

Apr. 24, 1923.

1,453,019

W. E. MOLINS

SHEET FEEDER

Filed March 24, 1922

2 Sheets-Sheet 1

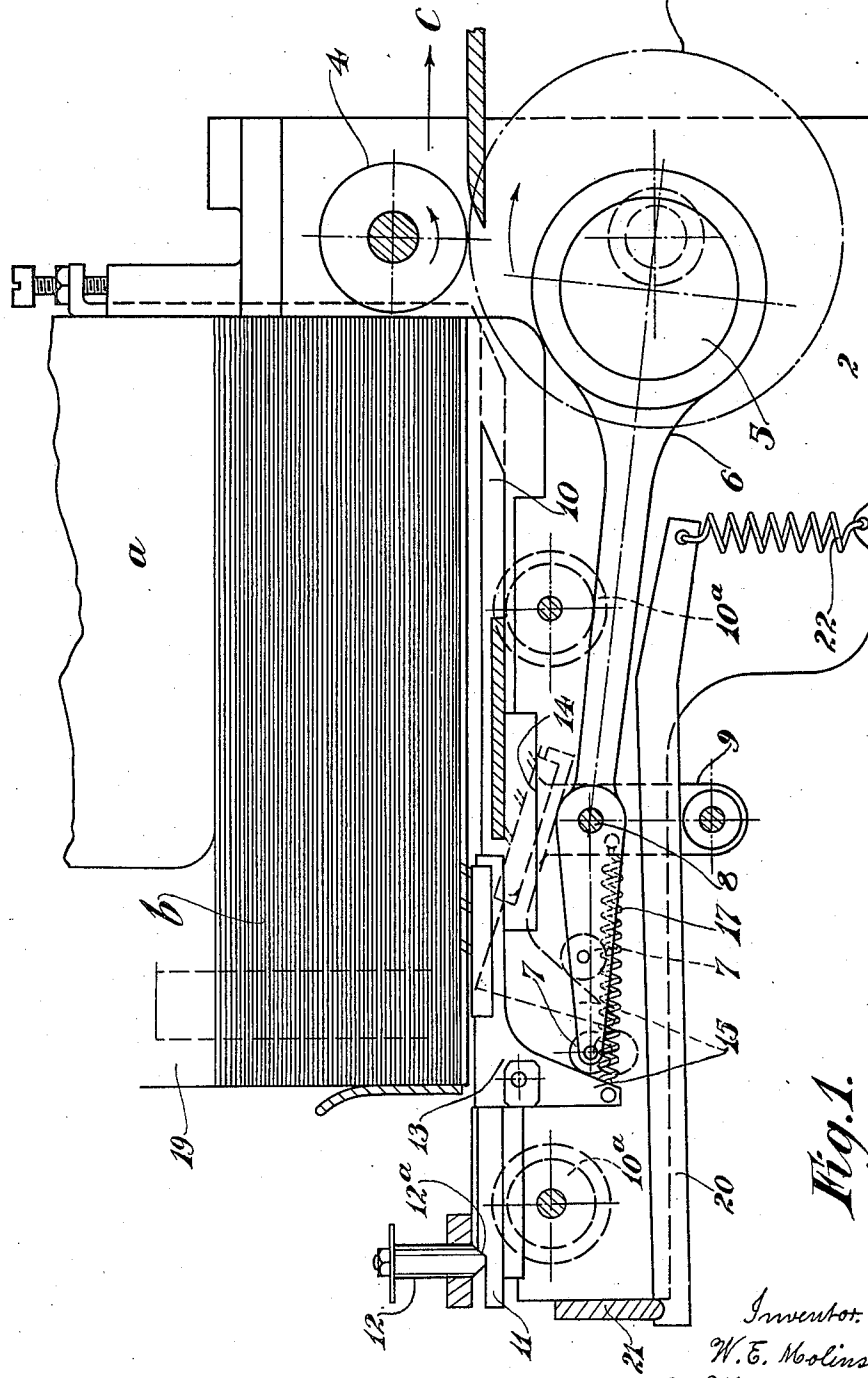


Fig. 1.

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Fig. 4.

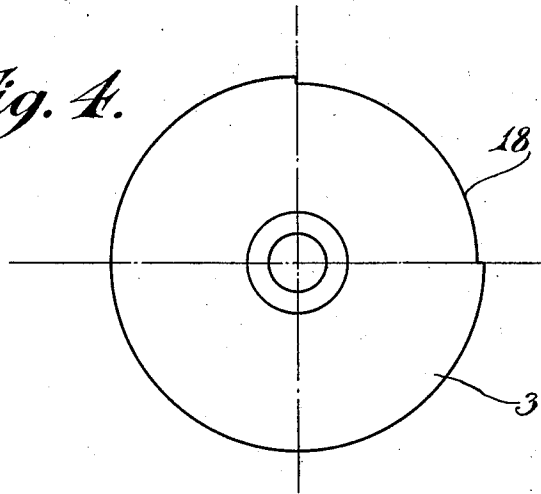


Fig. 2.

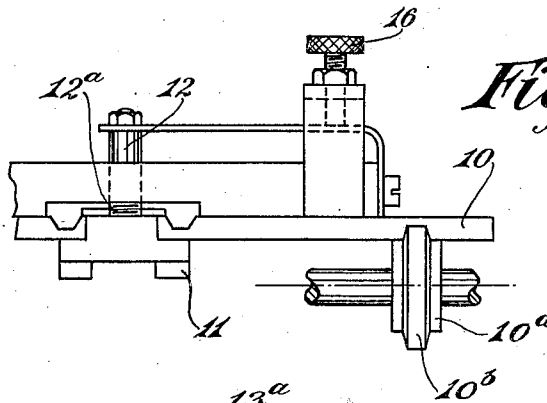
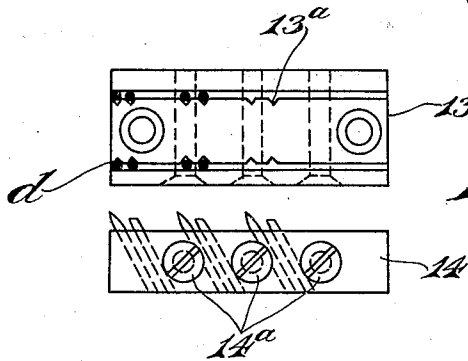


Fig. 3.



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UNITED STATES PATENT OFFICE.

WALTER EVERETT MOLINS, OF LONDON, ENGLAND.

SHEET FEEDER.

Application filed March 24, 1922. Serial No. 546,511.

To all whom it may concern:

Be it known that I, WALTER EVERETT MOLINS, a citizen of the United States of America, residing in London, England, have invented certain new and useful Improvements in Sheet Feeders, of which the following is a specification.

This invention relates to apparatus for feeding sheets of cardboard, millboard, stout paper or like material one by one from the bottom of a pile. Such apparatus is known in connection with box-making and cigarette packing machines for example and usually comprises a reciprocating member having a tooth or the like which, as the member reciprocates, makes contact with the bottom sheet of a pile and feeds said sheet into suitable sheet gripping means.

According to the present invention the reciprocating member is provided with a series of pins which as the member reciprocates on its feeding stroke are caused to move into contact with the bottom sheet, to engage or pierce and feed said sheet to the gripping means or the like. On the completion of the feeding stroke the pins are caused to move out of contact with the sheet. Means are also provided for preventing the pins from piercing more than one sheet at a time and also means for preventing breakage of the pins if, for any reason, the sheet jams during the feeding process.

In a suitable construction for carrying out the invention the apparatus comprises a sliding feed table suitably driven by an eccentric or the like and adapted to be reciprocated beneath a magazine containing a pile of sheets and a holder having a series of pins preferably arranged in parallel rows of pairs mounted on a member having a depending portion and pivoted to the table. The rod of the eccentric or the like driving the table has an extension carrying a roller at its end, said roller being normally in contact with the depending portion of the pin holding member. A spring is connected to the depending portion of the pin holding member and to the bearing of the small end of the eccentric rod or the like.

The arrangement is such that as the eccentric reciprocates the table, the roller rides up and down on the depending portion of the pin holding member and on the feeding stroke of the table forces the pins into engagement with the sheet and at the end of

the feeding stroke depresses said pins causing them to leave the sheet.

The pins are preferably mounted in grooves formed in suitable plates clamped together by screws or the like to form a holder and arranged so that both the holder and the said pins may be readily removed. The pins are arranged at a suitable angle to the path of the table.

In order to prevent the pins from penetrating into more than one sheet at a time, one pin of each pair has its point flattened and is shorter than its adjacent pin, by an amount approximately equal to the thickness of the sheet or card to be fed.

To prevent breakage of the pins in case of jamming of the sheet, the pin holding member may be pivoted to a slide mounted in a groove in the feed table, said slide being normally held fixed in the groove by an adjustable spring pressed pin or catch. If in operation of the device any unusual resistance is met with, the catch yields, allowing the feed table to move independently of the slide.

To enable the invention to be fully understood it will now be described by reference to the accompanying drawing, in which:—

Figure 1 is a side elevation, partly in section, of a feeding apparatus constructed according to the invention,

Figure 2 is an end view of the safety device for the pin holding member,

Figure 3 is a view shewing a plan and side elevation of the pins and the holder therefor,

Figure 4 is a detail of a feed roller preferably employed in carrying out the invention.

As shewn in the drawings, the apparatus comprises a magazine *a* for the blanks *b*, of known construction, having a pair of feed rollers 3 (one only being shewn) which co-operate with pressure rollers 4 to feed a blank in the direction of the arrow *c* after same has been introduced between said rollers by the pin feeding mechanism.

The magazine *a* is mounted over a reciprocating table 10 which forms the bottom of said magazine and is provided with a groove in which a slide 11 is mounted, normally held in position by a spring plunger 12, bearing on a recess formed in the slide having a sloping end surface 12^a, against which the shaped end of the plunger bears.

The pressure of the plunger spring is adjusted by means of the screw 16 (Fig. 2). The table 10 is mounted on pairs of rollers 10^a (one only of each pair being shewn), each roller having a central rib 10^b engaging a groove in the underside of the table to prevent side play (Fig. 2). A bracket 9 is secured to the underside of the table and carries a roller 9^a. This roller bears on the underside of a rail 20 to prevent the table from rising when in motion. One end of the rail bears against a fixed plate 21 attached to the machine, the other end being anchored to the machine frame by a spring 22. The table is adapted to be reciprocated by means of an eccentric 5 driven from the spindle of the feed rollers 3, the eccentric rod 6 being pivoted to the bracket 9 by a pin 8. The free end of the rod 6 carries a small roller 7 which is adapted to operate the feeding device.

The pin feed device 13 is pivoted to one end of the slide 11 and carries pins *d* arranged in a suitable holder 14 and is provided with a depending curved tail portion 15 adapted to make contact with the roller 7 on the rod 6.

A spring 17 is arranged to maintain the holder in a horizontal position when it is not under the action of the roller 7.

The pins are preferably arranged in a series of pairs as shewn in Figure 3 and the holder may comprise a central portion 13 having grooves 13^a for the reception of the pins, cut at the required angle and side clamps 14. The pins are placed in the grooves and are secured by the clamps 14 and screws 14^a.

One pin of each pair has its point ground away so that the difference in height between the pins of each pair is equal to the thickness of material to be fed. By this method, only one blank at a time can be fed, since the second needle acts as a stop to the first.

The operation of the above described apparatus is as follows:—

The table 10 is reciprocated by the action of the eccentric 5, beneath the bottom of the magazine, the roller 7 pressing on the tail piece 15, and since the rod 6 oscillates about the pivot 8, the roller 7 is caused to ride up and down on the tail piece raising and lowering the pivoted pin holder.

The arrangement is such that as the forward or feed stroke of the table is about to begin, the roller 7 permits the pins to move upwardly into engagement with the lowest blank in the magazine and the pins remain in this position until the end of the stroke.

As the table 10 is about to begin its return stroke, the roller 7 rides up the tail piece 15 and depresses the pin holder, removing the pins from the blank, the latter

being now held and carried between the feed and pressure rollers 3, 4.

At the end of the return stroke, further motion of the roller 7 allows the needles to swing up to engage the next blank under the action of the spring 17.

During the operation of the apparatus, it may happen that the feed rollers 3, 4, grip a blank before the pins have quite released it, the result being a torn or scratched blank, or, perhaps, broken pins. To prevent this, the feed rollers may be constructed as shewn in Figure 4. As shewn in this figure, a portion 18 of circumference of the roller 3 is cut away, and the roller is mounted in the apparatus in such a manner that when the blank is fed in between the rollers, the cut away portion is on top and no feeding movement takes place.

This gives the pin rocking gear sufficient time to disengage the pins from the blank.

Should the forward movement of blanks be prevented by any obstacle, the slide 11 forces plunger 12 up the sloping surface 12^a, allowing the pin holder to remain at rest, although the table 10 still continues its motion. This prevents the pins from breaking.

Various modifications are possible without departing from the spirit of the invention. For example, instead of the pin operating mechanism described, the pin holder may be mounted on a reciprocating rod or like part and trip mechanism, cam mechanism or the like may be provided for giving the desired movements to the pin holder.

Having thus described the nature of the said invention and the best means I know of carrying the same into practical effect, I claim:—

1. Apparatus for feeding sheets of material to sheet gripping means one by one from the bottom of a pile comprising in combination, a magazine adapted to receive a pile of sheets, a reciprocating slide beneath said magazine, a pin holder pivoted to said slide, pins in said holder, a depending portion on said holder and an eccentric rod operating the slide and bearing on said depending portion of the holder.

2. Apparatus for feeding sheets of material to sheet gripping means one by one from the bottom of a pile comprising in combination, a magazine adapted to receive a pile of sheets, a reciprocating slide beneath said magazine, a pin holder pivoted to said slide, pins in said holder, a depending portion on said holder, an eccentric rod operating the slide and a roller on the end of said rod bearing on the depending portion of the holder.

3. Apparatus for feeding sheets of material to sheet gripping means one by one from the bottom of a pile comprising in combination, a magazine adapted to re-

ceive a pile of sheets, a reciprocating slide beneath said magazine, a pin holder pivoted to said slide and yieldingly mounted thereon, pins in said holder, a depending portion on said holder and an eccentric rod operating the slide and bearing on the depending portion of the holder.

4. Apparatus for feeding sheets of material to sheet gripping means one by one from the bottom of a pile comprising in combination, a magazine adapted to receive a pile of sheets, a reciprocating slide beneath said magazine, a pin holder pivoted to said slide and yieldingly mounted thereon, a series of pins in said holder arranged in parallel lines in pairs, one pin of each pair being shorter than the other by an amount equal to the thickness of the sheet to be fed and means for operating the holder to raise and depress the pins.

5. Apparatus for feeding sheets of material to sheet gripping means one by one from the bottom of a pile comprising in combination, a magazine adapted to receive a pile of sheets, a reciprocating slide beneath said magazine, a pin holder pivoted to said slide, and yieldingly mounted thereon, a series of pins in said holder arranged in parallel lines in pairs, one pin of each pair being shorter than the other by an amount equal to the thickness of the sheet to be fed a depending portion on said holder, and an eccentric rod operating said slide and bearing on the depending portion of the holder.

6. Apparatus for feeding sheets of material to sheet gripping means one by one from the bottom of a pile comprising in combination, a magazine adapted to receive a pile of sheets, a grooved reciprocating slide beneath said magazine, a pin holder pivotally attached to a member yieldingly held in the groove in said slide, a series of pins in said holder and means for operating the holder to raise and depress the pins.

7. Apparatus for feeding sheets of material to sheet gripping means one by one from the bottom of a pile comprising in combination, a magazine adapted to receive a pile of sheets, a grooved reciprocating slide beneath said magazine, a pin holder pivotally attached to a block yieldingly held in the groove of said slide, a spring pressed pin mounted on the slide and pressing on said block to hold same, a series of pins in said holder, a depending portion on said holder and means for operating said depending portion to raise and depress the pins.

8. Apparatus for feeding sheets of material to sheet gripping means one by one from the bottom of a pile comprising in combination, a magazine adapted to receive a pile of sheets, a grooved reciprocating

slide beneath said magazine, a pin holder pivotally attached to a block yieldingly held in the groove of said slide, a spring pressed pin mounted on the slide and pressing on said block to hold same, a series of pins in said holder, a depending portion on said holder and an eccentric rod operating the slide and bearing on the depending portion of the holder.

9. Apparatus for feeding sheets of material to sheet gripping means one by one from the bottom of a pile comprising in combination, a magazine adapted to receive a pile of sheets, a grooved reciprocating slide beneath said magazine, a pin holder pivotally attached to a block yieldingly held in the groove of said slide, a spring pressed pin mounted on the slide and pressing on said block, a series of pins in said holder arranged in parallel lines in pairs, one pin of each pair being shorter than the other by an amount equal to the thickness of the sheet to be fed and means for operating the holder to raise and depress the pins.

10. Apparatus for feeding sheets of material to sheet gripping means one by one from the bottom of a pile comprising in combination, a magazine adapted to receive a pile of sheets, a grooved reciprocating slide beneath said magazine, a pin holder pivotally attached to a block yieldingly held in the groove of said slide, a spring pressed pin mounted on the slide and pressing on said block, a series of pins in said holder arranged in parallel lines in pairs, one pin of each pair being shorter than the other by an amount equal to the thickness of the sheet to be fed, a depending portion on said holder and an eccentric rod operating the slide and bearing on the depending portion of the holder.

11. Apparatus for feeding sheets of material to sheet gripping means one by one from the bottom of a pile comprising in combination, a magazine adapted to receive a pile of sheets, a grooved reciprocating slide beneath said magazine, a pin holder pivotally attached to a block yieldingly held in the groove of said slide, a spring pressed pin mounted on the slide and pressing on said block, a series of pins in said holder arranged in parallel lines in pairs, one pin of each pair being shorter than the other by an amount equal to the thickness of the sheet to be fed, a depending portion on said holder, an eccentric rod operating the slide and bearing on the depending portion of the holder and feed rollers for gripping each sheet as it is fed forward by the pins, the circumferences of said rollers being partially cut away to allow the sheet to become properly disengaged from the pins before further feed motion takes place.

12. Apparatus for feeding sheets of material to sheet gripping means one by one

from the bottom of a pile comprising in combination, a magazine adapted to receive a pile of sheets, a grooved reciprocating slide beneath said magazine, a pin holder pivotally attached to a block yieldingly held in the groove of said slide, a spring pressed pin mounted on the slide and pressing on said block, a series of pins in said holder arranged in parallel lines in pairs, one pin of each pair being shorter than the other by an amount equal to the thickness of the sheet to be fed, a depending portion on said

holder, means for operating the holder to raise and depress the pins and feed rollers for gripping each sheet as it is fed forward by the pins, the circumferences of said rollers being partially cut away to allow the sheet to become properly disengaged from the pins before further feed motion takes place.

In testimony whereof I have signed my name to this specification.

WALTER EVERETT MOLINS.