E. L. SMITH.

WRAPPING MACHINE.

APPLICATION FILED FEB. 5, 1918.

1,287,124.

Patented Dec. 10, 1918.

4 SHEETS—SHEET 1.

Fig. 1.

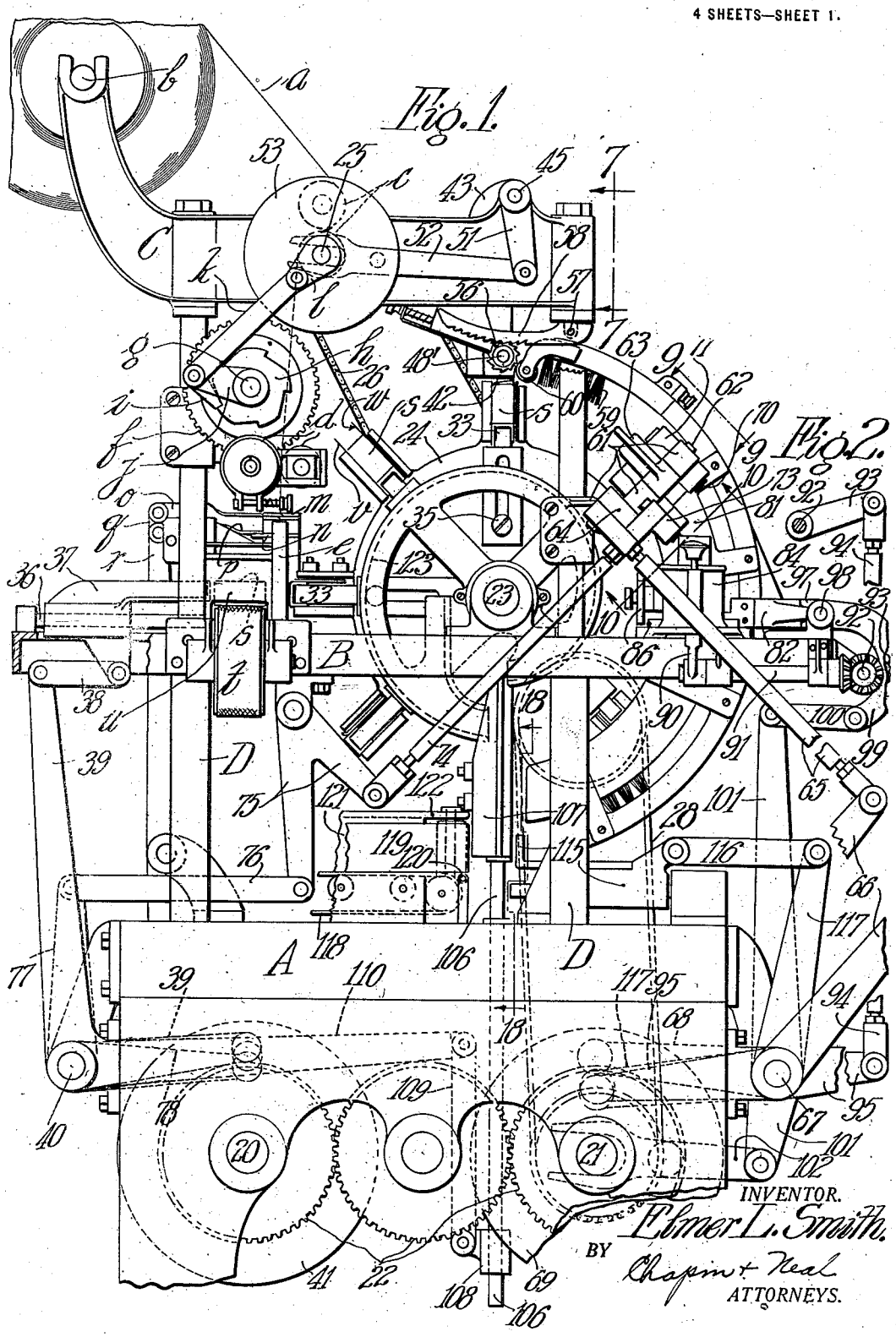


Fig. 2.

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4 SHEETS—SHEET 2.

Fig. 4.

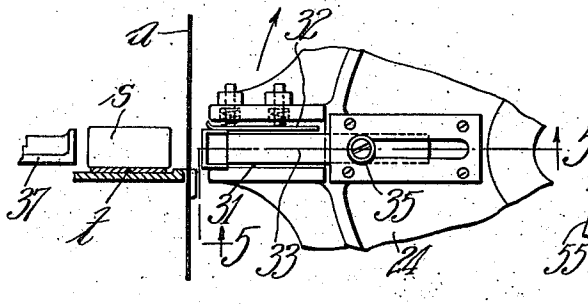


Fig. 6.

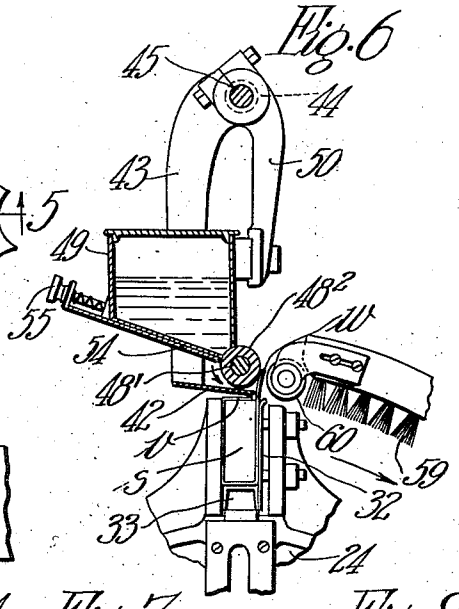


Fig. 5.

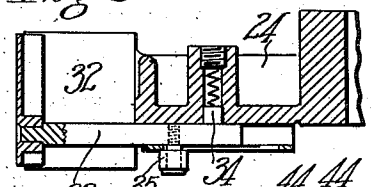


Fig. 11.

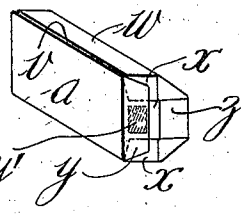


Fig. 7.

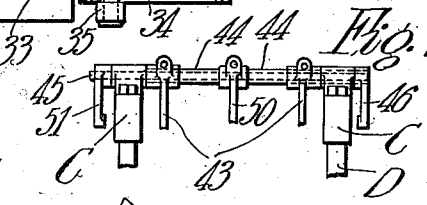


Fig. 8.

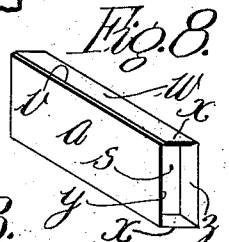
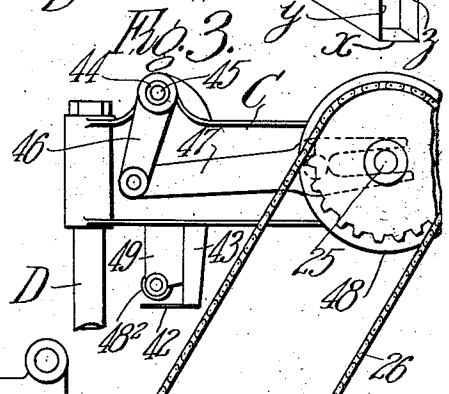


Fig. 12.

Fig. 3.



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4 SHEETS—SHEET 3.

Fig. 9.

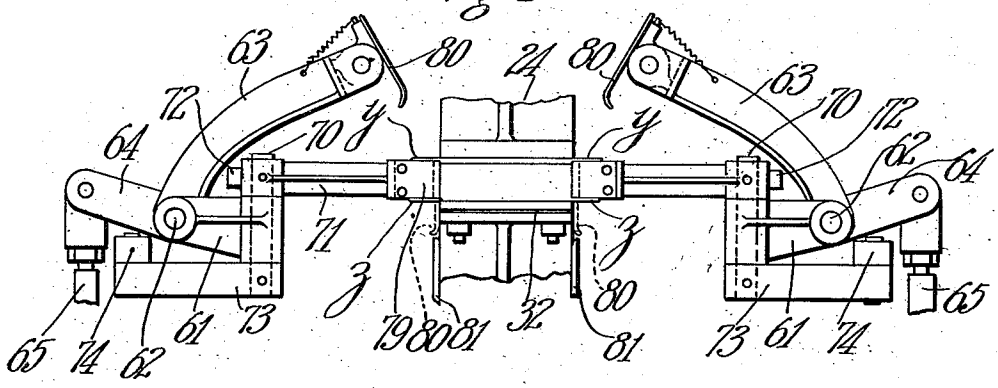


Fig. 10.

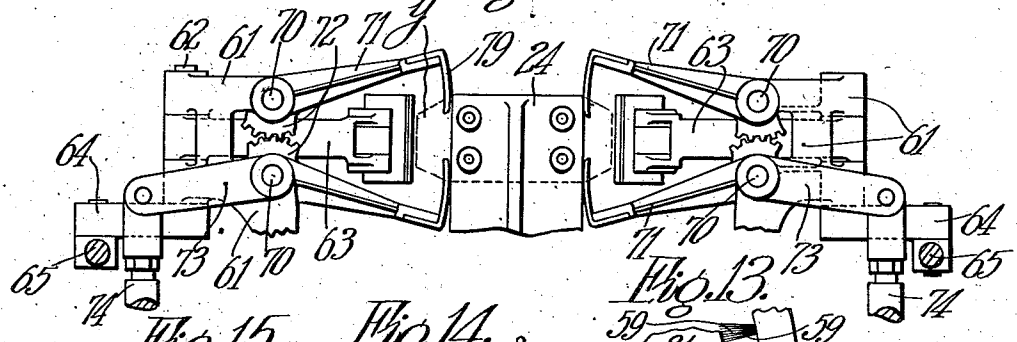


Fig. 15.

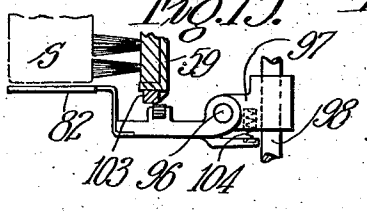


Fig. 14.

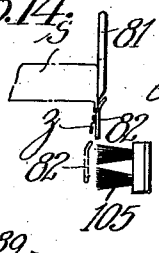


Fig. 13.

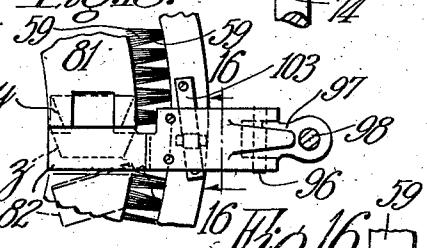


Fig. 16.

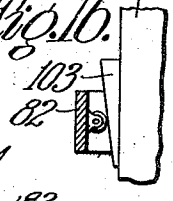


Fig. 17.

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4 SHEETS—SHEET 4.

Fig. 19.

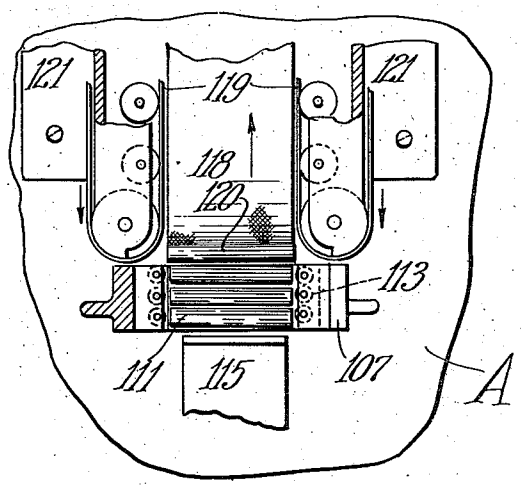
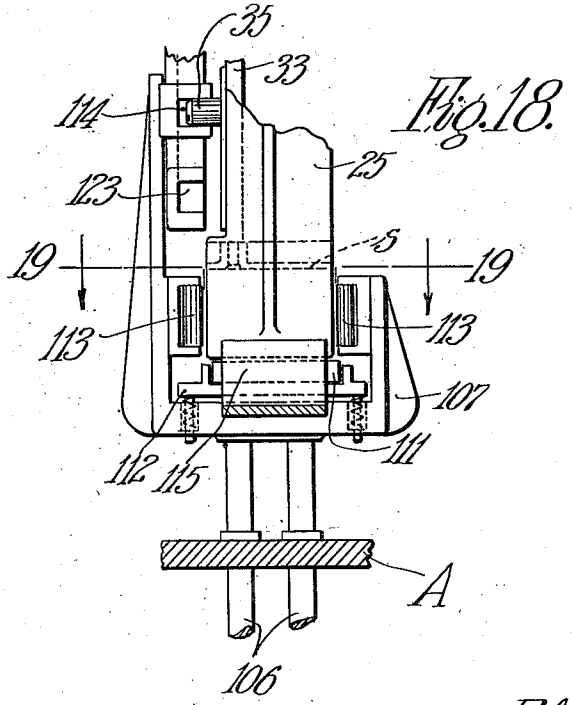


Fig. 18.



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UNITED STATES PATENT OFFICE.

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WRAPPING-MACHINE.

1,287,124. Specification of Letters Patent. Patented Dec. 10, 1918.

Application filed February 5, 1918. Serial No. 215,485.

To all whom it may concern:

Be it known that I, ELMER L. SMITH, of the city of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Wrapping-Machines, of which the following is a specification.

This invention relates to improvements in wrapping machines, and more particularly to machines wherein articles may be entirely inclosed in a sealed wrapper.

According to one feature of the invention, the wrapping of the articles is entirely accomplished while the articles are held in a single intermittently-movable turret, and the folds of the several overlapping seams in the wrapper are sealed by the application of adhesive to the wrapper, while the articles are in the turret and just prior to the overlapping of one fold of the seam upon the other.

According to another feature of the invention, means are provided to protect and cover one each of the several pairs of wrapper extensions, which are to be laid in overlapping relation against the article, while adhesive is being applied to the other extension of each pair, characterized in that the adhesive is confined entirely to the one wrapper extension where it is needed and is prevented from gumming moving parts of the machine.

According to another feature of the invention, the articles are positioned for wrapping in an intermittently-movable carrier so as to leave two wrapper extensions, which are to be laid in overlapping relation against one face of the article, and a folding device is provided to fold both of said extensions in the same direction and into the same plane, so that adhesive may be applied to one extension while the other thereof is positioned as far as possible therefrom.

According to a further feature of the invention, a blade is provided to assist in the wrapping operations and is mounted to move along one face of one fold and return to its original position along the opposite face of the same fold.

According to another feature of the invention, the articles, while held by a suitable carrier, are inclosed by a wrapper having gummed overlapped seams along one side and both ends of the articles, and ejecting means are provided, which confine both ends and sides of the articles and hold the several seams from opening during the removal of the articles from the carrier.

Other features and advantages will appear in the following description and in the illustrative embodiment of the invention in the accompanying drawings, in which:

Figure 1 is a front elevational view of the machine, certain parts being broken away;

Fig. 2 is a detail elevational view of parts shown as broken away in Fig. 1;

Fig. 3 is a fragmentary rear elevational view of the machine, illustrating in diagrammatical form certain driving connections of the machine;

Fig. 4 is an enlarged fragmentary elevational view of the turret, illustrative of the first stage in the wrapping operations;

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 4;

Fig. 6 is an enlarged fragmentary elevational view of the turret and the mechanism associated therewith for effecting the second stage in the wrapping operations;

Fig. 7 is a fragmentary end elevational view taken on the line 7—7 of Fig. 1;

Fig. 8 is a perspective view showing the wrapped article as it appears after the second stage in the wrapping operation;

Figs. 9 and 10 are enlarged fragmentary views taken on the lines 9—9 and 10—10, respectively, of Fig. 1 and illustrate the mechanism for the third stage in the wrapping operations;

Fig. 11 is a perspective view showing the wrapped article as it appears at the end of the third stage in the wrapping operations;

Fig. 12 is an enlarged elevational view of mechanism associated with the turret and functioning in the third, fourth and fifth stages in the wrapping operations;

Fig. 13 is an elevational view of the folding mechanism operable during the fourth stage in the wrapping operation;

Fig. 14 is an elevational view of the left-hand end of the mechanism shown in Fig. 13;

Fig. 15 is a sectional plan view thereof;

Fig. 16 is a cross-sectional view taken on the line 16—16 of Fig. 13;

Fig. 17 is an end elevational view, partly in section, of the gumming mechanism asso-

ciated with the fourth stage of the wrapping operations;

Fig. 18 is an enlarged cross-sectional view taken on the line 18—18 of Fig. 1 and illustrative of the ejector mechanism; and

Fig. 19 is a sectional plan view taken on the line 19—19 of Fig. 18 and illustrative of the delivery apparatus.

The machine, in general, comprises a turret or tumble-box, which is movable step by step; means to feed wrappers and articles to be wrapped to the turret; wrapping mechanism arranged adjacent the turret's path to completely wrap the articles while in the turret; means to eject wrapped articles from the turret; and a delivery apparatus to receive and convey the wrapped articles. The wrapping of the articles, which, as mentioned, is performed entirely while the articles are in the turret, is accomplished largely during the intervals of rest of the turret. The description of the machine can therefore be best accomplished by considering the several stages in the operation of the machine, of which stages there are five, the first and last involving the feeding and ejection of the articles to and from the turret, respectively. The other three stages deal entirely with the wrapping of the articles; and the feeding of the articles, performed in the first stage of operation, also has a function in the wrapping. Although the wrapping is accomplished largely during intervals of rest of the turret, there are certain wrapping operations which are performed during the movement of the turret in what may be considered transition stages between the main stages of operation or periods of rest of the turret.

The general frame structure and main driving connections of the machine will first be described. Referring to Fig. 1, A represents a bed plate which may be suitably supported from the floor and which supports by means of columns D a table B and frame C, both in spaced parallel relation with the bed plate. Suitably supported from and below the latter are two spaced parallel shafts 20 and 21, upon which nearly all the operating cams are mounted. Shaft 20 is the main shaft of the machine and may be driven from any suitable source of power. Shaft 21 is driven from shaft 20 by the gear train 22. Mounted on the table B and parallel with shafts 20 and 21, is a horizontal shaft 23 to which is suitably fixed a turret or tumble-box 24. Above the turret and supported in frame C is a cam shaft 25, also arranged parallel with the main driving shaft 20. Referring to Fig. 3, the shaft 25 is driven by a chain 26, and suitable sprockets, from a stub shaft 27 which is supported from and below table B. Shaft 27 is adapted to be driven by a chain 28, and suitable sprockets, from the cam shaft 21 described. The turret shaft 23 has fixed thereto a "Geneva" cam 29, which is adapted to be moved intermittently by a driving crank 30 fixed on the shaft 27.

The wrapping turret 24 will now be described with particular reference to Figs. 4 and 5. The turret consists merely of a wheel having a plurality (eight in this instance) of pockets 31 in its periphery. Each pocket 31 has a yieldable side wall which consists of a plate 32 spring pressed toward the opposite side wall of the pocket. Each of the latter also has a movable bottom wall, which consists of a plunger 33 mounted to move radially of the turret in suitable guides, as clearly shown in Figs. 4 and 5. Plunger 33 is held frictionally in the various positions to which it may be moved by a spring-pressed plug 34 mounted in a recess in the turret and arranged to engage one face of the plunger, as shown in Fig. 4. On the opposite face of the plunger is a roll 35, by means of which the plunger may be moved in a manner to be described. As each pocket 31 is moved into article-receiving position, the plunger 33 therein is positioned, as in Fig. 4, with its outer face substantially flush with the outer edges of the pocket. The plunger is movable inwardly by the feeding of the articles thereto, leaving a pocket to receive an article and its wrapper so that the latter may be applied to one side and both ends of the articles, in a manner to be described.

The wrapper-feeding mechanism will be briefly described with reference to Fig. 1. Any suitable mechanism may be employed for this purpose, and that shown in the drawings is merely for illustrative purposes, the invention being independent of the particular type of feeding mechanism. A supply of wrapping material *a* in continuous strip form is supported in a roll on arbor *b* from frame C. The strip *a* passes between guide rolls *c*, supported from frame C, downwardly and between a pair of feed rolls *d* and thence through a suitable strip guide *e* to the position shown in Fig. 4. One of the feed rolls *d* is driven from a gear *f* rotatably mounted on a shaft *g*. Secured to gear *f* is a ratchet wheel *h*, which may be intermittently driven by a pawl *i* mounted in an end of an arm *j* which, in turn, is loosely mounted on shaft *g*. Arm *j* is connected by a link *k* to a crank *l* which is fixed on one end of the shaft 25 heretofore described. It will thus be seen that a measured length of strip *a* may be periodically fed in front of a pocket 31 when the latter is in article-receiving position. Means are provided to sever the measured length of strip from the supply, as shears *m*, and means are provided to yieldingly hold the severed strip suspended in the position illustrated in Fig. 4, as a clamping lever *n*. The

latter and shears *m* have been indicated merely in conventional form, as they are too well known in the art to require extended description here. Shears *m* and lever *n* are connected by links *o* and *p* to levers *q* and *r*, respectively, which levers are pivoted intermediate their ends to bed A and are adapted to be operated at properly timed intervals from suitable cams (not shown) mounted on the described shaft 20.

The articles *s* to be wrapped, as sacks of tobacco or like articles of generally rectangular shape, are supplied to the machine on the belt *t* (Figs. 1 and 4), the upper lap of which travels horizontally in the plane of the lower side wall of the wrapping pocket 31 when the latter is in article-receiving position. The belt *t* may be continuously driven by any suitable means (not shown), and the articles *s* are prevented from traveling with the belt beyond a predetermined point by a stop-plate *u* (see Fig. 1). Each article *s* when engaged with plate *u* is properly alined for insertion in pocket 31 and lies on the opposite side of the wrapper *a* from the pocket, as shown in Fig. 4.

The means for transferring articles *s* from belt *t* into the pockets 31 will now be described, and the feeding of the articles into the turret pockets constitutes the first stage in the operation of the machine. Referring to Fig. 1, slidably mounted on a horizontal guide 36 is a plunger 37, which is connected by a link 38 to one arm of a bell-crank lever 39. The latter is loosely mounted on a rod 40 rotatably supported from bed plate A. The other arm of lever 39 bears a suitable roll to ride in a path-cam 41 fixed on the described shaft 20. Cam 41 is so constructed as to normally hold plunger 37 in the retracted position illustrated, and to advance the plunger and thereafter quickly retract it just prior to movement of the turret.

The plunger 37 alines with the plunger 33 of that wrapping pocket 31 which is in article-receiving position, and after the wrapper *a* has been fed into the position illustrated in Fig. 4, the plunger advances, engages and moves the article *s* and carries it and the wrapper against the plunger 33. As the plunger 37 continues to advance, the plunger 33 is moved radially inwardly in the turret against the resistance of the spring-pressed plug 34. The article *s* is thus carried into the turret pocket while held between two plungers, and thus the wrapper *a* is held in fixed position with relation to the article during the insertion of the latter into the wrapping pocket. The article *s* and the folded wrapper are held in the pocket by the yieldable wall 32. In the first stage of the turret, the wrapper then is laid around the bottom and both sides of the article, leaving extensions *v* and *w* of the wrapper beyond the top of the article (Fig. 1) and extensions beyond both ends of the articles, as will appear.

The second stage in the wrapping will now be described with particular reference to Figs. 1 and 6. This stage involves the laying down of the wrapper extension *v*, together with the gumming of the extension *w* preparatory to folding, and these operations are accomplished in the second position of the turret from article-receiving position. The extension *v* is laid down by a folding blade 42 fixed to the ends of two spaced arms 43 (see also Fig. 7). Each arm 43 is clamped to a short sleeve 44 loosely mounted on a shaft 45 which is rotatably supported from frame C. One sleeve 44 (that to the left in Fig. 7) has no function except as a bearing for its lever 43. The other sleeve 44 (that to the right in Fig. 7) extends beyond frame C and has fixed thereto a lever 46. The latter is pivotally connected to one end of an arm 47 (Fig. 3), and the other end of the arm is forked to engage the described shaft 25 as a guide. A suitable roll is provided on arm 47 to ride in a path-cam 48 fixed on the shaft 25. Cam 48 is constructed to move blade 42 into the position illustrated in Fig. 6 shortly after the turret has come to rest and thereafter to hold it thus positioned, until the turret commences its next step of movement. The cam 48 is also designed to move blade 42 in unison with the turret, for a short distance, for a reason to appear, and thereafter to retract the blade sufficiently to permit the wrapper extensions *v* and *w* on a succeeding article to pass freely into the position shown in Fig. 6. The blade 42 therefore lays extension *v* flat against the article *s* and holds it so positioned during the performance of other operations to be described.

One of such operations consists in the application of a suitable adhesive to the wrapper extension *w* so that the latter may be held to extension *v* when subsequently folded thereupon in overlapping relation. This operation is accomplished by a roll 48^2 (Fig. 6) fixed on a shaft 48′ rotatably supported in the walls of a glue box 49 which, in turn, is removably connected to one end of a lever 50. The latter is fixed to the described shaft 45 intermediate the ends of the latter and between the adjacent ends of the two sleeves 44 described, as indicated in Fig. 7. Fixed to that end of shaft 45 opposite from lever 46 is a lever 51 (Figs. 1 and 7) which is pivotally connected to one end of an arm 52, and the other end of the latter is forked to engage the described shaft 25 for guiding purposes. A suitable roll on arm 52 is arranged to ride in a path-cam 53 fixed on the shaft 25. Cam 53 is constructed to swing roll 48^2 into the position illustrated in Fig. 6 shortly after the blade 42 has

come to rest in the position shown and to thereafter retract the roll sufficiently to permit the extensions v and w of the wrapper on a succeeding article s to freely pass thereinunder.

The roll 48^2 is arranged to close an opening in the lower right-hand corner of the glue box 49, and the lower wall of the latter is inclined toward the roll to cause the adhesive in the box to flow thereto. A scraper 54 is slidably mounted on the lower wall of the glue box and is adjustable to and from roll 48^2 by a screw 55 to regulate the thickness of the film of adhesive formed on the roll. The latter is turned in the direction of the arrow shown in Fig. 6, as the roll advances toward extension w, and is held stationary during the return movement of the roll. To accomplish this result, a ratchet wheel 56 (Fig. 1) is fixed to one end of the shaft $48'$ and, above the ratchet and connected at 57 to frame C for a limited degree of pivotal movement, is a curved bar 58 which has ratchet teeth to engage wheel 56. On a swinging movement of lever 50 in a counterclockwise direction, roll 48^2 will be turned in a like direction, but on the return movement of lever 50 the teeth on ratchet 56 cam the bar 58 upwardly without turning roll 48^2. The latter, as lever 50 is swung in a counterclockwise direction, engages the upstanding wrapper extension w closely adjacent the top thereof and applies a line of adhesive thereto.

The devices operable during the transition of the article from the second to the third stages comprise an arcuate brush 59 and a roll 60. The brush 59, as indicated in Fig. 1, is substantially semi-circular and encompasses the periphery of turret 25 from the third to the seventh positions thereof. In the drawings, bristles have been shown adjacent the upper and lower ends of the brush only, but it is to be understood that there are other bristles which completely fill the space between those illustrated. The brush is suitably supported, as indicated in Figs. 1 and 12, from the bed A and table B and is preferably made in a plurality of sections for convenient removal. The roll 60 is pivotally mounted on the upper end of the brush and is arranged to engage extension w, on movement of the turret, just in advance of the brush. The roll 60 effectively rolls down the extension w upon the extension v in overlapping relation, immediately on movement of the turret, and the blade 42, which, as described, moves in unison with the turret for a short distance, holds the extension v flat against the article s until the extension w has been laid down upon it. The brush 59 functions to hold the folded extensions in overlapping relation during the transition between the second and third stages and until the wrapped article has been ejected from the turret.

As the turret comes to rest in its next position, the article s is inclosed except for upper and lower end extensions x and other and longer extensions y and z, as shown in Fig. 8. The article and its wrapper are now in readiness for the third stage of operation, which will now be described with particular reference to Figs. 9 and 10. The mechanism operable during the third stage is, as indicated in Figs. 9 and 10, provided in duplicate sets, to operate on the tubular end extensions of the wrapper at both ends of the article s. A description of one set will therefore suffice for both.

Referring to Figs. 9 and 10, all the folding mechanism there shown is supported on a bracket 61 which, as indicated in Fig. 1, is clamped to one of the columns D described. The bracket 61, as best shown in Fig. 10, comprises two spaced arms connected intermediate their ends by a suitable and integral web portion. One end of each arm of bracket 61 rotatably supports one end of a short shaft 62, and fixed to the latter and between the arms is a lever 63. On one end of shaft 62, a lever 64 is secured and the latter is connected (see Fig. 1) by a link 65 to a lever 66, which is fixed to a shaft 67 rotatably supported in bearings attached to bed A. The link 65 and lever 66 have been shown in Fig. 1 as broken off on account of space limitations. The lever 63 of the set of mechanism on the opposite side of turret 24 has, as shown in Figs. 9 and 10, similar operating connections, so that there are two of the levers 66 secured to shaft 67 in spaced relation thereon. Also fixed to shaft 67 is an arm 68 which bears a roll to ride in a path-cam 69 fixed on the described cam shaft 21. The cam 69 controls the movement of both levers 63 and causes them to move simultaneously in a manner which will later appear.

Referring to Figs. 9 and 10, each arm of bracket 61 has a short shaft 70 rotatably mounted therein, which shaft projects beyond each end of its arm. On one end of each shaft is fixed a lever 71 and the two levers are connected by intermeshing segmental gears 72, which, as illustrated, are integral parts of the levers. A movement of one lever 71 will therefore cause a like degree movement of the other lever, but in an opposite direction. Fixed on one shaft 70 is an arm 73, which, as shown in Fig. 1, is connected by a link 74 to one arm of a bell-crank lever 75. The latter is pivotally supported from table B and its other arm is connected by a link 76 to an arm 77, which is fixed to the described shaft 40. The duplicate set of levers 71 on the opposite side of turret 24 have like operating connections so that there are two arms 77 fixed

in spaced relation on shaft 40. Also fixed on the latter is an arm 78 which bears a suitable roll to ride in a path-cam fixed to the described cam shaft, but arranged in back of the described cam 41, so that it does not appear in the drawing. Thus, one cam may control the movement of all four levers 71 and cause them to move simultaneously in a manner to be described.

The levers 71 are provided with tucking fingers 79, which, shortly after the turret comes to rest, are moved by their cam to lay the short end extensions x flat against the ends of the article s. This cam is also constructed to retract the fingers 79 shortly after the described movement, but, before the fingers have released the folded extensions x, the cam controlling the levers 63 causes the latter to rock downwardly, as viewed in Fig. 9, and fingers 80 on the ends of levers 63 are caused to engage the end extensions y. The fingers 80 are so actuated as to start the folding of extensions y shortly before the release of extensions x so that the latter will not be released until extensions y are folded thereover. The fingers 80 are preferably pivotally mounted on levers 63 and are connected to the latter by suitable springs, as illustrated, for the purpose of yieldingly forcing the extension y flatly against the folds x and the end of the articles s. The fingers 80 are so actuated that they not only lay down the extensions y, but continue to move until they come into the positions indicated by dotted lines in Fig. 9. In such positions the fingers are held stationary until the turret on the next step of movement carries the article by them, whereupon the fingers are returned into the positions illustrated by full lines in Fig. 9. The fingers 80, therefore, operate also on the extensions z and fold them away from the ends of the article into the positions illustrated in Fig. 11.

The transition of the article from the third to the fourth stage, involves nothing more than the retention of the folds of the wrapper in the positions to which they have been moved by the mechanism heretofore described. Referring to Fig. 12, the described brush 59 functions, as before, to hold the folds w and x flat against the article in overlapping relation. Referring to Figs. 9 and 12, a plate 81 is provided adjacent each end face of the turret and is supported from the frame of brush 59. The folding fingers 80, formerly described, substantially abut with the upper ends of plates 81, and the fingers 80, when at rest in the position shown by dotted lines in Fig. 9, lie in the same plane as the plates. Thus, as the turret advances one step to move the articles from the third to the fourth stage, the extensions z ride from engagement with fingers 80 into engagement with plates 81 and are thereby held in the condition illustrated in Fig. 11 during movement of the turret. Likewise, the folds y travel into engagement with and are similarly held by plates 81. The partially wrapped article comes to rest in readiness for the fourth stage operations in the lower of the two positions shown in Fig. 12. By reference to this figure, it will be seen that the plates 81 are long enough to retain folds y flatly against the ends of the article during the period of rest of the turret and during the operations of the fourth stage.

The fourth stage in the wrapping of the articles will now be described, and reference will be made to Figs. 12 to 17, inclusive. Referring first to Figs. 13 and 14, as the turret 25 comes to rest for readiness for the fourth stage operations, a blade 82 is positioned, as shown in Figs. 13 and 14, so as to substantially abut with and lie in the same plane as each of the plates 81. The blades 82, therefore, form continuations of the latter and function to retain folds z in the positions to which they were moved by the described folding fingers 80. As shown in Figs. 13 and 17, the lower ends of plates 80 are forked to provide recesses through which access to the central portion of folds y may be had.

Immediately after the turret comes to rest, adhesive is applied to the exposed portions of folds y, as indicated at y' in Figs. 11 and 12. The mechanism for applying the adhesive is best shown in Fig. 17 and will now be described. Mounted on table B and on opposite sides of turret 25 are racks 83, which are slidable in a direction parallel with the turret's axis, toward and away from the turret. Removably mounted on each rack 83 is a glue box 84 and the end of each of the latter adjacent the turret is closed by a roll 85 rotatably mounted in the side walls of the box. Fixed on one end of the shaft 85′ of each roll 85 is a ratchet 86 which is held from movement in one direction by a pawl 87. Bars 88, having teeth at one end to engage ratchets 86, are pivoted at their other ends to table B and the first-named ends are yieldingly forced upwardly by suitable springs, as shown. Thus, as each box 84 is advanced toward the turret, the engagement of ratchets 86 and bars 88 cause the rolls 85 to rotate in the illustrated directions and the adhesive carried by the rolls is formed into films of regulable thickness thereon by elements 89, which are adjustable toward and away from rolls 85. Below and in mesh with each rack 83 is a segment gear 90, which is fixed to a shaft 91 suitably supported in table B. The two parallel shafts 91 are connected by bevel gears, as indicated in Fig. 1, to a shaft 92, also rotatably supported from table B, and fixed on the shaft intermediate its ends is a lever 93 which, in Fig. 1, has been

largely broken away but is completely shown in Fig. 2. Lever 93 is connected by a link 94 to one end of a lever 95 which is loosely mounted intermediate its ends on the shaft 67 already described. The other end of lever 95 bears a roll to ride in a suitable path cam fixed on shaft 21, but behind the cam 69. It will noted that a turning movement of shaft 92 will, by reason of the bevel gear connections, rock the two segments in opposite directions, as indicated in Fig. 17. The cam for operating the glue boxes 84 is constructed to normally hold them away from the turret, and when the turret comes to rest, to advance them until rolls 85 engage folds y through the recesses in the ends of plates 81. Adhesive is thereby applied to folds y as indicated at y' in Fig. 11. After the application of the adhesive, the boxes 84 are retracted and held thus positioned until the turret brings another article s into position for the application of adhesive.

The remaining operation of the fourth stage consists in the manipulation of folds z so that they may be laid down in overlapping relation on folds y, on movement of the turret. The means for manipulating folds z will next be described with particular reference to Figs. 13 to 16, inclusive. Each of the described blades 82 is, as best shown in Fig. 15, pivoted at 96 to an arm 97. Each of the latter is fixed to a shaft 98 which is rotatably supported, as shown in Fig. 1, from bearings on table B. Referring to Fig. 1, fixed to shaft 98 intermediate arms 97 is a curved lever 99 which is connected by a link 100 to the upper end of the lever 101. The latter is loosely mounted intermediate its ends on the described shaft 67 and its lower end is connected to one end of an arm 102. The other end of the latter is forked to encompass the described shaft 21 for guiding purposes and bears a roll for engagement with a suitable cam on shaft 21. This cam is constructed to rock shaft 98 shortly after the adhesive has been applied to folds y to move blades 82 into the position indicated by dotted lines in the drawings, and immediately afterward to return the blades into the positions shown by full lines and hold them there until another article s has come into the fourth stage position and the glue boxes 84 have operated.

It is to be noted that the axis of pivot 96 is arranged at right angles to the axis of shaft 98 to permit movement of the blade toward and away from the side of the turret. A cam 103 is provided on each end face of the frame of the described brush 59 (Figs. 13 and 16) and springs 104 (Fig. 15) yieldingly force rolls on blades 82 against these cams. The result of the devices described is that after the adhesive y' has been applied to folds y, the blades 82 swing downwardly beyond folds z and release the latter. As the blades swing downwardly, they are also caused to move toward the center of the turret and bend folds z backwardly, so that when the folds are released from blades 82, they spring back into, if not beyond, their former and illustrated position. Thus, when blades 82 are again swung upwardly, they lie on the opposite sides of folds z from before, and, as the cams 103 force blades 82 outwardly, the folds z are forced toward folds y as far as is permitted by plates 81. At the end of the fourth, therefore, the folds z lie between the adjacent ends of blades 82 and plates 81.

The final laying down of folds z is accomplished during the transition of the articles from the fourth to the fifth stages. Thus, the blades 82, which remain in the positions illustrated by full lines in Figs. 13 and 14, function immediately on movement of the turret to lay down the folds z, which, as described, lie between blades 82 and plates 81, and press the folds z into intimate contact with the folds y, so that the overlapped folds may be held by the adhesive y'. As soon as the gummed overlapped folds y and z are released from blades 82, they encounter brushes 105 Figs. 12, 14 and 17) which function to retain the folds in overlapped relation. The brushes 105 are supported, as shown in Fig. 12, from the frame of the arcuate brush 59, already described. The brush 59 acts, as before, to prevent the overlapped folds v and w from opening during the transition of the articles from the fourth to the fifth stage.

The fifth stage is concerned with the removal of the wrapped articles from the turret and the transfer of the removed articles to a suitable delivery conveyer. The ejecting mechanism will now be described with reference to Figs. 1, 18 and 19.

Mounted to slide vertically in bed A is a pair of rods 106, to the upper ends of which is fixed a substantially U-shaped bracket 107 (Fig. 18). The lower ends of rods 106 are connected together by a bracket 108 (Fig. 1) which is connected by a link 109 to one end of a lever 110. The other end of the latter is loosely mounted on the described shaft 40. Lever 110, as indicated in Fig. 1, is provided with a roll for actuation by a suitable path-cam, which may be fixed on shaft 20 in the rear of the described cam 41. The cam for lever 110 is so constructed as to normally hold bracket 107 in the illustrated position and to lower the bracket, shortly after the turret comes to rest. This cam is also constructed to hold bracket 107 in its lowermost position until the turret starts upon its next step of movement, and thereafter to quickly restore the bracket so that it will lie in the illustrated position before the turret comes to rest. The bracket 107,

as shown in Figs. 18 and 19, is provided with a series of horizontally-arranged rolls 111 mounted in closely spaced parallel relation on a plate 112, which is supported from the cross-bar of the U and yieldingly forced upwardly. On each upstanding arm of the bracket 107 are similar series of vertically-arranged rolls 113. The bracket, when positioned as in Fig. 18, is arranged to encompass a portion of the turret so that rolls 111 will engage the top and rolls 113 the ends of the wrapped articles. Thus, the overlapped folds *v* and *w* and the overlapped folds *y* and *z*, which have heretofore been held by the brushes 59 and 105, respectively, are now engaged and held by the rolls during the ejecting operation. One of the upstanding arms of the U-shaped bracket 107 is made longer than the other and provided with a groove 114 in its inner face to receive the roll 35 on the plunger 33, which, as described, forms a movable bottom wall for the wrapping pocket. As the turret approaches the fifth stage position, roll 35 rides into groove 114, and, as soon as the turret comes to rest, the bracket 107 is lowered, as described, whereby the plunger, which has been connected by its roll 35 with the bracket, functions to eject the wrapped article from the turret. It is to be noted that the removal of the wrapped articles is accomplished while positively held along four edges, so that by no possibility can the gummed overlapped seams of the wrapper open during the ejecting operation.

When the bracket 107 is in its lowermost position, the cross-bar of the bracket and rolls 111 are carried slightly below the end of a plunger 115, which, as shown in Fig. 1, is mounted to slide horizontally on bed A and at right angles to the direction of movement of the bracket 107. The plunger 115 is connected by a link 116 to one arm of a bell-crank lever 117 which is loosely fulcrumed on the described shaft 67. The other arm of lever 117 is arranged, as indicated in Fig. 1, for engagement with a suitable cam, which may be fixed to the described cam shaft 21. The cam for lever 117 is arranged to move the plunger 115 to the left as viewed in Fig. 1, shortly after the bracket 107 comes to rest in its lower position, and to carry the left end face of the plunger entirely across the bracket. The cam thereafter operates to quickly restore plunger 115 into the illustrated position until the bracket 107 is again lowered. Thus, the wrapped article held in bracket 107 may be removed therefrom for transfer to other apparatus.

Such apparatus may be of any suitable type which will operate to hold the overlapped gummed folds of the wrapped articles until the adhesive has set and to carry the wrapped articles away from the turret while thus held. In the drawings (Fig. 19), the apparatus consists of three conveyer belts, one of which, as indicated at 118, travels with its upper lap horizontally and in a plane tangential to the upper peripheral portions of rolls 111, when the bracket 107 is in its lower position. The other belts 119 have their adjacent laps traveling in the same direction as the upper lap of belt 118 but in planes at right angles thereto. Thus, the wrapped articles removed from bracket 107 may be transferred by plunger 115 upon belt 118 and between belts 119, so that the three overlapped gummed folds of the wrapper are engaged and held by the belts. A small roll 120 is preferably mounted, as indicated in Figs. 1 and 19, to bridge the gap between the belt 118 and the adjacent roll 113. Preferably, also, the frame 121, which supports the described belts from bed A, is provided with a horizontal plate 122 (see Fig. 1), the inner face of which will engage the edge of the wrapped article opposite from the folds *v* and *w*, whereby the latter may be held to belt 118. The belts 118 and 119 may be driven in the illustrated directions by any suitable means (not shown).

There remains to be described a device which operates to insure that the movable bottom walls of the wrapping pockets—the plungers 33—are correctly positioned when they arrive in the first and fifth stage positions. This device consists of a spiral cam 123 which is suitably supported, as indicated in Fig. 1, from bed A and closely adjacent that face of turret 24 from which rolls 35 extend. One end of cam 123, hereinafter termed the entrance, lies substantially in the plane of the left-hand side of the wrapped article when in the fifth stage position. Starting from this end, the cam is radial from the fifth to the first stage positions, and then extends spirally from the first, through the second, third and fourth, to the fifth stage positions, terminating at the latter with its exit end substantially in the plane of the right-hand side of the wrapped article when in the fifth stage position. The two ends of cams 123 lie at different radial distances from the center of the turret, and the entrance end has a convergent mouth, as shown in Fig. 1.

It will be remembered that the plunger 33, when moved radially outward by the ejecting operation, is left thus positioned until the turret commences its next step of movement. Now, if the plungers 33, which are held in their moved positions merely by friction, are not precisely in the desired positions for the first stage operations, their rolls will ride into the convergent entrance end of cam 123 and be forced either radially inward or outward by the cam, into the desired position. Thus, the cam insures that the plungers 33 will arrive, correctly posi-

tioned, in the first stage position. It will also be readily apparent that a failure to feed an article into the turret at the first stage position would result in no radially inward movement of the plunger 33, and its roll 35 would be left so positioned that, not only would engagement with the groove 114 of the ejecting bracket 107 be impossible, but the roll might engage other parts and cause damage. The spiral portion of cam 123 functions to move the roll 35 of any improperly positioned plunger into correct position during movement of the turret, so that the roll 35 will be caused to ride into the groove 114 of the ejector bracket when it arrives in the fifth stage position.

The operation of the machine will now be summarized. The articles and their wrappers are fed into the turret, while the latter is at rest in its first stage position, by plunger 37, and by the feeding operation the article is inclosed by its wrapper except for pairs of wrapper extensions on one side and both ends of the articles. As the turret comes to rest in the second stage position, one of the side extensions v of the wrapper is laid down and held against the article by folding finger 42. While extension v is held and protected by the latter, the roll 48^2 of the glue box is moved to engage extension w and then is quickly retracted. As the turret commences its next step of movement, blade 42 follows it for a short distance to hold extension v until extension w is moved to meet it by roll 60. Blade 42 is retracted just before the extension w is superposed on extension v. The folded extension v and w are thereafter continually held by brush 59 until the articles arrive in position for ejection from the turret.

As the turret again comes to rest, the wrapper extensions at each end of the article are simultaneously operated upon. First, the end tuckers 71 lay down the short extensions x, and, before these tuckers have retracted, the folding blade 80 is actuated to fold extension y, the operations of the blade and tuckers being timed, so that folds x are not released until extension y has been moved nearly into its final position. The blade 80, having laid down extension y, continues its movement in the same direction and folds extensions z at right angles to the package but away from fold y. Blade 80 is then held stationary until the turret starts on its next step of movement and, since blade 80 substantially abuts with plate 81, the folds y and z easily ride from the former to the latter. Thus, the folds y and z may be held in their folded positions during movement of the turret.

As the latter comes to rest, the folds y and z are still held in their folded positions, the first by the forked ends of plate 81 and the other by blade 82. The rolls 85 of the reciprocable glue boxes then advance in opposite directions and apply adhesive to folds y while folds z are covered, protected and held by blades 82. Immediately the rolls 85 are retracted, blades 82 swing downwardly and inwardly by reason of cams 103, whereby folds z spring outwardly so that the blades, when returned to normal position, lie on the opposite side of folds z from formerly. Blades 82, being then held stationary, act as abutments to lay folds z upon folds y immediately on movement of the turret. The overlapped folds y and z are thereafter held by brushes 105.

As the turret comes to rest in the fifth stage position, the rolls 113 and roll 117 act to hold the overlapped folds previously held by brushes 105 and brush 59, respectively. When the article arrives in ejecting position, it is confined along four sides, the plunger 33 having been interlocked with the ejector 107. The seams in the wrapper of the article are thus held during the ejecting operation and are thereafter held until the adhesive has set by the delivery apparatus shown in Fig. 19, the wrapped articles being transferred thereto, without releasing the overlapped seams, by plunger 115.

The invention has been described, in one embodiment, for the purposes of illustration, but the scope of the invention is defined by the appended claims rather than by the foregoing description.

What I claim is—

1. A wrapping machine, comprising, an intermittently-movable carrier in which articles and their wrappers may be positioned, means to apply the wrappers about the articles to completely inclose the latter and form a plurality of overlapped seams in the wrappers, said means comprising a plurality of wrapper-folding devices some of which are operable during intervals of rest and others during intervals of movement of the carrier but all operable while the articles are held in the carrier, each of said devices arranged to hold the portion of the wrapper folded by it until such portion is engaged and held by subsequently operable devices, means to apply adhesive to one fold of each of said seams and operable just prior to the final folding operation on such seams, and means to continuously hold each overlapped seam from the time of its formation until the wrapped article is ejected from the carrier.

2. A wrapping machine, comprising, a carrier having pockets in which articles and their wrappers may be positioned with two wrapper extensions projecting beyond the pockets to be laid in overlapping relation against one face of the article, an adhesive-applying means movable into the path of both said projecting extensions, means operable prior to the movement of the first-

named means to fold one of said extensions flat against the article, means to move the first-named means while the folding means remains in its moved position, whereby adhesive is applied to the second extension only and while the first extension is covered by the folding means, and means to fold the second extension after the operation of the first-named means.

3. A wrapping machine, comprising, an intermittently-movable carrier having pockets in which articles and their wrappers may be positioned with two wrapper extensions projecting beyond the pockets and adapted to be folded in overlapping relation against one face of the article, an adhesive-applying means pivoted to swing into the path of said extensions when the carrier comes to rest in one position, a folding finger pivoted to swing about the same axis as said means, means to move said finger to fold one of said extensions, means operable while the first extension is covered by said finger to oscillate the first-named means and apply adhesive to the second extension, and means operable on movement of the turret to fold the second extension.

4. In a wrapping machine, means to apply a wrapper to an article leaving a projecting wrapper extension, a folding blade engageable with one face of said extension and movable in a plane oblique to that of the extension to and beyond the free end of the latter and back again, whereby the blade may move along one face of said extension and return along the other face thereof.

5. In a wrapping machine, means to apply wrappers to articles leaving two extensions to be folded in overlapping relation against one face of the article and sealed in such relation, means to fold one of said extensions, means to apply adhesive to the folded extension, and means to fold the second extension upon the first-named extension, the last-named means comprising a folding member to cover the second extension during the application of adhesive and movable after such application into position to fold the second extension.

6. A wrapping machine, comprising, an intermittently-movable carrier for articles and their wrappers, each of the latter having two extensions to be laid in overlapping relation against one face of its article, means to fold both extensions in the same direction, leaving one thereof flat against said face, means to apply adhesive to the last-named extension, means to cover the exposed face of the other extension during the application of adhesive, and means subsequently operable to move the covering means into a position to act as an abutment and lay the second extension in overlapping relation with the first extension on movement of the carrying means.

7. A wrapping machine, comprising, an intermittently-movable carrier for articles and their wrappers, each of the latter having two extensions to be laid in overlapping relation against one face of the article, a folding finger movable during an interval of rest of the carrier to fold both extensions in the same direction into the same plane leaving one extension flat against the article, said finger being arranged to remain in its moved position until the carrier commences its next step of movement, means substantially in abutment with said finger when the latter is in its moved position to receive the folded extensions from the finger and hold them during movement of the turret, means operable when the latter is at rest to apply adhesive to one of the folded extensions, means to cover and protect the other extension during the application of adhesive to the first extension, and means to thereafter fold the second extension in overlapping relation upon the first extension.

8. A wrapping machine, comprising, a turret movable step by step and having pockets to receive articles to be wrapped and their wrappers, means to wrap the sides and ends of the articles including means to form gummed overlapped seams in the wrappers along a side and both ends of each article, members adjacent the periphery and sides of the turret to continually hold the side and end seams from the time of their formation until the turret moves the articles into position for ejection, and means normally forming a continuation of said members to receive and hold the seams as the turret moves the articles into position for ejection, and mechanism to move the last-named means away from the turret to eject the articles.

9. A wrapping machine, comprising, a turret movable step by step and having pockets to receive articles to be wrapped and their wrappers, means to wrap the side and ends of the articles including means to form gummed overlapped seams at a side and both ends of the article, devices operable to continually hold said side and end seams from the time of their formation until the turret comes to rest in position for the wrapped articles to be ejected, and means to eject the wrapped articles, the last-named means having parts positioned as the turret comes to rest to form continuations of said devices to receive and hold said seams and to hold the latter during ejection of the articles.

10. A wrapping machine, comprising, a turret movable step by step and having pockets in which articles and their wrappers may be positioned, a movable bottom wall for each pocket, means to wrap the articles and form a gummed overlapped seam on that side of each opposite from said wall.

and means to eject the wrapped articles, said last-named means having a part to engage and move said wall and another part to engage said seam, whereby the article may be withdrawn from the turret while held between the wall and last-named part.

11. A wrapping machine, comprising, a turret having pockets in which articles and their wrappers may be positioned, a movable bottom wall for each pocket adapted to engage one side of the article, means to wrap the articles with overlapping folds on the other side and on both ends of the articles, and ejecting means having spaced parts to receive therebetween the wrapped article and engage the end overlapping folds thereof and a part to engage the overlapping folds on the side of the article, said means being constructed to engage and move said wall, whereby the wrapped articles may be withdrawn while held along four sides.

12. A wrapping machine, comprising, a turret having pockets in which articles and their wrappers may be positioned, a movable bottom wall for each pocket adapted to engage one side of the article, means to wrap the articles with gummed overlapping folds on the other side and both ends of the articles, ejecting means having spaced parts to receive therebetween the wrapped article and engage the end overlapping folds thereof and a part to yieldingly engage the overlapping folds on the side of the article, said means being constructed to engage and move said wall, whereby the wrapped articles may be withdrawn while held along four sides.

13. A wrapping machine, comprising, a turret having pockets in which articles and their wrappers may be positioned, a movable bottom wall for each pocket adapted to engage one side of the article, means to wrap the articles with gummed overlapping folds on the other side and both ends of the articles, ejecting means having spaced parts to receive therebetween the wrapped article and engage the end overlapping folds thereof and a part to engage the overlapping folds on the side of the article, said means being constructed to engage and move said wall, whereby the wrapped articles may be withdrawn while held along four sides, a discharge apparatus having means to engage the last-named sides and hold the folds until the adhesive has set, and means movable at right angles to said ejecting means to remove the wrapped articles therefrom and transfer them to said apparatus.

14. In a wrapping machine, a turret movable step by step and having a plurality of pockets to receive articles to be wrapped and their wrappers, a movable wall for each pocket, means to successively feed articles and their wrappers to the pockets and operable by engagement with the articles to move said walls to a predetermined position, mechanism operable only when said walls are in such predetermined position to move the walls and eject the articles, and supplementary means operable during movement of the turret to insure that said walls are moved to such position.

15. In a wrapping machine, a turret movable step by step and having a plurality of pockets to receive articles and their wrappers, a movable wall for each pocket frictionally held in position, means to feed articles and their wrappers to the turret and operable to move said walls in one direction, means to wrap the articles while in the turret, means subsequently engageable with each of said walls to move them in an opposite direction to eject the wrapped articles from the pockets, and means operable during the movement of the turret to insure that said walls are properly positioned for engagement by the ejecting means irrespective of the operation of said feeding means.

16. In a wrapping machine, a turret movable step by step and having a plurality of wrapping pockets, a movable wall for each pocket frictionally held to the turret, mechanism adjacent the turret and operable as the latter comes to rest in one position to successively move said walls in one direction, other mechanism adjacent the turret and operable as the turret comes to rest in another position to successively grip said walls and move them in the opposite direction, and independently-operable means to insure that each wall is properly positioned for operation by each of said mechanisms.

17. In a wrapping machine, a turret movable step by step and having a plurality of wrapping pockets, a plurality of plungers slidable in the turret and forming bottom walls for said pockets, means to feed articles and their wrappers to the pockets and arranged so that the plungers are moved in one direction by the articles, means to wrap the articles while in the turret, means with which said plungers are successively and automatically coupled as the turret moves into ejecting position, devices to move the last-named means to move said plungers in the opposite direction and to eject the wrapped articles from said pockets, means to frictionally hold the plungers in their moved positions, said feeding means being adapted to move the plungers into position for operation by the ejecting means, and means to move the plungers into the last-named position operable when the plungers are not so moved by the articles.

18. In a wrapping machine, means to apply a wrapper to an article and form folds in the wrapper, an arm mounted for swinging movement, and a folding blade on the arm and mounted to swing relatively to the latter about an axis substantially at right

angles to that of said arm, all constructed and arranged so that the blade may be moved along one face of one of said folds and return along the opposite side thereof.

19. In a wrapping machine, means to apply a wrapper to an article and form folds in the wrapper, a folding blade pivoted to swing about different axes, means to swing the blade about one of said axes and means operable during such swinging movement to move the blade about its other axis, whereby the blade may move along one face of one of said folds and return along the other face thereof.

ELMER LOVELL SMITH.