Oct. 11, 1938. J. T. DALTON 2,133,189

ARTICLE COUNTING AND STACKING MECHANISM

Original Filed April 12, 1935 3 Sheets-Sheet 1

Fig. 1.

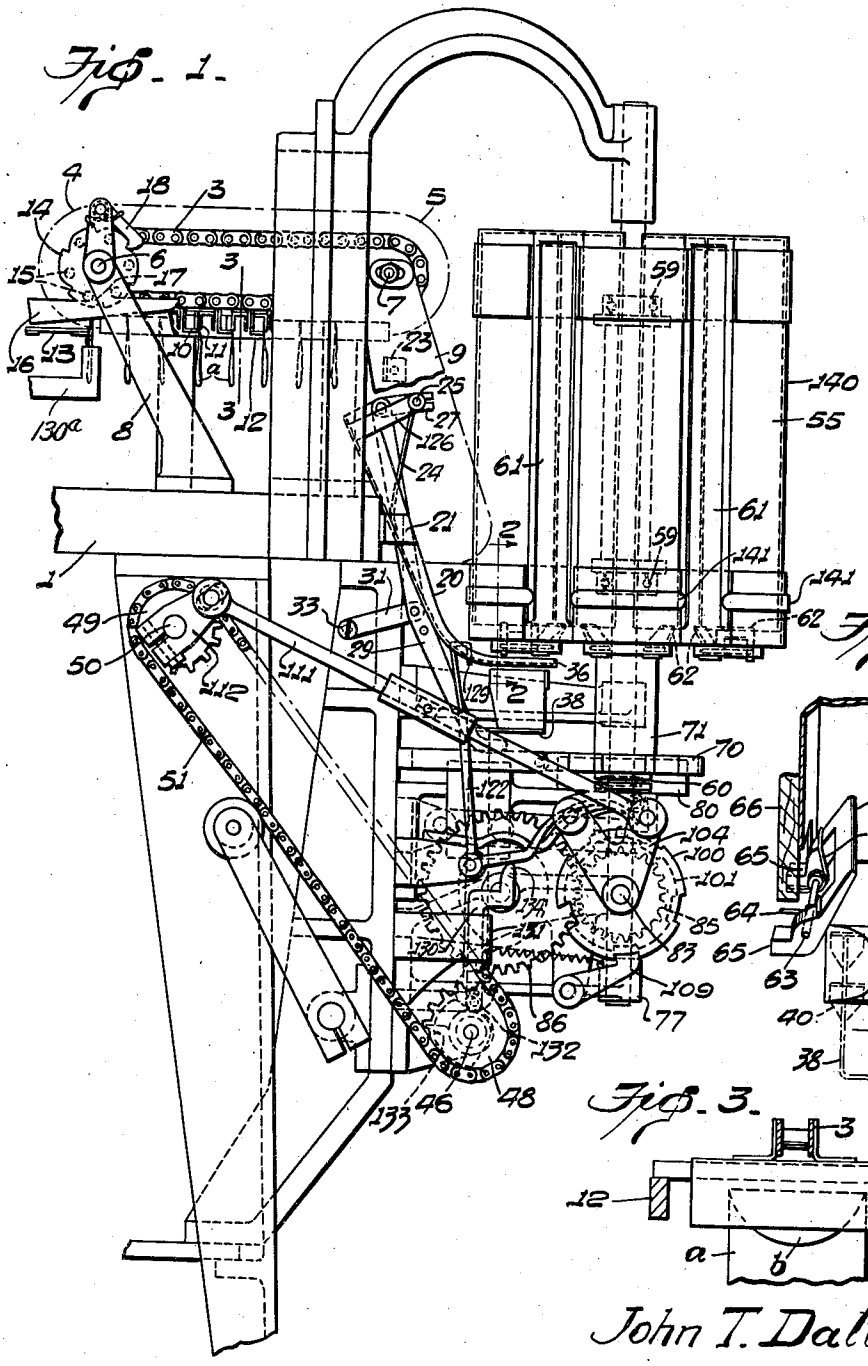


Fig. 2.

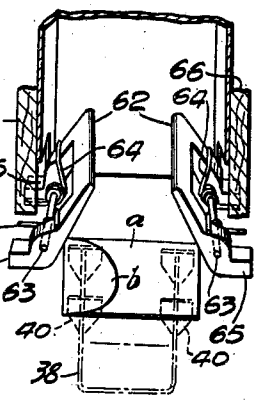


Fig. 3.

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Fig. 4.

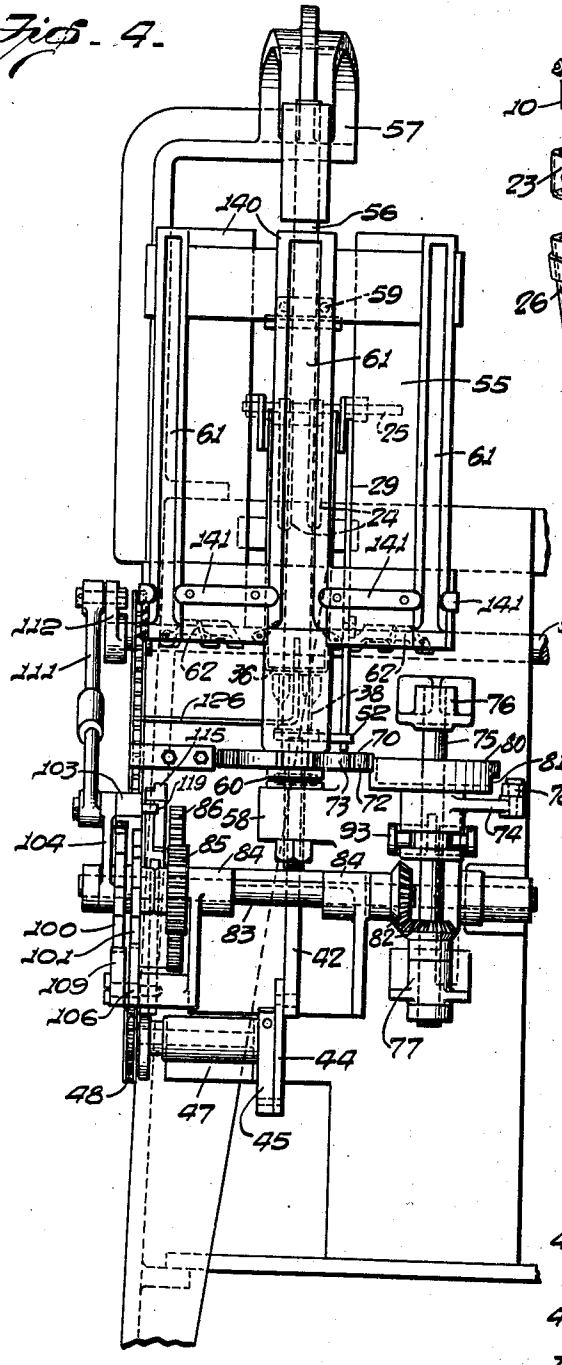
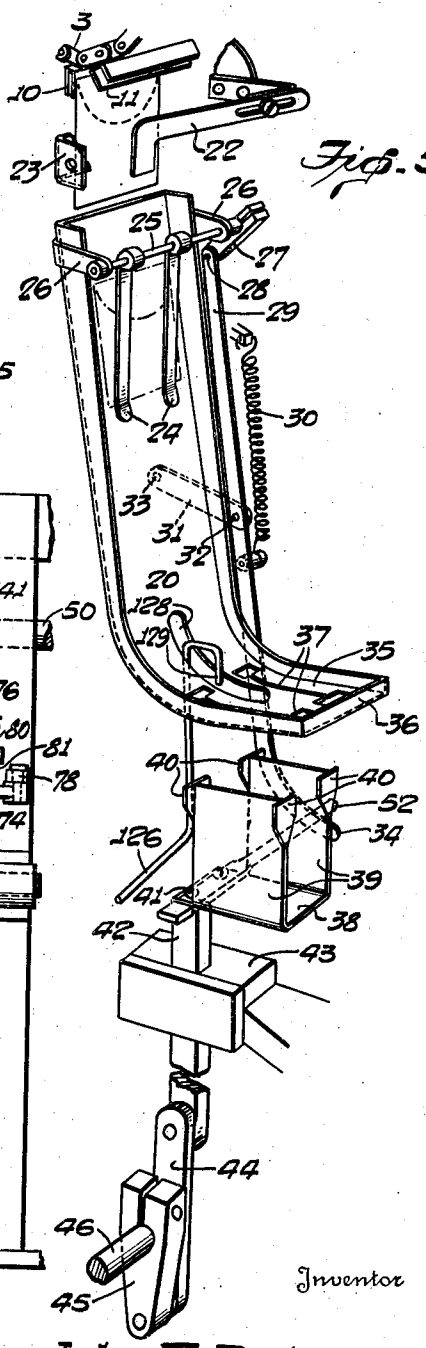


Fig. 5.



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ARTICLE COUNTING AND STACKING MECHANISM

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Fig. 6.

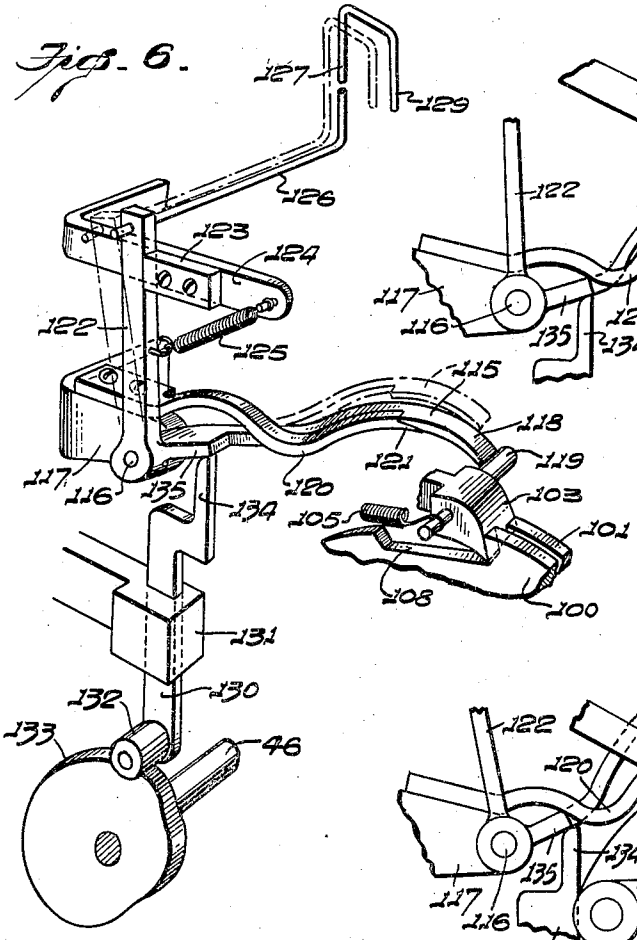


Fig. 7.

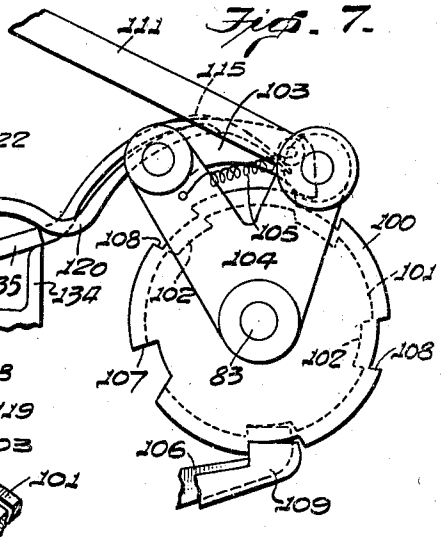


Fig. 8.

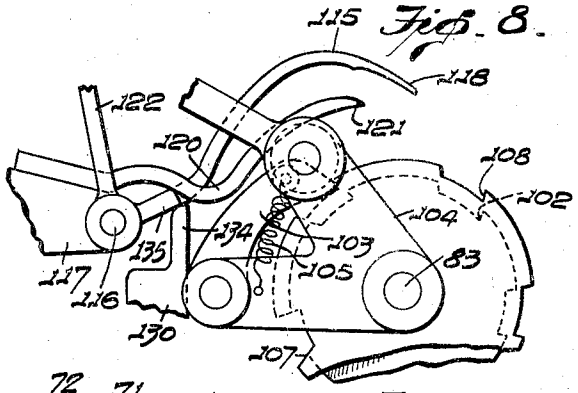


Fig. 9.

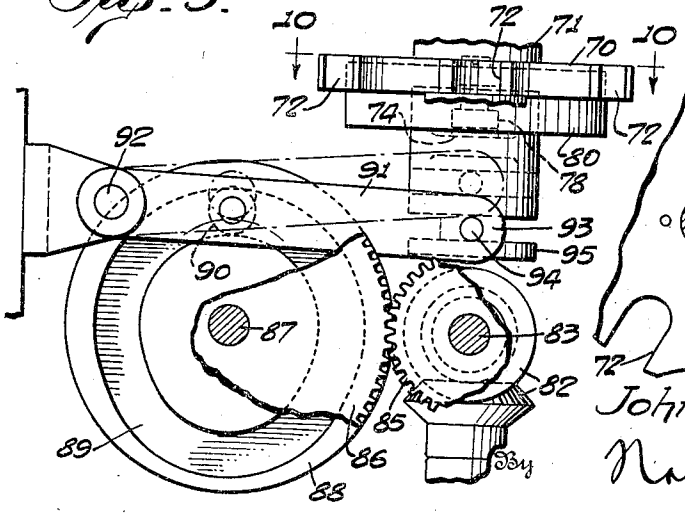
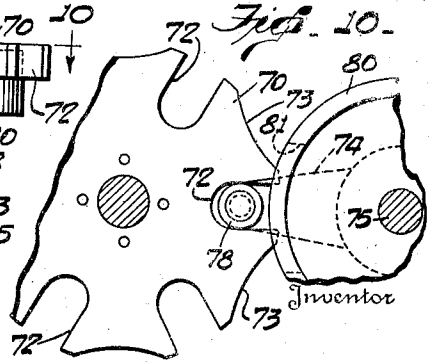


Fig. 10.



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Patented Oct. 11, 1938 2,133,189

UNITED STATES PATENT OFFICE

2,133,189

ARTICLE COUNTING AND STACKING MECHANISM

John T. Dalton, Durham, N. C., assignor to Wright-Dalton Machinery Company, Durham, N. C., a corporation of North Carolina

Original application April 12, 1935, Serial No. 16,092. Divided and this application April 13, 1936, Serial No. 74,220

20 Claims. (Cl. 93—93)

The present invention relates to machines for packaging articles, and more particularly to the packaging of pills and similar articles in envelopes and similar containers, the present application being a division of my prior application, Serial No. 16,092 filed April 12, 1935.

One of the primary objects of the invention is to provide novel and improved means for counting envelopes or similar receptacles, which may be filled with pills or similar articles, and forming them into stacks ready for packing and shipment or storage.

Another object is to provide novel and improved means for detecting the absence of an envelope and for controlling counting means accordingly, so that the counting means will not perform a counting operation unless an envelope is actually fed thereto.

A further object of the invention is to provide novel and improved means for introducing a predetermined accurately counted number of filled envelopes or receptacles into each of a number of pockets in a magazine and from which the envelopes or receptacles may be removed in the form of stacks ready for packing or storage, each stack containing an accurately counted number of the envelopes or receptacles.

To these and other ends the invention consists in certain improvements and combinations and arrangements of parts all as will be hereinafter more fully described, the features of novelty being pointed out particularly in the claims at the end of this specification.

In the accompanying drawings:

Figure 1 is an elevation of a mechanism according to the present invention for counting filled envelopes, a magazine to receive them, and means for introducing the filled envelopes into the magazine;

Figure 2 is a detail vertical section, on an enlarged scale, taken on the line 2—2 of Fig. 1 and looking in the direction of the arrows, showing the means for introducing the filled envelopes into a chamber or pocket of the magazine and the means for retaining a stack of filled envelopes therein;

Figure 3 is a transverse vertical section through the filled envelope carrier, on an enlarged scale, taken on the line 3—3 in Fig. 1;

Figure 4 is an elevation of the structure shown in Fig. 1 as viewed from the right in that figure;

Figure 5 is a detail perspective view of the mechanism for receiving the filled envelopes from the carrier, and feeding them to the means for introducing them into the magazine.

Figure 6 is a detail perspective view of the mechanism which controls the counting mechanism according to the presence or absence of a filled envelope;

Figure 7 is an elevation of a portion of the mechanism shown in Fig. 6, showing the counting mechanism set in inoperative or non-counting condition, as when a filled envelope is absent or not presented for introduction into the magazine;

Figure 8 is a view similar to Fig. 7 but showing the counting mechanism in normal or counting condition as when a filled envelope is present for introduction into the magazine;

Figure 9 is a detail view, partly in elevation and partly in section and on an enlarged scale, showing the mechanism for rotating the magazine to bring the envelope receiving chambers or pockets therein successively into envelope receiving position; and

Figure 10 is a horizontal section taken on the line 10—10 in Fig. 9.

Similar parts are designated by the same reference characters in the different figures.

The present invention provides a machine which embodies means for carrying filled and sealed envelopes, while maintained in sealed condition, to a magazine in which they are stacked, and for counting the actual number of filled envelopes stacked in the magazine, the magazine having a plurality of chambers or pockets therein, each adapted to stack a predetermined counted number of the filled envelopes therein, and means being provided for automatically bringing another chamber in the magazine into envelope receiving position when a preceding chamber therein has received a predetermined counted number of the filled envelopes.

The preferred embodiment of the invention is shown in the present instance as applied to the counting and stacking of envelopes, but it will be apparent that the invention is not restricted thereto or to the particular construction of machine shown since the machine may be employed for other similar purposes and constructions equivalent to that shown may be employed and such will be included within the scope of the claims.

The counting and stacking mechanism, as shown in the present instance, is mounted on the table 1 of an envelope filling and closing machine as shown and described more fully in my prior application hereinbefore referred to, although it is to be understood that it may be

employed alone or in conjunction with filling and closing machines of other constructions.

The filled envelopes to be introduced into the counting and stacking mechanism may be of an ordinary well-known form comprising a flat body *a* of paper or other suitable material, closed at the bottom by the usual closing flap which may be lapped and pasted against the body, and a closing flap *b*, this flap being in its closed and sealed condition when the envelopes are supplied to the counting and stacking mechanism.

After the envelopes have been filled and the flaps *b* have been folded, gummed and sealed by any suitable means, as by the filling and closing means discussed in my aforesaid prior application, they are introduced into the counting and stacking mechanism by any suitable means, as for example, by a carrier which maintains the flaps in sealed condition while conducting them to a feeding device which directs the filled and sealed envelopes to a magazine for stacking therein. The carrier device shown in the present instance is similar to that disclosed in my prior application filed December 6, 1934 Serial No. 756,355, it comprising, as shown in Figs. 1 and 5, an endless chain **3** which is mounted to travel over a pair of sprocket wheels **4** and **5** fixed on shafts **6** and **7** supported in bearing brackets **8** and **9** mounted on the table **1**. The links of the chain **3** carry gripping members **10** and **11** which while traveling around the sprocket wheels, are relatively separated but which while traveling along the lower straight side of the chain, are in relatively closed relation so that they will grip and maintain sealing pressure upon the gummed and closed flaps on the upper ends of the envelopes, rails **12** being provided along which the grippers travel at the underside of the chain for maintaining the gripping members in gripping relation with the envelope flaps. The shaft **6** of the sprocket wheel **4** is located above the path of travel of a conveyor such as that disclosed in my application Ser. No. 16,092 hereinbefore referred to, such conveyor carrying grippers **130a** which grip the edges of the envelope and advance it, as shown in Fig. 1, so that each envelope as it is advanced edgewise by the conveyor will be brought into a position between adjacent grippers **10** and **11** which at that time are about to leave the sprocket wheel **4** by an ejector **13** or other suitable means, so that these grippers will close upon the upper flap carrying end of the envelope.

Any suitable means may be provided for advancing the chain **3** of the carrier immediately after the upper flap carrying end of an envelope has been introduced between adjacent grippers thereon, whereby the upper end and closing flap of such envelope will be gripped and advanced by the carrier, as for example, a disk **14** fixed on the shaft **6** to which the sprocket wheel **4** is fixed, this disk having an annular series of pins **15** fixed thereon and projecting from a side thereof in appropriately spaced relation, and a pawl **16** having a dog **17** thereon which is engageable successively with the pins **15** as the pawl is reciprocated by any suitable means, as for example, that shown in my aforesaid prior application. The disk **14** has ratchet teeth formed in its periphery with which a spring pressed dog **18** cooperates to prevent backward motion of the carrier chain **3** after each advance thereof.

The filled and sealed envelopes are advanced by the carrier while suspended therefrom and while their upper ends and closing flaps are clamped firmly between the grippers of the carrier, as shown in Fig. 1, until the envelopes reach a position beneath the sprocket wheel **5**. As the envelopes reach this position, the grippers **10** and **11** of the carrier begin to pass around the sprocket wheel **5**, in consequence of which the grippers are opened or relatively separated, and the envelopes are thus released from the carrier and dropped by gravity into a feeding device for an envelope stacking magazine, shown particularly in Figs. 1 to 5 inclusive. This feeding device comprises an inclined chute **20** which is suitably supported in fixed position on the machine as by a bracket **21**. In order to insure the removal of any bag that may tend to adhere to the grippers of the carrier when such bag reaches the discharge point, a plate **22** is provided which is mounted to be reciprocated by any suitable means in parallelism with the plane of the envelope suspended at the discharge end of the carrier and a stationary stop **23** is also provided adjacent to the point of discharge of the envelopes from the carrier, this stop being fixed to a side of the bracket **9** so that it will be in the path of the lower portions of the envelopes suspended from the carrier as the envelopes reach the discharge point. By this arrangement, as each envelope reaches the discharge point on the carrier it will be released by the opening of the grippers thereof and the lower portion of the envelope will come against the stop **23**. If the envelope is released freely by the grippers of the carrier, it will immediately drop by gravity edgewise into the chute **20**. However, if adhesive on the flap or upper portion of the envelope causes it to adhere to either of the grippers **10** and **11** of the carrier so that such envelope is not released, the advancing stroke of the plate **22** which is timed to take place at this time, will strike the adhering envelope and thereby free it from the carrier, thus avoiding clogging of the carrier which might otherwise occur.

Each filled and sealed envelope, as it drops into the chute **20** is temporarily detained by a pair of fingers **24** which are fixed on a rock shaft **25** rotatably mounted in bearings **26** on the sides of the chute, the shaft **25** having a crank **27** fixed thereon and pivotally connected at **28** to a link **29**, a tension spring **30** being connected to said link and acting to lift it and thereby swing the fingers **24** into contact with the bottom of the chute **20** so that they will intercept and temporarily hold an envelope introduced therein. The link **29** is guided in its vertical movements by a link **31** which is pivotally connected thereto at **32** and is pivotally connected to the stationary frame of the machine at **33**, and the lower end of the link **29** is curved or bent as at **34**, to provide an actuating portion for lowering it, as will be hereinafter described. The lower portion of the chute **20** is curved to form a substantially horizontal terminal portion **35**, this end of the chute being closed by an end wall **36** which serves to arrest the movement of each envelope as it reaches the lower end of the chute, and this lower portion of the chute is provided with slots **37** through which an envelope lifter **38** reciprocates vertically. The envelope lifter, which is preferably of yoke shape in form to provide a pair of laterally spaced wings **39** and envelope supporting lugs **40** at the upper corners thereof, is of a shape to reciprocate upwardly through the slots **37** in the bottom of the envelope chute, and it is fixed as by a clamping screw **41** to the upper end of a plunger **42**, the latter being mounted to reciprocate vertically in

a stationary guide 43 mounted on a stationary part of the machine frame and being operatively connected by a link 44 to an operating crank 45, the latter being fixed on a shaft 46 mounted in a bearing 47 fixed on the frame of the machine, this shaft being driven by a sprocket wheel 48 fixed thereon and connected to a sprocket wheel 49 of equal size fixed on a shaft 50, by a connecting chain 51 so that during each revolution of the shaft 46 or of the shaft 50 from which it is driven, the crank 45 will lift the envelope lifter 38 through the slots 37 in the lower portion of the envelope chute and will lift an envelope therefrom, and then descend to its normal lowered position, as shown in Fig. 5. The bar or plunger 42 also carries an arm 52 which is fixed to project laterally therefrom and beyond the envelope lifter into a position where it will strike the lower end 34 of the link 29 and lower this link each time the envelope lifter is lowered or returned to its normal position, and such lowering of the link 29 will rotate the shaft 25 in a direction to retract the fingers 24 from the bottom of the envelope chute and thereby release an envelope retained thereby so that this envelope may descend by gravity to the lower end of the chute in a position above the slots 37 therein, and this envelope will be lifted out of the chute by the following ascent of the lifter 38. The fingers 24 thus controlled by the operation of the envelope lifter, insure the feeding of the envelopes one at a time to the envelope lifting position.

The present invention provides a magazine having a plurality of chambers therein into each of which a predetermined or counted number of filled and sealed envelopes is introduced to form a stack, the envelopes being automatically introduced into another chamber in the magazine after each chamber therein has received the predetermined or counted number of envelopes. This part of the mechanism comprises a magazine 55 which is mounted to rotate on a vertical axis by a shaft 56, the upper end of which is supported by a bracket 57 mounted on the table of the machine, the lower end of the shaft 56 being supported by a bracket 58 which extends outwardly from the frame of the machine, the magazine being rotatably mounted on the shaft 56 by bearings 59 and supported by a suitable thrust bearing 60 which rests on the bracket 58. The magazine contains an annular series of vertically extending chambers or pockets 61 which extend from the bottom to the top thereof, each of these chambers being of a cross section corresponding substantially in size and shape to that of the envelopes. These chambers are open at the bottom of the magazine for the reception of the envelopes, and in order to permit the envelopes to be introduced successively into each chamber and to support or retain a stack of envelopes therein, the bottom of each of these chambers, as shown in Fig. 2, is provided at its opposite sides with a pair of envelope retaining members 62 which are pivoted on shafts 63 mounted on the bottom of the magazine and are provided with springs 64 which act to normally but yieldingly swing these members inwardly into envelope supporting and retaining position. The lower ends of these members are provided with lugs 65 arranged to engage the lower edges of bars 66 fixed to the bottom of the magazine so that the members 62 may support the weight of a stack of envelopes in the magazine chamber. When the magazine is rotated into a position to bring a chamber 61 therein directly above the envelope lifter 38 and the lower end of the envelope chute 20, the ascent of the envelope lifter will carry an envelope thereon upwardly between the retaining members 62, spreading them apart so as to admit the envelope to the magazine chamber 61, and to lift the stack of envelopes in the chamber upwardly from the members 62, and when the lifter 38 descends, the envelope thus introduced into the magazine chamber as well as those in the stack above it, will come to rest on the retaining members 62 which swing inwardly or into envelope supporting position as the lifter 38 descends or returns to its normal lowered position.

The magazine is rotated step by step as each chamber therein receives a predetermined or counted number of the envelopes and it is retained successively in positions where the chambers therein are alined with the envelope lifter 38. The means for thus rotating and positioning the magazine comprises a Geneva plate 70 which is fixed to the lower end of a sleeve 71 the latter being fixed to the magazine, this Geneva plate having notches 72 therein of a number corresponding to the number of envelope chambers in the magazine, the periphery of the plate having concave portions 73 intervening the notches, and an actuating crank or member 74 splined on a shaft 75, the latter being mounted in bearings 76 and 77 supported on the frame of the machine, the crank 74 carrying a roller 78 which, when the crank is shifted upwardly on the shaft 75, will be engageable in one of the notches 72 in the Geneva plate 70, and rotation of the crank will rotate the Geneva plate a step to carry a filled chamber in the magazine out of envelope receiving position and to bring another chamber in the magazine into envelope receiving position. The magazine is held against rotation while any chamber therein is in envelope receiving position by a cylindrical locking member 80 which is shiftable vertically on the shaft 75 and rotates with the crank 74, the upper portion of the periphery of the member 80 being continuous and the lower portion of its periphery having a gap or cut-away portion 81 therein. Accordingly, while the crank 74 and locking member 80 occupy their normal lowered position on the shaft 71 as shown in Fig. 4, the continuous or interrupted upper portion of the periphery of the locking member 80 will be presented to one of the concave peripheral portions 73 of the Geneva plate, thereby locking the latter and the magazine against rotation, and the roller 78 of the crank 74 will operate in a path below the Geneva plate and hence will not rotate it, but when the crank 74 and locking member 80 are shifted upwardly on the shaft 75, the roller 78 on the crank will enter one of the notches 72 in the Geneva plate and will rotate it one step, the notch or cut-away portion 81 in the lower portion of the periphery of the member 80 being then opposite to the periphery of the Geneva plate, as shown in Fig. 10 thus unlocking the latter and permitting its rotation.

The shaft 75 which operates the Geneva motion just described is driven by bevel gears 82 from a shaft 83, the latter being mounted in bearings 84 supported on the stationary frame of the machine, and this shaft has a gear 85 which is fixed thereon and meshes with a gear 86 the latter being fixed on a shaft 87. The latter shaft has a cam 88 fixed thereon, this cam having a groove 89 in which a roller 90 on a

lever 91 operates, said lever being pivoted at 92 to a stationary part of the machine frame and carrying at its free end a fork 93 having pins 94 thereon which engage in a grooved collar 95 forming part of the crank 74. The cam groove 89 is of such shape that during each revolution of the shaft 87, the lever 91 will be lifted from the full line position shown in Fig. 9 to the dotted line position shown in that figure, thereby lifting the crank 74 into operating relation with the Geneva plate 70 and carrying the locking member 80 into unlocking relation therewith, so that the magazine will be rotated one step, after which the lever 91 returns to its full line position, Fig. 9 thus carrying the crank 74 out of operating relation with the Geneva plate and returning the member 80 to locking relation therewith. Preferably, the gear 86 which drives the cam 89, is of larger diameter than that of the gear 85 on the shaft 83, so that the magazine will not be rotated until after the shaft 83 has made a plurality of revolutions, the gears 86 and 85 being shown in the present instance as having a two-to-one ratio.

The present invention provides relatively simple but dependable means for counting the number of envelopes actually fed to the magazine, it embodying counting means which will not perform a counting operation unless an envelope is actually fed. Such counting means is shown more particularly in Figs. 1 and 4 and 6 to 8 inclusive. It comprises a pair of disks 100 and 101 both of which are mounted on the shaft 83, the disk 101 being fixed on this shaft but the disk 100 being loosely rotatable thereon. The disk 101 is provided in its periphery with a predetermined number of notches 102 spaced equally around its circumference, and a pawl 103 carried by a bell crank 104 mounted rotatably on the shaft 83, is engageable successively with these notches, under the action of its spring 105, under the control however of the disk 100. A detent 106 is provided to engage successively in the notches 102 of the disk 101 and thereby prevent backward rotation thereof. The disk 100 is of larger diameter than that of the disk 101 and it is provided in its periphery with notches preferably of a number corresponding with those in the disk 101, one of the notches 107 in the disk 100 extending to the full depth of each of the notches 102 in the disk 101 but the rest of the notches 108 in the disk 100 being shallower and of such depth that the bottoms thereof are located outwardly beyond the unnotched periphery of the disk 101. A detent 109 is arranged to cooperate with the notches in the disk 100 and thereby prevent backward rotation after each actuation thereof. By this arrangement, when the pawl 103 engages in one of the shallow notches 108 in the disk 100 it will be held out of engagement with a notch in the disk 101, so that actuation or swing of the pawl 103 will rotate the loosely mounted disk 100 but will not rotate the disk 101, and the disk 100 will be successively rotated, step by step, by successive actuations of the pawl 103 until the latter reaches the relatively deeper notch 107 in the disk 100 whereupon the pawl will engage this notch in the disk 100 and also a registering notch 102 in the disk 101, and actuation of the pawl will then cause the disk 101 as well as the disk 100 to be rotated a step. Any desired number of shallow grooves may be provided in the disk 100 according to any desired number of actuations thereof before rotating the disk 101 a step. For example, by providing four of the shallow notches 108 in the disk 100 and one deep notch 107 therein, five actuations of the pawl 103 will take place for each step in the advance of the disk 101. It will also be understood that the number of notches in the disk 101 may be varied as desired, according to the number of actuations of the pawl required to effect each revolution of the shaft 83. By providing each of the disks 100 and 101 with five notches as shown, five actuations of the disk 100 will actuate the disk 101 one-fifth of a revolution and a complete revolution of the disk 101 will require twenty-five actuations of the disk 100 by the pawl 103. By connecting the shafts 83 and 87 by the two-to-one gears as described, the magazine will receive fifty envelopes in each chamber therein before it is rotated to bring another chamber into envelope receiving position. The pawl 103 is actuated or swung at appropriate intervals about the axis of the disks 100 and 101 by a rod 111 which is pivotally connected to the bell crank 104 and operatively connected to a crank 112 which is fixed to the shaft 50.

The counting mechanism just described is controlled according to the presence or absence of an envelope ready to be fed to the magazine, the means for so controlling the counting mechanism being shown particularly in Figs. 1 and 6 to 8 inclusive. Such control means as shown in these figures comprises a pawl 115 which is pivoted at 116 on a bracket 117 fixed to the stationary frame of the machine, this pawl having a downwardly curved forward end 118 which is movable about the pivot 116 either downwardly into a position in the path of a pin 119 which projects from one side of the actuating pawl 103 during the retracting strokes thereof, as indicated by the full lines in Fig. 6 or as shown in Fig. 7 so that the pawl 103 will be lifted out of engagement with the disk 100 during the retracting strokes of said pawl, or is movable upwardly into the dotted line position shown in Fig. 6 or the full line position shown in Fig. 8, where it will be clear of or above the path of the pin 119 during the retracting strokes of the pawl 103 so that the latter may remain in contact with the disk 100. A guard 120 is attached rigidly to the bracket 117 and extends toward the free end 118 of the pawl 115 in a position immediately above the path of the pin 119 on the pawl 103 during retraction of the latter while in engagement with the disk 100, this guard having a portion 121 on which the pawl 115 may rest and thus be supported when the pawl 115 is in its relatively lower position. An arm 122 is fixed to the pawl 115 so that it will swing in unison therewith about the pivot 116, the upper end of this arm being arranged to abut against a stop 123 fixed on a bracket 124, the latter being fixed to the stationary frame of the machine, abutting of the arm 122 against the stop 123 limiting the downward movement of the pawl 115, and a tension spring 125 connects the arm 122 to the bracket 124 and serves to normally and yieldingly hold said arm against said stop. The upper end of the arm 122 carries a rod 126, the free end of which is bent upwardly, as at 127 to extend through a slot 128 formed in the bottom of the envelope chute 20 (Fig. 5), and the extremity of this rod is bent downwardly to form a finger 129 which extends somewhat below the bottom of the envelope chute so that it will engage an envelope lying on the bottom of the chute and resting against the end wall 36. A plunger 130 is mounted to reciprocate vertically in a guide 131 fixed to the

stationary frame of the machine, this plunger having a roller 132 on its lower end which rides on a cam 133 of suitable form fixed on the shaft 46 so that this plunger will be lifted and lowered during each revolution of the shaft 46 which elevates and lowers the envelope lifter 38. The upper end of the plunger 130 is provided with a toe 134 which is arranged to engage and press against the underside of a portion 135 on the pawl 115, to swing the latter into its upper or dotted line position shown in Fig. 6 each time the shaft 46 revolves and prior to each retracting stroke of the pawl 103, the cam 133 being so set on the shaft 46 as to cause the pawl 115 to be lifted during each descent of the envelope lifter 38.

By this arrangement each time the envelope lifter descends, the portion of the rod 126 which operates through the slot 128 in the bottom of the envelope chute will be retracted from the chute and the path of the envelopes descending therein, during each descent of the envelope lifter 38, and the engagement of the finger 52 with the lower end of the link 29, lowers this link and swings the retaining fingers 24 outwardly away from the chute and thereby releases an envelope for descent therein. The envelope thus released drops by gravity in the chute until its forward or bottom edge strikes the chute end wall 36, the envelope being then positioned above the slots 37 through which the envelope lifter 38 operates. If an envelope is thus positioned in the bottom of the chute, the finger 129 will swing against the trailing or upper edge of the envelope, under the action of the spring 125, as the rotation of the cam 133 continues, and although the shape of this cam is such that at this time the plunger 130 descends and hence no longer supports the pawl 115 in its upper position, the engagement of the finger 129 against the envelope will retain the rod 126 and finger 129 in relatively retracted position, thereby holding the pawl 115 in its elevated position as shown by the dotted lines in Fig. 6, where it will be above or clear of the path of travel of the pin 119 on the pawl 103, so that during the retracting stroke of the pawl 103 which then takes place, this pawl is permitted to remain in engagement with the periphery of the disk 100 so that, upon completion of its retracting stroke, it will engage in the next notch in the disk 100 as shown in Fig. 8, and the pawl 103 will therefore advance the disk 100 on its next following actuating stroke. However, if an envelope fails to feed into lifting position at the bottom of the envelope chute 20, the rod 126 and finger 129, upon their return stroke following lifting thereof by the plunger 130, will be free to swing until the arm 122 comes against the stop 123, the pawl 115 being thus allowed to descend until it rests on the guard 120, the downwardly curved free end of the pawl 115 then occupying a position in the path of the pin 119 on the pawl 103 during the retracting stroke of the latter, as shown in Fig. 7, and consequently, as the pawl 103 is retracted, the pin 119 will ride up over the free end of the pawl 115 and onto the guard 120, the pawl 103 being thus disengaged from the disk 100 so that it will not engage the next notch in said disk, with the result that the next actuating stroke of the pawl 103 will be idle or will not advance the disk 100. The disks 100 and 101 of the counting mechanism are thus controlled in their counting operation or actuation according to the presence or absence of an envelope ready for introduction into the magazine, each filled envelope actually fed by the envelope chute being counted but the counting mechanism remaining idle or without actuation in the event a filled envelope fails to feed into position for introduction into the magazine.

By providing the disk 100 with five peripheral notches, one deeper than the rest and providing the disk 101 with five notches, it will be understood that each time the disk 100 is actuated or advanced through five steps by five strokes or actuations of the pawl 103, the disk 101 will be advanced one step or one-fifth of a revolution, so that twenty-five actuations of the pawl 103 will rotate the shaft 83 to which the disk 101 is fixed, through one revolution. By connecting the shaft 87 carrying the cam 88 to the shaft 83 by gears 86 and 85 having a ratio of two-to-one, the crank 74 and locking member 80 which control the actuation of the Geneva plate 70 fixed to the magazine will be lifted after fifty actuations or working strokes of the pawl 103 have taken place, so that the magazine will be rotated to carry one chamber therein out of envelope receiving position, after fifty envelopes have been introduced therein and to bring another empty chamber therein into envelope receiving position.

By fitting box-like receptacles 140, open at the bottom and slotted at the front removably into chambers of the magazine 55, the filled and sealed envelopes will be introduced into such receptacles and after each receptacle has been filled and rotation of the magazine carries it out of filling position, the stack of envelopes introduced into each chamber of the magazine can be readily removed from the magazine manually by withdrawing the receptacle containing the envelopes from the chamber in the magazine, as by sliding the receptacle upwardly out of the chamber, radial displacement of the receptacles from the magazine being prevented by overlying plates 141 which are fixed to the periphery of the magazine and overlie the edges of the receptacles.

The counting and stacking mechanism may be driven from the envelope filling and closing machine in proper timed relation therewith and with the carrier or other means which feeds the filled envelopes, by the shaft 50 from which all of the parts of the counting and stacking mechanism are driven.

The operation of the different parts of the mechanism having been described in conjunction with the descriptions of the constructions thereof, the general operation of the mechanism may be briefly described as follows.

Each envelope, as it is released from the carrier and drops into the envelope chute 20, is arrested in its descent therein by the fingers 24 which at this time are swung against the bottom of the chute (Fig. 5), until the envelope lifter 38 approaches its lowermost or retracted position, whereupon the fingers 24 will be swung outwardly away from the chute and the envelope will be permitted to descend by gravity edgewise until its forward edge strikes the transverse end wall 36 at the bottom of the chute, the envelope being then positioned above the slots 37 in the chute through which the envelope lifter 38 operates. During the descent of the envelope, the detector finger 129 is retracted from the bottom of the chute so as to avoid obstructing the descent of the envelope under the control of the cam 133, the finger 129 being shown in such retracted position by the dotted lines in Fig. 6. While the envelope lifter 38 is in its retracted position, the plunger 130 is forced upwardly by the cam 133,

thereby lifting the pawl 115 out of the path of the pin 119 on the pawl 103 and simultaneously swinging the finger 129 out of the envelope chute, the pawl 103 being then in its actuated position, and before the pawl 103 is retracted through the action of the crank 112 and link 111, the cam 133 allows the plunger 130 to descend. If an envelope is in position at the bottom of the envelope chute, descent of the pawl 115 into the path of the pin 119 on the pawl 103 will be prevented by engagement of the finger 129 with the rear edge of such envelope, and during retraction of the pawl 103 which then takes place, the pin 119 will pass beneath the pawl 115 and the pawl 103 will engage the next notch in the periphery of the disk 100, ready to advance this disk a step on the next actuating stroke of the pawl 103. If however no envelope is contained in the lower end of the envelope chute, the pawl 115 will be allowed to descend by gravity, following the descent of the plunger 130, so that it will be in the path of the pin 119 on the pawl 103, so that during retraction of the latter, it will be lifted out of engagement with the periphery of the disk 100 and hence will not engage the next notch in its periphery, so that the next following actuating stroke of the pawl 103 will take place idly or without advancing the disk 100.

Immediately after the finger 129 has advanced into engagement with an edge of an envelope in the bottom of the envelope chute, the crank 45 lifts the envelope lifter 38, carrying it through the slots 37 in the bottom of the envelope chute, past the retaining members 62 in the bottom of a chamber in the magazine, and thus introducing the envelope into the bottom of such magazine chamber or at the bottom of a stack of envelopes which may have been previously introduced therein. The magazine at this time is held with the appropriate chamber therein in envelope receiving position by the Geneva plate 70 fixed thereto and the locking member 80 which is then in its lowered position so that it presents its uninterrupted periphery to a locking concavity 73 in the periphery of the Geneva plate.

The pawl 103 is operated on its actuating stroke to advance the disk 100 a step in its rotation for each ascent of the envelope lifter 38, and after the pawl 103 has been actuated a predetermined number of times, as for example fifty times if the disks 100 and 101 are each provided with five peripheral notches and the cam shaft 87 is connected to the shaft 83 by gears having a ratio of two-to-one, the cam 88 will lift the Geneva plate actuating crank 74 and locking member 80 so that the roller 78 will engage a notch 72 in the periphery of the Geneva plate 70 and rotate the latter one step, the cut-away or interrupted portion 81 of the locking member being then presented to the periphery of the Geneva plate, after which the actuating crank 74 and locking member 80 are lowered so that the Geneva plate will be retained in the position into which it was rotated. Such rotation of the Geneva plate rotates the magazine to which it is fixed to carry the chamber therein which has received the predetermined or counted number of filled and sealed envelopes out of envelope receiving position and to bring the next chamber in the magazine into envelope receiving position, so that the filled and sealed envelopes are formed into stacks in the magazine, each stack containing a predetermined counted number of the envelopes.

I claim as my invention:—

1. In a mechanism of the class described, the combination of means for feeding envelopes in succession, an upright rotatable magazine having a plurality of vertical chambers to receive the envelopes at their lower ends, means for introducing the envelopes successively into the lower end of one or another of the chambers of the magazine, and means controlled according to the presence or absence of an envelope for counting the number of envelopes introduced into each chamber of the magazine by the envelope introducing means.

2. In a mechanism of the class described, the combination of means for feeding envelopes in succession, an upright rotatable magazine having a concentric series of vertical chambers to receive the envelopes, envelope retaining members in the lower ends of said chambers, and means controlled according to the presence or absence of an envelope for introducing a predetermined counted number of envelopes into the lower end of each chamber of the magazine.

3. In a mechanism of the class described, the combination of means for feeding envelopes in succession, a magazine having an annular series of upright chambers each to receive a supply of envelopes at its lower end, an envelope introducing member located beneath the magazine, the magazine and said member being relatively shiftable to bring said member into envelope introducing relation with the lower end of one or another of said chambers in the magazine, and means controlled according to the presence or absence of an envelope for relatively shifting the magazine and said envelope introducing member after a predetermined counted number of envelopes has been introduced into a chamber in the magazine.

4. In a mechanism of the class described, the combination of envelope feeding means, a rotatable magazine having a plurality of envelope receiving chambers, a member for introducing envelopes successively into one or another of said chambers, a Geneva movement mechanism and controlling cam for rotating the magazine to bring the chambers thereof successively into alinement with the envelope introducing member, and means controlled according to the presence or absence of an envelope in the feeding means for actuating said Geneva movement mechanism and controlling cam.

5. In a mechanism of the class described, the combination of envelope feeding means, a rotatable magazine having a plurality of envelope receiving chambers, a member for introducing envelopes successively into one or another of said chambers, a Geneva movement mechanism for rotating the magazine and holding it with an envelope receiving chamber thereof in alinement with the envelope introducing member, and ratchet mechanism controlled according to the presence or absence of an envelope in the feeding means for actuating said Geneva movement mechanism.

6. In a mechanism of the class described, the combination of envelope feeding means, a rotatable magazine having a plurality of envelope receiving chambers, a member for introducing envelopes successively into one or another of said chambers, a Geneva movement mechanism for rotating the magazine and locking it successively in position with one or another of its envelope receiving chambers in alinement with the envelope introducing member, and means including a pair of ratchet wheels one having a ratchet tooth deeper than its other teeth and an actuat-

ing pawl common to both ratchet wheels, for actuating said Geneva movement mechanism to unlock and rotate the magazine.

7. In a mechanism of the class described, the combination of an envelope feeding chute, envelope retaining members cooperative therewith for controlling the delivery of envelopes therefrom in succession, a magazine, a member for receiving the envelopes successively from the chute and for introducing them into the magazine, and means for actuating the latter member to introduce an envelope into the magazine and for retracting said member and operating said retaining members to release an envelope in the chute for delivery therefrom.

8. In a mechanism of the class described, the combination of a chute adapted to position articles in succession for removal therefrom, means for successively removing the articles therefrom, counting means, and means controlled according to the presence or absence of an article in the chute in position for removal therefrom, for governing the operation of the counting means.

9. In a mechanism of the class described, the combination of a chute adapted to position articles in succession for removal therefrom, means for successively removing the articles therefrom, counting means, a finger engageable with an article in position for removal from the chute, and means controlled by said finger according to the presence or absence of an envelope in position for removal from the chute for governing the operation of the counting means.

10. In a mechanism of the class described, the combination of a chute to receive articles and to position them for successive removal therefrom, means for removing the articles from the chute and stacking them, a finger reciprocable in the chute toward and from an article in position for removal therefrom, counting means and means controlled by said finger according to the presence or absence of an article in position in the chute for removal therefrom for governing the operation of said counting means.

11. In a mechanism of the class described, the combination of means for directing articles to one or another of a plurality of stacks, a chute for feeding and positioning articles to be stacked, means in the chute for controlling the delivery of the articles to be positioned therein, means for removing the articles positioned by the chute and for actuating said controlling means, and means controlled according to the presence or absence of an article in position for removal from the chute for governing the means for directing the articles to one or another stack.

12. In a mechanism of the class described, the combination of means for directing articles to one or another of a plurality of stacks, a chute for feeding and positioning articles for removal therefrom, means for lifting the articles positioned in the chute to remove them from the chute and stack them, means for counting the articles and controlling said article directing means, and means located in the chute and controlled according to the presence or absence of an article positioned therein for removal for governing the means for counting and the means for directing the articles to one or another stack.

13. In a mechanism of the class described, the combination of an inclined article feeding chute having means at its lower end for positioning articles for removal therefrom, means for removing the articles positioned in the chute, means shiftable relatively to the chute for arranging the articles in a plurality of stacks, and means located in the chute and controlled according to the presence or absence of an article positioned therein for removal for governing the shifting of the article stacking means.

14. In a mechanism of the class described, the combination of an inclined article feeding chute having means at its lower end for positioning articles for removal therefrom, means for removing the articles from the chute, means in the chute for intermittently delivering the articles to be positioned, means shiftable relatively to the chute for arranging the articles in a plurality of stacks, means for counting the articles removed from the chute, means connected to the counting means for shifting the stacking means, and means controlled according to the presence or absence of an article positioned in the chute for removal therefrom for governing the operation of said counting means and said shifting means.

15. In a mechanism of the class described, the combination of an inclined article feeding chute having a horizontal lower end for positioning articles for removal therefrom, means located in the inclined portion of the chute for delivering the articles to be positioned, means for successively removing the articles positioned by the chute, means shiftable relatively to the chute for arranging the articles removed therefrom in a plurality of stacks, means operative upon a predetermined number of actuations thereof for shifting the stacking means to direct the articles from one stack to another stack, and means controlled according to the presence or absence of an article positioned in the chute for removal therefrom for governing the operation of the shifting means.

16. In a mechanism of the class described, the combination of an article feeding chute having means for positioning articles for removal therefrom, a lifter for removing the articles positioned by the chute, means shiftable relatively to the chute for arranging the articles lifted and removed therefrom in a plurality of stacks, means operative upon a predetermined number of actuations thereof for shifting the stacking means to direct the articles from one stack to another stack, means cooperative with said shifting means for counting the articles delivered to the stacking means, and means located in the chute and controlled according to the presence or absence of of an article positioned therein for removal and delivery to the stacking means for governing the operation of said shifting means and said counting means.

17. In a mechanism of the class described, the combination of an article feeding chute having means for positioning articles successively for delivery therefrom, means for delivering articles positioned by the chute, means for counting the delivered articles comprising a pair of toothed disks of different diameters, the larger of said disks having a tooth therein deeper than its other teeth and of substantially the depth of the teeth in the other disk, and a reciprocatory pawl cooperative with the teeth of said disks, and a finger movable into position behind an article positioned in the chute and cooperative with such article to control the cooperation of said pawl with said disks.

18. In a mechanism of the class described, the combination of an article feeding chute having means for positioning articles for delivery therefrom, means for delivering articles positioned by the chute, means for counting the delivered ar-

ticles comprising a pair of toothed disks of different diameters, the larger of said disks having a tooth therein deeper than its other teeth and of substantially the depth of the teeth in the other disk, and a reciprocatory pawl cooperative with the teeth of said disks, and a finger movable into the chute behind an article positioned therein and controlled according to the presence or absence of an article positioned to be delivered from the chute for governing the operation of said pawl with respect to said disks.

19. In a mechanism of the class described, the combination of an article feeding chute having means for positioning articles for delivery therefrom, means for delivering articles positioned by the chute, means for counting the delivered articles comprising a pair of toothed disks of different diameters, the larger of said disks having a tooth therein deeper than its other teeth and of substantially the depth of the teeth in the other disk, and a reciprocatory pawl cooperative with the teeth of said disks, and a finger having means for moving it into and out of the chute and controlled according to the presence or absence of an article positioned to be delivered from the chute for causing said pawl to engage with or disengage from said disks.

20. In a mechanism of the class described, the combination of an article feeding chute having means for positioning articles therein for delivery therefrom, means for delivering articles positioned by the chute, means for counting the delivered articles comprising a pair of toothed disks of different diameters, the larger of said disks having a tooth therein deeper than its other teeth and of substantially the depth of the teeth in the other disk, and a reciprocatory pawl cooperative with the teeth of said disks, a finger having means for yieldingly moving it into the chute and against an article positioned therein for delivery and having means for subsequently retracting it from the chute, and means controlled by said finger according to the presence or absence of an article positioned to be delivered from the chute for lifting said pawl into inoperative relation with said disks.

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