Jan 6, 1931. H. LANG 1,787,945

FOLDING MECHANISM FOR PRINTING PRESSES

Original Filed April 22, 1922 3 Sheets-Sheet 1

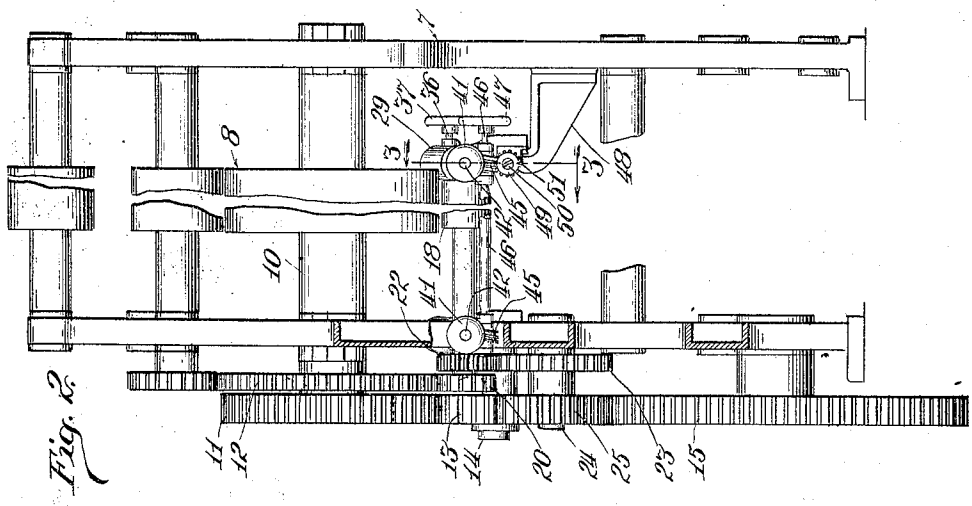


Fig. 2.

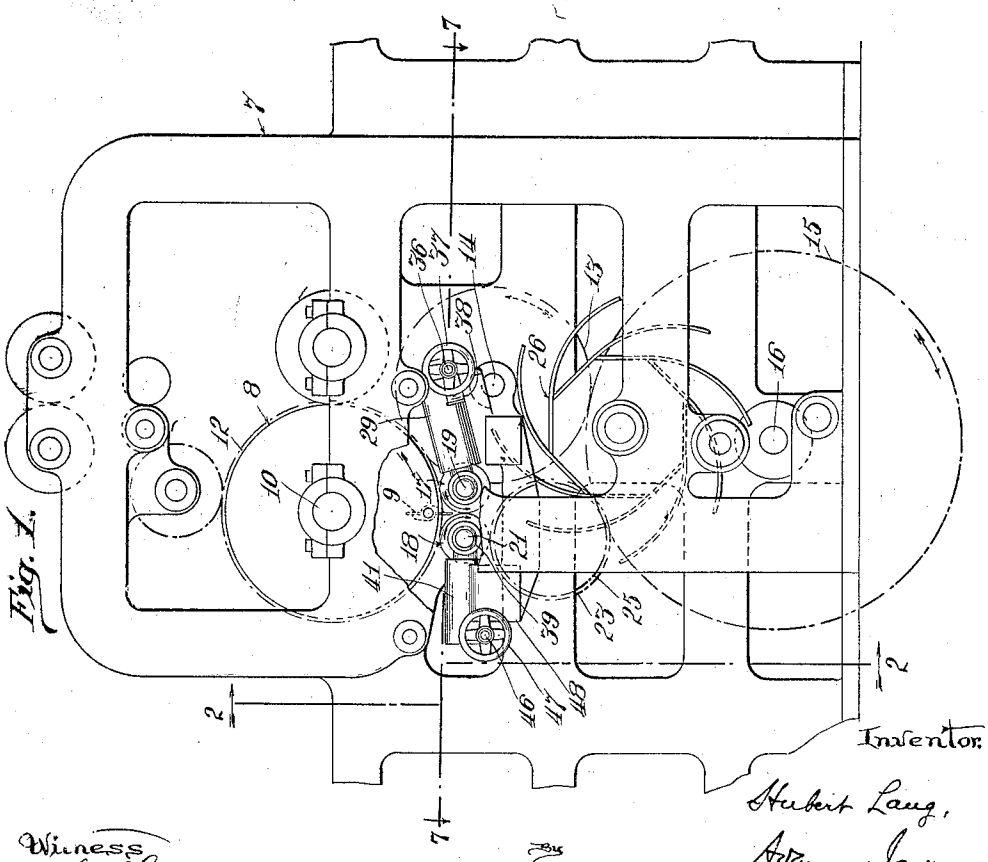


Fig. 1.

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FOLDING MECHANISM FOR PRINTING PRESSES

Original Filed April 22, 1922 3 Sheets-Sheet 2

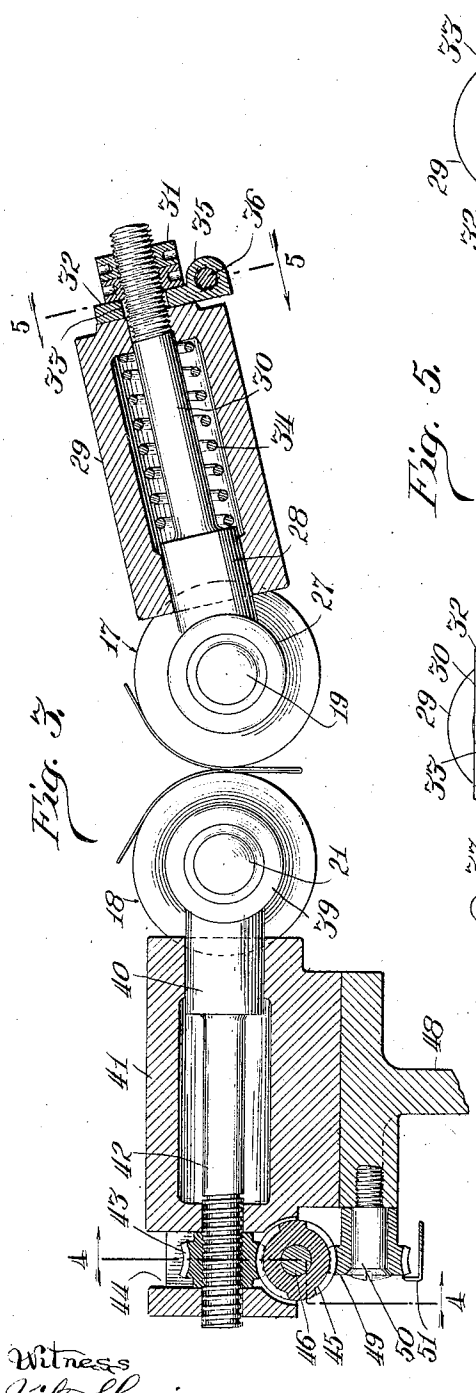


Fig. 3.

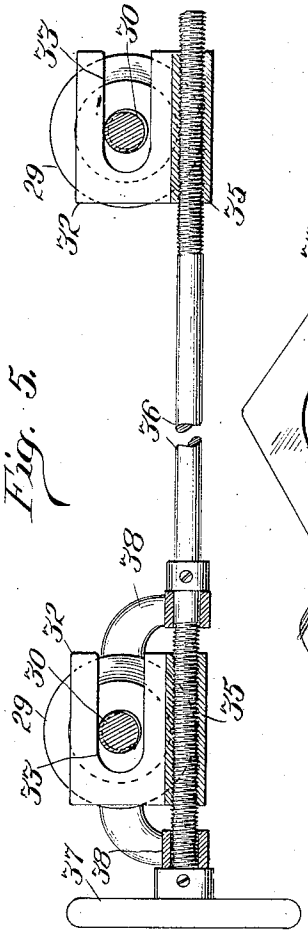


Fig. 5.

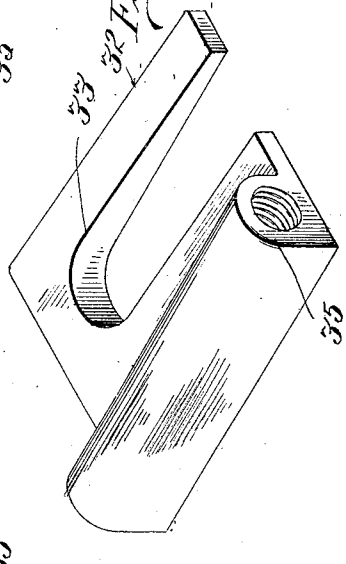


Fig. 6.

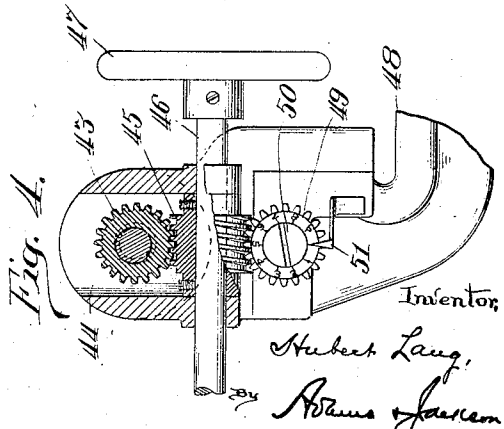


Fig. 4.

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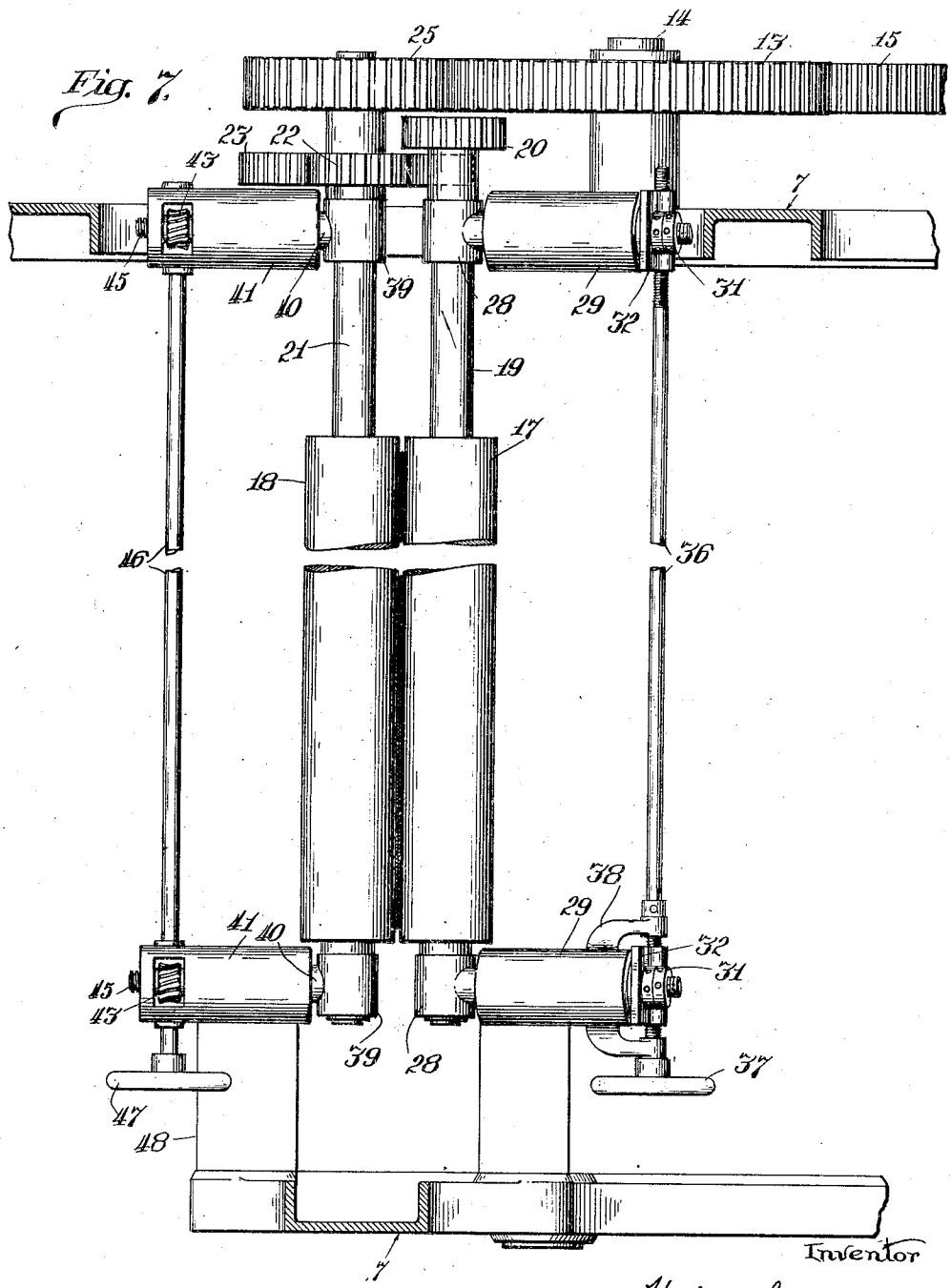
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FOLDING MECHANISM FOR PRINTING PRESSES

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Fig. 7.



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UNITED STATES PATENT OFFICE

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FOLDING MECHANISM FOR PRINTING PRESSES

Application filed April 22, 1922, Serial No. 556,105. Renewed October 29, 1929.

My invention relates to printing presses, and has particularly to do with mechanism by which the printed sheets are folded transversely prior to their delivery from the press. In newspaper perfecting presses it is common to conduct the longitudinally folded papers to a folding cylinder equipped with grippers or equivalent devices which hold the leading end of the sheets, so as to carry them around the cylinder until a folding blade, also carried by the cylinder, comes into action and projects the center line of the sheets out between co-acting folding rollers which then take the sheets from the cylinder and complete the transverse fold and advance the folded paper to suitable delivery mechanism such as a rotating fly. Heretofore these folding rollers have been geared directly together so that they rotate in opposite directions, but this direct connection is objectionable because it does not permit of any great amount of adjustment of the rollers toward or from each other to accommodate newspapers of different sizes, since movement of the rollers away from each other separates to a greater or less extent the pinions by which they are geared together, so that they do not mesh properly. In the case of metropolitan newspapers, the number of pages may vary greatly on different days, so that whereas on some days the folding rollers should be set quite close together, on other days they must be set a considerable distance apart to accommodate a forty-eight or sixty-four page paper, for example, and such a wide range of adjustment cannot be satisfactorily provided for where the folding rollers are driven in the manner above described. The object of my invention is to overcome this difficulty, and to provide an arrangement for driving the folding rollers by which any desired adjustment of the rollers toward or from each other may be obtained without interfering with their proper cooperation with each other or with the folding cylinder. This object I accomplish as hereinafter described and as illustrated in the drawings. What I regard as new is set forth in the claims.

In the accompanying drawings,—

Fig. 1 is a side elevation of part of a printing press frame, partly broken away to show the mounting of the folding rollers;

Fig. 2 is a partial vertical section on line 2—2 of Fig. 1, the intermediate portions of the folding cylinder and rollers being omitted;

Fig. 3 is an enlarged sectional detail illustrating the manner in which the folding rollers are adjustably mounted;

Fig. 4 is a vertical section on line 4—4 of Fig. 3;

Fig. 5 is a section on line 5—5 of Fig. 3;

Fig. 6 is a perspective view showing one of the wedge blocks used in the arrangement shown in Fig. 5, and Fig. 7 is a substantially horizontal cross-section taken on line 7—7 of Fig. 1, the fly being omitted.

Referring to the drawings,—7 indicates the frame of the press and 8 the folding cylinder, which, as indicated in dotted lines, is provided with the usual folding blade 9. The devices for operating the folding blade and the gripping devices, or other equivalent means for taking the leading end of the sheets, are not shown, as their construction and operation are well known to those familiar with the art. 10 indicates the folding cylinder shaft, on one end of which are mounted gears 11, 12, best shown in Fig. 2, the gear 12 being of slightly greater diameter than the gear 11. The purpose of the gear 11 is to drive the shaft 10, and to this end it meshes with a gear 13 mounted on a shaft 14 and driven by a gear 15 mounted on a shaft 16. The gear 15 may be connected with some other part of the press or may be driven in any other suitable way.

17, 18 indicate the two co-acting folding rollers hereinbefore referred to, which are mounted adjacent to the folding cylinder 8 in such position that the folding blade 9 projects the bight of the sheets in between them so that they take it from the cylinder and impart to it the transverse fold. The manner in which these folding rollers are adjusted toward or from each other will be hereinafter explained, and the mechanism by which they are driven will be described first. The roller 17 is mounted on a shaft 19, upon one end portion of which is a pinion 20 which

meshes with the gear 12 as shown in Fig. 2, and as said gear is slightly larger than the gear 11, which is of the same diameter as the cylinder 8, it will be obvious that the folding roller 17 will be driven at a slightly greater surface speed than that of the folding cylinder. The folding roller 18 is mounted on a shaft 21, which carries a pinion 22 of the same diameter as the pinion 20 and arranged to mesh with a gear 23 mounted on a stud 24 as shown in Fig. 2. The stud 24 also carries a gear 25 of slightly less diameter than the gear 23, and arranged to mesh with the gear 15 as shown in Figs. 1 and 2. It will be seen, therefore, that the folding roller 18 is driven from the gear 15 through separate gearing from that which drives the folding roller 17, but at the same surface speed as the latter, owing to the fact that the gear 23 is sufficiently larger than the gear 25 to obtain this result. It will also be apparent that the folding rollers 17, 18 will rotate in opposite directions, as indicated by the arrows in Fig. 1. The object of driving these rollers at higher surface speed than the cylinder 8 is to cause the speed of the folded sheets to be accelerated as they are removed from the folding cylinder. After passing between the folding rollers 17, 18 the sheets are delivered in any suitable way, as by means of a fly 26 shown in Fig. 1.

The manner in which the folding roller 17 is mounted is best shown in Figs. 3 and 5, from an inspection of which it will be seen that the shaft 19 of said roller is mounted in suitable bearings 27 carried by plungers 28 which are fitted in boxes 29 at opposite sides of the press. Each of the plungers 28 is provided with a stem 30, the outer end of which is screw threaded and projects through the outer end of the box. Upon the outer end of the stem 30 is mounted a nut 31, and between said nut and the adjacent end of the box 29 is a wedge plate 32 cooperating with the correspondingly wedge faced nut 31 or box 29 and having a slot 33 which embraces the stem 30, as shown in Fig. 5. Mounted upon the stem 30 within the box is a spring 34 which tends to project the plunger 28, and, therefore, by moving the wedge block 32 transversely the plunger may be moved endwise to a greater or less extent against the tension of the spring 34, thereby adjusting the position of the folding roller 17 with respect to the folding roller 18. For the purpose of simultaneously and similarly adjusting the wedge blocks 32 at opposite sides of the press, they are provided with internally screw-threaded sleeves 35 fitted upon a transverse rod 36 provided with a hand wheel 37 or other suitable means by which said rod may be rotated. Said rod is held against endwise movement by a bracket 38 shown in Fig. 5, which is secured to the frame of the press in any suitable way. By this construction by rotating the rod 36 in one direction or the other the wedge blocks 32 may be moved transversely of the box 29, thereby moving the plungers 28 longitudinally of said box. As shown in Fig. 1, the box 29 is disposed approximately tangentially with reference to the point on the gear 12 at which the pinion 20 meshes with it, so that when the position of the folding roller 17 is adjusted in the manner described its pinion 20 will continue in full mesh with the gear 12, notwithstanding such adjustment. Consequently, said folding roller will always be properly driven. This is best accomplished by disposing the plungers 28 at an angle to the plungers 40, as shown in Figs. 1 and 3.

While the mechanism thus far described provides for varying the normal space between the folding rollers to accommodate different sized newspapers without affecting the driving connections of said rollers, and, therefore, accomplishes the stated object of my invention, I prefer, also, to provide for adjusting the folding roller 18 toward and from the co-acting roller 17, in order to keep the space between said rollers centered properly with reference to the folding blade, and, therefore, as shown in Figs. 3 and 4, I have provided means by which the roller 18 may also be so adjusted. As shown in said figures, the shaft 21 of the roller 18 is mounted in bearings 39 carried by plungers 40, which are mounted in boxes 41 similar in some respects to the boxes 29. Each of the plungers 40 is provided with a stem 42 which projects through the outer end of its box and is externally threaded as shown in Fig. 3. Mounted upon the threaded portion of said stem is a worm wheel 43, which is fitted in a recess 44 in the outer portion of the box and meshes with a worm 45 non-rotatably secured on a rod 46 which extends transversely of the press and is provided with a hand wheel 47 or other suitable means by which it may be rotated. By this construction rotation of the rod 46 operates through the worms 45 and worm wheels 43 to move the plungers 40 longitudinally through their respective boxes, thereby adjusting the roller 18 toward and from the roller 17. The boxes 41 are supported on the frame of the press preferably by means of brackets 48, and for the purpose of facilitating accurate adjustment of the roller 18 I provide an indicator wheel 49, which is in the form of a worm wheel mounted on a stud 50 secured to one of the brackets 48. This worm wheel meshes with the under side of the worm 45, as shown in Figs. 3 and 4, so that whenever the rod 46 is rotated the indicator wheel 49 is also rotated. A fixed pointer 51 may be associated with said indicator wheel to show the extent to which said indicator wheel may have been rotated in either direction from a basic position.

By the construction described, the two

folding rollers are not geared together, and, consequently, their adjustment toward or from each other in no way affects their driving connections. They may, therefore, be moved as far apart as may be necessary to accommodate thick papers without in the least impairing their efficiency, and their adjustment may be very easily and quickly effected without modifying any of the other parts of the mechanism.

So far as I am aware, I am the first in the art to provide separately driven folding rollers associated with a folding cylinder for the purpose stated, and the claims hereinafter made are, therefore, to be construed accordingly.

What I claim as my invention and desire to secure by Letters Patent, is—

1. The combination with a folding cylinder, of co-acting folding rollers, and separate driving connections for rotating said rollers in opposite directions at an accelerated surface speed as compared with that of the cylinder.

2. The combination with a folding cylinder, of co-acting folding rollers, driving gearing connecting one of said rollers with said cylinder and operating to drive said roller at an accelerated surface speed, and separate means for driving the other roller at the same speed as that of said first mentioned roller.

3. The combination with a folding cylinder, of co-acting folding rollers associated therewith, driving gearing connecting one of said rollers with said cylinder and operating to drive said roller at an accelerated surface speed, separate means for driving the other roller at the same speed as that of said first-mentioned roller, and means operable to vary the normal width of the space between said rollers.

4. The combination with a folding cylinder, of co-acting folding rollers associated therewith, plungers supporting one of said rollers, driving gearing connecting the other of said rollers with said cylinder, and means for adjustably supporting the latter roller comprising plungers disposed at an angle to said first-mentioned plungers.

5. The combination with a folding cylinder, of co-acting folding rollers, and means for adjustably supporting one of said rollers comprising plungers upon which said roller is mounted, springs tending to move said plungers in one direction, wedges operable to move said plungers against the tension of said springs, and means for moving said wedges in either direction.

6. The combination with a folding cylinder, of co-acting folding rollers disconnected from each other, separate gearing for driving said rollers, and means for adjustably supporting one of said rollers comprising plungers upon which said roller is mounted, and worm gearing for moving said plungers endwise in unison to move said roller toward or from the other.

7. In a printing press folder, the combination with the folding cylinder and its blade, of a pair of cooperating folding rollers, means for adjusting both rollers towards or from a central line which corresponds to the position of the blade, and holding them in adjusted position, and rotary indexing means taking its motion from the adjusting means for indicating the departure of said rollers from the central line.

8. In a printing press folder, the combination of a folding cylinder having a blade, co-acting gear driven folding rollers, means operable to adjust both of said rollers towards or from each other, said means including a manually rotatable shaft bearing a pair of worms, worm gears driven by said worms, and threaded rods on which said worm wheels are mounted, said rods controlling the position of one of said rollers with respect to the other, and separate driving means for rotating said rollers in opposite directions.

9. A printing press folder including in combination a folding cylinder having a folding blade, a pair of folding rollers co-acting with the folding blade, and devices for moving both folding rollers equal distances toward and from a central line which corresponds to the folding position of the folding blade, to fold products of different thicknesses.

10. A printing press folder including in combination a rotating folding cylinder, a folding blade rotatably mounted on the cylinder, and adapted to strike a fold on a predetermined line, as the cylinder is rotating, a pair of folding off rollers adjacent to and coacting with the folding cylinder and its blade, devices for moving both said rollers equal distances toward and from said predetermined line of strike of the rotating folding blade, and means for driving said rollers in any of their several positions.

11. In a printing press folder, the combination with the folding cylinder and its blade, of a pair of cooperating folding rollers, means for adjusting both rollers toward or from a central line which corresponds to the position of the blade, and holding them in adjusted position, and indexing means moved by the adjusting means for indicating the departure of a folding roller from the central line.

12. A folding mechanism including in combination a pair of folding rollers, means for tucking sheets into the bite of the rollers, means for positioning a folding roller including a pair of contacting wedges and means for effecting relative movement of the wedges.

13. A folding mechanism including in combination a pair of folding rollers, means

for tucking sheets into the bite of the rollers, means for positioning a folding roller including a pair of contacting wedges at either end of the roller and means for effecting relative movement between the wedges of each pair.

14. A folding mechanism including in combination a pair of folding rollers, means for tucking sheets into the bite of the rollers, means for positioning a folding roller including a pair of contacting wedges at either end of the roller and simultaneous means for effecting relative movement between the wedges of each pair.

15. A folding mechanism including in combination a pair of folding rollers, means for tucking sheets into the bite of the rollers, means for positioning a folding roller including a pair of contacting wedges and screw-threaded means for effecting relative movement of the wedges.

16. A folding mechanism including in combination a pair of folding rollers, means for tucking sheets into the bite of the rollers, means for positioning a folding roller including a pair of contacting wedges at either end of said folding roller and screw-threaded means for effecting relative movement between the wedges of each pair.

17. A folding mechanism including in combination a pair of folding rollers, means for tucking sheets into the bite of the rollers, means for positioning a folding roller including a pair of contacting wedges at either end of said folding roller and screw-threaded means for effecting simultaneous relative movement between the wedges of each pair.

18. A folding mechanism including in combination a pair of folding rollers, means for tucking sheets into the bite of the rollers, movable supports at either end of one roller, a pair of contacting wedges for each support, and means for simultaneously effecting relative movement between the wedges of each pair to regulate the space between the folding rollers.

19. A folding mechanism including in combination a pair of folding rollers, means for tucking sheets into the bite of the rollers, movable supports at either end of one roller, a pair of contacting wedges for each support, and means for simultaneously effecting relative movement between the wedges of each pair to regulate the space between the folding rollers and springs pressing the supports to the wedges.

HUBERT LANG.