July 5, 1927.

1,634,711

M. B. FERGUSON

WRAPPING MACHINE

Filed Dec. 15, 1925

4 Sheets-Sheet 1

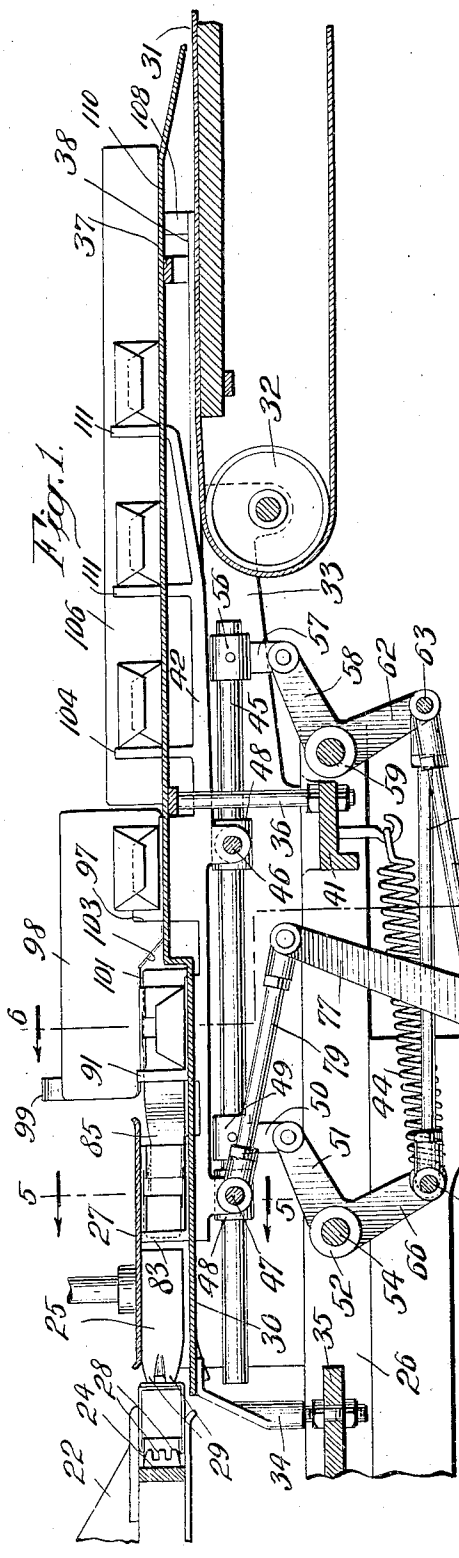


Fig. 1.

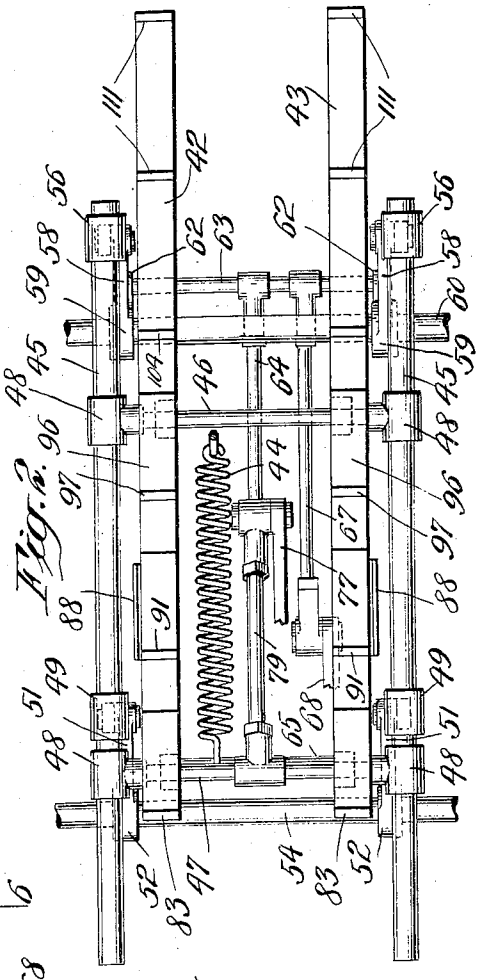


Fig. 2.

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Fig. 3.

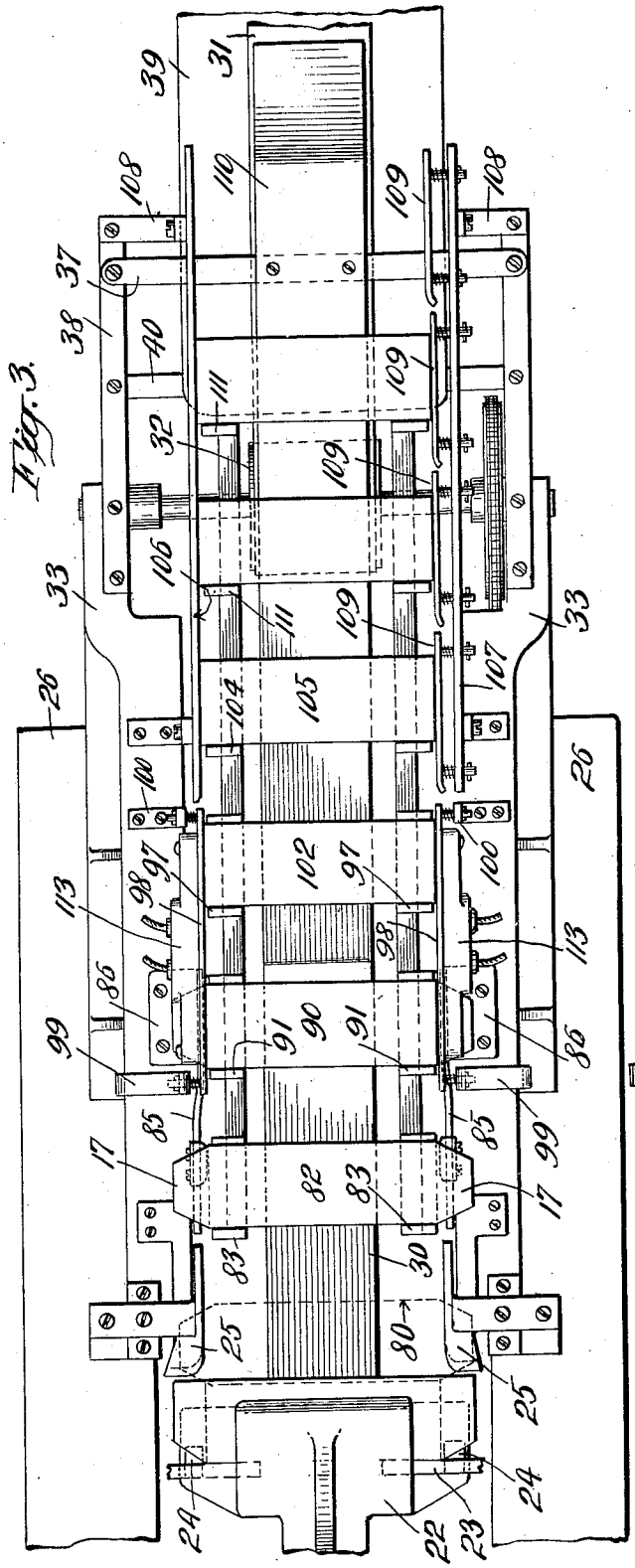
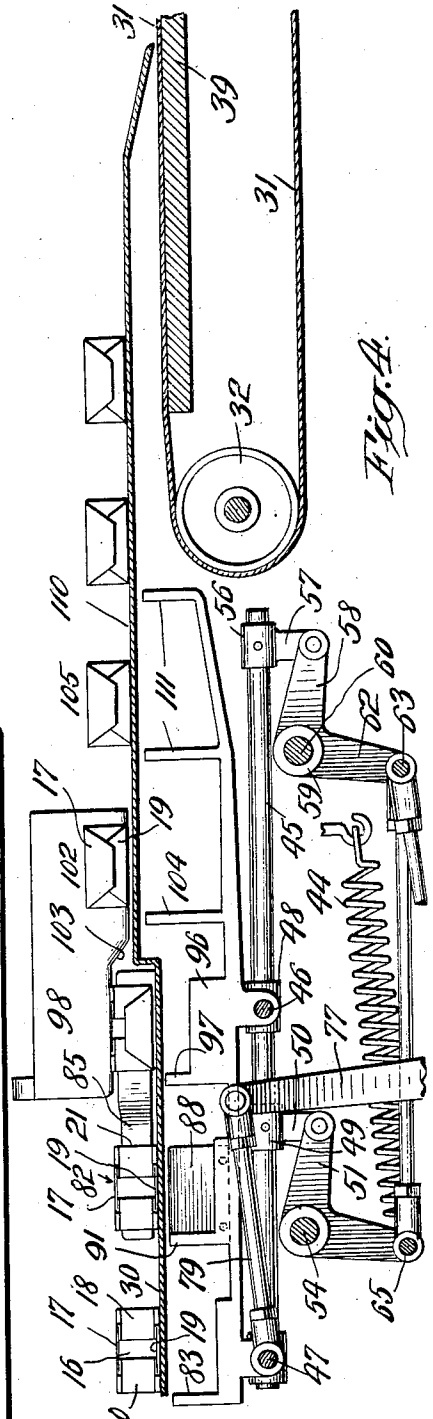


Fig. 4.



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Fig. 5.

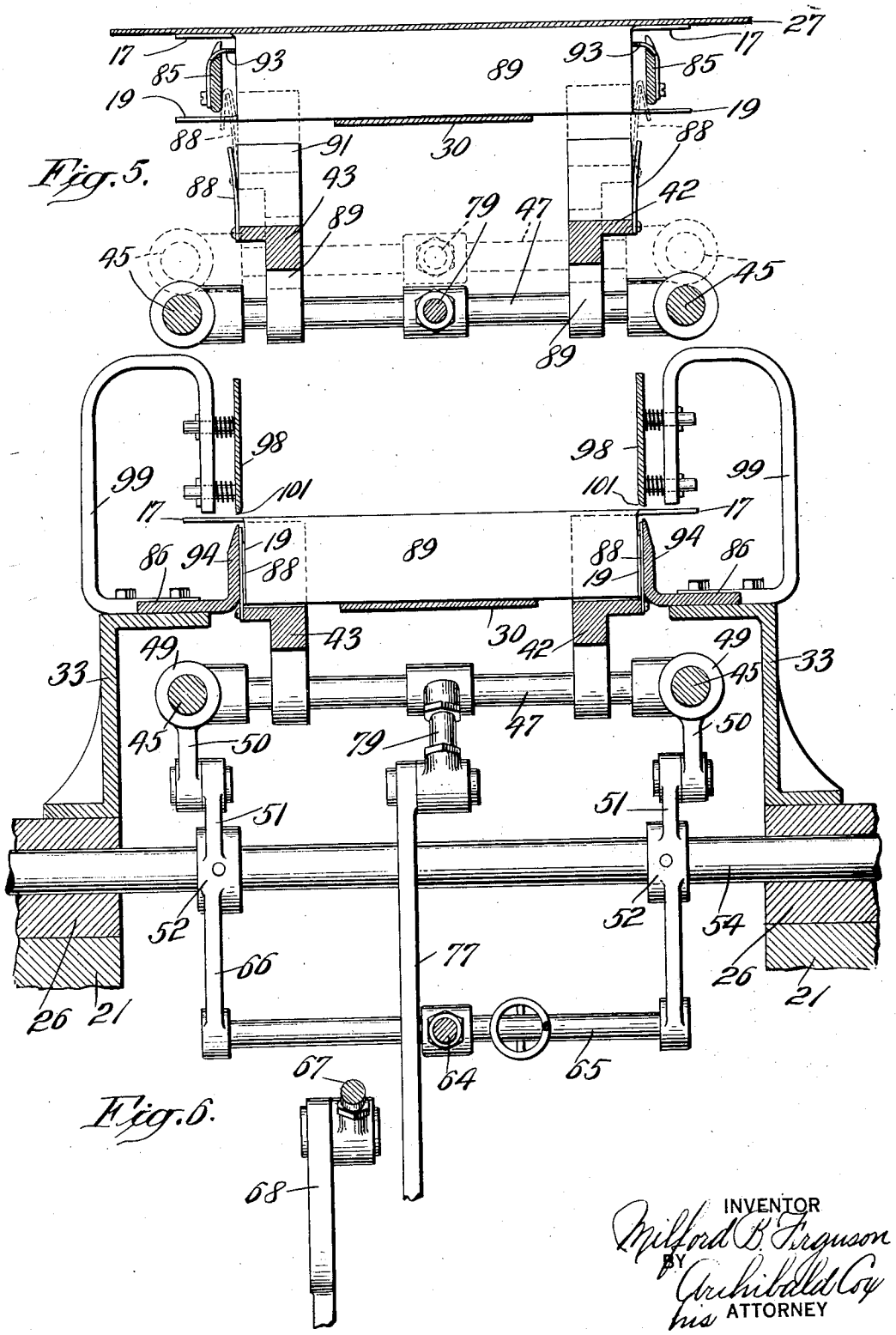


Fig. 6.

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Fig. 7.

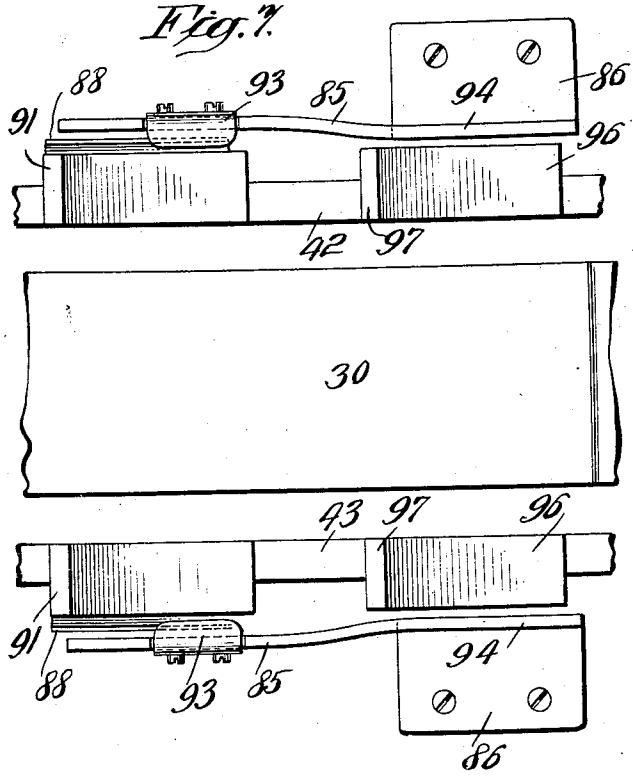


Fig. 9.

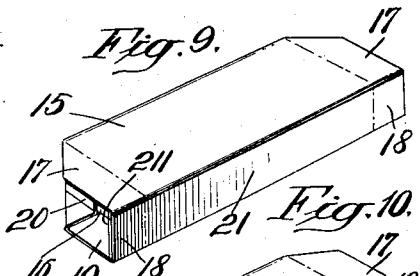


Fig. 10.

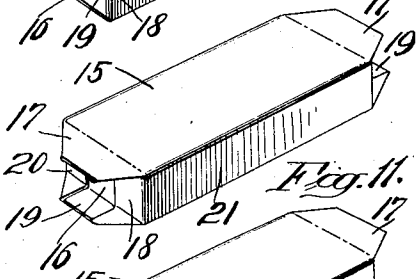


Fig. 11.

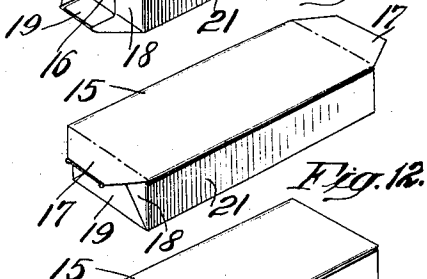
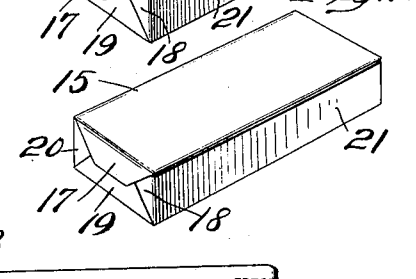


Fig. 12.



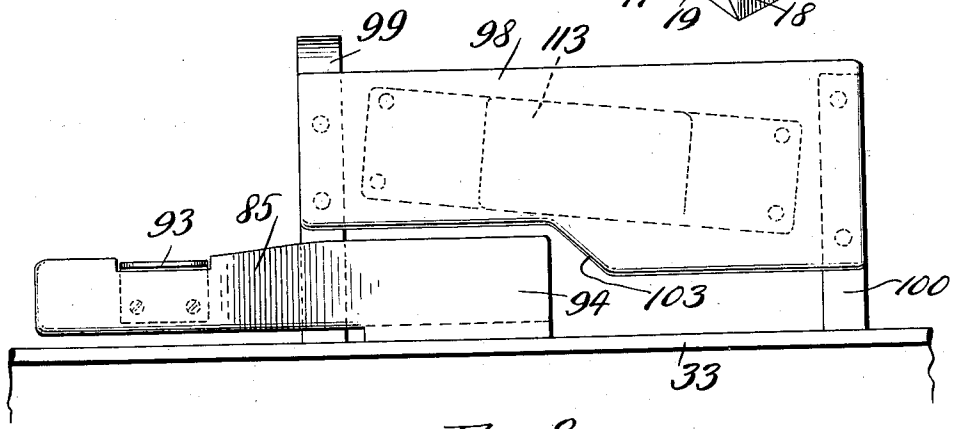


Fig. 8.

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UNITED STATES PATENT OFFICE.

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WRAPPING MACHINE.

Application filed December 15, 1925. Serial No. 75,498.

The invention relates to an improvement in wrapping machines and more particularly to devices for completing the wrapping of a partially wrapped article.

The devices of the present invention may be applied to and used in conjunction with wrapping machines of usual construction for wrapping elongated rectangular articles in which four separate and distinct folds are made in the ends of the wrapper. The wrapping machine to which the devices of the present invention may be applied is assumed to possess means for folding the wrapper about the article longitudinally, leaving the ends of the wrapper projecting longitudinally beyond the ends of the article. Each projecting end of the wrapper consists of four sides, each of which constitutes a flap or fold. The wrapping machine will also possess means for folding down two of these flaps, usually the two narrower flaps. The two wider end flaps usually overlap and hold in place the two narrower end flaps. The foregoing observations apply to articles which are oblong in cross-section. Of course if the articles are substantially square in cross-section all the end flaps, both the folded flaps and the projecting flaps will be substantially of the same size. In this case it is assumed than any two pairs of the flaps are folded, usually but not necessarily the side flaps. The devices of the present invention have to do more particularly with the folding down of the wider end or projecting end flaps.

The object of the present invention is to provide a wrapping machine with improved devices for folding down the last two end flaps of the article in such a way that the folds will be made tighter than has heretofore been possible, with the result that the wrapped article will present a smoother and neater appearance. To this end the invention consists in the improved wrapping machine hereinafter described and particularly pointed out in the appended claims.

In the accompanying drawings illustrating the preferred form of the invention, Fig. 1 is a side elevation, partly in section, of the delivery end of a wrapping machine showing the improvements of the present invention applied thereto; Fig. 2 is a plan, with parts broken away, of the transport mechanism; Fig. 3 is a top plan of the parts shown in Fig. 1; Fig. 4 is a side elevation, partly in section, similar to Fig. 1, but with certain parts broken away and the transport mechanism shown in a different position; Figs. 5 and 6 are sections, on an enlarged scale, taken along the lines 5—5 and 6—6, respectively, of Fig. 1; Fig. 7 is a plan, on an enlarged scale, of a portion of the transport mechanism and of the devices for making the bottom end folds; Fig. 8 is an inner side elevation of one of the devices for folding the two last end folds; and Figs. 9 to 12, inclusive, illustrate the various steps in making the end folds of the package.

In the drawings there is shown only so much of a wrapping machine of usual construction as is necessary to illustrate the application of the devices of the present invention thereto and their cooperation therewith. The wrapping machine is adapted to fold the wrapper longitudinally about an article and deliver it in the condition shown in Fig. 9, in which it is seen that the wrapper 15 is folded longitudinally about an elongated article 16, and that the end flaps 17, 18 and 19 of the wrapper extend longitudinally beyond the ends of the article 16. Each two end flaps 17, 18 and 19 are termed pairs of flaps. The other pair of flaps 20 (only one of which is shown) is turned down against the ends of the article while the latter is in the main folding devices of the wrapping machine, which are indicated by the portion 22 thereof shown at the left in Figs. 1 and 3. These folding devices are provided with two pusher members 23 of usual construction and operation having the forwardly projecting lugs 24 which serve to turn down the first folds 20 against the ends of the carton or other article.

The pushers 23 are actuated to eject the partially wrapped article from the jaws 22 and to shove it between the folder members 25 by which the second pair of end flaps 18 are folded down against the ends of the article. The folder members 25 are located at the entrance end of a runway through which are articles pass and are supported from the table members 26 resting on the frame 21 forming a part of the wrapping machine. The table members 26 project forwardly from the main body portion of the wrapping machine and support the devices of the present invention. The lugs 24 of the pushers 23 are notched at 28 to receive loosely the fingers 29 of the folders 25 so that

when the partially wrapped article is pushed forward between the folders 25 the folds 20 will be caught and held by the rear ends of the folders 25. This mode of operation is as usual in machines of this character. The article is now in the condition shown in Fig. 10.

The pushers 23 deliver the partially wrapped article between the folder members 25, as described above, and leave it there resting on the inner end of a platform 30 which supports the articles as they are subjected to the various operations by the devices of the present invention and the articles are then delivered from the machine onto an endless conveyor 31 the forward end of which passes over a pulley 32 journaled in brackets 33 projecting forwardly from the table members 26. A plate 27 supported from the frame of the machine is located above the platform 30 at the entrance of the runway to keep the longitudinal folds in place. The platform 30 is supported at its inner end by an adjustable bracket 34 secured to a plate 35 spanning the table members 26. The middle of the platform 30 is supported by the upright 36 and the outer end of the platform is supported by the cross-piece 37 resting on the arms 38 projecting forwardly from the brackets 33. The inner end of the conveyor 31 rests on a table 39, the inner end of which is supported by the cross-piece 40 secured to the arms 38.

The articles are advanced through the runway to complete the folding of the wrapper by means of a transport mechanism comprising the longitudinally extending arms 42 and 43 provided with pairs of upwardly projecting aligned fingers for engaging the articles. The arms 42 and 43 are slidingly supported on the longitudinally extending rods 45 by means of the cross-rods 46 and 47 the outer ends of which are provided with the heads 48 which loosely embrace the rods 45. The inner or left hand ends of the rods 45 are provided with the heads 49 the downwardly projecting lugs 50 of which are pivotally connected with the upper arms 51 of the bell-crank levers 52 fixed to the cross-rod 54 journaled at its opposite ends in the table members 26. The outer or right hand ends of the rods 45 are provided with the heads 56 of which the downwardly projecting lug parts 57 are pivotally connected with the upper arms 58 of the bell-cranks 59 secured to the rod 60 which is journaled at its ends in the table members 26 in the same manner in which the rod 54 is journaled therein.

The free ends of the lower arms 62 of the bell-cranks 59 are connected by a cross-rod 63 which is connected by the link 64 to a cross rod 65 connecting the lower arms 66 of the bell-cranks 52, so that the two bell-cranks will operate in unison. The bell-cranks 52 and 59 are oscillated to raise and lower the rods 45 by means of a link 67 secured to the arm 68 of a lever fulcrumed at 69 in the frame 21. The other arm 71 of the lever carries a cam roll 72 which travels in the cam path 73 of a cam 74 fixed on a transverse shaft 75 journaled in the frame 21 and actuated by the driving mechanism of the wrapping machine. The arm 68 is provided with an arcuate slot 70 so that the link 67 may be adjustably connected therewith to control the amount of rise and fall of the transport mechanism.

When the levers 52 and 59 have been actuated to raise the rods 45, the transport members 42 and 43 are moved outwardly from the wrapping machine (to the right, viewing Fig. 1) to advance the articles one step in their progress through the runway. When the levers 52 and 59 have been actuated to lower the rods 45, the transport members 42 and 43 are moved inwardly or toward the wrapping machine to place them in position for the next step in the advancement of the articles through the runway. For this purpose a lever 77, mounted on a rod 69 spanning the frame 27 and actuated from the cam 78 fixed on the shaft 75, is connected by means of the link 79 with the transverse rod 47 which connects the inner ends of the transport pieces 42 and 43.

In order to relieve the cam 74 of the burden of lifting the transport mechanism a spring 44 is provided, connected at one end to the cross-rod 65 and at the other end to a hook secured in a cross-piece 41 spanning the outer ends of the table members 26. This spring is so arranged as to exert its tension to lift the transport mechanism, the spring being expanded by the weight of the transport mechanism as it descends under the action of gravity aided by the cam 74.

The first position of the partially wrapped article (shown in Fig. 10) is indicated by the dotted lines 80 in Fig. 3 which corresponds to the article 16 in Fig. 4. The pushers 23 deliver the article to this position thereby completing the folding down of the second pair of end flaps 18 (as described above), leaving the article resting on the inner end of the platform 30. The article with its two pairs of wider flaps 17 and 19 projecting longitudinally from the ends of the article is advanced from this position to the next position, indicated at 82 in Figs. 3 and 4, by the first pair of fingers 83 of the transport mechanism. In traveling from its first to its second position nothing occurs to the end flaps 17 and 19 of the article. The article simply passes into position between the folder arms 85 extending inwardly or rearwardly from their bases 86 resting on the brackets 33. The folder arms 85 are so located that the bottom flaps 19 pass under

them, whereas the upper flaps 17 pass over them, as will be clearly understood from a consideration of Figs. 3 and 4. By further reference to Fig. 3 it will be seen that the transport members 42 and 43 are arranged outside the lateral edges of the platform 30 so that the pairs of aligned fingers which project upwardly from the transport members are free to advance the articles through the runway.

While the article is in this second position the bottom end flaps 19 are folded up against the ends of the article, overlapping the first folds 18 and 20. This is done by means of the folder blades 88 secured to the raised portions 89 on the transport members and arranged to pass upwardly between the ends of the article and the inner adjacent sides of the folder arms 85. The folder blades 88 are arranged parallelly with the folder arms 85 and are so located that when the transport mechanism rises they will pass upwardly in close proximity to the folder arms 85, as indicated in Fig. 5. By reference to this figure it will be seen that when the folder blades 88 move upwardly to fold the bottom end flaps 19 against the ends of the article, the flaps 19 will be pushed against the lower edges of the folder arms 85 which will thereby exert a drag or friction upon the ends of the flaps as the folder blades 88 are pushing them up into place against the ends of the article indicated at 89. This mode of operation causes the wrapper to be drawn tight against the under surface of the article and against the ends thereof. The action of the folder blades 88 in folding the flaps 19 against the ends of the article is indicated in dotted lines in Fig. 5, where it is clearly shown how the folder arms 85 exert a drag on the outer ends of the flaps 19 during the folding operation. To clear the bottom end corners of the articles the blades 88 flare outwardly slightly.

The folding of the bottom flaps 19 against the ends of the article takes place as the transport mechanism is rising to position to place the transport fingers to the rear of the articles preliminary to advancing them another step through the runway. During the folding of the flaps 19 while the article is in the position 82 the end folds 18 are held tight against the ends of the articles by means of the spring fingers 93 secured to the outer surfaces of the folder arms 85 and projecting inwardly therefrom, as clearly indicated in Figs. 5 and 7. Holding the end folds 18 against the ends of the package by the spring fingers 93 prevents the longitudinal side fold 21 from separating from the package as the bottom flaps 19 are folded into place. If the side fold 21 is permitted to separate even slightly from the package during the folding of the flaps 19, there will be a gap between the fold 21 and the underlying side fold 211 (Fig. 9) in the wrapper. The fingers 93 also serve to center the packages between the folder arms 85.

It will be observed by reference to Fig. 7 that the inner or left hand ends of the arms 85 are spaced farther apart than the outer or right hand ends 94 thereof. The reason for this is to permit the outwardly flaring folder blades 88 to pass upwardly between the inner ends of the arms 85 into position folding the flaps 19 loosely against the ends of the article and then by means of the contracted space between the ends 94 to force the blades 88 inwardly thereby pressing the flaps 19 tightly against the article so that they will snugly lie thereagainst during the folding of the upper flaps 17 over the flaps 19. On the completion of the folding of the flaps 19 the article is in the condition shown in Fig. 11. It is then advanced to its third position 90 between the contracted outer ends 94 of the folder arms 85 by means of the second pair of fingers 91. While the article passes from position 82 to position 90 no action takes place other than the pressing of the folds 19 tightly against the ends of the article.

On the third rise or upward motion of the transport mechanism the base part 96 of the third pair of fingers 97 encounters the under surfaces of the article and push the article up between the folder plates 98 yieldingly supported at their inner ends by the goose-neck brackets 99 rising from the brackets 33 and yieldingly supported at their outer ends by the brackets 100 also mounted on the brackets 33. These folder plates 98 are arranged parallelly with the folder arms 88 and the inner ends thereof are located above the outer ends 94 of the folder arms 85. The lower edges 101 of the inner ends of the folder plates 98 are spaced from the upper edges of the rear ends 94 of the folder arms 85 so as to permit the upper flaps 17 to pass therebetween. As a result of this construction, when the bases 96 of the third pair of fingers 97 push the article upwardly between the forward end of the folder plates 98, the upper flaps 17 are turned down against the ends of the article, overlapping the bottom flaps or folds 19. The article is now completely wrapped, as shown in Fig. 12.

On the next forward movement of the transport mechanism after the article has been pushed up between the inner ends of the folder plates 98, the third pair of fingers carry the article to its fourth position indicated at 102 in Figs. 3 and 4. Although the upward movement of the article between the inner ends of the folder plates 98 serves usually to complete the folding of the article, it happens at times that an extra long wrapper may be used, the ends of which are not completely folded down against the

ends of the article by the upward movement of the article between the folder plates. In such case, as the article passes from its position between the inner ends of the folder plates 98 to its position between the outer ends of the plates 98, the outwardly extending part of the end flaps 17 encounter the oblique portion 103 of the under edges of the outer ends of the folder plates 98 and are thereby folded down against the under folds 19.

While the article is traveling from its third position 90 to its fourth position 102, it rests on the base portions 96 of the third pair of fingers 97. When the fingers 97 become disengaged from the article by reason of the downward and rearward movement of the transport mechanism, the article is held between the outer ends of the folder plates 98, as shown in Fig. 4. On the next upward and forward movement of the transport mechanism, the fourth pair of fingers 104 will engage and push the article forward to its fifth position 105 between the inner ends of the plates 106 and 107 which are supported at their inner ends from the brackets 33 and at their outer ends by the angle irons 108 mounted on the outer ends of the arms 38. The plate 107 is provided with the yieldingly mounted sections 109 which engage with the ends of the articles. When the articles pass out from between the outer ends of the folder plates 98 they drop down onto the raised portion 110 of the platform 30. They are thence delivered by the last two pairs of fingers 111 onto the receiving end of the conveyor 31, the wrapped articles accumulating on the discharge end of the platform being pushed off one at a time.

The devices of the present invention are particularly adapted for wrapping the outside wrapper, which is usually of paraffined paper, about a box or carton. In order that the wrapper may stay in its folded condition completely enclosing the box or carton and hermetically sealing it, it is customary to heat portions of the folding devices so as to cause the paraffin of the overlapping folds to melt and run together, and thereby seal and hold the folds. In the drawing accompanying the present application I show heating devices for heating the end folds only. These devices are indicated at 113 in Fig. 3 and are shown attached to the outer surfaces of the folder plates 98. While the wrapped and sealed articles are passing between the plates 106 and 107, the paraffin becomes cold enough to set, so that the wrapper will be held folded about the carton or other article.

Having thus described the invention what I claim as new is:—

1. A machine for wrapping articles comprising, means for receiving a partially wrapped article having the two wider end flaps projecting longitudinally from the article, two stationary members spaced from the ends of the article and adapted to engage the inner surfaces of one pair of flaps, means arranged to move between the ends of the article and the members to fold the flaps against the article, the members serving to exert a drag on the flaps as they are folded against the article, and means for folding the other flaps against the ends of the article.

2. A machine for wrapping articles comprising, a runway for receiving a partially wrapped article having the two wider end flaps projecting longitudinally from the article, a transport mechanism arranged to reciprocate vertically and longitudinally for intermittently advancing the article through the runway, two stationary members located at the first station to which the transport mechanism carries the article, two folder blades secured to the transport mechanism and arranged to pass between the members and the ends of the article to fold one pair of the flaps against the ends of the article, and means for folding the other flaps against the article.

3. A machine for wrapping articles and the like comprising, a runway for receiving a partially wrapped article having two pairs of end flaps projecting longitudinally from the ends of the article, a transport mechanism arranged to reciprocate longitudinally and vertically for intermittently advancing the article through the runway, a stationary member located at each side of the runway and under which the lower flap of the adjacent end of the article passes, folder blades secured to the transport mechanism and arranged to pass between the members and the ends of the article to fold the lower flaps against the ends of the article, the members serving to exert a drag on the flaps, and means for folding the upper end flaps against the article.

4. A machine for wrapping articles comprising, means for receiving a partially wrapped article having two pairs of end flaps projecting longitudinally from the article, two stationary members spaced apart from the ends of the article and located over the lower pair of flaps, means for passing between the stationary members and the adjacent ends of the article to fold the bottom flaps against the ends of the article, and means for folding the other pair of flaps against the ends of the article.

5. A machine for wrapping articles comprising, means for receiving a partially wrapped article having an end flap projecting laterally beyond one end of the article, a member spaced from the end of the article and located adjacent the inner surface of the flap, and means adapted to pass between

the end of the article and the member to fold the flap against the end of the article, the member serving to exert a drag on the flap as it is folded against the end of the article.

6. A machine for wrapping articles comprising, means for receiving a partially wrapped article having two end flaps projecting longitudinally from each end of the article and two end flaps folded against each end of the article, two members spaced from the ends of the article and arranged to engage with the inner surface of one pair of projecting flaps at a point relatively near the ends of the article, means for engaging the outer surfaces of the pair of flaps at a point between the members and the ends of the article to fold the pair of flaps against the ends of the article, and means for folding the other pair of flaps against the ends of the article.

7. A machine for wrapping articles comprising, a runway for receiving a partially wrapped article with the two wider end flaps projecting longitudinally from the top and bottom of the article, a pair of folder arms located in the runway between which the article is adapted to pass with the bottom pair of flaps extending under the folder arms and the upper pair of flaps extending above the folder arms, a spring finger connected with each inner end of the folder arms and projecting toward the ends of the article to engage with one of the pairs of narrow end folds, thereby centering the article between the folder arms, means for folding the lower pair of flaps against the article, and means for folding the upper pair of flaps over the lower pair.

8. A machine for wrapping articles comprising, a runway for receiving a partially wrapped article having upper and lower end flaps projecting longitudinally from the article, a pair of folder arms located in the runway, the lower pair of flaps passing under the arms and the upper pair of flaps passing above the arms, the inner ends of said arms being spaced apart wider than the outer ends of said arms, a pair of folder blades adapted to pass upwardly between the arms for folding the lower pair of flaps against the ends of the article, means for advancing the article while the folder blades are against the lower pair of flaps between the outer ends of the folder arms to thereby press the lower pair of flaps tightly against the ends of the article, and means for folding the upper pair of flaps over the lower pair.

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