

No. 709,885.

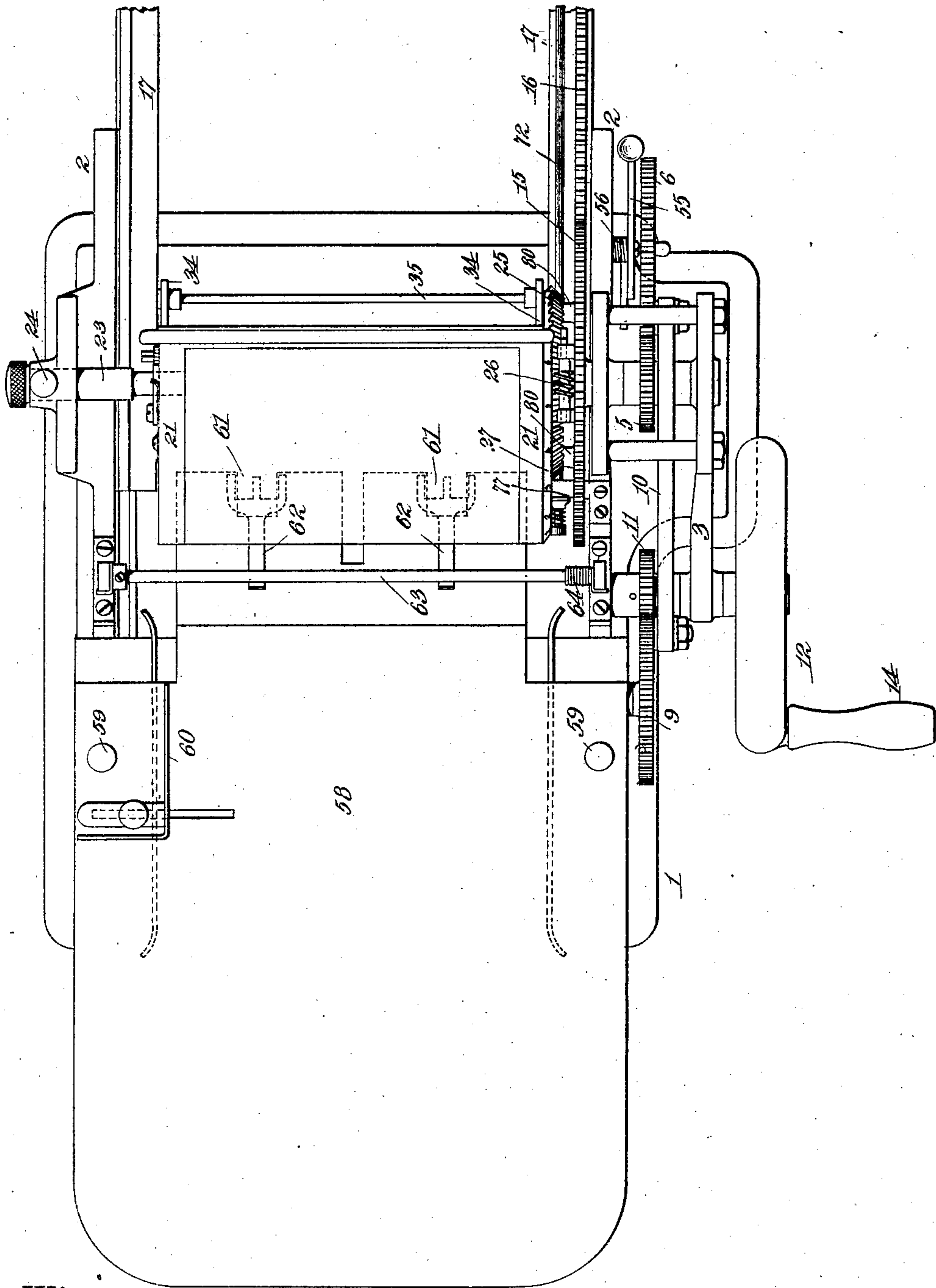
Patented Sept. 30, 1902.

A. B. DICK.
STENCIL PRINTING MACHINE.

(Application filed July 19, 1901.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses:

Jas. F. Coleman
Jno. Robt Taylor

Fig. 1

Inventor

Albert B. Dick
by Edgar Edwards
Att'ys.

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Fig. 2

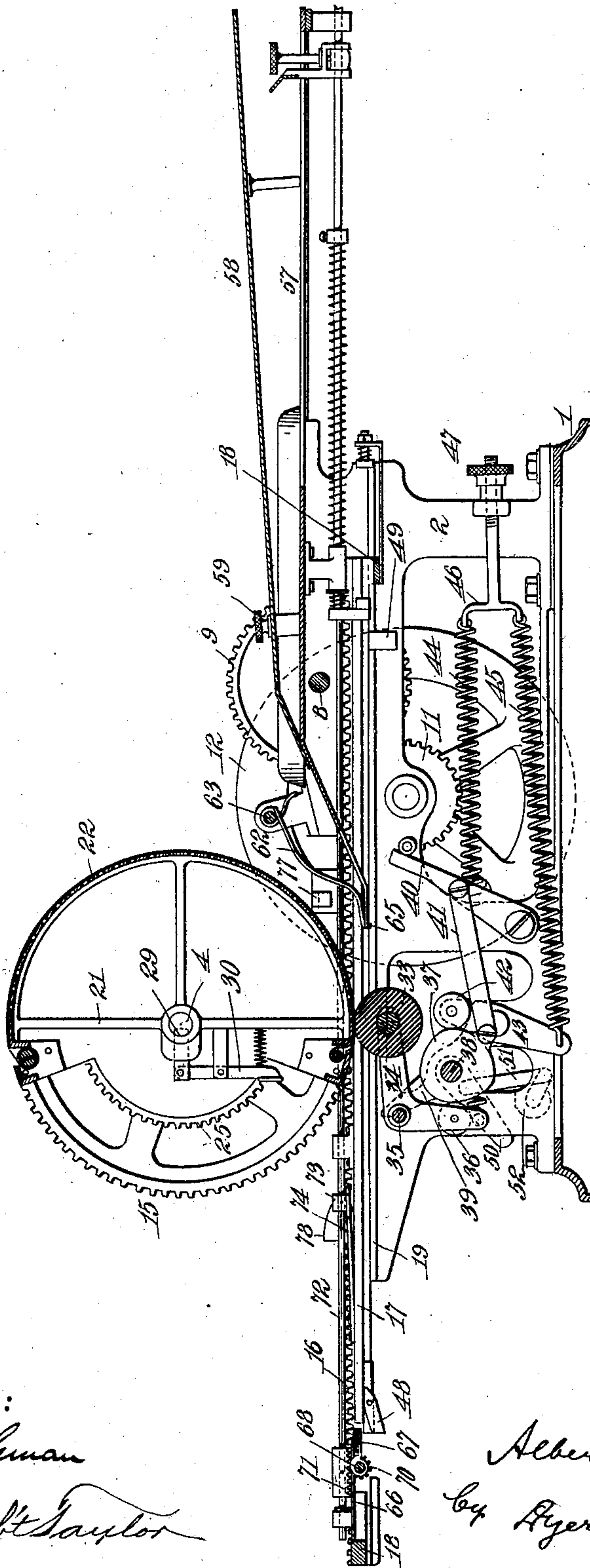
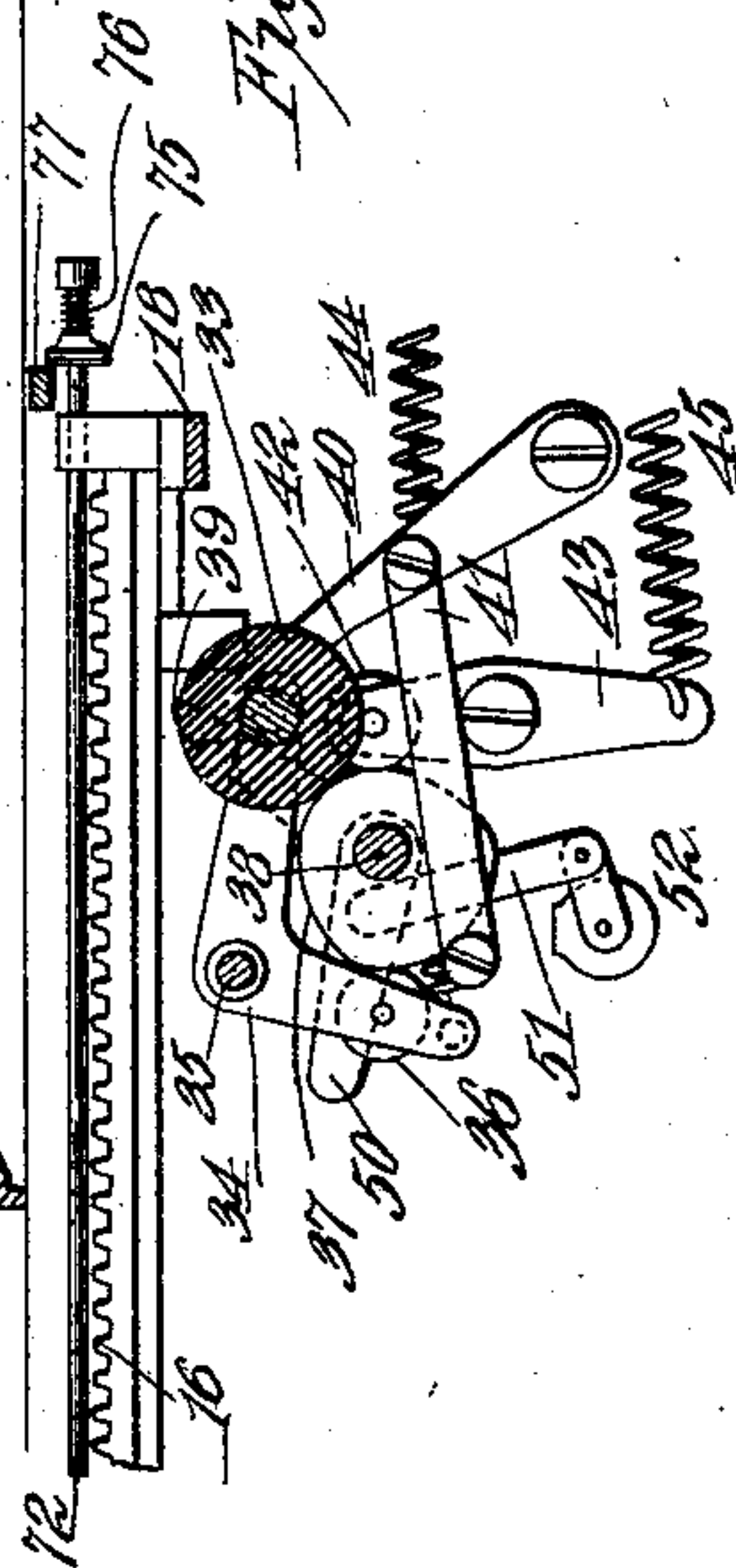


Fig. 3



Witnesses:

Jas. F. Coleman
Jno Robt Taylor

Inventor

Albert B. Dick
by Ayer Edmund Ayer
Att'ys.

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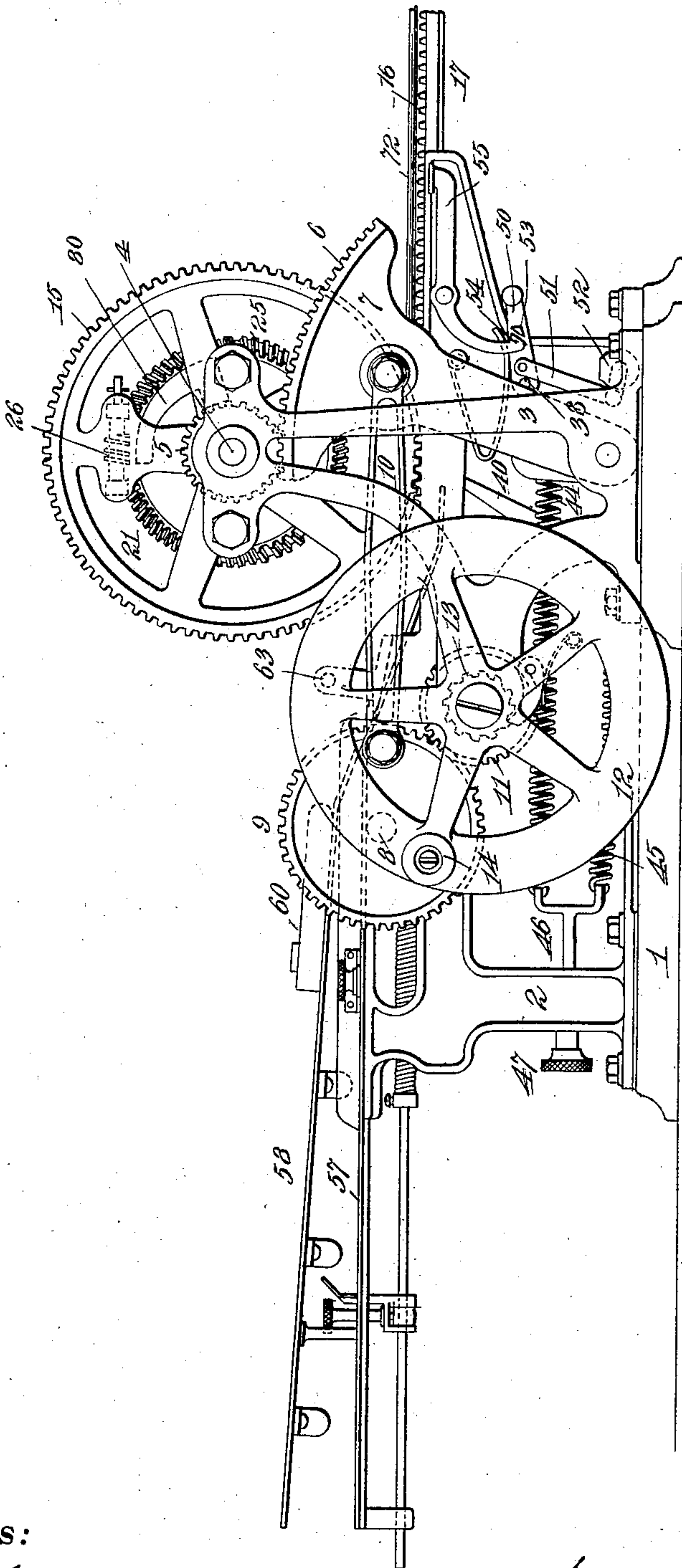
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4 Sheets—Sheet 3.

Fig. 4



Witnesses:

Jas. F. Coleman
Jno Robt Taylor

Inventor

Albert B. Dick
by Ayer Edmund Ayer
Att'ys.

No. 709,885.

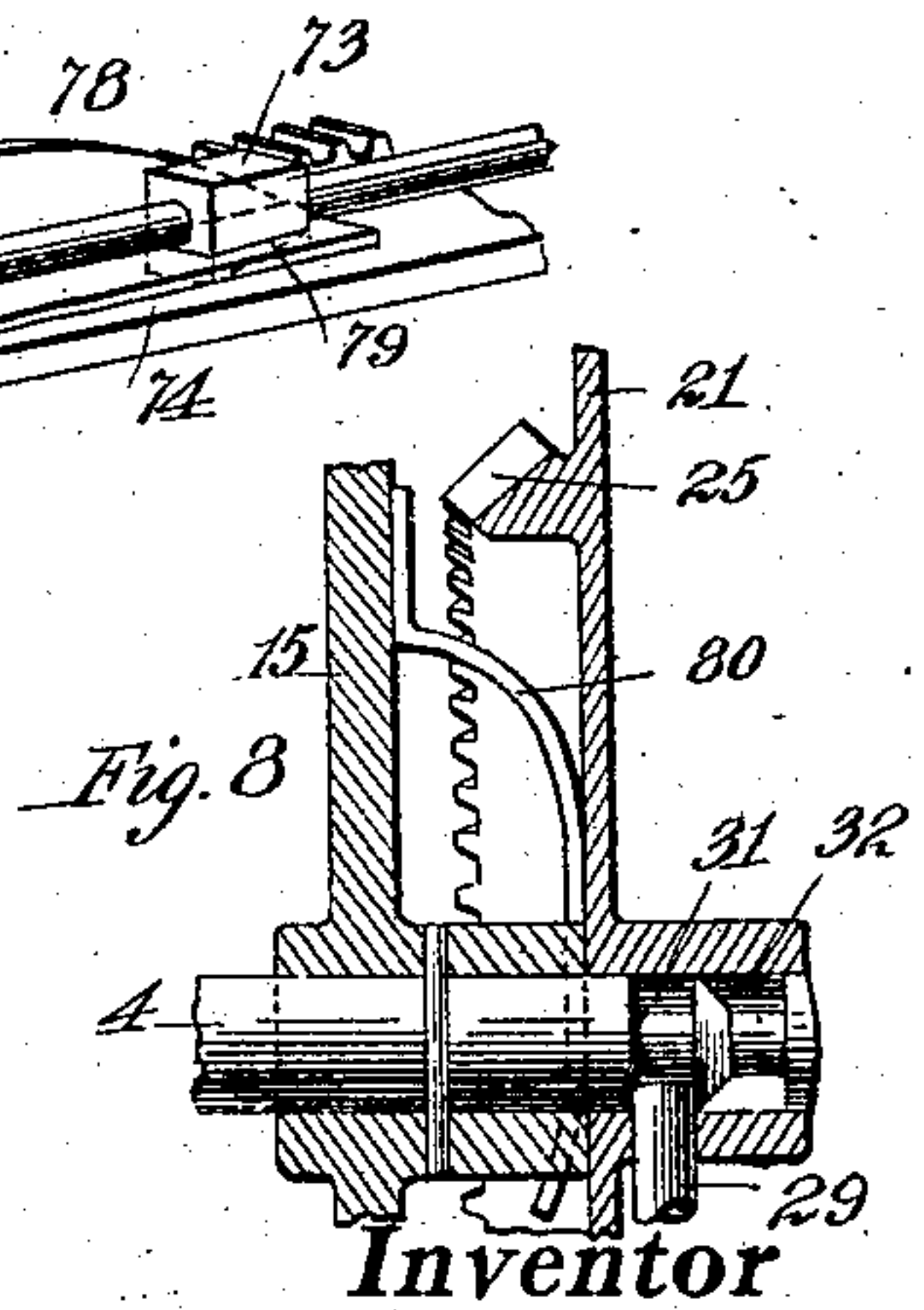
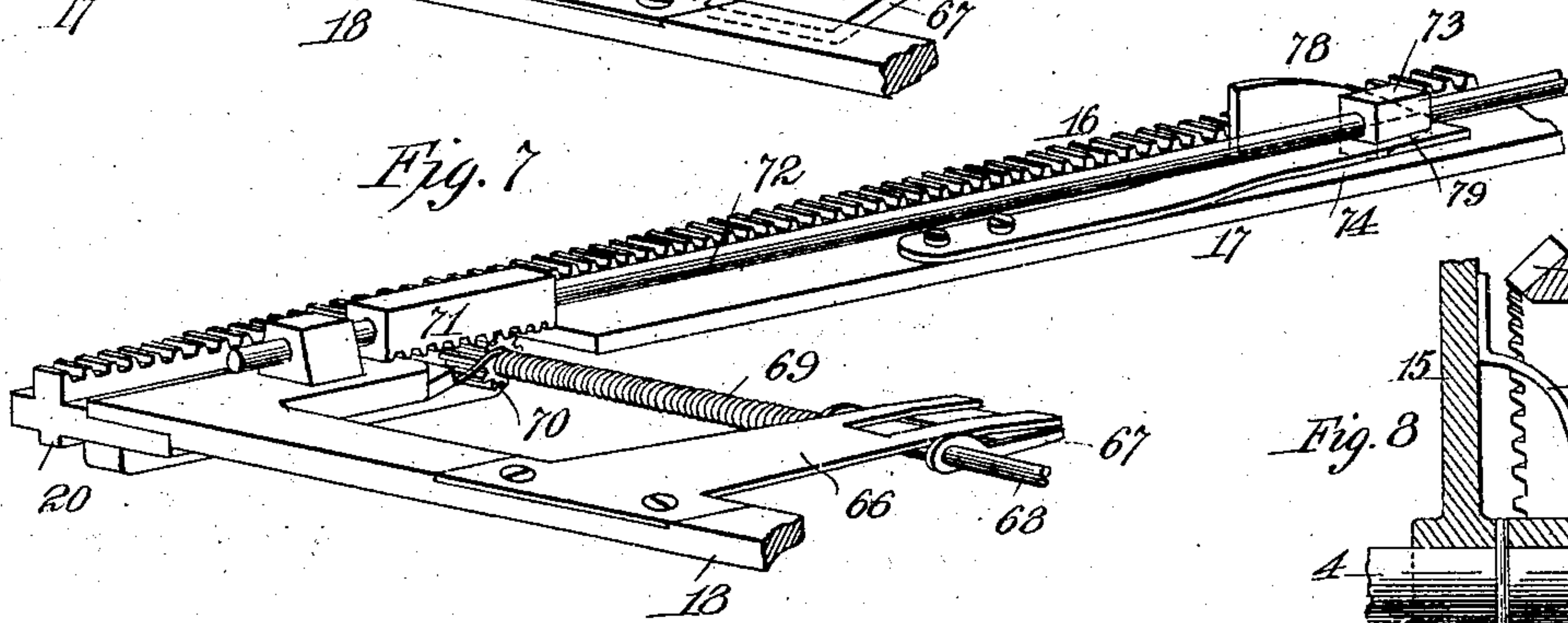
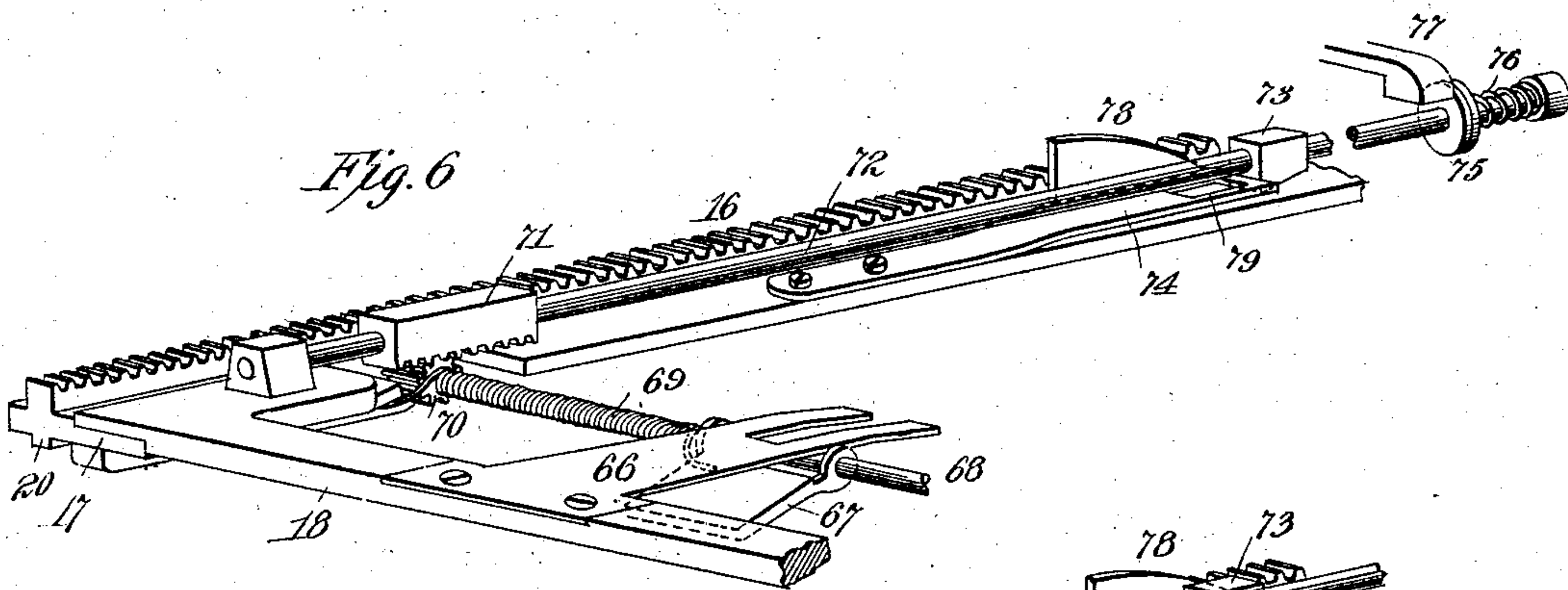
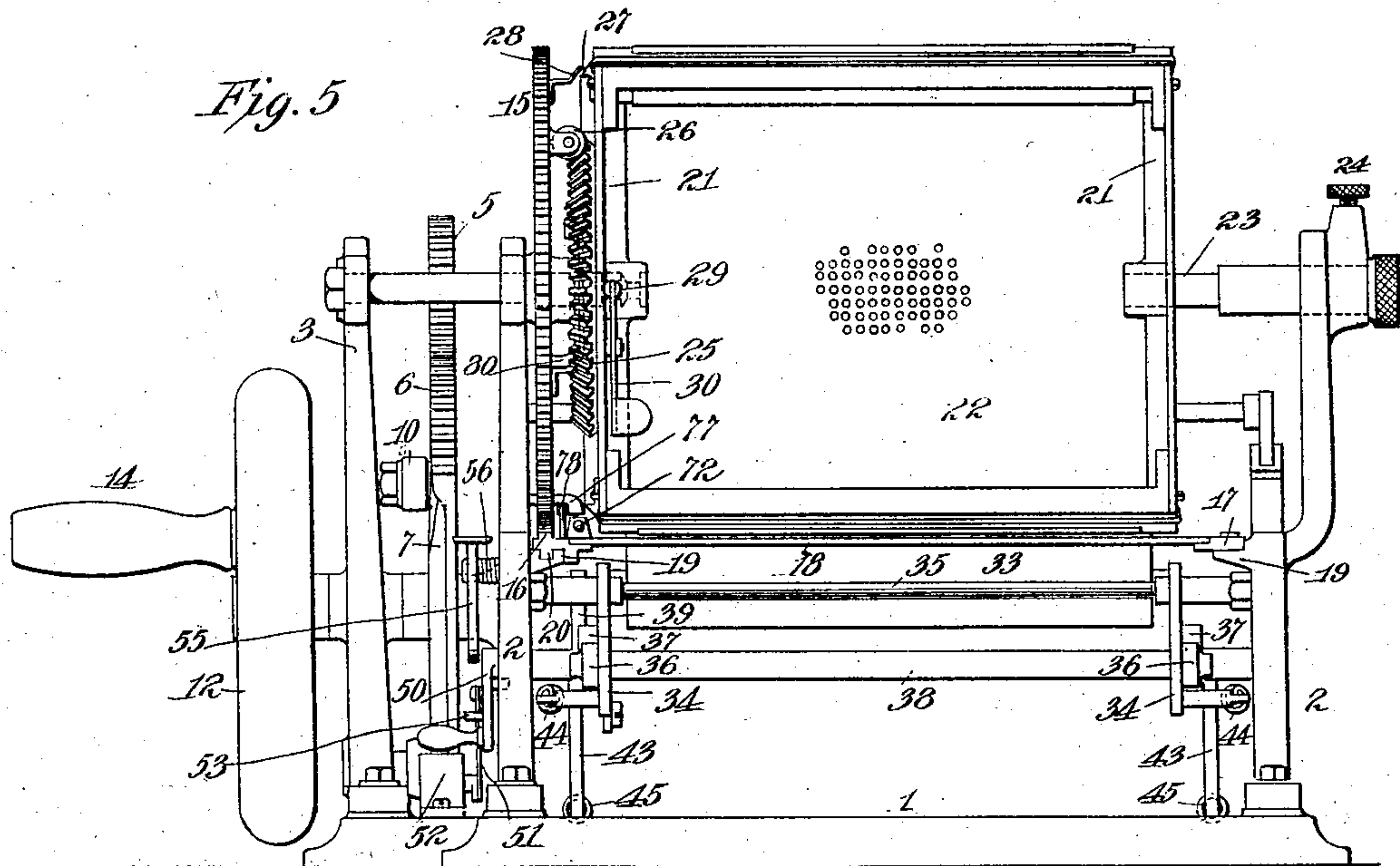
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STENCIL PRINTING MACHINE.

(Application filed July 19, 1901.)

(No Model.)

4 Sheets—Sheet 4.



Witnesses:

Jas. F. Cleman
Jno Robt Taylor

Inventor

Albert B. Dick
by
Ayer Edmund Ayer
Att'ys.

UNITED STATES PATENT OFFICE.

ALBERT B. DICK, OF CHICAGO, ILLINOIS.

STENCIL-PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 709,885, dated September 30, 1902.

Application filed July 19, 1901. Serial No. 68,892. (No model.)

To all whom it may concern:

Be it known that I, ALBERT B. DICK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Stencil-Printing Machines, of which the following is a specification.

My invention relates to improvements in stencil-printing machines of the type which I describe and claim in my application for Letters Patent filed June 10, 1899, Serial No. 720,008. With stencil-printing machines of this type an oscillating stencil-carrier is employed, which coöperates with a reciprocating paper-carrying frame arranged to draw the sheets to be printed between the stencil and an impression-roller and to automatically release the sheets after the printing operation.

My object is to provide improvements on the machine in question whereby its construction will be simplified and a more convenient operation will be permitted.

To this end the invention relates specifically to improvements in the mechanism for oscillating the stencil-carrier whereby a continuous rotary movement of the operating-handle will be converted into an oscillatory movement of the stencil-carrier instead of making use of an operating-handle, which requires first to be turned in one direction and then in the other, as with the machine of said application.

Second. The invention relates to improvements in the mechanism for depressing the impression-roller during the negative stroke of the machine and elevating it or permitting it to be elevated during the positive stroke, which will allow an easier operation of the parts to be secured than with the mechanism for the purpose described in said application.

Third. The invention relates to improvements in the mechanism for gripping the sheets at the end of the negative stroke of the paper-carrying frame and for releasing the sheets at the end of the positive stroke thereof which will be simpler in character and more certain in operation than the corresponding mechanism described in said application.

Fourth. The invention relates specifically to improvements in the mounting of the stencil-carrying frame whereby the location of

the stencil with respect to the sheets to be printed may be more conveniently and accurately adjusted than by the corresponding mechanism for the purpose described in said application.

Fifth. The invention relates to improvements in the mechanism for permitting the removal of the stencil-carrying frame for any purpose.

Sixth. The invention relates specifically to improvements in the mechanism for operating the counter for indicating the number of sheets being printed; and, finally, the invention relates to further specific improvements, all of which will be more fully hereinafter described and claimed.

In order that the invention may be better understood, attention is directed to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view of the improved machine; Fig. 2, a vertical sectional view showing the impression-roller in its elevated position, as during the printing operation, and illustrating the paper-carrying frame in an approximately midway position; Fig. 3, a detail of the mechanism for operating the impression-roller, showing the latter in a depressed position; Fig. 4, a side elevation; Fig. 5, and end view; Fig. 6, a detailed perspective view showing one of the paper-grippers in a retracted position; Fig. 7, a corresponding view showing the paper-gripper in its operative position; and Fig. 8, an enlarged view through one of the bearings of the stencil-carrier, illustrating particularly the two grooves therein with which the latch coöperates.

In all of the above views corresponding parts are represented by the same numerals of reference.

The base or foundation 1 carries side frames 2 2 of the desired form. At the side of one of the side frames is a supplemental frame 3. Mounted between the supplemental frame 3 and the adjacent side frame 2 is a shaft 4, (see Fig. 4,) and keyed to said shaft is a sleeve carrying a pinion 5. Engaging the pinion 5 is a segment 6 on a pivoted lever 7, the bearing for which is carried by the side frames. Mounted in suitable bearings in the side frames is a shaft 8, to which is keyed a spur-gear 9. Connecting the spur-gear 9 with the

pivoted lever 7 is a link 10. The spur-gear 9 is rotated by a pinion 11, the shaft of which is driven from a balance-wheel 12 through a ratchet-wheel and pawl 13, so that backward movement of the parts is prevented when an automatic paper-feeding attachment is used. A handle 14 is carried by the face of the balance-wheel for rotating the latter. Mounted on the shaft 4 within the adjacent side frame is a spur-gear 15, and said gear engages with a rack 16 on the paper-carrying frame. The latter comprises the side members 17 and end members 18. The side members 17 of the paper-carrying frame slide on guides 19, cast with the side frames, and one of said guides, as shown, is preferably provided with a recess with which a gib 20 on the paper-carrying frame engages, so that any tendency of the frame to become cramped in the ways will be overcome.

The stencil-carrier comprises side frames 21 and a semicylindrical perforated shell 22, substantially as I describe in my said application, whereby an open carrier will be produced, permitting ink to be applied on its interior. One of the side frames 21 of the stencil-carrier is mounted on the shaft 4, and the other is mounted on a stub-shaft 23, normally locked in position by a thumb-screw 24. The stencil-carrier is formed at one side with a bevel worm-gear 25, with which coöperates a worm 26 on the spur-gear 15. Preferably the stencil-carrier is also provided with a scale 27, with which an index 28 on the spur-gear 15 coöperates. (See Fig. 5.) In order to lock the stencil-carrier in its normal position, with the worm 26 in engagement with the bevel-gear 25, I employ a latch 29, (see particularly Fig. 2,) operated by a spring-pressed lever 30 and which engages a groove 31 (see Fig. 8) near the end of the shaft 4. By rotating the worm 26 by means of a suitable key applied to its shaft the stencil-carrier may be adjusted with respect to the gear 15 and in consequence with respect to the paper-carrying frame and the sheet therein. Since the grippers, (to be described,) which are mounted on the paper-carrying frame, always engage the sheet at its upper end, it will by this mechanism be possible to accurately adjust the stencil-carrying frame so that the stencil will always print upon the sheets at the right place, instead of necessitating the disengagement of the stencil-carrier from the paper-carrying frame in effecting this adjustment, as I describe in my said application. Preferably the shaft 4 is provided with a second groove 32, with which the latch 29 may engage when the stencil-carrier is shifted slightly to one side, withdrawing the gear 25 from the worm 26 and permitting the stencil-carrier to be rotated on the shaft 4 entirely independent of the gear 15. This enables a very rapid adjustment of the stencil-carrier to be effected and also permits the stencil-carrier to be properly manipulated when an old stencil is to be removed

and a new stencil placed in position, as will be understood. When it is desired to entirely remove the stencil-carrier, the stub-shaft 23 is withdrawn, and by then disengaging the latch 29 from the groove 31 or 32 the stencil-carrier may be shifted to one side to clear the end of the shaft 4 to thereby be completely removed. This makes a very convenient and effective device in actual use, as it secures either a rapid or a very handy adjustment of the stencil-carrier and enables the latter to be quickly removed or replaced, all of which operations become necessary in practice.

Preferably I employ a plurality of leaf-springs 80, which are interposed between the spur-gear 15 and the adjacent face of the stencil-carrier, as shown. The purpose of these springs is to offer a braking action on the stencil-carrier when the latch 29 is in engagement with the groove 32 of the shaft 4 to retard the movements of the stencil-carrier when the latter is being adjusted with respect to the stencil-carrying frame or for the purpose of having a new stencil applied in place. These springs tend to force the stencil-carrier toward the end of the shaft 4, so as to cause the latch 29 to automatically engage the groove 32 when said latch is released by the operation of the finger-piece 30 and at the same time disengage the worm-gear 25 from the worm 26.

Coöperating with the stencil-carrier, so as to force the sheet into engagement with the stencil on the positive stroke, is an impression-roller 33, the shaft of which is carried in bell-cranks 34, mounted on a shaft 35. The vertical arms of the bell-cranks 34 are provided with rollers 36, which engage with cams 37, one at each side of the machine within the side frames. These cams, which are of the form shown, are keyed to a shaft 38, so that they rotate in unison. Fixed to said shaft, outside of one of the cams and the impression-roller, is a lever 39 for moving the cam to the position to elevate the impression-roller, said lever being cut away, as shown, where it engages over the shaft 38 in the position shown in Fig. 2. Mounted in one of the side frames is a lever 40, which is used for moving the cams to the position to effect the lowering of the impression-roller, and said lever connects with one of the cams by a link 41. Since the cams are fast to the shaft 38, they will move in unison. Engaging with each of the cams 37 is a roller 42 on a lever 43, the purpose of which is to check any sudden movements of the cams in use and to assist the movement of the cams when opposition to such movement occurs in the operation. In other words, the levers 43 act as braking devices in one part of the operation and as accelerating devices in another part of the operation, as will be explained. The vertical arm of each bell-crank 34 is connected to a spring 44, and the lower end of each lever 43 is connected to a spring 45, both of which springs at each side

are attached to a yoke 46, adjusted by a nut 47. The lever 39 is moved from the position shown in Fig. 3 to the position shown in Fig. 2 at the commencement of the positive stroke of the paper-carrying frame by the engagement of a pawl or finger 48 on one of the side members 17 of the paper-carrying frame. The lever 40 is moved from the position shown in Fig. 2 to the position shown in Fig. 3 near the end of the positive stroke of the machine when it is desired to depress the impression-roller by the engagement therewith of a shoulder 49 on the same side member of the paper-carrying frame, but near the other end. If the equalizing-levers 43 were not used, it will be seen that when the lever 39 was moved to a slight extent to carry the high point of each cam beneath the rollers 36 the tension of the springs 44 would tend to rotate the cams to force the impression-roller upward with an objectionable shock. On the other hand, if such equalizing-levers were not used when the shoulder 49 engaged the lever 40 near the end of the positive stroke it will be seen that the cams in being moved from the position shown in Fig. 2 to that shown in Fig. 3 would be opposed by the tension of the springs 44, which would act as a check in the operation. By employing the equalizing-levers 43 it will be seen that as the cam moves from a low to a higher position with respect to the rollers 36 it will be moved in an inverse relation with respect to the rollers 42. In consequence the equalizing-levers oppose the springs 44 and prevent the latter from forcibly elevating the impression-roller in effecting the movement from the position shown in Fig. 3 to that shown in Fig. 2, while they assist the rotation of the cams, and hence reduce the stress of the springs 44, when the movement from the position shown in Fig. 2 to that illustrated in Fig. 3 is being effected.

Carried by the cam-shaft 38 is a small lever 50, having a handle at the end and which connects by a link 51 with a counter 52 of any suitable type. Such counters are common articles of manufacture on the market and are ordinarily about the size of a small bicycle-cyclometer. I do not claim anything new in its construction. It will be seen that each time the cam-shaft oscillates to depress or elevate the impression-roller the counter will be actuated to effect a registration. The lever 50 is provided with a tooth 53, which is adapted to engage a hook 54 on a pivoted lever 55, normally elevated by a spring 56, coiled around a shaft, as shown in Fig. 5. By slightly elevating the lever 50 the tooth 53 may engage the hook 54, thereby locking the impression-roller in a depressed position, throwing the device and the counter out of operation when desired.

Referring now to the means for gripping the sheets and releasing them after they have been printed, I illustrate the machine in the drawings as being provided with a bed 57, which is directly used only when the machine

is provided with an automatic feed, as I shall describe and claim in an application for Letters Patent filed on even date herewith. The rod, with the spiral spring coiled thereon, which is shown beneath this bed, has no function when the machine is used with a hand-feed, and therefore need not be described, although it constitutes a part of the stencil-printing machines, which are ordinarily built for both hand and automatic feed. For hand-feeding I carry a supplemental bed 58 on the bed 57 and secure it in place by thumb-screws 59. This supplemental bed is provided at one side with an adjustable gage 60 for guiding the sheets into the machine. At its forward edge the bed 57 is cut away at 61. Mounted above the bed 57 are spring-pressed limiting-fingers 62, each having three tines at its lower end, the outer ones resting upon the front of the bed 57 on both sides of the cut-away portion 61. The limiting-fingers 62 are carried on a shaft 63 and are impelled downward by a spring 64, coiled around said shaft. The middle tine of each limiting-finger is bent downward at 65, as shown in Fig. 2, so that sheets of paper introduced between the limiting-fingers and the bed 57 will be limited by said downturned ends, as will be understood. Secured to the front member 18 of the paper-carrying frame are two stationary jaws 66, each having a pair of fingers which work between the tines of the limiting-fingers 62 when the paper-carrying frame has been moved to the end of its negative stroke. Co-operating with these jaws are grippers 67 in the form of plates secured to a shaft 68, mounted in the side members of the paper-carrying frame and normally moved to the position shown in Fig. 7 to engage the fingers of the jaws 66 by a spring 69, coiled around said shaft. The shaft 68 carries a pinion 70 at one end, which engages with a rack 71, carried on a rod 72. This rod is provided with a block 73 thereon, which is adapted to be engaged in front of a spring-latch 74 (see Fig. 6) to hold the jaws 67 in a normally retracted position. The rod 72 is provided near its outer end with a buffer 75, working against a spring 76, so as to absorb any shocks in use, which buffer is adapted to be engaged with a stationary lug 77 on one of the side frames 2 of the machine when the paper-carrying frame approaches the end of its positive stroke, withdrawing the rod 72, opening the grippers, locking the block 73 in front of the latch 74, and permitting the sheet to fall out. The latch 74 is provided with a cam 78, which engages beneath the shaft 8 just as the paper-carrying frame completes its negative stroke, so that the latch 74 will be depressed to release the block 73, permitting the spring 69 to partially turn the shaft 68 to close the grippers 67 on the jaws 66 to grip the sheet. In this movement of the grippers 67 the latter will strike the depressed portion 65 of the central tine of the limiting-fingers 62, elevating the same from the sheet and permitting the lat-

ter to be drawn down into the machine for printing.

The spring-latch 74 is provided with a recess 79 therein, in which the block 73 may engage when in the position shown in Fig. 7.

The operation of my improved stencil-printing machine has been generally indicated in the foregoing description; but it may be briefly summarized as follows: By rotating the balance-wheel 12 the pinion 11 drives the spur-gear 9, and through the link 10 the lever 7 will be oscillated to thereby oscillate the pinion 5 and gear 15. The latter being connected to the stencil-carrier will oscillate the same, and being in engagement with the rack 16 will reciprocate the paper-carrying frame on the track 19. Assuming the impression-roller to be elevated, then near the end of the positive—i. e., the printing—stroke and after the sheet has passed out of engagement with the impression-roller the shoulder 49 on the paper-carrying frame will engage the lever 40, which through the link 41 will partially rotate the cams 37 to depress the impression-roller to the position shown in Fig. 3. As the paper-carrying frame moves on its return or negative stroke, the shaft 68, jaws 66, and grippers 67 will pass between the stencil-carrier and the impression-roller, and at the end of that stroke the cam 78 will strike the shaft 8, depressing the latch 74 and permitting the spring 69 to close the grippers so as to grip the sheet, the block 73 engaging within the recess 79 in the spring 74. (See Fig. 7.) The positive stroke then commences, the sheet being drawn by the grippers between the stencil-carrier and the impression-roller. As soon as the grippers have passed the impression-roller the pawl 48 on the paper-carrying frame will engage the upper end of the lever 39, rotating the cams 37 in the other direction and elevating the impression-roller to the position shown in Fig. 2 to effect the printing. At the end of the positive stroke the buffer 75 will engage the lug 77 on the frame, drawing the block 73 out of the recess 79 (the under side of the block being inclined, as shown, to permit this) and again engaging the block with the latch 74 to hold the grippers 67 in their retracted position, permitting the printed sheet to fall out into a suitable tray or basket.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. In a stencil-printing machine of the type described, the combination with a stencil-carrier and a paper-carrying frame geared together, of a shaft connected to the stencil-carrier, a pinion on the shaft, an oscillating segment engaging with said pinion, a hand-operated balance-wheel, and connections between said balance-wheel and said segment for oscillating the latter, a ratchet and pawl being interposed in said connections, substantially as set forth.

2. In a stencil-printing machine, the com-

bination with a shaft and means for operating the same, of a stencil-carrier loosely mounted on said shaft, and a worm-gear for adjusting the stencil-carrier with respect to the shaft, substantially as set forth.

3. In a stencil-printing machine, the combination with a shaft and means for operating the same, of a stencil-carrier loosely mounted on said shaft, a worm-gear for adjusting the stencil-carrier with respect to the shaft, and means for disengaging the elements of said worm-gear, substantially as set forth.

4. In a stencil-printing machine, the combination with a shaft and means for operating the same, of a stencil-carrier mounted on said shaft and adjustable longitudinally with respect to the same, a plurality of grooves in said shaft, and a latch on the stencil-carrier for engaging said grooves, substantially as set forth.

5. In a stencil-printing machine, the combination with a shaft and means for operating the same, of a stencil-carrier adjustable circumferentially with respect to the shaft, and a braking-spring connected to the shaft and engaging the stencil-carrier, substantially as set forth.

6. In a stencil-printing machine, the combination with a shaft and means for operating the same, of a stencil-carrier adjustable longitudinally and circumferentially with respect to said shaft, a latch for locking the stencil-carrier against longitudinal movement, and a braking-spring connected to the shaft for resisting radial movement of the stencil-carrier, substantially as set forth.

7. In a stencil-printing machine, the combination with a shaft and means for operating the same, of a stencil-carrier adjustable longitudinally and circumferentially of the shaft, a latch for locking the stencil-carrier against longitudinal movement, a worm-gear on the stencil-carrier, and a worm connected to the shaft engaging said worm-gear, substantially as set forth.

8. In a stencil-printing machine, the combination with a shaft and means for operating the same, of a stencil-carrier adjustable longitudinally and circumferentially of the shaft, a latch for locking the stencil-carrier against longitudinal movement, a worm-gear on the stencil-carrier, a worm connected to the shaft engaging said worm-gear, and a braking-spring connected to the shaft, engaging the stencil-carrier and moving the same longitudinally to disengage the worm from the worm-gear when said latch is operated, substantially as set forth.

9. In a stencil-printing machine of the type described, the combination with an oscillating stencil-carrier and a reciprocating paper-carrying frame geared to said stencil-carrier, of an impression-roller coöperating with the stencil-carrier, a lever connected with said impression-roller, a cam for operating said lever, and levers coöperating with stops on the

paper-carrying frame for partially turning said cam in reverse directions, substantially as set forth.

10. In a stencil-printing machine of the type described, the combination with an oscillating stencil-carrier and a reciprocating paper-carrying frame geared to said stencil-carrier, of an impression-roller cooperating with the stencil-carrier, a lever connected with said impression-roller, a cam for operating said lever, levers cooperating with stops on the paper-carrying frame for partially turning said cam in reverse directions, and an equalizing-lever cooperating with said cam, substantially as set forth.

11. In a stencil-printing machine of the type described, the combination with an oscillating stencil-carrier and a reciprocating paper-carrying frame geared to said stencil-carrier, of an impression-roller cooperating with said stencil-carrier, a cam for elevating and depressing the said impression-roller, a lever connected directly with the shaft of said cam for partially turning the same in one direction, and another lever connected to the cam for turning the cam in the opposite direction, substantially as set forth.

12. In a stencil-printing machine of the type described, the combination with an oscillating stencil-carrier and a reciprocating paper-carrying frame geared to said stencil-carrier, of an impression-roller cooperating with said stencil-carrier, a cam for elevating and depressing the said impression-roller, a lever connected directly with the shaft of said cam for partially turning the same in one direction, another lever connected to the cam for turning the cam in the opposite direction, and an equalizing-lever cooperating with said cam, substantially as set forth.

13. In a stencil-printing machine of the type described, the combination with an oscillating stencil-carrier and a reciprocating paper-carrying frame geared to said stencil-carrier, of an impression-roller, two bell-cranks carrying the impression-roller, a cam-shaft, cams on said shaft with which the bell-cranks engage, and levers cooperating with stops on the paper-carrying frame for partially rotating the cams, as and for the purposes set forth.

14. In a stencil-printing machine of the type described, the combination with an oscillating stencil-carrier and a reciprocating paper-carrying frame geared to said stencil-carrier, of an impression-roller, two bell-cranks carrying the impression-roller, a cam-shaft, cams on said shaft with which the bell-cranks engage, levers cooperating with stops on the paper-carrying frame for partially rotating the cams, and equalizing-levers cooperating with said cams, as and for the purposes set forth.

15. In a stencil-printing machine of the type described, the combination with an os-

cillating stencil-carrier and a reciprocating paper-carrying frame geared to said stencil-carrier, of an impression-roller, two bell-cranks carrying the impression-roller, a cam-shaft, cams on said shaft with which the bell-cranks engage, levers cooperating with stops on the paper-carrying frame for partially rotating the cams, equalizing-levers cooperating with said cams, a pair of springs at each side of the machine connected to the equalizing-levers and bell-cranks, and a common adjusting mechanism for each pair, substantially as set forth.

16. In a stencil-printing machine of the type described, the combination with an oscillating stencil-carrier and a reciprocating paper-carrying frame connected to said stencil-carrier, of an impression-roller cooperating with the stencil-carrier, a cam-shaft for depressing and elevating said impression-roller, an arm carried by said shaft, a counter connected to said arm, and a latch for holding said arm in a normally elevated position to keep the impression-roller normally depressed, substantially as set forth.

17. In a stencil-printing machine of the type described, the combination with an oscillating stencil-carrier and a reciprocating paper-carrying frame, of a stationary jaw mounted on said frame, a shaft mounted in the frame beneath the jaw, a gripper on said shaft, a pinion on said shaft, and a rack engaging said pinion to rotate the shaft to withdraw the gripper, substantially as set forth.

18. In a stencil-printing machine of the type described, the combination with an oscillating stencil-carrier and a reciprocating paper-carrying frame, of a stationary jaw mounted on said frame, a shaft mounted in the frame beneath the jaw, a gripper on said shaft, a pinion on said shaft, a rack engaging said pinion to rotate the shaft to withdraw the gripper, a rod for operating said rack, and a buffer on said rod engaging a stationary stop on the main frame, substantially as set forth.

19. In a stencil-printing machine of the type described, the combination with an oscillating stencil-carrier and a reciprocating paper-carrying frame, of a stationary jaw mounted on said frame, a shaft mounted in the frame beneath the jaw, a gripper on said shaft, a pinion on said shaft, a rack engaging said pinion to rotate the shaft to withdraw the gripper, a rod connected to said rack, a block on said rod, and a spring-latch for normally locking said block to hold the gripper in a retracted position, substantially as set forth.

This specification signed and witnessed this 11th day of June, 1901.

ALBERT B. DICK.

Witnesses:

FRANK L. DYER,
JNO. R. TAYLOR.