

No. 653,627.

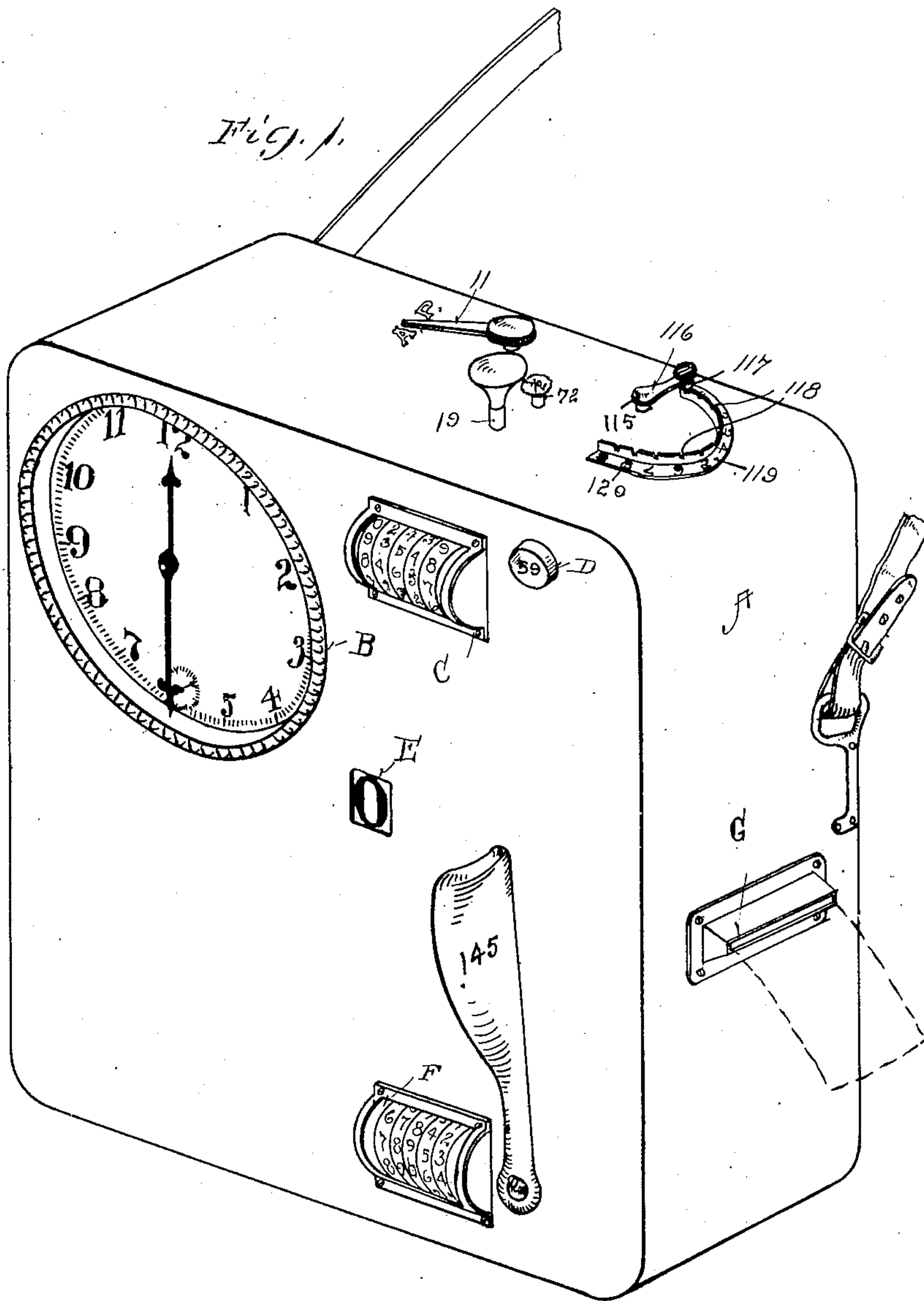
Patented July 10, 1900.

W. I. OHMER, J. N. KELLY & W. M. KELCH.
PRINTING AND REGISTERING MACHINE.

(Application filed Apr. 4, 1899.)

(No Model.)

6 Sheets—Sheet 1.



Witnesses
Jr. D. Dawley
H. M. Dawley

Inventors
WILFRED I. OHMER,
JOSEPH N. KELLY AND
WALLACE M. KELCH.
By *H. A. Toulmin*

No. 653,627.

Patented July 10, 1900.

W. I. OHMER, J. N. KELLY & W. M. KELCH.

PRINTING AND REGISTERING MACHINE.

(Application filed Apr. 4, 1899.)

(No Model.)

8 Sheets—Sheet 2.

Fig. 2.

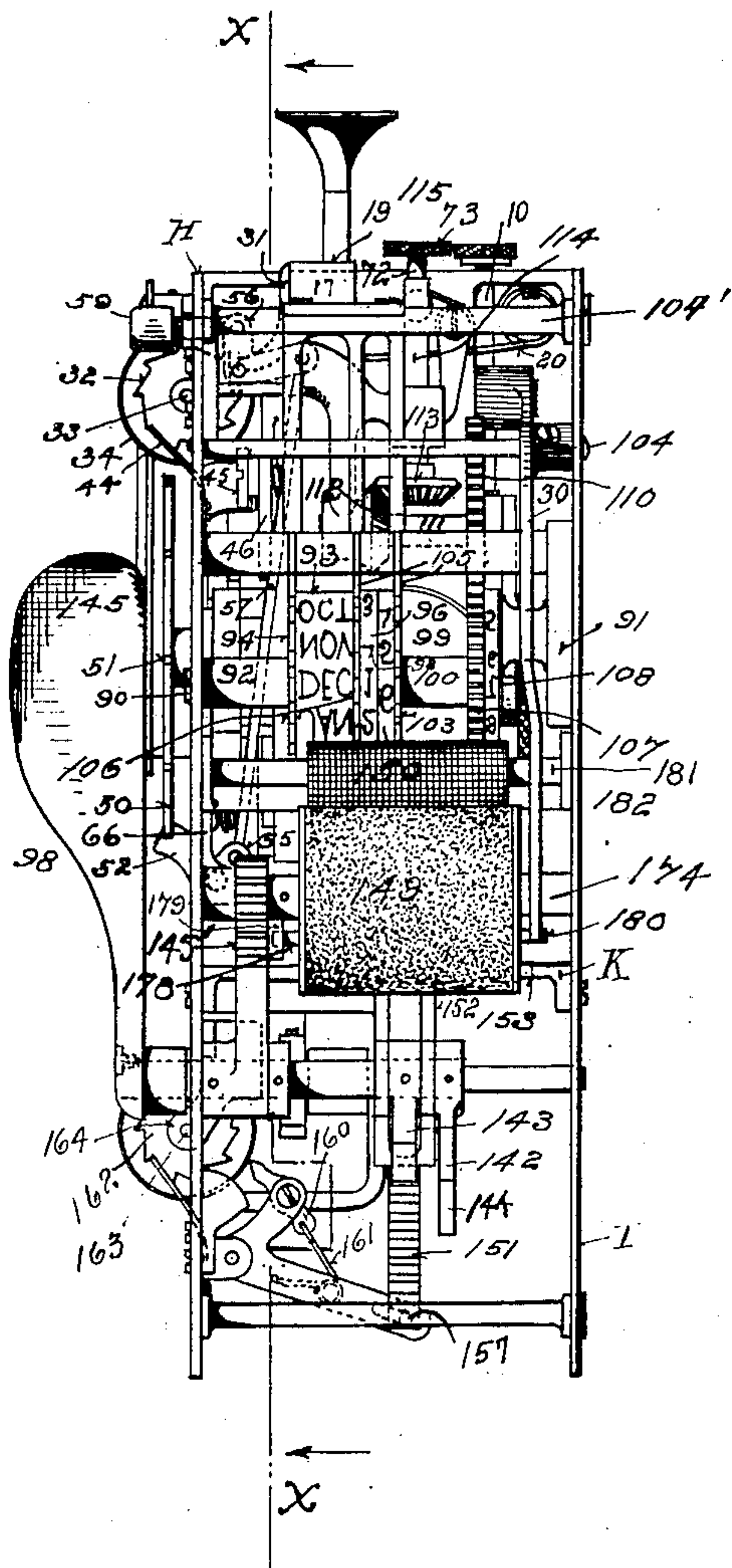
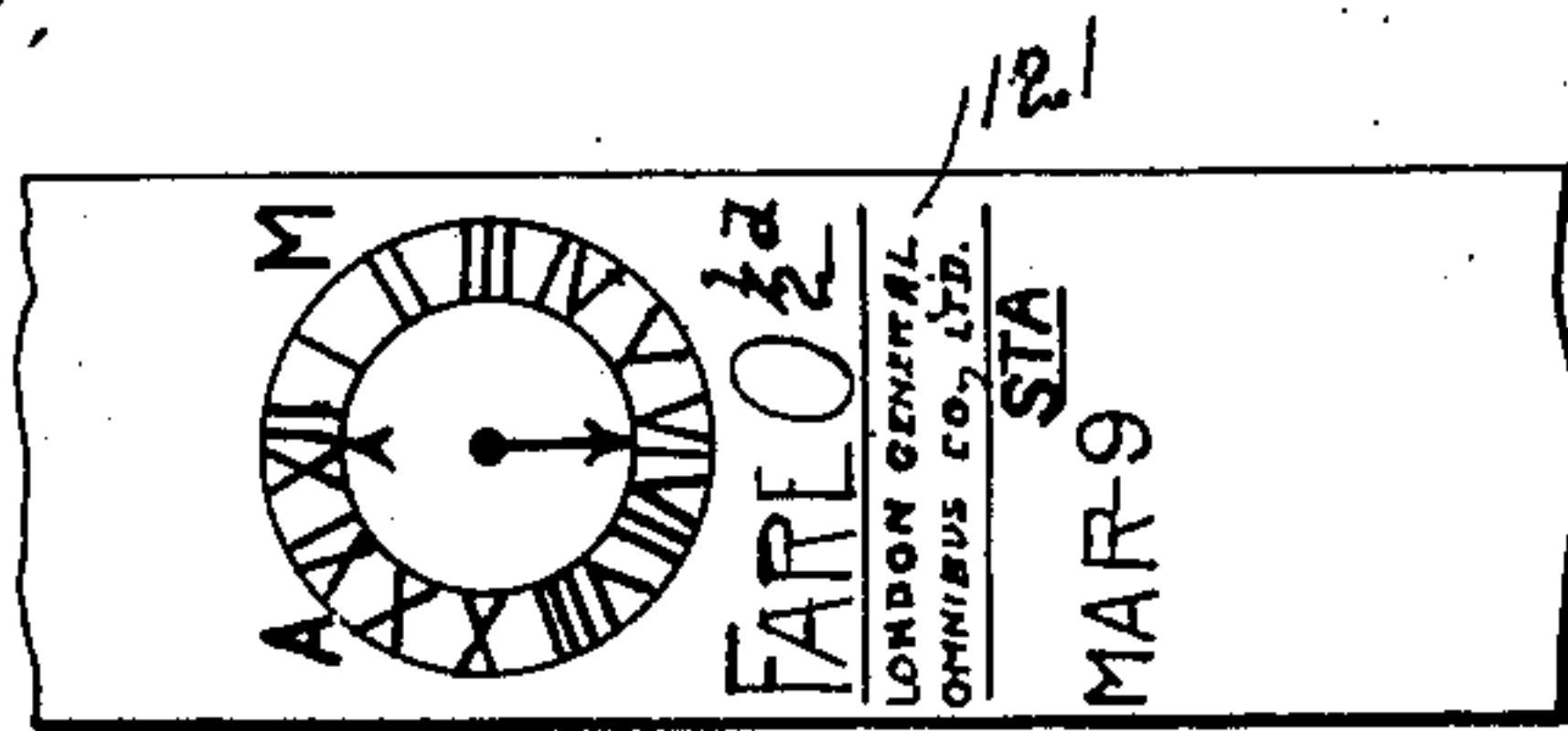


Fig. 3.



WITNESSES:

Jas. C. Lowley
H. W. Lowley

INVENTORS

WILFRED I. OHMER,
JOSEPH N. KELLY AND
WALLACE M. KELCH.

BY

H. A. Toulmin,
ATTORNEY.

No. 653,627.

Patented July 10, 1900.

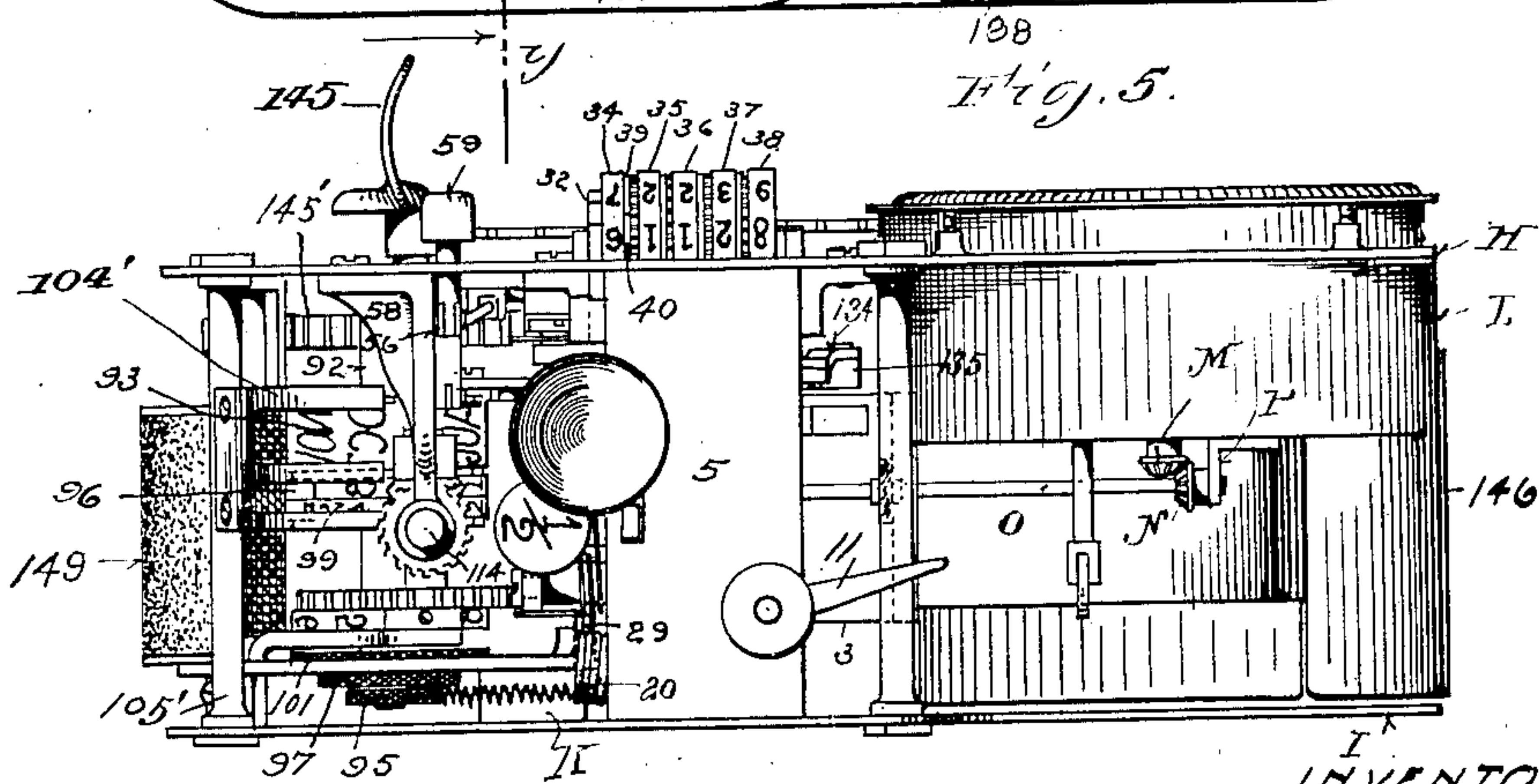
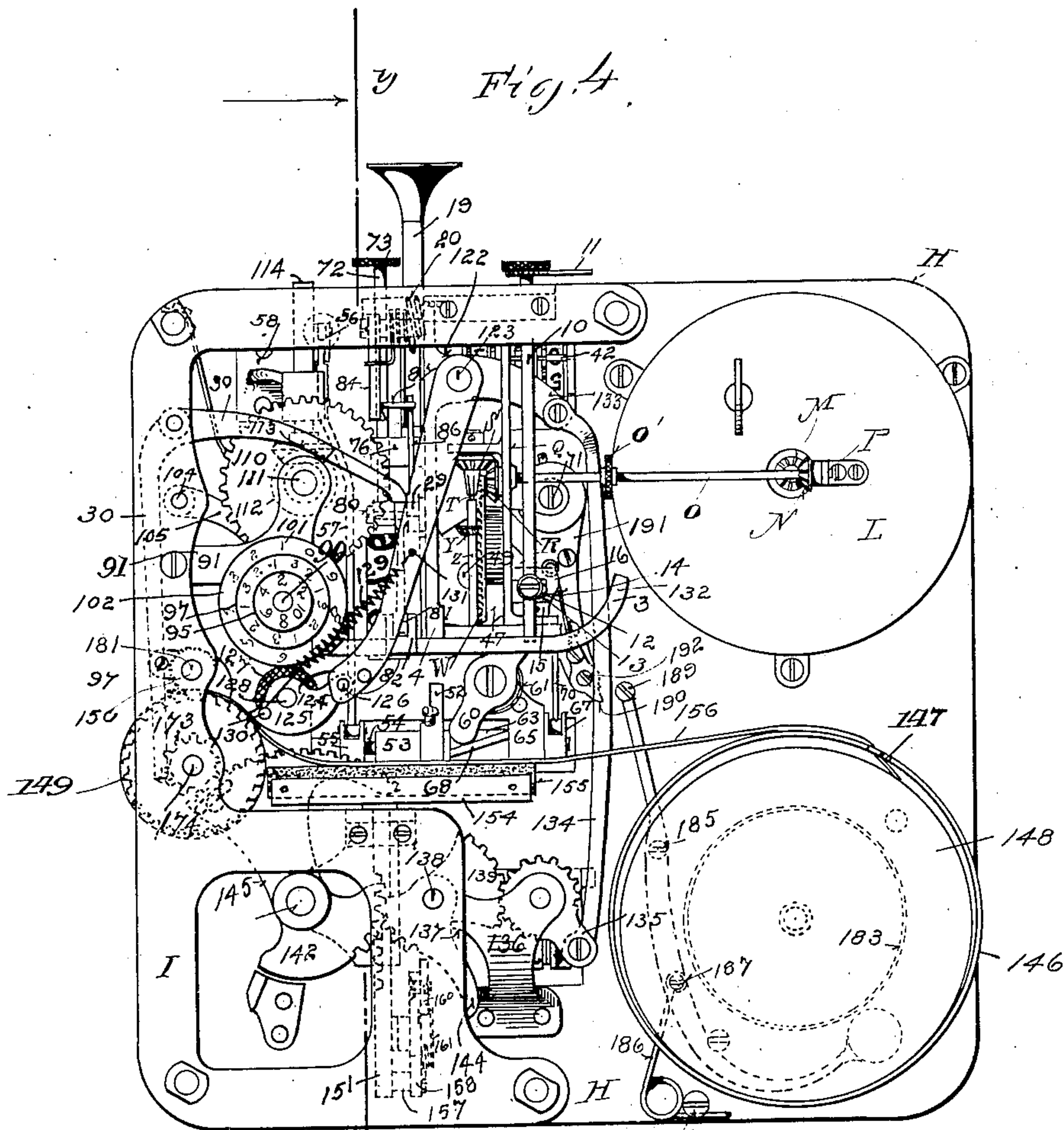
W. I. OHMER, J. N. KELLY & W. M. KELCH.

PRINTING AND REGISTERING MACHINE.

(Application filed Apr. 4, 1899.)

(No Model.)

6 Sheets—Sheet 3.



WITNESSES:

Jas. E. Hawley

H.M.D. unleg.

INVENTORS

WILFRED I. OHMER,
JOSEPH N. KELLY AND
WALLACE M. KELCH.

BY

BY *H. A. Gaulier*
ATTORNEY.

No. 653,627.

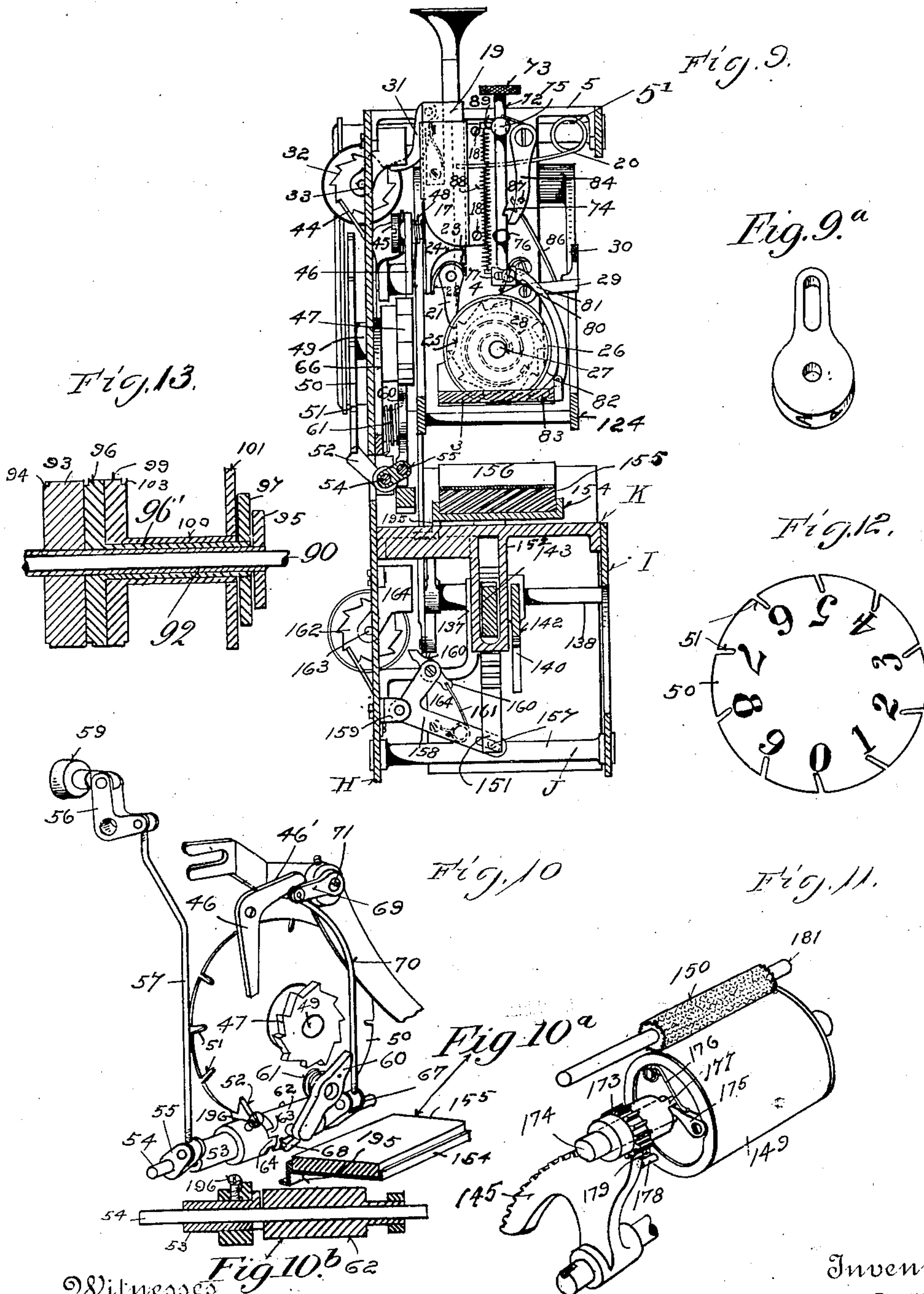
Patented July 10, 1900.

W. I. OHMER, J. N. KELLY & W. M. KELCH.
PRINTING AND REGISTERING MACHINE.

(Application filed Apr. 4, 1899.)

6 Sheets—Sheet 5.

(No Model.)



Witnesses
J. C. Hawley,
H. M. Hawley

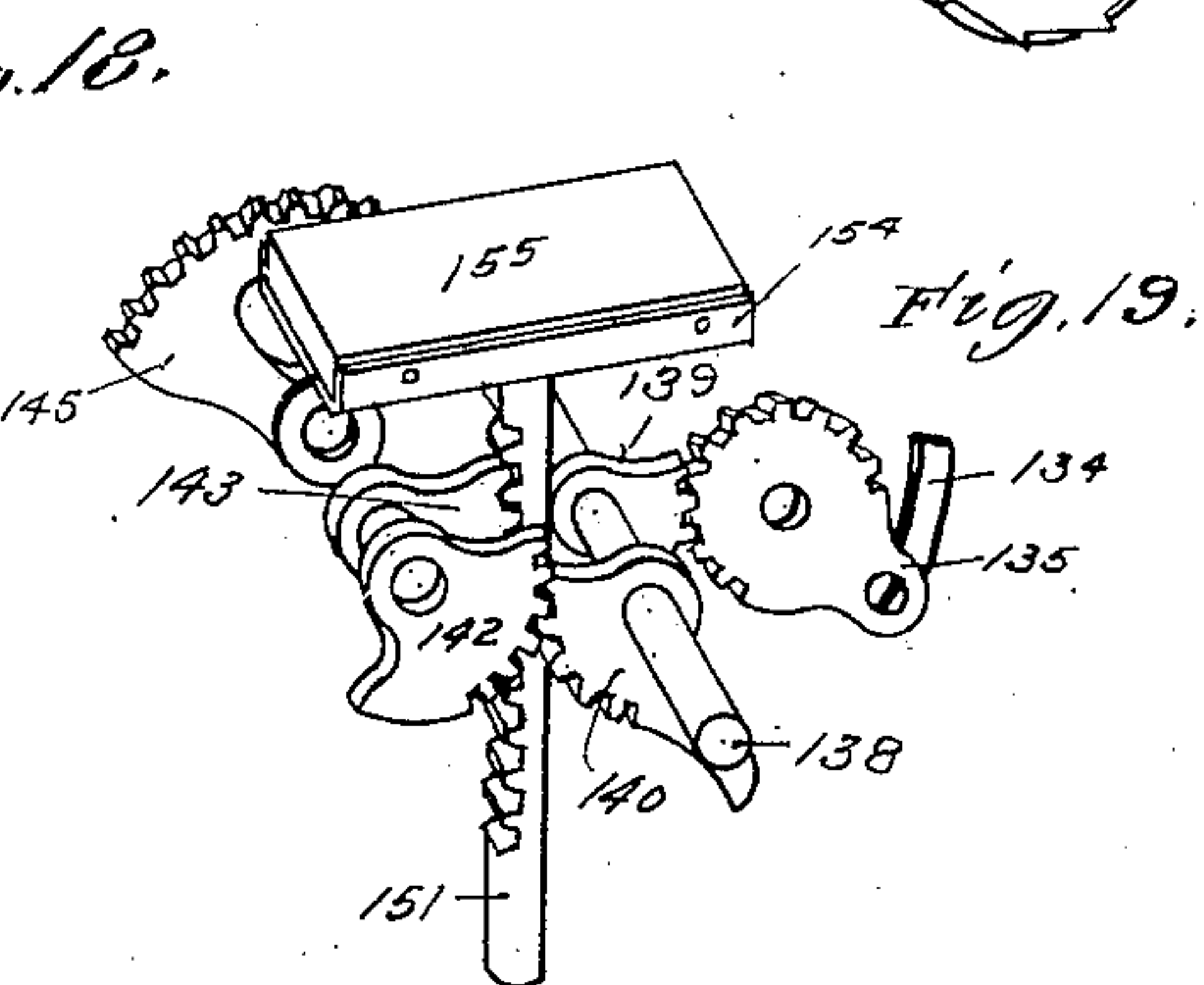
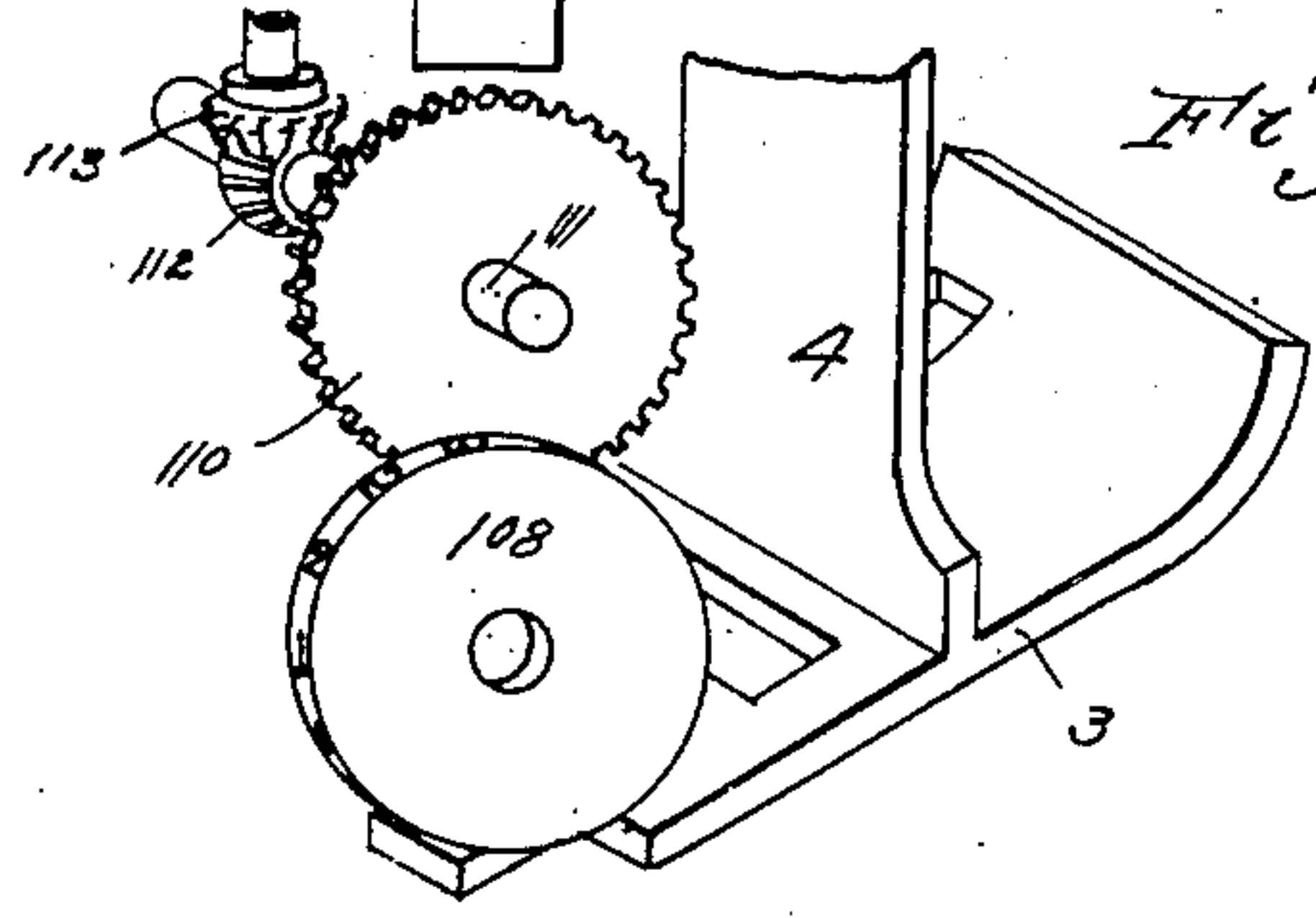
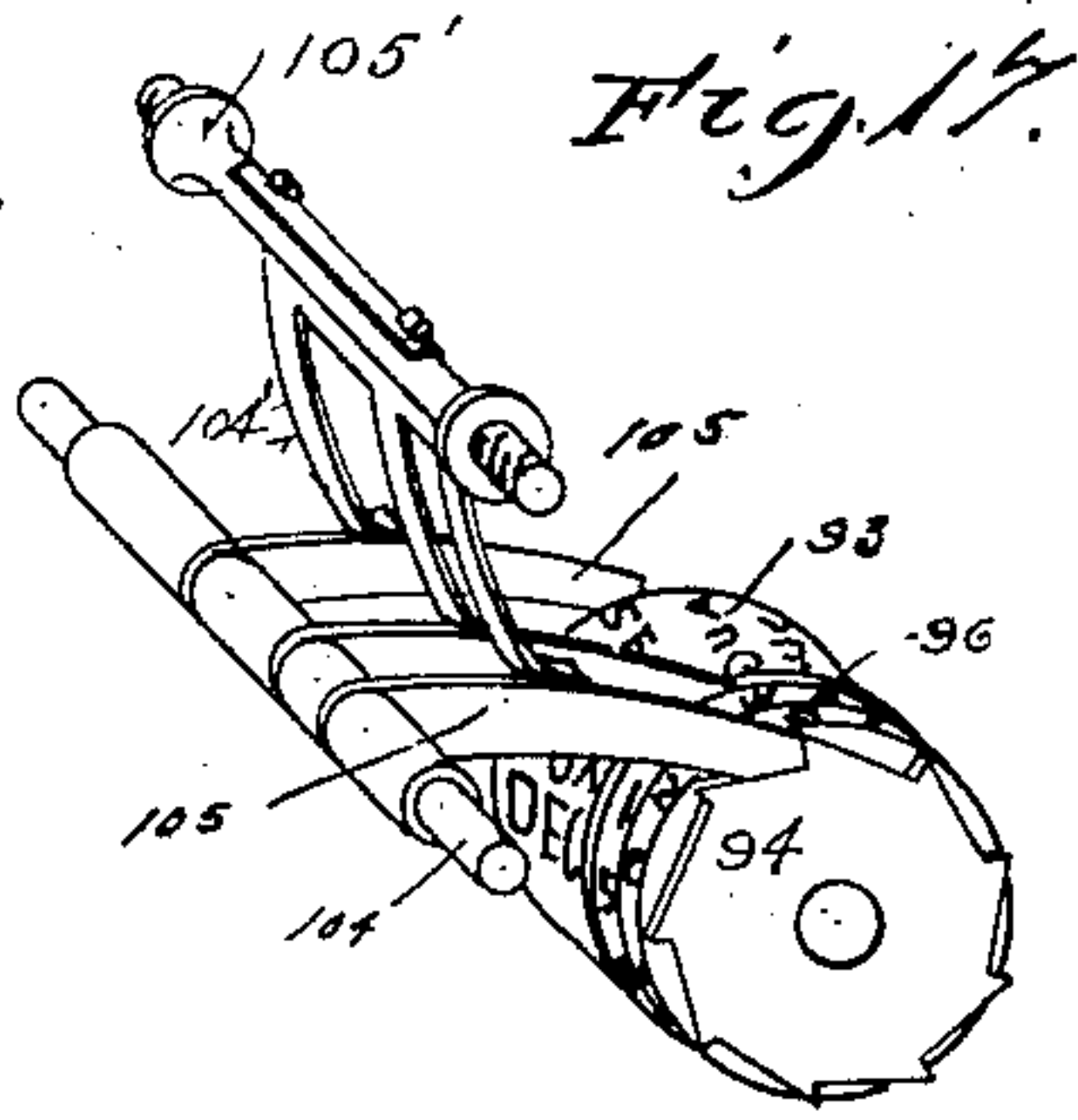
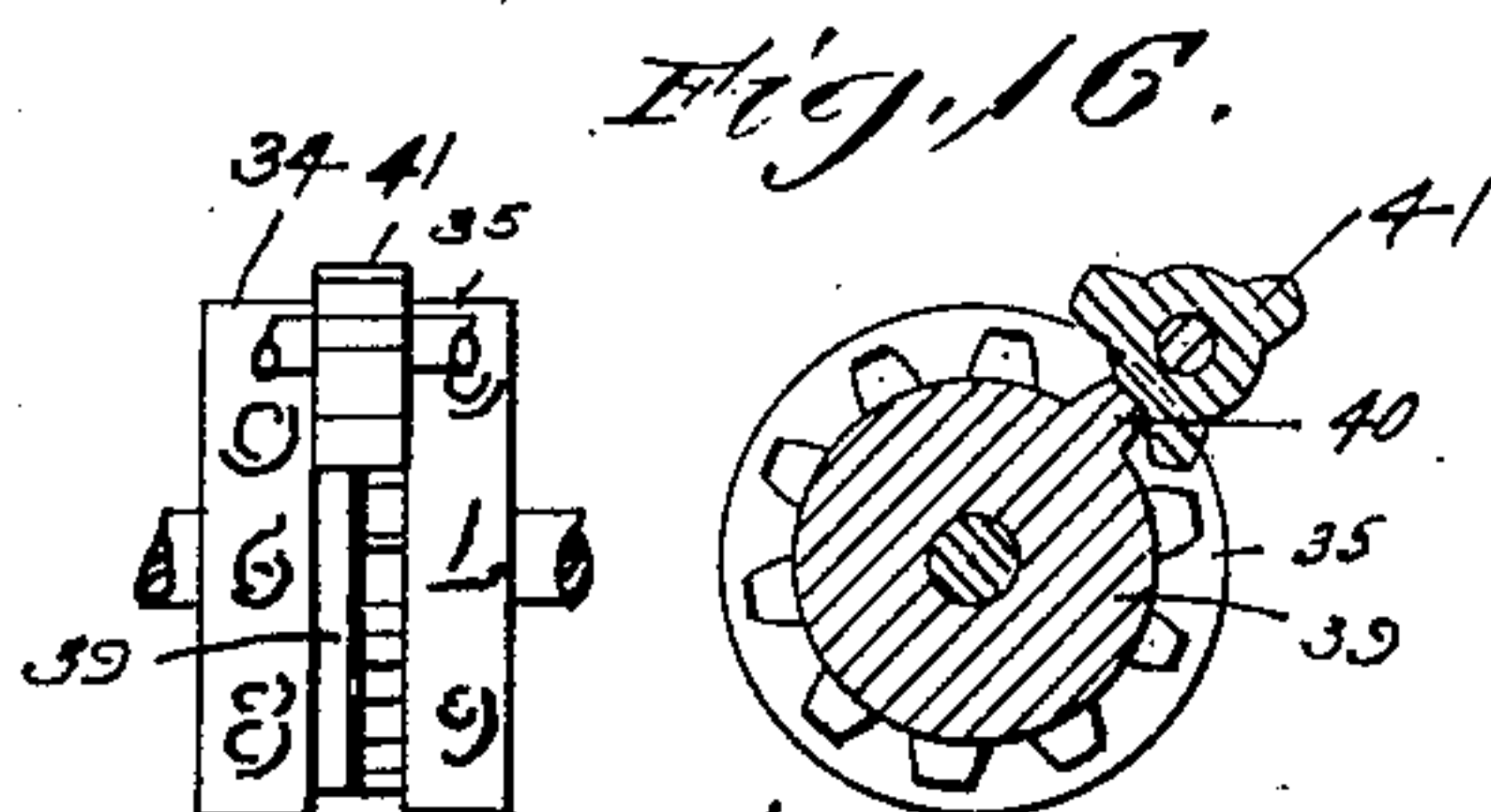
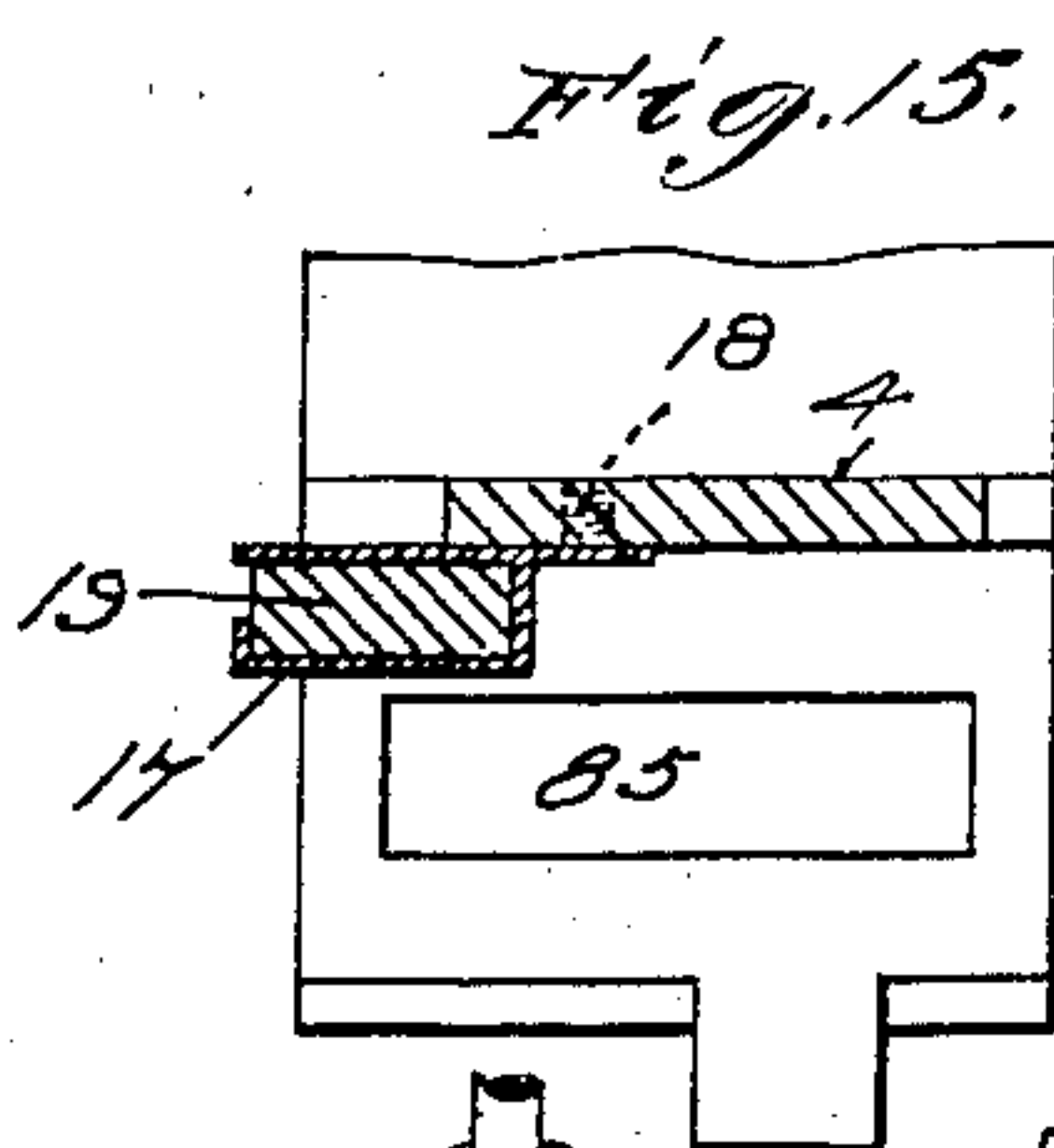
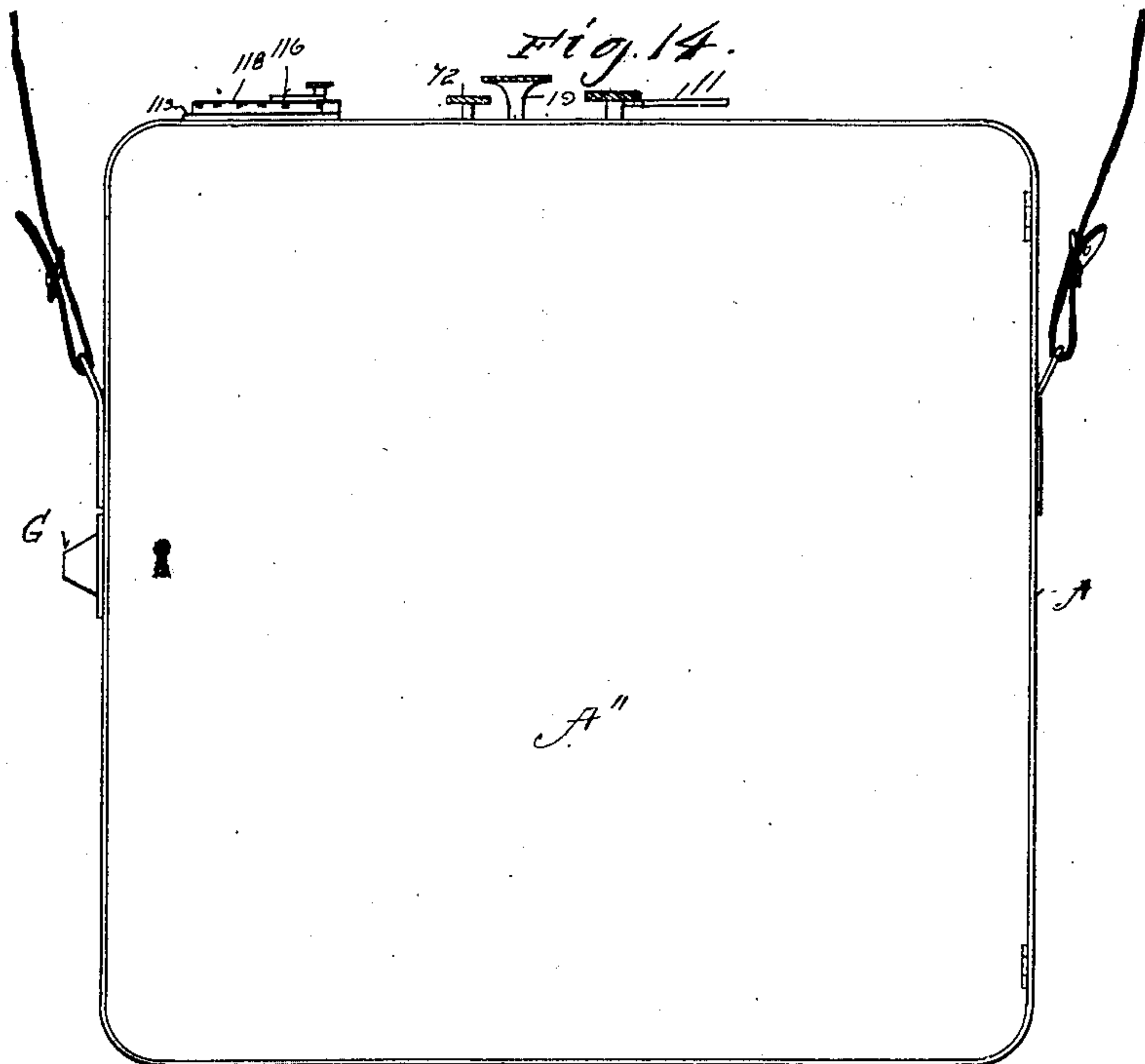
Inventors
WILFRED I. OHMER,
JOSEPH H. KELLY AND
WALLACE M. KELCH.
By THEIR Attorney
H. A. Coulman.

W. I. OHMER, J. N. KELLY & W. M. KELCH.
PRINTING AND REGISTERING MACHINE.

(Application filed Apr. 4, 1899.)

(No Model.)

6 Sheets—Sheet 6.



Witnesses
J. D. Dawley
W. M. McHair.

Inventors
Wilfred I. Ohmer
Joseph N. Kelly and
Wallace M. Kelch.
By their Attorney
H. A. Foulmer.

UNITED STATES PATENT OFFICE.

WILFRED I. OHMER, JOSEPH N. KELLY, AND WALLACE M. KELCH, OF DAYTON,
OHIO; SAID KELLY AND KELCH ASSIGNORS TO SAID OHMER.

PRINTING AND REGISTERING MACHINE.

SPECIFICATION forming part of Letters Patent No. 653,627, dated July 10, 1900.

Application filed April 4, 1899. Serial No. 711,754. (No model.)

To all whom it may concern:

Be it known that we, WILFRED I. OHMER, JOSEPH N. KELLY, and WALLACE M. KELCH, citizens of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Printing and Registering Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in ticket-printing and fare-registering machines.

This invention is designed as an improvement over the invention for "printing and registering machines" shown in the Patent No. 626,084, dated May 30, 1899, issued to Wilfred I. Ohmer and Wallace M. Kelch, and the present improvements relate to new constructions and arrangements of certain features of the above invention and to an entirely new and additional feature not embodied in said former invention, such feature consisting of mechanism for printing half-fare units, as halfpenny, &c., English money.

This invention relates to details of construction and arrangement hereinafter appearing and particularly pointed out in the claims.

In the accompanying drawings, on which like reference characters indicate corresponding parts, Figure 1 is a detail perspective view of the outer casing for inclosing the operating parts of our invention; Fig. 2, a side elevation of our invention with the casing removed. Fig. 3 shows a printed ticket. Fig. 4 is a rear elevation of our improved machine with the casing removed; Fig. 5, a plan view of the same; Fig. 6, a sectional elevation on the line *x x* of Fig. 2 looking in the direction of the arrows; Fig. 7, a detail view, partly in section, of the time, operating, and printing mechanism; Fig. 8, a detail view of the printing-plate; Fig. 9, a sectional view on the line *y y* of Fig. 4 looking in the direction of the arrows; Fig. 9^a, a detail enlarged view of the "A" and "P" segment; Fig. 10, a detail perspective view of the inside of the specific-fare-indicating wheel, together with the operating clutch mechanism therefor and also showing the manner in which such clutch mechanism is thrown into and out of engagement; Fig.

10^a, a detail view of the press, press-plate, and projecting step, the latter for operating the locking mechanism for locking the specific-fare-indicating plate; Fig. 10^b, a detail longitudinal sectional view through the sleeve 53 and sleeve 62; Fig. 11, a detail perspective view of the ticket-delivering roll and mechanism for operating the same; Fig. 12, a detail view of the specific-fare-indicating plate; Fig. 13, a detail horizontal sectional view of the dating rings or wheels; Fig. 14, a rear elevation of the outer casing; Fig. 15, a sectional view illustrating the relation between the plunger 19, bracket 4, and plate 17; Fig. 16, a detail enlarged view of a portion of the registering mechanism, one of said views showing a partial rear elevation and the other a sectional end elevation; Fig. 17, an enlarged detail view of the spring-pawls for engaging with the ratchet on their respective month, tens, and units printing wheels and showing such wheels, together with the springs for acting upon the pawls; Fig. 18, a detail enlarged view of the printing-plate and showing the station-printing wheel in printing position and its relation to such printing-plate; and Fig. 19, an enlarged detail view of the segments 140, 142, 143, and 144, together with the parts operating in conjunction therewith.

In the patent above mentioned there was no means for printing half-fares and no means for indenting the surface of the ticket. That invention also had no means for delivering certain lengths of tickets, so that no matter whether the ticket-roll was large or small the paper would still be fed smoothly and evenly regular distances, thereby permitting of printing advertisements on the under side of the ticket-strip before such strip is rolled up and placed in the machine; but with this machine this is accomplished, and all the advertising-printing mechanism for printing on the reverse side to that of the ticket is omitted. Therefore while the general objects of this invention are somewhat similar to those stated in Patent No. 626,084, dated May 30, 1899, still the general organization and various details of this invention differ very materially from what is shown in such patent.

Before describing in detail the various parts of our invention we will indicate some of its

uses. This invention is particularly designed for use by street-car and railway conductors, particularly where the fare is paid upon the car and it is designed to give the passenger a receipt or issue a ticket for the fare paid, while at the same time the amount of the fare is registered, so that at the end of the day or run the total amount of the fares received will be exhibited. The car-lines upon which this device is to be used are supposed to be divided up into stations—that is, certain distances which may be traveled for a certain number of fare units, such as from a central point or station to station 1 for two cents, and from station 1 to station 2 for four cents, from station 2 to station 3 for six cents, &c., the road being divided into ten stations. Of course it will be understood that the units paid to travel from one station to another may vary; but for each unit so paid the fare-registering mechanism of the machine will be brought into operation and a bell will be rung to indicate such unit. Thus if the conductor fails to register each unit in the fare from one station to another the bell will not be rung as often as it should and the ticket to be printed will not indicate the correct fare paid, and consequently the conductor's error is liable to be quickly detected. In some instances there may be but one fare for short and long distances traveled; but in that case the ticket issued by the machine is good for traveling over the entire line.

The letter A represents a suitable casing which is adapted to inclose the working parts of our invention, as will hereinafter more fully appear. This casing is provided with openings B, C, D, E, F, and G therein. Within this casing is mounted a frame structure consisting of a front plate H and a rear plate I, together with cross bars and plates J and K, respectively. Between these plates is mounted the operating mechanism of our machine. We will first describe the time-printing mechanism and the manner in which the same is operated.

Referring to Figs. 4, 5, and 7 particularly, the letter L represents a clock-casing inclosing suitable clock mechanism, on the main shaft of which is carried a miter-pinion M, which meshes with a similar pinion N, carried by a driving-shaft O, the outer end of which is supported in a bracket P, screwed or otherwise secured to the clock-casing, while the other end is mounted in a bearing in the upright bar Q. This inner end of said bar also carries a miter-gear R, which meshes with a similar gear S upon the shaft T, which we will term the "minute-shaft," since it carries upon its outer end a minute-hand character, as shown at U. This character is adapted to be rotated by the shaft T at the correct speed to indicate minute. The bevel-gear V is also mounted upon the minute-shaft and is adapted to mesh with the driving-gear W, supported by a stud X, screwed into the bar Q. Another bevel-gear Y meshes with this

driven gear W and is connected with the shaft Z, which we term the "hour-shaft," because it carries the hour-indicating character 2 at its lower end. This shaft is preferably bored out or made hollow to receive the hour-shaft, and the gears between it and said hour-shaft are such as to give the correct speed to the minute-shaft. These minute and hour characters extend through the hole or opening in a printing-plate 3, which is screwed or otherwise secured to the bar Q and also to the bracket 4, it being understood that the bracket projects downward from a cross-plate 5, which also acts to support the bar Q. A suitable clock-dial 6 is formed upon the plate 3, as illustrated in Fig. 8. The dial characters are slightly raised, as also the characters representing the hands of the clock, so that they will properly print upon the paper strip, presently to be referred to. To one side of the clock-dial is also mounted upon the plate 3 the letter "M," near one end of its sides, as shown at 7, while near the opposite side of the plate and also to one side of the dial is formed a slot 8, through which appear the letters "A" and "P," as indicated at 9, and either one or the other is brought into printing position, so as to indicate fore or after noon in a manner presently to appear. A shaft 10 projects into the plate 3 and extends up through the cross-plate 5 and carries at its upper end a pointer 11, which is adapted to be moved to point toward the letter "A" or "P," stamped on the outside of the casing A, as shown in Fig. 1. As illustrated, this pointer indicates that the letter "A" is in printing position. Near the lower end of this shaft is secured a stud 12, which engages with a slot 13 in the upper end of the "A" and "P" segment 14, the latter being pivoted to the plate 15. The lower end or periphery of this segment has the letters "A" and "P" formed thereon. When the pointer 11 points to the "P" character on the casing, (see Fig. 1,) the stud comes into contact with a hook 16, projecting outwardly from the bar Q. When the pointer is pointing toward the letter "A," the stud 12 will strike against the bar Q. Thus the shaft 10 is limited in its movement by reason of the stud or projection coming in contact with the hook or bar above mentioned, and when the stud is thrown to its extreme limit either way the character "A" or "P" will be thrown into printing position within the slot 8 in the printing-plate 3. As illustrated, the letter "A" is in such printing position, while on account of the curvature of the "A" and "P" segment 14 the "P" character is out of printing position. Thus it will be seen that with our printing mechanism we indicate not only hour and minute, but also whether forenoon or afternoon, and consequently the exact time when the ticket is issued is indicated on the ticket when the same is brought into contact with this time-printing mechanism, as will hereinafter appear. It will also be observed that on the shaft O is mounted a

knurled collar O'. This is for the purpose of setting the clock printing mechanism and also for setting the clock, so that they will both indicate the proper time, and is used particularly when the clock has run down or when setting the clock. It will also be understood that in some cases the clock may be dispensed with, when this time-printing mechanism may be set by hand by this chased nut; but we prefer, of course, to employ the clock.

In order that a person may have access to the knurled collar O' for setting the clock, it will be understood that the back of the casing is provided with a hinged door A'', which is normally locked by any suitable lock. (See Fig. 14.)

We will now refer to the fare printing, indicating, and registering mechanism, whereby the correct amount of fare is brought into printing position on the fare-printing device and the fare units are registered, and a succession of such units are also brought into indicating position, according to the number of units indicated on the ticket for each ticket issued by the machine, such indicating device being returned to zero before another ticket is issued. We will term the indicating device a "specific-fare-indicating plate," and it will be understood from the above that it indicates the number of fare units paid by a passenger.

From Fig. 9 particularly it will be seen that a guide-plate 17 is screwed or otherwise secured to the bracket 4 by means of screws 18. Between the bracket and guide-plate is mounted a plunger 19, which is normally held in its raised position by a spring 20, secured to the cross-plate 5 by means of a screw 5' or in any other suitable manner. On the lower end of this plunger is mounted a pivoted detent 21, which is controlled by a spring 22, one end of which is screwed or otherwise secured thereto, as shown at 23, and which presses at its outer end against the plunger, it being understood that the plunger is notched, as shown at 24, to receive said detent and spring. This detent is adapted to engage with a ratchet 25, carried by a units-fare-printing wheel which is mounted upon a stud-shaft 27, projecting from the bracket 4. Within the periphery of said printing-wheel is mounted a spring 28, which is secured at its outer end to the printing-wheel and at its inner end to the stud-shaft, as shown particularly in Fig. 9. This spring is for the purpose of returning the printing-wheel to normal position after a ticket has been printed and when released by the pawl 29, which is accomplished by means of a double bell-crank lever 30, hereinafter referred to. At the same time that the pivoted detent 21 engages with the ratchet 25 to operate it one unit the pawl 31, also pivoted to the plunger 19, engages with a ratchet 32, mounted upon a shaft 33 and formed on the face of the units-registering wheel 34, as clearly shown in Fig. 5. It will be observed that there are a succession of units-registering wheels,

as indicated at 35, 36, 37, and 38, respectively. The registering-wheel 34 is of units order, while the registering-rings 35 to 38, respectively, are of the tens, hundreds, thousands, and ten-thousands order, so that they will register as high as "99,999," or by adding more registering-wheels the registering device may be made to register any amount. On the inner side of the units-ring is formed a plate 39, which is provided with a tooth, as shown at 40, adapted to engage one tooth at a time of a transferring gear-wheel 41, loosely mounted upon a shaft 42, which gear-wheel is wide enough to engage with a gear 43, projecting from the adjacent face of the tens-wheel. Thus as the gear 41 is rotated one notch the tens-wheel will be rotated one number, or from "0" to "1." In the same manner each of the wheels of higher denominations is operated, it being understood that when such wheel makes a complete revolution the tooth projecting from its plate will engage a tooth of a transferring-gear also mounted on the shaft 42, and which meshes with the next ring of higher denomination to cause it to rotate one notch. Each ring is numbered from "0" to "9," inclusive. To this registering mechanism *per se* I lay no claim. A spring-detent 44, carried by the plate H, engages with the ratchet-wheel 32 to prevent its backward movement, but which at the same time will permit the ratchet to readily move forward. The stud 45 projects from the plunger 19 and has pivoted thereon a detent 46, which is normally held in position to engage a ratchet-wheel 47 by means of a spring 48, wound around the stud 45 and bearing at its lower end against said detent. Thus as the plunger is pressed downward the ratchet-wheel 47 is rotated, and since it is rigidly connected with the shaft 49, projecting through a plate H and carrying a specific-fare-indicating plate 50, such latter plate is also rotated. It will be seen that on the face of this specific-fare-indicating plate are arranged numbers from "0" to "9," inclusive, such numbers for the purpose of indicating the number of fare units paid by each individual, the number of such units appearing through the opening E in the casing. Between each of these numbers the periphery of said plate is notched, as shown at 51. A detent 52, rigidly mounted upon a sleeve 53, is adapted to engage with said notches to hold the specific-fare-indicating plate from turning, and which must be moved out of engagement with said plate before the plunger 19 will be permitted to descend. The sleeve 53 is rigidly mounted upon the rock-shaft 54 and is adapted to be partially rotated thereby. A crank 55 is also secured to said shaft and its outer end connected to the bell-crank lever 56 by means of a rod 57. This bell-crank lever is pivoted to a bracket 58, projecting inward from the front plate H. A little push-button 59 is connected with the upper arm of the bell-crank lever 56, and when the button is pressed upon the

rock-shaft 54 will be rocked and the detent 52 will be thrown out of engagement with the specific-fare indicator. The plunger 19 may then be depressed, so that not only the units-
 5 printing ring and the registering mechanism, but also the specific-fare-indicator plate may be operated. In order to prevent this indicator-plate from rotating backward after the fare-unit has been indicated thereon, I provide a double detent 60, which is adapted to
 10 engage with the ratchet 47 and is held in engagement therewith by means of a spring 61. (See Figs. 6, 9, and 10 particularly.) Beneath the double detent 60 is mounted a sleeve 62
 15 upon the rock-shaft 54. This sleeve is loosely mounted upon said shaft and has lug 63, adapted to engage with a lug 64, projecting from the rigidly-mounted sleeve 53. The other end of the sleeve is reduced and fits in
 20 a bearing 65, projecting from a bracket 66, in which the outer end of the shaft 54 is mounted. This reduced portion of the sleeve projects through the bracket a short distance and has mounted upon it a crank 67. The
 25 lower end of the double detent 60 rides upon a helical wedge 68, and when the sleeve is partially rotated in one direction, in a manner hereinafter appearing, the detent 60 will be thrown out of engagement with the ratchet
 30 47, and consequently the specific-fare-indicating plate may be returned by means of its spring to zero, so that zero will appear through the hole or opening E in the cover or casing A, as shown in Fig. 1. In order that said
 35 sleeve may be partially rotated in the opposite direction to permit the spring 61 to disengage the pawl 60 from the ratchet 47, we have connected the crank 67 with the crank 69 by means of a rod 70. An extension 46'
 40 from the detent 46 is adapted to come in contact with the crank 69 to cause it to pivot upon its stud 71, which extends inward from the plate H.

We have now traced the operation of the
 45 fare-printing wheel, the registering mechanism, and the specific-fare-indicating plate. We will now refer to the half-units-printing device, such as for printing halfpence, English money, or for printing other fare half
 50 units.

Upon the upper end of a rod 72 is mounted a thimble 73 for depressing the rod 72. It will be observed that this rod is notched, as shown at 74, and is mounted in studs 75 and
 55 76, projecting from the bracket 4. The lower end of this shaft carries a slotted head 77, (see Fig. 9,) through which projects a screw 80, adapted to screw into the long arm 81 of a double bell-crank lever pivoted on a bracket
 60 82, projecting upward from the plate 15. The short arm of this bell-crank lever, as shown at 83, carries at its lower end half-unit characters—in this instance, " $\frac{1}{2}d$ "—as indicated upon the printed ticket in Fig. 3. As
 65 the rod 72 is pressed downward a detent 84 will engage in the notch 74, thereby holding the rod down. When this rod was pressed

down, the half-unit characters were thrown into printing position through the slot 85 in the printing-plate 3, which is sufficiently elongated for that purpose, it being understood
 70 that the units-printing wheel or device also projects through said slot into printing position. The spring-detent 84 is released from the notch 74 by means of an arm 86, which
 75 engages with a pin 87, projecting from the detent 84. This arm is carried by the pivoted lever 29, and when said lever is operated by the double bell-crank lever 30 to disengage
 80 from the fare-printing-ring ratchet the detent 84 will also be disengaged from the notch 74. This will permit the spring 88, secured at one end to the slotted enlargement on the
 85 lower end of the halfpenny-rod and to the lug 89, projecting from the stud 75, to instantly return the halfpenny-rod to its normally-raised position, thereby rocking the double bell-crank lever upon its pivot 82 and withdrawing the halfpenny-printing characters from printing position.
 90

We will now refer to the dating and station-printing mechanism.

By referring to Figs. 2, 4, 5, and 13 it will be observed that upon the shaft 90, having
 95 a bearing at one end in the plate H and in the bracket 91, is mounted a sleeve 92, carrying a dating-ring 93, from one face of which projects a ratchet 94. The sleeve 92 extends through the bracket-bearing and has mounted upon its end a turn-plate 95. (See Figs. 4, 5,
 100 and 13.) Upon this sleeve is mounted a tens-dating ring 96, which also has a sleeve 96' projecting through the bracket-bearing and carrying at its outer end a knurled turn-plate 97. It will be observed that this tens-ring
 105 has a succession of numbers from "1" to "3," inclusive, as also a dash between the succession of numbers, such dash and numbers being shown at 98. (See particularly Fig. 2.) The plate 97 is numbered on its exposed face
 110 to correspond with the succession of numbers on the tens-wheel 96. By turning this plate the proper number on the tens-wheel is brought into printing position at the end of printing-plate 3, as also the month-wheel,
 115 above described, when the plate 95 is rotated. The units-ring 99 is mounted on the sleeve of the tens-ring, adjacent thereto, and also has a sleeve 100 projecting through the bracket
 120 91, and carries at its outer end a knurled turn-plate 101, which is also numbered on its front face to correspond with the numbers on the periphery of the units-ring, as illustrated in Fig. 4 at 102. This units-ring also carries a
 125 ratchet 103. Upon a cross-bar 104 is mounted three pawls 105, which project downward and inwardly sufficiently to engage with the respective ratchets 94, 106, and 103, carried by the month-printing wheel, the tens-printing
 130 wheel, and the units-printing wheel, respectively. These pawls prevent these various wheels from moving backward, but permit them to be moved forward as much as desired. Springs 104', secured to a cross-bar 105', press

upon the respective pawls to hold such pawls in place. A driving-gear 107, formed on the face of the station-printing wheel 108, is mounted on the sleeve 100. This station-printing wheel is adapted to project slightly below the printing-plate adjacent to the projection 109 extending therefrom, such projection bearing the letters "STA," which are an abbreviation of the word "station." In order to set this station-printing wheel, a gear-wheel 110, mounted upon the shaft 111, meshes with the station gear-wheel 107. This shaft carries a miter-pinion 112, which meshes with a miter-pinion 113, carried by a station set-shaft 114, upon the upper end of which is mounted an indicator-head 115, which carries a pointer 116, having a lug 117, adapted to engage with notches 118, formed in a semicircular flange 119, mounted on the upper edge of the casing A, as clearly seen in Fig. 1. It will be observed that around upon this semicircular flange is arranged numbers ranging as high as "9," as shown at 120. When the pointer 116 is turned to indicate the station to which the traveler indicates that he is going, the gear 110 will cause the station-printing wheel to rotate to present the proper station-number into printing position at the end of the plate 3, above referred to.

We have now seen how the months, day of the month, and station printing mechanism are operated to present the proper printing characters into printing position. We will now describe the manner in which the time-indicating characters, individual-fare-indicating characters, and dating and station characters are inked, so that they may properly be impressed upon the strip of paper through the instrumentality of suitable press mechanism; but before entering this branch of the subject it will be observed that the plate may carry other printed matter preferably placed between the fare-indicating wheel and the dating and station indicating wheel, such as shown at 121. In this instance the words exhibited are "London General Omnibus Co., L't'd;" but any other words may be substituted. From the bracket 4 extend lugs 122. (See Fig. 4.) In these lugs is carried a shaft 123, upon which is mounted a pivoted inking-roll frame 124. To the lower end of the frame is pivotally connected a semicylindrical inking-roll holder 125, as shown at 126. In this inking-roll holder is rotatably mounted the inking-roll 127, which is composed of felt or other suitable ink-absorbing material mounted upon the shaft 128. To this inking-roll holder is connected one end of a spring 129 by a stud 130 or in any other suitable manner. The other end of the spring is connected to the stud 131, projecting from the inking-roll frame 124. This inking-roll is adapted to run upon the printing-plate 3, which is curved at its rear end, as shown at 132 in Figs. 4 and 7. From the inking-roll frame 124 projects an arm 133, to which is pivotally connected a link 134, which extends to

near the lower portion of the machine and engages with a crank-segment 135, supported in a bracket 136, secured to the front plate H. In one arm of this bracket, as shown at 137, is supported one end of a shaft 138, while the other end is carried by the rear plate of the casing I. A toothed segment 139 is adapted to mesh with the crank-segment 135 and is mounted upon the inner end of the shaft 138. Another segment 140 is also mounted upon the shaft 138. In order to operate the segment 140, it will be observed that upon the main driving or operating shaft 141 are mounted three toothed segments 142, 143, and 144, respectively. When the main driving-shaft is operated by means of the hand-lever 145 in a manner hereinafter appearing, the toothed segment 139 will cause the crank-segment 135 to pull down upon the pitman or connected rod 134, and thereby cause the inking-roll to travel across the face of the printing-plate, which will ink the printing characters. One movement of the hand-lever from its forward position, as illustrated by full lines in Fig. 6, to its vertical position, as also indicated by dotted lines in Fig. 6, will cause said inking-roll to travel to its forward limit across said printing-plate, while when the lever is returned from the dotted position (illustrated in Fig. 4) to the full-line position the inking-roll will be withdrawn from the face of the printing-plate against the curved end 132 of the plate. In this position the inking-roll will be out of the path of the printing-plunger, which acts to press the ticket into printing contact with the printing-plate, as will hereinafter be seen.

We will now describe the manner in which the ticket strip or roll of paper is held and conveyed from the machine.

It will be observed from Fig. 4, particularly, that upon the plate H is mounted a paper-roll receptacle 146, which has a slot in its rim, as shown at 147. The end of the paper from the paper-roll 148 is slipped through this slot and is passed beneath the printing-plate 3 and between the feed and delivering rolls 149 and 150, respectively, hereinafter more particularly referred to. The hand-lever 145 is then taken hold of and thrown forward. This causes the segment 143, which engages with the toothed press plunger-rod 151, slidably mounted in a bearing 152, formed integral with and depending from the cross-plate 153, to be raised. The inner end of the main driving-shaft 141 is also supported by said bracket-bearing 152, which is bifurcated and has mounted between said bifurcations, upon the main driving-shaft, the segment-gear 143, above referred to. Thus as the main driving-shaft is rocked the press-plunger is raised or lowered. On the upper end of this press-plunger is carried a press, consisting of a flanged plate 154, in which is placed an elastic cushion 155 to press the paper strip 156, above referred to, into contact

with the printing characters. The lower end of this printing-press plunger-rod carries a stud 157, upon which is mounted the slotted end of a bell-crank lever 158. This bell-crank lever is pivoted to a bracket 159, carried by the plate H. To the other arm of the bell-crank lever is pivoted a detent 160, which is normally held in position by a spring 161 to engage with a ratchet 162, supported by a shaft 163, mounted in brackets 164. This ratchet forms a portion of the units-ticket-registering mechanism for registering the number of tickets issued by the machine. As the printing-plunger is raised, in the manner above described, the bell-crank lever 158 will rock, so that the detent 160 may engage said ratchet 162 and will rotate said ratchet one notch, thus indicating "1" on the periphery of the first ticket-registering wheel, it being understood that its periphery carries numbers from "0" to "9," inclusive, as particularly illustrated in Figs. 5 and 6. When this first wheel has made a complete revolution, a notch 165 in the plate 166, projecting from the units-registering wheel 167, will be engaged by a tooth of a traveling gear 168, loosely mounted upon the shaft 169, also mounted in brackets 164, and will rotate such gear one notch, and since it is engaged with a gear 170, projecting from the tens-ticket-registering wheel 171, it, too, will rotate one notch and will consequently exhibit the number "1" on its periphery, it being understood that such periphery is also provided with figures from "0" to "9," inclusive, as shown at 172. In this same manner when the tens-ticket-registering ring has made a complete revolution its count will be transferred to the next adjacent registering-wheel, and so on as high as desired. To this registering mechanism *per se* we lay no claim, as it is old and well known to those skilled in such art.

We shall now refer to the feeding and delivering roll for drawing the paper strip from the paper-receptacle and for delivering the same through the slot G in the casing A.

The toothed segment 145', carried by the main driving-shaft, as above referred to, engages with the gear 173, mounted upon a shaft 174, carried by the plates H and I. A feeding and delivering drum 149, above referred to, is loosely mounted upon said shaft 174. This drum carries a detent 175, which is held normally against the shaft 174 by means of a spring 176. A lug 177 projects from the hub or sleeve forming a portion of the gear 173 and is adapted to be engaged by the lug 175, whereby the feeding and delivering drum 149 is rotated. This drum, however, can only rotate in one direction by the lug engaging with the projection 177, for the reason that when the shaft 174 is rotated in the opposite direction the detent will ride over the lug without causing the feeding and delivering rolls to rotate. This is of great practical importance, as the roll will not act to feed the

paper at such times. In order to prevent this roll from rotating when the operating-lever is in its normal position, we provide the lug 178, which projects from the end of the roll and is adapted to come in contact with a flange 179, projecting from the inner face of the toothed segment 145 for this purpose. This flange is best shown in Fig. 6, and has only sufficient length to stop the feeding and delivering rolls when the operating-lever is in its normal position; but when such operating-lever is moved away from its normal position the cam 179 is rotated out of the path of the stud 178, and consequently will permit the roller to revolve. The opposite end of the feeding and delivering roll also carries a stud 180. This stud is adapted to engage with the bell-crank lever 30 in order that the detent 29 may be released from the fare-printing wheel 26 and the detent 84 from engagement with the notch 74 in the rod 72. In this manner the half-units-fare-indicating printing mechanism is released from printing position, and the units-fare-printing wheel is rotated back to zero after printing every ticket. It will be observed that a short distance above the feeding and delivering roll is mounted another shaft 181. This shaft carries a roll 150, which is covered with short teeth 182, adapted to engage with the lower roll 149. This roll 149 is preferably covered with elastic material, so that the teeth of the roll 150 will sink into the same. Thus as the ticket-strip is passed between these two rolls it is not only prevented from slipping as it is being fed forward, but its entire surface is indented or "pebbled," as it were. This enables the ticket to be severed from the remainder of the strip much more readily than if the indentations were not formed therein, as the teeth on the feed-roll frequently slightly pierce the paper. Thus it will be understood that these feeding and delivering rolls not only perform the function of positively and accurately feeding and delivering the ticket, but they so act on the ticket that it may readily be severed from the rest of the ticket-strip. It has been found in actual practice that these rolls work so perfectly in conjunction with each other and feed the ticket-strip so regularly and evenly that the printed matter arranged on the under side of the ticket-strip will always come exactly beneath the ticket being printed. In the patent heretofore referred to it was necessary to employ printing mechanism for printing upon the under side of the ticket-strip at the same time the ticket was being printed; but all this we have overcome and have simplified the machine at least to that extent, as the printing may be done on an ordinary printing-machine before the ticket-roll is placed within its receiver.

It will be observed that beneath the ticket-roll receiver is mounted a bell, as shown at 183, by dotted lines in Fig. 4. A bell-crank lever is pivoted upon a screw 185, screwed

into the base-plate H. The bell-striker is held normally in engagement with the bell by means of a spring 186, secured thereto, as shown at 187, as also to the plate H, as shown at 188. The upper end of said lever carries a stud 189, which is adapted to be engaged by a pivoted trip 190, pivoted upon a double bell-crank lever 191, as shown at 192. To the upper end of this pivoted trip is connected a spring 193. This spring is also connected with the double bell-crank lever 191, as shown at 194. This double bell-crank lever is pivoted upon the stud 71, and its upper end is bifurcated to fit over the stud 45, carried by the plunger 19. Thus as the plunger is depressed to register a fare unit this double bell-crank lever will be operated to cause the trip above described to rock the bell-striker lever, so that the bell will always be rung when a unit is registered.

We will now refer to the means for causing the shaft 54 to be rocked so that the detent 52 will engage with the specific-fare-indicating plate to prevent such plate from rotating until just before another fare is to be registered.

It will be observed that from the side of the press printing-plate 154, adjacent to the plate H, projects a step 195. (See Figs. 9 and 10.) When the printing-plunger is operated, this step comes in contact with the screw 196, projecting from the sleeve 53, and by this means throws the detent 52 into engagement with the plate 50. This causes the lug 64 on said sleeve to engage with the lug 63 on the sleeve 62, thus partially rotating said sleeve, which will cause the helical wedge to disengage the pivoted pawl 60 from the ratchet-wheel 47. As heretofore referred to, before the specific-fare-indicating wheel can be returned to zero the rock-shaft 53 must have been partially rocked to disengage the detent 52 from the notches 51. This is accomplished by means of a push-button 59, which operates the bell-crank lever 56. This bell-crank lever is connected with the crank 55, thereby rocking the shaft 54, as heretofore described. When the plunger 19 is pushed down, the upper arm 46' of the pivoted detent 46 engages with the crank 69 and presses downward thereon. This downward movement of said crank is transmitted to the crank 67, which is rigidly mounted on the upper end of the sleeve 62 and will be partially rotated, as also said sleeve. In this manner the helical wedge is so far turned about the shaft 54 as to readily permit the spring 61 to cause the pivoted detent 60 to engage with the ratchet 47, whereby the specific-fare-indicating wheel will be prevented from turning backward, but must make a forward movement each time the plunger is operated, so that at each operation of said plunger a unit of higher denomination will be brought into view through the opening E in the casing A, as heretofore described.

Referring again to the specific-fare-indicating plate 50, it will be understood that such

plate moves from one unit to the next unit each time the operating-plunger is operated, so that should a person wish to travel a certain distance requiring him to pay three fare-units, such as three pennies, English money, the operating-plunger would be operated three times and the specific-fare-indicating plate would move from "0" to "3," so that "3" would appear in the opening in the casing.

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

1. In a ticket-printing and fare-registering machine, the combination with a suitable frame, of time-printing mechanism carried thereby, printing mechanism, for printing units and half-units, also carried thereby, means for indicating the time and specific fares, means for pressing a ticket strip or roll into contact with said mechanisms, and means for engaging with said ticket-strip to feed said strip beneath said printing mechanisms and deliver the same from said frame, all substantially as shown and described.

2. In a ticket-printing and fare-registering machine, the combination with a suitable frame, of time-printing mechanism, printing mechanism for printing units and half-units, and dating mechanism mounted in said frame, clock mechanism for operating said time-printing mechanism, means for registering the fare, and mechanism for registering the number of tickets issued by said machine, means for feeding a ticket-strip to said printing mechanisms and delivering the same therefrom, and mechanism for pressing a ticket-strip into engagement with said printing mechanisms as it is fed beneath them, substantially as shown and described.

3. In a ticket-printing and fare-registering machine, the combination with a frame, of clock-operated time-printing mechanism, printing mechanism for printing both units and half-units, dating mechanism for printing the day of the month, mechanisms for registering the fare units and mechanism for registering the tickets issued, means for feeding a ticket-strip to said printing mechanism and delivering the same therefrom after being printed, and mechanism for pressing said paper strip into contact with said printing mechanisms, all substantially as shown and described.

4. In a ticket-printing and fare-registering machine, the combination with a frame, of time-printing mechanism mounted therein, fare-printing mechanism also mounted in said frame to print fare units and half-units, dating-printing mechanism for printing the month and the day of the month, also carried by said frame, clock mechanism for operating said time-printing mechanism, a plunger and a half-fare operating-rod adapted to operate said fare mechanism, means for registering the units of said fare mechanism, indicating means for indicating each specific fare, means for presenting a ticket roll or strip into print-

ing position and delivering the same therefrom, mechanism for pressing said paper strip into printing contact with said printing mechanisms, all substantially as shown and described.

5. In a ticket-printing and fare-registering machine, the combination with a frame, of time-printing mechanism consisting of a minute-shaft, (as T) an hour-shaft (as Z) mounted on said minute-shaft, a pair of bevel-gears carried by said minute-shaft, (as S and V) a bevel-gear (as Y) carried by said hour-shaft, a double bevel-gear (as W) rotatably mounted adjacent to said shafts and having one of its gears larger than the other, said larger gear engaging with one of the bevel-gears V on said minute-shaft and said smaller bevel-gear engaging with the bevel-gear Y on said hour-shaft, time-operated means (as O) for engaging with and driving the second bevel-gear S on the minute-shaft, whereby all of said bevel-gears are rotated, and printing characters for indicating the hours and minutes carried by the hour and minute shafts respectively.

6. In a ticket-printing and fare-registering machine, the combination with a frame, of fare-printing mechanism carried thereby, a plunger also carried thereby, a detent carried by said plunger and adapted to operate the units-fare-printing mechanism, and a push-rod adapted to present half-fare units, printing position-registering mechanism also operated by said plunger and adapted to register the fare units, all substantially as shown and described.

7. In a ticket-printing and fare-registering machine, the combination with a frame, having a plunger mounted therein, a detent carried by said plunger and for engaging with a fare-printing wheel to rotate it to present the proper fare units into printing position, a pair of other detents also connected with said plunger, a specific-fare-indicator plate operated by one of said detents and fare-registering mechanism adapted to be engaged by the other of said detents, whereby each fare is presented into printing position, and such fare is indicated and registered, all substantially as shown and described.

8. In a ticket-printing and fare-registering machine, the combination with a frame having a fare-indicating wheel mounted therein, a half-fare-printing device also mounted therein, said half-fare-printing device consisting of a pivoted double bell-crank lever having half-fare characters mounted thereon, a push-rod pivotally connected with the other end of said lever, a detent adapted to engage with said rod for holding said rod in position to present and hold said half-fare-printing characters in position for printing, and means for releasing said detent, and other means for elevating said push-rod and thereby withdrawing said half-fare characters from printing position, all substantially as shown and described.

9. In a ticket-printing and fare-registering

machine, the combination with a frame, of a specific-fare-printing device carried thereby, a half-unit-printing device also carried thereby, means for operating each of said devices for presenting their respective characters into printing position, detents for engaging with each of said devices for holding them in position, and a bell-crank lever adapted to release each of said pawls from engagement with its respective device, and means to operate said bell-crank lever every time a ticket is issued, and other means for returning said specific-fare-printing device to its normal or zero position, and other means for returning said half-fare-printing device out of printing position.

10. In a ticket-printing and fare-registering machine, the combination with a frame, of a plunger carried thereby, a pawl pivotally connected with said plunger, a specific-fare-indicating plate carrying a spring and a ratchet, said spring being connected at one end with said indicating-plate and at its other end with said ratchet, the latter of which is adapted to be operated by said pawl, a double pawl carried by said frame, one end of which is also adapted to engage with said ratchet to act as a stop therefor when the first of said pawls is released therefrom and the other end of said pivoted pawl adapted to engage with a helical wedge, a rocking shaft, a sleeve carried by said shaft, said sleeve carrying said wedge, means for rocking said sleeve and wedge to disengage said holding-pawl from said ratchet, and other means for causing said double pawl to engage with said ratchet when said helical wedge is moved sufficiently to permit of such engagement, all substantially as shown and described.

11. In a ticket-printing and fare-registering machine, the combination with a frame, of a specific-fare-indicating plate carried thereby and having notches on its periphery, a rock-shaft also carried by said frame structure, a rigidly-mounted detent thereon adapted to engage in the notches in said plate and having a lug extending therefrom, a sleeve having a helical wedge thereon and a lug extending therefrom also mounted on said rock-shaft, said lugs adapted to engage with each other, a pivoted lever also carried by said frame structure and adapted to engage at one end with said helical wedge and at its other end with a ratchet, a spring interposed between said ratchet and said specific indicating-plate, means for intermittently rotating said plate to indicate the fare units and other means for rocking said shaft whereby the helical wedge will disengage said lever from said ratchet-wheel, and a spring for normally returning said lever into engagement with said ratchet-wheel when the helical wedge will permit, all substantially as shown and described.

12. In a ticket-printing and fare-registering machine, the combination with a frame, of a fare-printing device carried thereby, a

ratchet-wheel and a stop projecting from said device, a plunger also carried by said frame adapted to connect with said ratchet and operate it, fare-registering mechanism, and specific-fare-indicating mechanism, both of which are operated by said plunger, a stud carried by a bracket mounted in the path of the projection from the fare-printing device and adapted to limit the rotation of said fare-printing wheel in both directions and also adapted to limit the movement of the plunger whereby the specific-fare-indicating device and fare-registering device all remain inoperative, until after the machine is again operated, all substantially as shown and described.

13. In a ticket-printing and fare-registering machine, the combination with a frame, of a specific-fare-indicating plate having notches therein, a plunger adapted to connect with said plate to operate the same, a rock-shaft mounted in said frame and a detent secured thereto, a reciprocating platen, a step carried by said platen, operating means to reciprocate said platen whereby said step will cause said detent to engage with one of the notches in said indicating-plate, substantially as shown and described.

14. In a ticket-printing and fare-registering machine, the combination with a frame, of a main driving-shaft therein, a toothed segment mounted on said shaft, a bracket carried by said frame in which is mounted a notched press-plunger rod, said plunger-rod adapted to engage with said toothed segment whereby the press-rod is reciprocated, all substantially as shown and described.

15. In a ticket-printing and fare-registering machine, the combination with a frame, of a main reciprocating driving-shaft, a pair of toothed segments rigidly mounted thereon, a bracket carried by said frame, a notched press-bar mounted in said bracket and adapted to engage with one of said toothed segments to be reciprocated thereby, an inking-roll frame pivotally mounted in said frame structure, a pitman connected at one end with said inking-roll frame and at its other end with a crank toothed segment, a shaft also mounted in said frame and carrying a pair of toothed segments thereon one of which meshes with said crank toothed segment and the other of which meshes with the second toothed segment on the main reciprocating shaft and an inking-roll carried by said inking-roll frame and adapted to ink printing mechanism also mounted in said frame structure, all substantially as shown and described.

16. In a ticket-printing and fare-registering machine, the combination with a frame, of a main reciprocating driving-shaft mounted therein, three toothed segments carried thereby, a feed and delivering roll shaft engaging with one of said segments, a press-plunger engaging with another of said segments and an inking-roll mechanism engaging with the re-

maining segment, a double bell-crank lever pivoted in said frame, one end of which engages with said press-plunger and the other end of which carries a pivoted detent, ticket-registering mechanism carried by said frame and adapted to be engaged by said pivoted detent, and a hand-lever for rocking said main driving-shaft, thereby rotating said feed and delivery roll, operating said printing-roll and reciprocating said press-plunger and through it operating the ticket-registering device, all substantially as shown and described.

17. In a ticket-printing and fare-registering machine, the combination with a frame, of a main driving rock-shaft mounted thereon, a toothed segment rigidly connected with said shaft, a feed and delivery roll shaft mounted in said frame, a pinion loosely mounted on said shaft as also a feed and delivery roll, said pinion meshing with said toothed segment, a pawl pivotally connected with said feed and delivery roll, a projection extending from said pinion and adapted to engage with said pawl to drive the feed and delivery roll in one direction and pass beneath said pawl when being rotated in the opposite direction, a spring to normally hold said pawl upon said feed-roll and delivery-shaft, a stud or projection extending from the opposite end of said feed-roll and delivery-shaft, a double bell-crank lever pivoted to said frame structure and adapted to be rocked by said stud or projection, a pair of detents, one of which engages with a half-fare-printing device and the other of which engages with a fare-printing device, adapted to be disconnected from said device by said bell-crank lever, and a toothed feed and delivery roll adapted to work in conjunction with the first feed and delivery roll, substantially as shown and described.

18. In a ticket-printing and fare-registering machine, the combination with a frame, of printing mechanism and time driving mechanism therefor mounted therein, fare-printing mechanism embodying a half-unit-fare-printing device, and means for operating said printing mechanism, other means for indicating the specific-fare units and other means for registering said units, dating mechanism also mounted therein, inking mechanism for inking said characters, a ticket strip or roll receptacle mounted therein and carrying a ticket strip or roll, a pair of feed and delivery rolls, one of which has an elastic surface and the other of which has a toothed surface adapted to engage said ticket strip or roll and feed the same beneath said printing mechanisms, a driving rock-shaft, a hand-lever secured thereto by which said shaft is reciprocated, and toothed segments carried by said rock-shaft and so connected with the feed and delivery rolls that it will rotate them in one direction and a platen also operated by one of said segments and adapted to press said ticket-strip into contact with said printing mechanisms, an inking-roll also connected with still another of said toothed segments on said main

rock-shaft and adapted to operate said printing mechanisms, and a station-indicating printing-roll, all substantially as shown and described.

5 19. In a ticket-printing and fare-registering machine, the combination with a casing, of a frame structure mounted therein carrying time-printing, specific-fare printing, dating-printing, station-printing and half-fare-printing mechanisms therein, means for operating
10 said time-printing, said specific-fare-printing, said dating-printing, said station-printing and said half-fare-printing mechanisms respectively, and a time-indicating dial, a specific-
15 fare-indicating plate, ticket-registering mechanism and specific-fare-registering mechanism, means for locking the specific-fare-indicating plate, and a push-button for releasing said plate after each ticket issued, all sub-
20 stantially as shown and described.

20. In a ticket-printing and fare-registering machine, the combination with a frame, of a double bell-crank lever pivoted therein, half-

fare-printing characters mounted on one arm of said lever, a push-rod slidably mounted in 25 said frame, means for connecting said push-rod with the other arm of said double bell-crank lever whereby there may be relative movement between them to compensate for the rocking and reciprocating movements of 30 said lever and push-rod, respectively, a detent for holding said printing characters in printing position, and means for releasing said detent, and a spring for normally raising said push-rod and withdrawing said half-fare- 35 printing characters from printing position, substantially as shown and described.

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

WILFRED I. OHMER.
JOSEPH N. KELLY.
WALLACE M. KELCH.

Witnesses:

JOSEPH LEITSCHER,
CHARLES W. ELLIFF.