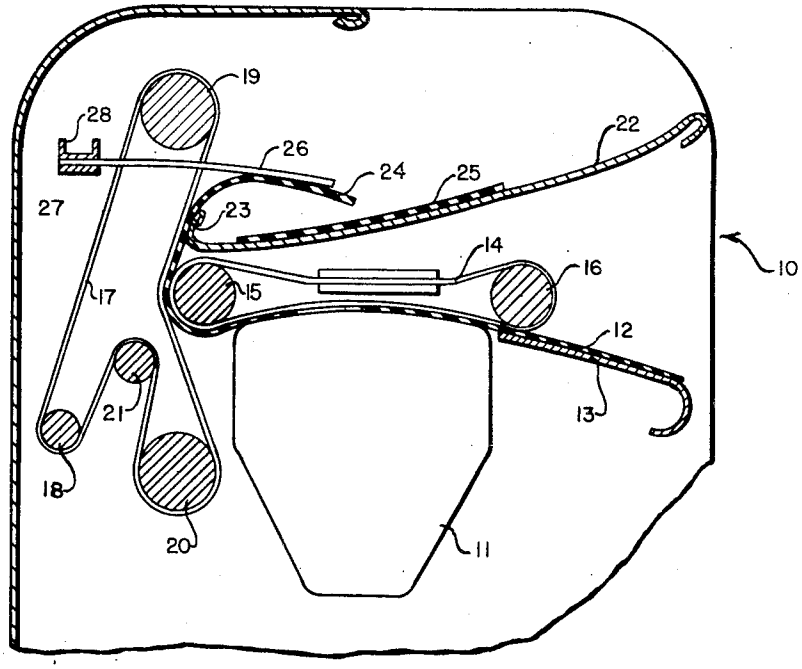
Aug. 9, 1949. F. O. TRUMP 2,478,850

PRINT STACKING MEANS FOR PRINTING MACHINES

Filed March 28, 1947

FIG. 1



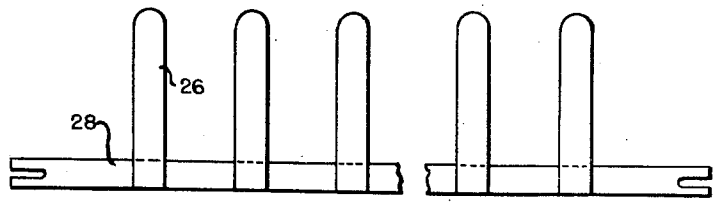


FIG. 2

INVENTOR
FREDERICK O. TRUMP

BY Lawrence Scribner
Rodney C. Haselwood
ATTORNEY

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PRINT STACKING MEANS FOR PRINTING MACHINES

Frederick Otto Trump, Binghamton, N. Y., assignor to General Aniline & Film Corporation, New York, N. Y., a corporation of Delaware

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4 Claims. (Cl. 271—63)

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This application pertains to an invention in sheet delivering and stacking means for printing devices such as the so-called dry printing and developing machines. More specifically, the invention is devoted to means for stacking sheet material emerging from a printing and/or developing device, in sequence, and without permitting the sheets to roll or to become otherwise distorted to disturb the effectiveness of the sheet delivery.

It is an object of the invention to provide simple and inexpensive means for printing and/or developing machines which shall serve to stack the originals or printed material emerging from the machine in a predetermined sequence.

Another object of the invention is to provide in such a machine means for preventing rolling or other distortion of the material discharged from the machine, that material having an inherent quality of rolling upon itself in one direction.

Other objects of the invention will become apparent from the following disclosure.

In dry developing and other similar machines, the method of operation frequently involves feeding several originals in sequence, and sometimes repeatedly, through the machine thereby to produce a relatively great number of prints. These prints are preferably to be stacked in the same order in which the original material was introduced to the machine. The sensitized material employed (diazo-type coated paper in most instances) is relatively thin, has little inherent rigidity, and like most sensitized material tends to curl in one direction. Consequently, it is difficult to handle the sensitized material in automatic procedure.

The delivery of the material may be so designed that there will be a definite control exercised which would tend to stack each succeeding sheet delivered upon the preceding sheet. However, if one of the sheets starts to roll upon itself, the entire sequence of operation is disturbed, and the general scheme for delivering the printed material in the sequence of feeding the original material is disturbed. In the solution of this problem positive guiding means are provided, the first taking the form of a continuous lip which bears with predetermined pressure against a plurality or more or less vertically moving delivery belts or tapes. These belts are preferably of narrow width, and are spaced to receive the printed and/or developed sheets from other mechanism in the machine adapted to perform one or the other of the above-mentioned functions. The

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stacking lip is of sufficient height to force each delivered sheet to emerge at a plane above the top most level of a stack of sheets of predetermined height. The total height will naturally depend upon the number of sheets or height of the pile of sheets intended to be gathered at any one time.

If no further control is provided, it has been found that at frequent intervals the material will roll upon itself and when such material starts to roll, it continues to do so except as prevented by contact with some other element of which none has heretofore been provided. The general system employed has been that of watching the delivered material and straightening those sheets which do start to curl. Obviously, this is undesirable since it prevents the operator from making full use of the capacity of the machine. If not watched practically continuously, the delivered material soon becomes more or less unmanageable, and the intended stacking arrangement must be abandoned.

According to the invention, a plurality of fingers or equivalent means is provided, these fingers being supported at a height above the top of the stacking lip such that the material delivered will not be permitted to rise high enough to start to curl or roll. These stacking fingers may be supported at any convenient part of the machine adjacent the point of delivery for the material, but according to a preferred form of the invention, are supported so that they project between the adjacent tapes or belts by which the material is delivered. In this way, there is no possibility of the material finding its way upwardly past the fingers and, therefore, the material has no alternative path to follow and must move upwardly under the influence of the tapes or belts until it passes the stacking lip and thereafter contacts the said fingers which constrain the material to have its direction of travel altered by approximately 90° so that it immediately projects outwardly away from the belts and lip to extend or project in a direction more or less parallel to the surface of the stack before the free, or comparatively free end of the material becomes long enough to permit it to curl or roll. By the time that much material has been delivered, the leading edge of the material will have been in contact with the receiving tray or sheet material lying on that tray and cannot then alter its direction of movement or start to roll upon itself. The fact that the material is bent substantially at right angles when leaving the stacking lip gives a smoothing or pressing effect administered by the

fingers, their being tight and close contact between them and the material. This prevents curling in the interim while the material leaves the fingers and falls in the receiving tray.

The invention will be more specifically described by reference to the accompanying figures of drawings, wherein:

Fig. 1 is a sectional view of as much of a typical machine of the type described as is necessary to show the application of the invention thereto.

Fig. 2 is a detail view of the stacking fingers.

Referring to Fig. 1, the top portion of a combined printing and developing machine is illustrated and has a general casing or frame work indicated by numeral 10 within which is supported a vaporizing tank 11 in which ammonia is vaporized, and through the upper perforated portion of which the vapors are permitted to contact sensitized material having a latent image impressed thereon. The material, one sheet of which is shown at 12 is fed in over a feed board 13, and is guided and moved over the top of the developing tank 11 by a sealing sleeve 14 passing about the rolls 15 and 16, at least one of which is positively driven. The sleeve 14 is preferably of a rubber-like material resistant to ammonia or ammonia vapors. This sleeve is both resilient and flexible, and should be sufficiently tensioned to perform its intended function. The basic mechanism is described in literature and in prior patents so that a more detailed description, if desired, may be obtained therefrom.

A plurality of tapes or belts 17 pass about a series of guide rolls 18, 19, 20 and 21, and also contact the sealing sleeve 14 as it passes over the roller 15, or contact the developed material as it moves along with the sealing sleeve. The belts 17 are driven by frictional engagement with the roller 20 or one of the other rollers, and are spaced apart through approximately the same distance as the width of the independent belts themselves.

Above the developing and print feeding mechanism just described is provided a print receiving tray 22 having at its inner end, adjacent to the belts which pass upwardly at that point, a stacking lip 23, the top portion of which is turned back on itself or otherwise widened to provide a safe, smooth edge over which the delivered material may pass. There is sufficient pressure between the belts 17 and the smooth surface of the lip 23 to confine the developed material therebetween. Since the moving belts have a higher coefficient of friction than the lip, they grip and feed the material upwardly as indicated by the sheet material 24, part of which has passed the upper edge of the lip.

As stated previously, if no further control is provided at this point, the sheet material which has an inherent tendency to curl and which may be unsupported or unguided over a considerable length thereof, instead of finding its way properly into the stack, one sheet of which is indicated at 25, may curl or otherwise become distorted to disturb the intended sequence and arrangement of the plurality of stacked sheets. To prevent this a series of relatively inflexible fingers 26 are supported at 27 adjacent to the ends of the machine frame or casing and, as herein illustrated according to a preferred form of the invention, project between the belts 17. Depending upon the width of the belts and the spacing, there may be one finger for each space between belts, or the fingers may be arranged at more widely spaced intervals. These fingers project over the stacking tray 22 and are at such a height above the top of lip 23, that the end of a sheet being delivered will be forced to the right and downwardly, as shown in Fig. 1, while that sheet material 24 is of such length that there is still considerable resistance against curling. The result is that the leading edge of the sheet 24 will be pressed downwardly against the previous sheet 25, or against the bottom of the tray 22 in the case of the first sheet delivered, so that any further movement may only be a horizontally directed one. The sheet then moves toward the right until the entire sheet has been forced past the lip 23, whereupon it must fall into its intended place at the top of the pile.

The fingers 26 and supporting bar 28 are shown in greater detail in Fig. 2. Instead of being supported at the opposite side of the print delivery belt structure, as illustrated, the fingers may be supported at any convenient place so long as a part thereof extends between the stretch of the belts which passes upwardly from the roll 15 past the lip 23 and to the roll 19.

While the invention has been described by illustrating and describing a specific form thereof as applied to developed material delivered from a dry developing machine, it may be employed for stacking originals rather than the printed material, or for stacking similar material under analogous treatment in any type of machine, and it may be utilized as a part of any operation in which it may be advantageously employed.

While one embodiment of the invention has been disclosed, it is to be understood that the inventive concept may be carried out in a number of ways. This application is, therefore, not to be limited to the precise details described, but is intended to cover all variations and modifications thereof falling within the spirit of the invention and the scope of the claims.

I claim:

1. In a sheet delivery and stacking means for machines of the type described, the combination of a conveyer system comprising a plurality of spaced belts for frictionally contacting and advancing the sheet material to be delivered, a tray for receiving said sheet material, a stacking lip at one end of said tray extending in a generally vertical direction and so disposed adjacent to the spaced belts that the sheet material is guided between the surface of the lip and the belts and is maintained in contact with the belts by the said lip, and means for maintaining intended sequence of the stacked material and for preventing rolling or curling thereof which comprises a plurality of members contacting said material at spaced points transversely to its direction of travel and extending out from the spaces between belts and overlying the stacking lip and tray, said members being generally horizontally disposed and so spaced from the top of said lip as to guide and constrain the sheet material from the belts in a direction toward the tray before the leading edge thereof has passed far enough beyond the lip effectively to curl or roll upon itself.

2. In a sheet delivery and stacking means for machines of the type described, the combination of a conveyer system comprising a plurality of belts for frictionally contacting and advancing the sheet material to be delivered, a tray for receiving said sheet material, a stacking lip extending in a general vertical direction and so disposed adjacent to the plurality of belts that the sheet material is guided therebetween and is

maintained in contact with the belts by the said lip, and means for maintaining the intended sequence of the stacked material and for preventing rolling or curling thereof which comprises a plurality of fingers contacting said sheet material at spaced points transversely to its direction of travel and extending out from the spaces between belts and overlying the stacking lip and tray, said fingers being generally horizontally disposed and so spaced from the top of said lip as to guide and constrain the sheet material from the belts at substantially right angle toward the tray before it has emerged far enough from the lip effectively to curl or roll upon itself.

3. In a sheet delivery and stacking means for machines of the type described, the combination of a conveyer system comprising a plurality of spaced belts for frictionally contacting and advancing the sheet material to be delivered, a tray for receiving said sheet material, a stacking lip projecting in a substantially vertical direction from one end of said tray so disposed adjacent to the plurality of belts that the sheet material is guided therebetween and is maintained in contact with the belts by the said lip, and means for maintaining the intended sequence of the stacked material and for preventing rolling or curling thereof which comprises a plurality of fingers contacting the sheet material at spaced points transversely to its direction of travel, a support for said fingers so positioned that the fingers project through the spaces between belts to overlie the stacking lip and tray, said fingers further being disposed at substantially right angles to the direction of the stacking lip and spaced from the top of said lip a distance such that they constrain the sheet material to alter its direction and guide the leading edge of the sheet material as it passes upwardly beyond the lip toward the tray before it has travelled far enough from the lip effectively to curl or roll upon itself.

4. In a sheet delivery and stacking means for

a machine of the type described, the combination of a conveyer system comprising a plurality of belts for frictionally contacting and advancing the sheet material to be delivered, a tray for receiving said sheet material, a stacking lip projecting from one end of said tray and being disposed adjacent said belts and in a generally vertical direction parallel to the path of travel of said belts whereby the sheet material is guided between the lip and belts and is maintained in contact with the belts by said lip, and means for maintaining the intended sequence of the stacked material and for preventing rolling or curling thereof which comprises a plurality of transversely spaced fingers contacting the sheet material at spaced points transversely to its direction of travel, a support for said fingers so disposed that the fingers as they project from the support pass between the travelling belts and extend in a substantially horizontal direction to overlie the stacking lip and at least a portion of the tray, said fingers being vertically spaced from the top of said lip a distance such that they cause the sheet material as it passes from the top edge of the lip to change direction at substantially 90° thereby pressing said material before it separates from the belts and guide it toward the tray so that the leading edge thereof will properly engage the tray or material stacked thereon before it has passed far enough beyond the lip effectively to curl or roll upon itself.

FREDERICK OTTO TRUMP.

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