

No. 613,173.

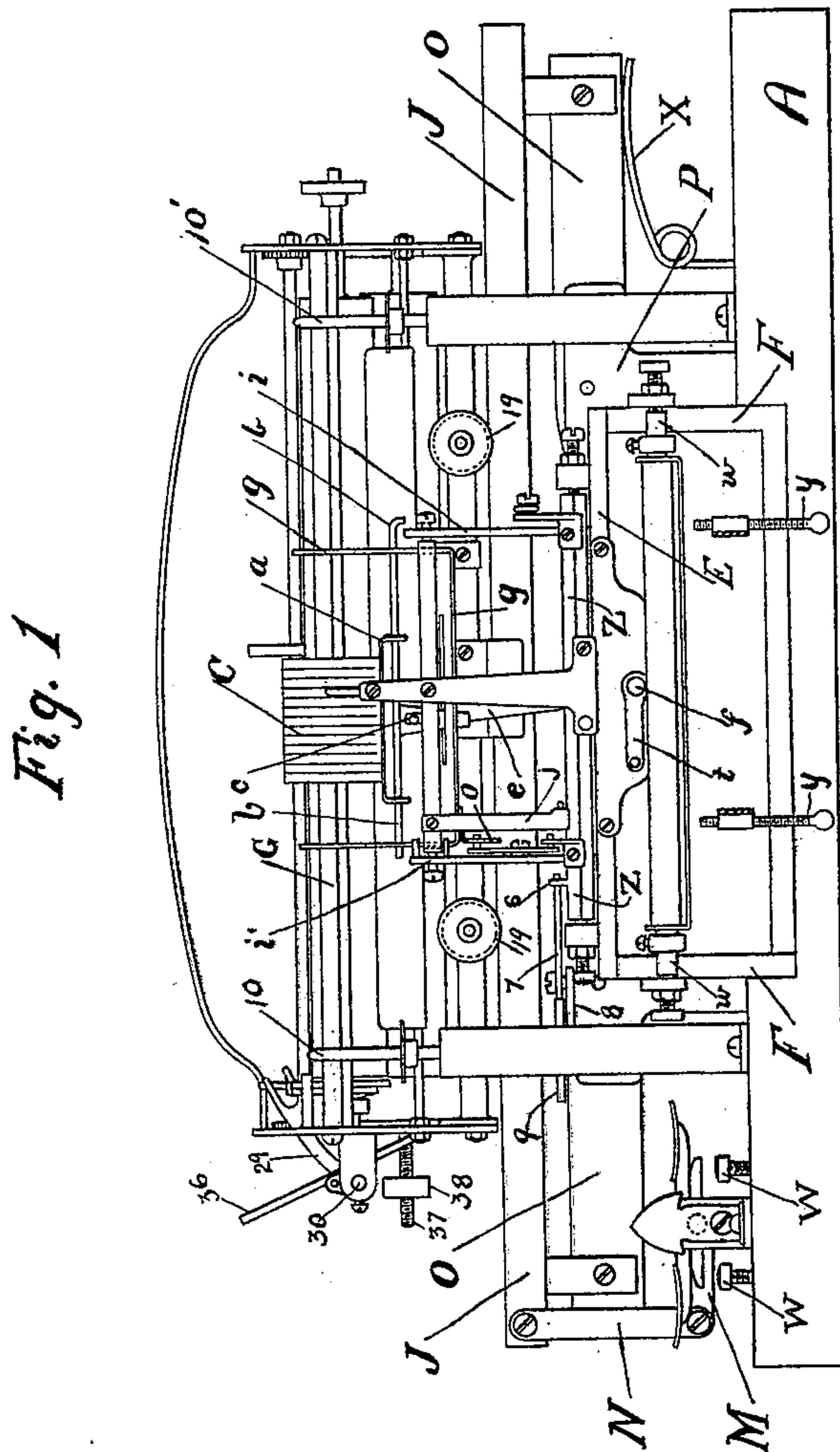
Patented Oct. 25, 1898.

J. PRATT.
TYPE WRITING MACHINE.

(Application filed Sept. 4, 1896.)

(No Model.)

5 Sheets—Sheet 1.



WITNESSES:

Wm. L. Donnelly
A. Fisher & Co.

INVENTOR.

John Pratt

No. 613,173.

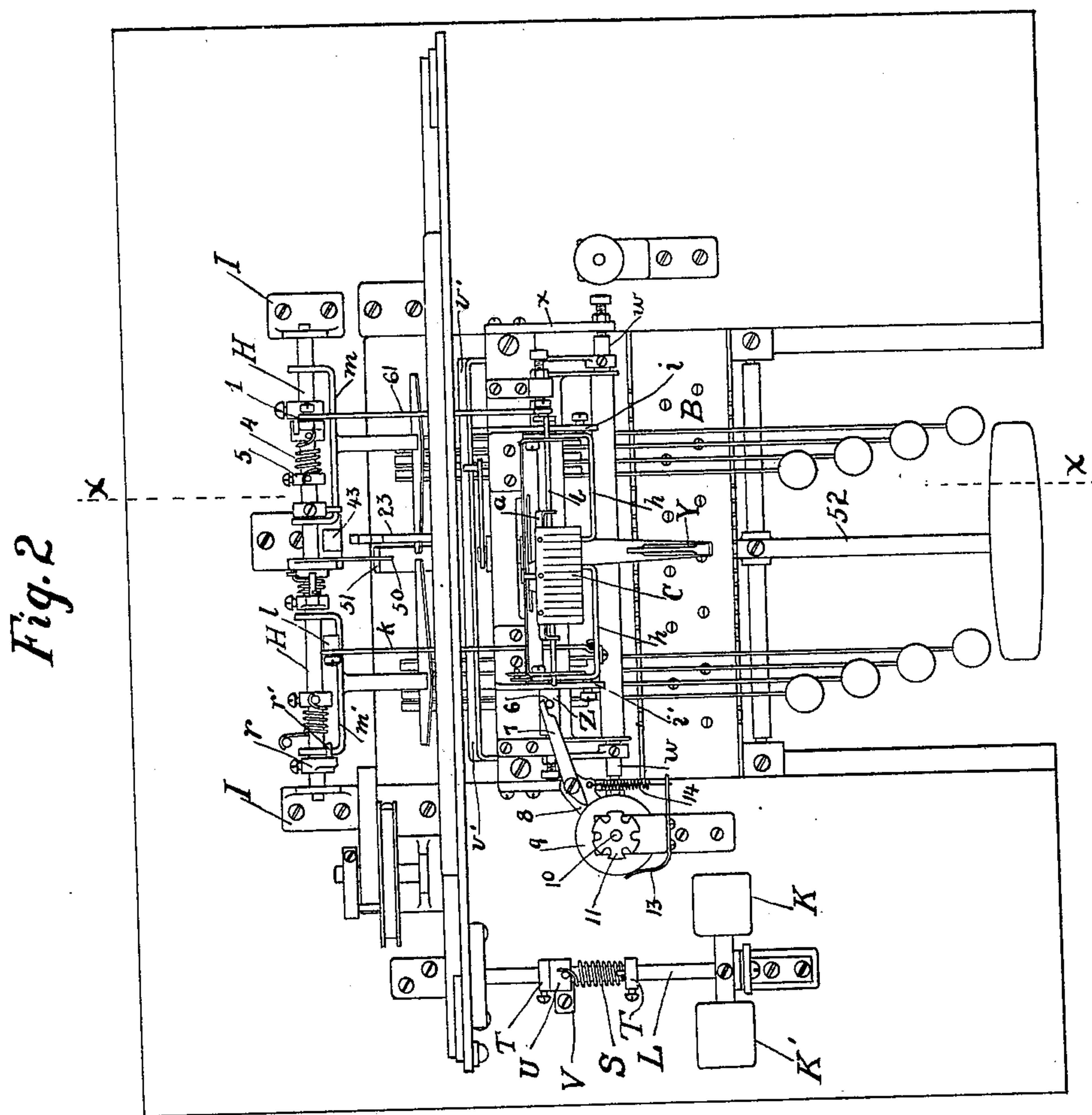
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5 Sheets—Sheet 2.



WITNESSES:

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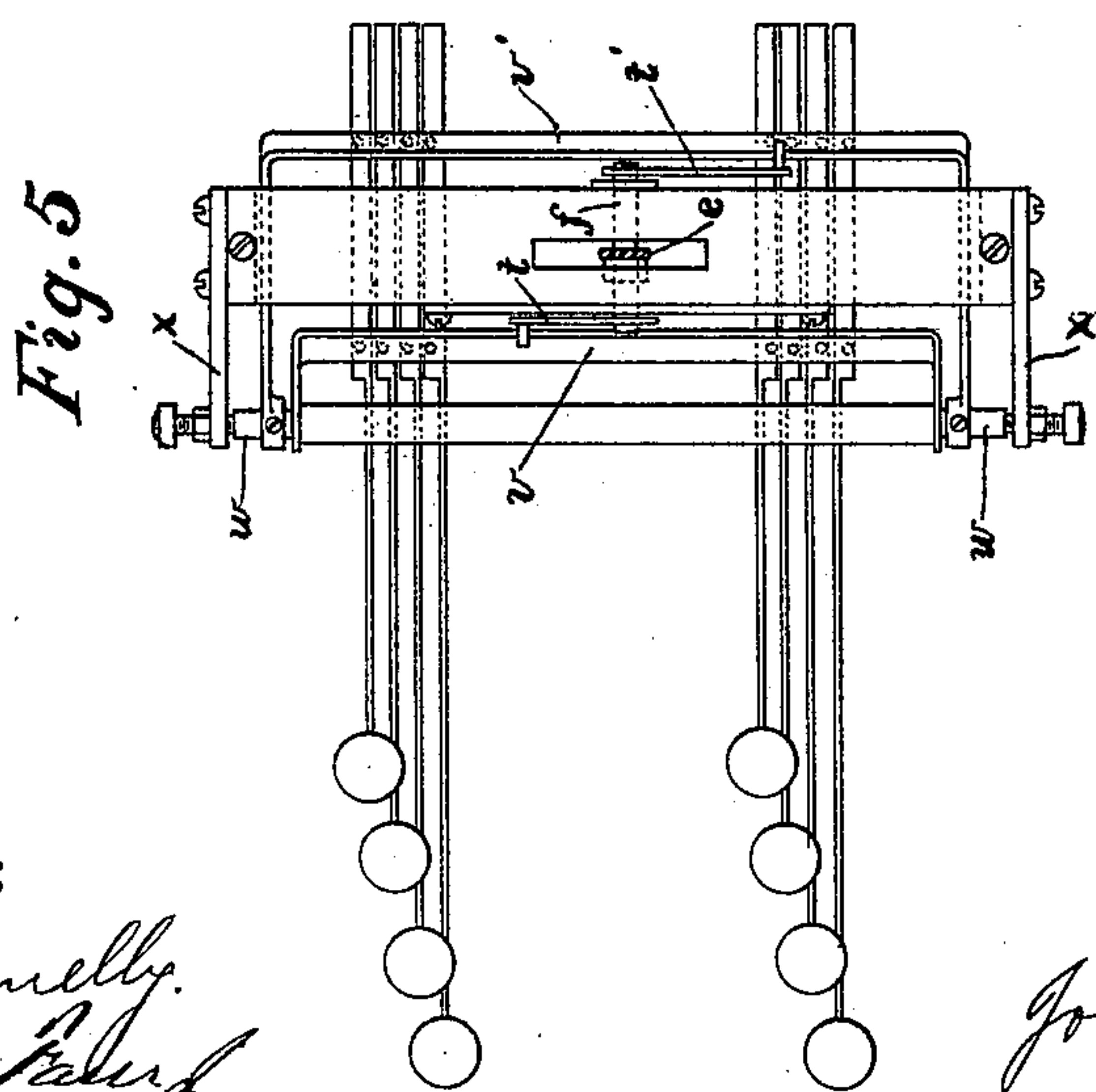
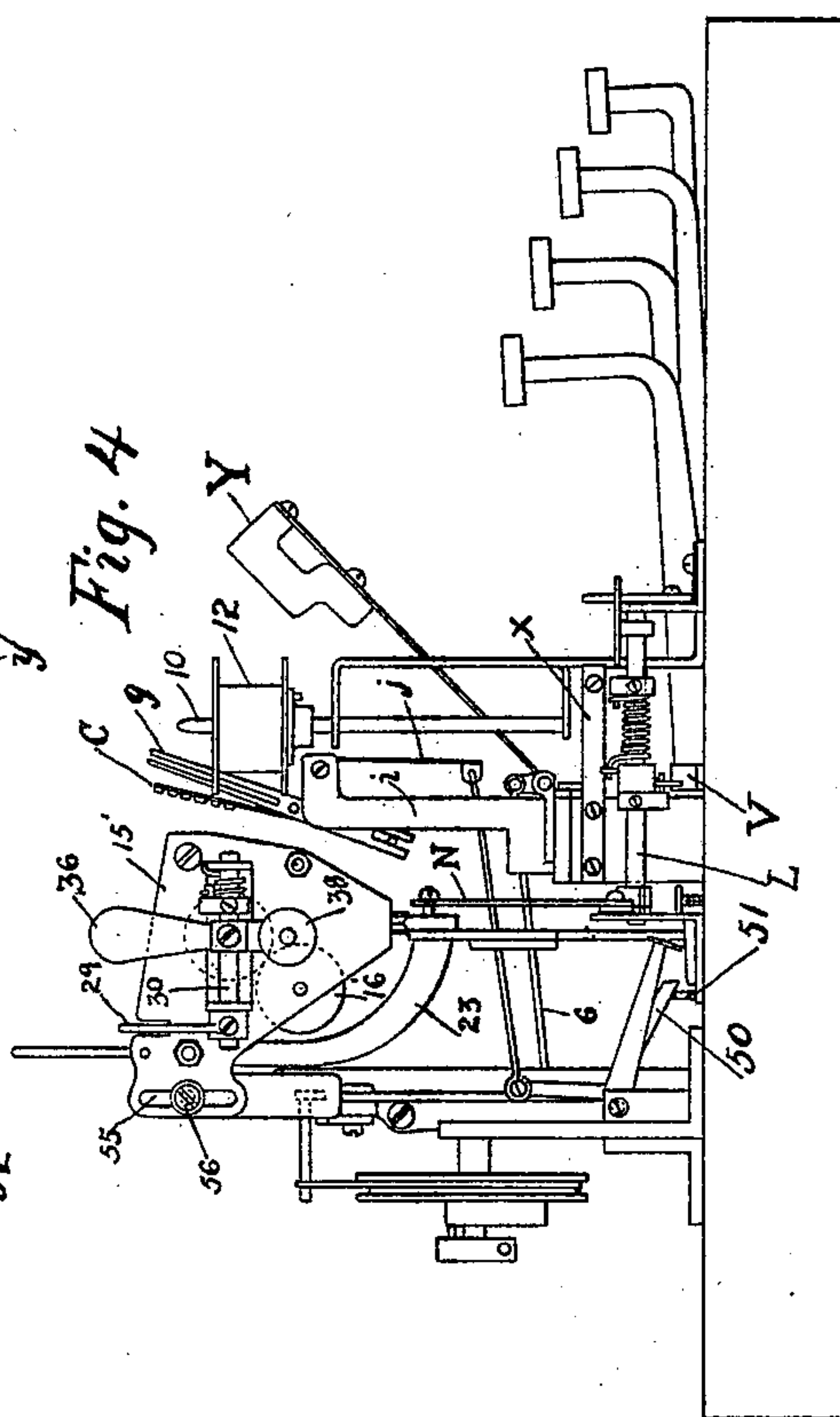
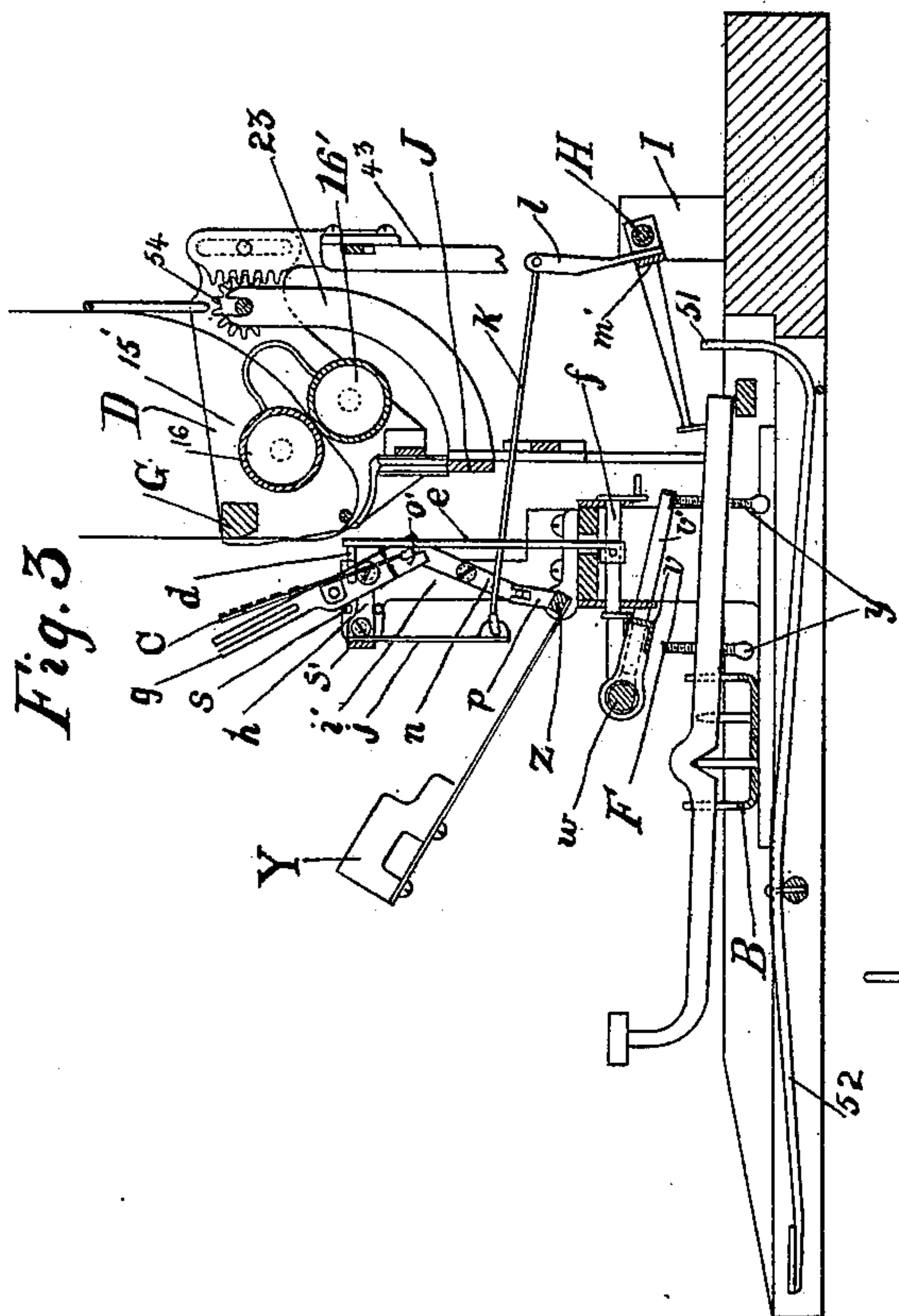
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5 Sheets—Sheet 3.



WITNESSES:

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5 Sheets—Sheet 4.

Fig. 7

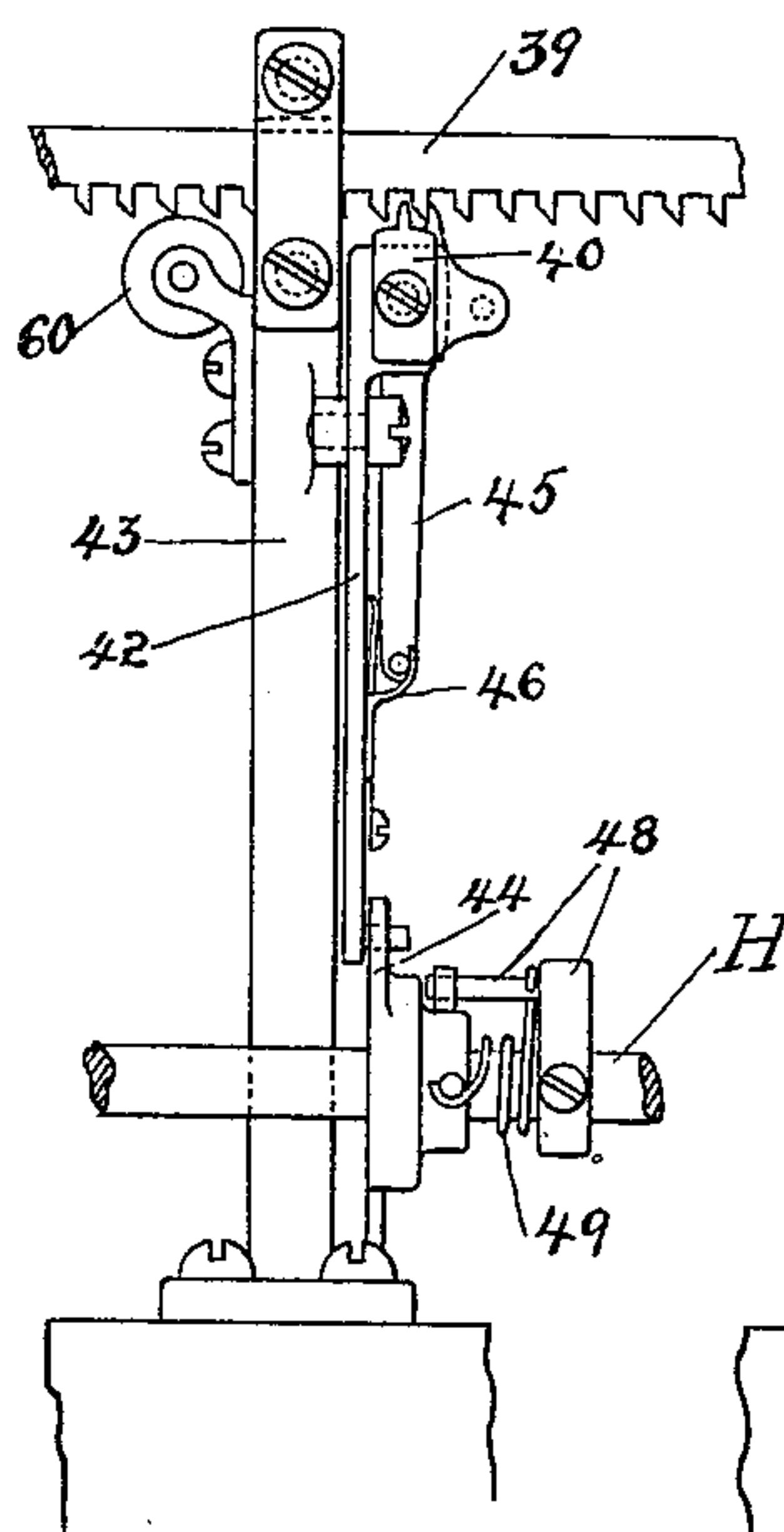


Fig. 8

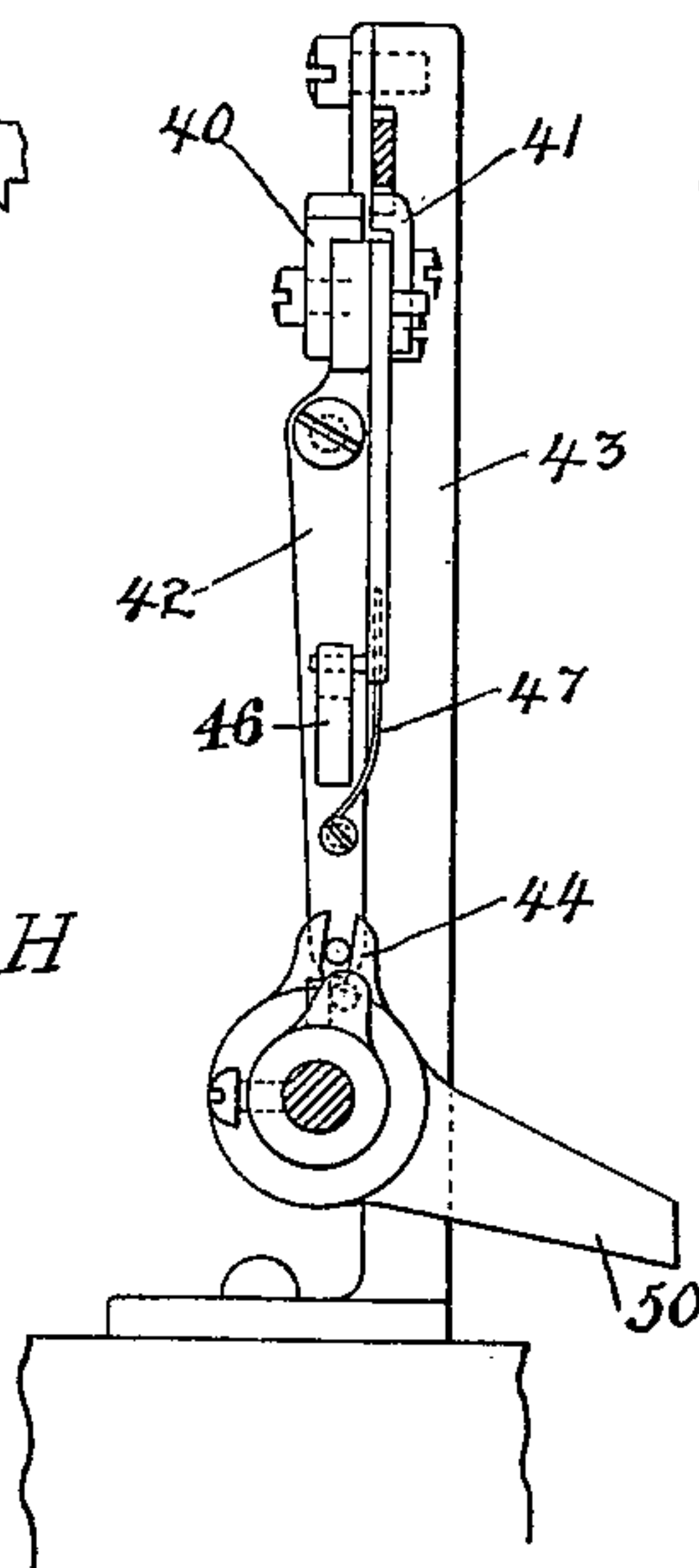


Fig. 9

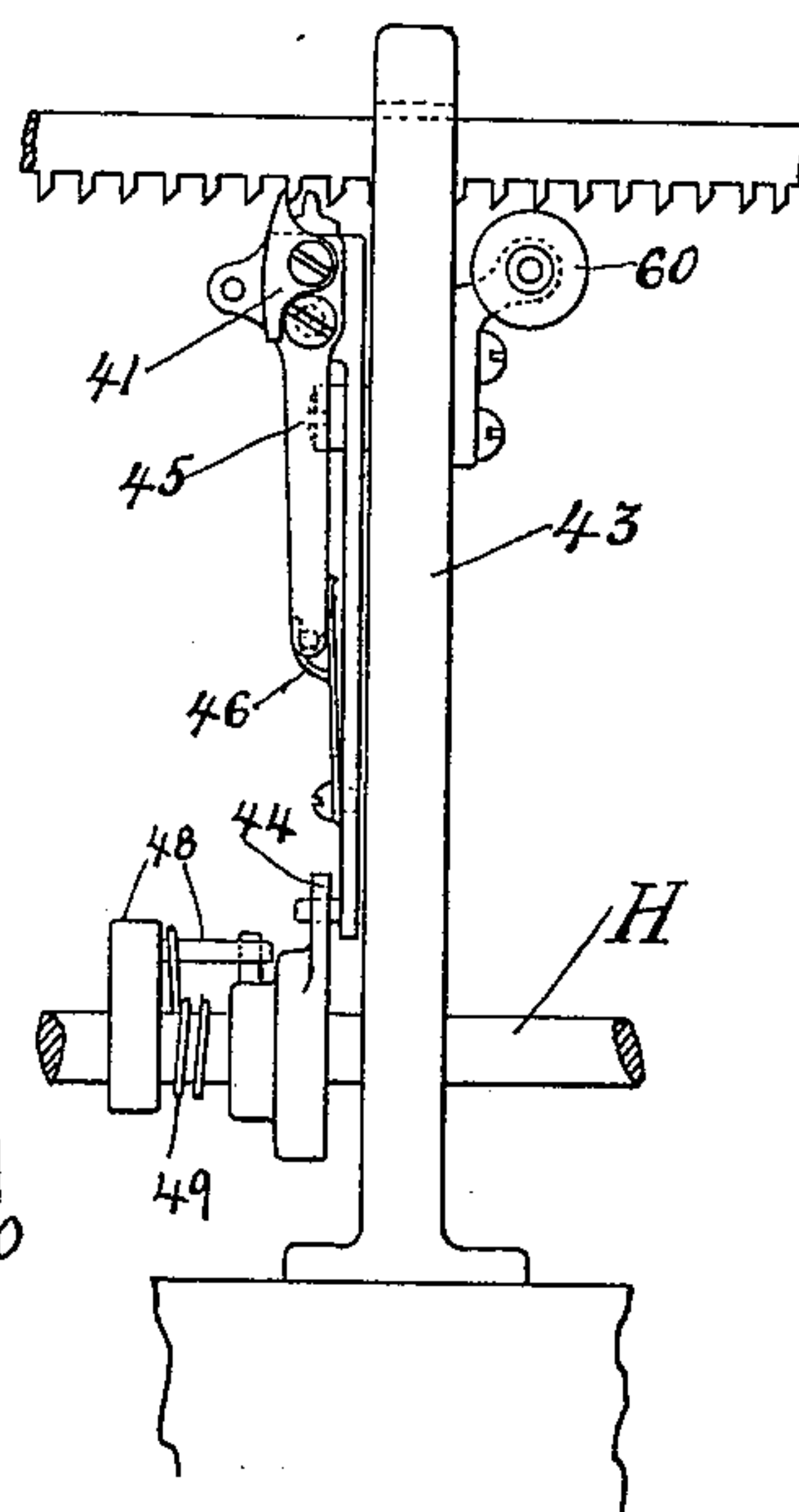
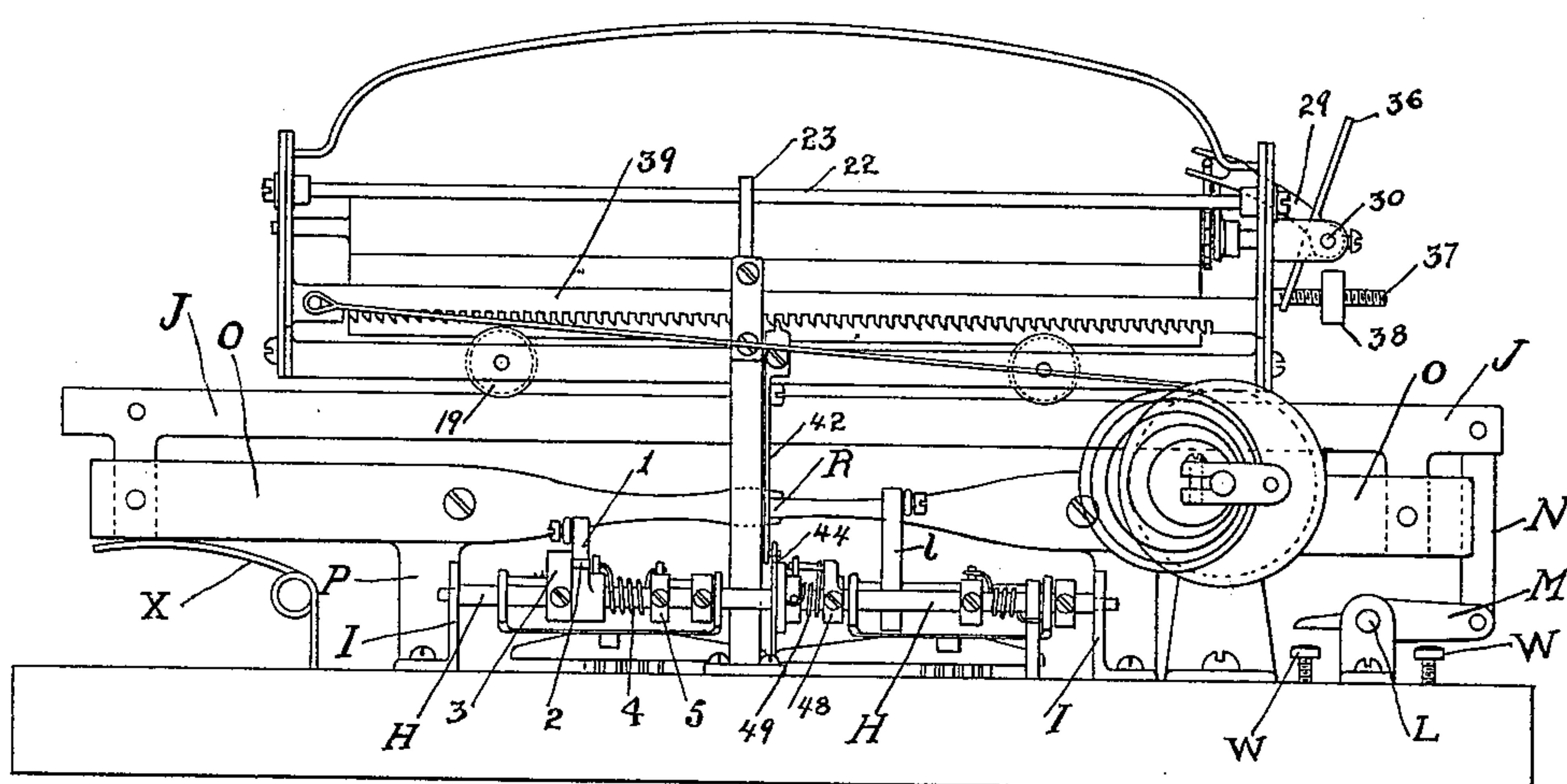


Fig. 6



WITNESSES:

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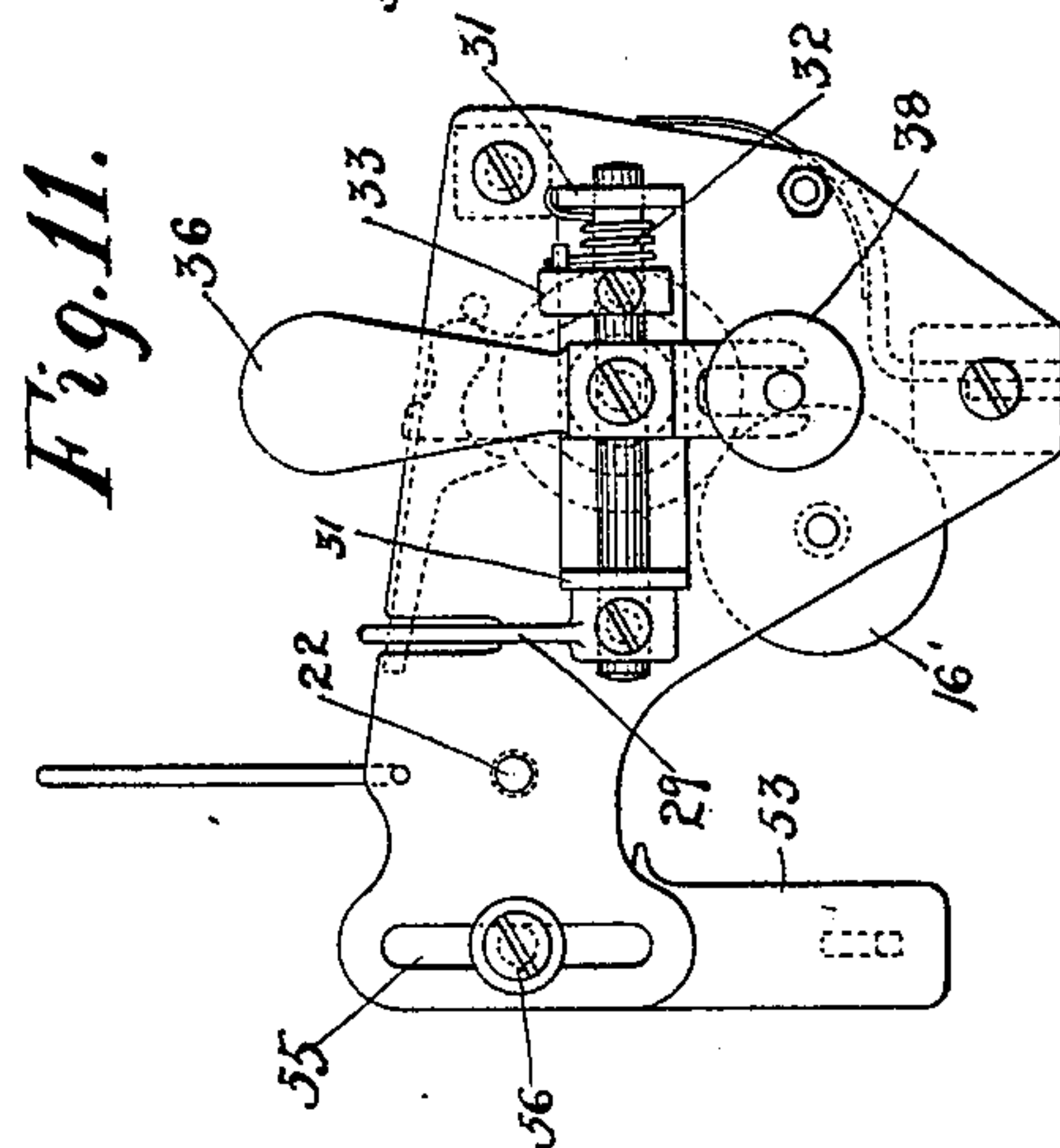
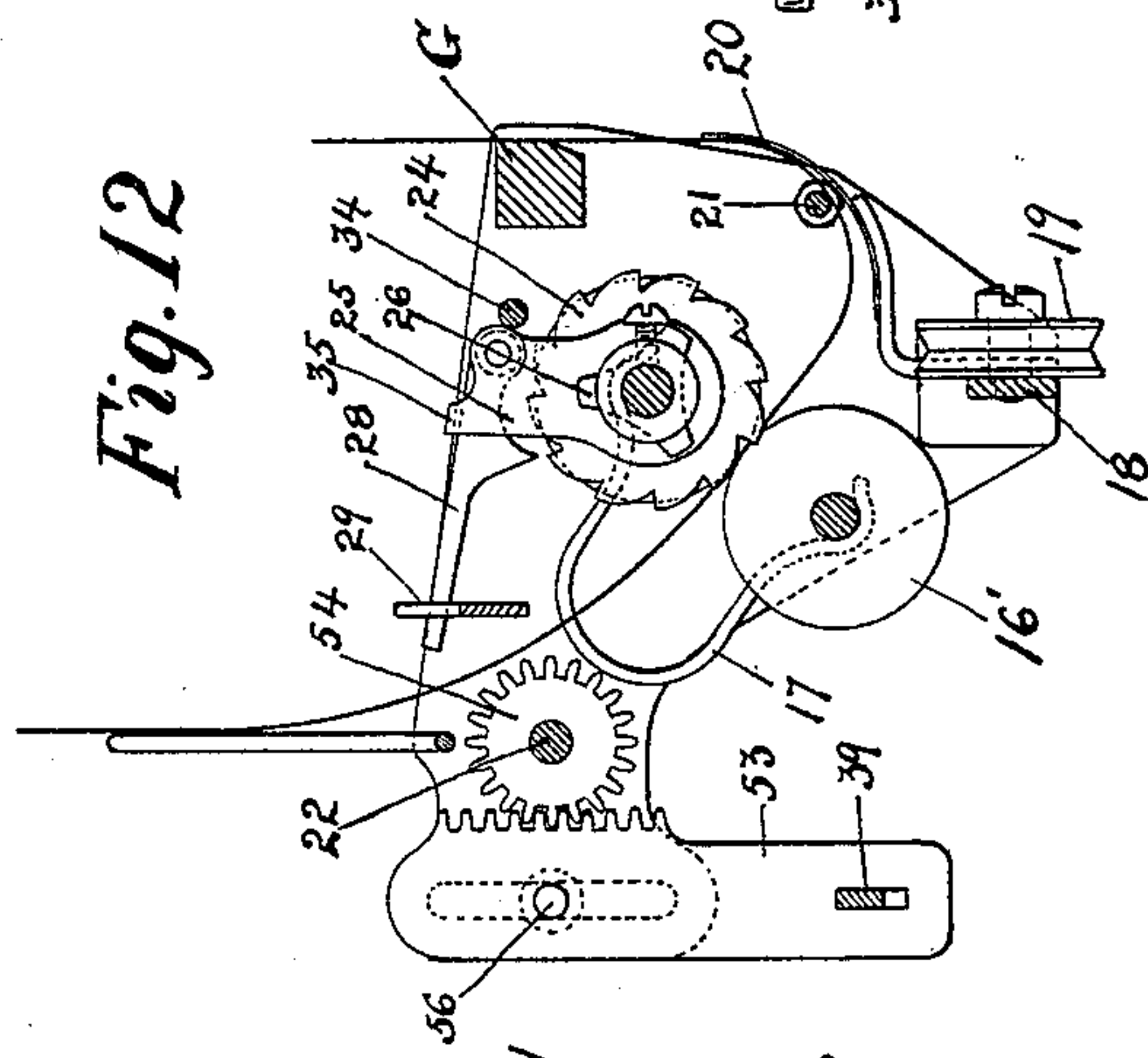
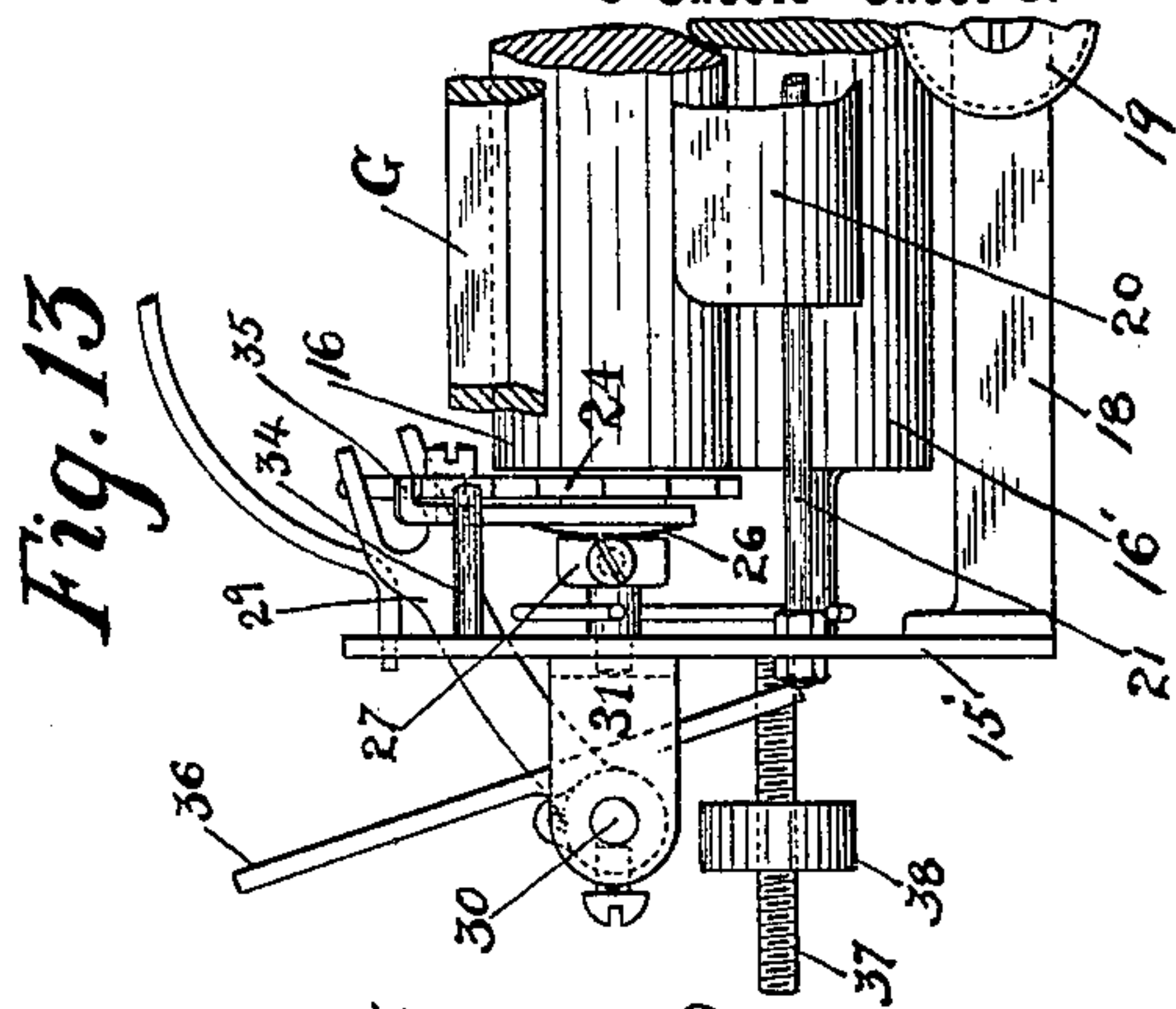
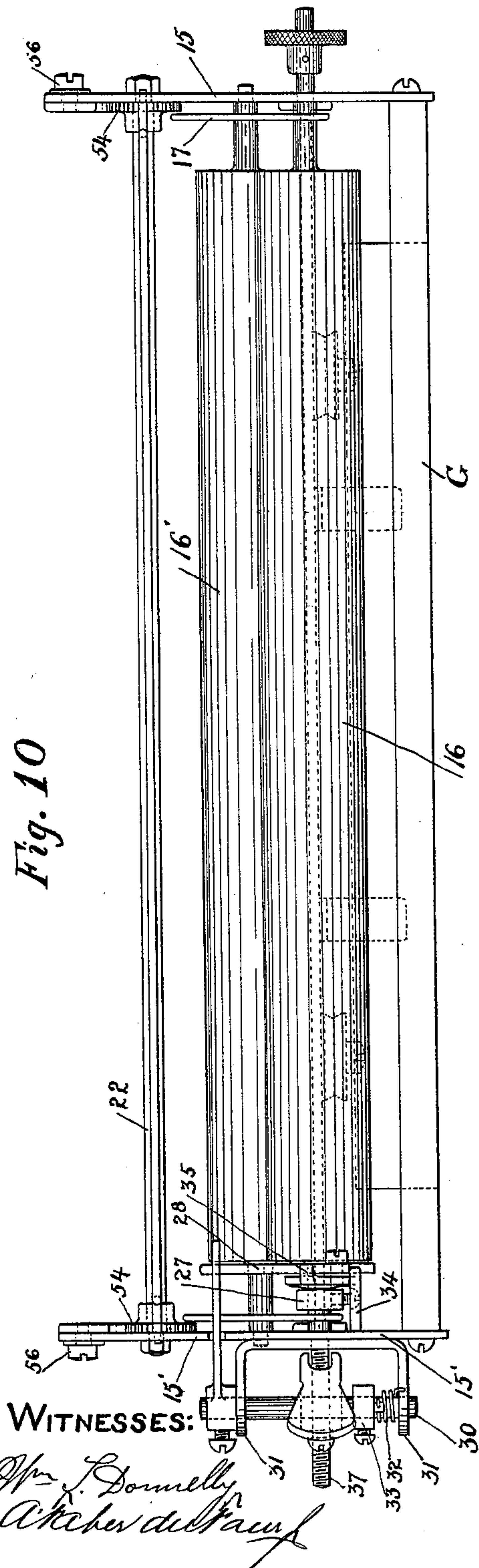
Patented Oct. 25, 1898.

J. PRATT.
TYPE WRITING MACHINE.

(Application filed Sept. 4, 1896.)

(No Model.)

5 Sheets—Sheet 5.



INVENTOR

John Pratt

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. 613,173, dated October 25, 1898.

Application filed September 4, 1896. Serial No. 604,836. (No model.)

To all whom it may concern:

Be it known that I, JOHN PRATT, a citizen of the United States, residing in 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 that class of machines in which the types are all contained in one carrier; and the objects of my improvement are to secure ease of touch, speed, accuracy, simplicity of construction, and convenient manipulation. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation. Fig. 2 is a plan showing eight keys, carriage removed. Fig. 3 is a sectional elevation on line *xx*, Fig. 2. Fig. 4 is an end elevation viewed from left side. Fig. 5 is a detailed view of type-moving mechanism. Fig. 6 is a rear elevation; Figs. 7, 8, and 9, detailed views of escapement and friction roller for rack, enlarged; Fig. 10, an enlarged plan view of carriage; Fig. 11, an end view of paper-carriage, showing line-feed; Fig. 12, a view of same with end plate removed; Fig. 13, a side view of same.

The mechanism controlling the carriage movement, the impression, and the type-carrier is mounted on a three-sided metal frame B, secured to a wood base A, and it is operated by, preferably, four banks of keys, the levers of which are fulcrumed, so as to compensate leverage, as shown.

First of the type-carrier. This consists of a celluloid plate thin enough for flexibility and slit into separate vertical fingers, each carrying molded thereon, preferably, six types. These six types are brought into the field of impression, except where initially so, by means of two separate vertical movements of the paper-carriage D, one upward, the other downward, from the initial position, in conjunction with an upward movement of the type-carrier carried the distance of one row of types. The initial vertical position controls one row—third from top—the upward movement of carrier the row next below. The downward motion of carriage brings to the impression field the two bottom rows.

The upward movement of carriage does the same for the two top rows.

The type-plate C is fitted with a metal frame *a*, secured by cement or otherwise, bent and perforated, so as to slide on a rod *b* and having a downwardly-extending yoke *c* for engagement with a pin *d* in an arm *e* of a driving-shaft *f*. Rod *b* is detachably fitted to a light three-sided metal frame *g*, slotted at its two upper ends as a guide for the ink-ribbon. This frame is pivoted to a second frame *h*, which is pivoted to standards *i i*, that are secured to a bar E, screwed to uprights F of base-frame B. Extending downward from the front arm of frame *h* is a thin flexible spring-arm *j*, connected at its lower end by a link or rod *k* with the upwardly-extending arm *l* of a lever *m'*. The forward arm of said lever rests upon the left-hand series of key-levers and is operated by said levers. The lever *m'* is mounted loosely on a shaft H, which is journaled in brackets I. A collar *r*, secured to said shaft and having a lateral pin *r'* extending over the lever *m'*, causes the shaft to be moved by said lever. The shaft, however, does not move the lever. This lever is operated only by the left-hand series of keys, and it is said keys that move the type-plate vertically. This is done by raising the forward arm of the lever *m'*, rocking the arm *l* backward, and drawing spring-arm *j* forward, which will lower the front arm of the frame *h* and raise its back arm and the type-plate and ribbon-frame pivoted thereon. The arm *j* is made delicately flexible and springy, so that it may have waste motion and not cause the type-plate to be too rapidly raised, as a rigid arm would do. Two stops *s* and *s'* on one of the standards *i'* and extending above and below the frame *h*, serve to limit the upward and downward movements of the rear arm of said frame, respectively, and consequently the upward and downward movements of the type-plate. The position of the stop *s* is such, Fig. 3, that the upward limit is reached before the movement of the key-levers is completed. This is to prevent the necessity of nice adjustment. The shaft *f*, which supports the upwardly-extending arm *e*, above described, has secured to it the two laterally-extending arms *t t'*,

which act alternately as driver and stop arms for the lateral movements of the type-plate. This mechanism serves to lift the type-plate to bring second row of type to impression-point without interfering with the lateral movement thereof; but besides the two simultaneous lateral and vertical movements of the type there is a third motion of the type-carrier frame and ribbon toward the platen G. The object of this is to show the printed matter when they are at rest. This is imparted by a lever *n*, pivoted to standard *i*, gearing with slotted arm *o* of frame *g*, and also with a slotted arm *p* of the hammer-shaft, with just enough leverage to carry the type-carrier on frame in contact, or nearly so, with the platen before receiving the hammer stroke. The means for operating the lever *n* and the hammer-shaft and for swinging the type-carrier and ribbon toward the platen are described hereinafter.

The lateral movement of the type-plate is imparted by the arm *e*, shaft *f*, the arms *t* and *t'*, also secured to said shaft *f*, and the two transverse levers *v* and *v'*, mounted concentrically on shaft *w*, journaled in brackets *x*, secured to uprights F. Both these levers *v* and *v'* are operated by the key-lever, and are driver-levers as well as stop-levers, and both arms *t* *t'* are driver and stop arms, as above stated, and when one of the arms *t* or *t'* is a driver-arm it is lifted by one of the levers *v* or *v'*, and the other arm becomes a stop-arm by coming in contact with the other lever as it rises, and which acts as a stop-lever. The type-plate has no reversing-spring and stands in the position in which the last key-stroke leaves it. The position in which it happens to be at the last stroke determines whether a given lever, the next stroke, is a driver-lever or a stop-lever. The key-levers are each fitted with two adjusting-screws *y*, one under each transverse lever, and are the point of contact therewith. These adjusting-screws regulate the exact position of a given type when it is ready to print. Keeping in mind that at the initial position of platen G said platen is in the field of third row of type from top of plate, third and fourth rows being lower-case letters, and a key of the right-hand series being struck, the key-lever lifts levers *v*, *v'*, and *m*. Levers *v* and *v'* strike arm *t* or *t'*, according to the then position of the type-plate, one moving its corresponding arm, the other stopping said arms; *t* *t'* being fixed, as shown, to type-shaft *f*, rock same, and through the intervention of upright arm *e*, pin *d* therein, and slot *c* in frame *a* move the type-plate laterally on rod *b*. Levers *m*, journaled on shaft H, at the same time move same, and, through *l*, also journaled on said shaft, and connecting-rod 6, pivoted to an arm of hammer-shaft *z*, drive the hammer toward platen G and through arm *p* of hammer-shaft, and lever *n* moves forward, swing-frame *g* carrying guide-rod *b* and type-plate, and also the ink-ribbon, so as to bring type-plate in con-

tact with the platen. Now when lever *m* is moved by a right-hand series of key-levers it moves shaft H by means of collar and pin *r*, but does not disturb lever *m'*, and, conversely, when lever *m'* is operated by a left-hand series lever it moves said shaft by pin *r*, but does not disturb lever *m*. Thus the third or initial row of type is operated. When lever *m'* is moved by a left-hand series key-lever, the same movements occur as just described, with an addition, for this lever lifts the fourth row of type—lower-case also—to the printing position. This it does, when moved by a key-lever, through arm *l*, connecting-rod *k*, and flexible arm *j*, fixed to frame *h*, journaled in standards *i* *i'*, said frame *h* having pivoted to it the swing-frame *g*, carrying guide and ribbon, as shown above.

The vertical movement of the paper-carriage rail J is imparted by a double shift-key K K', of which K lifts, K' lowers, the rail. A shaft L, on which said shift-key is mounted, is geared through an arm M and connecting-rod N with said rail. Rail J forms part of a parallel frame, consisting of said rail and equalizing-levers O, hinged to standards P, and geared together midway between said standards by a male and female tooth R. A spiral spring S, mounted on shaft L, tensioned by set-screw collar T against a collar and pin U, resting against an upright V, holds the carriage-way in an initial vertical position and restores it thereto when the carriage is lowered. When lifted, it is brought back by gravity, and screws W regulate the degree of movement. To partly relieve the shift-key K K' of the weight of the paper-carriage and supporting-rail, a supplemental spring X, set in case A, presses upward against the rail J throughout its entire up-and-down movement. Spiral spring S, limited by upright V, acts only on the downward movement. Spring X only acts during the upward movement, thus partly relieving the finger of the weight, as stated.

As stated above, initially, the platen G is in a vertical line with third row of type. Its upward movement, imparted by shift-key *k*, brings it in line with the topmost row of type, upper-case, preferably, and any right-hand series key prints a letter of that line. A left-hand key, as above described, lifts the type-plate so as to bring the next row below, (also upper-case letters.) When the shift-key *k'* is pushed down, the platen descends, so as to bring it in line with fifth row from top, and a right-hand series key prints from this line, while a left-hand key lifts type-plate as before and prints from sixth row. The fifth and sixth rows are preferably figures and signs.

The impression is made by a hammer Y, mounted on shaft Z, geared with an arm 1, loose on shaft H, by connecting-rod 6. Arm 1 is pressed back against pin 2 in a collar 3 by a spiral spring 4, tensioned by a set-screw collar 5. When a key is struck, the spring yields more or less according to its tension,

and the movement of the hammer is retarded just as much or little as is required. This feature of the machine is important for the accurate alinement of the type, since although the type-stop is positive each stop is attended with a certain vibration, and a rigid thrust of the hammer must either be modified by lost motion, which is old and unsatisfactory, or by a retarding device like that shown, which I claim to be new and useful not only as retarding the blow, but on account of the utilization of the stored-up resiliency of the spring does so without loss of force.

The hammer-shaft Z is furnished with a pin 6', gearing with a clutch-pawl 7, fitted to an arm 8, operating a disk 9 on a shaft 10, carrying a serrated disk 11. An ink-ribbon spool 12 is adapted to be held by the top of the shaft 10 with a pin 12' from said spool engaging with one of the slots in the disk. A corresponding spool is mounted on the shaft 10', in which the pin 12' is clearly shown. A friction-spring 13, bearing upon the periphery of the disk 9, serves to keep the disk and spool firm and prevents too easy rotation and slipping. A spring 14 reciprocates the movement of the pawl. The feed is confined to one shaft, the ribbon-feed being reversed by interchanging the spools.

The type-hammer has a face prolonged across the field of impression and a length corresponding to five rows of type, so as to cover a type in any position of the plate and platen. The head is cut away, as shown, and prolonged downward, so as to cause it to strike as nearly as possible with equal efficiency at any part of the striking-face.

The paper-carriage D has for its salient feature a fixed longitudinal metal platen G instead of the roller-platen usually employed. The other parts consist of two end plates 15 and 15', supporting said platen, two rollers 16 and 16', journaled in said end plates, and consisting of light hollow cylinders of wood pressed together by springs 17, brace-bar 18, carrying antifriction-rollers 19, a curved guide-plate 20, a paper-guide rod 21, a rod 22, serving to hold the carriage upright and sliding in a slot of curved arm 23, secured to rail J, and of the page-feed mechanism. The paper is introduced to the rollers, which carry it obliquely against the said guide-plate 20, where it is passed between said plate and guide-rod 21 and then is bent upward and passed in front of and in contact with the platen G, which is beveled at its lower margin to prevent the paper from catching. The combination of the guide-rod and guide-plate causes the paper to assume a vertical position and to be held firmly therein. The guide-rod should be almost in contact with guide-plate; otherwise the paper will not retain its place or direction.

The line-feed consists of a ratchet-wheel 24, mounted on the axle of roller 16, of a pawl-lever 25, held by a friction-washer 26 in frictional contact with said wheel by means of a

set-screw collar 27; also of a pawl 28, pivoted on said lever, and of a slotted arm 29, mounted on a shaft 30, journaled in bracket 31 and held in position by a spiral spring 32 tensioned by set-screw collar 33. The pawl is operated directly by the arm 29 and is held initially out of gear with ratchet-wheel, and as there is more resistance to the movement of lever 25 (caused by the friction-washer) than there is to the pawl 28 it will move first and engage said ratchet-wheel before the lever 25 supporting it moves forward. When this takes place, the ratchet will be rotated by the pawl. On reverse movement stop 35 limits pawl motion and stop 34 limits lever motion of lever and causes pawl to be lifted free of ratchet. Thumb-plate 36, slotted at the lower end to allow passage of an adjusting-screw 37 and nut 38, moves the roller a distance determined by said nut. The advantage of the mechanism described is that the pawl being normally out of engagement with the roller-ratchet it may be turned back without lifting a detent.

The letter-feed of the machine is effected by means of a ratchet-bar 39, a detent 40, a jointed pawl 41 45, mounted on a lever 42, pivoted to post 43, and a slotted lever 44, mounted on shaft H. The jointed pawl consists of a pivoted nib 41, fulcrumed on a lever 45, which is fulcrumed on said lever 42. The lever 45 has a play equal to a tooth distance and is controlled by stop 46 and spring 47. The nib is retained in position by gravity and stopped by fulcrum-pin of lever 45. Lever 44 is loosely mounted on shaft H and pressed by a spring 49 against a pin 47 and collar 48. The reciprocating movement of the shaft makes the escapement. Pawl-lever 45 gives to the carriage movement part of the distance between two of the ratchet-teeth. The nib 41 is intended to allow the reverse movement of the ratchet-bar without raising the bar. The lever 44 is prolonged into an arm 50, which rests on the bent projection 51 of a space-key lever 52 and is by it operated without moving the shaft H and hammer.

In order that the vertical movement of the carriage may be made without moving the ratchet-bar, said bar is provided with rack-arms 53, engaging pinions 54, mounted on the ends of a shaft 22, journaled in end plates 15 15'. Said arms are kept in a vertical position and in engagement with said pinions by means of slots 55, sliding on pins 56, the bar itself moving laterally during feed motion in a slot in post 43. Rack 39 rests on antifriction-roller 60. The large forward movement of carriage is effected by lifting the ratchet-bar off of the escapement-pawl.

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

1. In a type-writer, the combination with a type-plate, of two arms extending in opposite directions from the same rock-shaft, and intermediate mechanism between said shaft and plate for moving the same edgewise when

either of said arms is operated, a series of key-levers, two rock-levers extending over said key-levers and adapted to be operated by the same, and adapted to operate respectively the two rock-arms, whereby the arm being raised will act as a driver for the plate, and the descending arm will act as a stop by meeting its lever on its rise, all as set forth.

2. In a type-writer, the combination with the type-plate supported loosely on a horizontal guide, and having a downwardly-projecting yoke, a rock-shaft having two lateral arms extending in opposite directions, and an upwardly-extending arm engaging with the yoke of the type-plate, a series of key-levers, two rock-levers extending over said key-levers and adapted to be operated by the same, and adapted to operate respectively the two rock-arms, whereby the arm being raised will act as a driver for the plate, and the descending arm will act as a stop by meeting its lever on its rise, all as set forth.

3. In a type-writer, the combination with the type-plate of a rock-frame on which said frame is supported and having an operating arm or extension, a series of key-levers, and intermediate mechanism between said key-levers and frame-operating arm, whereby the operation of the key-levers will move the arm and rock the frame, and raise the type-plate, all as set forth.

4. In a type-writer, the combination with the type-plate, of a rock-frame on which said plate is supported, a series of key-levers, a rock-lever resting on and adapted to be operated by said key-levers, and intermediate mechanism connecting said rock-lever and rock-frame, whereby the operation of the former by the key-levers will operate the rock-frame to raise the type-plate, all as set forth.

5. In a type-writer, the combination with the type-plate, of a rock-frame with which said plate is connected, and having a downward extension from its opposite arm, a series of key-levers, a rock-lever adapted to be operated by said key-levers, and having an upwardly-extending arm, and a link connecting said arm with the downward extension of the rock-frame, all as and for the purposes set forth.

6. In a type-writer, the combination with the type-plate, of a rock-frame with which said plate is connected and having a flexible downward extension from its opposite arm, a series of key-levers, a rock-lever adapted to be operated by said key-levers and a link connecting said rock-lever with the downward extension of the rock-frame, all as set forth.

7. In a type-writer, the combination with the type-plate, of a rock-frame with which said plate is connected, a series of key-levers, a rock-lever adapted to be operated by said key-levers, intermediate mechanism connecting said rock-lever and rock-frame, whereby the operation of the former by the key-levers will operate the rock-frame to raise the type-plate, and means for stopping the rise of the

rock-frame and plate before the movement of key-levers is completed, all as set forth.

8. In a type-writer, the combination with the platen, of a type-plate having the type arranged on the side nearest the platen, a lever-frame supporting the plate in front of the platen, a hammer supported on a rock-shaft below said frame and having a movement toward the same, a connection between the hammer-shaft and the lower arm of the type-frame, whereby the rotation of the shaft will cause the type-plate to swing to the platen before the hammer strikes the plate, all as set forth.

9. In a type-writer, the combination with the platen, of a type-plate having the type arranged on the side nearest the platen, a lever-frame supporting the plate in front of the platen, a hammer supported on a rock-shaft below said frame and having a movement toward the same, a rock-lever having its two arms loosely connected with an upward extension of the hammer-shaft and the lower arm of the type-frame respectively, whereby the rotation of the shaft will cause the type-plate to swing to the platen before the hammer strikes the plate, all as set forth.

10. In a type-writer, the combination with two sets of key-levers two rock-levers extending over said two sets respectively and adapted to be operated thereby, and both of said levers being loosely journaled on said shaft and provided with means for rocking the same without being rocked by the shaft, the pivotal type-plate and hammer and means connecting the same with one rock-lever whereby said type-plate and hammer are swung forward, and means connecting the swinging support of the type-plate with the other rock-lever, whereby the type-plate is raised, and the action of each lever being entirely independent of the other, as set forth.

11. In a type-writer, the combination with the type-plate, of a rock-frame to which said plate is attached, and having a rest and guide for the ribbon in its upper portion, a series of key-levers, a rock-lever resting on and adapted to be operated by said key-levers, intermediate mechanism connecting said rock-lever and rock-frame, whereby the operation of the former by the key-levers will rock the frame supporting the type, and thus raise the type-plate and ribbon, all as set forth.

12. The combination of the shaft H, the lever *m'* journaled loosely on said shaft, a collar fixed to said shaft and having a lateral projection overlapping the lever *m'*, the vertically-movable type-plate, and means connecting said lever and plate for raising the same, one set of a series of key-levers adapted to raise said lever *m'* and the raising of said lever serving to raise the type-plate and rock the shaft H, all as set forth.

13. The combination of the shaft H, the lever *m* journaled loosely on said shaft, a collar fixed to said shaft and having a lateral projection overlapping the lever *m*, the oscillat-

ing hammer and swinging type-plate frame, and means connecting said lever and frame for swinging the same forward, one set of a series of key-levers adapted to raise said lever *m*, and the raising of said lever serving to swing the type-plate and hammer forward and rock the shaft H, all as set forth.

14. In a type-writer, the means for raising and lowering the paper-carriage vertically, consisting of a longitudinal bar on which the paper-carriage is supported, two longitudinal arms connected loosely to said bar and also connected loosely together at their inner ends, a vertical arm for raising and lowering said bar and the outer end of the longitudinal arms, and a rock-lever pivotally connected with said vertical arm, all as set forth.

15. In a type-writer, the combination with the longitudinal bar for supporting the paper-carriage, two longitudinal arms connected loosely at or near the outer ends of said bar respectively, and connected loosely together at their inner ends, a vertical arm for raising and lowering said bar and the outer ends of the longitudinal arms, a lever pivotally connected with said vertical arm, and the shaft of said lever provided with operating-arms extending on opposite sides of the same, all as set forth.

16. In a type-writer, the combination with the longitudinal bar for supporting the paper-carriage, two longitudinal arms connected loosely at or near the outer ends of said bar respectively, and connected loosely together at their inner ends, a vertical arm for raising and lowering said bar and the outer ends of the longitudinal arms, a lever pivotally connected with said vertical arm, and the shaft of said lever provided with operating-arms extending on opposite sides of the same, and stops for limiting the play of said arms, all as set forth.

17. In a type-writer, the combination with the shaft of the ribbon-spool, of a disk on said shaft, a lever-pawl for rotating said disk,

the hammer rock-shaft, and means whereby the pawl is operated to rotate the disk, at every stroke of the hammer, all as set forth.

18. In a type-writer, the combination with the shaft of the ribbon-spool, of a disk on said shaft, a lever-pawl for rotating said disk, the hammer rock-shaft, and a projection from said shaft extending over the pawl, and adapted to operate the same, at every stroke of the hammer, all as set forth.

19. In a type-writer, a to-and-fro swing-frame pivoted to a vertically-moving swing-frame, in combination with a transverse lever, operated by one-half of a series of key-levers, as set forth.

20. In a type-writer, the combination with a non-rotatable platen, a pair of feed-rollers, a curved scroll or plate, and a rod situated longitudinally thereto, whereby the paper may be guided between said rollers, and between said rod and scroll to the platen, as set forth.

21. In a type-writer, the combination with the longitudinal rack for giving the letter-feed, and having arms provided with vertical racks, of the paper-carriage having pinions engaging with said racks, and vertical slots engaging with lateral projections from the rack-arms, all as set forth.

22. In a type-writer, the combination with the longitudinal rack on the longitudinally-movable carriage, of an antifriction-roller on which said rack rests and moves, and a projection from the upright supporting the carriage, extending over said rack, all as set forth.

23. In a type-writer, a type-plate of celluloid molded with its type integral therewith and on one side thereof, and slit between said type into strips, all as set forth.

JOHN PRATT.

Witnesses:

A. FABER DU FAUR, Jr.,
WM. S. DONNELLY.