

Aug. 18, 1936.

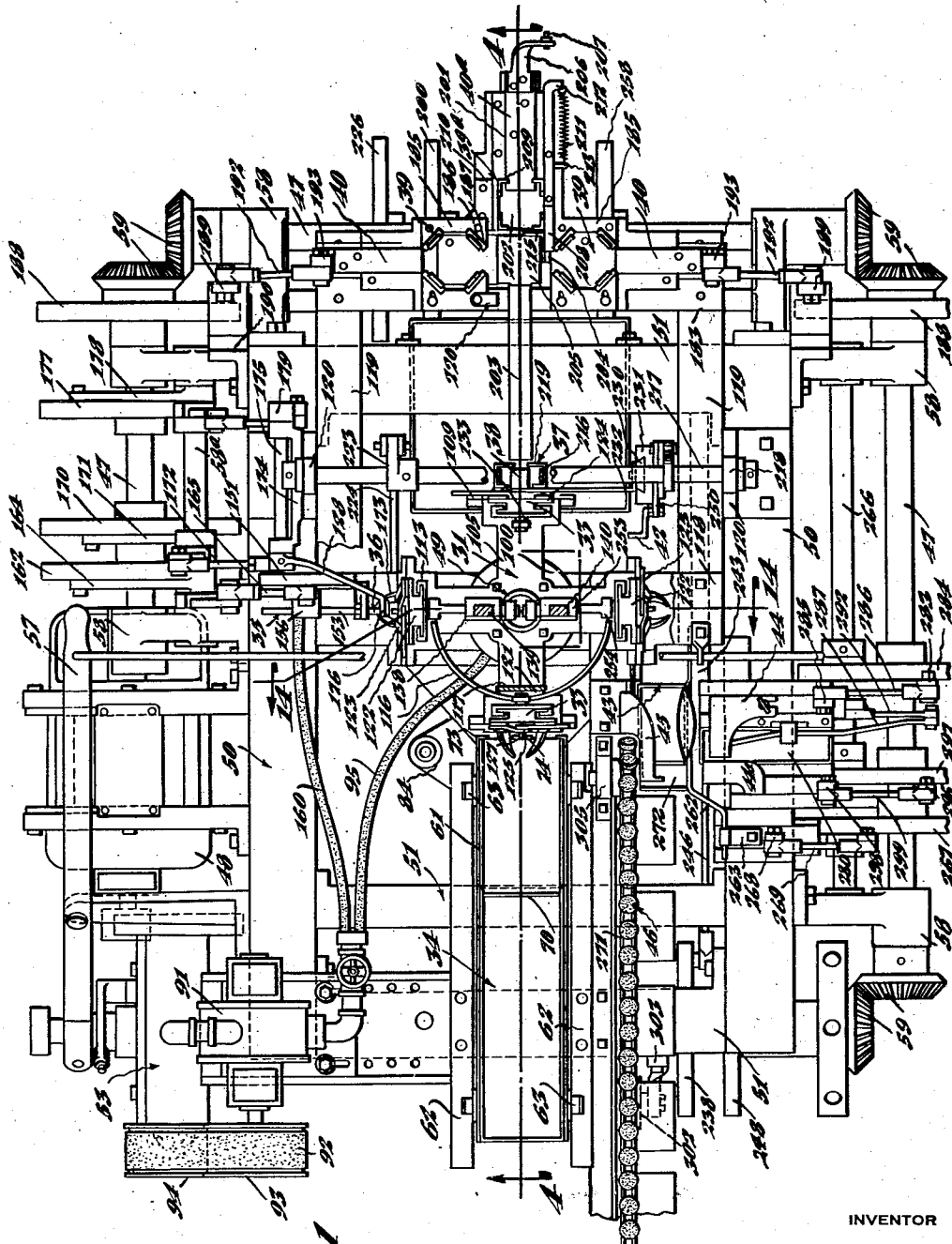
R. A. JONES

2,051,483

CONTAINER FILLING MACHINE

Filed May 16. 1930

17 Sheets-Sheet 1



Aug. 18, 1936.

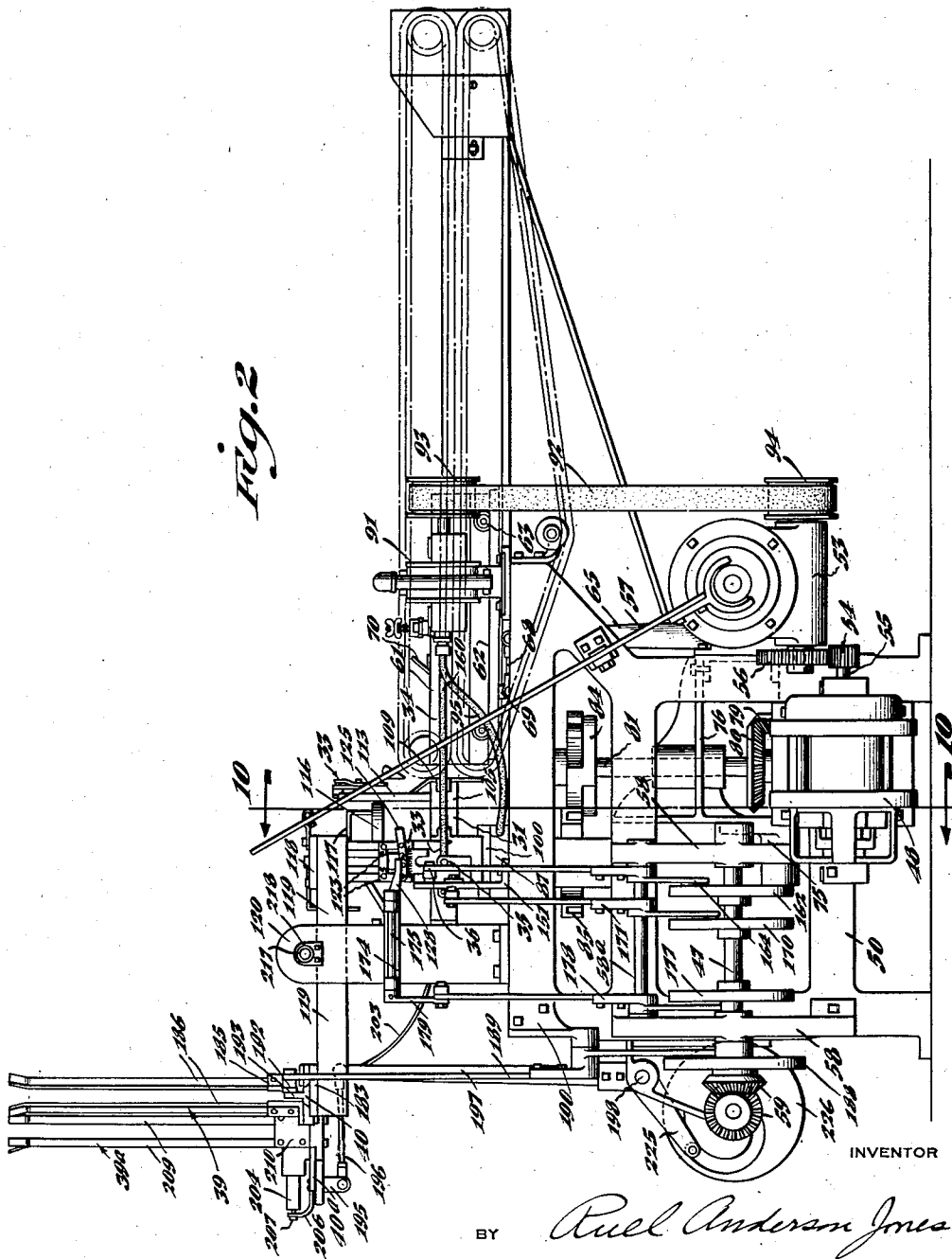
R. A. JONES

2,051,483

CONTAINER FILLING MACHINE

Filed May 16, 1930

17 Sheets-Sheet 2



Worth & Worth ATTORNEYS

Aug. 18, 1936.

R. A. JONES

2,051,483

CONTAINER FILLING MACHINE

Filed May 16, 1930

17 Sheets-Sheet 3

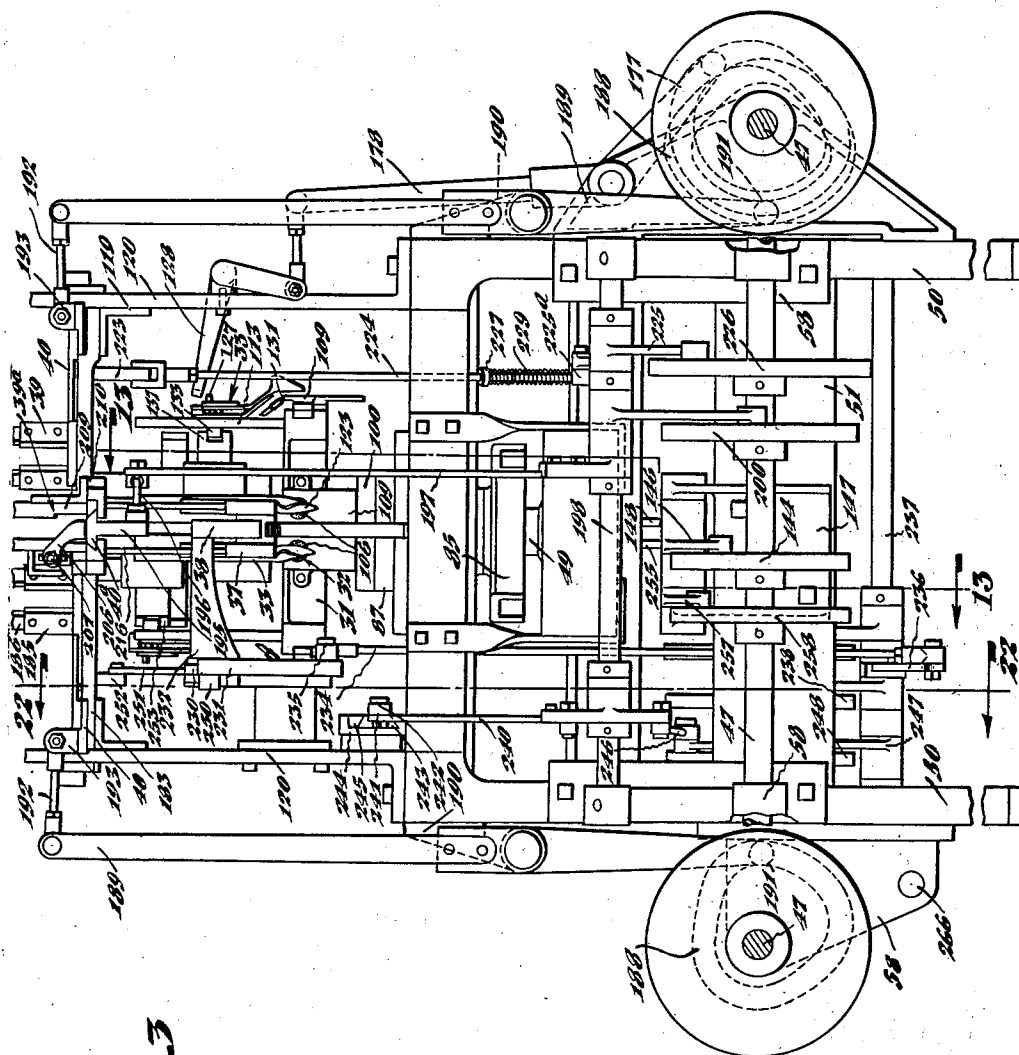


Fig. 3

INVENTOR

BY

Ruel Anderson Jones

Word & Word ATTORNEYS

Aug. 18, 1936.

R. A. JONES

2,051,483

CONTAINER FILLING MACHINE

Filed May 16, 1930

17 Sheets-Sheet 4

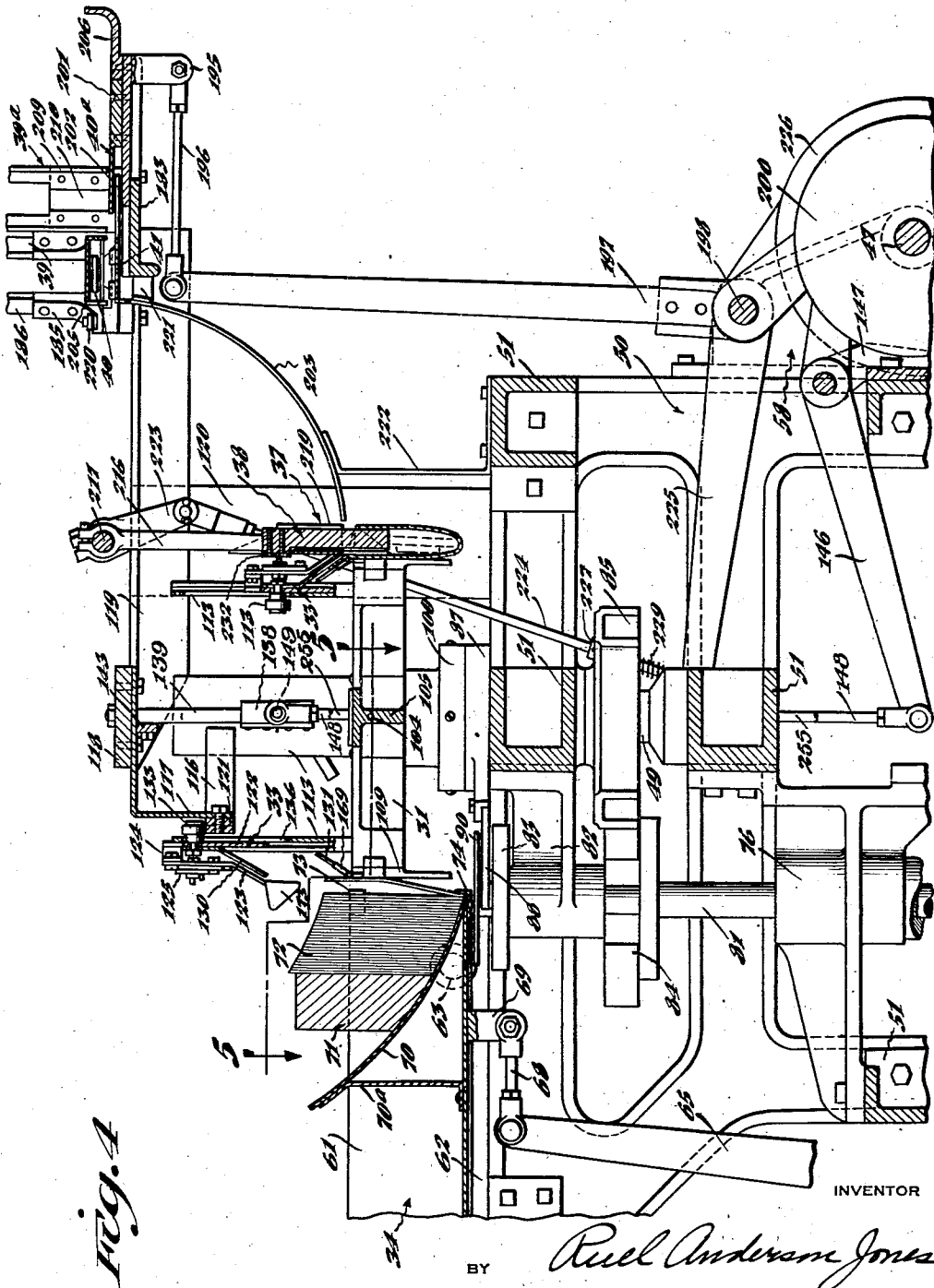


Fig. 4

BY

Ruel Anderson Jones

Word & Word ATTORNEYS

Aug. 18, 1936.

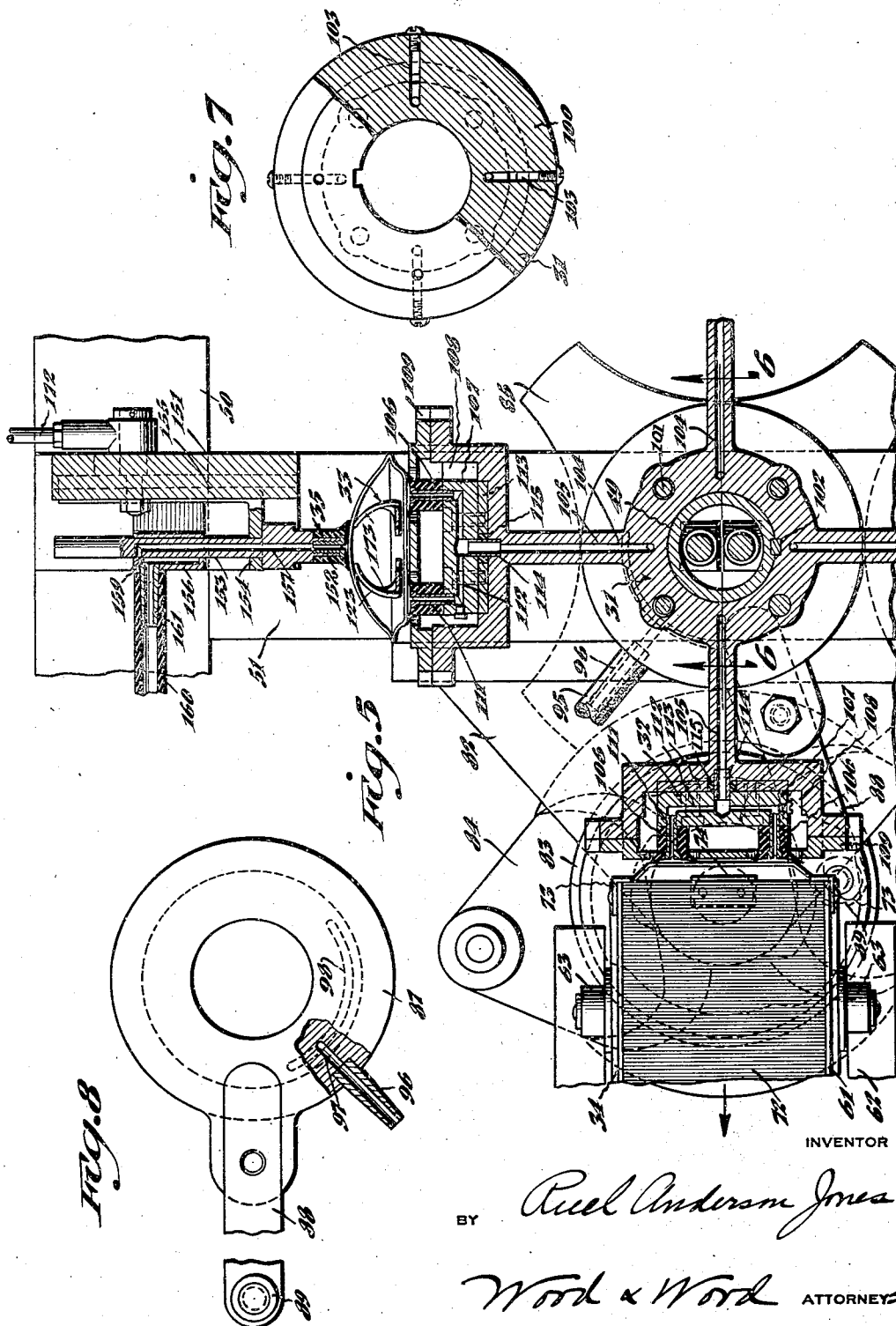
R. A. JONES

2,051,483

CONTAINER FILLING MACHINE

Filed May 16, 1930

17 Sheets-Sheet 5



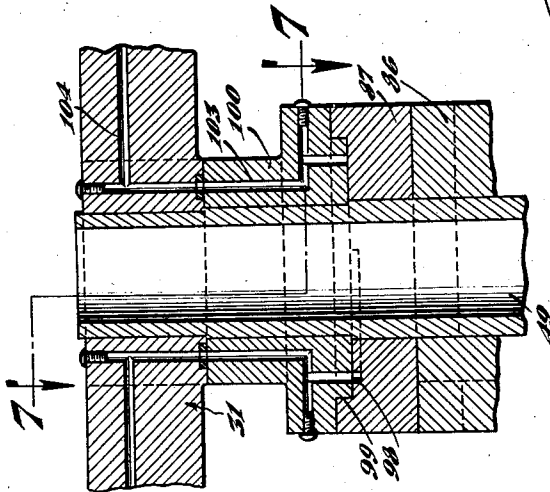
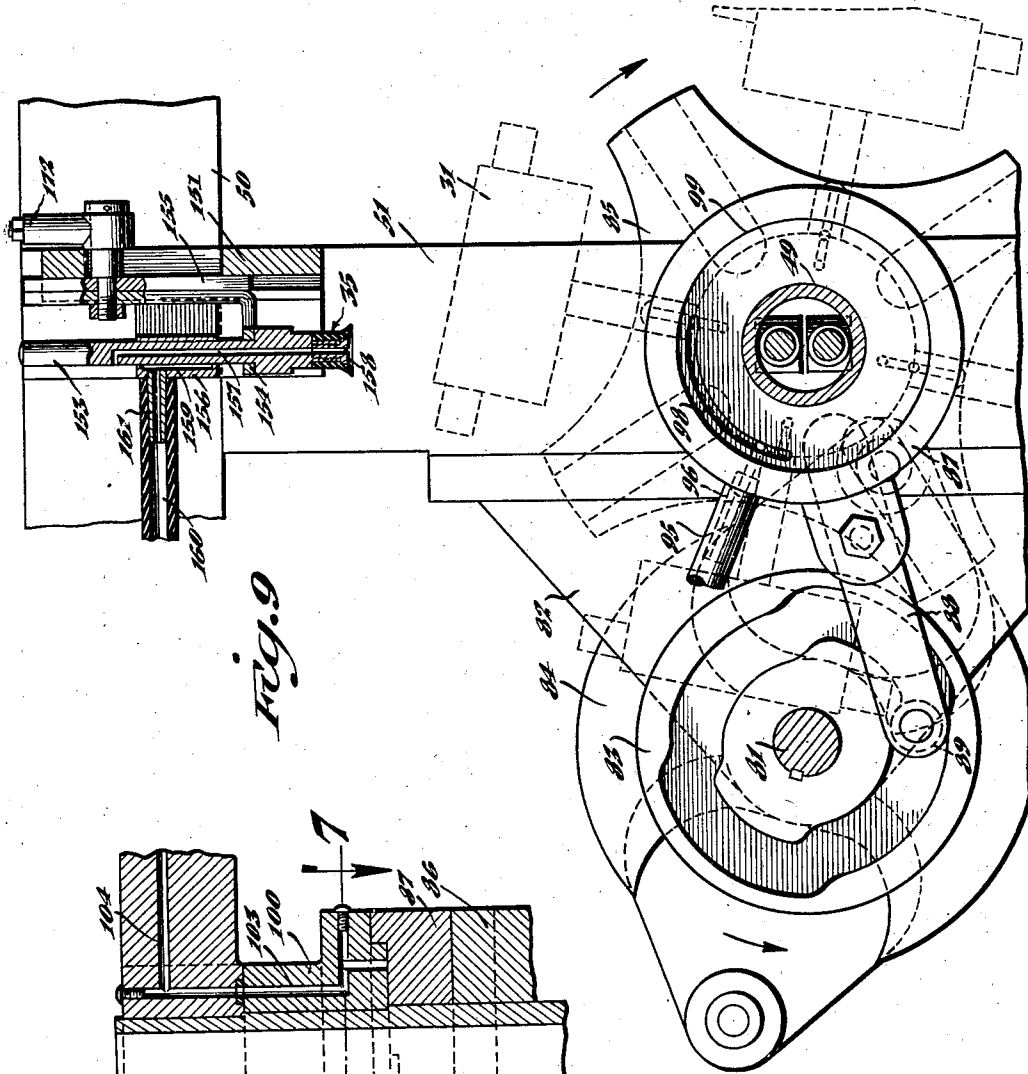
Aug. 18, 1936.

R. A. JONES
CONTAINER FILLING MACHINE

2,051,483

Filed May 16, 1930

17 Sheets-Sheet 6



INVENTOR

BY

Ruel Anderson Jones

Wood & Wood ATTORNEYS

Aug. 18, 1936.

R. A. JONES

2,051,483

CONTAINER FILLING MACHINE

Filed May 16, 1930

17 Sheets-Sheet 7

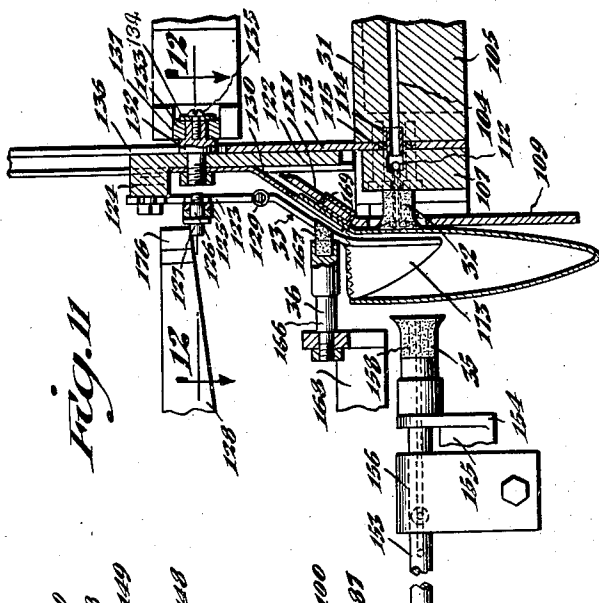


Fig. 11

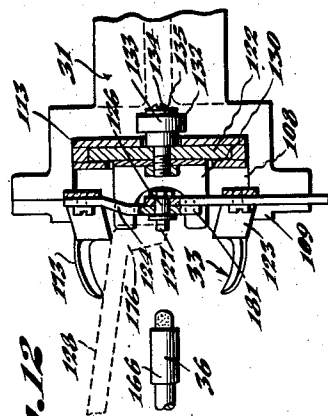
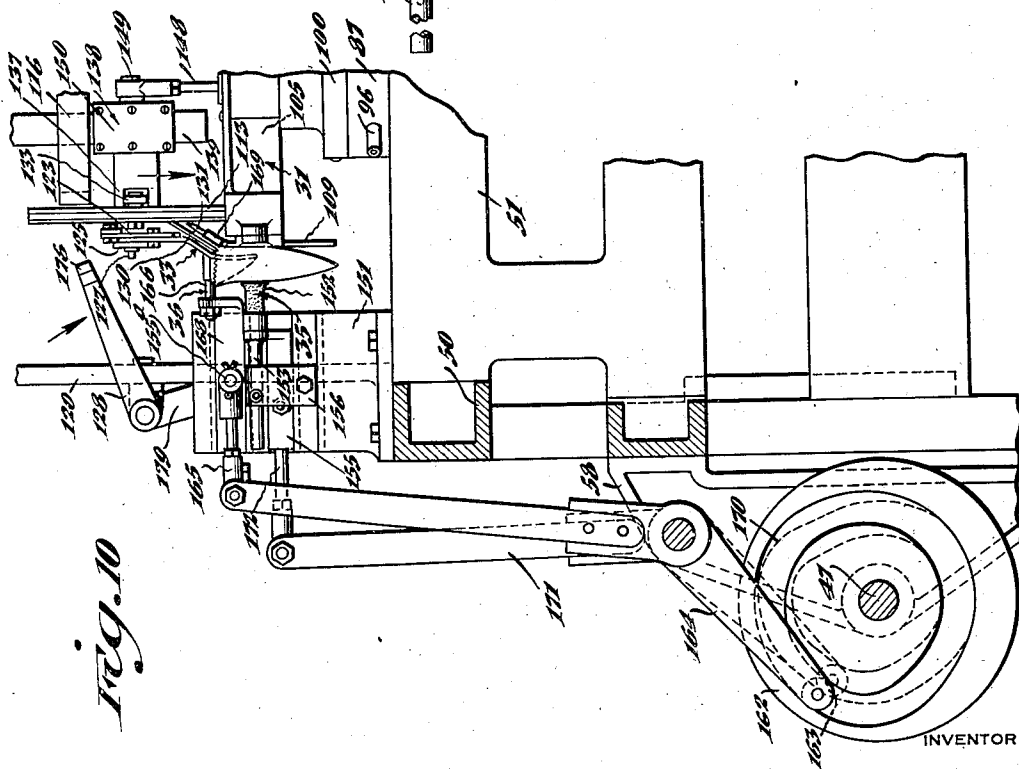


Fig. 12



Aug. 18, 1936.

R. A. JONES

2,051,483

CONTAINER FILLING MACHINE

Filed May 16, 1930

17 Sheets-Sheet 8

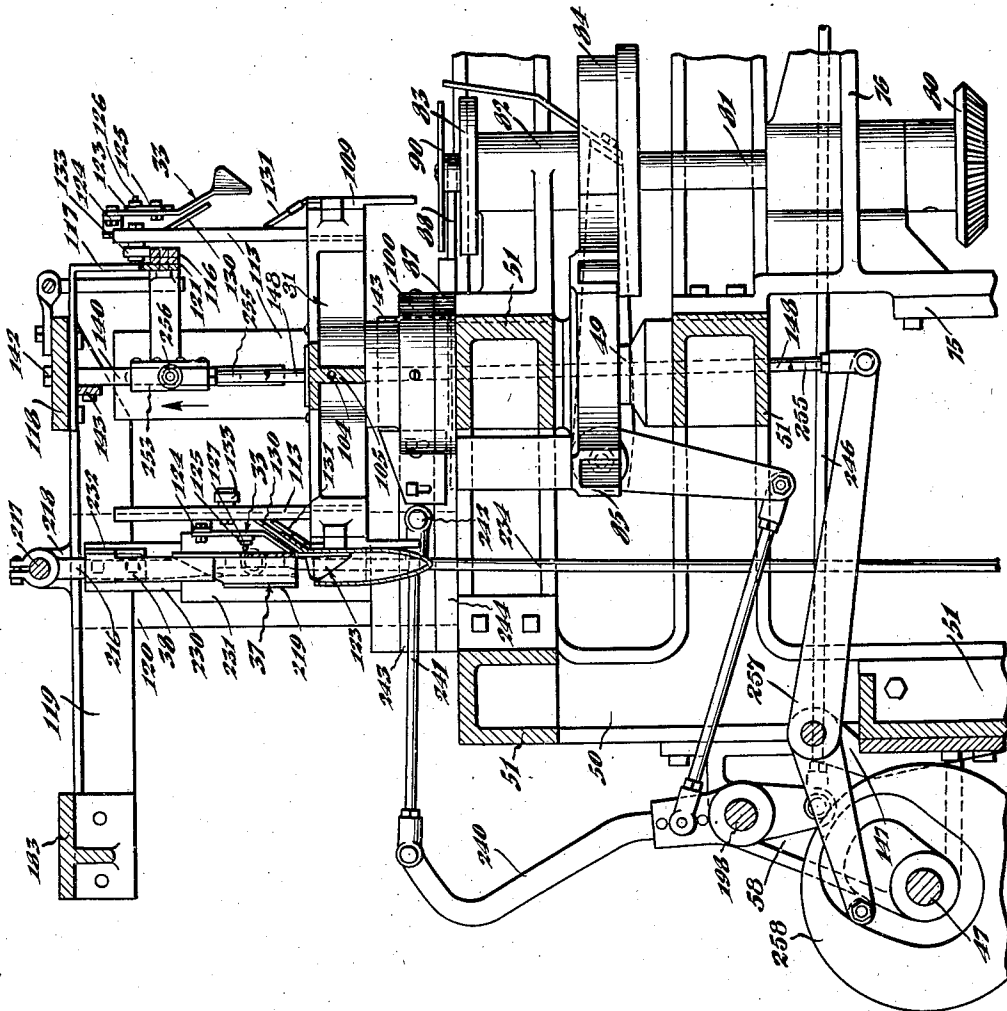


Fig. 13

INVENTOR

Ruel Anderson Jones

BY

Wood & Wood

ATTORNEYS

Aug. 18, 1936.

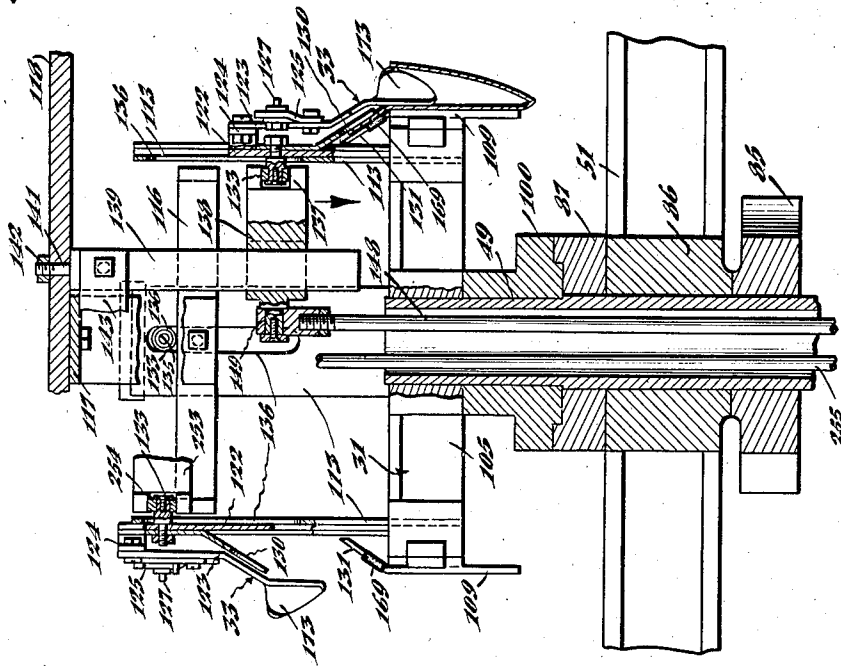
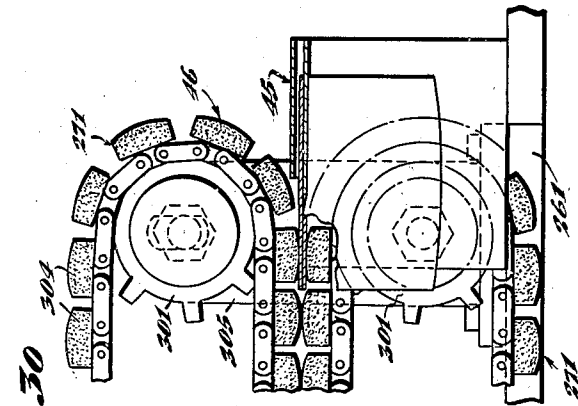
R. A. JONES

2,051,483

CONTAINER FILLING MACHINE

Filed May 16, 1930

17 Sheets-Sheet 9



INVENTOR

BY *Ruel Anderson Jones*

Wood & Wood ATTORNEYS

Aug. 18, 1936.

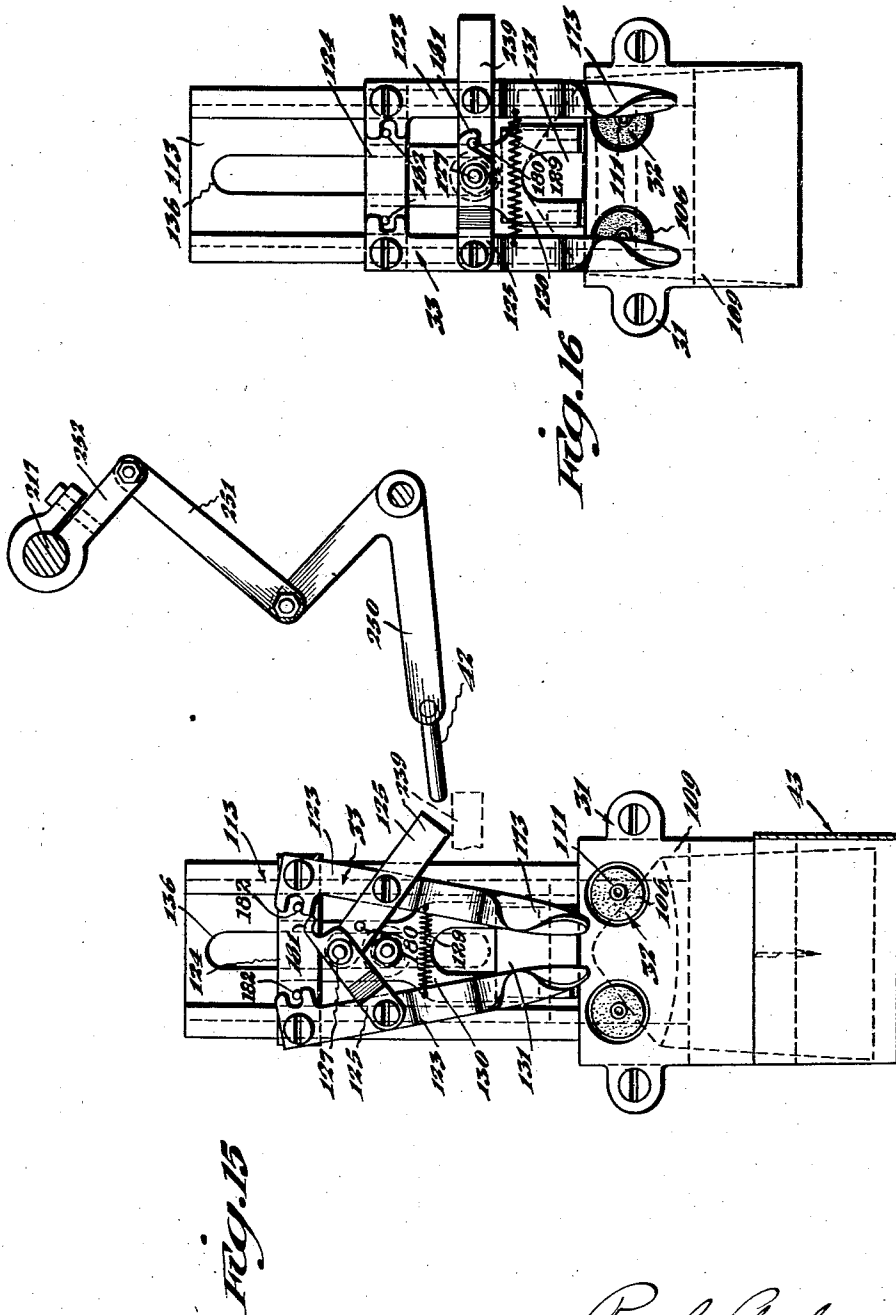
R. A. JONES

2,051,483

CONTAINER FILLING MACHINE

Filed May 16, 1930

17 Sheets-Sheet 10



INVENTOR

BY

Ruel Anderson Jones

Wood & Wood ATTORNEYS

Aug. 18, 1936.

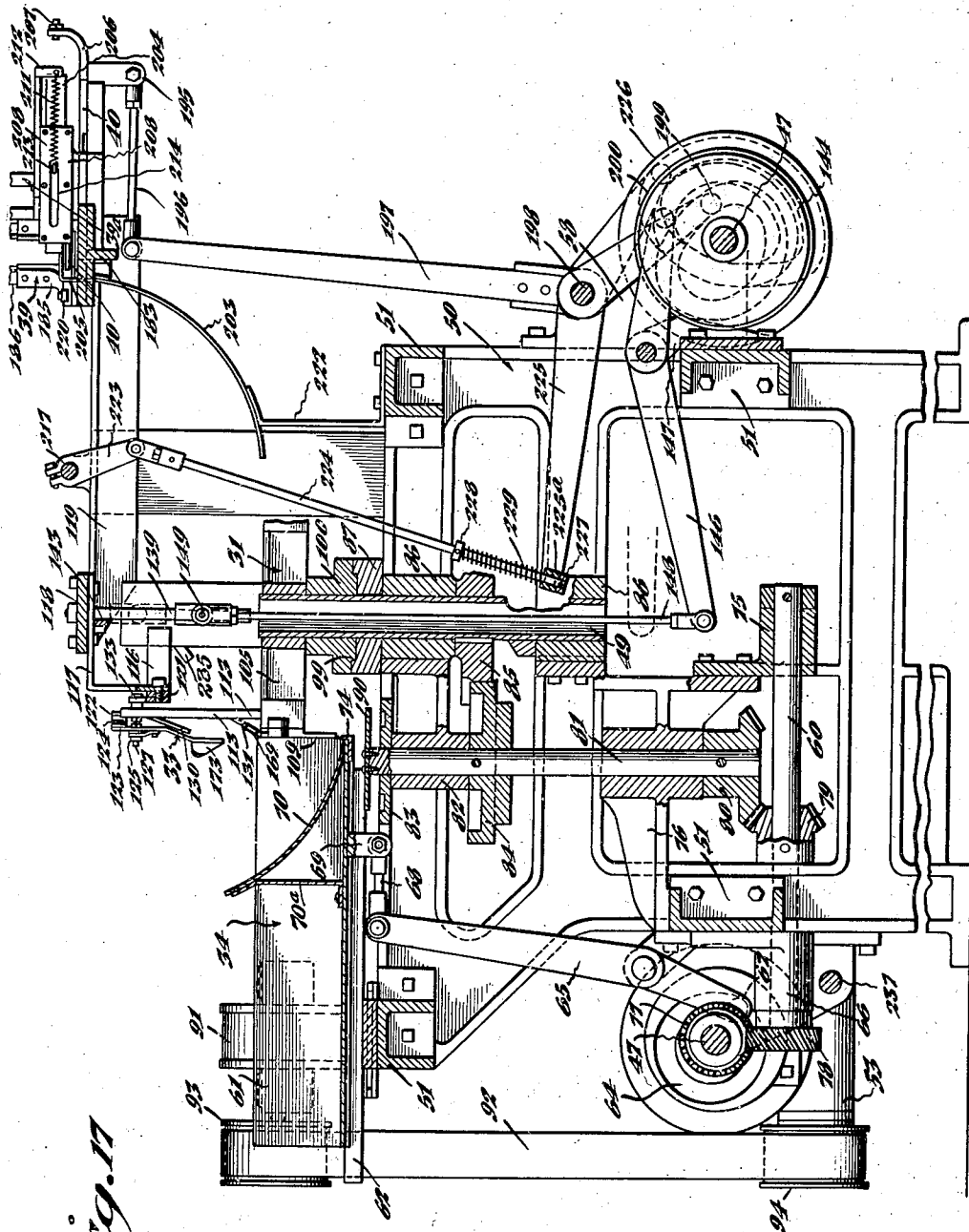
R. A. JONES

2,051,483

CONTAINER FILLING MACHINE

Filed May 16, 1930

17 Sheets-Sheet 11



INVENTOR

INVENTOR
Ruel Anderson Jones

BY

Work & Wood

ATTORNEYS

Aug. 18, 1936.

R. A. JONES

2,051,483

CONTAINER FILLING MACHINE

Filed May 16, 1930

17 Sheets-Sheet 12

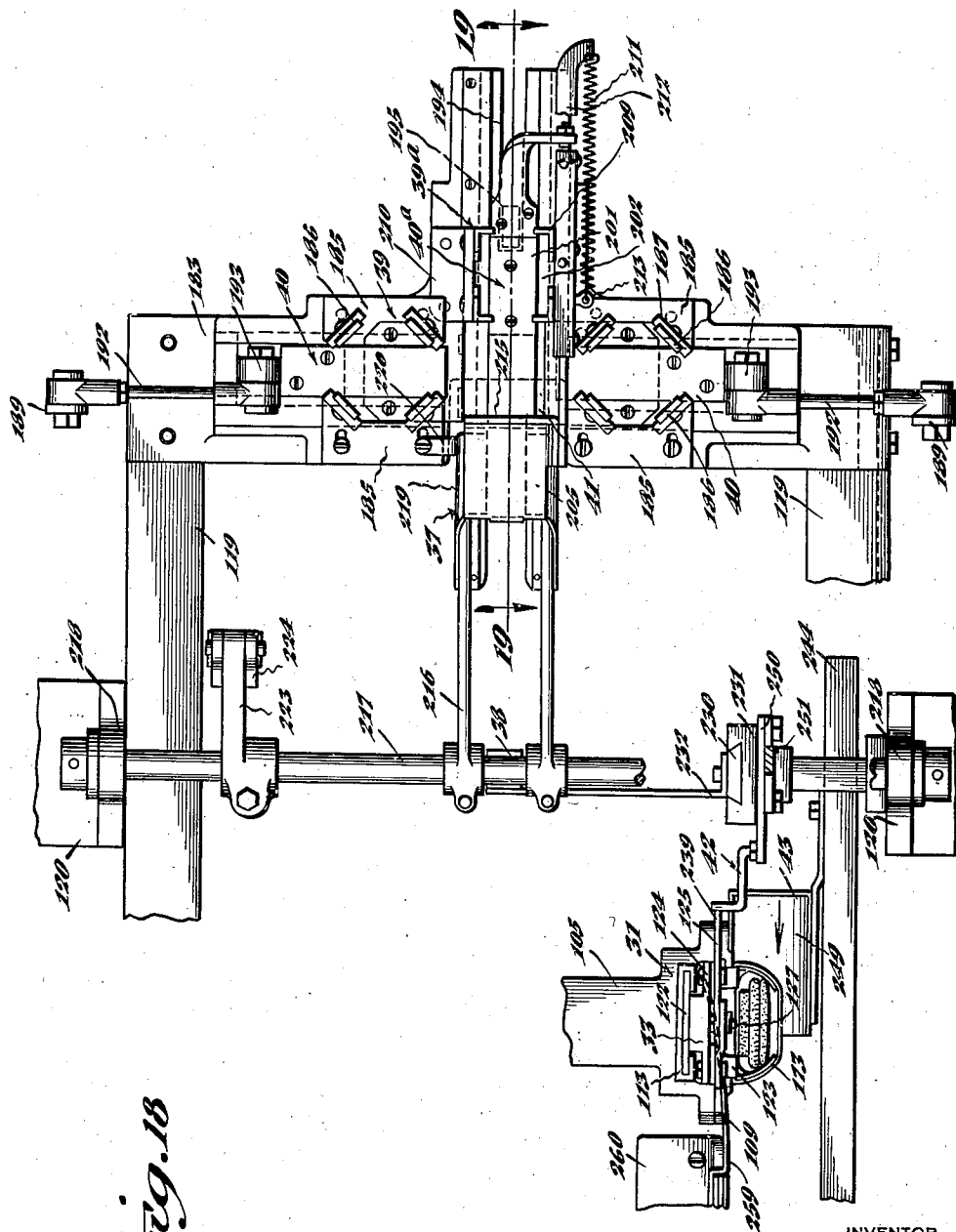


Fig. 18

INVENTOR

BY

Ruel Anderson Jones

Word & Word ATTORNEYS

Aug. 18, 1936.

R. A. JONES

2,051,483

CONTAINER FILLING MACHINE

Filed May 16, 1930

17 Sheets-Sheet 14

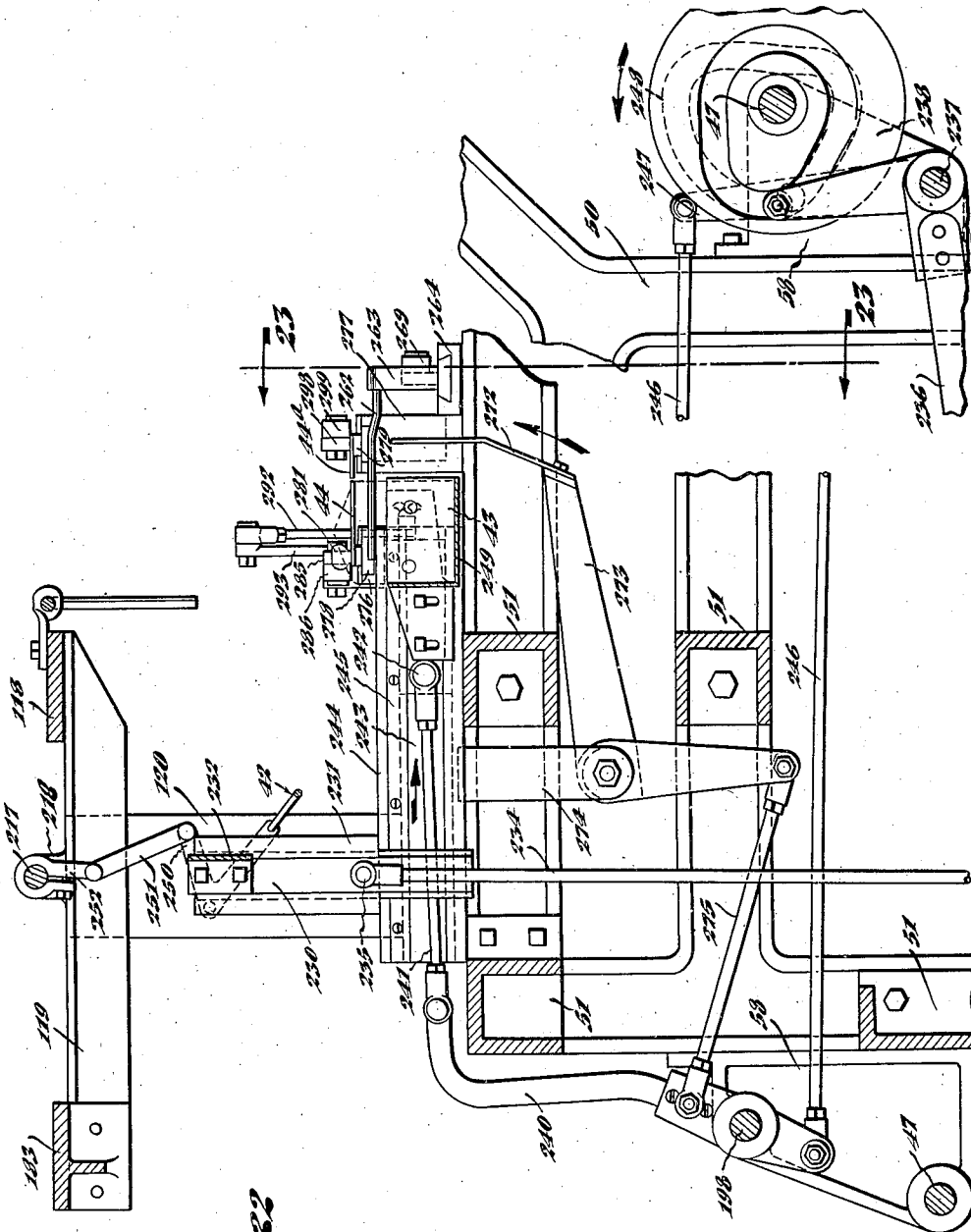


Fig. 22

INVENTOR

BY

Ruel Anderson Jones

Wood & Wood

ATTORNEYS

Aug. 18, 1936.

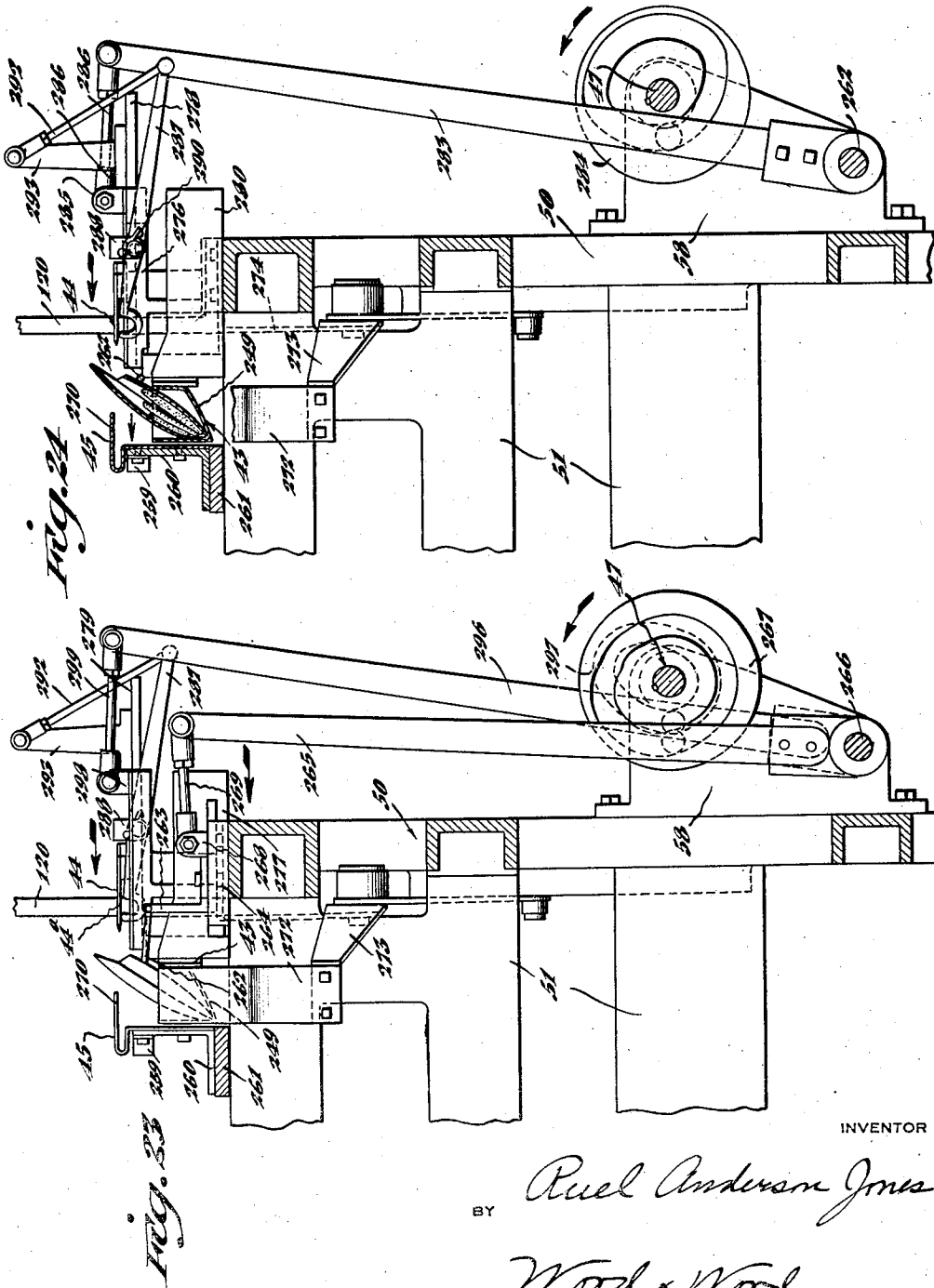
R. A. JONES

2,051,483

CONTAINER FILLING MACHINE

Filed May 16, 1930

17 Sheets-Sheet 15



INVENTOR

BY *Ruel Anderson Jones*

Wood & Wood ATTORNEYS

Aug. 18, 1936.

R. A. JONES

2,051,483

CONTAINER FILLING MACHINE

Filed May 16, 1930

17 Sheets-Sheet 16

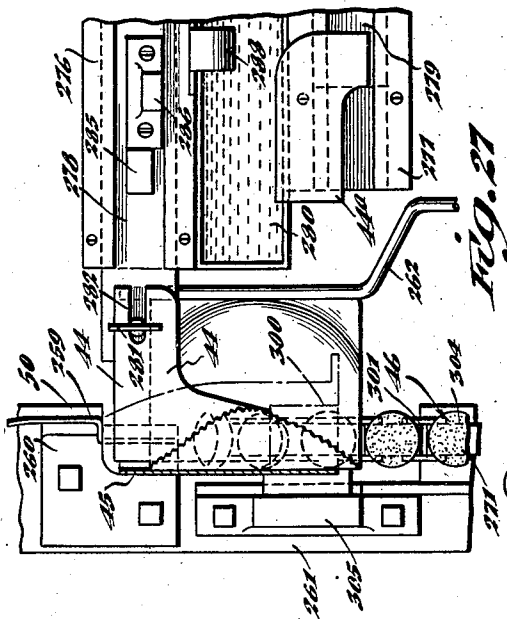


Fig. 25

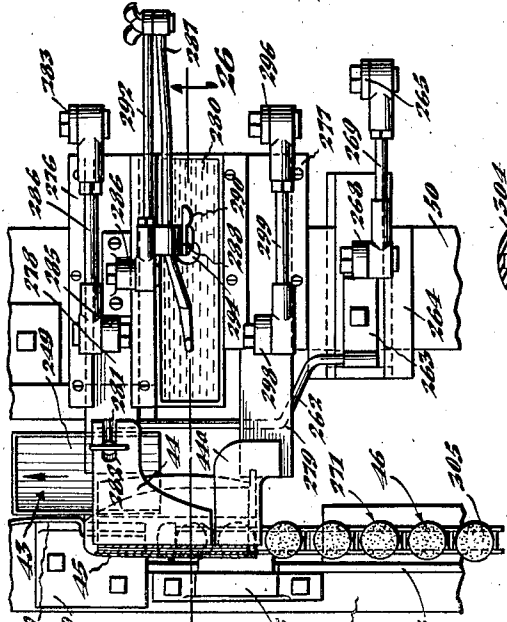


Fig. 26

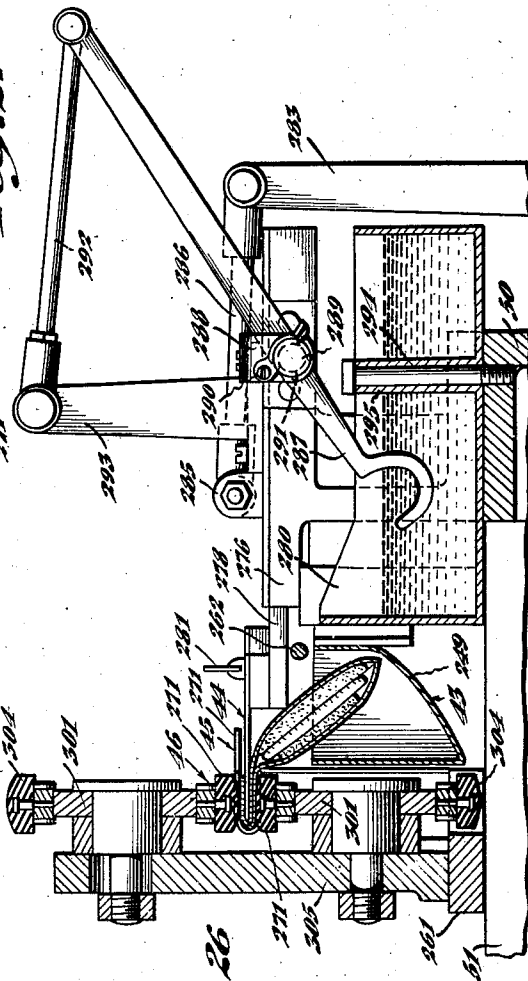


Fig. 27

INVENTOR

Ruel Anderson Jones

BY

Wood & Wood ATTORNEYS

Aug. 18, 1936.

R. A. JONES

2,051,483

CONTAINER FILLING MACHINE

Filed May 16, 1930

17 Sheets-Sheet 17

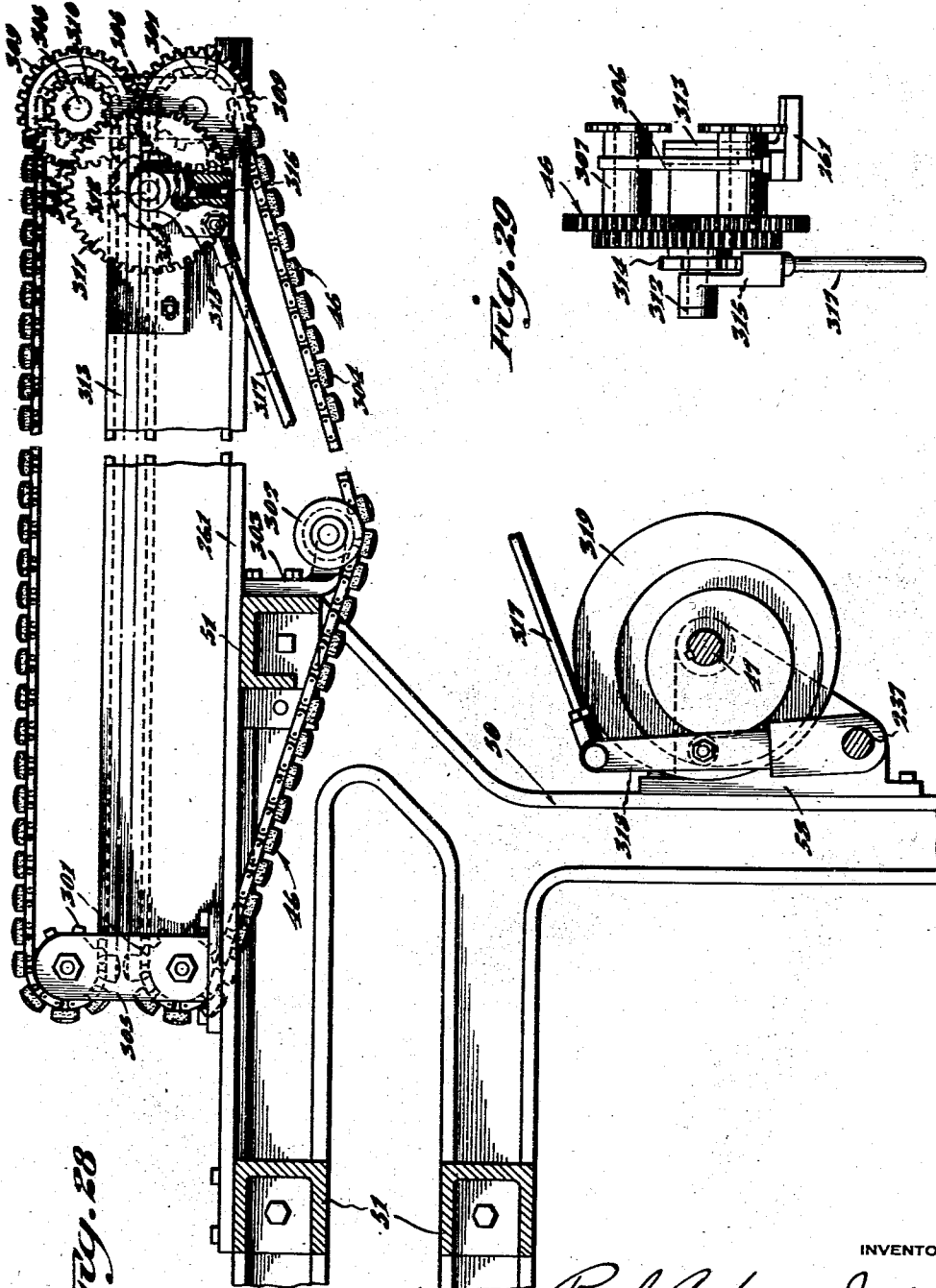


Fig. 28

Fig. 29

INVENTOR

Ruel Anderson Jones

BY

Word & Word ATTORNEYS

UNITED STATES PATENT OFFICE

2,051,483

CONTAINER FILLING MACHINE

Ruel Anderson Jones, Covington, Ky., assignor
to R. A. Jones & Company, Inc., Covington,
Ky., a corporation of Kentucky

Application May 16, 1930, Serial No. 452,908

72 Claims. (Cl. 226—49)

This invention relates to automatic machinery and is particularly directed to a machine for rapidly filling containers such as envelopes, sacks or bags with either a single article or a plurality of articles of merchandise, such as letters, cakes, powder puffs, etc. The type of container particularly adapted to be handled by this machine is of envelope form providing an open side for receiving the goods and a flap for closing the receiving side of the container, these containers being presented to the machine in flat stacked relation in a magazine.

The machine has been disclosed for loading a plurality of cakes or biscuits into an envelope or sack, the cakes as grouped being provided of various shapes and sizes. A relatively thin paper bag has been disclosed. It will be understood, however, that the nature and shape of the merchandise loaded is immaterial as well as the texture of the envelope. The machine is extremely efficient in the handling of light paper envelopes and fragile articles and is therefore applied in this instance as the extreme problem for an automatic filling machine.

The flat containers are successively drawn from a magazine and carried at spaced intervals on a rotating carrier, this carrier having an intermittent motion for appropriate pauses to permit coordinating mechanism to extract a single envelope at each stop from the receiving end of the magazine and to also pause at the various operating stations located radially about the carrier, namely, an opening and spreading station incorporating a device for widening the sack opening, an article assembling station and coacting mechanism for loading the grouped articles or a single article into the envelopes, and a discharge station at which last mentioned station the loaded containers are discharged into an intermittently moving conveying device including at this point the means for adhesively coating the flaps and rolling the same for an efficient closing of the container.

It is an object of this invention to provide a reciprocating magazine for feeding a stack of envelopes disposed therein into the region of the carrier, this magazine moving in synchronism with the rotary carrier and a gripping mechanism thereon for successively and positively extracting a single envelope from the magazine and attaching it upon the carrier at each pause of the carrier and reciprocation of the magazine. The rotary carrier is provided with a plurality of the extracting devices, it being observed that there is one extracting device for each of the

four stations surrounding the carrier so that upon each pause of the rotary carrier a gripping or extracting device is in position to operate upon the endmost envelope of the stack in the magazine.

Another object is to provide cooperating devices at the next station, before which the intermittently moving carrier pauses for opening the envelope and to envelope spreading means above each gripping means for further maintaining and locking the envelope in open condition for subsequent transportation by carrier movement to a filling or loading station. The envelope opening device at this fixed opening station may include a gripping means engaging the outer wall of the envelope for separating or pulling apart the respective sides of the envelope, a coacting finger engaging and initially turning back or clearing the flap for subsequent engagement by the flap engaging means of the spreader device, a plunger for inserting the envelope spreading device into the envelope and a finger for actuating and setting the spreading device.

Another object is to provide an article assembling mechanism at the next station for stacking a plurality of articles of merchandise from a plurality of magazines on a loading platform and to a cooperating movement providing that the assembled articles are transported to the region above the open envelope positively and to a loading device coacting with the transporting device for inserting the articles in the envelopes without damage to the articles or the envelopes, as the envelope is brought or carried to this loading station from the envelope opening station. It is a further objective, in connection with the primary loading features of the machine, to provide the above mentioned assembling means as an auxiliary which may be arbitrarily included in the machine when desired for grouping a set of articles of varied form and size from their respective magazines and arranging them in stacked position for subsequent movement thereof, in a group, by the transporting device to the region of the envelope for depositing the group in the open envelope.

Another object is to provide a device for releasing the envelope spreading means which spreading means has sustained the loaded and open envelope through the rotative movement of the carrier, this release mechanism being located at the discharge station for depositing each successively filled envelope into a reciprocating transport, which transport is moved beneath the par-

ticular envelope to be discharged each time the carrier dwells.

Another object is to provide glue applying means which acts upon each envelope after it has been discharged or released from the rotary carrier.

Another object is to provide a flap folding mechanism for folding the flap of the envelope against the body of the envelope and cooperating with the glue applying means for adhesively attaching the flap against the body of the envelope. The last mentioned flap folding device acts to align the flap edge of the envelope for feed between the elements of a flap rolling device. The foregoing mechanisms apply the glue to the underside of the flap and immediately thereafter place the closed edge of the envelope between the elements of the rolling device for pressing or rolling the flap to firmly set the same.

Thus another object is to provide a combined transporting and flap folding means whereby the successively discharged filled envelopes are carried in spaced relation and subjected for the proper time during the transporting period to a rolling action and subsequently entirely discharged from the machine.

Another object is to provide an extremely compact automatic machine for accomplishing the foregoing successive operations for filling envelopes, in which machine the operative parts are efficiently co-related and synchronized. This objective includes the provision of a rotary carrier having the various stations embodying the respective mechanisms for acting on the envelope radially disposed thereabout and furthermore includes the provision of a hollow shaft for the rotary carrier, wherein, for compactness operating rods are brought up centrally through the machine to actuate various radially disposed devices functioning on the envelope as previously described.

Other objects and certain advantages relate to the various means for operating the rotary carrier and all the devices in synchronism whereby there are a number of envelopes passing through the machine and the successively described acts are being performed simultaneously on envelopes in different stages of progression through the machine, which objects and advantages will be more fully apparent from the description of the accompanying drawings, in which:

Figure 1 is a top plan view of the machine illustrating it generally.

Figure 2 is a side elevation of the machine looking toward that side thereof embodying the envelope opening devices.

Figure 3 is an end elevation of the machine looking toward the article loading station, a portion of the mechanism being removed to more clearly illustrate the interior of the machine.

Figure 4 is a slightly enlarged sectional view taken on line 4—4, Figure 1, detailing the envelope magazine and illustrating an envelope gripping means on the carrier functioning to extract an envelope and also illustrating the diametrically opposite article inserting mechanism located at the third station of the rotary carrier functioning to insert articles in an opened envelope.

Figure 5 is an enlarged fragmentary sectional view taken on line 5—5, Figure 4, illustrating: one of the radially disposed gripping devices on the carrier extracting a single envelope from the magazine and attracting it to the carrier; the construction of the rotary carrier; and the means

initially opening the envelope at the next or envelope spreading station.

Figure 6 is a sectional view taken on line 6—6, Figure 5, further detailing the rotary carrier as well as the embodied exhaust passageways extending to the suction or gripping devices, and the valve cooperating with the carrier, for controlling the suction.

Figure 7 is a sectional view taken on line 7—7, Figure 6, further detailing the rotary carrier.

Figure 8 is a bottom view of the valve element which controls the suction in the carrier, a portion of the valve being broken away and shown in section to illustrate the interior thereof.

Figure 9 is a horizontal sectional view taken below the carrier element for detailing the valve in its assembled position as well as the means for operating the same; this view additionally illustrating the envelope opening device at the second station in section and in fully retracted position with the suction relieved.

Figure 10 is a fragmentary sectional view taken on line 10—10, Figure 2, illustrating the devices and their respective operating means at the second or envelope opening and spreading station of the machine.

Figure 11 is an enlarged fragmentary detail sectional view illustrating the envelope opening and flap clearing device in retracted position after having separated the sides of the envelope, the envelope illustrated in position on a set spreading device of the rotary carrier which device is to transport the envelope through the filling station.

Figure 12 is a sectional view taken on line 12—12, Figure 11, further detailing the mechanism for spreading the envelope.

Figure 13 is a general sectional view of the machine taken on line 13—13, Figure 3, illustrating the envelope loading plunger in retracted position, the swinging transport bucket in position above the envelope and the supported opened envelope in position beneath the plunger and transport bucket for receiving the articles of merchandise.

Figure 14 is a fragmentary sectional view taken on line 14—14, Figure 1, illustrating the respective plungers for lowering the envelope spreading means at the second station and for raising the same at the discharge or fourth station after the release of the envelope to elevate the spreading means to the level of a track for ineffective movement of the spreading means on the rail past the envelope pick-up station and back to the second station.

Figure 15 is a detail view looking toward an envelope spreading device dwelling at the discharge station and showing it in tripped or released position with the envelope receiving transport disposed therebeneath.

Figure 16 is a detail view taken similar to Figure 15 but showing the envelope spreading device in set position for supporting an envelope in opened condition.

Figure 17 is a general sectional view of the machine taken on substantially the same line on Figure 1 as Figure 4, illustrating, the details of various operating levers and cams at the underside of the machine, the transmission for driving the rotary carrier, and the general arrangement at the center of the machine.

Figure 18 is a plan view of a portion of the machine, illustrating the plurality of article magazines above the third station, the device for moving the assembled articles to the open envelope

and the envelope spreader tripping means and transport at the fourth station.

Figure 19 is an enlarged sectional view taken on line 19—19, Figure 18, further detailing the mechanism shown in Figure 18, and showing the slide means for inserting the group of articles in the swinging transport bucket in retracted position.

Figure 20 is a sectional view taken on line 20—20, Figure 19, further detailing the grouping mechanism.

Figure 21 is a sectional view taken similar to Figure 19, but showing the assembly sliding device actuated to move the assembled articles into the swinging transport bucket.

Figure 22 is a fragmentary sectional view taken on line 22—22, Figure 3, illustrating the means for tripping the envelope spreading device at the fourth or discharge station, the transport moving the discharged or released filled envelope to the flap gluing and folding station and a swinging abutment for insuring the proper placement of the envelope in the transport when it arrives before the flap gluing and folding means.

Figure 23 is a sectional view taken on line 23—23, Figure 22, illustrating the flap gluing and folding device moving forward to operate on an envelope in the transport.

Figure 24 is a sectional view taken on substantially the same line as Figure 23, certain parts being removed and the section line slightly varied for further illustrating the mechanism.

Figure 25 is an enlarged fragmentary plan view of the machine illustrating the details of the gluing and flap folding device and showing the device acting on an envelope.

Figure 26 is a sectional view taken on line 26—26, Figure 25, further detailing the gluing and flap folding device showing the device functioning to tuck the envelope flap edge in a form and guide at the mouth of the discharge conveyor and flap rolling device.

Figure 27 is a fragmentary top plan view, considerably enlarged, showing the flap folding device in detail.

Figure 28 is a detail sectional view taken along the inner side of the discharge conveyor and rolling device, illustrating the same and the intermittent movement means for operating the same.

Figure 29 is an outer end view of the discharge conveyor and rolling device, illustrating the transmission for driving the same.

Figure 30 is an enlarged detail view of the intake end of the discharge conveyor and flap rolling device showing an envelope entering the same.

Generally described, the machine includes coordinated mechanical components on a circumferential work line and on a rotary carrier or turntable by means of which various functions are performed by the cooperating devices at four radially disposed stations. There are certain mechanical movements or devices at these four fixed radial points on the circumferential work line coordinating with devices on the rotating carrier, which moves intermittently on the work line and dwells simultaneously before all stations, moving up one station at each rotation.

The turntable transports not only the envelope but cooperating movements or devices which are serially coordinated with the orbitally disposed complementary work elements at the respective stations. Thus, the four step or station positioning of the rotary carrier does not merely constitute the means for disposing the envelope to the

action of mechanisms at each station but upon these dwells or pauses the mechanism on the carrier coordinates with the mechanism at the station to complete four distinct but serially related mechanical units.

The machine, broadly describing its four stations and referring to the drawings, comprises a rotary carrier 31 which is intermittently rotated with each period of dwell disposing four active points of the carrier before four stations simultaneously. Each pause of the rotary carrier places a radially disposed envelope gripper 32 and a spreader device 33, which devices are each present at each of the four points of the carrier, before each station. The envelope grippers and spreading devices progress and function or are acted upon serially relative to the stations. The devices on each radial arm or active point of the rotary carrier cooperate at each station with other mechanisms which are said to be complementary to the devices of the rotary carrier.

The stations regarded in the order in which a given envelope progresses around the circular work line as defined by the rotary carrier are: a first or envelope pick-up station at which an envelope is seized by the carrier 31; a second or envelope spreading station, at which the envelope is opened; a third or filling station, at which the envelope in its open condition is filled; and a fourth or discharging station, at which the envelope is released from the rotary carrier and entirely discharged from association therewith.

As an adjunct to the third station which is the filling station, an article assembling station may be provided, whereby a plurality of articles of various shapes and sizes may be stacked and inserted in a device which transports the stacked group to the region of the third or filling station. Also as an adjunct to the fourth station, a flap folding, gluing and rolling station is provided.

The intermittent rotation of the rotary carrier is accomplished by means of a Geneva gear movement having four points. The complementary movement at the first or pick-up station comprises a magazine 34 and reciprocating movement therefore which cooperates with the particular radial extension of the rotary carrier dwelling before it and the particular suction or gripper device 32, for gripping the endmost envelope of the magazine, and attaching it to the rotary carrier.

A quarter turn of the rotary carrier 31 next places the picked up envelope at the envelope opening and spreading station, where the spreader device 33 on that particular extension of the rotary carrier is operated to enter the envelope being acted upon by a cooperating or complementary mechanism 35 at this station for initially and momentarily opening the envelope, and a complementary mechanism 36 for holding back the flap of the envelope to aid in the entrance of the spreader device 33 into the envelope.

At the third station, which is reached by the next quarter turn, the envelope being supported by the spreader device 33 in open position, the merchandise is swung from an assembling station by means of a swinging transport bucket 37, brought into the region over the opened envelope and urged into the envelope by a plunger 38 cooperating with the bucket device, which brings the merchandise into this region, for positively inserting the merchandise in the envelope.

The assembling mechanism adjoining this station comprises a plurality of vertically disposed magazines 39 each of which has a slide 40 moving horizontally and transversely relative to its base, 75

the paths of movement of these slides intersecting and disposed at different elevations for stacking the articles on a loading platform 41 from whence they are inserted in the swinging transport 37 by one of the slides and thence moved to the envelope as aforesaid.

Another quarter turn of the rotary carrier moves the loaded envelope to the discharge station where the envelope opening device 33 is tripped by a cooperating device 42 and is deposited in a transport 43, which transport has paused beneath the discharge point, through the action of a mechanism synchronized with the rotary carrier drive. The transport moves the loaded envelope forwardly into the region of the flap folding and gluing station where a glue smeared blade 44 tucks the upper margin and folds over the flap by cooperation with a form 45 into which the blade moves. At this point the envelope is picked up by its flap margin and the folded flap and envelope margin are rolled between a conveying and rolling device 46 to a point of total discharge from the machine.

Substantially, all the movements are cam and lever operated and the entire machine is motor driven from a single source. The power shaft 47 extends from a motor 48 bolted to one side of the machine entirely around the machine and back to the motor. Two of the movements for operating the envelope opening devices extend up through the center of the machine through the hollow shaft 49 which rotatively mounts the rotary carrier.

The machine therefore includes a carrier which transports a plurality of envelopes in spaced relation in a circular path, each envelope being closed when initially picked up and opened, filled and closed as it progresses. These envelopes may be of very light material, such as, an oil paper and yet be handled with absolute efficiency and with extreme delicacy.

The relation of the envelope mechanism as above described lends itself extremely well to the provision of auxiliary devices for further operations relative to the envelopes as they are fed. The opened envelopes may be loaded, by means of the disclosed device, with merchandise, such as groups of cakes, powder puffs, etc., or the adjunct to the filling station may be a folding mechanism for handling letters, circulars, etc. In the same way a tucking mechanism may be substituted for the flap gluing mechanism if it is desired to merely tuck in the flap rather than to fold and glue it.

The various mechanisms and devices of the machine are mounted on a frame work which is fabricated of side standards 50 and cross rails 51. The power for operating all the mechanisms is derived from the electric motor 48 bolted to the frame or more specifically to one of the side standards thereof at the envelope spreading side of the machine. The power shafting extending from the motor is in the form of four sections of the shaft 47, one on each side of the machine. The power shafting therefor totally encircles the frame. It is the characteristic of the mechanical arrangement of the present machine that all the working parts are arranged about the same center. In other words, the turntable or rotary carrier 31 is the center of activity upon which all movements are brought into play.

A clutch unit 53 is hung at one end of the frame and the drive from the motor is connected thereto by means of a pinion 54 on the stub shaft 55 of the motor in mesh with a gear 56 of the

clutch unit. The clutch is shifted by means of a lever 57 extending to the top of the machine. The shaft section 47 at the intake end of the machine has one end journaled in the clutch unit and its opposite end journaled in a bracket 58 affixed to the frame. In each instance of the sectional shaft, except the corner on which the clutch unit is mounted, the sections are journaled in brackets 58 at the corners of the frame and are drivingly connected by means of bevelled gears 59 on the ends of the shafts which extend beyond the brackets and are disposed at right angles to each other. A shaft 60 extends from the shaft section 47 at the intake side of the machine toward the center of the machine and provides the drive for the rotary carrier, this shaft being the only departure from the encircling line of shafting. A multitude of cams is carried by this circular line of shafting with their corresponding levers extending into the machine for the various purposes hereinafter set forth in detail.

Envelope magazine and pick-up mechanism of carrier

The rotary carrier provides four radially disposed points upon which are mounted identical suction devices 32 so that upon each pause of the rotary carrier after a ninety degree driving impulse, the particular sucker dwelling before the envelope magazine operates to take on a single envelope. The envelope magazine is of the reciprocating type. It comprises a channel-shaped body or slidable container 61 which is mounted on spaced tracks 62 affixed to the upper surface of the frame. Rollers 63 are provided substantially at each corner of the reciprocating magazine for a rolling engagement on the tracks.

The reciprocation for the magazine is obtained through a cam 64 (see Figure 17) affixed to the shaft section 47 at the forward or intake end of the machine. A bell crank lever 65 is fulcrumed on a bearing bracket 66 bolted to the frame and has a roller 67 on the end of its lower arm in engagement with the cam groove. The upper arm is pivotally connected to a link 68, the other end of which link is pivotally connected to a lug 69 depending from the base of the magazine between the tracks. For the particular type of envelope being fed, an auxiliary bottom 70 of arcuate form is placed in the magazine toward the discharged end thereof forming an incline for gravity feed of the envelopes. (See Figures 4 and 17.) This bottom 70 is supported at its rear end by means of a standard 70^a and is attached to the magazine floor at its forward end.

The envelopes are stacked in vertical position on this bottom 70 and a block or weight 71 is placed behind the stack of envelopes, the lower surface of this weight being shaped to fit the arcuate contour of the magazine bottom. The stack of envelopes indicated at 72 is maintained against displacement through the discharge end of the magazine by means of a lug 73 at each upper corner of the magazine extending inward to engage the side edge margin of the forward envelope and an abutment 74 disposed centrally of the lower edge of the magazine opening and engaging the lower edge margin of the forward envelope.

The rotary carrier 31 is driven by means of a Geneva gear providing a four point stop. The inwardly extending shaft 60 is mounted at its outer end in the bearing bracket 66 affixed to the forward or intake side of the frame and at its

inner end supported and journaled in a bearing bracket 75 bolted to a vertical bearing 76 mounted on the cross rails 51 of the frame. A spiral gear 77 on the power shaft section 47 is engaged with a spiral gear 78 on the extending end of the shaft 60 and immediately inwardly beyond the bearing bracket a bevel gear 79 is pinned to the counter shaft, this bevel gear 79 meshing with a second bevel gear 80 pinned to the lower end of a vertically mounted shaft 81. This shaft 81 is journaled at its lower end in the bearing 76 and at its upper end in a bearing 82 attached to a central cross rail 51.

The vertical shaft 81 is suspended in its bearings by means of a valve operating cam 83 which is attached to its extreme upper end and engages on the upper bearing 82. The Geneva gear driving element 84 is pinned to the vertical counter shaft immediately below the upper bearing thereof and is in engagement with its complementary four point or star element 85 keyed to the shaft 49 of the rotary carrier 31. The complementary Geneva gear element 85 is affixed to the rotary carrier driving shaft between its respective bearings 86—86, which bearings are provided as an integral part of vertically spaced cross rails 51 of the frame. The rotary carrier shaft is hollow to provide a convenient clearance and working path centrally of the machine for various operating rods as hereinafter set forth. As mentioned before, the rotary carrier carries four suction devices. For the operation of these devices the following suction control is provided.

Suction control for carrier

An oscillatable valve 87 is mounted on the axis of the rotary carrier and is rotatable about the hollow shaft 49, (see Figures 5 to 9 inclusive). This valve is supported on the upper bearing 86 of the shaft and is oscillated by means of the cam 83 affixed to the upper end of the vertical shaft 81. The valve includes (see Figure 8) an arm 88 extending radially from the circular body portion thereof and having a roller 89 at its outer end engaging in the groove of the cam 83. A circular plate 90 is attached to the upper end of the shaft 81 for covering the cam and lever connection to prevent the entrance of dirt, etc.

The suction is supplied to the valve by means of a suction pump 91 mounted on the frame and driven by means of a belt 92 operating between a pulley 93 of the pump and a pulley 94 mounted on a shaft of the clutch unit 53. A hose 95 connects the pump to a nipple 96 of the valve, this nipple connecting with a radial passageway 97, said passageway turning upwardly and entering a semi-circular groove 98 milled on a radius of the axis of rotation of the valve. The groove is formed in a countersunk portion 99 of the valve. The semi-circular groove extends substantially between the envelope loading station and the envelope spreading station.

An element 100 of the rotary carrier (see Figures 6, 7 and 17) is secured to the shaft and mounted upon the valve element, this element providing a circular boss on its underside registering with the countersunk portion of the oscillatable valve element. The rotary carrier 31 is secured to the element 100 by means of a plurality of screws 101 extending through from the upper surface of the rotary carrier and screwed into the element 100. The rotary carrier including the element 100 is keyed to the shaft 49 by means of a key 102.

Passageways extend through the element 100 to

register with passageways in the rotary carrier 31 extending out to each suction device. These passageways 103 in the element 100 at their lower ends are disposed on a radius corresponding to the radius of the semi-circular groove 98, so that they must serially register with this groove and be in communication individually therewith for substantially a quarter turn of the rotary carrier. Each quarter turn moves a picked-up envelope from the magazine to the spreading station, at which latter station, it is no longer required that the suction devices be effective for holding the envelope since other mechanisms have acted to grip the envelope.

The passageways 104 in the rotary carrier extend through radial ribs 105 of the carrier 31 and communicate in each instance with a pair of suckers 106. The suckers and their carrier block 107 are mounted within a chamber 108 formed by a depression or cupped outer wall at the ends of the respective radial extensions of the carrier. Cover plates 109 are bolted over the outer faces of the chambers 108 (see Figures 5 and 11). These cover plates have various extensions which will be hereinafter described and identified as to function.

Each cover plate 109 may be described as an abutment plate against which the envelope is drawn when extracted from the magazine. The suckers 106 extend slightly beyond the outer face of this plate, being disposed through apertures in the plate. The suckers are attached to the carrier block 107 by means of hollow screws 111 passing through the suckers from the operative ends thereof and screwed into the block in communication with branches 112 of the particular air passageway 104. Between the sucker carrier block 107 and the carrier 31, the lower end of a guide element 113 is disposed in a vertical groove in the carrier and the block is secured against this guide 113 by means of screws extending into the carrier. Where the radial passageway extends through the guide plate tube 114 is provided passing through a rubber sleeve 115 disposed in an aperture of the plate for preventing leakage at this point.

As the rotary carrier pauses, the particular sucking device dwelling before the magazine has its passageway registering with the extreme end of the semi-circular groove 98, the valve controlling cam 83 having just acted to move the valve back to place the groove in position where it will register in this manner. While the suction is thus being applied to this particular sucking device, the magazine reciprocates and engages the outermost envelope of the stack firmly against the ends of the sucker cups, whereupon the suction cups immediately seize the envelope and upon a retractive movement of the magazine firmly retain it. The envelopes are flexible enough to slip past the various abutments 73, 74 normally holding the stacks in the magazine. An envelope is thereby retained upon the suckers and against the face of the plate 109, the envelope arranged with its filling opening and tucking flap disposed upwardly, the tucking flap being on the side adjacent the plate.

As the Geneva gear movement again acts the carrier is rotated, the particular passageway continuing in registry with the groove. The valve has been actuated to rotate the groove 98 slightly with the carrier so as to clear the envelope intake station. This permits the next passageway and sucking device of the rotary carrier to arrive at a complete stop in front of the

magazine before the suction will again be connected, the application of the suction occurring when the valve is again actuated slightly in a reverse direction to move the groove back. The foregoing movement is repeated for each pause or dwell of sucking device before the magazine and as has been staged before, an identical gripping device is brought up for this purpose. For a detailed illustration of the action of a sucking device relative to the magazine and the position of the groove 98, see Figure 5.

The envelope opening mechanism

The bag or envelope is advanced in the foregoing quarter turn to what may be termed the envelope opening station. At this station the opening or spreading devices 33, one above each suction device on the rotary carrier, are actuated, each being acted upon by mechanism at this second station to open and support the particular envelope. The mechanism for operating these devices as they are moved around to the opening station is positioned to receive each opening device in operative connection as the rotary carrier dwells at each quarter turn.

As brought out in Figure 13, the opening devices are each suspended or supported, for a portion of their rotative movement, on a semi-circular track 116 which extends from the discharge or fourth station of the machine through the loading station and around to the envelope spreading or opening station. This track as shown is supported on a hanger 117 which is bolted to a cross rail 118 mounted on side rails 119, which in turn, are supported on standards 120 rising from the frame of the machine. This hanger is connected to or supports the track at an intermediate point thereof which is adjacent the loading station, and provides a saddle or attaching block 121 between the track and the hanger fitting the contour of the inner side of the track for a snug fitting connection.

The spreading devices are vertically reciprocable on the guides 113 which have heretofore been mentioned and which are secured to each active point of the rotary carrier and rise to a height above the elevation of the track, the track 116 being sufficiently elevated to support the opening devices when they are not operative. The guideways 113 are of channel form providing outer overhanging flanges at each side to guidingly support the carriages 122 of the devices. Each spreading or opening device (see Figures 11, 12, 15 and 16) has a pair of levers 123 pivotally connected, one element of the pair at each corner or end of a cross member 124 of the carriage. These swinging levers or fingers 123 normally depend loosely on their pivots. A pair of toggle links 125 connects the finger, each link being connected at its end to a respective finger and the links being joined by a pivot pin 126 which provides a head 127 extending outwardly for engagement by a swinging operating lever 128. A spring 129 under tension joins the lower ends of the fingers and normally urges them together.

Each spreading device is also provided with a clamping plate 130 bolted thereto between the fingers, extending downwardly and inclined outwardly for engagement with the flap of the envelope to maintain it against a correspondingly inclined plate extension 131 disposed upwardly as a part of the plate 109 against which the envelopes are held by the suction cups. The clamping plate 130 is attached to the carriage

between the overhanging flanges of the guide by means of a bolt 132 and nut. The head of the bolt is disposed on the other side of the carriage and has a roller 133 mounted on a counterturned portion thereof and maintained thereon by means of a washer 134 and screw 135. The back of each guide is longitudinally or vertically slotted as at 136 to provide appropriate working clearance for the stud and roller.

The rollers 133 are adapted to engage upon the semi-circular track when supporting the opening devices as they pass the loading station. As shown in Figures 10 and 11, each roller 133 as it leaves the end of the track adjacent the spreading or opening station, passes into the bifurcated outer end 137 of the arm of a vertically reciprocable slide 138. This slide 138 includes the lateral arm bifurcated as aforesaid extending from the guided body of the slide which surrounds a square slide post 139 depending from the cross rail 118 at the top of the machine (see Figure 14).

There are two of these plunger movements, another being diametrically disposed for receiving the rollers of the opening devices as they are brought up to the discharge or fourth station for raising the devices to the level of the track at that side of the machine. The two slide posts 139, 140 for these movements are both attached to the cross rail 118 by means of studs 141 extending through the rail and nuts 142 on the studs and are braced by means of a cross piece 143 extending between the two and bolted thereto. Both of these movements are operated by rods extending down through the hollow shaft of the rotary carrier. In the instance of the opening device lowering plunger, the motion is derived from the following source.

On that section 47 of the power shaft disposed toward the rear of the machine, a cam 144 is pinned, this cam engaging the roller on the outer arm of a bell crank lever 145 fulcrumed on a bracket 147 attached to the frame. The other arm of the lever extends toward the center of the machine to a point below the hollow shaft and is connected at this point to the lower end of a rod 148 which extends up through the hollow shaft and is connected at its upper end to a wrist pin 149 (see Figure 14) on the inner side of the guided body of the slide 138. For the purpose of assembly, the guided body is made sectionally, one side 150 thereof being removable to permit attachment of the body laterally to the post 139. As stated before, this slide is effective for receiving the roller of the opening device to be operatively connected to the particular device coming around to the opening station. As soon as the roller is supported between the arms of the plunger, the slide is moved downwardly, sliding the entire opening device therewith.

It will be understood that during this time, the suction has been maintained to retain the envelope on the rotary carrier. During the lowering movement of the slide and opening device, other movements are co-ordinating therewith at the loading station to arrange the envelope for the proper insertion of the fingers and opening of the bag. Figures 5, 10 and 11 illustrate these synchronized movements.

A guide bracket 151 is mounted on the frame at the spreading station and two movements are slidably mounted on this guide bracket. One of these movements 35 may be termed a primal envelope opening movement, and the other 36, a flap placing and holding movement. A valve arrangement is provided for the primal envelope

opening movement controlling the suction to a sucker 152 thereof. The sucker 152 is mounted substantially in alignment with the suction device on the rotary carrier and is adapted to move toward and from the envelope to draw the outer side thereof away from the inner side so as to space the walls and permit the insertion of the spreading fingers 123. The rubber suction cup 152 is mounted on a headed rod 153 and the shank of this rod is disposed through an arm 154 extending at right angles from a slide 155 mounted on the guide bracket 151. The head of the rod 153 lies against this arm and the shank of the rod is slidably mounted in a valve element 156 stationarily attached to the guide bracket.

A passageway 157 extends from the sucker through its hollow attaching screw 158 through the rod to a point intermediate its ends and thence turns radially to the outside of the rod. The normal retracted position of this envelope opening movement is shown in Figure 9. Figure 5 shows the movement just prior to release of the suction after the envelope has been opened and as the movement is retracting. The valve element 156 in which the rod moves provides an internal groove 159 which registers with the radial extension of the passageway in the rod. Suction is applied to this groove through a hose connection 160 to the pump 91 attached to a nipple 161 of the valve element. As the movement is advanced, the passageway in the rod is connected with the groove and the sucker cup engages the outer wall of the envelope. As the movement is retracted, the radial opening passing beyond the valve element is opened for exhaust to the atmosphere.

The slide 155 carrying the suction cup 152 is actuated by means of a cam 162 on the power shaft 47 at that side of the machine. A roller 163 on one arm of a bell crank lever 164 mounted on a pivot shaft 58* journaled in end brackets 58, is engaged by the groove of the cam 162 and the other or upper arm of the bell crank lever 164 is connected to the outer end of a link 165 pivotally connected at its inner end to a wrist pin 155* extending from the slide 155.

The flap handling movement comprises a finger 166 which moves in a path parallel with the movement of the primal envelope opening movement and above the same. The tip 167 of the finger 166 of this movement is formed of rubber and is mounted in the recessed end of the finger and the finger is bolted to the right angled arm of a slide 168. This finger 166 is adapted to engage the flap, which in the flat envelope normally extends upwardly to press the flap back against the previously described plate extension 131. The finger engages the flap intermediate thereof and through a cut-away portion of the clamping plate 130 mounted on the spreading device 33. To additionally assure the positive clamping of the flap, rubber inserts 169 are placed in the extension 131 against which the flap is clamped.

The flap positioning finger is actuated by means of a cam 170 mounted on the drive shaft at that side of the machine moving a lever 171 similar to the lever of the primal opening movement also in connection with the guide by means of a link 172 and pivotal connection.

The sequence of the movements is arranged so that the flap is forced back against the plate 131 and the outer wall of the envelope is drawn out prior to the descension of the opening device, and that the flap engaging the plate therefor descends upon the flap previously set in position and the

fingers 123 of the spreader move into the envelope in normal collapsed position. Prior to release of the envelope by the primal opening sucker device and the carrier suckers, another movement is effective for spreading the fingers and flaring the bag opening. These fingers are permanently set for movement from this station to the release station, and therefore through the loading station. The lower ends of the fingers 123 provide outwardly extending flanges 173 of curved contour for rounding the ends of the bag and spreading the walls. The finger setting movement provided is as follows.

Upon one of the side standards 120 supporting the top frame work of the machine a bearing 15 bracket 174 is bolted. This bracket mounts a short shaft 175. One end of this shaft carries the lever 128 which extends toward the fingers 123 and has a substantially right angle tip 176 disposed for engagement with the extending head 127 of the toggle link connecting pin. This lever is rotated or actuated toward and from the toggle links as shown in Figures 10 and 11, by means of a cam 177 mounted on a shaft section 47 at that side of the machine (see Figure 2) operating a bell crank lever 178 fulcrumed on the same pivot shaft 58* as the other two movements. This lever 178 includes an upper arm pivotally connected by a link to the outer end of an arm 179 pinned to the short shaft 175 previously mentioned at the end opposite to the actuating finger.

As will be seen in Figures 11 and 12, aided by Figure 15, the finger descends upon the extending head 127 to align the links 125 and spread the fingers 123. A pin 180 mounted on one link 125 is engaged by a hook extension 181 on the other link pivot stopping the links in aligned position. Movement of the fingers in either direction is also regulated by means of pins 182 on the carriage element set between bifurcations on the upper ends of the respective fingers for limiting the swinging movement. After this spreading has been effected by the foregoing movement, the Geneva movement of the rotary carrier is again effective to move the rotary carrier. At the beginning of this next quarter turn, the suction is still effective in the suction device 32 on the rotary carrier acting on the envelope just described. This suction is released after movement of the rotary carrier is started by return or back movement of the valve 87 controlling these devices. From this point or station, the opened envelope is supported by the clamping engagement of its flap on the plate extension 131 of the carrier and by the set fingers 123 within the envelope. It will be apparent that, since the rotary carrier movement moves the roller of the loaded opening device 33 out of the bifurcations of the slide 138, the slide may be again elevated to a position for receiving the next opening device 33.

Article assembling or grouping mechanism

In those instances where a plurality of articles of merchandise are inserted in the envelope, the foregoing mechanism is provided as an adjunct to the inserting mechanism at the third station of the machine. This mechanism is next described since it transmits the articles into the inserting mechanism. From the point of the grouping mechanism, the grouped articles are transported in the swinging bucket 37 to the region above the opened envelope supported on the rotary carrier. The assembling mechanism is mounted on a cross rail 183 on the side rails 119 at an elevation above the rotary carrier.

The assembling mechanism generally described includes a plurality of vertically disposed magazines 39, three in the instance shown. The stack of articles in each magazine rests upon a moving bottom in the form of a slide 40 which moves back to permit one article, such as a cake, to drop into its path and which then on its forward stroke moves the article forwardly to a grouping platform. The slides and fed articles for the respective magazines are at different elevations so that the cakes are moved into the form of a stack by overlapping slides and are finally slid into the receiving end of the bucket 37. The shape or size of the articles is immaterial, the magazines being made to fit the particular article.

These magazines and slides are supported centrally of and on the cross rail 183 mounted on and between the side rails previously mentioned and the assembling station constituted thereby may be generally described as located above and outwardly of the loading station before which the rotary carrier dwells to receive the articles. One of the magazines 39^a is located radially of the rotary carrier and the slide 40^a of this magazine is aligned with the intake for the bucket for acting upon the assembled group to insert it in the bucket. At each side and inwardly of this magazine are located the other two magazines 39—39, the slides 40—40 of which intersect the path of movement of the first slide 40^a from respective sides. Each of the last mentioned laterally disposed magazines comprise two adjustable base elements 185—185 each supporting two uprights 186—186 constituting the four corners of the magazine. The base elements have slots traversed by attachment screws for lateral adjustment. As designed, these magazines are adapted for round articles. The base elements are disposed at each side of the path of movement of the particular discharge slide and the slats or uprights 186 of the magazine rise from lugs 187 of the base elements which are disposed obliquely across the respective corners of the magazine.

Each of these laterally disposed magazines has its slide 40 moving in a horizontal dovetail slideway beneath the magazine, this slide carrying a forwardly extending finger or blade which normally lies in support position beneath the stack of articles and is fully retracted to permit the stack to descend slightly for placing an article in the path of forward movement of the slide. The slide finger is approximately the thickness of the article so as to clear the remainder of the stack during forward movement against the lowermost article.

The laterally disposed slides 40 are operated by means of cams 188 on shafts 47 on their respective sides of the machine. Levers 189 are fulcrumed on brackets 190 attached to the sides of the frame having their lower arms provided with rollers 191 engaging the cam and their upper arms connected to the ends of links 192, the other ends of which links are pivotally connected to lugs 193 rising from the respective slide 194. The slides of these two laterally disposed magazines are disposed, one slightly above the other, the purpose of which will be more fully understood following the description of the slide 40^a acting radially of the rotary carrier.

As shown in Figures 19, 20 and 21, the slide for the intermediate magazine 39^a is mounted in a slideway also formed horizontally in the cross rail 183. The base of the slideway is slotted as at 194 for clearing a lug 195 which depends from

the slide and is pivotally attached to one end of a link 196, the other end of which link is pivotally attached to the arm of a bell crank lever 197 mounted on a rock shaft 198 journaled in the bearing brackets 58 on the rear side of the frame. The lower arm of the lever carries a roller 199 engaging in the groove of a cam 200 mounted on the rear power shaft section 47.

The slide 40^a has a finger 201 affixed to its upper surface extending beneath the magazine 10 for supporting the stack of articles. This finger moves in a plane below the overlapping paths of movement of the laterally moving slides.

The platform for receiving the grouped stack of articles is constituted by a horizontally disposed plate 41 secured to the upper face of the cross rail and having limbs 202 extending back at each side of the slide 40^a to constitute a support surface for the stack of articles when the slide is retracted, which surface is therefore contiguous with the platform. The plate 41 also has lateral extensions or wings which are disposed beneath the slides 40 and constitute the floor for the magazine 39. This platform 41 at its inner end adjoins and has attached thereto the vertical end of a semi-circular track 203 extending to the region immediately above the opened envelope.

The slide 40^a for the intermediate magazine is effective, toward the last stage of its movement, for operating a slide 204 which has an inverted channel element 205 attached to its inner end and disposed transversely above the path of movement of the slide 40^a for overhanging the articles moved through its ends from the laterally disposed magazines. These movements are arranged so that the discharging finger for the intermediate magazine jointly with the inverted channel, act to insert or slide the stacked or grouped articles from the surface of the platform, into the swinging bucket.

The undersides of the base elements 187 are slotted to provide appropriate working clearance for the respective slides 40, it being necessary that these clearance openings be just slightly greater in height than the thickness of the slide finger or blade so that the base elements function as baffles to prevent displacement of the next article above the one being discharged.

As shown in Figure 19, an arm 206 at the rear of the finger 201 extends upwardly as well as laterally. This arm carries an abutment screw 207 adjustably mounted therein in alignment with the channel moving slide 204, Figure 19 illustrating the abutment screw just coming into contact with the slide 204 after the slide 40^a has been effective to displace the grouped articles. The auxiliary slide 204 is guidingly maintained against the side wall of a base element supporting the intermediate magazine by means of a plate 208.

It will be noted here that the intermediate magazine is formed of angle iron corner uprights 209 attached at the lower ends to base elements 210 secured to the cross frame. This magazine will receive either square or round cakes. Movement of the auxiliary slide is effected by the last phase of movement of the slide 40^a. It is necessary to automatically return this slide, which return is accomplished by means of a spring 211 under tension between a bracket 212 extending outwardly from the base element and an eye bolt 213 secured to the side of the slide through a slot 214 in the gib plate 208. The spring urged return movement of the slide is

limited by the abutment of a bracket 215, carrying the inverted channel element 205 with the inner wall of the magazine 39^a. The swinging bucket 37 as shown in Figures 18 and 19, is carried by a pair of arms 216 affixed to a cross shaft 217 journaled in bearings 218 formed in the standards 119.

The bucket is secured to the spaced outer end of the arms, this bucket being of channel form with inwardly extending overhanging flanges 219 toward its outer end. The arms are attached in the inner corners of the bucket.

As shown in Figure 21 the grouped cakes or articles are shoved into and supported in the bucket, the inverted channel 205 passing between the overhanging flanges in its movement. The swinging bucket moves in an arc or semi-circle, wherein its outer edge is disposed substantially against and moves along the semi-circular track 203, the bucket having the same center of revolution as the axis of the track so that the track supports the articles, as the bucket assumes a vertical position toward the lower end of its stroke. The bucket and its arms are stopped in horizontal return position with the base of the bucket flush with the loading platform for the magazines by means of a stop element abutment 220 bolted to one of the base elements.

Envelope filling mechanism

As previously set forth, the grouping or assembling mechanism is located above and outward of the third filling station of the machine. The grouped articles are moved from the grouping platform by means of the swinging bucket 37 moving in registry with the arcuate track 203. The arcuate track is supported on a bracket 221 on the cross rail 183 at its upper end and its lower end is supported on a standard 222 rising from the frame. The track at its lower end stops short of the spread opening of the bag. As described, the envelopes are successively brought around to this station in open condition and dwell immediately in line with the arcuate track. (See Figure 4.)

The swinging bucket 37 is actuated by means of an arm 223 attached to the outer end of the shaft 207 having a rod 224 pivotally connected thereto. The lower end of the rod is pivotally connected to the inner end of a bell crank lever 225 pivoted to the rock shaft 198 journaled in the brackets 58 at the rear end of the frame. The outer end of the bell crank lever carries a roller in engagement with the groove of a cam 226 pinned to the power shaft section 47 at that side of the machine.

As detailed in Figure 17, the connection of the rod to the bell crank lever 225 is a slidable one. Two collars 227, 228 are attached to the rod, one 227 abutting the underside of a block 225^a pivoted on the end of the inner arm of the bell crank lever 225 and the other 228 spaced upwardly for maintaining a spring 229 compression about the rod between the upper collar and the block on the bell crank lever. By means of this connection, the bucket 37 being swung upwardly to receiving position against the stop 220, resiliently engages the stop since the bell crank lever is free to be swung to compress the spring 229 without conveying any further movement to the bucket 37. This flexible connection is provided to insure positive full upward swinging of the bucket 37 and alignment thereof with the loading platform 41. When the bucket is swung down-

wardly, it moves into direct vertical alignment with the opened envelope. (See Figures 4 and 13.)

It will be understood that since the bucket passes beyond the end of the arcuate track, the articles will fall by gravity into the bag but in order to positively insure loading and to destroy any tendency for the articles to remain in the swinging bucket, the plunger device 38 is provided for positively moving them out of the bucket. For this purpose, a slide 230 is mounted for vertical reciprocation in a slide bracket 231 bolted to one of the standards 120 of the machine, (see Figure 3), this slide carrying a horizontally extending arm 232 extending inwardly and clear 15 of the lower position of the bucket.

The plunger 38 is attached to this arm in alignment with the bucket and is normally disposed above the bucket so that it is straddled by the arms of the bucket as the articles are brought down to the region of the envelope. (See Figure 13.) This plunger is actuated after the bucket has been aligned with the envelope for a downward movement passing through the bucket and positively forcing the contents thereof into the envelope, partly entering the mouth of the envelope in placing the cakes or articles in the bottom thereof. The reciprocations of this slide and carried plunger are accomplished by means of a rod 234 pivoted at its upper end on a wrist pin 235 extending from the slide 230. This rod has its lower end connected to the inner arm of a bell crank lever 236 (see Figure 22), fulcrumed on a pivot shaft 237 journaled in the brackets 58 at the front of the machine. The other arm of the bell crank lever 236 has a roller engaging an appropriate cam 238 at that side of the machine, this cam being affixed to a shaft section 47.

The reciprocation of the plunger having accomplished the last function at the third station and having assumed its upper position and the bucket returned, the rotary carrier is again rotated a quarter turn to the fourth or discharging station. The bag which is 180 degrees from the second station at this fourth station has been maintained in open condition for the purpose of efficient loading through the third station.

Envelope releasing or discharging mechanism

At the fourth or discharge station, each opening device 33 is sprung to release the loaded envelope and to drop it in the transport 43 and the unloaded opening device is thereafter elevated to the level of the semi-circular track 116 for a supported inoperative movement thereon of 180 degrees through the envelope pick-up or initial station of the machine.

As shown in Figure 15, one of the toggle links 125 of each opening device is extended well beyond its pivotal connection to the spreader or opener finger 123. This extending end 239 of the toggle linkage functions as a means by which the spread fingers are tripped. (See Figure 15.)

When the particular envelope has been brought up to or dwells in front of the fourth station, the transport or receptacle 43 formed of sheet metal providing an open forward end and top, is moved directly beneath the suspended envelope. The means for operating this transport is illustrated in Figure 22.

A bell crank lever 240 is fulcrumed on the pivot shaft 198 at the rear end of the machine. The upper arm of this bell crank lever is formed to turn inwardly horizontally above the frame and is pivotally connected to the outer end of a rod 75

or link 241, the other end of which link is pivotally connected to a wrist pin 242 extending from a slide 243 reciprocable in a slideway of a slide block 244 mounted on the frame, the slide being maintained in position by the conventional gib plate 245. The transport receptacle 43 is laterally bolted to this slide. The reciprocation of the slide moves the transport between the fourth station and the flap tucking and gluing station.

10 The bell crank lever 240 is actuated by means of a rod 246 pivotally connecting its lower arm to the upper end of a rock arm 247 pivotally mounted on the pivot shaft 237 at the opposite end of the machine, this rock arm being oscillated

15 by the engagement of a roller thereof in the groove of an appropriate cam 248 on the power shaft section 47 at that end of the machine.

The cross sectional shape of the transport is shown in Figure 26. It has an inclined bottom 249 causing the envelope to always assume the same position therein. For this purpose the inner corner is deepest and the lower edge of the envelope accordingly always slides into this corner to incline the upper end of the envelope against the outer wall of the receptacle (see Figures 23 and 24).

The first tripping movement acting on the envelope as it is brought up to the fourth station is of the following nature. A bell crank lever 250 is fulcrumed on the vertical slide block 231 of the plunger mechanism. One arm of this bell crank lever extends toward the extending link end 239 and includes the finger 42 having its end turned transversely to the extending end of the link and adapted for swinging in an arc for striking the link when the fingers are in set or spread position. The upper arm of this bell crank lever 250 is pivotally connected by a link 251 to an arm 252 clamped to the cross shaft 217 which carries the swinging bucket 37. Figure 15 illustrates the position of this lever about to strike the extending end of the link 125 and shows the envelope opening mechanism in sprung position.

It will be understood that rotation of the cross shaft 217 carrying the bucket moves the finger 42 and bucket 37 in synchronism whereby the functions are performed at the appropriate time on the envelopes at the third and fourth stations. The sprung opening device is immediately elevated by means of a slide 253 moving on the guide post 140 previously described at the center of the rotary carrier. As the opening device is brought up to the fourth station, its roller 133 enters the bifurcations of the arm 254 of the slide 253 and pauses

55 in this position.

In Figure 14 the slide 253 has been moved to its uppermost position for disposing the roller above the level of the track 116. The slide at this side of the machine is identical in construction with the slide 138 and its mechanism at the diametrically opposite side. It is operated on its post 140 by means of a rod 255 engaging an inwardly extending wrist pin 256 of the slide, the lower end of the rod being connected to the inner end of a bell crank lever 257 fulcrumed on the bracket 147 at the forward end of the frame, this lever having its outer arm actuated by means of a roller thereon in engagement with a groove in an appropriate cam 258 on the power shaft section at the forward end of the machine.

After the release of the envelope and elevation of its opening device, the rotary carrier again moves and the travelling receptacle 43 moves coincidentally therewith, the particular opening device of the rotary carrier which has been followed

through the machine then proceeding to the initial point for picking up its next envelope.

From the foregoing description, it will be apparent that a four station machine is provided, the stations being radially located relative to a turntable or rotary carrier which carries cooperating or complementary mechanisms adapted to be united for various functions at the respective station. The mechanism for further handling of the envelope is an adjunct to the fourth station.

Flap tucking, gluing and setting mechanism

The movement of the transport for conveying the discharged envelope to the flap tucking and gluing mechanism is generally tangential of the work line as defined by the rotary carrier. The envelope lies in the transport or moving receptacle with its flap including wall disposed toward the inside relative to the machine. For the purpose of positively guiding the upper end of the envelope outwardly in the receptacle a bowed guide rail 259 is provided, this rail being bolted to a bracket 260 attached to a rail 261 of the frame as shown in Figure 18, and extending outwardly toward the envelope to the point at which the transport pauses before the tucking means.

Figures 23 and 24 illustrate the envelope as it is disposed in the transport at the time of the pause of the transport at the forward end of its stroke and the engagement of the envelope by the tucking mechanism. As the envelope is brought up to the tucking and gluing station, its outer wall lies against a pusher 262 formed of wire and secured in the upwardly extending arm of a slide 263 beyond the gluing station. This pusher extends parallel to the envelope movement (see Figure 27) and engages the entire length of the envelope. The slide carrying the pusher is mounted for reciprocation transverse to the line of movement of the envelopes through the gluing station, in a slide block 264 affixed to the frame. The slide is reciprocated by means of a lever 265 mounted on a pivot shaft 266, journaled in the brackets 58 on the frame, and having its roller engaged in the groove of an appropriate cam 267 mounted on the power shaft 47 at that side of the machine. The upper end of the lever 265 is connected to a lug 268 on the slide by means of a link 269. Forward movement of this pusher tips the envelope toward the form 45 bolted to the bracket 260.

The form or slot containing element 45 is formed by bending the upper portion of a sheet of metal rearwardly and outwardly, whereby a channel or slot therein faces toward the envelope and provides an overhanging upper lip 270. This lip causes a half folding of the flap to occur prior to insertion of the flap and envelope margins into the channel. The channel of the form not only receives the folded tucking flap and functions as a form but constitutes a guideway for the proper introduction of the closed envelope between a pair of belts 271—271 of the rolling device 46, which belts operate upon the flap edge margin of the envelope from both sides to clamp and roll the same and firmly set the flap during conveyance of the envelope out of the machine.

As shown in Figure 22 an auxiliary movement is provided for definitely locating the envelope before the tucking and gluing mechanism. This device operates toward the open end of the transport and includes a paddle 272 serving as a wall for that end of the transport and moving displaced envelopes back into the transport. The device consists of a flap plate constituting the pad-

die, disposed relative to the open end of the transport and carried by an arm of a bell crank lever 273 pivoted to a bracket 274 depending from and secured to the frame. The other arm of the bell crank lever 273 is pivotally connected by a link 275 to the transport operating bell crank lever 240 particularly to that arm which is directly connected to the slide. The transport and paddle are therefore moved together by the same cam 248 for properly locating the envelope in the transport at the forward end of the transport stroke. After the envelope has been engaged by the tucking mechanism the transport is retracted and the abutment plate or paddle is revolved below the frame. Figures 1 and 22 show the transport and blade approaching abutting position.

A tucking device is provided in which two blades 44, 44^a operate simultaneously upon the flap but are retracted independently, the purpose of which will be apparent from the foregoing description. Slide blocks 276, 277 for respective slides 278, 279 carrying the respective blades 44, 44^a are provided, having slideways disposed transversely to the path of movement of the transport and envelope. The blocks are bolted in spaced relation on the frame and a glue pot 280 is secured to the frame between the blocks. The blades 44, 44^a are disposed at an elevation above the glue pot and are appropriately aligned with the flap including end of the envelope for engaging the line of fold between the flap and body of the envelope.

The first slide in the order of envelope movement carries the tucking blade 44 on its inner end, this finger being attached to the slide 278 by means of a set screw 281 passing through a slot 282 in the blade, the slot disposed longitudinally in the blade to permit adjustment of the blade on the slide. This blade has a flared outer end which extends toward the mouth of the rolling device or conveyor.

This slide 278 is actuated by means of a lever 283 mounted on the pivot shaft 266 and swung by means of a cam 284 engaging a roller on the lever. The upper end of the lever is connected to a lug 285 of the slide 278 by means of a link 286.

As illustrated in Figures 24 and 26 particularly, the blade 44 engages the envelope along the line of fold defining the flap and body thereof on the inner side of the envelope. The blade has previously been daubed with glue on its underside by means of a mechanism of the following nature.

A daubing finger 287 having a hook end normally disposed in the glue is fulcrumed on the side of the slide block 276 between the arms of a U-shaped bracket 288 fixed to the slide block, the fulcrum pin 289 being secured through the arms of the bracket and through the lever and maintained in position by means of a latch 290 pivoted on the outside of the bracket and engaging an annular groove 291 in the outer end of the fulcrum pin. The upper end of this finger is pivotally connected to a link 292, the link in turn being pivotally connected to the upper end of a standard 293 rising from the slide 44. The connection of the finger to the slide is such that, at the time the slide is forward in a flap tucking operation, the hook end of the finger is disposed in the glue and upon retraction, the hook end rises from the glue and contracts the underside of the slide overhanging the glue pot.

The glue pot 280 is maintained in position by means of a screw 294 passing through an internal boss 295 in the glue pot and screwed into the

frame. The glue is smeared on the tucking margin of the envelope and the entire upper margin of the envelope including the flap is tucked into the form or guide 45. The other finger 44^a is operated by means of a lever 296 mounted on the pivot shaft 266 and operated by a cam 297 engaging its roller, this lever being connected to a lug 298 of the slide 279 by means of a link 299.

Figure 25 shows the second slide 279 coincidentally active with the first 278 and Figure 27 illustrates the second slide retracted for clearing the forward end of the envelope to aid in insertion between the belts of the conveying and rolling means. The upper and lower wall of the form 45 are cut away as at 300 to clear the end- less conveyors of the conveyor means, so that these belts may engage the forward end of the envelope and withdraw it from the form or guiding slot. The movement of the conveyor or roller means is intermittent, so that it functions only between the tucking movements of the blades.

The conveyor or rolling device (see Figures 28 and 29) comprises the two endless conveyor belts 271—271 having their respective turns engaged over sprocket gears 301, disposed in vertical position in alignment whereby the belts oppose and engage each other throughout adjacent runs. The lower belt has an idler pulley 302 disposed against its inner side and journalled in a bracket 303 attached to the frame. This pulley bracket is adjustable for tensioning the lower belt. The upper sprocket gear at the intake end of the belts is adjustable vertically in the bracket 305 by means of its stub shaft attachment through a vertical slot in the bracket (see Figure 26).

The belts are formed of sprocket chains having rubber buttons 304 closely spaced and attached along their outer edges. The belts move in parallelism and in contact, so that the opposing runs clamp and move the seized envelopes therebetween. The vertically aligned sprockets at adjacent ends of the belts are journalled in respective bearing standards 305, 306 affixed to the rail 261. The outer standard 306 provides appropriate hubs 307 for supporting stub shafts 308 carrying the respective sprockets and having meshing gears 309 mounted on their inner ends. A smaller pinion 310 is secured to the upper stub shaft 308 and is in mesh with a large gear 311 loosely journalled on a trunion 312 bolted to a wall 313 extending along the inner side of the rolling device.

A circular rack 314 is affixed to the gear and actuated by means of a pawl 315 loosely mounted on the outer end of the trunion 312 and having a detent 316 therein engageable serially with the grooves of the circular rack. This pawl 315 is oscillated by means of a link or rod 317 pivotally connecting it with the upper end of an arm 318 mounted on the rock shaft 237, this lever being actuated by an appropriate cam 319 mounted on the power shaft section 47 by means of a roller of the lever engaging the groove of the cam. This pawl and rack transmission imparts an intermittent motion to the belts for discharging the envelopes between tucking operations.

Operation of the machine

The operation of the machine has been partly described in relation to the various devices and movements to aid in the structural description but the foregoing continuous description of the operation is given to follow an envelope through the entire machine.

It will be understood that the movements, although described to follow one envelope, are operating coincidentally and are overlapping to perform various functions on four envelopes at one time in relation to the rotary carrier. Additional envelopes are being acted upon at the same time by the tucking, gluing, and rolling mechanism. Therefore, all four stations of the rotary carrier contain an envelope after the machine has once been primed.

Initially, the vertically disposed envelopes are stacked in flat condition in the magazine 34 at the forward end of the machine. In this stack the flap including wall is disposed toward the rotary carrier 31. The magazine is reciprocated to move the forward end of the stack against a particular radially extending portion of the rotary carrier, pausing at that time before the magazine. The valve 87 is effective at this time to open the suction to the sucker cups at this station and the receding movement of the magazine carries away the entire stack with the exception of the endmost envelope, which has been seized by the suckers and withdrawn from the magazine.

The rotary carrier 31, thereupon, is moved a quarter of a turn by means of its Geneva gear movement and pauses before the envelope supporting station. At this point, the opening mechanism 33 on the particular point of the carrier is brought into play for spreading and supporting the carried envelope. This opening device carried by the rotary carrier is moved down upon the envelope, which at that time, has been drawn open by means of the sucker mechanism 35 and its flap properly disposed back against a plate 109 of the rotary carrier by means of the pusher 36. The opener fingers 123 of the opening device 33 are moved into the envelope and are spread for bulging the envelope. At the same time the element 130 of the opener device descends upon the flap to clamp it against the rotary carrier.

After the various mechanisms are retracted the rotary carrier is again rotated a quarter of a turn to what has been termed the filling station. The articles, flat, round and square cakes in this instance, are grouped at a plane above the opened envelope and are moved into stacked relation by the overlapping slides onto a loading platform 41.

The slide of the intermediate magazine 39^a first moves the lowermost cake in that magazine onto the platform 41. At this time the slide 40 at the right of the machine, looking from the bucket toward the magazines, moves the cake from its magazine 39 on top of the previously mentioned cake. At the time that this cake is fully moved into stacked position, the slide 40 on the left hand side of the machine moves the lowermost cake and its magazine on top of the two previously mentioned stacked cakes. At the moment that these three cakes are stacked, the slide for the rear or intermediate magazine is effective for actuating the auxiliary slide 204 carrying the inverted channel element 205 to move the same coincidentally therewith for moving all the cakes of the stack off the platform and into the bucket 37.

After the group is slid from the loading platform into the bucket, the bucket immediately afterwards is swung downwardly carrying the stacked articles or cakes in an arc on the track 203 into a position above the open envelope. As soon as the bucket is aligned with the envelope, the plunger 38 descends from above and passes

through the bucket discharging its contents into the envelope.

After retraction of these movements, the rotary carrier moves another quarter of a turn to pause before the discharging station. At this point, the fingers sustaining the loaded envelope are tripped and collapse inwardly and the opening device is raised away from the envelope. The envelope drops by gravity into the transport or travelling receptacle 43, which at this time is disposed immediately therebeneath.

After the raising of the opening device and the clearing of this side of the rotary carrier, the Geneva movement is again effective for moving the particular rotary carrier portion back to the starting point before the envelope magazine with the opening device suspended out of the way through the first or pick-up station. The transport at this time is carrying the loaded envelope into the region of the tucking and gluing apparatus. The transport pauses at the forward end of its stroke before the tucking blades 44, 44^a, whereupon the blades are moved in transversely and tuck the flap in the form, smearing the margin of the envelope with glue. Upon a retraction of the blades the conveyor or rolling belts are moved and the flap or edge margin of the envelope caught between the opposing belts and rolled therebetween to positively insure its attachment.

The slide 44^a is retracted first in order to clear the belts prior to movement thereof since it is disposed between them at the intake point. The slide 44 follows in its retractive movement after aligned feed of the envelope is insured.

Ultimately, through a series of impulses, the envelope is carried to the end of the conveyor belts and totally discharged from the machine.

It will be appreciated that the machine may include any or all of the functions described. Its efficiency and novelty resides both in its independent movements and the successive arrangement of the movements in a compact machine for continually passing a plurality of envelopes serially through the respective mechanisms which are simultaneously performing various functions on respective envelopes in various stages of progress through the machine.

Having described my invention, I claim:

1. In a machine of the class described, a frame, a rotary carrier journaled in said frame, means for intermittently rotating said carrier, said carrier having four radially disposed work supporting portions, a device on each portion for gripping an envelope, envelope opening devices mounted on each portion and vertically slidable thereon, a reciprocating envelope magazine moving radially relative to the rotary carrier, before the end of which magazine said rotary carrier is adapted to pause to serially dispose the gripping devices in the path of movement of the magazine, whereby an endmost envelope therein is gripped on each gripping device of the carrier successively pausing before the magazine, a rail at this station for supporting the opening device passing therethrough in inoperative position, a lever effective at the next stop of the particular work supporting portion for actuating the opening device to insert the same in the envelope, and a lever for spreading the opening device within the envelope.

2. In a machine of the class described, a frame, a rotary carrier journaled in said frame, means for intermittently rotating said carrier, said carrier having radially disposed envelope seizing devices, envelope opening devices mounted above

each seizing device, a reciprocating envelope magazine moving radially relative to the rotary carrier before the end of which magazine said rotary carrier is adapted to pause to dispose the seizing devices successively in the path of movement of the magazine, whereby the endmost envelope is seized by each device pausing before it, a rail at this station for supporting the opening device passing therethrough in inoperative position above the seizing device, and a device effective at the next stop of the particular seizing device for lowering the opening device to insert the same in the envelope.

3. In a machine of the class described, a rotary carrier, a hollow shaft for said rotary carrier, means for supporting an envelope on a radial portion of said carrier, a vertically reciprocable element mounted on said rotary carrier above the supported envelope, a pair of fingers pivotally mounted on said element, a toggle connection between said fingers, slide means for actuating said toggle connection, an operating rod for said slide means extending up through the hollow shaft, a sucker engaging the outer wall of the envelope to draw the same away from the inner wall, whereby when the fingers are lowered they enter the envelope, and means for actuating said toggle connection to spread the fingers within the envelope.

4. In a machine of the class described, a frame, a rotary carrier, a pair of upwardly extending guides mounted on diametrically opposite sides of the rotary carrier, a device mounted in each guide, said devices including envelope opening fingers, a semi-circular rail extending between the respective guides at an elevation toward the upper ends thereof, rollers on the respective devices, and vertical slides having bifurcated ends adapted to be disposed at the respective ends of the rail to receive the rollers to raise or lower the respective devices, and means on the carrier for supporting envelopes beneath the respective devices whereby the envelope opening fingers may be moved into the envelope or raised therefrom.

5. A machine of the class described, comprising, a rotary carrier, upwardly extending guides mounted on the rotary carrier, a device slidably mounted in each guide, envelope opening fingers included in said devices, a semi-circular rail supported on said frame and extending between the respective guides, rollers on the respective slidable devices engageable on said rail, means for engaging said rollers at the ends of the rails for raising or lowering the devices, and means for supporting envelopes beneath said devices.

6. In a machine of the class described, a rotary carrier, means for rotating said carrier, means for supporting an envelope on a radial portion of said carrier, a vertically reciprocable device mounted on said rotary carrier above the supported envelope, a pair of fingers included in said device, means for spreading the fingers, a slide, and an operating rod for said slide, said slide engageable with said device, whereby when the fingers are lowered they are entered into the envelope and spread therein.

7. In a machine of the class described, a rotary carrier, a plurality of vertically slideable pairs of fingers mounted at radial points on the carrier, means for attaching envelopes to the carrier immediately below the fingers, said fingers connected by a pair of joined links, a spring normally drawing said fingers of each pair together, means for lowering each pair of fingers successively as they come up to a given point on the circle of movement of the devices, and means for

aligning the links connecting the fingers to spread and lock the fingers within the envelope after they have been lowered thereinto.

8. In a machine of the class described, a rotary carrier, vertically reciprocably mounted slides mounted on radial points of said carrier, a pair of fingers mounted on said slide, a spring connecting the fingers of each pair and normally drawing the fingers together, a toggle connected between the fingers, an envelope supporting device beneath each pair of fingers, means adjacent one point in the circumferential movement of the fingers for lowering the fingers into the envelope therebeneath, a lever means for setting the toggle in locked aligned position for spreading the fingers within the envelope and a lever movement at a subsequent station for tripping the toggle to release the fingers.

9. In a machine of the class described, a carrier, a vertically reciprocable slide mounted on said carrier, a pair of fingers mounted on said slide, a spring connecting and normally drawing the fingers together, means for supporting an envelope beneath said fingers, means for lowering the fingers into an envelope, a device for spreading the fingers within the envelope, means for actuating said device, and means at a subsequent position of the carrier for tripping the spreading means to release the fingers.

10. A machine of the class described, comprising, a rotary carrier, a suction cup radially disposed on said rotary carrier, means for causing suction in the device for securing an envelope thereon, a second suction cup, means for reciprocating said latter suction cup toward and from the outer wall of the envelope, means for controlling the suction in said latter suction cup whereby the latter suction cup grips the outer wall of the envelope and pulls it from the inner wall thereof.

11. In a machine of the class described, a rotary carrier, a suction device radially outwardly disposed on said rotary carrier, means for causing suction in the device for securing an envelope thereon, a second suction device reciprocable toward and from the outer wall of the envelope, means for reciprocating said latter suction device, means for controlling the suction to said second device for causing the sucker thereof to grip the outer wall of the envelope when contacted therewith and to pull it from the inner wall, a spreading device mounted for vertical reciprocation above said envelope, means for actuating said spreading device to insert it in the envelope, and means for operating the spreading device.

12. In a machine of the class described, a frame, a rotary carrier journaled in said frame, a plurality of suction cups mounted on radial portions of the rotary carrier, each suction cup having a radially inwardly extending passageway, means for intermittently rotating said carrier, a valve mounted on the axis of the rotary carrier and oscillatable thereon, said valve having a semi-circular groove therein, a suction creating device connected to said groove, said groove normally registering with two of said passageways, means for oscillating said valve to place the groove beyond registry with a passageway at the position of dwell for the suction device, controlled through said passageway, and for moving the valve back to connect the groove to this passageway, after the carrier is stopped.

13. In a machine of the class described, a frame, a rotary carrier journaled in said frame, a plu-

ality of suction cups mounted on the rotary carrier, each suction cup having an inwardly extending passageway, means for moving said rotary carrier, a valve mounted relative to said rotary carrier, said valve having a groove therein, a suction creating device connected to said groove, said groove normally registering with two of said passageways, means for moving said valve to place the groove beyond connection to a given suction cup at its position of dwell and for moving the valve back to connect the groove to this passageway, after the carrier has been moved into position of dwell.

14. In a machine of the class described, a rotary carrier, a suction device affixed to a radial portion of said rotary carrier and including suction cups outwardly disposed, a plate secured to the carrier having its outer face substantially flush with the working faces of the cups, means for creating suction in the cups for attaching an envelope thereto, a reciprocating suction device engageable with the outer face of the envelope, a valve for said latter suction device for controlling suction therein, whereby the suction is present in the reciprocating suction device at the inner limit of stroke and until it is fully retracted, and spreader means mounted on the rotary carrier for entering the envelope and maintaining it in open condition.

15. In a machine of the class described, a frame, a rotary carrier journaled therein, suction means on the rotary carrier for attaching an envelope thereto, suction means for engaging the outer wall of the envelope to open the mouth of the envelope, and spreader means entering the envelope and spreading against its ends to maintain it in open condition.

16. In a machine of the class described, a frame, a carrier journaled therein, suction means on the carrier for attaching an envelope thereto, suction means for engaging the outer wall of the envelope to open the mouth of the envelope, a pusher for forcing back the flap of the envelope, and spreader means entering the envelope and spreading against its ends to maintain it in open condition.

17. In a machine of the class described, a carrier, a suction device affixed to said rotary carrier having suction cups outwardly disposed, means for creating suction in the cups for attaching an envelope thereto, a reciprocating suction device, and a valve for said latter suction device for connecting the suction creating means thereto as the latter suction device reaches its inner limit of stroke and until it is fully retracted.

18. A machine of the class described, a carrier, means for securing an envelope to said carrier, a reciprocating suction device having a cup adapted to seize the outer wall of the envelope as the device is retracted, means for actuating said device, a stationary valve through which said reciprocating suction device moves, the device having a passageway therein extending from the suction cup thereof to a point adjacent the stationary valve and thence radially outwardly, a passageway in said valve registerable with said radial opening, means for constantly creating a suction in said valve passageway, said valve passageway and opening in the device disposed in registry when the sucker is entirely forward and during retractive movement, until the opening moves beyond the valve and into communication with the atmosphere.

19. In a machine of the class described, a rotary carrier, means for intermittently rotating said

carrier, gripping devices located at a plurality of points on the carrier for attaching envelopes thereto, and opening and spreading devices above each gripping device, and means at one station in the circular path of movement of these devices for successively operating the opening devices and spreading the same within the envelopes supported therebeneath.

20. In a machine of the class described, an envelope carrier, a plurality of gripping devices located at points about the periphery of said envelope carrier, means for rotating said carrier intermittently, a reciprocating sucker moving radially of the carrier, means for reciprocating said sucker in timed order with the intermittent movement of the carrier, whereby each envelope pausing before the reciprocating sucker has its outer wall gripped thereby and drawn away from its inner wall, and spreading devices for entering and supporting said envelopes after the walls thereof have been drawn apart.

21. In a machine of the class described, a rotary carrier, a pair of vertically reciprocable fingers unitarily mounted on said carrier, said fingers respectively pivotally mounted, a spring for drawing the lower swinging ends of said fingers together, toggle links joining said fingers, means at one side of said carrier for aligning said links and spreading said fingers, and means at another side thereof for tripping the toggle links and releasing said fingers.

22. In a machine of the class described, a rotary carrier, means for intermittently rotating said carrier, an oscillatable valve mounted on the axis of rotation of said rotary carrier, a plurality of suckers fixed to peripheral points of the rotary carrier, said carrier having radial passageways for said suckers, a semi-circular groove in said valve element, means for continuously creating suction in said groove, said groove disposed on a circle coincidental with the inner ends of the passageways and communicating with two of said passageways simultaneously, means for disposing an envelope on each sucker as it pauses before a given point, and means for moving said valve to connect the groove to the particular sucker being engaged by an envelope after the engagement has occurred.

23. A machine of the class described, a rotary carrier, a suction device mounted thereon including radially extending cups, means for causing suction in the cups to seize the inner wall of an envelope, a suction cup radially reciprocable relative to the carrier including a cup moving relative to the outer wall of the envelope, means for reciprocating said latter device, a stationary support in which said reciprocating suction device is slidably journaled, a passageway extending through said reciprocating suction device from the suction cup thereof to a point adjacent the stationary support and thence radially outward, a groove in said support registerable with said radial opening, means for constantly creating a suction in said groove, said groove and opening disposed in registry when the sucker is forward and said sucker is in its retractive movement until the opening passes beyond the valve and into communication with the atmosphere.

24. In a machine of the class described, a rotary carrier, means for supporting envelopes at spaced points about the periphery of said carrier, an intermittent motion mechanism for moving said rotary carrier, an envelope magazine mechanism, an envelope opening mechanism, an envelope filling mechanism, and an envelope dis-

charge mechanism, said rotary carrier adapted to dwell with the supported envelopes disposed simultaneously before the four mechanisms whereby each envelope is serially advanced.

25. An envelope opening and supporting mechanism, comprising, a horizontally disposed rotating support, radially outwardly disposed suction devices on said support, a plate on said support against which said suction device draws the envelope, said plate including an upwardly rearwardly inclined portion against which the flap of said envelope is disposed, a reciprocating suction device moving toward and from the outer wall of the envelope, a valve for controlling the suction causing the reciprocating suction device to grip the wall on its retractive movement, a reciprocating finger engaging the flap and turning it back against the inclined portion of the plate, a vertically reciprocable slide immediately above the plate, a pair of fingers pivoted to and depending from said slide, a spring urging said fingers together, a toggle for spreading said fingers, a portion of said slide inclined correspondingly to the inclined portion of the support for clamping the flap against said portion, means for reciprocating the slide, and means for setting the toggle when the slide is down and the fingers are within the envelope.

26. In an envelope mechanism, an envelope support, a suction device maintaining the envelope in flat vertical position against the support, a reciprocating suction device moving toward and from the outer wall of said envelope, a valve for controlling the suction to the reciprocating suction device, whereby the suction is on when the reciprocating device is initially engaging the wall and during the retractive movement of the reciprocating suction device.

27. In a mechanism for opening an envelope, a support including an outer plate, a gripping device for engaging a wall of said envelope and holding the envelope against said plate, and a reciprocating gripping device engaging the outer wall of the envelope for drawing the same outwardly from the inner wall.

28. An envelope opening mechanism, comprising, a support, means for vertically mounting an envelope, an upper portion of said support rearwardly inclined, which portion the flap of said envelope is adapted to engage upon, a reciprocating gripping device moving toward and from the envelope and adapted to grip the forward wall for drawing it from the rear wall of the envelope, a reciprocating finger moving against the flap to pass it back against the inclined portion, a descending slide including a flap engaging plate and envelope spreading fingers, and means for spreading said fingers in the envelope.

29. In a machine of the class described, a rotary carrier, means for securing an envelope against the periphery of said carrier with the flap including wall of said envelope disposed toward the carrier, a reciprocating vertically mounted slide located above said envelope securing means, means for reciprocating said slide, fingers depending from and pivoted to said slide, toggle links connecting said fingers, a spring drawing the fingers normally together and a lever for engaging said toggle links to align the same for spreading the fingers when the slide is down and the fingers are within the envelope, and a lip on said slide engaging the inner side of the flap and clamping it against the rotary carrier.

30. In a machine of the class described, a work

support, means on said work support for gripping an envelope against the support, a vertically reciprocable slide mounted above said gripping means, said slide having fingers depending therefrom, a second gripping device reciprocating toward the outer wall of the envelope and adapted to seize said wall and withdraw it away from the inner gripped wall, a pusher for moving the flap of the envelope back away from the path of movement of said slide and fingers, means for moving the slide downwardly to enter said fingers into the open envelope, and means for spreading said fingers into the ends of said envelope.

31. In a machine of the class described, means for supporting an envelope by attachment to its inner flap including wall, fingers depending over said support means, a gripping device reciprocating toward the outer wall of the envelope adapted to seize the wall and draw it from the inner wall, and means for spreading said fingers in said envelope.

32. In a machine of the class described, a carrier, means for securing an envelope against the periphery of said carrier with the flap including wall of said envelope disposed toward the carrier, a reciprocating vertically mounted slide located above said envelope securing means, means for reciprocating said slide, fingers depending from and pivoted to said slide, means for spreading the fingers when the slide is down and the fingers are within the envelope, and a lip on said slide engaging the inner side of the flap and clamping it against the carrier.

33. In a machine of the class described, an article assembling mechanism, comprising, a central loading platform, a plurality of vertically disposed magazines rising from the plane of the loading platform reciprocating slides traversing the base end of each magazine, the paths of movement of the slides being disposed toward the loading platform and each slide disposed at a different elevation, whereby the slides are effective for compiling the articles on the platform.

34. In a machine of the class described, a rotary carrier, means for intermittently rotating said carrier, means for supporting envelopes on the rotary carrier at spaced intervals around its periphery, a loading platform located above said rotary carrier, means for stacking a group of articles on said loading platform, a swinging bucket adapted to be swung from a position in alignment with the platform to a position above the envelopes as they are successively brought in alignment therewith, a slide for moving the articles from the platform into the bucket, and means for traversing said bucket to move the articles into an envelope when the bucket is over the envelope.

35. In a machine of the class described, an article assembling mechanism, comprising, a central loading platform, three vertically disposed magazines rising from the plane of the loading platform at the respective sides thereof, reciprocating slides traversing the base end of each magazine for feeding the lowermost article therefrom, the paths of movement of the slides disposed toward the loading platform, each slide disposed at a different elevation, and an auxiliary slide moved by the slide of the intermediate magazine for displacing the assembled articles from the platform, and means for receiving said displaced articles.

36. In a machine of the class described, a work carrier, means for attaching envelopes to the carrier in spaced intervals thereon, a loading plat-

form located above said rotary carrier, means disposing an article on said loading platform, a swinging bucket adapted to be swung from a position in alignment with the platform to a position above the envelopes as they are successively brought in alignment therewith, and means for moving said article from the platform into the bucket.

37. In a machine of the class described, an assembling mechanism, comprising, a loading platform, three magazines rising from points about said loading platform, a slide traversing the base end of each magazine for displacing the lowermost article therefrom, means for actuating each slide, two of said slides having their paths of movement in alignment at opposite sides of the path of movement of the third, said slides disposed at different elevations, whereby said slides are moved, with the lowermost acting first to deposit an article on the platform, and the remainder following in the order of elevation, so that a compiling action ensues.

38. In a machine of the class described, an envelope carrier, a plurality of devices on said carrier for gripping and supporting envelopes at spaced intervals thereon, an arcuate track having a horizontal end disposed adjacent to said envelope carrier, means for intermittently moving said envelope carrier to cause it to pause for disposing each envelope thereon below and beyond the terminal end of the track, a swinging bucket moving on the axis of the track and having an open outer end, and means for inserting articles in the bucket at its upper position beyond the track, whereby when the bucket reaches the lower end of the track, the articles fall by gravity from the bucket into the particular envelope pausing at the lower end of the track.

39. In a machine of the class described, a loading platform, an arcuate track extending downwardly from said loading platform and terminating in a horizontal plane at its lower end, a bucket swinging on the center on which the track curve is generated, said bucket providing an open outer end disposed in alignment with the loading platform at its upper limit of movement, means for inserting articles from the platform into the bucket, means for supporting an envelope beyond the lower terminal of the track for receiving the contents of the bucket when the bucket moves beyond the track.

40. In a machine of the class described, a carrier for supporting envelopes, means for maintaining the envelopes in open condition, a plurality of vertical magazines, a slide moving beneath each magazine, a loading platform for receiving the articles fed from the magazine, said slides located at different elevations, whereby they compile the articles on the platform, a swinging bucket having an open end disposed toward the platform and moving from the loading platform to the region above an envelope, and means for inserting the articles on the platform into the bucket through the open end of the bucket, said bucket at its lowermost limit of movement having its open end disposed downwardly, whereby the articles fall by gravity into the envelope.

41. In a machine of the class described, a loading platform, an arcuate track extending from said platform downwardly to a horizontal terminal, a bucket swinging on the center of generation of the arcuate track, the bucket having an open outer end lying against the track during movement adjacent thereto, means for inserting

articles from the platform into the bucket, means for supporting an envelope adjacent the lower end of the track, and a reciprocating plunger passing through the bucket at its lower limit of movement at the lower end of the track for forcing the contents thereof into the envelope.

42. A machine of the class described, comprising, an envelope carrier, a plurality of devices on said carrier for gripping and supporting envelopes at spaced intervals thereon, an arcuate track having a horizontal end disposed adjacent said envelope carrier, means for intermittently moving said envelope carrier to cause it to pause for disposing each envelope thereon below the terminal end of the track, a loading platform disposed at the upper vertical end of the track, a swinging bucket moving on the same center as the axis of the track and having an open outer end for receiving the articles to be inserted from the loading platform when in alignment therewith, whereby when the bucket reaches the lower end of the track, the articles fall by gravity from the bucket into the particular envelope pausing at the lower end of said arcuate track.

43. In a machine of the class described, a rotary carrier, envelope gripping devices located at spaced points on the periphery of said rotary carrier, a loading platform, a swinging bucket having an open end adapted to be disposed adjacent the platform, a slide for moving articles from the platform into the bucket, means for swinging the bucket to a point above the circular path of movement of the envelopes, and means for causing said rotary carrier to dwell for disposing each envelope thereon below the downwardly swung bucket.

44. In a machine of the class described, a horizontally disposed loading platform, an arcuate track extending downwardly from said horizontal loading platform and terminating in a horizontal plane at its lower end, a bucket swinging on the center on which the track curve is generated said bucket providing an open outer end, an abutment for limiting movement of the bucket so as to stop it in alignment with the loading platform at its upper limit of movement, compressible means for swinging said bucket against the abutment, means for inserting articles from the platform into the bucket, and a holder for supporting an envelope adjacent the lower terminal of the track for receiving the contents of the bucket when the bucket is moved beyond the terminal of the track.

45. In a machine of the class described, an article assembling mechanism, comprising, a plurality of magazines, a loading platform disposed intermediate of said magazines, a reciprocating slide for each magazine traversing the lower end thereof for displacing the lowermost article therefrom, two of the slides having their paths of movement disposed laterally relative to the path of movement of the third slide at opposite sides, said slides disposed at different elevations above the third slide, a receptacle disposed in a path of movement of the third slide beyond the platform, and a spring returned plunger engaged by the intermediate or third slide for engaging the two upper stacked articles in the last phase of its movement to carry all the articles compiled by the slides into the receptacle.

46. In a machine of the class described, an envelope carrier, a reciprocable transport having one terminus at a point below the discharge station of said carrier, a form located adjacent the other terminus of the transport, and a blade moving transverse to and across the path of move-

ment of said transport for inserting the flap and margin of the envelope in the transport into said form, the edge of said blade engaging the inner side of the flap fold line.

47. In a machine of the class described, a mechanism for opening an envelope, comprising a pair of pivotally hung fingers, toggle links connecting said fingers, said links connected by a headed pin, and a lever engaging the head of the connecting pin of said toggle links for aligning the links and spreading the fingers.

48. In a machine of the class described, a rotary envelope carrier, a reciprocable transport moving tangentially of the carrier beneath a discharge point thereof, an element located adjacent the outer terminal of the transport having a slot formed therein, and a blade moving transverse to and across the path of movement of said transport for inserting the flap and margin of an envelope in the transport into said slot.

49. In a machine of the class described, a reciprocating blade, a transport bucket moving transversely of and beneath the path of movement of said blade, an element providing a slot in alignment with said blade, whereby an envelope supported in the transport having an upwardly disposed flap has its flap folded against the blade inserted between the flap and envelope and into the slot, and a pusher for moving said envelope toward the slot prior to the blade engagement.

50. In a machine of the class described, an envelope support, a reciprocating blade, said support adapted to mount each envelope with the main line of its flap fold in the path of movement of the blade which moves transverse thereto, an element providing a slot adapted to be entered by said blade, a glue applying finger swinging transverse to the path of movement of said blade and synchronized to engage said blade at its retracted position for daubing glue thereon, whereby the blade, when interposed between the flap and the envelope, smears the glue between the flap and the envelope.

51. In a machine of the class described, a reciprocating tucking blade, an element located in the path of movement of said blade providing a slot entered by said blade, means for supporting an envelope with its inner flap folding line disposed for engagement by the blade, a gluing finger, a glue pot, means for dipping said finger in said pot synchronized with the blade movement to daub glue thereon at its retracted position, and a conveyor means engaging the folded flap and margin of the envelope for rolling the flap against the envelope and withdrawing the envelope endwise from the slot.

52. In a machine of the class described, an element providing a slot, means for supporting an envelope, means for tucking the envelope in the slot with its flap disposed against the body thereof, means for applying glue on said flap, and a conveyor means engaging the flap margin at both sides thereof for rolling the flap against the envelope body and withdrawing the envelope endwise from the slot.

53. In a machine of the class described, an envelope support, a reciprocating blade, said support adapted to mount the envelope with its flap fold inner line in the path of movement of the blade which moves transverse thereto, an element providing a slot adapted to be entered by said blade, a glue applying finger synchronized to contact said blade at its retracted position for daubing glue thereon, whereby the blade when

interposed between the flap and the envelope smears the glue between the flap and the margin of the envelope.

54. In a machine of the class described, a transport for carrying an envelope, said envelope adapted to lie in said transport with its flap projecting above the same, an element located adjacent the path of movement of said transport, said element providing a forming slot, opposing conveyor belts having their intake ends adjacent the ends of the slot, and a reciprocating blade passing transversely over said transport for tucking said flap and margin of the envelope into the forming slot and between the opposing conveyor belts.

55. In a machine of the class described, means for supporting an envelope with the flap disposed upwardly, a reciprocating blade, said blade moving in a path for engaging the inner line of flap fold of the envelope disposed on the support, an element forming a slot into which said blade moves with the blade disposed between the flap and the body of the envelope, and means for applying glue to the active end of the blade.

56. In a machine of the class described, a mechanism for spreading and opening an envelope, comprising, a pair of pivotally hung fingers, the lower edges of said fingers including curved flanges, a spring under tension connected between said fingers toward the lower end thereof for normally holding them together, toggle links connecting said fingers, said links connected by a pin, a lever engaging the connecting pin of said toggle links for aligning the links and spreading the fingers, and a lever for engaging the end of one of said toggle links to break the alignment and to collapse the fingers inwardly.

57. In a machine of the class described, a reciprocating two piece blade, a transport bucket moving transversely of and beneath the path of movement of said blade, an element providing a slot in alignment with said blade, whereby the envelopes supported in the transport have their upwardly disposed flaps folded against the blade inserted between the flap and envelope and into the slot, intermittently moving co-acting conveyor belts engaging the flap and margin of the envelope in the slot for withdrawing the envelope endwise from the slot, and means for retracting the blade piece adjacent the conveyor belts prior to the other piece.

58. In a machine of the class described, a rotary carrier, gripping devices located at diametrically opposite points on said carrier for engaging respective envelopes, opening devices normally suspended above said diametrically opposite gripping devices, plunger slides for engaging said opening devices, said plunger slides located toward the inside of said opening devices adjacent the path of movement thereof, said opening devices moving into operative connection with said plunger, means for reciprocating the plungers to insert the opening devices in the envelope, a hollow shaft for said rotary carrier, and rods for operating said plungers extending upwardly through said hollow shaft.

59. An automatic packaging machine, comprising conveyor means for transferring packages supplied thereto to a given point, suction means for retaining said packages on said conveyor at spaced intervals, means for opening said packages, said means including arms engaging the edges of said packages, means for depositing a quantity of material in said packages as the same are

transferred to said given point, and means for closing and sealing said packages.

60. In an apparatus for the uses and purposes set forth, a magazine for holding a plurality of pouches, a first suction device contacting one side of a pouch to remove it from the magazine, a second suction device movable against the opposite side of the pouch and operative in combination with the first suction means to open the mouth of the pouch, and a feeding device for loading the pouch.

61. In an apparatus for the uses and purposes set forth, a magazine for holding a plurality of pouches, a first suction device contacting one side of a pouch to remove it from the magazine, a second suction device movable against the opposite side of the pouch and operative in combination with the first suction device to open the mouth of the pouch, an expansible guide movable into the mouth of the pouch, and a feeding device for loading the pouch.

62. In a machine, the combination of a magazine for pouches, a drum to remove a single pouch from the magazine, a suction head movable towards and from the drum and cooperating therewith to open a pouch, a loading device operable in timed relation to the movement of the suction head to load a pouch, and a spreader movable into the mouth of the pouch in advance of the loading device.

63. In a machine, the combination of a magazine for pouches, a movable transfer drum having suction openings on its face, means to maintain a partial vacuum thereon during a portion of the rotation of the drum, means to feed pouches on to the drum, means for opening the pouches while so held, and a loading device operable while the pouch is opened.

64. In an apparatus for the uses and purposes set forth, a magazine for holding a plurality of pouches, suction means for withdrawing single pouches therefrom and for holding one side of the pouch from the exterior thereof, a suction device movable towards and away from the pouch withdrawing and holding means and cooperating therewith for opening an end of the pouch, and feeding means for loading the pouch while held open.

65. In an apparatus for the uses and purposes set forth, a magazine for holding a plurality of pouches, first suction means for withdrawing single pouches therefrom, second suction means movable towards and away from the first suction means and cooperating therewith for opening an end of the pouch after withdrawal from the magazine, and feeding means for loading the pouch.

66. In an apparatus for the uses and purposes set forth, a magazine for holding a plurality of pouches, first suction means for withdrawing single pouches therefrom and for holding one side of the pouch from the exterior thereof, second suction means movable towards and away from the first suction means for opening an end of the pouch, and feeding means for loading the pouch while held open, said feeding means including an expansible spreader movable into the

mouth of the pouch prior to insertion of the article therein.

67. In a machine, the combination of a magazine for pouches, an intermittently movable transfer drum having suction openings on its face, means to maintain a partial vacuum thereon during a portion of the rotation of the drum, means to feed pouches on to the drum, means for opening the pouches while so held, and a loading device operable for inserting articles in the opened pouches.

68. In a machine, the combination of a magazine for pouches, an intermittently movable transfer drum having suction openings on its face, means to maintain a partial vacuum thereon during a portion of the rotation of the drum, means to feed pouches on to the drum, vacuum means for opening the pouches while so held, a loading device operable for placing articles in the opened pouches, and means to relieve the vacuum after the opening operation, and means for holding the pouches in open position after relief of the vacuum.

69. An automatic packaging machine, comprising conveyor means for transferring opened packages to a given point, means for retaining said packages at spaced intervals on said conveyor, said means including suction means and a pair of arms engaging the edges of said packages, means for depositing a quantity of material in said packages as the same are transferred to said given point, and means for closing and sealing said packages.

70. In an automatic packaging machine, the combination of a rotating conveyor for conveying packages to be filled with material and for discharging said filled packages, a package supply means movable into proximity with said conveyor, suction means for drawing packages from said supply means and for retaining said packages in spaced relation on said conveyor, and means for opening said packages, said means including cam operated arms for engagement with the edges of said packages.

71. In an automatic packaging machine, the combination of a rotating conveyor for conveying packages to be filled with material and for discharging said filled packages, said conveyor having suction ducts terminating at spaced intervals on the periphery of said conveyor, a package supply means movable into proximity with said ducts whereby packages are drawn from said supply onto said conveyor and retained thereon, cam operated arms for engagement with the edges of said packages for holding the same open until filled, and means for releasing said suction after said arms engage the packages.

72. In an automatic packaging machine, the combination of a rotary member for transferring packages, suction means for holding packages at spaced intervals on the periphery of said member, and means for opening said packages, said means including a pair of arms adapted to engage the edges of said packages, and cam means for normally moving said arms into said engaging relation.

RUEL ANDERSON JONES.