349 are again pressed back, this time by the cam-inclines 355, until they pass the shoulders 356, which, as already stated, prevent the impression-roller from returning along the portions 340 of the guiding-grooves during the return stroke. Assuming, on the other hand, that

the movement of the carriage from its central position is toward the rear of the machine, the ends of the impression-roller first travel along the upper horizontal portions 341 of the guiding-grooves, thereby taking the impression from the printing-surface upon the paper. Returning, said ends descend by gravity along the portions 345 of the guiding-grooves and return along the lower horizontal portions 346 of said grooves, being thus held clear of the printing-surface during the return stroke. As the ends of the impression-roller shaft travel up the portions 347 of the guiding-grooves the spring-pins 349 are pressed back by the inclines 357 until they pass the shoulders 358, which latter prevent the impression-roller from entering the portions 347 of the guiding-groove during its outward or impression stroke to the rear. It will be understood, of course, that the rearward travel of the impression-roller prints from the printing-wheels of the rear row and from the printing-plate associated therewith, to which reference will be hereinafter made.

It will be seen that movement of the printing-carriage to the front from its central or normal position will print an impression upon the paper from the front row of counters, while movement of said carriage to the rear from said central position will print an impression from the rear row of counters.

The movement of the printing-carriage is imparted to it by the following mechanism: Each of the members 322 of said carriage is provided at its upper edge with a rack 359. A printing-shaft 360 is mounted in the upper portion 1 of the frame, extending transversely across the same, having its bearings in the members 4 and 5 thereof and extending beyond said members at each end for the purposes hereinafter set forth. Said printing-shaft has secured on it two gear-wheels 361, which mesh with the rack 359, and therefore serve to move the carriage in one direction or the other, according to the direction in which the shaft 360 is rotated. It may be here noted that the upper guide-flanges 319 are cut away, as indicated at 362, to permit the gears 361 to mesh with the racks 359. The printing-shaft 360 is extended at one side of the machine, as shown in Fig. 5, to receive a suitable operating means, shown in the present instance as a sleeve 363, having a polygonal recess in its end to receive a key or crank-handle located outside of the casing of the machine. At its opposite end the projecting end of the shaft 360 carries a disk 364, having an eccentric pin 365 thereon, which serves to operate the paper-feeding mechanism. This pin is preferably provided with a roller in order to reduce the friction. The pin enters a cam slot or groove 366 in a gear-segment 367, which is loosely mounted on a bearing-sleeve 368, in which the shaft 67 has

its bearing at one end. The normal position of the parts is that shown in Fig. 4, with the pin 365 in the central portion of the cam-slot. It will be understood, of course, that the pin 365, being carried by the shaft 360, is given a half-revolution or travels in a semi-circular arc either in one direction or the other, according to whether the conductor or cashier operates said shaft, there being mechanism, hereinafter described, provided for restricting the operative movement of the printing-shaft in the manner just specified. When the conductor operates the printing mechanism, the movement of the pin 365 is downward and forward from the position shown, and the lower portion of the cam-slot 366, through which the pin then travels, is so shaped as to give the gear-segment 367 a very small movement of oscillation, this being because of the fact that the printing is then done from the front row of printing-wheels, the impression from which consists of only a single line, and therefore requires a relatively small feed of the paper. The movement of the pin 365 when the printing mechanism is operated by the inspector is in a direction upward and forward from the position shown, and the upper portion of the cam-slot 366, through which the pin then travels, is so shaped as to give to the gear-segment 367 a relatively large movement of oscillation, this being so because the impression is then being taken from the rear row of printing-wheels and the printing-plate associated therewith, and the impression is a relatively extensive one from top to bottom, requiring a considerable feeding forward of the paper. The extent of the feed is regulated by the extent of movement of the gear-segment 367, which latter meshes with a pinion 369, loosely mounted on the shaft 370 of the upper feed-roll 371. This upper feed-roll is shown in the present instance as divided into three separated sections, bearing upon the paper at its center and edges only, so as to avoid as far as possible contact with the impression thereon. This upper feed-roll is preferably constructed of roughened steel, and its shaft 370 has its bearings in boxes 372 on the side members 316 of the lower portion 2 of the frame. As already stated, the gear 369 is loosely mounted on the shaft 370 and is provided on its inner face with a ratchet clutch member 373, with which coöperates a ratchet clutch member 374, splined on the shaft 370, so as to rotate in unison therewith, and held in engagement with the clutch member 373 by means of a spring 375. Thus rotation of the gear-segment 367 in the direction indicated by the arrow in Fig. 4 will rotate the feed-roller, while rotation of said gear-segment in the opposite direction will merely rotate the gear 369, the feed-roller remaining stationary. The cam-slot 366 is so constructed that dur-

ing the movement of the printing-carriage to print from the front row of printing-wheels the feeding movement occurs during the outward movement of the printing-carriage and when the printing-carriage is being employed to take an impression from the rear row of printing-wheels the feeding movement occurs during the inward or return movement of the carriage toward its central position. Thus the feeding movements are arranged to occur at the times when the impression-roller is held away from the printing-surface by the guiding-grooves provided for that purpose.

376 indicates a feed-roller coöperating with the feed-roller 371, it having, preferably, a rubber body secured on a shaft 377. The shaft 377 is provided at one end with a gear 378, which meshes with a similar gear 379 on the end of the shaft 370, so that the two feed-rollers revolve in unison. The shaft 370 is provided at one end with a hand-wheel 380, by which it may be turned by hand to feed out the paper when necessary, and said shaft 370 is further provided with a ratchet-wheel 381, engaged by a pawl 382, mounted on one of the bearings 372, said pawl and ratchet acting to prevent the shaft from turning except in the desired direction. The cross-bar 318 serves to support a ledger-bar 383, having lugs 384, by means of which it is pivotally mounted on the cross-bar. This ledger-bar normally lies closely adjacent to or in contact with the under feed-roller 376, the paper passing over it and its rear edge (indicated at 385) being sharpened to form a tearing edge over which the sheet of paper may be readily torn along a straight line when it is desired to detach from the web within the machine that portion which has been fed out by the feed-rollers and carried the printed records thereon. This ledger-bar may be readily swung back out of the way when it is desired to have access to the feed-rollers for the purpose of introducing the paper between them.

We will now proceed to describe the locking mechanism by means of which the actuating, setting, and printing mechanisms are locked and released.

Referring first to the locking mechanism controlled by the conductor's key, it will be observed that said key (shown in detail in Fig. 60 of the drawings) has in addition to the three projections 386 which operate the number-printing wheels of the identifier a projection or tooth 387, located so as to be outside of the frame member 5 when the key is in position. This projection coöperates with a lever 388, pivotally supported on the outer side of the frame member 5, its pivot being indicated at 389. Said lever has a downwardly-extending arm 390, which swings or travels immediately above the barrel 314, which receives the conductor's key, said arm having at its lower end a notch 391,

which is adapted to receive the tooth 387 of said key. Thus when the lever 388 is in locking position, which is indicated in full lines in Fig. 58 and shown in Fig. 5, if the conductor's key is inserted and turned the tooth 387 will engage the notch 391 and will swing the lever 388 over into the position shown in dotted lines in Fig. 58, which is its unlocking position. Similarly when the conductor's key is turned back to its original position prior to withdrawing it the tooth 387 will again engage the notch 391 and swing the lever 388 back into locking position. It will be noted that the lower end of the arm 390 of said lever on each side of the notch 391 is rounded or concave, as indicated at 392 and 393, to fit against the barrel 314 when the lever is in either of its positions, acting as a stop to limit the throw of the lever. The arm 390 of the lever 388 has pivoted thereto at 394 one end of a locking-bar 395 which passes through a suitable guide 396, and terminates adjacent to the projecting end of the actuating-shaft 10. Said end of the actuating-shaft is provided with a collar 397, having therein a notch or recess 398, adapted to receive the end of the locking-bar 395. When the lever 388 is moved into locking position, the end of the locking-bar 395 enters the notch 398 and prevents rotation of the shaft 10, it being understood that said shaft, as already stated, makes one complete revolution at each actuating movement, always stopping with the notch or recess in line with the locking-bar. The lever 388 is further provided with an arm 399, to which is pivoted at 400 the lower end of a locking-bar 401, which extends upward through a suitable guide 402, its upper end being adapted to engage between the teeth of a notched collar or locking-disk 403, secured on the end of the setting-shaft 40, and provided with a number of notches equal to the number of positions which the setting mechanism determines—twenty-four in the present instance. The arrangement is such that a notch will always be opposite and in position to register with the end of the locking-bar 401 after the setting mechanism is operated, and when the locking-lever 388 is thrown into locking position said end of the locking-bar will engage with the notched disk and lock the setting mechanism against movement. We have shown means for holding the locking-bars in the position to which they may have been moved, having particularly illustrated the detent mechanism for the locking-bar 401 in Fig. 56 of the drawings. Here it will be seen that the guide 402 has mounted therein a pin 404, acted on by a spring 405, which causes it to project into the interior of the guide in position to engage either one of two notches 406 formed in the locking-bar. The guide 396 has a similar detent provision.

The lever 388 is provided with a third arm 407, terminating in lugs 408 and 409, in the path of which lies a pin 410. This pin projects from a locking-bar 411, sliding in a guideway in the frame member 5 and adapted to be projected downward through an aperture 412 in the top flange 319 of one of the side members 316 of the lower portion of the frame, so as to be projected downward in front of the printing-carriage, as shown in Fig. 55. When the locking-bar 411 is in this position, the printing-carriage cannot move forward from its central position. When the locking-lever 388 is moved to unlocking position, however, the locking-bar 411 is lifted so as to permit the carriage to move forward from its central position. Thus it will be seen that when the barrel 314, which receives the conductor's key, is in position to permit the insertion and withdrawal of said key the actuating and setting mechanisms of the register are locked, and the printing-carriage is locked against taking an impression from the printing-counters of the front row, and these parts can only be released by inserting a conductor's key and turning the same to unlock the said parts.

We have also made provision for compelling the conductor to print a record before removing his key, this mechanism being shown more particularly in Figs. 56, 57, and 58. Upon the barrel 314 there is secured a collar 413, having therein a notch 414. On the frame member 5 there is mounted a locking-dog 415, supported in a housing 416 and acted on by a spring 417, which causes a tooth 418 of said locking-dog to bear against the collar 413 and enter the notch 414 thereof when it registers with said tooth. In the operation of the device when the barrel 314 is turned in the act of unlocking the parts the notch 414 registers with the tooth 418 just before the completion of the revolution, and said tooth enters said notch and locks the collar, barrel, and key against turning in either direction. There is loosely mounted on the barrel 314 outside of the collar 413 a second collar 419, having thereon a cam-surface 420, which is adapted to engage a shoulder 421 of the locking-dog 415 and lift the tooth 418 out of the notch or recess 414. This collar 419 is held normally in the position shown in full lines in Fig. 57 by means of a detent-pin 422, mounted in a recess 423 in the frame member 316 and normally pressed upward to engage a notch 424 in the collar 419 by means of a spring 425. The collar 419 is provided with a projection 426 on its periphery, which projection lies in the path of a cam 427 on the printing-shaft 360, said cam being formed in the present instance on the sleeve 363, which is secured on the end of said shaft. The collar 419 is further provided with a stop projection 428, in the path of which lies the locking-lever 388. Assuming

that the conductor's key has been inserted and rotated in the manner hereinbefore described until the locking-dog has engaged with the barrel 314 and locked the parts against movement, this position of said parts being shown in full lines in Fig. 57, it is then impossible for the conductor to withdraw his key or further operate the locking mechanism of the machine until he prints a record. The conductor in printing the record rotates the printing-shaft 360 in the direction indicated by the arrow in Fig. 57, and this rotation causes the cam 427 to engage the projection 426 and rotate the collar 419 a distance sufficient to cause the cam-surface 420 to lift the locking-dog 415 and disengage the tooth 418 thereof from the collar 413. This releases the key-barrel 314 and permits the conductor to return his key to its normal position and remove it. The projection 428 acts as a stop by coming into contact with the locking-lever 388, thus preventing the collar 419 from being thrown too far in one direction by the cam 427. The collar 419 is returned to its normal position by the act of turning the conductor's key back to its released position, the projection 387 of said key engaging the projection 428 for said purpose. The limit of this return movement of the key brings the notch 424 again into engagement with the detent-pin 422 and holds the releasing-collar 419 in normal position ready for the next operation.

Referring now to the locking mechanism associated with the cashier's key and identifier, said locking mechanism is for the purpose of preventing the printing-carriage from being used to print a record from the rear printing-wheels except by a cashier or inspector provided with an identifying-key, by means of which the identity of the person making the record is established. The barrel 311, which receives the cashier's key 312, is provided with a cam 429, which operates a locking-lever 430, pivoted on the outer side of the frame member 5 at 431. This locking-lever has two arms 432 and 433, lying on opposite sides of the barrel 311 and adapted to be alternately engaged by the cam 429, which is of a length such as to positively hold the locking-lever in either of the two positions to which it moves it. These two positions are shown in full and dotted lines, respectively, in Fig. 59, the full lines showing the normal or locking position and the dotted lines the released position. The engagement of the cam 429 with the arm 432 moves the locking-lever to locking position and holds it there, while its engagement with the arm 433 moves the locking-lever to the released position and holds it there. These movements are effected by the rotation of the barrel 311 when the cashier's key is inserted and turned to identifying position. When the parts are in normal position, so

that the key can be inserted and withdrawn, the lever is in locking position, so that the withdrawal of the key insures the locking of the printing mechanism in the manner hereinbefore referred to. The locking is effected by means of a locking-bar 434, arranged to slide in a suitable recess in the frame member 5 and having a pin or projection 435, which engages a slot or notch 436 in the end of the locking-lever 430, said pin extending outwardly through a slot 437 in the frame member 5. When this locking-bar is moved downward into the position shown in Fig. 55, which is its normal position, its lower end lies immediately behind one of the frame members 322 of the printing-carriage and prevents movement of said carriage toward the rear of the machine. When said locking-bar is lifted by the locking-lever 430, it rises above the printing-carriage and permits the same to move rearward. The upper flange 319 of the frame member 316 is cut away, as indicated at 438, for the passage of the locking-bar 434.

We have already referred to the printing-plate which coöperates with the printing-wheels in printing the record of the machine. This plate (indicated by the reference-numeral 439) is shown in detail in Fig. 62 of the drawings, while the record printed therefrom is shown in Fig. 63. The plate is provided with a series of apertures 440, through which the groups of printing-wheels of the front row project to printing position. Above these apertures is a line of printing characters 441, consisting of legends alined with the respective apertures 440 and adapted to print upon the record the designation of the particular numbers lying in the column below. Thus, in the present instance, considered from left to right, these legends or headings are respectively "Station No.," "Total passengers," "Tickets," "Coupons & mileage," "Transfers," "Passes," and the specific cash fares from five cents to one dollar, followed by the "Conductor's No." Above this row of legends the printing-plate has a second row of apertures 442, through which the printing-wheels of the rear row project to printing position. Above this second row of apertures is a row of type-matter or printing characters 443, consisting of legends designating the figures printed below them, respectively. Considered from left to right of the printing-plate, the first legend is "Trip No.," designating the imprint from the printing-counter A'. The next three legends consist of a common heading "Daily totals" and three subheadings, the first being "Tickets, mileage, transfers & passes;" the next, "Passengers;" the last, "Cash." The remaining headings of this row are respectively "Trip cash," "Trip passengers," "Grand total passengers," "City passengers," "Car No.," and "Cashier's No."

Above these legends the printing-plate may bear any suitable matter—as, for instance, the name of the railway employing the machine. We have also shown the plate as provided with printing characters at 444 to print the number of the particular machine or recorder upon the records. We have also shown the plate as provided with an aperture 445, through which project printing-wheels 446, constituting date-printing wheels. These wheels are three in number, carrying respectively, the names of the months and numerals, and operated by three separate operating-wheels 447, connected to the printing-wheels by an arrangement of sleeves and a shaft similar to that described in connection with the car-number-printing wheels 260, 261, and 262. By this means the date on which the record is taken may be imprinted upon the record.

As usual, suitable provision will be made for an alarm of some kind to indicate the fact that a fare has been registered upon the machine. Any suitable provision for this purpose may be employed; but we prefer a bell, such as is shown in the accompanying drawings. In this construction a bracket 448 extends inward from the frame member 4 and supports a bell 449 at its upper end and a bell-lever 450, pivoted between its ends on the bracket at 451. The upper end of said bell-lever has the usual striker 452, while its lower end is bent, as indicated at 453, and lies in the path of a cam 454, secured on the shaft 10. This cam is a spiral cam, terminating in an abrupt shoulder 455. A spring 456, bearing against an abutment 457 on the bracket 448 and an abutment 458 on the bell-lever 449, holds the end 453 out of the bell-lever against the controlling-surface of the cam 454. When the shaft 10 completes its actuating-revolution, the finger 453 slips off the shoulder 455 and the spring 456 throw the bell-lever against a stop 459 on the bracket 448. The upper end of the lever, carrying the striker 452, is carried onward by its inertia, so that the striker strikes the bell to give the alarm and immediately recedes therefrom, so as to not check the tone by continued contact therewith. It will be understood, of course, that the upper portion of the bell-lever is sufficiently resilient for this purpose.

We shall now describe the general operation of the machine and the record which the machine produces, referring to Fig. 63 in connection with this latter.

As already stated, the machine may be adjusted so that the car may start in either direction from any intermediate station of the line through the provision made for the hand adjustment of the station-number-printing wheels of the group A. Assuming, however, that the car starts on its day's work on an "out" trip from station No. 1, all of the

printing-wheels of the front row are turned to zero, as well as the daily total and trip total printing counters, constituting the groups B', B², C', G', and G², while the groups A and A'—the station-number and trip-number groups, respectively—are set to print the number "1." The passenger-indicator is also turned to zero. The number-printing wheels of the car-number group J' are set to print the number of the car in which the machine is mounted, and the date-printing wheels are set to print the proper date, while the wheels of the identifying groups K' and L' are of course at zero, which positions they always assume when the keys are removed. In this initial condition of the machine, the keys having been withdrawn, the printing-carriage is locked against movement in either direction and the setting and actuating mechanisms are both also locked against movement. The conductor thereupon inserts his key in the barrel 314 and turns the same as far as it will go, whereupon the printing-wheels of the identifying group L' are turned into position to print the conductor's identifying-number, and the conductor's key is at the same time locked against both rotatory and longitudinal movement, so that it can be neither turned nor withdrawn. At the same time the setting and actuating mechanisms are unlocked and the locking-bar is withdrawn from in front of the printing-carriage, so that said carriage may be moved to print a record from the front row of counters.

As the conductor collects the fares he sets the machine to indicate the particular kind of fare which he receives, the same being shown by the fare-indicating wheel 63; while the actuating-gear 33 is at the same time moved into position to actuate the corresponding specific-fare-printing counter of the front row. If the fare is a cash fare, the variable gear is so moved that the proper number of teeth are projected therefrom to add the corresponding amount of cash upon the cash-counters. The machine having been thus set to correspond to the specific fare received, it is then actuated by the mechanism for that purpose, which imparts one complete rotation to the primary and secondary operating-shaft 10 and 32. The rotation of the primary shaft 10 serves to add one upon the daily-total-passenger-printing counter B', the trip-total-passenger-printing counter B², and the grand-total-passenger-printing counter H'. If the fare is a cash fare, the rotation of the primary operating-shaft 10 also adds the proper amount of cash upon the daily and trip total-cash-printing counters G' and G² through the medium of the variable gear 192. At the same time upon the completion of the rotation of the shaft 10 the bell 452 is rung to indicate the fact that the fare has been duly registered. The rotation of the secondary actuating-shaft 32 not only adds one upon

the proper specific-fare-printing counter of the front row through the medium of the actuating-gear 33, but also adds one upon the total-passenger-printing counter B through the medium of the gear 83. If the fare is a paper fare, one is also added upon the daily-total-paper fare-printing counter C' through the medium of the gears 33 and 166 and pinion 167. At the same time the rotation of the shaft 32, through the medium of the gear 90 and the train of gears driven therefrom, adds one upon the passenger-indicator, composed of the wheels 86, 87, and 88. The conductor proceeds to thus register each fare received until station No. 2 is reached. He thereupon prints a record from the front row of counters by giving the printing-shaft 360 a half-rotation in the only direction in which he is free to move it. This prints the bottom line of the record shown in Fig. 63, giving the station-number, the total number of passengers, the number of specific fares of each kind received, and the identifying-number of the conductor responsible for their collection and the record. At the same time the conductor's key is unlocked by the cam 427, so that in case there is to be a change of conductors at any station it is possible for the conductor to withdraw his key, at the same time of course locking the machine and turning the identifier L' back to zero. This, however, seldom occurs, and in the ordinary conduct of the business the conductor then resets to zero the printing-counters of the front row by giving to the shaft 67 a rotation in the proper direction. This operation adds one upon the station-printing counter A, thus setting the same into proper position to print the next station-number. The conductor then proceeds to collect fares as before, setting and registering as he collects and at each station printing a record and resetting the fare-counters of the front row to zero.

When the end of the "out" trip is reached, the reversing mechanism for the station-number-printing counter is operated through the medium of the hand-wheel 301, at the same time setting the pointer 309 from "Out" to "In." The collecting and registering of fares and the printing of a record at each station then proceed as before, the resetting to zero of the counters of the front row during the return trip diminishing by one the number printed by the counter A during the "in" trip. When the original starting-station No. 1 has been reached on this portion of the trip, the trip is completed, and the conductor after printing his last record, which is the line immediately below the headings in Fig. 63, turns his key back to its original position and removes it, this being rendered possible by the printing of the last record, which releases the key through the cam 427. The turning back of the conductor's key prior to this removal locks the setting and actuating

mechanisms, through the locking-bolts 401 and 395, and also locks the printing-carriage so that it cannot print from the front row of counters, through the locking-bar 411. The cashier thereupon inserts his key in the barrel 311 and turns the same, thereby setting the identifier K' into position to print the number of the cashier and at the same time withdrawing the locking-bar 434 from behind the printing-carriage, so that it is free to move to the rear and print a record from the rear row of counters and printing-plate. The cashier then proceeds to print this record by giving the printing-shaft 360 a half-rotation in the only direction in which he can move it, which is the direction reverse to that in which it is operated by the conductor. The record thus printed is the upper part of the printed record shown in Fig. 63, being all above the uppermost line of the conductor's record. The trip-totalizing counters B² and H' and the passenger-indicator are then turned to zero by a rotation of the shaft 89, which operation at the same time adds one upon the trip-number-printing counter A', setting it to print the number of the next trip. The cashier thereupon turns his key back to its original position and removes it, thereby again locking the printing-carriage and setting the identifier K' to zero. During the time when the cashier has access to the machine he cannot either set or actuate the machine, nor can he print from the front row of counters. After the cashier has removed his key the machine is again locked as in the first place, and upon starting upon the next trip the same or another conductor must insert his key and unlock his portion of the machine before proceeding to use it. The cashier who takes the final record at the end of the day may, if he deem desirable, print a double record, so as to have a final daily-total record separate from the trip-records. He thereupon resets the daily-total-printing counters C', D', and G' to zero by rotating the shaft 84, at the same time resetting to zero the trip-number-printing counter A'.

It will be understood that in the operation of the printing mechanism the paper is fed forward at each operation, the extent of the feed corresponding with the extent of the record printed. The record will remain locked within the casing, which will be provided with a suitable door or removable part, controlled by a key, to give authorized access to the record. The web of paper containing the record may be torn off and removed, as desired.

We do not wish to be understood as limiting ourselves to the precise details of construction hereinbefore described and shown in the accompanying drawings, as it is obvious that these details may be modified without departing from the principles of our invention.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a machine of the character described, the combination, with a plurality of alined counters, of an operating-shaft arranged parallel with said line of counters, means for rotating said shaft, an actuating member mounted on said shaft, rotating in unison therewith and movable longitudinally thereof, means for moving said actuating member longitudinally of said shaft to bring the same into operative relation with any desired counter, means for actuating said last-mentioned means, and detent mechanism for holding said actuating member in such relation, substantially as described.

2. In a machine of the character described, the combination, with a plurality of alined counters, of an operating-shaft arranged parallel with said line of counters, operating mechanism for rotating said shaft, an actuating member mounted on said shaft, rotating in unison therewith and movable longitudinally thereof, means for moving said actuating member longitudinally of said shaft to bring the same into operative relation with any desired counter, means for actuating said last-mentioned means, and means controlled by said operating mechanism for positively locking said actuating member against longitudinal movement on the shaft during the operative period of said operating mechanism, substantially as described.

3. In a machine of the character described, the combination, with a plurality of alined counters, of an operating-shaft arranged parallel with said line of counters, means for rotating said shaft, an actuating member mounted on said shaft rotating in unison therewith and movable longitudinally thereof, means for moving said actuating member longitudinally of said shaft to bring the same into operative relation with any desired counter, detent mechanism for holding said actuating member in such relation, and means controlled by said operating mechanism for positively locking said detent to hold said actuating member against longitudinal movement on the shaft during the operative period of said operating mechanism, substantially as described.

4. In a machine of the character described, the combination, with a plurality of alined counters for different specific fares, of an operating-shaft arranged parallel with said line of counters, means for rotating said shaft, an actuating member mounted on said shaft, rotating in unison therewith and movable longitudinally thereof, means for moving said actuating member longitudinally of said shaft to bring the same into operative relation with any desired counter, a fare indicator, and means for moving said indicator

in unison with the longitudinal movement of the actuating member to cause said indicator to indicate the fare corresponding with the counter with which said actuating member is in operative relation, substantially as described.

5. In a machine of the character described, the combination, with a plurality of alined specific-fare counters, and a total-passenger counter, of an operating-shaft arranged parallel with said line of counters, an actuating member mounted on said shaft, rotating in unison therewith and movable longitudinally thereof, means carried by said machine for moving said actuating member longitudinally of said shaft to bring the same into operative relation with any one of the specific-fare counters, means for actuating said last-mentioned means, and a second actuating member fixed on said shaft in operative relation with the total-passenger counter, substantially as described.

6. In a machine of the character described, the combination, with a plurality of alined counters, of an operating-shaft arranged parallel with said line of counters, means for rotating said shaft, an actuating member mounted on said shaft, rotating in unison therewith and movable longitudinally thereof, means for moving said actuating member longitudinally of said shaft to bring the same into operative relation with any desired counter, means for actuating said last-mentioned means, a passenger-indicator, a second actuating member secured on said shaft, and means actuated by said second actuating member for operating said passenger-indicator, substantially as described.

7. In a machine of the character described, the combination, with a plurality of alined specific-fare counters, and a total-passenger counter, of a passenger-indicator, an operating-shaft arranged parallel with the alined counters, means for rotating said shaft, an actuating member mounted on said shaft, rotating in unison therewith and movable longitudinally thereof, means for moving said actuating member longitudinally of said shaft to bring the same into operative relation with any desired specific-fare counter, and two other actuating members fixed on said shaft, one in operative relation with the total-passenger counter, the other in operative relation with the passenger-indicator, substantially as described.

8. In a machine of the character described, the combination, with a plurality of alined counters, of an operating-shaft arranged parallel with said line of counters, means for rotating said shaft, an actuating member mounted on said shaft, rotating in unison therewith and movable longitudinally thereof, a screw-shaft arranged parallel with said operating-shaft, and a carriage engaging said

screw-shaft and actuating member to move the latter longitudinally of its shaft when the screw-shaft is rotated, whereby said actuating member may be brought into operative relation with any desired counter, substantially as described.

9. In a machine of the character described, the combination, with a plurality of alined counters, of an operating-shaft arranged parallel with said line of counters, means for rotating said shaft, an actuating member mounted on said shaft, rotating in unison therewith and movable longitudinally thereof, a screw-shaft arranged parallel with said operating-shaft, and a carriage comprising a sleeve mounted to slide on the screw-shaft and having a threaded engagement therewith, and having arms fitted to slide on the operating-shaft and embrace between them the actuating member, substantially as described.

10. In a machine of the character described, the combination, with a plurality of alined specific-fare counters, of an operating-shaft arranged parallel with said line of counters, means for rotating said shaft, an actuating member mounted on said shaft, rotating in unison therewith and movable longitudinally thereof, a screw-shaft arranged parallel with said operating-shaft, a carriage actuated by said screw-shaft and engaging the actuating member to move the same longitudinally of the operating-shaft to bring said actuating member into operative relation with any desired counter, and a fare-indicator rotating in unison with said screw-shaft to indicate the fare corresponding with the counter with which said actuating member is in operative relation, substantially as described.

11. In a machine of the character described, the combination, with a plurality of alined counters, of an operating-shaft arranged parallel with said line of counters, means for rotating said shaft, an actuating member mounted on said shaft, rotating in unison therewith and movable longitudinally thereof, a screw-shaft arranged parallel with said operating-shaft, a carriage actuated by said screw-shaft and engaging the actuating member to move the same along the operating-shaft, a setting-shaft, and gearing connecting said setting-shaft and screw-shaft, whereby a single revolution of the setting-shaft will feed the carriage the entire length of the screw-shaft, substantially as described.

12. In a machine of the character described, the combination, with a plurality of alined specific-fare counters, of an operating-shaft arranged parallel with said line of counters, means for rotating said shaft, an actuating member mounted on said shaft, rotating in unison therewith and movable longitudinally thereof, a screw-shaft ar-

ranged parallel with said operating-shaft, a carriage actuated by said screw-shaft and engaging the actuating member to move the same longitudinally of the operating-shaft, a setting-shaft, a fare-indicator, and gearing connecting said screw-shaft and fare-indicator with the setting-shaft, whereby rotation of said setting-shaft operates the screw-shaft and fare-indicator in unison, substantially as described.

13. In a machine of the character described, the combination, with a plurality of alined specific-fare counters, of an operating-shaft arranged parallel with said line of counters, means for rotating said shaft, an actuating member mounted on said shaft, rotating in unison therewith and movable longitudinally thereof, a screw-shaft arranged parallel with said operating-shaft, a carriage actuated by said screw-shaft and engaging the actuating member to move the same longitudinally of the operating-shaft, a setting-shaft, a fare-indicator, and gearing connecting said screw-shaft and fare-indicator with the setting-shaft, whereby rotation of said setting-shaft operates the screw-shaft and fare-indicator in unison, said fare-indicator being provided with detent mechanism whereby it and the actuating member are held in proper operative position, substantially as described.

14. In a machine of the character described, the combination, with a plurality of alined counters, of an operating-shaft arranged parallel with said line of counters, means for rotating said shaft comprising an actuating-sector, a counter-actuating member mounted on said shaft, rotating in unison therewith and movable longitudinally thereof, a screw-shaft arranged parallel with said operating-shaft, a carriage actuated by said screw-shaft and engaging the counter-actuating member to move the same longitudinally of the operating-shaft, a toothed wheel rotating in unison with said screw-shaft, a yielding pawl engaging said toothed wheel, and a locking-bar operated by the actuating-sector to lock the pawl in engagement with the toothed wheel at the beginning of the stroke of said sector, said sector operating said locking-bar to release said pawl at the end of its stroke, substantially as described.

15. In a machine of the character described, the combination, with a plurality of horizontally-alined specific-fare counters, a selective operating mechanism for actuating any one of said counters, and setting mechanism comprising a rotary setting-shaft, of a fare-indicator consisting of a wheel rotating around a vertical axis, having fare-indicating characters on its periphery, and having a gear connection with said setting-shaft to rotate in unison therewith, substantially as described.

16. In a machine of the character described, the combination, with a plurality of

horizontally-alined specific-fare counters, a selective operating mechanism for actuating any one of said counters, and setting mechanism comprising a rotatory setting-shaft, of a fare-indicator consisting of a wheel rotating around a vertical axis, having fare-indicating characters on its periphery, and having a gear connection with said setting-shaft to rotate in unison therewith, said indicator-wheel rotating in a horizontal plane at the top of the machine above the remaining mechanism, whereby it may be given a maximum circumference without materially increasing the dimensions of the machine, substantially as described.

17. In a machine of the character described, the combination, with two rows of counters, of two operating-shafts arranged parallel with the respective rows and provided with actuating members to operate the counters, means connecting said shafts to cause them to rotate in unison, and means for rotating one of said shafts, substantially as described.

18. In a machine of the character described, the combination, with a row of station-record counters, of a second row of counters comprising trip and daily-total counters, a primary operating-shaft arranged parallel with said second row of counters and having actuating members to operate the same, means for rotating said primary operating-shaft, a secondary operating-shaft arranged parallel with the row of station-record counters and provided with actuating members to operate the same, and means connecting said primary and secondary shafts to cause them to rotate in unison, substantially as described.

19. In a machine of the character described, the combination, with an alined row of counters, an operating-shaft parallel therewith, an actuating member rotating with and movable longitudinally of said shaft, means carried by said machine for moving said actuating member into operative relation with any desired counter and means for actuating said last-mentioned means, of mechanism controlled by the operator for imparting to said shaft a complete revolution for each operation of said mechanism, substantially as described.

20. In a machine of the character described, the combination, with a counter, of an operating-shaft provided with an actuating member, a pinion loosely mounted on said shaft, a ratchet-clutch connecting said pinion and shaft, and an actuating-sector meshing with said pinion and adapted to impart to said shaft a single revolution in one direction only, substantially as described.

21. In a machine of the character described, the combination, with a counter, of an operating-shaft provided with an actuating member, a pinion loosely mounted on

said shaft, a ratchet-clutch connecting said pinion and shaft, and an actuating-sector meshing with said pinion and adapted to impart to said shaft a single revolution in one direction only, said sector moving in a plane parallel with the shaft, substantially as described.

22. In a machine of the character described, the combination, with a counter, of an operating-shaft provided with an actuating member, a pinion loosely mounted on said shaft, a ratchet-clutch connecting said pinion and shaft, and an actuating-sector meshing with said pinion and adapted to impart to said shaft a single revolution in one direction only, said sector being provided with means for limiting its movement in each direction, substantially as described.

23. In a machine of the character described, the combination, with a setting mechanism comprising a toothed detent-wheel, a pawl adapted to engage said wheel, a longitudinally-sliding locking-bar adapted to lock and release said pawl with relation to said wheel, a lever engaging said locking-bar to move the same longitudinally, said lever being provided with adjacent projections, an operating-shaft, and an actuating member for said operating-shaft moving first in one direction and then in the opposite direction, said actuating member having a projection which engages with one of the lever projections at the beginning of its movement to move the locking-bar in one direction, said projection engaging with the other lever projection at the close of its return movement to move the locking-bar in the opposite direction, substantially as described.

24. In a machine of the character described, a detent-wheel provided with V-shaped notches between its teeth, a pawl sliding radially with respect to the said wheel and having a correspondingly-shaped engaging end, a locking-bar engaging said pawl and having an inclined surface which acts to force the pawl positively into full engagement with the detent-wheel, and means for actuating said locking-bar, substantially as described.

25. In a machine of the character described, a plurality of specific-fare counters, some of which are cash-fare counters and others of which are counters for fares other than cash, selective mechanism for operating any one of said counters comprising an actuating member movable longitudinally of said counters, a totalizing-counter for fares other than cash, means for actuating said totalizing-counter when any one of the counters for fares other than cash is actuated, a total-cash-adding counter, and means for adding on said cash-adding counter an amount equal to the specific cash fare of any one of the cash-fare counters when said cash-fare counter is actuated, substantially as described.

26. In a machine of the character described, a plurality of alined specific-fare counters, some of which are cash-fare counters, and others of which are for fares other than cash, an operating-shaft arranged parallel with said line of counters, an actuating member rotating with said shaft and movable longitudinally thereof, means for moving said actuating member along said shaft to bring it into operative relation with any one of the counters, means for rotating said shaft to cause said member to actuate said counter, a totalizing-counter for fares other than cash, and a gear operatively connected with said totalizing-counter and extending parallel with the operating-shaft coextensively with the portion thereof occupied by the actuating member in operating the counters for fares other than cash, whereby said actuating member will operate said totalizing-counter whenever one of the counters for fares other than cash is operated, substantially as described.

27. In a machine of the character described, a plurality of specific-fare counters, a selective operating mechanism whereby any one of said counters may be operated, said mechanism comprising a single-revolution operating-shaft and a setting mechanism having a rotatory setting-shaft, a cash-total-adding counter comprising an operating-pinion, a variable gear mounted on the operating-shaft, rotating in unison therewith and meshing with the pinion, and means connecting the setting-shaft and variable gear whereby the number of teeth projected from said gear will correspond with the specific-fare counter for which the setting mechanism is set, substantially as described.

28. In a machine of the character described, a plurality of specific-fare counters, a selective mechanism whereby any one of said counters may be operated, said mechanism comprising a single-revolution operating-shaft, and a setting mechanism having a rotatory setting-shaft, two cash-total-adding counters, an operating-pinion for said counters, ratchet-clutch connections between said pinion and counters whereby said counters are operated in unison but may be separately reset to zero, means for separately resetting to zero said counters, a variable gear mounted on the operating-shaft, rotating in unison therewith and meshing with the pinion, and means connecting the setting-shaft and variable gear whereby the number of teeth projected from said gear will correspond with the specific-fare counter for which the setting mechanism is set, substantially as described.

29. In a machine of the character described, an operating-shaft, in combination with a variable gear comprising two members, one fixed on said shaft and the other normally free to rotate relatively thereto,

gear-teeth mounted to slide in the first-mentioned member, the other member having a cam engaging said gear-teeth to project and retract the same into and out of operative position, means for rotating said cam member, means for simultaneously disconnecting said cam member from its rotating mechanism and locking together the two members of the variable gear, and means for imparting to the operating-shaft a single rotation, said last-mentioned means controlling the mechanism whereby the cam member of the variable gear is released from its driving mechanism and locked to the other member, substantially as described.

30. In a machine of the character described, an operating-shaft, in combination with a variable gear mounted thereon and comprising two members, one secured on the shaft, having gear-teeth mounted to slide therein and having a radially-movable spring-actuated detent-pawl, the other member having a cam engaging said gear-teeth to operate the same, and also having detent-teeth with which said pawl engages, a clutch for driving said cam member, a key-bar for locking said pawl in engagement with the teeth, and means for simultaneously operating said clutch and key-bar, whereby the one is released when the other is engaged, substantially as described.

31. In a machine of the character described, an operating-shaft, a variable gear mounted thereon and comprising two members, one secured on the shaft and having gear-teeth mounted to slide therein, the other normally free to rotate relatively thereto and having a cam to operate the gear-teeth, means for locking together said members when the operating-shaft is rotated, a sleeve mounted to rotate on the operating-shaft and driven from the setting mechanism, said sleeve having a clutch to engage the cam member of the gear, and means for disengaging said clutch when the operating-shaft is rotated, substantially as described.

32. In a machine of the character described, an operating-shaft having a longitudinal groove, a variable gear mounted on said shaft and comprising two members, one fixed on said shaft, having gear-teeth mounted to slide therein, and provided with a hub, a spring-actuated pawl mounted to slide radially in said hub and extending to the groove of the shaft, a key-bar mounted to slide in said groove and notched to receive the inner end of the pawl when in release position, the other member of the gear having a cam to operate the gear-teeth, and a central aperture provided with detent-teeth with which the pawl engages, a clutch for rotating said cam member, and means for simultaneously operating the clutch and key-bar, substantially as described.

33. In a machine of the character de-

scribed, an operating-shaft and a gear-sector for imparting to the same a single revolution, in combination with a variable gear mounted on said shaft and comprising a member secured on the shaft and having sliding gear-teeth, and a second member rotatable relatively thereto and having a cam to operate the gear-teeth, a clutch for driving said cam member, a locking device locking the two gear members together, and means for simultaneously operating said clutch and locking device, said means comprising a spring-controlled sliding rod, and a projection on the gear-sector to operate said rod against its spring, a lever engaged by said rod to operate the clutch, and an arm secured on said rod and engaging the locking device to operate the same, substantially as described.

34. In a machine of the character described, an operating-shaft and a gear-sector for imparting to the same a single revolution, in combination with a variable gear mounted on said shaft and comprising a member secured on the shaft and having sliding gear-teeth, and a second member rotatable relatively thereto and having a cam to operate the gear-teeth, a clutch for driving said cam member, a locking device locking the two gear members together, and means for simultaneously operating said clutch and locking device, said means comprising a spring-controlled sliding rod, and a projection on the gear-sector to operate said rod against its spring, a lever engaged by said rod to operate the clutch, and an arm secured on said rod and engaging the locking device to operate the same, said arm being provided with a locking-pin and the fixed member of the gear being provided with a recess to receive said locking-pin at the end of the revolution of said gear, substantially as described.

35. In a machine of the character described, an operating-shaft, in combination with a variable gear comprising two members, one fixed on said shaft and the other normally free to rotate relatively thereto, gear-teeth mounted to slide in the first-mentioned member, the other member having a cam to operate said gear-teeth, a clutch for driving the cam member, means for locking the tooth-bearing member against movement when the cam member is free to rotate, and means for simultaneously disconnecting the clutch, locking the two clutch members together and releasing the tooth-bearing member, substantially as described.

36. In a machine of the character described, an operating-shaft and an oscillating gear-sector for imparting to said shaft a single revolution, said shaft having mounted thereon a variable gear comprising a member fixed to said shaft and having movable gear-teeth, and another member rotatable relatively thereto and having a cam to operate the gear-teeth, a clutch for driving said

cam member, means for locking the two gear members together, and means for locking the tooth-bearing member against movement when the cam member is free to rotate, and a sliding rod actuated by the gear-sector prior to the beginning of the revolution of the operating-shaft, said rod acting to disconnect the clutch, release the tooth-bearing gear member and lock together the two gear members before the revolution of the operating-shaft begins, substantially as described.

37. In a machine of the character described, a counter having an actuating-pinion, a single-revolution operating-shaft having a variable gear mounted thereon to drive said pinion, a sliding bar provided with a tooth to engage said pinion to arrest its motion, a spring acting to hold said bar normally out of said engagement, and a cam projecting on the variable gear arranged to engage said sliding bar toward the close of the revolution of said gear to bring the tooth of said bar into engagement with the pinion, substantially as described.

38. In a machine of the character described, a counter having an actuating-pinion, a single-revolution operating-shaft having a variable gear mounted thereon to drive said pinion, a sliding bar provided with a tooth to engage said pinion to arrest its motion, a spring acting to hold said bar normally out of said engagement, and a cam projection on the variable gear arranged to engage said sliding bar toward the close of the revolution of said gear to bring the tooth of said bar into engagement with the pinion, said cam projection passing clear of said engagement at the end of the revolution, to release the bar, substantially as described.

39. In a machine of the character described, a station-record-printing counter, a resetting-shaft therefor, a station-printing wheel, connecting mechanism between said resetting-shaft and station-printing wheel whereby said wheel is moved one step when said shaft is operated to reset the counter, and means controlled by the operator for setting said station-printing wheel to any desired initial position, substantially as described.

40. In a machine of the character described, a station-record-printing counter, a resetting-shaft therefor, a station-printing wheel, and connecting mechanism between said resetting-shaft and station-printing wheel whereby said wheel is moved one step when said shaft is operated to reset the counter, and means under the control of the operator for reversing at will the direction of movement of said station-printing wheel, substantially as described.

41. In a machine of the character described, a station-record-printing counter, a resetting-shaft therefor, a station-printing wheel, a station-indicator moving in unison

with said station-printing wheel, connecting mechanism between the resetting-shaft and station-printing wheel whereby said wheel is moved one step when said shaft is operated to reset the printing-counter, and means under the control of the operator for setting said station-printing wheel and indicator to any desired initial position, substantially as described.

42. In a machine of the character described, a station-record-printing counter, a resetting-shaft therefor, a station-printing wheel, connecting mechanism between said resetting-shaft and station-printing wheel whereby said wheel is moved one step when said shaft is operated to reset the counter, and means under the control of the operator for reversing at will the direction of movement of said station-printing wheel, said means comprising a direction-indicator which visibly indicates the direction of movement of the station-printing wheel, substantially as described.

43. In a machine of the character described, a station-record-fare-printing counter, a resetting-shaft therefor, a station-printing wheel, mechanism for operating the station-printing wheel from said resetting-shaft comprising a shaft operatively connected with the station-printing wheel, a gear on said shaft, and a yoke or support pivoted on said shaft and having on one side a driving-gear directly meshing with the shaft-gear and on the other side a driving-gear and an intermediate idle gear meshing with the said driving-gear and the shaft-gear, an actuating-tooth on the resetting-shaft, and means for swinging said yoke or support so as to bring either one of the driving-gears into the path of said actuating-tooth, substantially as described.

44. In a machine of the character described, a station-record-fare printing counter, a resetting-shaft therefor, a station-printing wheel, and mechanism for operating the station-printing wheel from said resetting-shaft comprising a shaft operatively connected with the station-printing wheel, a gear on said shaft, and a yoke or support pivoted on said shaft and having on one side a driving-gear directly meshing with the shaft-gear and on the other side a driving-gear and an intermediate idle gear meshing with said driving-gear and the shaft-gear, an actuating-tooth on the resetting-shaft, and means for swinging said yoke or support so as to bring either one of the driving-gears into the path of said actuating-tooth, said means comprising an eccentric, a rod connecting said eccentric and the yoke or support, and means for manually rotating said eccentric, substantially as described.

45. In a machine of the character described, mechanism for shifting the position of the reversing-gear train of the station-

printing wheel, comprising a pivoted yoke or support supporting said gear-train, a gear provided with an eccentric, an eccentric-rod connecting said eccentric and the yoke or support, a direction-indicator moving with said gear, a manually-operated shaft, a spring-pressed sleeve mounted on said shaft and carrying a pinion meshing with the gear, and a detent mechanism cooperating with said sleeve, substantially as described.

46. In a machine of the character described, a station-record-fare-printing counter, a resetting-shaft therefor provided with an actuating-tooth, a station-number-printing counter loosely mounted on said shaft, a counter-shaft provided with a gear for actuating the station-number-printing counter, and having a second gear actuated from the actuating-tooth of the resetting-shaft, a station-number-indicating counter, a gear on said counter-shaft for actuating said indicating-counter, and means for manually rotating said counter-shaft, substantially as described.

47. In a machine of the character described, a wheel provided with a detent-wheel having V-shaped notches between its teeth, in combination with a radially-sliding spring-actuated detent-pawl, the engaging end whereof has inclined faces arranged at an angle more obtuse than the angle of the notches of the detent-wheel, substantially as described.

48. In a machine of the character described, an indicator-wheel having indicating characters upon its rim, and a detent-wheel connected with the side of the indicator-wheel and lying within the rim thereof, in combination with a radially-moving spring-actuated detent-pawl extending past the rim of the wheel and having its engaging end laterally offset to engage the detent-wheel, substantially as described.

49. In a machine of the character described, a group of counters for printing a conductor's record, a second group of counters for printing a cashier's record, a single-revolution operating-shaft for actuating said counters, an identifying mechanism comprising a conductor's key, and a locking-rod operated by said key to engage the operating-shaft and lock the same against rotation, substantially as described.

50. In a machine of the character described, printing-counters, in combination with setting, actuating and printing mechanisms, locking-bars for said mechanisms, a locking-lever actuating said bars, and an identifying mechanism comprising a rotatory key directly engaging and operating said locking-lever, substantially as described.

51. In a machine of the character described, two groups of printing-counters, a selective printing mechanism for printing a record from either of said groups, comprising

a reciprocating printing-carriage having a central neutral position, locking-bars arranged to be projected on opposite sides of said carriage to prevent its movement in either direction, and separate conductors' and cashier's identifying-keys respectively controlling said locking-bars to project them into or withdraw them from the path of the printing-carriage, substantially as described.

52. In a machine of the character described, printing-counters for printing a conductor's record, a printing mechanism for printing a record from said counters, an identifying mechanism comprising a conductor's key, means for locking said key when moved into identifying position, and means controlled by the printing mechanism for releasing said key when a record is printed, substantially as described.

53. In a machine of the character described, two groups of printing-counters for printing a conductor's and a cashier's record respectively, a selective printing mechanism for printing a record from either group of counters, comprising a reciprocating printing-carriage having a central neutral position, locking mechanism for said printing mechanism comprising locking-bars adapted to be projected into and withdrawn from the path of the printing-carriage on opposite sides thereof, and conductors' and cashier's identifying-keys respectively controlling said locking-bars, said printing-carriage being provided with racks, a printing-shaft having pinions engaging said racks, and means for rotating said printing-shaft, substantially as described.

54. In a machine of the character described, a printing mechanism comprising a reciprocating carriage, and an impression-roller movable in said carriage in a direction transverse to the plane of reciprocation thereof, said impression-roller having guiding-journals provided with spring-pins, in combination with slideways in which said carriage moves, guiding-grooves formed in said slideways to receive the journals of the impression-roller, and cam-grooves formed in said guiding-grooves to receive the spring-pins and control the travel of the journals in the guiding-grooves, substantially as described.

55. In a machine of the character described, two printing-surfaces of different extent, a selective printing mechanism comprising a reciprocating carriage, and a printing-shaft rotatable in opposite directions to print a record from one or the other of the printing-surfaces, and a variable paper-feed comprising feed-rollers, a pinion for driving one of said rollers, a gear-segment meshing with said pinion, an eccentric-pin driven by the printing-shaft, and a cam-slot in said gear-segment engaged by said pin, said slot having portions extending from op-

posite sides of the normal position of said pin and so formed that the movement of said pin in one direction will impart a relatively extensive movement to the gear-segment and feed-rolls, while movement of the pin in the opposite direction will impart a relatively slight movement to said parts, substantially as described.

56. In a machine of the character described, printing-counters for printing a conductor's record, a printing mechanism for printing a record from said counters, an identifying mechanism comprising a conductor's key and a rotatable barrel to receive said key, means for locking said key comprising a locking-dog adapted to engage the barrel when the key is moved into identifying position, and mechanism actuated from a moving part of the printing mechanism to disengage said locking-dog when a record is printed, substantially as described.

57. In a machine of the character described, printing-counters for printing a conductor's record, a printing mechanism for printing a record from said counters, an identifying mechanism comprising a conductor's key and a rotatable barrel to receive the same, a locking-dog acting to engage the barrel when the key is turned to identifying position, and a cam-collar loosely mounted on said barrel and acting to disengage the locking-dog, the printing mechanism comprising a moving part engaging said cam-collar to actuate the same when a record is printed, substantially as described.

58. In a machine of the character described, printing-counters for printing a conductor's record, a printing mechanism for printing a record from said counters, an identifying mechanism comprising a conductor's key and a rotatable barrel to receive the same, a locking-dog acting to engage the barrel when the key is turned to identifying position, and a cam-collar loosely mounted on said barrel and acting to disengage the locking-dog, the printing mechanism comprising a moving part engaging said cam-collar to actuate the same when a record is printed, said part consisting of a printing-shaft provided with a cam, said collar having a projection arranged in the path of the cam, substantially as described.

59. In a machine of the character described, a printing-counter for printing a conductor's record, a printing mechanism for printing a record from said counter, an identifying mechanism comprising a conductor's key and a rotatable barrel to receive the same, a locking-dog acting to engage said barrel when the key is turned to identifying position, a collar loosely mounted on said barrel and having a cam to disengage the locking-dog, means actuated by the printing mechanism for moving said collar in one direction to effect said disengagement, and

means actuated by the rotation of the key for restoring said collar to its normal position, substantially as described.

5 60. In a machine of the character described, a printing-counter for printing a conductor's record, a printing mechanism for printing a record from said counter, an identifying mechanism comprising a conductor's key and a rotatable barrel to receive the
10 same, a locking-dog acting to engage said barrel when the key is turned to identifying position, a collar loosely mounted on said barrel and having a cam to disengage the locking-dog, means actuated by the printing
15 mechanism for moving said collar in one direction to effect said disengagement, means

actuated by the rotation of the key for restoring said collar to its normal position, and a detent for holding said collar in said normal position, substantially as described. 20

In testimony whereof we affix our signatures in the presence of witnesses.

WILFRED I. OHMER.
ALBERT J. KIRCHNER.
JOHN W. HILL.

Witnesses to the signatures of Wilfred I. Ohmer and Albert J. Kirchner:

GUSTAV BECKER, Jr.,
D. B. WHISTLES.

Witnesses to the signature of John W. Hill:

HUGH MILLER,
OWEN F. GALLAGHER.