

(No Model.)

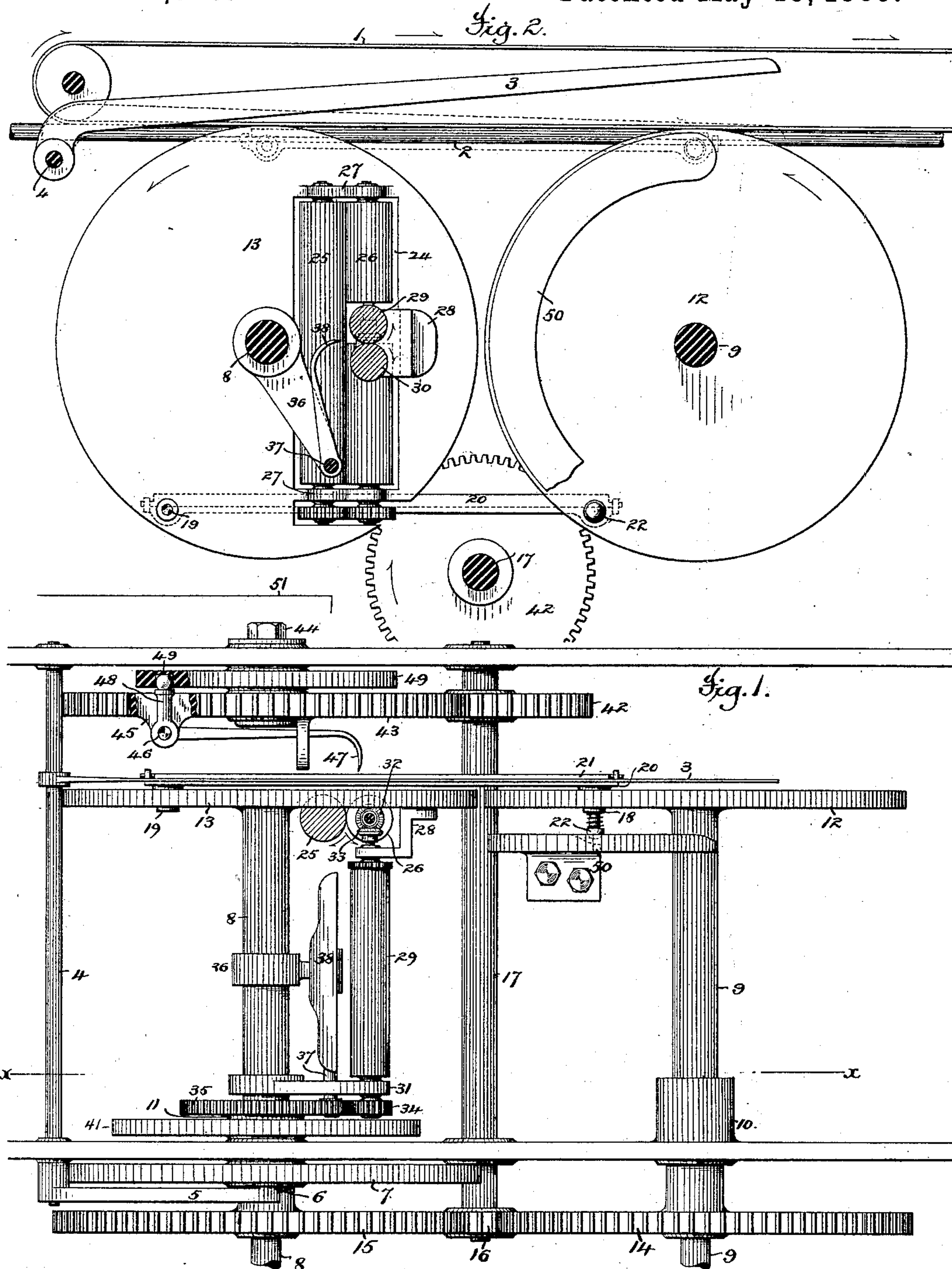
2 Sheets—Sheet 1.

L. C. CROWELL.

FOLDING MACHINE.

No. 277,549.

Patented May 15, 1883.



Witnesses,

*C. C. Perkins.*  
*L. H. Graham.*

Inventor,

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by *Munson & Philipp*  
*Attys.*

(No Model.)

2 Sheets—Sheet 2.

L. C. CROWELL.  
FOLDING MACHINE.

No. 277,549.

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Fig. 4.

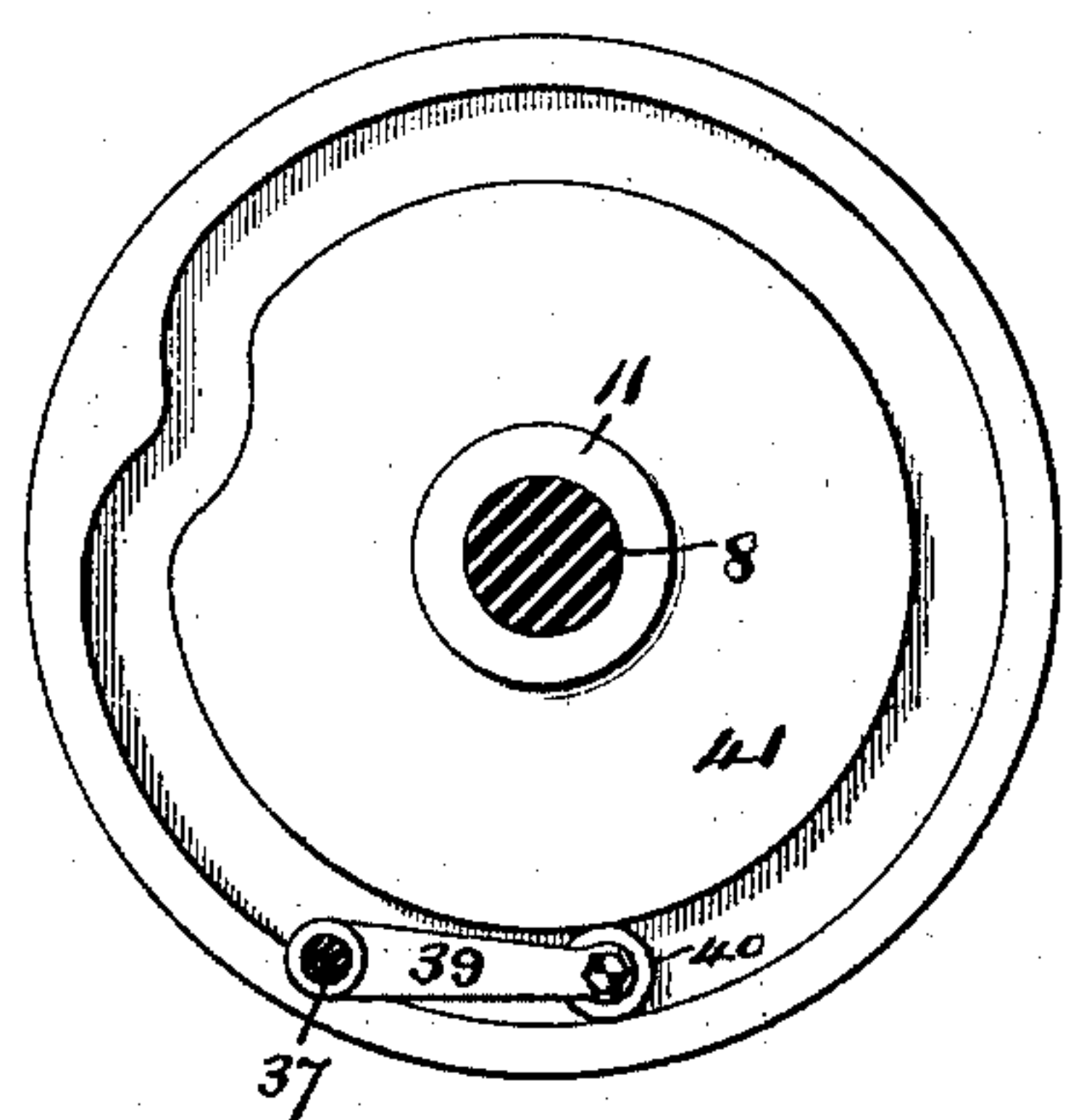


Fig. 5.

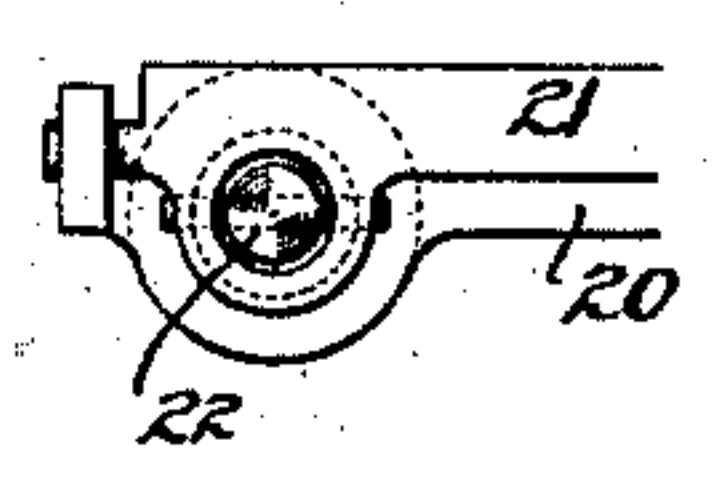


Fig. 6.

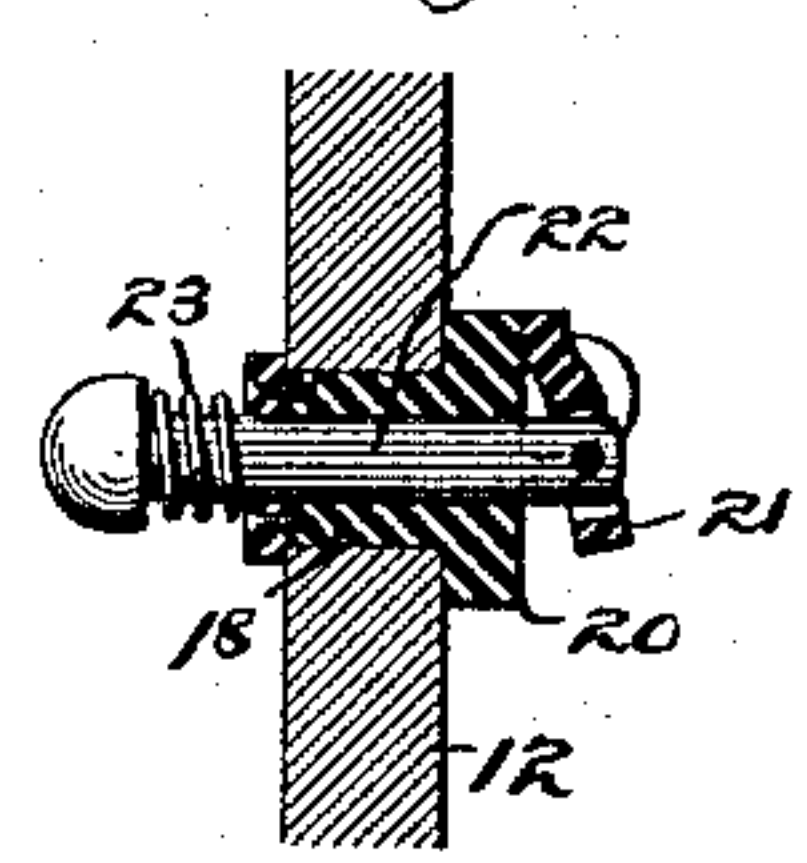
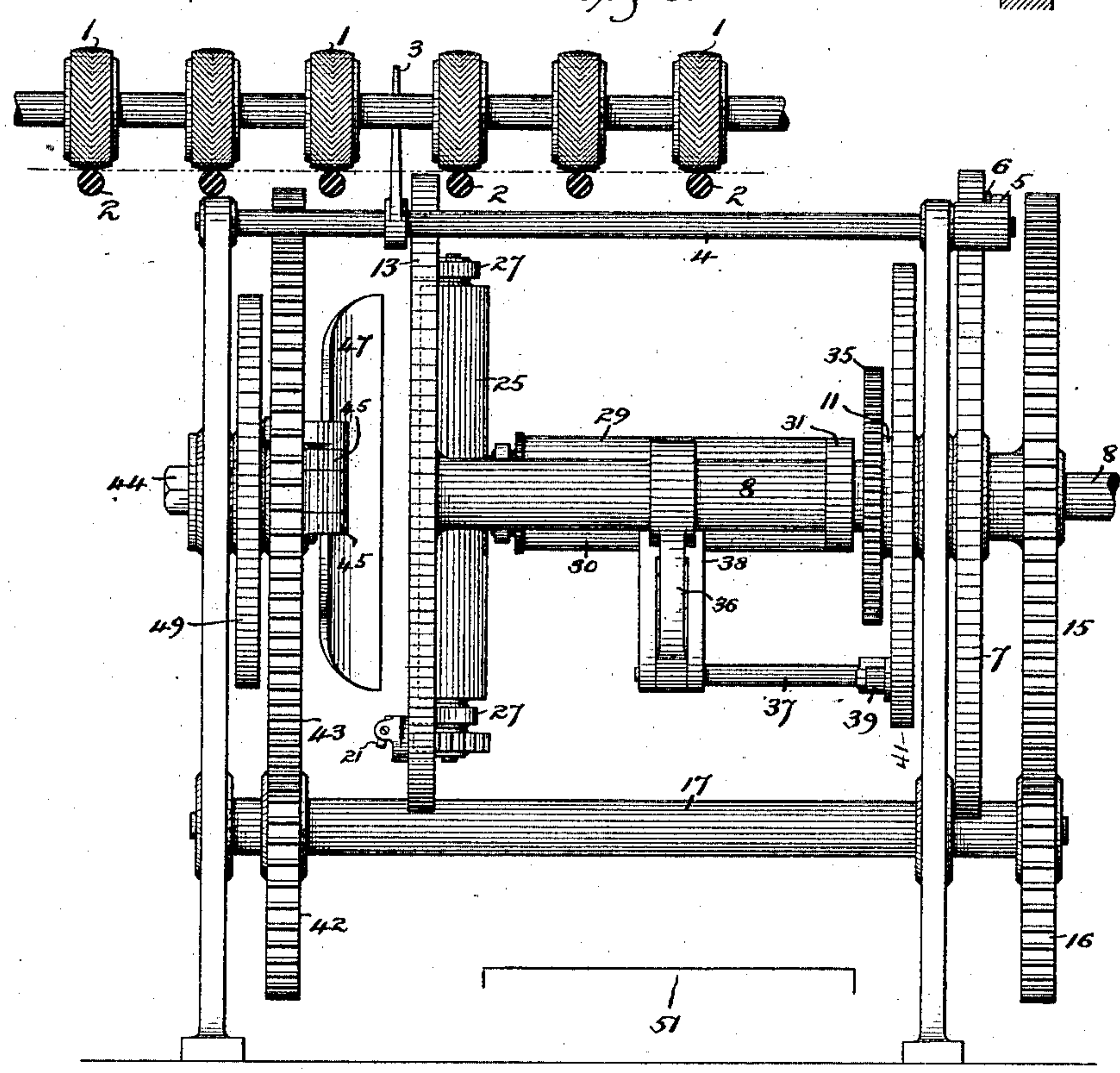


Fig. 3.



Witnesses.

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# UNITED STATES PATENT OFFICE.

LUTHER C. CROWELL, OF BROOKLYN, ASSIGNOR TO R. HOE & CO., OF  
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## FOLDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 277,549, dated May 15, 1883.

Application filed December 29, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, LUTHER C. CROWELL, a citizen of the United States, residing in the city of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Folding-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to that class of folding-machines which are adapted to operate upon sheets of paper to fold them longitudinally—that is to say, upon a line parallel to the direction of travel through the machine—and to that particular class of these machines in which the fold is made by a blade, which strikes the sheet upon the fold-line and forces it between turning-edges or into the bite of rolls or jaws, which complete the fold.

In the operation of machines of this class, as they have been usually constructed heretofore, the forward motion of the sheet was arrested at the time of making the fold, which was generally effected by causing it to strike against fixed stops. This stopping of each sheet necessarily reduced the speed at which the machine could be made to operate, and the striking of the moving sheet against fixed stops sometimes caused it to buckle, so that the product was wrinkled and imperfect, or the machine became clogged and inoperative. Another disadvantage attending the use of these machines was due to the fact that the sheets could not be fed to the folding-blade in close succession, it being necessary to separate the sheets in the line of feed by spaces equal to at least one-half of the width of the sheet in order to prevent the incoming sheet from fouling with the sheet just folded. This made it impossible for these machines to operate upon the sheets as they issued from an ordinary web printing and severing mechanism, unless such sheets were passed through an accelerating mechanism, or were first folded transversely, and even in this latter case it was impossible unless the sheets were very narrow in proportion to their length. In United States Letters Patent No. 259,978 I have shown and described a mechanism in which these disadvantages are overcome by placing the rolls into the bite of which the sheets are folded in an inclined position and causing the folding-blade to move longitudinally while in

contact with the sheet, so that the forward movement of the sheet is not arrested while the fold is being made.

The mechanism constituting the present invention possesses the same general characteristics as that shown in said patent, and is designed for the accomplishment of the same object. In the present case, however, the sheet, instead of being folded into the bite of rolls, is tucked upon the fold-line into the bite of a pair of jaws, which are caused to advance with the sheet, so that its forward motion is not arrested while the fold is being made.

The present invention also includes a mechanism for making a second and third fold in the sheets.

In the accompanying drawings, Figure 1 is a plan view of a mechanism embodying the invention, the devices for presenting the sheet to the folding-blade being removed and the first pair of folding-rolls being shown in cross-section for the sake of clearness of illustration. Fig. 2 is a longitudinal vertical section of the same, taken upon the line *x x* of Fig. 1. Fig. 3 is an end elevation of the same, and Figs. 4, 5, and 6 are views of details to be hereinafter referred to.

The first folding-blade, 3, may be of either of the constructions shown in my former Letters Patent hereinbefore referred to, so as to move forward with the sheet while pressing it downward; but in the present case it is shown as a simple vibrating blade secured to a rock-shaft, 4, and operated through a rock-arm, 5, the end of which is provided with a bowl, 6, which rests in the path of a cam, 7, secured to a shaft, 8. When a blade of this character is used the sheets must of course be slightly separated from each other in their line of travel in order to permit the blade to return to its raised position without striking the under side of the incoming sheet.

The shaft 8 and a similar shaft, 9, are supported in elongated bearings 10 11 in one of the side frames of the machine, as shown in Fig. 1, and extend inward to a point nearly beneath the blade 3, where they terminate in large plain disks 12 13, the outer ends of said shafts being provided with gears 14 15, which connect with each other through an intermediate, 16, mounted upon a transverse shaft, 17, so that said shafts and their disks revolve in the same direction.



Mounted in suitable bearings in the disks 12 13 are a pair of studs, 18 19, the outer ends of which are connected by a bar, 20, to which is hinged a second bar, 21, the two bars thus forming a pair of jaws, into which, at the proper times, the blade 3 forces the fold-line of the sheet.

Referring to Figs. 5 and 6, it will be seen that the stud 18, which has its bearing in the disk 12, is provided with an opening in which rests a pin, 22, the outer end of which is pivotally attached to the jaw 21, while its inner end is provided with an enlarged head, and is encircled by a spiral spring, 23.

The disk 13 is provided with an aperture, 24, in which are placed a pair of folding-rolls, 25 26, said rolls being geared to each other and journaled in bearings formed in projections 27 upon the inner face of the disk. The disk 13 is also provided with a bracket, 28, in which is journaled one end of a pair of folding-rolls, 29 30, arranged at right angles to the rolls 25 26, the opposite end of said rolls being journaled in a bracket, 31, extending from the shaft 8. The roll 26, at a point near its middle, is cut away for a short distance, and its shaft is at that point provided with a small bevel-gear, 32, which engages with a like gear, 33, upon the shaft of roll 29. The rolls 29 30 are geared together in the usual manner, and receive motion through a gear, 34, from the stationary gear 35, mounted upon the bearing 11. The shaft 8 is also provided with a rigid arm, 36, in the end of which is mounted a rock-shaft, 37, to which is secured an oscillating folding-blade, 38, which is so positioned as to co-operate with rolls 29 30. The movement of the blade 38 is effected by means of a rock-arm, 39, the end of which is provided with a bowl, 40, resting in the path of a stationary cam, 41, mounted upon the bearing 11, as shown in Fig. 4. The transverse shaft 17 is, in addition to the gear 16, provided with a second gear, 42, which engages with a gear, 43, mounted upon a stud, 44, secured in the frame of the machine. The gear 43 is provided upon its inner face with projections 45, in which is journaled a short rock-shaft, 46, carrying an oscillating folding-blade, 47, said blade being so positioned as to co-operate with the rolls 25 26, and operated by a short rock-arm, 48, secured to the shaft 46, and extending through an opening in the gear 43, so that its end rests in the path of a stationary cam, 49, as shown in Fig. 1.

Motion may be given to the various moving parts by connecting either of the shafts 8, 9, or 17 with any convenient source of power.

The operation of the mechanism is as follows: The sheets, as they issue from any ordinary form of printing or severing mechanism, or from a folding mechanism which has previously operated upon them, or from the hands of an operative, are advanced by the tapes 1, or other suitable feeding devices, along the smooth supporting-rods 2 to a position beneath the first folding-blade. The parts are so timed

with relation to each other that as the sheets arrive in proper position beneath the blade the jaws 20 21 will arrive at the position indicated by the dotted lines in Fig. 2. While the parts are in this position the blade 3 will descend and carry the fold-line of the sheet between the jaws, which will immediately afterward be closed by the action of the cam 50 upon the pin 22, so as to grasp the sheet and carry it forward and downward. The sheet thus held by its doubled portion between the jaws will be drawn downward between the rods 2, so as to be folded longitudinally, and will at the same time be carried forward by the revolution of the disks 12 13, so as to be kept out of the way of the succeeding sheet. When the parts have arrived at the position shown in Figs. 1, 2, and 3 the stud 22 will pass off the cam 50 and allow the jaws 20 21 to be operated by the spring 23, and at the same time the folding-blade 47 will strike the sheet upon the second fold-line and double it into the bite of the rolls 25 26. It will be observed that at this time the rotation of the disks 12 13 is carrying the jaws 20 21 downward and the rolls 25 26 upward, so that as soon as the sheet is struck by the blade 47 its fold-line will be withdrawn from between the jaws and left free to pass between the rolls 25 26. As the sheet emerges from between the rolls 25 26 it will be struck upon its third fold-line by the blade 38 and doubled into the bite of the second pair of folding-rolls, 29 30, which are so timed that when the disk 13 has made about three-fourths of a revolution from the position shown in Fig. 1 the sheet will emerge from between them and be deposited upon carrying-tapes or a piling-table, 51. The jaws 20 21 having in the meantime, when in their upper position, taken a second sheet, the same operation will be repeated.

What I claim is—

1. The combination, with a pair of folding-jaws, as 20 21, arranged to grasp the sheet upon its longitudinal fold-line, of means for doubling the sheet into said jaws and means for giving said jaws longitudinal movement, all substantially as described.

2. The combination, with the folding-blade 3, of jaws 20 21 and means for giving said jaws a rising and falling and an endwise movement, all substantially as described.

3. The combination, with blades, as 3 47, of the rotating disks 12 13, carrying the jaws 20 21, and folding-rolls 25 26, substantially as described.

4. The combination, with blades, as 3 47, of the rotating disks 12 13, carrying jaws 20 21, and rolls 25 26, rolls 29 30, and blade 38, all arranged and operating substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

Witnesses: LUTHER C. CROWELL.  
JAS. A. HOVEY,  
T. H. PALMER.