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L. L. MATTHEWS

2,261,973

SHEET-FEEDING MACHINE

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Fig. 2

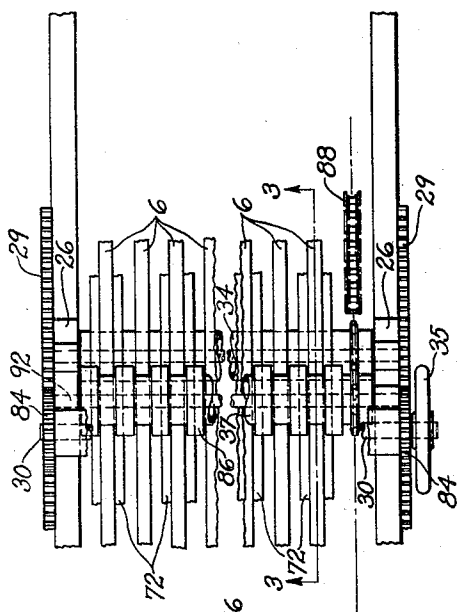


Fig. 3

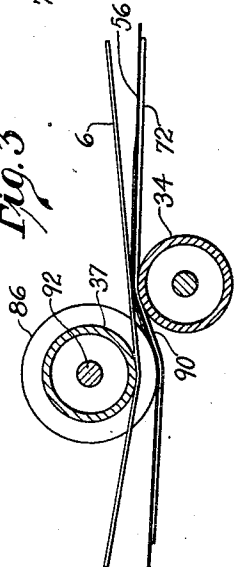
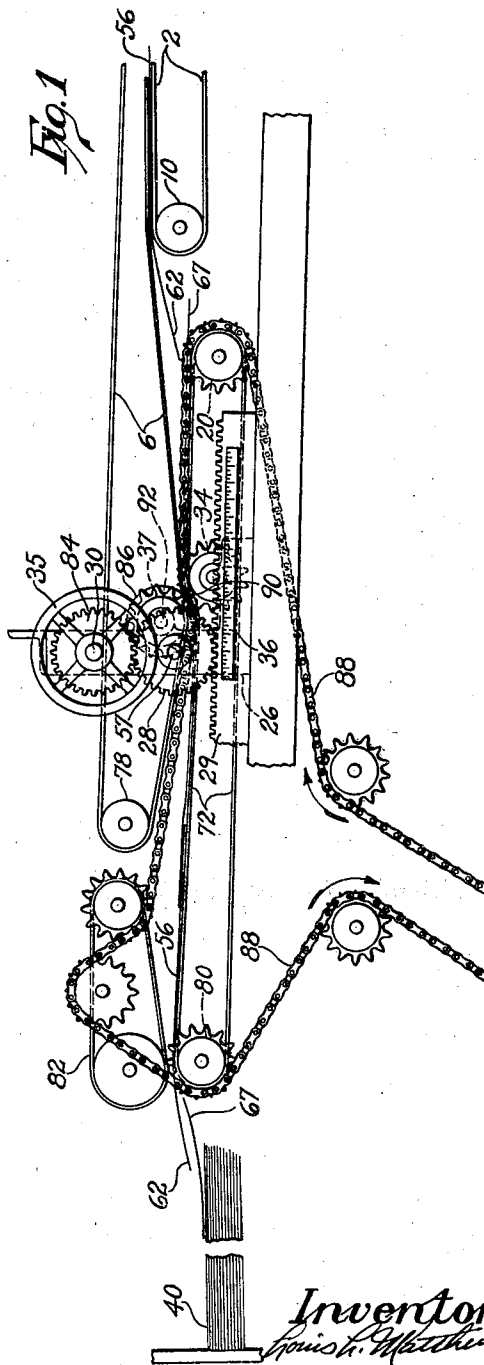


Fig. 1



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SHEET-FEEDING MACHINE

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11 Claims. (Cl. 271—76)

The present invention relates to machines for feeding sheet material, such as paper and the like. The invention is particularly related to machines involving high speeds, like those used at paper mills for cutting webs from a roll or rolls into sheets, and feeding the sheets, by means of more or less horizontal conveyor tapes, into a lay-boy or other magazine. The sheets are fed by high-speed tapes to low-speed tapes by which they become overlapped, and it is in this overlapped condition that they arrive in the lay-boy.

In connection with machines of this character, it has been the practice to employ a "slowing-down" carriage or support, illustrated, for example, in Letters Patent 1,545,910, issued July 14, 1925, to Charles B. Maxson, at 56, manually adjustable along the path of feed of the sheets to accommodate different sheet lengths. The carriage has been provided with idler wheels or rolls, shown in the said Letters Patent at 42, disposed at intervals cross-wise of the machine, for engaging or gripping the heads of the fast-moving sheets against a cooperating idler roll 28, thereby to slow the sheets down. The idler wheels 42 and the idler roll 28 have been free to turn in response to the friction exerted by the conveyor tapes and the paper sheets, as they went through the machine between the rolls 28 and 42.

If the idler roll 28 or the idler wheels 42, becoming "lazy," did not turn, however, the paper sheets became mussed up. To insure their turning insofar as possible, furthermore, it was necessary to make the wheels 42 of considerable size. The consequent weight of these wheels 42 would cause injury, by marking, of delicate paper stock. Injury to stock of even less delicate nature has been frequently caused by the "load" of stopping the high-speed sheet, imposed upon the head end of the sheet as it struck the rolls 28 and 42. This has involved considerable loss to high-grade papers. The spaces between the transversely spaced wheels 42, moreover, provided room for corners of high-speed sheets to fly up into between the upper conveyor tapes, causing damage as well as muss-ups.

An object of the present invention, therefore, is to provide a new and improved carriage for a machine of the above-described character that shall render the machine free of these defects. Other and further objects will be explained hereinafter, and will be particularly pointed out in the appended claims.

The invention will now be described in connection with the accompanying drawing, in which

Fig. 1 illustrates a preferred embodiment of the invention, in fragmentary side elevation; Fig. 2 is a corresponding plan, with parts broken away, for clearness; and Fig. 3 is a vertical section, upon a larger scale, taken upon the line 3—3 of Fig. 2, looking in the direction of the arrows.

It will be convenient to describe first two adjacently disposed upper and lower rolls 37 and 34 that extend transversely of the machine. A shaft 92, upon which the upper roll 37 is mounted, is positioned to the left of the shaft upon which the lower roll 34 is mounted, as illustrated. The lower roll 34 may be of the same nature as the roll 28 of the said Letters Patent. The upper roll 37, however, may be constituted of steel tubing upon which may be mounted a plurality of rings 86 that may be constituted of a phenol-condensation or other suitable product, like Bakelite. The Bakelite rings 86 are disposed all the way across the machine, close enough to one another so that there is just sufficient room between each two successively disposed rings 86 for the passage of an upper relatively high-speed tape 6 between them. A plurality of rings of smaller diameter than the rings 86 are thus exposed on the roll 37, alternating with the rings 86. The lower reaches of the high-speed tapes 6 each engages under one of these exposed rings of the roll 37. The rings 86 each extends down through between adjacently disposed high-speed tapes 6 into engagement with relatively low-speed lower tapes 72, shown mounted over rolls 20 and 80. In so engaging the low-speed tapes 72, on their upper side, the rings 86, in combination with the roll 34 engaging the tapes 72 on their lower side, impart a slight downward bend to the tapes 72 in the region illustrated at 90, between the rolls 34 and 37.

Sheets 56 of paper or other suitable material are shown in Fig. 1 engaged on opposite sides by the upper relatively high-speed tapes 6 and cooperating lower relatively high-speed tapes 2. The high-speed tapes 2 are shown mounted over a roll 10, and the high-speed tapes 6 over a roll 78. The relatively low-speed tapes 72 are overlapped by, and separated from, the high-speed tapes 6, as shown. The roll 37 is thus disposed opposite to the high-speed tapes 6, but to one side of the high-speed tapes 2.

The sheets 56 are thus fed at relatively high speed, confined by the tapes 2 and 6, over the roll 10, to the relatively low-speed lower tapes 72, but become unconfined by the tapes 2 and 6 after leaving the roll 10.

The head 62 of each sheet is received by the

low-speed tapes 72 from the high-speed tapes 2 and 6 in the region of bend 90, over the roll 34 below and the roll 37 above. The load of stopping the sheet becomes distributed evenly across the full width of the head end 62, without any hard "pinch" between the rolls 34 and 37. The sheet becomes stopped merely by the contact between the Bakelite rings 86 and the tapes 72, which is a much softer stopping means than is provided by the contact of the upper wheels 42, resting by their own weight against the lower roll 28 of the machine of the said Letters Patent.

After the head of the sheet becomes stopped between the rings 86 and the lower tapes 72, it becomes gripped or pressed on opposite sides between the tapes 72 below and the rings 86 of the upper roll 37 above. The lower tapes 72 and the upper roll 37 thus cooperate to receive the head 62 of each sheet 56, and to slow down the speed of advance of the sheet. Because of this reduction in speed, the head 62 of each sheet, as it is delivered from between the high-speed tapes 2 and 6, will lap over the tail 67 of the prior-fed sheet, as illustrated. In overlapped relation upon the low-speed tapes 72, the sheets are then fed by the low-speed tapes 72 and cooperating short low-speed upper tapes 82 at relatively low speed into a lay-boy 40.

For reasons explained in the said Letters Patent, it is desirable to adjust the position of the adjacently disposed rolls 34 and 37, corresponding to the length of the sheets 56. To this end, they are mounted upon a carriage or support 26 that is adjustable back and forth, in the direction of feed of the sheets. The degree of adjustment of the carriage 26 corresponding to various sheet lengths may be determined by means of a scale 36. This adjustment may be effected through the medium of two gear wheels 28 that mesh with two racks 29 upon opposite sides of the bed of the machine. The gear wheels 28 are mounted on studs 57 that are fastened on the carriage 26, and may be turned by gear wheels 84 that mesh with the gear wheels 28. The gear wheels 84 are mounted upon a rod 30 that is disposed above the return path of the upper high-speed tapes 6 and above the respective gear wheels 28. The rod 30 and the gear wheels 84 are thus mounted out of the way, where they can not cause trouble. The gear wheels 84 may conveniently be rotated, to effect adjustment of the carriage 26, for different sheet lengths, by means of a hand-wheel 35 that is fixed to the rod 30.

The rolls 34 and 37 are both shown driven by a chain 88 that drives also the rolls 20 and 80 and the tapes 82. The chain 88 is wrapped around the rolls 34 and 37 so that the carriage 26 may be moved forward and backward without any necessity for changing the chain length.

Modifications will occur to persons skilled in the art, and all such are considered to fall within the spirit and scope of the invention, as defined in the appended claims.

What is claimed is:

1. A sheet-feeding machine having, in combination, a relatively high-speed tape for feeding sheets at relatively high speed, a relatively low-speed tape separated from and lapped by the high-speed tape for receiving the sheets from the relatively high-speed tape and feeding them further at relatively low speed, a roll disposed opposite to the relatively high-speed tape for engaging the low-speed tape and between which and the low-speed tape the heads of the sheets are pressed as the sheets are received from the

high-speed tape, and means for producing a bend in the low-speed tape at the point where the heads of the sheets are pressed, whereby the sheets are fed at relatively low speed after their heads reach the bend.

2. A sheet-feeding machine having, in combination, upper and lower relatively high-speed tapes for feeding sheets at relatively high speed, lower relatively low-speed tapes between which and the upper tapes the sheets are received, and a roll provided with a plurality of relatively soft rings disposed between successive tapes of the upper high-speed tapes to engage the relatively low-speed tapes and between which rings and the relatively low-speed tapes the heads of the sheets are engaged.

3. A sheet-feeding machine having, in combination, relatively high-speed tapes for feeding sheets at relatively high speed, relatively low-speed tapes for receiving the sheets and feeding them further at relatively low speed, and two rolls spaced from each other in the direction of feed engaging opposite sides of the relatively low-speed tapes and positioned to form a bend in the relatively low-speed tapes, one of the rolls having a plurality of relatively soft rings disposed between successive high-speed tapes and engaging the low-speed tapes and between which and the low-speed tapes the heads of the sheets are engaged in the bend.

4. A sheet-feeding machine having, in combination, tapes for feeding sheets at relatively high speed, relatively low-speed tapes for receiving the sheets and feeding them further at relatively low speed, a roll for engaging the heads of the sheets after delivery by the high-speed tapes, an adjustable carriage in which the roll is mounted, a gear mounted on the carriage, a second gear meshing therewith, and a rack with which the second gear meshes, the first-named gear being disposed above the second-named gear.

5. A sheet-feeding machine having, in combination, tapes for feeding sheets at relatively high speed, relatively low-speed tapes for receiving the sheets and feeding them further at relatively low speed, a roll for engaging the heads of the sheets after delivery by the high-speed tapes, an adjustable carriage in which the roll is mounted, a second roll disposed on the carriage to one side of the first-named roll, a gear mounted on the carriage, a second gear meshing therewith, a rack with which the second gear meshes, the first-named gear being disposed above the second-named gear, and a chain connecting the rolls.

6. A sheet-feeding machine having, in combination, relatively high-speed tapes for feeding sheets at relatively high speed, relatively low-speed tapes between which and the relatively high-speed tapes the sheets are received, and a roll provided with a plurality of rings respectively disposed between successive tapes of the relatively high-speed tapes to engage the relatively low-speed tapes and between which rings and the relatively low-speed tapes the heads of the sheets are engaged.

7. A sheet-feeding machine having, in combination, means for feeding sheets at relatively high speed, relatively low-speed tapes for receiving the sheets and feeding them further at relatively low speed, a fixed roll cooperating with the relatively low-speed tapes between which and the relatively low-speed tapes the heads of the sheets are received, and means for positively driving the roll.

8. A sheet-feeding machine having, in com-

5 bination, a relatively high-speed tape for feeding sheets at relatively high speed, a relatively low-speed tape separated from and lapped by the high-speed tape for receiving the sheets from the relatively high-speed tape and feeding them further at relatively low speed, a roll disposed opposite to the relatively high-speed tape and engaging the relatively low-speed tape and between which and the relatively low-speed tape the heads of the sheets are pressed as the sheets are received from the high-speed tape, and means for positively driving the roll.

9. A sheet-feeding machine having, in combination, means for feeding sheets at relatively high speed, a relatively low-speed tape for receiving the sheets and feeding them further at relatively low speed, a roll for engaging the relatively low-speed tape and between which and the relatively low-speed tape the heads of the sheets are received, and means positioned adjacent to the roll on that side of the roll that is opposite to the direction of feed for producing a bend in the relatively low-speed tape, whereby the sheets are fed at relatively low speed after their heads reach the bend.

10. A sheet-feeding machine having, in com-

5 bination, a relatively low-speed tape for feeding sheets at relatively low speed, two rolls spaced from each other in the direction of feed for engaging the tape on opposite sides of the tape, the rolls being positioned to form a bend in the tape, and means for feeding the sheets at relatively high speed to cause the heads of the sheets to be delivered to the bend between one of the rolls and the low-speed tape to slow down the speed of the sheets to that of the relatively low-speed tape.

11. A sheet-feeding machine having, in combination, means for feeding sheets at relatively high-speed, a relatively low-speed tape for receiving the sheets and feeding them further at relatively low speed, a roll for engaging the relatively low-speed tape and between which and the relatively low-speed tape the heads of the sheets are received, a roll disposed adjacent to the first-named roll on that side of the first-named roll that is opposite to the direction of feed for producing a bend in the relatively low-speed tape, whereby the sheets are fed at relatively low speed after their heads reach the bends, and means for positively driving the tape and the rolls.

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