

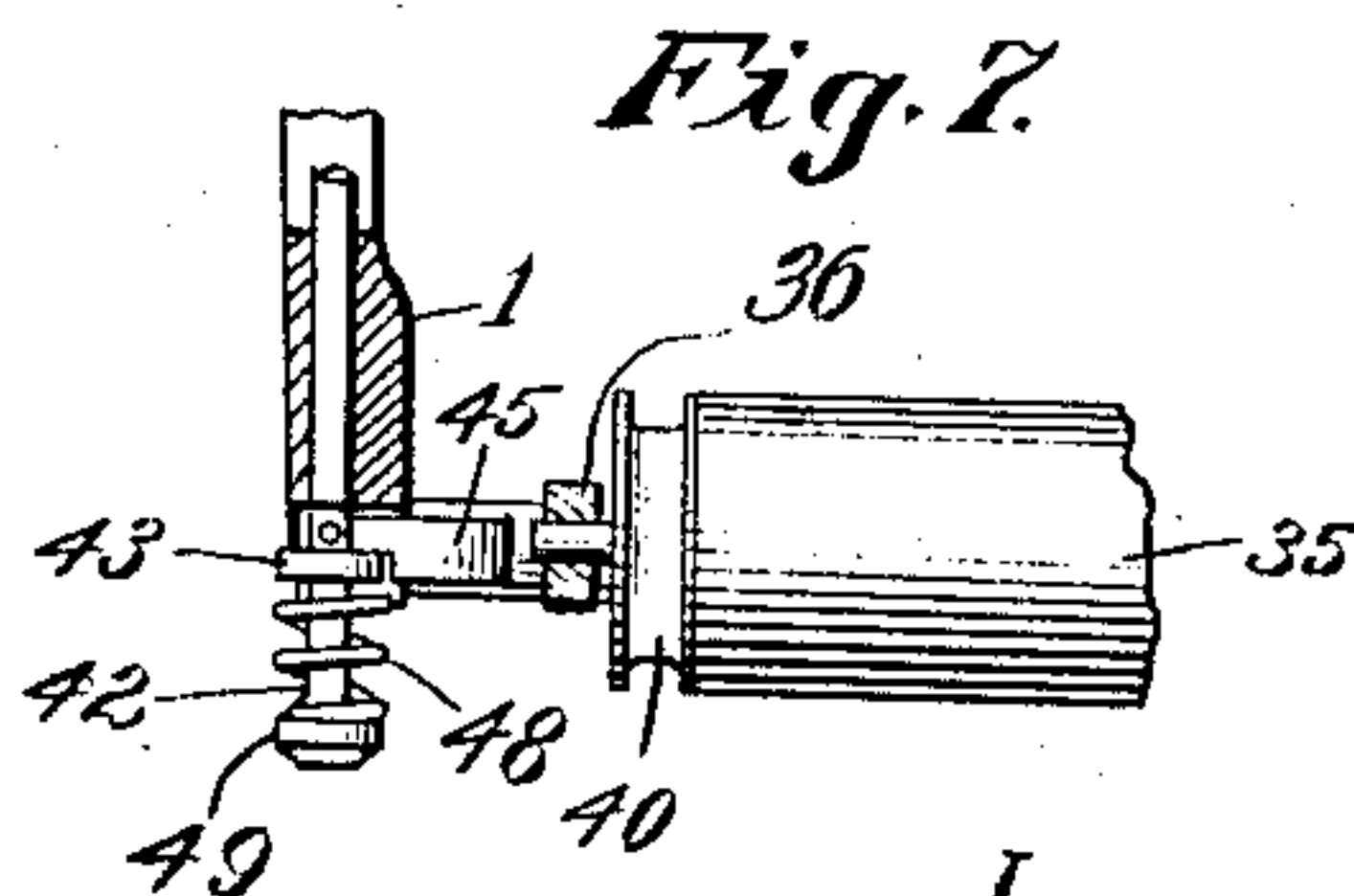
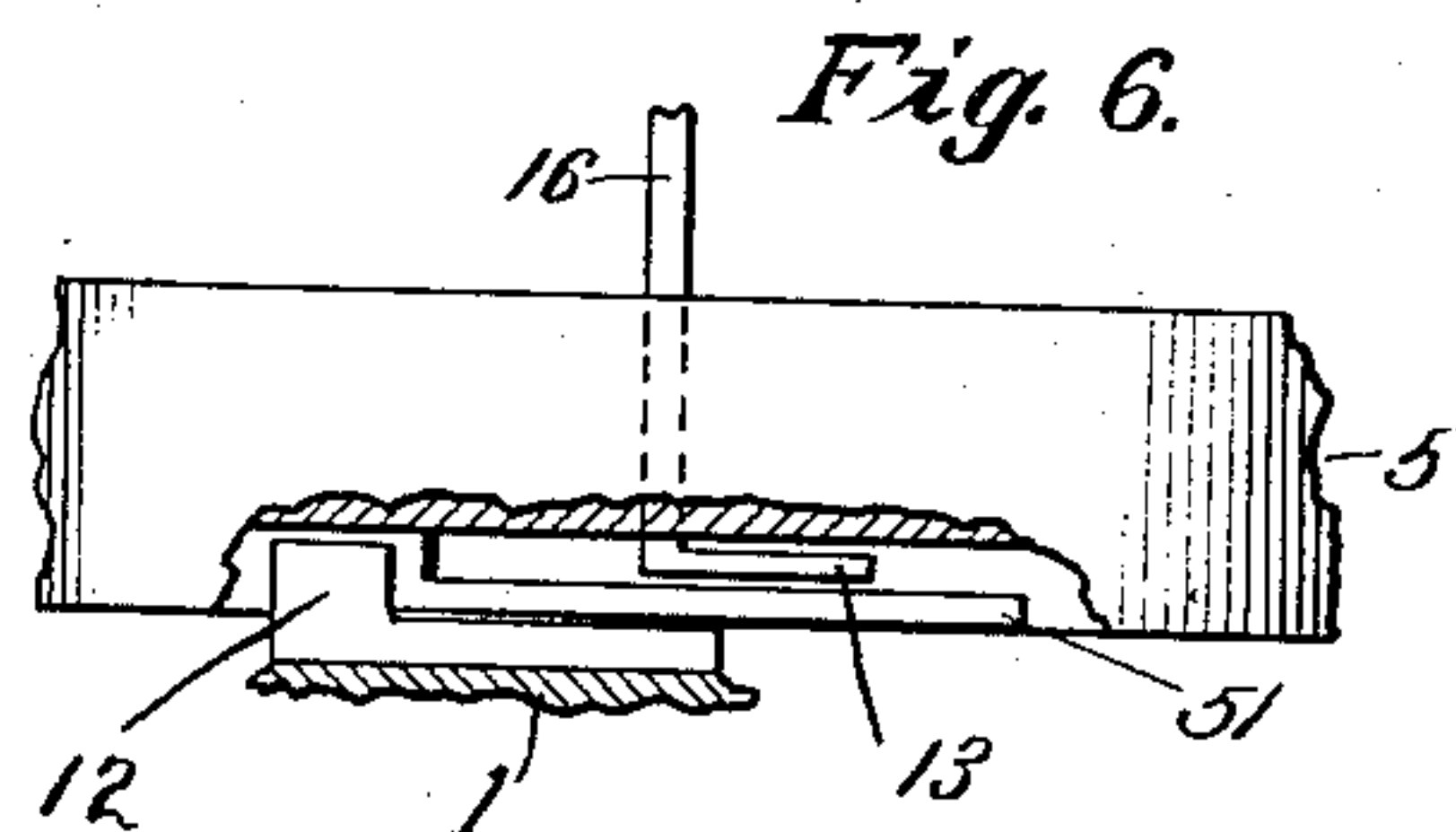
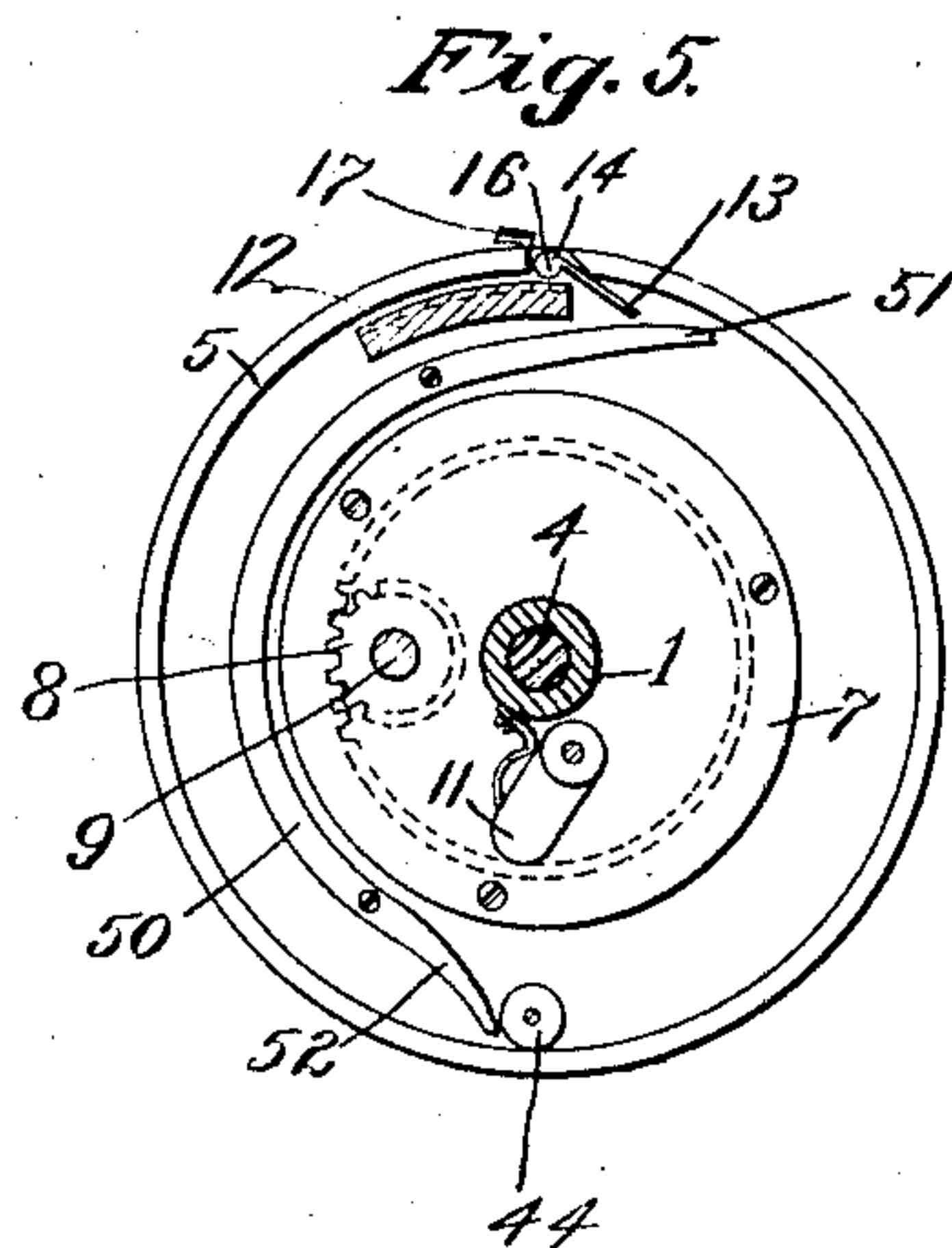
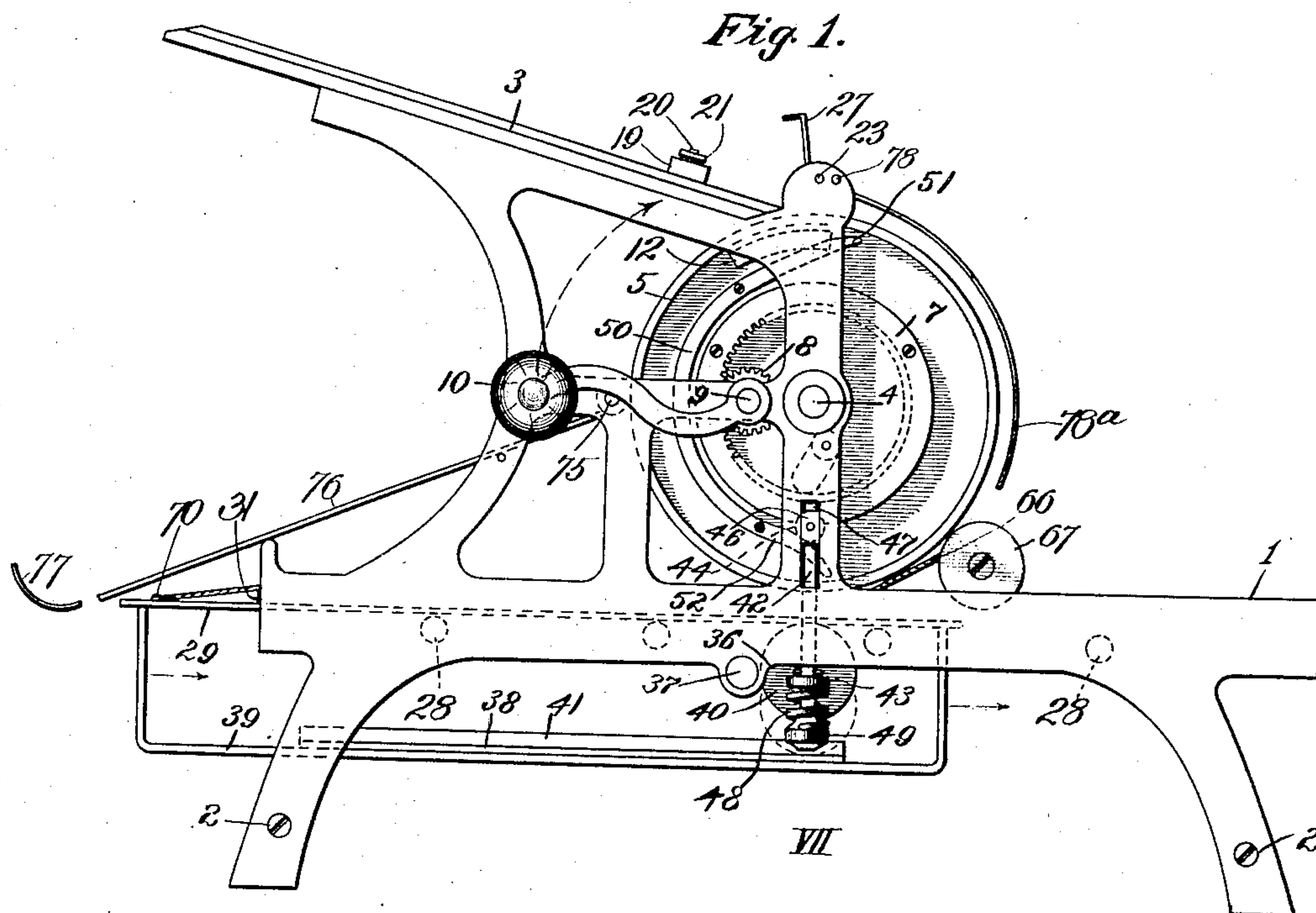
DUPLICATING OR PRINTING MACHINE.

APPLICATION FILED SEPT. 23, 1908.

935,604.

Patented Sept. 28, 1909.

4 SHEETS—SHEET 1.



Witnesses

E. E. Slightman.
H. C. Rodgers

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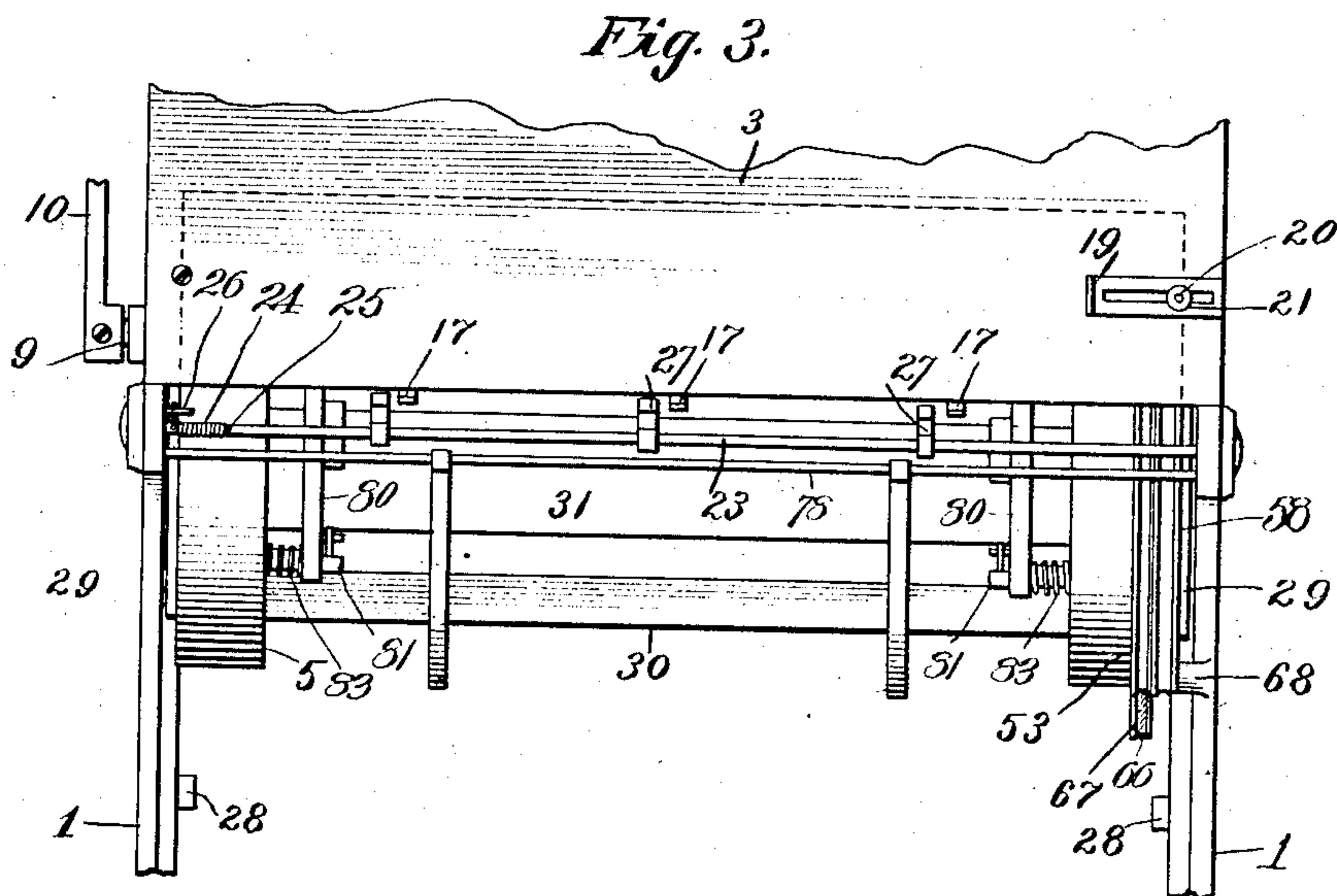
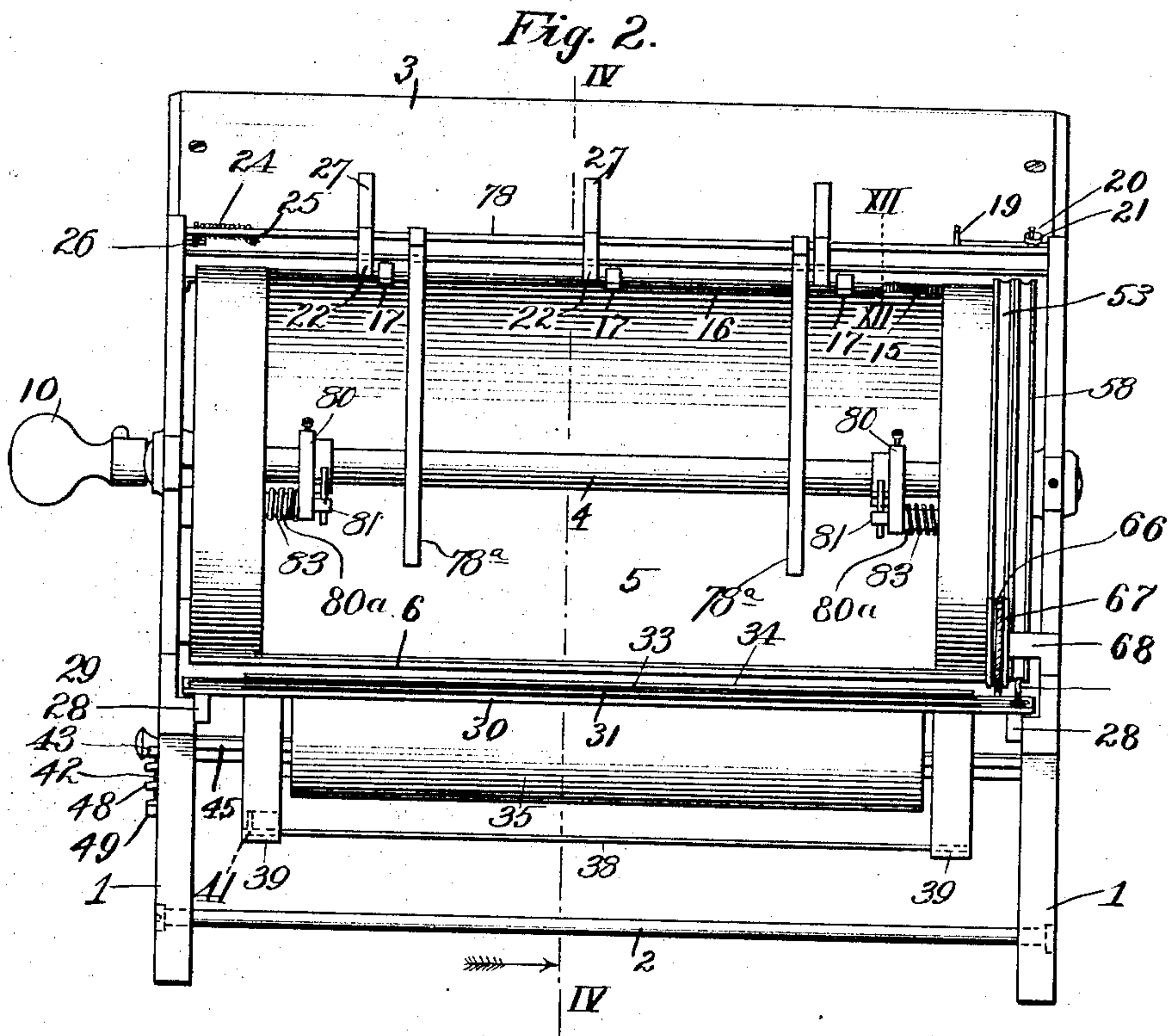
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4 SHEETS—SHEET 2.



Witnesses:

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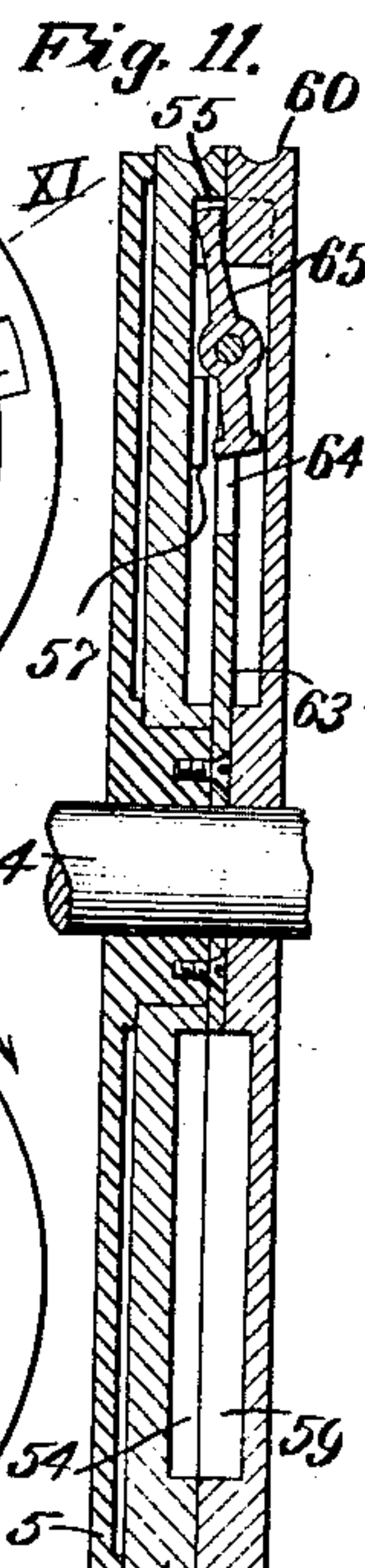
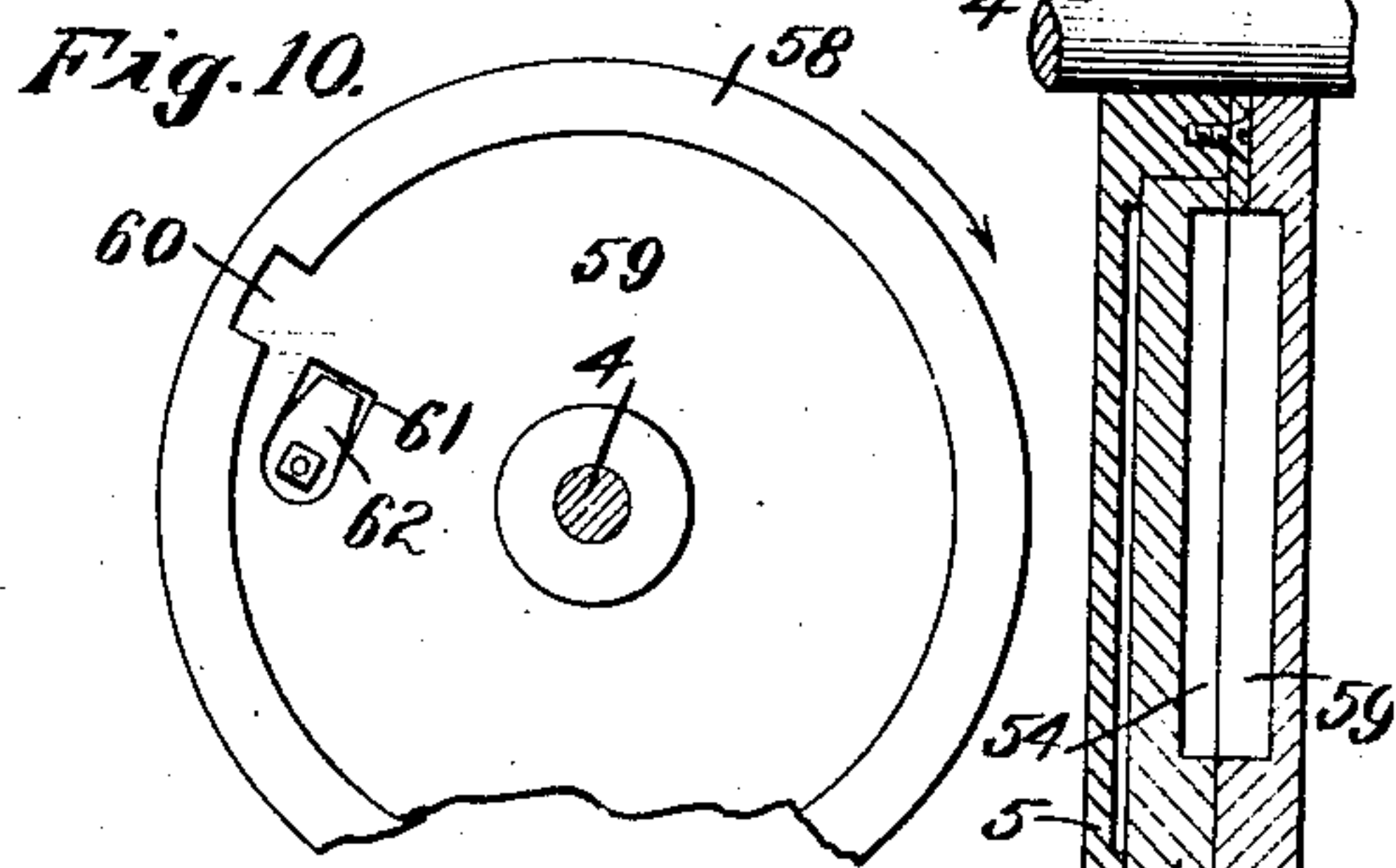
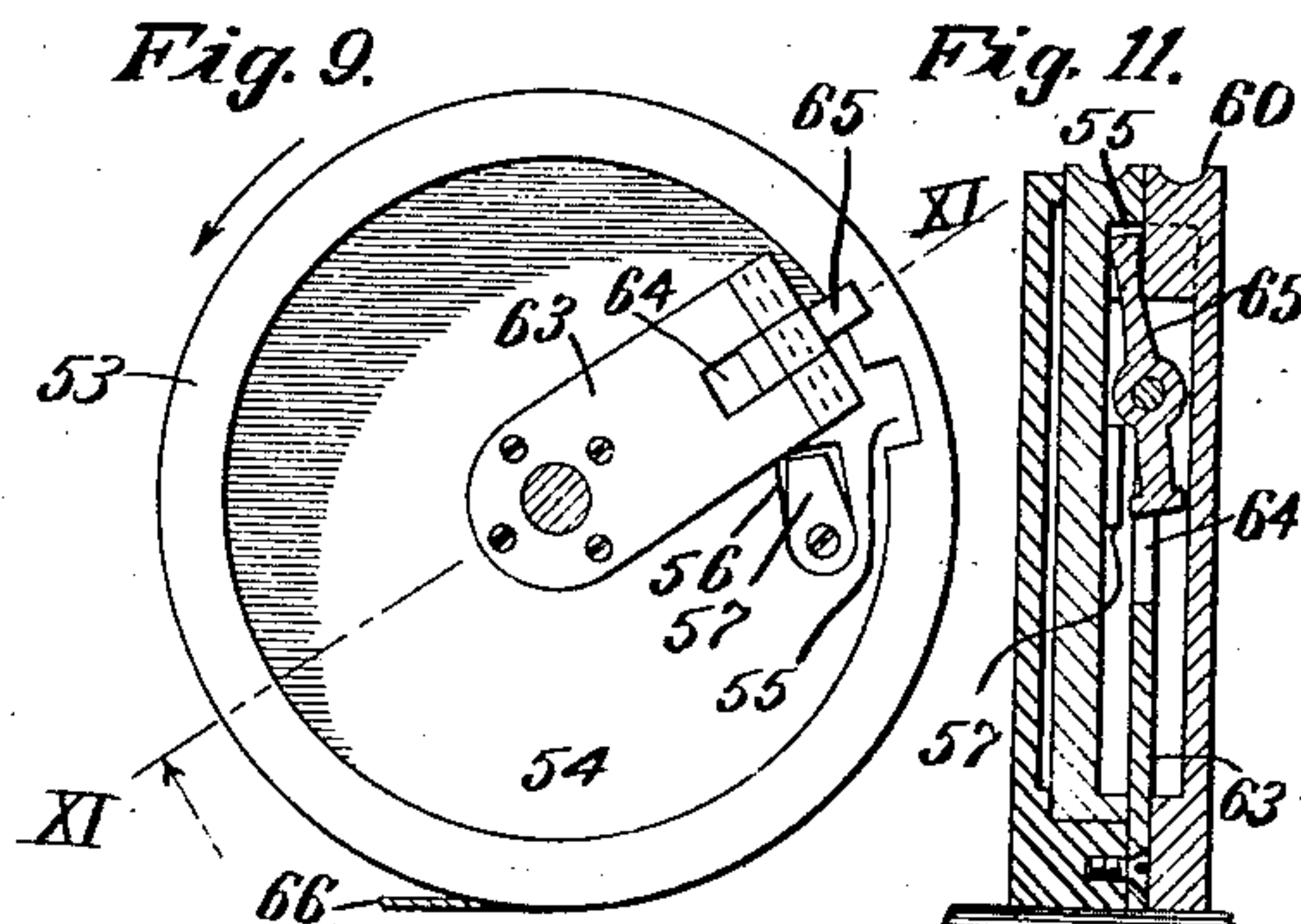
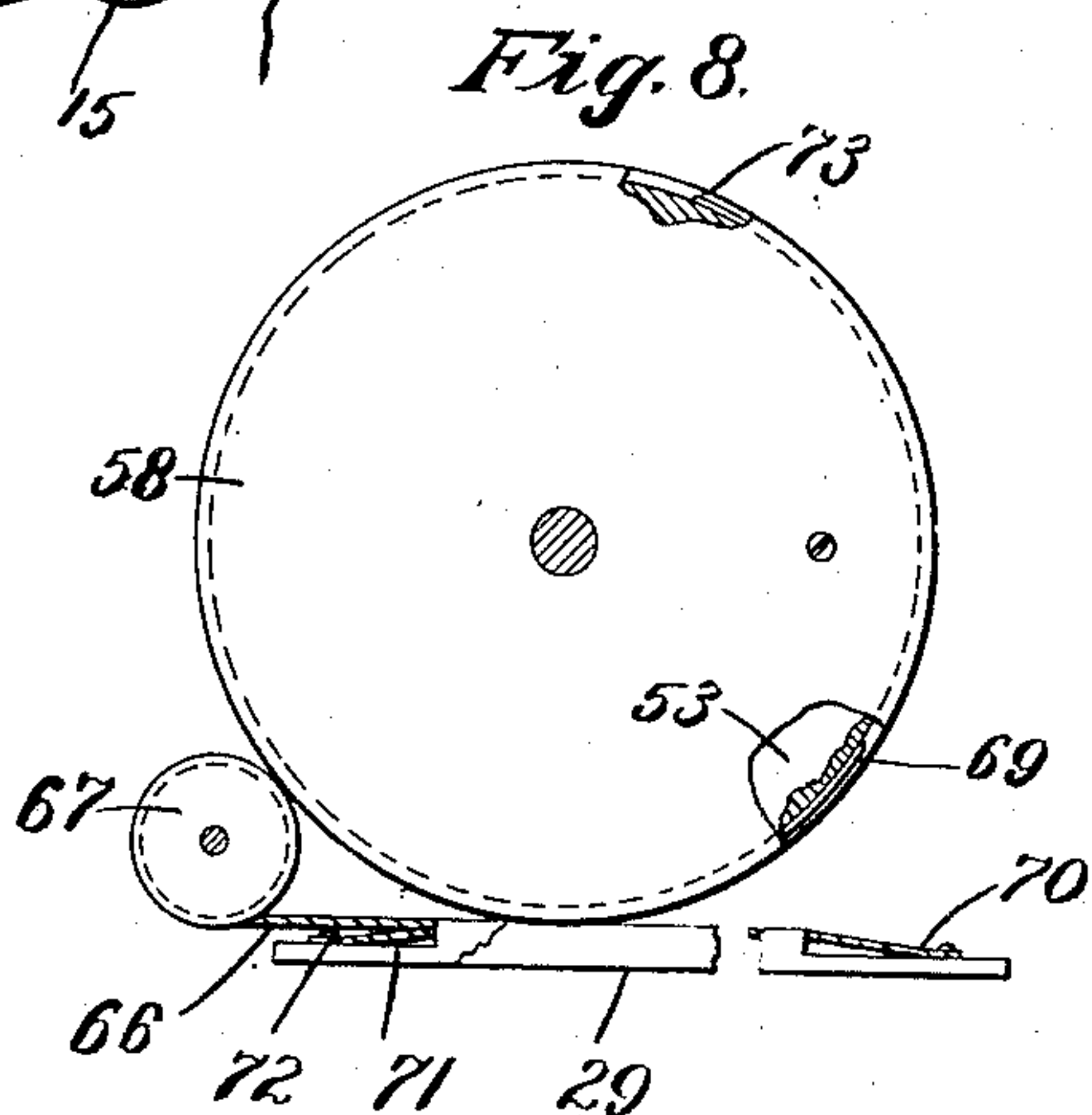
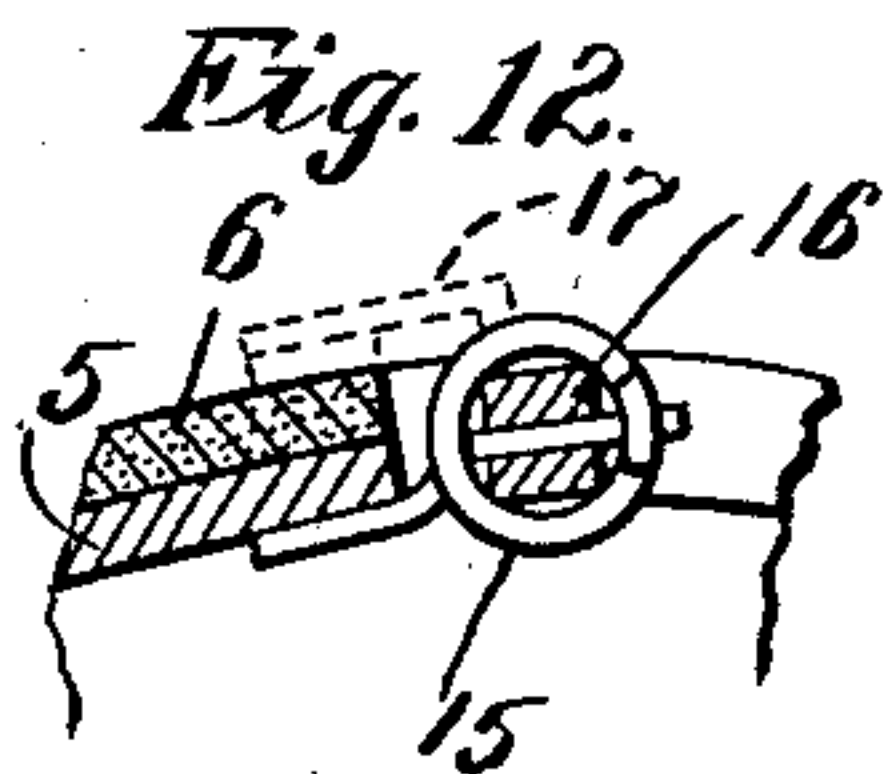
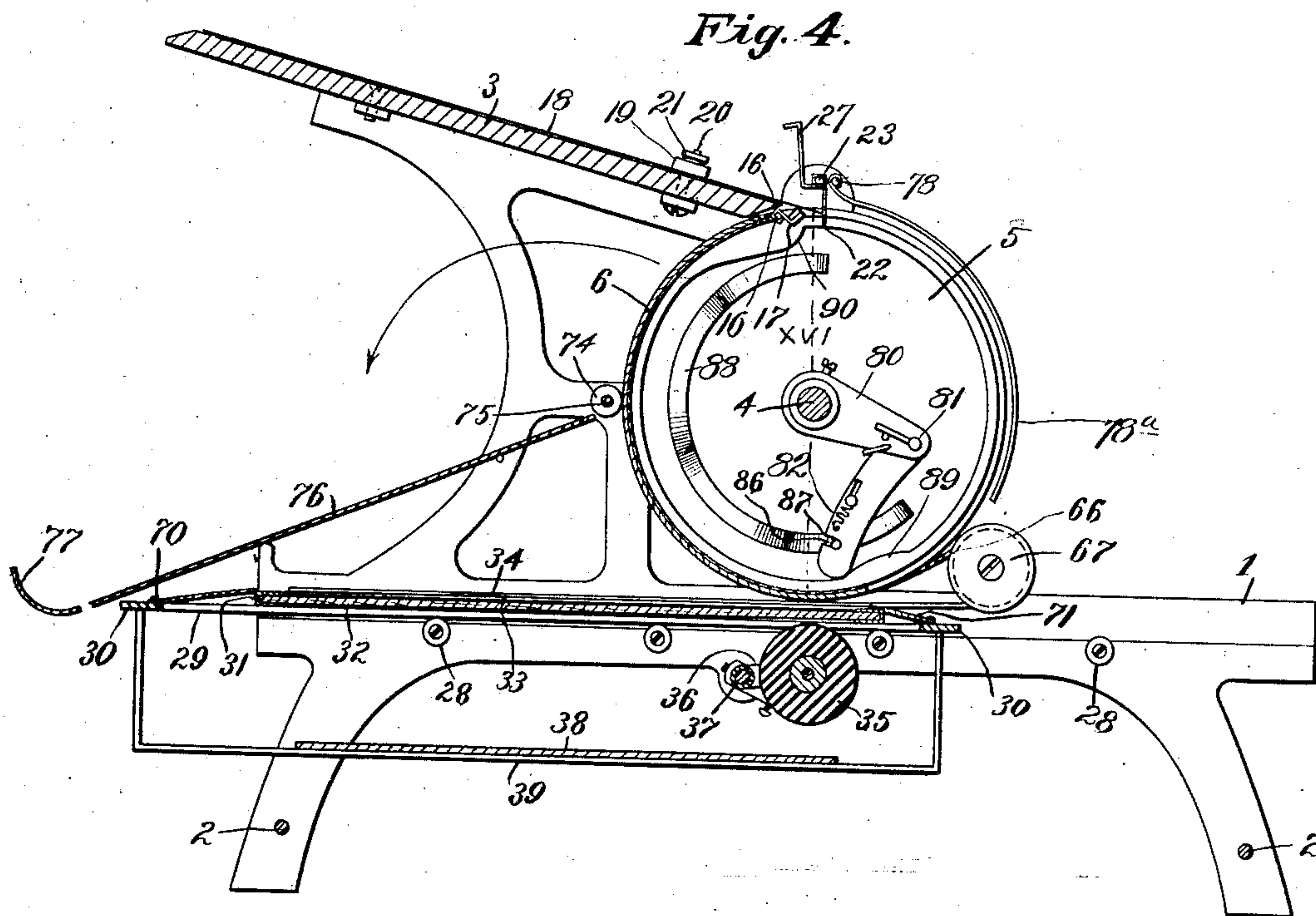
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4 SHEETS—SHEET 3.



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 4 SHEETS—SHEET 4.

Fig. 16.

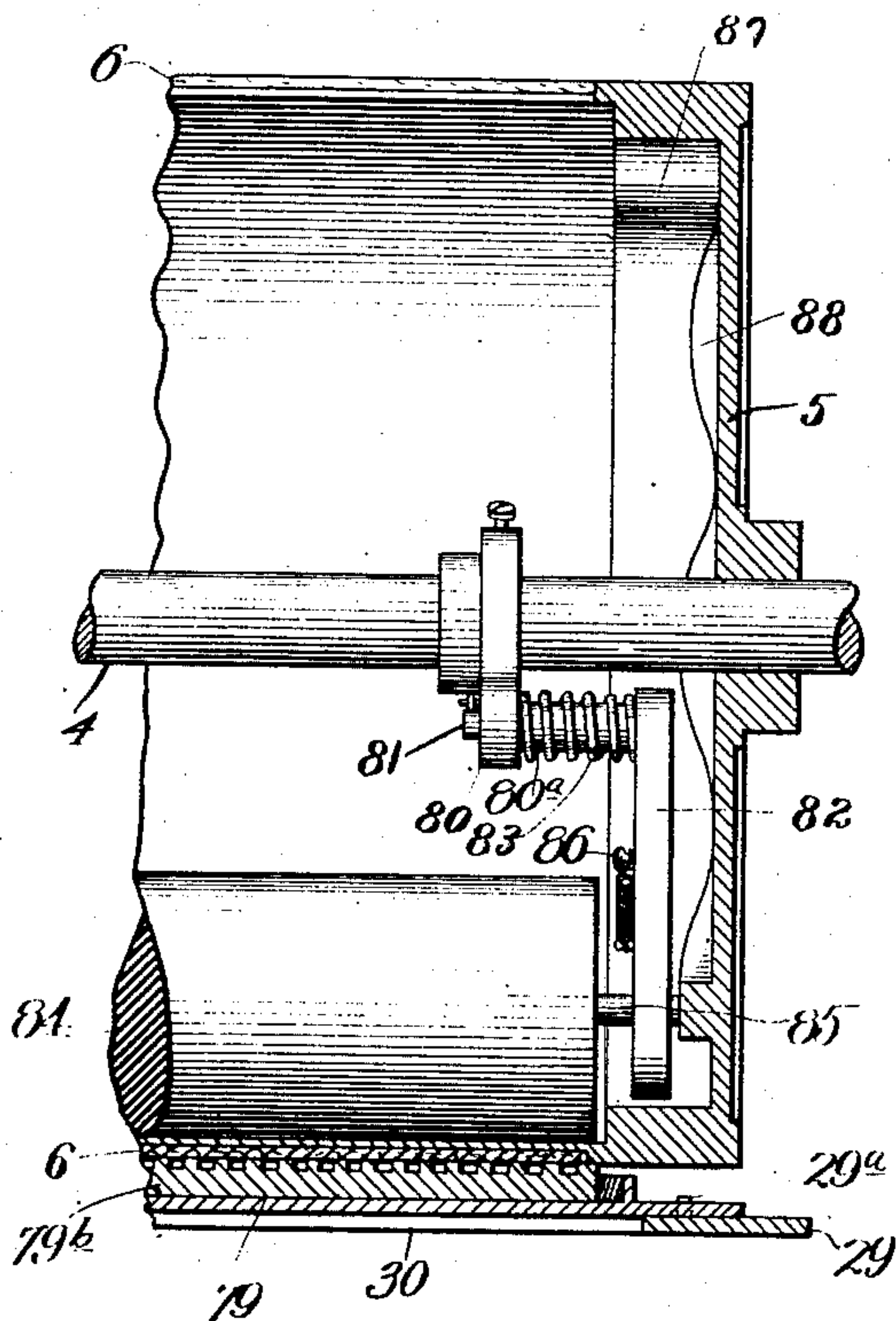


Fig. 14.

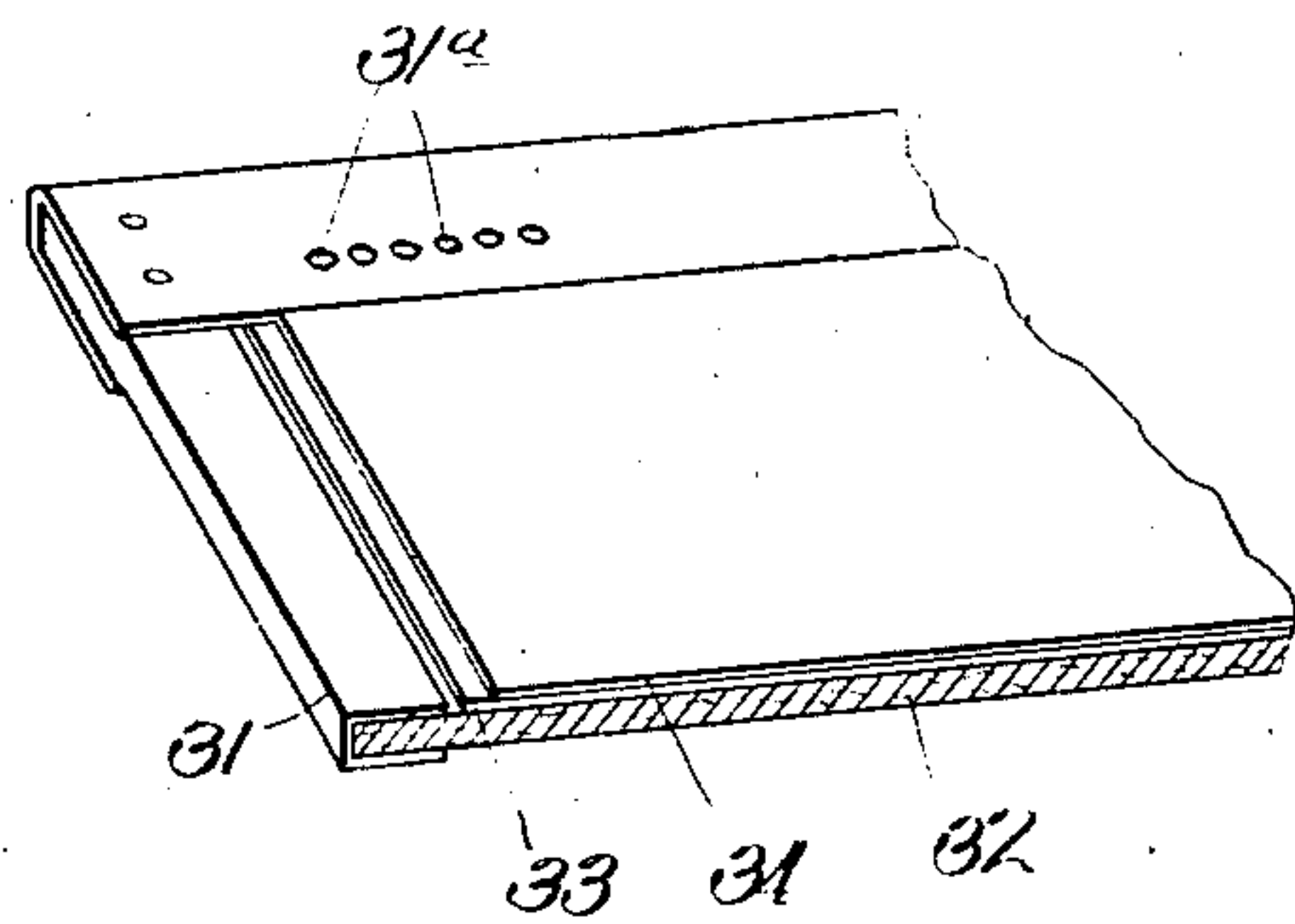


Fig. 15.

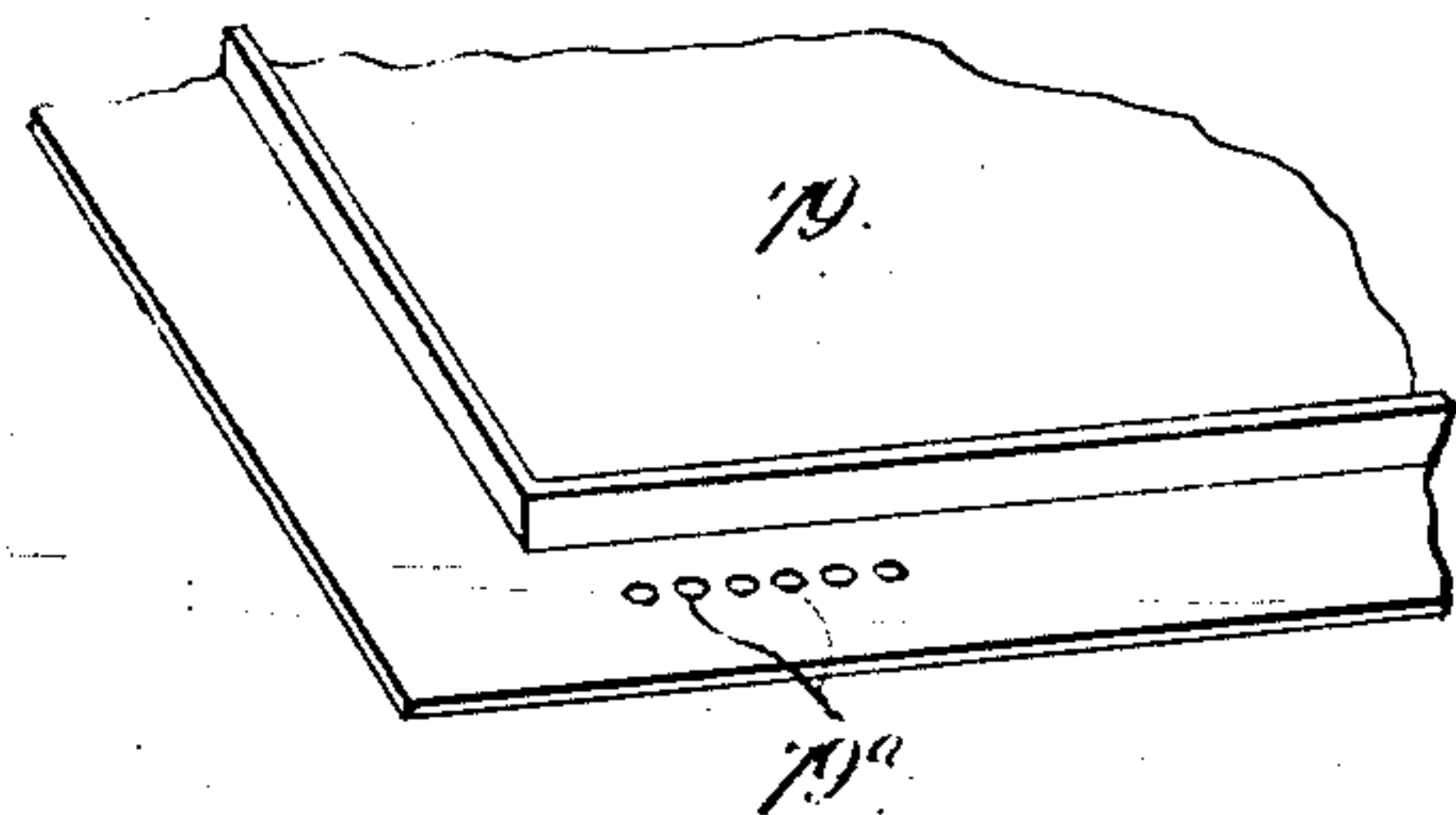
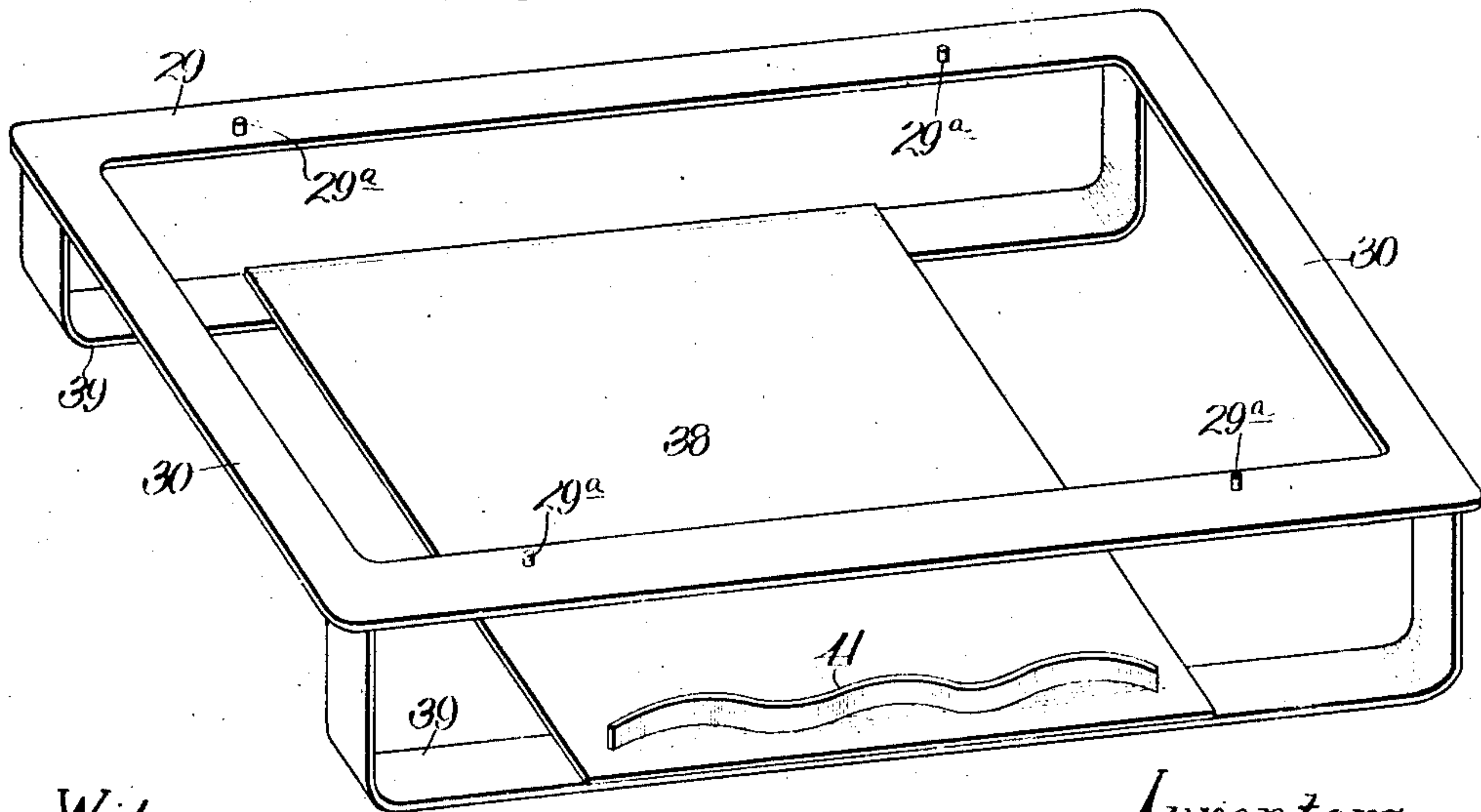


Fig. 13.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOSEPH D. HAVENS AND HERBERT M. PAGE, OF KANSAS CITY, MISSOURI; SAID PAGE
ASSIGNOR OF ONE-HALF OF HIS RIGHT TO RAYMOND M. HAVENS. OF KANSAS
CITY, MISSOURI.

DUPLICATING OR PRINTING MACHINE.

935,604.

Specification of Letters Patent. Patented Sept. 28, 1909.

Application filed September 23, 1908. Serial No. 454,461.

To all whom it may concern:

Be it known that we, JOSEPH D. HAVENS and HERBERT M. PAGE, citizens of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Duplicating or Printing Machines, of which the following is a specification.

This invention relates to duplicating or printing machines of that type embodying a reciprocatory bed and a rotatable cylinder for picking the paper from the feed table and carrying it around into engagement with the bed and releasing it at a point below the table, and has for its object to produce a machine of this character which operates efficiently, reliably and expeditiously.

A further object is to produce a simple, strong, durable and inexpensive machine and one to which a stencil sheet may be easily and quickly applied or from which it may be readily removed without injury so that the same stencil can be preserved for future service, as distinguished from the ordinary type of duplicating machine from which a stencil cannot readily be removed without irreparable damage.

A further object is to produce a machine which can be quickly adapted for use with either a stencil, type bed or other printing face.

With these general objects in view and others as hereinafter appear, the invention consists in certain novel and peculiar features of construction and organization as hereinafter described and claimed; and in order that it may be fully understood reference is to be had to the accompanying drawings, in which,

Figure 1, is a side elevation of the machine as adapted for use with a stencil. Fig. 2, is a front view of the same. Fig. 3, is a top plan view of a portion of the same. Fig. 4, is a vertical section taken on the line IV—IV of Fig. 2. Fig. 5, is a vertical section taken between the end of the cylinder and the side of the frame shown in Fig. 1. Fig. 6, is an enlarged detail of a part of the cylinder and the adjacent side of the frame, broken away to expose the operative relation between certain parts carried by said cylinder and frame. Fig. 7, is a vertical section on line VII of Fig. 1, with certain parts in the plane of said section, shown in elevation. Fig. 8, is

a detail view of the stencil-carrying frame and the means for reciprocating said frame, the said frame and means being partly broken away. Fig. 9, is an inner face view of one member of the means for reciprocating the stencil-carrying frame. Fig. 10, is a corresponding view of the companion member of the means for reciprocating the stencil-carrying frame. Fig. 11, is an enlarged section of the stencil-frame-reciprocating means, the adjacent end of the cylinder and the corresponding end of the shaft, the said section being taken on the line XI—XI of Fig. 9. Fig. 12, is an enlarged section on the dotted line XII—XII of Fig. 2, to show only the connection of the gripper shaft spring with the gripper shaft and the cylinder. Fig. 13, is a detail perspective view of the reciprocatory frame for adjustably supporting the stencil-carrying frame or the type-carrying frame. Fig. 14, is a sectional perspective view of a part of the stencil-carrying frame. Fig. 15, is a perspective view of a portion of the type-carrying frame. Fig. 16, is a vertical section taken on the line XVI of Fig. 4, but with the type-carrying frame underlying the cylinder and the latter equipped with an inking roller for the type.

Referring now to the drawings, in which like parts are identified by the same reference characters, 1 indicates the sides of the machine frame and 2 are tie-rods connecting said sides. 3 is a feed-table also connecting and secured to the sides and pitched downwardly and forwardly at a suitable angle and terminating slightly rearward of the vertical plane of the shaft 4 journaled in the sides at a point below the plane of the table.

5 indicates a slotted cylinder mounted on shaft 4, the slot extending for almost the entire length and slightly more than half way around the cylinder, the non-slotted portion of the latter being provided with a tympan or pad 6. Secured rigidly to one end of the cylinder concentrically of shaft 4, is an internal-tooth gear-wheel 7, and meshing with the same is a gear-pinion 8 secured on the inner end of a short shaft 9 journaled in the adjacent side of the frame and equipped at its outer end with a handle 10, adapted to be turned in the direction indicated by the arrow, Fig. 1, for the purpose of imparting movement in the same direc-

tion to the cylinder, the said side of the frame being equipped with a preferably spring-actuated dog 11 engaging the internal-tooth gear-wheel at such an angle that it will prevent back rotation of the same without interfering with rotation in the opposite direction.

12 indicates a lug projecting from the machine frame into the recessed end of the cylinder, viz., that end equipped with the gearing, as shown in Figs. 1, 5 and 6, the said lug being disposed rearward of the vertical plane of shaft 4 and in the path of an arm 13 occupying said recess and a notch 14 in the wall forming such recess, so that as the cylinder is rotated said arm shall engage the rear end or edge of lug 12 and be caused thereby to swing backward until it is capable of being dragged over the outer or upper face of said lug, this action of the arm being yieldingly resisted by a spring 15 encircling the preferably rectangular shaft 16 of which such arm forms a crank, journaled in the heads or ends of the cylinder, the said spring being secured at one end to said shaft and at the other bearing against the cylinder as shown in Fig. 12. Shaft 16 is provided at a plurality of points, preferably three, with projecting grippers or jaws 17 adapted under the action of said spring, to turn with said shaft 16 the instant crank-arm 13 clears lug 12, and snap down upon the outer side of the contiguous edge of the non-slotted portion of the cylinder and clamp down on and to the same the front edge of a sheet of paper 18 at that time projecting forward from the table, and to insure the printing of the sheets at corresponding distances from their top or upper margins, a guide 19 is secured to the table, consisting of a slotted angle plate fitted on a screw 20 projecting from the table and clamped to the latter at the desired point of adjustment by a nut 21.

The sheets of paper to be printed are fed forward on the table one at a time, and to insure side margins of corresponding width on all of the sheets we provide a series of stops 22 on a rock-shaft 23 journaled in the upper ends of the sides of the frame and depending into the slot of the cylinder at times and adapted when so positioned to limit the distance which a sheet can be inserted. Once in each revolution of the cylinder the stops 22 are engaged and pressed aside by the shaft of the grippers, moving upwardly and forwardly until said shaft and the cylinder carrying the same underlies them, this movement of the stops and shaft occurring against the resistance of the spring 24 encircling said shaft and secured to the same at one end at 25, and to a pin 26 projecting from the adjacent side of the frame. The said movement of the shaft causes the angular

rearwardly until sufficiently close to the table to prevent a second sheet of paper being fed into the machine, the said detainers being held in this position during the next half revolution of the cylinder because the non-slotted portion of the latter prevents the stops from swinging downward. When said half revolution is completed and the sheet engaged by the grippers has been withdrawn completely from the table, the slotted portion again registers with the stops and as a result the latter under the action of the spring 25 snap down into the slot of the cylinder; the detainers of course, swinging upwardly and forwardly to their original positions and permitting the operator to feed another sheet of paper forwardly until limited by engagement with said stops, in which position it is ready to be engaged by the grippers in passing.

28 indicates a series of anti-friction rolls supported in the same horizontal plane by the sides of the frame and engaging and supported by a plurality of said rolls at all times, is a reciprocatory frame, consisting of side bars 29, having upwardly projecting pins 29^a and cross bars 30 connecting the ends of the side bars. A frame 31 is adapted to rest upon the reciprocatory frame and is provided with longitudinal series of holes 31^a to receive the pins 29^a and be held thereby against creepage upon the reciprocatory frame, a sufficient number of said holes being provided to permit of longitudinal adjustment of frame 31 of the reciprocatory frame to enable the person in control to effect a variation of side marginal space on the sheets printed, it being understood that the frame 31 is a skeleton frame with an opening in width substantially equal to the length of the cylinder and of length preferably equal to half the circumference of the cylinder and is designed as a support and carrier for the ink pad 32 and for a sheet 33 of thin silk or equivalent fabric which in turn forms the direct support for a stencil 34 in the form of a sheet of waxed paper or its equivalent.

35 indicates an inking roller parallel with and vertically below the shaft 4 of the cylinder and also below the reciprocatory frame mounted on rollers 28, the spindles of said roller being journaled in the front ends of a pair of arms 36 hinged or pivoted on a cross rod 37 connecting the sides of the frame. During the rearward movement of said reciprocatory frame, which movement is that which takes place when the actual printing of the paper occurs, the roller is elevated against the pad, and for the purpose of elevating the roller, we mount a vertical rod 42 slidingly in one of the sides of the machine frame and equip said rod at its lower end with a collar 43 and with an anti-friction roller 44 occupying the recess in the end of

the cylinder, the collar underlying an extension 45 of one of the hinge-arms 36 of the inking roller so that the weight of the latter is utilized to hold the roller of said rod down near the wall of said recess, the rod being equipped with a rigid collar 46 playing in a vertical slot 47 in the side of the frame to limit the vertical movement of the rod. A spring 48 on rod 42 is interposed between collar 43 and a rigid collar 49, said spring holding the collar elevated but capable of yielding downward with the inking roller, if necessary. For the purpose of elevating the inking roller and forcing it up against the overlying pad, a substantially semicircular curved track 50 is secured to the cylinder in the recess thereof, and at one end said track extends gradually outward at 51 toward the wall of the recess so as to pass under the roller 44, of said rod and gradually elevate the latter and the inking roller, it being noticed in this connection that the roller is lifted just before the forward movement of the stencil-carrying frame ends and that it is completely elevated by the time the rear end of the pad and stencil is disposed vertically over it. The body portion of said track maintains the roller elevated for nearly the full rearward movement of the stencil and then just before said movement is completed the roller travels downward upon the opposite end 52 of said track which likewise slopes gradually outward toward the wall of the recess so that, as it passes under said roller 44, the inking roller descends into contact with the underlying inking plate.

For the purpose of causing the cylinder to impart reciprocatory movement to the stencil-carrying frame, we provide the following mechanism:—53 is a peripherally grooved wheel journaled on one end of the cylinder and provided with a circular recess 54 in its outer face and a notch 55 in the inner edge of the wall forming such recess, and secured to said wheel in a recess 56 is a preferably spring plate 57 which has its free end projecting into the recess 54 and terminating in about the radial line of the adjacent side of the notch 55. A similar wheel 58 journaled on the shaft 4 between the adjacent side wall of the main frame and the wheel above described, fits snugly against the latter and is provided with a similar recess 59 and notch 60 and also with a recess 61 provided with a spring plate 62, projecting at its free end into the recess 59, the wheels being disposed in opposite directions so that their recesses 54 and 59 form a common chamber and their spring plates 57 and 62 project in the same direction. 63 is an arm projecting rigidly from the cylinder into the said common chamber and having its outer end bifurcated at 64 and pivotally carrying a dog 65 in said bifurcation, the outer end of the dog being adapted

to alternately enter notches 55 and 60 through the action of the spring plates of the companion wheels for the purpose of alternately locking said wheels to the cylinder. A flexible cable 66, doubled around a guide sheave 67 suitably journaled on an arm 68 projecting from the adjacent side of the main frame, has its upper portion engaging the grooved periphery of wheel 53 and secured thereto at its end as at 69 and its lower portion extending horizontally rearward to the rear end of the reciprocatory frame to which it is attached as shown at 70 or otherwise. A second flexible cable 71 is attached at its front end to the front end of the reciprocatory frame at 72 and at its rear end engages the grooved periphery of wheel 58 and is attached to the same at 73.

Just prior to the engagement of the grippers with a sheet of paper projecting from the table over the cylinder in the path of said grippers, the rearward movement of the reciprocatory frame terminates and as it terminates the spring plate 57 of the inner wheel engages the inner end of the dog 65 and rocks the latter, this engagement taking place at the moment the notches 55 and 60 in wheels 53 and 58 register, so that the outer end of the dog swings from the notch of the outer wheel into the notch of the inner wheel and thus locks the last-named wheel rigidly to the cylinder in order that as the latter continues to rotate, said inner wheel shall rotate in the same direction and thus through the medium of the doubled cable, impart forward travel to the reciprocatory frame, such travel of said frame, through its connection with the other cable, pulling the latter forward so as to cause the connected wheel 58 to rotate backward at the same speed. At the end of the next half revolution of the cylinder said wheels have each rotated a corresponding distance in opposite directions, this action resulting in the reregistration of their notches 55 and 60, this reregistration occurring just as the spring-plate of the outer wheel engages the inner end of the dog so as to rock the latter and swing its outer end out of the notch of the inner wheel and into the notch of the outer wheel for the purpose of releasing the inner wheel from the cylinder and locking the outer wheel to the same, so that as the cylinder continues to rotate the corresponding rotation of the outer wheel winds the cable 71 thereon and consequently pulls the reciprocatory frame rearward, this rearward movement of the frame through the medium of the cable 66 turning the inner wheel backward. At the end of the second half revolution of the cylinder, said notches are again disposed opposite each other to permit the spring plate of the inner wheel to again force the dog out of the notch of the outer wheel into the notch of the inner wheel, this action taking place just prior to

the engagement of the grippers with the next sheet of paper, the previous sheet during the revolution of the cylinder described, having received an impression from the stencil or printing surface and having been carried up around the cylinder and released by the grippers before the latter emerge from under the table, the release by the grippers being effected as hereinbefore described, by the rearward swing which lug 12 causes crank 13 to make. Shortly before the rear edge of the paper has been withdrawn from between the cylinder and stencil or printing surface, said paper is carried by the grippers up past the friction rolls 74 spaced at suitable intervals on a rod 75 journaled in the sides of the machine frame. As the grippers release the front edge of the paper, the latter through its resiliency, will swing rearward as indicated by the arrow, Fig. 4, over the friction rolls and down upon a table or chute table 76 which inclines downwardly and rearwardly from said friction rolls, and is supported as shown or otherwise by the machine frame and preferably has an upturned lip 77 at its rear end to prevent the paper as its rear edge passes above its friction rolls and is thus released from sliding over the table.

78 indicates a rod paralleling and arranged rearward of shaft 23 and secured to the opposite sides of the machine frame and secured to said rod is a series of curved guards 78^a which extend downward and forward and occupy a plane slightly outward of and parallel with the periphery of the cylinder for the purpose of guarding against the paper swinging downward and forward at its rear end after it is completely withdrawn from the feed table, and thus becoming defaced by premature contact with the stencil or printing surface.

When it is desired to print sheets of paper by means of type instead of by stencil, the roller 35 is removed, and the stencil-carrying frame is replaced by a type-carrying frame 79, having a series of holes 79^a, corresponding to holes 31^a of frame 31 for engagement with pins 29^a of a reciprocatory frame when the stencil-carrying frame is removed, the frame 79 being equipped with type, as shown at 79^b for engagement by an inking roller hereinafter described. The shaft 4 is provided near each end with a crank arm 80 having outwardly projecting bosses 80^a and journaled in said losses are rods 81 equipped with downwardly extending arms 82 pressed yieldingly forward at their lower ends by means of helical springs 83 mounted on the bosses and pressing at their outer ends down upon the arms and at their opposite ends upwardly against the crank arms 80. An inking roller 84 has a spindle 85 projecting from its ends and journaled in said spring-pressed arms, a spring-actuated pin 86 carried by one of the arms extending

across the notch 87 in such arm, to hold the roller reliably in position and yet permit of its easy and quick removal when desired, the said roller being removed (or raised out of operative position), when the machine is used in connection with the stencil. The pressure of the springs 83 holds the roller pressed against the inner or inking surface of the cylinder so as to receive a coating of ink by rotating against such surface, ink being applied to such surface at suitable intervals by the attendant, and in order to have an even distribution of the ink on the cylinder and hence on the type, because the roller rides over the surface of the type when the frame carrying the same moves forward, the ends of the cylinder are cast with inwardly projecting cam tracks 88 which engage the contiguous ends of the spindle alternately and thus causes the roller to slide endwise while rotating in contact with the said inner surface of the cylinder, the inwardly projecting flanges of the end walls of the cylinder being formed with cam portions 89 and 90 which alternately pass under the lower ends of the spring-pressed arms 82. The cam portions 89 pass under arms 82 just before the slot of the cylinder moves under roller 84 for the purpose of first elevating said roller slightly so as to raise it from the inner wall of the non-slotted portion of the cylinder and thus avoid pushing any ink off said portion through the slot onto the type face, and then permitting arms 82 to be pressed downward so as to project said inking roller slightly outward through the slot of the cylinder to permit it to come into engagement with the type 79^b to ink the same. The inking roller remains in engagement with the type as the latter are moving rearwardly until the cam portion 90 passes under and again elevates arms 82 a sufficient distance to raise the roller 84 into the cylinder and then said cam permits spring 83 to press said arm 82 downwardly until the roller is again in engagement with the inner or inking surface of the cylinder, this re-elevation of the inking roller occurring just before the gripper-carrying shaft reaches said roller so that the paper shall not come into contact with the latter. It will thus be seen that for half the revolution of the cylinder the inking roller is in engagement therewith and that for the other half said roller projects through the slot of the cylinder and applies ink to the forwardly moving type.

From the above description it will be apparent that we have produced a machine of the character described embodying the features of advantage enumerated as desirable and we wish it to be understood that we reserve the right to make all changes in the form, proportion, detail construction and organization of the parts properly falling within the spirit and scope of the invention.

Having thus described the invention what we claim as new and desire to secure by Letters Patent is:—

1. The combination of a suitable frame, a cylinder journaled in said frame, a reciprocatory frame contiguous to the cylinder, a pair of members, connections between said members and the opposite ends of the reciprocatory frame, and means whereby one complete revolution of the cylinder imparts movement to said members successively to cause them to impart undeviating advance and retrograde movement to said reciprocatory frame.

2. The combination of a suitable frame, a cylinder journaled in said frame, a reciprocatory frame contiguous to the cylinder, a pair of circular members bearing a journaled relation to the cylinder, a flexible connection between one of said members and the front end of the reciprocatory frame, a flexible connection between the other member and the rear end of said frame, and means whereby the rotation of the cylinder effects its interlocking with one of said members and its unlocking from the other of said members.

3. The combination of a suitable frame, a cylinder journaled in said frame, a reciprocatory frame contiguous to the cylinder, a pair of grooved wheels, a flexible connection between one of said wheels and the other end of the reciprocatory frame and engaging the groove of said wheel, a flexible connection between the other wheel and the rear end of said frame and engaging the groove of said other wheel, a dog rotatable with the cylinder and interlocked with one of said wheels, and means carried by the other wheel to force said dog out of engagement with said wheel and into engagement with its own wheel.

4. The combination of a suitable frame, a cylinder journaled in said frame, a reciprocatory frame contiguous to the cylinder, a pair of grooved wheels, a flexible connection between one of said wheels and the other end of the reciprocatory frame and engaging the groove of said wheel, a flexible connection between the other wheel and the rear end of said frame and engaging the groove of said other wheel, a dog rotatable with the cylinder and interlocked with one of said wheels, and means carried by the other wheel to force said dog out of engagement with said wheel and into engagement with its own wheel, and means carried by the wheel originally engaged with the dog for tripping the latter out of engagement with the second wheel and forcing it into engagement with its own wheel.

5. The combination of a suitable frame, a cylinder journaled in said frame, a reciprocatory frame contiguous to the cylinder, a pair of grooved wheels having their axes co-

incidental with that of the cylinder and fitting snugly together and provided with recesses which conjointly form an opening and with notches in the walls surrounding said recesses and opening into the latter, a part secured to each of said wheels and projecting into said recesses, an arm rigid with the cylinder and projecting into the opening formed by said recesses, a dog pivotally carried by said arm and engaging the notch of one of said wheels, a reciprocatory frame underlying the cylinder, flexible connections between opposite ends of said frame and said wheels, means to rotate the cylinder and through the flexible connections between the said frame and the wheel engaged by the dog, move said frame and permit the other flexible connection to reverse the operation of the other free wheel to effect the tripping of the dog out of the notch of the wheel rigid with the cylinder and free said wheel and into the notch of the other wheel to lock the same rigid with the cylinder.

6. The combination of a suitable frame, a cylinder journaled in said frame, a reciprocatory frame contiguous to the cylinder, a pair of members, connections between said members and the opposite ends of the reciprocatory frame, means whereby the rotation of the cylinder effects its interlocking with one and its unlocking from the other of said members, a printing face movable with the reciprocatory frame, and means for carrying a sheet of paper around the cylinder and into engagement with said printing face when moving in the opposite direction from that referred to.

7. The combination of a suitable frame, a cylinder journaled in said frame, a reciprocatory frame contiguous to the cylinder, a pair of members, connections between said members and the opposite ends of the reciprocatory frame, means whereby the rotation of the cylinder effects its interlocking with one and its unlocking from the other of said members, a printing face movable with the reciprocatory frame, means for inking said face, when the frame is moving in one direction, and means for carrying a sheet of paper around the cylinder and into engagement with said printing face when moving in the opposite direction from that referred to.

8. The combination of a suitable frame, a cylinder journaled in said frame, a reciprocatory frame contiguous to the cylinder, a pair of members, connections between said members and the opposite ends of the reciprocatory frame, means whereby the rotation of the cylinder effects its interlocking with one and its unlocking from the other of said members, a printing face movable with the reciprocatory frame, means for inking said face, when the frame is moving in one direction, means for carrying a sheet of paper around the cylinder and into engagement

with said printing face when moving in the opposite direction from that referred to, and means for effecting the release of the printed sheet from the cylinder.

5 9. The combination of a suitable frame, a cylinder journaled in said frame, a reciprocatory frame contiguous to the cylinder, a pair of members, connections between said members and the opposite ends of the reciprocatory frame, means whereby the rotation
10 of the cylinder effects its interlocking with one and its unlocking from the other of said members, a printing face movable with the reciprocatory frame, means for inking said
15 face, when the frame is moving in one direction, means for carrying a sheet of paper around the cylinder and into engagement with said printing face when moving in the opposite direction from that referred to,
20 means for effecting the release of the printed sheet from the cylinder, and a table pitched downwardly and rearwardly to receive the printed sheet after it is released.

10. In a machine of the character described, the combination of a suitable frame, a cylinder journaled in said frame, a reciprocatory frame engaging the cylinder and provided with a printing face, means for inking said printing face, means whereby
30 the rotation of the cylinder in one direction effects reciprocatory movement of said frame, a feed table partly overlying the cylinder, a rock shaft journaled in the cylinder near one wall of the slot thereof, and provided
35 with a plurality of grippers, and a crank arm, a lug projecting from the frame to swing said grippers into the cylinder just before they pass forwardly under and beyond the front end of the table, and a sheet
40 of paper projecting inwardly therefrom, and a spring to lock said shaft and to cause said grippers to clamp the front edge of said sheet of paper down upon the cylinder as said crank arm passes said lug.

45 11. In a machine of the character described, the combination of a suitable frame, a cylinder journaled in said frame, a reciprocatory frame engaging the cylinder and provided with a printing face, means for inking said printing face, means whereby
50 the rotation of the cylinder in one direction effects reciprocatory movement of said frame, a feed table partly overlying the cylinder, a rock shaft journaled in the cylinder near one wall of the slot thereof, and provided
55 with a plurality of grippers, and a crank arm, a lug projecting from the frame to swing said grippers into the cylinder just before they pass forwardly under and beyond the front end of the table, and a sheet
60 of paper projecting inwardly therefrom, and a spring to lock said shaft and to cause said grippers to clamp the front edge of said sheet of paper down upon the cylinder as

said crank arm passes said lug, a rock shaft 65 journaled in the machine frame above the cylinder and forward of the feed table and provided with stops and detainers, the former being adapted to be engaged by the gripper-carrying rock-shaft and pushed up- 70 wardly and forwardly to cause the detainers to move downward into close proximity with the table and the sheet of paper thereon engaged by the grippers and to be held in such position by the engagement of the non-slot- 75 ted portion of the cylinder with said stops, and means for returning the shaft equipped with the stops and detainers to its original position the instant the opposite end of the slot of the cylinder is caused to register there- 80 with by the rotation of the cylinder.

12. The combination of a suitable frame, a cylinder journaled in said frame, a reciprocatory frame contiguous to the cylinder, a pair of members, connections between said 85 members and the opposite ends of the reciprocatory frame, means whereby the rotation of the cylinder effects its interlocking with one and its unlocking from the other of said members, a printing face movable with the reciprocatory frame, a roller for inking said
90 face, when the frame is moving in one direction, and means for carrying a sheet of paper around the cylinder and into engagement with said printing face when moving 95 in the reverse direction.

13. The combination of a suitable frame, a cylinder journaled in said frame, a reciprocatory frame contiguous to the cylinder, a pair of members, connections between said 100 members and the opposite ends of the reciprocatory frame, means whereby the rotation of the cylinder effects its interlocking with one and its unlocking from the other of said members, a printing face movable with the reciprocatory frame, a roller for inking said
105 face when the frame is moving in one direction, means to impart endwise movement to said roller to distribute the ink evenly thereon before it applies the ink on the printing 110 face, and means for carrying a sheet of paper around the cylinder and into engagement with said printing face when moving in the reverse direction.

14. The combination of a suitable frame, 115 a cylinder journaled in said frame, a reciprocatory frame contiguous to the cylinder, a pair of wheel-members journaled coincidently with the axis of the cylinder, a flexible connection between one of said members and one end of said frame, a grooved guide-roller suitably supported at the opposite side of the cylinder from the end of the reciprocatory frame to which said connection is attached and forming a guide for said con- 120 nection between its ends, a flexible connection between the other wheel-member and the other end of said reciprocatory frame, 125

means whereby the rotation of the cylinder effects its simultaneous interlocking with one of said wheel-members and unlocking from the other to cause said members to be successively rotated by the cylinder and the reciprocatory frame to make an advance and a retrograde movement.

In testimony whereof we affix our signatures, in the presence of two witnesses.

JOSEPH D. HAVENS.
HERBERT M. PAGE.

Witnesses:

W. S. WHITFORD,
C. E. BIGLER.