

1,070,021.

P. J. DREHER.
SHEET FEEDING MEANS FOR TYPE WRITERS, &c.
APPLICATION FILED AUG. 29, 1911.

Patented Aug. 12, 1913.

3 SHEETS-SHEET 1.

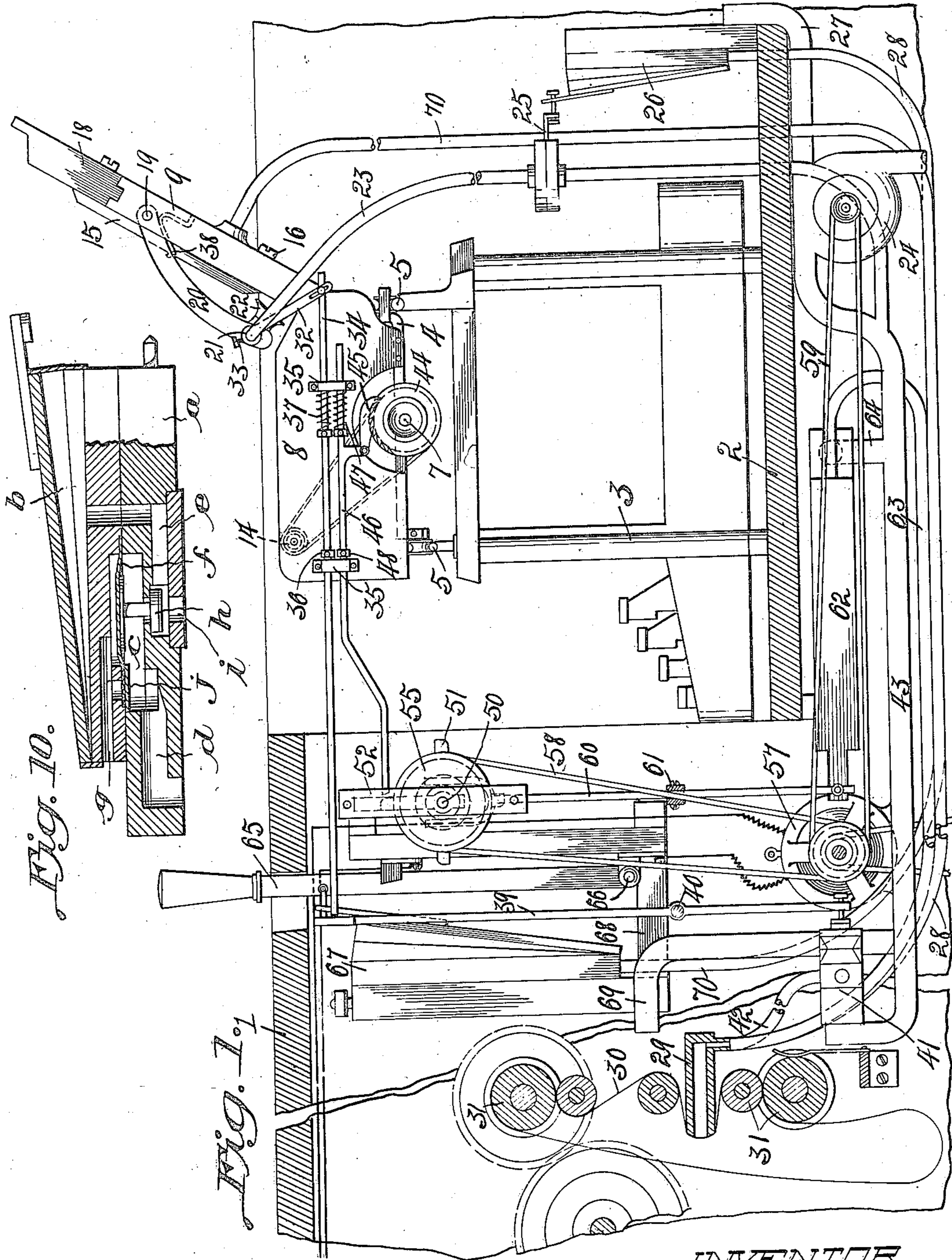


Fig. 10.

Fig. 1.

WITNESSES:

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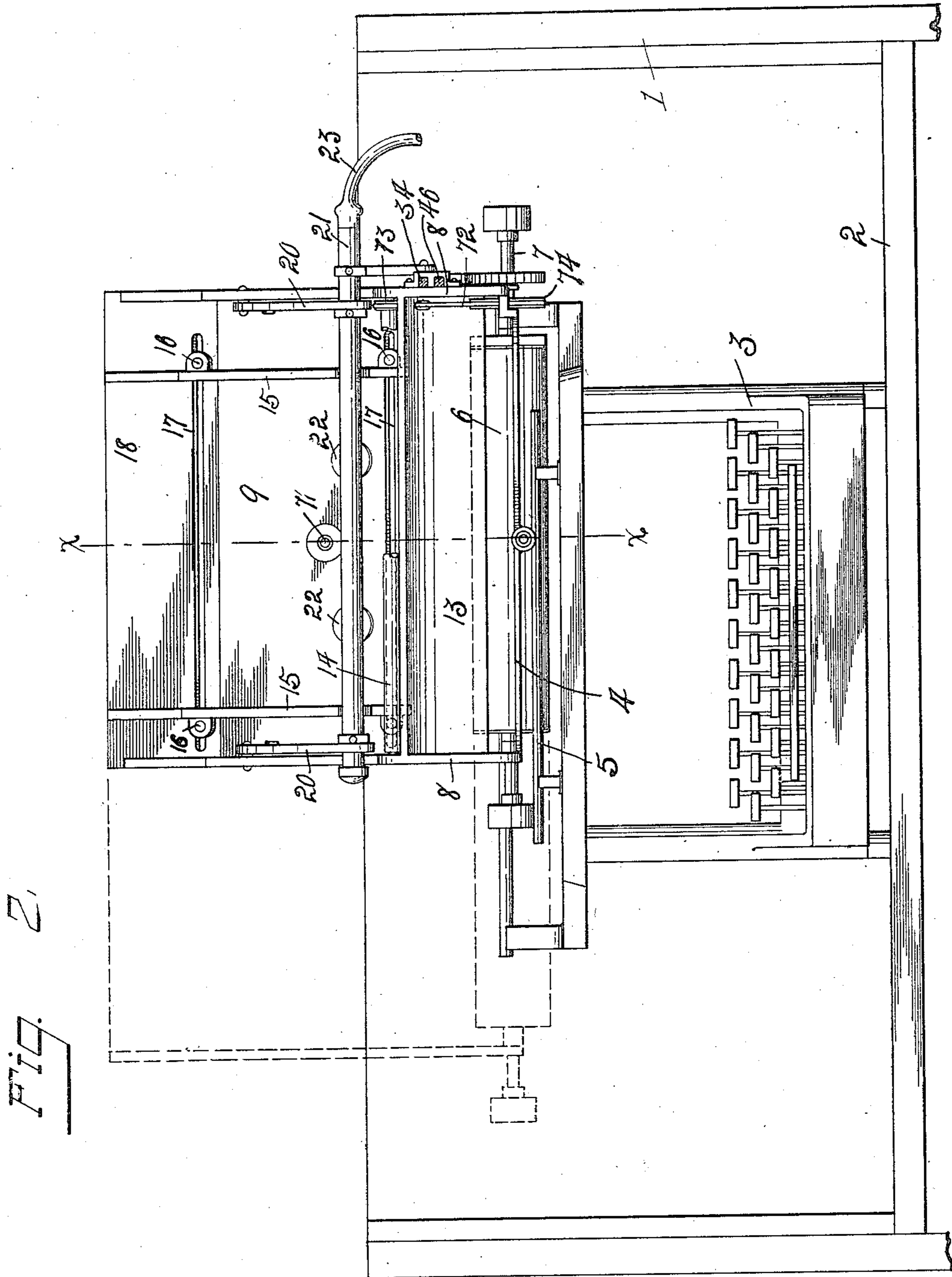


Fig. 2.

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3 SHEETS--SHEET 3.

Fig. 3.

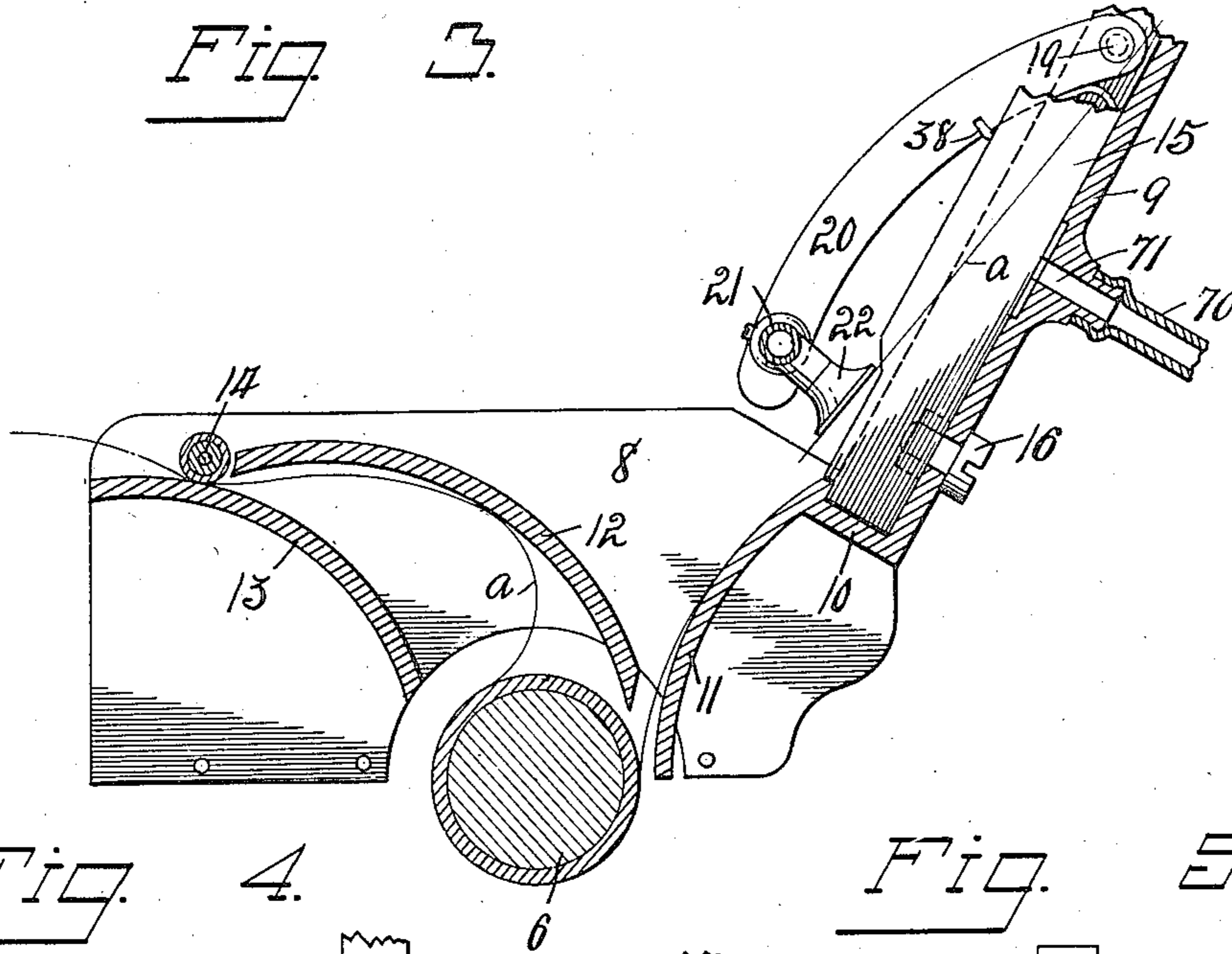


Fig. 4.

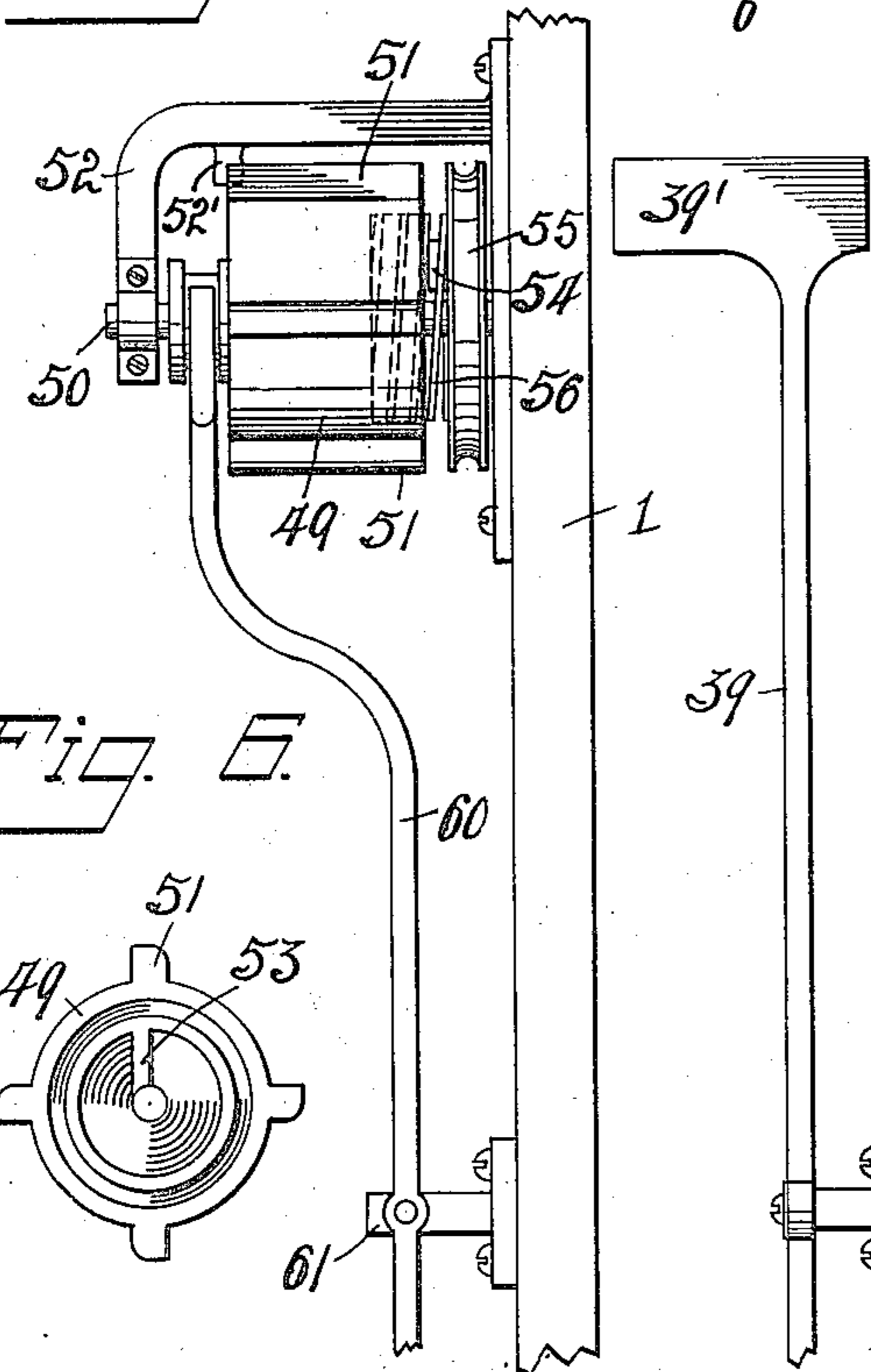


Fig. 5.

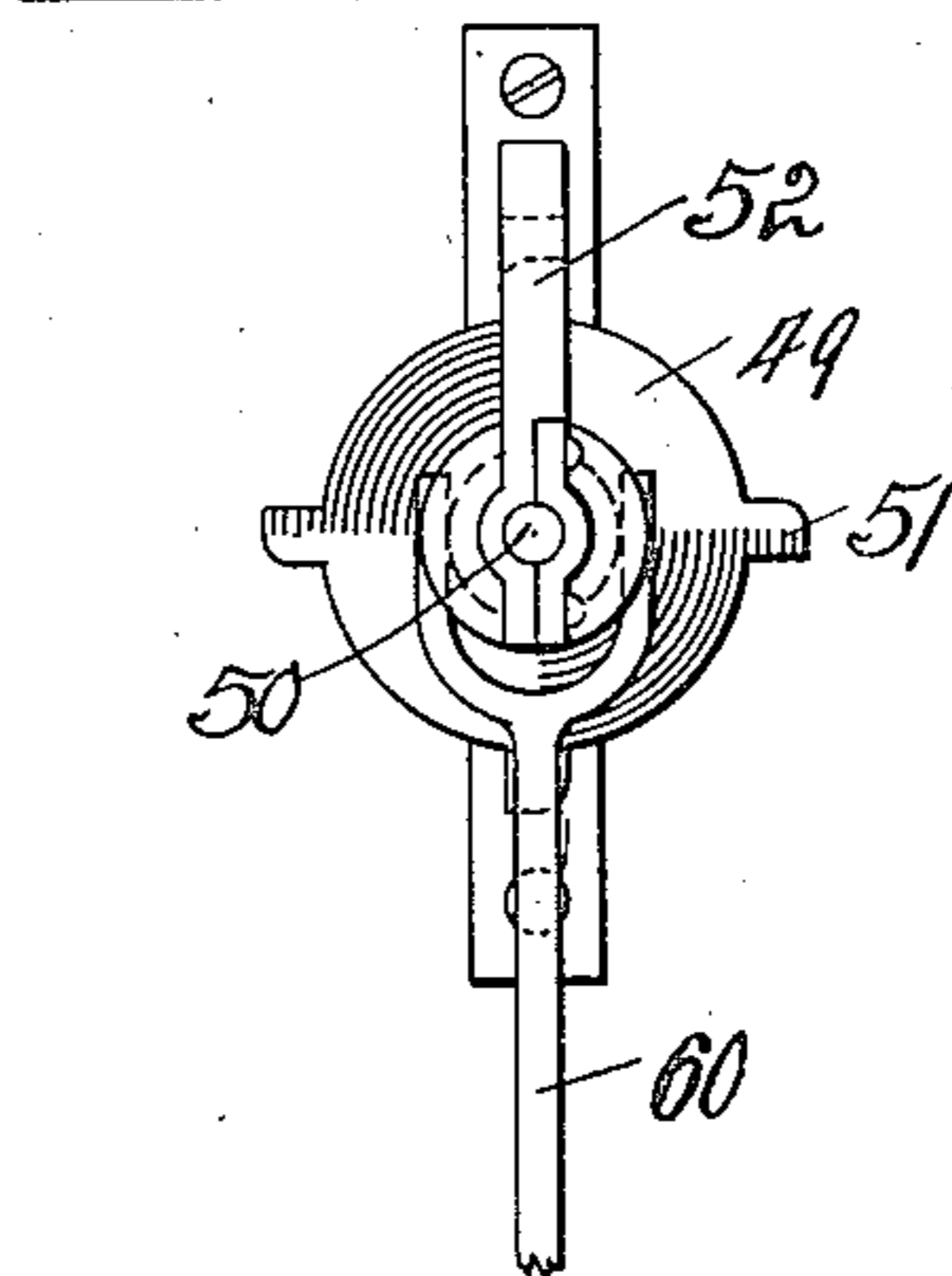


Fig. 6.

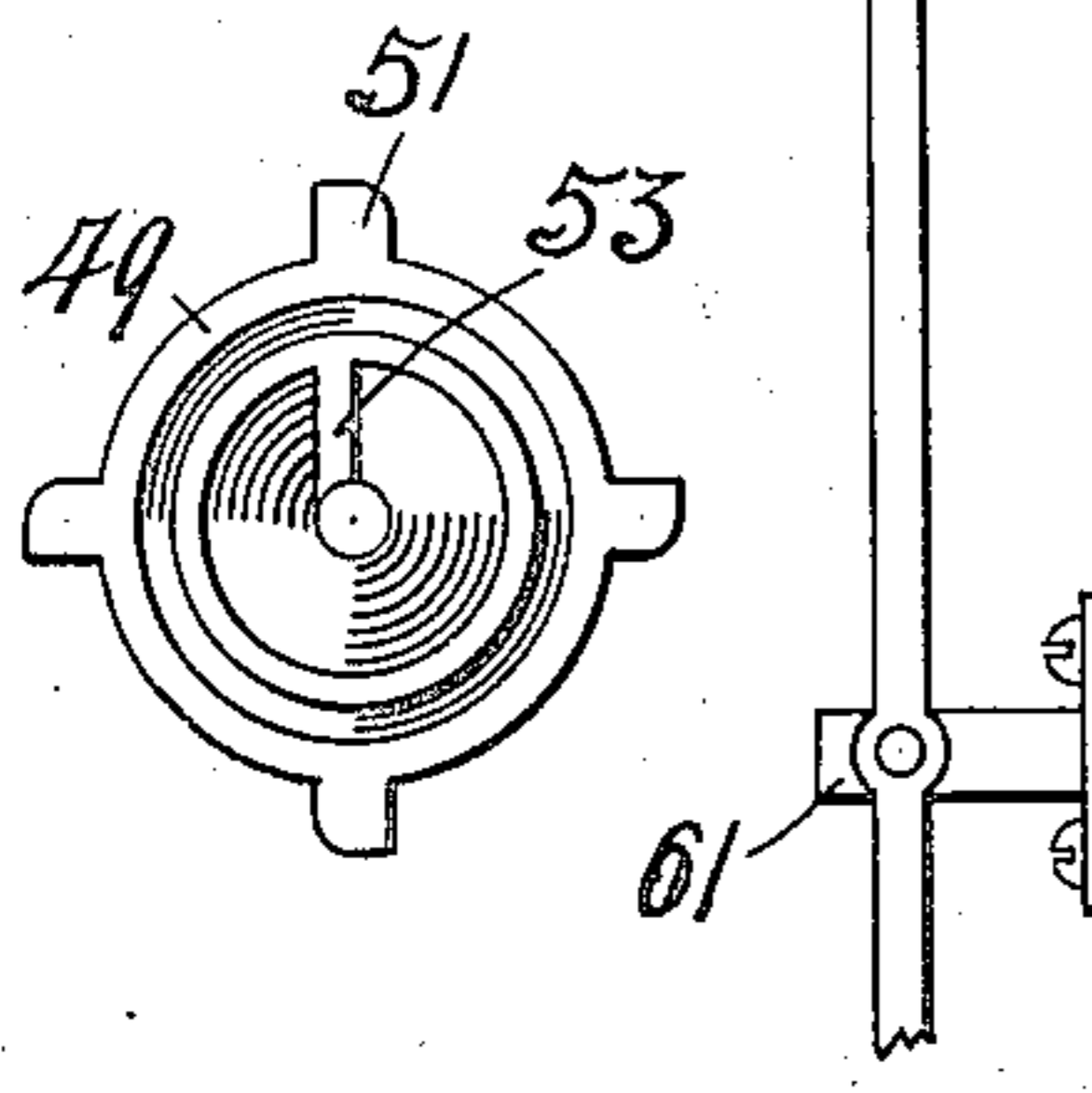


Fig. 7.

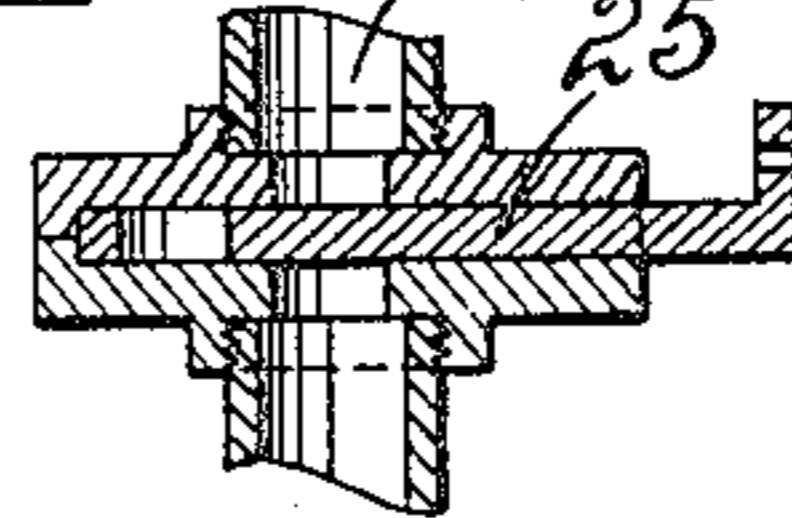
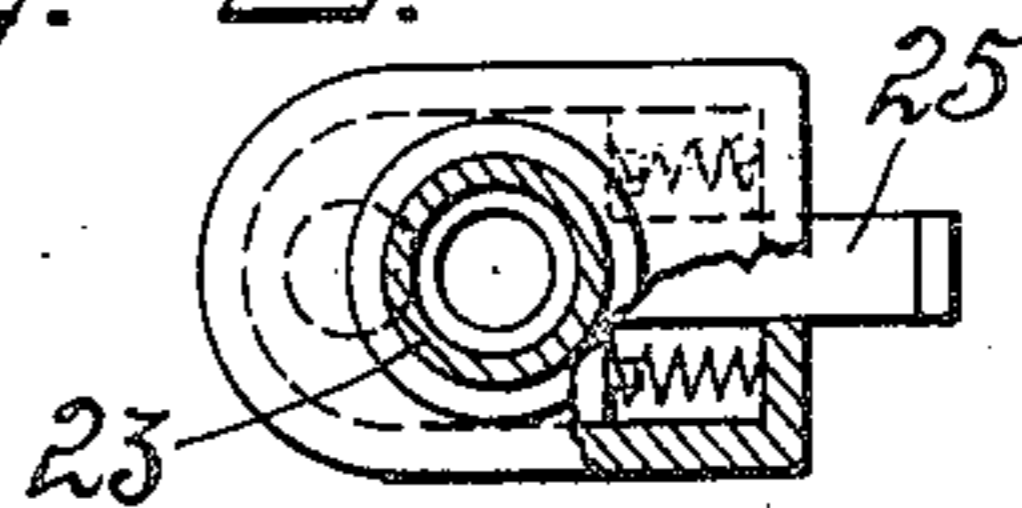


Fig. 8.



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Fig. 9.

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UNITED STATES PATENT OFFICE.

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SHEET-FEEDING MEANS FOR TYPE-WRITERS, &c.

1,070,021.

Specification of Letters Patent.

Patented Aug. 12, 1913.

Application filed August 29, 1911. Serial No. 646,661.

To all whom it may concern:

Be it known that I, PHILLIP JACOB DREHER, a citizen of the United States, and a resident of Toledo, in the county of Lucas and State of Ohio, have invented a certain new and useful Sheet-Feeding Means for Type-Writers, &c.; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to automatically operated typewriters, and has particular reference to the paper or sheet feeding mechanism thereof, but is not restricted to such use as it may be used in any connection for which it is applicable.

The object of my invention is the provision, in combination with a typewriter or other machine for which it is applicable, of simple and efficient mechanism, which is automatically operable to intermittently feed sheets of paper or the like to the printing parts of the machine, and also to rapidly place the sheets in writing position within the machine and rapidly deliver the printed sheets from such parts when the printing thereon has been completed.

Further objects of my invention will be obvious from the following detailed description.

The invention is fully described in the following specification, and while in its broader aspect, it is capable of embodiment in numerous forms, a preferred embodiment thereof is illustrated in the accompanying drawings, in which,—

Figure 1 is a side elevation of the mechanism embodying my invention in association with a typewriter with parts of the same in section. Fig. 2 is a front elevation of a typewriter and associated sheet feeding parts with portions of the latter broken away. Fig. 3 is an enlarged cross-section of the sheet feeding mechanism and associated typewriter platen taken on the line x, x in Fig. 2 with a portion of the former broken away. Figs. 4, 5 and 6 are different enlarged details of parts of the platen driving mechanism. Figs. 7 and 8 are different sectional views of the valve in the air-conduit leading from the sheet picking up means. Fig. 9 is an enlarged view of the upper end portion

of the striker lever which actuates the sheet picking up mechanism, and Fig. 10 is an enlarged sectional detail of one form of pneumatic unit.

Referring to the drawings, 1 designates a typewriter desk or other suitable part with which my invention is associated, 2 the lowered top portion thereof, and 3 a typewriter of any suitable form which rests upon the part 2.

4 designates the customary typewriter carriage, which operates over the top portion of the machine on tracks 5, in the usual or any suitable manner, and 6 designates the platen-roll, the ends of the shaft 7 of which are journaled in the carriage 4.

Secured to and rising from the carriage 4 at the ends thereof are the side plates or walls 8 which are connected at their rear ends by an inclined sheet-carrying table 9, the lower end portion of which is provided with a wall 10 against which the lower edges of the sheets to be fed to the typewriter rest. The plates 8 are also connected by the paper guiding webs 11, 12 and 13 arranged one in advance of the other in the order designated. The web 11 extends downward and forward from the forward edge of the lower table wall 10 in position to guide the course of the sheet a to the platen roll 6 in position to be wound thereon, while the web 12 extends from adjacent to the rear portion of the platen roll upward and forward from the same over a portion of the web 13 to coact with the forward end of a sheet as it feeds forward from the platen 6 and direct its course between the forward ends of the webs 12 and 13, which are arranged as indicated for such purpose. A delivery roll 14 is arranged over the forward portion of the web 13 in advance of the web 12 and coacts with a sheet a to deliver it from the platen when released thereby. The table 9 is provided on its upper surface with gage bars 15 which extend lengthwise of the table and are adjustable transversely thereof to suit the width of the sheets a to be printed. For the purpose of such adjustment the bars 15 are secured to the table by set screws 16, which work through transversely extending slots 17—17 therein.

To accommodate long sheets a and also to permit the table 9 to be shortened to enable it to be lowered into the ordinary typewriter desk with the typewriter, it is provided at its upper end with a removable

extension part 18, which fits against the upper end of the major portion of the table 9, as indicated in Figs. 1 and 2, and is held thereto by the gage-bars 15 due to one of the slots 17 being provided therein. To remove the extension 18 and gage-bars from the table 9 it is only necessary to remove the screws 16 at the lower ends of the bars 15.

Pivoted to the sides of the table 9, as at 19, and extending forward and downward therefrom are a set of arms 20 which are connected at their lower ends by a tubular shaft 21, which is mounted for rotary movements therein and has one end closed. One or more suction mouthpieces 22 extend laterally from the shaft 21 toward the table 9 and have their outer ends preferably formed in bell shape of soft rubber or other suitable material. These mouthpieces are in connection with the interior of the shaft 21 and are adapted, when moved inward to place their open ends in flat contact with a sheet. A suction is created through the mouthpieces 22 to cause a sheet to adhere thereto and be carried outwardly therewith upon an outward swinging movement of the attached shaft with the arms 20 by reason of a tube or conduit 23 extending from the open end of the shaft 21 to a suction-pump 24, said tube having, in the present instance, a slide-valve 25 located therein.

The movements of the valve 25 are pneumatically controlled, being attached to the movable part of a bellows 26 which has an exhaust tube 27 leading to the pump 24 and an air-inlet tube 28 leading thereto from a passage in a tracker-board 29. The admission of air to the different passages of the tracker-board 29 is controlled by the co-operation therewith of a perforated sheet 30 the feeding and guiding of which is controlled in any suitable manner by the feed and guide rolls 31, as is well understood in the art. The means for driving the perforated sheet 30 is more fully described in my copending application Serial No. 638,894. The valve 25 normally stands closed and opening movements are communicated thereto by a collapsing of the bellows 26. Numerous forms of these bellows are on the market, and it will be sufficient for an understanding of the operation of the invention to describe one form only thereof, which is shown in detail in Fig. 10.

In such bellows, *a* designates the body or stationary part, and *b* the interior of the bellows proper. The body *a* is provided with a chamber *c* which has communication through a passage *d* with a suction pipe 27 and has communication through a passage *e* with the interior *b* of the bellows. A diaphragm *f* is disposed in the chamber *c* and divides it into two compartments, one of which has communication with both passages *d* and *e*, while the other has communi-

cation through a passage *g* with the tube 28 leading from the associated tracker board passage. A disk-valve *h* is disposed in the passage *e*, and has its stem projected into the chamber *c* and attached to the diaphragm *f*. When the valve is raised by the suction action thereon from within the chamber *c* it closes the communication between such chamber and the passage *e*, and when lowered, due to the atmospheric pressure in the passage *g* upon the diaphragm *f*, it is lowered and opens the communication between the chamber *c* and passage *e* to the bellows and closes the opening *i* from the passage *e* to the atmosphere. It is thus apparent that when the tracker passage is closed the suction action within the chamber *c* will move the valve *h* to close the communication between the suction means and the interior of the bellows and open the communication between the atmosphere and the bellows, and that upon an opening of the tracker passage the atmospheric pressure, which then rushes into the passage *g*, acts upon the diaphragm *f* and effects a movement of the valve *h* to open communication between the suction means and the interior of the bellows so that a sudden collapsing of the bellows is effected. A small bleed-opening *j* is provided between the passage *g* and the suction chamber *c* so that any air remaining in the passage *g*, after the closing of the associated tracker passage, will be slowly drawn therefrom to relieve the pressure on the side of the diaphragm *f* opposed to the valve.

An arm 32 extends downward from the shaft 21, being fixed thereto by a set screw 33, or in any other suitable manner, and has its lower end provided with a longitudinally extending slot in which a pin, which projects from a thrust bar 34, works. This bar extends forward from the arm 32 being mounted for free reciprocatory movements within guides 35 attached to the outer side of one of the plates 8 and has its forward movement limited by a stop-block 36 thereon coacting with one of said guides. A coiled compression spring 37 is mounted on said bar and has its opposite ends thrust against a shoulder thereon and one of said guides 35 to yieldingly hold the bar 34 at the limit of its forward movement. Upon a rearward movement of the thrust bar 34 the arm 32 is caused to swing rearward a short distance and is then pulled to effect a drawing of the suction mouthpiece 22 into flat contact with the uppermost one of a pile of sheets which is disposed within the table 9. At approximately the time of engagement of the mouthpiece 22 with a sheet *a* the bellows 26 is operated to effect an opening of the valve 25 to permit a suction action through said mouthpieces, shaft 21 and tube 23. Upon the return movement

of the bar 34 to its normal position the shaft 21 and mouthpieces are moved forward from sheet engaging position and carry the engaged sheet therewith, due to the suction within the mouthpieces 22.

When the mouthpieces have been moved to near the limits of their outward movements they are swung forward due to the forward swinging of the arm 32 at such point, and at approximately the same time the elongated perforation which is moving in register with the passage in the tracker-board 29 in communication with the bellows 26 moves from register therewith, thus permitting said bellows to open and effect a closing of the valve 25 to release the suction action of the mouthpieces 22 upon the engaged sheet. The swinging movement of the mouthpieces 22 with the shaft 21 as their axis moves the engaged sheet forward and downward, tending to throw it over the guide web 11 to platen engaging position. Such movement of the sheet also permits air to pass between it and the next sheet to facilitate the sliding or feeding movement thereof, as is apparent. A spring 38 yieldingly acts upon each arm 20 to normally retain it in the position shown in Figs. 1 and 3.

The means employed for imparting properly timed rearward movements to the bar 34 as the feeding of the sheets to the typewriter platen may require, is shown in the present instance as being effected by the movement in one direction of a striker lever 39 which is pivoted to any suitable support, as at 40, and has its upper end disposed in position to have contact with the forward end of the thrust bar 34 and impart longitudinal movements thereto when oscillated. The lower end of the lever 39 is connected with the movable part of a bellows 41 whereby a collapsing of such bellows will impart a bar striking movement to the lever. The bellows 41 has a tube 42 leading thereto from a passage in the tracker-board and has a conduit 43 leading therefrom to the suction pump 24. It is thus apparent, that whenever a perforation in the control sheet 30 moves into register with the passage in communication with the bellows 41, a collapsing of such bellows will be effected and a consequent bar-striking movement imparted to the lever 39 to cause a lowering of the sheet picking up mouthpieces 22 into engagement with a sheet on the table 9. The upper end of the lever 39 or that which coacts with the push-rod 34 is broadened as indicated at 39' (Fig. 9) to adapt the lever to strike said rod within a predetermined range of transverse movement of the rod 34 with the typewriter carriage as the adjusting of the stops for the carriage for different lengths of lines may require. It is to be understood that the

lever 39 does not move laterally with the carriage and can therefore only effect a striking of the push-bar 34 when the typewriter carriage 4 is substantially in line starting position.

In order to cause a turning of the platen roll to rapidly feed a sheet *a* into position for the starting of the writing of a letter or other matter thereon and also to rapidly deliver the sheet therefrom when the writing of such matter has been completed, I provide an automatically controlled mechanism for such purpose which is operable independently of the line spacing mechanism of the typewriter, which latter is described in my copending application Serial No. 641,560, filed July 31, 1911. To accomplish such turning of the platen roll I provide a ratchet-wheel 44 on one end portion of the platen roll shaft 7 with which a pawl 45, which is carried above the ratchet wheel by a push-bar 46, coacts. The bar 46 is mounted in the bearings 35 with the push-rod 34 and is normally held at the limit of its forward movement by the action thereon of a coiled compression spring 47. The forward movement of the bar 46 is limited by a stop 48 thereon coacting with one of the guides 35, and upon a rearward movement of the bar 46 the pawl 45 coacts with the ratchet-wheel 44 to impart a predetermined rotary movement thereto. To rapidly reciprocate the push-bar 46 I provide a wiper wheel 49, which is carried by a shaft 50 in position for its wiper flanges 51 to coact with the forward end of the push-bar 46 to impart reciprocatory movements thereto when said bar stands in register with said flanges and the wheel 49 is rotated. The shaft 50 is mounted in a bearing bracket 52, which is secured to one side of the desk or case 1. The wiper wheel 49 is axially shiftable on the shaft 50 to adapt a clutch surface 53 on one end thereof to be moved into engagement with a clutch lug 54 on a pulley 55, which pulley is mounted on the shaft 50 and is continuously driven during an operation of the machine. A coiled compression spring 56 is interposed between the adjacent sides of the wheel 49 and pulley 55 to normally maintain the same in released position. The pulley 55 is driven, in the present instance, by an electric motor 57 through the medium of a belt 58. A belt 59 is also shown as leading from said motor to the rotary pump 24 for driving the same. When the wiper wheel is released from the pulley 55 its rotation is stopped by the engagement of one of the flanges 51 thereon with a stop-lug 52' on the bracket 52.

The means employed for automatically moving the wiper wheel 49 into clutch engagement with the pulley 55 at predetermined intervals during the operation of the machine comprises, in the present instance,

a shift lever 60 which is pivoted to a bracket 61 projecting from the adjacent casing side with its upper end in forked engagement with a peripherally grooved hub end of said wheel and its lower end attached to the movable part of a bellows 62, whereby a collapsing of said bellows will impart a pulley engaging movement to the wheel 49. The bellows 62, which is similar in its action to the bellows 26, has a tube 63 leading thereto from a passage in the tracker-board 29 whereby the admission of air thereto is controlled by perforations in the controlling sheet 30, and has a suction pipe 64 leading therefrom to the suction pipe 43.

A knife switch is shown as being interposed in the circuit with the motor 57, the control lever 65 of which is pivoted to a bracket within the desk, as at 66, and has its free end projecting without the desk to permit a manual manipulation of the same. This lever is attached to a movable part of a bellows 67, which is similar in its action to the bellows 26 and is suitably carried within the desk, as by the bracket 68, and has its exhaust tube 69 communicating with the exhaust pipe 43 and its air inlet tube 70 leading from an opening 71 in the bottom of the sheet carrying table 9. The inlet end of the opening 71 is disposed in position to be covered by the sheets *a* when resting upon the table 9 and upon the raising of the last sheet from the table the opening 71 will be uncovered to the atmosphere to permit a collapsing of the bellows 67 by suction action, as is well understood in the art, and effecting a throwing of the switch 65 to open position, thus stopping the motor.

The feed roll 14, which is adapted to deliver the printed sheets from the machine after the same have been released by the platen roll, has rotation communicated thereto from the platen roll by a belt 72 connecting pulleys 73 and 74 on the respective shafts of said rolls. The pulley on the feed roll 14 is smaller than the other pulley to compensate for the difference in sizes of the feed and platen rolls, and also to effect a rapid delivery of the sheets *a* from the machine when released by the platen roll 6. While the frictional engagement of the roll 14 with the sheets *a* is sufficient to deliver such sheets from the machine when released by the platen roll 6 and coating pressure rolls (not shown) it is not sufficient to cause a faster feeding of the sheets when in engagement with the platen roll 6 than would be accomplished by a turning of such roll, the roll 14 slipping in contact with the sheets *a* during such action.

The operation of my invention is as follows: Upon the retraction of the platen carriage 4 to line starting position upon the completion of the writing of a letter or other matter, a perforation in the control sheet 30

will move into register with the tracker-board passage in communication with the bellows 41 to permit a collapsing of such bellows and a consequent movement of the striker lever 39 to throw the thrust-bar 34 to the limit of its rearward movement. Upon such movement of the bar 34 the crank arm 32 will be rocked to turn the paper pick-up mouthpieces 22 relative to the arms 20 into position to rest flat upon the top one of the sheets *a* on the table 9 when lowered for such purpose, and will pull upon the arm 32 to move the arms 20 and attached parts into position for the mouth pieces 22 to engage a sheet. The spring 37 now acts upon the thrust-bar 34 to return it to its normal position, the striker lever 39 having returned to its normal position due to the movement of the perforation from register with the associated tracker-board passage, thus causing the arms 20 and associated parts to move outwardly from the sheets, and rocking the shaft 21 and attached mouthpiece 22 so that the mouthpieces will have compound oscillatory movements imparted thereto to tend to throw the engaged sheet *a* downward into platen roll engaging position. At approximately the period of engagement of the mouthpieces 22 with a sheet *a*, a perforation in the control sheet 30 moves into register with the tracker-board passage which is in communication with the bellows 26 thus permitting a collapsing of such bellows to effect an opening of the valve 25 to open communication between the suction pump 24 and mouthpieces 22 to cause the engaged sheet *a* to adhere thereto, the control sheet perforation being of sufficient length to prevent an opening of the bellows 26 and consequent closing of the valve 25 until the mouthpieces have moved to sheet delivery position. Upon the delivery of a sheet to the platen roll by the pick-up members 22 a perforation in the control sheet 30 moves into register with the tracker-board passage which is in communication with the bellows 62, thus permitting a collapsing of said bellows which effects a shifting of the lever 60 to throw the wiper-wheel 49 into clutch engagement with the pulley 55. The revolving of the wiper-wheel flanges 51, upon an engagement of the wheel with the pulley 55, causes said flanges to successively strike and impart reciprocatory movements to the push-bar 46, which in turn acts through the pawl 45 and ratchet wheel 44 to impart intermittent movements to the platen roll. When the sheet *a* has been fed in proper position for the starting of the letter or other matter thereon, the perforation in the control sheet 30 passes from register with the associated tracker-board passage to permit an expanding or opening of the bellows 62 and a shifting of the wiper wheel 49 to released position. Upon the completion of the

writing on the sheet *a*, which is accomplished in any suitable manner, as, for instance, by the mechanisms disclosed in my said copending applications Nos. 638,894 and 5 641,560, an elongated perforation in the control sheet 30 again moves into register with the tracker-board passage in communication with the bellows 62 to effect a throwing of the wiper wheel 19 into engagement with 10 the actuating pulley 55 and a consequent rapid delivery of the written sheet from the machine. When the sheet *a* has been freed or substantially freed from the platen roll 6 the sheet picking up means is again 15 actuated as above described to pick up and deliver a fresh sheet to the platen roll and the other operations are accomplished in their proper order as above described. When the last sheet has been raised from the table 20 9 by the pick-up means, the opening 71 in communication with the bellows 67 is uncovered, thus permitting a collapsing of said bellows to effect a throwing of the switch lever 65 to open position and stopping the 25 operation of the machine.

I wish it understood that my invention is not limited to any specific construction or arrangement of the parts except in so far as such limitations are specified in the claims. 30 Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is,—

1. In combination, a sheet holding table, a sheet picking up member movable toward 35 and away from said table, means for creating a suction through said member to hold a sheet thereto, a valve reciprocally movable to open and close said suction means, and a bellows having its movable part in 40 engagement with said valve and being automatically operable at predetermined intervals to open communication between said member and the suction means.

2. In combination, a sheet holding table, a pneumatic sheet picking up mouthpiece mounted for movements relative to the table, suction means in communication with said mouthpiece, a valve movable to open or close said communication, means 50 yieldingly acting on the valve to maintain it in position to close said communication, a bellows having its movable part attached to said valve, and perforated sheet controlled means for operating said bellows at 55 predetermined intervals to effect an opening of the valve.

3. In combination, a pneumatically controlled sheet picking up mouthpiece, a rock

shaft carrying said mouthpiece, oscillatory means carrying said shaft, and pneumati- 60 cally controlled mechanism for moving said mouthpiece to sheet picking up position and then oscillating said shaft carrying means and rocking the shaft relative thereto to deliver an engaged sheet to a predetermined 65 point.

4. In combination, a pneumatically controlled sheet picking up mouthpiece, a rock shaft carrying said mouthpiece, oscillatory means carrying said shaft, an arm project- 70 ing from said shaft, a push-bar attached to said arm and movable in one direction to impart sheet engaging movements to the mouthpiece and in the opposite direction to impart sheet picking up and delivering 75 movements thereto, and pneumatically controlled mechanism for operating said push-rod.

5. In combination, a pneumatically controlled sheet picking up member, means 80 movably carrying said member, a push-bar cooperating with said means to impart sheet engaging and picking up movements thereto, a striker lever for actuating the 85 movements of said push-bar in one direction, yielding means for actuating its movements in the opposite direction, and pneumatically controlled means for oscillating said lever at predetermined intervals.

6. In combination, a pneumatic sheet 90 picking up member, a rock shaft carrying said member and mounted for transverse swinging movements, and mechanism automatically operable to intermittently rock said shaft and impart simultaneous trans- 95 verse swinging movements thereto.

7. In combination, a sheet picking up mouthpiece, means for creating a suction through said mouthpiece, means for inter- 100 mittently opening and closing the communication between said mouthpiece and suction means, a rock shaft carrying said mouthpiece, arms swingingly carrying said shaft, a crank arm attached to said shaft and pneumatically controlled mechanism op- 105 erable at predetermined intervals to move said crank arm to impart simultaneous rocking and swinging movements to said shaft.

In testimony whereof, I have hereunto signed my name to this specification in the 110 presence of two subscribing witnesses.

PHILLIP JACOB DREHER.

Witnesses:

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E. E. THOMAS.