Jan. 28, 1964 C. H. PORTER 3,119,609

PRINTING MACHINE DELIVERY

Filed Oct. 26, 1961 2 Sheets-Sheet 1

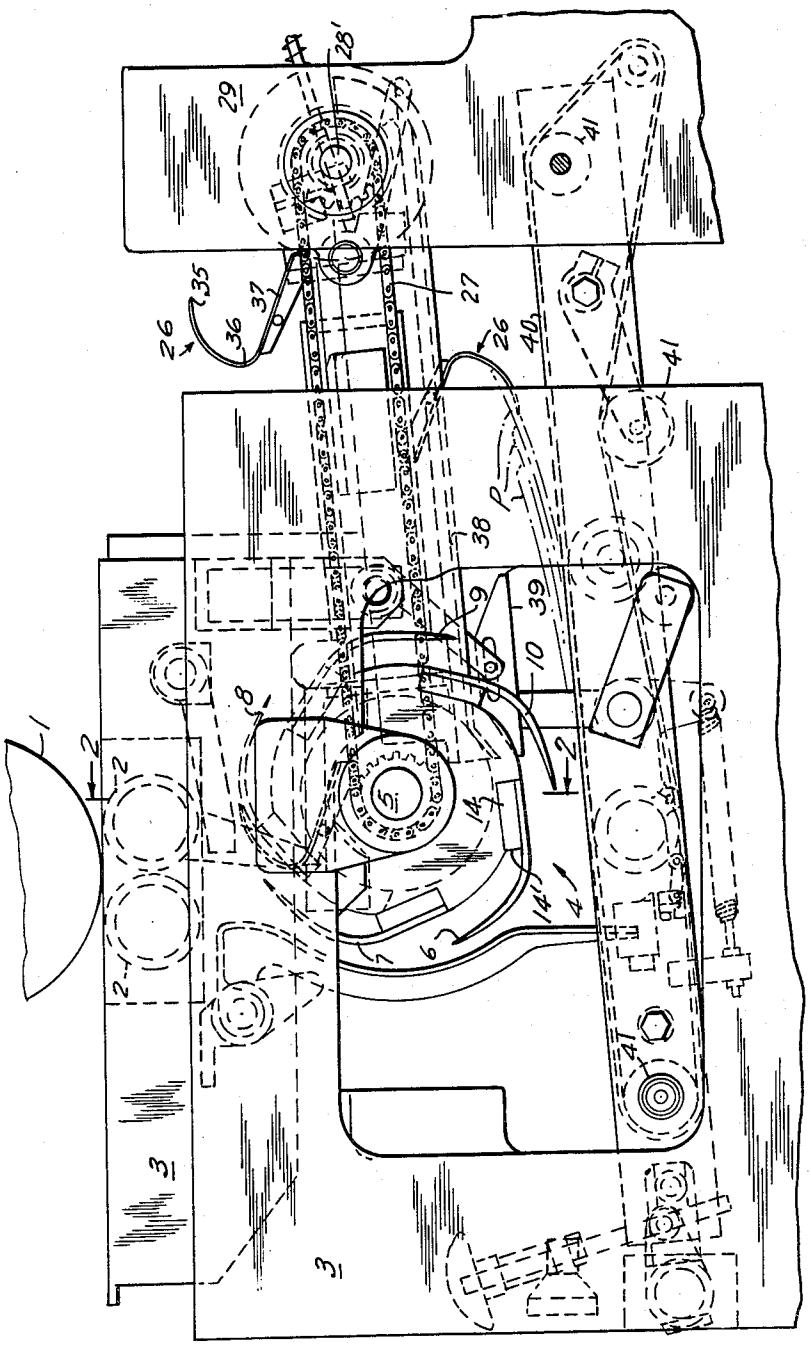

FIG. 1

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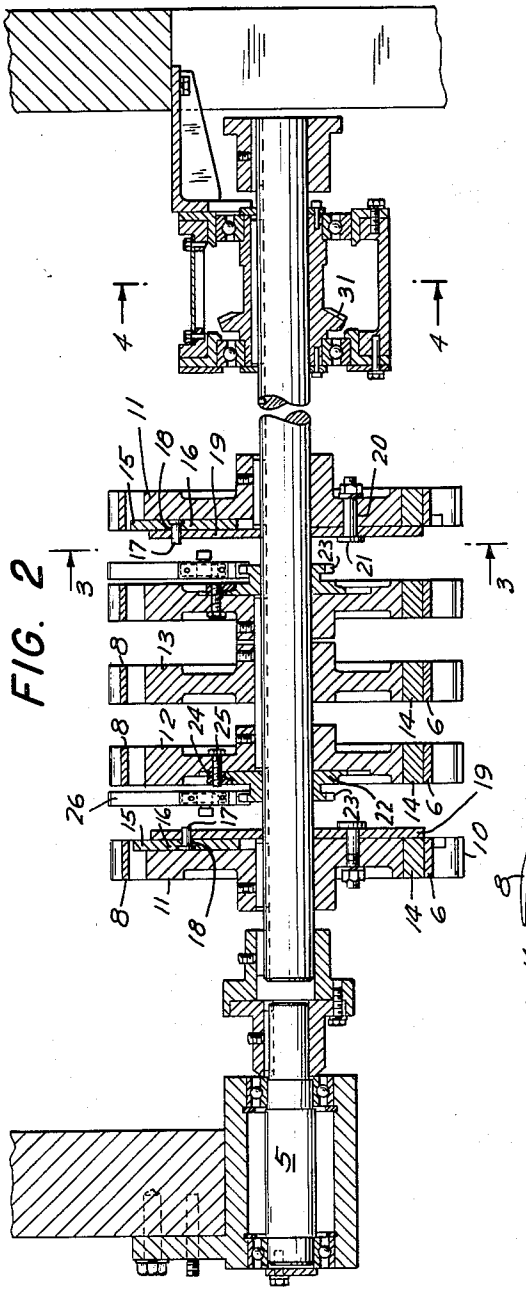

FIG. 2

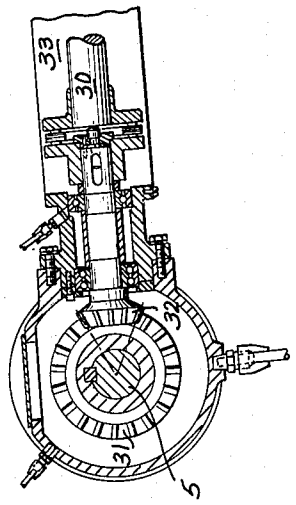

FIG. 4

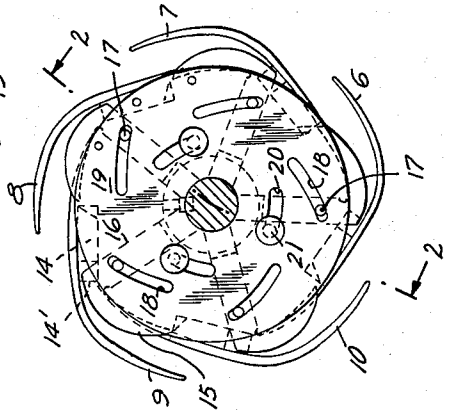

FIG. 3

INVENTOR.

BY

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PRINTING MACHINE DELIVERY

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This invention relates to printing machine deliveries and more particularly to separating mechanism for dividing products as delivered into batches or quires.

In newspaper and other delivery mechanisms, the products are deposited in overlapped relation on delivery belts and divided either manually or mechanically into batches for facilitating counting and wrapping. The mechanical devices now available for so separating the batches comprise separator elements moving in under the copy as it is being delivered to the tapes or wires at suitable intervals and forming in one way or another a separation between this copy and succeeding copies on the one hand and previously delivered copies on the other. There is involved in such mechanisms, the movement of a part into a blade of a delivery fan, the maintenance for suitable movement with relation to the delivery tapes for a time and then the movement of the element out of the path of the products being delivered, such mechanisms being subject to jamming and operating with difficulty at high and variable speeds.

It is an object of the present invention to provide a separating mechanism of an improved character in which jamming is eliminated and there is no need for accurate synchronization of the movement of separating elements and the blades of a fan.

With this and still other objects which will appear in the following full description in mind, the invention consists in the combination, arrangement of parts and details of construction which will now first be fully described with reference to the accompanying drawing, and then be more particularly pointed out in the appended claims.

In the drawing:

FIG. 1 is a side elevation of a separator mechanism embodying the invention in a preferred form;

FIG. 2 is a section on the lines 2—2 of FIGS. 1 and 3;

FIG. 3 is a section on the line 3—3 of FIG. 2; and

FIG. 4 is a section on the line 4—4 of FIG. 2.

There is indicated schematically in FIG. 1 a folding cylinder 1, below which are folding off rollers 2 supported in the frame structure indicated generally at 3. The details of these elements and other structure of the printing machine and folder form no part of the present invention, it being sufficient to note that the products P are delivered to the fan 4 in the usual way, folded edge first and that they will generally have a second folded side edge resulting from a prior longitudinal fold or folds. The fan 4 is rotatably carried on shaft 5 by the frame structure 3. It comprises a number of sets of fan blades 6–10, inclusive, each set containing a number (in the embodiment shown, five) of such blades, as shown in FIG. 2. Blades 6–10 are carried on discs 11, 12 and 13 secured to the shaft 5, each blade being mounted on a block 14 secured to the disc, the end 14′ of the block forming an abutment for the leading edge of a product deposited in the fan under the blade. The end discs 11 (FIGS. 2, 3) are equipped with radially slidable elements 15 which guide the products into a definite position with relation to the blades of the fan. Each of these members has a shank 16 sliding in a radial groove within the disc 11 and carrying a pin 17 extending through an eccentric slot 18 formed in a circular adjusting plate 19. This plate is rotatably adjustable about the shaft 5 and has three concentric slots 20 receiving bolts 21 by means of which it is secured in adjusted position with relation to the disc 11. As is apparent, rotatable adjustment of the member

19 permits locating the members 15 in radially adjusted position as desired.

Each of the discs 12 has a hub or supporting member 22 of a sprocket wheel 23 secured in a rotatably adjustable manner against its face by means of one or more gibs 24, held in clamping relation to the supporting member 22 by bolts 25. These sprocket wheels 23 guide and drive sprocket chains carrying the separator hooks 26. There are three of the hooks 26 carried by sprocket chain 27 which passes around the sprocket wheel 23 previously referred to and a second sprocket wheel 28 carried in frame member 29. Sprocket wheels 23 and 28 are coupled together by a shaft 30 and bevel gearing 31, 32 (the bevel gearing shown in FIG. 4 adjacent the shaft 5 being reduplicated for the shaft of the sprocket wheel 28), tie members or struts 33 connecting to the housing 34 of the bevel gearing serve to maintain the relative position of the sprocket wheels 23 and 28.

Each hook 26 is of arcuate shape having a tip 35, bottom 36 and shank 37 attached to two successive pins of the sprocket chain so as to maintain the hook 26 in fixed relation to the chain. The shaft 28′ is press driven.

The mechanism includes guides 38 of usual character associated with the folding off rollers 2 and the fan 4 and an adjustable stop 39 of usual character for stripping the products from the blades of the fan. Below the fan is positioned a set of delivery tapes 40 guided on rollers 41 and driven (by means not shown) at a constant speed ratio of the fan to the sprocket chain. The general course of travel of the sprocket chain and hooks carried thereby is rectilinear and in parallelism with the belts 40, the speed of travel of the hooks with relation to the fan being determined by the radius of the sprocket wheels 23, 28 as compared with the radius of the fan, at the point where the leading edges of the products engage block surfaces 14′ under the blades.

In the construction shown, the sprocket wheel pitch radius is approximately one half the fan radius, so that the speed of travel of the hooks 26 is approximately one half the speed of travel of the fan. The speed of travel of the belts 40 is intermediate between the speed of the fan pockets and the speed of the hooks 26 as they travel along above the belts, all elements being driven from the press.

The number of blades or pockets on the fan may be varied, as also the number of hooks 26 on the sprocket chain and the spacing of these elements, thereby determining the number of products in each separated batch. In the construction shown, the speed of the sprocket and spacing of hooks thereon is such that a hook will always cooperate with the same pocket of the fan, which is the pocket defined by the blade 8 in the construction shown. FIG. 1 shows the hook in position between the pockets formed by fan blades 7 and 8, prior to the time when a product is dropped into the pockets formed by blade 8. At this point, the hook or sprocket section on which it is carried has just passed on to the sprocket wheel 23, so that from the approximate position of FIG. 1 and through 130° thereafter the hook follows around with the blade 8, with its bottom portion 36 in advance of the leading edge of any product held behind the blade 8. As the product held behind blade 8 engages the stop 39 to be stripped therefrom the hook 26 will continue along the straight course of the sprocket chain above the tapes 40, so that as the leading edge of the product P is dropped by blades 8, it will fall onto the hooks 26 midway between their tips 35 and bottoms 36. The hook 26 will continue to support the leading edge of the product until the hook reaches the other sprocket wheel 28, at which point it will move away from the conveyor tapes 40, dropping the leading edge of this product onto the tapes. By this time, due to the greater speed of the tapes 40 as compared with

the hook 26, space will have been opened up between the leading edge of the product and the trailing edge of the last product of the previous batch or quire, and the following four products will have been advanced somewhat so as to close the products up somewhat over each other, and to an extent sufficient to open up a space between the trailing edge of the fifth product of the batch and the leading edge of the next following product. As is apparent, the specific structure shown separates the stream of products into quires of five products each. For a collect run, the action of the elements is the same, except that double products are dropped into the pockets of the fan alternately, so that a hook 26 cooperates first with the pocket 8 in loaded condition and then with this pocket when empty, so that five collect products, equivalent to ten single products, now form the batch or quire.

What is claimed is:

1. In a printing machine delivery mechanism comprising a rotary fan having a plurality of circumferentially spaced pockets for receiving successive products and conveyor tapes for receiving the products successively in overlapped relation from the fan pockets, product batching mechanism comprising a sprocket chain, means guiding the same in a course substantially parallel to the conveyor tapes, a hook carried by the sprocket chain and positioned for receiving the leading edge of a product as it is dropped from a said pocket, means driving the said sprocket chain at a predetermined speed ratio to the fan, the pitch speed of the sprocket chain and speed of the said hook in its course substantially parallel to the conveyor tapes being less than that of the conveyor whereby the product engaged by the hook is spaced from the last preceding product, and means guiding the sprocket chain in a circular arc lying radially inwardly of the said pockets and in fixed rotary relation to the fan, the hook being mounted on the sprocket chain for extending radially outward between pockets of the said fan and thereby travelling at a higher linear speed than the sprocket chain in said arc and in fixed relation to the said pockets through the said arc.

2. In a printing machine delivery mechanism comprising a rotary fan having a plurality of circumferentially spaced pockets for receiving successive products and conveyor tapes for receiving the products successively in overlapped relation from the fan pockets, product batching mechanism comprising a sprocket chain, means guiding the same in a course substantially parallel to the conveyor tapes, a plurality of hooks carried by the sprocket chain and positioned for receiving the leading edge of a product as it is dropped from a said pocket, means driving the said sprocket chain at a predetermined speed ratio to the fan, the pitch speed of the sprocket chain and speed of the said hooks in their course substantially parallel to the conveyor tapes being less than that of the conveyor whereby the product engaged by a said hook is spaced from the last preceding product, and means guiding the sprocket chain in a circular arc lying radially inwardly of the said pockets and in fixed rotary relation to the fan, the hooks being mounted on the sprocket chain for extending radially outward between pockets of the said fan and thereby travelling at a higher linear speed than the sprocket chain in said arc and in fixed relation to the said pockets through the said arc.

3. A product batching mechanism according to claim 2, comprising a sprocket wheel coaxial with the fan, rotatably fixed thereto and guiding the sprocket chain around the same in timed relation to the fan pockets, whereby each said hook is accommodated in the space between pockets as it passes around the fan.

4. A product batching mechanism according to claim 3, comprising a second sprocket wheel and means drivingly connecting the two said sprocket wheels together.

5. A product batching mechanism according to claim 4, in which the means drivingly connecting the sprocket wheels together comprises a bevel gear rotatably fixed to the fan, a bevel gear rotatably fixed to the second said sprocket wheel and a drive shaft carrying bevel gears in mesh therewith.

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