Dec. 4, 1928.

1,693,675

E. L. SMITH ET AL

SOAP WRAPPING MACHINE

Filed Sept. 4, 1923

6 Sheets-Sheet 1

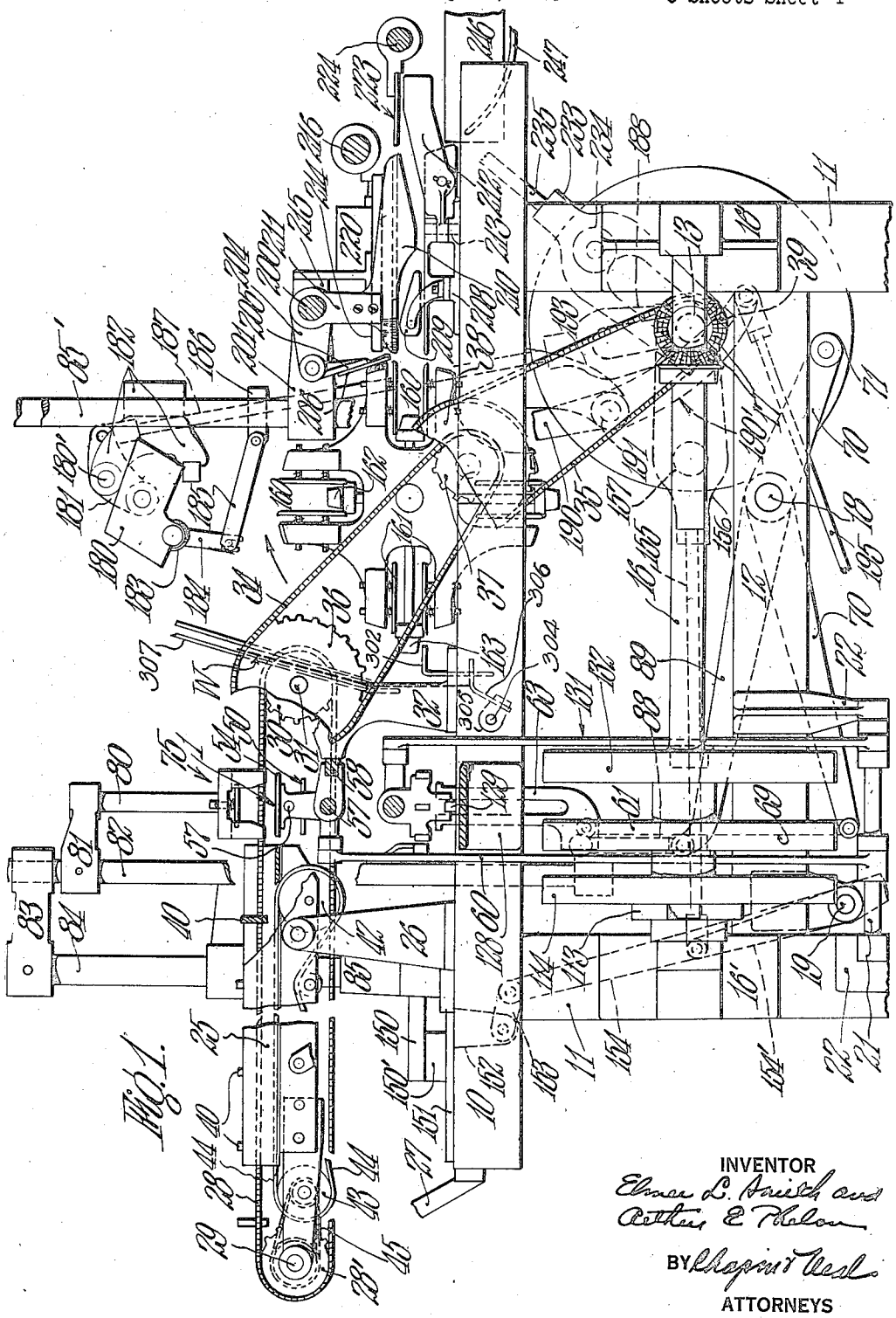


Fig. 1.

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BY Chapin & Neal

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Dec. 4, 1928. 1,693,675

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SOAP WRAPPING MACHINE

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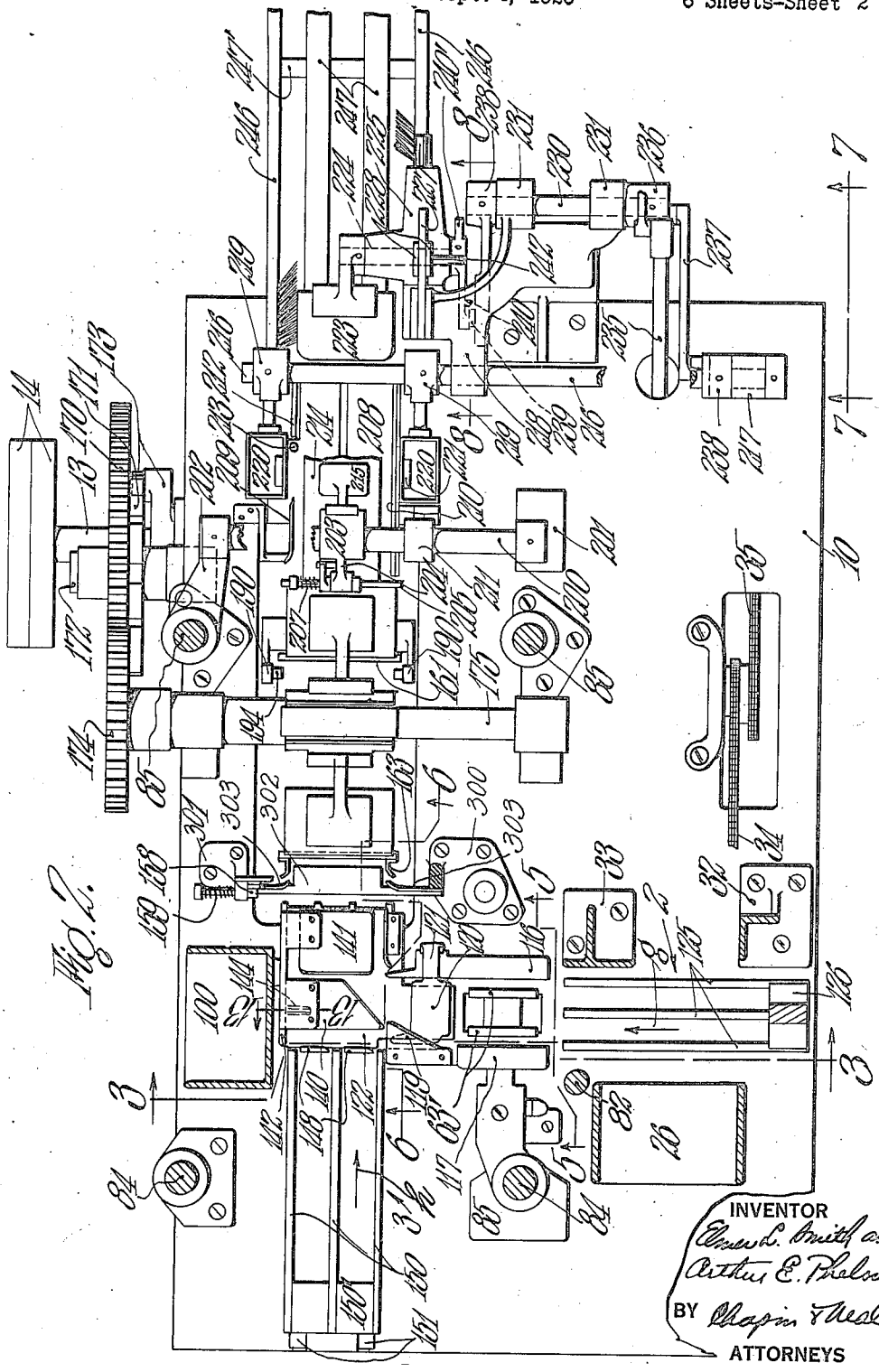


Fig. 1.

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1,693,675

E. L. SMITH ET AL

SOAP WRAPPING MACHINE

Filed Sept. 4, 1923

6 Sheets-Sheet 3

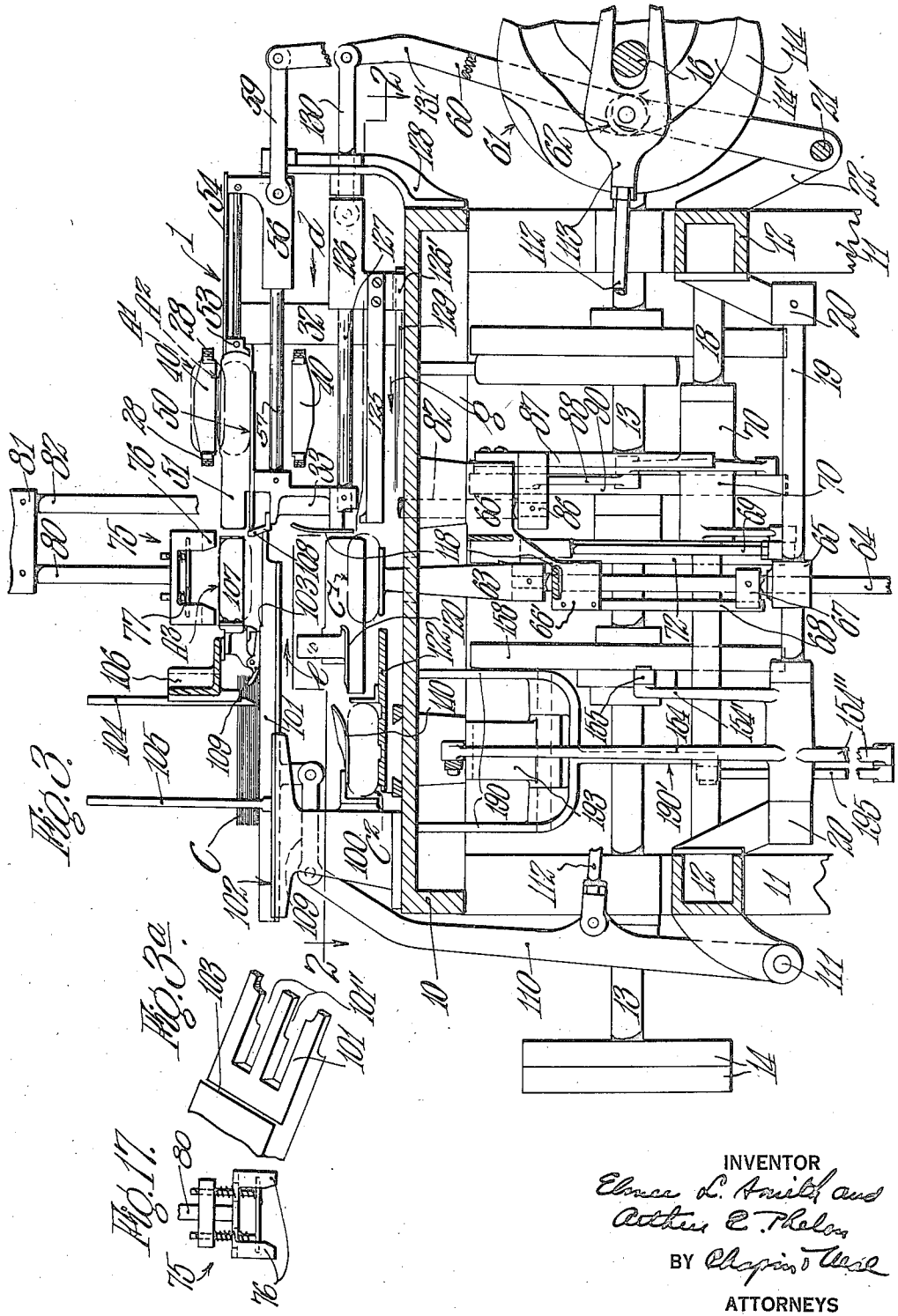


Fig. 3.

Fig. 3a.

Fig. 17.

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Dec. 4, 1928. 1,693,675

E. L. SMITH ET AL

SOAP WRAPPING MACHINE

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Fig. 9.

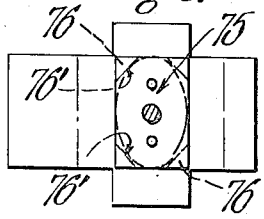


Fig. 10.

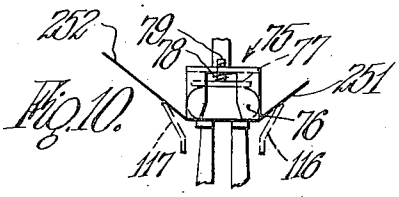


Fig. 11.

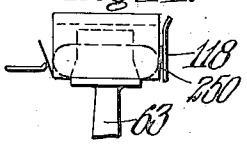


Fig. 4.

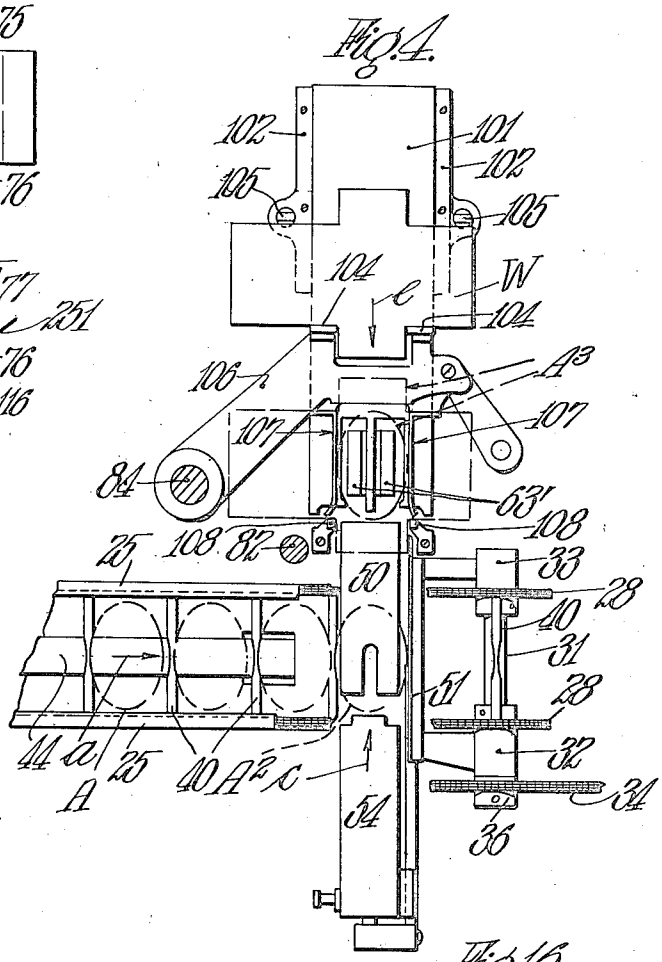


Fig. 12.

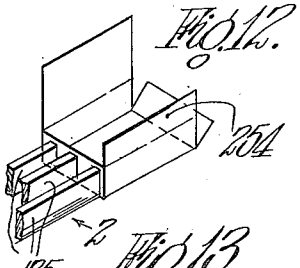


Fig. 13.

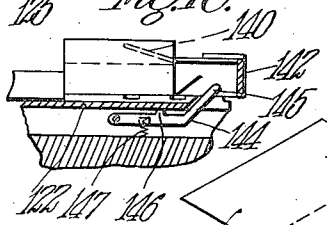


Fig. 14.

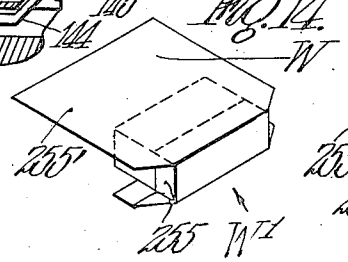


Fig. 15.

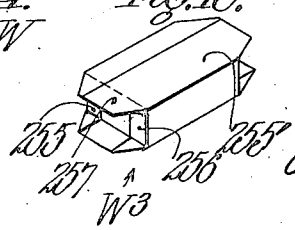
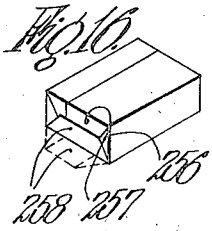


Fig. 16.



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Dec. 4, 1928. 1,693,675

E. L. SMITH ET AL

SOAP WRAPPING MACHINE

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Fig. 5.

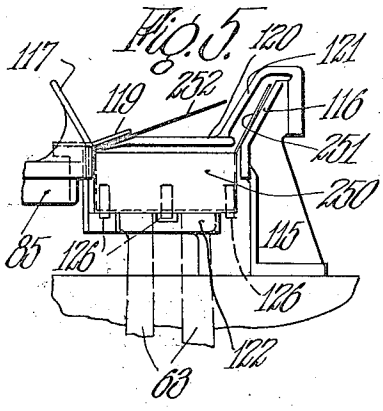


Fig. 7.

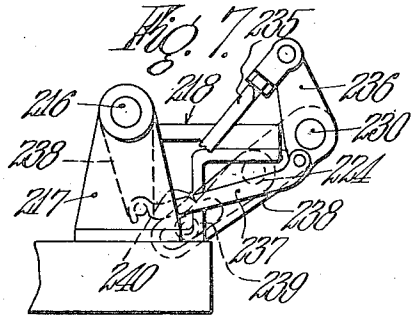


Fig. 6.

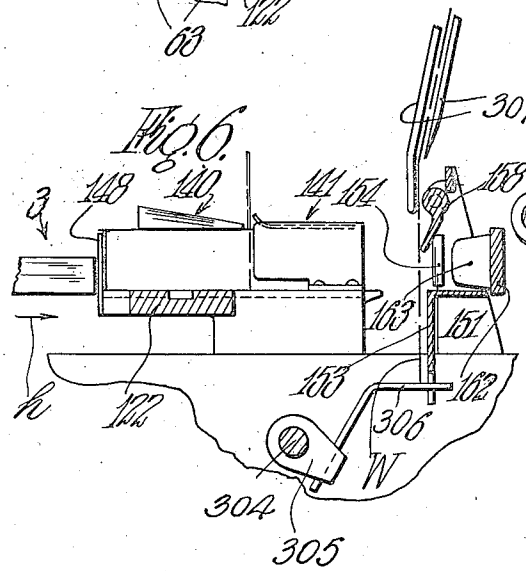


Fig. 8.

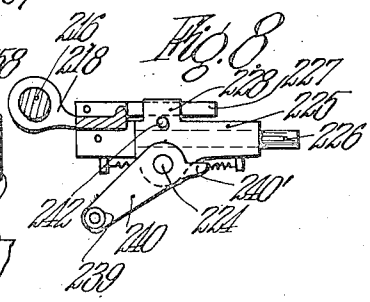
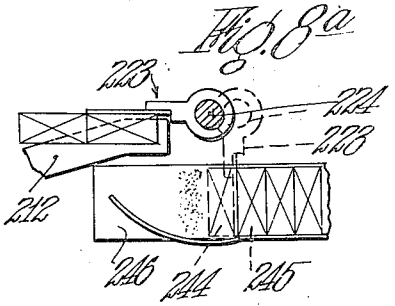


Fig. 8a.



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E. L. SMITH ET AL

SOAP WRAPPING MACHINE

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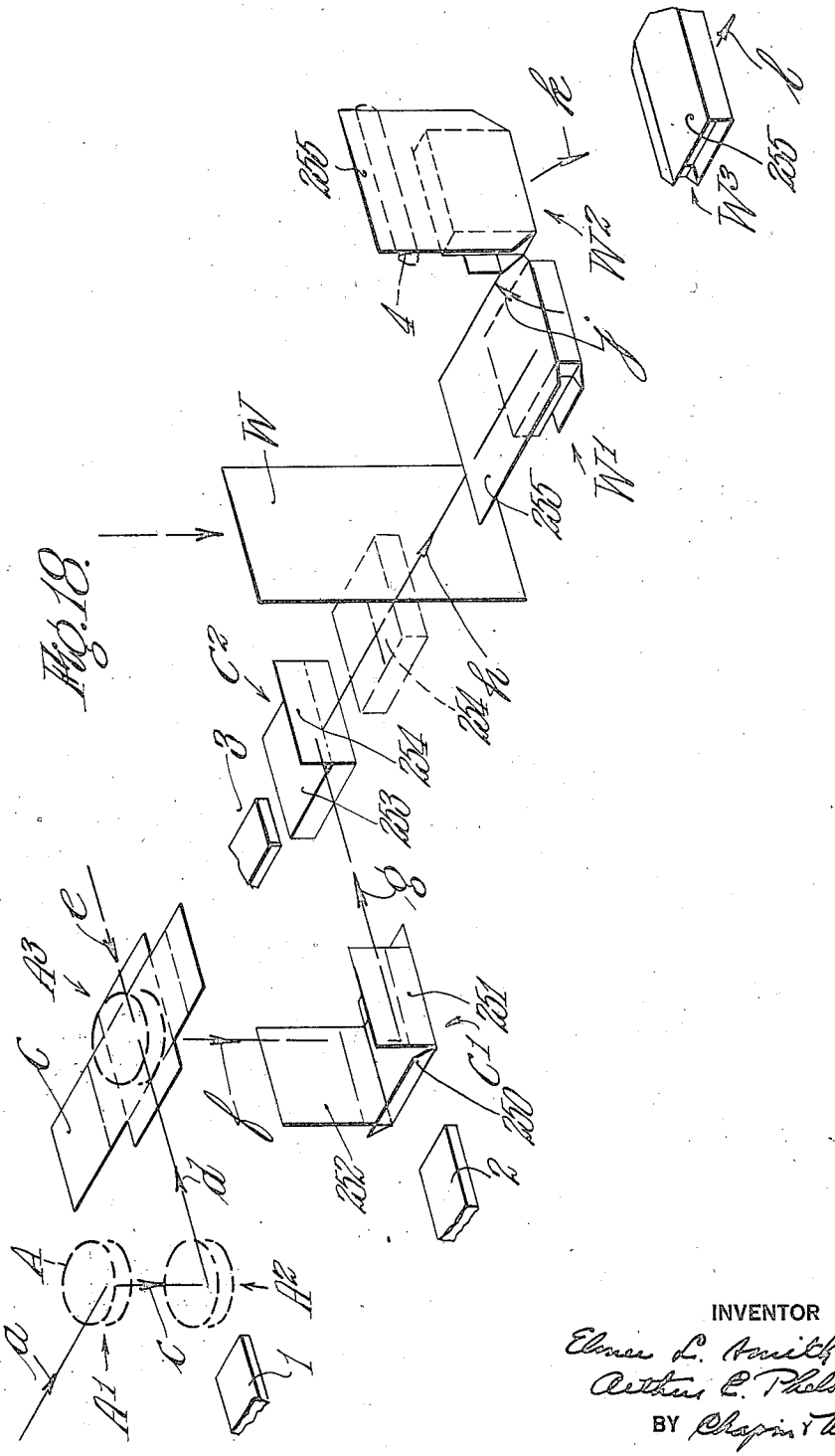


Fig. 18.

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Patented Dec. 4, 1928. 1,693,675

UNITED STATES PATENT OFFICE.

ELMER LOVELL SMITH AND ARTHUR E. PHELON, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNORS TO PACKAGE MACHINERY COMPANY, OF SPRINGFIELD, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

SOAP-WRAPPING MACHINE.

Application filed September 4, 1923. Serial No. 660,719.

This invention relates to improvements in wrapping machines and more particularly to machines of the type adapted to enclose an article in an inner carton and outer wrapper.

An important feature of the present invention resides in wrapping mechanism which forms a carton of box-like form about an article of different form such as one with rounded sides, and without fastening the sides of the carton, encloses the same in an outer wrapper of paper which serves to hold the carton in shape. The carton may conveniently be formed of a blank to provide no overlapping sides, or at the most overlapping portions upon only the top side thus economizing in material.

Other objects and advantages will be apparent from the following description and drawings in which;

Fig. 1 is a side elevational view of the machine;

Fig. 2 is a plan view of the machine with a portion of the article and carton feeding mechanism omitted for clearness and is taken on the line 2—2 of Fig. 3;

Fig. 3 is a sectional elevational view taken on the line 3—3 of Fig. 2;

Fig. 3^A is a perspective view of the blank feeding plunger;

Fig. 4 is a plan view of the article feeding mechanism;

Fig. 5 is a section on the line 5—5 of Fig. 2;

Fig. 6 is a section on the line 6—6 of Fig. 2;

Fig. 7 is an elevational view of the article discharge mechanism taken on the line 7—7 of Fig. 2;

Fig. 8 is a sectional elevational view taken on the line 8—8 of Fig. 2;

Fig. 8^A is a diagrammatic view of the article discharge arm;

Figs. 9 and 10 are plan and end elevational views of the elevator and plungers shown in article engaging position;

Fig. 11 is a fragmentary view showing the elevator as it passes certain of the carton folders;

Fig. 12 is an isometric view of the cross plunger and a partially folded carton;

Fig. 13 is a sectional view taken on the line 13—13 of Fig. 2;

Figs. 14, 15 and 16 are isometric views showing certain of the folding operations of the wrapper about the article;

Fig. 17 is an elevational view showing a modified form of a carton plunger;

Fig. 18 is an isometric diagrammatic view showing the path of travel of the article, carton and wrapper in their travel through the machine.

A machine constructed according to our invention is easily adapted for general application where it is desired to enclose an article in a carton and an outer wrapper. In the form at present preferred the invention will be disclosed in connection with the wrapping of an oval or circular shaped article such as a cake of soap or the like. Such articles, being of a brittle or soft material are more easily wrapped when enclosed in a carton or container which provides a stiff symmetrical form to receive the outer wrapping material.

To facilitate a clear understanding of the detailed description to follow, we will first briefly describe the way and manner in which the article, carton and wrapper are advanced through the machine for the various assembling, folding and tucking operations. (See Fig. 18).

The articles A are successively fed to the machine in a horizontal plane and in the direction of the arrow *a* preferably by a chain conveyer. The articles are deposited by the chain onto the top of a reciprocating plunger 1 in the position A^1 and as the plunger 1 moves to the left in Fig. 18, are allowed to fall in the direction of the arrow *c* onto a suitable support (not shown) where they are in the position A^2 and in line with or in the path of the plunger 1.

The article A is then advanced by the plunger 1 in a direction at right angles to the direction of travel of the chain and as shown by the arrow *d* while a carton C is simultaneously advanced by suitable mechanism from the direction indicated by arrow *e*. The article is thus brought to rest in the position A^3 over the carton and between cooperating vertically reciprocating plungers (not shown) which hold the article and carton in correct relative position and which are adapted to carry the same downwardly in the direction of the arrow *f* to a rest position

C^1. During this downward movement certain folding operations are performed upon the carton sides and the same is brought to rest at position C^1 in the path of a horizontal reciprocating plunger 2.

The partially folded carton and article are next advanced by the said plunger 2 in the direction indicated by arrow *g* from position C^1 to the rest position C^2. During this travel subsequent folds are made in the carton and the nearly completely folded carton is brought to rest at C^2 in the path of a horizontally reciprocating plunger 3 that travels at right angles to the plunger 2.

A wrapper W for the outer wrapping is advanced or fed downwardly and positioned as shown and in the path of or in line with the article and carton.

The article and carton are next advanced from position C^2 by the plunger 3 in the direction indicated by arrow *h* into a pocket of a rotatable pocketed wheel indicated at position W^1. During this movement the remaining fold is made upon the carton and the wrapper W is folded about three sides of the carton while an end tuck is made when the carton and wrapper are deposited in the before mentioned pocket of the wheel.

The wheel carries the partially wrapped carton in the direction of arrow *j* to a rest position W^2 where a glue stripe is applied to the extending wrapper flap by a roll 4 of a suitable gluing mechanism.

A further rotation of the wheel carries the partially wrapped carton in the direction of the arrow *k* to a rest position W^3. It is then ejected from the wheel pocket 8 into suitable folding mechanism in which it is advanced in the direction of the arrow *l*. Successive remaining folds are made upon the wrapper during its passage through the folding mechanism and the completely wrapped article is finally delivered into a brush lined discharge chute.

By reference to the drawings, the structure will now be described in detail. A bed plate 10 is provided that is supported on suitable uprights 11 which are preferably tied together by the horizontal struts 12 to form a rigid and substantial frame work.

A main driving shaft 13 extends transversely of the machine and is provided with tight and loose pulleys 14. A driven shaft 16 extends longitudinally of the bed 10 and is suitably journaled in bearings 16′ carried by the supports 11 (see Figs. 1 and 3). Bevel gears 17 are fixed to the shafts 13 and 16 and are in intermeshing engagement for operating the said shafts in a proper timed relation. A bearing shaft 18 is fixed in the struts 12 and serves as a bearing for various rocking levers as will later appear. A fixed bearing rod 19 parallel to the rock shaft 18 is fixed in suitable hangers 20 carried by the struts 12 and serves as a bearing for other rocking levers as will later be described. A third rock shaft 21 (see Fig. 1) parallel to the shaft 16 is fixed in bearings 22 carried by the strut 12 and support 11 and is provided for carrying rocking levers later to be referred to.

The article feed conveyer comprises a pair of spaced side plates 25 (see Fig. 1) that are supported by the brackets 26 and 27 secured to the bed plate 10. Endless chains 28 spaced apart a distance sufficient to receive an article therebetween are carried by the loose idler sprockets 28′ rotatably supported by the shaft 29 and are in driven engagement with the sprockets 30 fixed to a driven shaft 31. The shaft 31 is rotatably carried by the bearing standards 32 and 33 fixed upon the bed plate 10. Suitable chains 34 and 35 in engagement with the sprockets 36, 37, 38 and 39 connect the shaft 31 to the driving shaft 13 from which the conveyer chains are driven in a timed relation. Cross bars 40 suitably connected between the chains 28 serve as pushers to advance the articles successively into the machine. An idler pulley 42 and a driving pulley 43 are journaled in the conveyer plates 25 and carry an endless article supporting belt 44 that is adapted to support the articles during their advancement by the chains 28. Chain and sprocket connections 45 between the shaft 29 and pulley 43 serve to drive the pulley and belt in a proper timed relation with the chains 28.

As previously mentioned, the articles are fed onto the top of plunger 1. As said plunger reciprocates to the right in Fig. 3 the article drops onto a stationary plate 50 best shown in Figs. 1, 3 and 4, which plate is fixed to and supported by the standard 33. A vertical guide plate 51 carried by the brackets 32 and 33 serve as a stop against which the article abuts as it is carried into the machine by the chains. The cross plunger 1 is best shown in Figs. 1, 3 and 4 comprises a forward shoe portion 53 and a top horizontal plate 54. The top plate is adapted when moved to the left in Fig. 3 to receive thereupon an article advanced by the conveyer chains. When moving to the position shown in Fig. 3 the article resting thereon is allowed to drop upon the plate 50. The plunger 53 and plate 54 are carried by a suitable bracket 56 slidably mounted on the stationary rods 57 and 58 and receives its reciprocating motion by means of the link 59 and lever 60 pivotally mounted upon the rock shaft 21. A cam 61 fixed on the shaft 16 is provided with a suitable cam groove within which a roll 62 of the lever 60 operates to move the lever for reciprocating the plunger 1.

A vertically recpirocating elevator 63 having spaced article supporting surfaces 63′ as shown in Fig. 2 and Fig. 4, is arranged to elevate to a height corresponding substantially to the plate 50 there to receive a carton C and

an article A in their superposed position A^3. The said elevator (see Fig. 3) is carried by a slidable vertical rod 64 which is guided in the lower bearing 65 fixed to the fixed bearing rod 19 and in the upper bearing 66′ extending from the bracket 66 secured to the underside of the main bed plate 10. A shoe 67 fixed to the rod 64 straddles the fixed guide bar 68 for sliding action thereon and which functions to prevent a turning action of the elevator. The rod 68 may be suitably secured to the members 65 and 66′. The elevator 63 is reciprocated (see Fig. 1) by means of a link 69 connected to a lever 70 which has a cam roll 71 in engagement with a suitable groove of a cam 72, fixed on the shaft 13, said lever 70 being pivoted on bearing rod 18.

A vertically reciprocating plunger 75 that is in line with the elevator 63 is provided with four downwardly depending corner portions 76 that are adapted to engage a carton and to straddle the article A. (See Figs. 9, 10 and 17.) Said plunger has straight vertical side portions which form square edges at the four corners thereof, against which and by the means of which the carton is folded into its rectangular shape. A plate 77 yieldingly supported within the plunger 75 by means of compression springs 78 and pins 79 provides a means of exerting tension or pressure upon the article and to hold the article firmly against the carton. A rod 80 fixed to the upper side of the plunger is carried in a bracket 81 fixedly secured to the vertically reciprocating rod 82. The reciprocating rod 82 is guided at its upper end in a bearing 83 fixed to an upwardly extending supporting rod 84 that is in turn fixed in a stationary standard 85 carried on the bed plate 10 (see Fig. 1). The lower end of the rod 82 is preferably guided (see Fig. 3) in the bearing 66 and carries on its lower end a shoe member 86 that is in sliding engagement with a stationary vertical bar 87. The rod 82 (see Figs. 1 and 3) is reciprocated by means of a link 88 pivoted to the shoe 86 and connected to a rocking lever 89, pivoted on rod 18 and having a cam roll (not shown) working in a suitable groove of a cam 90 mounted on shaft 13.

The carton magazine and mechanism for delivering cartons therefrom will now be described with particular reference to Figs. 3 and 4. A standard 100 fixed upon the bed plate 10 supports a horizontally reciprocating slide 101 that is adapted to support a stack of properly scored carton blanks C.

The said slide is guided in its reciprocating movement by means of the gibs 102 fixed to the standard 100. The said slide as best shown in Fig. 3^A is provided at its forward portion with a ledge or somewhat sharp step shoulder 103 which functions as the slide is moved forwardly or to the right in Fig. 3 to remove the lowermost carton from the stack and carry the same to its position A^3 and over the elevator 63, as in the patent to Smith 1,313,863 of August 19, 1919. The stack of carton blanks is held in position by means of the forward vertical bars 104 and rear bars 105. The bars 104 have their lower ends spaced from the slide 101 a sufficient distance to allow the passage thereunder of one carton blank at a time. The slide 101 is further provided at its forward end with open slots 101′ to facilitate the said slide being moved forwardly while the elevator 63 is in an elevated position (see Fig. 3^A).

The slide 101 is reciprocated by the link 109 pivotally connecting it with the rocking lever 110 mounted on the bearing shaft 111. A connecting rod 112 connects the said lever with a cam fork 113 slidably in the shaft 16 that is given a reciprocating movement by means of its cam roll in engagement with a suitable groove 114′ of cam 114 on the said shaft 16.

A bracket 106 rigidly fixed to the upright 84 supports the members 104 previously referred to and has fixed to it spaced guides 107 for guiding the article as it approaches its position A^3 over the elevator 63. A latch 109′ pivoted beneath the bracket 106 engages the rearward edge of the carton after it has been delivered upon the elevator and prevents its displacement when the slide 101 is returned to the left in Fig. 3. Upstanding prongs 108 are carried by the bracket 33 and are so positioned as to serve as stops for the carton blanks and to properly locate the said blanks when they are fed forward to their position over the elevator 63.

The previously referred to plunger 75 and the elevator 63 are adapted to receive therebetween a carton C and an article A and are so timed that they descend in unison to lower the carton and article to a lower level or position C^1. During this movement the side flaps of the carton are folded, as shown in Fig. 18, and the mechanism for performing this operation will now be described with particular reference to Figs. 1, 2, 3 and 5. As the article and the carton blank are carried down by the plunger 75 and the elevator 63, the side flaps 251 and 252 of the blank strike folding plates 116 and 117 (see Figs. 2 and 10), by means of which they are folded upwardly as at C^1 in Fig. 18. The end flaps of the carton blank strike a folder 118 at one side of the path of the plunger 75 and a folding plate 120 at the other side. The article is then positioned as at C^1 in Fig. 3 in position to be carried under the folding plate 120 by the plunger 2. As this plunger advances, the flap 252 is carried under the folding plate 119 disposed above the folding chute 122.

The plunger previously indicated as 2 comprises three spaced bars 125 that are rigidly fixed to a head member 126. The said head member is slidably mounted on a rod 127 that is supported by the standard 33 and bracket

128 and has a shoe portion 126′ that engages a guide 129 fixed to the bed plate 10 to prevent a turning action thereof. A link 130 pivotally connected to the head 126 is also pivotally connected to the upper end of a rocking lever 131 pivotally mounted on the rock shaft 21. The said lever 131 is provided with a suitable cam roller (not shown) that is in engagement with a cam groove in a cam 132 on shaft 16 and adjacent cam 61 which functions to rock the said lever and thereby reciprocate the said plunger bars 125 to the left in Fig. 3. This reciprocation of the plunger 2 moves the article and partially folded carton from the elevator onto the platform 122 also through the folders 119 and 120 previously referred to and finally deposits the partially folded carton in the position C^2, or in a location in the path of the plunger 3 (see Figs. 1, 2, 3, 6 and 8.)

Folder plates 140 and 141 are carried by the side wall 142 of the platform 122, the former of which functions as the article and carton are fed thereunder to fold the upwardly extending side flap down upon the article leaving the opposite side fold extending upwardly in the space between the said folders. A folding finger 144 (see Figs. 2 and 13) having a portion 145 extending upwardly and through a suitable slot in the plate 122 is designed to strike the end flap of the carton as it is fed thereagainst and to fold the same against the article. A stop 146 is provided on the upper side of the finger is adapted to strike against the under side of the platform 122 to limit its upward movement and a compression spring 147 beneath the finger tends to yieldingly press the finger upwardly for the folding operation. Separated side plates 148 carried by the platform 122 are provided to hold the vertical side fold of the carton in place preparatory to the advancement of the carton and article to the right in Fig. 2 and in the direction of the arrow *h*.

The plunger 3 for advancing the carton and article will now be described with reference to Figs. 1, 2 and 3. A plurality of spaced bars 150 fixed to a reciprocating head member 150′ are arranged to pass between and at the sides of the plates 148 (see Fig. 2). The said head 150′ is guided in suitable gibs 151 fixed to the bed plate 10 and has a lug 152 depending therefrom to which is pivotally connected a link 153. The said link 153 is pivotally connected to the long arm of a rocking lever 154 pivoted on the fixed shaft 19. The short arm 154′ of the lever 154 is connected to a pull rod 155 having a fork 156 on its end that slides on the driving shaft 13. A cam roll 157 carried by the fork is in engagement with a cam groove in a suitable cam 158 on the said shaft whereby the said rod and lever are rocked to reciprocate the plunger 3 in a proper timed relation. An arm 154″ extending downwardly from the lever 154 is connected to and serves to operate ejector plungers later to be described. Means for supporting a wrapper W in position in the path of the carton and plunger will now be described with reference to Figs. 1, 2 and 6. Standards 300 and 301 fixed to the bed plate 10 support an angular shaped table 302 the horizontal leg of which is flush with the platform 122 and is adapted to receive the carton and wrapper as they are advanced thereunto by the plunger 3. Side guides 303 are caried by the standards 300 and 301 and function to guide the advancing package and to start the side fold 254 in the wrapper W as the carton and wrapper are advanced therebetween. A transverse bar 304 carried by the bed plate 10 carries adjustable members 305 in which are rigidly secured upstanding rods 306 as shown that are adapted to support a wrapper W in position and in the path of the carton to be advanced thereto. Wrappers are supplied to the wrapper guides 307 from any suitable wrapper feeding means which means may be supported above the bed plate by the uprights 84 and 85′. It will be apparent that any means for supplying wrappers may be employed to deliver a wrapper of the desired dimensions in a timed relation with the other units of the machine.

A wiper member 158 pivoted at its ends in the supports 150 and 151 is provided with a coil spring 159 on one of its pivotal extensions which tends to yieldingly hold the said gate in the position shown in Fig. 6. As the carton and wrapper are advanced to the right in the direction of arrow *h* (in Fig. 6) and into a pocket of the tumble box the said gate exerts a tension upon the wrapper to fold the same against the carton in the usual manner.

The tumble box will now be described with reference to Figs. 1, 2 and 6. It comprises a plurality of pockets 160 having the usual resiliently mounted upper and lower article engaging plates 161. Bottom members 162 located in each of the pockets are rigidly connected by slidable rods as in the patent to Smith 1,306,358 of June 10, 1919. Folder plates 163 are carried by each of the members 162 at the ends thereof that are adapted to fold an end tuck in the wrapper as it is inserted with the carton into the said pocket. The tumble box is preferably rotated through 90 degrees between its rest positions W^1, W^2 and W^3 and receives its intermittent rotary motion by means of the following mechanism best shown in Fig. 2. A combined driving gear and geneva 170 and 171 respectively are rotatably mounted on a stud 172 fixed to the bed plate 10 and the said geneva is driven in the usual manner by a Geneva roll and crank 173 fixed to the driving shaft 13. A driven gear 174 fixed to the tumble shaft 175 is in meshing engagement with the said driving gear 170 and from which it is intermittently rotated.

Mechanism for applying glue to the extending wrapper flap when the tumble box has carried the same to the position W^2 will now be described, with particular reference to Fig. 1. A container 180 suitable for containing glue or other adhesive is fixed to a bell crank 181 pivoted at 180′ on a bracket 182 fixed to one of the uprights 85′. A roller 183 rotatably mounted in the container has a portion of its outer periphery exposed through a slot in the lower side of the container in the usual manner whereby it may contact with the extending wrapper flap. A lever 184 pivoted on the axis of the roll 183 is also connected by the pivoted link 185 to a member 186 fixed to the upright 85. The usual ratchet and pawl (not shown) carried by the lever 184 and roll 183 are adapted to rotate the said roll 183 as the container 180 is swung for the purpose of presenting a new portion of the roll's surface each time it engages a wrapper flap. Such mechanism is of common and well known construction. The container 180 receives its swinging motion by means of a connecting rod 187 that is connected to the upper end of the bell crank 181 and that has its fork 188 in sliding engagement with the shaft 13 from which it receives a reciprocatory motion by means of the usual cam and roll, etc. (not shown).

Ejecting levers 190 for engaging the tumble box members 162 will now be described with reference to Figs. 1 and 2. The said levers are pivotally mounted upon a rocking shaft 191 that is rotatable in a depending bracket 193 carried on the underside of the main bed plate 10. The said levers are spaced apart sufficiently to allow the tumble box to rotate therebetween and carry in their upper ends inwardly extending pins 194 that are adapted to abut the rear side of the members 162 in their swinging movement to the right in Figs. 1 and 2 whereby the said member is moved outwardly to eject a partially wrapped carton in the usual and well known manner. One of the levers 190 has a depending end portion 190′ that is suitably connected by a rod 195 to the lower end 154″ of the lever 154 previously referred to and best shown in Fig. 3 and from which the said lever receives its rocking motion.

As the partially wrapped article is ejected from the pocket in position W^3 it is advanced into a folding mechanism now to be described and by the means of which the final folding operations are accomplished. A transverse rod 200 (see Figs. 1 and 2) is rigidly supported above the bed plate 10 by means of the standard 201 fixed to the bed plate 10 and the bracket 202 fixed to the upright rod 85 and has fixed thereto a member 203 having an arm 204 extending to the left therefrom. A swinging arm 205 pivoted on said arm carries a friction pad 206 that is adapted to engage the extending wrapper flap as it is moved therepast and to exert a drag thereagainst. A coil spring 207 carried by the pivot of the arm is adapted to yieldingly hold the said arm in the position shown in Fig. 1.

Folding chute bottom plates 208 are fixed to the bed plate 10 and have fixed thereto at their forward ends the end tuckers 209 that are spaced apart in the usual manner to allow a carton to pass therebetween and are adapted to form an end tuck in the wrapper as it is advanced therepast. Side folding plates 210 are supported by brackets 211 depending from and fixed to the rod 200 and are spaced apart a distance to allow a partially wrapped carton to advance therebetween. These plates fold certain of the wrapper flaps as will later be described. Folder plates 212 for forming the final folds are pivotally mounted on vertical pivots 213 of the members 208 and are connected by a coil spring (not shown) to cause the said plates to yieldingly press upon an article and wrapper as the same is fed therebetween during the folding operation. A brush 214 having its bristles depending downwardly therefrom for exerting friction upon the upper side of the article as it is advanced through the folding chute is supported by a suitable bracket 215 depending from and fixed to the rod 200.

A shaft 216 rotatably mounted in bearings 217 and 218 has fixed thereto members 219 that carry suitable glue containers 220 for supplying glue to the wrapper flaps 258 extending from the folding chute. Suitable glue rolls 221 rotatably mounted in the containers 220 and extending through slots in the bottoms thereof present a small portion of their periphery having glue thereon to the extending wrapper flaps. The said shaft 216 is rocked to contact the dauber roll and wrapper flap in a manner shortly to be described.

The completely wrapped articles are ejected from the folding chute to a position beneath the swinging and reciprocating arm 223 shown in Figs. 1, 2, 8 and 8^A. The said arm 223 is fixed to a shaft 224 rotatably carried in a slide 225 that is adapted to reciprocate upon a rod 226 fixed in the before mentioned bracket 218 (see Figs. 1 and 8.) A stationary guide bar 227 is also fixed to the bracket 218 and upstanding lugs 228 carried by the slide 225 straddle the said bar 227 to prevent a turning of the slide 225 during its reciprocation back and forth along the rod 226.

A rock shaft 230 rotatable in bearings 231 of the standard 218 is rocked in a proper timed relation for the purpose of operating the said arm 223 and glue daubers 220 previously described by the following means and best shown in Figs. 1, 2, 7, 8 and 8^A.

A cam fork 233 slidable upon the shaft 13 and having a cam roll 234 in engagement with a suitable cam groove of a cam fixed

upon the said shaft receives a reciprocating motion therefrom and is connected by a rod 235 to an upwardly extending lever 236 fixed to the end of shaft 230 whereby the said shaft is rocked. A link 237 (see Figs. 2 and 7) pivotally connecting the lever 236 and a lever 238 fixed to the shaft 216 is adapted to rock the shaft 216 whereby the glue daubers carried by the shaft 216 are operated. A slotted lever 238 fixed to the shaft 230 and depending downwardly therefrom receives a roll 239 carried by the lever 240 fixed to the arm shaft 224 and as the said shaft 230 is rocked the shaft 224 is likewise rocked by means of the slotted lever 238, roll 239 and lever 240, whereby the arm 223 is swung downwardly from the position shown in Fig. 8A. The lever 240 is provided with an abutment 240′ (see Figs. 2 and 8) that is adapted to abut a pin 242 projecting from the slide 225. As the lever 240 and arm 223 are swung downwardly through an angle sufficient to carry a wrapped package from its horizontal to its vertical position shown in Fig. 8A the abutment 240′ engages the pin 242 whereby further relative swinging movement of said lever 240 is prevented and the continued swinging movement of slotted lever 238 acts to move said lever 240 and slide 225 forwardly along its guide rod 226, a distance equal to the thickness of one package, or rather from the position 244 to that indicated as 245 in Fig. 8A. Side brushes 246 having their bristles inclined rearwardly are provided and are suitably supported on the frame 10 in such a manner as to receive therebetween the wrapped packages as they are fed thereinto.

Bottom bars 247 having their forward ends curved as shown are supported on suitable cross bars 247′ fixed to the brushes 246 and are adapted to support the packages as they are advanced through the said brushes.

In operation articles A are placed between the chains 28 and cross bars 40 thereof and rest upon the endless belt 44. The said chains and belt are driven continuously in the direction of the arrow A to carry the articles to the position A^1 where they rest upon the top plate 54 of the plunger 1 which in its timed relation is moving to the right in Fig. 3. When the said plunger has reached the extreme position as shown in Fig. 3, said article drops downwardly from the top plate 54 and onto the stationary supporting plate 50. This dropping action allows the chain and its bars to pass thereover without interference with the article in its position A^2 and now in the path of the plunger 1.

Cartons C of a desired shape and size and that are properly scored to form a package of the shape and form desired are held in the carton stack by the guides 104 and 105 thereof. The carton plunger 101 in its reciprocation to the right in Fig. 3 removes from the bottom of the stack one carton and carries it forwardly into the position A^3 where its corners are engaged by the upstanding guides 108 which function to accurately position the carton. During the latter part of this forward movement of the plunger 101 the article plunger 1 also moves to the left and toward the plunger 101 and is so timed that the article A and carton reach their destination, position A^3, at substantially the same time at which time the elevator 63 is in its raised carton supporting position. As will be seen from Fig. 3A the said plunger 101 is slotted at 101′ to facilitate the said elevator being raised to its carton supporting position while the carton plunger 101 is approaching its forward or advanced position.

After the carton and article have been located upon the elevator 63 the vertically reciprocating plunger 75 commences its descent and the lower corner prongs 76 thereof engage the carton as shown in Fig. 9 and at the same time the inner surfaces 76′ act to locate the article A and to hold the same in its correct relative position with respect to the carton. The plunger 75 and elevator 63 commence their downward reciprocation simultaneously and as the article and carton pass the folder plate 118 (see Fig. 3) the rear end flap 250 of the carton is folded upwardly. As the carton and article are forced between the folders 116 and 117 the sides 251 and 252 are folded upwardly as shown in Fig. 18 and are held in this folded position by the lower upright portions of the folders 116 and 117. The plunger 2 now commences its reciprocation to the left in Fig. 3 and in the direction of the arrow *g* and the bars 127 of the said plunger 2 as they contact with the rear end of the carton serve to hold the rear end flap 250 of the carton in position. The plunger 2 carries the said carton and article to position C^2 and during its travel thereto the top fold 253 is completely folded down upon the article by means of the horizontal folder plate 119 (see Fig. 2) which fold is held against the package by the plate 140 as the carton and article reach the rest position C^2. The unfolded flap 254 of the carton enters a slot formed between the plates 140 and 141 and stands uprightly therein as shown in Figs. 12 and 18. The article and partially folded carton in the position C^2 are directly in the path of the plunger 3 and are to be advanced thereby in the direction indicated by arrow *h*.

A wrapper W is delivered by suitable wrapper-feeding mechanism to the position shown in Figs. 1 and 18 and in the path of the said partially folded carton. The plunger 3 now advances in the direction of the arrow *h* and engages the longitudinal side of the almost completely folded carton and advances the same forwardly. During this advancement of the carton, the plate 141 completely folds the last flap 254 of the carton down as shown by dotted lines in Fig. 18 subsequent to which

the said folded carton and article engage the wrapper W and all are delivered into a pocket 160 of the tumble wheel in position W^1. The wrapper is folded about three sides of the article as shown in Figs. 14 and 18 and as it is forced into the said pocket the end tucks 255 are formed in the ends of the wrapper in the usual manner by the end tuckers 163 carried by the tumble box plates 162. As will be noted, the upper flap 255′ of the wrapper is considerably longer than the width of the package and projects outwardly from the tumble box pocket.

The tumble box is rotated clockwise through an angle of 90 degrees to its rest position W^2.

While the article is in this rest position the glue pot 180 is swung downwardly and the glue roll thereof engages the upstanding flap 255′ of the wrapper and applies thereto a stripe of glue across the same. The wheel is again rotated clockwise to carry the partially wrapped package to the horizontal position W^3 during which movement the extending wrapper flap 255′ is frictionally engaged by the tension device 205 which acts to draw the wrapper tightly about the article and to hold the same preparatory to its ejection from the wheel.

The ejector arms 190 now advance to the right in Fig. 2 and the pins thereof engage the rear faces of the plates 162 and by their continued movement to the right carry the partially wrapped package within the folding chute. On entering the folding chute the extended wrapper flap 255′ is laid down against the carton by means of the upper brush 214 of the chute and the end tucks 256 are formed by the end folders 209 located on either side of the said folding chute. The package remains in the folding box and in the form shown in Fig. 16 until a subsequent package is ejected thereinto.

The next succeeding package ejected into the tumble box abuts the package previously referred to and moves the same therealong a distance substantially equal to the width of one package. During this latter movement the upper flaps 257 are folded down and against the end of the package by the side folders 210 forming the wrapper as shown in Fig. 16 and leaving the lower flaps projecting from beneath the said folders as shown by dotted lines 258. The said package remains in this position until another partially wrapped package is ejected from the tumble box, and while so positioned the glue daubers 220 are moved downwardly to apply a stripe of adhesive to the said flaps 258 in the usual manner. Another article ejected into the tumble box moves the articles contained therein along once more a distance equaling the width of one package and as the package is ejected from the folding chute the flap 258 is folded upwardly to its final position and against the ends of the package as shown in Fig. 16 by the resilient folders 212 which it will be remembered are held toward one another by a spring by the means of which spring action the said completely folded package is held by the plates 212 in position beneath the arm 222 as shown in Fig. 8A.

The arm 223 is now operated and swings downwardly and counter-clockwise to carry the wrapped package from its horizontal position to the vertical position 244 (see Fig. 8A). As the package is swung downwardly to its vertical position it enters between the bristles of the side brushes 246 which serve to frictionally engage the article and to wipe the glued flap last folded and to hold same against the article. After the article has been moved to its vertical position 244 said arm 223 is moved to the right to carry the article to the position 245 where it remains until moved forwardly between the brushes by succeeding packages.

We claim:

1. In a wrapping machine in combination, means for folding a cardboard blank into a box-like carton about an article of different shape than said box like carton comprising, a folding die, means for positioning said blank and article in superposed relation above said die, cooperating upper and lower plungers for carrying the blank and article through the die, the upper plunger having depending portions for engaging said blank, and a spring pressed plate for engaging said article.

2. In a wrapping machine in combination, means for folding a cardboard blank into a box-like carton about an article of different shape than said carton comprising, a folding die, means for positioning said blank and article in superposed relation above said die, cooperating upper and lower plungers for carrying the blank and article through the die, the upper plunger having depending corner portions to clamp the blank against the lower plunger and having right angular outer surfaces against which the blank is folded, and inner surfaces for engaging the article to position the same relative to the wrapper during the folding operation.

3. In a wrapping machine in combination, means for folding a cardboard blank into a box-like carton about an article of different shape than said carton comprising, a folding die, means for positioning said blank and article in superposed relation above said die, cooperating upper and lower plungers for carrying the blank and article through the die, the upper plunger having depending corner portions to clamp the blank against the lower plunger and having right angular outer surfaces against which the blank is folded and inner surfaces for engaging the article to position the same relative to the wrapper during

the folding operation and a spring pressed plate within said corner portions for clamping said article against said blank.

4. In a wrapping machine, in combination, a folding die having vertical sides in the form of folders to provide a vertical passage therethrough, means for positioning a wrapping blank and an article in a superposed relation above said die, cooperating plungers having separate portions for engaging said article and blank for holding the said wrapper and article and carrying the same through the said folding die whereby the wrapper is folded about the article, a horizontally deposed folding chute at the lower end of said die for folding the blank against the top side of the article, and a reciprocable plunger for advancing the said partially folded blank and article through the last named folding chute.

5. In a wrapping machine, in combination, a folding die having a vertical passage therethrough, means for positioning an article and a wrapper blank in a superposed relation above said die, means for carrying said article and blank through the folding die to fold the sides of the blank upwardly against said article, a chute at the lower end of said die passage, means for advancing the partially folded blank through the said chute, for folding the blank about the top side of the article leaving an extending flap, a further horizontal folding chute disposed at right angles to said first named chute and means for advancing the said article and wrapper blank through the last named chute to fold the extended flap against the article and complete the folding operation of said blank.

6. In a wrapping machine in combination, a folding die adapted to fold a wrapper blank about an article, a container for holding wrapper blanks in a stacked relation, a blank feeding slide reciprocable beneath the stack of blanks that is adapted to remove the lowermost blank from the stack and to support and position the same above said folding die, a reciprocable member for depositing an article upon the positioned blank, cooperating reciprocating plungers to engage the sides of the article and hold the wrapper blank and article in their relative position for advancing the same through the folding die.

7. In a wrapping machine, in combination, a folding die for folding a wrapper blank about an article, a container for holding wrapper blanks in stacked relation, a reciprocable slide for supporting the said stack that is adapted to remove in its forward reciprocatory movement the lowermost blank from the stack and to support the same in line with the die, means for depositing an article upon the blank, a lower plunger reciprocable through the die adapted to support the blank and article while the feeding slide is being withdrawn, and an upper plunger cooperating with the lower plunger for firmly holding the blank against the latter and for embracing the sides of the article for retaining the article in its position upon the blank, the said plungers adapted to advance the said blank and article through the folding die.

8. In a wrapping machine, in combination, a folding die, a container for holding wrapper blanks in a stacked relation, a reciprocable slide for supporting the said stack and adapted to remove in its forward reciprocatory movement the lowermost blank from the stack and to support the same above said folding die, means for depositing an article upon the positioned blank, a lower plunger reciprocable through the die and adapted to support the blank and article while the feeding slide is being withdrawn, and an upper plunger cooperating with the first named plunger for firmly holding the blank against the supporting plunger and for retaining the article in its position upon the blank, the said supporting plunger having a bifurcated end to provide more than one supporting surface and the said feeding slide being provided with corresponding openings therein whereby the said plunger may partially support the wrapper blank preparatory to the withdrawal of the slide.

9. In a wrapping machine, in combination, means for folding a wrapper blank about an article leaving an extended final flap, a folding chute for receiving the said partially folded blank and article for completely folding the blank, means for receiving and positioning an outer wrapper adjacent the said folding chute, a pocketed wheel adapted to bring a pocket in a receiving position in line with the said folding chute, a plunger reciprocable through the folding chute for advancing the blank and article from the chute into the said receiving pocket whereby the final fold is made upon the blank to form a completed package and the said outer wrapper is partially folded about the said package, leaving extending flaps.

10. In a wrapping machine, in combination, means for folding a wrapper blank about an article leaving an extended final flap, a folding chute for receiving the said partially folded blank and article for completely folding the blank, means for receiving and positioning an outer wrapper adjacent the said folding chute, a pocketed wheel adapted to bring a pocket in a receiving position in line with the said folding chute, a plunger reciprocable through the folding chute for advancing the blank and article from the chute into the said receiving pocket whereby the final fold is made upon the blank to form a completed package and the said outer wrapper is partially folded about the said pack-

age, leaving extending flaps, means for intermittently rotating the said pocketed wheel to move the pockets successively from receiving to intermediate and discharge positions, and means operable to glue the extended wrapper flap while the said pocket is in an intermediate position.

11. In a wrapping machine, means for folding a wrapper blank about an article leaving an extending flap, a chute for receiving and folding the final flap upon the article, an intermittently rotatable pocketed wheel adapted to bring a pocket successively to receiving, intermediate and discharge positions, means for positioning an outer wrapper in line with the receiving pocket, a plunger reciprocable through the folding chute for advancing the said partially folded blank, article and wrapper into the said receiving pocket whereby the blank is finally folded upon the article to form a completed package, and the outer wrapper is partially folded about the completed package leaving extending side and end flaps, means for moving the said pocket to intermediate and discharge positions, means for applying glue to the extending side flap of the wrapper when in an intermediate position.

12. In a wrapping machine, in combination, means for folding a wrapper blank about an article leaving an extending flap, a chute for receiving and folding the final flap upon the article, an intermittently rotatable pocketed wheel adapted to position a pocket successively in receiving, intermediate and discharge positions, means for positioning an outer wrapper in line with the receiving pocket, a plunger reciprocable through the folding chute for advancing the said partially folded blank article and wrapper into the said receiving pocket whereby the blank is finally folded upon the article to form a completed package, and the outer wrapper is partially folded about the completed package leaving extending side and end flaps, means for advancing the said pocket to intermediate and discharge positions, means for applying glue to the extending side flap of the wrapper when in an intermediate position, a brush lined folding chute for receiving the partially folded wrapper and article for completely folding the wrapper about the article and means for advancing the said article and wrapper from the said pocket into the said folding chute.

13. In a wrapping machine, a folding channel for folding a wrapper about an article, a discharge chute for receiving the wrapped article, a member adapted to move the wrapped article from its position in the said channel to a position at right angles thereto in the discharge chute the said member being adapted for a reciprocating movement to move the said wrapper and article along the said chute.

14. In a wrapping machine, a folding channel for folding a wrapper about an article, a discharge chute for receiving wrapped articles, a member for moving the wrapped article from its position in the channel to a position at right angles thereto in the discharge chute, the said member being adapted for a reciprocating movement to move the article along the said chute a distance substantially equal to the thickness of the said article.

15. In a wrapping machine, a folding channel for folding a wrapper about an article having yielding sides for engaging the ends of the wrapped article for holding the wrapped article, a discharge chute for receiving the wrapped articles and a member adapted to move the wrapped article from its position in the folding chute to a position at right angles thereto in the discharge chute, the said member being adapted for a reciprocating movement to advance the said article along the said chute a distance substantially equal to the thickness of the said article.

16. In a wrapping machine, a folding channel for folding a wrapper about an article, the said channel having yielding side folders at the ends thereof for folding the wrapper against the ends of the article and adapted to hold the completely wrapped article, a discharge chute for receiving the said articles that is provided with side brushes for yieldingly engaging the ends of the articles, a swinging member adapted to engage the upper side of an article held in the folding channel and to move the same downwardly through an angle of ninety degrees to a position in the discharge chute at right angles to its position in the folding channel.

17. In a wrapping machine, a folding channel for folding a wrapper about an article, the said channel having yielding side folders at the ends thereof for folding the wrapper against the ends of the article and adapted to hold the completely wrapped article, a discharge chute for receiving the said articles that is provided with side brushes for yieldingly engaging the ends of the articles, a swinging member adapted to engage the upper side of an article held in the folding channel and to move the same downwardly through an angle of ninety degrees to a position in the discharge chute at right angles to its position in the folding channel, the said arm adapted to move the article along the said chute whereby successive articles may be swung from the channel to the said chute.

18. In a wrapping machine in combination, a folding die having a passage therethrough, means to position a carton blank and an article to be wrapped in superposed relation before said die, oppositely acting cooperating plungers to carry said blank and article through said die for folding the blank about the article with a bottom of rectangular form

and four upstanding side portions, a folding chute extending at right angles to said die passage and having folding members arranged to fold down one of said upstanding side portions upon the top of the article, a pusher for advancing said article and blank through said chute, a second folding chute at right angles to said first chute, and a pusher for delivering said article and carton into said second chute, a folding member in said second chute to fold down another side portion on top of said first folded down side portion.

19. In a wrapping machine in combination, a folding die having a passage therethrough, means to position a cardboard blank and an article to be wrapped in superposed relation before said die, oppositely acting cooperating plungers to carry said blank and article through said die for folding the blank about the article with a bottom of rectangular form and four upstanding side portions, a folding chute extending at right angles to said die passage and having folding members arranged to fold down one of said upstanding side portions upon top of the article, a pusher for advancing said article and blank through said chute, a second folding chute at right angles to said first chute and a pusher for delivering said article and blank into said second chute, a folding member in said second chute to fold down another side portion on top of said first folded down side portion, a wrapping wheel with pockets adjacent the discharge end of said second chute, means to present a paper wrapper between the discharge end of said chute and a pocket of said wheel, and a pusher for delivering said article from said second folding chute into a pocket of said wheel to complete the folding of said cardboard blank and begin the folding of a paper wrapper about the same and folding means associated with said wheel to complete the folding of the paper wrapper about said article.

20. In a wrapping machine in combination, a folding chute for folding a carton to form a rectangular package about a single non-rectangular article, a plunger reciprocable through said chute for supporting said carton and article and a feed plunger cooperating therewith having angular corner portions for engaging said carton and loosely embracing said article, against which the carton may be folded to form the rectangular package.

21. In a wrapping machine in combination, a folding chute for folding a carton to form a rectangular package about a single non-rectangular article, a plunger for feeding a carton and article superposed thereon through said chute having a rectangular plate portion with depending angular portions at the corners thereof which enclose an article and serve as abutments for the carton to be folded about to form the rectangular package.

22. In a wrapping machine in combination, a folding chute for receiving and folding a carton about an article, a plunger reciprocable in said chute for supporting a carton and article, a plunger for supporting a carton and article superposed thereon at the mouth of said chute, said plungers being movable in intersecting paths and arranged whereby one plunger may move across the path of the other without contacting with one another.

23. In a wrapping machine in combination, means for advancing a carton partially folded about an article, a folding chute for receiving the same, the said carton having a flap extending forwardly thereof in the direction of its movement and the said folding chute having a rear wall in the path of said flap, and a resilient folder disposed in the path of said flap for engaging the same and moving it upwardly into a position parallel to said wall.

In testimony whereof we have affixed our signatures.

ELMER LOVELL SMITH.
ARTHUR E. PHELON.