June 28, 1927. L. E. LA BOMBARD ET AL 1,634,072

FLAT FEED MECHANISM

Filed July 6, 1925 2 Sheets-Sheet 1

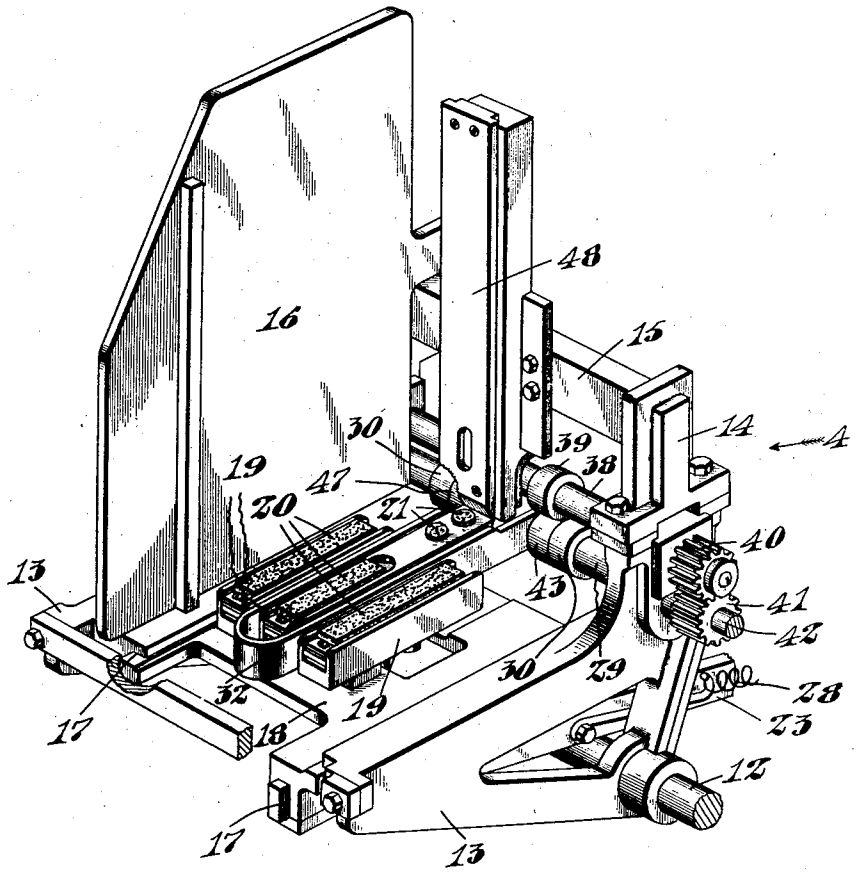

Fig.1.

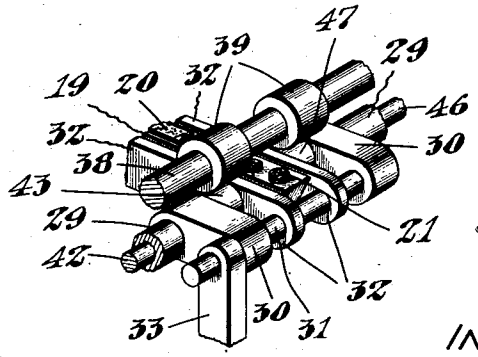

Fig.4.

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FLAT FEED MECHANISM

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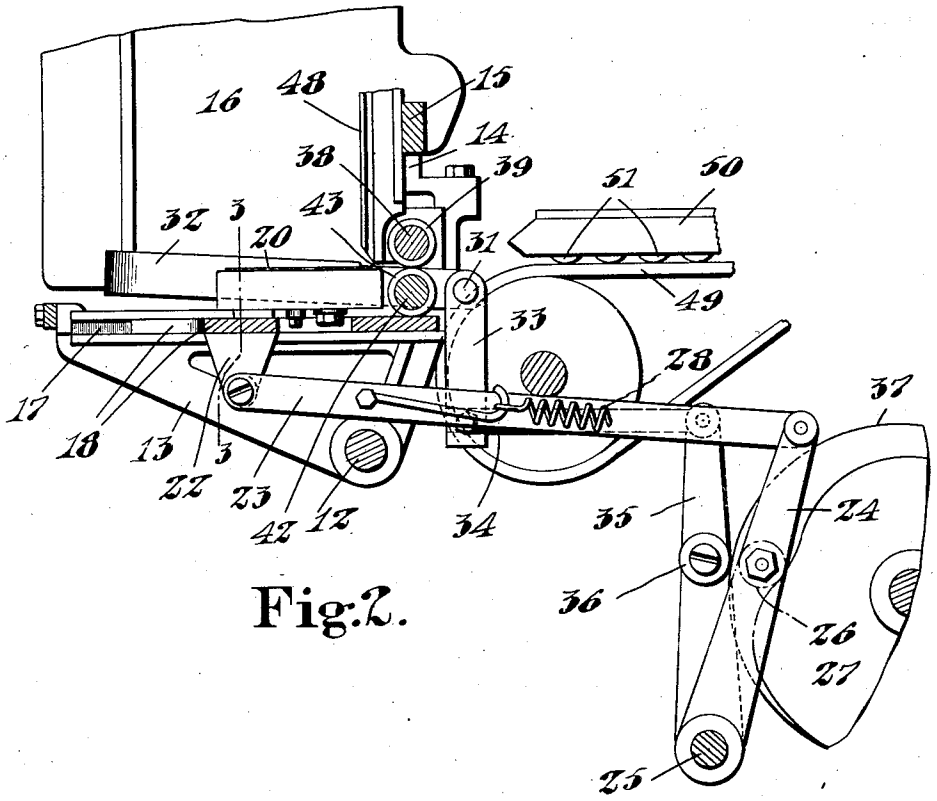

Fig.2.

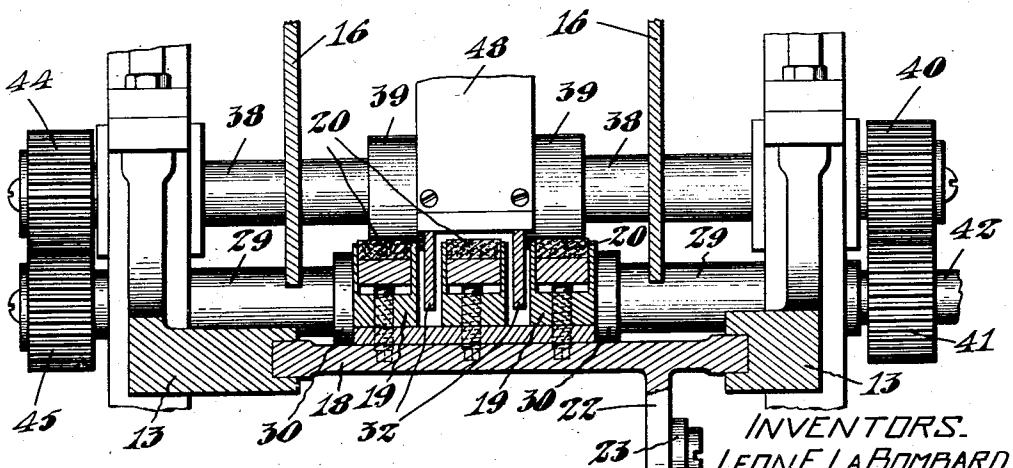

Fig.3.

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UNITED STATES PATENT OFFICE.

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FLAT-FEED MECHANISM.

Application filed July 6, 1925. Serial No. 41,611.

This invention relates to mechanism for feeding flat blanks singly and successively from a stock, usually in a pile, to other mechanism which is to act on the blanks to fold, print, or otherwise treat them.

A very well-known type of blank feeder includes a rotary friction device in the form of one or more wheels having peripheral friction pads. Obviously the frictional contact of such feeder with the blank that is to be fed must be quite limited in area. It is so limited that some kinds of blanks can not always be reliably detached from a pile and fed.

One of the objects of the present invention is to provide a flat friction feeder for acting on the end blank of a stock of blanks, preferably the bottom blank of a pile, which feeder, in operation, moves in feeding direction while in contact with the blank but has no contact with any blank during its return movement, the structure being such as to enable a very large or wide friction surface to be provided for ensuring complete and accurate feed that will prevent the blank from turning askew as it is fed.

Another object is to provide a friction feeder that retains its friction contact with the fed blank until after such blank is taken by the nip of rolls which ensure complete feeding and delivery to other mechanism for folding or otherwise treating the blanks.

With the above mentioned objects in view, and others hereinafter explained, the invention consists in the construction and combination of parts substantially as hereinafter described and claimed.

Of the accompanying drawings which illustrate the invention as embodied in mechanism for feeding blanks from the bottom of a pile:—

Figure 1 is a perspective view of the feeding mechanism and portions of some of the parts of the machine immediately cooperating therewith, one of the side plates for the pile of blanks being omitted.

Figure 2 is a sectional side elevation, with some of the parts in positions differing from the Figure 1 illustration.

Figure 3 represents a transverse section on line 3—3 of Figure 2, on a larger scale.

Figure 4 is a detail perspective view looking in the direction of the arrow 4 adjacent to Figure 1.

Similar reference characters indicate similar parts in all of the views.

One of the tie rods of the machine which is to operate on blanks supplied to it by the illustrated feeder is indicated at 12. Mounted on said tie rod is the frame-work of the feeder, said frame-work including two brackets 13 having upright portions 14 connected by a cross bar 15.

Supported by the bar 15 and laterally adjustable thereon are two vertical plates 16 (compare Figs. 1 and 3) which form the side walls of the hopper for holding a pile of blanks.

The horizontal portions of the brackets 13 are provided with ways 17 for a slide 18 on which are mounted three elongated strips or boxes 19 in each of which is adjustably and renewably mounted a strip 20 of suitable friction material such as rubber. The middle box 19 is longer than the two side ones and carries friction pads 21 at its forward end.

A lug 22 (Figs. 2 and 3) projecting down from the slide 18 is connected by a link 23 with a lever 24 pivoted on a cross rod 25 and having a roll 26 which is acted upon by a cam 27 a portion of which is illustrated in Figure 2. A suitably connected spring 28 draws the feed slide forward (in feeding direction) while the cam 27 causes the slide to move back. This described construction ensures reciprocation of the flat feeder uniformly or continuously in a single plane.

Carried by the brackets 13 are members 29 (Fig. 3) which are tubular to provide bearings for shafts hereinafter described. Projecting from said bearing members 29 are lugs 30 (Fig. 4) in which a rock shaft 31 is mounted. Secured to said rock shaft and extending rearwardly therefrom is a strip of metal 32 bent as illustrated in Figure 1, the parallel portions of said strip being located in the spaces between the feeder boxes 19. For convenience, the bent strip 32 will be referred to as the pile lifter since, in the embodiment of the invention illustrated, it serves to lift the pile during backward movement of the three feeders 19, 20, which, as stated, move both forward and back in a single plane.

To actuate the lifter 32, to cause it to occupy alternately a lower position with its upper edges flush with or slightly below the plane of the feeder friction pads 20 as indicated in Figure 1, or to occupy a raised position as indicated in Figures 2 and 3, the rock shaft 31 from which the lifter extends horizontally is provided with a downwardly extending arm 33 which is connected by a link 34 with a lever 35 pivoted on cross rod 25 and having a roll 36 actuated by a cam 37.

A shaft 38, mounted in the side brackets, carries two rolls 39, 39. At one end said shaft has a pinion 40 (Figs. 1 and 3) meshing with and driven by a pinion 41 carried by a lower shaft 42 which is mounted in one of the bearings 29. The shaft 42 extends inwardly only to a point close to one side of the lifter 32 and at its inner end carries a roll 43 to cooperate with the roll 39 above it.

At the other end of the upper shaft 38 is a pinion 44 meshing with, so as to drive, a pinion 45 carried by a shaft 46 which is mounted in the other bearing 29 in alinement with the shaft 42 and extends in only to a point close to the other side of the lifter 32 and at its inner end carries a roll 47 (Figs. 1 and 4) to cooperate with the roll 39 above it.

A gate strip 48, such as commonly employed in blank feeders, is supported by the cross bar 15 with its lower end slightly spaced from the plane of travel of the feed boxes 19 and their friction pads.

During feeding operation the width of the opening or gateway for the successively fed blanks, between the lower end of the strip 48 and the surface of the feeder, is uniform or constant so that only one blank at a time can pass. Therefore no additional device is necessary to hold back the blank next to the bottom one.

It will now be understood that although there are four rolls (39, 39, upper, and 43, 47, lower) to the nip of which rolls each lower blank is to be fed as presently described, there is nothing in the way of the forward end of the middle feeding box to prevent it from moving forward past or beyond the nip of said rolls. Such possition is indicated by Figure 4. In other words, while the shaft 38 carrying the two upper rolls 39, 39, is continuous from end to end, the two lower shafts 42, 46, carrying the two lower rolls 43, 47, are short and spaced from each other to permit the forward end of the middle feed member with its friction pads 21 to be projected through said space so that the friction feeding action continues until after the fed blank is taken by the nip of the forwarding rolls 39, 39, 43, 47.

When the machine illustrated is to be used, a pile of blanks is placed in the hopper between the side walls 16 and with their front edges against the gate strip 48. Each forward movement of the slide 18 causes the friction surfaces 20, 21, to feed the bottom blank of the pile, and only the bottom blank, under the gate strip and to the forwarding rolls 39, 39, 43, 47, which then deliver said blank to a belt 49, the latter cooperating with small rolls 51 in a housing 50 (Fig. 2) to deliver the blank to whatever mechanism is to act further thereon.

The reciprocating flat friction feeding members 20, 21, are so extensive in area that there is practically no liability of a blank that is engaged thereby being advanced otherwise than squarely to the nip of the forwarding rolls. The timing of the action of the two cams 27, 37, is such that during the forward movement of the flat feeders the lifter 32 is down, and at the completion of said forward movement the lifter rises and holds the pile of blanks slightly raised during the retreat of the feeders, so that there will be no contact between the friction pads and any blank. Then, just before the feeding movement begins again, the lifter is lowered and permits the bottom blank, which is next to be fed, to rest squarely on the friction pads throughout the area thereof.

An important feature of the invention resides in the mechanism which ensures maintenance of a flat frictional feeding contact with each blank that is to be fed, from the moment that the blank is started under the gate 48 which acts as a separator in that it permits the passage of but one blank at a time under the strip 48, until that blank is well on its way to the carrier 49 and is firmly engaged by the forwarding rolls 39, 43, 47. To attain this result a portion of the flat feeder passes directly under the gate or separator 48 and always at the same distance therefrom and preferably passes beyond the nip of the forwarding rolls as hereinbefore described and as illustrated by Figure 4.

Having now described our invention, we claim:—

1. A blank feeder including in its construction a flat feeder mounted to reciprocate uniformly in a single plane, and means for preventing contact of any blank with the feeder during movement of the latter in non-feeding direction.

2. A blank feeder including in its construction a reciprocatory feeding member having a flat friction surface for feeding blanks from the bottom of a pile, said feeding member being mounted to reciprocate in a single plane, and another member capable of supporting the pile independently of the feeding member, and means for intermittently raising and lowering one of said members relatively to the other.

3. The combination with a hopper for a pile of blanks, said hopper having an outlet

for the passage of blanks therefrom, of a flat feeder mounted to reciprocate in a single plane, and means for actuating the latter in feeding direction under and beyond said outlet.

4. Mechanism substantially as specified in claim 3, an intermittently operative lifter being provided to lift the blanks from the feeder during retreat of the latter.

5. The combination with a hopper for a pile of blanks, said hopper having an outlet for the passage of blanks therefrom, of cooperating rolls for forwarding blanks issuing from said outlet, a feeder mounted to reciprocate in a single plane, and means for actuating the latter in feeding direction to a point beyond the nip of the said rolls.

6. A feeder for flat blanks, including in its construction a friction member mounted to reciprocate in a single plane and having an extended area for engaging blanks to remove them singly from the bottom of a pile, and lifters having an extended area for raising the pile from said friction member during retreating movement of the latter.

7. A blank feeder including in its construction a slide mounted to reciprocate in a single plane and having a plurality of flat friction-feeding members providing an extended area for contact with a blank thereon.

8. A blank feeder including in its construction a slide mounted to reciprocate in a single plane and having three flat friction-feeding members the middle one of said members being longer than the others.

9. A blank feeder including in its construction a slide having a plurality of flat friction-feeding members, and metal strips between said members, means being provided for raising and lowering said metal strips.

10. A blank feeder including in its construction a slide having three flat friction-feeding members, a bent metal strip extending into the spaces between said members, and means for oscillating said metal strip in a vertical direction.

11. The combination with a hopper for a pile of blanks, said hopper having an outlet for the passage of blanks therefrom, of a pair of rolls beyond the outlet and having a space between them, upper rolls cooperating with said spaced rolls, and a feeder movable from the bottom of the hopper into the space between the first mentioned pair of rolls, said feeder being mounted to reciprocate in a single plane.

12. The combination with a hopper for a pile of blanks, said hopper having an outlet for the passage of blanks therefrom, of a flat friction feeder at the bottom of the hopper, said feeder being mounted to reciprocate in a single plane, and means for actuating said feeder a distance to maintain feeding contact with each blank fed from the time of starting the feeding movement until the blank is well through the hopper outlet.

In testimony whereof we have affixed our signatures.

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