

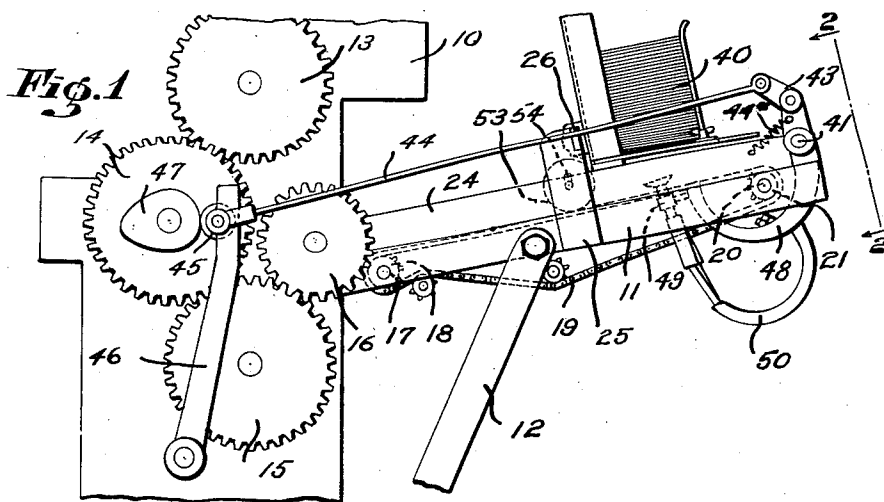
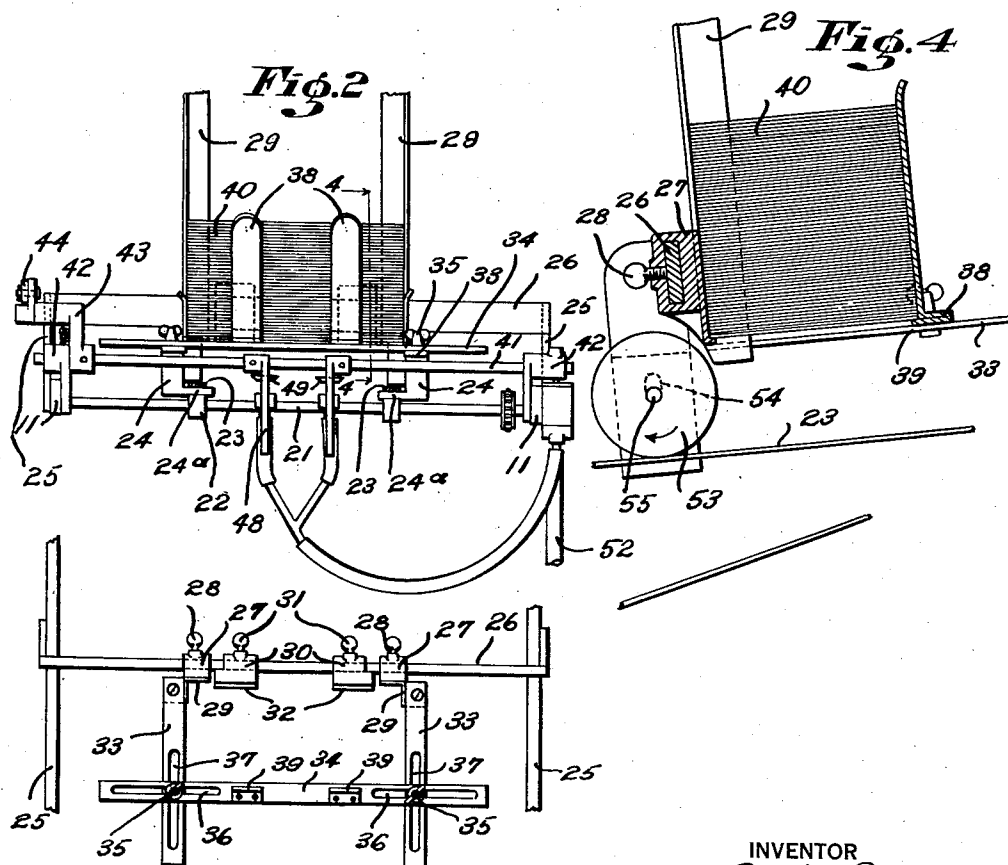
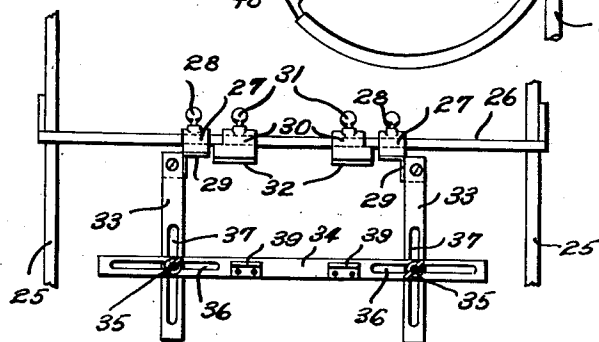
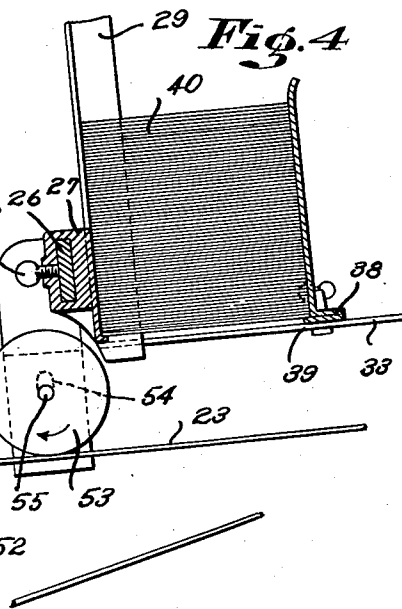
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FEEDING MECHANISM FOR OFFSET PRINTING MACHINES

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FEEDING MECHANISM FOR OFFSET PRINTING MACHINES

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This invention relates to feeding mechanism and more particularly to a feeding mechanism for use in connection with printing on the back side of finished envelopes.

In connection with the above art, printing means have been perfected, referred to in my co-pending application Ser. No. 122,543, filed January 27, 1937, making possible the printing of envelopes in the manner referred to at greatly increased rates of speed, as many as 5,000 envelopes per hour and more being printed. As a result very efficient and accurate feeding mechanism is required and with such production rates the nature of envelopes in and of themselves give rise to specific feeding problems. The quality and thickness of paper is a factor, the occurrence of warped edges must be taken care of, and there are peculiar difficulties arising from sagging of stacks of envelopes when in position to be fed into a printing machine. The present mechanism overcomes such difficulties and makes possible the feeding of 5,000 or more envelopes per hour.

The principal object of my invention therefore is an improved feeding mechanism.

Another object is means for holding and feeding envelopes.

Another object is means for overcoming feeding difficulties occurring from non-uniformly shaped envelopes.

Other objects and novel features comprising the construction and operation of my invention appear in the following description.

In the drawing illustrating the invention:

Fig. 1 is a view in side elevation fragmentarily indicating a printing machine and the improved feeding mechanism associated therewith.

Fig. 2 is an end elevation looking in the direction indicated by line 2—2 of Fig. 1.

Fig. 3 is a detail plan view of an envelope stack holder.

Fig. 4 is an enlarged cross section taken on the line 4—4 of Fig. 2.

Referring more in detail to the drawing, 10 indicates fragmentarily a frame within which is mounted rotary offset printing means forming no part of the present invention and not shown in the drawing.

Supported at one end in frame 10 are outwardly extending sides 11 which carry the feeding mechanism to be described hereafter and 12 indicates strap members further supporting the sides 11 in an adjustable manner. 13, 14, 15 and

16 comprise driving means for the printing mechanism above referred to.

Mounted between the sides 12 is a shaft 17 which is rotated by a gear mechanism forming a part of the printing machine proper and not shown in the drawing. Mounted on shaft 17 is sprocket 18 carrying a chain 19 which drives sprocket 20 mounted on a shaft 21 pivotally secured between sides 12 at the outer end of the feeding mechanism.

Fixed on shaft 21 are pulleys 22 which drive conveyor belts 23 also passing over a pulley member located on shaft 17. It may also be desired to provide another belt occurring midway between the belts 23 and driven in a similar manner to those already described.

Located adjacent the belts 23 are plate members 24 being provided with inwardly extending edges 24a for guiding subject matter being carried by the conveyor belts.

Solidly mounted on the outer sides of side walls 11 are uprights 25 which in turn support a rail 26. Slidably mounted on the rails 26 are blocks 27 provided with adjustment screws 28 and carrying angle members 29 projecting upwardly to form corners of a frame for receiving envelopes. Adjacent the blocks 27 are additional block members 30 similarly adjustable by screws 31 and formed on their inner sides with shelf portions 32. The remainder of the frame is made up of a pair of straps 33 fixed to the angle members 29 and across the edge is adjustably mounted another strap member 34 forming the rear side of the frame.

Strap 34 is secured across the two straps 33 by means of adjustment screws 35 which pass through elongated slots 36 and 37 whereby two-way adjustment of straps 33 relative to strap 34 may be effected. On strap 34 are mounted supporting pieces 38 inset to leave edges 39 for receiving the edges of envelopes.

It will be noted that a very efficient rack is effected by this construction in which a stack of envelopes 40 is supported along front and rear edges and the whole structure can be adjusted in two dimensions to adapt itself to various sizes of envelopes. In handling such subject matter, it has been found that stacks of envelopes, owing to certain warped conditions or other reasons, may tend to lie unevenly and may sag at the middle. By providing two support members 38 at one edge, and the adjustable edges 32 at the other edge, it is possible to maintain the stack in correct position for removal of single units

and a substantially straight alinement of the bottom envelope in the stack is effected since the edges 39 are substantially in the same plane. The significance of maintaining correct position of the envelope stack will be again referred to in connection with means for removing single envelopes therefrom.

Mounted above shaft 21 is a second shaft 41 being received at its ends in bearings 42. Fixed at one end of shaft 41 is a rod and link mechanism 43 and 44 and spring 44a, in which the rod member extends forwardly to the frame of the printing machine proper to connect with a cam follower unit 45 received on the inner side of a lever member 46. The cam follower unit is adapted to contact a cam 47 which is actuated by the driving mechanism of the printing machine, and the movement of the cam in this particular instance will be such that for each complete rotation of the printing rolls with the cam, the link will pass through one complete cycle.

Solidly fixed on shaft 41 are a pair of curved arms 48 having secured at their extremities suction cup members 49. Attached to the suction cups 49 are air conduits 50 which connect with a switch 51 controlling passage of air through conductor 52, which in turn is connected to some mechanical suction means of a conventional order not shown in the drawing. The switch 51 is provided with some desirable valve means for opening and closing the air passage to the suction cup at predetermined intervals during the cycle of movement of the suction members. The operation of the suction members as actuated by the rod 44 is to pass forward and upwardly into engagement with the bottom envelope of a stack such as 40 illustrated in Fig. 2. As the suction cups pass into contact with the envelopes, suction is occurring and the envelope will be removed from the stack by the edges 32 and 39 and passed downward upon the belts 23 slightly before which time the suction has been shut off, so that the envelope is free to move along on the belt.

It is understood that suction means for removing stacked subject matter to be printed is known in the art. However, in the present mechanism as many as 5,000 or more envelopes per hour are being fed into the machine and difficulties arise. For instance, at such a rate of speed, there may occur contacting of the suction cups in its upward path with an envelope that it has just deposited on the belts if for any reason the envelope has been slightly delayed in its passage along the belts. This difficulty is thought to be peculiar to the treatment of envelopes. To overcome this, the shape of the cam 47 is such that a portion of its surface, roughly speaking a third, is a true circle whereby the curved arms when this part of the cam is driving will be held at rest by spring 44-a, and the practical result of such a mechanism under high-speed conditions is to effect a very slight dwell in the movement of the curved arms 48 which allows the envelope which has just been dropped on the belts to move ahead out of the way of the suction cups coming up for the next operation.

In Fig. 4 I have shown roll members 53 which will preferably be composed of some soft resilient material such as sponge rubber. These rolls are provided to insure advancement of an envelope on the belts 23 as fast as possible.

It has been found that by locating the periphery of these rolls directly under the point at which the front edge of an envelope occurs, best results may be obtained. Several difficulties

arise in the handling of an envelope at this particular point. There may be the possibility of an envelope having its front edge projecting up from the belts sufficiently to impede its passage just long enough for the suction cups to come up and break the sequence of operation. By positioning the roll periphery in the manner referred to, there is a tendency for the clockwise rotation of the roll to absolutely prevent uplifting of the front edge of the envelope. Another difficulty which occurs at this particular point results from different thicknesses of paper of which the envelope may be composed. Such variance in thickness may result in failure of the envelope to be carried between the belt and the roll fast enough. To further overcome such a condition the roll 53 has been provided with an elongated slot 54 so that the roll mounted on shaft 55 is in a substantially floating position relative to its contact with the belt, 23 and thereby adapts itself to a variance in the thickness of the envelope passing between it and the belts. It may further be desired to use additional belts farther along to further insure steady progression of envelopes to the printing means.

One of the more important results achieved by the frame structure shown is maintenance of the envelopes in a substantially flat state by the application of the supporting edges in the particular manner shown, while providing an opening for the suction members to come up from beneath the pile in contrast with the conventional method of working from the top of the pile.

Very slight change in the position of the bottom envelope in the stack may result in failure of one of the suction members to properly engage the envelope and in such case, only one end of the envelope is carried to the belts and clogging occurs. In addition to avoiding such complications, the frame is of such adjustable nature as to adapt itself to a great variety of sizes such as is constantly being encountered in filling orders from different companies.

The action of the suction members together with the rolls 53 and the frame pieces 33 and 34 and the edges 32 combine to effect a steady accurate removal of envelopes from the bottom of the stack, which is adaptable to various non-uniformities particularly occurring with envelopes. The exact means of overcoming the difficulties referred to may be varied to some extent in size or shape of structure while still effecting the functions set out above.

Having thus described my invention, what I claim is:

1. In an offset printing machine a feeding mechanism for feeding envelopes, comprising in combination a frame, an endless carrier in said frame, holding means located on said frame, said holding means provided with adjustable shelf portions for holding two sides of an envelope stack, suction means pivotally mounted in said frame adapted to engage with the bottom unit in the said stack by uniformly pulling an envelope away from the said edges uniformly and releasing it upon the carrier member, roll means located in said frame in floating engagement with said carrier for advancing envelopes therealong, and being located in such manner that their peripheries fall directly and tangentially under the forward edges of envelopes in the said stack.

2. In a printing machine a feeding mechanism for feeding envelopes, comprising in combination a frame, endless carrier means located in said frame, holding means located on said frame

above the endless carrier for holding envelopes in stacked relationship, means for removing envelopes singly from the bottom of said stack and depositing them in a substantially horizontal position on the said endless carrier, driven roller means being so located as to prevent upturning of the front edge of an envelope which has been located on the endless carrier, and means for maintaining said roller means in floating engagement with the endless carrier whereby constant engagement of subject matter is effected between the carrier and the roller means irrespective of the thickness of the envelopes.

3. In a printing machine, a feeding mechanism for feeding envelopes comprising in combination a frame, an endless carrier in said frame, and a holding means for holding envelopes in stacked relationship, means for withdrawing an envelope from the bottom of the holder and releasing it in a substantially aligned position on the carrier, being cooperatively associated with driven roll means so located as to engage the envelope immediately after it has been located on the carrier, and said driven roll means supported in slotted bearings whereby self-adjusting engagement of the driven roll with the endless carrier is effected.

4. In a printing machine, a feeding mechanism for feeding envelopes comprising in combination a frame, an endless carrier and a stack holder, said stack holder comprising a plate, upright members adjustably located on said plate, adjustable supporting edges on said plate between said upright members, rearwardly extending straps comprising the sides of said holder, being slotted at their extremities to receive a transverse strap similarly slotted at its ends whereby two-way adjustment of the holder dimension may be effected, and an adjustable shelf and upright member movably located on said transverse strap.

5. In a printing machine a feeding mechanism for feeding envelopes comprising in combination a frame, an endless carrier in said frame, and a stack holder mounted directly over said carrier for receiving a stack of envelopes, said stack holder comprising front and rear supporting edges and front and rear upright portions, said supporting edges being adjustable relative

to their location to one another, said rear upright members being adapted to engage a stack of envelopes therein, means for removing envelopes occurring horizontally therein from the bottom of said stack, and means for engaging an envelope as it is lowered and after it engages with the endless carrier to insure its passage therealong.

6. In a mechanism for feeding envelopes, sheets and like materials, in combination, a frame, carrier means, supporting means for a stack of said material, suction means adapted to engage the bottom unit in the said stack and to pull said unit away from the stack and release it upon the carrier member, roll means for advancing units along the carrier, said roll means being so located as to present a peripheral surface falling directly and tangentially under the forward edges of the units in said stack.

7. In a mechanism for feeding envelopes, sheets and like materials, in combination, a frame, carrier means, supporting means for a stack of said material, suction means adapted to engage the bottom unit in the said stack and to pull said unit away from the stack and release it upon the carrier member, roll means for advancing units along the carrier, said roll means being so located as to present a peripheral surface falling directly and tangentially under the forward edges of the units in said stack, and means for delaying the return movement of the suction means toward the stack for that period of time required for a unit of subject matter to pass into engagement with said roll means after it has been deposited on said conveyor.

8. In a mechanism for feeding envelopes, sheets and like materials, in combination, a frame, carrier means, supporting means for a stack of said material, suction means adapted to engage with the bottom unit in the said stack and to pull said unit away from the stack and release it upon the carrier member, roll means so located in the frame that the front edge of a sheet when removed will fall directly under the roll periphery, and means for delaying return movement of the suction members toward the stack until a sheet passes along the conveyor to the position in which it is engaged by the said roll.

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