

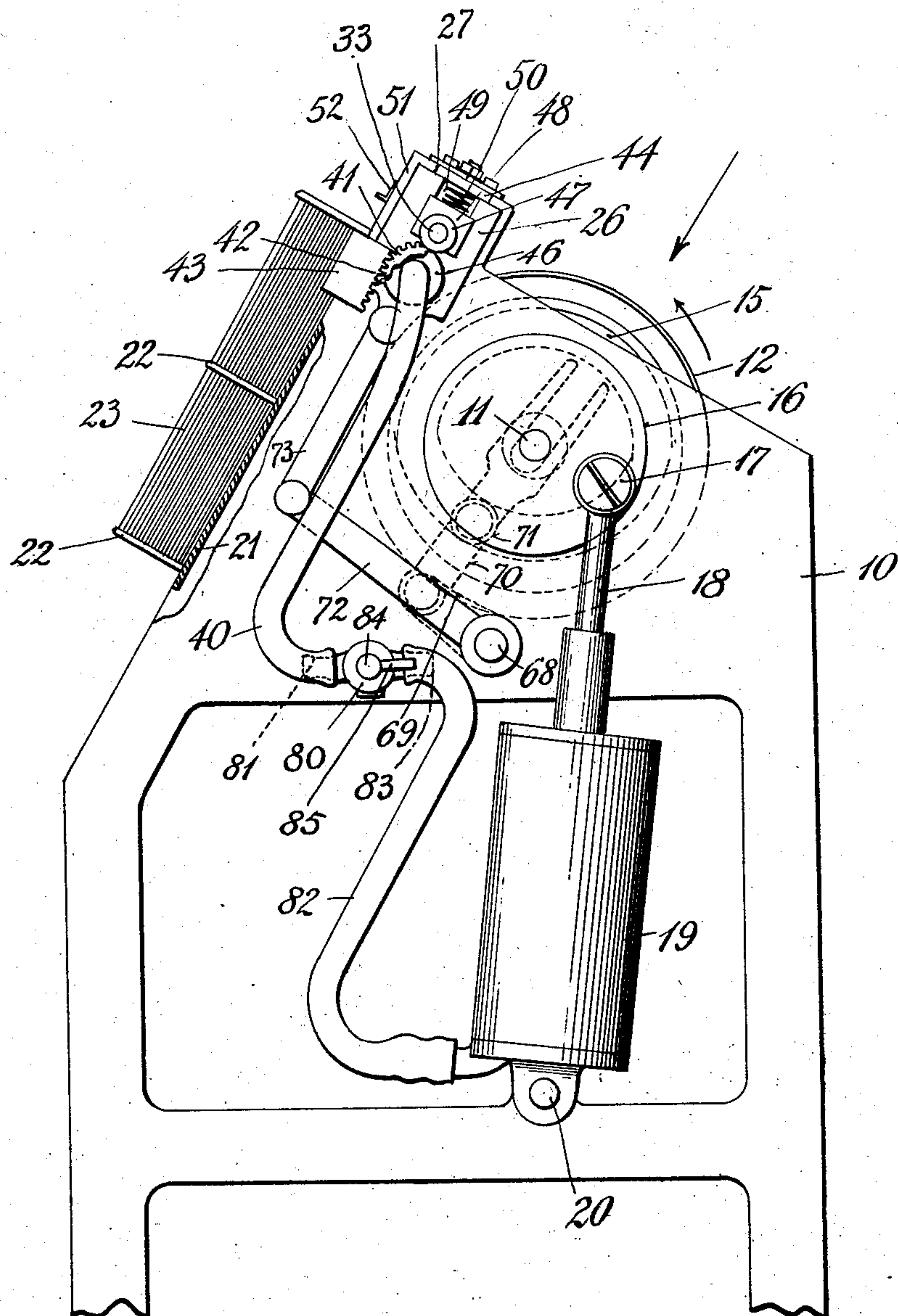
H. B. COOLEY.
FEEDING DEVICE.
APPLICATION FILED DEC. 26, 1908.

994,376.

Patented June 6, 1911.

3 SHEETS—SHEET 1.

Fig. 1.



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994,376.

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3 SHEETS—SHEET 2.

Fig. 2.

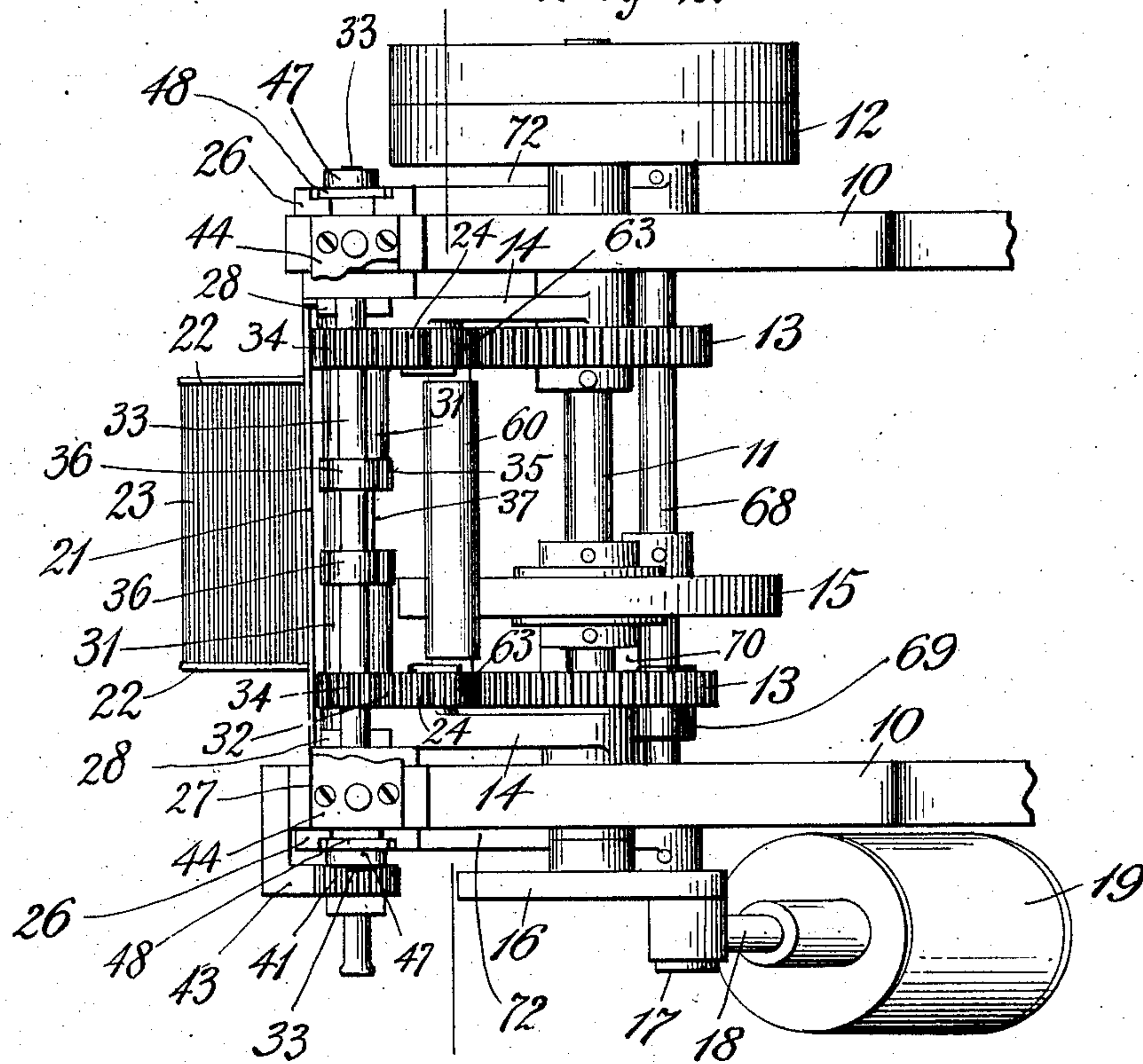
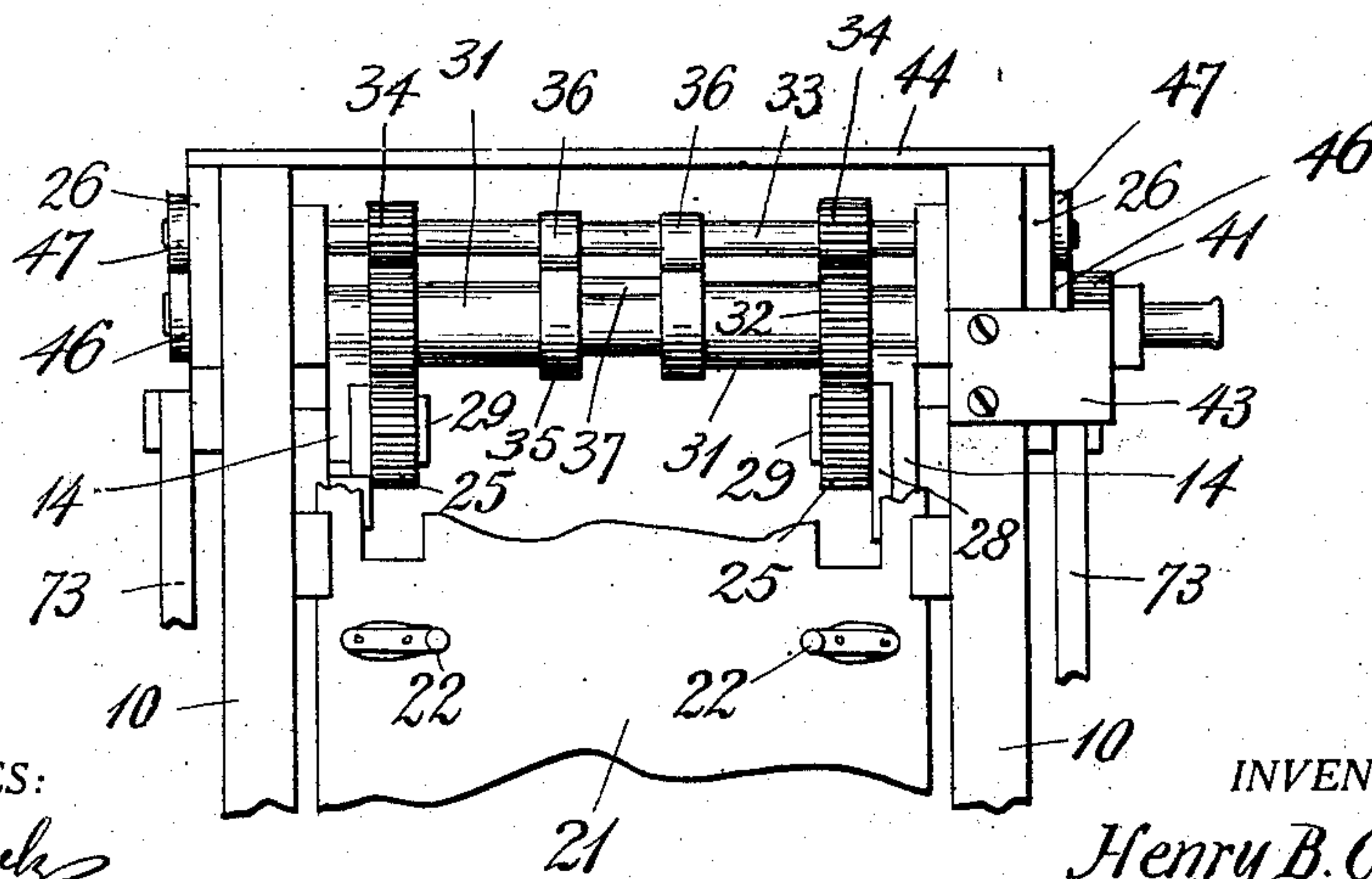


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 4.

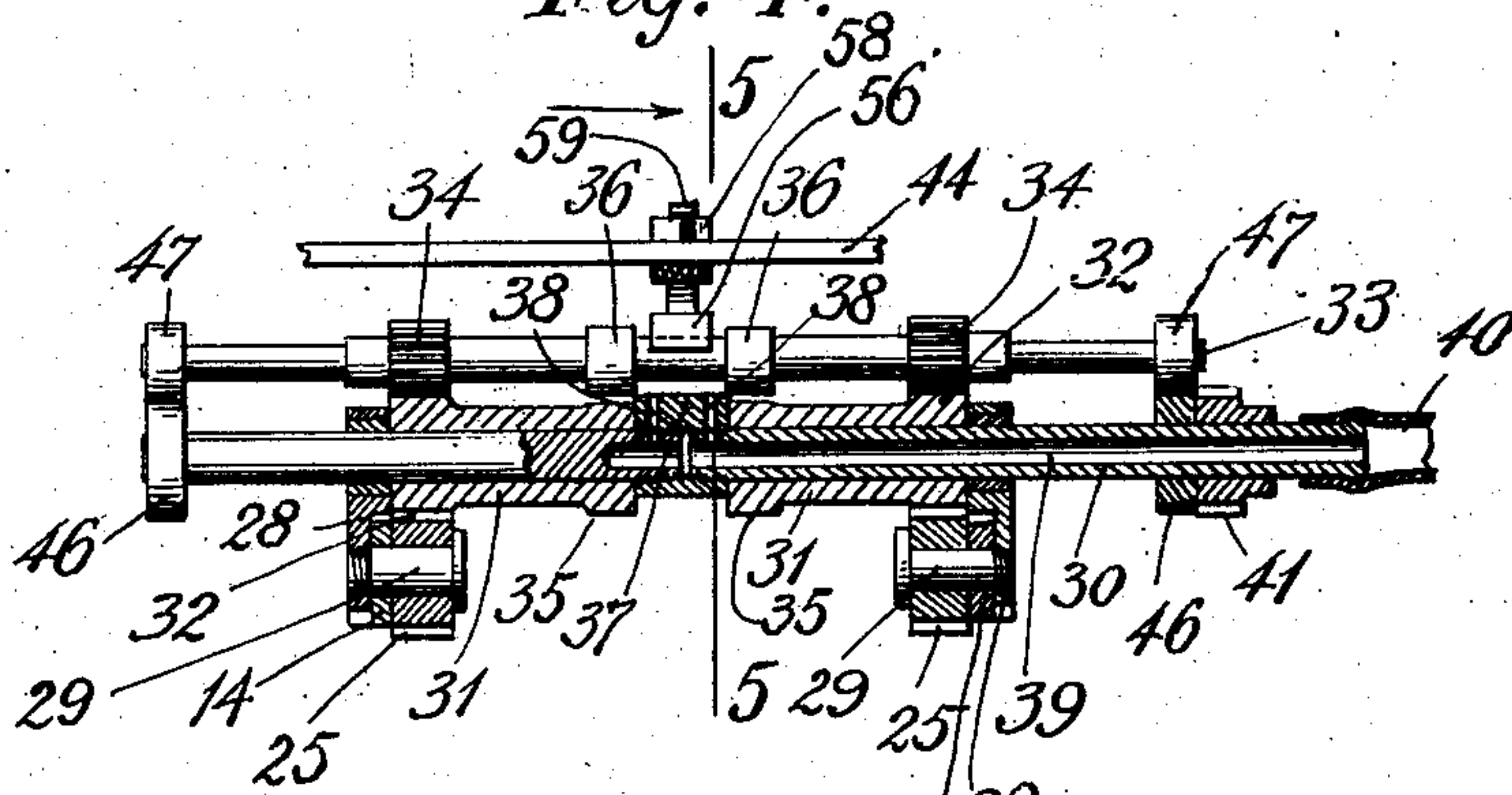


Fig. 5.

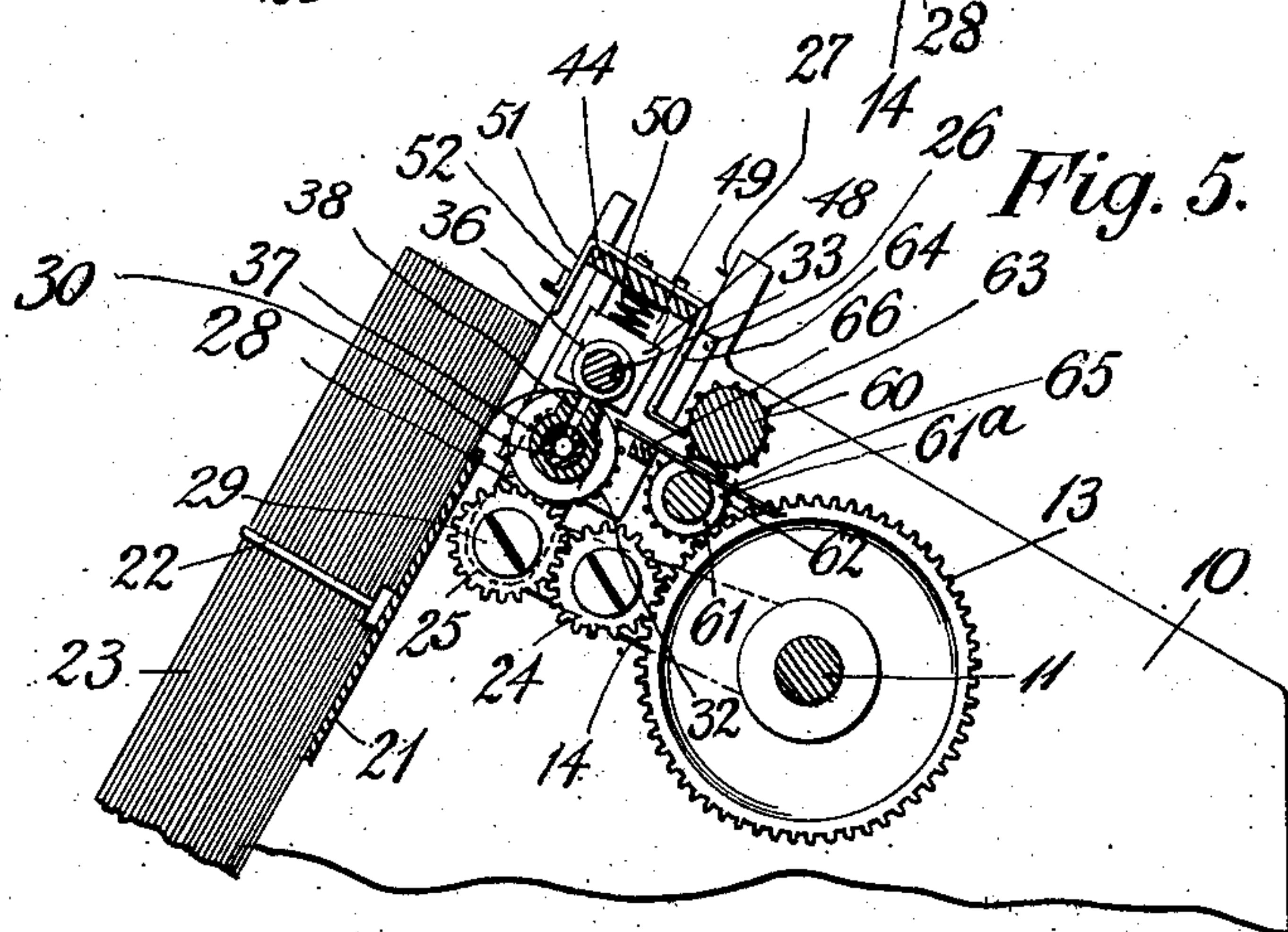


Fig. 6.

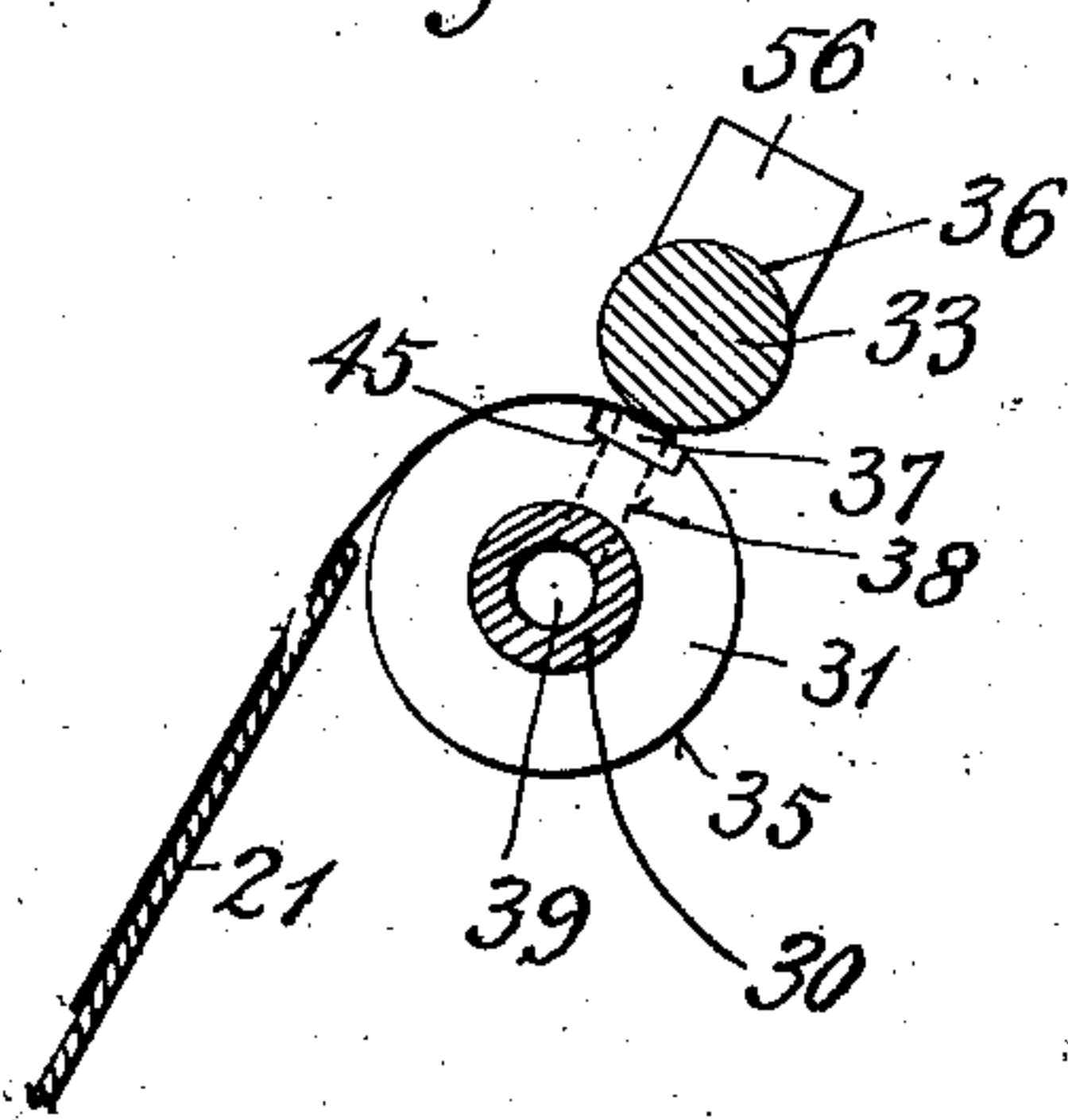


Fig. 8.

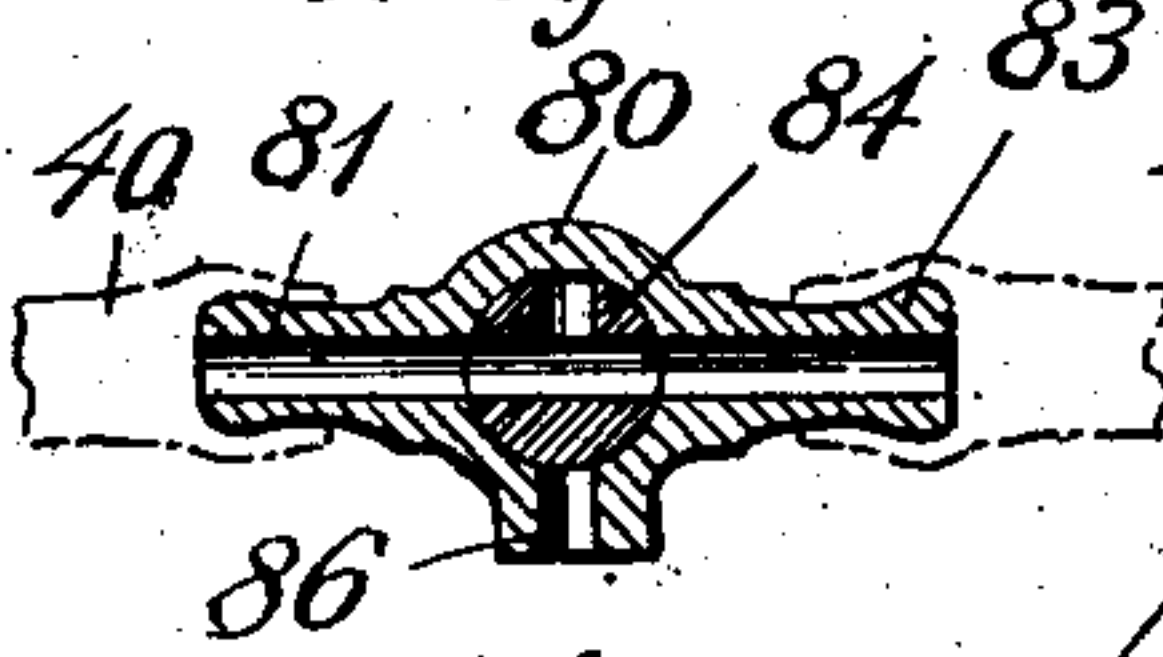


Fig. 9.

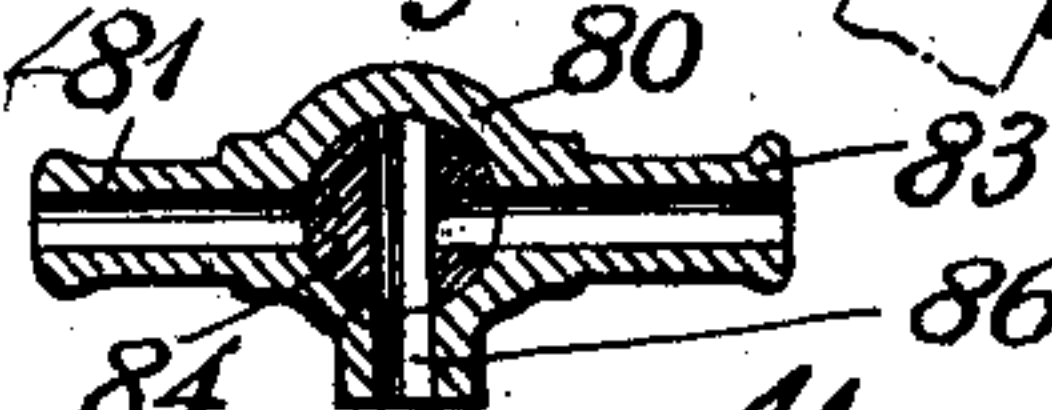


Fig. 10.

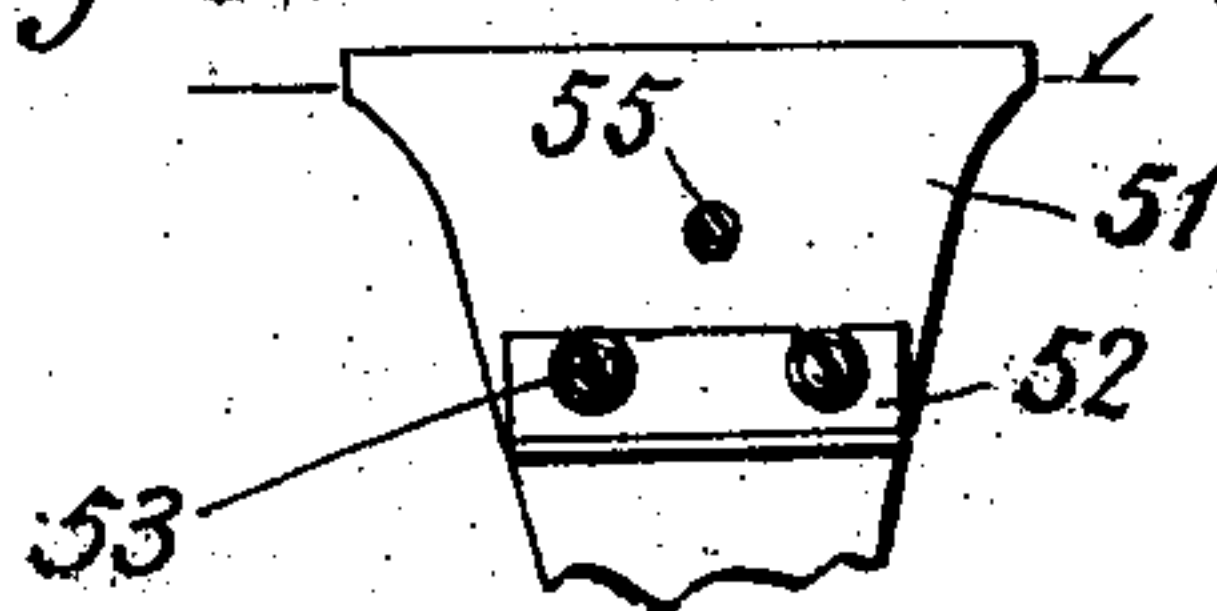
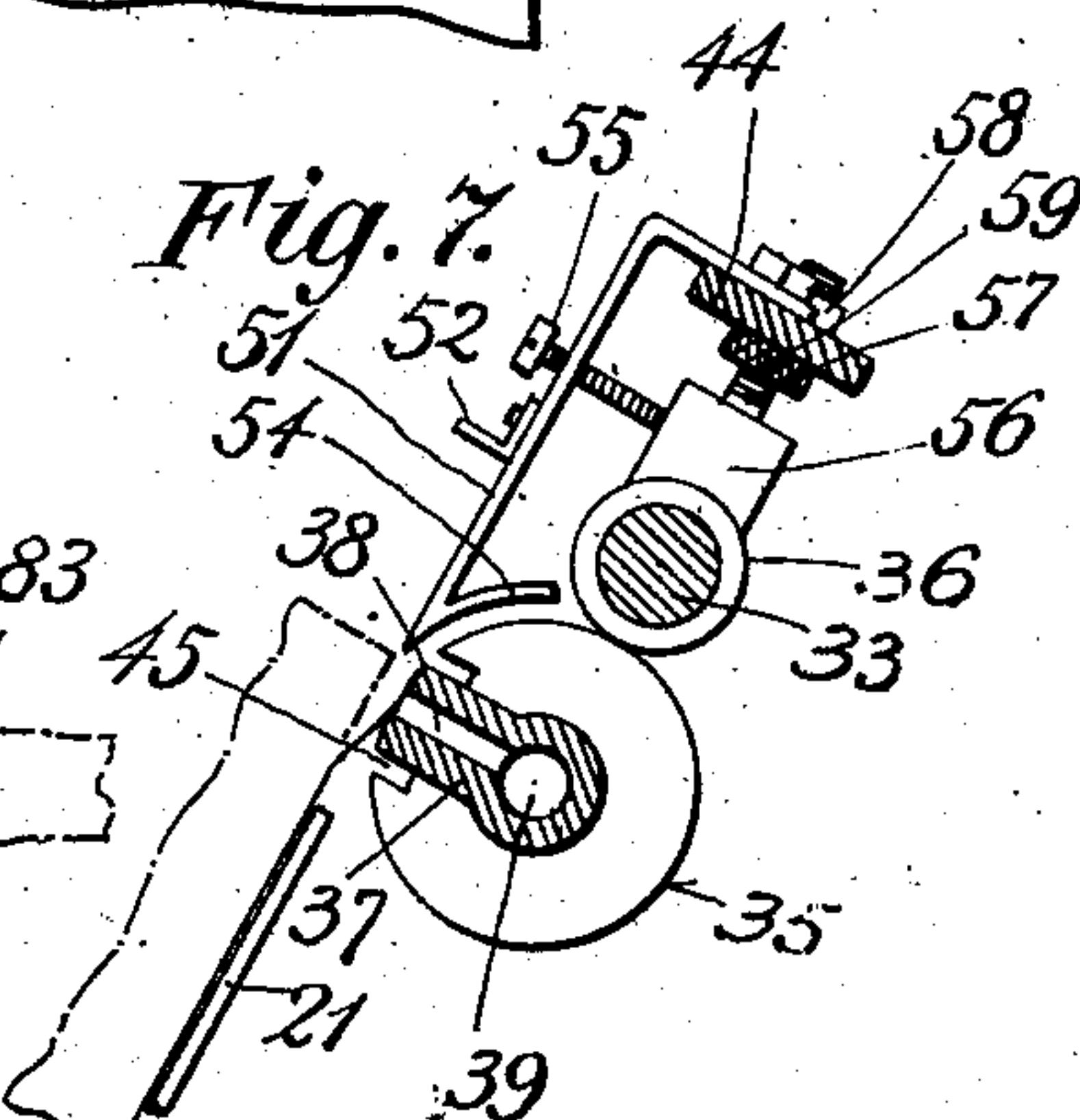


Fig. 7.



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UNITED STATES PATENT OFFICE.

HENRY B. COOLEY, OF NEW BRITAIN, CONNECTICUT, ASSIGNOR TO THE AMERICAN PAPER GOODS COMPANY, OF MONTCLAIR, NEW JERSEY, A CORPORATION OF NEW JERSEY.

FEEDING DEVICE.

994,376.

Specification of Letters Patent.

Patented June 6, 1911.

Application filed December 26, 1908. Serial No. 469,249.

To all whom it may concern:

Be it known that I, HENRY B. COOLEY, a citizen of the United States, and a resident of New Britain, in the county of Hartford and State of Connecticut, have invented a new and Improved Feeding Device, of which the following is a specification.

My invention relates to the class of machines employed for performing various operations upon sheets of paper or like material, or on articles formed more or less flat from such material, and the object of the invention is to improve the construction and operation of various parts of such a machine, and thus not only increase the accuracy of the work done by the machine, but also to increase the general efficiency and capacity of the machine as a whole.

A further object of the invention is generally to provide a machine of this class having various novel features of advantage and utility.

One form of device in the use of which the objects sought may be attained is illustrated in the accompanying drawings, in which—

Figure 1 is a view in side elevation of a portion of a machine embodying my invention, with parts partially shown in dotted outline. Fig. 2 is a view of the same looking from the top in the direction indicated by the arrow in Fig. 1, the guide bars being removed. Fig. 3 is a view in front elevation of the upper portion of the machine the supporting plate being omitted. Fig. 4 is a view in front elevation of a portion of the device shown in Fig. 3, with parts broken away to show construction. Fig. 5 is a detail view in section through parts of the machine on plane denoted by line 5—5 of Fig. 4, and showing the relative position of the parts at the time of release of the suction. Fig. 6 is a detail view on enlarged scale showing the manner of reception of the paper by the feed rolls. Fig. 7 is a like view showing the construction of the paper guide. Figs. 8 and 9 are detail views on enlarged scale showing the valve for cutting off the action of the pump. Fig. 10 is a detail view on enlarged scale showing the construction of the buffer plate.

The invention forming the subject matter of this application is especially applicable in the feed of envelopes to mechanism for

performing various operations thereon, such as printing, counting, banding, or any of the various operations performed upon articles of this class, and for this reason I have chosen such a machine for the purpose of illustrating herein my improved feed mechanism, but it will be understood that the invention is not limited to machines for handling envelopes, as it is equally applicable to machines for feeding sheets of any material or articles formed more or less flat, and from piles arranged with more or less regularity, as the case may be.

In the accompanying drawings the numeral 10 indicates the end parts or standards of the machine, composed of any suitable material and formed in any desired shape. These standards may be properly connected by cross-bars or other ties if necessary to provide a sufficiently strong and rigid structure. A main driving shaft 11 is suitably supported by the standards and secured thereto is a driving pulley 12 or other suitable device for receiving power to drive the machine. Driving gears 13 are secured to the driving shaft and arms 14 are loosely mounted upon said shaft, preferably in proximity to said gears. A cam 15 is also secured to the driving shaft, as is also a disk 16 at one end. This disk has a pin 17 upon which is pivoted a piston rod 18 projecting from a cylinder 19 pivoted at 20 to the frame of the machine. This cylinder and the piston therein are of any suitable construction to produce a vacuum of sufficient degree and to release the same at the proper time to properly accomplish the work required.

A table 21 is supported upon the frame or end parts 10 thereof, this table having posts 22 arranged to retain a pile 23 of envelopes or other articles to be fed by the mechanism. This table is so arranged that one edge of the pile will lie in proximity to a feed device to be hereinafter described.

Idle gears 24 are mounted on the arms 14, meshing with the gears 13 and also with gears 25 mounted on the arms. Slides 26 are located in the slide-ways 27 in the ends 10 and are connected with the arms 14 by links 28. The links are preferably pivoted upon studs 29 bearing the gears 25, and the connection with the slides is preferably by means of a hollow shaft 30 mounted in bear-

ings in the slides. Feed sleeves 31 are mounted upon the hollow shaft 30, to rotate independently thereof, these sleeves having gears 32 meshing with the gears 25. A feed shaft 33 is mounted in the slides 26 and bears pinions 34 meshing with the gears 32. The feed sleeves 31 are preferably enlarged at the ends of the sleeves located nearest each other. These enlargements form feed rolls 35 that co-act with enlargements 36 constituting feed rolls on the feed shaft 33.

The hollow shaft 30 has a picker 37 located between the feed rolls 35, this picker having ports 38 communicating with the opening 39 in the hollow shaft. This picker is preferably an enlargement formed on or secured to the hollow shaft, the opening 39 communicating with the cylinder as through a tube 40, the connection between the tube and cylinder being more particularly hereinafter described. This shaft bears a gear 41 meshing with a rack 42 on a rack plate 43 secured to the frame of the machine, the shaft, by this construction, receiving a turning-reciprocating movement effected in a manner to be more particularly hereinafter described.

The mechanism thus far described is set forth by drawings and description in my patent for mechanism for feeding paper, dated December 31, 1907, No. 874,943, and forms, of itself, no part of the present invention, and reference is hereby made to said prior patent for a more thorough understanding of the construction and operation of the parts, if required.

In insuring accuracy of the feed it is important that the sheets when they are taken from the pile 23 shall move co-extensively with each of the parts of the mechanism employed to move them, that is, that the grip upon the sheets shall be such that no slipping will occur between the sheet and the part or parts engaging it; it is also important that there shall be no lost motion between the several parts of the feed device. There are several locations in a feed mechanism of this kind in which such faults of operation are liable to occur, and it is the purpose of the present invention to remedy such faults, among others.

In order to enable the feed rolls 35 and 36 to certainly grip a sheet as its edge enters the throat between the rolls and without any slipping movement backward of the sheet or movement of the rolls forward independently of the sheet I provide means whereby an opening occurs between the meeting faces of the rolls at the time a sheet is presented to the rolls, the edge of the sheet being projected into this opening so that when the two surfaces of the roll subsequently come into contact the edge of the sheet lies well in advance of the line of

contact surface of the rolls. This opening 65 may be formed in any desired manner on either or both of the rolls. In the form of construction herein shown the feed rolls 35 are cut away at their edges for a distance extending partly around the periphery 70 forming a receiving opening 45.

It is desirable that the feed rolls shall accurately maintain their relative positions at all times to insure smooth action. The necessary looseness required between the teeth 75 of the intermeshing gears of the rolls prevents them from performing this function. The rolls themselves effect this result for a greater part of the time as they are supported one against the other except at such time however that the receiving opening comes into a plane passing through the axis of both of the feed rolls. The mutual support of the rolls is at this time withdrawn and in order to properly support the rolls 85 at such time and insure at all times an even and regular movement collars 46-47 are mounted on the hollow shaft 30 and the feed shaft 33 respectively. These collars may be located in any desired manner to effect the required result; in the form of construction herein shown the collars 46 being loosely mounted upon the hollow shaft, while the collars 47 are secured to the feed shaft. These collars are preferably of the same size as the feed rolls on the shaft to which the collars are secured. The shaft 33 is supported in blocks 48 loosely mounted in slots 49 in the slides 26, springs 50 forcing the blocks downward, thus holding the feed rolls in yielding engagement to allow them to give to a degree depending upon the thickness of paper being fed between the rolls.

A bar 44 is secured to each of the slides 26 and this bar bears at its front edge a supporting plate 51 rigidly secured and lying in position to encounter the bottom surface of the pile 23, as the bar is moved downward in the reciprocating movement of the slides 26. This plate has a buffer 52 adjustably secured thereon as by means of screws 53, this buffer being located to engage the edge of the pile 23 of sheets as the bar is moved downward. A guide 54 is secured to the back of the plate 51, this guide having a curved surface corresponding more or less to the surface of the feed rolls so that a sheet of paper as it is drawn from the table 21 is guided between the rolls 35 and 36 and is prevented from passing upward in front of the roll 36. An adjusting screw 55 projects through the plate, its inner end thrusting against a support 56 for the feed roll 36. This adjusting screw is employed to locate the lower edge of the plate 51 in position to properly engage the pile of sheets, the spring quality of the plate being made use of in this adjustment. The support 56 has a

stem 57 passing through the bar 44, nuts 58—59 located on opposite sides of the bar affording means for adjusting the position of the support and locating it in such adjusted position.

A second pair of feed rolls is located a short distance from the initial pair composed of the rolls 35 and 36 hereinabove described, this second pair consisting of the rolls 60—61. These rolls are located in position to take the sheets from the first pair of rolls and deliver them to machines for performing the necessary operations thereupon. These rolls may be connected up and driven from the main shaft in any desired manner. In the form of construction herein shown gears 62 on the shaft 61 mesh with the driving gears 13, the gears 62 also meshing with gears 63 secured to the upper feed roll 60, said gears being properly timed with respect to the other feed rolls to take the sheets without pulling.

Guide bars 64, secured to the cross-bar 44 extend in a position to overlie the sheets of paper as they pass between the two sets of feed rolls, and lower or supporting guide bars 65 secured to a cross-piece 66 are located between the two sets of feed rolls at such distance below the guide bar 64 as to afford space for the passage of the sheets. These supporting guide bars project through grooves 61^a in the lower feed roll and extend a sufficient distance beyond this second set of rolls to deliver the paper to succeeding mechanism.

The support 56 prevents the feed rolls 36 from springing under the action of the machine, thus keeping the two feed rolls 35 in close contact with the two rolls 36, maintaining them in the same relative position and insuring an equal grip of said rolls upon the different portions of the edge of the paper. Should the feed roll be allowed to spring the grip of the two rolls 35—36 upon different parts of the edge of the paper would be uneven, thus causing an irregular feeding action and uneven feed of the paper or sheets. Another cause for uneven feed of the paper in a mechanism of this class is liable to occur by reason of a greater movement of the parts located at one side of the machine than those at the other, such unequal movement being occasioned by a certain looseness between the intermeshing gears, this allowing unequal movement between the two sleeves bearing the feed rolls 35. In order to avoid such a fault the feed shaft 33 is provided with a pinion at each end of the shaft, these pinions each meshing with the gears 32 on the feed sleeves 31. This construction insures an equal movement not only of the sleeves and the feed rolls supported thereby with respect to each other, but an equal movement of either or both of

said sleeves with the feed rolls on the feed shaft so that an even feed of the paper is insured.

In order to effect a regular feed of the sheets of paper it is desirable that the feed rolls 35—36 shall be stationary, so far as reciprocating movement is concerned, when the sheets of paper are being drawn from the pile. To effect this result the cam 15 for causing the reciprocating movement of the slides 26 and hence of the feed rolls 35—36 is so shaped that a dwell in the movement of the slides is imparted at the lower limit of their play, this dwell being of sufficient duration to allow the several feed rolls by rotation to entirely remove a sheet of paper from the pile. This construction and operation allows the picker to perform its function solely, and when it has performed its work upon a sheet of paper the latter is released therefrom and then the feed of the feed rolls takes place independently of the picker.

A rock shaft 68 is mounted in the end parts of the frame and has an arm 69 secured thereto and connected by a rod 70 with the cam 15. This rod is forked at its end to straddle the driving shaft 11, and a stud 71 secured to the rod bears a roller located in a cam groove in the cam. Arms 72 also secured to the rock shaft 68 extend in position to receive links 73, these links being secured one to each of the arms 72 and pivotally connecting said arms with the slides 26.

A general description of the operation of the machine is as follows: The various parts being in position with the slides at the upper limit of their play, as shown in Figs. 1, 3 and 4, the piston in the cylinder 19 begins its upward movement causing the formation of a vacuum in said cylinder, which extends through the tube to the ports 38 of the picker 37. The suction thus created through said ports draws the bottom sheet of paper down to the picker and away from the other sheets of the pile, the edge of such sheet passing under the edge of the plate 51. The slides 26, by reason of the shape of the cam, are held stationary for a brief period at this time and until a considerable vacuum has been formed by the piston. The cam now causes the slides to move downward, which movement, by reason of the engagement of the gear 41 with the rack 42, causes the hollow shaft and the picker thereon to be rotated a partial turn. The downward movement of the shaft and its rotative movement, however, are so proportioned that the sheet is not disturbed in its position in the pile, its edge simply being drawn over and presented into the throat between the two feed rolls 35—36. The rotation of the two feed rolls is so timed with respect to the reciprocating movement of the slides that the receiving opening 45 is positioned in a plane passing

through the axes of the two feeding rolls at or about the time the slides finish their downward movement and the feed shaft its rotative movement to move the ports 38 upward and backward. The dwell in the reciprocating movement of the slides hereinbefore described now occurs, during which dwell the circular periphery of the two feed rolls come in contact at a point back of the edge of the sheet, so that the movement of the sheet is immediately taken up and it is quickly drawn from the pile, there being no slipping or lost motion as would be the case were the sheet forced into the throat between the two rollers. The circular periphery of the feed rolls is of sufficient length to deliver the sheet to the second pair of feed rolls before the opening recess is again presented in the plane passing through the axis of the two shafts, the second pair of feed rolls thus continuing the movement of the sheet which otherwise would be interrupted owing to the receiving opening being again located in the position above described. As the slides move downward the plate 51 is projected between the bottom sheet of the pile and that sheet next to the bottom and the buffer 52 encounters the edge of the pile, these parts thus firmly supporting the pile while the bottom sheet is being drawn therefrom.

In order to provide a ready means for stopping the operation of the machine without actually stopping its running I have provided the following mechanism. A valve 80 is located on the frame or end part of the machine, the tube 40 extending from the hollow shaft 30 to a nipple 81 on the valve. Another tube 82 extends from a nipple 83 on the valve body to the cylinder 19. A plug 84 having a handle 85 is suitably connected with the valve and may be of the ordinary three-way valve construction, so that when the handle is in position a communication is established between the cylinder and the hollow shaft through the tubes 40 and 82, and the operation of the piston thus effects a suction at the ports of the picker and causes the feed of the sheets. By turning the handle to another position the relief port 86 is brought into communication with the cylinder through the tube 82, thus not only cutting off the ports in the picker from the cylinder, but also relieving the load upon the cylinder which would otherwise be occasioned in its efforts to form a vacuum. The feed of the sheets may thus be quickly and readily stopped and at the same time the machine may run free without any load caused by the formation of a vacuum in the cylinder.

I claim—

1. A receiver, cooperating members to remove articles from the receiver, said members being formed and relatively located with their surfaces in contact during part of

a movement, but having an opening occurring therebetween at intervals during such movement, means for moving said members, and means rigidly connected to move with one of said members and arranged to exert a hold upon an article in the receiver to draw it into said opening and to retain said hold until about the time said opening is closed by the surface of the members coming in contact.

2. A receiver, cooperating feed rolls to remove articles from the receiver, said rolls being formed and relatively located with their peripheries in contact during part of a rotation, but having an opening occurring therebetween at intervals during rotation, means for operating the rolls, and means connected to rotate with one of said rolls and arranged to exert a hold upon an article in the receiver to draw it into said opening and to retain said hold until about the time said opening is closed by the surface of the rolls coming in contact.

3. A receiver, cooperating feed rolls for removing articles from the receiver, said rolls being shaped and relatively located to form and close an opening therebetween by the rotation of a roll, means for rotating one of said rolls, and means rigidly connected to move with one of said rolls and arranged to exert a hold upon an article to draw it into said opening and to retain said hold until about the time said opening is closed by the surface of the members coming in contact.

4. A receiver, cooperating members to remove articles from the receiver, said members having contact surfaces cut away to create and close an opening during movement, means for moving said members, a picker moving in the same direction and at the same rate as one of said members, said picker being arranged to exert a hold upon an article to draw it into said opening and to retain said hold until about the time said opening is closed by the surface of the members coming in contact.

5. A receiver, cooperating members to remove articles from the receiver, said members having contact surfaces, a cut-away portion in said surfaces forming and closing an opening during movement of one of said members, means for moving said members, a picker rigidly connected to move with one of said members, and arranged to maintain contact with an article until about the time said opening closes, a pneumatic apparatus connected to produce a suction at the picker and means for operating the picker.

6. A receiver, feed rolls located adjacent to the receiver, a cutaway portion in a periphery of one of said rolls creating and closing an opening during rotation, means for rotating one of said rolls, a picker mounted to turn in cooperative relation with said

roll, and means for turning the picker to draw an article into said opening and to retain its hold upon said article until about the time said opening closes in the rotation of the rolls.

7. A receiver, a picker shaft, rolls cooperatively located with respect to the receiver and including sleeves mounted upon the picker shaft, said rolls having a cutaway portion in the periphery thereof creating and closing an opening during rotation, means for operating the picker shaft to draw an article into said opening, and means for operating the rolls.

8. A receiver, a picker shaft, a picker mounted on the shaft, a connection between said shaft and a pneumatic apparatus, feed rolls including sleeves mounted upon said shaft on opposite sides of the picker, said rolls having cutaway surfaces in the peripheries thereof creating and closing an opening during rotation, means for operating the rolls, and means for operating the picker to draw an article into said opening.

9. A receiver, cooperating members to remove articles therefrom, said members being shaped and relatively located to create and close an opening therebetween by a movement of one of said members and one of said members being supported by the other member and held in yielding contact therewith, means for holding the surfaces of the members spaced apart in fixed relation during the presence of said opening, means for operating one of said members, and means for presenting an article from the receiver to said members.

10. A receiver, feed rolls to remove articles from the receiver, said rolls being shaped and relatively located to create and close an opening therebetween during rotation of one of said rolls, means for rotating one of said rolls, a bearing for one of said rolls mounted to vary its position with respect to the other roll, said rolls being supported one by the other, means for holding the rolls spaced apart in fixed relation during the presence of said opening, and means for presenting an article from the receiver to said rolls.

11. A receiver, feed rolls to remove articles from the receiver, said rolls being shaped and relatively located to create and close an opening therebetween during rotation of one of said rolls, means for rotating one of said rolls, a bearing for one of said rolls being mounted to vary the position of said roll with respect to the other roll, enlargements upon said rolls to limit the movement of one roll toward the other during the presence of said opening, and means for presenting an article from the receiver to said rolls.

12. A receiver, cooperating members to remove articles from the receiver, said members being formed and relatively located to

create and close an opening therebetween during movement of one of said members, means for imparting said movement, means for imparting a reciprocating movement to said members and for causing a dwell in said reciprocating movement, and means for projecting an article into said opening during said dwell.

13. A receiver, cooperating members to remove articles from the receiver, said members being formed and relatively located to create and close an opening therebetween during movement of one of said members, means for imparting said movement, a cam formed to impart a reciprocating movement to said members and to cause a dwell during said movement, connections between said cam and said members, and means for projecting an article into said opening during said dwell.

14. A receiver, cooperating feed rolls to remove articles from the receiver, said rolls being formed and relatively located to create and close an opening during rotation of one of said rolls, means for rotating one of said rolls, means for imparting a reciprocating movement to the rolls and for causing a dwell in said reciprocating movement, and means for projecting an article into said opening during said dwell.

15. A receiver, a picker shaft, a picker located on said shaft, means for operating the picker, sleeves constituting feed rolls mounted on opposite sides of the picker, cooperating feed rolls, said rolls being formed and relatively located to create and close an opening during rotation of one of said rolls, means for rotating one of said rolls, means for imparting a reciprocating movement to said picker shaft and said rolls, and means for projecting an article from the receiver into said opening.

16. A receiver, slides mounted to have a reciprocating movement, means for operating the slides, a picker shaft mounted in the slides, a picker mounted on said shaft, means for operating the picker, sleeves forming feed rolls mounted on said picker, cooperating feed rolls borne by the slides, said rolls being formed and relatively located to create and close an opening during rotation of one of said rolls, means for rotating one of said rolls, and means for projecting an article from the receiver into said opening.

17. A receiver, cooperating members to remove articles therefrom, said members being shaped and relatively located to create and close an opening therebetween by movement of one of said members, means for moving one of said members, means moving in unison with one of said members and arranged to exert a hold upon an article to draw it into said opening and to retain

said hold until about the time said opening is closed by the surface of the members coming in contact, and means for conducting an article from said members.

5 18. A receiver, feed rolls to remove an article from said receiver, said rolls being formed and relatively located to create and close an opening during rotation of one of
10 said rolls, means for rotating one of said rolls, means moving in unison with the surface of one of said rolls and arranged to exert a hold upon an article to draw it into said opening and to retain said hold until
15 surface of the members coming in contact, and means for conducting an article from said feed rolls.

19. A receiver, a pair of members having gripping surfaces to grip an article between
20 them and draw it from the receiver, one of said members having a cutaway portion to create and close an opening between said members during movement thereof, a picker mounted with its working end to move at
25 the same rate and in a path parallel to that of a gripping surface, means for operating the members, and means for operating the picker.

20. A receiver, a pair of feed rolls mounted to grip an article between them and draw
30 it from the receiver, one of said rolls having a cutaway portion to create and close an opening between the rolls in the rotation thereof, a picker mounted to turn on the
35 same axis as one of said rolls, means for operating the picker, and means for rotating said rolls.

21. A receiver, cooperating members to remove articles from the receiver, said members being formed and relatively located to
40 create and close an opening therebetween

during movement of either of said members, means for imparting said movement, means for simultaneously imparting a reciprocating movement to said members, and means
45 for projecting an article into said opening.

22. The combination with a support for a pile of sheets, of a suction roll oscillating beneath the pile, feed rolls mounted on the suction roll and having cutaway portions to
50 receive the bottom sheet of the pile, a cooperating feed roll, means for operating the feed rolls, and means for oscillating the suction roll.

23. The combination with a support for a
55 pile of sheets, of a suction roll oscillating beneath the pile, feed rolls mounted on the suction roll and having cutaway portions on their peripheries to create and close an opening to receive the bottom sheet of the
60 pile, a cooperating feed roll, a collar on the feed roll shaft to properly support said feed rolls when their peripheries are not in contact, means for oscillating the suction roll, and means for operating the feed rolls.
65

24. The combination with a support for a pile of sheets, of a suction roll oscillating beneath the pile, feed rolls mounted on the suction roll and having cutaway portion in
70 their peripheries to create and close an opening to receive the bottom sheet of the pile, a cooperating feed roll, a shaft therefor, collars on said shaft to properly support said feed rolls when their peripheries are not in
75 contact, means for operating the suction roll to draw the bottom sheet into said opening to be gripped by the feed rolls, and means for operating the feed rolls.

HENRY B. COOLEY.

Witnesses:

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R. W. FISHBURN.