March 12, 1946. F. R. BELLUCHE 2,396,240

CONTINUOUS FEEDER FOR CARDBOARD

Filed Oct. 31, 1942 2 Sheets-Sheet 1

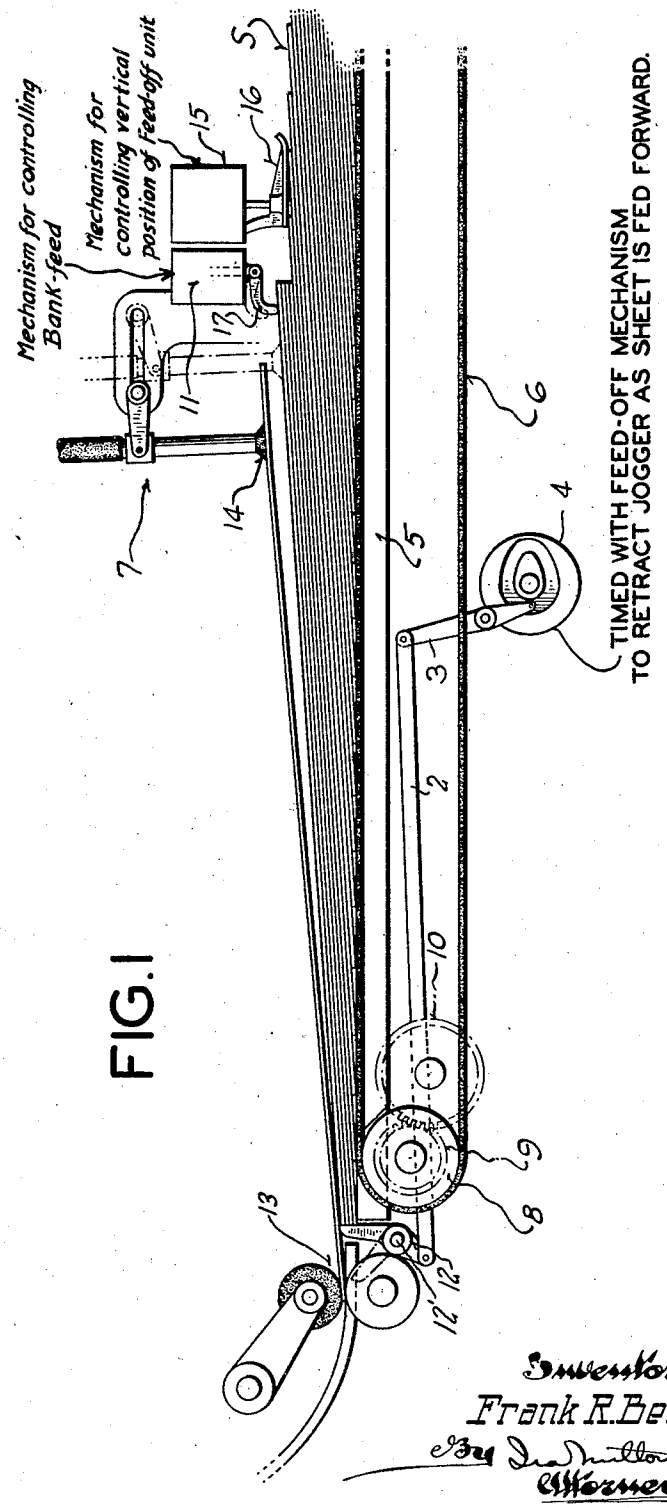


FIG. 1

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Fig. 2.

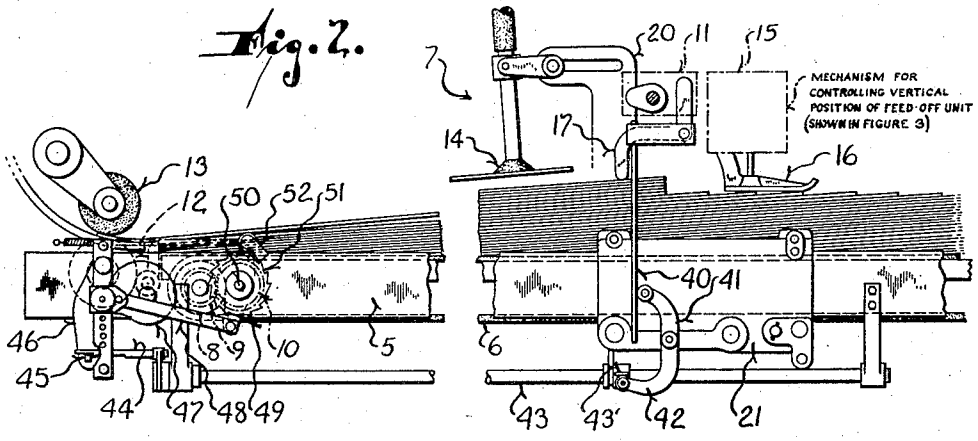
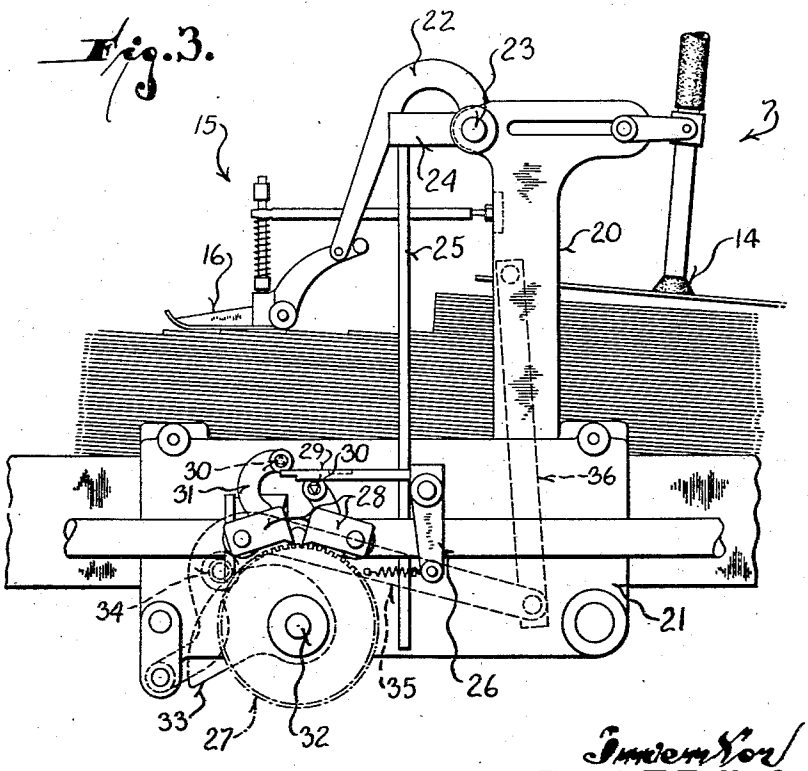


Fig. 3.



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CONTINUOUS FEEDER FOR CARDBOARD

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Application October 31, 1942, Serial No. 464,025

1 Claim. (Cl. 271—43)

This invention relates to sheet feeders used in conjunction with printing machines and the like, and refers particularly to the continuous type of sheet feeder wherein the sheets are fanned out and advanced in a bank to a feed-off position.

While sheet feeders of this type function admirably with ordinary weight paper, difficulties are experienced whenever they are used for heavier stock. This follows from the fact that it is practically impossible to fan out a bank or cardboard or heavy stock so that the offset is uniform between all adjacent sheets, and for the reason that slippage is more apt to occur in a bank of cardboard with the result that even after the feeder is loaded the offset is apt to be irregularly increased.

It is therefore an object of the present invention to provide a sheet feeder of the continuous type so designed and constructed that the disadvantages of irregular offset between sheets is entirely obviated to thus specifically adapt the same for use with cardboard.

More specifically, it is an object of this invention to provide a sheet feeder which in its essential characteristics is of the continuous type, but which incorporates means for jogging the foremost sheets of the bank into a pile so that the rear edges of the sheets always occupy a predetermined position with relation to the feed-off mechanism.

A further object of this invention is to provide a sheet feeder of the character described wherein the bank advancing mechanism is controlled from the height of the pile into which the foremost sheets of the bank are jogged.

With the above and other objects in view, which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claim.

The accompanying drawings illustrate one complete example of the physical embodiment of the invention constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a view in side elevation of the sheet feeder, diagrammatically illustrating this invention;

Figure 2 is a detail elevational view illustrating the manner in which the bank of sheets is advanced in accordance with decrease in the height of the pile of sheets; and

Figure 3 is a detail elevational view illustrating the manner in which the feed-off mechanism is maintained at a proper elevation with respect to the rear portion of the pile of sheets.

Referring now particularly to the accompanying drawings, the numeral 5 designates the bank supporting platform over which bank advancing tapes 6 move to advance a bank of sheets S to a feed-off position at which the foremost or topmost sheet is properly presented to feed-off mechanism 7.

The bank advancing tapes 6, as is customary, are trained over sets of pulleys one of which, 8, is illustrated near the front end of the bank supporting platform. The shaft on which the pulley 8 is mounted is shown provided with a gear 9 meshing with a driving gear 10 which in turn is driven at the dictation of a control mechanism 11, illustrated diagrammatically in Figure 1 but shown in greater detail in Figure 2.

In the paths of the sheets advanced by the tapes is a jogger 12 the function of which is to jog the foremost sheets into a pile as shown. This jogger is mounted on a cross shaft 12' which is oscillated in timed relation with the feed-off mechanism to be swung to its retracted position, indicated in dotted lines, at the time the top sheet starts forwardly into the bite of feed-off rollers 13. After the sheet so fed has been gripped by these rollers, the jogger 12 swings back to its active position, shown in full lines. Any suitable drive mechanism may be employed to actuate the jogger, as for instance a cam 4 driven in timed relation with the feed-off mechanism to make one revolution for each cycle of machine operation. The motion of this cam is translated into oscillation of the rock shaft 12' through a medially pivoted lever 3 and a link 2.

The feed-off mechanism 7 is essentially the same as that shown and described in Patent No. 2,267,784, issued to Frank R. Belluche, December 30, 1941. For a complete disclosure thereof reference may be had to the aforementioned patent, but it will suffice in the instant case to note that the feed-off mechanism comprises a sucker 14 mounted to move with a lateral reciprocating and up and down motion so that its suction cup is caused to engage the top of the sheet, lift it and move forwardly, and then back to pick up the next sheet.

The position of the feed-off mechanism is adjustable vertically and for this purpose is mounted on opposite slides 20 mounted for vertical ad-

justing motion from longitudinally adjustable castings 21 at opposite sides of the machine. The raising and lowering of the slides to effect adjustment of the feed-off mechanism to the proper elevation is controlled by mechanism 15 including a feeler 16 arranged to ride on top of the bank, rearwardly of the pile.

The feeler 16 is mounted on the lower end of an arm 22 having its upper end fixed to a rock shaft 23 carried by the slides 20 and connecting transversely thereacross. Also fixed on the rock shaft 23 at one extremity thereof is a lever arm 24 having a depending rod 25 secured thereto so that raising or lowering of the feeler 16 depending upon the height of the bank rearwardly of the pile of sheets is translated into oscillatory motion of the lever 24 to carry the rod 25 in an arcuate path toward and from engagement with trigger mechanism 26 mounted alongside one of the castings 21.

As described in the aforesaid patent, arcuate motion of the rod 25 to the right as viewed in Figure 3 in consequence to lowering of the height of the bank of sheets upon which the feeler 16 rides acts on the trigger mechanism 26 to effect driving of a ratchet wheel 27 by one or the other of a pair of oscillating pawls 28. To effect this purpose, the trigger mechanism 26 carries one of a pair of latch bars 29 fixed thereon (only one latch bar is shown) into latching engagement with one or the other of a pair of triangularly shaped studs 30 carried by arms 31 normally oscillatable about the axis of the shaft 32 upon which the ratchet wheel is mounted so as to discontinue such oscillatory motion of the arm carrying the stud thus engaged.

These arms normally hold the pawls 28 from engagement with the teeth of the ratchet wheel 27 and permit engagement of the pawls with the ratchet wheel only upon interruption of oscillatory motion of the arms 31 as described in greater detail in the aforementioned patent to Frank R. Belluche.

A cam 33 fixed on the ratchet shaft 32 engages with a follower 34 carried by a lever 35 pivoted on the casting 21 and connects with the slide through a link 36 to effect raising and lowering of the slide depending upon the direction of rotation of the ratchet wheel and cam by the pawl engaged therewith.

The bank feed controlling mechanism 11 as shown includes a feeler 17 which feels for the height of the pile so that whenever the top of the pile drops below a predetermined level the bank is advanced to bring sheets forward and restore the top sheet to its proper elevation.

The manner in which the bank is advanced whenever the top of the pile drops below a predetermined level and the mechanism for effecting this result is essentially the same as that described in the aforementioned patent to Frank R. Belluche, No. 2,267,784. This mechanism includes a depending rod 40 fixed to move with the feeler 17 with its lower end engageable with a medially pivoted lever 41 to swing the lower end 42 of the lever upwardly when the height of the pile is less than desired. Such motion of the lever 41 is translated into rotation of a longitudinally extending shaft 43 through a finger 43' engaged with the end 42 of the lever 41 to effect disengagement of a latch bar 44 carried by the shaft from a stud 45 carried by a lever 46 pivotally supported by the table adjacent to the jogger and feed rolls 13.

Disengagement of the latch 44 from the stud allows the lever 46 to follow a continuously driven cam 47 and the resulting oscillatory motion of the lever is translated through a link 48 to a lever 49 freely pivotally mounted on the shaft 50 carrying the gear 10. This shaft also has a ratchet wheel 51 fixed thereon, and a pawl 52 on the end of the lever 49 opposite the link 48 cooperates with the ratchet wheel during oscillation of the lever 49 by the lever 46 to impart rotation to the shaft 50. Since the shaft 50 is geared to the shaft for the pulley 8, it follows that the tapes are thus driven to carry the sheets forwardly toward the feed-off position.

While the operation of the feeder may be apparent from the drawings and the foregoing description, for convenience it is summed up as follows:

The bank advancing tapes 6 advance the bank of sheets S toward the feed-off position. At the same time the jogger 12 jogs the foremost sheets into a pile. The functioning of the drive for the bank advancing tapes is controlled by the mechanism 11, the feeler 17 of which feels for the height of the pile. Thus, not only is the height of the sheet to be fed off maintained in proper relation to the feed-off mechanism, but in addition the rear edge of the sheet, being controlled by the jogger 12, is in a predetermined position at all times, regardless of irregularities in offset between adjacent sheets of the bank.

The manner in which the feed-off mechanism functions to pick off the topmost sheet in timed relation with the jogger motion 12 is, of course, readily apparent and needs no further explanation.

From the foregoing description, taken in connection with the accompanying drawings it will be readily apparent to those skilled in the art that this invention provides a substantial improvement in sheet feeders of the continuous type in that it utilizes the advantages of a pile and at the same time retains the continuity of feed which characterizes the continuous or bank type feeder, and that it thereby renders such feeders wholly satisfactory for use with all types of stock and particularly cardboard.

What I claim as my invention is:

In a sheet feeder of the continuous type wherein sheets are fed in a bank to a predetermined feed-off position, the combination of: means for advancing a bank of sheets toward the feed-off position; a jogger in the path of the sheets for intermittently engaging the front edges of the foremost sheets of the bank and jogging them into a pile at the feed-off position; mechanism for controlling the operation of the bank advancing means including a feeler adapted to feel for the height of the pile; feed-off mechanism operable upon the rear portion of the topmost sheet of the pile for effecting movement of the sheet forwardly off the pile across the jogger; and control means for maintaining said feed-off mechanism at a proper operating elevation with respect to the pile including a feeler engaging with the top of the bank near the rear of the pile.

FRANK R. BELLUCHE.