

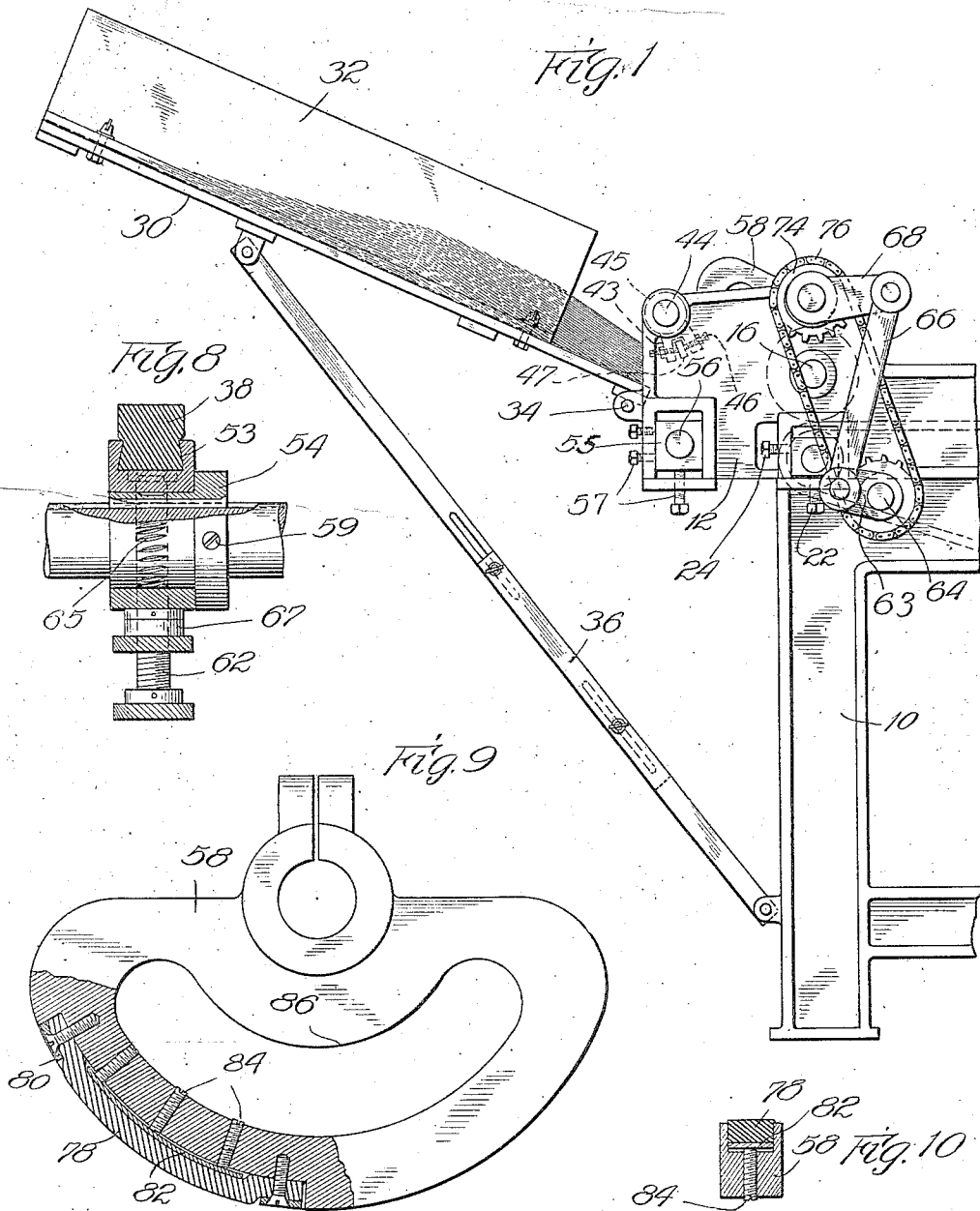
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Jan. 30, 1923

1,443,430.

A. OLGAY.  
PAPER FEEDING MECHANISM,  
FILED MAY 5, 1920.

4 SHEETS—SHEET I.



Inventor  
Albert Olgay

By Miller Chindahl  
Att'y

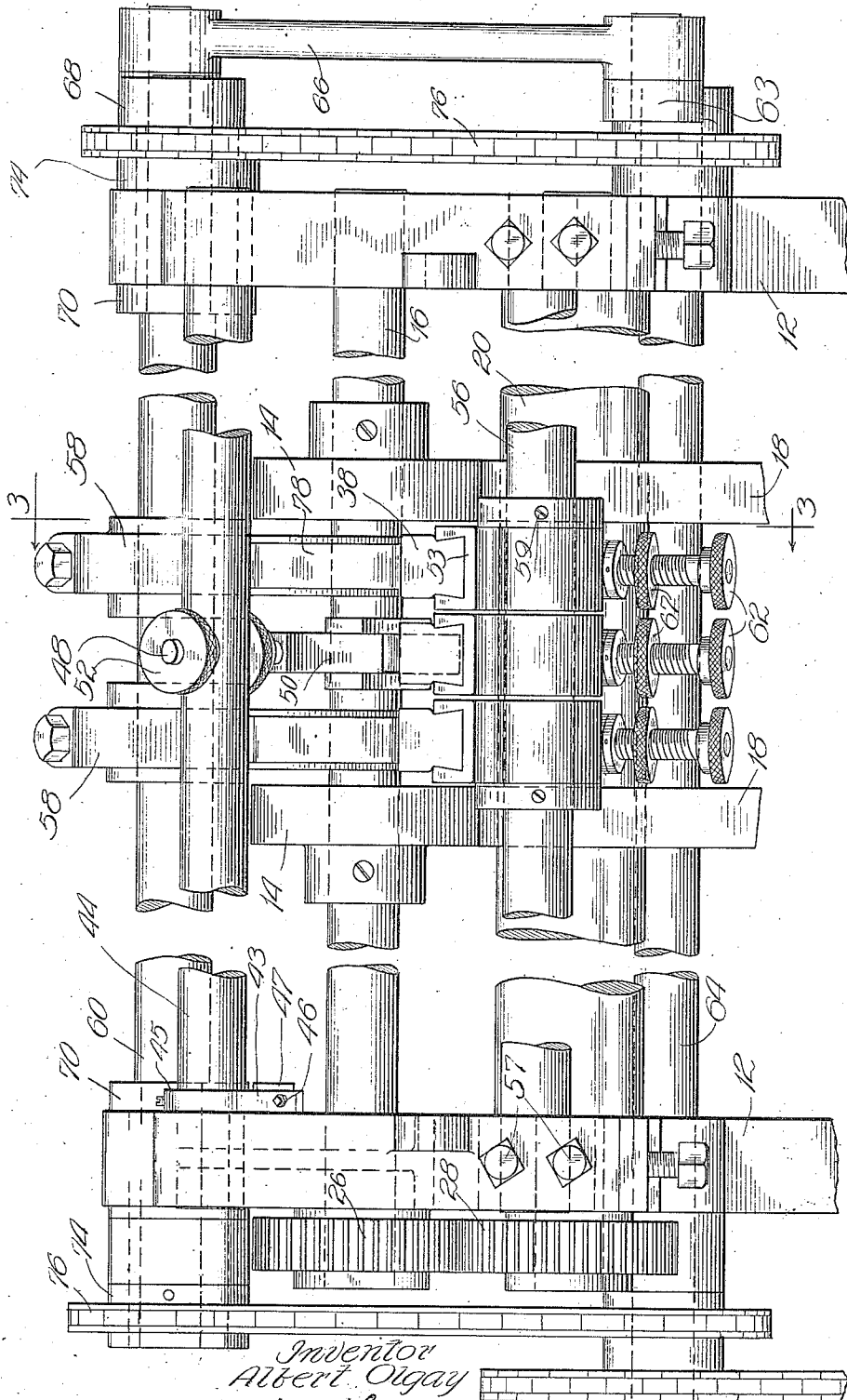
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4 SHEETS—SHEET 2.

Fig. 2



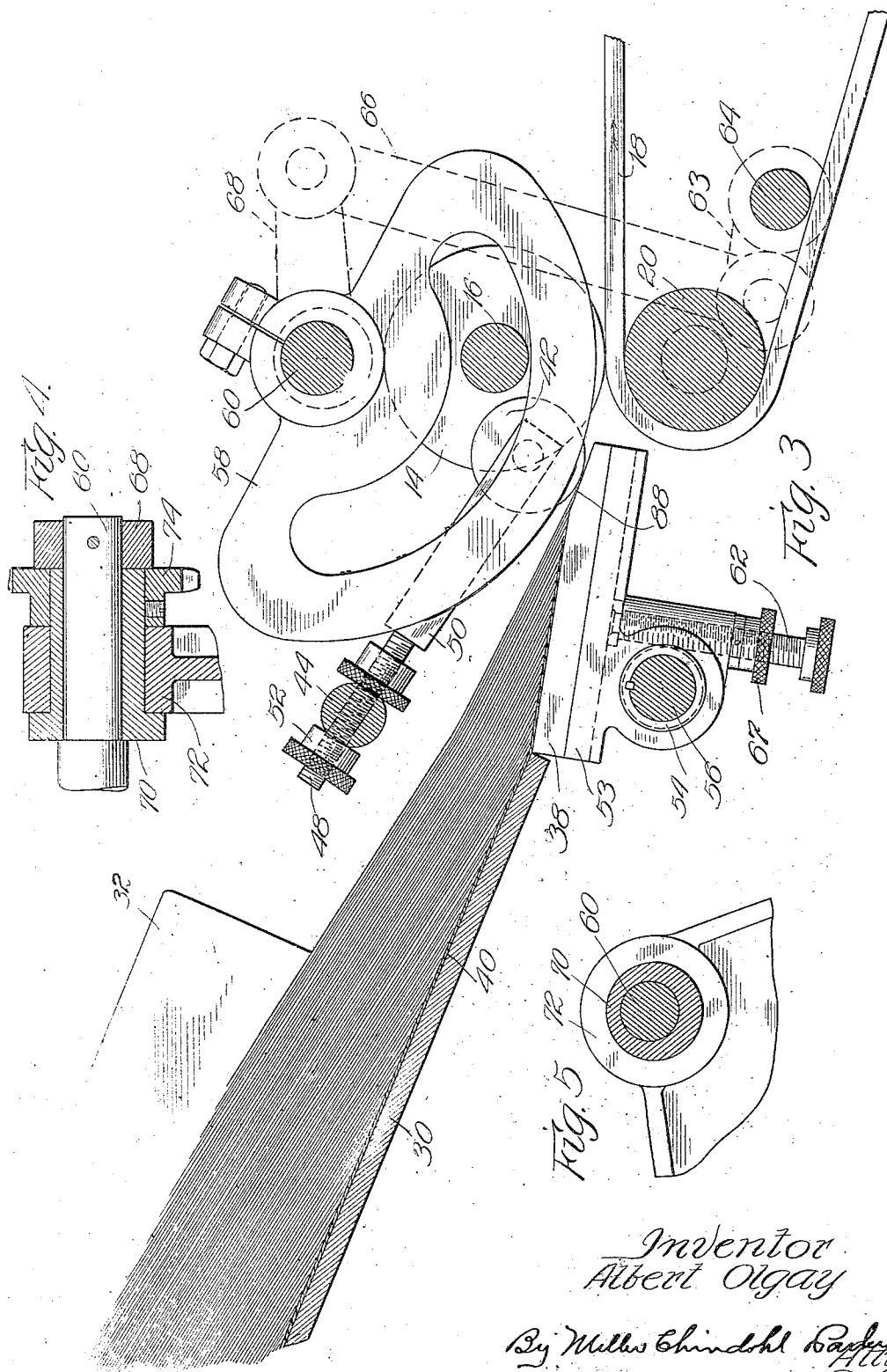
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4 SHEETS—SHEET 3.



Inventor  
Albert Olgay

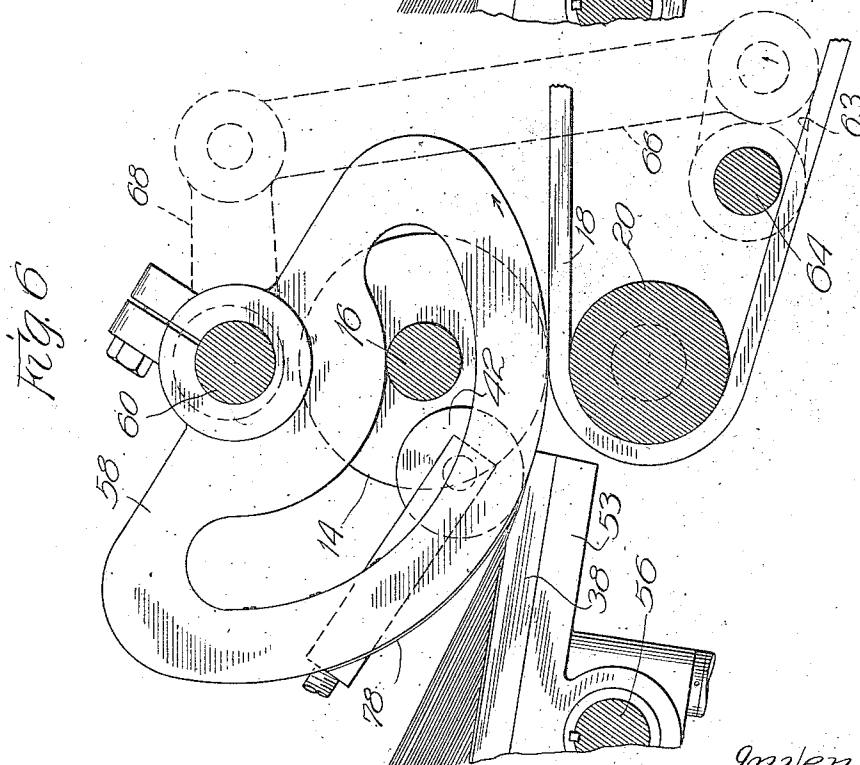
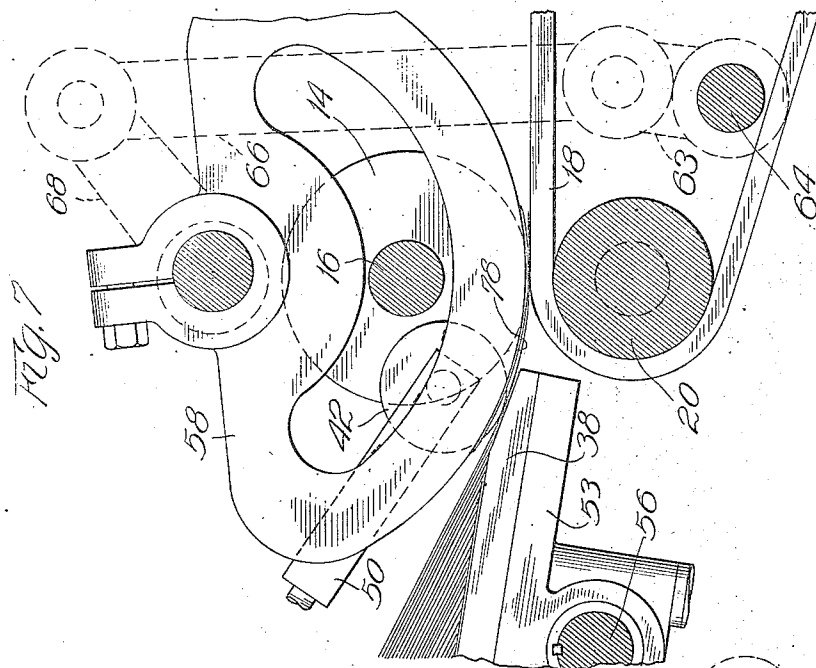
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FILED MAY 5, 1920.

4 SHEETS—SHEET 4.



Inventor  
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## UNITED STATES PATENT OFFICE.

ALBERT OLGAY, OF CHICAGO, ILLINOIS, ASSIGNOR TO GAW-O'HARA ENVELOPE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## PAPER-FEEDING MECHANISM.

Application filed May 5, 1920. Serial No. 378,975.

*To all whom it may concern:*

Be it known that I, ALBERT OLGAY, a German citizen, who have declared my intention of becoming 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 Paper-Feeding Mechanism, of which the following is a specification.

My invention relates to paper handling devices for feeding individual sheets of paper from a pile. Devices for this purpose have a wide range of usefulness in connection with many different kinds of printing, perforating, folding and wrapping machines.

One object of my invention is to simplify the mechanism necessary for feeding the sheets.

Another object is to provide a mechanism capable of being operated at a much greater speed than those at present in use without sacrificing either reliability or certainty of operation.

Further objects and advantages of my invention will become apparent as the description proceeds.

In the accompanying drawings Figure 1 is a side view of a portion of a paper handling machine showing my improved device in side elevation. Fig. 2 is an end elevation of the feed mechanism. Fig. 3 is a section on the line 3—3 of Fig. 2. Figs. 4 and 5 are detail sections of the eccentric mountings for the shaft carrying the feed shoes. Figs. 6 and 7 are fragmentary sections similar to Fig. 3 illustrating two other stages in the operation of the device. Fig. 8 is a detail view illustrating the mounting of the rubber end block. Fig. 9 is a detail of the feed shoe showing in section the adjustable mounting of the contact piece. Fig. 10 is a detail section of the shoe and contact piece.

In the embodiment of my invention selected for illustration a frame 10 adapted to support any kind of paper handling or printing device is equipped with plates 12 supporting my improved feeding mechanism and the receiving means of the paper handling device to which the pieces of paper are to be delivered. The receiving means comprises in this instance a set of feed rollers 14 mounted on a shaft 16 and engaging the surface of a moving belt 18

which passes over a roller 20. The roller 20 may be adjusted vertically by set screws 22 and clamped in adjusted position by set screws 24 to vary the gripping action of the belt and rollers on the paper handled. Inasmuch as this adjustment is very slight I prefer to drive the shaft 16 from the shaft carrying roller 20 by a simple pair of gears 26 and 28. It is well known that gears having involute teeth may be slightly separated from each other without destroying the proper intermeshing engagement of the teeth.

An inclined chute preferably comprising a bottom 30 and adjustable side pieces 32 may be pivoted at 34 and supported at any desired angle by an adjustable and extensible brace 36. The support for the pile of paper comprises the bottom of this chute and friction terminal blocks 38 preferably of rubber of the grade known as "mechanical" rubber. The latter are preferably mounted to prolong the end of the chute bottom at an angle slightly nearer the horizontal. A flexible covering 40 may be used if desired to overlie the chute bottom 30 and part of the terminal blocks to provide a suitable surface for the support of the pile of paper. I have illustrated three duplicate terminal blocks and a stop wheel or roller 42 over the center one. The stop wheel is adjustably mounted on a shaft 44 rotatably adjustable by means of set screws 46 carried on arms 43 on a collar 45 and engaging a lug 47 on plate 12, which shaft is penetrated by the threaded shank 48 on the end of the bar 50 pivotally supporting the roller 42. Suitable nuts 52 engage both sides of the shaft 44 for longitudinal adjustment of the bar 50. It will be seen that the exact position of the roller 42 may be adjusted with precision to any point in its plane and within the range of the adjustment provided.

The blocks 38 are carried in supports 53 individually rotatable on a sleeve 54 splined on the shaft 56 rigidly fastened in vertically adjustable blocks 55 at the ends of the mechanism. Set screws 59 may be used to clamp the blocks in adjusted position longitudinally of shaft 56. The shaft 56 may also be suitably adjusted and clamped in position by set screws 57. For rotary adjustment around the sleeve 54 each support 53 carries a screw 62 meshing with worm 110

teeth 65 formed in the sleeve. A suitable lock nut 67 may be employed to fasten the screw and thereby the block 38 in adjusted position. The stop wheel 42 and center block 38 are to be adjusted so that a single sheet of material can slide over the block in contact with the stop roller with a gentle friction sufficient to prevent the sheet from moving under the action of gravity alone. Their positions may readily be adjusted with sufficient precision so that two sheets cannot pass due to the very heavy friction set up by the pressure necessary to force two sheets between the roller and the block. The sheets are laid on the support in the staggered or "fanned out" arrangement shown and the slope of the support may be adjusted to control the tendency of the sheets to slide down against the roller.

I have provided means for intermittently engaging the topmost sheet of paper at either side of the roller 42 and moving it forward to be engaged by the belt 18 and rollers 14. As illustrated, this means comprises oscillating feed shoes 58 located on either side of the roller 42 and cooperating with the two outside blocks 38. These feed shoes receive an oscillatory movement of rotation about the axis of the shaft 60 supporting them, and the shaft itself is also oscillated around a circle of very small diameter, the two movements being superposed in such a way that the feed shoes will be lifted clear of the paper while moving back to the position shown in Fig. 3, and then by the oscillation of the shaft 60 forced into contact with the paper as shown in Fig. 6, and rocked as shown in Fig. 7 while still in contact with the paper to carry the topmost sheet into place between the belt 18 and rollers 14, and again lifted on the return stroke.

The connections I have illustrated for thus moving the feed shoes include a crank 63 carried by a rotating shaft 64 which for the present purpose may be considered a source of power, a connecting link 66 and a longer crank 68 fastened to the shaft 60 to rotate the same. The upper crank 68 being longer than the lower crank 62, it will be obvious that the lower crank may rotate continuously throughout a circle in one direction and operate the link 66 to rock the upper crank back and forth through a portion of a revolution only, thus imparting the desired rotation to the feed shoes.

As clearly illustrated in Figs. 4 and 5 each end of the shaft 60 is rotatably supported in a bushing 70, the outer cylindrical surface of which is rotatably supported by a bearing 72 formed in the supporting framework and is eccentric to the inner surface engaging the shaft 60. The eccentrics at both ends of the machine are rotated at the same speed as the shaft 64 by suitable

connections such as sprocket wheels 74 on the two shafts and a connecting chain 76. To produce the required motion it will be obvious that the positions of the crank 63 and eccentrics 70 must be properly synchronized. With the linkage as laid out in the drawings the displacement due to the eccentric mounting is approximately directly upward as indicated in Fig. 3 while the shoe is rocked back by the crank 63 which extends approximately horizontally to the left and is therefore about one quarter of a revolution ahead of the eccentric 70. When the crank 63 passes through its lower dead center with the shoe in rearward position the eccentric connection will rapidly lower the shoe into contact with the paper and hold it there while the eccentric passes through its other dead center position during which time the crank 63 will make the return stroke and deliver a piece of paper to the belt 18.

The feed shoes 58 should preferably have the portions engaging the paper faced with rubber. In Fig. 9 I have illustrated a rubber facing 78 fastened to the shoe at its ends by retaining plates 80, and an arcuate backing plate 82 engaged by a plurality of set screws 84 passing through the outer arcuate portion of the shoe. This provides an additional means for precise adjustment of the clearance and the resulting friction between the pieces of paper, the rubber blocks 38 and the rubber facing 78. The shoes 58 are formed with arcuate slots 86 which not only provide convenient access to the set screws 84 but enable the roller shaft 16 to be mounted in the position shown, passing through the shoes without interfering with their action. Obviously the width of the arcuate slots 86 must be the diameter of the shaft 16 plus twice the arm of eccentric 70 plus a reasonable allowance for clearance.

The spacing of the outer blocks 38 and the facings 78 may be adjusted so that a single sheet of paper may lie between the opposed rubber surfaces and be subjected only to a relatively gentle friction. With the surfaces thus adjusted it will be obvious that if two sheets of paper are interposed between the surfaces, each will be pressed strongly against the rubber surface next it which has a much greater coefficient of friction with the paper than that between two paper surfaces. As shown in Fig. 3 the sheet of paper next the top overlies the sloping portion 88 of the block 38 so that its leading edge comes within the arc of contact between the face 78 of feed shoe 58 and the block 38. The portion of the top sheet therefore overlying the front edge of the next sheet below it represents a point where two thicknesses of paper are interposed between the parts. The friction with the rubber surfaces therefore

will be heavy at this point and the top piece of paper will readily slide on the lower piece of paper moving across it and across all three blocks 38 under the roller 5 42 without heavy friction on the roller or on any of the blocks except where it overlies the edge of the next sheet. As soon as the sheet has been taken by the belt 18 and removed, the remaining sheets will slip 10 down by gravity until the top sheet is again checked by the stop roller 42 in position to be taken by the feed shoe on its next stroke.

Devices according to my invention are capable of feeding individual pieces of paper at much higher speeds than heretofore possible. The mechanism employed 15 comprises relatively few parts of relatively simple shapes and is reliable and durable in service.

20 While I have illustrated and described in detail the preferred embodiment of my invention, it should be clearly understood that the disclosure is merely for purposes of illustration and that many modifications and variations will naturally occur to those skilled in the art. I aim in the subjoined 25 claims to cover all such legitimate variations and modifications.

I claim as my invention:

30 1. A sheet feeding device having, in combination, means for supporting a pile of sheets, adjustable friction shoes, means for moving said shoes to intermittently engage the upper surface of the topmost sheet and 35 move it off the pile, and means operating on the sheets by engagement on opposite sides of their leading edges for preventing the removal of more than one sheet at a time by said shoes, said last mentioned 40 means being operable separately from and not relying upon the adjustment of said shoes.

2. A sheet feeding device having, in combination, means for supporting a pile of 45 sheets, friction shoes adjustable relative to the pile of sheets on said support, means for moving said shoes to intermittently engage the upper surface of the topmost sheet adjacent its edge and move it off the pile, and 50 means operating above and below the leading edges of the topmost sheets to prevent displacement of more than one sheet from its position on the pile, said means being operable separately from and not relying upon 55 the precise adjustment of the shoes.

3. A sheet feeding device having, in combination, means for supporting a pile of sheets, friction means offering relatively slight resistance to a sliding movement of a 60 single sheet off the top of said pile but a great resistance to a sliding movement of more than one sheet, and friction shoes moving intermittently into engagement with the topmost sheet adjacent its edge to move 65 said topmost sheet off the pile, said shoes

being adjustable as to the degree of pressure which they exert in engaging said sheets, and said friction means being operable separately and not relying for its proper operation upon the operating adjustment of 70 said shoes to attend to the feeding of the sheets separately.

4. A sheet feeding device having, in combination, a shaft, a friction shoe carried by said shaft, means for oscillating said shoe 75 by oscillation and rotation of said shaft, and means for shifting said shoe into and out of contact with a sheet by displacement of said shaft toward and away from said sheet. 80

5. In a sheet feeding device, in combination, a shaft, means for moving said shaft bodily in a circular orbit of small diameter, and means for imparting oscillation and rotation to said shaft, said means being 85 synchronized to produce a regular cycle of operation.

6. A sheet feeding device having, in combination, a contact shoe, means for rocking said contact shoe back and forth, means for 90 lowering said contact shoe on the forward stroke into contact with a sheet, means for raising said shoe on the rearward stroke, and means for positioning a fanned out pile of sheets where the shoe will engage the 95 leading edges of the same on the forward stroke.

7. A sheet feeding device having, in combination, means for supporting a pile of sheets in staggered relation, means adjacent 100 the leading edge of the topmost sheet adapted to permit only one sheet to slide off said pile, and means for intermittently engaging the upper surface of the topmost sheet for sliding said sheet off the pile, said second means being operable separately and not relying upon the manner of operation or adjustment of said third means. 105

8. A sheet feeding device having, in combination, an inclined support for carrying a 110 fanned out pile of sheets, rubber friction elements underlying the edges of the uppermost sheets, a movable element cooperating with one of said friction elements and spaced to allow only a single sheet to slide across 115 its cooperating friction element, and friction shoes adapted to move intermittently over certain other of said underlying friction elements, engaging the upper surface of the topmost sheet and sliding it off the pile. 120

9. A sheet feeding device having, in combination, an inclined support carrying a fanned out pile of sheets, elements underlying the edges of the uppermost sheets and having a greater coefficient of friction with 125 said sheets than the coefficient between two sheets, and shoes also having a greater friction with the sheets than the friction between the sheets and gauging means cooperating with said shoes and underlying elements to 130

prevent the passage of more than one sheet past the same, and means for intermittently moving said shoes over said underlying elements to feed the single sheet past said means.

10. A sheet feeding device having, in combination, an inclined support carrying a fanned out pile of sheets, stationary elements underlying the edges of the uppermost sheets, movable elements, means for moving said movable elements past said stationary elements with a clearance sufficient to accommodate one sheet only, and separate means to prevent the passage into said clearance of more than one sheet.

11. A sheet feeding device having, in combination, an inclined support carrying a fanned out pile of sheets, stationary elements underlying the edges of the uppermost sheets, gauging means to cooperate with said stationary elements, movable elements, and means for moving said movable elements past said stationary elements with a clearance sufficient to accommodate one sheet only, said stationary and moving elements having a greater coefficient of friction with the sheets than the coefficient of friction between two sheets.

12. A sheet feeding device having, in combination, an inclined support carrying a fanned out pile of sheets, stationary elements underlying the edges of the uppermost sheets, movable elements, means for moving said movable elements past said stationary elements with a clearance sufficient to accommodate one sheet only, means for positioning said sheets with the edge of more than one sheet within the active area between said stationary and moving elements, and means cooperating with said movable elements to permit the entry therebeneath of only a single sheet.

13. A sheet feeding device having, in combination, an inclined support carrying a fanned out pile of sheets, stationary elements underlying the edges of the uppermost sheets, movable elements, means for moving said movable elements past said stationary elements with a clearance sufficient to accommodate one sheet only, means for positioning said sheets with the edge of more than one sheet within the active area between said stationary and moving elements, and gauging means operating in said area, said stationary and moving elements having a greater coefficient of friction with the sheets than the coefficient of friction between two sheets.

14. A sheet feeding device having, in combination, an inclined support carrying a fanned out pile of sheets, a movable gauging element and a movable friction feeding element operating on the edges of said sheets at the top of the pile and engaging the topmost sheet where it overlies

the edge of the sheet below it with a relatively heavy friction, the clearance between said support and said gauging element being such that only a single sheet may lie between them with a relatively light frictional engagement.

15. A sheet feeding device having, in combination, an inclined support carrying a fanned out pile of sheets, a movable friction gauging element and a movable friction feeding element operating on the edges of said sheets at the top of the pile and engaging the topmost sheet where it overlies the edge of the sheet below it with a relatively heavy friction, the clearance between said support and said friction elements being such that a single sheet may lie between them with a relatively light frictional engagement, said friction elements having a greater coefficient of friction with the sheets than the coefficient of friction between sheets.

16. A sheet feeding device having, in combination, an inclined support carrying a fanned out pile of sheets, friction feeding means including a movable friction gauging element and a movable friction feeding element operating on the edges of said sheets at the top of the pile and engaging the topmost sheet where it overlies the edge of the sheet below it with a relatively heavy friction, the clearance between said friction elements being such that a single sheet may lie between them with a relatively light frictional engagement, said sheets tending to slide by gravity due to the inclination of the support, said gauging means being adapted to check the sliding action with a plurality of sheets in position to be engaged by said friction feeding element.

17. A sheet feeding device having, in combination, an inclined support carrying a fanned out pile of sheets, said sheets tending to slide by reason of the inclination of said support, means for checking the sliding action of the uppermost sheets at a definite point, and means for intermittently sliding the topmost sheet off the pile.

18. A paper feeding device having, in combination, means intermittently engaging the topmost sheet of a pile of sheets to move it off the pile, and a thickness gauge comprising frictional elements engaging the leading edges of a plurality of sheets next the top of the pile and adjustable to positively prevent the feeding of more than one sheet at a time.

19. A paper feeding device having, in combination, a support for a fanned out pile of sheets comprising an inclined supporting element and friction means forming the portion of the supporting element engaging the leading edges of the topmost sheets of the pile, movable means intermittently engaging the leading edge of the top-

most sheet to remove it off the sheets, and a thickness gauge operating to prevent withdrawal of more than one sheet at a time and also as a stop for the downward movement of the entire pile of sheets.

20. A paper feeding device having, in combination, means intermittently engaging the topmost sheet of a pile of sheets to move it off the pile, and a thickness gauge comprising frictional elements engaging the leading edges of a plurality of sheets next the top of the pile.

21. A paper feeding device having, in combination, a support for a fanned out pile of sheets comprising an inclined supporting element and friction means forming the portion of the supporting element engaging the underside of the leading edges of the topmost sheets of the pile, movable means intermittently engaging the leading edge of the topmost sheet to move it off the sheets, and a member movable in the feeding stroke with said movable means as a sheet is fed therebeneath adapted to prevent more than one sheet from being fed.

22. A paper feeding device having, in combination, an inclined support, the front portion of said support having a relatively high coefficient of friction, a rotatable friction gauging element positioned adjacent the front portion of the support and spaced therefrom to permit withdrawal of a single sheet with very slight friction but to impose great frictional resistance to movement of more than one sheet at a time, movable frictional means operating through a predetermined path to engage the leading edges of the topmost sheet of paper, and means for adjusting the leading portion of the support toward and away from the path of said movable friction means.

23. A paper feeding device having, in combination, an inclined support, the front portion of said support having a relatively high coefficient of friction, a stationary friction roller positioned adjacent the front

portion of the support and spaced therefrom to permit withdrawal of a single sheet with very slight friction but to impose great frictional resistance to movement of more than one sheet at a time, movable frictional means operating through a predetermined path to intermittently engage the leading edges of the topmost sheet of paper, and means for adjusting the leading portion of the support outward from the path of said movable friction means.

24. In a device of the character described, the combination of a shaft carrying operating elements, means for driving said shaft, an eccentric bearing for said shaft, and means for driving said bearing.

25. In a device of the character described, the combination of a rocker shaft, rocking operating elements mounted thereon, and means for moving the axis of said shaft in an orbit whereby said elements on one stroke swing out farther than on another stroke.

26. In a device of the character described, the combination of an operating shaft, an operated shaft, eccentric bearings for said operated shaft, a driving connection between said bearings and said operating shaft whereby said bearings rotate continuously, a crank on said operating shaft, a rocker member on said operated shaft, and means connecting said member and said crank whereby said member is oscillated.

27. In a device of the character described, the combination of an operated shaft having its ends on eccentric members whereby the axis of the same is shiftable, rocker members on said shaft, a continuously rotated operating shaft and a driving connection between said shafts whereby to communicate rotary movement to said eccentric members and rocking movement to said rocker members.

In testimony whereof, I have hereunto set my hand.

ALBERT OLGAY.