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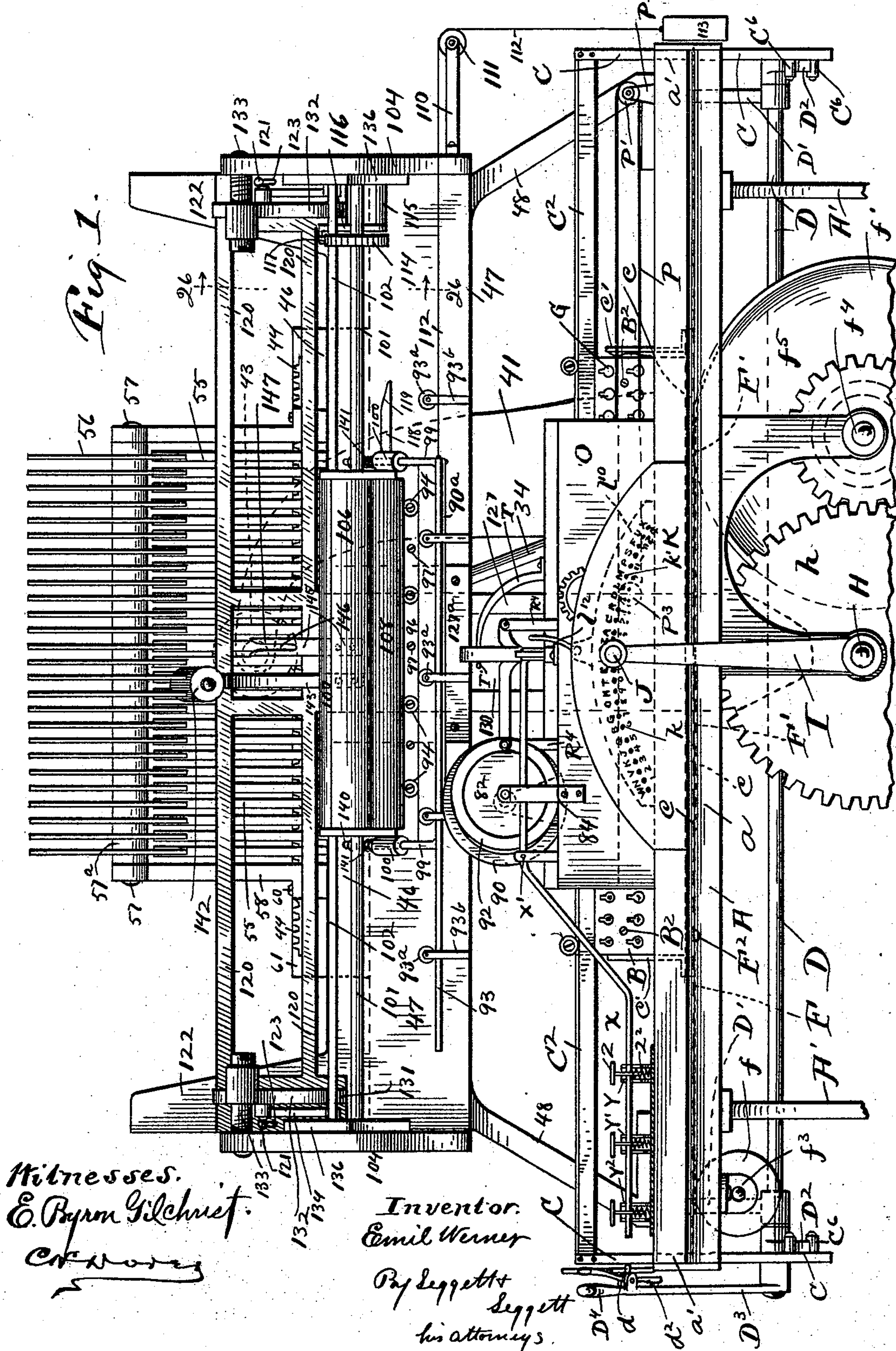
11 Sheets—Sheet 1.

E. WERNER.

TYPOGRAPHIC MACHINE AND ATTACHMENT.

No. 519,517.

Patented May 8, 1894.



Witnesses.
E. Byron Gilchrist.
C. W. W. W.

Inventor.
Emil Werner
By Leggett & Leggett
his attorneys.

(No Model.)

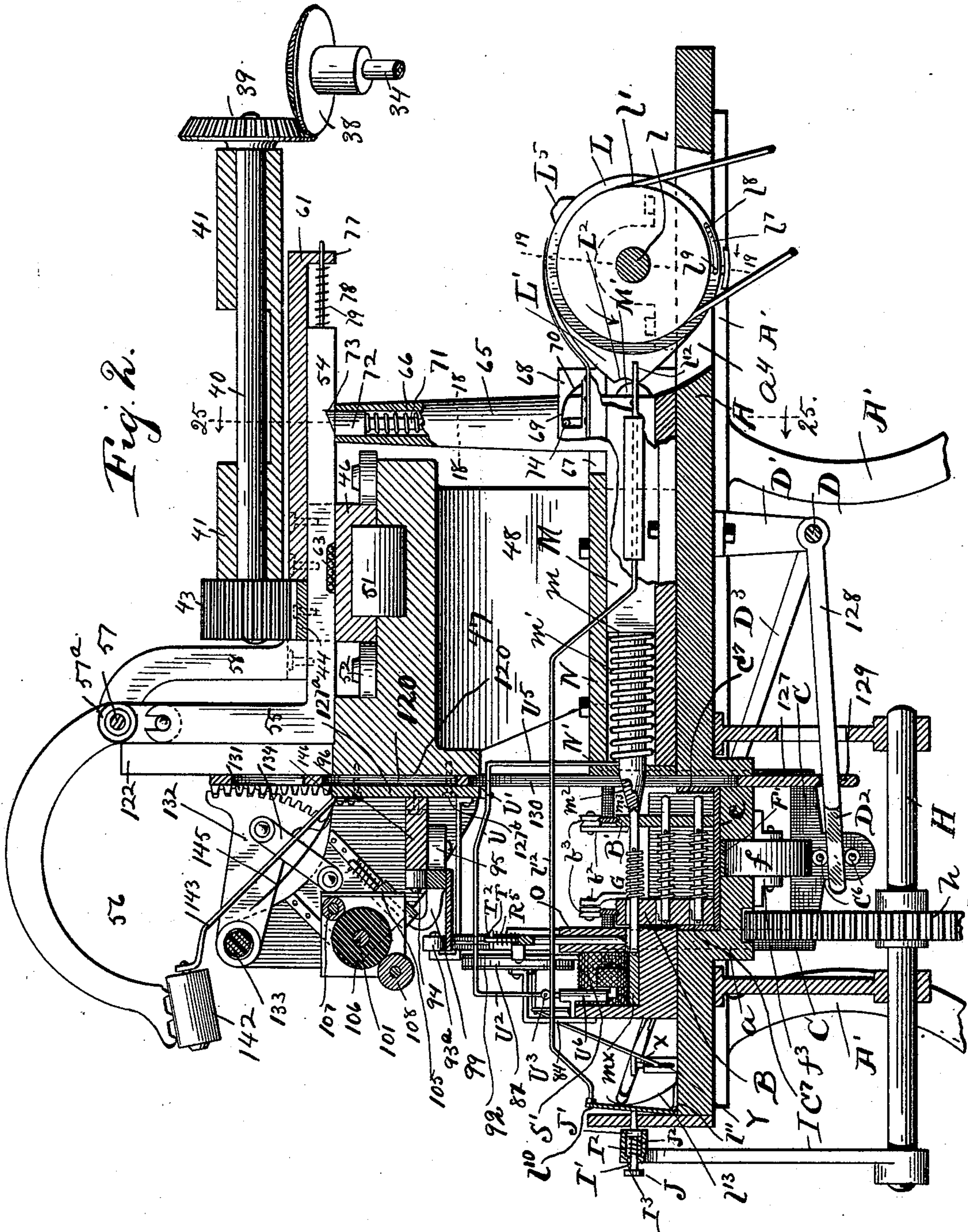
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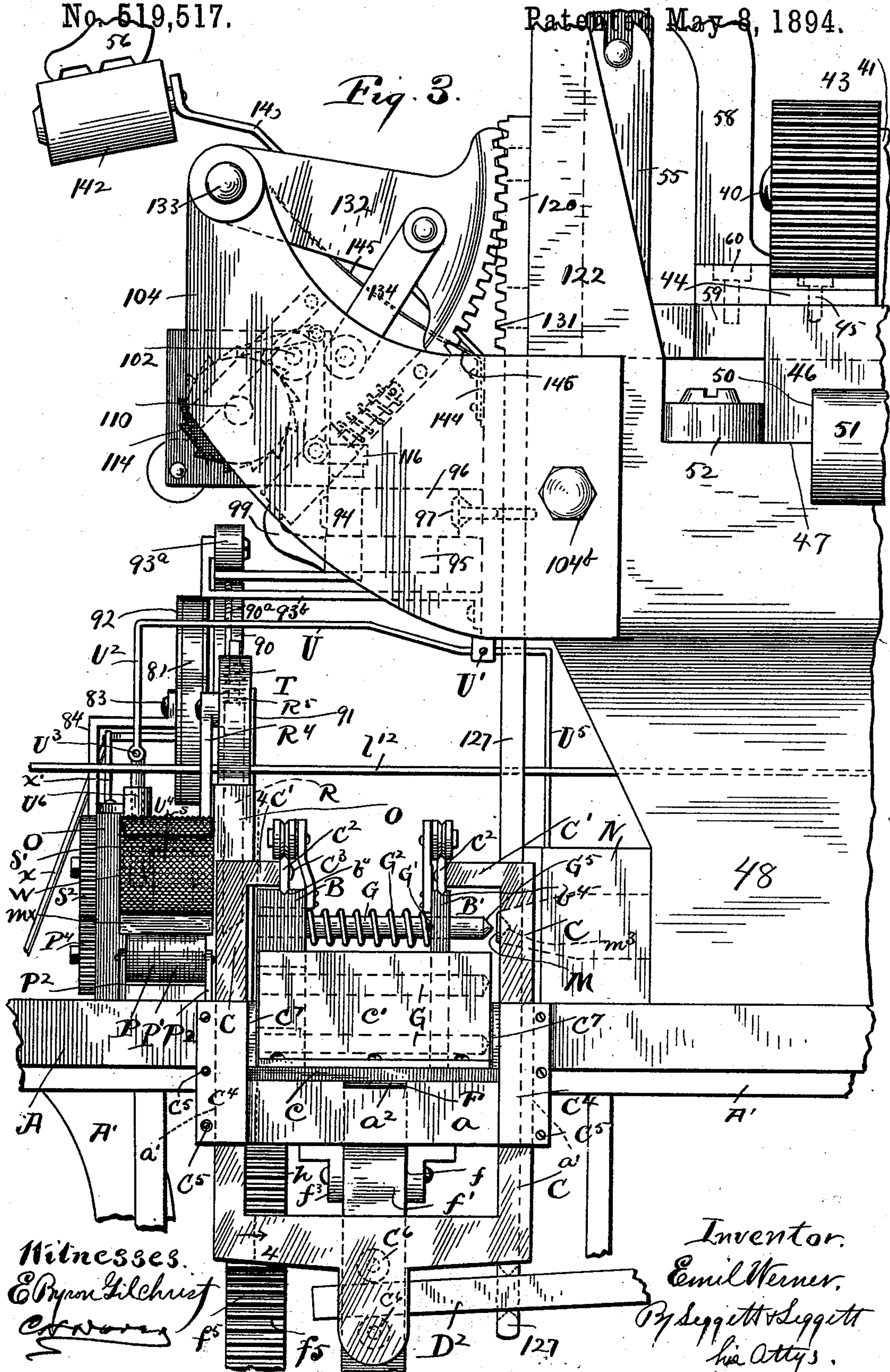
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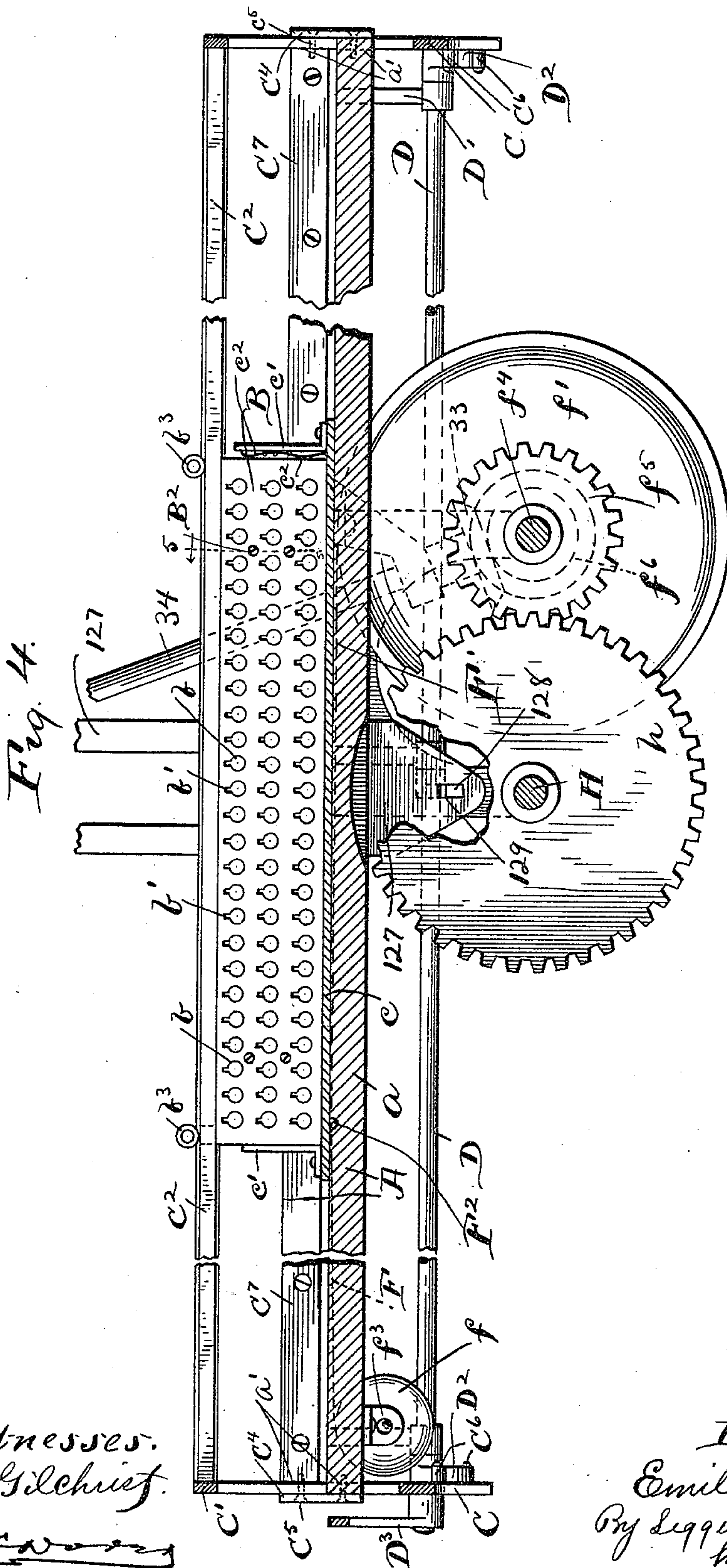
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Fig. 6.

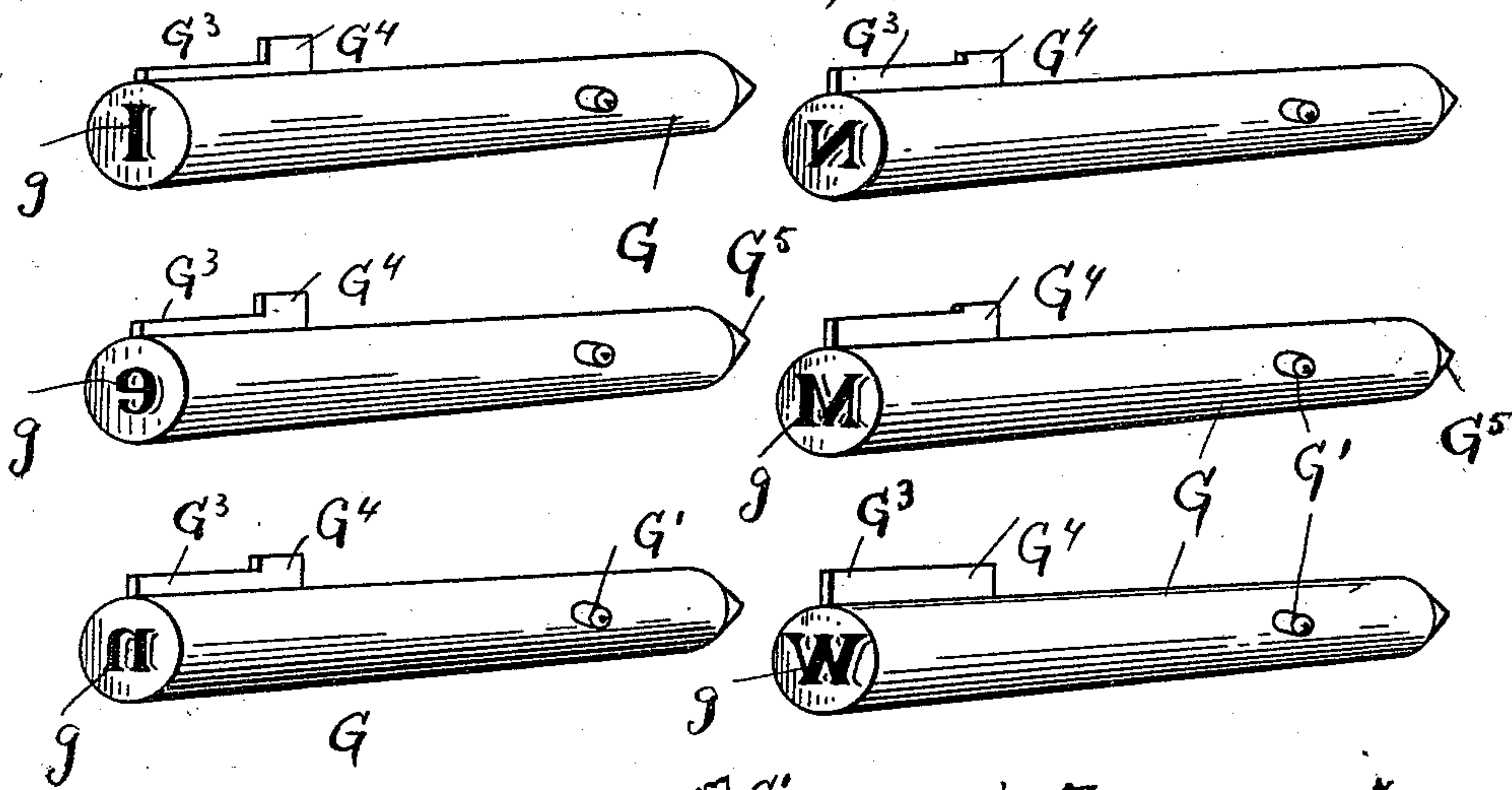


Fig. 7

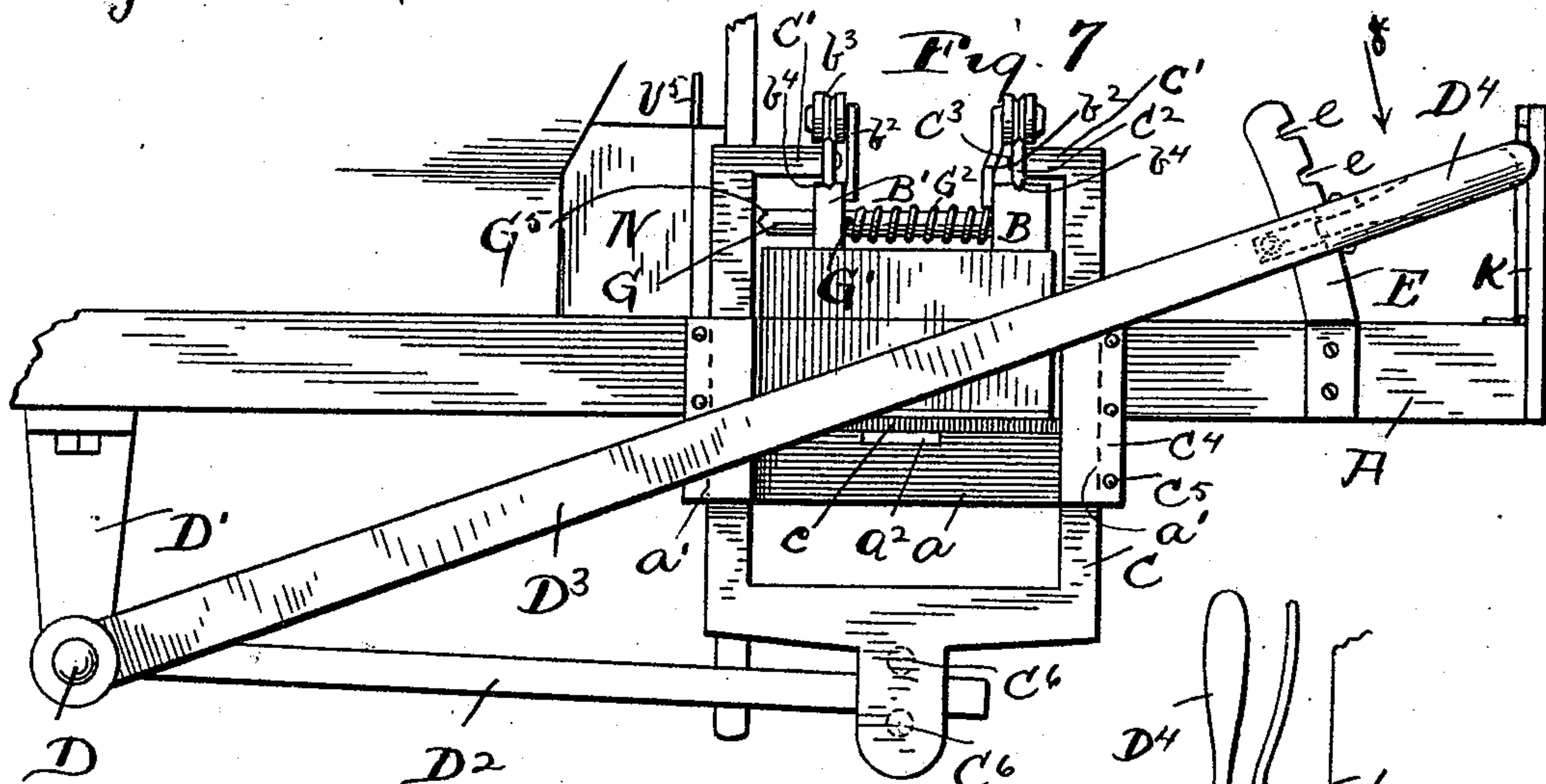


Fig. 5.

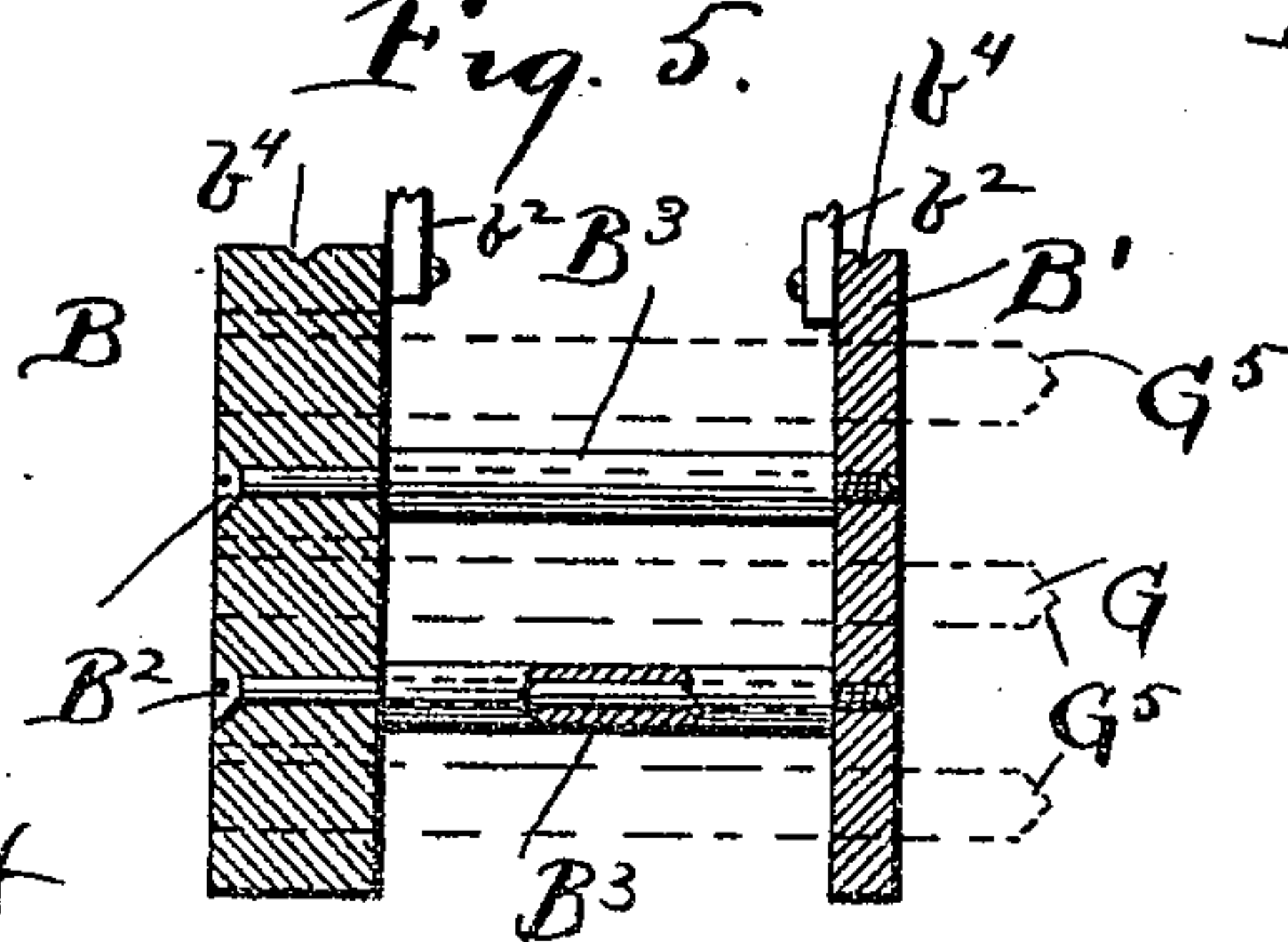
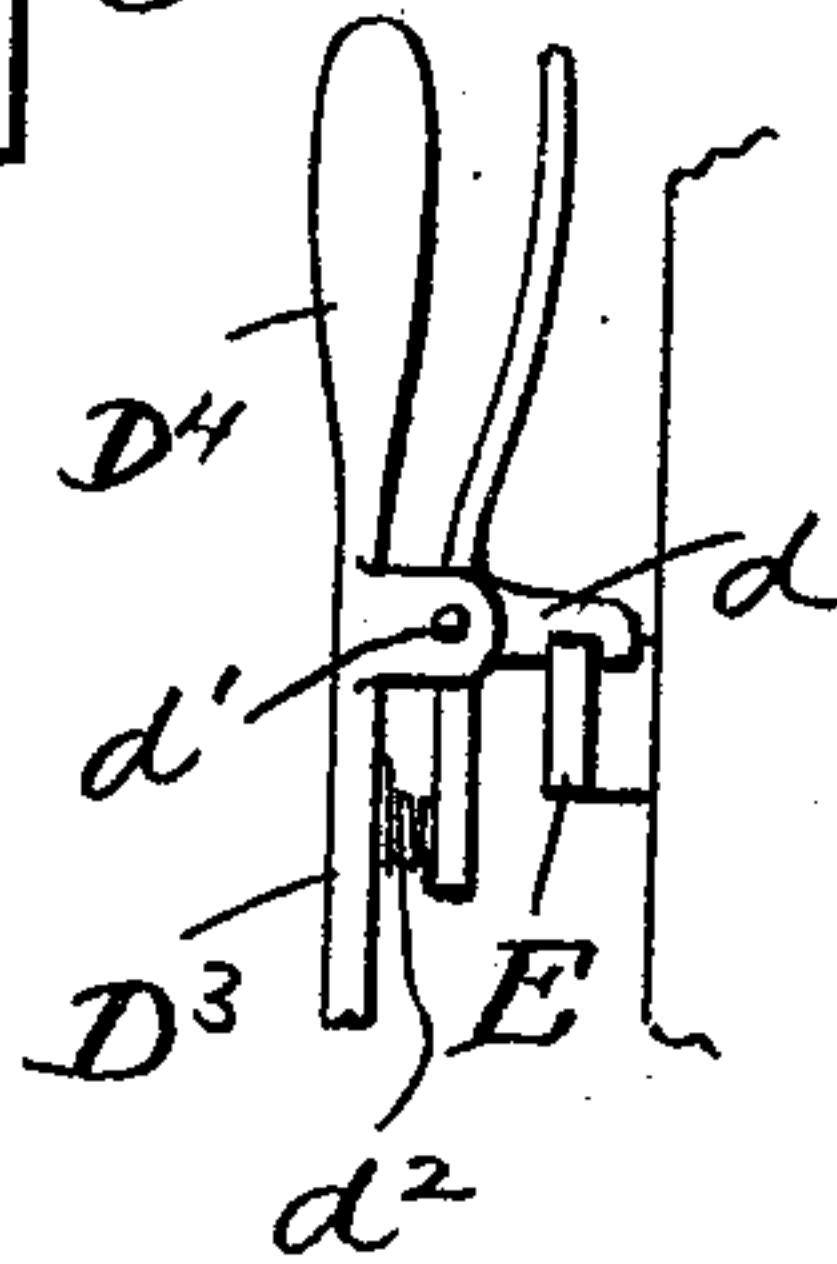


Fig. 8.



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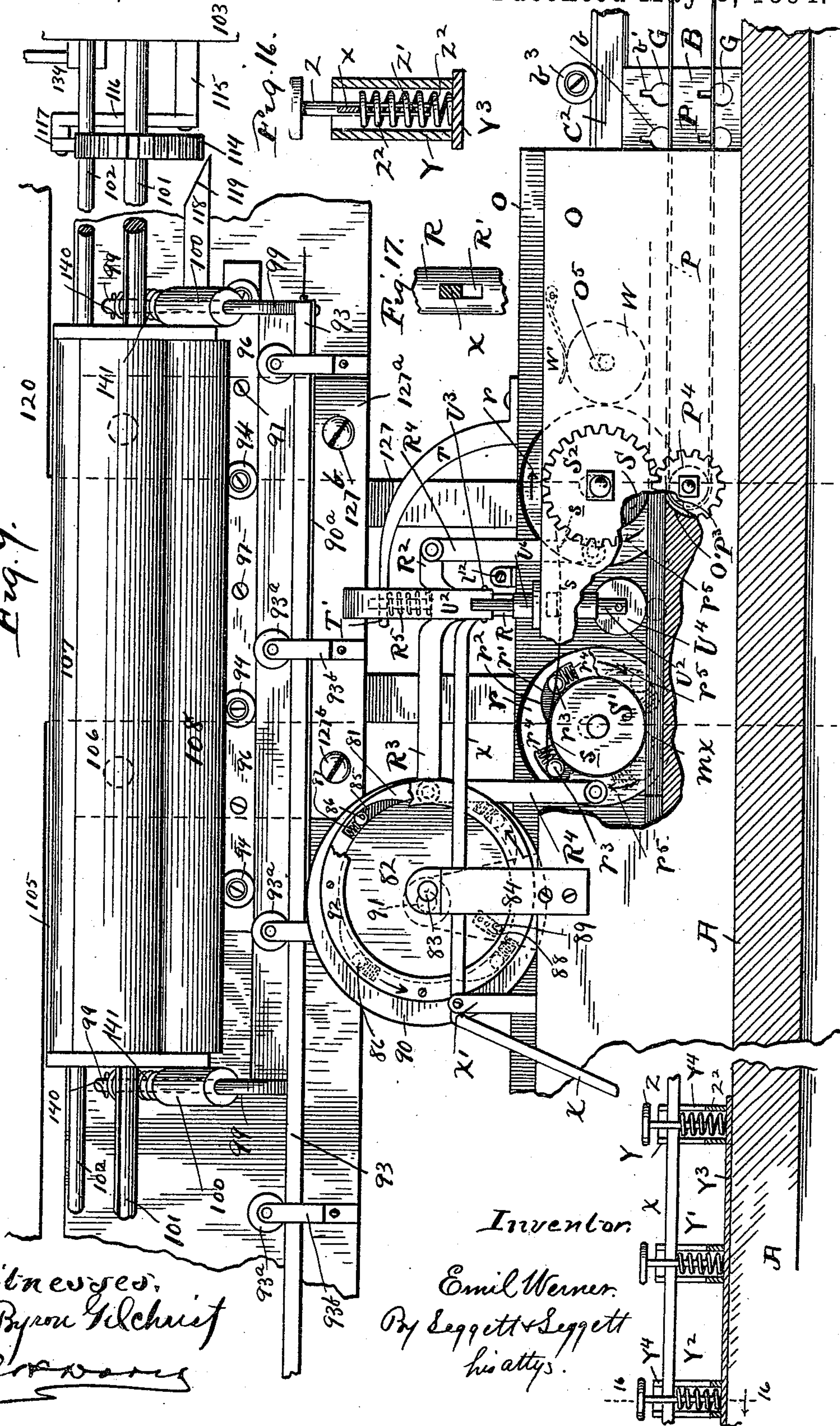
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Fig. 9.



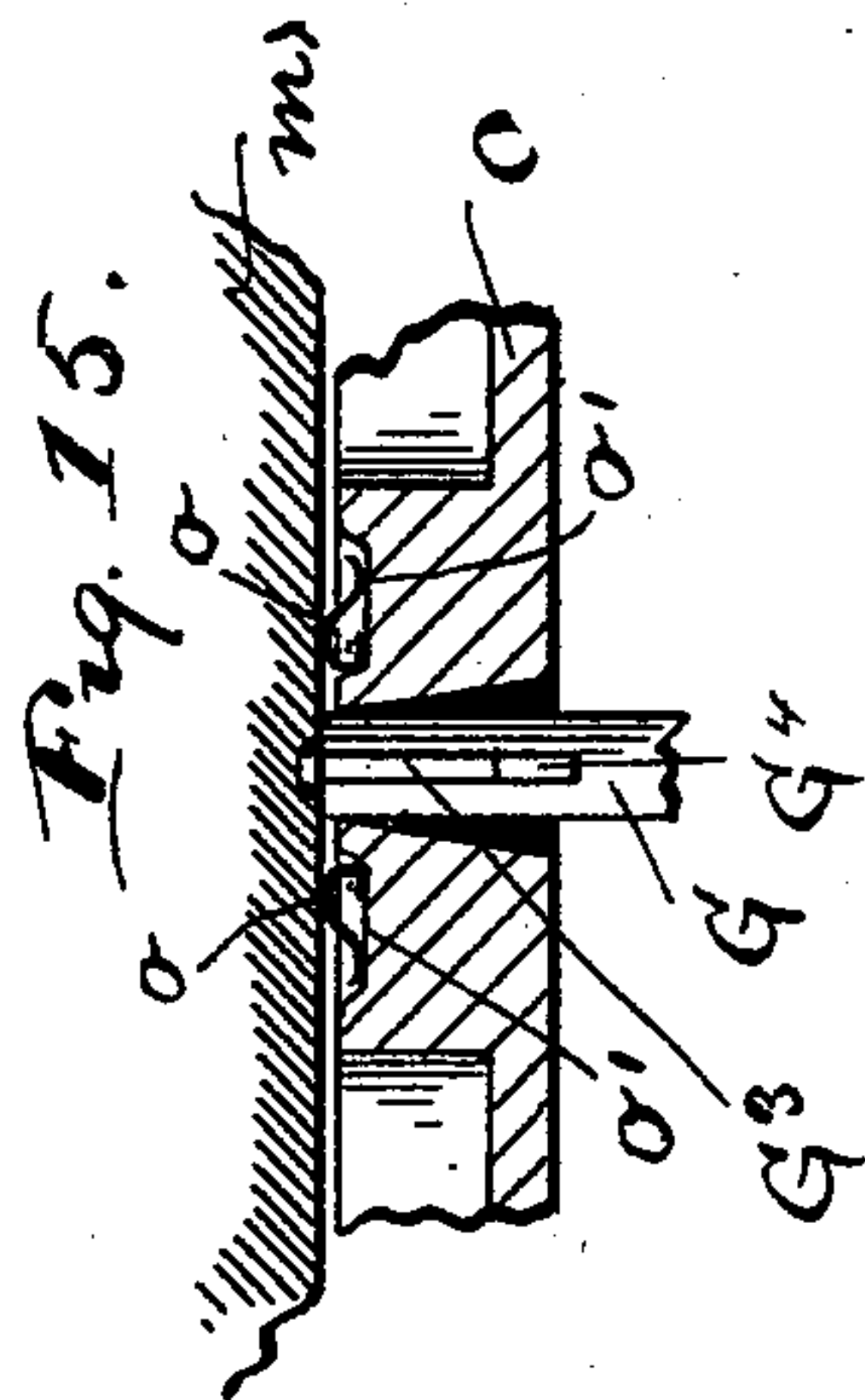
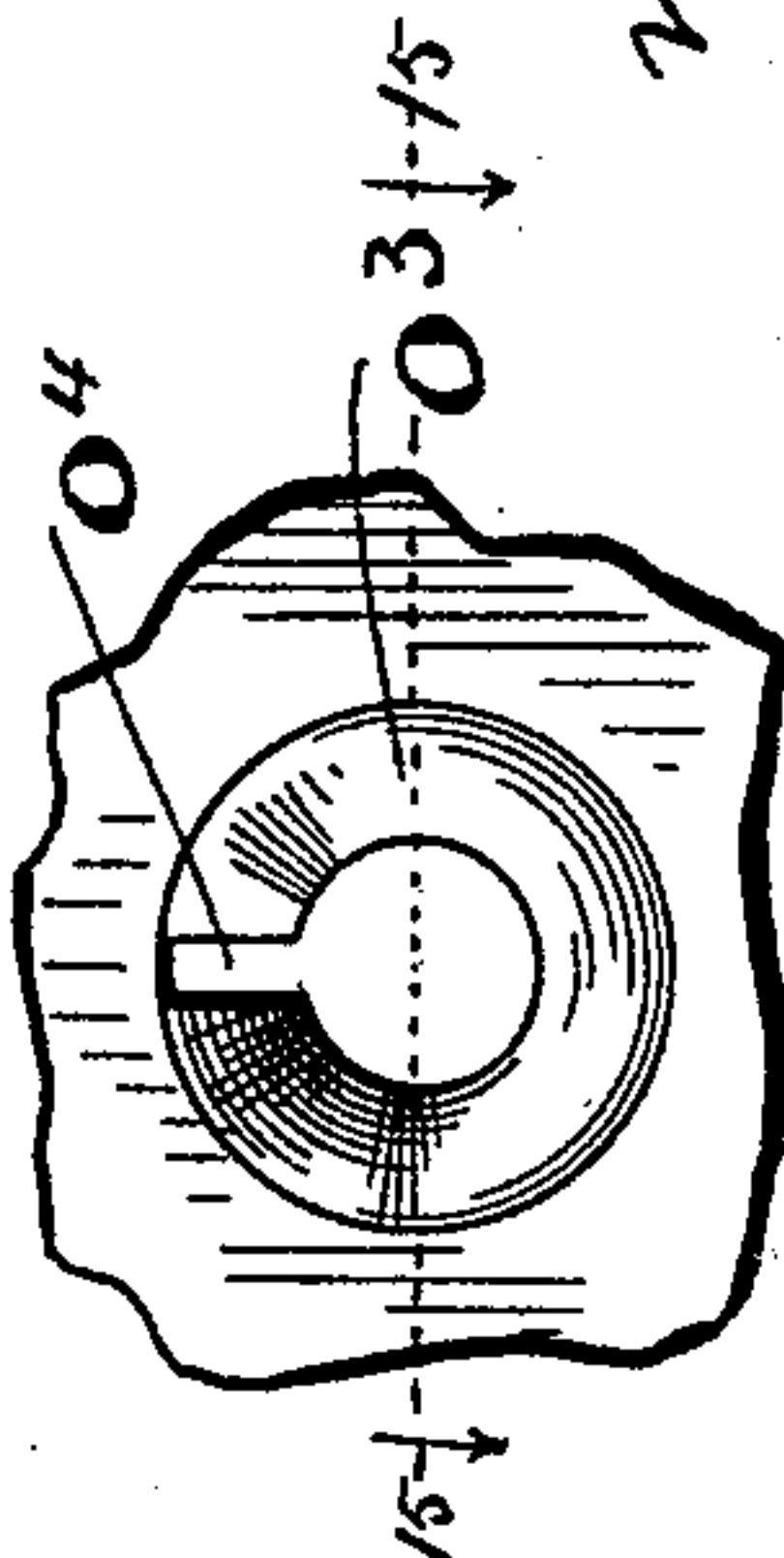
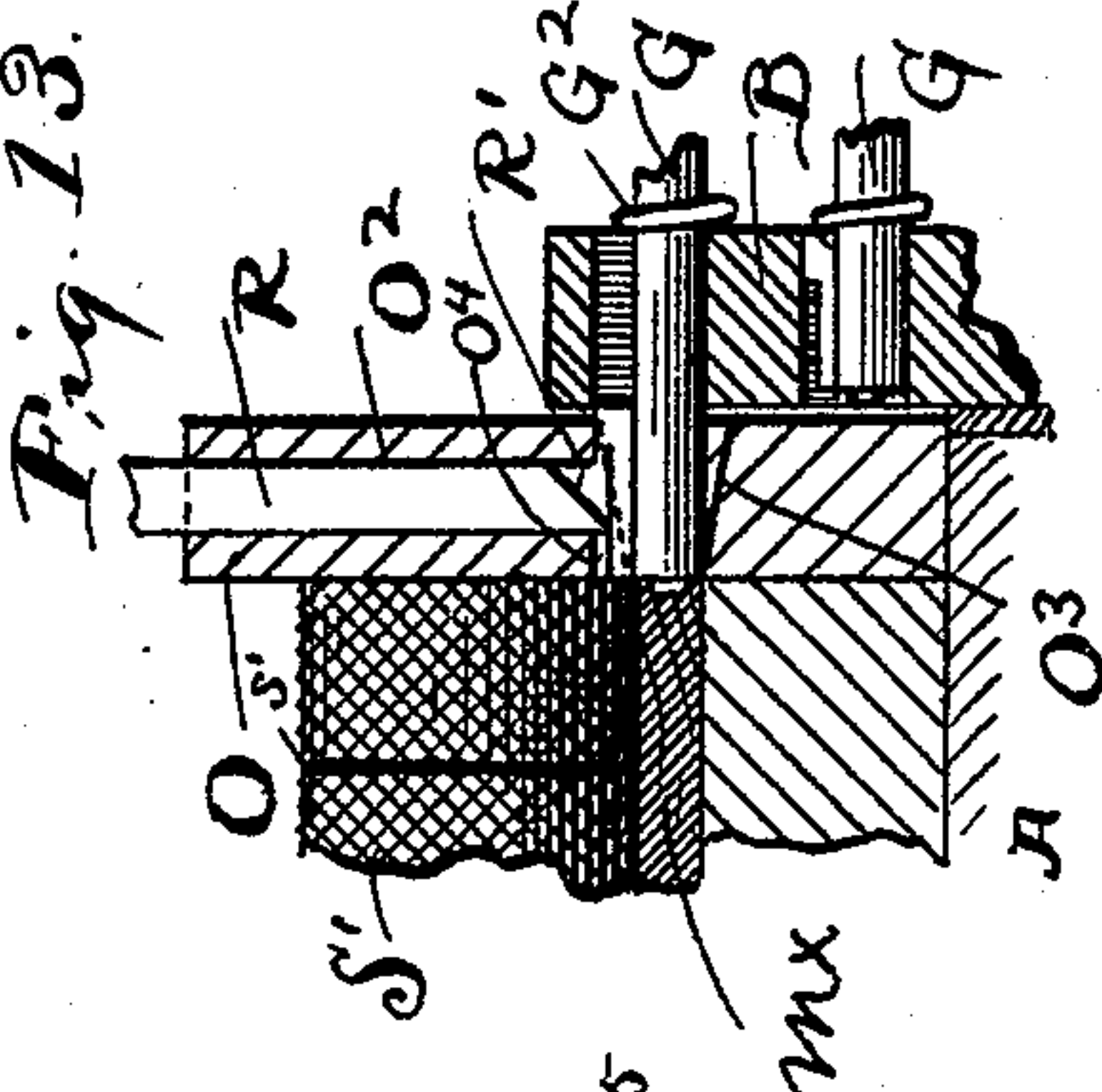
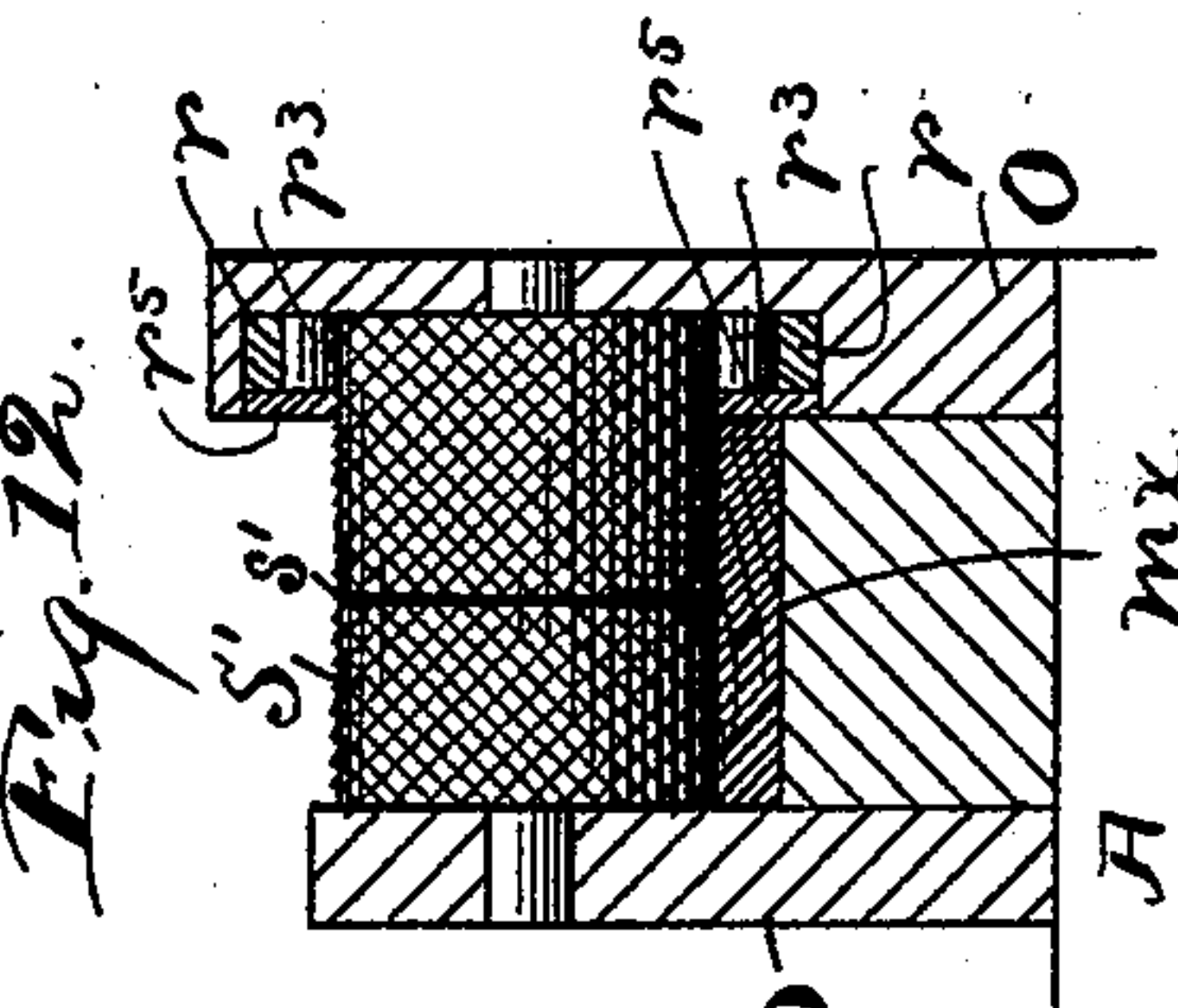
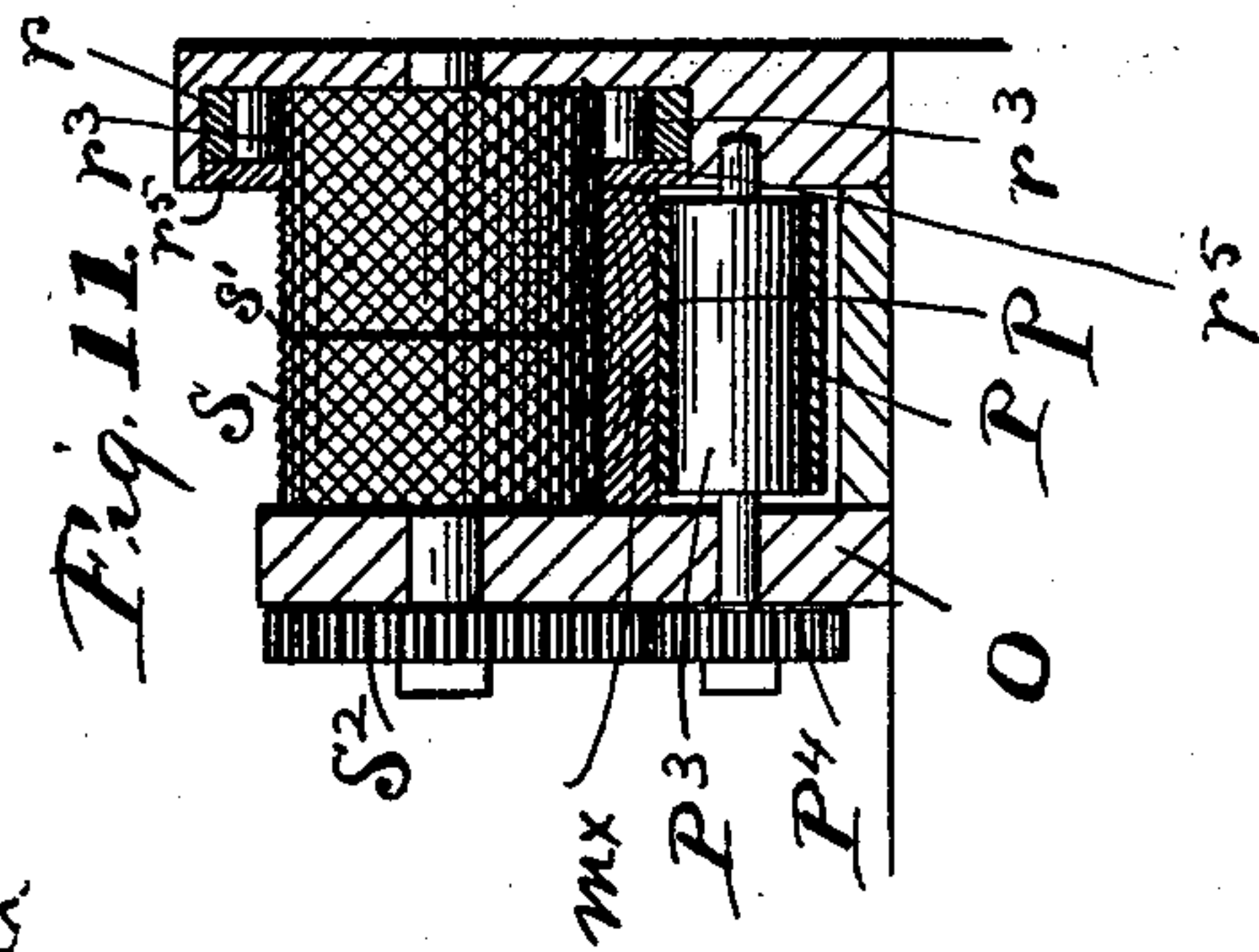
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11 Sheets—Sheet 7.

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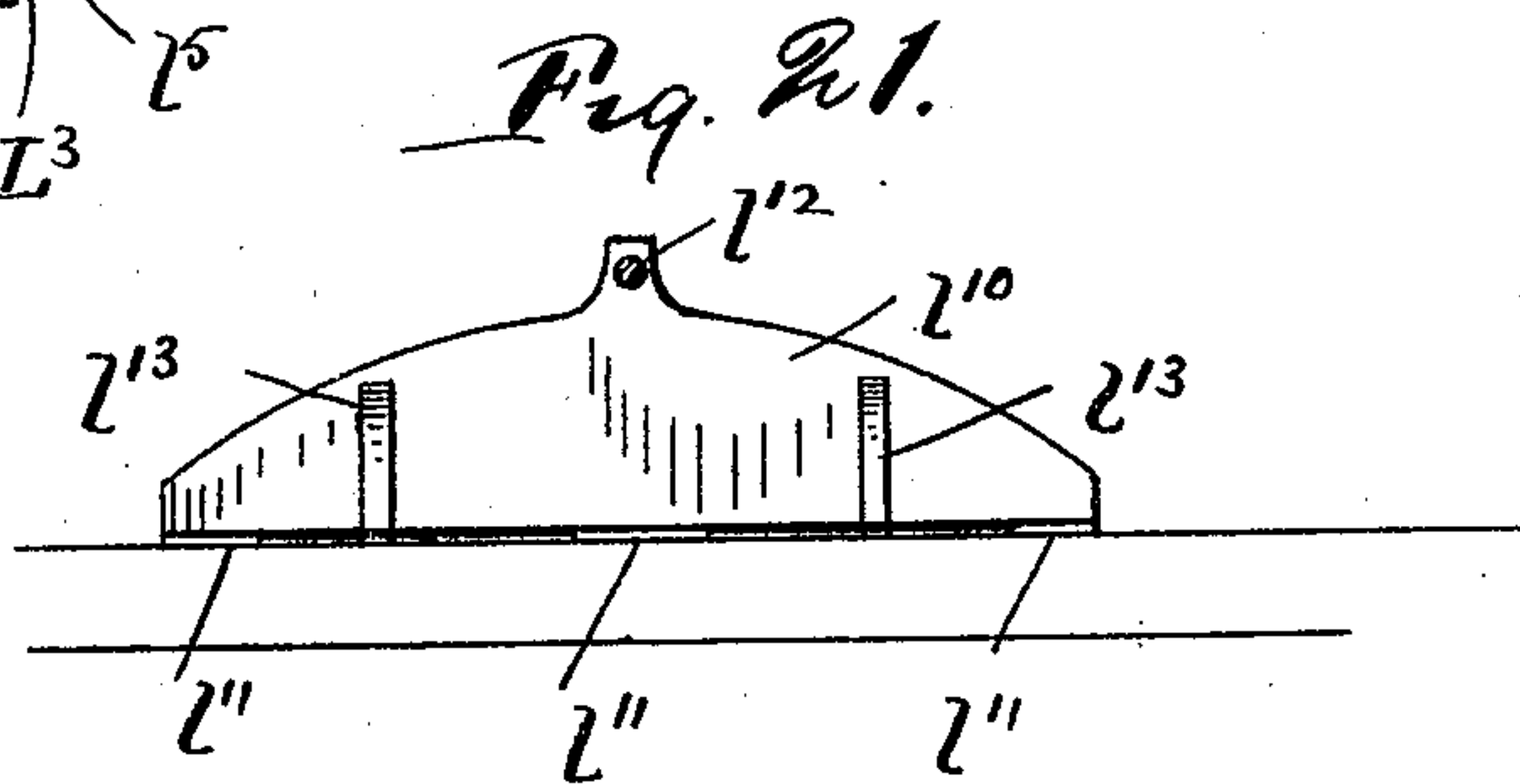
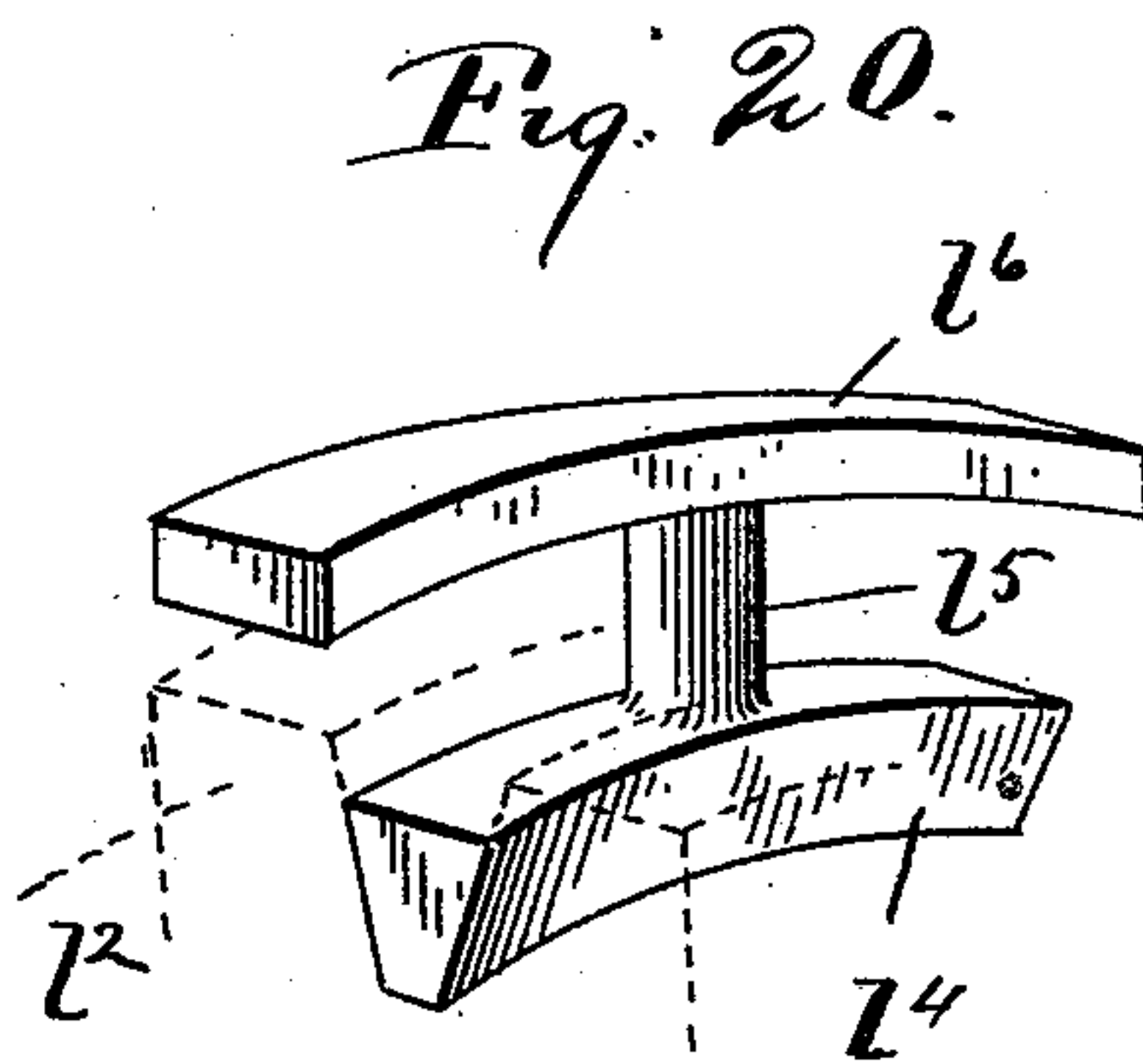
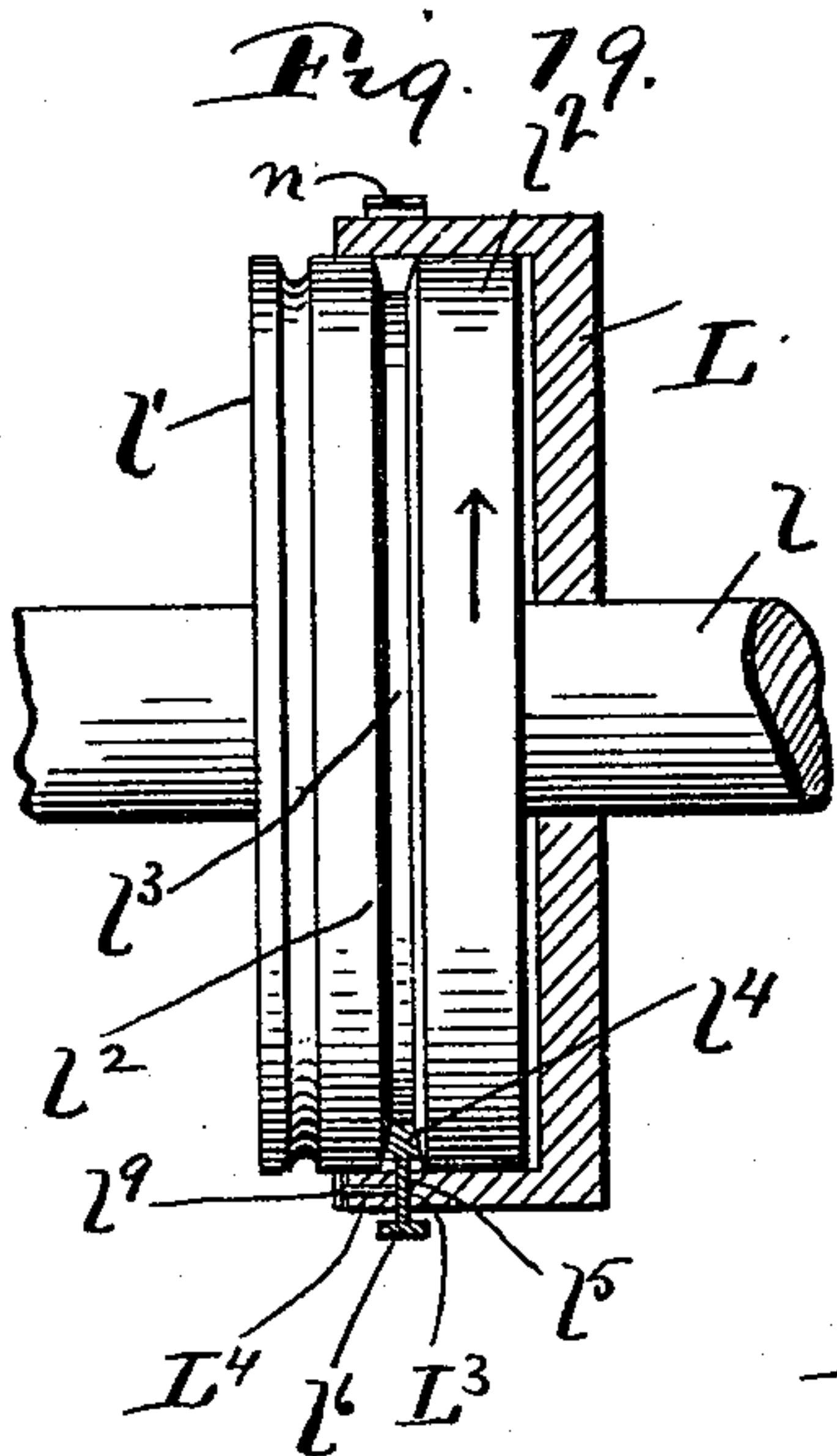
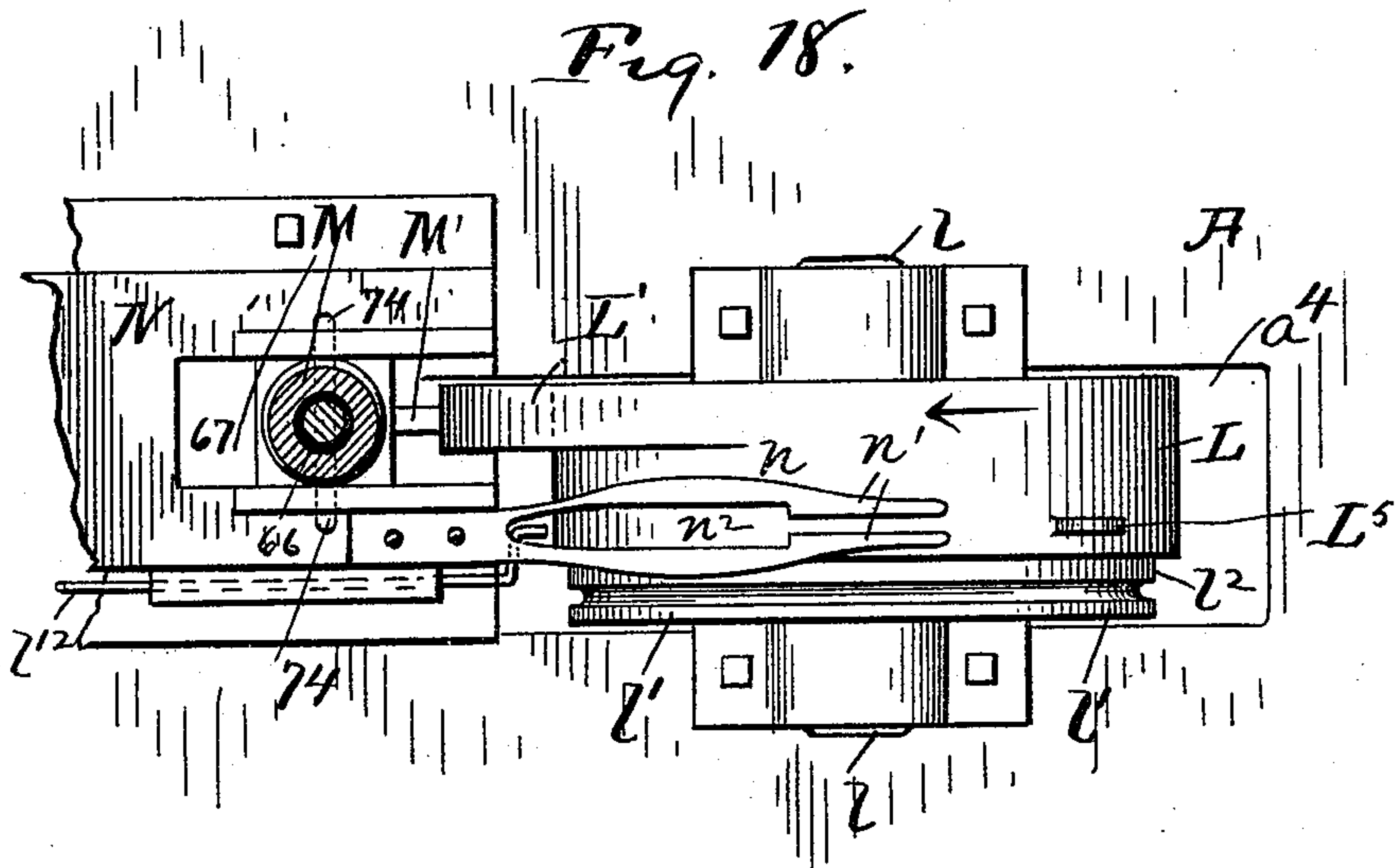
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11 Sheets—Sheet 9.

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TYPOGRAPHIC MACHINE AND ATTACHMENT.

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Fig. 22.

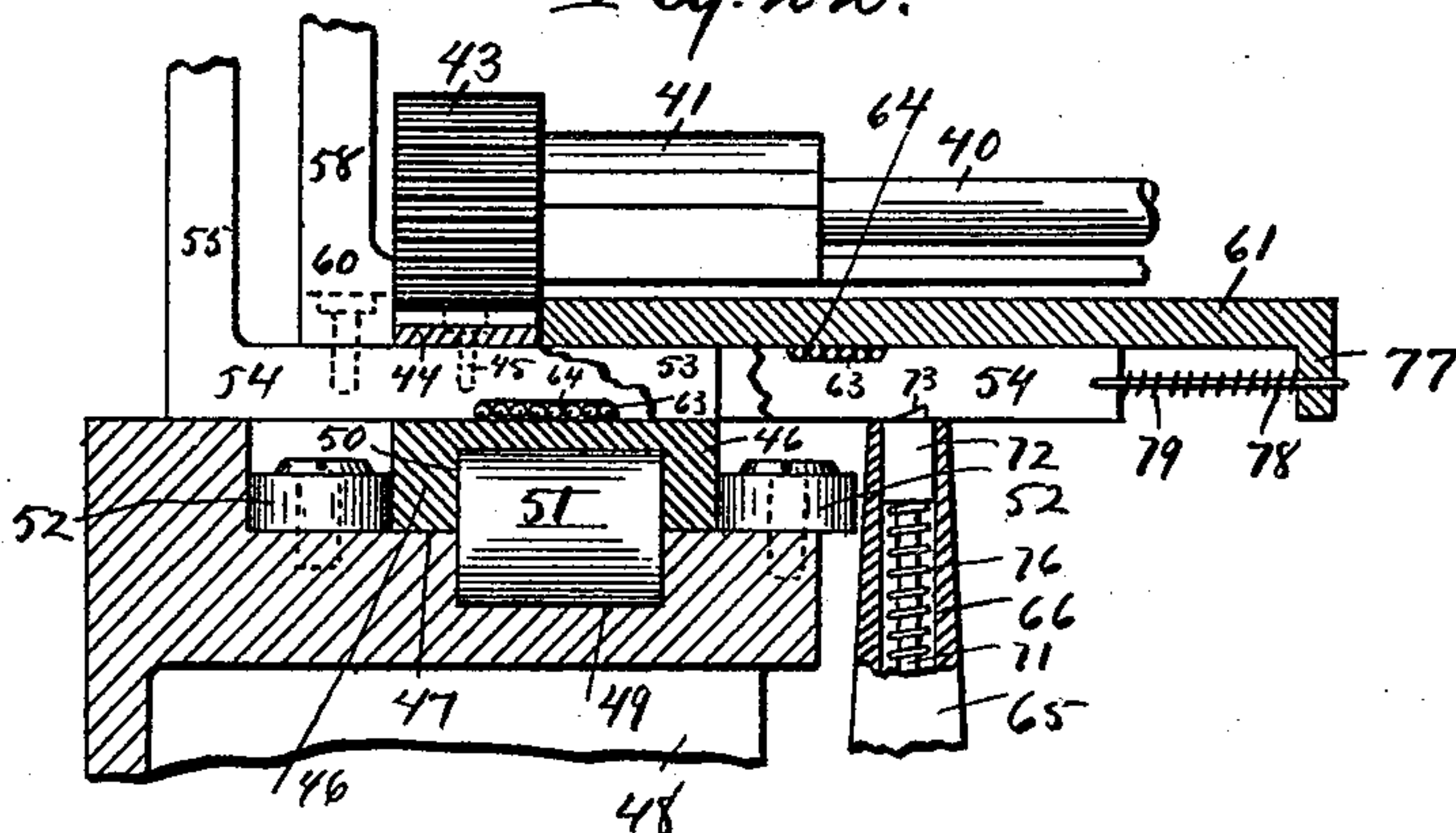


Fig. 23.

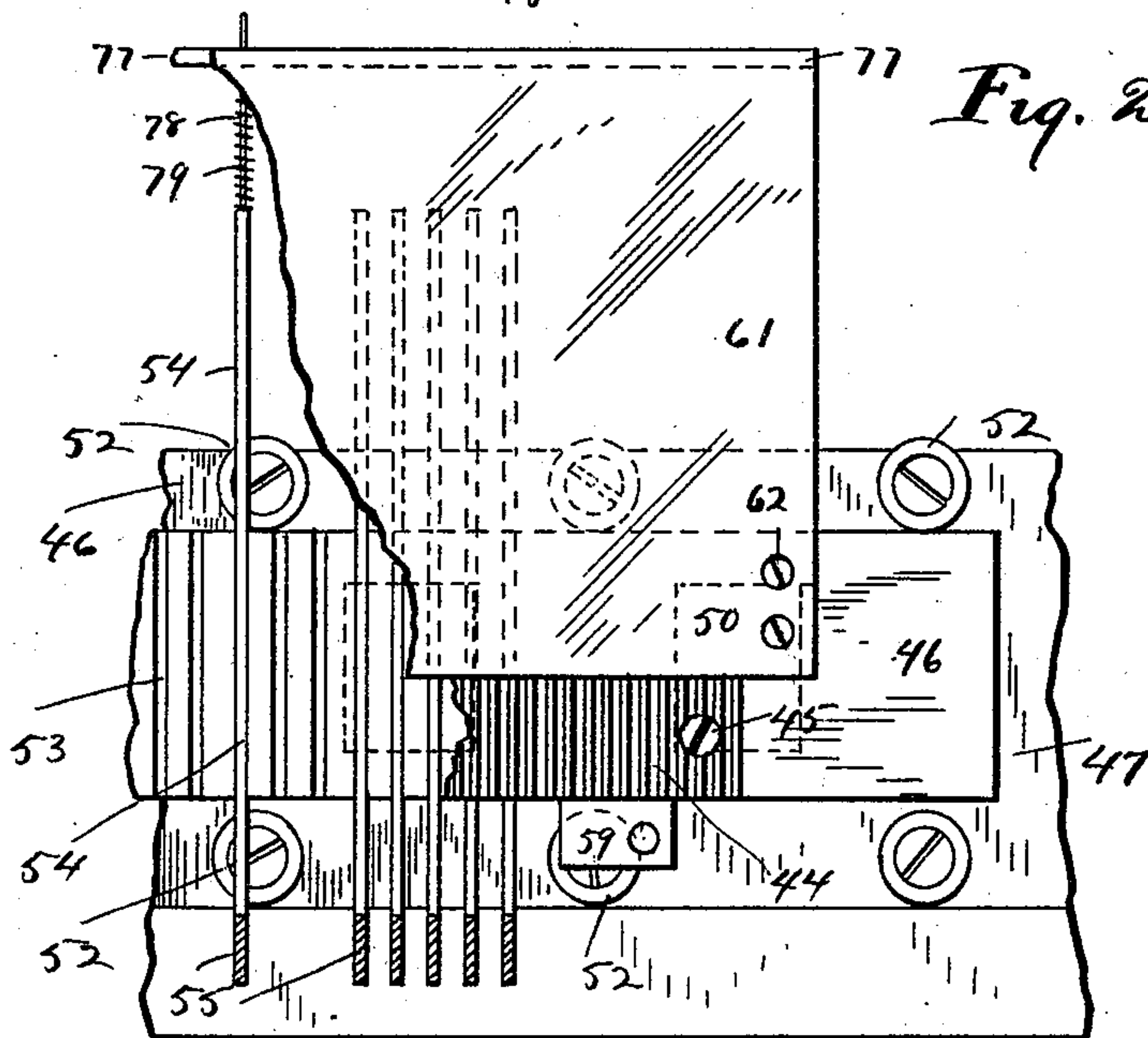
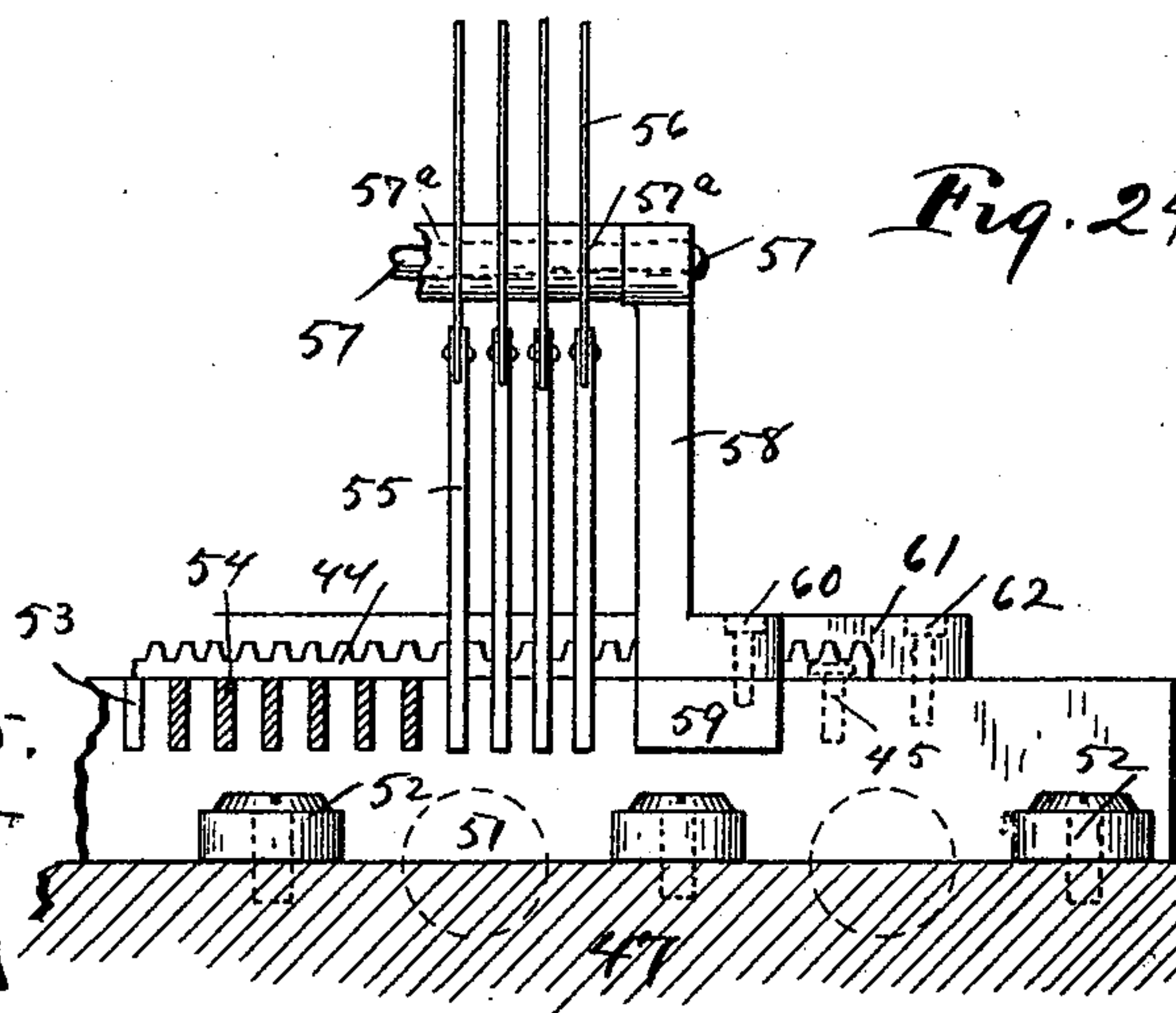


Fig. 24.



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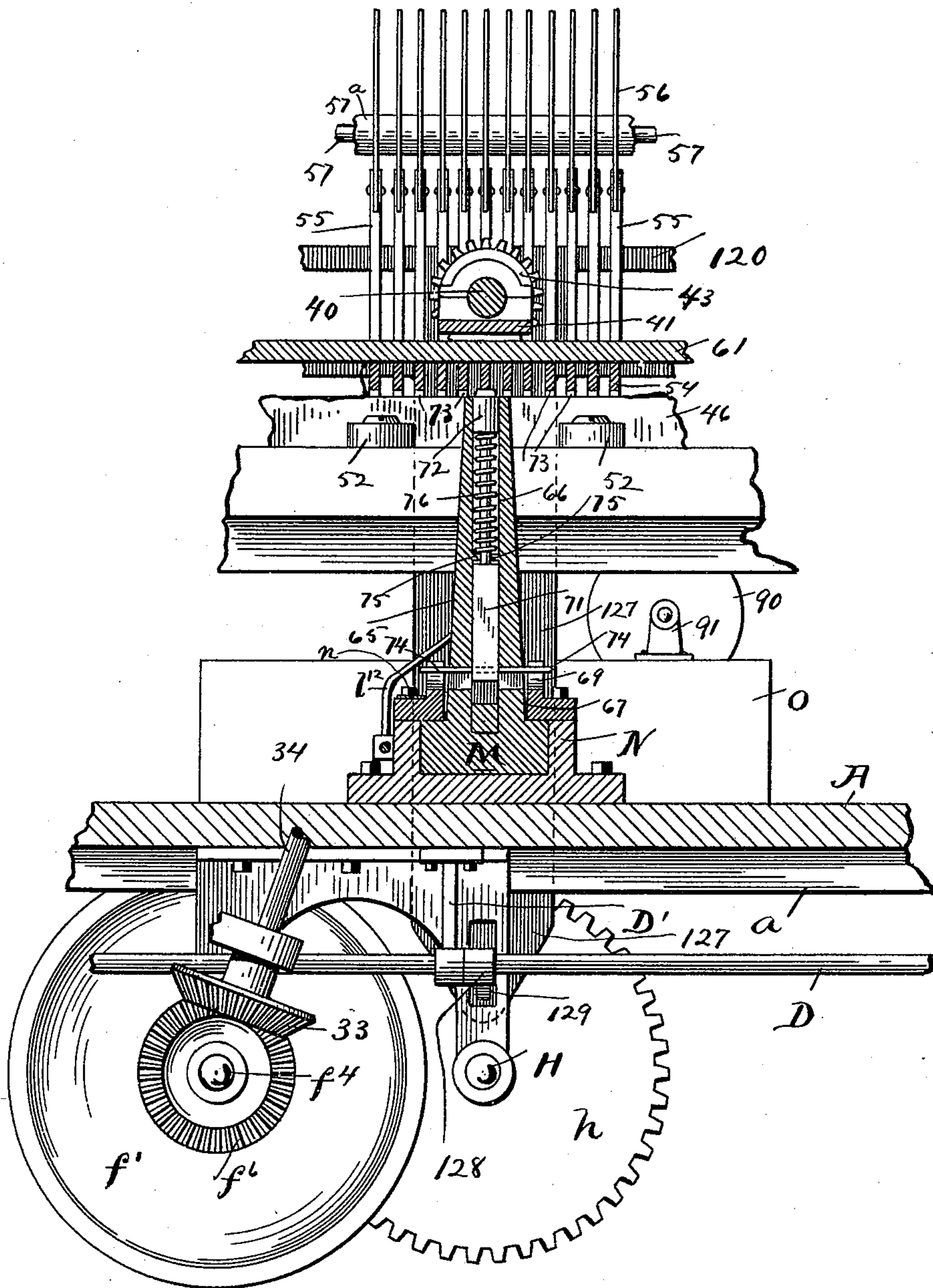


Fig. 25.

Witnesses.

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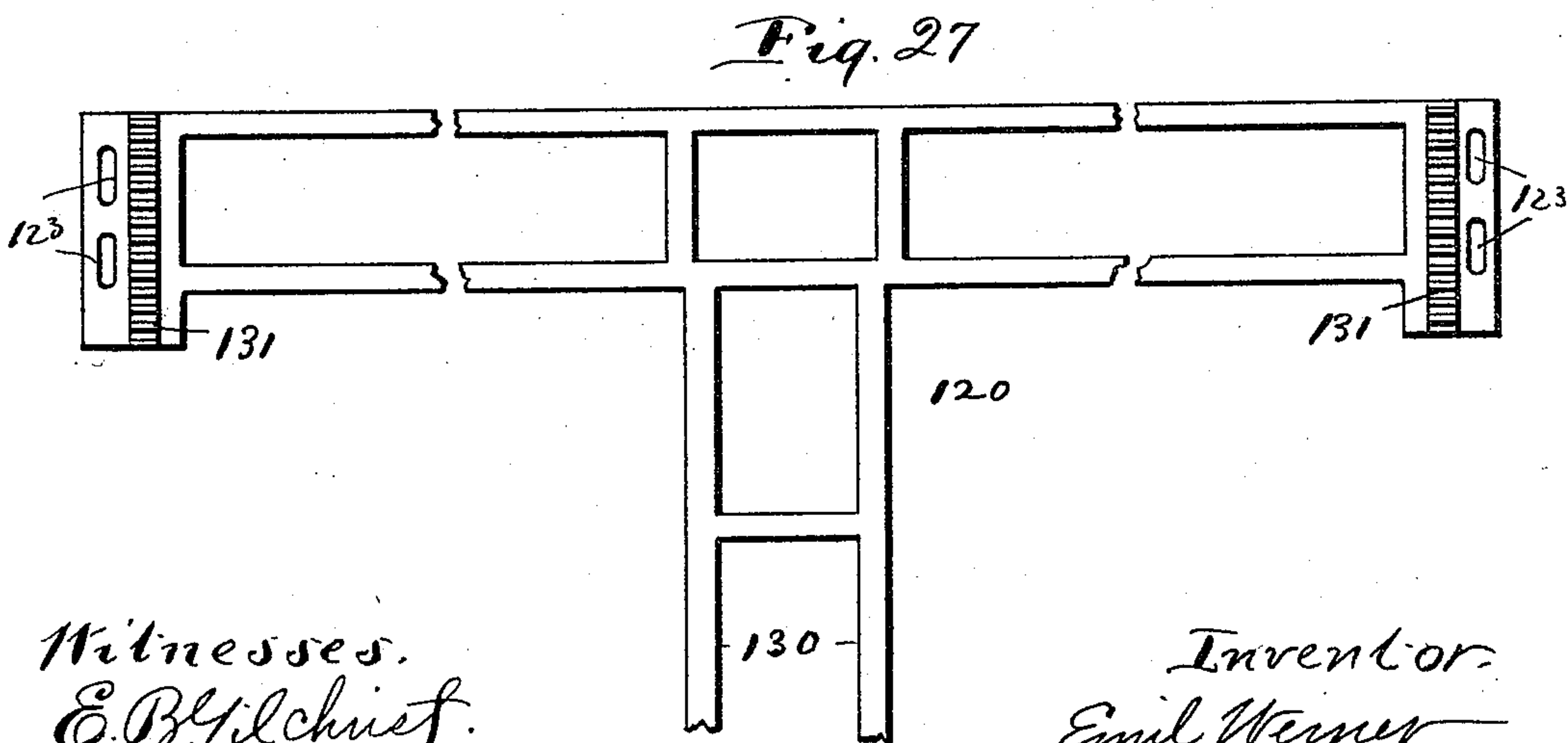
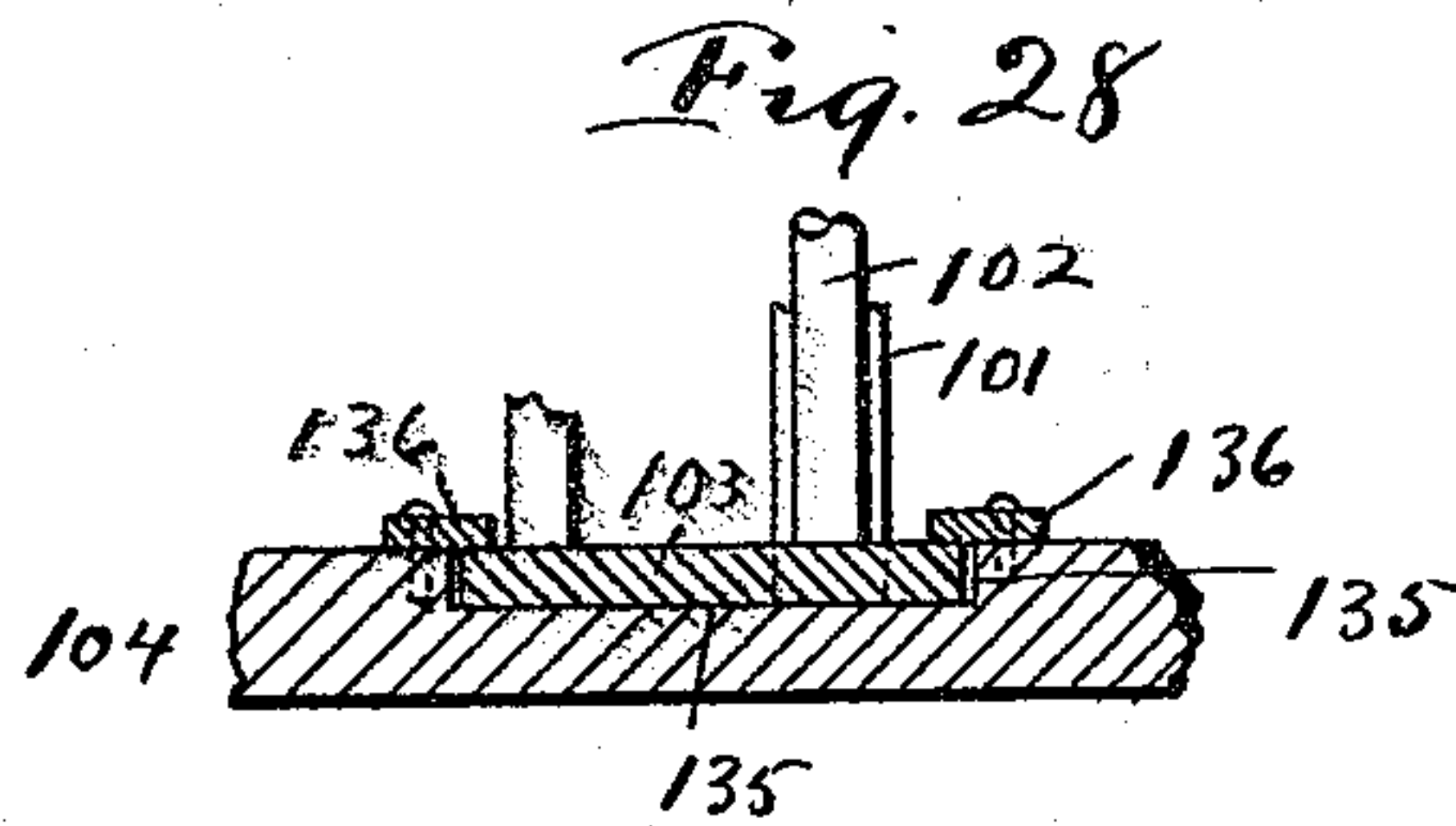
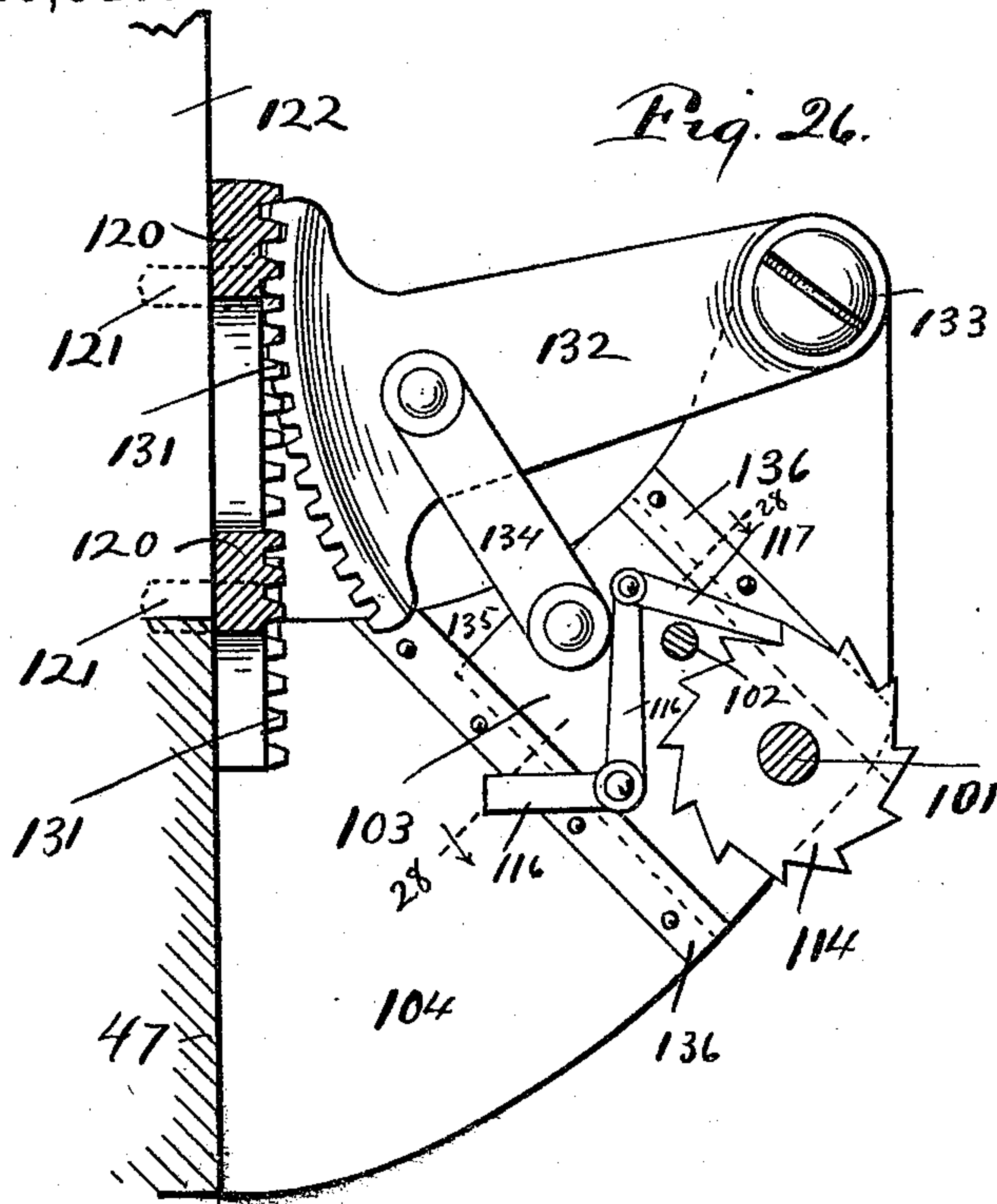
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TYPOGRAPHIC MACHINE AND ATTACHMENT.

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UNITED STATES PATENT OFFICE.

EMIL WERNER, OF CLEVELAND, OHIO.

TYPOGRAPHIC MACHINE AND ATTACHMENTS.

SPECIFICATION forming part of Letters Patent No. 519,517, dated May 8, 1894.

Application filed August 29, 1892. Serial No. 444,450. (No model.)

To all whom it may concern:

Be it known that I, EMIL WERNER, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful
5 Improvements in Typograph-Machines and Attachments; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to
10 make and use the same.

My invention relates to improvements in typograph-machines and attachments,—to a typograph-machine of that variety wherein type-dies are employed to impress the matrix-blank or matrix from which a stereotype-
15 bar or plate may be subsequently cast,—and my invention consists in certain features of construction and in combination of parts hereinafter described and pointed out in the
20 claims.

In the accompanying drawings, Figure 1 is a front side elevation of my improved typograph-machine and attachments, a portion of the spacing-mechanism being shown in section, and portions being broken away to reduce the size of the drawing. Fig. 2 is a right
25 hand side elevation of the same in vertical section, portions being shown unsectioned, and portions being broken away to more clearly show the construction and to reduce the size of the drawing. Fig. 3 is an enlarged
30 right hand side elevation of a portion of the machine, more clearly showing certain features in the construction. Fig. 4 is a front side elevation, partly in vertical section, on
35 line 4—4, Fig. 3, showing the type-die-carrier and means employed in reciprocating said carrier, both vertically and horizontally, the type-dies being removed from the carrier, a
40 portion of gear *h* being broken away to disclose the operative connection of arm 127 of slide 120 with oscillating-shaft D. Fig. 5 is a transverse section of the type-die-carrier on
45 line 5—5, Fig. 4. Fig. 6 shows a perspective of several type-dies, exhibiting the variations in the size of ribs or noses *G*³ employed for actuating the matrix-blank or matrix-feeding-mechanism. Fig. 7 is a left-hand side
50 elevation showing, among other things, the means employed for locking the type-die-carrier and paper-carriage of the typewriter mechanism at the desired elevation, and Fig.

8 is a top view of the locking mechanism, looking in the direction of arrow 8 in Fig. 7. Fig. 9 is a front side elevation of the matrix-
55 blank or matrix-feeding-mechanism, the paper-carriage of the typewriter mechanism and the mechanism that operatively connects said paper-carriage with the matrix-feeding-mechanism to effect the horizontal movement
60 of the paper-carriage. Fig. 10 shows a plan view of a portion of the matrix-feeding-mechanism and spacing-mechanism with bar *R* and lower portion of member *U*² of lever *U* in transverse section. Figs. 11, 12 and 13 are
65 vertical sections of portions of the matrix-feeding-mechanism taken, respectively, on lines 11—11, 12—12 and 13—13, Fig. 10, looking in the direction of the arrows. Fig. 14 is an elevation exhibiting the funnel-shaped
70 guide employed in causing the type-die to engage the matrix-blank or matrix exactly at right angles to the surface to be impressed. Fig. 15 is a top plan in horizontal section on line 15—15, Fig. 14, exhibiting means em-
75 ployed for uniformly holding the matrix-blank or matrix in its passage by the point at which it receives its impression. Fig. 16 is a central vertical section on line 16—16, Fig. 9. Fig. 17 is a detail showing the spacing-lever
80 in engagement with the top wall of slot *R'* in feed-bar *R*, the lever being shown in transverse section. Fig. 18 is a top plan, partly in section on line 18—18, Fig. 2, showing the driving-pulley and cam-wheel *L* for actuating
85 the type-die-impressing-plunger, and means employed for operatively connecting and disconnecting said cam-wheel and driving-pulley. Fig. 19 is a vertical section on line 19—
90 19, Fig. 2. Fig. 20 is a perspective of the clutch-mechanism employed to operatively connect cam-wheel *L* with the driving power. Fig. 21 is a rear side elevation of hinged plate
95 *h*¹⁰. Fig. 22 is a side elevation, partly in section, of a portion of the typewriter mechanism, somewhat enlarged as compared with corresponding parts in Fig. 2. Fig. 23 is a plan view of a portion of the typewriter-mechanism with the upright members
100 of the type-lever-bars in transverse section. Fig. 24 is a front side elevation of a portion of the typewriter-mechanism, with bed 47 and a number of type-lever-bars in section. Fig. 25 is a vertical section on line 25—25, Fig. 2,

looking in the direction of the arrow, the same exhibiting the mechanism employed to operatively connect the type-levers of the typewriter mechanism, with the type-die-actuating-mechanism of the typograph-machine. Fig. 26 is a vertical section of a portion of the typewriter mechanism on line 26—26, Fig. 1, looking in the direction of the arrow. Fig. 27 is a front side elevation of vertically-reciprocating slide 120, parts being broken away to reduce the size of the drawings. Fig. 28 is a section on line 28—28, Fig. 26, looking in the direction of the arrow.

A represents the bed of the typograph-machine, that is supported in any suitable manner, preferably upon legs A'. Bed A, at the front side, is offset downward, as at *a*, (see Figs. 1, 2, 3, and 4,) said offset extending lengthwise of the bed and accommodating the location and operation of the horizontally-reciprocating type-die-carrier. The type-die-carrier comprises two vertical side-members, B and B', arranged a suitable interval apart and extending lengthwise from end to end of the carrier. Members B and B' are rigidly connected with each other preferably by means of pins or screws, B², (see Figs. 4 and 5) and effectively braced apart, for instance, by means of sleeves, B³, mounted on the screws. Members B and B' of the type-die-carrier afford bearing for the type-dies, G, that extend transversely of the type-die-carrier and are arranged in two or more horizontal series located the one series above the other. There is preferably a type-die for each numeral, punctuation-mark and letter of the alphabet. Members B and B' are, of course, perforated, as at *b*, to afford suitable bearing for and accommodate the movement of the type-dies in the performance of their function. In the present instance, there are three horizontal series of horizontal type-dies arranged as hereinbefore indicated. The type-dies bear the type, *g*, at their forward end or face. (See Fig. 6.) In the normal position of the type-dies the face of the type is preferably flush with the outer surface of forward side member B of the type-die-carrier, with the shank or stock of the type-die protruding at the rear of the rearward side-member B' of the carrier. Just forward of member B' the type-die is provided with a stop, usually a pin, G', to limit the rearward movement of the die, and mounted upon the die, between stop G' and the rear side of member B of the type-die-carrier, is a coil-spring, G², (see Figs. 3 and 7) that is adapted to act in the direction to hold the die rearward. The type-die, at the forward end, has an upwardly or laterally-projecting rib or nose, G³, for the purpose hereinafter made apparent, and immediately at the rear of this nose or rib and preferably integral therewith, has a laterally-projecting flange, or guide, G⁴. Forward side-member B of the type-die-carrier has slots, b', in open relation with holes *b* in said member, to snugly accommodate the passage of

nose or rib G³ and guide G⁴ of the type-die, whereby the type-die is properly held and guided during its movement toward and from the matrix-blank or matrix, as will hereinafter more fully appear. The type-die-carrier is supported by a vertically-reciprocating frame that is constructed preferably as shown in Figs. 1, 2, 3, 4 and 7, wherein the same comprises a U-shaped member, C, at opposite sides of the machine, that is, at opposite ends of the horizontal travel of the type-die-carrier. U-shaped members, C, at their upper or free ends, are flanged inwardly, as at C', and the U-shaped members are rigidly connected with each other by means of plates, C², that are secured, preferably by means of screws, C³, to the faces of inwardly-projecting flanges C' of said U-shaped members. Plates C² constitute the ways or rails of a track endwise of which the type-die-carrier is adapted to travel as will hereinafter appear, side-members B and B' of the type-die-carrier, at or near each end of the same, being provided with an upwardly-extending arm, b², that at its upper end, and outer side, is provided with a wheel, b³, mounted on the adjacent way or rail.

The bed of the machine is provided with suitable vertical slideways, a', for the U-shaped members of the vertically-reciprocating frame, and C⁴ represents caps that prevent the displacement of said members of the vertically-reciprocating frame from their respective slideway, caps C⁴ being secured to the bed of the machine preferably by means of screws, C⁵. (See Figs. 3 and 7.)

The means employed for elevating and lowering the type-die-carrier supporting-frame is preferably as follows:

D (see Figs. 1, 2, 4 and 7) represents a shaft that is located below and extends lengthwise of the bed of the machine, said shaft having bearing in brackets, D', depending from and secured to the bed of the machine.

D² represents rock-arms that are operatively mounted on shaft D and are operatively connected with U-shaped members C of the vertically-reciprocating type-die-carrier supporting-frame, the construction being preferably as shown in the figures last referred to, wherein said rock-arms extend forwardly between a pair of rollers, C⁶, secured to the respective U-shaped member of said frame. At the left-hand side of the machine shaft D has operatively mounted thereon a hand-lever, D³, by manipulating which in the one direction or the other the aforesaid frame and type-die-carrier supported thereby, are elevated or lowered to bring the desired series of type-dies at the proper elevation relative to the type-die plunging or actuating mechanism hereinafter described.

Suitable locking mechanism for holding the vertically-movable type-die-carrier supporting-frame at the desired elevation, is shown in Figs. 1, 7 and 8, wherein lever D³, in suitable proximity to its handle D⁴, has pivot-

ally secured thereto, as at d' , a tilting-latch d adapted to engage any one of three notches or recesses e (arranged in series concentric with the axis of lever D^3), in the upper edge of segmental plate E secured to the adjacent portion of the bed of the machine. A spring, d^2 , interposed between lever D^3 and latch d , and secured at opposite ends, respectively, to said latch and lever, acts in the direction to retain the latch in engagement with the respective notch or recess e . The arrangement of parts is such that in the position of lever D^3 shown in Fig. 7, with latch d engaging the lowermost notch or recess of the series of notches or recesses e a die in the uppermost series of type-dies of the type-die-carrier is in position for operation, and by disengaging the latch from said notch or recess and manipulating lever D^3 to bring the latch into engagement with the central or uppermost notch or recess e the central or lowermost series of type-dies would be brought to the proper elevation relative to the type-die impressing-plunger, as would be required if the die selected were in the central or lowermost series of dies.

The means employed for reciprocating the type-die-carrier in a horizontal plane is preferably as follows:— c (see Figs. 2, 3, 4 and 7) represents a slide that is adapted to move endwise between the side-walls of the downward offset a in the bed of the machine. Slide c , at each end of the type-die-carrier, has an upwardly-extending member, c' , the type-die-carrier being confined between members c' up and down which it is adapted to slide. To the bottom of slide c are attached the bands, $F F'$, for propelling the slide, and consequently the carrier, in opposite directions respectively. These bands, however, may constitute a single continuous band secured to slide c , as at F^2 , as shown in Fig. 4. Bands $F F'$ are preferably of steel and of course lead in opposite directions, the one band F being attached to and leading over a pulley or wheel, f , at the left-hand side of the machine, and the other band F' being attached to and leading over a pulley or wheel f' at the opposite side of the machine, wheel or pulley f being supported preferably by a depending bracket or hanger f^3 secured to the bottom of the bed of the machine. The downwardly-offset portion of the bed is recessed longitudinally, as at a^2 , and suitably slotted, for accommodating the location and operation of the aforesaid means of propelling slide c . Pulley or wheel f' is operatively mounted on a shaft, f^4 , that extends transversely of the machine and is supported by a depending arm or bracket, secured to the bottom of the bed of the machine. (See Figs. 1, 4 and 25.) Shaft f^4 , forward of pulley or wheel f' , has also operatively mounted thereon a spur-gear, f^5 , that meshes with a spur-gear, h , operatively mounted on a shaft, H , that extends transversely of the machine and is located directly below the type-die

that is in position for operation. Shaft H has bearing in a depending arm or bracket, secured to the supporting-bed. Upon shaft H , at the forward end thereof, (see Figs. 1 and 2,) is rigidly mounted an arm, I . Arm I , at its upper end, is provided with an index-key, J , the upper end of the arm being perforated, as at I' , to accommodate the location and operation of said index-key. The key is provided with a shoulder or pin J' , and perforation I' of arm I is enlarged as at I^2 , forming a shoulder I^3 , between which and pin or shoulder J' is confined upon the index-key, a coil-spring, J^2 , that is adapted to act in the direction to retain the index-key within the respective hole of the series of lateral holes k in segmental index-plate, K , that is rigidly secured to the front of the bed of the machine. The series of lateral holes k is concentric with the axis of arm I and the holes, in number, correspond with the number of type-dies in a series of type-dies of the type-die-carrier. Holes k are preferably funnel-shaped or flaring outwardly to facilitate the entrance of the index-key. Index-plate K bears letters, marks or characters that the respective holes represent, that is, bears, in suitable proximity to each hole, letters, marks or characters indicating the type-dies that are adapted to be brought into position for operation when arm I and index-key J are manipulated to cause the latter to enter said hole or perforation.

The one series (and we will suppose the uppermost series) of type-dies bear the capital letter type; another series (and we will suppose the central series) the small letter type, and the remaining series the type for numerals, punctuation-marks and other signs or characters. There being only one series of holes in the index-plate, the latter, consequently, not only bears, in the desired proximity to each hole or perforation, the marks, letters or characters required to indicate what type-dies are adapted to be brought into proper position upon the engagement of the respective hole or perforation by the index-key, but said marks, letters or characters are arranged in such a manner that the operator can at once tell in what series of type-dies the die, that the respective mark, letter or character on the index-plate indicates, is located. If the type-dies bearing the small letter type, are directly below those bearing the capital letter type, as we will suppose, it, of course, would not be necessary to have the index-plate bear both the capital and the small letter, but one letter, either capital or small, would be sufficient.

Referring to Fig. 1 of the drawings, the index-plate, adjacent to hole or perforation k' , for instance, bears the letter "m" indicating a type-die in the central and uppermost series of type-dies, and directly below said letter is the comma-mark of punctuation (,) indicating that the type-die bearing the comma-type is located in the lowermost series of type-dies.

The type-die-carrier is reciprocated in the

one direction or the other to bring the desired type-die of a series of type-dies in position for operation according as arm I bearing index-key J is manipulated in the one direction or the other. By means of the intergearing of shafts f^4 and H it will be observed that propelling-band F' winds on pulley or wheel f' at one side of the machine while band F unwinds from pulley or wheel f at the opposite side of the machine, and vice versa; and that the type-die-carrier is reciprocated in a direction opposite to that in which arm I is moved. The sizes of gears f^5 h , relative to each other, are preferably such that arm I need be moved but the least distance practicable, being preferably as shown in Fig. 4, wherein the diameter of gear f^5 on shaft f^4 is one-half that of gear h ; consequently the index-key is moved only one-half the distance that the type-die-carrier is moved, and the distance apart of the holes or perforations in the index-plate is only one-half the distance apart of the type-dies in a series of type-dies of the type-die-carrier.

As already indicated the type-die-carrier is movable in a vertical plane to bring the series of type-dies, containing the type-die selected for operation, at the proper elevation relative to the type-die-impressing plunger herein-after described, whereby, in conjunction with the horizontal reciprocation of the type-die-carrier, any type-die in either or any of the series of type-dies can be brought into the proper position.

To prevent end play of the type-die-carrier, a spring, as at c^2 , (see Fig. 4) is preferably interposed between the one end of one or both side-members of the type-die-carrier and the adjacent upwardly-extending member c' of the type-die-carrier slide, said spring being secured to member c' and acting in the direction to hold the type-die-carrier against member c' at the opposite end of the carrier.

Plates C^2 , that as already indicated, constitute the ways or rails of the track of the wheeled type-die-carrier, at their lower edge, extend more or less into corresponding recesses b^4 (see Fig. 3) in the top of the adjacent side-members of the type-die-carrier, to guard against and prevent any lateral movement of the upper portion of the type die-carrier and said lower edges of plates C^2 are preferably V-shaped as shown to reduce the friction to a minimum. The upper edge of plates or ways C^2 is preferably of an inverted V-shape, as shown and engages a corresponding recess in the periphery of the respective wheels or rollers of the type-die-carrier.

Slide c of the type-die-carrier, extends, widthwise, beyond the side-members of the type-die-carrier and fits snugly but easily between the side-walls of the downward offset in the bed of the machine.

C^7 represents bars or plates that extend from end to end of the horizontal travel of the type-die-carrier, the same being secured to the side-wall of the downwardly-offset in the bed

of the machine just above the type-die-carrier slide, and serving as guides to check any tendency of an upward displacement of the type-die-carrier-slide. Hence, it will be observed that by the construction hereinbefore described the type-die-carrier slide is held strictly in line, both horizontally and vertically.

l (see Figs. 2 and 18) represents the driving-shaft upon which is operatively mounted the driving-pulley l' , the driving-shaft having bearing in suitable boxes rigid with the supporting bed.

L represents a cam-wheel loosely mounted on the driving-shaft. Cam-wheel L is, however, adapted to be operatively connected with the driving-shaft as will hereinafter appear.

Cam-wheel L is provided with a peripheral cam L' that is adapted to engage a roller, M' , trunnioned in the rear end of plunger, M , and actuate the latter, plunger M being adapted to reciprocate endwise in plunger-case, N , that is rigid with bed A of the machine. The forward portion of plunger M is reduced in size, as shown, forming shoulders, as at m , and the forward end of plunger-case N is correspondingly perforated, as at N' , for the passage of said reduced portion of the plunger, the latter having mounted thereon a coil-spring m' , that is confined between shoulders m and the forward end of the plunger-casing, and adapted to act in the direction to hold the plunger rearward. The plunger is adapted to engage the butt of the shank or stock of the type-dies and force the dies forward to cause the dies to impress the matrix-blank or matrix, the latter represented by m^x , being conveyed along, forward of the type-die-carrier, by the following mechanism:

O represents a box (see Figs. 1, 2, 3, 9, 10, 11 and 12) rigidly secured to or integral with a bed A of the machine, and located immediately forward of offset a . Box O is open at the ends and top. The matrix-blank or matrix is fed endwise through box O by means that will presently be described, the sides of said box constituting guides for the matrix-blank or matrix in the passage of the latter past the impressing-plunger.

P represents an endless-conveyer-belt that leads around a roller or pulley, P' , trunnioned in upright posts or suitable supports, P^2 , (see Fig. 1) at the right hand end of the machine, and leads over a roller or pulley, P^3 , (see Figs. 9 and 11) that is trunnioned in the sides of box O . The forward trunnion of roller, P^3 , extends outside of box O , and has operatively mounted upon its forward end a spur-gear, P^4 .

The bottom of box O , in the present instance, is located somewhat above the bed of the machine, but, of course, is cut away, as at O' , (see Fig. 9) to accommodate the passage of belt P and the location of roller P^3 . Immediately forward of the type-dye that is in position to be operated upon by impress-

ing-plunger M, rear side of the box O is perforated or bored vertically, as at O^2 , (see Fig. 13) and within said perforation or bore is located the lower portion of an upright bar R of the matrix-blank or matrix feeding-mechanism. The lower end of this bar is inclined or beveled, downward and forward, as at R' , this bevel or incline of the lever being adapted to be engaged by nose or rib G^3 of the type-die, and the rear side of box O has a lateral perforation, as at O^3 , for the entrance and passage of the type-die, said lateral perforation of course being in open relation with vertical perforation O^2 . Perforation O^2 is preferably square and bar R, in cross-section, is of a corresponding shape and size. As shown more clearly in Figs. 13 and 14 of the drawings, lateral perforation O^3 is tapering or funnel-shaped to facilitate the entrance of the type-die, the forward or reduced end of said perforation being just large enough to receive the type-die, and to cause the latter to properly engage and impress the matrix-blank or matrix, that is, to cause the impression to be made exactly at right angles to the surface to be impressed. The rear side or wall of box O has a slot, as at O^4 , in open relation with perforation O^3 , to accommodate nose or rib G^3 and flange or guide G^4 of the type-die.

I would here remark that it is desirable to have the type-dies operate easily in their bearings but that it is of vast importance to have the dies truly engage the surface of the matrix-blank or matrix to be impressed. I, therefore, employ dies, the butt or rear end of the stock whereof is pointed, convex or reduced in size, as at G^5 , and provide the forward end of the impressing-plunger with a corresponding recess, hole or cavity, m^3 , adapted to receive or engage said reduced end of the die, the arrangement of parts being such that in conjunction with the reduced end of funnel-shaped guide O^3 (that as hereinbefore indicated, is just large enough to receive the die) when said recess or cavity in the forward end of the plunger makes engagement with the rear reduced end of the die, the latter will be properly centered to engage the matrix-blank or matrix exactly at right angles to the surface to be compressed.

Bar R has laterally-extending arms R^2 , R^3 , (see Fig. 9) that extend in opposite directions and to which are pivotally secured depending links R^4 , that, at their opposite ends, are pivotally connected, with annular disks or rings, r , loosely mounted upon feed-rollers S and S' . Feed-rollers S and S' are located, respectively, within box O and at opposite sides of, and preferably equidistant from, bar R.

Feed-rollers S and S' are trunnioned in the sides of box O, (see Figs. 11 and 12) annular disks or rings, r , being mounted upon the respective roller in the rear side or wall of box O that is recessed to accommodate the location and operation of said annular disks or rings. The forward trunnion of feed-roller S

extends outside of box O (see Figs. 9 and 11) and, upon its forward or outer end, is operatively mounted a spur-gear S^2 , that is in mesh with spur-gear P^4 , mounted on the forward trunnion of roller P^3 , hereinbefore described.

Annular disks or rings r , on their inner periphery, are provided with curved grooves or slots, r' , preferably four in number, and gradually reduced in size, as at r^2 . Within grooves or slots r' between the periphery of the respective rollers S S' and the opposing walls of said grooves or slots are located rollers r^3 , and between these rollers and the end or grooves or slots r' opposite to the reduced end of said slots or grooves are located springs r^4 that are adapted to act against the respective rollers r^3 in the direction of the reduced end of the slot or groove. To prevent the displacement of rollers r^3 and springs r^4 is provided an annular plate, r^5 , secured to annular disk or ring r about the respective feed-roller and flush with the inner surface of the rear side of box O, (see Figs. 9, 11 and 12) and links R^4 are connected, respectively, directly with the respective annular plate or cap r^5 . The operation of this feeding mechanism is as follows:—cam-wheel or roller L is operated to cause peripheral cam L' thereof to actuate plunger M, the latter in turn engaging and forcing the type-die forward to impress the matrix-blank or matrix, the latter having been brought into proper position within box O. Previous to the type-die making its impression, however, lateral rib or nose G^3 at the forward end of the die will engage the incline or bevel R' at the lower end of bar R, and cause the latter to be elevated. This motion of bar R and its arms R^2 , R^3 , will through links R^4 , R^4 , be communicated to annular disks or rings, r , the latter being moved in the direction indicated by the arrows, (Fig. 9) causing rollers r^3 , located within slots or grooves r' of disks or rings r , to be wedged into the reduced portion of said grooves or slots between the periphery of the respective feed-rollers S S' and the opposing wall of the respective slots or grooves, and causing feed-rollers S S' to rotate with the respective encircling disk or ring r .

The periphery of feed-rollers S S' is milled, or knurled, as shown, or provided with suitable projections, whereby the rollers, upon being rotated, as aforesaid, will take hold on the matrix-blank or matrix and feed the same onward as required. To cause the taking hold of the matrix-blank or matrix by the feed-rollers to be more positive, I provide a spring, or springs, s , acting downward upon the rollers, (see Figs. 9 and 10) said spring or springs being supported in any suitable manner, and the rollers have preferably an annular groove, s' , for receiving said spring or springs. The gearing at P^4 S^2 communicates motion from roller S to conveyer-belt P upon which the matrix-blanks will likely be fed in procession to feed-roller S. The matrix-

blank may, of course, be of any length desired, but should just be wide enough to nicely pass between the sides of box O, the sides of box O serving as guides to maintain the matrix-blank or matrix in a straight path. The distance that feed-rollers S S' are located, respectively, above the bottom of box O and conveyer-belt P (the portion of the latter within box O may be said to constitute a bottom for this part of said box) relative to the thickness of the matrix-blank, is, of course, such that feed-rollers S S' will not fail to take hold of the matrix-blank or matrix, and feed the same as required. To guard against the objection that would be met in case the matrix-blank or matrix did not sufficiently snugly fit between the guides constituted by the sides of box O, I provide, one or more springs, o , (see Fig. 15,) to act against the same edge of the matrix-blank or matrix that is designed to receive the work of the type-dies, and cause the matrix-blank or matrix to closely hug the forward side of box O, thereby insuring that the matrix-blank or matrix is always properly, firmly and uniformly held relatively to the type-dies, during the impression by the latter.

As shown more clearly in Fig. 15, a recess o' and spring o seated in said recess, are provided at each side of the point at which the impression of the matrix-blank or matrix takes place.

The noses or ribs G^3 of the respective type-dies, of course, vary in size, according to the distance it is required to feed the matrix-blank or matrix that is to receive the impression of the respective dies. For instance, a die adapted to impress the letter "m" would necessarily require a rib or nose, G^3 , adapted to lift or elevate bar R a greater distance and consequently cause the connected mechanism to feed the matrix-blank or matrix farther than, for instance, the die adapted to impress the letter "i." In impressing the matrix or matrix-blank with the letters composing a word, to render the work desirable, the impression should be equidistant apart, but as aforesaid, the letter "m," for instance, requires more space than the letter "i;" consequently the variation in the size of ribs or noses G^3 of the respective type-dies to cause the feeding-mechanism to move the matrix or matrix-blank the proper distance. This difference in the size of ribs or noses G^3 of the respective type-dies, will be more readily understood upon reference to Fig. 6 that exhibits, in perspective, six type-dies bearing the type, I, e, n, N, M, and W. Of these letters or characters, the letters I and e occupy the least space and the letters M and W occupy the most space. It is quite obvious that in order to obtain the proper adjustment of space or distance between the letters of a word, the matrix-blank or matrix must be fed or moved a greater or less distance according to the size of the space occupied by the letter or character impressed. By pro-

viding the type-die with a rib or nose G^3 of the proper size of the most accurate justification is obtained. Cam L' having passed plunger M spring m' will return the plunger to its normal position, and the pressure being thus removed from the type-die that has just made an impression in the matrix-blank or matrix said type-die will also be returned to its normal position by the action of spring G^2 . Bar R and connected annular disks or rings r , upon the withdrawal or recession of the type-die from the matrix-blank or matrix, are returned to their normal position, partly by the gravity of the parts, and partly (and promptly) by the action of a spring, R^5 , (see Figs. 2 and 9) the latter, as shown, being preferably a coil-spring mounted on the upper portion of bar R, the spring being confined upon bar R between the top of lateral arms R^2 and R^3 of the bar and the overhanging end T' of a bracket or arm, T, that is secured to the top of the rear side of box O, end T' of said arm or bracket being perforated, as at T^2 , to accommodate the vertical movement of bar R, bracket or arm T thus serving as a guide to assist in maintaining the verticality of arm R.

The bed of the machine is of course slotted, as at a^4 , to accommodate the location and operation of cam-wheel or roller L and driving-mechanism. Cam L' of the cam-wheel has a slight depression, L^2 , extending transversely of the periphery of the cam. The office of this slight depression in the cam will be quite obvious when it is considered that it is desirable to have uniformity in the impression of the matrix by the type-dies. Owing to peculiarities in the construction and shape of certain letters and characters and the consequent peculiarities in the displacement of the material of the matrix-blank or matrix by the dies adapted to impress such letters or characters, with a cam adapted to cause but one impulse to be given to the die there might be difficulty in obtaining uniformity in the impression of the matrix-blank or matrix by the various dies, and I have found that with a slight depression in the cam as just described the prominence of the cam, that immediately follows such depression, causes a fresh or second impulse, as it were, to be given to the die, and affords the die an opportunity to prevent any inequality or irregularity in the impression of the matrix, causing the degree of successive impressions of successive dies to be uniform. The depression in the cam referred to should, of course, not be so great as to cause a disturbance in the feeding-mechanism of the matrix-blank or matrix.

U represents a bent lever that is fulcrumed, as at U' , to the bed of the typewriter mechanism hereinafter described. Lever U, at its forward end, terminates above the feeding-mechanism of the matrix-blank or matrix in a depending member U^2 , that is, however, jointed, as at U^3 . The lower section of depending member U^2 , at the lower end there-

of and preferably directly over the central portion of the path of the matrix-blank or matrix and in line with the operative type-die, is provided with a roller, U^4 , that is adapted to bear upon the matrix-blank or matrix. Lever U , at the rear of its fulcrum and above the type-die actuating plunger, terminates in a depending member U^5 the lower extremity whereof engages an incline m^2 at the forward end of the type-die actuating plunger, the trend of such incline being upward toward its rear end. In the normal position of parts, member U^5 of lever U rests upon the lower end of incline m^2 , and roller U^4 rests gently upon the matrix-blank or matrix. As plunger M advances to engage and actuate the type-die to cause the latter to impress the matrix-blank or matrix member U^5 lever U will be elevated by means of the aforesaid incline at the forward end of said plunger, resulting in the depression of roller U^4 at the opposite end of said lever, thereby causing the roller to exert a pressure upon the matrix-blank or matrix at the same time that the latter receives the impression of the type-die, thus firmly holding the matrix-blank or matrix while being impressed by the die. The lower section of member U^3 of lever U extends through a sleeve U^6 (see Figs. 2, 3 and 9) secured to the top of the forward side of box O , whereby the verticality of the lower section of member U^2 of lever U is maintained and roller U^4 at all times caused to rest or bear squarely upon the matrix-blank or matrix.

A roller, W , (see Figs. 9 and 10) is located within box O directly above and transversely of the path of the matrix-blank and in advance of feed-roller S , roller W being trunnioned in the sides of box O and being adapted to rest and bear upon the matrix-blank and prevent the rear end of the latter from being lifted as it is received and fed by roller S , the trunnions of roller W being capable of slight vertical movement, however, the sides of box O being slotted or grooved for the purpose as at O^5 , (shown in dotted lines Fig. 9) to accommodate any slight irregularity or inequality in the thickness of the matrix-blank. Springs, as at W' , are provided, the same being secured, respectively, to the sides of box O , with the free ends thereof bearing upon the periphery of roller W .

Suitable spacing mechanism is provided for causing longer or shorter spaces to be made, for instance, between words, or between characters or letters, as required.

As shown in Figs. 1, 9, 16 and 17, (Figs. 16 and 17 being on the same sheet with Fig. 9,) X represents a bent lever fulcrumed to a suitable support, such, for instance, as a post or standard X' rigid with the forward side of box O . The extremity of the weight arm of lever X extends into a slot R^6 of bar R and is adapted to engage the top wall of said slot (Fig. 17). The power arm of lever X extends through hollow posts or barrels, as at $Y Y' Y^2$,

that are preferably integral with a plate Y^3 rigidly secured to the bed of the machine. Lever X comprises preferably a flat bar, and upon the power-arm of lever X , within the respective barrels $Y Y' Y^2$, is seated a button, Z , the shank of the latter being comparatively long and slotted, as at Z' , (see Fig. 16) whereby the bifurcated shank is adapted to straddle lever X , the slot extending preferably to the lower extremity of the shank, but the latter does not extend to the bottom of the respective barrel and the barrel is vertically slotted at opposite sides, as at Y^4 , (see Fig. 9) with said slots extending below lever X sufficiently far to enable the depression of the power-arm of lever X the distance required, whereby lever X , by depressing the proper button, will be actuated to lift or elevate bar R and connected matrix-feeding mechanism and cause the matrix to be fed the space desired, the latter being greater or less according to the distance the button aforesaid is located from the fulcrum of lever X and according to the proximity of the lower extremity of the shank of the button to the bottom of the respective barrel; hence, the provision of several buttons, Z , located at different intervals from the fulcrum of lever X and with the shank of the button in closer or less proximity to the bottom of the respective barrel. Referring to Fig. 9 of the drawings, button Z , seated upon lever X within barrel Y being the button located nearest to the fulcrum of lever X and with the lower extremity of its shank farthest from the bottom of the barrel, is adapted to actuate lever X to cause bar R and connected feed-mechanism to feed the matrix a greater distance than buttons Z in barrels, Y' , Y^2 , which latter buttons are located farther from the fulcrum of lever X with the shanks thereof nearer to the bottom of the respective barrels. A spring, as at Z^2 , is mounted upon the shank of buttons Z and confined between lever X and bottom of the respective barrel, springs Z^2 being adapted respectively, to return the respective button to its normal position upon the removal of the pressure upon the button. In case more than one button, Z , is employed, as in the present instance, and as is desirable, slots Y^4 in the sides of the respective barrels, as already indicated, should of course extend sufficiently far below lever X to accommodate the movement of the latter in all cases.

The power-arm of lever X extends in suitable proximity to the handle of lever D^3 so that both the latter and the spacing-lever can be conveniently operated by the same hand of the operator and with the least loss of time in changing from the operation of one to the operation of the other of said levers.

As already indicated, suitable means are provided whereby cam-wheel L is automatically operatively connected and disconnected with the driving-shaft preparatory to and af-

ter the actuation of the impressing-plunger by cam L'. Upon driving-shaft l (see Figs. 2, 18, 19 and 20) is operatively mounted a grooved-wheel, l^2 , that is located within cam-wheel L and is preferably integral, as shown, with the driving-pulley l' . Within groove l^3 in the periphery of wheel l^2 is located a friction-shoe, l^4 , that is provided with a pin l^5 projecting outwardly through a lateral hole or perforation L^3 in cam-wheel L and terminating at its outer end in a head l^6 , hole L^3 being just sufficiently large to snugly receive said pin. By the construction shown it will be observed that a pressure exerted upon the head of pin l^5 will press shoe l^4 against the walls of groove l^3 in wheel l^2 and cause the cam-wheel to rotate with the driving-pulley. Shoe l^4 is retained in the position desired by means of a spring l^7 , that is fastened at one end to the cam-wheel, as at l^8 , and the other end terminates in a member l^9 extending through a hole L^4 provided in the cam-wheel and in open relation with lateral hole L^3 , said spring acting in the direction to cause member l^9 thereof to engage and bear against pin l^5 , thereby, in conjunction with the frictional contact between pin l^5 and the surrounding wall of hole L^3 , retaining shoe l^4 in the position desired, in or out of frictional contact with the walls of groove l^3 of wheel l^2 , as the case may be. Shoe l^4 of the clutch-mechanism thus constituted, with its members l^5 l^6 , is shown detached in Fig. 20.

n represents a fork that is secured, at the side of cam-wheel L opposite to the direction of rotation of said wheel, to any suitable support, such, for instance, as plunger-case N. The arrow indicates the direction of travel of said cam-wheel. Prongs or members n' of fork n project over the cam-wheel opposite to the direction of the rotation of said wheel, and terminate in close proximity, and are arranged tangentially, to the periphery of said wheel. Fork n is located in such a position relative to the clutch-mechanism that is adapted to operatively connect cam-wheel L with the driving-pulley or driving-shaft, members n' of the fork are located such a distance apart, and the size of head l^6 of the clutch-mechanism is such, that when the clutch-mechanism arrives at the free end of the fork, pin l^5 of said mechanism will pass between members n' of the fork, and head l^6 of the pin will ride upon the fork, releasing shoe l^4 from frictional contact with wheel l^2 and resulting in operatively disconnecting the cam-wheel and driving-shaft. Prongs or members n' of fork n are cut away or farther separated, as at n^2 , to permit head l^6 of the clutch-mechanism to pass through the fork, after cam-wheel L has become operatively disconnected from the driving-shaft.

For automatically establishing frictional contact between shoe l^4 and wheel l^2 and thereby operatively connecting the cam-wheel with the driving-pulley or driving-shaft, is provided as follows:

l^{10} (see Figs. 2 and 21) represents a stiff plate located at the rear of index K, the same being hinged, as at l^{11} , at or near the bottom of the index. Plate l^{10} is adapted to be tilted rearward on its hinges by the engagement therewith of index-key J, and is of such size, relative to the index, that it will be actuated by the index-key no matter what hole or perforation in the index-plate is engaged by the index-key. To the upper end of plate l^{10} is rigidly connected a rod, l^{12} that extends rearward across the machine and terminates at its rear end just outside of the path of head l^6 of the aforesaid clutch-mechanism. Of course, it is obvious that cam-wheel L, owing to its momentum, will travel some distance further after it has become operatively disconnected from the driving-shaft as hereinbefore described, and the free end of rod l^{12} , for the purpose hereinafter made apparent, terminates approximately at such a point relative to the path of head l^6 that the latter after becoming released from fork n and before it has come to a stop will come into position to be engaged by said rod. Rod l^{12} is bent, as required, to avoid interference with other parts of the machine. The index-key is of such length, that as said key, in the operation of the machine engages any one of the holes in the index it will also engage hinged plate l^{10} , and the arrangement of parts is such that just as head l^6 of the clutch-mechanism comes opposite the free end of rod l^{12} the latter will be engaged by head l^6 of the clutch-mechanism whereupon said rod will be actuated by means of index-key J engaging plate l^{10} and exert a pressure upon said head, depressing the latter and causing frictional contact to be established between shoe l^4 and wheel l^2 , thereby operatively connecting cam-wheel L with the driving-shaft. Head l^6 of the clutch-mechanism is elongated in the direction of the circumference of wheel L so that there is no liability of a failure of its coming into engagement with rod l^{12} aforesaid.

Cam-wheel or roller L, in the same circular plane with the clutch-mechanism hereinafter described, is provided with a peripheral cam, L^5 , that is sufficiently narrow to pass between prongs or members n' of fork n and is adapted to engage rod l^{12} and return the same to its normal position, the arrangement of parts being such that said cam will come into engagement with rod l^{12} after the latter has actuated the clutch-mechanism to operatively connect the cam-wheel with the driving-shaft. A spring, as at l^{13} , is also preferably provided at the rear of plate l^{10} to act in the direction to return the plate to its normal position. Either cam L^5 or spring l^{13} , alone, might answer the purpose, but I prefer the employment of both, that the return of plate l^{10} to its normal position, shall be positively effected and retained in such position, until again actuated by index-key J.

Having thus described the construction and operation of the typograph-mechanism, I will

proceed with a description of the means and mechanism employed for operatively connecting with the typograph-mechanism, suitable typewriter mechanism whereby the operator, at all times, is enabled to see a proof of his work.

Shaft f^4 , at or near its rear end, has operatively mounted thereon a bevel-gear, f^6 , that meshes with bevel gear 33 (see Figs. 4 and 25) operatively mounted on an upright shaft 34 that extends through bed A of the machine and is supported in any suitable manner. Shaft 34, at its upper end, has operatively mounted thereon a bevel-gear, 38, (see Fig. 2) that meshes with a bevel-gear, 39, suitably mounted on a shaft, 40, that has suitable bearing in the upper member, 41, of a bracket or standard, 42, rigidly secured to bed A of the machine. (See Fig. 1.) Shaft 40, forward of its forward bearing, has operatively mounted thereon a spur-gear, 43, that meshes with a rack, 44, the latter (see Figs. 2, 22, 23 and 24) extending lengthwise of the machine, and being secured at either end, preferably by means of screws, 45, to a block, 46, that extends longitudinally, and by means of rack 44 aforesaid, is adapted to be slid endwise bed 47 of the typewriter mechanism, bed 47 being supported by and preferably integral with legs, 48, that are bolted or rigidly secured to bed A of the machine, bed 47 of the typewriter mechanism of course being located sufficiently far above the typographic mechanism underneath that the latter will not be interfered with. To render the travel of sliding-block 46 as easy as possible, bed 47 is grooved or recessed longitudinally as at 49, and block 46, at suitable intervals, on its under surface is provided with recesses or depressions, 50, that register with the longitudinal groove or recess 49 in bed 47, and fitting nicely between the opposing walls of recesses 50 and 49, and extending transversely of recess 49, are located rollers, 51. Sliding-block 46 also travels in contact with rollers 52 secured to bed 47 at suitable intervals along the sides of block 46. By this construction the travel of block 46 is not only rendered exceedingly easy, but comparatively noiseless. Block 46 is provided with a series of transverse grooves or recesses, 53, on its upper surface, within which grooves or recesses are nicely, but easily fitted, bars 54, the latter being adapted to slide endwise within said grooves or recesses, that are preferably of such depth as to receive bars 54 with the top surface thereof flush with the top surface of block 46. Bars 54, at their forward end, terminate, respectively, in an upwardly-extending arm or member, 55, to the upper end of which is pivotally connected the power-arm of a curved type-lever, 56, levers 56 being fulcrumed upon a rod, 57, in common, the latter being supported, at either end, by an upwardly extending arm or bracket, 58, rigidly secured to sliding-block, 46, the latter being preferably flanged forwardly at either end, as at 59, and arms or

brackets 58 being screwed to the respective flange, as at 60 (see Figs. 23 and 24), collars as at 57^a being preferably mounted on rod 57 between levers 56, as shown. To prevent vertical motion of bars 54, within grooves or recesses 53 of sliding-block 46, is provided a cap-plate 61, that is secured, preferably by means of screws, 62, (see Figs. 22, 23 and 24) to block 46, at either end of the latter, and to render the endwise movement of bars 54 easy and comparatively noiseless, said bars are also caused to work upon rollers as at 63, provided in recesses 64, in the upper and lower surfaces of said bars adjacent cap-plate 61 and sliding-block 46, (see Fig. 22.) The endwise movement of a bar 54 rearward causes the type-lever operatively connected with said bar to make its imprint on the paper in the paper-carriage hereinafter referred to, and this movement of bars 54 is effected by mechanism operatively connected with type-die plunger M of the typographic mechanism, as follows:—Type-die-plunger M, at the rear end, (see Figs. 2, 22, and 25) has an upwardly-extending arm or member, 65, that is hollow or bored, as at 66. Type-die plunger-case N, is, of course slotted, as at 67, (see also Fig. 18) to accommodate the location and movement of arm or member 65, but at either side of the latter is provided with an upwardly-projecting and laterally-slotted ear or member 68, the top and rear walls of slots 69 of members 68, sloping downward and rearward, forming an incline as at 70, (see Fig. 2.) Within the bore of arm or member 65 is located a bolt, 71, the head of the latter, 72, being adapted to engage a notch, 73, in the lower surface of bar 54 immediately above. The shank of bolt 71, at the rear end, is provided, at either side, with a laterally-projecting pin, 74, that is adapted to ride up and down the sloping or inclined wall of the slot in the respective ear or member 68 of plunger-case N. Arm or member 65, is provided with inwardly-projecting shoulders 75, between which and head 72 of bolt 71, is confined a spring, 76, preferably a coil-spring as shown mounted upon the shank of bolt 71, said spring acting in the direction to retain the head of bolt 71 in its shot position. Cap-plate 61 at the rear end, (see Figs. 2, 22, and 23) has a depending flange, 77, that is perforated for the passage of pins or rods, 78, that are screwed into the respective bars 54, and upon rods or pins 78, between flange 77, and the respective bars 54, are mounted springs 79, adapted to act in the direction against bars 54. There are as many type-levers 56, as there are type-dies in a series of type-dies in the type-die-carrier of the typographic mechanism; each type-lever is provided with as many type as there are series of type-dies, and the type carried by the type-levers, as to the letters or characters they are adapted to imprint, correspond to the type of those type-dies that have the same relative position in the series of type-dies, that the type-lever

has in the series of type-levers, and as the type-die-carrier is moved in the one direction or the other to bring a certain type-die into position for operation by manipulating arm I, the type-lever of the type-writer mechanism that carries the type corresponding with the type-die thus brought into an operative position, is, by means of rack 44, (that as aforesaid is secured to sliding-block 46 that carries bars 54 with which the type-levers are operatively connected,) and intermediate gearing, and mechanism that operatively connects said rack with the type-die-carrier brought into an operative position; that is, bar 54 with which the type-lever in question is operatively connected, is brought into such position that when arm or member 65 of type-die-plunger, M, is caused to move forward with the type-die plunger as the latter is actuated by cam L' to cause the type-die to make an impression in the matrix-blank or matrix, as hereinbefore described, bolt 71, within member 65, will come under notch 73 of the respective type-lever-bar 54 and be shot by the action of the spring mounted on the shank of the bolt, and lock the respective type-lever-bar to type-die plunger M, whereupon, as the latter recedes, after having caused the respective type-die to make the desired impression in the matrix-blank or matrix, the respective type-lever-bar will be moved rearward with the plunger and actuate the respective type-lever to make the desired imprint on the paper in the type-writer carriage hereinafter described, springs, 79, at the rear of the respective type-lever bar, of course, being compressed, and just as the type-lever has performed its function lateral pins 74 of bolt 71 will have moved down inclines 70 of ears or members 68 of plunger-case N, and withdrawn bolt 71 from notch 74 in the type-lever-bar, permitting spring 79 aforesaid to return the type-lever-bar and type-lever to its normal position.

Having described the manner of operating the type-levers of the typewriter mechanism, I will now proceed with a description of the mechanism for effecting the movement of the paper-carriage of the typewriter, both, horizontally, to present a fresh place for the type to strike, and, vertically, for the purpose hereinafter made more apparent.

Referring, first, to the horizontal movement of the paper-carriage, that is effected by mechanism adapted to be operatively connected with the matrix-feeding-mechanism of the typograph mechanism, upon reference to Figs. 3, 9 and 26, of the drawings, it will be observed that lateral arm R³ of bar R is connected, by means of lateral pin 80, with an annular disk, or ring, 81, loosely mounted on the periphery of a wheel or disk, 82, that is rotatably mounted upon a pin or stud, 83, of bracket 84 rigid with the forward side of box O. Annular disk or ring 81, on its inner periphery, (see Fig. 9) has grooves or slots, 85, substantially the same as grooves or slots

r' of similar disks or rings in the matrix-feeding-mechanism hereinbefore described, having rollers, as at 86, and springs, as at 87, located within them excepting that the arrangement of the reduced end of slots or grooves 85, rollers 86, and springs 87, relative to each other, is necessarily such that the elevation of arm R³ of bar R of the matrix-feeding-mechanism aforesaid will move disk or ring 81 in the direction of the arrow and cause wheel or disk 82 to move in a corresponding direction. Wheel or disk 82 (see Figs. 3, 9 and 11) is provided with a dog, as at 88, that is adapted to engage a forwardly-projecting pin or lug 89, of a pulley 90 that is rotatably secured to a standard or post 91 rigid with the rear side of box O. Wheel 90, by means of dog 88 of wheel or disk 82 engaging pin or lug 89 of said wheel is thus caused to be rotated with the matrix-feeding-mechanism of the machine. Annular disk or ring 81, on either side, has secured thereto a circular plate, 92, that extends somewhat inside of the periphery of wheel or disk 82 and serves as a guard to prevent displacement of annular disks or rings 81, and rollers and springs, 86 and 87, respectively. It will also be observed that the axis of wheel 90 and wheel or disk 82 are not coincident, and that the path of pin 89 of wheel 90, and the path of dog 88 of wheel or disk 82, are eccentric to each other, and the arrangement of parts is such that once in a revolution of dog 88 and pin 89, said pin and dog will be disengaged for the purpose hereinafter made apparent.

The horizontal movement of the paper-carriage of the typewriter mechanism is effected by a cord or band 90^a (see Figs. 2, 3 and 9), said band being fastened at one end to the right hand end of a bar 93 of the paper-carriage and thence leading over and secured at the opposite end to wheel or pulley 90. Bar 93 extends lengthwise of the paper-carriage and beyond the latter at the left-hand end, said bar on its upper surface at the forward side of the bar reciprocating in contact with rollers 93^a, provided at suitable intervals along the horizontal travel of the paper-carriage, said rollers being supported, respectively, by a bracket 93^b rigid with the bed of the typewriter mechanism, said rollers checking any tendency of the forward side of bar 93 to tilt upward. To render the operation of bar 93 easy and comparatively noiseless, said bar, at the rear, reciprocates in contact with rollers 94 and 95 secured, respectively, to the forward end and under side of a forwardly-projecting plate or member 96 that is secured, as at 97, to the front of the bed of the typewriter mechanism (see Figs. 1, 2 and 9 and dotted lines Fig. 3). Bar 93 (see Figs. 1, 2, 3 and 9) has upwardly and rearwardly-extending arms, 99, of such shape as to be out of the way of rollers, 95, and extending loosely through ears or sleeves, 100, rigid or integral with the end or side-members of the paper-

carriage of the typewriter mechanism, said carriage being mounted upon shafts 101 and 102, that extend lengthwise of the machine, through the end or side-members of the carriage and have bearing, at either end, in a sliding-plate or block 103, secured to brackets 104, that are bolted, as at 104^b, to bed 47 of the typewriter mechanism, the paper carriage being adapted to move endwise of the machine with bar 93 aforesaid.

The end or side-pieces of the paper-carriage, at the rear, are connected by one or more pieces, 105, (see Figs. 2 and 9) and with the latter compose a suitable frame-work for the carriage. Upon shaft 101, within the side or end-members of the paper-carriage, is mounted the cylindrical platen 106, by the well known means of groove and feather, the groove extending the entire length of the horizontal travel of the carriage, and upon shaft 102, that is located at the rear of and above shaft 101, and also within the side or end-members of the paper-carriage, is loosely mounted a guide-roller, 107. Below and forward of cylindrical platen 106, the side or end-members of the paper-carriage afford bearing for the trunnions of a paper-carrying-roller, 108. Rollers, 107 and 108, and cylinder 106, are located in suitable proximity to each other, and the paper is fed from roller 108, between said roller and the cylindrical platen 106 under the latter, and up between the same and guide-roller 107, and over the cylindrical platen.

The paper-carriage, in printing, is fed from right to left, and bar 93 is connected with a spring or weight acting in the direction to return the paper-carriage to the place of beginning. For instance, as shown in Fig. 1, the bed of the typewriter mechanism, at the right hand end, is provided with an arm or bracket 110 that has attached a roller or pulley 111, and 112 represents a cord fastened to bar 93 and thence leading over said roller or pulley, and having attached at its other or opposite end a weight 113 that acts to return the paper-carriage as aforesaid. The arrangement of parts is such that as the paper-carriage reaches the limit of its leftward movement dog 88 of wheel 82 and pin 89 of feed-wheel 90 become disengaged from each other, allowing weight 113 to return the paper-carriage to its place of beginning as aforesaid.

For rotating the paper-carriage the distance of a line-space is provided as follows:—114 represents a ratchet-wheel (see Figs. 1, 9, and 26) operatively mounted on the right hand end of shaft 101, and plate or block 103, secured to bracket 104 at the right hand end of the machine, has a laterally and inwardly-projecting lug or member, 115, the free extremity whereof has pivoted thereto a bell-crank-lever 116, the latter, at its upper end, having pivotally attached a pawl, 117, that is adapted to engage the teeth of ratchet-wheel, 114. The right hand end or side member of the paper-carriage has a laterally-extending

arm, 118, provided with an incline, as at 119, that, as the paper-carriage is returned to its place of beginning as aforesaid, is adapted to engage and actuate bell-crank-lever 116 to actuate pawl, 117 in the direction to move ratchet-wheel 114, to rotate shaft 101 and cylindrical platen 106, as required, and feed the paper the distance of a line-space.

The location of cylinder 106, relative to type-levers 56, is of course such that the latter will strike the paper on the cylinder as required. Each type-lever, however, as hereinbefore indicated, is provided with as many type as there are series of type-dies G in the type-die-carrier, the type on the type-levers corresponding with the type of the dies that are located in the same vertical plane. It will, therefore, be manifest that some suitable mechanism should be provided for moving the paper-carriage of the typewriter mechanism relative to the type-levers to bring the required type at the end of the type-lever in position for imprinting, and I provide as follows:

120 represents a vertically-sliding-plate secured to the forward end of the bed of the typewriter-mechanism, for instance, as shown, plate 120 (shown detached in Fig. 27) extending lengthwise of the machine and secured in place preferably by means of screws or bolts, 121, to upwardly-extending-arms or standards 122 at opposite ends of the bed of the typewriter mechanism (see Figs. 1 and 3), plate 120 being vertically slotted, as at 123, for the passage of said securing-bolts or screws and to accommodate the up-and-down movement of the slide. The slide has a depending arm or member 127, that is operatively connected with shaft D preferably as shown in Figs. 2 and 4, wherein 128 represents an oscillating arm operatively mounted on said shaft and extending forwardly through a lateral perforation or slot, 129, in the lower portion of arm or member 127 of said slide. Arm or member 127 is also slotted, as at 130, to accommodate the location and operation of impressing-plunger M, lever U, and rod 1¹², and bed A is of course slotted for accommodating the location and operation of arm 127. It will thus be observed that slide 120 is moved up or down, according as the type-die-carrier of the typograph machine is elevated or lowered to bring a type-die of another series of type-dies into position for operation. Sliding plate 120, at either end thereof, is provided with a rack, 131. With racks 131 mesh, respectively, a toothed sector, 132, sectors 132 being pivoted, as at 133, to the adjacent bracket 104. Toothed sectors 132 (see Figs. 1, 2, 3 and 26) are pivotally connected with sliding-plates or blocks 103, by means of a link, 134, slides 103 operating in suitably inclined recesses, 135, in the respective arms or brackets 104, and being held in place (see Figs. 26 and 28) by means of cap-plates or bars, 136, that are secured, preferably, by means of screws to the respective brackets, sliding-plates or blocks

103 carrying the shafts that support the paper-carriage as hereinbefore indicated, and it will readily be observed that by means of the mechanism just described, the paper-carriage is moved in an inclined plane and brought in the proper position to enable the paper on the cylindrical platen, to receive the imprint of the proper type of the type-levers, that is, to receive the imprint of that type of the type-lever that corresponds to the type of the type-die that has been brought in position for operation. The paper-carriage of the typewriter mechanism having been elevated, as hereinbefore described with the elevation of the type-die-carrier of the typograph-mechanism, upon again lowering said type-die-carrier, the paper-carriage of the typewriter mechanism will likewise be lowered, but to assist the return movement of the paper-carriage, arms 99 of bar 93, at their rear or upper end are provided, respectively, with a pin or shoulder, 140 (see Fig. 9) between which and ear or sleeve 100 of the paper-carriage-frame, through which the respective arm or bar 93 passes, is mounted and confined upon said arm a spring, as at 141, that is adapted to act in the direction to return the paper-carriage to its lowermost position. 142 represents an inking-roller supported at the forward end of a forwardly-projecting arm or bracket, 143, (see Figs. 1, 2 and 3) rigidly secured, as at 144, (see dotted lines Fig. 3,) to the bed of the typewriter-mechanism, or rather to a cap-plate 127^a secured to the bed, as at 127^b, forward and over arm 27 of slide 120. The location of said inking-roller relative to the type-levers is such that the levers when moved from one side of the machine to the other, in the operation of the machine, will glide over the periphery of said inking-roller, thereby inking the type of the type-levers. A feature of no inconsiderable importance consists in the provision of suitable means, whereby lateral motion of the free ends of the type-levers, in their operation, (that would result in an inaccurate justification of the type-written work) is avoided. Preferable means for this purpose is shown in Figs. 1 and 3, wherein 145 represents a forwardly-projecting arm rigid with the bed of the typewriter mechanism. Arm 145, at its forward end, is provided with an open-ended Y-shaped slot 146, that is, the forward or upper end of slot 146 is open and the upper portion of the side-walls of said slot flare outwardly, that is, diverge to facilitate the entrance of the type-lever, the lower portion of said slot being reduced in size to just accommodate said lever and being located in the same vertical plane with the point at which the imprint is made. Arm or fork 145 thus constitutes a guide that prevents any lateral movement or deflection of the free ends of the type-levers in performing their functions; hence there is no liability of an inaccurate justification in the work of the type-levers, and the horizontal movement of the paper-carriage of the typewriter mechanism being

effected by means operatively connected with the matrix-blank or matrix-feeding mechanism of the typograph mechanism, it follows that the same accuracy is had in the justification of the type-written work as in the work on the matrix by the dies of the typographic mechanism.

What I claim is--

1. In a typograph-machine, the combination with the type-die impressing-plunger, a vertically reciprocating frame provided with a horizontal track extending lengthwise of said frame and a type-die-carrier mounted upon said track and provided with two or more series of reciprocating type-dies arranged substantially as indicated, of suitable means whereby said vertically reciprocating frame and horizontal reciprocating type-die-carrier are actuated to bring the selected die in either or any of the series of type-dies in proper position relative to the type-die impressing-plunger, substantially as set forth.

2. In a typograph-machine, the combination with the type-die impressing-plunger, a vertically-reciprocating frame provided with a horizontal track extending lengthwise of said frame and a wheeled type-die-carrier mounted upon said track and provided with two or more series of reciprocating type-dies arranged substantially as indicated, of suitable means whereby said vertically reciprocating frame, and horizontally-reciprocating type-die-carrier are actuated to bring the selected die in either or any of the series of type-dies in the proper position relative to the type-die impressing-plunger, substantially as set forth.

3. In a typograph-machine, the combination with the type-die impressing-plunger, a vertically reciprocating frame, a type-die-carrier adapted to reciprocate endwise of said frame and provided with two or more series of reciprocating type-dies arranged substantially as shown, said vertically-reciprocating frame comprising, at each end, a U-shaped member, as at C, flanged inwardly, as at C', and plates or bars, as at C², secured to said inwardly-projecting flanges, rigidly connecting said U-shaped members with each other and constituting a track, the type-die-carrier having upwardly-extending arms d², provided at their upper ends, respectively, with a wheel mounted on the adjacent rail or way of the track aforesaid, of suitable means whereby said vertically-reciprocating frame and said horizontally-reciprocating type-die-carrier may be actuated to bring the selected die in either or any of the series of type-dies in proper position relative to the impressing-plunger, substantially as set forth.

4. The combination with the bed of the typograph-machine, a vertically-reciprocating frame, slideways, as at a', for said frame, the latter being provided with a track extending lengthwise thereof, a horizontally-reciprocating type-die-carrier mounted on said track, two or more series of type-dies having suit-

able bearing in said type-die-carrier and arranged substantially as indicated, and suitable mechanism for actuating the type-dies to impress the matrix-blank or matrix, of a shaft extending in the direction of the length of said vertically-reciprocating-frame, suitable means operatively connecting said frame with the shaft aforesaid, and suitable means for oscillating said shaft, the arrangement of parts being such that by oscillating said shaft in the one direction or the other the aforesaid frame and type-die-carrier supported thereby are elevated or lowered to bring the desired series of type-dies at the proper elevation relative to the aforesaid type-die plunging or actuating mechanism, substantially as set forth.

5. The combination with the bed of a typograph-machine, a vertically-reciprocating-frame, slide-ways for said frame, the latter being provided with a track extending lengthwise of the frame and a type-die-carrier mounted upon and adapted to reciprocate endwise of said track, two or more series of type-dies having suitable bearing in said type-die-carrier and arranged substantially as indicated, and suitable mechanism for actuating the type-dies to impress the matrix-blank or matrix, of a shaft extending lengthwise of said vertically-reciprocating frame, rock-arms operatively mounted on the shaft and operatively connected with said frame, a lever operatively mounted on said shaft for oscillating the same, the arrangement of parts being such that by manipulating said lever in the one direction or the other the aforesaid frame and type-die-carrier supported thereby are elevated or lowered to bring the desired series of type-dies at the proper elevation relative to the aforesaid type-die plunging or actuating mechanism, substantially as set forth.

6. In a typograph-machine, the combination with the type-die impressing-plunger, a vertically-reciprocating frame, a type-die-carrier mounted upon and adapted to reciprocate endwise of said frame, said type-die-carrier having two or more series of type-dies arranged substantially as indicated, of a shaft extending in the direction of the length of said supporting-frame, suitable means for operatively connecting said frame with the shaft, and a hand-lever operatively mounted on the shaft, of a stationary segment provided with as many notches or recesses as there are series of type-dies and with the notches or recesses arranged in a plane concentric with the axis of the aforesaid shaft, a latch pivoted to the aforesaid hand-lever and adapted to engage either or any one of said notches or recesses, the arrangement of parts being substantially as and for the purpose set forth.

7. In a typograph-machine, the combination, with the mechanism for actuating the type-dies to cause the latter to impress the matrix-blank or matrix, of a vertically-recip-

rocating type-die-carrier, two or more series of type-dies having suitable bearing in said carrier, and arranged substantially as indicated, a horizontally-reciprocating slide, suitable means rigidly connected with said slide to engage or adapted to engage and cause the type-die-carrier to reciprocate therewith, and suitable means whereby said vertically-reciprocating type-die-carrier and horizontally-reciprocating type-die-carrier slide may be actuated to bring any type-die in either or any of the series of type-dies in proper position relative to the aforesaid type-die actuating means, substantially as set forth.

8. In a typograph-machine, the combination with a horizontally-reciprocating slide provided at or near each end with an upwardly-extending member, a vertically-reciprocating type-die-carrier confined between said upwardly-extending members of the slide, two or more series of type-dies having bearing in said type-die-carrier and arranged substantially as indicated, of a type-die impressing-plunger and suitable means whereby said vertically-reciprocating type-die-carrier and horizontally-reciprocating slide may be actuated to bring any type-die in either or any of the series of type-dies in proper position relative to the type-die impressing-plunger, substantially as set forth.

9. In a typograph-machine, the combination with suitable means for actuating the type-dies to cause the latter to impress the matrix-blank or matrix, of a horizontally-reciprocating slide provided at or near each end with an upwardly-extending member, a vertically-reciprocating type-die-carrier supported between said upwardly-extending members, two or more series of type-dies having bearing in said type-die-carrier and arranged substantially as indicated, suitable means whereby said vertically-reciprocating type-die-carrier and horizontally-reciprocating slide may be actuated to bring any type-die in either or any of the series of type-dies in proper position relative to the aforesaid type-die-actuating means, and a spring interposed between the one end of the type-die-carrier and the adjacent upwardly-extending member of the type-die-carrier slide, the arrangement of parts being substantially as and for the purpose set forth.

10. In a typograph-machine, the combination with suitable means for actuating the type-dies to cause the latter to impress the matrix-blank or matrix, of a horizontally-reciprocating slide provided at or near each end with an upwardly-extending member, a vertically-reciprocating type-die-carrier supported between said upwardly-extending members, two or more series of type-dies having bearing in said type-die-carrier and arranged substantially as indicated, suitable means whereby said vertically-reciprocating type-die-carrier and horizontally-reciprocating slide may be actuated to bring any type-die in either or any of the series of type-dies in

proper position relative to the aforesaid type-die-actuating means, and means, substantially as indicated, for preventing upward displacement of the aforesaid slide, substantially as set forth.

11. In a typograph-machine, the combination with suitable means for actuating the type-dies to cause the latter to impress the matrix-blank or matrix, of a horizontally-reciprocating slide provided at or near each end with an upwardly-extending member, a vertically-reciprocating type-die-carrier confined between said upwardly-extending members, two or more series of type-dies having bearing in said type die-carrier and arranged substantially as indicated, suitable means whereby said vertically-reciprocating type-die-carrier and horizontally-reciprocating slide may be actuated to bring any type-die in either or any of the series of type-dies in proper position relative to the aforesaid type-die-actuating means, and means, substantially as indicated, for holding the slide aforesaid, strictly in line, both horizontally and vertically, substantially as set forth.

12. The combination with the bed of the typograph-machine, and type-die-impressing plunger, the bed being offset downwardly, as at *a*, of a horizontally-reciprocating slide operating endwise of said downwardly offset portion of the bed, means, substantially as indicated, for guiding said slide, the latter at or near each end of the same having an upwardly-extending member, a type-die-carrier confined between said upwardly-extending members of the slide, two or more series of type-dies having bearing in the type-die-carrier and arranged the one series above another, means substantially as indicated for propelling the slide, and suitable means for elevating and lowering the type-die-carrier and holding it at the desired elevation relative to the type-die-impressing-plunger, the arrangement of parts being substantially as shown and described.

13. In a typograph-machine, the combination with the type-dies and matrix-feeding mechanism adapted to be actuated by the dies, said matrix-feeding mechanism comprising a pair of feed-rollers adapted to feed the matrix-blank or matrix past the point at which it is impressed, of a single spring bearing upon the top of both of said feed-rollers, substantially as and for the purpose set forth.

14. In a typograph-machine, the combination with a pair of guides arranged at opposite sides, respectively, and extending lengthwise of the path of the matrix-blank or matrix, of one or more springs located in a recess in one of said guides and adapted to act against the matrix-blank or matrix in the direction of the impression, substantially as and for the purpose set forth.

15. In a typograph-machine, the combination with a pair of guides arranged at opposite sides, respectively, and extending lengthwise of the path of the matrix-blank or ma-

trix, of a spring, at each side of the point at which the matrix-blank or matrix receives its impression, acting against the matrix-blank or matrix in the direction of the impression, substantially as and for the purpose set forth.

16. The combination with a type-die, of a plunger for actuating the type-die to cause the die to impress the matrix-blank or matrix, and suitable means for reciprocating said plunger, of a rearwardly and upwardly-extending incline on the plunger, a lever, as at *U*, said lever being adapted to be actuated by the aforesaid incline, and suitable means connected with the lever for exerting a pressure downward upon the matrix-blank or matrix, the arrangement of parts being such that said lever will be operated to actuate said pressure-exerting means preparatory to the impression of the matrix-blank or matrix by the type-die and to cause said pressure-exerting means to remain in action during the impression, substantially as and for the purpose set forth.

17. In a typograph-machine the combination with a rotating-shaft, type-die-carrier, a series of type-dies having bearing in said carrier, type-die impressing-plunger, a cam-wheel loosely mounted on said shaft and adapted to actuate said plunger, a wheel operatively mounted on the shaft, and suitable clutch-mechanism for operatively connecting said wheels, of a stationary index provided with a series of holes representing, respectively, a die in the aforesaid series of type-dies, an index-key operatively connected with the type-die-carrier in such a manner that the selected type-die, by manipulating or actuating said index-key as required, is brought into the proper position relative to the impressing-plunger, a movable plate at the rear of the index adapted to be actuated by the index-key upon the engagement by said key of any of the aforesaid holes in the index-plate, a rod rigidly connected with said movable plate and adapted to actuate the clutch-mechanism to establish operative connection between the aforesaid wheels, and suitable means for automatically operatively disconnecting said wheels, the arrangement of parts being substantially as described and for the purpose specified.

18. In a typograph-machine, the combination with the type-die-impressing-plunger, of a rotating shaft, a cam-wheel loosely mounted on said shaft and adapted to actuate said plunger, a grooved wheel operatively mounted on said shaft within said cam-wheel, suitable clutch-mechanism adapted to establish frictional contact between said wheels, suitable means for applying said clutch-mechanism and stationary means for actuating said clutch-mechanism to operatively disconnect the wheels aforesaid, substantially as and for the purpose set forth.

19. In a typograph-machine, the combination with the type-die impressing-plunger, of a rotating shaft, a cam-wheel loosely mounted

on said shaft and adapted to actuate said plunger a grooved wheel operatively mounted on said shaft within said cam-wheel, suitable clutch-mechanism adapted to establish frictional contact between said wheels, suitable means for applying said clutch-mechanism, a spring acting in the direction to retain said clutch-mechanism in its operative position and suitable means for automatically operatively disconnecting the aforesaid wheels, substantially as and for the purpose set forth.

20. In a typograph-machine, the combination with a type-die-impressing-plunger, a rotating-shaft, a cam-wheel loosely mounted on said shaft adapted to actuate said plunger, said cam-wheel having a hole, as at L^3 , a grooved wheel operatively mounted on said shaft within said cam-wheel, a friction-shoe, as at L^4 , located between the side-walls of said groove and having a pin or member, L^5 , extending outwardly through hole L^3 in the cam-wheel and terminating at its outer end in a comparatively large head, suitable means for engaging said head to cause the friction-shoe to establish frictional contact between the aforesaid wheels preparatory to the actuation of the impressing-plunger, and suitable means for automatically actuating said clutch-mechanism to operatively disconnect the wheels aforesaid, substantially as set forth.

21. In a typograph-machine, the combination with a type-die impressing-plunger, a rotating-shaft, a cam-wheel loosely mounted on said shaft adapted to actuate said plunger, said cam-wheel having a hole, as at L^3 , a grooved wheel operatively mounted on said shaft within said cam-wheel, a friction-shoe, as at L^4 , located between the side-walls of said groove and having a pin or member, L^5 , extending outwardly through hole L^3 in the cam-wheel and terminating at its outer end in a comparatively large head, suitable means for engaging said head to cause the friction-shoe to establish frictional contact between the aforesaid wheels preparatory to the actuation of the impressing-plunger, and a stationary fork for automatically engaging and actuating said clutch-mechanism to operatively disconnect the wheels aforesaid and adapted to permit the passage of said clutch-mechanism upon the performance of its function, substantially as set forth.

22. In a typograph-machine, the combination with a rotating-shaft, type-die-carrier, type-dies having bearing in said carrier, type-die-impressing-plunger, a cam-wheel loosely mounted on said shaft and adapted to actuate said plunger, a wheel operatively mounted on the shaft, and suitable clutch-mechanism for operatively connecting said wheels, of a stationary index provided with a series of holes representing, respectively, one or more of the aforesaid type-dies, an index-key operatively connected with the type-die-carrier in such a manner that the selected type-die, by manipulating or actuating said index-key as required, is brought into the proper position

relative to the impressing-plunger, a movable plate at the rear of the index adapted to be actuated by the index-key upon the engagement by said key, of any of the holes in the index-plate, a rod operatively connected with said movable plate and adapted to actuate the clutch-mechanism to establish operative connection between the aforesaid wheels, suitable means for automatically operatively disconnecting said wheels, and suitable means for returning the aforesaid plate to its normal position upon the disengagement of the index by the index-key, substantially as set forth.

23. In a typograph-machine, the combination with a rotating-shaft, type-die-carrier, type-dies having bearing in said carrier, type-die-impressing-plunger, a cam-wheel loosely mounted on said shaft and provided with a peripheral cam for actuating said plunger, a wheel operatively mounted on said shaft and suitable clutch-mechanism for operatively connecting said wheels, of a stationary index provided with a series of holes representing, respectively, one or more of the aforesaid type-dies, an index-key operatively connected with the type-die-carrier in such a manner that the selected type-die by manipulating or actuating said index-key as required is brought into the proper position relative to the impressing-plunger, a tilting-plate at the rear of the index adapted to be actuated by the index-key upon the engagement by said key of any of the holes in the index-plate, a rod or suitable member operatively connected with said index-plate and adapted to actuate the clutch-mechanism to establish operative connection between the aforesaid wheels, suitable means for operatively disconnecting said wheels and suitable means for returning the aforesaid tilting-plate to its normal position upon the disengagement of the index by the index-key, substantially as set forth.

24. In a typograph-machine, the combination with a rotating shaft, type-die-carrier, type-dies having bearing in said carrier, type-die-impressing-plunger, a cam-wheel loosely mounted on said shaft, and provided with a peripheral cam for actuating said plunger, a wheel operatively mounted on said shaft, and suitable clutch-mechanism for operatively connecting said wheels, of a stationary index provided with a series of holes representing, respectively, one or more of the aforesaid type-dies, an index-key operatively connected with the type-die-carrier in such a manner that the selected type-die by manipulating or actuating said index-key, as required, is brought into the proper position relative to the impressing-plunger, a movable plate at the rear of the index adapted to be actuated by the index-key upon the engagement by said key of any of the holes in the index, a rod or suitable member operatively connected with said movable plate and adapted to actuate the clutch-mechanism to establish operative connection between the aforesaid

wheels, and a peripheral cam on the aforesaid cam-wheel adapted to engage and actuate the aforesaid rod to return the aforesaid movable plate to its normal position upon the disengagement of the index by the index-key, substantially as set forth.

25. In a typograph-machine, the combination with a rotating shaft, type-die-carrier, type-dies having bearing in said carrier, type-die-impressing-plunger, a cam-wheel loosely mounted on said shaft and provided with a peripheral cam for actuating said plunger, a wheel operatively mounted on said shaft, suitable clutch-mechanism for operatively connecting said wheels, of a stationary index provided with a series of holes representing, respectively, one or more of the aforesaid type-dies, an index-key operatively connected with the type-die-carrier in such a manner that the selected type-die by manipulating or actuating said index-key, as required, is brought into the proper position relative to the impressing-plunger, a movable plate at the rear of the index adapted to be actuated by the index-key upon the engagement by said key of any of the holes in the index, a rod or suitable member operatively connected with said movable plate and adapted to actuate the clutch-mechanism to establish operative connection between the aforesaid wheels, and one or more springs acting in the direction to retain said movable plate in its normal position, substantially as set forth.

26. In a typograph-machine and attachments, the combination with a horizontally-reciprocating type-die-carrier, of type-writer-mechanism comprising a series of type-levers operatively connected with said type-die-carrier, the arrangement of parts being such that the corresponding type-die and type-lever will simultaneously be brought into position for operation, substantially as set forth.

27. The combination with a typograph-machine comprising a horizontally-reciprocating type-die-carrier, a shaft, as at H, and suitable means for operatively connecting the type-die-carrier with said shaft, a stationary index having a series of lateral holes or perforations concentric with the axis of said shaft, an arm, as at I, bearing an index-key, operatively mounted on the forward end of said shaft, of type-writer mechanism comprising a series of type-levers operatively connected with said shaft, the arrangement of parts being such that upon the engagement by the index-key of any of the lateral holes or perforations in the index to bring the selected type-die and type-lever of the typographic and type-writer mechanism, respectively, will simultaneously be brought into position for operation, substantially as set forth.

28. The combination with a typograph-machine comprising a horizontally-reciprocating type-die-carrier, a shaft, as at H, and suitable means for operatively connecting the type-die-carrier with said shaft, a stationary index having a series of lateral holes or perfora-

tions concentric with the axis of said shaft, an arm, as at I, bearing an index-key, operatively mounted on the forward end of said shaft, of a shaft, as at f^4 , intergeared with the aforesaid shaft H, substantially as indicated, and a series of type-levers of type-writer mechanism operatively connected with said shaft f^4 , the arrangement of parts being such that the corresponding type-die and type-lever will simultaneously be brought into position for operation, substantially as set forth.

29. The combination with a typograph-machine comprising a horizontally reciprocating type-die-carrier movable in a vertical plane, and an oscillating-shaft, of type-writer mechanism comprising a paper-carriage, and suitable means operatively connecting said paper-carriage with said oscillating shaft in such a manner that the paper-carriage will be elevated or lowered according as said shaft is oscillated to elevate or lower the type-die-carrier, substantially as and for the purpose set forth.

30. The combination with a typograph-machine comprising a type-die-carrier, a shaft, as at D, rock-arms mounted on said shaft and operatively connected with the type-die-carrier and suitable means for oscillating said shaft, of typewriter mechanism comprising a paper-carriage and suitable means operatively connecting said paper-carriage with said shaft in such a manner that the paper-carriage will be elevated or lowered according as the aforesaid shaft is oscillated to elevate or lower the type-die-carrier, substantially as set forth.

31. The combination with a typograph-machine comprising a reciprocating type-die-carrier, an oscillating-shaft, suitable means operatively connecting the type-die-carrier with said shaft, and suitable means for oscillating said shaft, of typewriter mechanism comprising a paper-carriage, one or more vertically-reciprocating-racks operatively connected with the aforesaid shaft, and operatively connected with the paper-carriage, the arrangement of parts being such that the type-die-carrier and paper-carriage will be simultaneously elevated or lowered according as the aforesaid shaft is oscillated in the one direction or the other, substantially as set forth.

32. The combination with a typograph-machine comprising a type-die-carrier, a horizontal shaft, as at D, rock-arms operatively connecting the type-die-carrier with said shaft, of a vertically-reciprocating slide operatively connected with said oscillating shaft, racks rigid or integral with said slide, typewriter-paper-carriage, and toothed sectors operatively connected with said carriage and meshing with the aforesaid racks, the arrangement of parts being substantially as shown and for the purpose specified.

33. The combination with an oscillating-shaft, as at D, and a type-die-carrier and typewriter paper-carriage operatively connected

with said shaft in such a manner that the oscillation of said shaft in the one direction or the other will simultaneously elevate or lower said type-die-carrier and paper-carriage, and suitable means for operating said shaft, of suitable means for locking the type-die-carrier and paper-carriage at the desired elevation, substantially as set forth.

34. The combination with the matrix-feeding-mechanism of a typograph-machine, of typewriter mechanism comprising a paper-carriage, a pulley, as at 90, a cord or band operatively connecting said pulley with the paper-carriage and adapted to propel the latter in the one direction, and suitable means for communicating motion from the matrix-feeding mechanism to said pulley, substantially as set forth.

35. The combination with the matrix-feeding-mechanism of a typograph-machine, of typewriter mechanism comprising a paper-carriage, suitable mechanism operatively connecting the paper-carriage with the matrix-feeding-mechanism and adapted to advance the paper-carriage as required, said connecting mechanism comprising a bar, 93, a pulley, 90, a cord or band 93^a operatively connecting said bar and pulley, of suitable means for communicating motion from the matrix-feeding-mechanism to said pulley, and suitable means for preventing the lifting or upward displacement of said bar, substantially as set forth.

36. The combination with the type-die-actuating-mechanism of a typograph-machine

and type-levers of typewriter-mechanism, of suitable means operatively connected with the type-die-actuating mechanism and adapted to actuate the aforesaid type-levers, and suitable means for preventing lateral movement or deflection of the type-levers in their operation of rendering the imprint, substantially as and for the purpose set forth.

37. The combination with the type-die-actuating-mechanism of a typograph-machine and type-levers of typewriter-mechanism, of suitable means operatively connected with the type-die-actuating mechanism and adapted to actuate the aforesaid type-levers, and a forked guide, substantially as indicated, for receiving the type-levers and preventing lateral movement or deflection of the levers in the performance of their function, substantially as and for the purpose set forth.

38. The combination with the type-die-actuating-mechanism of a typograph-machine and type-levers of typewriter-mechanism, of suitable means operatively connected with the type-die-actuating mechanism and adapted to actuate the aforesaid type-levers, and an inking-roller for said type-levers, said inking-roller being located substantially as shown, for the purpose specified.

In testimony whereof I sign this specification, in the presence of two witnesses, this 6th day of August, 1892.

EMIL WERNER.

Witnesses:

C. H. DORER,
WARD HOOVER.