

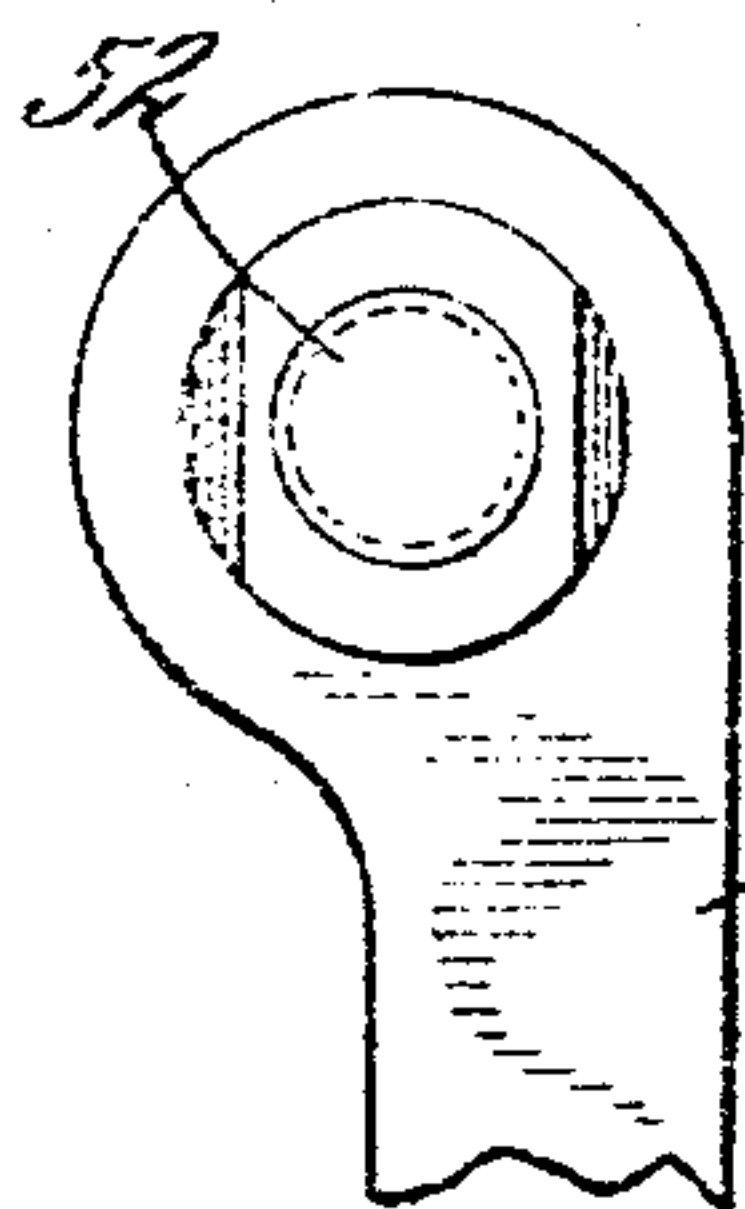
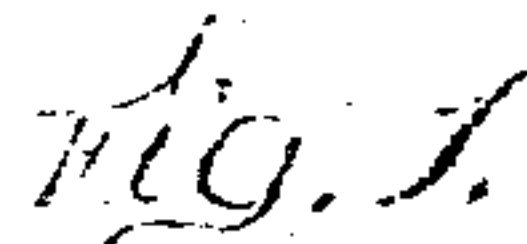
FOLDING MACHINE.

APPLICATION FILED JUNE 25, 1907.

948,117.

Patented Feb. 1, 1910.

4 SHEETS—SHEET 1.



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4 SHEETS—SHEET 2.

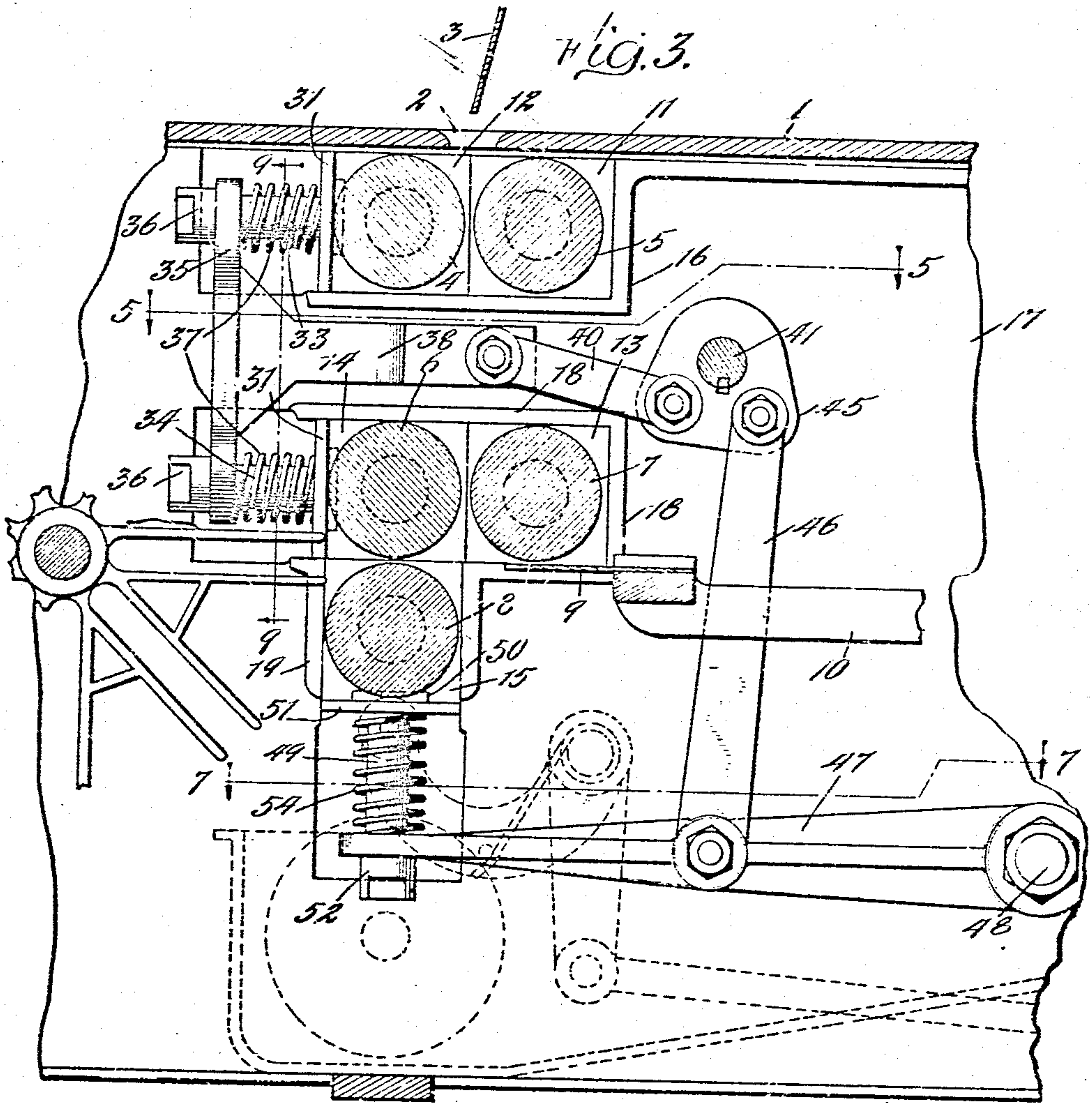
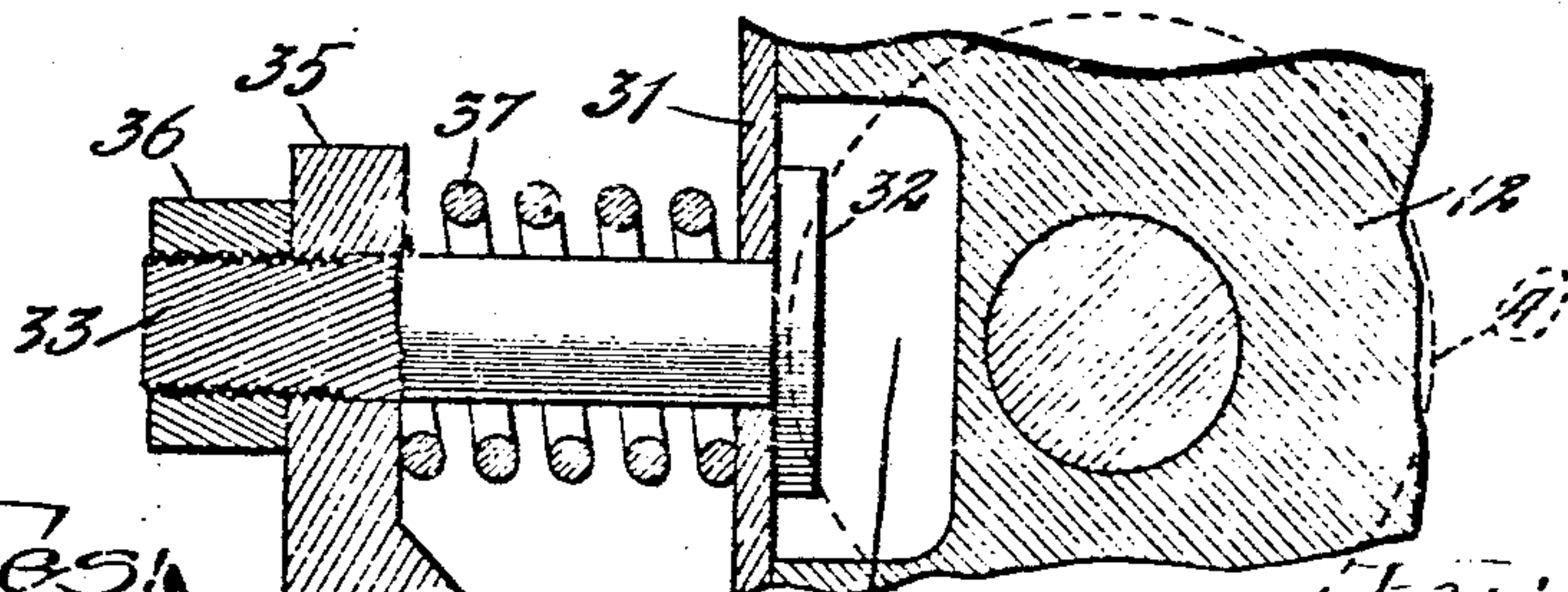


Fig. 3.



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4 SHEETS-SHEET 3

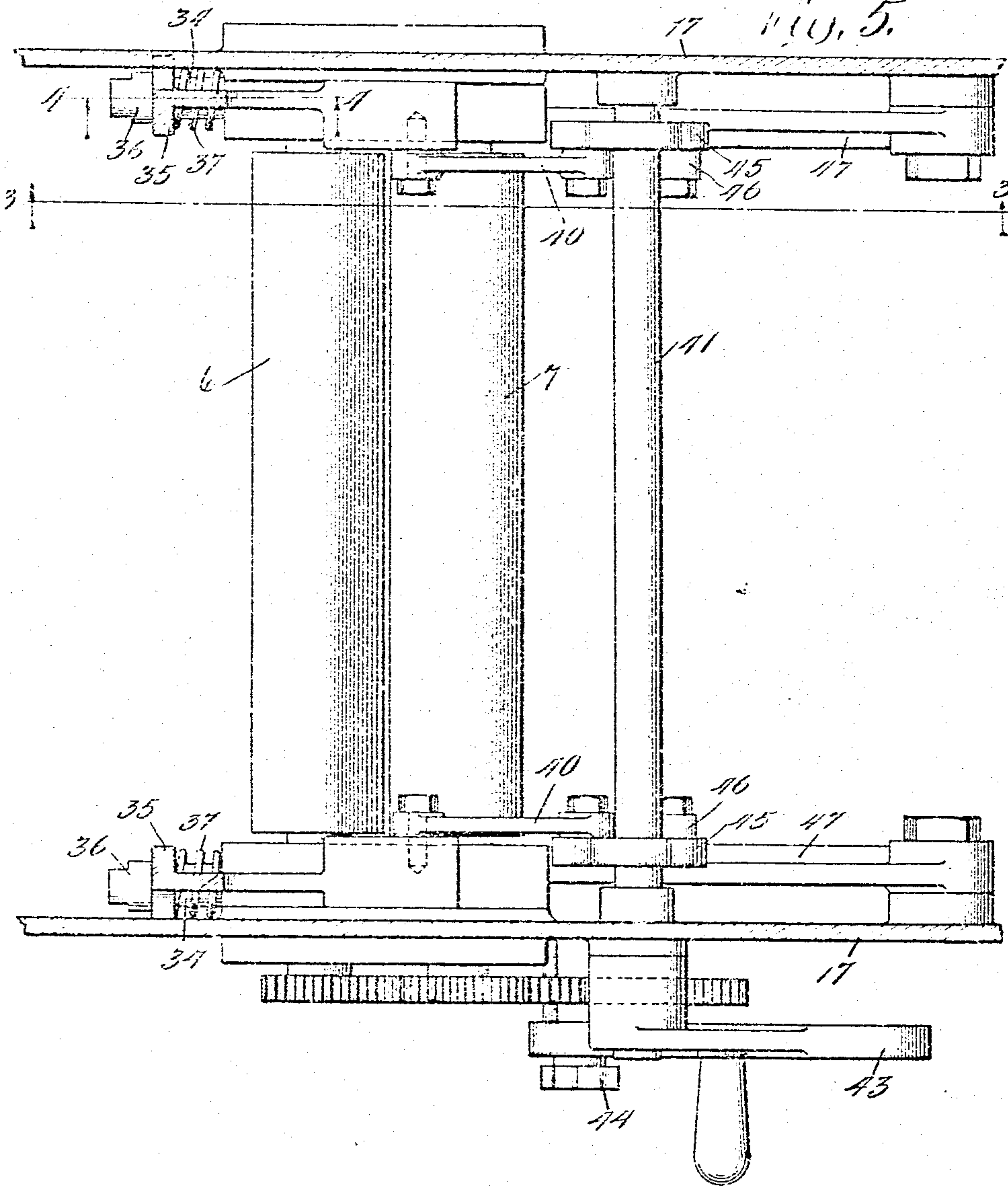
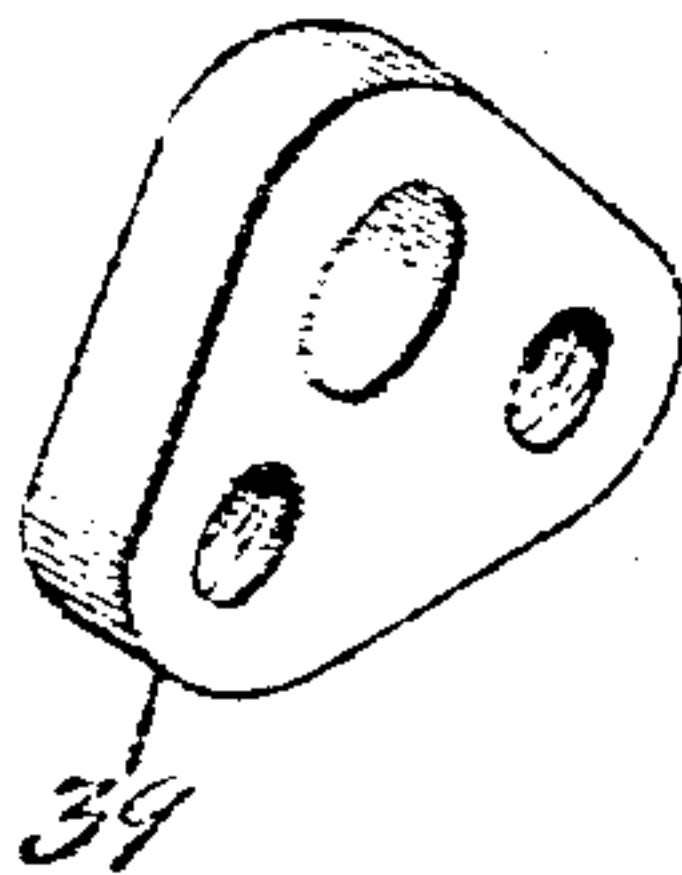


Fig. 6.



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4 SHEETS—SHEET 4.

Fig. 7.

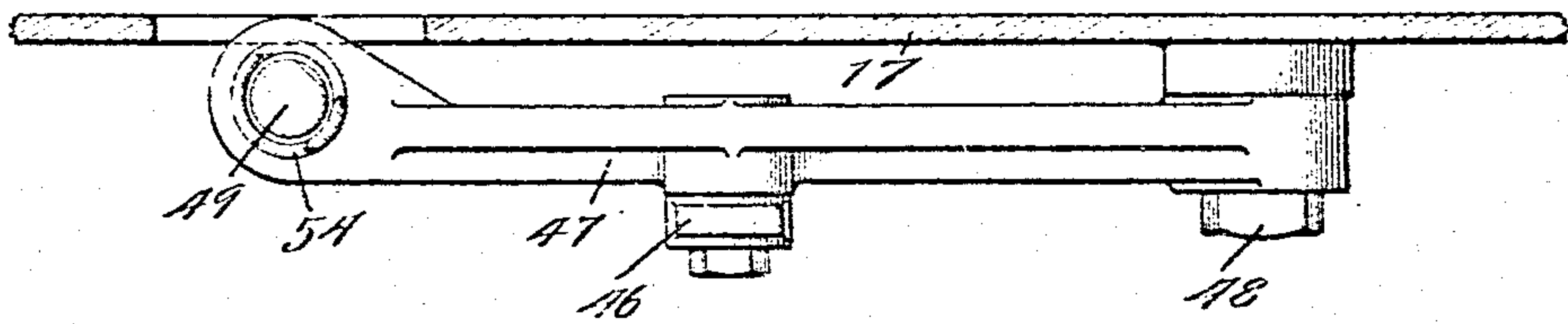


Fig. 8.

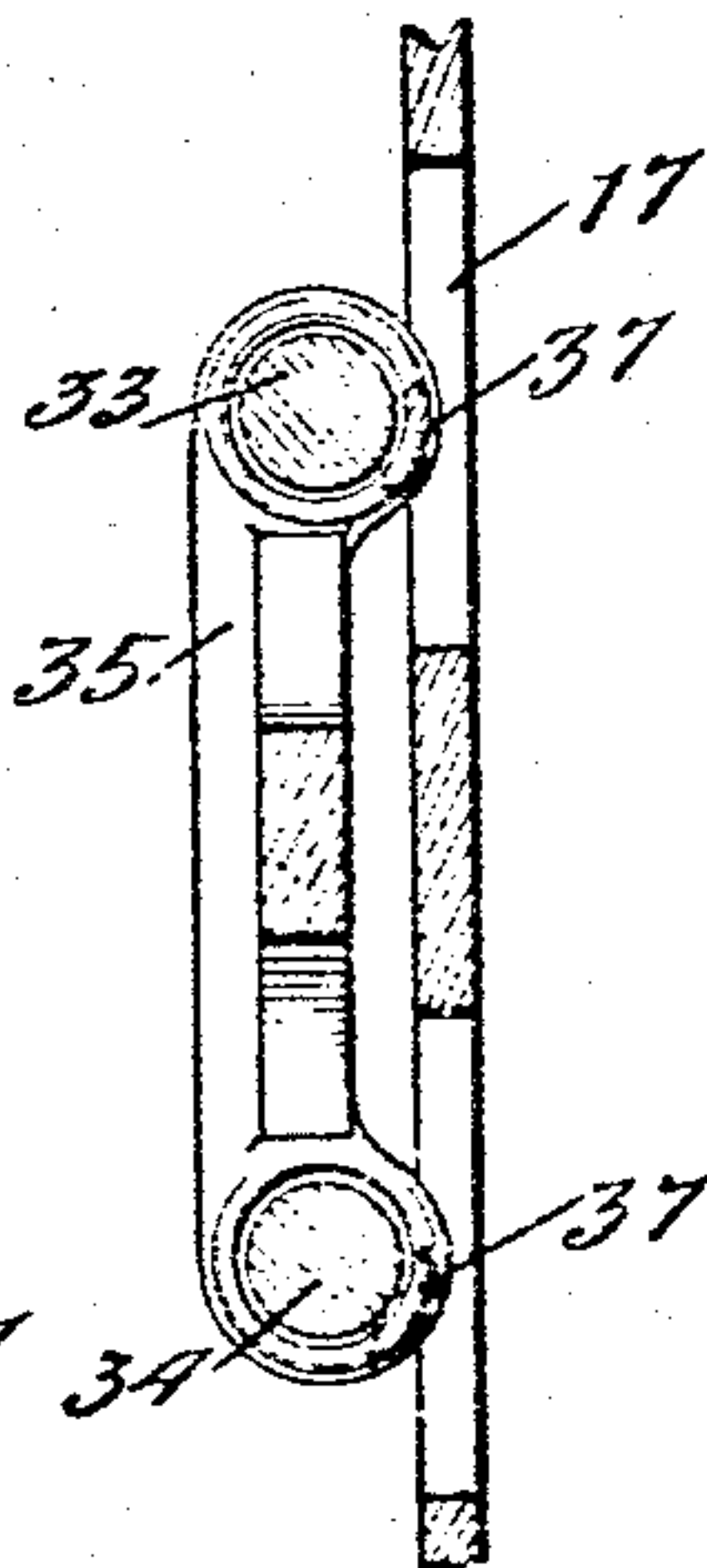
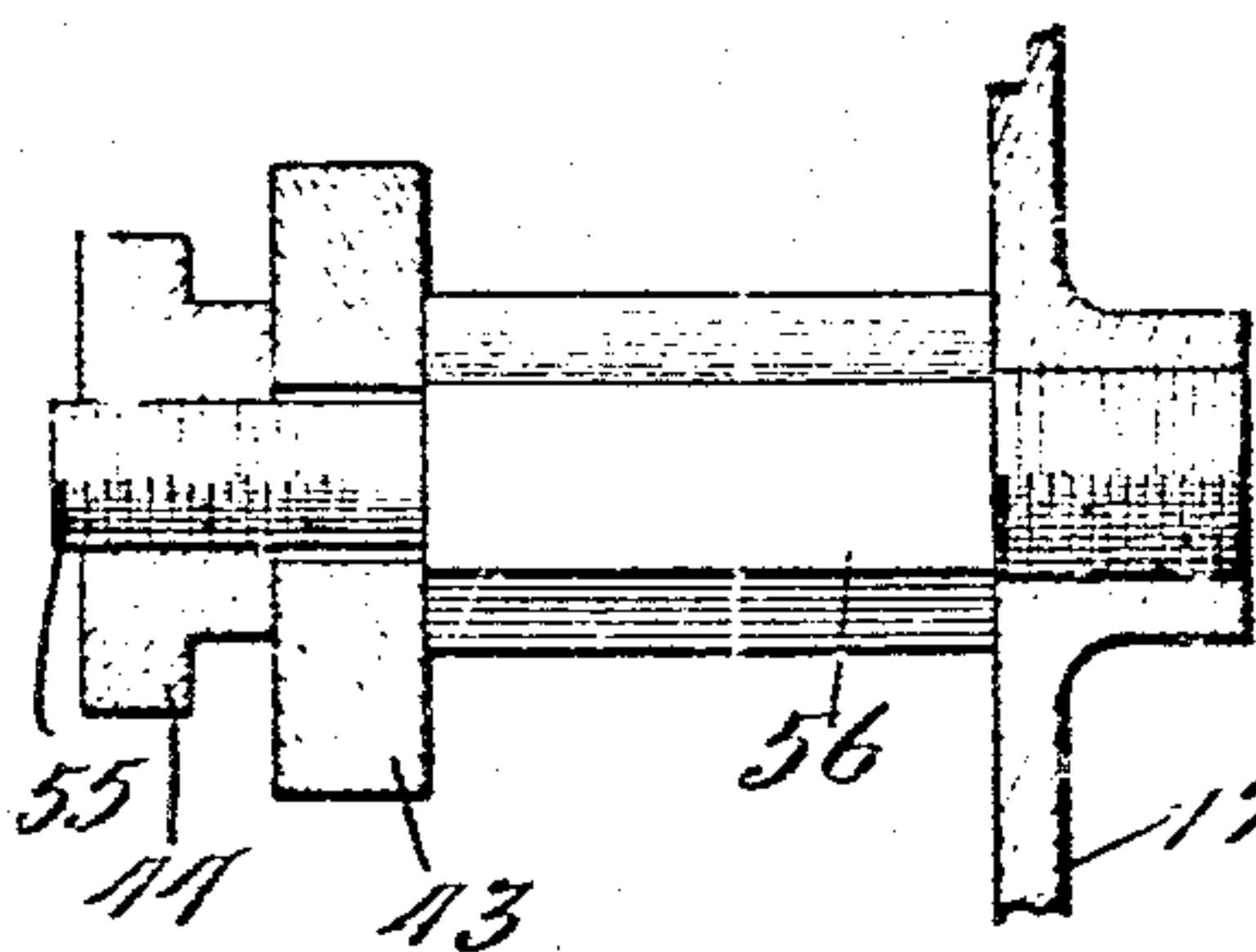
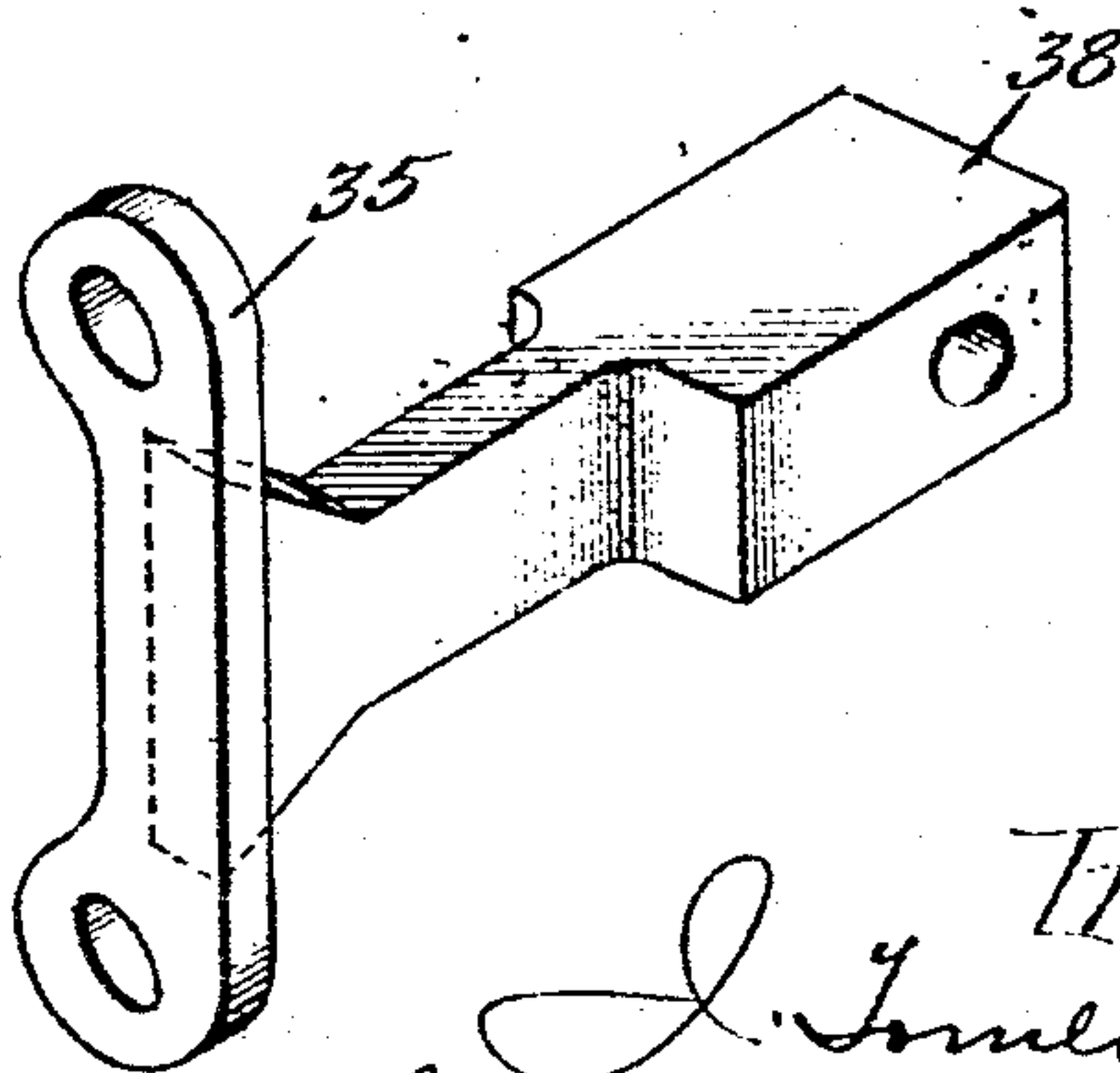


Fig. 9.

Fig. 10.



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# UNITED STATES PATENT OFFICE.

JOSEPH TOMLINSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO COX MULTI-MAILER COMPANY, OF AUGUSTA, MAINE, AND NEW YORK, N. Y., A CORPORATION OF MAINE.

## FOLDING-MACHINE.

948,117.

Specification of Letters Patent.

Patented Feb. 1, 1910.

Application filed June 25, 1907. Serial No. 380,782.

*To all whom it may concern:*

Be it known that I, JOSEPH TOMLINSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Folding-Machines, of which the following is a full, clear, and exact specification.

This invention relates to that class of folding machines particularly adapted for folding newspapers preparatory to or simultaneously with the wrapping of the same in which the folding operation is performed by the cooperation of one or more folding devices with one or more pairs of folding rolls between which the knife doubles or folds the paper, such, for example, as shown in the pending application of Sanford C. Cox for improvements in folding and wrapping machines filed May 5, 1906, Serial No. 315,389. With machines of this character it is of course obvious that the folding rolls are relatively spaced to suit the thickness of paper which is to be forced between them, and this makes it necessary to readjust this spacing of the rolls when it is desired to fold papers of different thicknesses. This readjusting operation, however, is tedious and slow and is also inaccurate because of the difficulty of adjusting the rolls of each pair for the proper respective thicknesses.

My invention has for its object to overcome this difficulty and to provide improved and efficient means whereby the rolls may be quickly adjusted, a further object being to provide improved means whereby a plurality of the rolls may be simultaneously adjusted the proper relative distances with respect to each other.

With a view to the attainment of these ends and the accomplishment of certain other objects which will hereinafter appear, the invention consists in the features of novelty which will now be described with reference to the accompanying drawings, and more particularly pointed out in the claims.

In the said drawings—Figure 1 is a side elevation of a part of a folding machine equipped with this invention. Fig. 2 is a detail view hereinafter described. Fig. 3 is a vertical sectional view taken on the line 3—3, Fig. 5. Fig. 4 is an enlarged detail section taken on the line 4—4, Fig. 5. Fig.

5 is a plan section on the line 5—5, Fig. 3. Fig. 6 is a detail perspective view of a bell crank lever hereinafter described. Fig. 7 is a detail plan section on the line 7—7, Fig. 3. Fig. 8 is an enlarged detail section hereinafter described. Fig. 9 is a detail section on the line 9—9, Fig. 3. And Fig. 10 is a detail perspective view of a yoke hereinafter described.

In illustrating the invention everything excepting that which is necessary for an understanding of the construction and operation of the adjusting mechanism of the folding rolls has been omitted. For the purposes of this invention it is simply necessary to understand that the paper to be folded is, according to the ordinary method, deposited upon a table 1, having a slot 2, through which the paper is forced and given its initial fold by any suitable folding blade or knife which is partially indicated at 3, and by which the paper is forced down between the initial folding rolls 4, 5. From here the paper is continued in its downward course, in this particular example of a folding machine, by the rotating action of the rolls 4, 5, until it is received between a second pair of rolls 6, 7. In this example, however, the function of the roll 7 is purely that of a feed roll, which co-acting with roll 6 serves to convey the partially folded paper down across another folding roll 8, the rolls 6, 8 constituting a pair between which the paper is again forced and folded by a second folding knife or blade 9, supported in a suitable arm or support 10, which may be given a reciprocating motion at the proper time by any suitable mechanism or mechanism heretofore employed in folding machines, well understood and not necessary to be described for an understanding of this invention. To follow further along the folding action it might be said that from the rolls 6, 8 the paper is received by other means, the particular construction and operation of which are entirely immaterial for an understanding of this invention, and indeed so far as this invention is concerned, the folding action or operation may cease with the discharge of the paper from the rolls 6, 8.

With an example of folding machine thus briefly described, it is apparent that the dis-



tance between the rolls 4, 5, 6, 7 and 6, 8, must be gaged with respect not only to the different folds that the paper receives and is thereby caused to increase in thickness, but with respect to the initial number of sheets received upon the folding table. Consequently the rolls when adjusted for a 10-page paper, for example, must be readjusted when either a paper of a larger or smaller number of pages is to be folded, and this same relative or gradually increasing distance between the rolls along the line of the folding operation must be maintained in the same ratio. The purpose of this invention is to accomplish this adjustment of all of the rolls concerned with the folding action and which require to be adjusted, simultaneously and by simple means, which will now be described.

It is apparent that the ends or journals of the various rolls are mounted in boxes 11, 12, 13, 14, 15, respectively. The two boxes 11, 12 are mounted in a suitable guideway 16 formed in the main frame 17 at both sides of the machine, while the boxes 13, 14 are situated in similar guideways 18, and the box 15 is mounted in a vertical guideway 19, it being understood of course that one of these boxes is at each end of each roller and the guideways are duplicated in the side frames, all as commonly resorted to in machinery of this character. In Fig. 1 of the drawings is shown a suitable train of gearing for imparting the necessary rotation to the various rolls, and from which it is apparent that the two top rolls 4, 5 are provided, respectively, with pinions 20, 21 engaging with idlers 22, 23, respectively, and the next two rolls 6, 7 are provided with pinions 24, 25 engaging also with the idlers 22, 23, and serving to impart motion thereto, the idlers 22, 23 being in mesh with each other. The bottom roll 8 is provided with a pinion 26, and this receives rotation from an idler 27 meshing therewith and also with pinion 25, and this idler 27 is given rotation from a main gear 28 driven from any suitable source or part of the machine and which communicates its motion to the pinion 27 by an idler 29.

It is of course unnecessary to adjust both rolls of each pair. Therefore the boxes 11 and 13 remain at rest at all times in the ends of their guideways, but the boxes 12, 14 and 15 are provided with means for sliding them in their guideways and thereby effecting the adjustment of their respective rolls. In Fig. 4 of the drawings is shown an enlarged view of one of the boxes in vertical cross-section, and this may be taken as a sample indeed of the construction of all three of the boxes 12, 14 and 15, although the particular section is that of the top box 12, but the bottom box 15 differs therefrom only in its position with respect to the perpen-

dicular, in the position of box 12 the adjustment being horizontal and in the position of box 15 it being vertical.

As shown in Fig. 4, the box is formed with a cavity or recess 30, which is closed by a cap 31 and which receives the head 32 of a bolt 33. The box 14 of the lower pair of rolls is similarly constructed and arranged and provided with a similar bolt 34. These bolts 33, 34 pass through apertures in the vertical or upright cross-bar 35 of a yoke shown in perspective in Fig. 10, and their outer ends on the outer side of this cross-bar are provided with nuts 36, which prevent them from pulling through the perforations in the cross-bar. Interposed between the cross-bar and the caps 31 are springs 37, which when the cross-bar is moved in the direction of the rolls 4, 6 communicate the motion of the cross-bar to the boxes 12, 14 and through these to the rolls, thereby forcing the rolls toward their companion rolls 5, 7 with a yielding pressure, and when the cross-bar is moved in the opposite direction the rolls 4, 5 will be simultaneously spaced with relation to their companion rolls 5, 7 a certain definite distance. It is of course unnecessary to explain that the boxes at both ends of the rolls 4, 6 are constructed as in Fig. 4, and one of these yokes illustrated in Fig. 10, is also provided at the other side of the machine for the boxes on that side, the springs and bolts being duplicated as shown in Fig. 1. Each of the yokes appearing in Fig. 10 is formed with a shank 38 projecting from the cross-bar of the yoke at the mid-length of the cross-bar and arranged between the guideways 16, 18 close to the side frames 17 of the machine, so as not to interfere with the descent of the paper from the rolls 4, 5. To each of these shanks 38 is pivoted one arm 39 of a bell-crank lever, two of which are employed, one at each side of the machine contiguous to the side frame thereof. An example of these bell-cranks is shown in Fig. 6, and the connection between arm 39 of each and the shank is effected in each instance by a link 40. Both bell cranks are mounted upon a rocker shaft 41 extending across the machine and provided outside one of the side frames 17 with an operating handle or lever 42, having a segment 43, provided with a locking or clamping screw 44 for holding it at its proper position of adjustment. It is, of course, obvious that the segment 43 may be marked with graduations 43<sup>a</sup> if desired, to indicate the proper position of adjustment for different papers of given thicknesses. When the lever 42 is oscillated it will be seen, therefore, that both rollers 4 and 6 will be simultaneously adjusted with respect to their companion rolls 5 and 7. This oscillation of the lever also effects the adjustment of the bottom roll 8, for it is seen that depending from the other arm 45



of each of the bell cranks is a link 46, and pivoted to each of these links is a horizontal arm 47, which is pivoted to the side frame 17 at 48 at one end, while its other end is provided with a perforation through which passes a bolt 49, similar to the bolt 33, having a head 50 like the bolt 33 situated within the recess corresponding to recess 30, in the box 15, and which recess in box 15 is closed by a cap plate 51 serving to retain the head 50 of the bolt. The lower end of the bolt at a point below the arm 47 is provided with a nut 52 serving to communicate the downward motion of the arm 47 to the bolt and thence to the box 15. Therefore, it will be seen that when the rocker shaft 41 is rotated the arms 47 will pull the roller 8 downward with respect to its companion 6 if the rocking motion be in one direction, and if in the other direction the arms 47 would lift the roller 8 through the intermediary of springs 54 interposed between the arms 47 and the cap plates 51 at both sides of the machine, as shown on one side in Fig. 1 and on the other side in Fig. 3.

In Fig. 8 of the drawing is shown a detail relating to the means for locking the adjusting lever 42, the locking nut 44 being screw-threaded upon a projection 55 of a stud 56, which is secured in the frame 17 and which stud serves as a shoulder for the segment 43 to be clamped against by the nut 44.

In order that the invention might be understood by those skilled in the art, an exemplification thereof has been thus specifically described, but

What I claim as new and desire to secure by Letters Patent, is:

1. In a machine for the purpose described, the combination of two pairs of horizontally arranged rolls, a fifth roll arranged in operative relation to one of the aforesaid rolls, one roll of each pair and said fifth roll being movable, and means operatively connecting all of said movable rolls together whereby they may be simultaneously adjusted.

2. In a machine for the purpose described, the combination of two pairs of folding rolls, one of which in each pair is movable with respect to its companion, slidable boxes in which the ends of the movable rolls are journaled, a yoke for each end of the two movable rolls having operative connection with the boxes of both rolls, whereby the rolls may be moved in one direction simultaneously at each end, springs interposed between said yokes and the boxes for imparting the movement of the yokes to the boxes when the yokes are moved in the opposite direction, and means for moving the yokes simultaneously.

3. In a machine for the purpose described, the combination of two pairs of folding rolls, one roll of each pair being movable with relation to its companion, yokes connecting

the movable rolls together at both ends, whereby both rolls at each end may be caused to move simultaneously, two cranks to which said yokes are respectively connected, and a shaft and operating means for simultaneously oscillating said cranks.

4. In a machine for the purpose described, the combination of two pairs of folding rolls and a fifth roll arranged in operative relation to one of them, one roll of each pair and said fifth roll being movable with relation to their companions, means yoking the ends of the said movable rolls of the pairs together, means for moving said yoking means simultaneously for causing simultaneous adjustment of the movable rolls of the pairs, and means connecting the ends of the said fifth roll with the last said means whereby the operation of the last said means will cause a simultaneous adjustment of all of the movable rolls.

5. In a machine for the purpose described, the combination of two pairs of folding rolls, one of which of each pair is movable with relation to its companion, yokes connecting the ends of the movable rolls together at each end, bell cranks to one arm of each of which one of said yokes is connected, a fifth roll arranged in operative relation to one of the aforesaid rolls and being movable with relation thereto, pivoted arms supporting the ends of said fifth roll, means connecting said pivoted arms with the other arms of said bell cranks respectively, and means for oscillating said bell cranks simultaneously.

6. In a machine for the purpose described, the combination of two pairs of folding rolls, one roll of each pair being adjustable with relation to its companion, yokes connecting the ends of the movable rolls together at both ends, a fifth roll movable with relation to one of the other rolls, arms supporting said fifth roll, means connecting said yokes and arms together, embodying a crank shaft, a lever for oscillating said shaft, means for locking said lever in the position of its adjustment, and means in connection with the lever embodying graduations for indicating the relative arrangement of the said movable rolls.

7. In a machine for the purpose described, the combination of a pair of folding rolls, one of which is movable with relation to the other, boxes in which the ends of the movable roll are journaled, having recesses or cavities, flanged or headed members having their flanges or heads confined in said recesses, springs encircling said headed members and bearing at one end against the boxes, and means encircling said headed members and bearing against the opposite ends of the springs, for moving the boxes in one direction through the intermediary of the springs, said headed members being provided with means for causing the first



said means to move the headed members in the opposite direction and thereby move the boxes, the first said means at the ends of the movable roller being operatively connected, whereby the ends of the roller will be simultaneously moved.

In testimony whereof I have signed my

name to this specification, in the presence of two subscribing witnesses, on this 12th day of June A. D. 1907.

JOSEPH TOMLINSON.

Witnesses:

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M. W. CANTWELL.