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DELIVERY DEVICE FOR ROTARY PRINTING MACHINES

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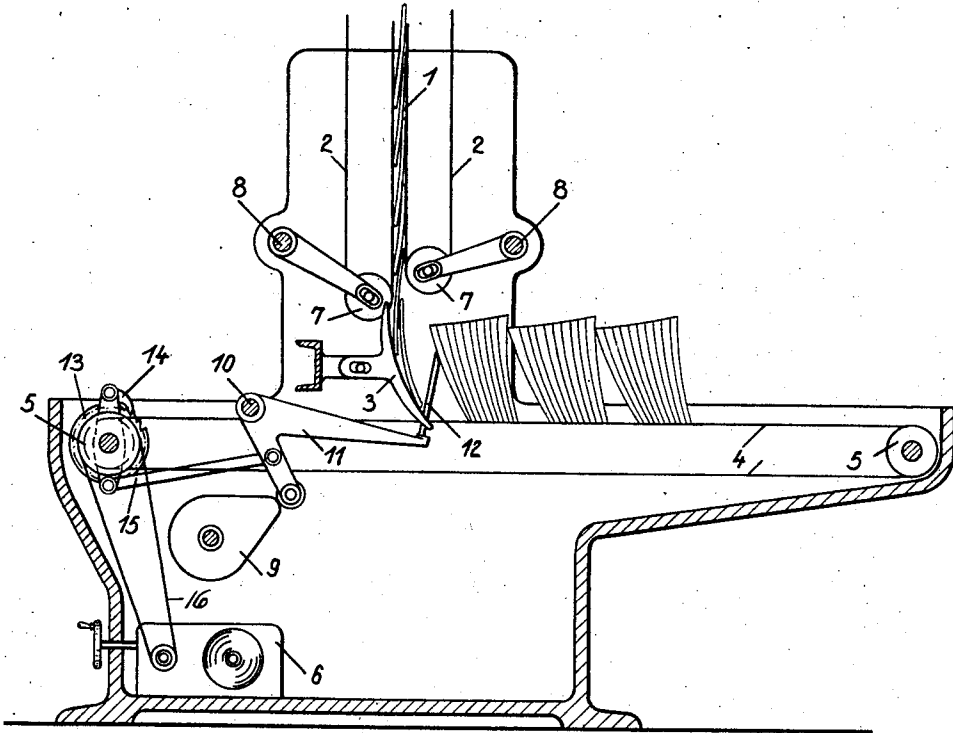


Fig. 1

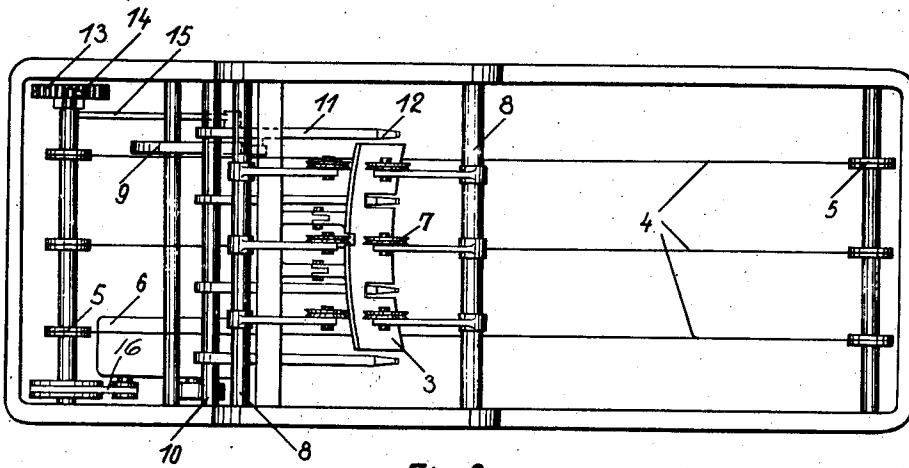


Fig. 2

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# UNITED STATES PATENT OFFICE

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## DELIVERY DEVICE FOR ROTARY PRINTING MACHINES

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3 Claims. (Cl. 93—93)

This invention relates to delivery devices in rotary printing machines, to which the printed products superposed like scales are fed by a conveyor or the printing machine itself so as to be removed in counted groups by another conveyor slowly moving rectangularly to the direction of feeding.

In some known delivery devices for rotary printing machines connected with conveying plants the printed products are counted by causing suitable means, such as a gripper, etc., to place, at certain distances, one of the products in a special position, so that it laterally or upwardly projects from the row of the other printed products vertically or horizontally arranged on the conveying device or is displaced in the conveying direction. These counting delivery devices are, however, open to the objection that they can be connected only to the printing machine itself or the folder thereof and are unsuited for delivering the products coming, for instance on a belt conveyor, from the printing machine in counted groups to another conveyor. Furthermore, separate motions of single products to mark off groups can hardly be carried out in view of the high speed of modern printing machines without endangering safety in operation.

It is further known to form piles by delivering the printed matter perfectly flat to compartments of a conveyor chain which after the filling of each compartment must be displaced at least to the extent of the height of one printed product. This displacement has to be effected in the short time between the delivery of two consecutive products, so that, considering modern printing speed, undue accelerations are unavoidable, and, furthermore, it is quite difficult to pick out individual products for examination.

It is further not possible to overcome this drawback by placing the printed products, according to another suggestion, from the delivery bucket wheel first in a broken row on the conveyor and, after a certain number of products has been thus delivered, piling them up by means of rapidly moving grippers which engage the conveyor from below. This method causes frequent slurring of the freshly printed sheets, and single copies cannot be removed from the group of printed products delivered by the bucket wheel on account of the risk of injury involved by the nearness of the latter and the action of the grippers.

In still other known delivery devices the conveyor is partitioned off and the printed products

are placed thereon so as to stand on edge instead of lying flat. Devices of this type are, however, suffering from the defect that with varying thickness of the products to be accommodated in the sections whose width does not change either overcrowding or collapse of the products takes place.

The invention eliminates the drawbacks mentioned and provides for the counting and separation of the piles of printed products on the conveyor by employing the grippers, etc. moving into the path of the printed products fed after a certain number thereof has been supplied and actuated in known manner by a cam disc and levers or other suitable means to stop the following products, and, simultaneously, by accelerating the conveyor by suitable devices, such as a feed mechanism, to provide a space between the finished piles. The speed of the conveying device can be regulated, preferably by an interposed gear with adjustable gearing, according to the thickness of the printed products due to that of the paper or the number of pages. The stability of the printed products placed on the conveyor can be increased by imparting to them in known manner, by means of adjustable rolls, a curved form which is maintained by providing the conveying path with three or more rows of attached teeth or a corresponding number of toothed chains into which the printed products are inserted with their curved edges.

By way of example, the invention is illustrated in the accompanying drawing, in which

Figure 1 is a side view of the device according to the invention; and

Fig. 2, a plan thereof.

Referring to the drawing, 1 designates the printed products which are fed by the conveying means of the delivery device and move with the closed edge in front; they are superposed like scales at a distance of approximately 8 cm. and are moved down by the conveying means, such as the wire spirals 2. Passing the guide rails 3, the printed products 1 move onto the conveyor 4 which travels to the right at a low speed, is carried by the rolls or rollers 5 and driven from the printing machine through the belt 6 by means of the regulatable gear 6.

The conveying means 2 are guided at their lower reversing point by the rolls 7 separately arranged in slotted and adjustable levers which are disposed on joint round traverse 8. The rolls 7 are so adjusted that the printed products are slightly bent and thus rendered capable of standing on the conveyor 4 without collapsing. The

conveyor 4 comprises three chains provided on their upper side with small teeth to compel the printed products arranged on the conveyor 4 to retain their curved form. The printed products are so arranged on the toothed conveyor 4 that the form of the individual printed products curved by the rolls 7 is maintained due to the edges of the products gripping in the gaps between the teeth. Thus the reason for the teeth is to provide a certain type of rough upper surface on the conveyor 4 so that the printed products will maintain their curved form. The guide rails 3 are adjustable in horizontal direction to permit adaptation to the curved form of the paper.

The cam disc 9 rotates proportionally to the speed of the printing machine, for instance at a ratio of 1:100 if packets of 100 pieces are desired to be formed on the conveyor 4. The cam disc 9 controls a double-armed lever 11 fixed at 10 and carrying at its right-hand end several grippers 12 which, during upward motion, enter between the printed products arriving in a certain order and prevent the first printed products from continuing their motion, the printed copies to the left of grippers 12 being prevented from continuing to move with conveyor 4 when said grippers enter between the products.

The spindle on which the left rollers 5 are arranged carries a ratchet wheel 13 which is fixed to the spindle of the left rollers 5 and which is engaged by the pawl of the lever 14 carried by a lever, also controlled by the cam disc 9, since it is connected with the lever 11 by the coupling bar 15. When the lever 11 is moved by the cam disc 9, the conveyor 4 is also moved a short distance by the pawl 14 to provide a clearly visible gap in the row of printed products arranged on the path.

I claim:—

1. A delivery device for rotary printing machines, comprising means for feeding the printed products in superposed scale-like fashion to the device, a conveyor moving rectangularly, or approximately so, to the direction of feeding, a guide for directing the printed products from said feeding means of said conveyor, rolls for carrying said conveyor, shafts for holding said rolls, a regulatable gear for imparting drive to said conveyor from the printing machine at a speed adapted to the thickness of the printed products, a cam disc rotating at a predetermined ratio to the speed of the machine, a double-armed lever con-

nected with and controlled by said cam disc, a plurality of grippers secured to the free right-hand end of the upper arm of said double-armed lever and adapted in response to the action of said cam disc to enter between predetermined numbers of the printed products arriving on said conveyor and to stop the motion of the first products of each predetermined number when said cam disc moves upwardly, a ratchet wheel carried by the shaft of one of said rolls, and a lever carrying a pawl and connected by a rod with said double-armed lever and cam disc, said pawl engaging said ratchet wheel in response to the action of said cam disc and double-lever for imparting additional motion to said conveyor and producing thereby a clearly visible gap in the row of printed products arranged thereon.

2. In a device according to claim 1 rolls for guiding the feeding means at its lower reversing point, slotted and adjustable levers bearing said rolls, and means for carrying said levers, said rolls being adjusted to slightly bend the printed products to impart stability thereto prior to the passage thereof to the conveyor.

3. A delivery device for rotary printing machines, comprising means for feeding the printed products in superposed scale-like fashion to the device, a conveyor moving substantially rectangularly to the direction of feeding, a guide for directing the printed products from said feeding means to said conveyor, rolls for carrying said conveyor, a regulatable gear for imparting motion to said conveyor from the printing machine at a speed adopted to the thickness of the printed product, a cam disc rotating at a predetermined ratio to the speed of the machine, means connected with and controlled by said cam disc adapted in response to the action of said cam disc to enter between predetermined numbers of the printed products arriving on said conveyor and to stop the motion of the first products of each predetermined number when said cam disc moves upwardly, a ratchet wheel associated with one of said rolls, and a lever carrying a pawl to which reciprocating motion is applied by said cam disc, said pawl engaging said ratchet wheel in response to the action of said cam disc for imparting additional motion to said conveyor and producing thereby a clearly visible gap in the row of printed products arranged thereon.

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