April 16, 1935. E. W. BELLUCHE ET AL 1,997,850

SHEET FEEDER

Filed Dec. 21, 1933 2 Sheets-Sheet 1

Fig. 1.

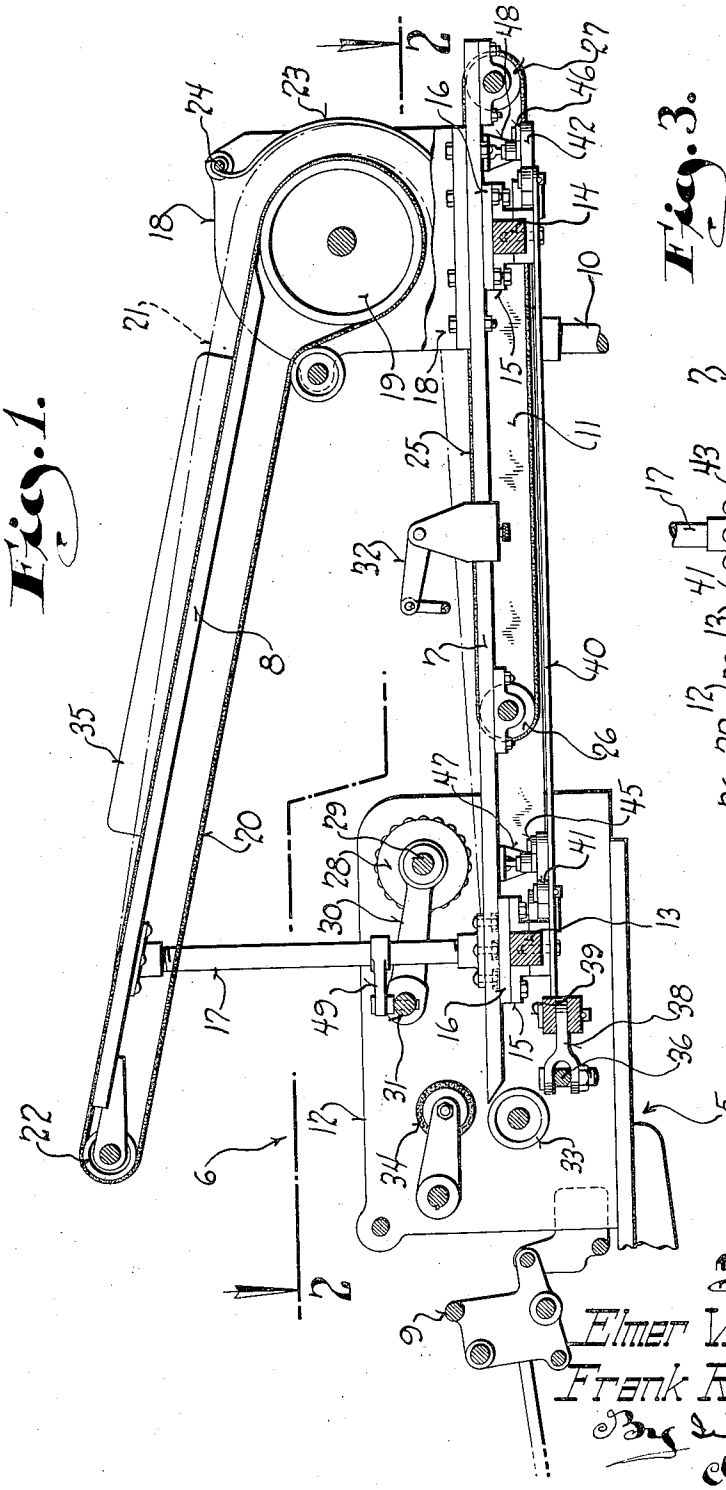
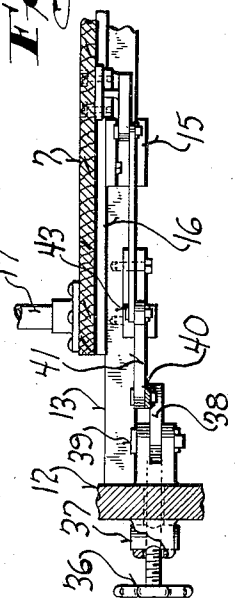


Fig. 3.



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SHEET FEEDER

Filed Dec. 21, 1933 2 Sheets-Sheet 2

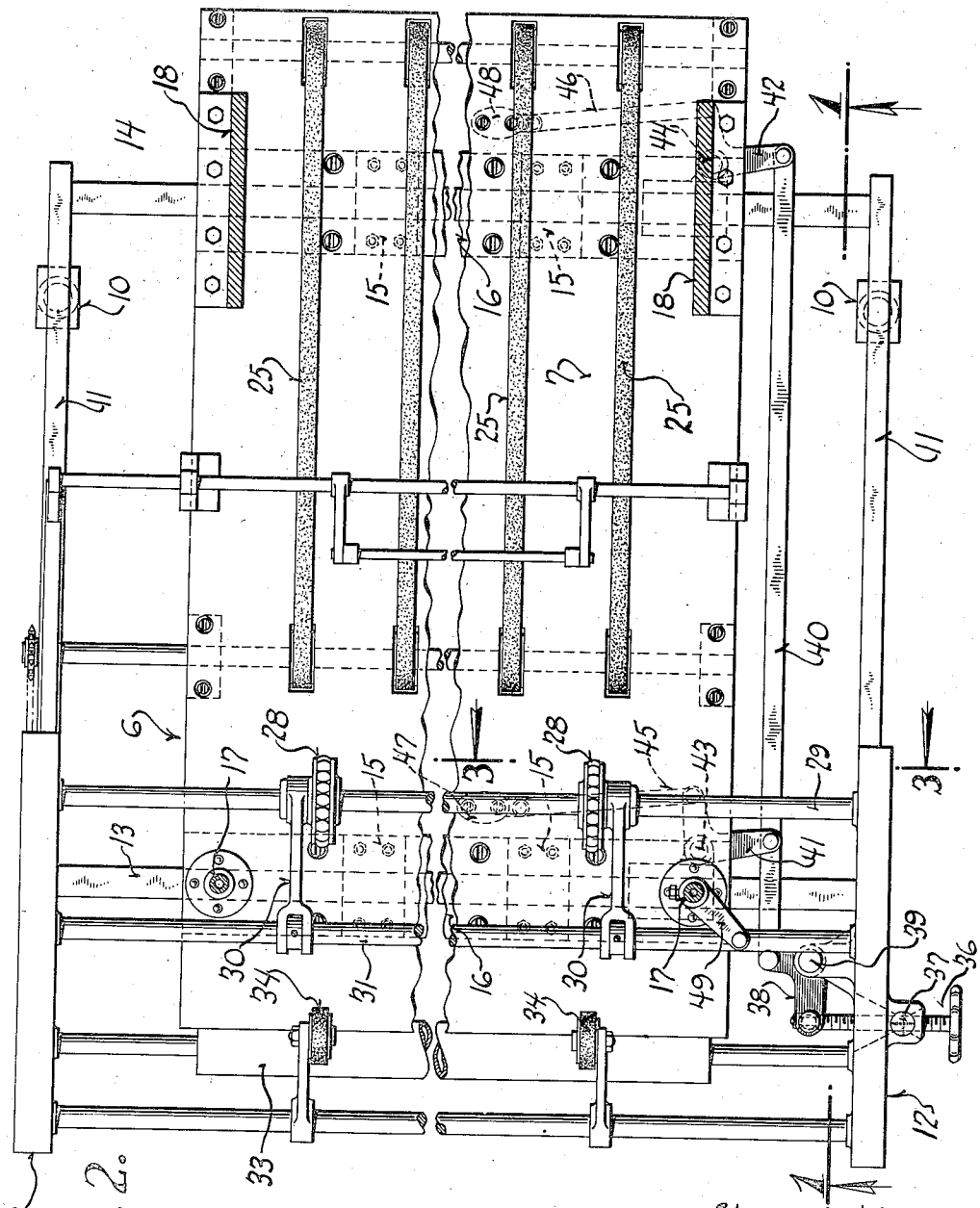

Fig. 2.

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UNITED STATES PATENT OFFICE

1,997,850

SHEET FEEDER

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9 Claims. (Cl. 271—37)

This invention relates to new and useful improvements in sheet feeding devices in which successive sheets are separated from a bank or pile, to be automatically carried forward and presented singly to a printing press or other machine or device to which the sheets may be fed.

The invention relates more particularly to sheet feeders known in the art as continuous feeders in which a bank of sheets is loaded on a continuously advancing conveyer to be carried forwardly to a point of discharge. The feeders of this type consist generally of a lower feed board from which the sheets are discharged, and an upper board on which the bank of sheets is loaded in staggered relationship to be carried around a drum down onto the lower feed board.

The upper board is provided with a side guide against which the bank of sheets is piled and which should be adjusted so as to insure proper sidewise disposition of the sheets upon discharge from the feeder as determined by the side guides of the press or other machine being fed. Accurate adjustment of the side guide on the upper board is sometimes difficult and as a result the bank of sheets is often incorrectly loaded so that when the sheets reach the side guides of the press or other machine, they are either too close or too far from these guides.

Heretofore the only manner in which this inaccuracy could be corrected was by reloading the entire bank of sheets, which obviously entailed considerable time and was, therefore, an expensive and objectionable requirement. With this objection to present continuous pile feeders in mind, this invention has as its primary object, to provide means for adjusting the entire feeder unit sidewise to make it unnecessary to reload the bank of sheets thereon.

Another object of this invention is to provide for sidewise adjustment of the entire feeder unit in such a manner that the desired adjustment may be effected while the machine is in operation and merely by the actuation of a single adjusting screw.

With the above and other objects in view which will appear as the description proceeds, our 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 claims.

In the accompanying drawings, we have illustrated one complete example of the physical embodiment of our invention constructed according to the best modes we have so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a longitudinal section view through a feeder unit constructed in accordance with this invention, said view being taken on the plane of the line 1—1 of Figure 2;

Figure 2 is a horizontal section view taken through Figure 1 on the plane of the line 2—2; and

Figure 3 is a detail section view taken through Figure 2 on the plane of the line 3—3.

Referring now more particularly to the accompanying drawings in which like numerals indicate like parts throughout the several views, the numeral 5 represents the feed board of a press or other machine to which sheets of paper are to be fed. Resting on the feed board 5 is the feeder unit of this invention, indicated generally by the numeral 6. This unit is of the continuous type and comprises a lower feed board 7 and an upper feed board 8, the lower board being arranged to feed the sheets into the delivery mechanism 9 of the feeder unit, which carries the sheets to the press or other machine, and the upper board being arranged to have the sheets loaded thereon in staggered or banked relationship as is customary.

The unit is supported by the feed board 5 and standards 10 which may rest on the floor. Side rails 11 connect the standards 10 with side frames 12, which rest directly on the feed board as shown.

The side frames 12 are connected by a plurality of tie rods and shafts including a square bar 13. A similar bar 14 connects the rear ends of the side rails 11. The lower board 7 is supported on the cross bars 13 and 14 for sidewise sliding movement, being held thereon by brackets 15 fixed to the underside of transverse metal plates 16, which extend transversely across the underside of the lower feed board as shown, the brackets 15 slidably embracing the cross bars 13 and 14.

The upper feed board 8 is supported directly from the lower board by upright standards 17 and drum frames 18 so that any sidewise motion of the lower board carries the upper board with it.

As is customary the drum frames 18 mount a drum 19 over which a plurality of endless belts 20 are trained to provide a conveyer to carry the bank of sheets indicated by the construction line 21 and loaded on the upper board, downwardly toward the rear and around the drum. The endless belts 20 have their forward ends trained over

idler rolls 22. Guards 23 are carried by a cross bar 24 connecting the drum frames 18 to guide the paper around the drum 19 and down onto the lower board, where it is carried forwardly by endless belts 25 trained about front and rear pulleys 26 and 27 respectively.

The forward edge portion of the bank of sheets is disposed beneath a pair of combing wheels 28 slidably splined to a cross shaft 29, which in turn is supported by arms 30 from a longitudinally slidable shaft 31. The ends of the shaft 29 extend into the side frames 12 which provide housings for mechanism (not shown) to drive the combing wheels and raise and lower the same out of and into engagement with the top of the bank of sheets as is customary. As the topmost sheet is conveyed forwardly through the functioning of the combing wheels, the remaining sheets are held against forward movement by a tail clamp indicated generally by the numeral 32. The manner in which the tail clamp is actuated forms no part of this invention.

As the sheets reach the forward edge of the lower feed board, they are gripped between a feed roll 33 and drop rolls 34, which act to carry the sheet forwardly into the delivery mechanism 9.

As hereinbefore noted, it is necessary that the sheets be introduced to the delivery mechanism, or directly to the press or other machine to be fed, if no delivery mechanism is employed, in predetermined sidewise relationship with respect to the side guides of the press or other machine, and as the sidewise disposition of the sheets at the time of their discharge from the feeder is dependent upon the initial position of loading of the bank of sheets, it is necessary that the bank be accurately loaded. However, regardless of the care exercised by the operator loading of the bank is often inaccurate and heretofore necessitated reloading of the entire bank.

To obviate this difficulty, the present invention provides means for effecting sidewise adjustment of the entire feeder unit so that in the event the operator does make an error in loading, it may be corrected merely by the actuation of a single adjusting screw. The provision of this adjusting means, however, does not do away with the side guide 35 on the upper board against which the bank of sheets is loaded, and as is customary, this guide is adjustable sidewise to accommodate sheets of different width so that regardless of the width of the sheet, it may be centered with respect to the press or other machine being fed.

The means to effect the desired sidewise adjustment consists of an adjusting screw or hand wheel 36 threaded in a nut 37 carried by one of the side frames 12 and having its inner end swivelly connected to one arm of a bell crank 38. The bell crank 38 is pivotally mounted as at 39 on the inner side of the side frame 12 and has its other arm connected to a link 40 which extends rearwardly past the cross bar 14.

Pivotally connected to the link 40 are two bell crank levers 41 and 42. The bell crank lever 41 is pivotally mounted as at 43 from the cross bar 13 and the bell crank 42 is pivotally mounted as at 44 from the cross bar 14.

The arms of the bell cranks 41 and 42 which are attached to the link 40 are parallel and of the same length so that longitudinal motion of the link effected through actuation of the adjusting screw transmits identical motion to both of these bell cranks.

The opposite arms of the bell cranks 41 and 42 are connected through links 45 and 46 respectively, to brackets 47 and 48 respectively, secured to the underside of the lower feed board 7, in such a manner that upon motion of the bell cranks produced by adjustment of the hand wheel, the lower board and all the mechanism carried thereby will be slid sidewise on its supporting bars 13 and 14.

It is to be noted that the longitudinally slidable shaft 31 on which the arms 30 supporting the combing wheel shaft are pivoted, is connected through a link 49 to one of the upright standards 17 so that upon sidewise adjustment of the boards, this shaft will be slid longitudinally.

The arms 30 are so connected with the bushings of the combing wheels as to prevent relative axial motion between the combing wheels and the arms and in view of the fact that the arms are non-longitudinally movably attached to the shaft 31, it follows that the longitudinal shifting of the shaft 31 carries the combing wheels with it to maintain their same relative positions with respect to the bank of sheets without necessitating longitudinal shifting of the shaft 29.

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 affords simple but highly efficient means for insuring proper sidewise alignment of the sheets fed by a continuous feeder, with the press or other machine being fed and that it entirely obviates the heretofore objectionable possibility of requiring complete reloading of the pile or bank of sheets.

What we claim as our invention is:

1. In a sheet feeder, superimposed feed boards to support a bank of sheets, mechanism to feed the bank of sheets along the boards and from the upper board to the lower board, mechanism to separate the sheets from the end of the bank on the lower board for conveyance to a machine requiring predetermined alignment of the sheet therewith, and means to shift the feed boards together with the said associated mechanism sidewise to adjust the relative sidewise position of the bank of sheets with respect to the machine being fed and thereby adjust the sidewise alignment of the sheets as they enter the machine.

2. A sheet feeder of the continuous type comprising, upper and lower feed boards to support a bank of sheets, mechanism to advance a bank of sheets from the upper board to the lower board and along the lower board to a point of discharge, sheet separator mechanism associated with the lower board to separate the sheets from the bank for discharge from the feeder to a unit to be fed, sidewise adjustable supports for the feed boards and means to simultaneously move the feed boards sidewise on said supports to adjust the relative sidewise position of the bank and consequently the individual sheets as they arrive at the unit being fed.

3. A sheet feeder of the continuous type comprising a fixed supporting structure, a lower feed board, an upper feed board, mechanism to convey a bank of sheets from the upper board to the lower board and along the lower board to a point of discharge, mechanism to separate and discharge individual sheets from the bank at said point of discharge, means to mount the boards for sidewise adjustment on said fixed supporting structure, and means to simultaneously effect sidewise adjustment of the feed boards and said mechanism associated therewith so as to

determine the relative sidewise position of the sheet upon its discharge from the feeder with respect to the fixed supporting structure.

4. In a sheet feeder of the character described, a lower feed board, an upper feed board held in predetermined relative fixed relation with respect to the lower feed board, mechanism to convey a bank of sheets loaded on the upper feed board down onto the lower feed board, mechanism carried by the lower feed board to advance the sheets therealong, separating mechanism associated with the lower feed board to separate individual sheets from the bank for discharge from the feeder, a sidewise adjustable support for the feed boards, and means to shift the feed boards sidewise to move the entire bank of sheets carried thereby and all mechanism acting thereon and associated with the feed boards sidewise to adjust the relative sidewise position of the sheet upon discharge from the feeder.

5. A sheet feeder of the character described comprising, a feed board to receive a bank of sheets, mechanism to convey the bank of sheets along the board, mechanism to separate and discharge individual sheets from the bank, means to mount said board and the associated mechanism for sidewise adjustment to afford sidewise adjustment of the position of the sheet upon discharge from the board with respect to a unit to which the sheets are fed, and means to adjust said board and associated mechanism comprising, a hand screw, and mechanical linkage connected with the board and operable by the hand screw.

6. A sheet feeder of the character described, comprising a rigid supporting structure including transverse supports, a feed board mounted on said transverse supports for sidewise movement and adapted to receive a bank of sheets, mechanism associated with the board to advance the sheets, mechanism also associated with the board to separate the sheets from the bank for conveyance to a unit to which the sheets are fed, and means to adjust the board and its associated mechanism sidewise on said transverse supports to afford sidewise adjustment of the position of the sheets upon discharge from the board with respect to said unit to which the sheets are fed, said adjusting means comprising a hand screw mounted on part of said rigid supporting structure, and mechanical linkage connected with said hand screw and the feed board and operable upon actuation of the hand screw to slide the board sidewise on said transverse supports.

7. A sheet feeder of the character described comprising a rigid supporting structure including transverse supports, a lower feed board slidable sidewise on said supports, an upper feed board, means to rigidly support the upper feed board from the lower feed board so that both feed boards are movable in unison, mechanism to convey a bank of sheets loaded on the upper feed board down onto the lower feed board, mechanism carried by the lower feed board to advance the sheets therealong, separating mechanism associated with the lower feed board to separate individual sheets from the bank for discharge from the feeder, and means to slide the connected feed boards and the mechanism associated therewith sidewise on said transverse supports to afford sidewise adjustment of the position of the sheets upon discharge from the lower feed board with respect to a machine to which the sheets are fed.

8. In combination with a sheet feeder of the continuous type including upper and lower feed boards and mechanism to convey sheets from the upper feed board to the lower feed board and along the lower board for presentment to a machine being fed, a stationary supporting structure having transverse supports, means to slidably mount the lower feed board on said transverse supports so that the entire continuous feeder is shiftable sidewise with respect to the stationary support to adjust the sidewise disposition of the sheets as they leave the feeder and with respect to a machine being fed, and means to effect such sidewise adjustment of the feeder including a manually operable driving member carried by the stationary support, and mechanical linkage connecting the lower feed board with said manually operable member.

9. In a sheet feeder of the character described, a feed board arranged to support a bank of sheets to be fed therealong for presentment to a machine being fed, an endless tape conveyer mounted on said feed board to advance the bank of sheets, mechanism associated with the feed board to separate the sheets for individual presentment to the machine being fed, a stationary supporting structure having transverse supports, means to slidably mount the feed board on said transverse supports whereby the feed board is slidable sidewise on said stationary supporting structure to adjust the sidewise disposition of the sheets upon presentment to the machine being fed and with respect to said machine, and means to slide the feed board on said transverse supports including a manually operable driving member carried by the stationary support, and a driving connection between said manually operable member and the feed board.

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