

Nov. 21, 1944.

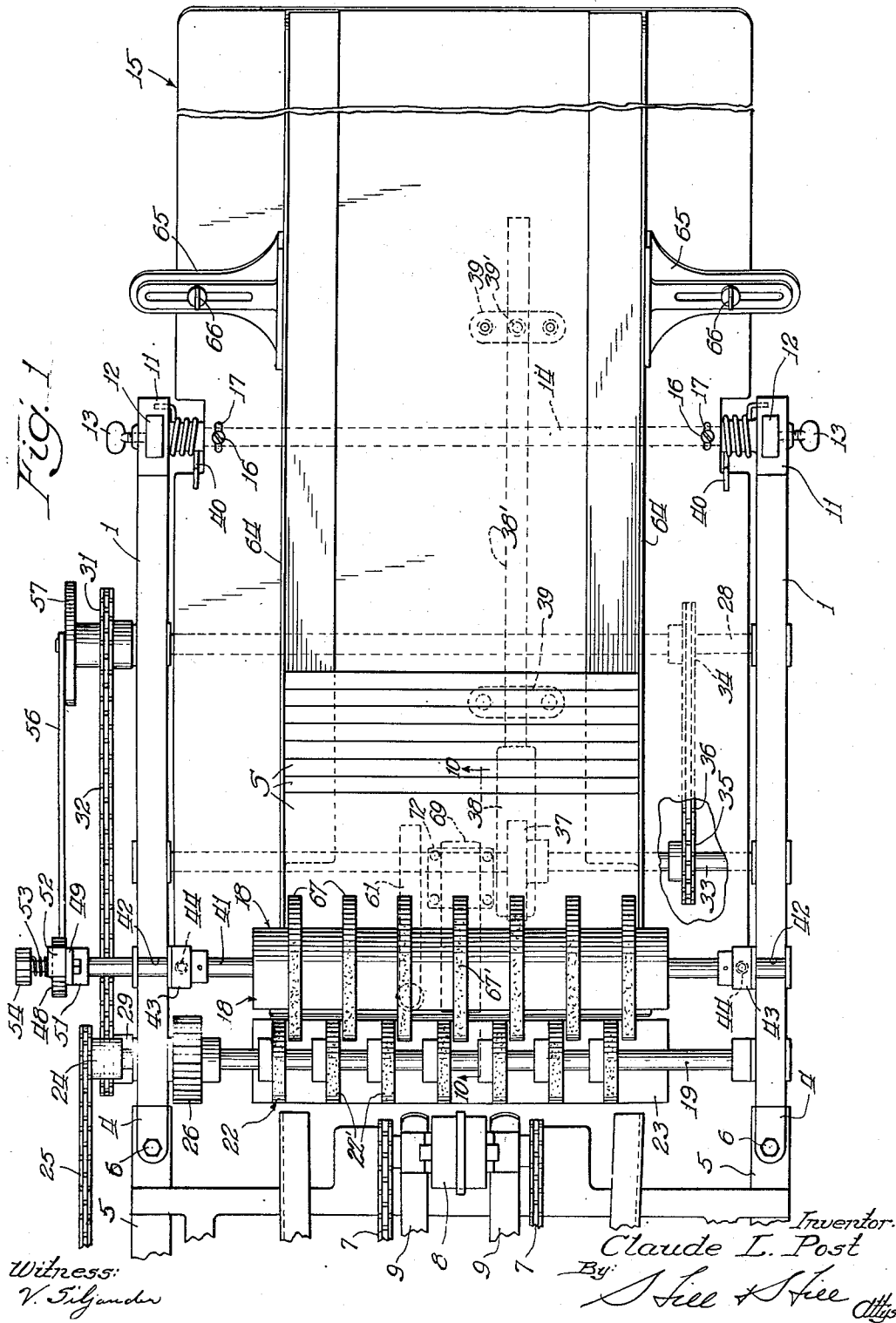
C. L. POST

2,363,357

SHEET FEED

Filed Feb. 10, 1941

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Nov. 21, 1944.

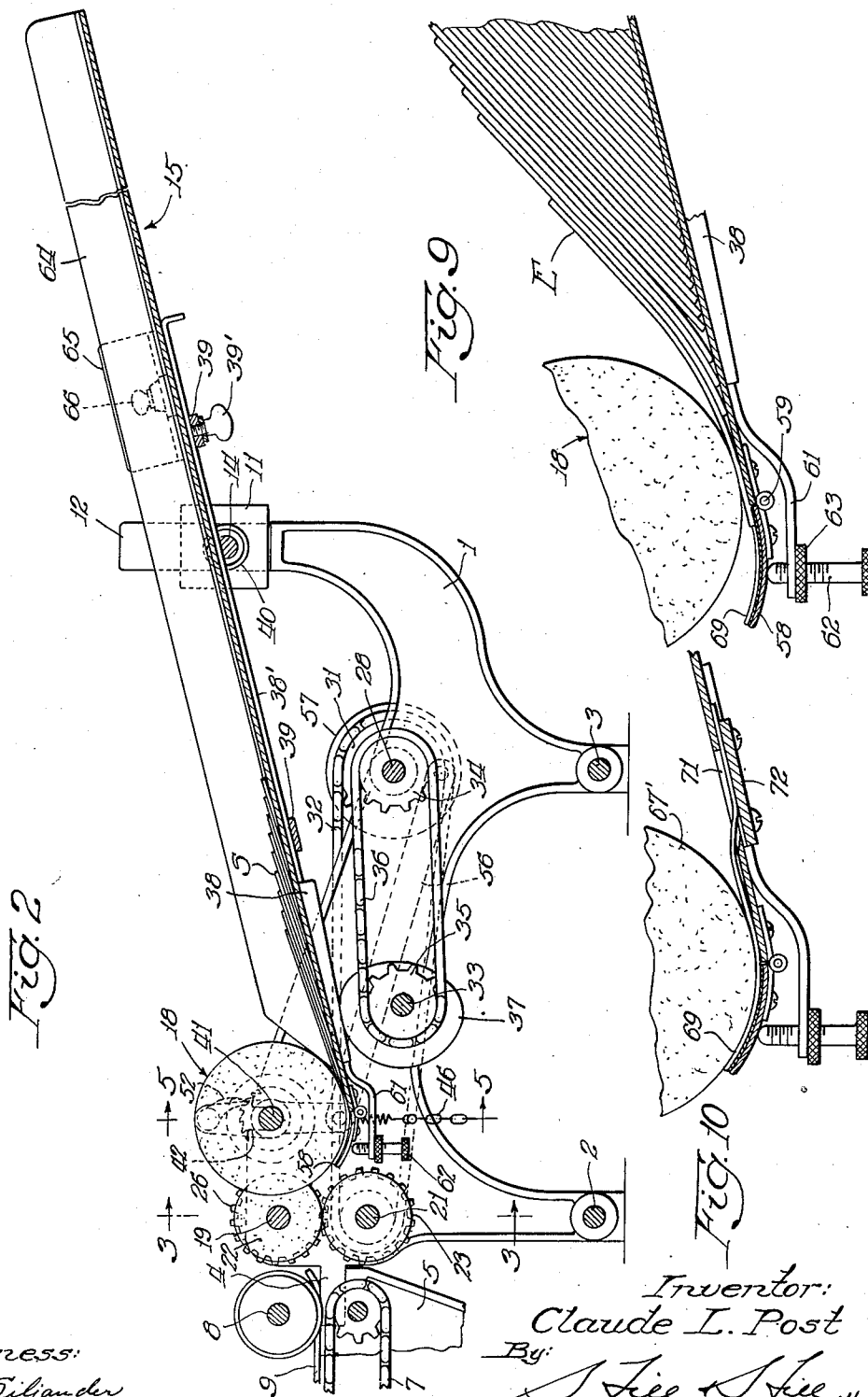
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SHEET FEED

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4 Sheets-Sheet 2



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SHEET FEED

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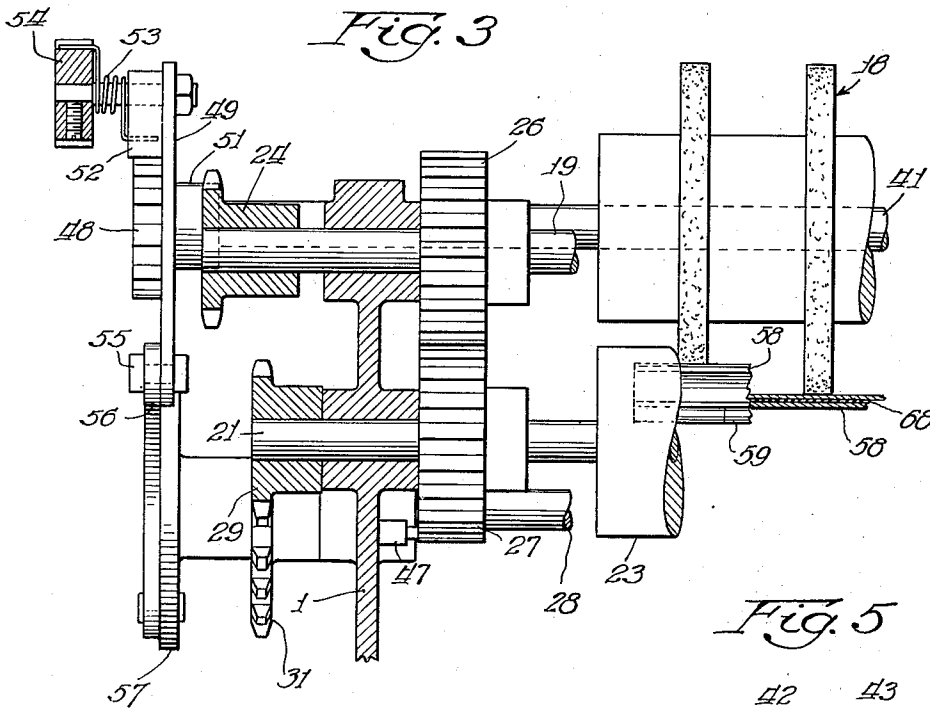
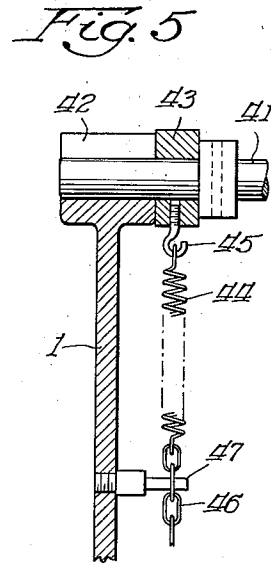
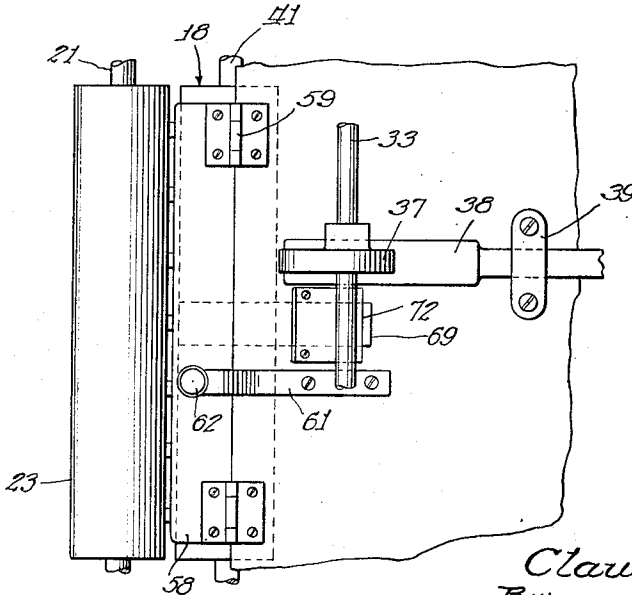


Fig. 4



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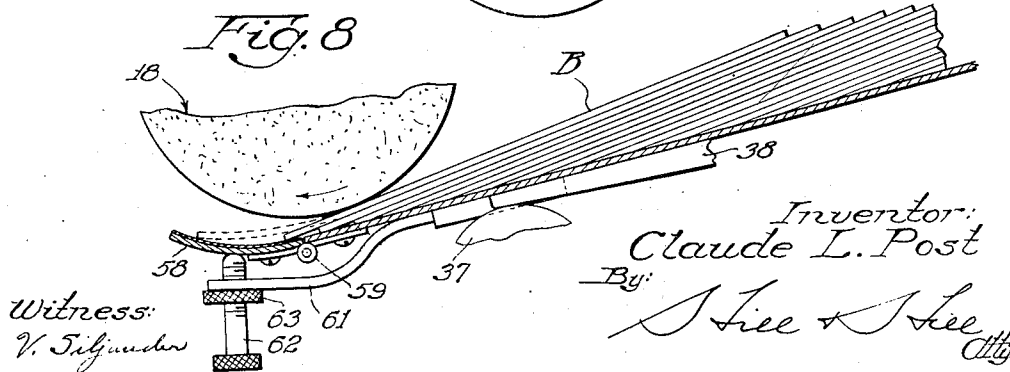
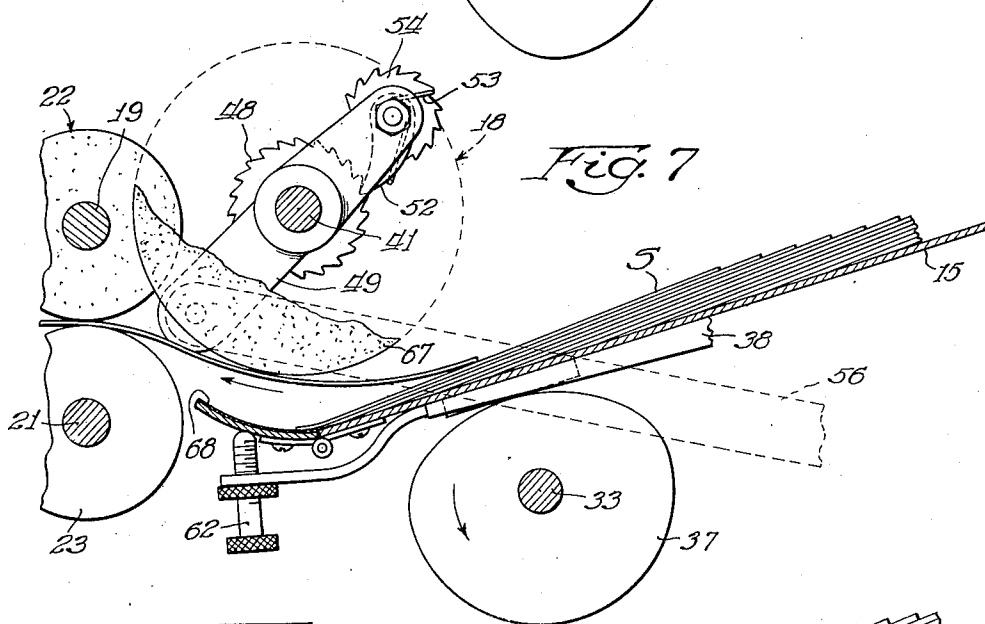
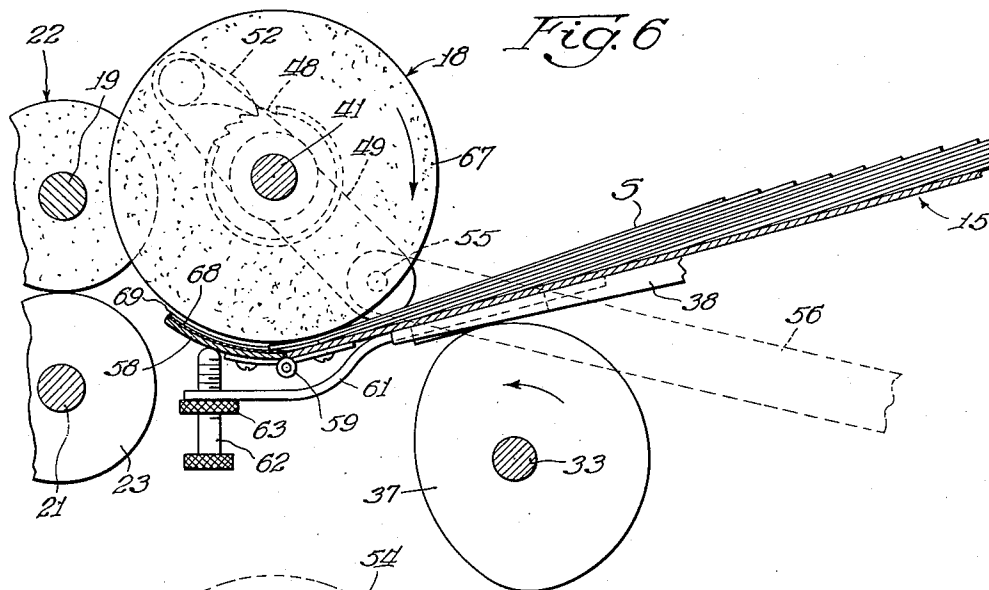
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,363,357

SHEET FEED

Claude L. Post, Chicago, Ill.; Anah K. Post administratrix of said Claude L. Post, deceased

Application February 10, 1941, Serial No. 378,201

12 Claims. (Cl. 271—39)

The invention relates generally to sheet feeding mechanisms and more particularly to a feeding mechanism for use with printing presses or the like of the type described in my prior Patents Number 1,629,118, dated May 17, 1927, and Number 1,759,536, dated May 13, 1930.

The invention has among its objects the production of a sheet feeding mechanism which is relatively simple in construction, durable, and very efficient in operation.

Another object of the invention is the production of such a mechanism which will automatically feed single sheets from the stack, and which may be readily adjusted for sheets of various sizes and thicknesses.

A further object of the invention is the production of such a mechanism in which a portion of the feed table is reciprocated in synchronism with the advancing roll to insure a steady and constant feeding action.

A further object of the invention is the production of such a mechanism in which the feeding roll is placed under tension with respect to the stock, and in which the roll is free to raise upwardly when this action is desirable, as for example, when the stock becomes bunched adjacent the roll.

A further object of the invention is the production of such a mechanism embodying novel means for adjusting the end of the feed table relative the feed roll to provide a fine adjustment thereof.

Many other objects and advantages of the construction herein shown and described will be obvious to those skilled in the art from the disclosure herein given.

To this end my invention consists in the novel construction, arrangement and combination of parts herein shown and described, and more particularly pointed out in the claims.

In the drawings, wherein like reference characters indicate like or corresponding parts:

Fig. 1 is a plan elevational view of a machine embodying the present invention;

Fig. 2 is a side elevational view in section of the machine illustrated in Fig. 1;

Fig. 3 is a sectional view of a portion of the machine taken approximately on the line 3—3 of Fig. 2, and also showing a portion of the ratchet mechanism in section;

Fig. 4 is a plan view of the underside of the feed table and associated parts;

Fig. 5 is a sectional view through the frame member taken approximately on the line 5—5 of Fig. 2;

Fig. 6 is an elevational view in section of a portion of the feeding table and the main feed roll;

Fig. 7 is a view similar to Fig. 6 illustrating a different stage of operation of the mechanism;

Fig. 8 is a view similar to Fig. 6 illustrating adjustment of the machine for heavier stock;

Fig. 9 is a similar view illustrating the application of the invention to the feeding of envelopes; and

Fig. 10 is a sectional view approximately on the line 10—10 of Fig. 1.

The embodiment illustrated in the drawings comprises a pair of spaced frame members 1 connected by rods 2 and 3 to provide a unitary structure. The frame members 1 are provided with lugs or ears 4, which are secured to the frame or bed 5 of the printing press or other device used in conjunction therewith by means of bolts 6, the numeral 7 indicating the feed chains of the press, 8 representing one of the guide rolls and 9 the guide bars. Slidably carried by each frame member 1 are blocks 11 which are locked in position on the vertically extending portions 12 of the frame members by thumb screws 13. Having its ends journaled in the respective blocks 11 is a shaft 14, to which is secured the feed table designated generally by the numeral 15. This is accomplished by screws 16 which pass through slots 17 in the table and are threaded into the shaft 14. By loosening the screws 16 the table may be longitudinally moved relative the shaft within the limits of the slot 17.

Positioned adjacent the forward end of the table is an initial or main feed roll 18 mounted on a shaft 41 journaled in the frame members 1. Also journaled in the frame members 1 are shafts 19 and 21 carrying smaller feed rolls 22 and 23, respectively. Carried by the shaft 19 is a sprocket 24 which is connected by a chain 25 to a driving sprocket actuated by the press mechanism. Pinions 26 and 27 carried by the shafts 19 and 21, respectively, transmit power from the sprocket 24 and shaft 19 to the shaft 21. Also journaled in the frame members 1 is a shaft 28 operatively connected to the shaft 21 by sprockets 29 and 31 on the respective shafts 21 and 28 and connecting chain 32. Operatively connected to the shaft 28 is a cam shaft 33 which is also journaled in the frame, the shafts 28 and 33 being connected through sprockets 34 and 35 and chain 36. Rigidly carried by the shaft 33 and rotatable therewith is a cam member 37 which is engageable with a wedge-shaped member 38 carried by the feed table at the lower side

thereof. Thus the feed table 15 is supported by the shaft 14 and cam 37, and as the shaft 14 is free to rotate in the blocks 11, the forward end of the feed table is free to move up and down as the shaft 33 and cam 37 rotate. The member 38 is slidably carried by the table 15, the extension 38' of the member passing through guides 39 and locked to the table by the screw 39'. By varying the initial position of the member 38, the end of the table 15 may be varied or lowered relative to the roll 18. Springs 40 engageable at one end with the table and at the opposite end with the respective blocks 11, urge and maintain the forward end of the feed table through wedge member 38 in engagement with the cam 37.

The shaft 41 which rigidly carries the feed roll 18 is supported by the frame members 1 in vertical slots or channels 42 formed in the frame members, as illustrated in Figs. 1 and 5, so that the shaft 41 and roll 18 may be placed under tension with respect to the stock and may move upwardly when desired. Sleeve members 43 are connected to the base members 1 by springs 44, the latter being operative to urge the shaft 41 and roll 18 downwardly in the channels 42. The springs 44 are connected at one end to the sleeves 43 by means of eyes 45 secured to the respective sleeve members and at the opposite ends to the frame member by means of chains 46 engageable with pins 47 extending from the respective frame members. The tension of the springs 44 and the roll 18 may be varied by engaging the pins 47 with different links of the respective chains 46.

Secured to the shaft 41 is a ratchet wheel 48 having a lever 49 freely carried on its hub 51, the lever 49 being connected with the ratchet wheel through a pawl 52. A spring 53 maintains the pawl 52 in engagement with the ratchet wheel 48, the opposite end of the spring being secured to an adjustment knob 54, by means of which the tension of the spring 53 may be varied. Pivotaly connected to the opposite end of the lever 49 by means of an offset bolt 55 is a connecting link 56, the opposite end of which is eccentrically connected to a disc 57 rigidly carried by the shaft 28, whereby the feed roll 18 is intermittently rotated.

The forward end of the feed table 15 adjacent the feed roll 18 is provided with a concave plate or flap 58 which is pivotaly carried by the feed table as shown at 59. Carried by the feed table 15 is an arm 61 provided with an adjustment screw 62 threaded into the arm and engageable at its free end with the flap or plate 58. Thus by turning the screw 62 the flap 58 may be raised or lowered with respect to the remainder of the feed table and the roll 18, providing a means of adjustment as will hereinafter be described. A lock nut 63 maintains the adjustment screw 62 in any given position.

The operation of the device is as follows:

The sheets S or other material to be fed are placed on the feed table 15 between adjustable guides 64 which are secured to the table by means of brackets 65 and bolts 66 which pass through slots in the brackets and into the feed table. Thus the device may be adjusted to accommodate stock of various sizes. The main feed roll 18 is provided with a plurality of discs 67 of sponge rubber or the like which are adapted to engage the sheets S. The feed roll 23 is of solid construction, while the feed roll 22 is provided with a plurality of discs 22' similar to those carried by the roll 18 but of smaller size and en-

gageable with the roll 23. The stock at the beginning of the feeding operation will assume the initial position shown in Fig. 6, with the uppermost sheet engaging the discs 67 of the feed roll 18. As the roll 18 is partially rotated, due to the action of the ratchet construction through the link 56 and lever 49, the uppermost sheet will be moved forward between the rolls 22 and 23 which are continuously revolving. As soon as the leading edge of the uppermost sheet passes between the rolls 22 and 23, the cam 37 will be in the position illustrated in Fig. 7, dropping the adjacent end of the table, the springs 40 urging the table into such position, so that the leading edges of the remainder of the sheets fall away from the sheet entering the feeding rolls. The plate or flap 58 is preferably provided with a thin coating 68 of rubber or other suitable material which will frictionally engage the edges of the lower sheets and exert a retarding action upon the same. This retarding action is not sufficient to prevent the rubber discs 67 drawing the uppermost sheet into the feeding rolls 22 and 23, but there is exerted a retarding action on the edges of the lower sheets greater than the frictional or static force exerted between the two paper sheets. Likewise, as the feeding sheet is moving relative to the lowermost sheets before the table drops, the possibility of more than one sheet being drawn into the feeding rolls is eliminated.

If desired, a thin strip 69 of metal or other suitable material may be positioned adjacent the rubber surface 68 of the flap 58, the strip 69 in the present instance being positioned in alignment with the center disc 67' of the feed roll 18. This strip reduces the retarding action of the rubber facing 68 at the disc 67'. The strip 69 passes through an aperture 71 in the feed table 15 and along the underside of the same, a block 72 bolted to the table providing means for clamping the strip to the same. By loosening the screws that hold the plate 72 to the table, the strip 69 may be slid forward or backward to cover or uncover, as the case may be, the rubber facing 68 of the flap 58. Similarly the strip could be shaped to cover a greater portion of the flap 58 should this be desirable.

The device may be readily adjusted to accommodate various thicknesses of stock from thin paper to heavy plyboard. First, the initial position of the front end of the feed table may be adjusted with relation to the feed roll 18 by sliding the wedge 38 backward or forward until the desired adjustment has been reached. The flap 58 may be adjusted by means of the screw 62 to achieve sufficient retarding action. This adjustment is preferably made to give the least amount of retarding action necessary to prevent more than one sheet entering the feed rolls.

Fig. 8 illustrates the use of plyboard B or the like in the machine and approximate adjustment therefor, while Fig. 9 illustrates the approximate adjustment for use in feeding envelopes E or the like.

It will be noted that the reciprocation of the feed table not only assists in preventing more than a single sheet entering the feed rolls 22 and 23, but also agitates the stock on the feed table, insuring feeding of the stock to the roll 18.

The table 15 may be tilted at a greater or lesser angle to meet varied requirements by loosening the thumb screws 13, raising or lowering the blocks 11 to raise or lower the rear portion of the table after which the thumb screws

are tightened to lock the blocks 11 on the portion 12 of the frame.

As previously mentioned, the shaft 41 carrying the roll 18 may shift in a vertical plane, the ends of the shaft being slidable in the slot 42, with the shaft and roll being normally urged downwardly by the springs 44. This construction permits the roll 18 to be placed under less or greater tension with respect to the stock to provide the best results for different types and thicknesses of stock, the tension being increased or decreased by varying the length of the chains 46 and thereby varying the tension of the springs 44. This construction also permits the roll to raise should too many sheets of stock gravitate to a position directly below the roller, and which otherwise would tend to jam the machine and possibly injure some of the stock. With the present construction, however, the roll will raise sufficiently to compensate for the additional thickness of stock and will continue to feed in the usual manner, the retarding surface 68 preventing the additional sheets from being drawn into the machine as previously described.

It will be noted that the concave plate 58 approximates the curvature of the roll in contrast to prior constructions which generally employed a retarding roll or the like of convex shape. Furthermore, the concave plate 58 curves upward from the lower end of the table and catches the ends of the sheets, thereby resisting the tendency for the sheets to slide off the table. It might be mentioned that with the present invention the capacity of the press is greatly increased, the feeding mechanism herein described being capable of feeding sheets or other stock at rates above ten thousand an hour. It will be apparent from the above description that I have provided a feeding device which is exceptionally fast and efficient and which may be readily adjusted to take stock of various sizes, shapes and thicknesses.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence I do not wish to be understood as limiting myself to the exact form, construction, arrangement and combination of parts herein shown and described, or uses mentioned.

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

1. In a feeding mechanism of the kind described, the combination of a feed table, a feed roll operatively related thereto for withdrawing the uppermost sheet of stock from said table, means adjacent said feeding means carried by said table for retarding the lower sheets and preventing the withdrawal thereof, and means for reciprocating said retarding means towards and away from said feed roll in synchronism with the feeding action thereof.

2. In a feeding mechanism of the kind described, the combination of a stock supporting table, a feeding roll operatively related to said table adjacent one end thereof for feeding stock therefrom, means for intermittently rotating said roll and means for moving the end of said table adjacent said roll towards and away from the roll in synchronism with rotation of the latter.

3. In a feeding mechanism of the kind described, the combination of a stock supporting table, a feeding roll operatively related to said table adjacent one end thereof for feeding stock

therefrom, means for varying the initial position of said end of the table relative said roll, means for intermittently rotating said roll and means for moving the end of said table adjacent said roll towards and away from the roll in synchronism with rotation of the latter.

4. In a feeding mechanism of the kind described, the combination of a frame member, a stock supporting table pivotally carried by said frame, a feeding roll operatively related to said table adjacent one end thereof for feeding stock therefrom, means for intermittently rotating said roll, a concave plate pivotally carried by said table in opposed relation to said roll, and means for moving said plate towards and away from said roll in synchronism with rotation of the latter.

5. In a feeding mechanism of the kind described, the combination of a frame member, a stock supporting table pivotally carried by said frame, a feeding roll operatively related to said table adjacent one end thereof for feeding stock therefrom, means for intermittently rotating said roll, a concave plate pivotally carried by said table in opposed relation to said roll, the concave surface of said plate being at least partially covered with retarding material, means for varying the amount of said retarding material engageable with the stock, and means for moving said plate towards and away from said roll in synchronism with rotation of the latter.

6. In a feeding mechanism of the kind described, the combination of a frame member, a stock supporting table pivotally carried by said frame, a feeding roll operatively related to said table adjacent one end thereof for feeding stock therefrom, means for intermittently rotating said roll, a concave plate pivotally carried by said table in opposed relation to said roll, the concave surface of said plate being at least partially covered with retarding material, a member of relatively non-retardable material slidably carried by said table and overlying a portion of said retarding surface to reduce the effect thereof, means for varying the amount of said retarding material and engageable with the stock, and means for moving said plate towards and away from said roll in synchronism with rotation of the latter.

7. In a feeding mechanism of the kind described, the combination of a frame member, a stock supporting table pivotally carried by said frame, a shaft positioned below the forward end of the table, a cam carried by said shaft, an adjustment member carried by said table and engageable with said cam for supporting the adjacent end of the table thereon, a countershaft, driving means operatively connecting said shafts, an initial feeding roll positioned adjacent the forward end of said table, driving means connecting said roll and said countershaft, a pair of opposed feed rolls positioned at the front side of said initial roll, pinions operatively connecting said opposed rolls, driving means connecting one of said last mentioned rolls and said countershaft, and driving means from the press to one of said shafts.

8. In a feeding mechanism of the kind described, the combination of a frame member, an inclined stock supporting table pivotally carried by said frame, a concave plate pivotally carried by said table adjacent the lower end thereof, a shaft positioned below the said end of the table, a cam carried by said shaft, a wedge shaped member slidably carried by said table and en-

gageable with said cam for supporting the adjacent end of the table thereon, resilient means urging said member to engagement with said cam, a countershaft, driving means operatively connecting said shafts, an initial feeding roll positioned adjacent said concave plate, the latter having a sheet retarding surface opposing said roll, means carried by said table for supporting said plate in various positions of adjustment relative thereto, driving means connecting said roll and said countershaft, a pair of opposed feed rolls positioned at the front side of said initial roll, pinions operatively connecting said opposed rolls, ratchet means connecting one of said last mentioned rolls and said countershaft, and driving means from the press to one of said last mentioned rolls.

9. In a feeding mechanism of the kind described, the combination of a vibrating feed table, feeding means adjacent the forward edge of the table operatively related thereto for withdrawing the uppermost sheet of stock from the table, and a concave means secured to and extending upward from the forward edge of the table for engaging the end edges of the sheets and preventing the same from sliding off the table.

10. In a feeding mechanism of the kind described, the combination of a vibrating feed table, feeding means adjacent the forward edge of the table operatively related thereto for withdrawing the uppermost sheet of stock from the table, a concave plate secured to and extending upward from the forward edge of the table for

engaging the end edges of the sheets and preventing them from sliding off the table, and sheet retarding means on said plate.

11. In a feeding mechanism for feeding sheet material, the combination of an inclined vibratory feed table supporting said sheet material, feed means disposed adjacent the forward edge of said table and operatively related thereto for intermittently withdrawing each top sheet of said material from said table, and concave means adjacent said feed means connected with and directly carried by said table to extend upwardly therefrom for engaging the end edges of certain of the other sheets of material to maintain all of said sheets in place upon the table until withdrawn by said feed means.

12. In a feeding mechanism for feeding sheet material, the combination of an inclined vibratory feed table supporting said sheet material, feed means disposed adjacent the forward edge of said table and operatively related thereto for intermittently withdrawing each top sheet of said material from said table, and concave means adjacent said feed means connected with and directly carried by said table to extend upwardly therefrom for engaging the end edges of certain of the other sheets of material to maintain all of said sheets in place upon the table until withdrawn by said feed means, and means for vibrating said table and concave means toward and away from said feed means in synchronism with the feeding action thereof.

CLAUDE L. POST.