Aug. 7, 1945. F. R. BELLUCHE 2,381,430

SHEET DELIVERY MECHANISM

Filed July 2, 1943 2 Sheets-Sheet 1

Fig. 1.

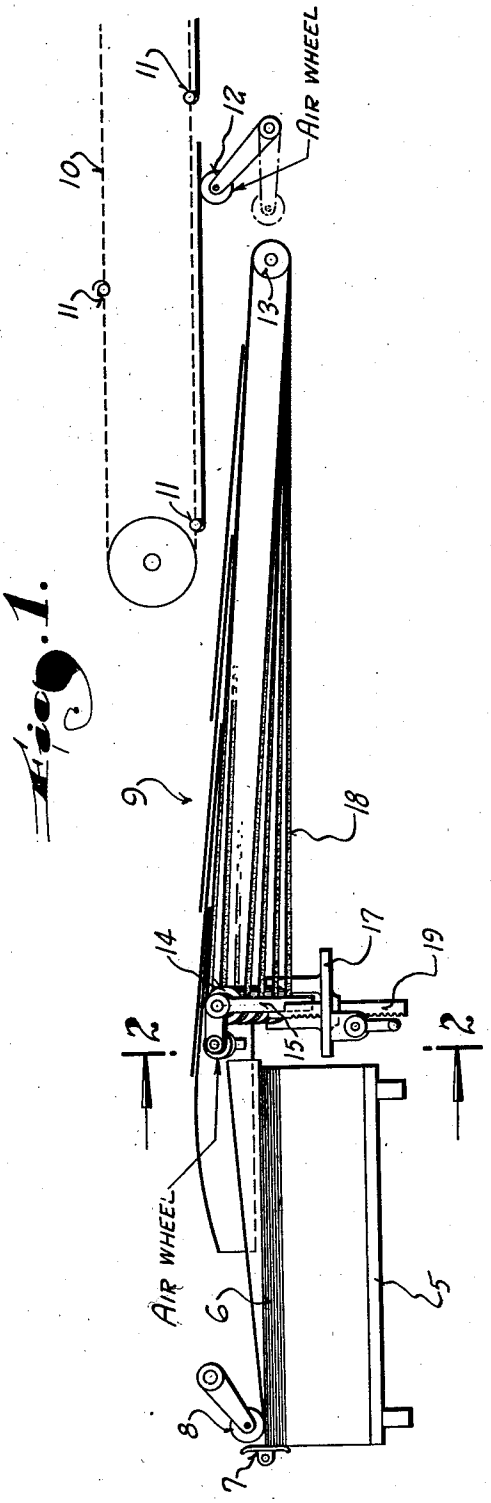
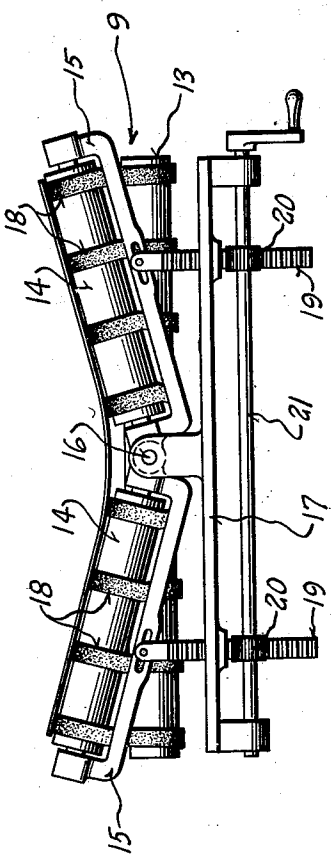


Fig. 2.



Inventor
Frank R. Belluche
By Dunlap Jones
Attorneys

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Fig. 3.

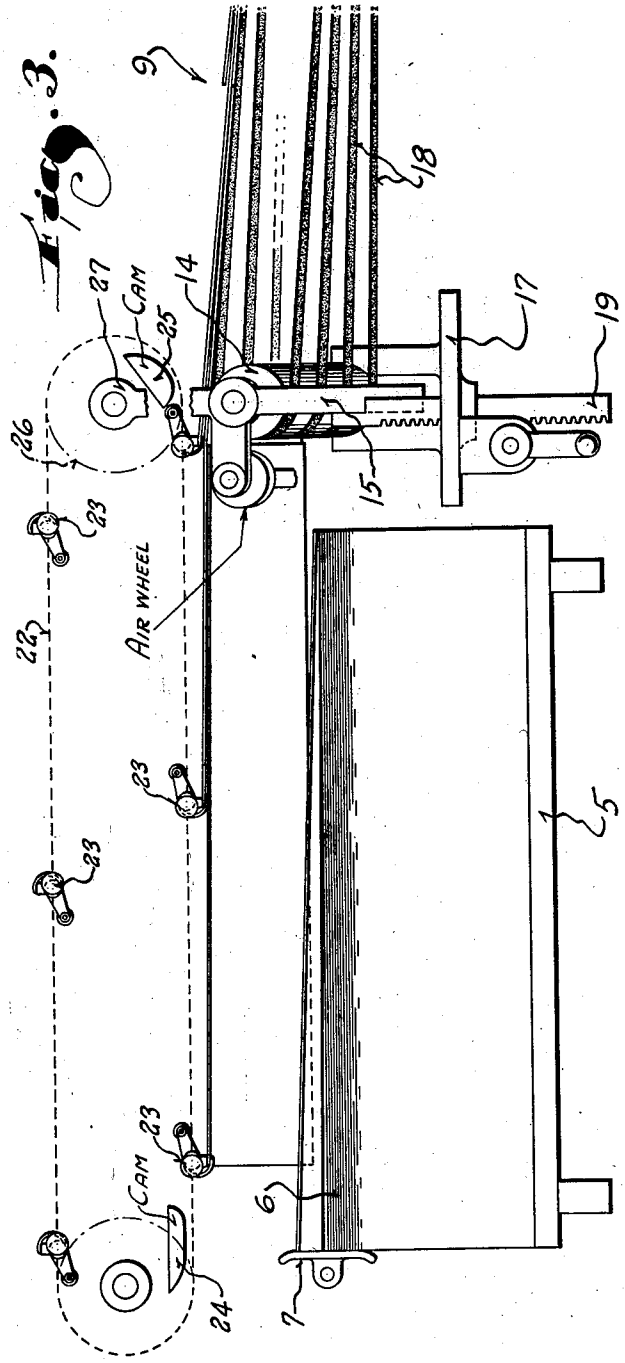
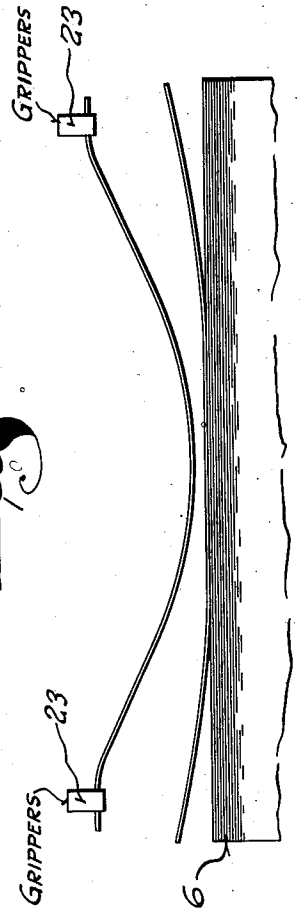


Fig. 4.



Inventor
Frank R. Belluche
By Whittemore Jones
Attorney

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2,381,430

SHEET DELIVERY MECHANISM

Frank R. Belluche, Racine, Wis., assignor to Christensen Machine Company, Racine, Wis., a corporation of Wisconsin

Application July 2, 1943, Serial No. 493,182

5 Claims. (Cl. 271—68)

This invention relates to delivery mechanisms for printing presses and kindred sheet handling apparatus.

In the conventional sheet delivery mechanism sheets are carried from the press or other source to the delivery point by a chain conveyer equipped with gripper bars. This conveyer travels at press speeds and carries the sheets in endwise spaced relation. As a consequence the sheets travel at considerable velocity as they arrive at the delivery stack or pile which makes it difficult to properly stack the sheets. Also, due to the entrapped air between the sheets as they drop down onto the pile, difficulty is often experienced by the grippers colliding with a previously delivered sheet which has not as yet settled down onto the pile.

The present invention overcomes these deficiencies of past sheet delivery mechanisms through the provision of a novel manner of delivering the sheets to the pile or stack with practically no air entrapped therebetween and at a rate of speeds considerably less than press speeds.

To this end it is an object of this invention to provide a delivery mechanism adapted to take sheets from the press delivery and carry them to the point of final delivery in overlapped relation, and with the overlapped sheets bowed transversely to stiffen the same and substantially entirely avoid air entrapment between sheets.

Another object of this invention is to provide means for adjusting the extent to which the sheets are bowed during their initial delivery whereby the desired stiffening of the sheets as they are projected from the delivery conveyer may be had regardless of the weight of the sheets being handled.

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 claims.

The accompanying drawings illustrate two complete examples of the physical embodiments of the invention constructed according to the best modes so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a view in side elevation of a delivery mechanism embodying this invention;

Figure 2 is an end view thereof taken on the plane of the line 2—2, in Figure 1;

Figure 3 is a view similar to Figure 1 but illustrating a modified embodiment of the invention; and

Figure 4 is a view diagrammatically illustrating the manner in which air entrapment between the sheets at their point of final delivery is eliminated or substantially minimized by this invention.

Referring now particularly to the accompanying drawings in which like numerals indicate like parts, the numeral 5 designates the platform or other support upon which the delivered sheets 6 are stacked or piled. A suitably mounted guide 7 provides a stop against which the sheets are drawn by a driven friction roll 8 which may be raised and lowered in timed relation with the advance of the sheets to the pile.

Sheets are fed to the pile by a tape conveyer indicated generally by the numeral 9, which receives the sheets from a discharge conveyer 10. The discharge conveyer 10 is of conventional design and comprises an ordinary chain conveyer with gripper bars 11 adapted to take the sheets from the press or other source and carry them in endwise spaced relation in a position over the receiving end portion of the tape conveyer 9. The discharge conveyer travels at press speeds whereas the tape conveyer 9 has a slower speed. Hence, it is possible to load the sheets onto the tape conveyer in overlapped relation so that the sheets on the tape conveyer are stream fed.

At the point of transfer of the sheets from the fast moving conveyer 10 to the slow moving tape conveyer 9 an air wheel 12 or its equivalent grips the trailing end of each sheet and holds it above the tape conveyer until the grippers open whereupon the air wheel descends to deposit the sheet onto the tape conveyer. In this manner the sheets are properly controlled and properly positioned on the tape conveyer for stream feeding.

The tape conveyer comprises a roll 13 at its receiving end which is straight throughout its entire length and which extends across the full width of the conveyer, and a pair of complementary rolls 14 arranged end to end at the delivery end of the tape conveyer.

These rolls 14 are mounted in brackets 15 the adjacent ends of which are hingedly supported as at 16 from a supporting frame 17. Hence, the rolls 14 may be swung vertically to raise and lower their outer ends and give the tape conveyer a trough-like formation of gradually increasing depth from its receiving end to its delivery end, the tapes 18 being divided into two sets, one trained over each of the rolls 14.

The brackets 15 are adjustably supported by racks 19 meshing with pinions 20 on a cross shaft 21. Hence, by turning the cross shaft 21 the angle of the V formed by the rolls 14 is conveniently and quickly adjusted.

By virtue of the trough or V-shaped formation of the tape conveyer the sheets thereon are bowed transversely and materially stiffened at their point of discharge from the tape conveyer. Consequently, as the sheets are projected from the end of the tape conveyer they are sufficiently stiff to preclude dragging the top sheets across the surface of the lower sheets, thereby facilitating the disposition of the sheets over the top of the pile.

Moreover by virtue of the transversely bowed relationship the amount of air entrapped between the sheets is materially reduced and such air as is entrapped is quickly and easily expelled at the sides of the sheets as graphically illustrated in Figure 4, thereby quickly allowing the sheets to settle down onto the stack or pile.

If desired, a final delivery conveyer 22 may be provided as illustrated in Figure 3. This conveyer may be of the conventional chain type equipped with gripper bars 23 spaced, however, to correspond to the spacing of the overlapped sheets on the tape conveyer and arranged to grip the sheets and carry them in overlapped and bowed relation to the point of final disposition over the stack or pile. At this time the grippers are opened by a cam 24 in the usual way to drop the sheet directly onto the pile. It is, of course, understood that the opening of the grippers by a cam 25 in the customary manner to have them take a sheet is properly timed with the presentation of the sheets by the tape conveyer.

In order to maintain proper relationship between the grippers 23 and the leading edges of the sheets as they are advanced off the tape conveyer the sprockets 26 over which the receiving end of the conveyer 22 travels are supported as by arms 27 from the outer free ends of the brackets 15.

Thus, any adjustment of these brackets 15 effects concurrent raising and lowering of the receiving end of the conveyer 22.

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 sheet delivery mechanism which enables stream feeding of the sheets to their point of final delivery and thereby insures more accurate control of the sheets as they are fed to the delivery pile or stack.

What I claim as my invention is:

1. A sheet delivery mechanism comprising: an endless tape conveyer substantially trough shaped at least at its delivery end so that sheets carried thereon are bowed transversely and substantially stiffened as they are projected from the conveyer; means for feeding sheets to the receiving end of the tape conveyer; means for controlling the deposit of sheets by said last named means onto the tape conveyer to cause the sheets to be deposited thereon in overlapped relation; and a final delivery conveyer having sheet grippers adapted to grip the sheets and carry them in overlapped relation from the delivery end of the tape conveyer to a point properly positioned over the delivery pile, said final delivery conveyer maintaining the sheets transversely bowed as they are carried thereby to facilitate their deposit onto the pile by minimizing air entrapment between the sheets.

2. A sheet delivery mechanism for feeding sheets onto the top of a pile comprising: an endless tape conveyor having a straight roll extending across the width of the conveyor at its receiving end and complementary independent rolls arranged end to end at its delivery end; tapes trained over the rolls at the opposite ends of the conveyor; a bracket for each of the complementary rolls at the delivery end of the conveyor; means individually journalling each of said complementary rolls in its bracket; means hingedly connecting the adjacent ends of the brackets so that said brackets and the rolls carried thereby may be adjusted angularly with respect to each other; and an adjustable support for the free ends of the brackets whereby said brackets and the rolls carried thereby may be adjusted to impart a trough formation of variable angle to the delivery end of the tape conveyor.

3. In a sheet delivery mechanism of the character described: an endless tape conveyor having a straight roll extending across the width of the conveyor at its receiving end; a pair of complementary rolls disposed end to end at the delivery end of the conveyor; tapes trained over the rolls at the opposite ends of the conveyor; means hingedly connecting the adjacent ends of the complementary rolls at the delivery end of the conveyor; and adjustable supports for the outer free ends of said complementary rolls whereby said rolls may be disposed at a variable angle to give the delivery end of the conveyor a trough formation of variable angle.

4. A delivery mechanism of the character described comprising: a conveyor travelling at press speeds and adapted to carry sheets in endwise spaced relation; a tape conveyor under the delivery end portion of said first named conveyor and onto which the sheets are deposited in overlapped relation by said first named conveyor, said transfer taking place upon release of the sheets by the first named conveyor; and means for gripping the trailing end of each sheet as it is presented to the tape conveyor by the first named conveyor, said means being downwardly movable to control the deposit of the sheet onto the tape conveyor.

5. A sheet delivery mechanism for stream feeding sheets onto the top of the pile comprising: an endless tape conveyor having a roll extending across the width of the conveyor at its receiving end; a pair of complementary rolls arranged end to end at the delivery end of the conveyor; endless tapes trained over the rolls at the opposite ends of the conveyor; hinged means mounting the adjacent ends of the pair of complementary rolls; and vertically adjustable supports for the outer free ends of said complementary rolls by which they may be held in positions forming a variable angle to give the tape conveyor a trough formation and bow the sheets a variable amount.

FRANK R. BELLUCHE.