

No. 684,163.

Patented Oct. 8, 1901.

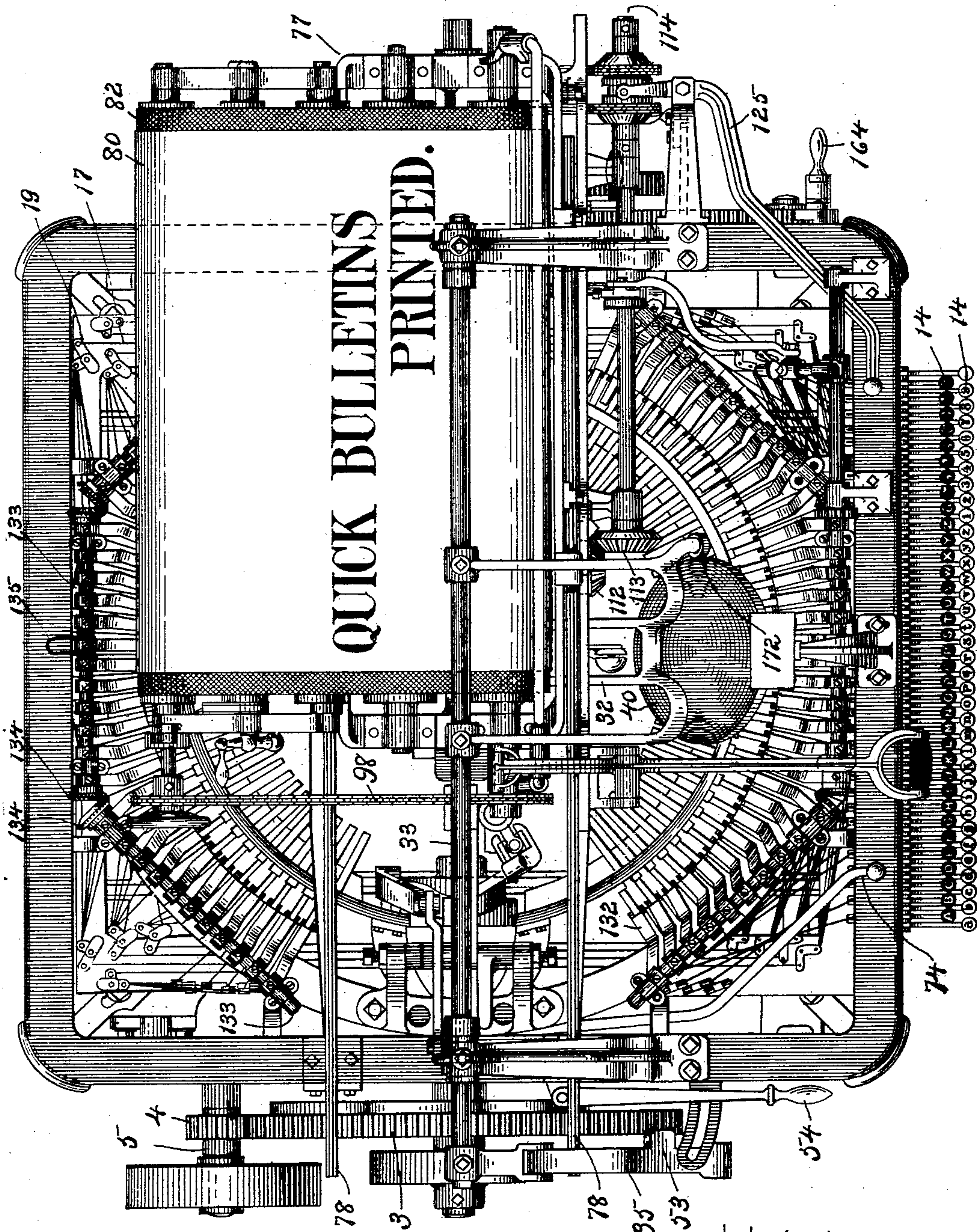
F. E. ALLEN.

TYPE WRITER FOR PRINTING BULLETINS, &c.

(Application filed Mar. 5, 1900.)

(No Model.)

19 Sheets—Sheet 1.



WITNESSES.

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Fig. 1.

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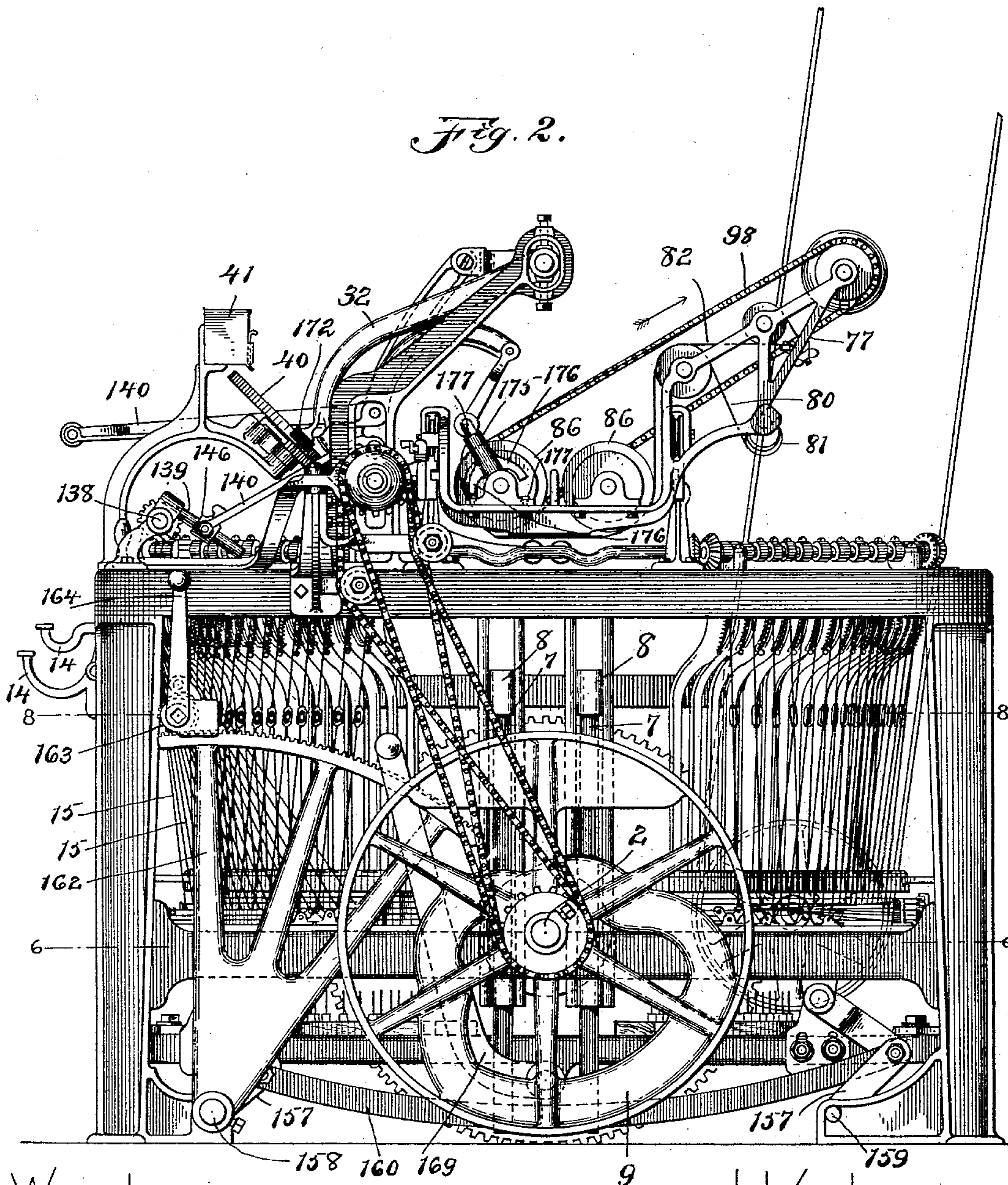
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Fig. 2.



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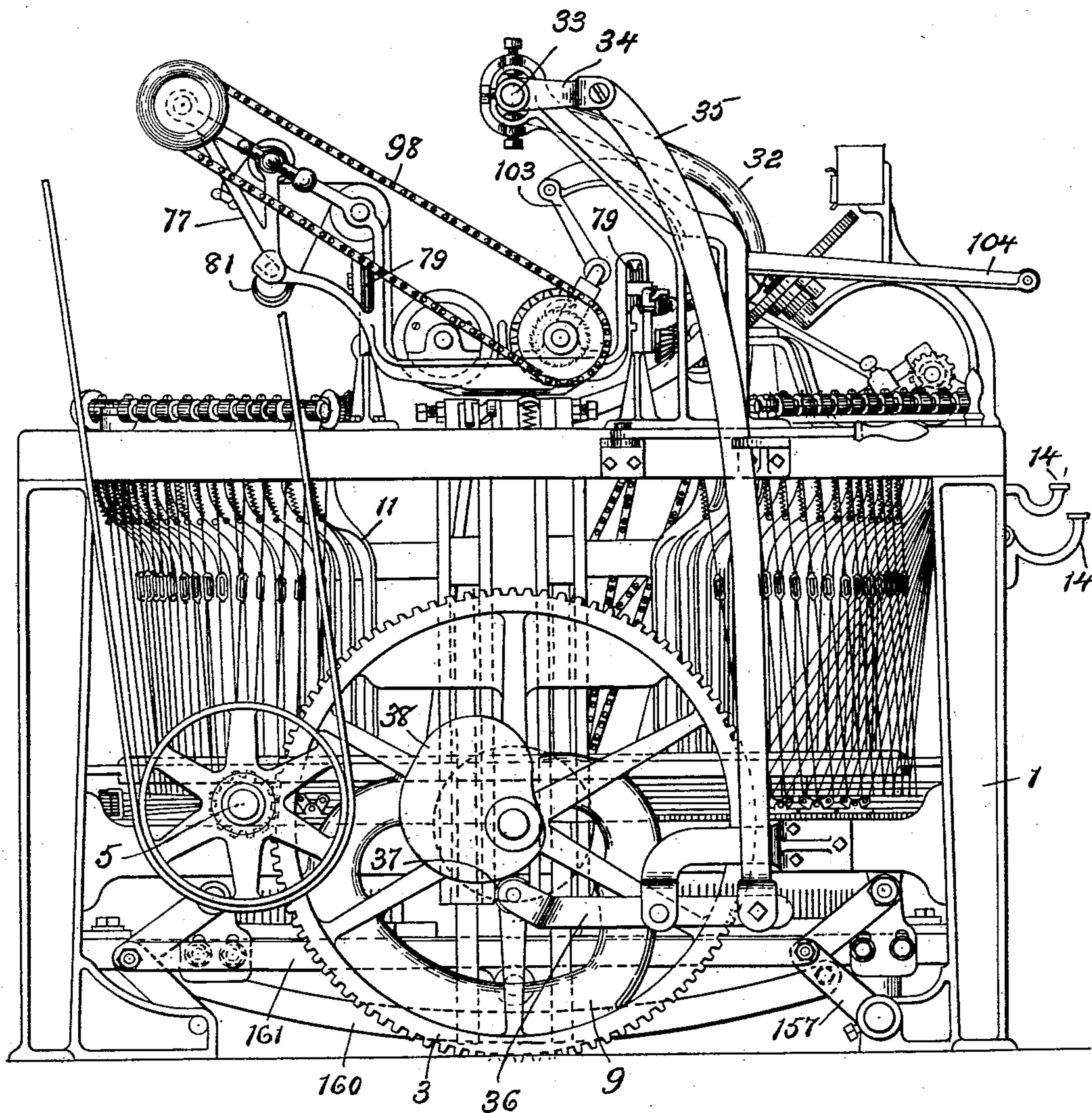
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Fig. 3.



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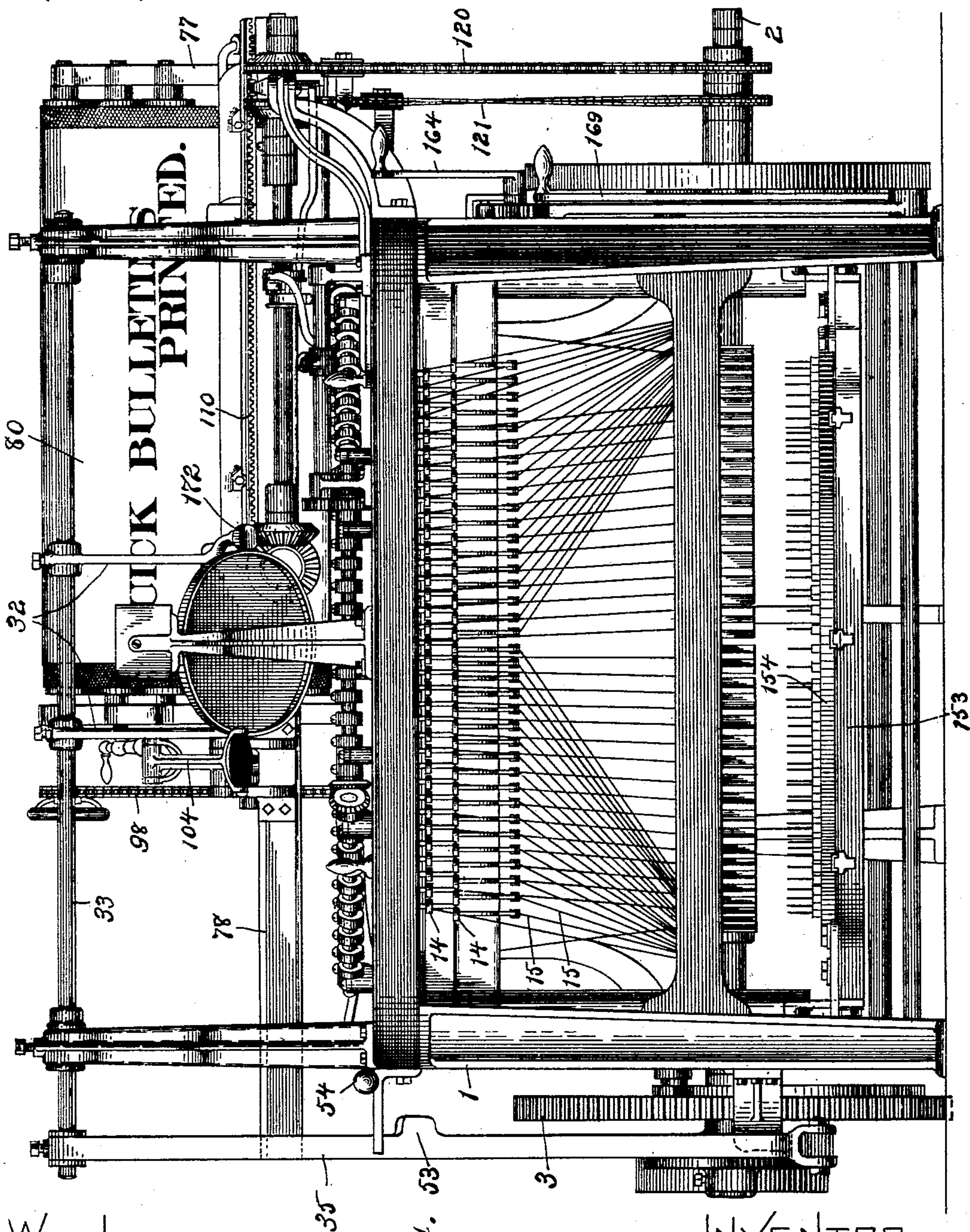
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WITNESSES.

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Fig. 4. 53.

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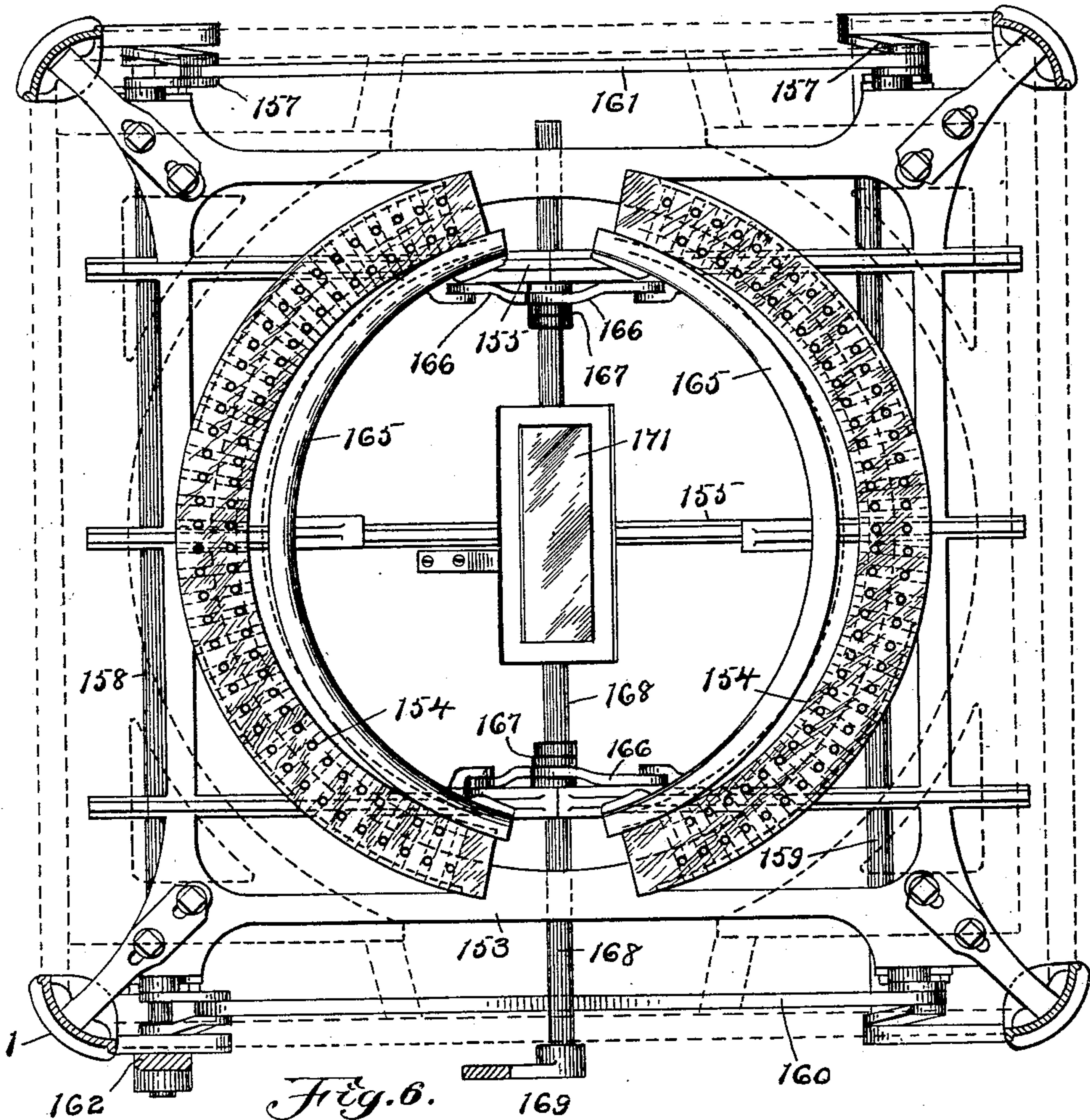


Fig. 6.

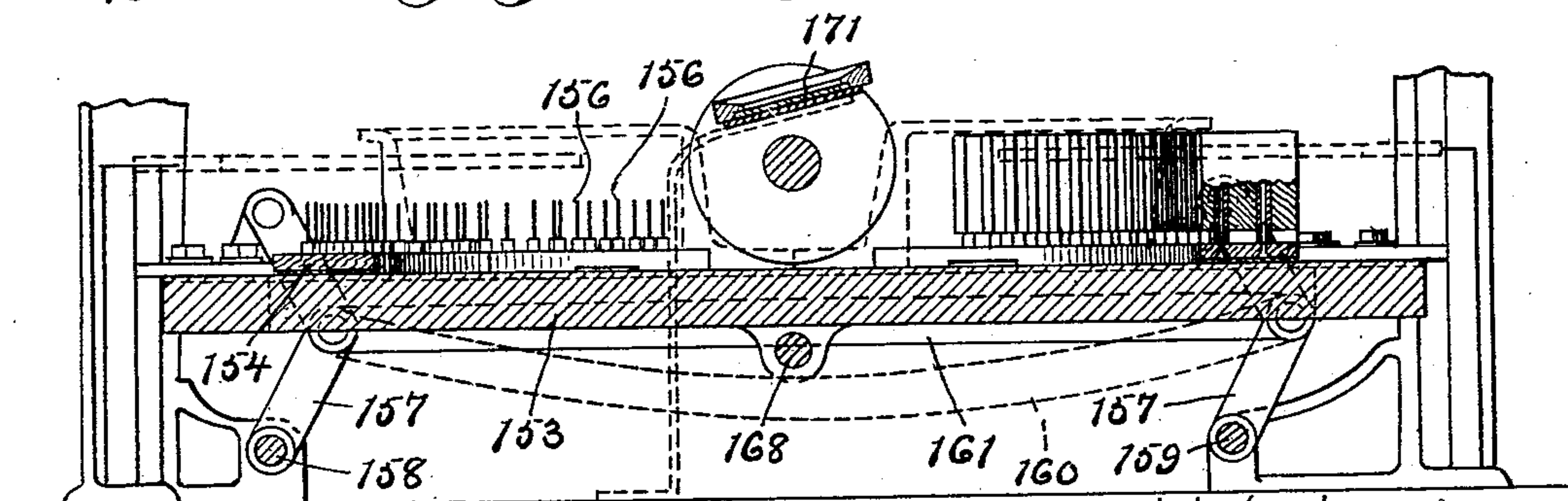


Fig. 5.

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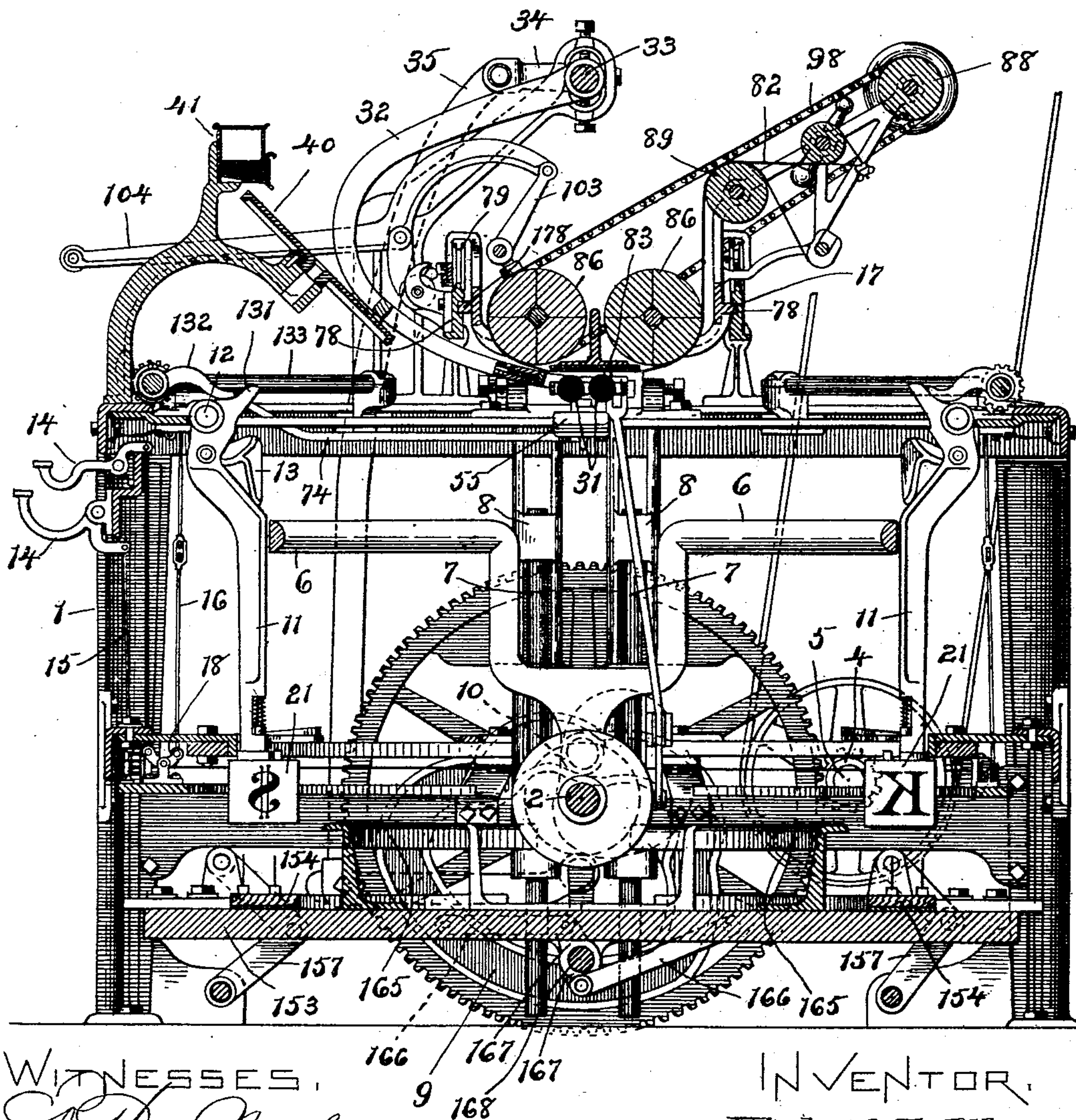
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Fig. 8.



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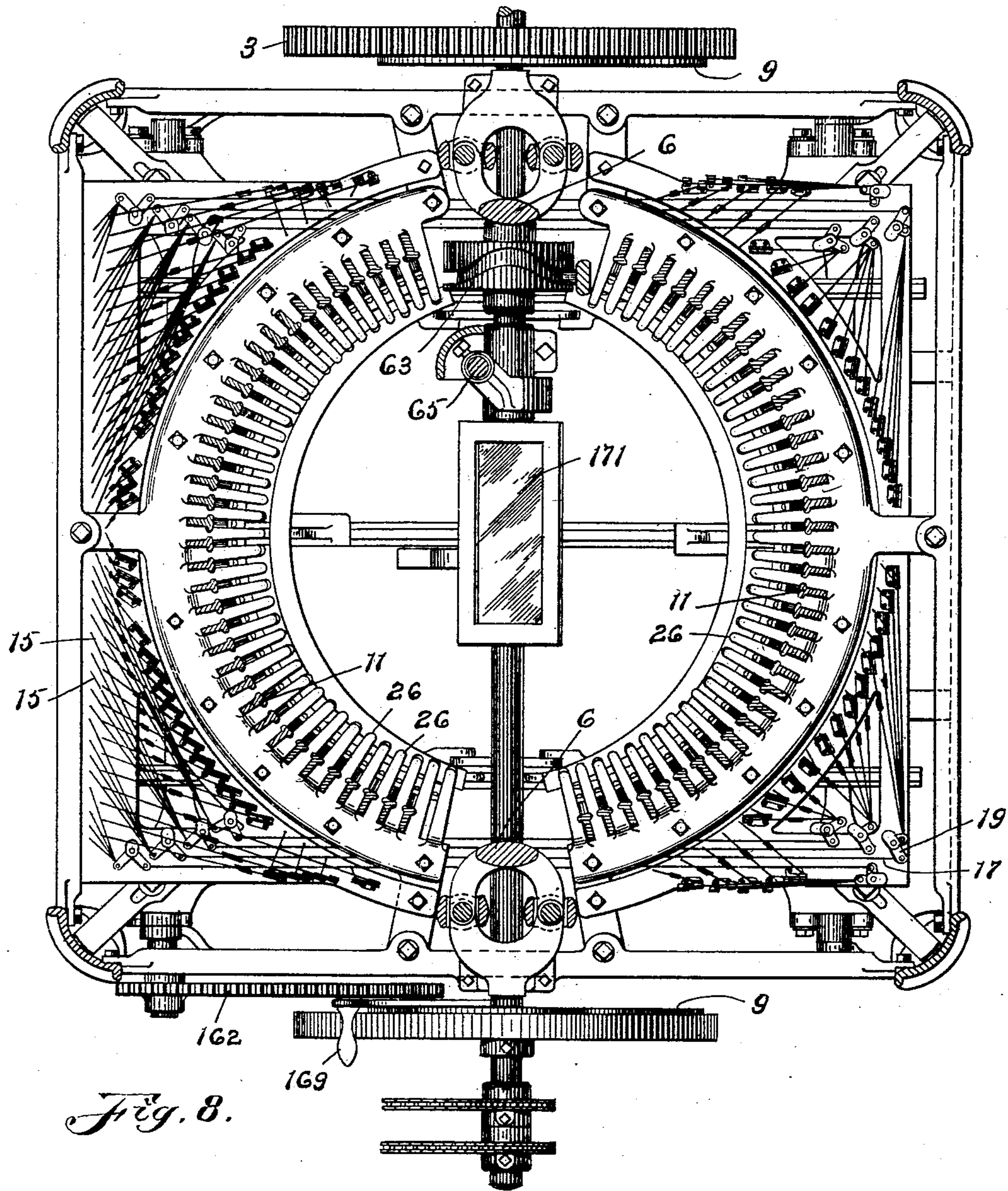


Fig. 8.

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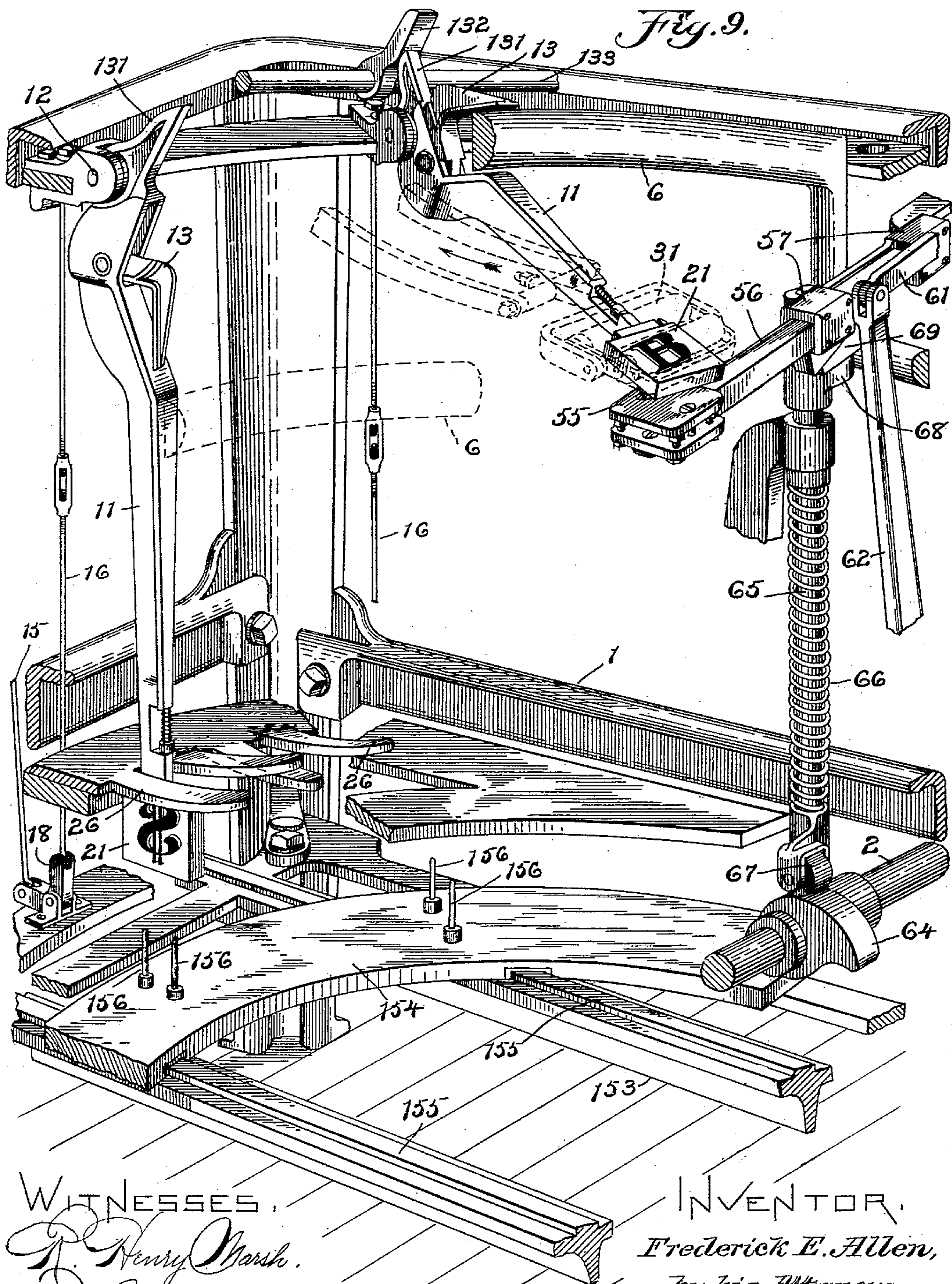
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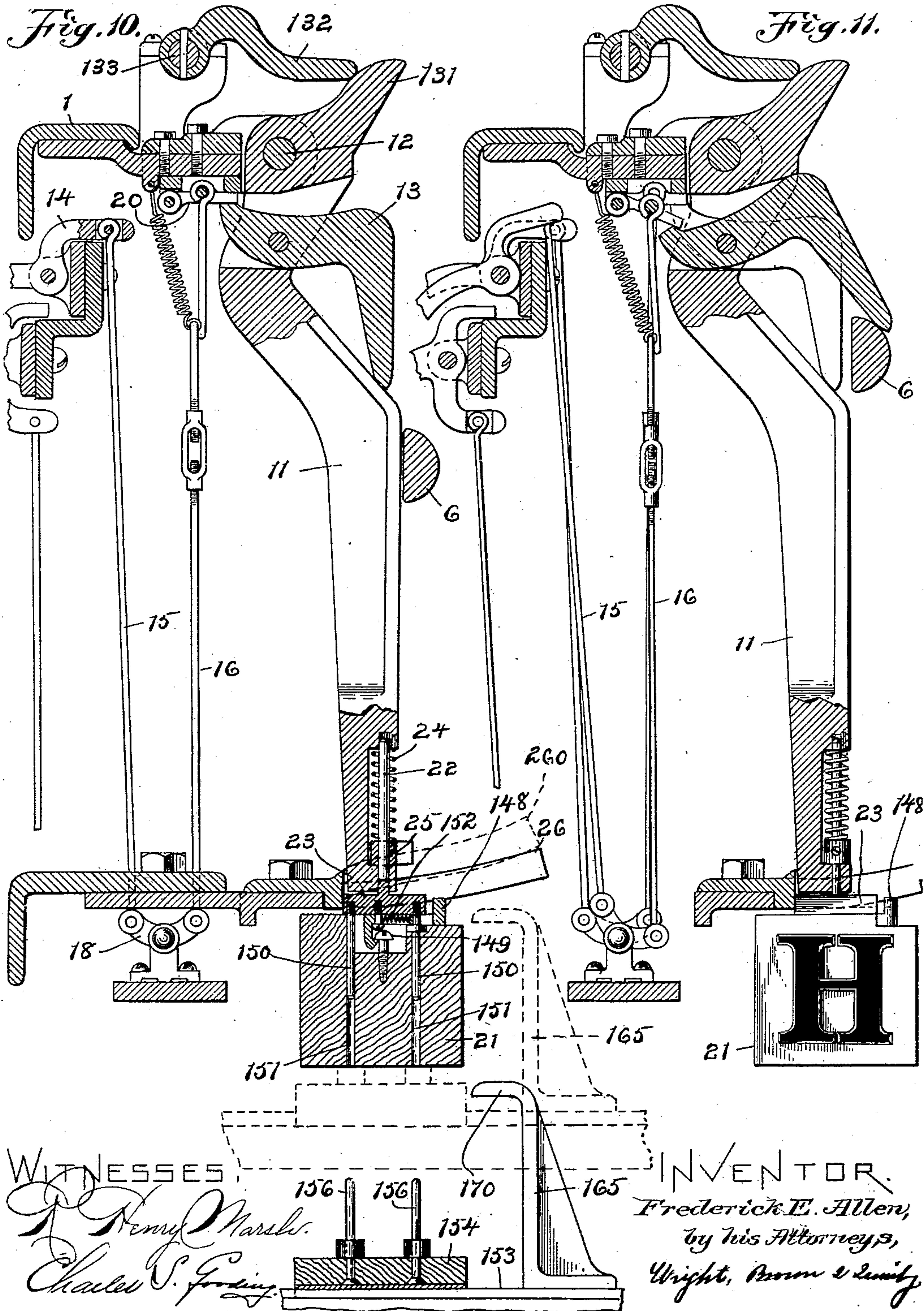
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19 Sheets—Sheet 10.

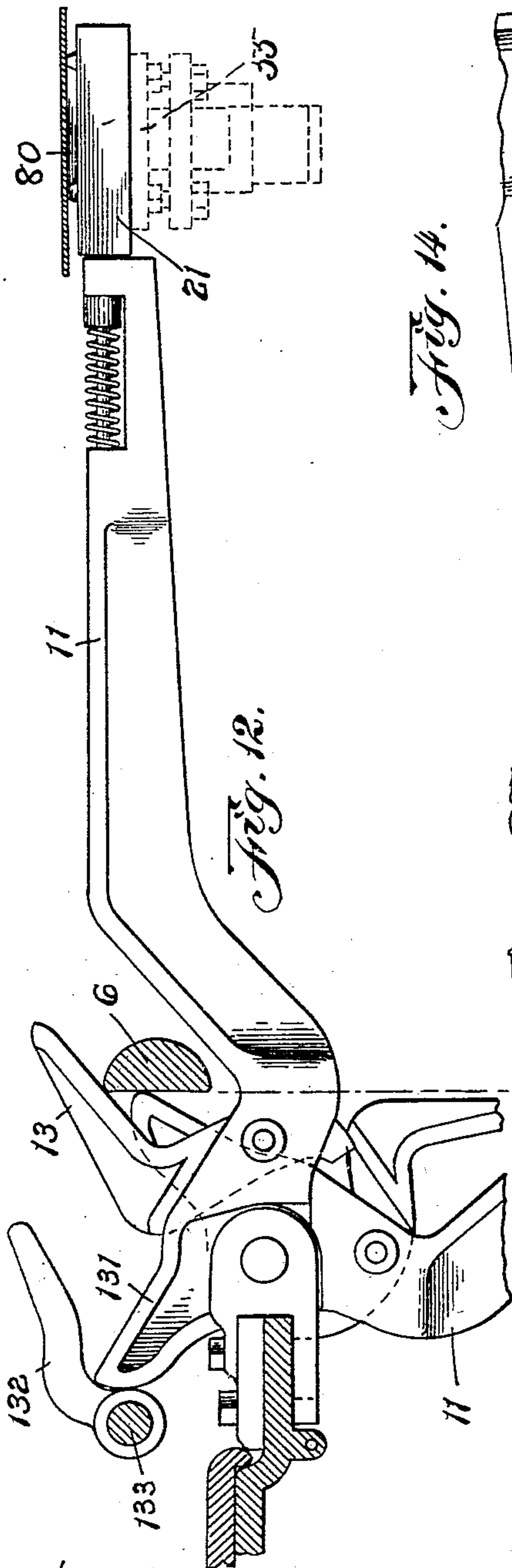


Fig. 12.

Fig. 14.

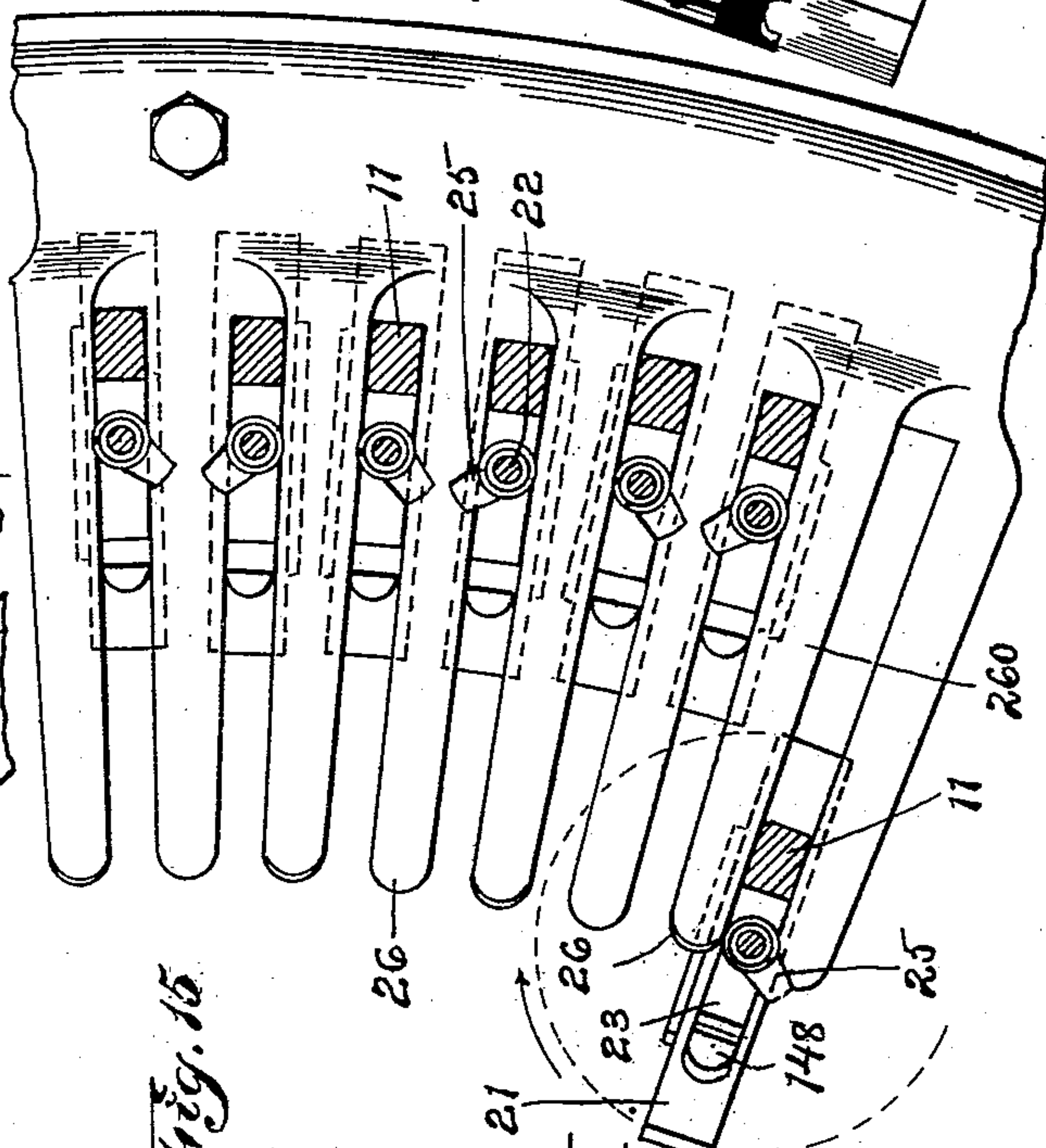
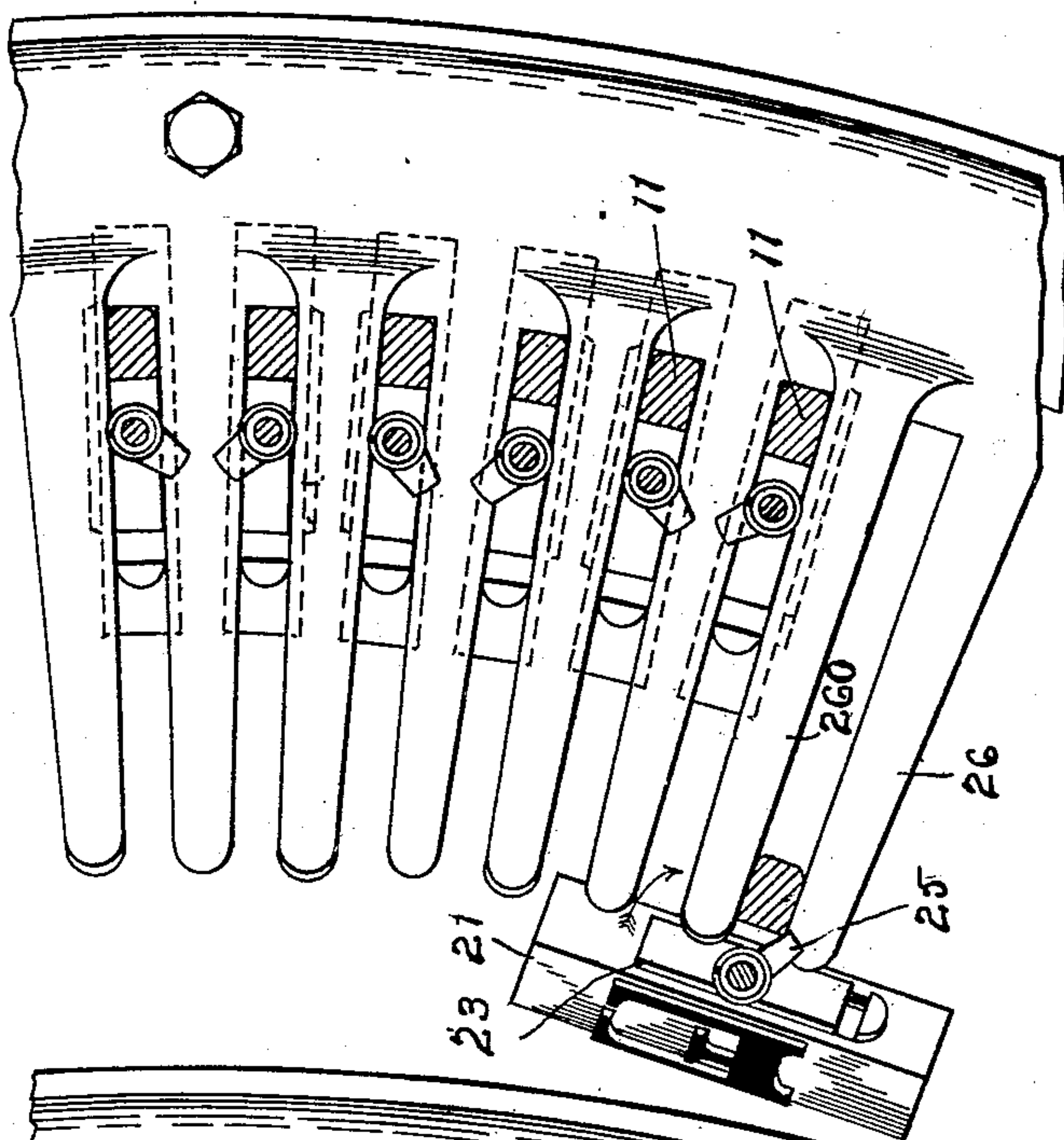


Fig. 15.

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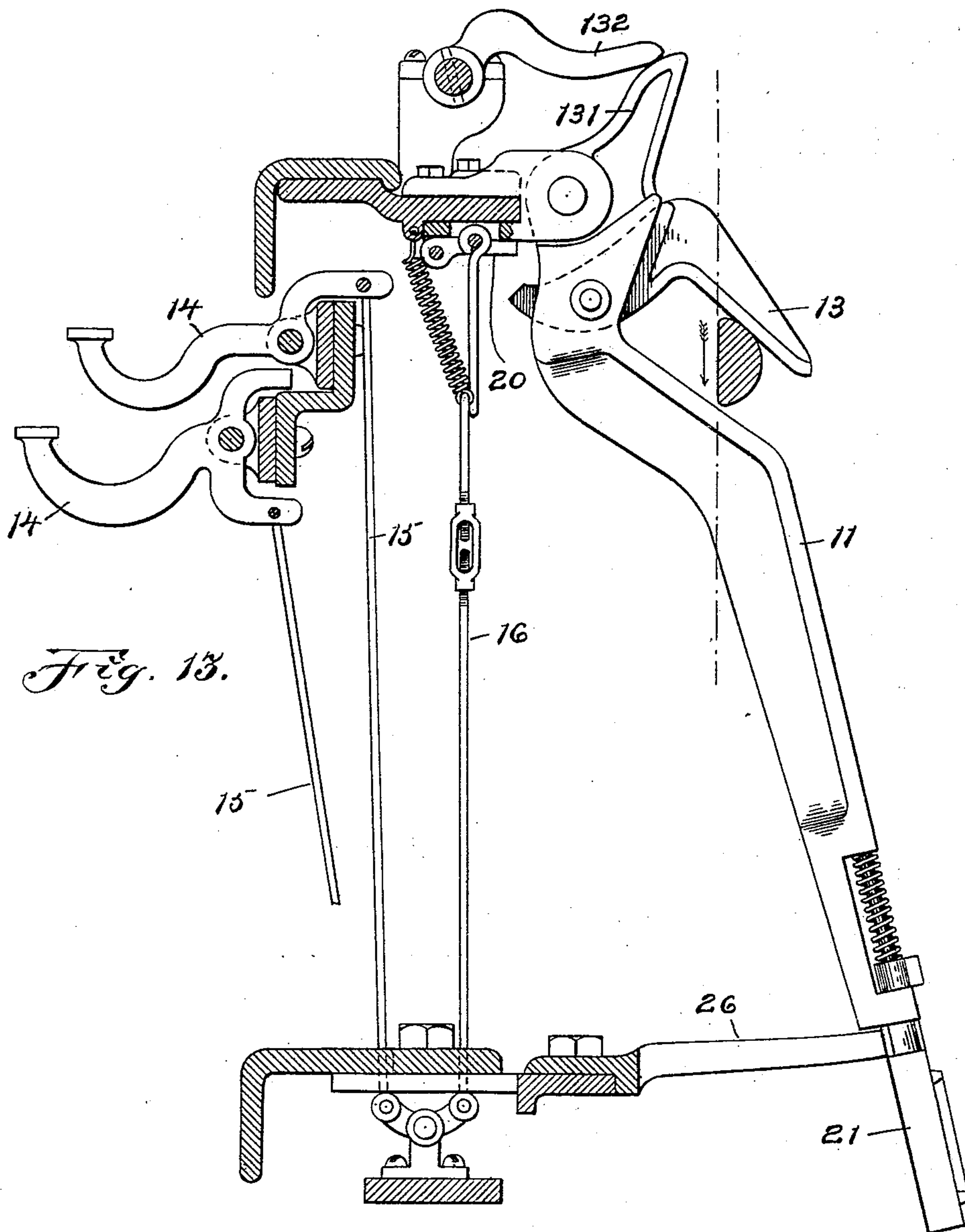
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19 Sheets—Sheet II.



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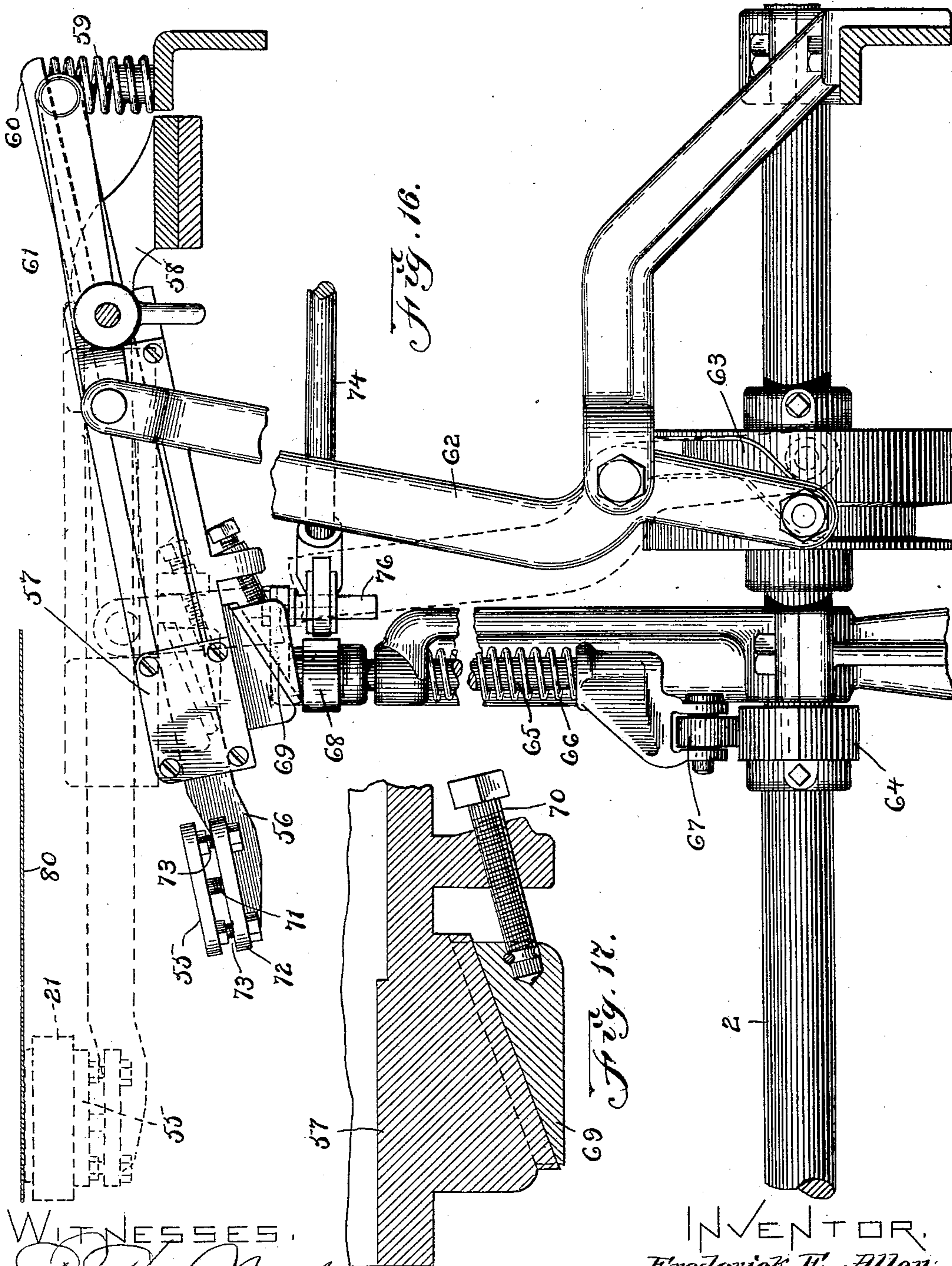
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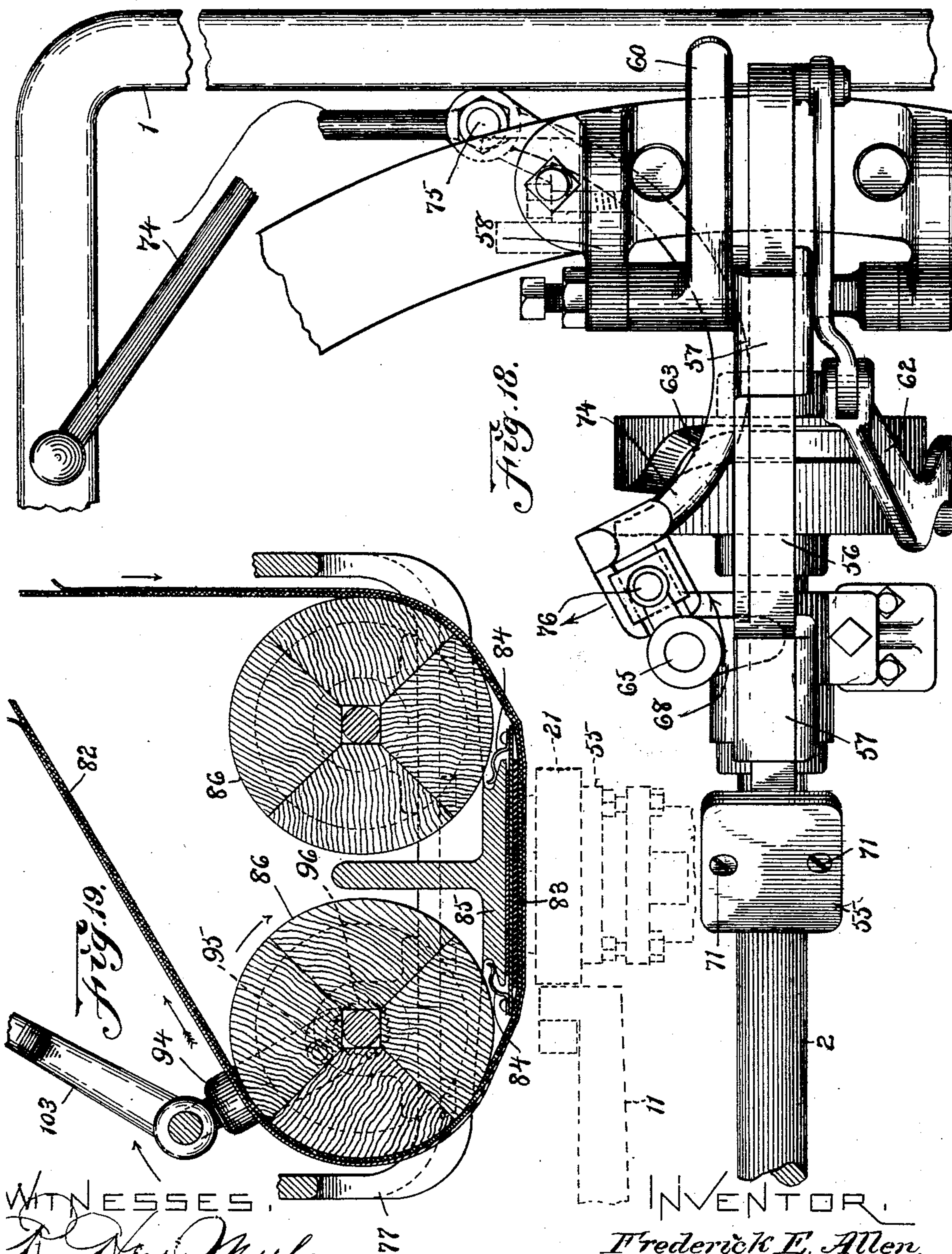
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19 Sheets—Sheet 13.



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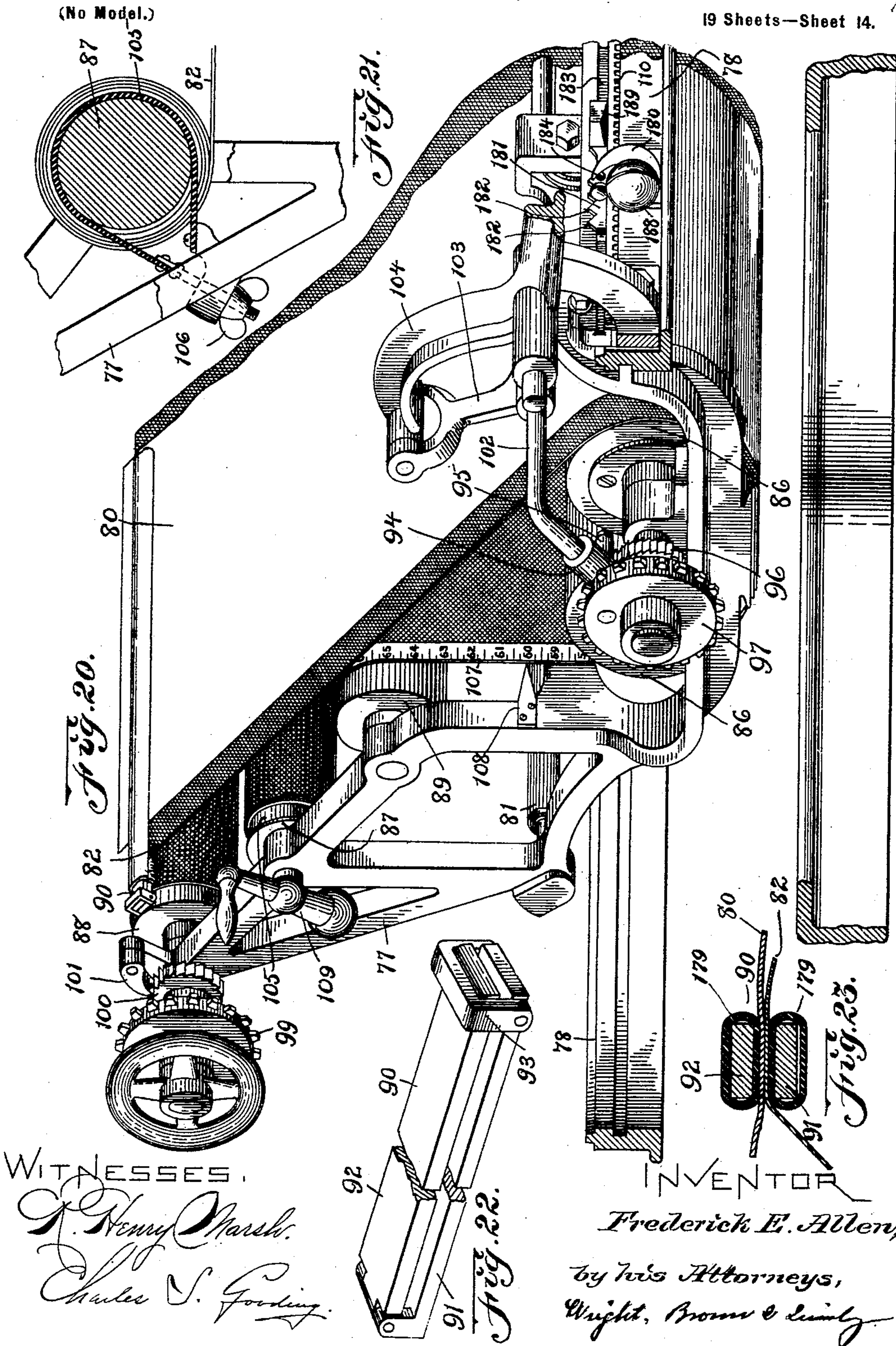
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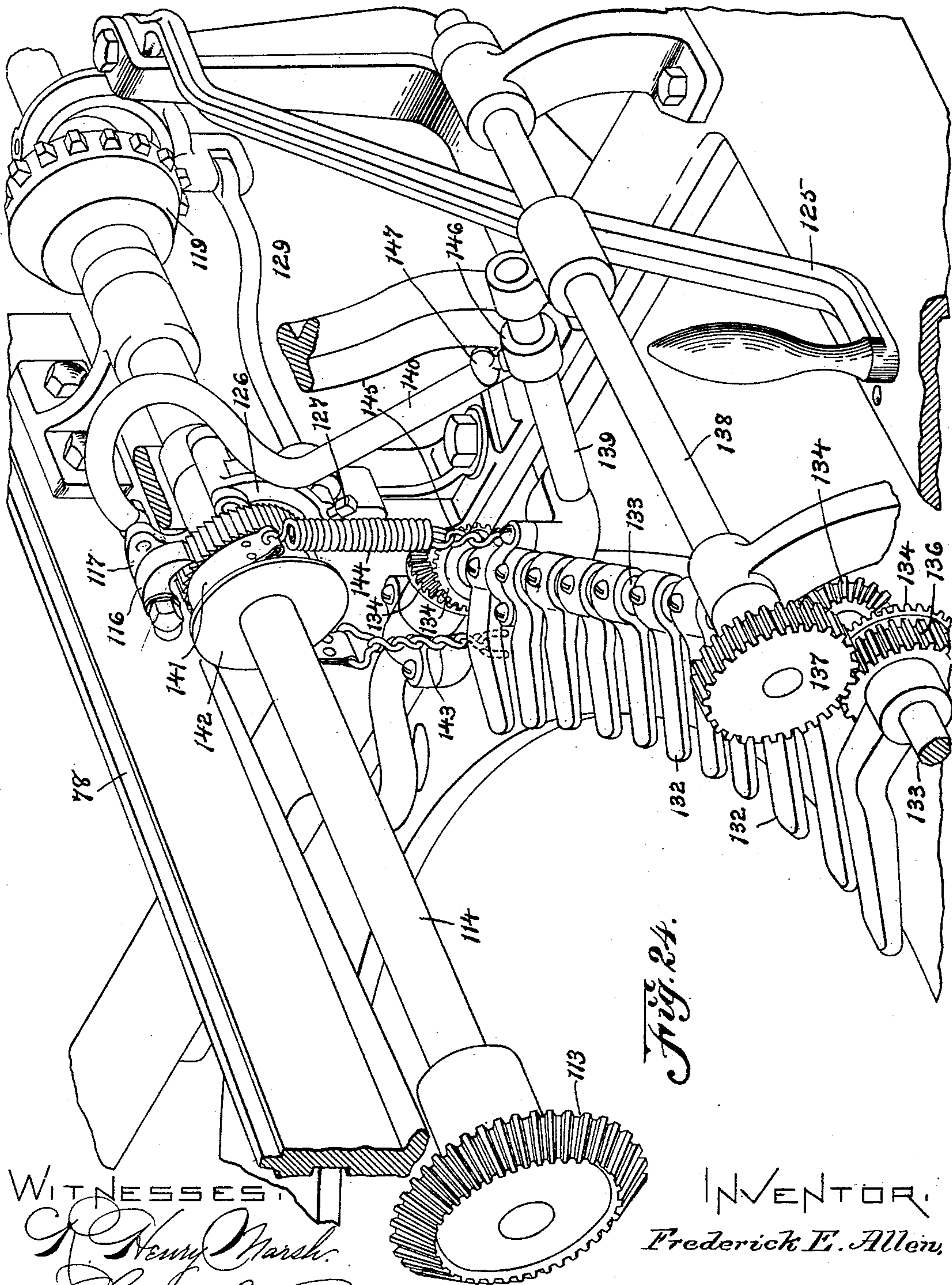


Fig. 24.

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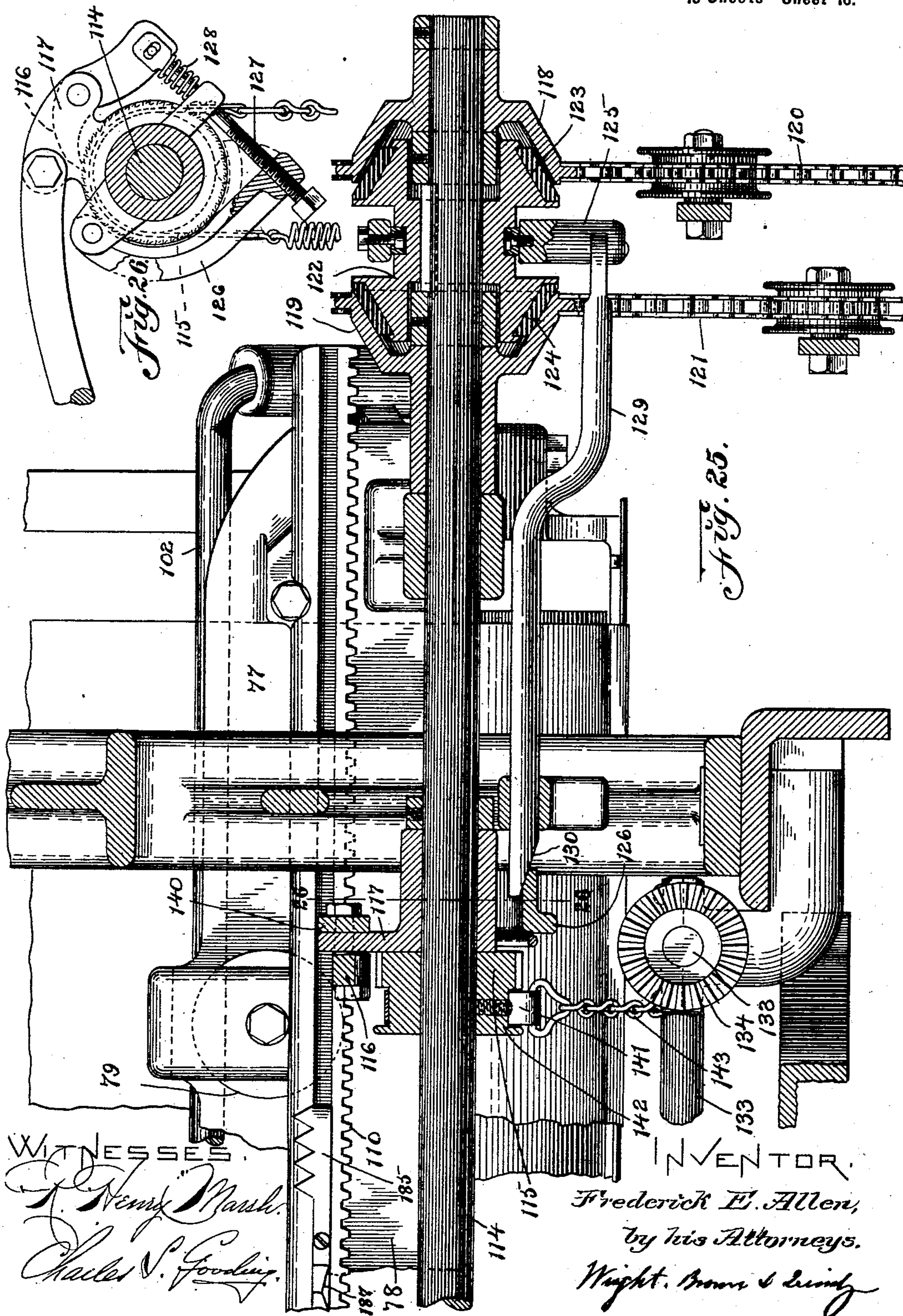
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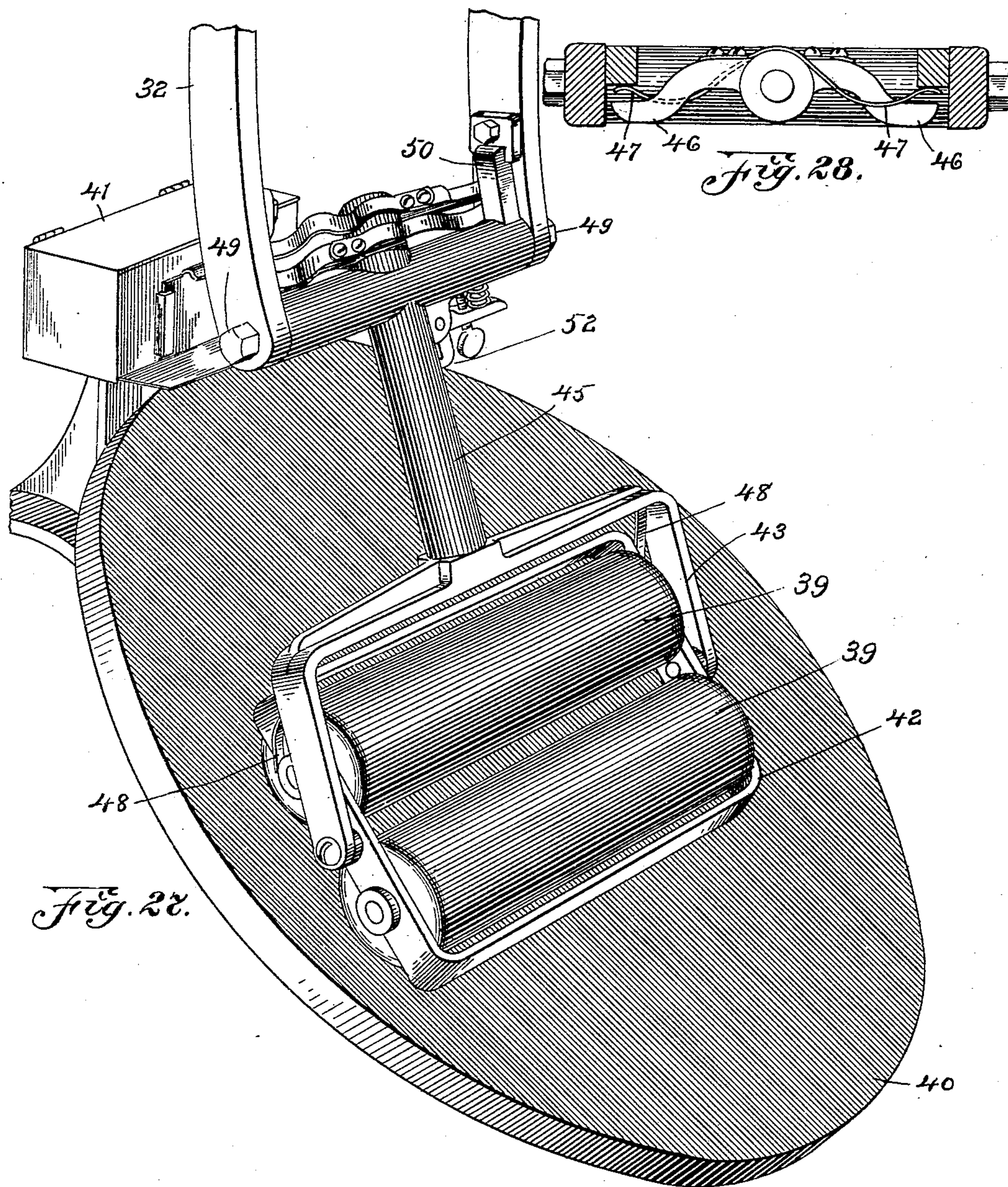
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19 Sheets—Sheet 17.



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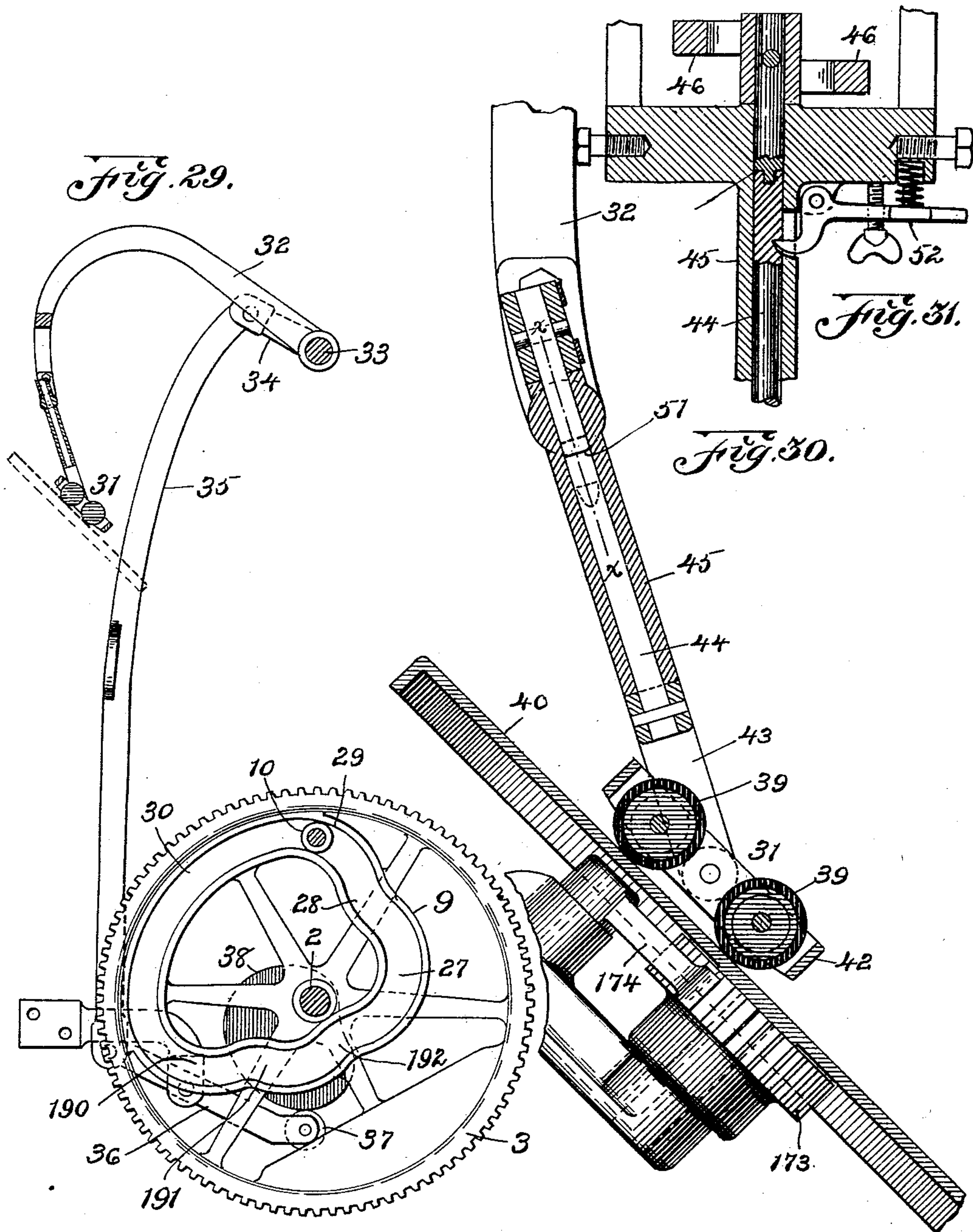
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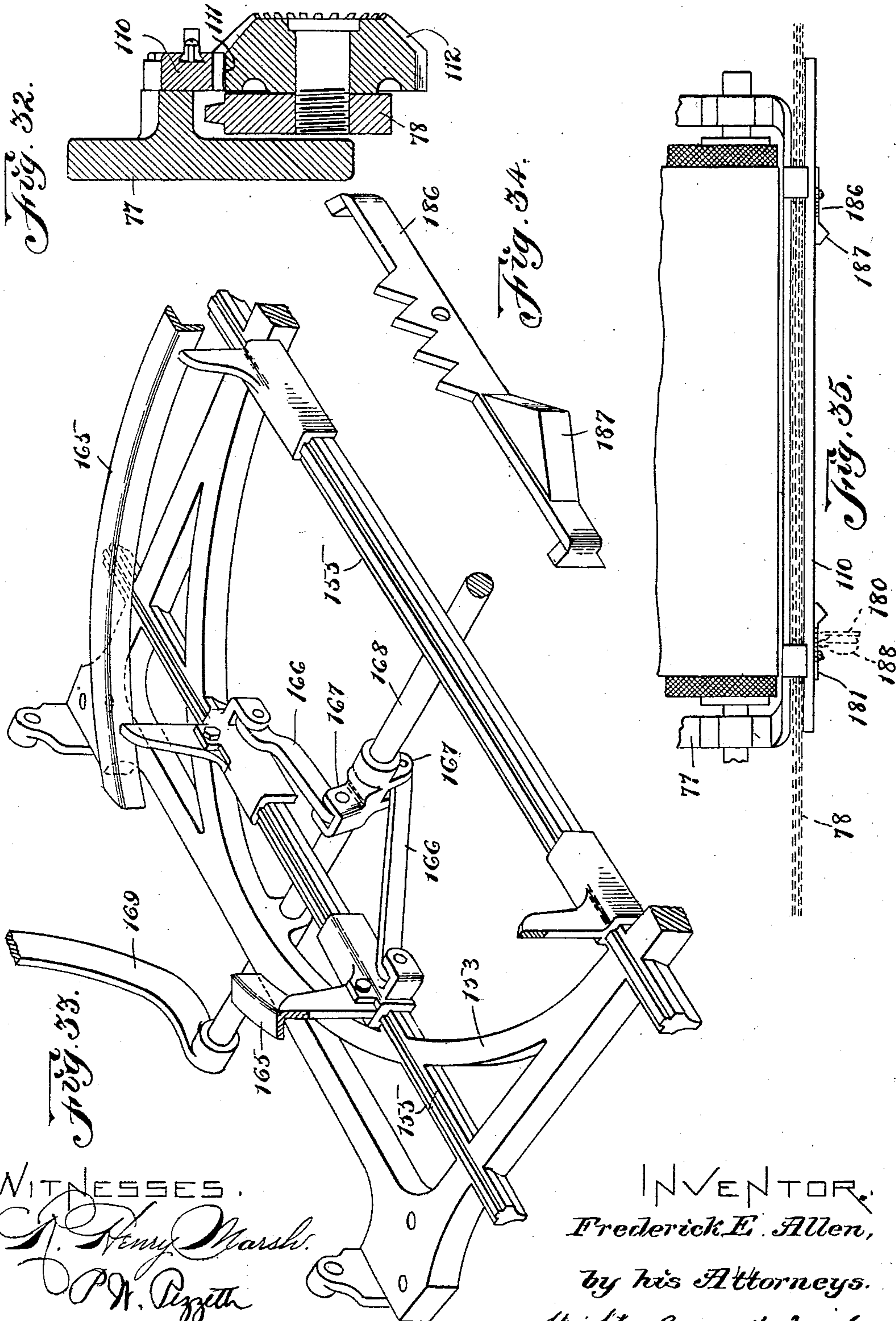
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19 Sheets—Sheet 19.



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UNITED STATES PATENT OFFICE.

FREDERICK E. ALLEN, OF BOSTON, MASSACHUSETTS.

TYPE-WRITER FOR PRINTING BULLETINS, &c.

SPECIFICATION forming part of Letters Patent No. 684,163, dated October 8, 1901.

Application filed March 5, 1900. Serial No. 7,334. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK E. ALLEN, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Type-Writers for Printing Bulletins, &c., of which the following is a specification.

This invention relates to type-writers; and its general object is to provide a power-operated machine of this type suitable for printing bulletins, placards, and the like in characters large enough to be read at a distance.

The invention consists in the improvements which I shall now proceed to describe and claim.

Of the accompanying drawings, Figure 1 represents a plan view of a type-writer constructed in accordance with my invention. Fig. 2 represents a right-hand side elevation thereof. Fig. 3 represents a left-hand side elevation. Fig. 4 represents a front elevation. Fig. 5 represents a vertical section of the lower part. Fig. 6 represents a horizontal section on the line 6 6 of Fig. 2. Fig. 7 represents a median transverse vertical section. Fig. 8 represents a section on line 8 8 of Fig. 2. Fig. 9 represents a perspective view showing the type-levers and presser. Figs. 10, 11, 12, and 13 represent views in side elevation and section of a type-lever and its actuating mechanism, showing different positions of the parts. Figs. 14 and 15 represent detail horizontal sections above the types, showing successive positions assumed by the types in approaching and receding from retracted position. Fig. 16 represents a side elevation of the presser, partly broken away. Fig. 17 represents a vertical section of the adjustment for the presser. Fig. 18 represents a plan view of the presser. Fig. 19 represents a vertical section of the platen and apron-guiding rolls. Fig. 20 represents a perspective view of one end of the carriage. Fig. 21 represents a vertical section of the brake for the web-feed. Fig. 22 represents a detail perspective view, partly broken away, of the clip for attaching the web to the apron. Fig. 23 represents a transverse sectional view of said clip. Fig. 24 represents a perspective view of the carriage-feed mechanism. Fig. 25 represents a longitudinal vertical sectional view thereof. Fig. 26 represents a transverse section on the line

26 26 of Fig. 25. Fig. 27 represents a perspective view of the inker and ink-plate. Fig. 28 represents an end view of the inker-stem. Fig. 29 represents a side elevation, partly in section, of the mechanism for actuating the inker. Fig. 30 represents a transverse vertical sectional view of parts shown in Fig. 27. Fig. 31 represents a longitudinal sectional view of the inker-stem. Fig. 32 represents a sectional view of the carriage-driving gearing. Fig. 33 represents a perspective view showing the type-stripper-actuating mechanism. Fig. 34 represents a perspective view of one of the carriage-gages. Fig. 35 represents a plan view of the front part of the carriage.

The same reference characters indicate the same parts in all the figures.

The machine herein illustrated and described as constituting an embodiment of my invention has, briefly stated, the following characteristics: For the purpose of carrying the type-levers from their normal retracted positions toward their printing positions a continuously-reciprocated actuator is provided, and each type-lever has a latch operated by a key, which upon being depressed throws the latch into the path of the actuator and causes the type-lever to be moved toward its printing position upon the next forward stroke of the actuator. The printing is done by direct contact of the types with the face of the web or sheet to be printed upon, and prior to the contact of each type with said web its face is inked by an inking device. The type is then engaged by a presser and moved against the surface of the web to deposit its imprint. The parts are then retracted in time for another character to be operated upon the next stroke of the actuator. The types themselves are movable on the type-levers and are so arranged that in their retracted positions they lie substantially parallel to the plane in which the type-lever moves and are caused to assume a position transverse to said plane when the type-lever moves toward printing position. The types are also removable from their levers by means of a novel type-changing mechanism, whereby one set of types may be removed and another substituted. This gives an opportunity for using different styles or different sizes of types and different-col-

ored inks. The carriage-feed is performed by power mechanism. The feed is made variable, so as to be greater for large type and less for small type, and the feed is also made variable for different characters in the same style or font, narrow letters having a short feed or spacing movement and wide letters having a longer feed.

Mechanism for operating type-levers.—Referring to the drawings, 1 designates a frame having bearings near its lower end for a main shaft 2. Said shaft is provided with a large gear 3, meshing with a pinion 4 on a belt-shaft 5, which may be driven from any suitable source of power.

6 is a type-lever actuator, consisting of two horizontal curved bars, forming a frame of general circular shape and provided with vertical guide-rods 7 7, mounted to slide in suitable guides 8 8 on the machine-frame. Said actuator is continuously reciprocated by means of a pair of path-cams 9 9, attached to the shaft 2 on opposite sides of the machine and engaging cam-rolls 10 10, mounted on the actuator 6.

The type-levers 11, each mounted on a pivot 12, are arranged in two semicircular groups, and each is provided with a latch 13, pivoted to the type-lever near the latter's axis of oscillation and normally resting by its own weight against the type-lever out of the path of the actuator 6. The actuator is continuously reciprocated in a vertical path in front of the two groups of type-levers, and if while the actuator is retracted or at its lower extreme of movement the latch 13 of any one of the type-levers is moved on its pivot from the retracted position shown in Fig. 10 to the position shown in Fig. 11 the actuator on its next upward stroke will engage said latch and oscillate the type-lever from its vertical retracted position to a substantially horizontal position. (Shown in Fig. 12.) Each of the latches 13 is controlled by a key 14, pivoted to the machine-frame and marked with a character corresponding to the type carried by the type-lever. The keys 14 are here shown as arranged in two banks at the front of the machine. They are connected by a suitable system of rods 15 16 17 and bell-crank levers 18 19, with a series of short levers 20 pivoted to the machine-frame and engaging the heels of the latches 13. When any key 14 is depressed, its corresponding lever 20 will be oscillated and the corresponding latch 13 will be moved into the path of the actuator 6.

21 21 represent the types, attached to the lower ends of the type-levers 11 and carried by said levers when the latter are oscillated from different retracted positions toward a common printing position, as is usual in typewriters. Each type 21 has a stem 22 rotatably mounted in the type-lever and having at its lower end a block or type-holder 23, to which the type is removably attached, as more fully hereinafter described. Surrounding the stem 22 is a spring 24, exerting a ten-

sion which tends to turn the type crosswise of the plane of movement of the type-lever into a printing position. The turning movement of the type is limited in this direction by means of a collar 25, formed as a lug attached to the stem 22 and abutting against the lever 11. When the type-levers occupy their vertical retracted positions, the types are held in positions substantially parallel to the plane of movement of the type-levers by means of a series of cam projections 26 26, arranged circularly around the interior space of the machine-frame and their side edges lying closely against the sides of the blocks or type-holders 23. The cam projections 26 alternate with a series of guiding projections 260, elevated above the cam projections 26, so as not to engage the blocks or type-holders 23, but acting as guides for the lower ends of the type-levers. As the type-lever descends toward its retracted position and reaches the row of cam projections 26 one of said projections engages the type-holder 23, which is then in its transverse position at one side of its axial line, and further movement of the type-lever causes the type to be turned against the tension of its spring 24 and to assume a position parallel to the cam projection 26. Alternate types are turned respectively to the right and to the left in moving into retracted position. By mounting the types as described the type-levers can be more closely grouped than when the types are rigidly affixed in transverse positions.

The actuator 6 in its upward movement serves to carry the type-lever 11 toward printing position, but does not impart the final printing pressure to the type. It is necessary to control the actuator throughout its movement either by means of a path-cam or an edge cam, against which the roll on the actuator is held by a spring or weight or by other positive mechanism, since otherwise the inertia acquired by the parts would be injurious both to the machine itself and to the quality of the work which the machine is intended to do. By inspecting Fig. 29, in which one of the cams 9 is shown, it will be seen that said cam has an abrupt rise at 27, followed by a nearly concentric portion 28, after which the cam goes by a gradually-rounded portion 29 into the outer dwell 30. The effect of this shape is that the first part of the movement of the type-lever from its retracted position is quickly performed. When the roll 10 on the actuator reaches the part 28 on the cam, the movement of the actuator is slackened to prevent a shock through violent contact with the latch on the type-lever. A rapid movement of the actuator then ensues, whereby the type-lever is carried toward printing position. As it approaches printing position its movement is gradually slackened to avoid an overthrow due to inertia by the passage of the cam-roll 10 through the rounded part 29 of the cam. When the roll 10 reaches the outer concentric portion or dwell 30 of the

cam, the type is inked and is then raised by the presser to printing position, as hereinafter explained. The return or receding stroke of the actuator is performed with a quick movement in its early part as the roll passes through the abrupt portion 190 on the cam, said abrupt portion being followed by a nearly-concentric portion 191, which retards the actuator and type-lever as the latter reaches the cam projection 26, thereby preventing shock from violent contact of the type with said projection.

Inking mechanism.—For inking the types I provide an inker 31, mounted at the end of an arm 32, which is reciprocated to carry the inker into and out of the paths taken by the types. The arm 32 is attached to a rock-shaft 33, having at one end a short arm or crank 34, connected by a link 35 to a lever 36, pivoted on a bracket at one side of the machine-frame and having at its end a roll 37, engaged by a cam 38 on the main shaft 2. The weight of the parts holds said roll 37 against the cam 38, and the action of the cam imparts the required reciprocatory motion to the inker. The inker 31 consists of two rolls 39 39, which in each retractive movement pass over the face of an inclined ink-plate 40, which is supplied with ink from an ink-fountain 41. The mechanism is so timed that the inker 31 passes across the upper face of the type just before the latter reaches its horizontal position and deposits ink thereon. Since the different types at the time they are inked are at various inclinations with respect to the inker, owing to their not having reached a horizontal position, I make the inker 31 universally adjustable to accommodate itself to the types. The ink-rolls 39 39 are carried in a frame 42, pivoted in a forked holder 43, which has a stem 44 mounted to turn within a sleeve 45. The pivotal axes of the frame 42 and of the holder 43 are at right angles, so that the ink-rolls may assume any inclination within limits. Stops 46 at the upper end of the stem 45 limit the rotary movement of said stem, and springs 47 serve to yieldingly centralize the stem. The movement of the frame 42 is limited by spring-stops 48. The sleeve 45 itself is pivoted at 49 on the arm 32 and is confined by a stop 50 to a limited oscillatory movement, which permits the inker to adjust itself vertically to the position of a type. The lower section of the stem 44 is removable from the upper section, the joint being at 51, Figs. 30 and 31, and is retained within the sleeve 45 by means of a spring-latch 52. By actuating said latch the inker may be removed from place and another inker substituted. This operation will ordinarily be performed when a change of color is made in the ink. When this change is effected, the ink-fountain, inker-plate, and type, which are all made removable, are changed. The link 35 in the inker-reciprocating mechanism is provided with a projecting lug 53, and the frame of the machine is equipped with a hand-lever 54,

which is adapted to be thrown into position beneath the lug 53. In this position it supports the inker and its reciprocating mechanism, including the cam-engaging roll 37, in a retracted position, whereby the parts of the inking mechanism may more readily be changed. The several adjustments of the inker are limited, so as to prevent the ink-rolls from soiling the paper.

A rubber-shod friction-roll 172 is mounted on the reciprocating inker-arm 32 in such a position as to engage the cylindrical edge of the ink-plate 40 during a portion of the stroke of said arm. An intermittent rotation is thereby imparted to the ink-plate on the down-strokes of the inker, and reverse rotation of the plate is prevented by means of a check-pawl 174, pivoted to the fixed bracket which supports the ink-plate and engaging a ratchet 173, attached to said ink-plate.

Presser mechanism.—The presser for engaging the types and moving them into printing position is continuously reciprocated and suitably timed, so that the presser raises the type against the web after the inker has been retracted, leaving the path of the type unobstructed.

55 represents the presser, the same consisting of a plate attached to the end of a bar 56, mounted to slide in a guide 57, said guide being pivoted in a bracket 58 on the machine-frame and normally depressed by a spring 59, interposed between its heel 60 and the said machine-frame. The rear end of the bar 56 is connected by a link 61 with the upper end of a pivotal lever 62, oscillated by a cam 63 on the shaft 2. By this mechanism the presser 55 is alternately advanced to a position beneath the printing position of the types and retracted therefrom. The guide 57 and with it the presser rod or carrier and presser are vertically oscillated by a cam 64 on the shaft 2 through the medium of a vertical sliding rod 65, depressed by a spring 66, having at its lower end a roll 67, engaging said cam, the rod having at its upper end a lug or projection 68, which abuts against a block or plate 69 on the lower side of the guide 57. Said block is made adjustable by means of a screw 70 to vary the vertical position reached by the presser 55, and hence to vary the pressure of the imprint. The presser-plate 58 is attached by screws 71 to a head or plate 72 on the end of the bar 56 and is made angularly adjustable with respect to said bar by means of leveling-screws 73 73, whereby the presser may be adjusted to exert an even pressure on the types. The lug 68 is rotatable on the rod 65 and is controlled by a hand-lever 74, which may be operated to throw the presser out of action at any time. The hand-lever 74 is pivoted at 75, Fig. 18, to the machine-frame and is connected with an elongated wrist-pin 76, attached to the hub of the lug 68. Movement of the hand-lever 74 throws the lug 68 into or out of position to engage the guide 57. The hand-lever 74 may

be used to prevent the printing of a character after the type-lever corresponding to said character has been engaged with the upwardly-moving actuator 6.

- 5 *Carriage and platen—Web-feed.*—77 designates the carriage for supporting the web or sheet to be printed upon. Said carriage is mounted upon guides 78 78 and is equipped with rollers 79 79, which roll on said guides.
- 10 The carriage-frame is also provided with longitudinal laterally-projecting ribs 178, fitting in grooves in the inner faces of the guides 78, whereby the pressure on the platen due to the upward thrust of the types during an im-
- 15 pression is resisted. The web 80 is here shown as an elongated strip inserted in the machine in the form of a roll 81 and supported by means of a flexible apron 82.

- 83 represents the platen, consisting of a
- 20 horizontal plate the lower side of which is its working face and is preferably surfaced with a yielding material, such as rubber. The platen is best seen in Fig. 19. It is removably attached by means of side spring-clips
- 25 84 84 to a dovetail portion 85 of the carriage-frame and may be inserted in and removed from place by a longitudinal movement. The apron 82 on the carriage passes underneath the platen 83 and is supported across the face
- 30 thereof by means of two guide-rolls 86 86, journaled in the carriage and extended along opposite edges of the platen. The apron 82 is attached at one end to a roll 87 and at its other end to a second roll 88, both journaled
- 35 in the carriage 77. Between the roll 87 and the rearmost one of the rolls 86 the apron passes over a guide-roll or tension-roll 89. The web 80 lies against the face of the apron 82, passing with it underneath the platen 83,
- 40 and at its upper end is attached by suitable means, such as a clip 90, to the apron 82. The clip 90, as shown in Figs. 22 and 23, consists of two bars or plates 91 92, hinged together and adapted to hold between them the
- 45 web and apron. Their free ends being fastened by a bail or catch 93, the web will be securely attached to the apron. The bars are shown as sheathed in rubber tubes 179 179, which increase the frictional hold of the
- 50 clip on the apron and web. A longitudinal feeding movement, causing the apron and web to be carried transversely across the face of the platen, is imparted to the apron 82 by the following mechanism: Loosely mounted
- 55 on the shaft of the front guide-roll 86 is an arm 94, carrying a pawl 95. Attached to said shaft is a ratchet 96 and a sprocket-wheel 97, the latter connected by a chain 98 with a sprocket-wheel 99 on the shaft of the roll 88.
- 60 Also located on the shaft of the roll 88 is a ratchet 100, engaged by a check-pawl 101. The arm 94 is provided with a lateral extension 102, supported also by an arm 175, similar to the arm 94 and loosely mounted on the op-
- 65 posite end of the shaft of roll 86. A handle-lever 104, pivoted on a fixed bracket on the machine-frame, is connected with the lateral

extension 102 by means of a link 103, through which the extension 102 slides during movement of the carriage. Said lever carries at 70 its outer end a handle within reach of the operator, and upon being oscillated will actuate the driving mechanism described and cause the apron 82 to wind up on the roll 88 and unwind from the roll 87. The latter roll 75 is provided with a band-brake 105, Fig. 21, having an adjustment 106 for varying its tension, whereby the roll is frictionally retarded and prevented from rotating too freely. By means of the described longitudinal feed of 80 the apron the printing on the web is spaced from line to line. To regulate the spacing accurately, I provide the edge of the apron 82 on its innerside with an index 107, graduated in convenient units, such as inches and 85 fractions thereof, with which index a pointer 108, affixed to the carriage, coöperates to indicate the distance traveled by the apron. Any given spacing between printed lines may be attained by manipulating the apron-feed 90 and observing the pointer and index-gage. Reverse movement of the apron 82 is effected by lifting the pawls 95 and 101 and manipulating a handle 109 on the shaft of the roll 87. The apron may thereby be rewound on 95 the said roll and unwound from the roll 88. Coöperating with lugs 176 on the arm 175 are adjustable stop-screws 177 on the carriage-frame, which limit the movement of the extension 102 and prevent it from striking the 100 web or the carriage-frame. Obviously with slight modifications to adapt it an endless apron may be employed in feeding the web.

Carriage-feed.—In moving longitudinally on its guides the carriage 77 carries with it 105 the platen 83, apron 82, and web 80, the web being thereby carried along past the printing-point reached by the types, so as to permit a continuous line of printing to be formed on the web. Longitudinal feeding movement 110 is imparted to the carriage, both in a step-by-step manner by the manipulation of the keys and also continuously in either direction by means of a suitable clutch device, to be described. The front of the carriage 77 is provided with a rack 110, engaged by a station- 115 arily-journaled spur-gear 111, Fig. 32, having on its stud or shaft a bevel-gear 112. Said bevel-gear meshes with another bevel-gear 113, attached to a shaft 114, running 120 parallel to the movement of the carriage and mounted in fixed bearings. Affixed to said shaft is a ratchet 115, engaged by a pawl 116, pivotally mounted on a plate 117, which is loosely supported on the shaft 114. The re- 125 ciprocation of the pawl 116 is controlled by the keys and effects a step-by-step forward feed movement of the carriage, as hereinafter explained. Mounted on the outer end of the shaft 114 is a compound clutch consisting 130 of two hollow cones 118 119, loosely mounted on the shaft and continuously rotated in opposite directions by means of sprocket-chains 120 121, geared to the main shaft 2, and a

member 122, splined to the shaft 114 and having cones 123 124 on its ends, adapted to engage with the cones 118 119, according as the member 122 is moved in one direction or the other. A hand-lever 125 controls the member 122 and when moved in a direction to engage the cone 123 with the cone 118 the shaft 114 is rotated and the carriage 77 is fed continuously forward or to the left. When the hand-lever is moved in an opposite direction, the cone 124 engages the cone 119 and the carriage is fed continuously to the right. When the hand-lever occupies an intermediate position, both parts of the clutch are disengaged and the continuous feed does not operate. The continuous feed is principally employed to return the carriage after a line of printing is finished and preparatory to beginning a new line. It is also employed to quickly position the carriage at any desired point. When the continuous return-feed takes place, the pawl 116 is thrown out of action by the same movement with which the clutch 119 124 is put into operation. Attached to a lug on the hub of the plate 117 is a pivoted segmental arm 126, controlling the pawl 116 through an adjustable screw-rod 127, connected with the heel of the pawl and mounted in the segmental arm 126, Fig. 26. A spring 128, interposed between the heel of the pawl and a lug on the hub of the plate 117, normally holds the pawl in engagement with the ratchet 115. When, however, the free end of the arm 126 is depressed or moved in a direction away from the shaft 114, the operating end of the pawl 116 will be lifted away from the ratchet. This movement of the arm 126 is effected by means of a rod 129, connected at one end with the movable clutch member 122 and formed at its other end with a beveled cam-surface 130, which engages the inner edge of the segmental arm 126. Movement of the rod 129 to the left depresses the arm 126 and throws the pawl 116 out of action.

Step-by-step movement of the carriage, under the control of the type-keys, is effected in the following manner: The hubs of the several type-levers 11 are provided with toes or cams 131, and overlying the several said cams are a series of short arms 132, one for each type-lever, attached to a series of rock-shafts 133, journaled in bearings on the machine-frame. The adjacent ends of the several rock-shafts are connected by bevel-gears 134 134, so that the oscillation of one of said rock-shafts causes the whole series to oscillate. A movement of any one of the type-levers 11 from retracted position to printing position will cause the end of the corresponding arm 132 to be lifted and will thereby rock the system of shafts 133. As the type-lever descends the rock-shafts and arms are returned to their normal positions by the weight of the arms and the tension of a spring 135, Fig. 1. On one of the rock-shafts 133 is secured a spur-gear 136, (see particularly Fig.

24,) meshing with a second spur-gear 137, secured to a counter-shaft 138. Also secured to said counter-shaft is an arm 139, connected by a link 140 with the plate 117, to which the pawl 116 is pivoted. It is evident that when one of the arms 132 is thrown up by the movement of a type-lever toward printing position a feeding movement of the carriage takes place, the extent of which is determined by the extent of movement of the pawl 116. Two means of varying the pawl movement, and hence the feeding movement, of the carriage are shown. The movement of the carriage is made different for different characters, being less for narrower characters and greater for wider characters, so that the actual spaces between different characters are made practically the same and a uniform appearance given to the printed word. To this end the several arms 132 are made of different lengths. As seen in the drawings, the several type-levers 11 are grouped in a curvilinear or substantially circular form. The rock-shafts 133, however, being straight and arranged in angular relation to one another, are disposed in a polygonal form outside of the two curvilinear rows of type-levers. Different portions of the rock-shafts are therefore at different distances from the type-levers and their cams 131, and the arms 132 are made of different lengths to reach said cams. The cams themselves, being of uniform length, will as to those type-levers which are nearer the ends of the rock-shafts act on the arms 132 at a greater distance from the rock-shafts than as to those type-levers which are nearer the middle of said rock-shafts. The former levers will therefore rotate the system of rock-shafts to a less extent than the latter and will impart a shorter throw to the pawl 116. The narrower characters in a given set of types are assigned to the short-spacing type-levers or those nearest the ends of the rock-shafts, while the wider characters are assigned to the long-spacing type-levers, nearest the middle of the shafts. The feeding movement of the carriage takes place upon the upward or positioning stroke of the type-lever and terminates just prior to the occurrence of the impression. To counteract the inertia of the carriage at the end of the feeding stroke, I provide a band-brake 141, engaging a drum 142 on the shaft 114, alongside of the ratchet 115. One end of the band is connected by a chain 143 with the machine-frame, and the other end is connected by a spring 144 and chain 145 with one of the rock-shafts 133. The lifting of the arms 132 puts tension on the spring 144, which sets the brake as the pawl 116 reaches the limit of its forward stroke.

The feeding movement of the carriage equivalent to a given movement of the rock-shafts 133 may be varied in the following manner: That end of the link 140 which connects with the arm 139 is pivotally attached to a collar 146, fixed by a set-screw 147 to said

arm and adjustable to different positions along said arm. It is evident that when the collar 146 is fixed farther out on the arm 139 the throw of the pawl 116 will be greater for
 5 a given movement of the shaft 138, and when said collar is fixed nearer the shaft 138 the throw of the pawl will be less. By this means the actual spacing of all of the letters may be varied by a single adjustment either for different sizes of types or when it is desired to
 10 make a uniform change in the appearance of one or more lines by spreading or contracting them.

To furnish indication of the position of the carriage, I provide the machine-frame with a
 15 fixed pointer 180, which coöperates with suitable gages 181-185, attached to the carriage near the respective ends thereof, Figs. 20 and 25. The gage 181 at the left of the carriage coöperates with the pointer 180 in indicating
 20 the position of the carriage at the beginning of a line, to which position the carriage is brought in its return movement by the operation of the continuous feed. Said gage 181 is mounted to slide in a dovetail groove 183
 25 along the face of the rack 110 and can be fixed at any position by means of a screw 184. Its position will be varied for different left-hand margins or for different widths of the
 30 web. The gage is formed with a series of teeth or points 182, equivalent to graduations which correspond to the different sizes of types used in the machine. Thus with a narrow type—say one inch—the left-hand one of
 35 the points 182 will be brought opposite the pointer 180 at the beginning of a line, for two-inch type the second one of the points would be used, and so on.

188 is a bell mounted on the machine-frame
 40 adjacent to the pointer 180, and 189 is a cam-lug formed on the gage 181 and adapted to actuate the bell 188 as said lug moves past the bell. A signal is thereby given as the carriage approaches the end of its return movement.
 45 The gage 185 at the right-hand end of the carriage is, as here shown, similar to the gage 181, having a series of indicating-points and capable of adjustment in the dovetail groove 183. It also has a cam-lug 187, adapted to
 50 actuate the bell 188 as the end of a line is approached.

Spacing between words is effected in a step-by-step manner by depressing a key which controls one of the cams 131, having no operative type-lever, but operating one of the
 55 arms 132 and effecting a feeding movement of the carriage the same as an ordinary type-lever.

Type-changing mechanism.—The several
 60 types 21, as seen particularly in Fig. 10, are removably secured to the ends of their type-levers by latches 148. The latch is mounted to slide horizontally on the block or type-holder 23, and its hooked inner end engages a
 65 headed stud 149, secured to the type 21, within a recess in the upper side of said type. The type-holder 23 is provided with two down-

wardly-projecting dowels 150, which enter
 dowel-holes 151 in the type. The outer end of the latch 148 is exposed above the type 21,
 70 so that a horizontal inward pressure exerted on said latch will disengage the latch from the stud 149 and permit the type to be withdrawn from its holder. In replacing the type the stud 149 snaps past the head or hook
 75 on the latch. The latch is provided with a spring 152, tending to press it outwardly.

153 is a horizontal frame or carrier mounted to reciprocate vertically in the lower part of the frame 1 and guided at the corners of said
 80 frame, and 154 154 are two type-holding frames supported by the carrier 153 and mounted to slide on and off therefrom in opposite directions on ways or guides 155. The frames 154 when in position are alined
 85 with the lower ends of the type-levers and are provided with a series of type-holders, which consist of two upwardly-projecting dowels 156 156, alined with the dowel-holes 151 in the type 21. Upward movement being
 90 imparted to the frame 154 by raising the carrier 155, the dowels 156 will enter the dowel-holes in the type. The carrier 153 is supported by four toggles 157 157, the lower levers of which are connected in pairs by shafts
 95 158 159, mounted in fixed bearings, while the knuckles of the toggles are connected by links 160 161. At one end of the shaft 158 is affixed a segment 162, having gear-teeth engaged by the teeth of a pinion 163, mounted
 100 in a fixed bracket. The said pinion is rotated by a hand-crank 164, whereby the segment 162 is oscillated and the carrier 153 raised or lowered. Also mounted to slide on the ways 155 are two semicircular "type-strippers"
 105 and latch-actuators 165 165, connected by links 166 166 with arms 167 167, secured to a rock-shaft 168, which is mounted in bearings on the carrier 153. At the outer end of said rock-shaft is secured a hand-lever 169. By
 110 oscillating said hand-lever the strippers 165 will be moved simultaneously in opposite directions, either toward or from the two groups of types at the lower ends of the type-levers. On its upper edge each stripper 165 has a
 115 horizontal projecting lip or flange 170. When it is desired to remove the types from the type-levers, the carrier 153 (on which the frames 154 and strippers 165 have their relative positions, represented in Fig. 10, the strippers
 120 being retracted from the frames) is raised from the retracted position shown in full lines in Fig. 10 until the frames are brought into engagement with the lower edges of the types, the dowels 156 on said frames entering the
 125 dowel-holes 151 in the types. The strippers are then moved horizontally toward the types until the lips or flanges 170 on the strippers overlie the upper edges of the types. At the limit of the horizontal movement of the strip-
 130 pers the edge of the lip 170 of each stripper will have simultaneously actuated the latches 148 of all of the types in both groups and freed said types from their locked engage-

ment with the type-levers. The carrier 153 is then depressed, and the entire set of types in both groups is drawn off of the type-levers by the lips 170 on the strippers 165, the types 5 being left standing upright on the dowels 156. The two type-frames 154, carrying the types, may then be withdrawn. The above construction affords a rapid and convenient method of changing types or of removing 10 types for cleaning. When the types are to be reattached to the type-levers, the frames 154, carrying the types, are set in place, the strippers 165 being retracted, and the carrier 153 is raised until the types become automatically locked with their respective levers. 15

Mirror.—To enable the operator to see the line which is being printed, I arrange a mirror 171 at the lower part of the machine, below the middle of the platen 83, and incline the same so that the reflection of the printed line will reach the operator positioned in front of the keys 14. 20

I claim—

25 1. In a type-writer, a type-actuator, means for continuously reciprocating said actuator and for positively controlling the same throughout its movement, a series of types, key-controlled means for effecting individual 30 connection between said types and said actuator, and a presser for effecting the final movement of the types.

2. In a type-writer, a type-actuator, means for continuously reciprocating said actuator 35 and for positively controlling the same throughout its movement, a series of pivoted type-levers, key-controlled means for effecting individual connection between said levers and said actuator, and a presser for effecting the final movements of the types. 40

3. In a type-writer, a continuously-rotated shaft, a type-actuator continuously reciprocated by said shaft, a series of types, key-controlled means for effecting individual connection 45 between said types and said actuator, and a presser for effecting the final movements of the types.

4. In a type-writer, a type-lever actuator, means for operating said actuator, a type-lever 50 pivoted to a fixed support, a latch on said type-lever movable into the path of the actuator, a latch-operating lever pivoted to a fixed support, a key, a mechanical connection between said key and said latch-operating lever, 55 and a presser for effecting the final movements of the types.

5. In a type-writer, a type-actuator, a rotary shaft having an irregular cam to reciprocate said actuator, a series of types, and 60 key-controlled means for effecting individual connection between said types and said actuator.

6. In a type-writer, a series of types, a type-actuator, key-controlled means for effecting 65 individual connection between said types and said actuator, means for projecting and retracting said actuator, the projection thereof

causing the types to be moved from a retracted position toward a printing position, and means for imparting to said actuator, in 70 projecting it, a relatively rapid movement, then a slackening, followed by a faster movement.

7. In a type-writer, a series of types, a type-actuator, key-controlled means for effecting 75 individual connection between said types and said actuator, means for projecting and retracting said actuator to project and retract the types, and means for imparting to said actuator, in retracting it, a relatively rapid 80 movement, then a slackening, followed by a faster movement.

8. In a type-writer, a series of type-levers, a flat rectangular type movably mounted on each of said levers, a spring normally acting 85 to move said type to a plane at a right angle to the path of movement of the lever, and guides for swinging and holding the types in planes parallel with the paths of movement of the levers when said levers are in their po- 90 sitions of rest.

9. In a type-writer, a series of type-levers, a flat rectangular type rotatably and yieldingly mounted on each of said levers, a spring normally acting to move said type to a plane 95 at a right angle to the path of movement of the lever, and guides for swinging and holding the types in planes parallel with the paths of movement of the levers when said levers are in their positions of rest. 100

10. In a type-writer, a series of type-levers, types movably mounted on said levers, a spring for each of said types normally acting to move it to a plane at a right angle to the path of movement of its lever, and guides for 105 swinging and holding the types in planes parallel with the paths of movement of the levers when said levers are in their positions of rest.

11. In a type-writer, a series of type-levers, types movably mounted on said levers, springs 110 normally holding said types in position to deliver an imprint, and means actuated by the retracting movement of the type-levers for moving the types out of said imprinting position. 115

12. In a type-writer, a series of type-levers arranged side by side, types yieldingly carried thereby, springs to move said types into positions transverse to the paths of movement of the levers as the levers approach printing 120 position, and guides to automatically move them into positions substantially parallel to said paths as the levers recede from printing position.

13. In a type-writer, a series of type-levers 125 arranged side by side, types carried by said levers and movable into positions transverse to the paths of movement of the levers, or into positions substantially parallel to said paths, springs normally moving said types 130 into the former positions, and a series of stationary cams adapted to maintain said types in the latter positions when the levers are in their normal retracted positions.

14. In a type-writer, a series of type-levers arranged side by side, types carried by said levers and movable into positions transverse to the paths of movement of the levers or into positions substantially parallel to said paths, springs normally moving said types into the former positions, a series of stationary cams adapted to maintain said types in the latter positions when the levers are in their normal retracted positions, and a series of type-lever guides alternating with said cams.
15. In a type-writer, a series of type-levers, key-controlled power-operated mechanism for moving said type-levers and their types toward a printing position, and additional power-operated mechanism for moving said levers and their types into printing position.
16. In a type-writer, a series of type-levers, key-controlled power-operated mechanism for moving said type-levers and their types toward a printing position, additional power-operated mechanism for moving said levers and their types into printing position, and an adjustment for the last-said mechanism to vary the pressure of the imprint.
17. In a type-writer, a series of type-levers, key-controlled means for moving said levers and their types from a retracted position toward a printing position, and a continuously-reciprocated presser adapted to move the levers and their types into printing position.
18. In a type-writer, a series of pivoted type-levers having types, key-controlled means for swinging said levers from a retracted position toward a printing position, and a presser adapted to engage said types and move them with their levers into printing position.
19. In a type-writer, a series of type-levers, key-controlled means for moving said levers and their types from a retracted position toward a printing position, a continuously-reciprocated presser adapted to move said levers and their types into printing position, and manually-operated means for throwing said presser into and out of action.
20. In a type-writer, a series of type-levers, key-controlled means for moving said levers and their types from a retracted position toward a printing position, a continuously-reciprocated presser adapted to move said levers and their types into printing position, a presser-carrier, and means for imparting presser-positioning and presser-operating movements to said carrier in different directions.
21. In a type-writer, a series of types, key-controlled means for moving said types from a retracted position toward a printing position, a presser adapted to move said types into printing position, mechanism for continuously imparting a reciprocatory positioning movement to said presser, mechanism for continuously imparting a reciprocatory operative movement to said presser, and manually-operated means for throwing the last-said mechanism into and out of action.
22. In a type-writer, a series of types, key-controlled means for moving said types from a retracted position toward a printing position, a presser adapted to move said types into printing position, a sliding bar carrying said presser, a pivoted guide holding said bar, means to reciprocate said bar longitudinally in said guide, and means to oscillate said guide.
23. In a type-writer, a series of types, key-controlled means for moving said types from a retracted position toward a printing position, a presser adapted to move said types into printing position, a sliding bar carrying said presser, a pivoted guide holding said bar, means to reciprocate said bar longitudinally in said guide, means to oscillate said guide, and a manually-operated device for throwing said guide-oscillating means into and out of action.
24. In a type-writer, a series of types, key-controlled means for moving said types from a retracted position toward a printing position, a presser adapted to move said types into printing position, a sliding bar carrying said presser, a pivoted guide holding said bar, means to reciprocate said bar longitudinally in said guide, a reciprocatory bar having a lug or projection adapted to engage and oscillate said guide and movable into and out of operative position, means to continuously reciprocate said bar, and a manually-operated device controlling said lug.
25. In a type-writer, a series of types, key-controlled means for moving said types from a retracted position toward a printing position, a presser adapted to move said types into printing position, a sliding bar carrying said presser, a pivoted guide holding said bar, means to reciprocate said bar longitudinally in said guide, a reciprocatory bar adapted to oscillate said guide, means to continuously reciprocate said bar, and an adjustment between said bar and the guide to vary the pressure of the imprint.
26. In a type-writer, a series of key-controlled type-levers, a presser adapted to impart the imprinting pressure to said levers and their types, a carrier for said presser, and means for adjusting said presser on its carrier.
27. In a type-writer, a series of key-controlled types, a presser adapted to impart the imprinting pressure to said types, a carrier for said presser, and means for adjusting said presser angularly on its carrier.
28. In a type-writer, a series of key-controlled types, a presser adapted to impart the imprinting pressure to said types, a carrier for said presser, and means for effecting a universal angular adjustment of said presser on its carrier.
29. In a type-writer, a series of key-controlled types adapted to print by direct contact, and an inker adapted to ink each type as it approaches printing position, said inker being movable into and out of the path of

movement of the types, and being universally adjustable to automatically accommodate itself to types at different angles or inclinations.

5 30. In a type-writer, a series of key-controlled types adapted to print by direct contact, an inker adapted to ink each type as it approaches printing position, and means to automatically reciprocate said inker into and
10 out of inking position, said inker being automatically and universally adjustable on said reciprocating means.

31. In a type-writer, a series of types adapted to print by direct contact, a type-actuator
15 continuously operated by power, a type-inker continuously operated by power, key-controlled means for effecting individual connection between said types and said actuator, and means to control the cycle of the actuator
20 and the cycle of the inker in a predetermined relation.

32. In a type-writer, a series of types adapted to print by direct contact and movable
25 from separate retracted positions to a common printing position, an inker movable in cycles into and out of the path of each and any one of said types, and means to control the movement of said types and said inker in a predetermined relation.

30 33. In a type-writer, a series of types, a type-actuator continuously operated by power, key-controlled means to effect individual connection between said types and said actuator, a type-presser continuously
35 operated by power, a type-inker continuously operated by power, and means to control the cycles of said type-actuator, type-presser, and type-inker in a predetermined relation.

34. In a type-writer, a series of types, key-
40 controlled means for moving said types toward a printing position, a power-operated presser to then move said types into printing position, a power-operated inker, and means to control the cycles of said presser and inker
45 in a predetermined relation.

35. In a type-writer, a series of types adapted to print by direct contact and movable
50 from different retracted positions to a common printing position, a type-inker movable into and out of the paths of said types, and a carrier for said inker, the inker being automatically adjustable on the carrier to position itself with respect to different types.

36. In a type-writer, a series of types adapted to print by direct contact and movable
55 from different retracted positions into position to be inked and subsequently into a common printing position, a type-inker movable into and out of the paths of said types, and
60 a carrier for said inker, said inker being automatically adjustable on its carrier for different inclinations of the types.

37. In a type-writer, a platen, a series of types adapted to print by direct contact and
65 movable from different retracted positions into position to be inked and subsequently into a common printing position in coöpera-

tive relation with the platen, a type-inker movable into and out of the paths of said types, and a carrier for said inker, said inker
70 being automatically adjustable on its carrier in the direction of the platen.

38. In a type-writer, a series of types adapted to print by direct contact and movable
75 from different retracted positions to a common printing position, a type-inker having a plurality of inking-rolls, a frame carrying said rolls, a holder pivotally supporting said frame, a carrier pivotally supporting said
80 holder, and means to operate said carrier to move the inker into and out of the paths of the types.

39. In a type-writer, a series of types movable from different retracted positions to a
85 common printing position, a type-inker, a holder therefor, a carrier pivotally supporting said holder, means to yieldingly centralize the holder on the carrier, and means to operate the carrier to carry the inker into
90 and out of the paths of the types.

40. In a type-writer, a series of types movable from different retracted positions to a
common printing position, a type-inker, a holder therefor, a carrier pivotally supporting
95 said holder, springs adapted to yieldingly centralize the holder on the carrier, stops adapted to limit the pivotal movement of the holder in both directions, and means to operate the carrier to carry the inker into and
100 out of the paths of the types.

41. In a type-writer, a series of types movable from different retracted positions to a
common printing position, a carrier, a member pivotally mounted thereon, a holder piv-
105 otally mounted on said member, a frame pivotally mounted on said holder, inking-rolls journaled in said frame, and means to operate the carrier to carry the rolls into and out of the paths of the types.

42. In a type-writer, a series of types movable from different positions to a common
110 printing position, a type-inker movable into and out of the paths of said types, a carrier for said inker, and a latch removably attaching the inker to the carrier.
115

43. In a type-writer, a series of key-controlled types, an inker adapted to ink said
types, mechanism for reciprocating said inker
120 into and out of operative position, and a device for holding said inker retracted from operative position and disconnected from its reciprocating mechanism.

44. In a type-writer, a series of key-controlled types, an inker adapted to ink said
types, a pivotal arm carrying said inker, a
125 cam for reciprocating said inker into and out of operative position, a connection between said arm and cam, including a link movable to throw said connection out of operative relation to the cam and hold the inker in a re-
130 tracted position, and a manually-movable device adapted to engage said link and hold the parts in the last-named condition.

45. In a type-writer, a series of types, an

inker adapted to ink said types, a reciprocating arm carrying said inker and having a friction-roll, a rotatable ink-plate intermittently engaged by said roll during the reciprocation of said arm and rotated thereby in one direction, said ink-plate having a ratchet, and a stationary check-pawl engaging said ratchet to prevent reverse rotation of the ink-plate.

46. In a type-writer, a main frame, a series of types movable from different retracted positions to a common printing position, a carriage mounted to travel along the main frame and having mechanism for feeding the web or sheet to be printed upon, to space the printed lines, said mechanism comprising rolls between which the web or sheet extends, a ratchet on the shaft of one of said rolls, an arm having a pawl engaging said ratchet and having a lateral extension, and a lever stationarily supported on the main frame, and having a link provided with a sliding connection with said lateral extension.

47. In a type-writer, a series of types movable from different retracted positions to a common printing position, a carriage adapted to support the web or sheet to be printed upon, a flat platen stationarily mounted on said carriage, and web-guiding rolls journaled on the carriage and located along opposite edges of the platen so as to support the web or sheet across the face of the platen.

48. In a type-writer, a series of types movable from different retracted positions to a common printing position, a carriage, a platen mounted thereon, and a flexible carrying-apron mounted on said carriage and extending across the face of the platen for the purpose of supporting and carrying the web or sheet to be printed upon.

49. In a type-writer, a series of types movable from different retracted positions to a common printing position, a carriage, a platen mounted thereon, a flexible carrying-apron mounted on said carriage and extending across the face of the platen, for the purpose of supporting and carrying the web or sheet to be printed upon, and means for imparting a longitudinal feeding movement to said apron to space the printed lines.

50. In a type-writer, a series of types movable from different retracted positions to a common printing position, a carriage, a platen mounted thereon, a flexible carrying-apron mounted on said carriage and extending across the face of the platen, for the purpose of supporting and carrying the web or sheet to be printed upon, and means for attaching the web or sheet to said apron.

51. In a type-writer, a series of types movable from different retracted positions to a common printing position, a carriage, a flat platen stationarily mounted on said carriage, a flexible carrying-apron mounted on said carriage and extending across the face of the platen, for the purpose of supporting and carrying the web or sheet to be printed upon,

and rolls journaled on the carriage along opposite edges of the platen and supporting said apron across the face of the platen.

52. In a type-writer, a series of types movable from different retracted positions to a common printing position, a platen, a movable carriage having a flexible web-carrying apron extended across the face of said platen, means to impart a longitudinal feeding movement to said apron to space the printed lines on the web, and a gage for indicating the feeding movement of the apron.

53. In a type-writer, a series of types movable from different retracted positions to a common printing position, a platen, a movable carriage having a flexible web-carrying apron extended across the face of said platen, means to impart a longitudinal feeding movement to said apron to space the printed lines on the web, and a gage for indicating the feeding movement of the apron, said gage comprising a graduated index on the margin of the apron, and a pointer cooperating with said index.

54. In a type-writer, a series of types movable from different retracted positions to a common printing position, a platen, a movable carriage having a flexible web-supporting apron extended across the face of said platen, rolls on said carriage supporting the apron, suitable gearing or mechanism connecting said rolls, and mechanism for rotating said rolls.

55. In a type-writer, a series of types movable from different retracted positions to a common printing position, a platen, a movable carriage having a flexible web-supporting apron extended across the face of said platen, mechanism for propelling said apron, a frictional device or brake applied to the apron-propelling mechanism, and means to adjust or vary the friction of said brake.

56. In a type-writer, a carriage, key-controlled means for imparting a step-by-step feeding movement to said carriage, and power-operated means additional to said key-controlled means for imparting a continuous feeding movement to said carriage in the same direction as the key-controlled feed.

57. In a type-writer, a carriage, key-controlled means for imparting a step-by-step feeding movement to said carriage, and power-operated means additional to said key-controlled means for imparting a continuous feeding movement in either direction, to said carriage.

58. In a type-writer, a carriage, mechanism for imparting a feeding movement to said carriage, a continuously-rotated shaft, and a clutch adapted to connect and disconnect said shaft with the carriage-feeding mechanism for feeding said carriage continuously forward.

59. In a type-writer, a carriage, mechanism for imparting a feeding movement to said carriage, a continuously-rotated shaft, a clutch adapted to connect and disconnect said shaft

with the carriage-feeding mechanism for feeding said carriage continuously forward, and a manual operating device for said clutch.

60. In a type-writer, a carriage, mechanism for imparting a feeding movement to said carriage in either direction, a continuously-rotated shaft, and a double clutch having two positions in which it connects said shaft to the carriage-feeding mechanism in a forward-feeding or return-feeding manner.

61. In a type-writer, a carriage, key-controlled means for imparting a step-by-step feeding movement to said carriage, mechanism independent of the key-controlled feed for imparting a continuous-feeding movement to said carriage, a continuously-rotated shaft, and a clutch adapted to connect and disconnect said shaft with the continuous-feeding mechanism.

62. In a type-writer, a carriage, key-controlled means for imparting a step-by-step feeding movement to said carriage, power-operated means for imparting a continuous-feeding movement to said carriage, a device to throw the continuous feed into and out of action, and mechanism controlling the step-by-step feed and operated by movement of said device.

63. In a type-writer, a carriage, key-controlled means for imparting a step-by-step forward-feeding movement to said carriage, power-operated means for imparting a continuous return-feeding movement to said carriage, means to throw the return feed into and out of action, and mechanism operated by the throwing in of the return feed for throwing the step-by-step feed out of action.

64. In a type-writer, a carriage, a key-controlled ratchet-and-pawl device for imparting a step-by-step forward-feeding movement to said carriage, power-operated means for imparting a continuous return-feeding movement to said carriage, means to throw the return feed into and out of action, and mechanism operated by the throwing in of the return feed, for moving the pawl out of coaction with the ratchet.

65. In a type-writer, a carriage, a shaft geared to said carriage, a ratchet fixed to said shaft, a key-controlled pawl coacting with said ratchet and adapted to rotate the shaft in a direction to feed the carriage forward, power-operated means for rotating said shaft in an opposite direction to return the carriage, a device to throw said power-operated means into and out of connection with the shaft, and mechanism operated by the throwing in of said power-operated means for throwing the pawl out of coaction with the ratchet.

66. In a type-writer, a carriage, a series of type-controlling keys, power mechanism, key-controlled means operated from said power mechanism for imparting to said carriage feed movements of varying extent for different keys, and means for increasing or diminishing the feed movements controlled by the en-

tire series of keys in order to vary the spacing between the letters.

67. In a type-writer, a carriage, a series of type-operating devices, power mechanism which actuates said type-operating devices, a series of keys controlling the power operation of said devices, mechanism operated to a varying extent by the different type-operating devices for feeding said carriage, and means for varying the spacing between all of the letters.

68. In a type-writer, a carriage, a ratchet-and-pawl device for imparting a feeding movement to said carriage, a series of type-operating devices, power mechanism which actuates said type-operating devices, mechanism interposed between the pawl and said devices whereby different ones of said devices impart a different operative length of stroke to said pawl, and means for varying the movement of the pawl to increase or diminish the spacing between the letters.

69. In a type-writer, a carriage, mechanism including a rock-shaft for imparting a feeding movement to said carriage, a series of arms mounted on said rock-shaft, and a series of pivoted type-levers having cams engaging said arms at varying distances from said shaft, whereby the operation of different type-levers imparts feeding movements of varying extent to said carriage.

70. In a type-writer, a carriage, a plurality of pivoted type-levers mounted in a curvilinear series and having cams, a plurality of rock-shafts mounted end to end in a polygonal series and geared together, a ratchet-and-pawl device actuated by said rock-shafts for imparting a feeding movement to the carriage, and a series of arms on said rock-shafts engaged by said cams at varying distances from the rock-shafts, whereby the operation of different type-levers imparts feeding movements of varying extent to the carriage.

71. In a type-writer, a carriage, a series of keys, a series of movable devices corresponding to said keys, mechanism operated to a varying extent by different ones of said devices, for feeding said carriage, a continuously-reciprocated actuator, and means controlled by said keys for effecting individual connection between said devices and said actuator.

72. In a type-writer, a carriage, a series of types, a series of keys controlling said types, a continuously-reciprocated type-actuator, a series of movable devices corresponding to said keys, mechanism operated to a varying extent by different ones of said devices, for feeding the carriage, and means controlled by said keys for effecting individual connection between said devices and said actuator.

73. In a type-writer, a carriage, a series of type-controlling keys, a rock-shaft oscillated to a varying extent by the operation of different keys, a device for imparting a feeding movement to said carriage, and an adjust-

ment between said rock-shaft and said device for varying the extent of the feeding movement.

74. In a type-writer, a carriage, mechanism for feeding said carriage, a brake for arresting forward movement of the carriage, a series of type-controlling keys, and means for operating said brake by any one of the series of keys.

75. In a type-writer, a carriage, mechanism including a rotary shaft, for feeding said carriage, a brake for arresting rotary movement of said shaft, a series of type-controlling keys, and means for operating said brake by any one of the series of keys.

76. In a type-writer, a carriage, power mechanism under the control of the operator for feeding said carriage, key-controlled means for controlling the feed of the carriage, a brake for arresting the carriage, a series of type-controlling keys, and means for controlling the operation of the brake by any one of said series of keys.

77. In a type-writer, a carriage, mechanism for feeding said carriage, a brake for arresting said carriage, a series of key-controlled type-levers, and a rock-shaft oscillated by said levers and arranged to actuate the feeding mechanism during the retracting movement of the type-levers.

78. In a type-writer, a series of key-controlled types, a longitudinally-movable web-supporting carriage, a fixed support, and a gage consisting of a member mounted on said support, and two members adjustably mounted on the carriage and each having a series of definite projections or points.

79. In a type-writer, a series of type-levers, and types removably attached to said levers, said levers and types having snap devices for automatic engagement when the types are placed in position relatively to the levers.

80. In a type-writer, a series of type-levers having types, and spring-latches removably attaching said types to said levers.

81. In a type-writer, a series of type-levers, type-holders yieldingly mounted on said levers, and types removably attached to said holders.

82. In a type-writer, a series of type-levers, types removably attached to said levers, and means for simultaneously removing the types from a plurality of said levers.

83. In a type-writer, a series of type-levers having types, latches removably attaching said types to said levers, and means for simultaneously actuating the latches of a plurality of said types.

84. In a type-writer, a series of type-levers, types removably attached to said levers, a type-holding frame having a series of type-holders, and means for moving said frame into engagement with the types.

85. In a type-writer, a series of type-levers, types removably attached to said levers, a type-holding frame having a series of type-holders, means for moving said frame into or

out of engagement with the types, and a type-stripper adapted to remove the types.

86. In a type-writer, a series of type-levers, types removably attached to said levers and having dowel-holes, a type-holding frame having dowels adapted to enter said dowel-holes, and means for moving said frame into or out of engagement with the types.

87. In a type-writer, a series of type-levers having types, latches removably attaching said types to said levers, and a latch-actuating and type-removing device adapted to actuate simultaneously the latches of a plurality of said types and to remove said types from the levers.

88. In a type-writer, a series of type-levers having types, latches removably attaching said types to said levers, and a latch-actuating and type-removing device movable in one direction to actuate the latches of a plurality of said types, and movable in another direction to remove said types from the levers.

89. In a type-writer, a series of type-levers having types, latches removably attaching said types to said levers, a latch-actuating and type-removing device movable in one direction to actuate the latches of a plurality of said types, and movable in another direction to remove said types from the levers, and mechanism for imparting said movements to said device.

90. In a type-writer, a series of type-levers, types removably attached to said levers, a carrier, a type-holding frame having a series of type-holders, and removably mounted on said frame, and means for reciprocating said carrier to carry the frame into or out of engagement with the types.

91. In a type-writer, a series of type-levers, a series of types removably attached to said levers, a carrier, a type-holding frame mounted on said carrier and having a series of type-holders, means for reciprocating said carrier to carry said frame into or out of engagement with the types, and a type-stripper adapted to simultaneously remove the types from a plurality of said levers and movable on said carrier into and out of position to engage the types.

92. In a type-writer, a series of type-levers having types, latches removably attaching said types to said levers, a carrier, a type-holding frame mounted on said carrier and having a series of type-holders, means for reciprocating said carrier to carry the frame into or out of engagement with the types, and a latch-actuator adapted to simultaneously actuate the latches of a plurality of said types and movable on said carrier into and out of engagement with said latches.

93. In a type-writer, a series of type-levers having types, latches removably attaching said types to said levers, a carrier, a type-holding frame mounted on said carrier and having a series of type-holders, a latch-actuating and type-removing device mounted on said carrier and movable thereon into en-

gagement with the latches of a plurality of said types and into position to remove said types from their levers, and means for reciprocating said carrier, movement of the carrier in one direction carrying the frame into engagement with the types, and movement thereof in the opposite direction causing the removal of the types from the levers.

94. In a type-writer, a series of type-levers arranged in groups, types removably attached to said levers, a carrier, a number of type-holding frames corresponding to the groups of type-levers and removably mounted on said carrier, said frames having a series of type-holders, and means for reciprocating said carrier to carry the frames into or out of engagement with the types.

95. In a type-writer, a series of type-levers arranged in two groups and having types, latches removably attaching said types to said levers, two latch-actuators located between

the groups of type-levers and each adapted to simultaneously actuate the latches of a plurality of said types in the respective groups, and means for simultaneously imparting latch-actuating movements to said actuators in opposite directions.

96. In a type-writer, a series of type-levers arranged in two groups, types removably attached to said levers, two type-strippers located between the groups of type-levers and each adapted to simultaneously remove the types of a plurality of said levers in the respective groups, and means for simultaneously moving said strippers in opposite directions into position to engage the types.

In testimony whereof I have affixed my signature in presence of two witnesses.

FREDERICK E. ALLEN.

Witnesses:

R. M. PIERSON,
C. F. BROWN.