

No. 620,959.

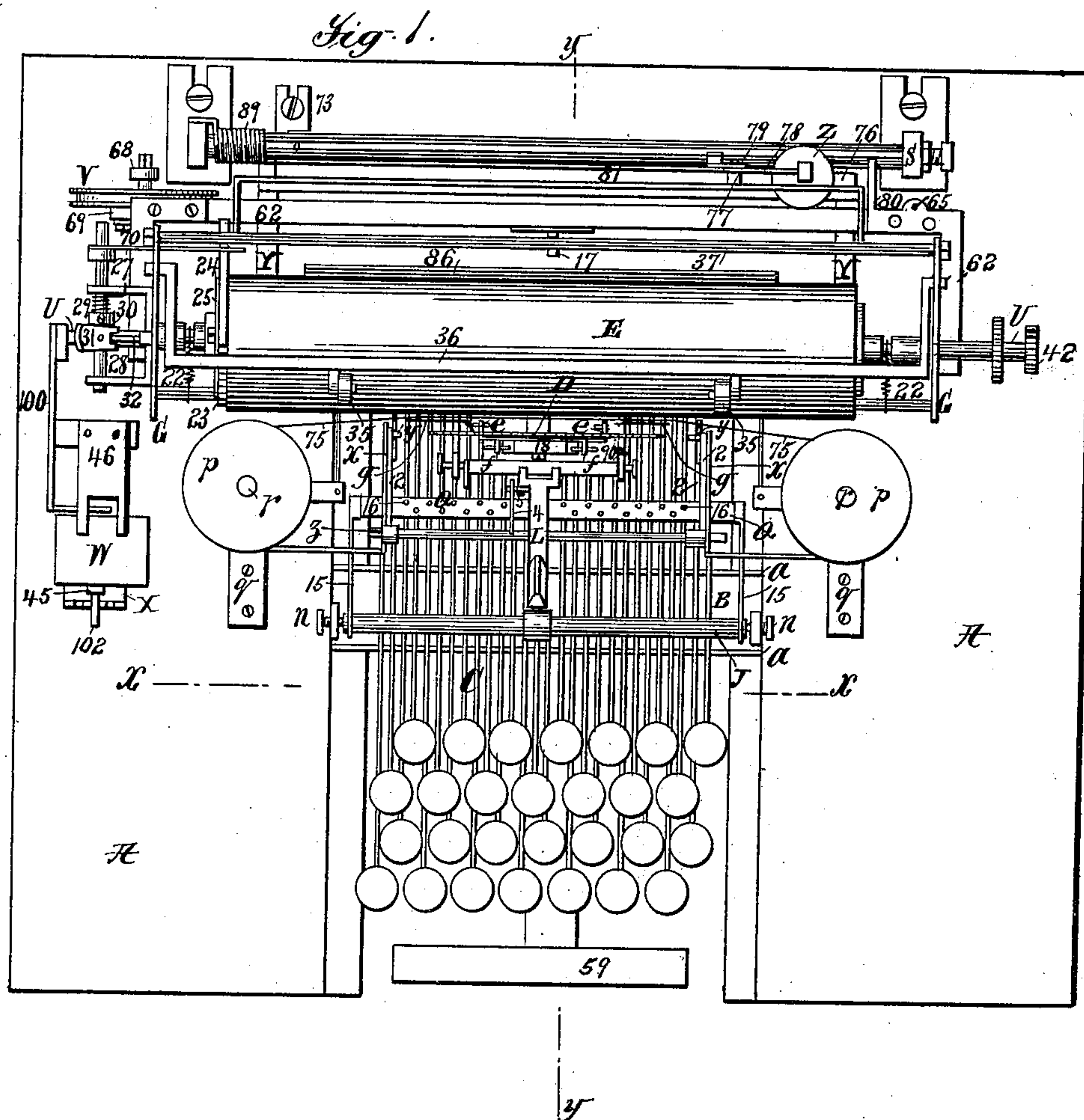
Patented Mar. 14, 1899.

J. PRATT.
TYPE WRITING MACHINE.

(Application filed Mar. 1, 1895.)

(No Model.)

8 Sheets—Sheet 1.



Witnesses:
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A. J. P. Buitrago.

Inventor:
John Pratt

No. 620,959.

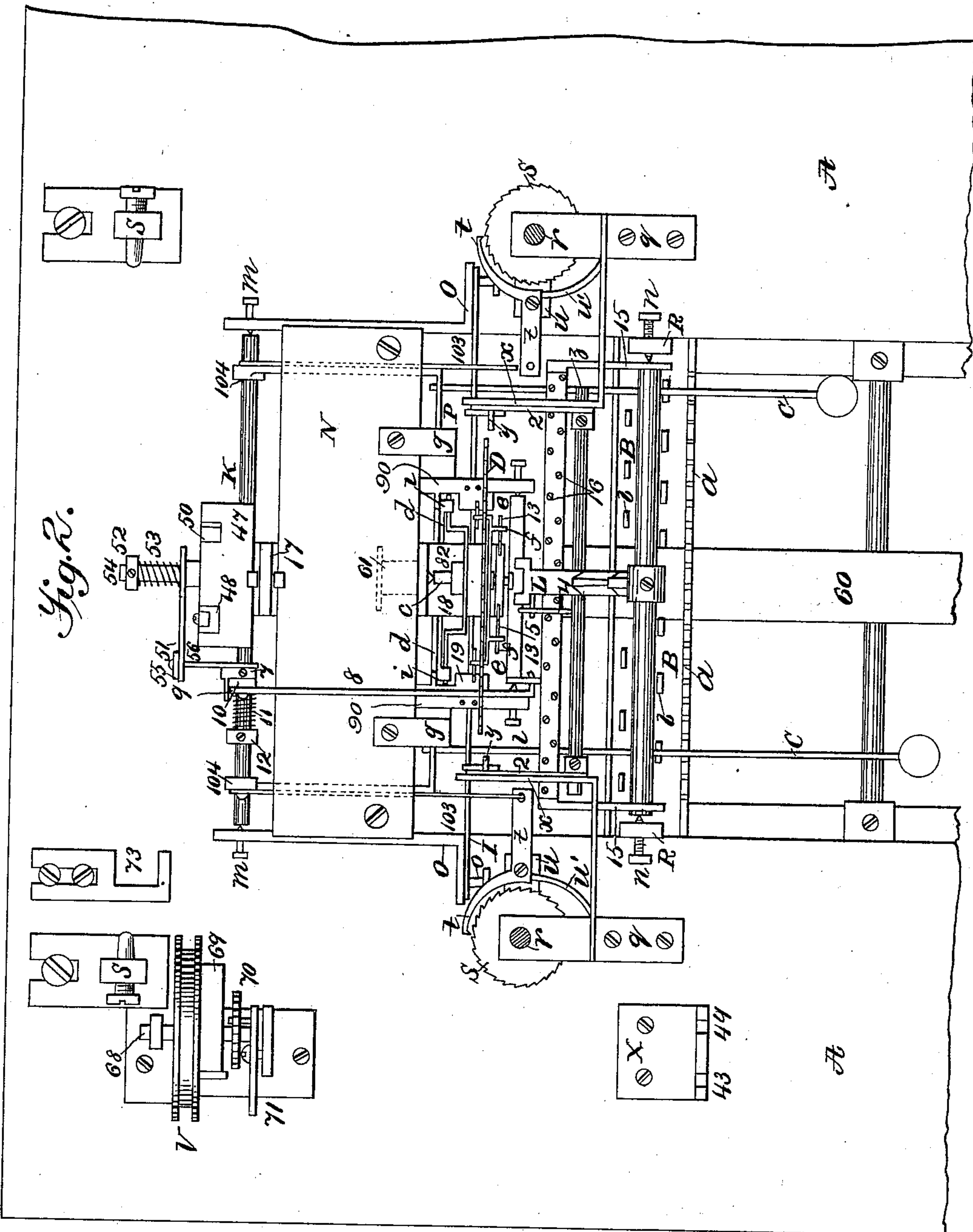
Patented Mar. 14, 1899.

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6 Sheets—Sheet 2.



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6 Sheets—Sheet 3.

Fig. 3.

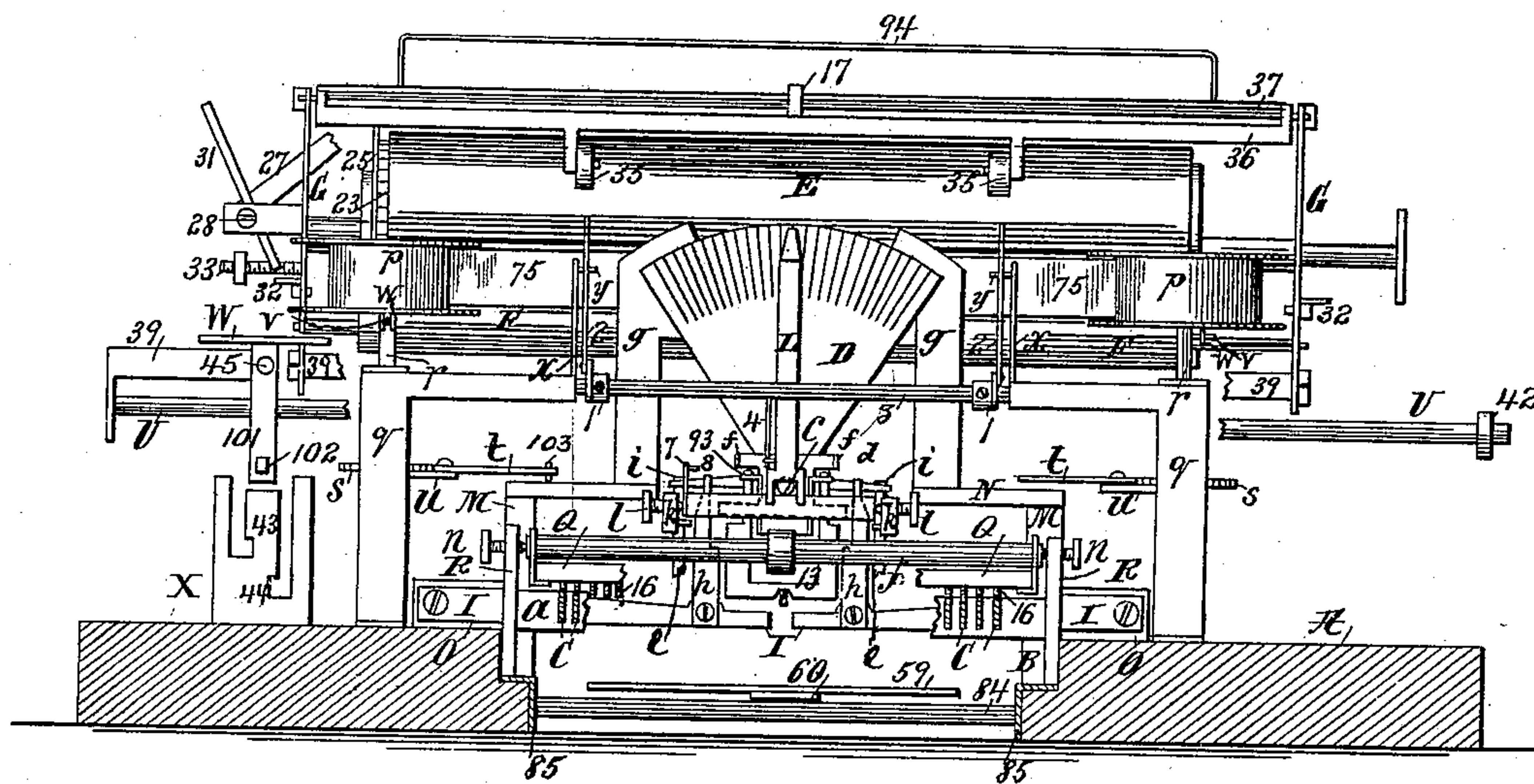
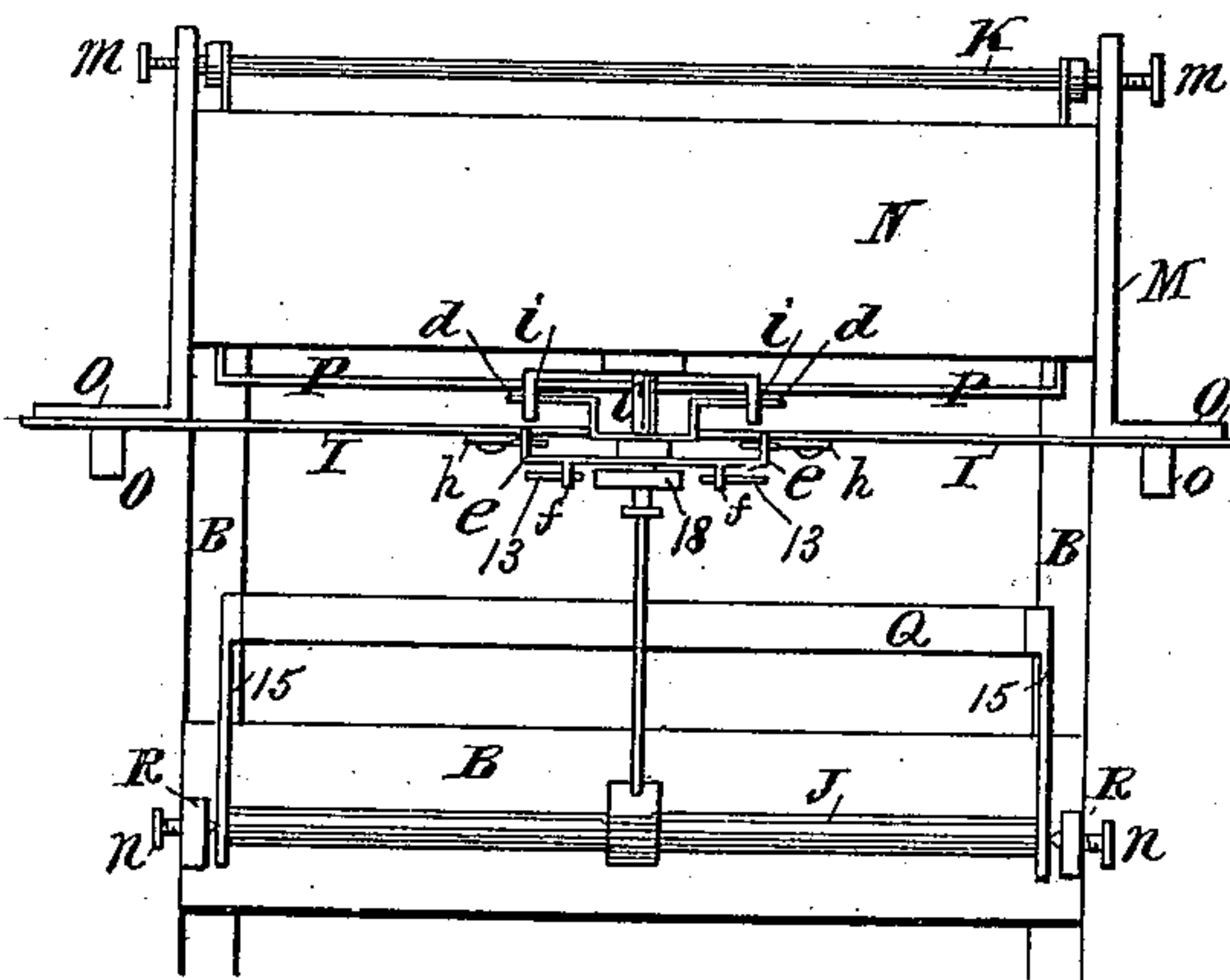


Fig. 6.



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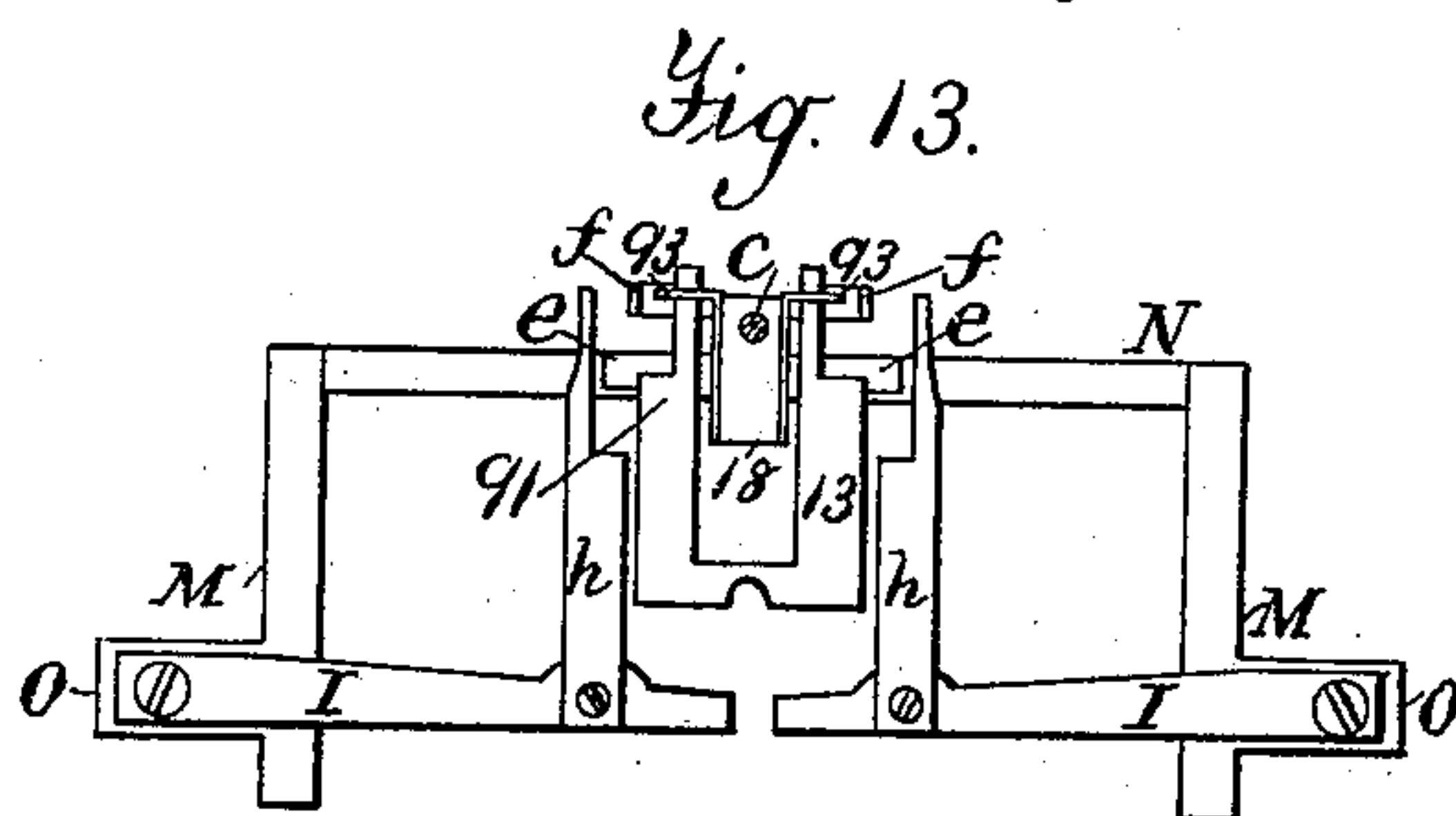
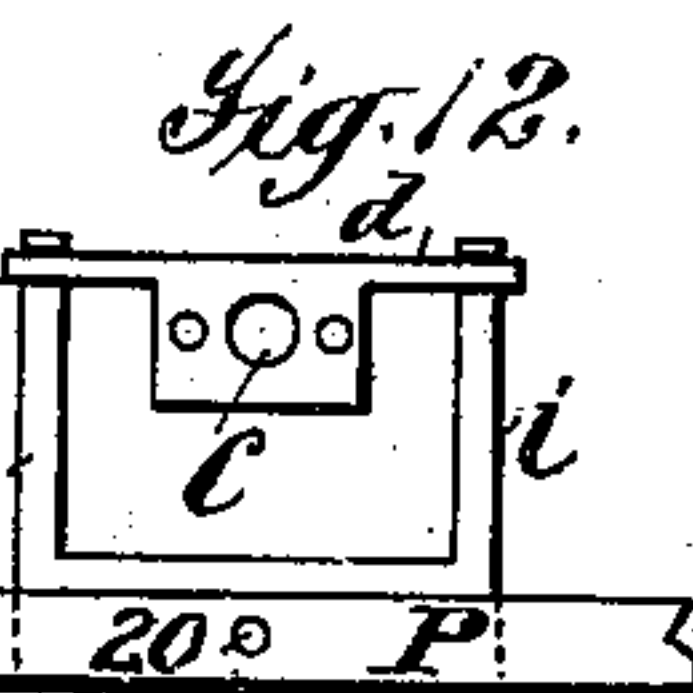
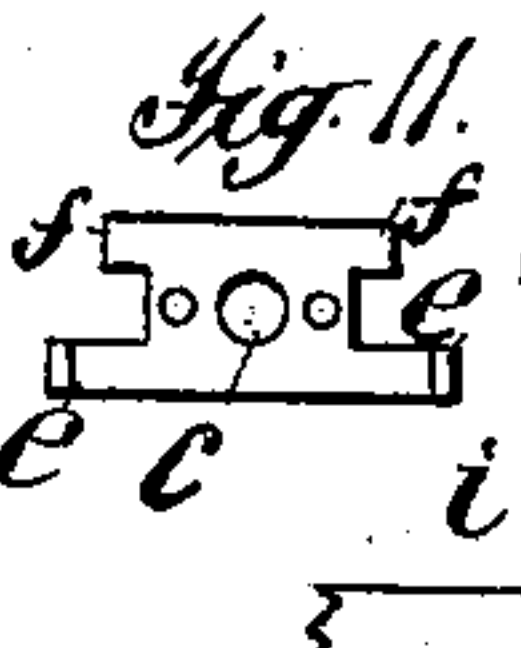
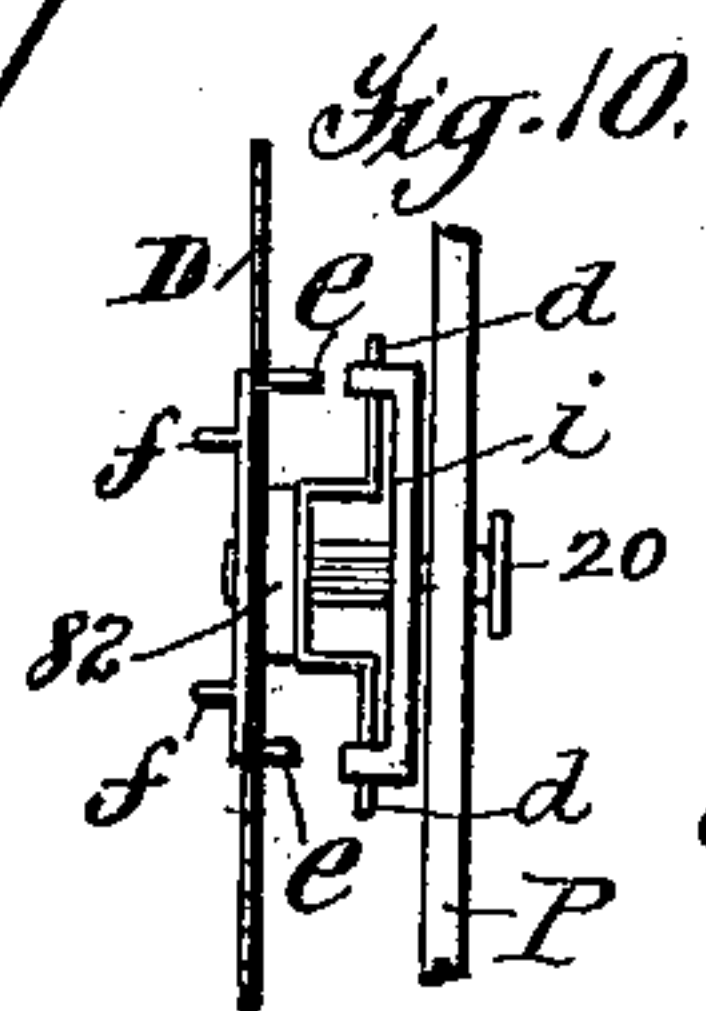
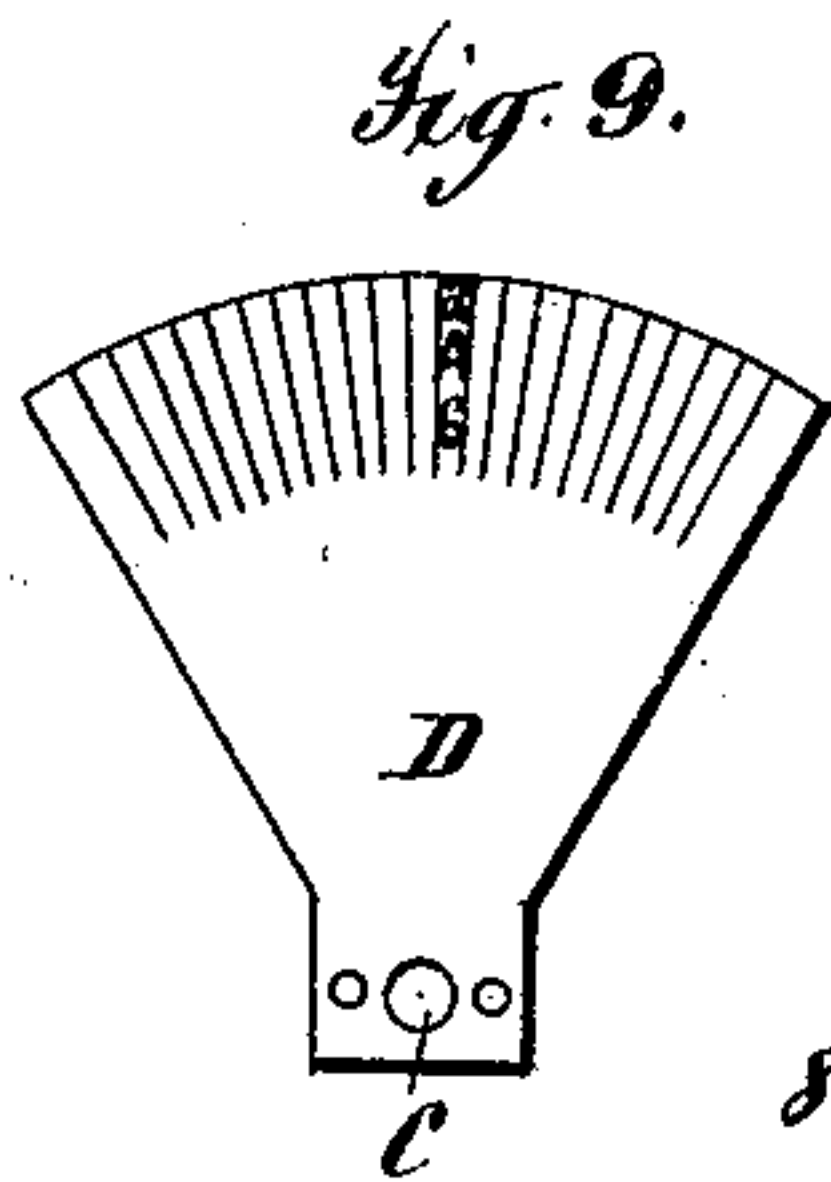
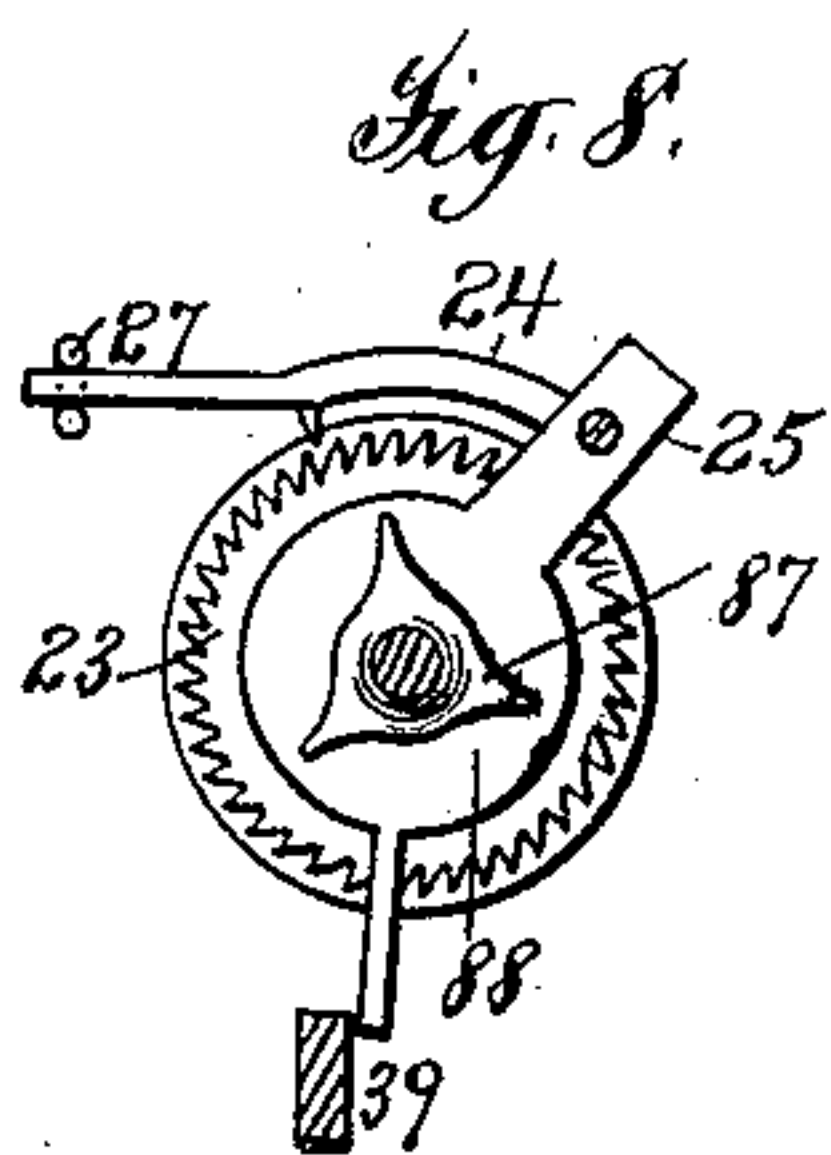
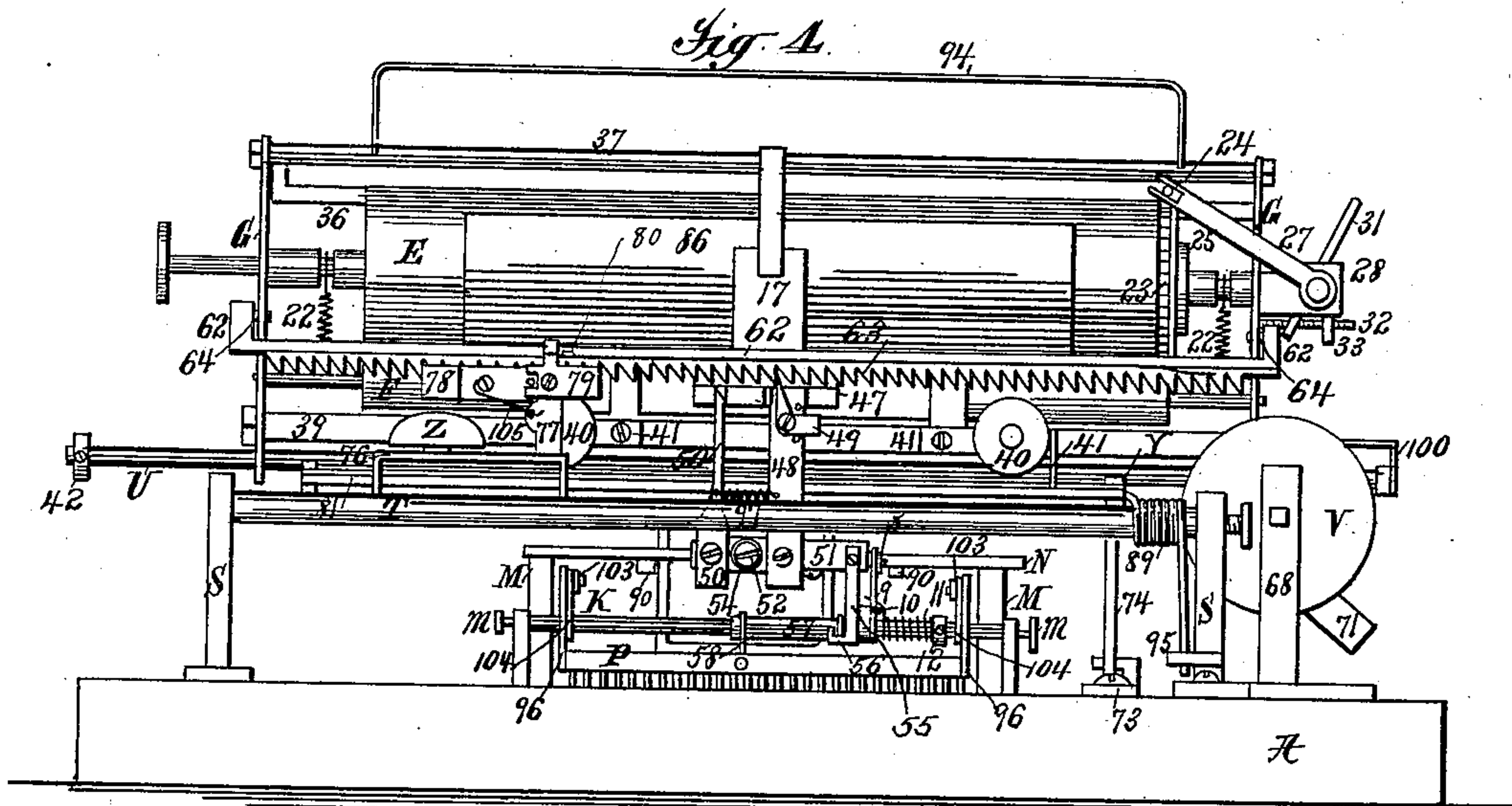
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(No Model.)

6 Sheets—Sheet 4.



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No. 620,959.

Patented Mar. 14, 1899.

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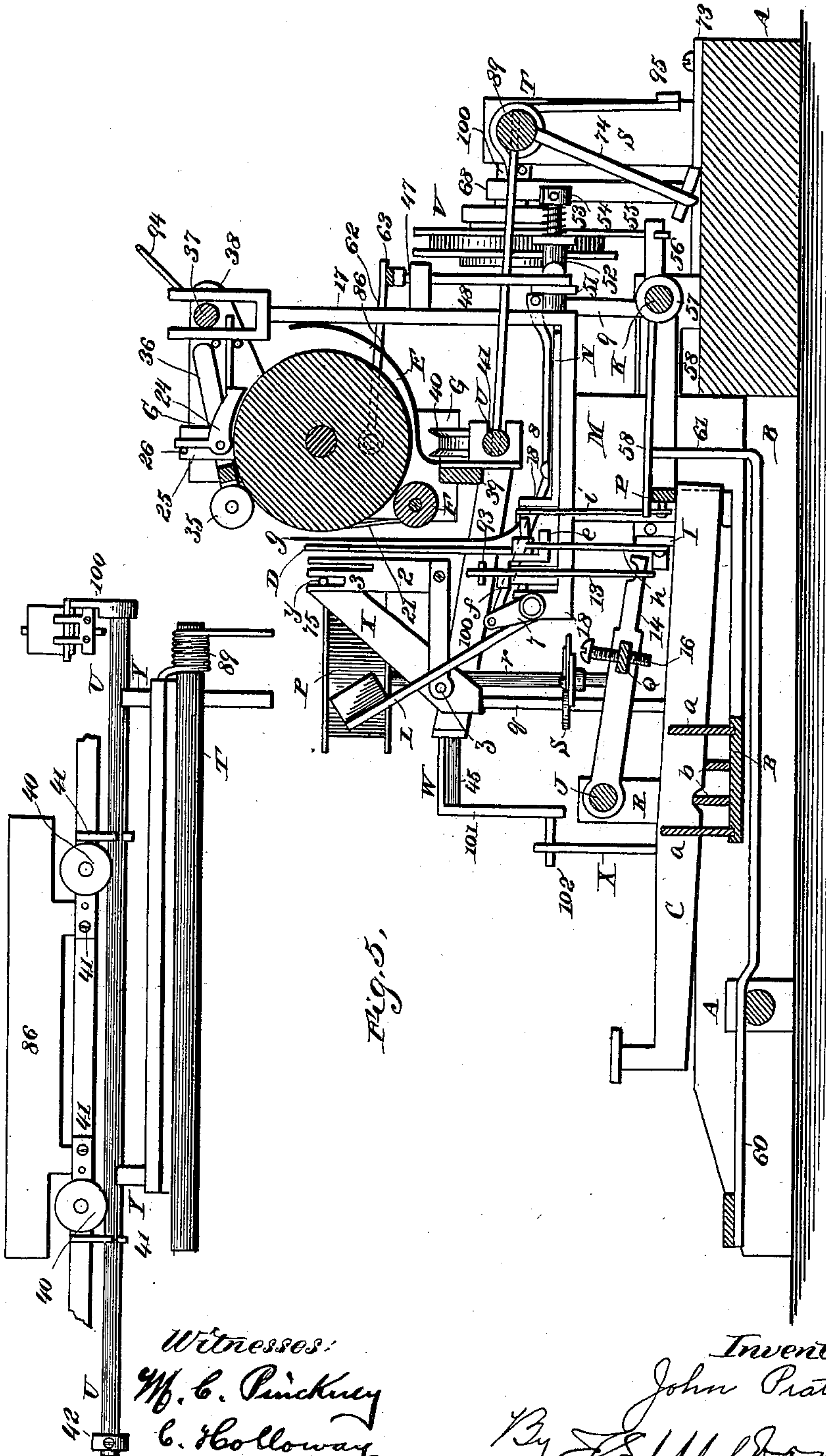


Fig. 7.

Fig. 5.

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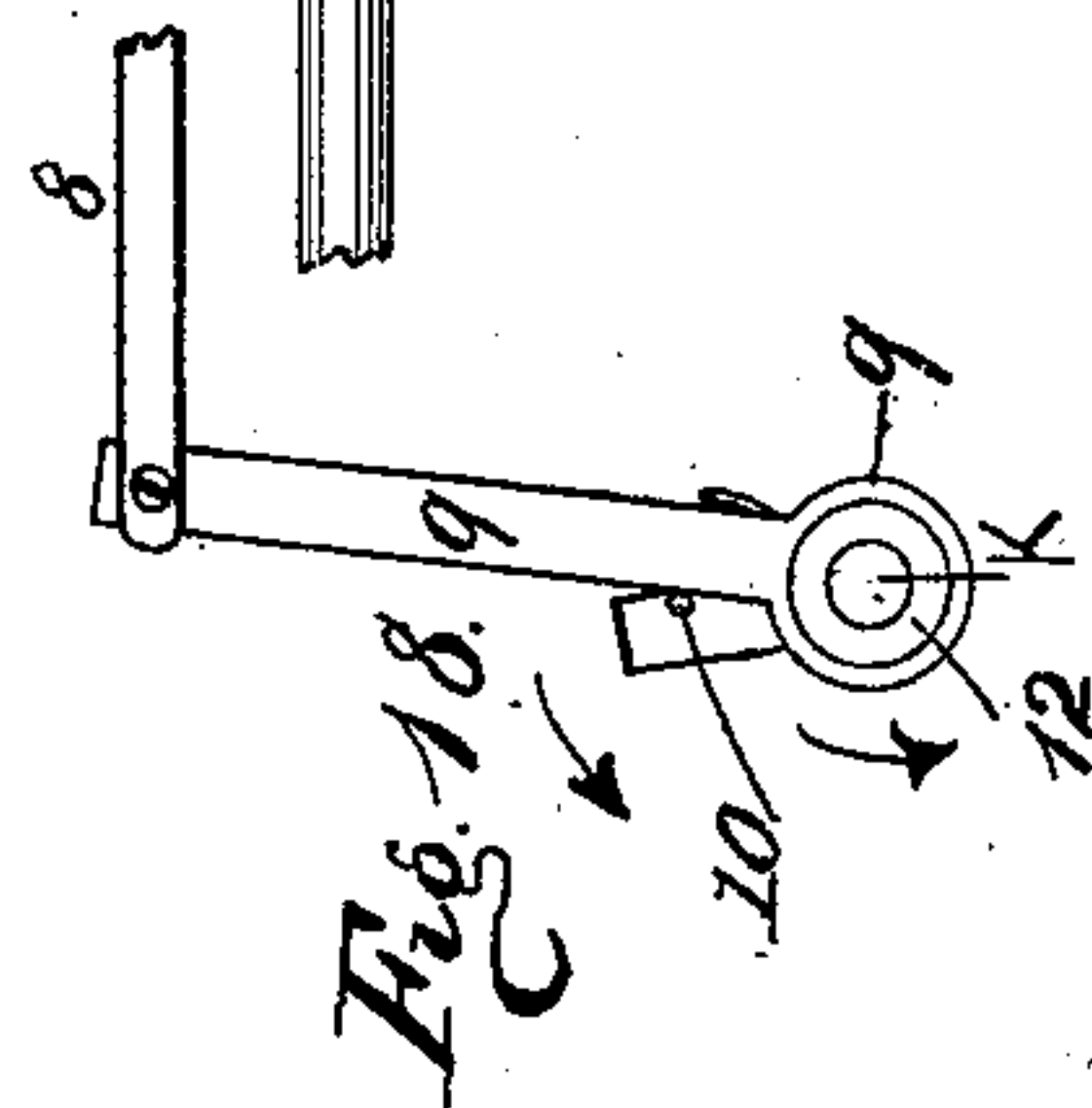
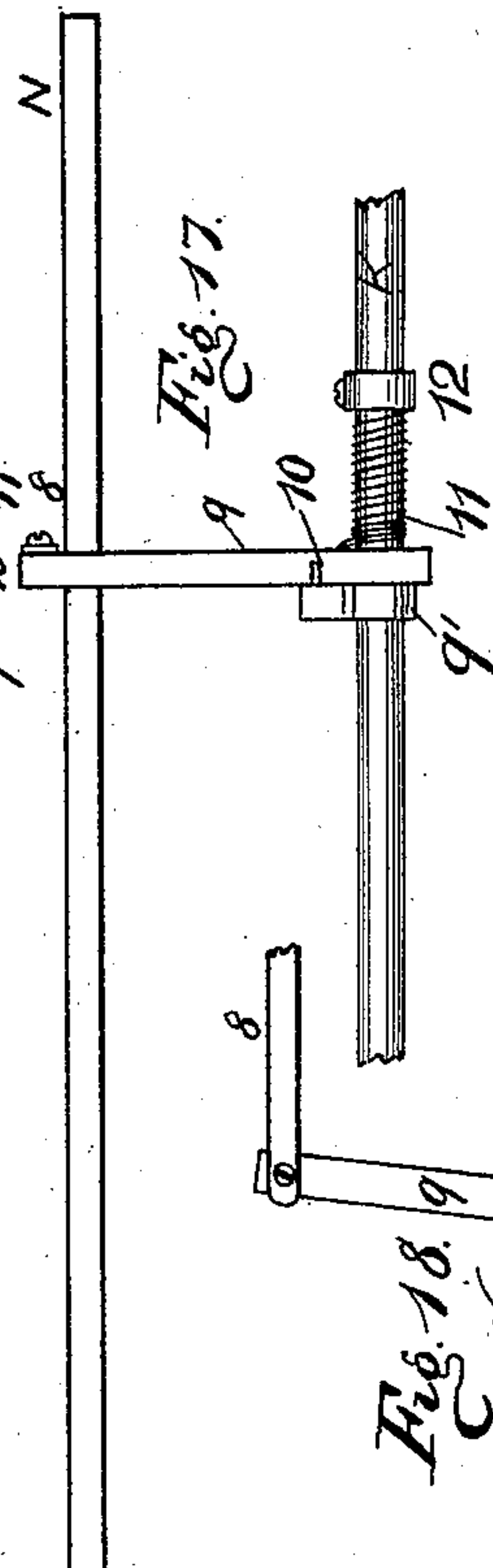
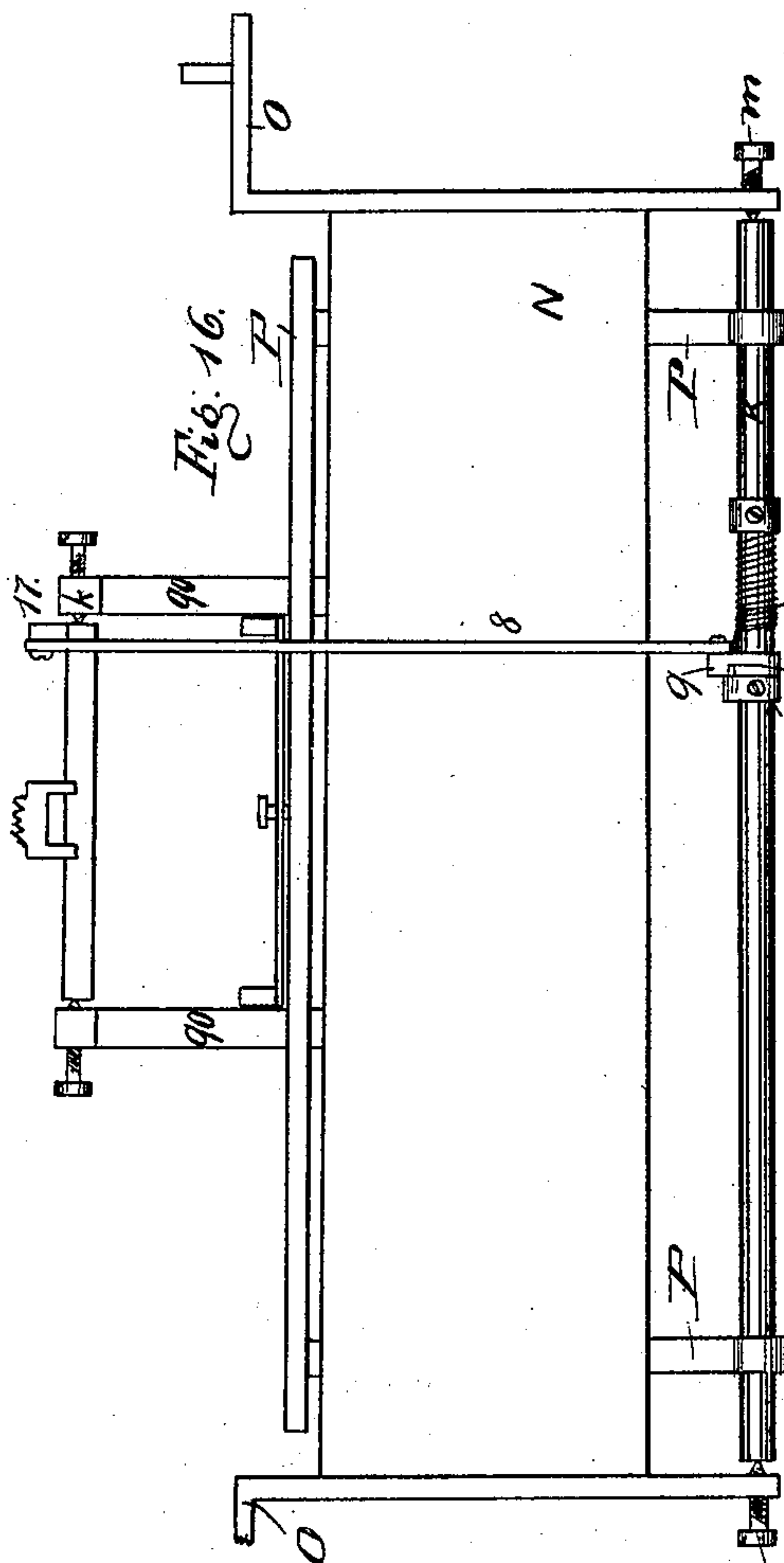
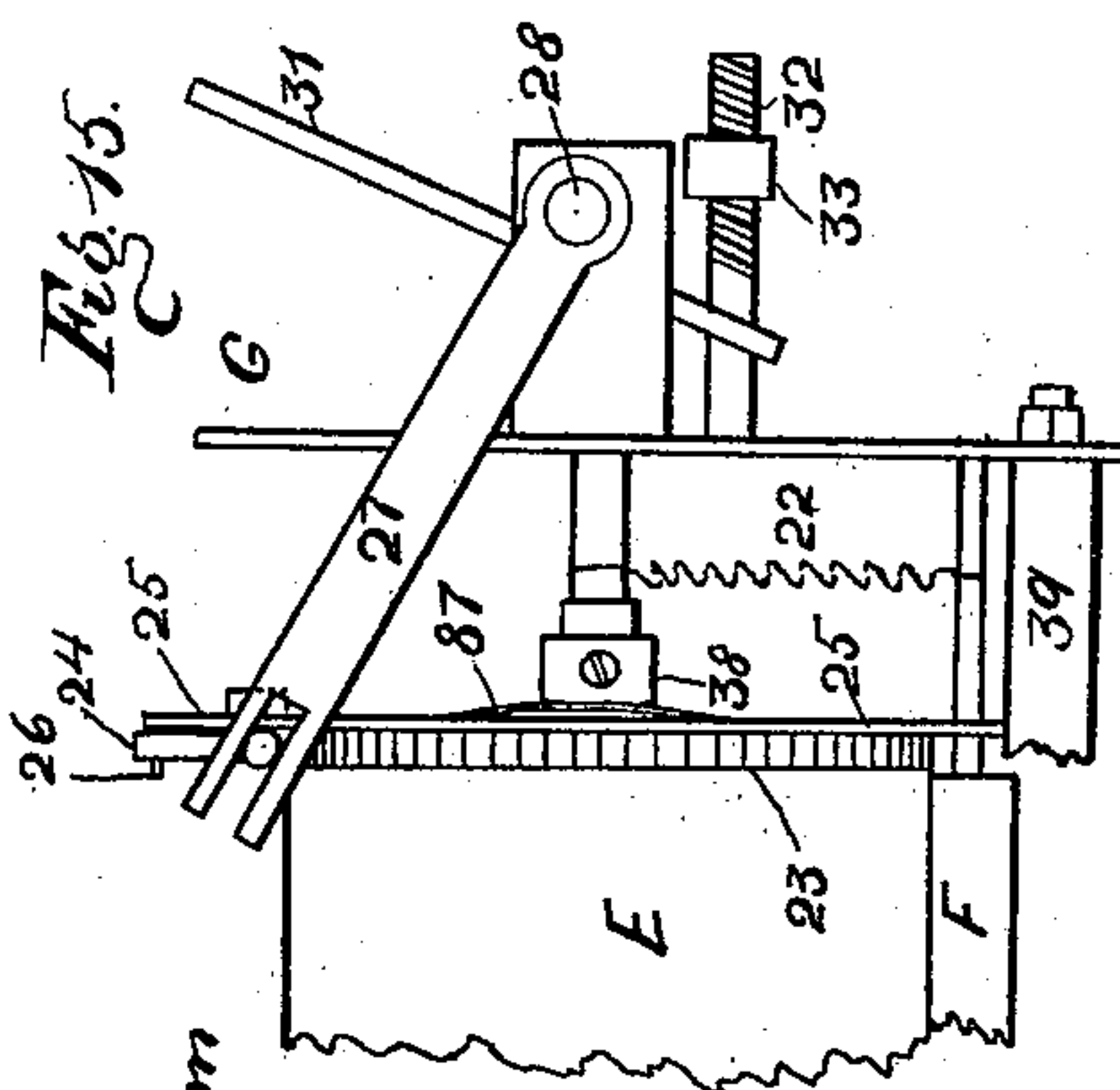
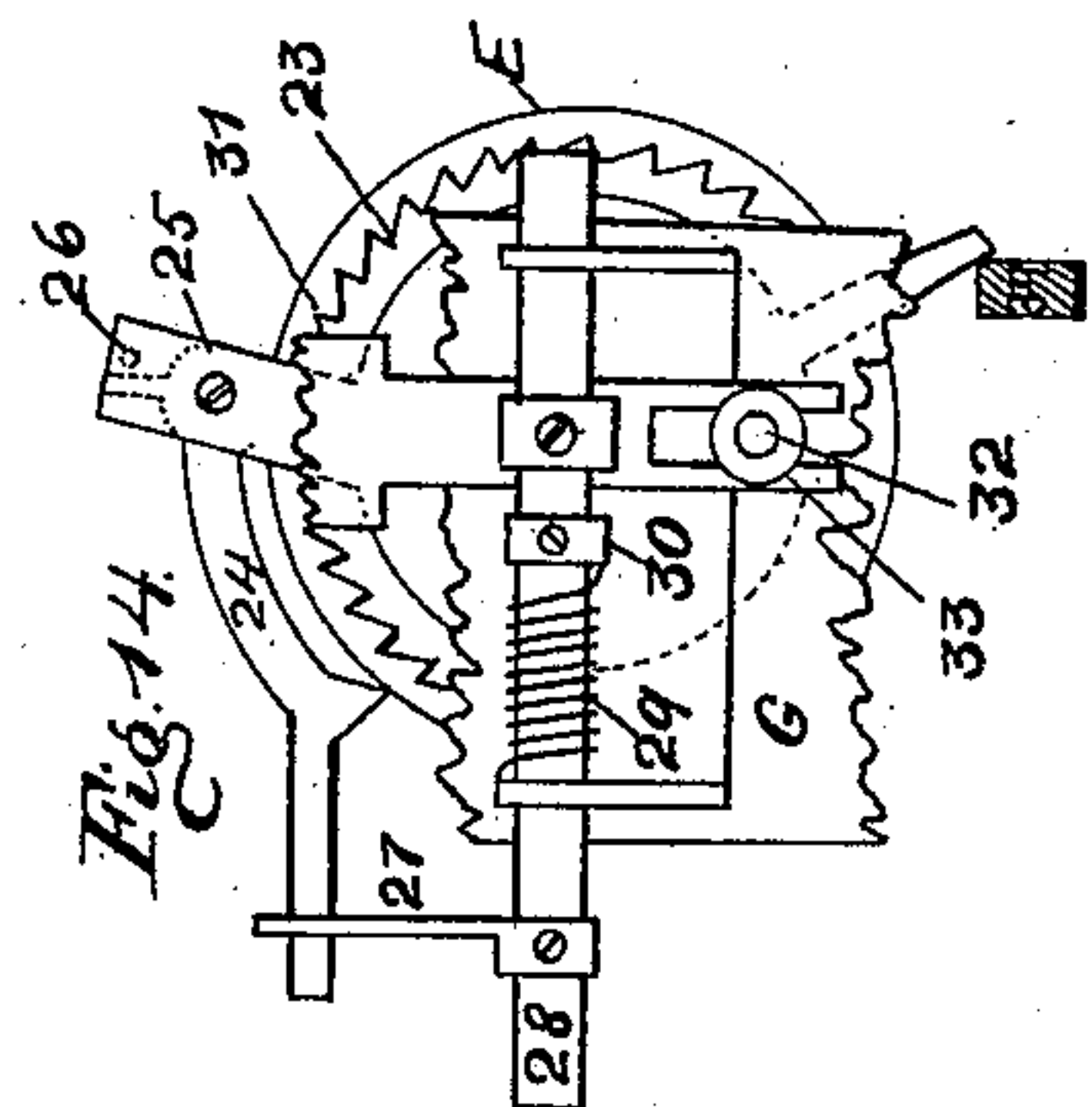
Patented Mar. 14, 1899.

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TYPE WRITING MACHINE.

(Application filed Mar. 1, 1895.)

(No Model.)

8 Sheets—Sheet 6.



WITNESSES.

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UNITED STATES PATENT OFFICE.

JOHN PRATT, OF NEW YORK, N. Y., ASSIGNOR TO THE HAMMOND TYPE-WRITER COMPANY, OF SAME PLACE.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 620,959, dated March 14, 1899.

Application filed March 1, 1895. Serial No. 540,168. (No model.)

To all whom it may concern:

Be it known that I, JOHN PRATT, a citizen of the United States, residing at New York, (Brooklyn,) in the county of Kings and State of New York, have invented a new and useful Type-Writing Machine, of which the following is a specification.

My invention relates to improvements in type-writing machines of the class in which all the types are moved simultaneously, and more especially is in the line of my United States and English patents of 1868 and 1867, respectively.

The objects of my improvement are speed, accuracy, uniform touch for all keys, manifold copies, and simplicity, durability, and cheapness of construction. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan of the entire machine; Fig. 2, a plan, enlarged one-half over the scale of the other general view figures, of the machine with the paper-carriage and carriage-shifter frame removed; Fig. 3, a vertical section, enlarged one-half over the scale of the other general view figures, of the entire machine along the line $x x'$, parts cut away for clearer view of other mechanism; Fig. 4, a rear elevation of same; Fig. 5, a vertical longitudinal section along the line $y y'$; Fig. 6, a plan of base-frame and parts of type-plate mechanism, and Fig. 7 parts of carriage-frame and carriage-way frame. Fig. 8 is a detached view of the page-feed mechanism. Fig. 9 is a rear view of the type-plate. Fig. 10 is a detail view of the type-plate, its shaft, stop-arms, and driver and reversing arms. Fig. 11 shows an elevation of the stop-arms plate. Fig. 12 shows the connection of the reversing-arms and part of a transverse lever. Fig. 13 is a view of driver-levers and stop-arms. Fig. 14 is an end elevation of page-feeding mechanism. Fig. 15 is a rear elevation of the same. Fig. 16 is a plan of the hammer-action. Fig. 17 is a rear elevation of the same. Fig. 18 is a side elevation of the same from the left side of the machine. The detail views, Figs. 14 to 18, are to the scale of an actual machine.

Similar letters and numerals refer to similar parts throughout the several views.

A is a wooden case, to which is secured the metal base-frame B, to which is fixed all the mechanism except the ribbon-spool standards and ratchets and bracket X and standard S. Plate N is secured to standards M.

The types are arranged in radial rows on the perimeter face of a type-plate D of very thin and flexible sheet metal, preferably steel or brass, and may be either stamped thereon or formed of electrotypes soldered or otherwise secured thereto. The plate is slit into radial slats about three-fourths of an inch long, corresponding to the number of sets of type of preferably three each, the type arranged, preferably, with the lower-case at the extreme end of said slats, the capitals in the middle, and the numerals and other signs next.

The separation of the type triplets is intended to secure the clear impression of the separate types free from partial markings of adjacent types, and the plate is made of extremely thin metal in order that each slat when struck by the hammer may be driven forward beyond the vertical plane of the type-plate. In order that the work may be seen, the type-plate is set at about one-eighth of an inch from its platen.

The type-plate (see detached views) is secured to the hub 82 of type-shaft c between said hub and the driver and stop arms plate $e f$, said arms being horizontal when in initial position. Said type-plate is moved reciprocally from right to left and from left to right in a vertical plane, oscillating in centers in projections 18 of horizontal arm of standard 17, secured to under face of plate N.

Levers I, of thin metal for lightness, are hinged to bar O, secured to standards M, and extend transversely across the key-levers C, nearly meeting at the middle of keyboard. The nearer a given key-lever is to the fulcrum of said driver-levers the greater their movement, and it is their relative positions that determine its degree for any type. These levers have pivoted to them thrust-plates h , (see Fig. 13,) resting in guide-slots in plates 19, secured to bars 90, screwed to under face of plate N. These thrust-plates are flanged or notched to form a shoulder about midway their length, and when a key-lever is struck

the flanges impinge against driver-arms *e* and the type-plate is driven to right or left as the left or right driver-lever is operated. They are also beveled, so that their guide-slots push them into engagement with driver-arms as they move upward. Initially they must be out of the field of movement, so as not to obstruct reciprocally. The distance of the flanges from the driver-arms causes considerable waste motion of the driver-levers and is intended to allow the parts to be brought into position for another impulse when the key-levers are only partially returned to the initial position, thus tending to speed in working.

The above construction of the operating mechanism of the type-plate differs specifically from similar mechanism in my application, Serial No. 670,946, filed February 19, 1898, in that the reversing-arms *d* are mounted to turn on the shaft or pivot *c* of the type-plate, while in the construction of said other application the arms for a similar purpose are secured to the pivot of an arm distinct from the type-plate, though having a working connection with said plate.

The reversing-lug *i* consists of a thin three-sided rectangular frame loosely pivoted to frame-lever *K P* at 20 (see Figs. 10 and 12) and having the upper ends of its fingers bent over the ends of the reversing-arms *d*, secured to the hub 82 of type-plate shaft. The vertical position of frame *i* is secured between arms *d* and plate 19, the loose pivoted connection 20 permitting of such vertical movement, although the bar *P*, supporting said frame, rises and falls in the arc of a circle. When the frame-lever *K P*, hereinafter described, is raised by a key-lever, the type-plate is free from any resistance and rotates in one direction, as do also the arms *d*; but when the said lever is returned to initial position the lug-frame by its bent ends draws back the arms *d* to their normal positions, reversing the movement of the type-plate and bringing it also back to its original position. In initial position the bent fingers press equally on each of the arms *d* and return type-plate quickly to initial position, allowing but little after vibration. The peculiarity of this reversing mechanism is that the type-plate is not resisted in its angular movement by a special reversing-spring, and therefore the key touch as regards this movement is substantially the same for any distance through which the type may be moved.

The mechanism for stopping the type-plate at the point of impression consists of a stop-frame lever *J Q*, consisting of shaft *J*, side arms 15, wooden bar *Q*, having regulator-screws 16 therein, middle arm 14, and of stop-frame 13, resting in a notch of 14, fitting in a corresponding notch of 13. Said stop-lever is centered in standards *R* by center screws *n*. Frame 13 is flanged at 91, and one or other of the two flanges is brought against one or other of the stop-arms *f* in its upward move-

ment, meeting the downward movement of the corresponding stop-arm. The degree of the movement in any given case is determined by the particular regulator-screw governing its motion upward. The arms of the frame rest in guide-slots in brackets 93, secured to projections 18. The regulator-screws are set severally over a corresponding key-lever, which actuates said frame-lever *J Q* through said screws. The nearer a screw in initial position is to its key-lever the sooner the lever *J Q* moves and therefore the farther it moves and the sooner it stops the type-plate.

The paper-carriage consists of two end plates *G*, framed together by bar 39, guide-rod 37, carrying-bail 94, and large roller *E*, pressed against small roller *F* by spiral springs 22 and axled in said plates. Other parts thereof are paper-guide scroll 86, secured to bar 39 by brackets 41, antifriction-rollers 40, axled on said bar 39, presser-roller frame 36, carrying-rollers 35, and a guide-plate 21, consisting of a strip of thin sheet metal stretched between end plates just above small roller. Other parts will be described in showing interlinear mechanism. The paper is introduced between large roller and scroll 86, which guides the upper margin to the lips of the rollers. Large roller is then rotated, and the paper moves in contact with guide 21, and then presser-roller frame is lifted and dropped upon it to hold it smoothly against the large roller.

The carriage-way frame (see Fig. 7) consists of a swing-shaft *T* and a rail *U*, riveted together by arms *Y*. The rollers 40 travel on rail *U*, being secured thereto by brackets 41, which are perforated, so as to slide on said rail. These perforations are open, as shown, to allow the arms *Y* to pass through. Shaft *T* is pivoted to standards *S*, and the frame is held in initial position by spiral spring 89, pressing a pin 74 against stop-bracket 73. A set-screw collar 42 stops the carriage at any desired point by coming in contact with one of brackets 41.

The carriage is supported vertically by a vertical slot in standard 17, wherein rod 37 moves laterally for line-feed and vertically, as will hereinafter be described, for another purpose.

The line-feed mechanism consists of the ratchet-bar or rack 63, secured to swing-frame 62, hinged at 64, having a perforated projection 65 for fastening pulley-cord, pulley-wheel *V*, journaled in standards 68 and operated by spring 69, wound by ratchet 70 and detent 71. The swing-frame is hinged to paper-carriage, so as to allow the feed to be operated at any vertical position of the carriage. The feed is accomplished by means of escapement mechanism geared with ratchet-bar. This consists of the frame-lever *K P*, operated by all the key-levers severally, arm 56, secured to a sleeve 57, mounted on shaft *K* and geared with a hanger 55, pivoted to arm 51, mounted

on shaft 52, stepped in standard 17. The sleeve has also an arm 58, resting on part P of lever K P.

Sleeve 57 fits shaft K loosely and may be operated independently, but since arm 58 rests on P is also actuated by said lever K P. Secured to standard 17 is a bracket 47, having two notches, in which reciprocate detents 50 and 48, pivoted to arm 51 on opposite side of shaft 52, whereon said arm oscillates. Initially detent 48 is geared with the ratchet through nib 49, its slot in bracket 47 allowing lateral play corresponding to the distance of one escapement movement. Spring 97, connecting the two detents, causes detent 48 to resume initial position after retraction from ratchet-bar. Detent 48 has a nib 49 pivoted thereto, which allows the ratchet free reverse movement when the carriage is pushed back for a fresh line of print. On shaft 52 is mounted a spiral spring 53, tensioned by set-screw collar 54 and pressing up arm 51 when it has been retracted and released into reengagement with rack-bar. The large forward movement of carriage is made by lifting swing-frame 62.

Space-key lever 60 has an upward limb 61, which rests against arm 58, mounted, as has been said, on sleeve 57. The space-key through these parts actuates the escapement independently of the lever K P and without moving it and without disturbing the impression mechanism.

The page-feed mechanism consists of ratchet-wheel 23, secured to end of roller E, pawl 24, hinged on arm 25, which is a prolongation of a disk, (see Fig. 8,) a slotted pawl-lever 27, straddling said pawl, a shaft 28, whereon is mounted said pawl-lever, a reversing-spring 29, tensioned by set-screw collar 30, a thumb-plate 31, slotted at its lower end to receive an adjusting screw-pin 32, stepped in end plate of carriage and bearing an adjusting-nut 33, also of friction-washer 87 (see detached view, Fig. 8) and collar 38. Initially the pawl is lifted by spring 29 out of engagement with the ratchet-wheel, so that the large roll may be revolved either way freely without lifting a latch. A pin 26 on arm 25 limits the movement of pawl and causes 25 to move with it. This movement of arm 25 is limited by rod 39. (See Fig. 8.) The slotted arm 27, shaft 28, and plate 31 constitute a bell-crank lever, the pressure of the arm or plate 31 toward the end of the platen forcing down the slotted arm 27 and causing the pawl 24 to engage with the ratchet 23 and rotate the same. When the pressure on the plate 31 is removed, the spring 29 will return the bell-crank lever to its normal position and raise the pawl 24 out of engagement with the ratchet, as shown in Fig. 14. The page-feed is operated by pressing the thumb-plate in pushing back the carriage. This brings the pawl into gear with the ratchet-wheel, because the friction of the arm 25 against the friction-washer is greater than the friction of

the pawl in its bearing. Then the roller E is moved a distance determined by the adjusting-nut 33.

The impression mechanism consists of a hammer L, having the face vertically prolonged to cover the field of impression, connecting-rod 8, bent downward, so as to allow descent of the carriage and geared with projection 7 on end of hammer-shaft and with arm 9 on shaft K of lever K P. Since it is difficult to time the hammer-stroke so as to follow and not precede the stop of the type-plate, I employ a mechanism to slightly delay the stroke. This consists of mounting arm 9 on shaft K so that it may turn freely thereon. A collar 9' is attached by a set-screw to the shaft K, and a lateral pin 10, extending from this collar, passes behind the arm 9. A spring 11, secured at one end by a set-screw collar 12 on the shaft K, has its other end bearing against the front of arm 9, and said spring tends to bear arm 9 against the pin 10. (See Figs. 4, 16, 17, and 18.) Said spring bears with tension on the oscillating arm 9 of the propelling device, and when said lever is operated the spring 11 is caused to bear with further pressure on said arm 9, and consequently propel said arm and the hammer L. Now when a key is struck the part P of lever K P is raised and the shaft K is rocked backward, the spring 11 yieldingly forcing back the arm 9, so as to operate the hammer. The free end of the spring acting directly upon the hammer-lever causes said spring to positively contract against its normal condition, and the pressure exerted by it on the arm 9 is a pressure against the more or less yielding resistance of the spring, which yields the more in proportion to the suddenness of the stroke. The resistance of the spring is regulated by the tension-collar. The hammer-shaft is journaled in projections $\frac{1}{2}$ of bars 90.

In its initial vertical position the paper-carriage is so adjusted that the upper part of the hammer-face strikes the outer row of types against the large roller. Since the type-plate cannot be raised to bring the supplementary type rows into the field of impression without changing the relative positions of the type moving and stopping mechanism, it is necessary to lower the paper-carriage. The mechanism for this purpose consists of the carriage-way frame, already described, arm 100 on the left end of rail U, shaft 45, stepped in a bent prolongation thereof, shift-key W, hinged thereon, held in horizontal position by spring 46, a downward prolongation of said key 101, nib 102, projecting therefrom, and bracket X. A pressure on the key W lowers the carriage. If the right margin of the key is pressed, the nib 102 enters the left slot of bracket and the bottom of the slot stops the movement at the capitals. If it be desired to print capitals continuously, the left side of the key is pressed, while down, into notch 43. Pressing left side of key deflects

nib into right-hand slot, where the movement is greater, and the bottom of this slot stops the carriage at figures and signs. Notch 44

5 Reversing-spring 89 brings back the carriage to initial position. During this vertical movement of the paper-carriage the ratchet-bar 63, secured to swing-frame 62, rests on bracket 47, while only its hinge connection
10 with paper-carriage shifts therewith. Guide-rod 37 descends in slot of bar 17.

The ribbon is wound on spools *p* and feeds from one to the other. The spools are mounted on shafts *r* and geared with it by pins *w*
15 in spools meshing with a pin *v* in shaft, as shown. Shafts *r* rotate in standards *q*. The feed mechanism embraces ratchet-wheels *s*, pawls *t*, pawl-levers *u*, connecting-rods 103, hinged to pawls *t*, and arms 104 of shaft K.
20 The lift of frame-lever K P causes pawls *t* to engage the ratchet-wheel and move it. Its reverse movement causes it to be disengaged, so as not to obstruct movement of spool when the ribbon is being wound off it. When a
25 given ratchet is to be moved, the connecting-rod belonging to it is placed in gear with its pawl-lever and the other opposing one disengaged, and vice versa. The stops *u* prevent the disengaged pawl from being carried around
30 with the shaft and *u* is so placed as to impinge on the pawl behind the pivot and keep it disengaged from the ratchet-wheel.

The spools are fitted loosely on the shaft, so as to be easily lifted off to renew ribbon.

35 A shield *g*, consisting of a very thin plate of sheet metal shaped as shown and secured to plate N, stands between type-plate and ribbon, so as to prevent the ribbon from being caught up by the said plate.

40 In order to enable the operator to scan the last line and letter of his work, the ribbon is raised to the field of impression at each key-stroke and retracted thereafter. For this purpose I employ ribbon-guide uprights 2,
45 having slits 3 for passage of ribbon 75. These guides are hinged to arms 1 on shaft *z*, axled in supports *x*, secured to standards *q*. The supports *x* have pins *y*, passing through slots in uprights 2, which serve to keep said up-
50 rights in a vertical position. Shaft *z* has a lift-pin 4, which rests upon a flange 5 of the hammer-shank, so that when the hammer strikes it lifts the ribbon-guide and so the ribbon into the field of impression. The
55 weight of the guide-arms and upright drops it out again.

The signaling mechanism consists of a bell Z; hammer 78; plate 76, to which the bell is secured and sliding on a slat 81, fixed to carriage-way frame; hammer-shank pivoted to
60 standard 77, stepped in plate 76; a notched lever 79, centered with hammer-shank, and a finger 80, projecting from swing-frame. The lever 79 is in the field of movement of finger
65 80 during the feed motion of paper-carriage and when struck by it lifts the hammer by catching the pin in the hammer-lever and as

the carriage passes on is let drop on the bell-spring 105, pressing against the pin, causing it to rebound. The carriage on being re-
70 tracted strikes the finger down, the notch therein allowing this to be done without affecting the hammer. When the carriage has passed, the weight of the finger causes it to resume its upright position. 75

The key-levers operating all rest in the slots in the plates *a* on fulera at the bottom of slots, cut shallow where used as fulera, or else on separate fulera *b*, according to what
80 bank a given key may belong to. There are preferably four banks of keys, with fulera so arranged as to equalize leverage.

Having thus described my invention and the mode of operating it, I claim—

1. In a type-writer, the combination with a
85 segmental type-plate having its type situated on one side of the plate and arranged radially, and said plate pivoted upon its center and provided with rocking arms extending on
90 either side of its journal, of a series of key-levers, and intermediate mechanism between said key-levers and rocking arms, whereby one of said arms is raised by the action of one
95 set of key-levers, and the other arm raised by the other set to rotate the type-segment to the right or left, all as set forth.

2. In a type-writer, the combination with a segmental type-plate having its type situated on one side of the plate and arranged radially,
100 and said plate pivoted upon its center, and provided with rocking arms extending on either side of its journal, of a series of key-levers, two transverse levers pivoted to the
105 machine-frame at opposite sides respectively of the key-levers, and extending partially across the same, and means connected with
110 said transverse levers for respectively raising the two rocking arms of the type-segment, when the transverse arms are raised by any
115 of the key-levers under them, all as set forth.

3. In a type-writer, an oscillating type-plate, having a driver and stop-arms on its shaft, and extending laterally from the same,
120 of a series of key-levers, and intermediate mechanism between said key-levers and arms, whereby the arms on one side of the shaft are raised by the action of one set of key-levers,
125 and the opposite arms raised by another set of key-levers, and the limit of upward play of said arms and rotation of the type-plate is effected by a stop-arm on the opposite side to
130 the raised arms striking a stop device, all as set forth.

4. In a type-writer, the combination with an oscillating type-plate, and provided with a
125 rocking frame on the same shaft having both propelling and stop arms extending on each side of the shaft, of a series of key-levers, and intermediate mechanism between said key-
130 levers and frame, whereby the arms on one side of the frame are raised by the action of one set of key-levers, and the opposite arms raised by another set of key-levers, and the limit of upward play of said arms and rota-

tion of the type-plate is limited by a stop-arm on the opposite side to the raised arms striking a stop device, all as set forth.

5 In a type-writer, the combination with an oscillating type-plate and provided with a rocking frame on the same shaft, and having both propelling and stop arms extending on each side of the shaft, of a series of key-levers, mechanism between said levers and
10 frame whereby the arms on the two sides of the frame are raised respectively by the action of one of two sets of key-levers, while the opposite arms are depressed, and a vertically-movable frame raised by the action of
15 the key-levers for coming in contact with one of the descending arms and limiting the rotary movement of the rock-frame and type-plate, all as set forth.

6. In a type-writer, the combination with
20 an oscillating type-plate and provided with rocking arms extending on either side of its journal, a frame adapted to be raised and depressed by the key-levers and having two vertical arms with bent ends overlapping the
25 two rocking arms respectively, whereby the downward movement of said frame will return the rocking arms and type-plate to their normal positions, all as set forth.

7. In a type-writer, the combination with
30 an oscillating segmental type-plate having rocking arms extending on either side of its shaft, of a series of key-levers, two transverse levers pivoted to the machine-frame at opposite sides respectively of the key-levers
35 and extending partially across the same, and vertical arms connected with said transverse levers for respectively raising the two rocking arms of the type-segment when the transverse arms are raised by any of the type-le-
40 vers, all as set forth.

8. In a type-writer, the combination with an oscillating type-plate having both rocking and stop arms extending on either side of the plate-shaft, of a series of key-levers, two
45 transverse levers pivoted to the machine-frame at opposite sides respectively of the key-levers and extending partially across the same, means connected with said transverse levers for respectively raising the two rock-
50 ing arms of the type-plate, and a vertically-movable frame adapted to be raised by the key-levers, and having two shoulders for coming in contact with the stop-arms respectively on their descent and thus limiting the rotary
55 movement of the type-plate, all as set forth.

9. In a type-writer, the combination with an oscillating type-plate, having stop-arms extending on either side of the plate-shaft, of a series of key-levers, intermediate mechanism for oscillating said plate by the action of
60 the key-levers, a rock-lever fulcrumed over and adapted to be raised by any of the character key-levers, and a vertically-movable frame supported on said rock-lever, and hav-
65 ing two shoulders for coming in contact with the two stop-arms respectively on their descent, all as and for the purposes set forth.

10. In a type-writer, the combination with an oscillating type-plate, having reversing-arms extending on either side of the plate-shaft, intermediate mechanism between the
70 key-levers and type-plate for oscillating the same, a rock-lever resting on the key-levers and adapted to be raised thereby, an oscillating frame pivoted to the rock-lever, and hav-
75 ing two upwardly-extending arms bent over the two reversing-arms respectively, all as and for the purposes set forth.

11. In a type-writer, the paper-carriage, in combination with a spring swing-frame sup-
80 porting said carriage, and the action of the spring tending to force the frame upward, two or more locking devices connected with the machine-frame and situated at different heights, and a connection with the swing-
85 frame for engagement with the different locking devices respectively, when the frame is depressed, whereby the frame is locked at different heights, all as and for the purposes set forth.
90

12. In a type-writer, the combination with an oscillating type-plate, having stop-arms extending on either side of the plate-shaft, of a series of key-levers, intermediate mechanism for oscillating said plate by the action of
95 the key-levers, a rock-lever fulcrumed over the key-levers, and having a bar extending transversely over the levers, and adjusting-screws passing through said bar and over the key-levers respectively and a vertically-mov-
100 able frame supported on said rock-lever, and having two shoulders for coming in contact with the two stop-arms respectively on their descent, all as set forth.

13. In a type-writer, the movable ribbon-
105 guide consisting of a rock-lever and its rock-shaft, two parallel arms supported on said rock-lever and having slots for holding the ribbon, in combination with the hammer, a projection or pin extending from said rock-
110 shaft, and a lateral projection from the hammer-shank overlapping the shaft-pin, whereby the action of the hammer will rotate the shaft and lift the arms, supporting the ribbon, all as set forth.
115

14. In a type-writer, the vertically-movable ribbon-guide, consisting of the two vertical arms 2, hinged to the arms 1 of a rock-lever
1, 2, 4, and having a slot for holding the ribbon and guided vertically in the machine-
120 frame, in combination with the oscillating hammer having a lateral projection overlapping the arm or pin 4 of rock-lever, all as and for the purposes set forth.

15. In combination with the two ribbon-
125 spools, revoluble shafts to which the spools are detachably secured, a ratchet fixed to each shaft, pawls for engaging said ratchets, and both pawls normally out of engagement with the same, an operating rock-lever, and de-
130 tachable links for connecting said lever and pawls respectively, all as set forth.

16. In combination with the two ribbon-spools, revoluble shafts to which the spools

are detachably secured, a ratchet fixed to each shaft, pawls for engaging said ratchets, and normally out of engagement with the same, an operating rock-lever, detachable links for
5 connecting said lever and pawls respectively, and stops for the pawl to abut against in the direction of their non-operative movements, all as set forth.

17. In combination with the key-levers, a
10 rocking lever adapted to be operated by said key-levers, the two ribbon-spools, revoluble

shafts on which the spools are detachably secured, a ratchet fixed to each shaft, pawls for engaging said ratchets, and normally out of engagement with the same, and detachable
15 links for connecting the rock-lever and pawls respectively, all as set forth.

JOHN PRATT.

Witnesses:

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