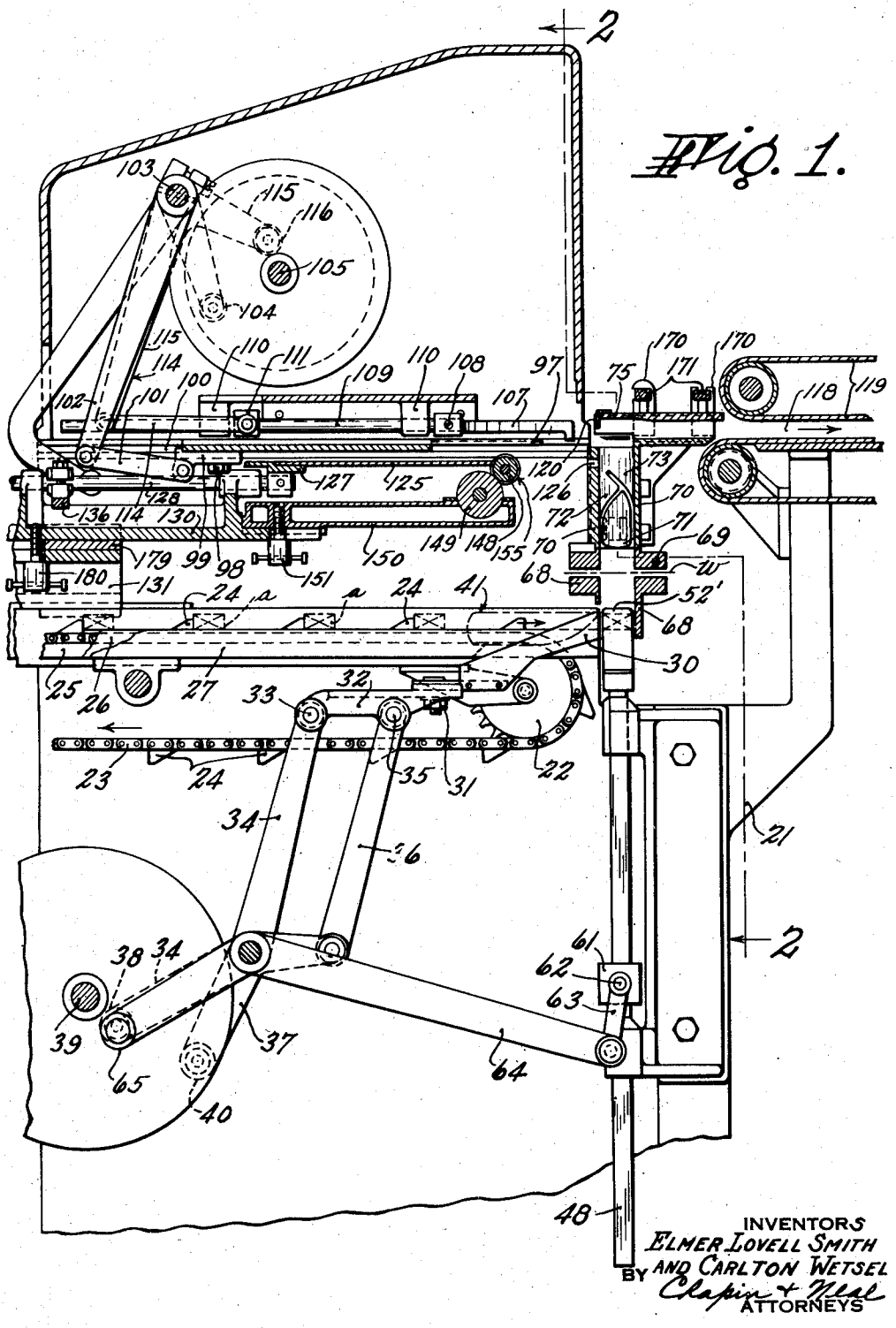
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WRAPPING MACHINE

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Fig. 1.



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FIG. 2.

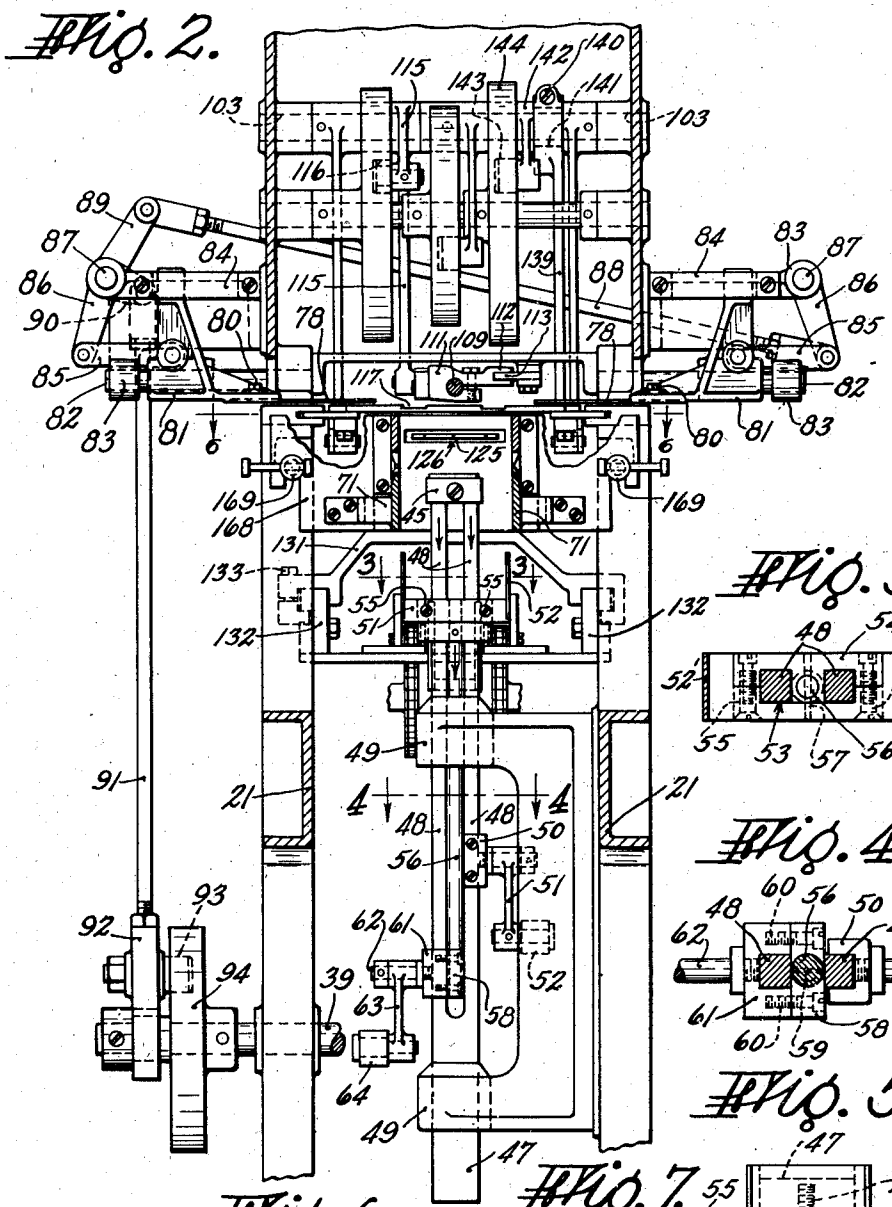


FIG. 3.

FIG. 4.

FIG. 5.

FIG. 6.

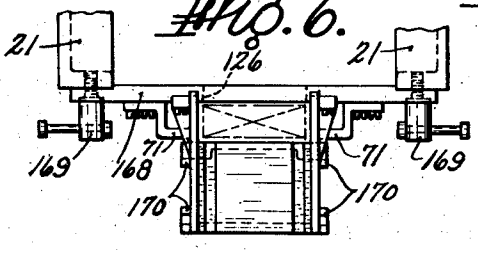
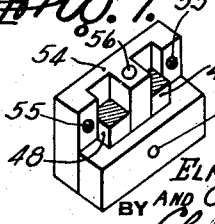


FIG. 7.



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Fig. 8.

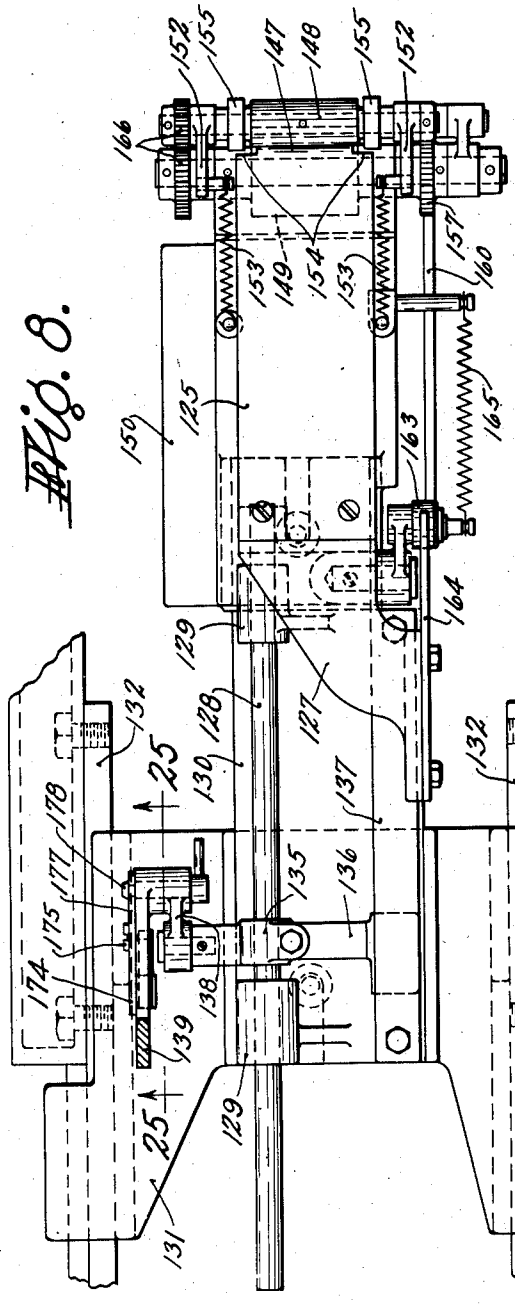
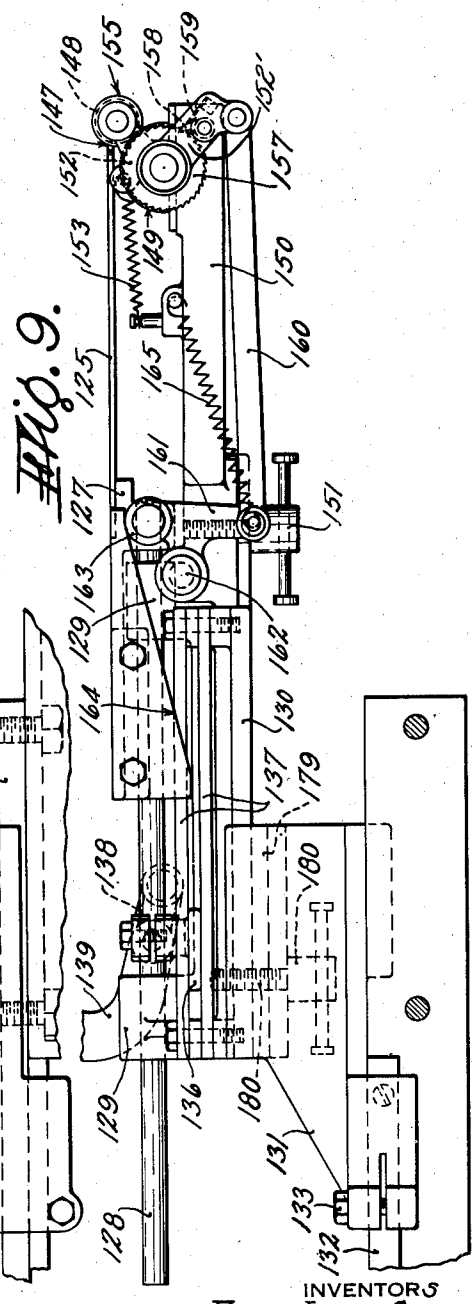


Fig. 9.



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Fig. 10.

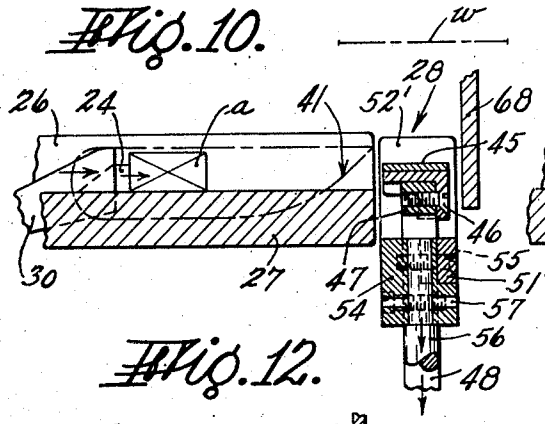


Fig. 11.

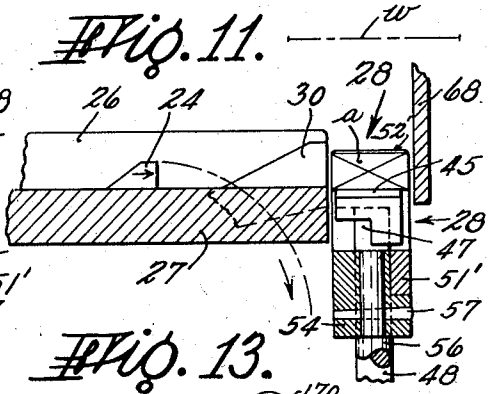


Fig. 12.

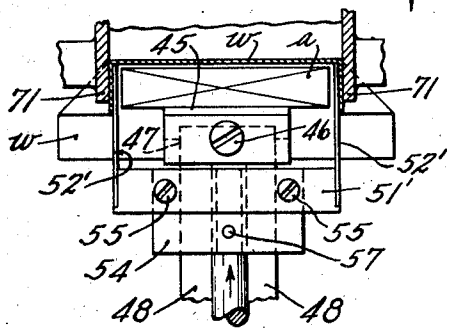


Fig. 13.

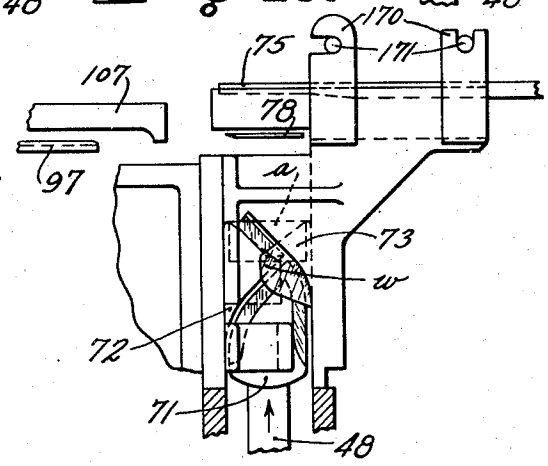


Fig. 14.

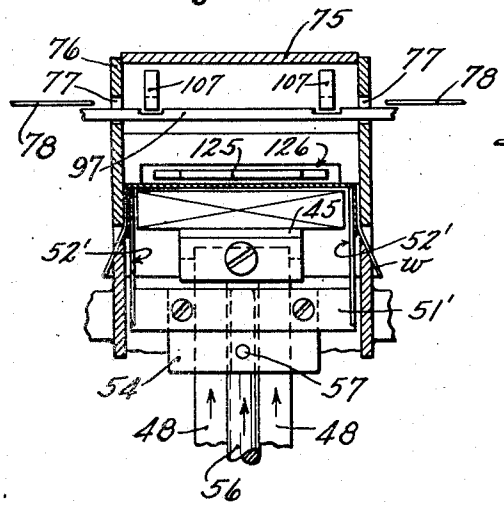
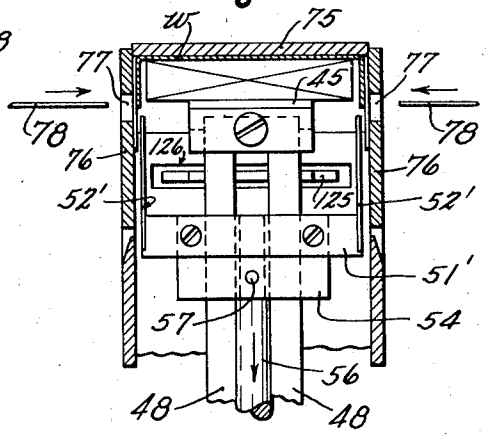


Fig. 15.



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Fig. 16.

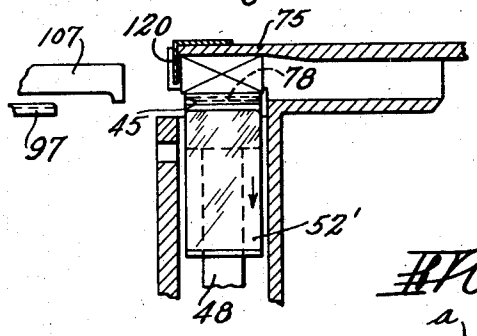


Fig. 17.

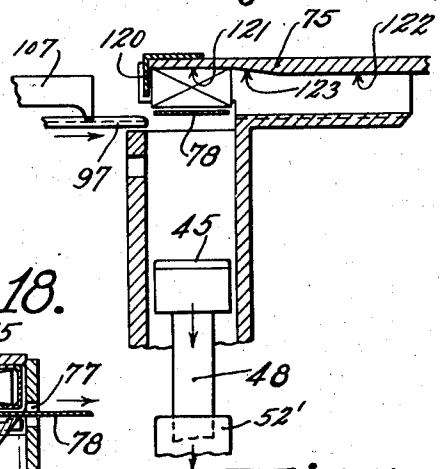


Fig. 18.

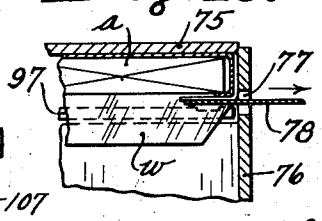


Fig. 19.

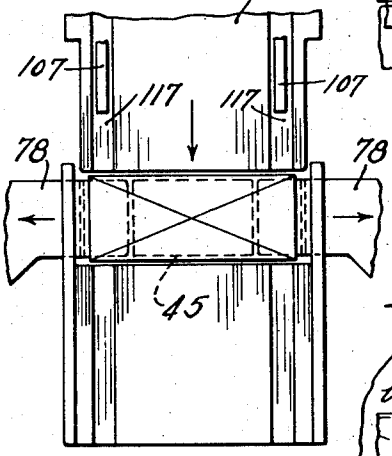


Fig. 20.

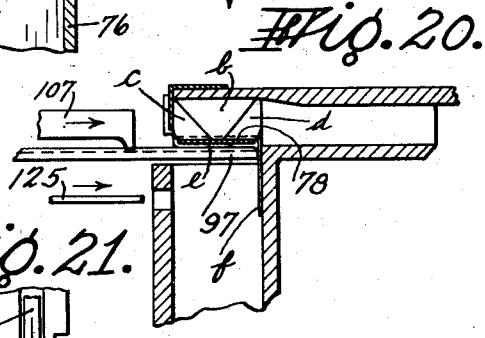


Fig. 21.

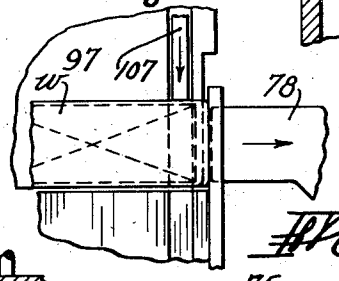


Fig. 22.

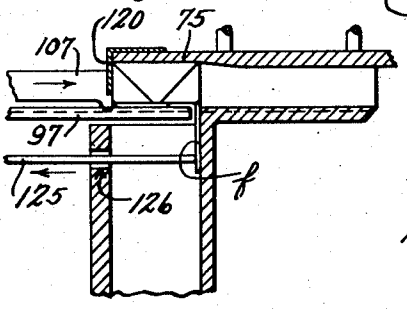
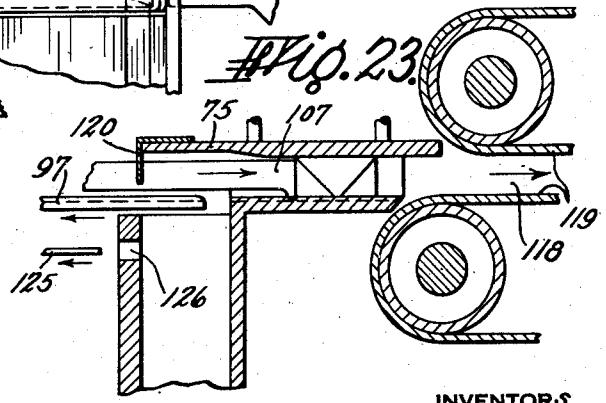


Fig. 23.



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WRAPPING MACHINE

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Fig. 24.

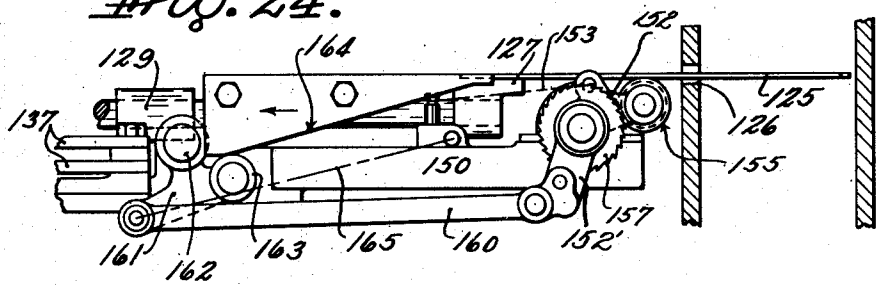


Fig. 25.

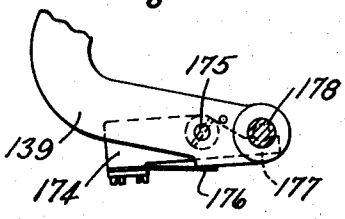


Fig. 26.

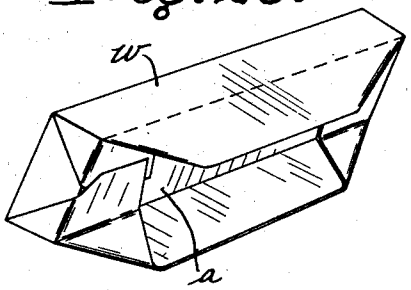
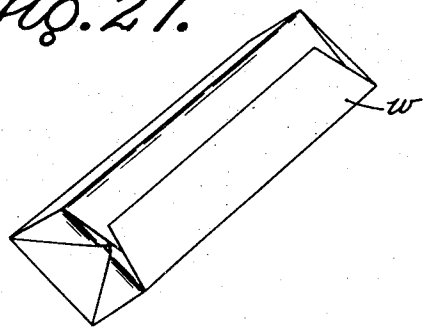


Fig. 27.



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Patented Dec. 8, 1942

2,304,428

UNITED STATES PATENT OFFICE

2,304,428

WRAPPING MACHINE

Elmer Lovell Smith, Longmeadow, and Carlton Wetsel, Springfield, Mass., assignors to Package Machinery Company, Springfield, Mass., a corporation of Massachusetts

Application May 12, 1941, Serial No. 393,034

10 Claims. (Cl. 93—2)

This invention relates to wrapping machines, and has particular utility in machines for wrapping articles of slightly irregular shape such as candy bars. One object of the invention is to improve the folding devices so that a better control of the folds will be had. A further object is to provide an improved type of folding box which may be replaced readily to accommodate articles of differing size. A further object is to improve the manner of feeding an article into the machine and in particular the manner of transferring it from the initial feeding conveyor to the plunger or elevator which associates it with the wrapper and assists in performing the initial wrapping operation. A further object is to provide an improved gluing device for applying glue or other adhesive to the inner side of the final bottom fold. Additional objects will appear from the following description and claims.

Referring to the drawings,

Fig. 1 is a longitudinal median section of the machine;

Fig. 2 is a transverse section thereof taken substantially on line 2—2 of Fig. 1 but with certain parts in different operative positions;

Fig. 3 is a section on line 3—3 of Fig. 2;

Fig. 4 is a section on line 4—4 of Fig. 2;

Fig. 5 is a top plan view of the elevator;

Fig. 6 is a detail plan of the folding box, taken on line 6—6 of Fig. 2;

Fig. 7 is a perspective detail of the support for the fold former;

Fig. 8 is an enlarged plan of an adhesive applying device;

Fig. 9 is a side elevation thereof;

Figs. 10 and 11 are successive details showing the manner in which the incoming article is transferred from the feed conveyor to the elevator;

Fig. 12 is a detail showing the formation of the initial folds in the wrapper;

Fig. 13 is a side view thereof;

Fig. 14 is a view similar to Fig. 12 but showing a later stage;

Fig. 15 is a similar view showing a still later position of the elevator;

Fig. 16 is a side elevation with the parts in the position of Fig. 15;

Fig. 17 is a similar view, showing the elevator receding and the support of the article as having been taken over by the side tuckers; the wrapper having been omitted for clearness;

Fig. 18 is an end view, and Fig. 19 is a plan, with the parts in the positions of Fig. 17;

Fig. 20 is a view similar to Fig. 17, showing the action of the rear bottom folder;

Fig. 21 is a plan, and Fig. 22 is a side elevation, showing the initiation of the discharge of the article from the folding box;

Fig. 23 is a side elevation showing a further stage in the discharge of the article;

Fig. 24 is a detail of the gluing device in position to apply a spot of adhesive to the inner surface of the last bottom flap (as shown in Fig. 22);

Fig. 25 is a detail section on line 25—25 of Fig. 8; and

Figs. 26 and 27 are perspective details showing respectively an article partially and completely wrapped.

The machine is supported on a frame 21 in which are journaled sprockets 22 driven continuously by any desired mechanism. Around these sprockets and other idle sprockets at the feeding end of the machine run chains 23 bearing spaced lugs 24 in front of which the articles *a* are placed manually or by any suitable feeding means. The chains are supported underneath by guides 25 and at their sides by plates 26. The articles are carried along in front of the lugs on rails 27 (Fig. 10), which extend a short distance beyond the point where the chains pass around the sprockets 22. Reciprocating vertically in front of the rails 27 is an elevator 28 mounted as will be described below.

In prior machines it has been customary either to drive the pushing lugs intermittently so that they came to rest with an article positioned on top of the elevator, or to employ special tilting pushers to deposit the article on the elevator and then withdraw so that they would not interfere with its further movement. In the present instance an arrangement is employed which increases both the speed of operation and the accuracy with which the article is positioned on the elevator. This mechanism comprises a pair of supplementary pusher fingers 30 which are reciprocated toward and away from the elevator and at the same time are raised and lowered so that they may pass rearwardly underneath an article being advanced by the lugs, come up behind the article as in Fig. 10, and move forwardly at a faster rate than the lugs to carry the article away from the lugs and deposit it upon the elevator (Fig. 11).

The pushing fingers are detachably mounted as at 31 (Fig. 1) on a member 32 pivoted at 33 to a bell crank 34 and at 35 to a link 36 itself pivoted to a second bell crank 37. Bell crank 34

carries a roll 38 running in contact with a cam on a cam shaft 39, and serves to move the fingers 30 forward and back; while bell crank 37 carries a roll 40 running in contact with a second cam on the shaft and serves to move the fingers vertically by elevating or lowering the pivot 35 with respect to the pivot 33. The fingers are by this means moved through an endless path of the nature indicated at 41 (Figs. 1 and 10).

The head 45 of the elevator 28 is formed as a detachable cap L-shaped in vertical and U-shaped in horizontal section and is replaceably held by a screw 46 to the integral upper end of a slide 47 the intermediate part of which is divided to form a pair of spaced square rods 48. The slide reciprocates vertically in guides 49 and has a bracket 50 attached to one side of its intermediate part. A link 51 connects this bracket to a lever 52 oscilliated periodically by any desired cam mechanism.

Reciprocable with the elevator during a portion of its upward movement, and movable independently during the rest of the cycle, is a fold former head 51' having fold forming wings 52' adapted to extend upwardly at the sides of the elevator. The former head 51' is recessed at 53 to receive the rods 48, and a member 54 is fastened to it by screws 55. The latter member is recessed to receive the upper end of a round rod 56, pinned in place at 57. The round rod extends downwardly between the rods 48, and at its lower end is shouldered to fit into a block 58 (Fig. 4) where it is pinned in place at 59. Block 58 is screwed at 60 to an operating member 61 grooved to permit it to slide upon one of the square rods, and pinned at 62 (cf. Figs. 1 and 2) to a link 63 coupled to a rocker 64 having on one arm a cam roll 65 engaging a cam on shaft 39. By this means the fold forming wings may be moved vertically in timed relation to the elevator as will be more particularly described below.

As the article is raised by the elevator it passes between guides 68, above which it picks up a wrapper *w* delivered in place by any suitable means not necessary to describe here. Above the wrapper slot 69 are folders 70 which drape the wrapper in U form down the front and rear of the article, and above these are opposed end folders 71 which turn down the ends of the wrapper as in Fig. 12, leaving outstanding front and rear flaps at each end. These flaps are folded in overlapped relation by plow folders 72 and 73, so that when the partially wrapped article is delivered to the final folding station it has a complete downwardly extending skirt.

During this entire action the fold forming wings 52' extend upwardly beyond the ends of the article, their operating cam being so shaped as to cause them to move upwardly synchronously with the elevator and with their upper edges about on the level of the top of the article (Figs. 12 and 13). The end folds are thus made over these wings and are independent of variations of contour in the article itself, which may be considerable in the case of an article such as a candy bar. As soon as the article is received against the top plate 75 of the folding box, however, the fold forming wings retract (Fig. 15) leaving the skirt unsupported and only the relatively narrow elevator holding the article.

The side walls 76 of the folding box are fitted with slots 77, through which bottom end tucking plates 78 may pass to turn against the bottom of the article the portion of the wrapper skirt at the ends of the article (Figs. 18 and 19). This motion of the tuckers is permitted by the fact that the elevator 28 is of less width than the article, so that the plates may move underneath the article a sufficient distance to make the folds without interference. Support of the article is now assumed by the tucking plates 78, which also hold all the previously made folds in position, and the elevator can recede (Fig. 17, in which the wrapper has been omitted to show the relation of the various folding members).

The tucking plates 78 are detachably secured as by bolts 80 (Fig. 2) to slides 81 movable on rods 82 held in brackets 83. The upper end of the slides are held between guide members 84 to maintain the folders always horizontal. Links 85 join the slides to rockers 86 mounted on shafts 87 journaled in the brackets 83. One of the rockers is connected by a cross link 88 to an extension 89 on the other, and one shaft 87 has an arm 90 joined by a link 91 with a forked member 92 embracing the shaft 39 and having a roll 93 engaging a cam 94 thereon. The tuckers will thus be driven simultaneously and in opposite directions in timed relation to the other mechanism.

After the end bottom tucks have been made by plates 78, the rear bottom fold is turned under the article by a folding plate 97 removably secured at 98 to a carriage 99 slidable in ways 100 formed in the frame. The carriage is connected by a link 101 to a bell crank 102 pivoted at 103 and bearing a cam roll 104 running against a cam on a shaft 105 suitably driven in timed relation with shaft 39. The folder 97 moves underneath the article while the tuckers 78 are still in position (Fig. 20) and not until the tucks are covered by the rear bottom fold and the support of the article has been taken over by the rear folder do the plates 78 withdraw.

At the time when this shift of support occurs the article is pushed forwardly off from the folder 97 (which at that time starts its retracting movement as in Figs. 22 and 23) by a forked pusher 107 detachably secured at 108 to a rod 109 slidable in bearings 110. A member 111 (Figs. 1 and 2) is clamped to the rod and has a lateral extension 112 engaging a guide 113 to keep the pusher against tilting sideways. A link 114 couples the member 111 with a bell crank 115 pivoted on shaft 103 and having a roll 116 engaging a cam on shaft 105, so that the pusher will be driven in timed relation to the other elements.

In order to make firm contact with the lower rear edge of the article, and prevent the wrapper from becoming loose, the forked ends of the pusher run in shallow grooves 117 (Fig. 2) formed in the rear bottom folder. The reciprocation of the pusher carries the article well into the delivery channel 118, where it is taken by upper and lower delivery belts 119. It should be noted that the upper plate 75 is preferably provided with a depending rear guide 120 slotted to permit the forked pusher to pass, and that it has an elevated surface 121 joined with the upper surface 122 of the delivery channel by a slanting section 123. This gives room for the tuckers 78 to lie over the rear bottom folder 97 and at the same time prevents looseness when the article is finally pushed over the folder 97 into the delivery channel.

In some instances it is desirable to have the folds secured by adhesive, and for this reason

a novel gluing device has been provided to apply a daub of adhesive to the inner surface of the final bottom fold *f* just before the article is ejected into the delivery channel. This device is shown in Figs. 1, 8, 9, and 24. It comprises a plate-like dauber 125 adapted to receive glue or other adhesive on its end and to pass through a hole 126 in the side of the vertical folding channel (Fig. 22) into contact with the flap. The plate 125 is carried on a bracket 127 secured to a rod 128 sliding in bearings 129 in a sub-frame 130. This sub-frame has a detachable bridge 131 slidable toward and from the vertical wrapping channel by sliding upon rails 132 secured to the main frame, and can be clamped in any adjusted position by a bolt 133. This permits the maximum forward position of the dauber 125 to be changed to correspond to different sizes of articles.

The rod 128 which carries the dauber is provided with a member 135 clamped to it and having a lateral guide 136 engaged between spaced rails 137, thus maintaining the dauber against angular displacement. A link 138 couples the member 135 to the lower end of a bent arm 139 secured as by a clamp screw 140 to a sleeve 141 (Fig. 2) rotating freely on the shaft 103. An arm 142 secured to this sleeve is provided with a roll 143 engaging a cam 144 suitably formed to cause reciprocation of the dauber in timed relation to the remaining parts of the machine. The end of the stroke of the dauber is regulated, as described above, by sliding the entire gluing assembly toward or away from the wrapping channel, and to permit this the arm 139 may be unclamped from the sleeve 141, being clamped again in position when the gluing device has been adjusted.

The dauber has a slightly narrowed end 147, best shown in Fig. 8, which rests against the rear side of a glue transfer roll 148 when the dauber is in the inactive position of Fig. 9. This roll runs in contact with a supply roll 149 journaled on a glue box 150 and dipping into it to receive glue and carry it to the transfer roll as the supply roll is rotated intermittently by mechanism to be described. The glue box is held in position on the sub-frame by a clamp screw 151 so that it may be removed for cleaning. The transfer roll 148 is not mounted directly on the glue box, but upon rockers 152 pivoted coaxially with the supply roll. Springs 153 give to these rockers a tendency to rotate counterclockwise as viewed in Fig. 9. As the dauber moves forwardly it pushes on the transfer roll and forces the arms to tilt against the springs. As the roll rocks the dauber passes over its surface until lateral abutments 154 on the dauber engage rolls 155 placed at each end of the transfer roll. Ultimately the sides of the dauber ride over these rolls 155, which are of slightly larger diameter than the transfer roll, and hold the bottom face of the dauber out of contact with the adhesive coated surface of the latter. When the dauber is extended into the position of Figs. 22 and 24 it deposits a stripe of glue on the inner surface of the flap *f*, which is the last unfolded flap extending down the wrapping channel; and when the dauber again retracts the transfer roll springs up in front of it to apply a fresh supply of glue.

The supply roll 149 is periodically rotated to convey adhesive to the transfer roll by a ratchet 157 located on one end of the supply roll and engaged by a pawl 158 carried by a rocker 152' and provided with a leaf spring 159. The rocker is coupled by a link 160 with an arm 161 pivoted at 162 and also bearing a roll 163 held in engagement with a cam plate 164 on the bracket 127 by means of a spring 165. As the dauber moves back and forth the cam roll 163 will be raised and lowered to cause intermittent rotation of the supply roll (cf. Figs. 9 and 24). The supply and transfer rolls are preferably connected by gearing 166 (Fig. 8).

In order to facilitate adjustment of the machine for different sizes of articles the entire folding box, including the vertical and horizontal wrapping channels, is carried by a bracket 168 (Figs. 1, 2, and 6) held to the main frame by clamp screws 169 over which slots in the bracket may fit. Other slots, one horizontal and the other vertical, are formed in lugs 170 projecting upwardly from the box and receive cross pieces 171 on the top plate 75. This top plate can thus be disengaged and removed at any time to permit access to articles without removing the entire folding box. If it is desired to remove the entire gluing assembly, a detachable connection between the arm 139 and the link 138 is preferably provided as indicated in Fig. 25. The arm has a latch 174 pivoted to it at 175 and normally held by a spring 176 with its end 177 in a slot in the pintle 178 connecting it with the link 138. The pintle is provided with a handle (Fig. 8) so that when the latch is tilted the pintle may be removed to free the gluing device from connection with the driving mechanism. When the gluing device is thus removed it may be adjusted for varying lengths of the flap *f* by interchanging the spacer 179 located between the sub-frame 130 and the bridge 131. When the proper spacer has been put in place the sub-frame is clamped to the bridge by a screw 180 (Figs. 1 and 9).

What we claim is:

1. A wrapping machine comprising an elevator for raising an article and a wrapper, folding means for draping the wrapper about the article into a four-sided depending skirt as the article is raised by the elevator, reciprocable blades movable oppositely underneath the article to fold opposed portions of the skirt and to assume support of the article as the elevator recedes, a rear folder movable underneath the article and blades while the latter are supporting the article to fold one outstanding flap over the blades, means for withdrawing the blades from the folds, a delivery channel, and means for pushing the article off the rear folder and into the delivery channel to make the last fold.

2. A wrapping machine comprising an elevator for raising an article and a wrapper, folding means for draping the wrapper about the article into a four-sided depending skirt as the article is raised by the elevator, fold forming plates extending beyond each end of the article and movable with the elevator during the action of said folding means, reciprocable blades movable oppositely underneath the article to fold opposed portions of the skirt and to assume support of the article as the elevator recedes, a rear folder movable underneath the article and blades while the latter are supporting the article to fold one outstanding flap over the blades, means for withdrawing the blades from the folds, a delivery channel, and means for pushing the article off the rear folder and into the delivery channel to make the last fold.

3. A wrapping machine comprising an elevator for raising an article and a wrapper, stationary

folders for draping the wrapper down into U form at the front and rear of the article, end tuckers and plow folders operable during the ascent of the article to fold the wrapper at each end of the article into overlapping folds, whereby the wrapper is draped into a skirt extending below the article, fold forming plates extending beyond each end of the article and movable with the elevator during the action of said folders and tuckers with the leading end of said fold forming plates substantially in line with the top of the article and retracting out of said skirt, reciprocable blades movable oppositely underneath the ends of the article to make folds in the end portions of the skirt and to assume support of the article as the elevator recedes, a rear folder movable underneath the article and blades while the latter are supporting the article to fold one outstanding flap over the blades, means for withdrawing the blades from the folds, a delivery channel, and means for pushing the article off the rear folder and into the delivery channel to make the last fold.

4. A wrapping machine comprising a vertical channel, folding means in the channel, an elevator reciprocable through the channel and having a loading station, a continuously movable conveyor forwarding articles to a point adjacent said loading station, and a pusher having a substantially parallel movement in a closed path to move an article from said conveyor onto the elevator and to return out of the line of movement of the next advancing article.

5. A wrapping machine comprising a vertical channel, folding means in the channel, an elevator movable through the channel, an elevator carrier including a vertical slide having its upper portion formed as parallel rods, means for reciprocating the carrier, a fold former carrier slidable on the parallel rods and having a pair of fold forming blades extending beyond the ends of the elevator, a rod extending from the fold former carrier between said parallel rods, and means for reciprocating the latter rod relative to said parallel rods.

6. A wrapping machine comprising a wrapping channel, means for forwarding an article through the channel, folders in the channel for draping the wrapper around the article into skirt form extending behind the article, means for folding against the article the portion of the skirt at one side thereof, and adhesive applying mechanism comprising a dauber movable across the channel from the side thereof adjacent the last named side of the article into contact with the inner surface of the opposite flap.

7. A wrapping machine comprising a vertical wrapping channel, an elevator for raising an article and a wrapper therethrough, folders in the channel for draping the wrapper around the article into a depending skirt, end tuckers movable oppositely to form opposed folds in the two sides of the skirt, a rear folder movable from the third side of the article underneath the end tuckers to form a rear bottom fold, a glue dauber movable underneath the rear folder into contact with the flap depending from the fourth side of the article, means for withdrawing the end tuckers, and means for ejecting the article from the channel to fold the adhesive coated flap against the flaps previously folded against the bottom of the article.

8. A wrapping machine comprising a vertical wrapping channel, an elevator for raising an article and a wrapper therethrough, folders in the channel for draping the wrapper around the article into a depending skirt, end tuckers movable oppositely to form opposed folds in the two sides of the skirt, a rear folder movable from the third side of the article underneath the end tuckers to form a rear bottom fold, a glue dauber movable underneath the rear folder into contact with the flap depending from the fourth side of the article, means for withdrawing the end tuckers, and means for ejecting the article from the channel to fold the adhesive coated flap against the flaps previously folded against the bottom of the article, said delivery channel having a top plate converging towards the floor thereof an amount substantially equal to the thickness of the reciprocable blades.

9. A wrapping machine having a frame, a pair of article forwarding plungers movable on the frame at right angles to another, operating means for said plungers to reciprocate them in timed relation, an angular wrapping channel through the branches of which the plungers reciprocate, stationary folding members associated with the channels, reciprocatory folding members movable on the frame into the channels adjacent their junction, and means for removing the angular channel from the frame as a unit.

10. A wrapping machine having a frame, a pair of article forwarding plungers movable on the frame at right angles one to another, operating means for said plungers to reciprocate them in timed relation, detachable connections between the plungers and their operating means, an angular wrapping channel through the branches of which the plungers reciprocate, stationary folding members associated with the channels, reciprocatory folding members movable on the frame into the channels adjacent their junction operating means for said reciprocatory folding members, detachable connections between the reciprocatory folding members and their operating means, and means for removing the angular channel from the frame as a unit.

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