Aug. 22, 1939. A. NOVICK 2,170,422

ENVELOPE MACHINERY

Filed July 6, 1936 3 Sheets-Sheet 1

Fig. 1.

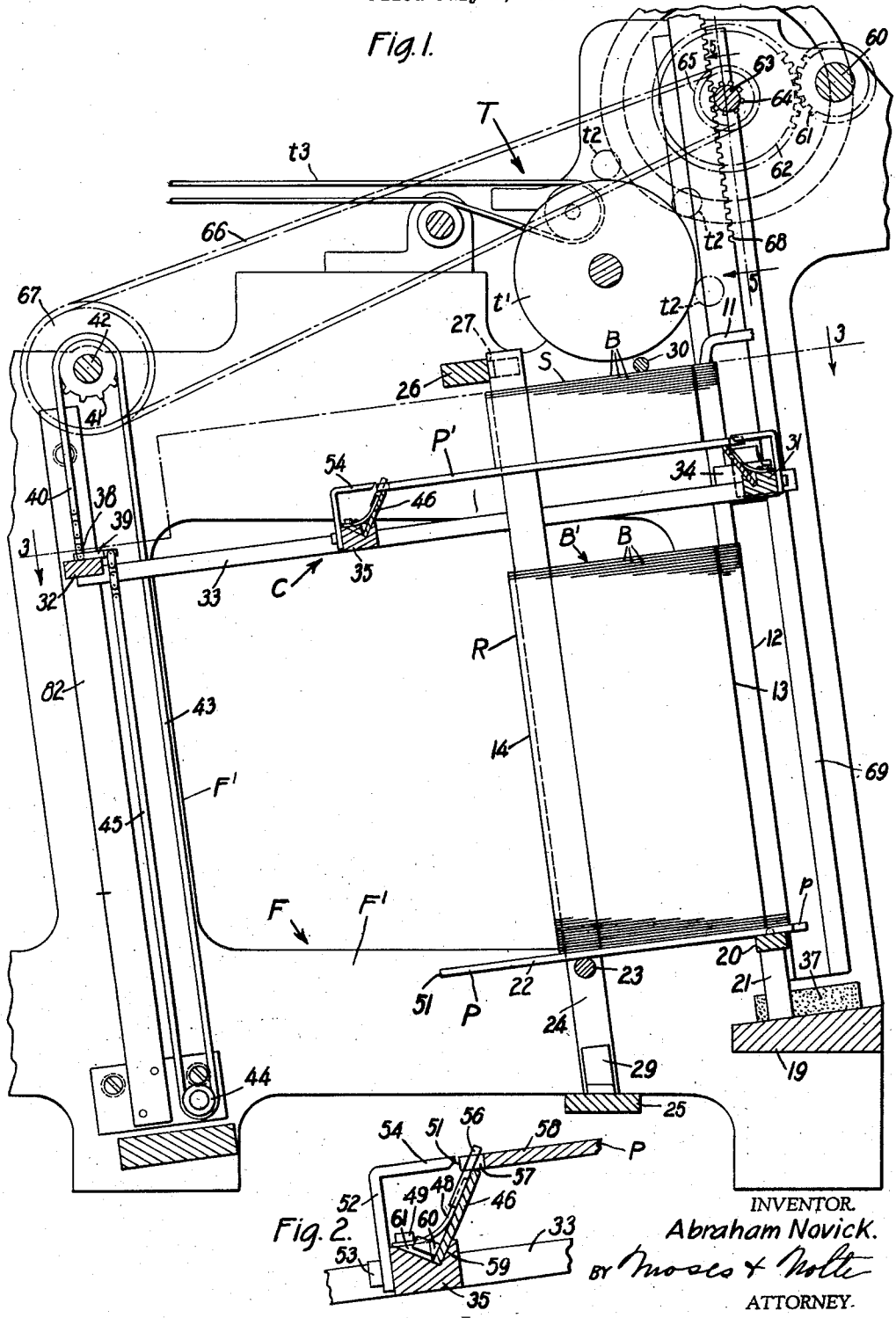


Fig. 2.

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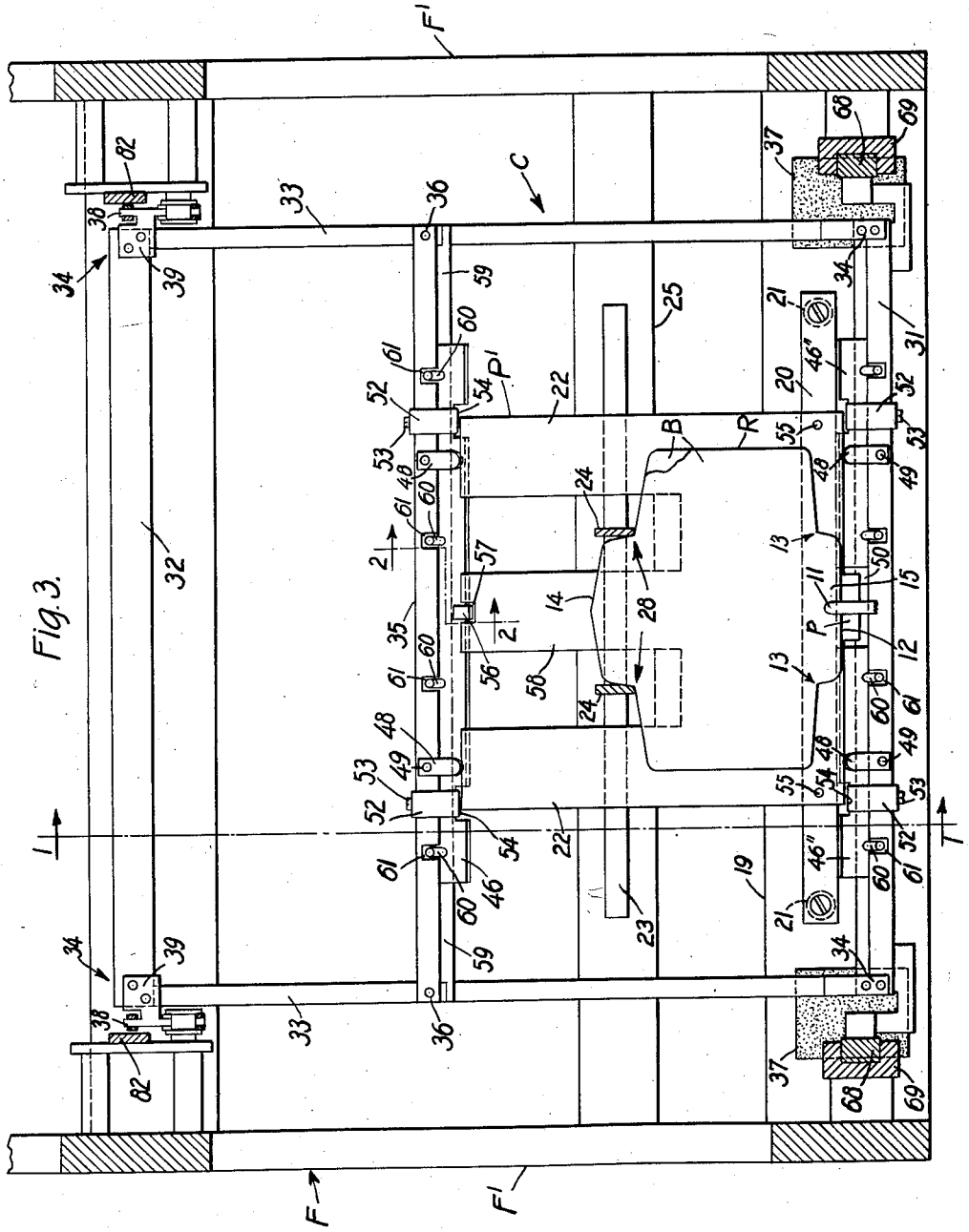


Fig. 3.

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ENVELOPE MACHINERY

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Fig. 4.

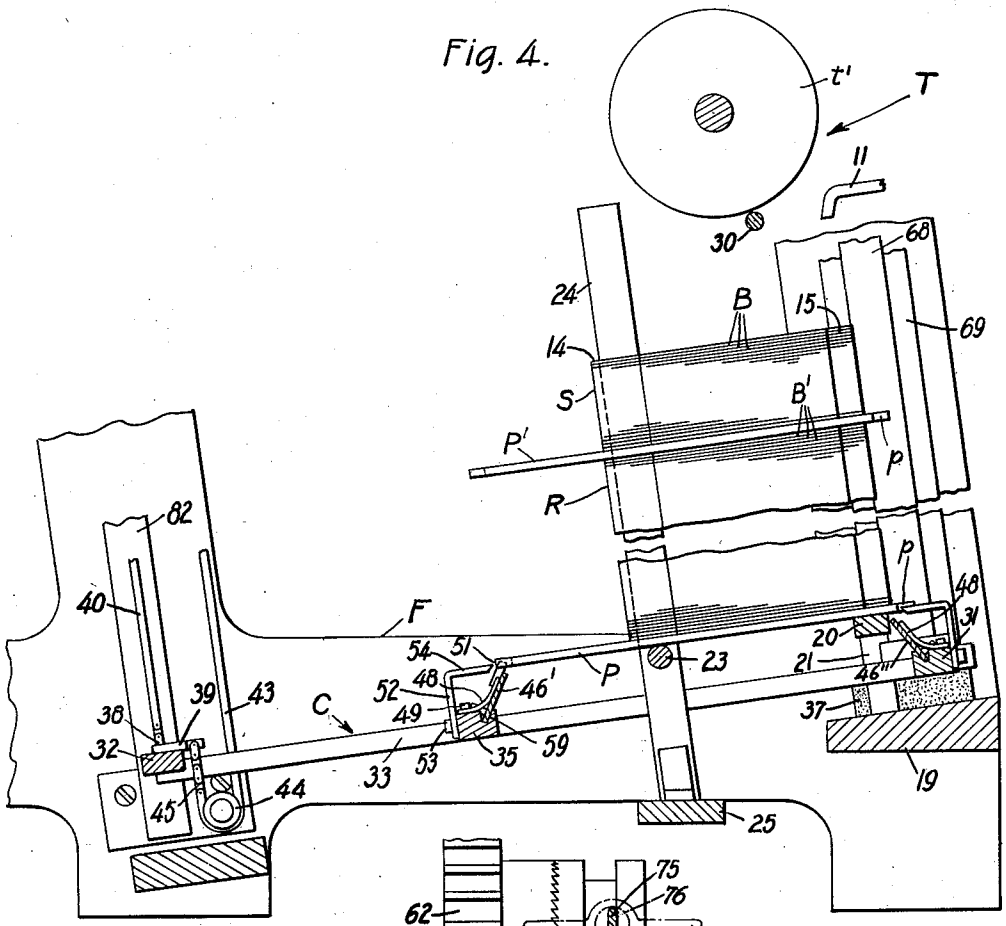


Fig. 6.

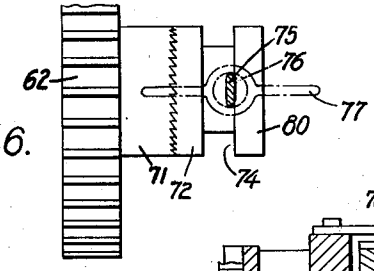


Fig. 5.

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Patented Aug. 22, 1939 2,170,422

UNITED STATES PATENT OFFICE

2,170,422

ENVELOPE MACHINERY

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Application July 6, 1936, Serial No. 89,085

11 Claims. (Cl. 271—62)

This invention relates to the art of fabricating envelopes and like planiform articles, especially to mechanism for transferring envelopes to and from various mechanisms for operating thereon, and more particularly to means for replenishing stacks of envelopes or similar planiform articles from which stacks they are concurrently consumed, being transferred therefrom individually.

It is known in the art of fabricating envelopes and similar planiform articles to build a stack of the articles in the upright or other path in which they are to be advanced and from which they are to be consumed, and in machines where elevators have been provided to raise stacks to a transfer point it has been a known practice to build supply stacks in succession upon the elevator platform, which is lowered for that purpose after the consumption of each such stack.

This is wasteful of time, as the machine is out of operation until the elevator can be again put into service, and so there has been an effort to obviate the above difficulty by building additional stacks aside from the elevator and then transferring each such stack, as needed, laterally to the elevator.

This latter practice has the disadvantage that such separately built stacks are likely to be upset during the displacement of the stack laterally from the building point to the elevator.

Under such conditions it is an object of the present invention to provide a novel method of stack replenishment according to which stacks are built successively in the same path along which each stack is to be advanced to the transfer point, such building of the successive stacks being accomplished in each instance while a preceding stack is being consumed from an advanced region of the stack formation, thus obviating the loss of time and danger of upset characteristic of the earlier practices as above set forth.

Another object of the invention is to provide a set of platforms or flights on each of which a stack can be built in its turn, and a means to support each flight in the path in which the articles are advanced in stack formation to the point of consumption.

In pursuance of the above, it is an object of the invention to provide for transferring the lifting mechanism from the consumed stack to the succeeding stack, either before or after the first-named stack has been entirely consumed, and to accomplish this transfer by snapping the elevator means over the new stack, leaving the platform or flight which formerly supported the consumed stack, now lying upon the top of the new stack, from which it can be removed readily and placed manually in position to support the next stack to be built.

An object of the invention is to save the time heretofore consumed in effecting alignment of each stack separately, such saving being effected by the above described novel method of building, jogging and aligning each stack increment in the final position it is to take without the need for awaiting the lowering of the conventional elevator.

A cognate object is to provide means by which my novel elevator is adapted to pick up automatically in succession each of a plurality of platforms or flights on which a group of envelopes shall have been stacked during the interval between such pick-up operations.

Another object is to provide mechanism by which manual operation of the working parts may be substituted at will for the automatic operation thereof.

Among other objects of the invention is to provide for a supporting structure, and for a coordination of the working instrumentalities carried thereby, such that there will be a smooth and continuous carrying on of the intended stacking of articles and a progressive transfer thereof from the delivery point to which they are successively brought by the elevator.

Still another object is to provide means by which such manual operations as are incidental to continuous operation of the machine may be effected from time to time without undue interference with the general functioning of the component mechanisms thereof.

Other objects and advantages of the invention will appear as the description of the particular physical embodiment selected to illustrate the invention proceeds.

In the accompanying drawings, like characters of reference have been applied to corresponding parts throughout the several views included in the drawings, in which:

Fig. 1 is a view of a somewhat schematic character, in vertical section, taken on the line 1—1 of Fig. 3, illustrating a stacking mechanism in the construction of which the present invention has been embodied;

Fig. 2 is a fragmentary, detail view on a somewhat larger scale, in vertical section, taken on the line 2—2 of Fig. 3;

Fig. 3 is a horizontal, sectional view taken on the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary, detail view in vertical

section, similar in viewpoint to Fig. 1, but with parts broken away, and showing the working instrumentalities in a different operative position from that of Fig. 1;

Fig. 5 is a fragmentary, detail view in vertical section on the line 5—5 of Fig. 1, showing portions of the manual operating devices and associated parts;

Fig. 6 is a fragmentary, detail view in plan of a portion of the parts shown in Fig. 5, but on a larger scale.

In a now preferred embodiment of the invention selected for illustration, the part designated generally by the reference character F is the framework of a mechanism which may be embodied in any suitable envelope making machine in which it is desired to elevate envelopes or like planiform articles, in stacks comprising successive groups of such articles, to a transfer point from which they are to be transferred seriatim, the transfer point being designated generally by the reference character T, the mechanism herein disclosed co-acting with a sucker arm 11 (see Fig. 4) that constitutes a typical working part of the transfer means.

In the instance illustrated, the sucker 11 is adapted to transfer each blank individually to further transfer means of any suitable character, and in the present embodiment the sucker 11 removes each blank from the top of the stack S when it has reached the top position thereon, the latter being denominated herein the first stack, for the sake of brevity, while the stack shown below it, at R, is denominated the second stack.

Only the articles near the top and bottom portions, respectively, of the stacks are shown in detail, the edges of the stack formation being indicated by the several upright lines 12, 13, 14, in Fig. 1. As will be understood upon reference to Fig. 3, the line 12 indicates the edge of the bottom flap 15 of an unfolded envelope blank B while 13 indicates one of the re-entrant corners and 14 indicates the tip of the sealing flap.

As the various elements of the stacking mechanism are organized around the stack formation R—S, and around the path in which each reserve stack is built up and is eventually elevated to become a supply or first stack S, the characteristics of this stack and path will now be described in sufficient detail to permit a complete understanding of the present embodiment of the invention.

The stack R is built upon a platform or flight P upon which the blanks B are accumulated by any suitable method, manual or mechanical, the method contemplated in the present instance being to add them to the stack by hand, either singly or in batches, until they reach approximately the height of that designated B' in Fig. 1, although this does not define essentially the upper limits of the stack R, this being substantially determined by the space available for introduction of envelopes below the platform P' upon which is being elevated the first stack S, the latter being a stack which has been built up on the platform P' when the latter occupied the lower position, viz., that occupied by the platform shown in full lines at P in Fig. 1.

The last-named platform is like the platform P' in general shape, which is best shown by the plan view Fig. 3, wherein the platform P' is revealed as roughly M-shaped in plan, the top of the M being extended in a forwardly direction. The front edge of the platform P (see Fig. 1) is supported on a long ledge 20 carried by posts 21 on a step 19 extending between the side frame members F' while the shanks 22 extend rearwardly over a rod 23, sufficiently lower in level to cause the platform P to assume naturally an inclined position, with the result that the envelopes naturally jog or slide back until stopped by the upright frame members 24.

These are stepped upon a cross-piece 25 of the frame structure and at their upper ends rest against a rail 26, which is provided with means 27 by which the guides 24 will be held in properly spaced position to align envelope blanks of a given dimension by abutment with the angular cut out portions 28 in the usual known manner of effecting such alignments. Similar means 29 (see Fig. 1) are effective at the lower ends of the guides, and the guides are transfixed horizontally by the rods 23, which they support.

In pursuance of the invention, provision is made of an elevator mechanism by which each platform or flight of the series P, P', etc., is in turn picked up with its stack of envelope blanks and raised to bring the top of the stack into juxtaposition with the sucker 11 of the transfer mechanism T, and against an overhead abutment rod 30.

The transfer mechanism T comprises a rotor *t'*, complemental rollers *t2* and belt conveyor *t3* which do not require description. This subject matter is claimed in another application Serial No. 89,083, filed July 6, 1936.

Geared to the driving means (not shown) of this transfer mechanism, is a shaft 60 having a pinion 61 meshing with a gear wheel 62 on the shaft 63, which is provided with pinions 64 and a sprocket wheel 65. A sprocket chain 66 runs thence to a sprocket wheel 67 on a shaft 42, so that the shafts 63 and 42 run desirably at a predetermined gear ratio.

The pinions 64 on the shaft 63 are engaged with rack members 68 working in slides 69 on the frame, which serve to elevate and depress alternately the front edge of the cage C of an elevator to be described, being connected to the forward member 31 of the cage.

The rear member 32 of this cage is elevated and depressed by a pair of flexible chains 40 working on sprocket wheels 41 of the shaft 42.

The cage C constitutes the principal element of the elevator, comprising front and rear bars 31, 32, and side bars 33 suitably fastened together at their corner joints as at 34. Across the middle of the cage frame extends a bar 35, fastened to each side bar 33, as at 36.

The middle bar 35 is spaced suitably from the front bar 31 to leave a rectangular opening in the cage slightly greater from front to rear than the corresponding dimension of the platforms P, P', etc., and when the cage C is in the position shown in Fig. 4, at the bottom of its path, the cage frame stands well below the level at which platform P is supported by bench 20 and rod 23.

This is the starting point, at which the platform P is to be picked up, and at this position the cage rests with its front end on an elastic pad 37 provided at each front end to cushion the fall, while the rear end of the elevator cage is supported by the two chains 40, each having one end fastened, as at 38, to a bracket 39 mounted on the rear bar 32 of the cage, whence each stretch 40 extends up over the sprocket wheel 41 on shaft 42 running across the rear of the frame at the top, as indicated in Fig. 1, this chain then extending, in another stretch 43, downward

and around an idler pulley 44, and then upward, in a stretch 45, to the bracket 39.

The pick-up means illustratively shown as provided upon the cage, comprises a series of elongated struts in the form of metal strips 46' and 46'', each set in a groove 59 (see Fig. 4) in one of the cage bars 31 and 35, there being one of the strips, as 46' at the rear and two of the strips as 46'' at the front. Each strip is held in a forwardly inclined position, as shown, by the series of stiffly resilient metal fingers 48 secured to bar 31 and bar 35, as by screws or rivets 49.

There is a gap 50 between the front bars 46'' in which stands a lug *p* of the platform, serving as an additional positioning means, and as a handle by which to manipulate the platform P' (see Fig. 3).

When the cage C is being lowered to the position of Fig. 4, the free edges of struts 46 are pressed yieldingly against the front and rear margins 51 of the platform P, but as soon as they pass the plane of the under surface of the platform they snap into the position shown best in Fig. 2, beneath the margins of the platform and ready to raise the platform when the cage ascends.

Fig. 2 shows also the manner in which the platform is aligned with the cage and in proper position for its upward travel. Abutments 52 of finger-like shape are bolted at intervals along the middle cage bar 35, and the front bar 31 as at 53, and their free ends 54 stand opposite the edge of the platform in substantially the position shown in the several figures, so that there is practically no opportunity for the platform P to shift forwardly or backwardly.

At the middle of the strut 46 shown in Figs. 2 and 3 is mounted a stop 56 which enters a notch 57 in the middle leg 58 of the platform P, and prevents sidewise shifting of the platform. Dowels 55 are also mounted on the rail 20, to enter complemental dowel holes in the platform (see Fig. 3).

The foot of each of the struts 46' and 46'' is set in the V-shaped channel 59 sunk in the upper face of bar 31 and bar 35, as already mentioned, and at intervals the adjacent wall of this channel is recessed, as at 61, to receive studs 60 extending rearwardly and upwardly from the struts. These also act to maintain proper alignment, as between each strut and the bar 31 or 35, as the case may be.

The invention provides suitable clutch means for connecting and disconnecting the elevator actuating shaft 63 from its driving pinion 62, the clutch including a member 71 integral with the hub of the gear 62, and a shifting member 72 splined at 73 to shaft 63 and having a peripheral groove 74 into which extends a finger 75 on a spindle 76, provided with a finger-piece 77. The spindle is mounted in a bracket 78 on the frame member F5, and when in the position shown in Fig. 5 the clutch is engaged and the elevator cage C is gradually raised by action of the pinion 64 on rack 68, and the concurrent action of pinion 41 on the chain 40. Its motions are timed suitably with respect to the action of sucker 11, by connections not shown. Guides 82 prevent sideshake of the cage.

The clutch member 72 is biased to closed position by coil-spring 79. When the finger-piece 77 is rotated to turn finger 76, the latter engages with collar 80 on the shifting member 72 and opens the clutch, overcoming the bias of spring 79. The finger 76 will hold the clutch in open position until again operated, and as long as the clutch is open the shaft 63 may be turned in either direction by the handwheel 81.

The shaft 63 may be so turned to lower the cage to the position shown in Figs. 2 and 4, or the weight of the cage itself will cause its descent by gravity. Bumpers 37 of elastic material are provided, as already noted, to cushion the shock at the bottom of the range of movement.

It will be understood readily from the foregoing description that if the first stack S in Fig. 1 be entirely consumed and then the cage C be lowered by hand in the manner described, the platform or flight P' of Fig. 1 will be left on top of the blank B' of the second stack R as the cage moves on down to pick up the platform or flight P' with the second stack. The aforesaid flight P' may then be removed readily, and as soon as the second stack R shall have been raised sufficiently to afford adequate clearance beneath the platform or flight P, the free flight or platform P' may be inserted into the pathway, rested upon the bench 20 and rod 23, and is then ready to have a new stack built in the pathway.

This operation will be repeated as long as the consumption of blanks from the top of the first stack continues.

It will be understood further that it is not necessary to await complete consumption of the first stack S, as the cage may be moved down to pick up a second stack, when, as illustrated clearly in Fig. 4, there are several of the blanks near the bottom of the first stack still unconsumed, and when a desirable quantity of blanks to form a second stack R has been accumulated on platform P.

It is found in practice that the platform P' of the first stack can be readily removed from between the last blank of the first stack and the first blank of the second stack with the exercise of only ordinary care to avoid disturbance of the blanks. Each flight or platform has a forward projection *p* (see Fig. 3) by which it may be grasped and drawn forward for removal from the stacks.

I have described what I believe to be the best embodiments of my invention. I do not wish, however, to be confined to the embodiments shown, but what I desire to cover by Letters Patent is set forth in the appended claims.

I claim:

1. In a machine for fabricating or treating envelope blanks and like planiform articles, in combination, a support adapted to receive in succession a series of platforms or flights for accumulation of a stack of said articles on each of said platforms, an elevator mechanism comprising upright guides associated with said support and forming a path for said platform, and a cage reciprocable in said guides, having a hatchway adapted to receive said platform, means on said cage surrounding said hatchway, for transferring said platform from said support to said cage, and means to raise said cage with said platform and superimposed stack of articles to a desired height.

2. An elevator mechanism for raising successively a series of platform each with a superimposed stack of planiform articles, in a machine of the class described, said elevator mechanism comprising the elements combined and cooperating as set forth in claim 1, and also characterized by having said hatchway formed as an opening of a size approximately that of the selected platform dimensions, and said transfer means including a strut device with means to bias said

strut device yieldingly into the area defined by the hatchway, whereby the strut device is adapted to slip along the upright stack when the cage is lowered to a level or position substantially coincident with that of the platform, and is biased into a position suitable to lift the platform and stack when the cage ascends.

3. In a machine of the class described, article engaging means defining an upright path for transfer of planiform articles such as envelope blanks to a transfer point for individual consumption, an elevator means reciprocable along in said path and adapted to raise successive stacks of blanks from a building point to said transfer point, means for operating said elevator means in forward and reverse directions, means for positively arresting reverse movement of the elevator means, and a plurality of supporting means in said path upon which successive stacks of said articles can be built serially, each during consumption of a preceding stack, and mechanism, operated in timed association with the main driving means for the machine, to actuate said elevator means.

4. A machine comprising the means combined and cooperating as set forth in claim 3, and further characterized by mechanism, operated in timed association with the main driving means for said machine, to actuate said elevator means, said mechanism comprising a rack-and-pinion device for elevating the forward edge of said elevator means, and a chain device for elevating the rear edge thereof.

5. A machine comprising the means combined and cooperating as set forth in claim 3, and further characterized by mechanism, operated in timed association with the main driving means for said machine, to actuate said elevator means, said mechanism comprising a rack-and-pinion device for elevating the forward edge of said elevator means, and a chain device for elevating the rear edge thereof, and a manually operable clutch to control said elevating devices.

6. A machine comprising the means combined and cooperating as set forth in claim 3, and further characterized by mechanism, operated in timed association with the main driving means for said machine, to actuate said elevator means, said mechanism comprising a rack-and-pinion device for elevating the forward edge of said elevator means, and a chain device for elevating the rear edge thereof, and a manually operable clutch to control said elevating devices, and to supersede them for manual actuation at will.

7. A machine for fabricating or treating envelope blanks or like planiform articles, having the features claimed in Claim 1, in which each stack is built on an M-shaped platform.

8. A machine for fabricating or treating envelope blanks or like planiform articles, having the features claimed in Claim 1, in which each stack is built on an M-shaped platform, and said support includes uprights disposed between legs of the M-shaped platform.

9. A machine for fabricating or treating envelope blanks or like planiform articles, having the features claimed in Claim 1, in which each stack is built on an M-shaped platform, and said support includes uprights disposed between legs of the M-shaped platform, said uprights having cross-bars on which said platforms respectively are mounted in a position inclined to bias the stack components toward certain of said uprights.

10. In a machine for fabricating or treating envelope blanks and like planiform articles, in combination, a magazine comprising blank engaging members inclined slightly to the vertical for promoting and maintaining registry of the blanks, an elevator cooperative with a stack supporting platform for carrying a blank supporting platform upward in the direction of said blank engaging members and in an attitude substantially at right angles to said members, means for moving said elevator up and down while maintaining the attitude thereof unchanged and resilient means for cushioning the downward movements of said elevator.

11. In a machine for treating envelope blanks, the combination of a support adapted to receive in succession a series of platforms for accumulation of a stack of said blanks on each of said platforms, an elevator mechanism comprising guide members associated with said support and forming a path for said platform, a cage reciprocable in said guides and having an open area adapted to receive and pass said platform, resilient means on said cage arranged to pass over said platform during the downward movement of said cage and to engage and support said platform during its upward movement, said platform being provided with a slot and said resilient means with a portion adapted to project into said slot to thereby prevent movement of said platform with reference to said cage, and power driven means for elevating said cage and platform to a desired height.

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