

Feb. 14, 1933.

F. E. PFEIFFER ET AL

1,897,654

MECHANISM AND METHOD OF FEEDING A PLURALITY OF PAPER SHEETS

Filed March 16, 1931

4 Sheets-Sheet 1

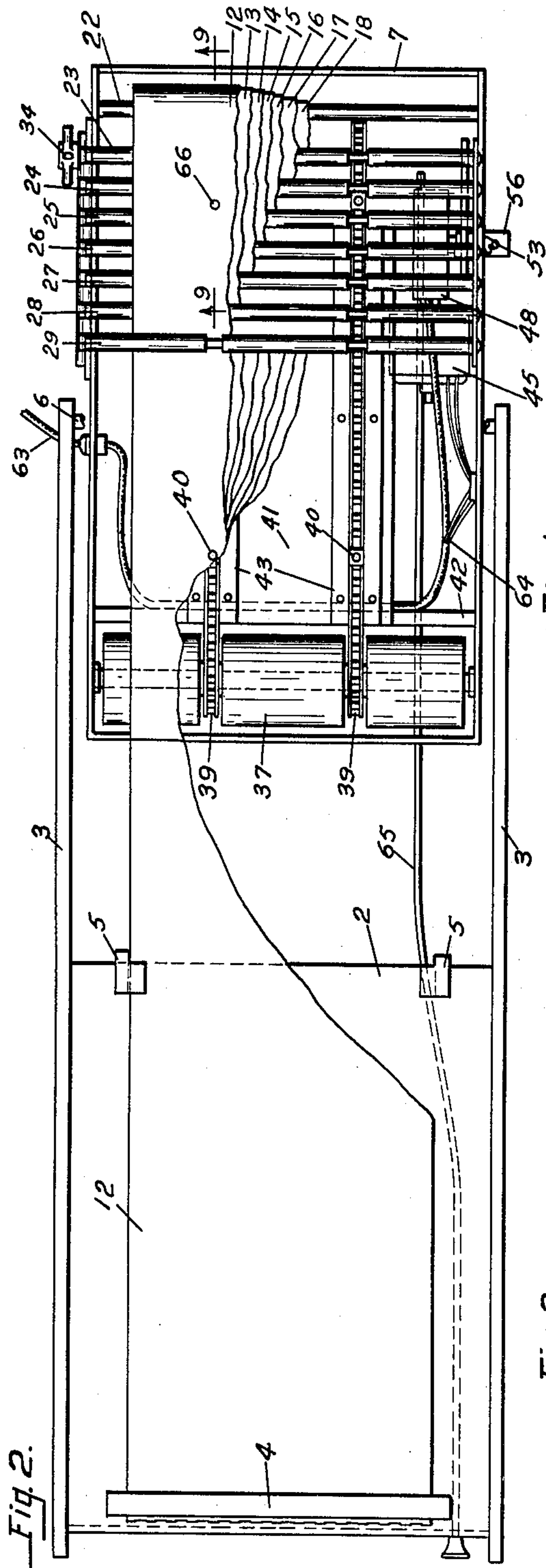


Fig. 2.

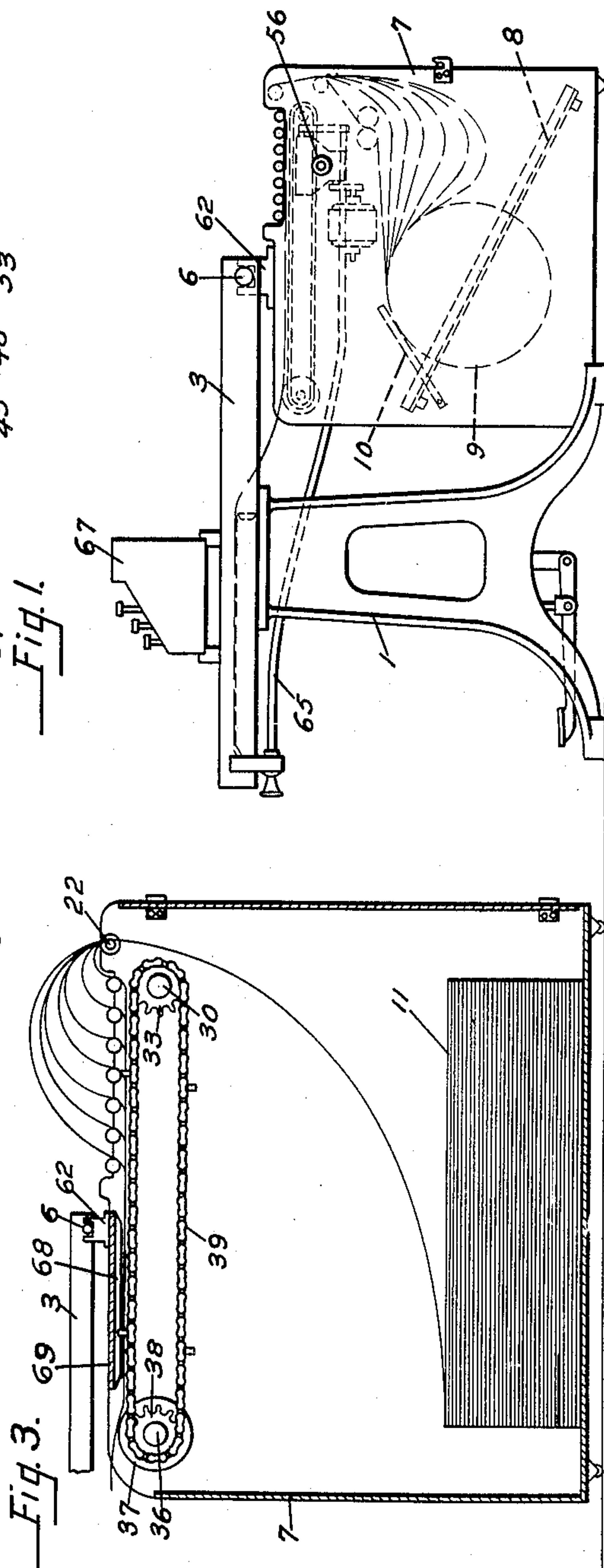


Fig. 3.

INVENTORS
FRANK E. PFEIFFER.
BY WILLIAM C. PFEIFFER.
Toulmin + Toulmin
ATTORNEYS

Feb. 14, 1933.

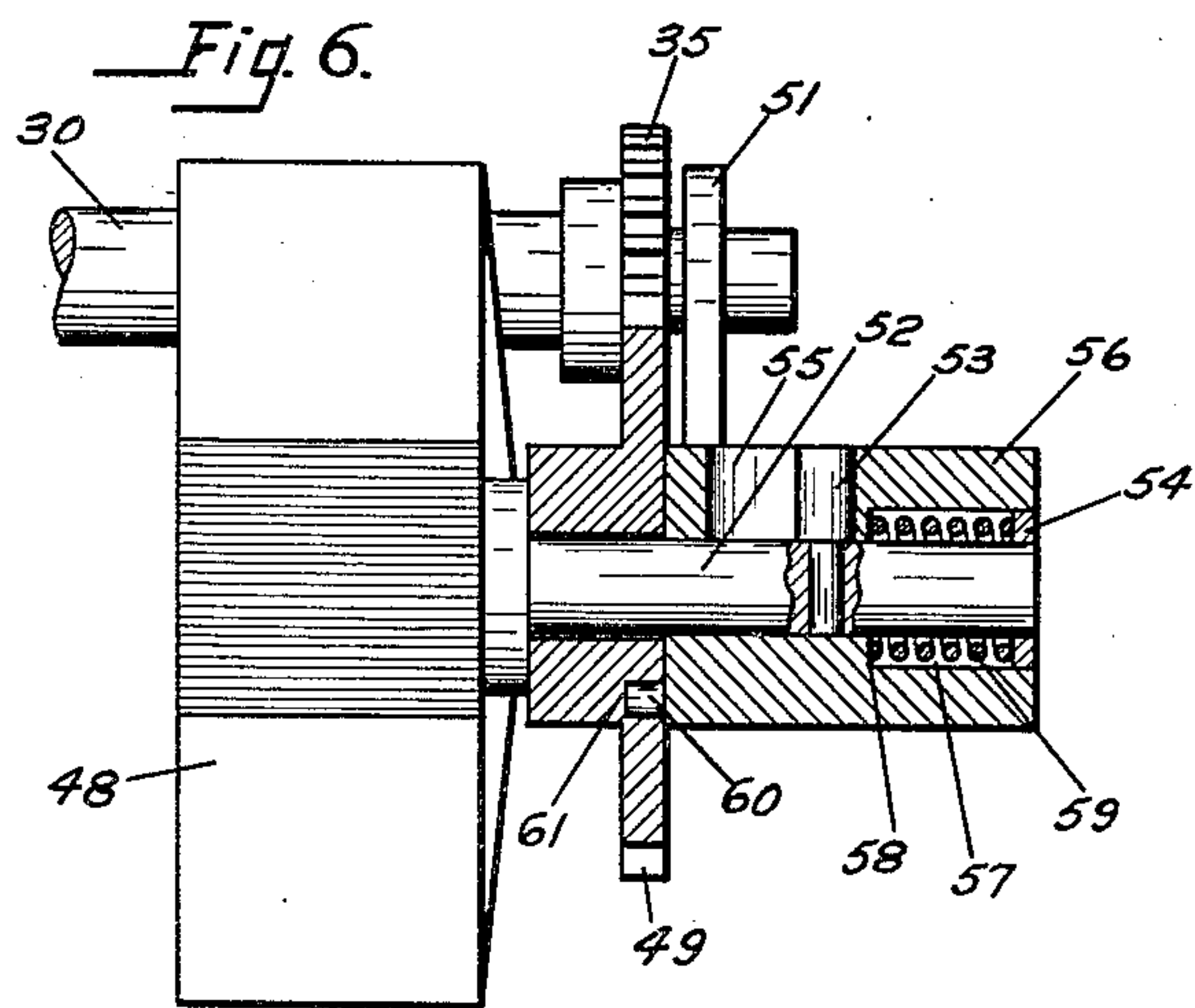
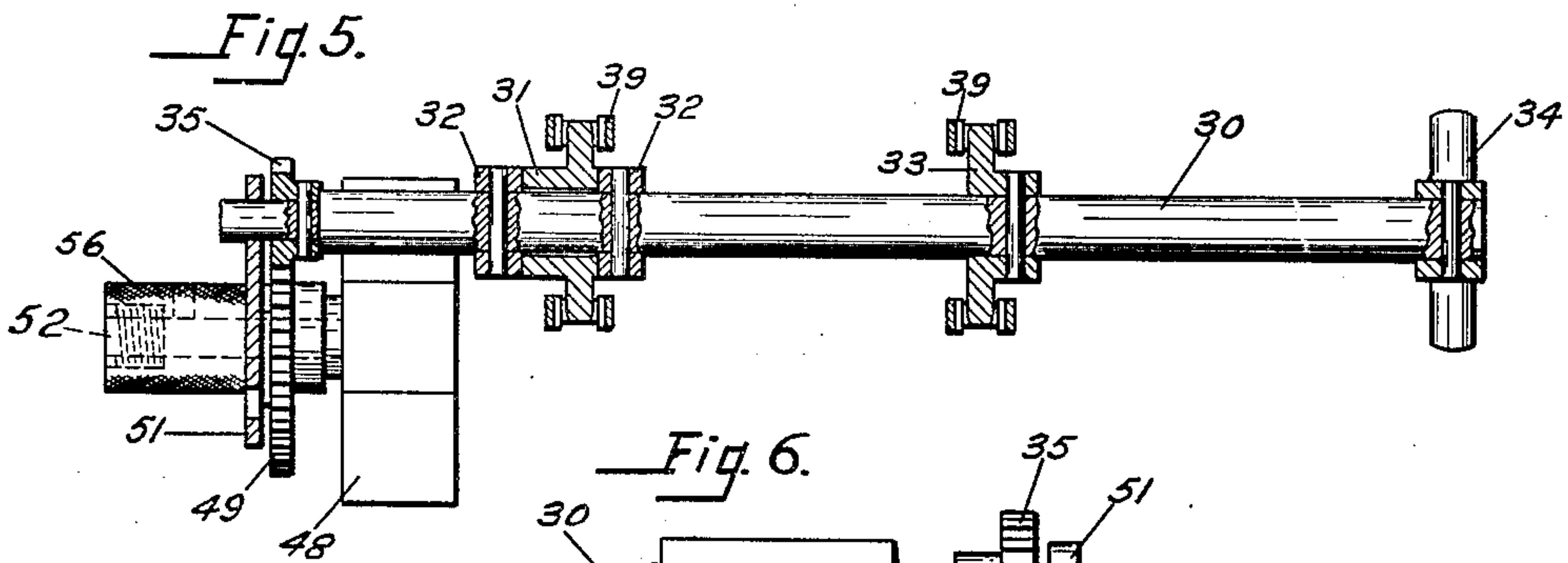
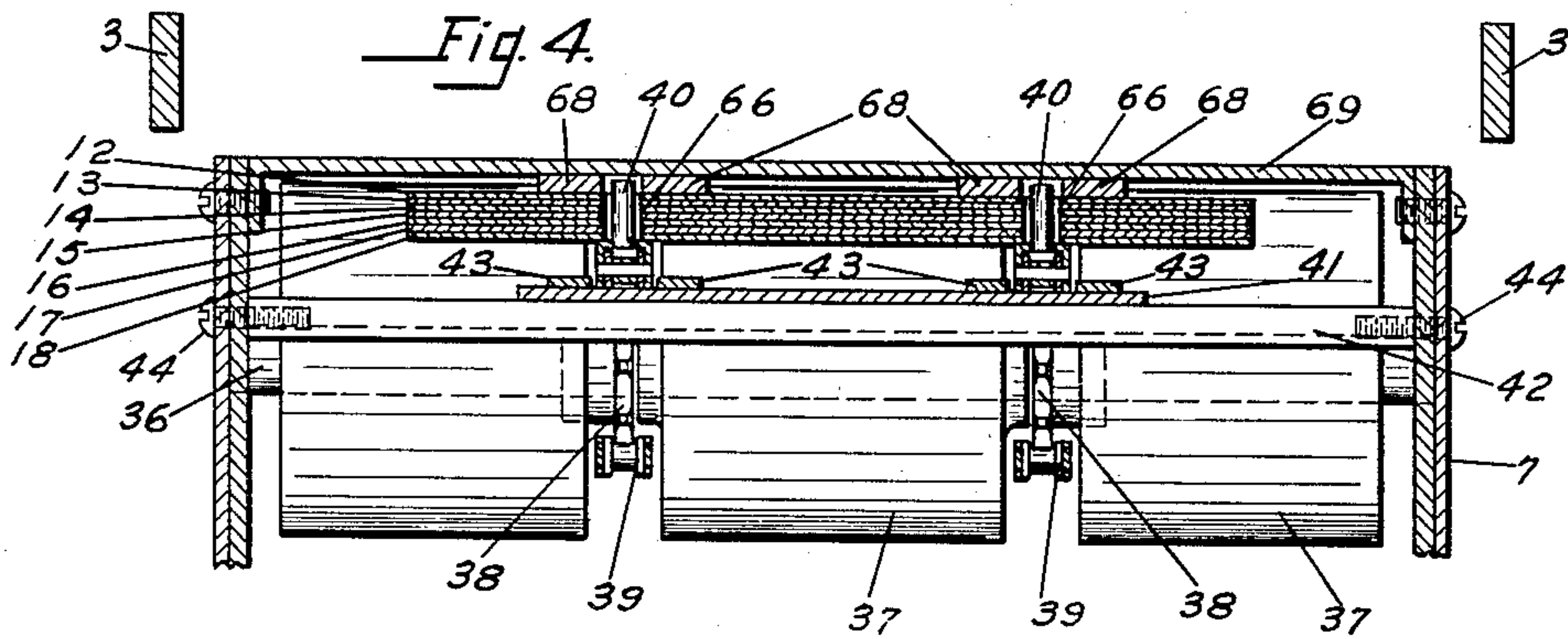
F. E. PFEIFFER ET AL

1,897,654

MECHANISM AND METHOD OF FEEDING A PLURALITY OF PAPER SHEETS

Filed March 16, 1931

4 Sheets-Sheet 2



INVENTORS
FRANK E. PFEIFFER.
BY WILLIAM C. PFEIFFER.
Toulmin + Toulmin
ATTORNEY

Feb. 14, 1933.

F. E. PFEIFFER ET AL

1,897,654

MECHANISM AND METHOD OF FEEDING A PLURALITY OF PAPER SHEETS

Filed March 16, 1931

4 Sheets-Sheet 3

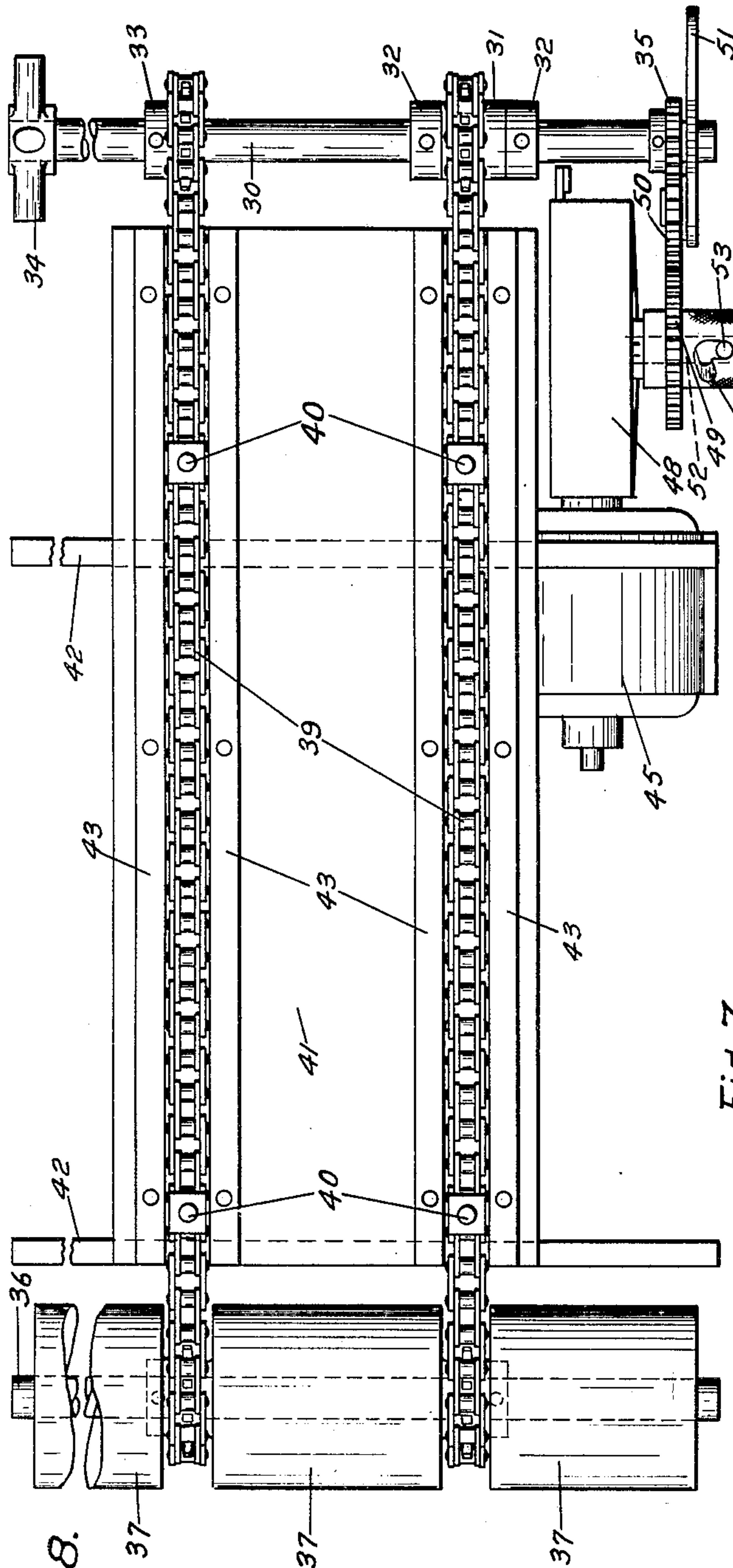
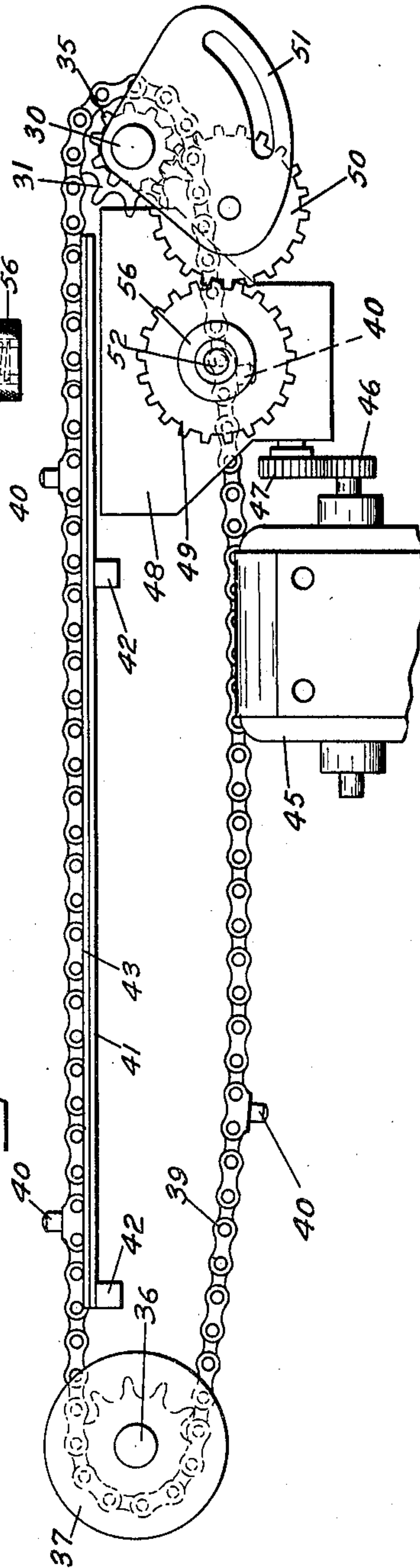


Fig. 8.

Fig. 7.



INVENTORS
FRANK E. PFEIFFER.
BY WILLIAM C. PFEIFFER.
Toulmin + Toulmin
ATTORNEYS

Feb. 14, 1933.

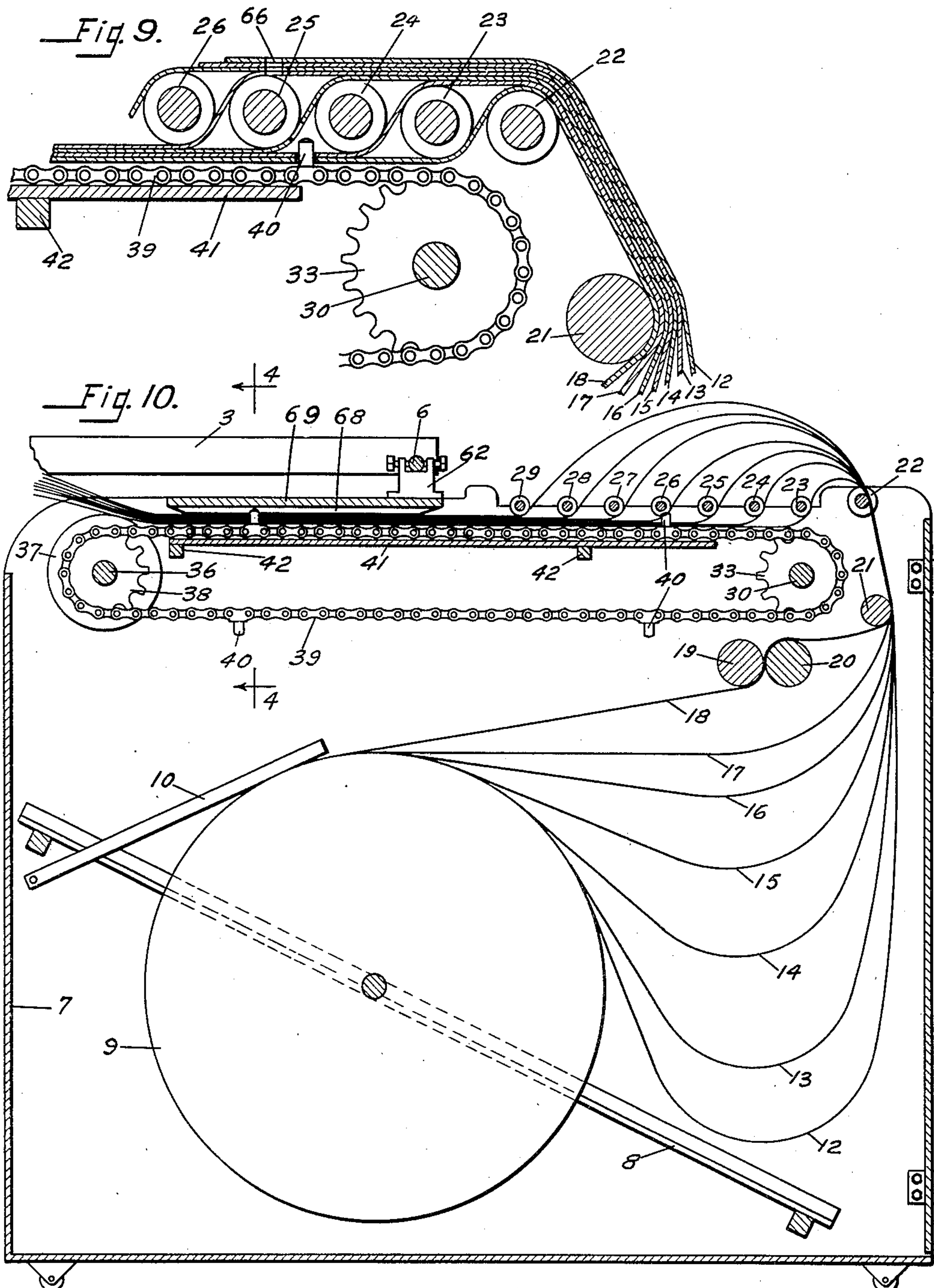
F. E. PFEIFFER ET AL

1,897,654

MECHANISM AND METHOD OF FEEDING A PLURALITY OF PAPER SHEETS

Filed March 16, 1931

4 Sheets-Sheet 4



INVENTORS
 FRANK E. PFEIFFER,
 BY WILLIAM C. PFEIFFER,
 Toulmin & Toulmin
 ATTORNEYS

UNITED STATES PATENT OFFICE

FRANK E. PFEIFFER AND WILLIAM C. PFEIFFER, OF DAYTON, OHIO, ASSIGNORS TO
THE EGRY REGISTER COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO

MECHANISM AND METHOD OF FEEDING A PLURALITY OF PAPER SHEETS

Application filed March 16, 1931. Serial No. 522,902.

This invention relates to improvements in apparatus for and a method of feeding a plurality of superimposed sheets of paper.

It has for its object to provide mechanical means for feeding and aligning the sheets of paper, together with clutch means for throwing out of gear the mechanical operating means so that the sheets may be individually adjusted by hand or may be operated as a whole by hand.

It is also an object of this invention to provide, in connection with some suitable power means, a driving shaft having thereon a fixed driving element, a driven shaft having a paper feeding means connecting it with the fixed sprocket on the driving shaft, and another paper feeding means positively operated from the driven shaft and supported by a loose rotating means on the driving shaft. The object of this arrangement is to prevent the buckling of the feeding belts or chains.

It is also an object of this invention to provide a method by which a plurality of superimposed sheets of paper may be fed, and by which the sheets may be individually and separately operated and aligned for properly bringing them in alignment with the mass of sheets.

These and other advantages will appear from the following description taken in connection with the drawings.

Referring to the drawings:

Figure 1 is a side elevation of the apparatus in connection with a typewriter.

Figure 2 is a top plan view of the apparatus shown in Figure 1, with the sheets of paper partly torn away to show the underlying structure.

Figure 3 is a vertical longitudinal section through the housing showing part of the paper feeding mechanism, and a stack from which the strips of paper are fed.

Figure 4 is a section on the line 4—4 of Figure 10.

Figure 5 is a detail view of the operating shaft.

Figure 6 is a sectional view showing the clutch mechanism for releasing the power from the driving shaft.

Figure 7 is a side elevation of one of the

feeding chains together with the power operating means for causing the chain to travel.

Figure 8 is a top plan view of the table over which the sheets of paper are fed, together with the operating means for feeding the sheets of paper.

Figure 9 is a section on the line 9—9 of Figure 2.

Figure 10 is a vertical section through the housing for inclosing the operating mechanism, showing a roll of paper from which the strips of paper are taken, and the mechanism for operating or moving the strips of paper.

In Figure 1 there is shown the assembled apparatus in operative position with relation to a typewriter supported on a standard 1. The platen upon which the paper travels and which supports the typewriter is indicated by the numeral 2, and has on each side a railing 3 held in spaced relation to each other by means of a cross rod 6.

Located at one end of the platen is a clamp bar 4 for holding the free ends of the sheets of paper against the platen, and remote from the clamp member 4 are clips 5 adapted to fit over the edges of the strips of paper to hold them down in proper position.

The frame formed from the side rails 3 and the cross rods 6 is supported on top of the standard 1 and on top of the housing for the operating mechanism of the paper feeding means. This housing, which supports one end of the frame, is indicated by the numeral 7. Within the housing is an inclined, rectangular frame 8 which supports thereon a roll of paper 9.

In order to prevent the too free rotation of the roll as the paper is fed, a brake member 10 is provided. This brake member is pivoted at one end to the side walls of the housing, while its other end rests upon the roll of paper. Instead of the paper being fed from a roll, as shown in Figure 10, it may be fed from a stack of paper, as shown in Figure 3.

There is a plurality of superimposed sheets of paper folded one upon the other and piled in the stack 11, or rolled one upon another on the roll 9. These sheets of paper are indi-

cated by the numerals 12, 13, 14, 15, 16, 17 and 18, the outer strip or sheet of paper being designated by the numeral 18. This strip of paper passes between two tension rollers 19 and 20. From these two rollers the strip of paper 18 passes under and up one side of a lower guide roller 21. The other sheets 12 to 17, inclusive, also pass over this lower guide roller and together the sheets of paper pass over an upper guide roller 22. All of these rollers are supported in the side walls of the housing in any suitable and convenient manner.

Located on the upper edges of the side walls of the housing is a plurality of rollers numbered 23, 24, 25, 26, 27, 28 and 29. These rollers are in horizontal alignment and receive thereunder the different sheets of paper after they pass over the upper guide roller 22. Sheet 18 passes under roller 23; sheet 17 passes under roller 24; sheet 16 passes under roller 25; sheet 15 passes under roller 26; sheet 14 passes under roller 27; sheet 13 passes under roller 28 and sheet 12 passes under roller 29.

All of these sheets or strips of paper have holes therein and these holes are aligned one with another after all of the strips of paper have passed under their respective rollers from 23 to 29. After the sheets have passed under these rollers they are assembled with the aligning holes therein in alignment with each other, to be engaged by a pin in a traveling belt or a sprocket chain. For feeding the sprocket chain there is provided, substantially beneath the roller 23, a shaft 30 supported in the side walls of the housing. On this shaft 30 is a sprocket wheel 31, loosely supported for free rotation thereon. This sprocket wheel is supported against longitudinal movement on the shaft by means of shoulders 32 pinned, or otherwise fastened to the shaft. There is also on this shaft, spaced from the loose sprocket wheel, a fixed sprocket wheel 33.

For hand operation the shaft 30 is provided on one end thereof, without the housing, with a hand wheel 34. On the other end of the shaft 30, within the housing, is a pinion 35 for mechanically operating the driving shaft 30. Cooperating with the driving shaft 30 is a driven shaft 36, which has thereon roller sections 37 to engage and support the advanced ends of the strips of paper as they move from the feeding chain or belt. These rollers rotate with the shaft 36.

On this shaft 36 are two fixed sprocket wheels 38, one between each of two of the roller sections 37, as clearly shown in Figure 8. Extending from each of the fixed sprocket wheels 38 to the sprocket wheels on the shaft 30 is a sprocket chain 39. One of these chains fits over the fixed sprocket 33, while the other engages the loose sprocket 31. Each chain has a plurality of pins 40 for engaging in the

aligning holes in the strips of paper for aligning and feeding the strips.

By means of the connection between the shaft 30 and the shaft 36, through the sprocket chains 39, the two sprocket chains act upon the sheets of paper in different ways. The upper run of the top sprocket chain, as shown in Figure 8, is somewhat slack and tends to push the sheets of paper rather than to pull them, and on account of the slackness this run of the sprocket chain will give the sheets or strips of paper slightly intermittent or yielding impulses. The upper run of the lower chain gives the strips of paper a constant pull because the tendency of this part of the chain is to remain tense so that there is a constant pull on the strips of paper without any yielding or intermittent action.

Immediately beneath the upper runs of the sprocket chains is a supporting plate 41, supported by cross bars 42. On the upper surface of this plate are channels 43, in which the sprocket chains travel as they feed and deliver the sheets of paper. The plate is supported in the side walls of the housing by means of screws 44 which extend through the walls into the ends of the cross bars 42. While sprocket wheels and sprocket chains have been shown and described, belts and suitable pulleys may be used instead of chains and sprocket wheels.

The driving shaft is operated by a motor 45, suitably and conveniently located within the housing. From this motor extends the usual motor shaft, which has thereon a gear 46 which meshes with a gear 47 on a shaft extending into a gear box 48. By a system of gearing within the gear box the shaft on which gear 47 is located operates a shaft 52 on which a gear 49 is located. This gear 49 meshes with a gear 50 supported on a bracket 51. This gear 50 meshes with the pinion 35 on the driving shaft 30 so that whenever the motor operates the shaft 30 will rotate, when the proper clutch connections are made.

The gear 49 is loosely mounted on the shaft 52 but in order that this gear may rotate with shaft 52 a clutch mechanism is provided on the outer end of the shaft 52. Somewhat removed from the outer end of the shaft 52 is a pin 53 which extends through a slot 55 in a clutch sleeve 56. On the extreme outer end of this shaft 52 is a head 54. The opening in the clutch sleeve for receiving the shaft 52 is enlarged at its outer end, as indicated by the numeral 57, and provides a shoulder 58 against which one end of a spring 59 rests. The other end of this spring rests against the head 54 on the outer end of the shaft 52. This spring tends to hold the clutch sleeve normally against the gear 49.

On the end of the clutch sleeve, adjacent the gear 49, is a pin 60 adapted to fit within

a hole 61 in the gear 49. Normally due to the action of the spring 59 this pin fits within the hole so that whenever the shaft 52 rotates the gear 49 rotates with it, thereby
 5 operating through a chain of gears the shaft 30. The pin 60 may be withdrawn from the gear 49 by simply gripping with the fingers the sleeve 56, and in order to hold the pin withdrawn the sleeve may be rotated so that
 10 the pin 53 will fit in a notch formed in the slot 55. The pin 53 may be forced into a transverse extension of this slot 55 by rotating the sleeve after the pin 60 has been withdrawn from the gear. For supporting
 15 one of the cross rods 6 above the housing there is provided a bracket 62 on each side of the housing, with a notch therein, as clearly shown in Figure 1.

For the purpose of providing electric current to the motor there is provided a conductor 63. At the point 64 this conductor branches, one branch going to the housing and the other to the motor. The current coming in through the conductor 63 passes
 20 through the gear box, and through the motor, back through the conductor 63. In other words, the motor and the switch mechanism confined within the gear box are in the same circuit so that during the course
 25 of operation the mechanism within the gear box automatically breaks the circuit, so that the operation of the feeding mechanism will stop. For the purpose of forming a contact with the parts within the gear box there is
 30 provided a push rod 65.

The aligning holes in the sheets of paper are indicated by the numeral 66. The typewriter located above the platen on the standard 1 is indicated by the numeral 67.

40 When the pin 60 is within the hole 61 the operation of the motor will cause the rotation of the shaft 30. The rotation of the shaft 30 positively drives the sprocket chain remote from the motor. Through this
 45 sprocket chain the shaft 36 is rotated, and with it the roller sections 37. There also rotates with this shaft the sprockets thereon, which cause the other sprocket chain adjacent the motor to travel, and with it the
 50 sprocket wheel loosely mounted on the shaft 30.

By this means we have a driving shaft with a driving sprocket wheel thereon, and a driven sprocket wheel loosely mounted thereon. The
 55 driving sprocket wheel rotates the driven shaft, which through a sprocket chain rotates the loosely mounted sprocket wheel on the driving shaft. By this means a feeding of the paper is effected without a buckling of
 60 the paper.

Whenever it is desired to separately align the sheets of paper the clutch mechanism is withdrawn so that the shaft 30 can rotate free of the operating mechanism. This shaft is
 65 rotated at this time by means of the hand

wheel 34 on one end of the shaft. Any necessary shifting or jogging back and forth of these chains may be effected through the operation of this shaft by means of the hand
 70 wheel 34.

The superimposed strips of paper are held together on the traveling members by means of a pressure plate 69. This pressure plate has on its under side two pairs of guide members 68, each pair providing a slot in which
 75 the upper ends of the pins 40 travel and are guided.

It is also possible by this structure to stop the operation of the paper feeding means at any stage of its action without interfering
 80 with the motor. All that is necessary is to withdraw the clutch mechanism so that the shaft 52 can rotate independent of the gear 49.

A further object of our detachment mechanism for detaching the feed from the power is to move the sheets backwardly for the insertion of new types of sheets and thereby save the sheets that are already in the machine.

We desire to comprehend within our invention such modifications as may be embraced within our claims and the scope of our invention.

Having thus fully described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. In a paper-feeding machine for feeding a plurality of superimposed strips of paper, means for feeding said strips, means for maintaining said strips in a looped condition as they are being fed, said means consisting of a pair of co-acting rollers engaging one of said strips, power means for operating said strip-feeding means, and a hand-operated means for disconnecting the power means from the strip-feeding means.

2. In a machine for feeding superimposed strips of paper, means for feeding said strips of paper, means for maintaining said strips of paper in a looped condition, said means consisting of a pair of co-acting rollers engaging one of said strips, and mechanical means for operating said strip-feeding means, said strip-feeding means including a pair of shafts and a pair of travelling means operatively connected to said shafts, both of said traveling means having a positive connection with one of said shafts, and only one of said traveling means having a positive connection with the other shaft.

3. In a paper-feeding mechanism for feeding a plurality of superimposed strips of paper, means for maintaining said strips of paper in a looped condition, and means for feeding said strips of paper, said means consisting of a shaft, power means operatively connected to said shaft, a second shaft, a travelling member operatively connected to said shafts, and a second travelling member

70

75

80

85

90

95

100

105

110

115

120

125

130

operated by the second-named shaft and loosely mounted on the first-named shaft.

4. In an apparatus for feeding a plurality of superimposed strips of paper in combination with a housing, a shaft supported by said housing, means for operating said shaft, a second shaft mounted on said housing, travelling means connecting said shafts whereby the second-named shaft is positively operated by the first-named shaft, and a second travelling means connecting said shafts and positively operated by the second-named shaft.

5. In an apparatus for feeding a plurality of superimposed strips of paper in combination with a housing, a shaft supported by said housing, mechanical means for operating said shaft, a second shaft, a travelling member connecting the first-named shaft to the second-named shaft whereby the second-named shaft is rotated, a second travelling member operatively connected to the second-named shaft and loosely connected to the first-named shaft, and paper-feeding and aligning means on said travelling members.

6. In an apparatus for feeding a plurality of superimposed strips of paper in combination with a housing, a plurality of horizontally-arranged traveling members on said housing for feeding and aligning said strips of paper, means for operating said travelling members, said means operating on one end of one of said travelling members and on the opposite end of the other of said travelling members through the first-named travelling member, and means for separating and directing the strips of paper to said feeding and aligning means.

7. In an apparatus for feeding and aligning a plurality of superimposed strips of paper in combination with a housing, a roller in said housing for supporting said strips of paper, means in said housing to cause said strips of paper to hang in a looped condition, means to feed and align said strips of paper, said means comprising a driving shaft and a driven shaft, a travelling member operatively connected to both of said shafts, a second travelling member operatively connected to the driven shaft and loosely connected to the driving shaft, and means for guiding the strips of paper to the feeding and aligning means in spaced relation to each other.

8. In an apparatus for feeding a plurality of superimposed strips of paper in combination with a housing, a source of paper supply supported in said housing, means for aligning and feeding said strips of paper consisting of a driving shaft, a driven shaft, a travelling member positively connected to both of said shafts, a second travelling member operatively connected to the driven shaft and loosely connected to the driving shaft, and a plurality of spaced rollers for guiding the strips of paper in spaced condition to the aligning and feeding means.

9. In an apparatus for feeding a plurality of superimposed strips of paper, a driving shaft, a driven shaft, a conveyer member operatively connected to both of said shafts, a second conveyer member operatively connected to the driven shaft and loosely connected to the operating shaft, and means on the conveyer members for engaging the strips of paper.

10. In an apparatus for feeding a plurality of superimposed strips of paper having aligning holes therein, in combination with a housing, a driving shaft supported by said housing, a driven shaft supported by said housing, a conveyer member operatively connected to both of said shafts whereby the driven shaft is operated by the driving shaft, a second conveyer member operatively connected to the driven shaft and loosely connected to the driving shaft, and a plurality of pin members projecting from said conveyer members to engage the strips of paper in the holes to feed them and align them.

11. In an apparatus for feeding strips of paper, strip-feeding means including a shaft, a second shaft having a gear loosely mounted thereon operatively connected to the strip-feeding means, means to operate the second-named shaft, and means to cause said gear to rotate with said second-named shaft.

12. In an apparatus for feeding strips of paper, strip-feeding means including a shaft, a second shaft having a gear loosely mounted thereon operatively connected to a part of the strip-feeding means, means to operate the second-named shaft, and means comprising another part of the strip-feeding means to operate the first shaft from the second shaft.

13. In an apparatus for feeding strips of paper, strip-feeding means including a shaft, a second shaft, a gear loosely mounted on said second-named shaft and operatively connected to said first-named shaft, an operative connection between the two shafts forming part of the feeding means, and mechanical means for rotating said second-named shaft.

14. In an apparatus for feeding strips of paper, a gear casing, a pair of operatively-connected shafts extending from said casing, an electric motor operatively connected to one of said shafts, strip-feeding means connected to the other shaft, and manual means for breaking the connection between the other shaft and the strip-feeding means.

15. In a paper-feeding machine for feeding a plurality of superimposed strips of paper, means engaging one side of the strips for feeding said strips, means operated by the last-named means engaging the other side of the strips for feeding the strips, power means for operating said strip-feeding means, and manually-operated means for disconnecting the power means from the strip-feeding means.

16. In a paper-feeding machine for feed-

ing a plurality of superimposed strips of paper in combination with a housing constituting a receptacle for said strips of paper, means for feeding said strips of paper, means
 5 for separating the strips of paper so that they enter the strip-feeding means at spaced intervals from one another, an electric motor for operating said strip-feeding means, and manually-operated means for disconnecting
 10 the motor from the strip-feeding means at any period of its operation.

17. In a paper-feeding machine for feeding a plurality of superimposed strips of paper having aligning holes therein, means
 15 to fit in said holes to feed the strips of paper, means to separate the strips of paper so that they enter the feeding means at spaced intervals, an electric motor operatively connected to said strip-feeding means for feeding said
 20 strips for a definite cycle of movement, and means manually operated for disconnecting the motor and the strip-feeding means.

18. In a paper-feeding machine for feeding a plurality of superimposed strips of paper with aligning holes therein, a plurality
 25 of travelling members having pins thereon to engage said strips in said holes, for feeding and aligning the strips, means for operating one of said travelling members, and means
 30 operated by said travelling member to operate another travelling member.

19. In a method of feeding a plurality of superimposed strips of paper forming a source of supply, which consists in causing
 35 the strips of paper to travel by engaging one of the edges of said strips and maintaining a constant, moving force thereon, and engaging the other edge of said strips, and applying thereto a moving force that is slightly
 40 intermittent.

20. In a method of feeding a plurality of superimposed strips of paper forming a source of supply, which consists in causing the strips of paper to travel by engaging one
 45 of the edges of said strips and maintaining a constant, moving force thereon and engaging the other edge of said strips and applying thereto a moving force that is slightly yielding to the constant, moving force.

21. In an apparatus for feeding and aligning a plurality of superimposed strips of paper, a shaft, means for operating the shaft, aligning and feeding means operated by the shaft, a second shaft operated by the aligning
 55 and feeding means, and a second aligning and feeding means operated by the second shaft, one of said feeding means being so arranged as to push the sheets of paper and the other of said feeding means being arranged to pull the paper.
 60

22. In a paper-feeding apparatus, a pair of feed means to feed a plurality of superimposed strips of paper having holes therein, said means comprising traveling pins to engage
 65 the strips in said holes, and means to

hold the strips down and guide the pins, one of said feed means being so arranged as to push the sheets of paper and the other of said means being arranged to pull the paper.

23. In a paper-feeding apparatus, means to
 70 feed a plurality of superimposed strips of paper having holes therein, said means comprising traveling pins to engage the strips in said holes, means to hold the strips down, and means on said last-named means to guide
 75 the pins, one of said feeding means being so arranged as to push the sheets of paper and the other of said feeding means being arranged to pull the paper.

24. In a paper-feeding apparatus, a traveling means to feed a plurality of superimposed strips of paper, a second traveling means for feeding said strips operated by the first traveling means, means to press the sheets against the traveling means, and pins
 80 on said traveling means adapted to enter said sheets one by one, one of said feeding means being so arranged as to push the sheets of paper and the other of said feeding means being arranged to pull the paper.
 85

25. In a paper-feeding apparatus, a pair of spaced chains having pins engaging apertures in a plurality of superimposed sheets carried on said pins and chains, means to drive one of said chains to push it, and means
 90 to drive the other of said chains to pull it.

26. In a paper-feeding apparatus, a pair of spaced chains having pins engaging apertures in a plurality of superimposed sheets carried on said pins and chains, means to drive one of said chains to push it, and means to drive the other of said chains to pull it, said means being so arranged that the pushing chain cooperates in pulling the other chain.
 100

In testimony whereof, we affix our signatures.

FRANK E. PFEIFFER.
 WILLIAM C. PFEIFFER.

110

115

120

125

130