

No. 615,650.

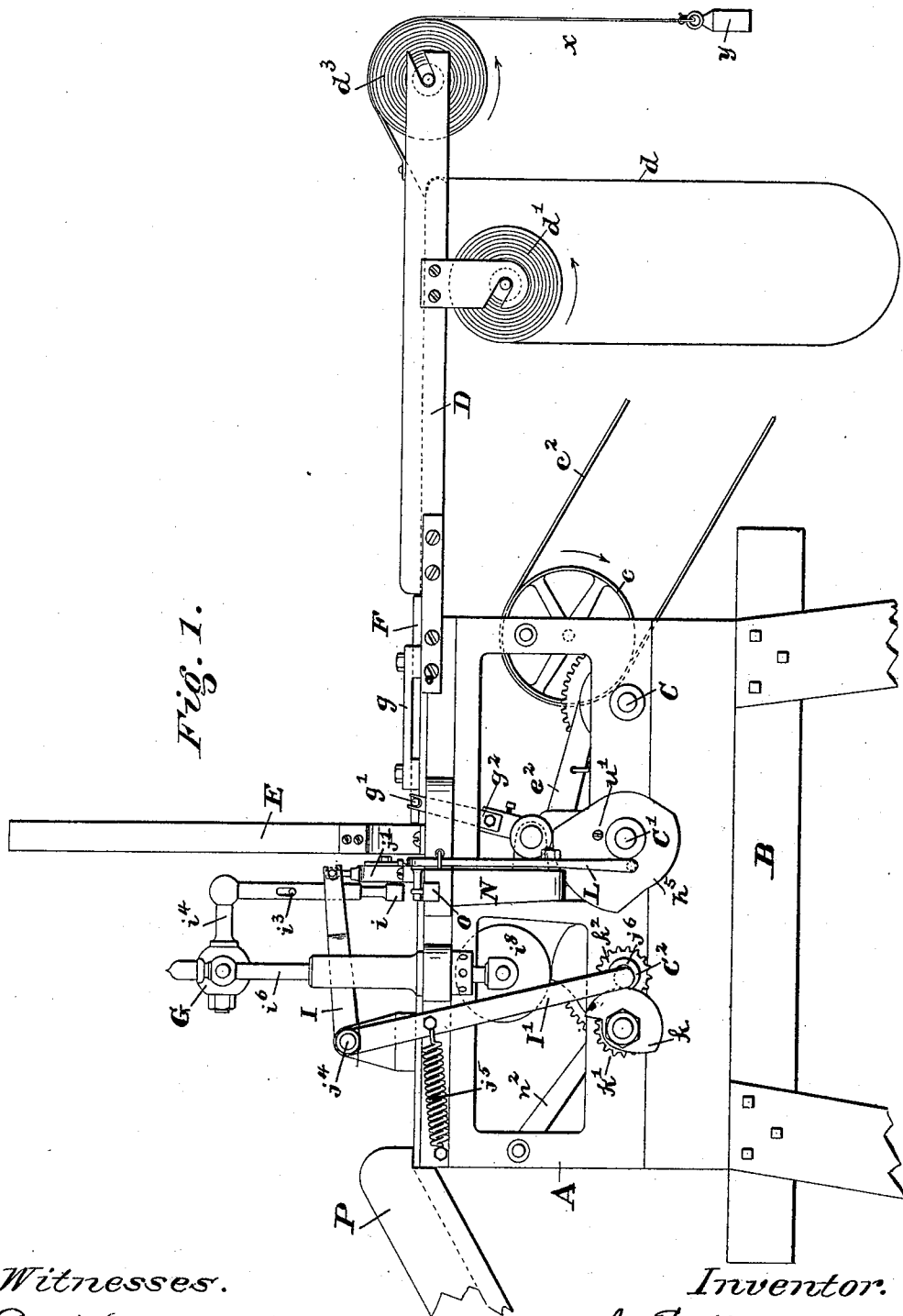
Patented Dec. 6, 1898.

J. F. HARGRAVES.
WRAPPING MACHINE.

(Application filed Oct. 6, 1897.)

(No Model.)

5 Sheets—Sheet 1.



Witnesses.
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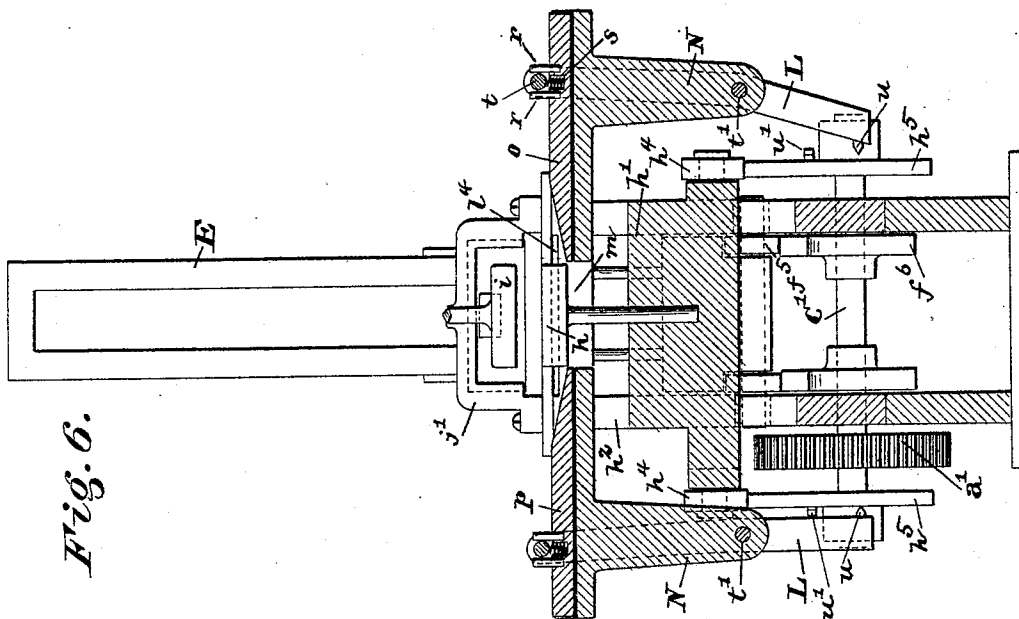


Fig. 6.

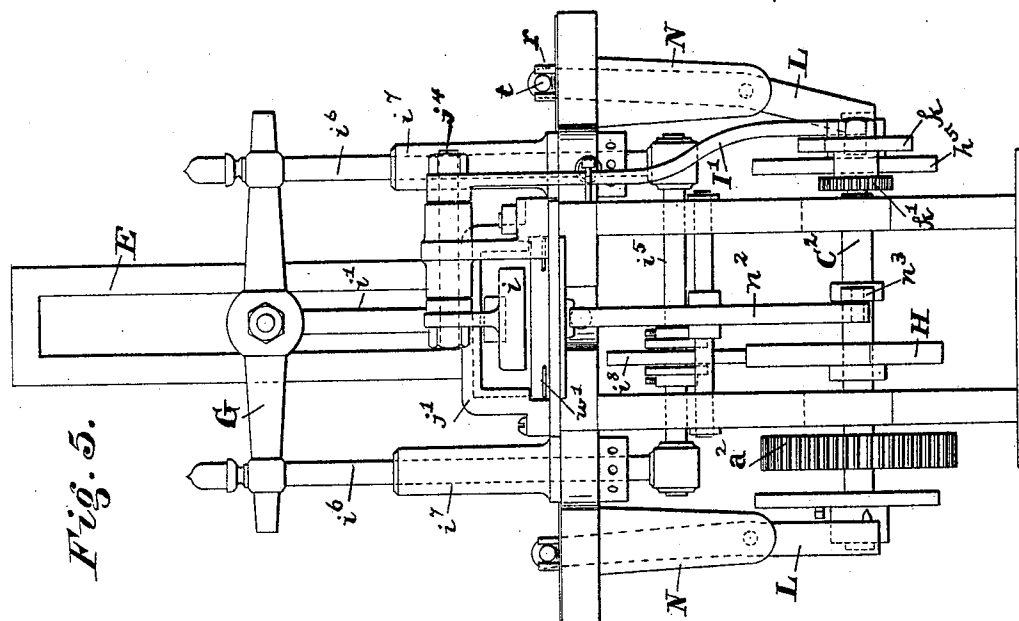


Fig. 5.

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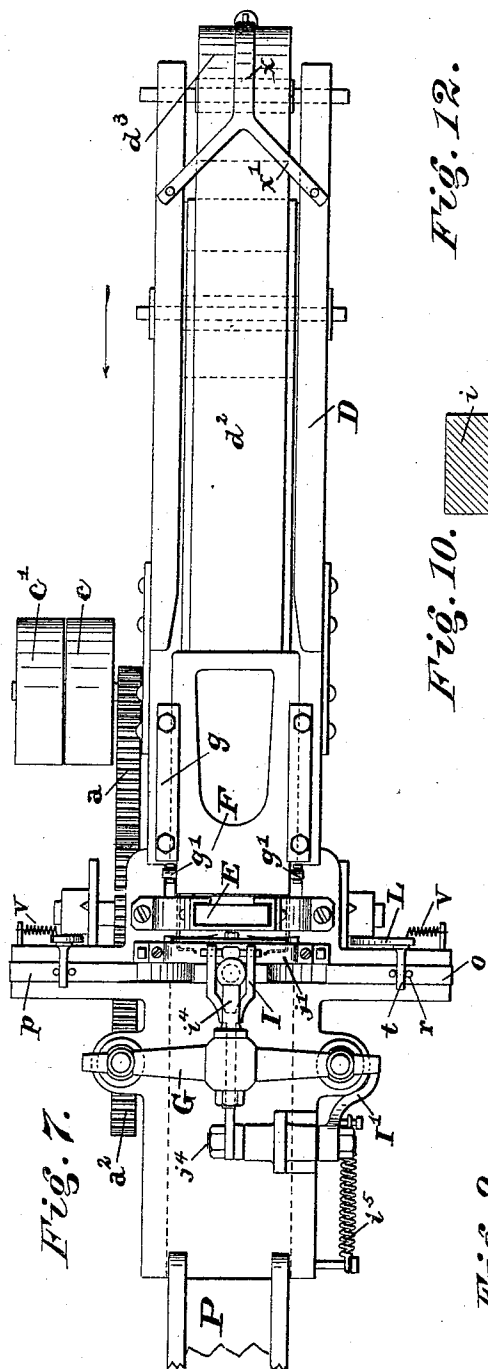


Fig. 7.

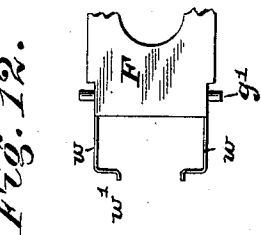


Fig. 12.

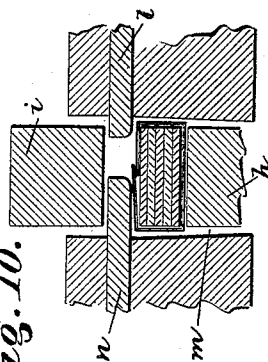


Fig. 10.

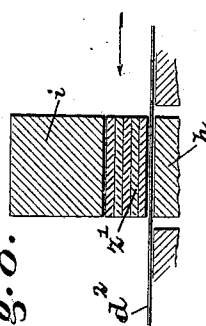


Fig. 8.

Fig. 11.

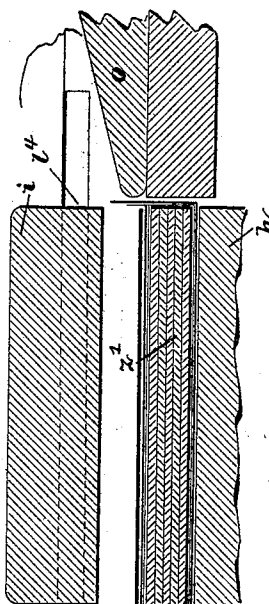
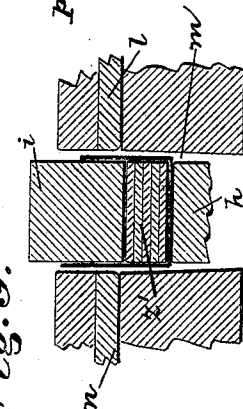


Fig. 9.



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Fig. 13.

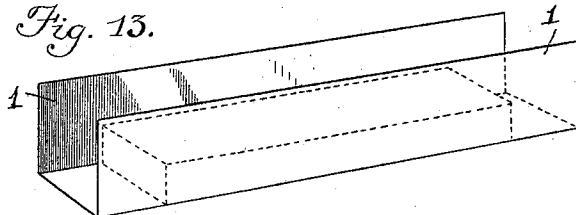


Fig. 14.

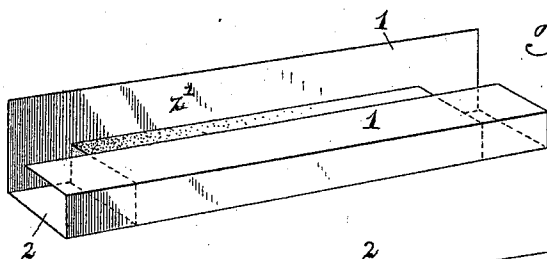


Fig. 15.

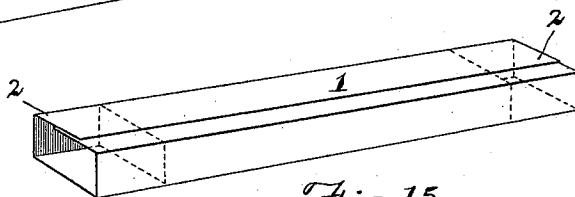


Fig. 16.

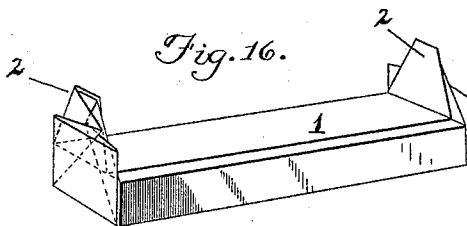
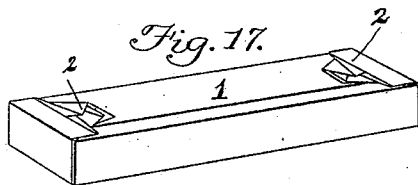


Fig. 17.



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UNITED STATES PATENT OFFICE.

JOHN F. HARGRAVES, OF BALTIMORE, MARYLAND, ASSIGNOR TO GEORGE M. HARSH, OF SAME PLACE.

WRAPPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 615,650, dated December 6, 1898.

Application filed October 6, 1897. Serial No. 654,204. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. HARGRAVES, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Wrapping-Machines, of which the following is a specification.

This invention relates to a machine for applying wrappers to small rectangular articles of any kind, such as chewing-gum.

The object of the invention is to provide a new machine of simple construction adapted to do the work indicated with rapidity and economy.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the machine. Fig. 2 is a vertical longitudinal elevation of the machine on a slightly-larger scale than shown in Fig. 1. Fig. 3 is a top or plan view of the first portion of the table. Fig. 4 is a side view separately of the oscillatory feed-arm. Fig. 5 is an elevation of the delivery end of the machine. Fig. 6 is a vertical cross-section of the machine on the line where the end crimpers or folders are located. Fig. 7 is a top view of the machine on the same scale as the elevation shown in Fig. 1. Fig. 8 is a sectional view showing five pieces of chewing-gum which are to be inclosed in a wrapper, shown open in the flat condition between the lower and upper plungers, the latter being down and resting on top of the said gum. This is the first step in the wrapping operation. Fig. 9 is a sectional view showing the five pieces of chewing-gum between the upper and lower plungers, both plungers having moved downward and bent the two sides of the wrapper upward. The side-crimpers are also shown. This is the second step in the wrapping operation. Fig. 10 is a view of the same parts seen in Fig. 9, but shows the upper plunger raised and the two sides of the wrapper folded over the top of the chewing-gum by the movement of the side-crimpers. This is the third step in the wrapping operation. Fig. 11 is a sectional view indicating the fourth step in the wrapping operation. This view shows the parts as seen in a transverse direction as compared with the views of Figs. 8, 9, and 10. The

wrapper ends are here projecting upward and the end-crimpers are about to move toward each other to fold said wrapper ends. Fig. 12 shows the wire pushers. Figs. 13 to 17, inclusive, illustrate the successive stages of folding the wrapper about the article.

The machine has a frame composed of two sides A A'. This frame is supported on a suitable stand B. Three cross-shafts C C' C² have bearings in the frame. On the outer side of side A' these shafts are geared together by wheels a a' a². A pinion b on the drive-shaft gears with the first wheel a, and a fast and loose pulley c c' are also on the drive-shaft. A belt c² over these pulleys imparts motion. The wrapper in this instance consists of a strip of tin-foil d on a roll d' below the table D and a strip of paper d² on a roll d³, attached to the table. The double strip of paper and foil moves forward from right to left, the paper on top of the foil. The articles to be wrapped—in this case the flat pieces of chewing-gum z—are stacked one above the other in an upright tubular hopper E, which has open sides, and are fed out at the bottom five pieces at a time.

The wrapper of paper and foil slides with an intermittent motion along the table-top, and the wrapper-feeder comprises two oscillatory arms e, projecting upward. The upper ends of these arms project up through two parallel slots e' in the table-top, and said ends press up in contact with the wrapper, the latter being held down by the reciprocating pusher-plate F, which pushes the gum from the bottom of the hopper-tube E. The oscillatory arms e are carried by an angle-lever e², pivoted on trunnions e³, which fit in oblong bearings e⁴ in the sides of the frame. (See the oblong broken line in Fig. 2.) These oblong bearings allow the angle-lever to lift slightly at the same time it tilts. Each arm e has its lower end loosely fitted in a socket f in the angle-lever. (See Fig. 4.) A small spiral spring in the socket presses on the end of the arm and pushes it outward; but a set-screw f' enters the side of the socket, and the end of this screw takes in a groove formed on that part of the arm which fits in the socket, and thereby, while the arm e may move endwise slightly in the socket, it cannot come out. The lower

end of the said angle-lever e^2 carries a roller f^2 , which is acted on by a cam f^3 , carried on the first cross-shaft C. This cam and a spiral spring f^4 impart the oscillatory motion to the arms e . The angle-lever carries on the bolt which forms the trunnions e^3 a roller f^5 , which is acted on by a cam f^6 on the second cross-shaft C'. This latter cam is the means for lifting the angle-lever by moving its trunnions e^3 in the oblong bearings. Thus the wrapper-feed arms e have an oscillation, a slight lift, and at the same time a capability of yielding endwise by the spring-pressure, that produces good results. The ends of the arms e which come in contact with the wrapper may be plain smooth ends or each end may be provided with a small roller f^7 .

The plate F, which pushes the gum from the bottom of the hopper-tube in readiness to be wrapped, reciprocates in slides g . This plate has at each side edge a trunnion or pin g^1 , which is acted on by a throw-arm g^2 , both of said arms being on the angle-lever e^2 . At each forward reciprocation of the plate F gum z' to be wrapped is pushed to the position between the lower plunger h and upper plunger i , and simultaneously the wrapper-strips d d^2 are likewise fed forward. The wrapper will rest upon the lower plunger h , and the five thin pieces of gum z' will be upon the wrapper, as in Fig. 8. The upper plunger next moves down on the gum, the pusher-plate recedes, and then the vertically-movable knife j comes down behind the gum and cuts the wrapper. The lower plunger h has a stem which fits in a cross-head h^1 , which is vertically movable in slots h^2 in the frame. At each end of the cross-head are two back-projecting bracket-arms h^3 , each of which carries a roller h^4 , that is acted on by a cam h^5 , carried on the end of the second cross-shaft C'. These two cams h^5 serve to raise and lower the lower plunger. The upper plunger i has a shank which fits loosely in a depending tube i^1 . A spiral spring i^2 is in the tube (see Fig. 2) to keep the plunger normally pressed downward, but allowing it to yield. The tube has a short slot and the plunger-shank has a pin i^3 , which projects through the said slot. This construction prevents the plunger from turning and limits the extent of its up-and-down yielding movement. The depending tube i^1 is secured to a horizontal arm i^4 , carried on the upper bar G of a cross-head frame. This frame is rectangular and comprises the said upper cross-bar above the table, a lower cross-bar i^5 below the table, and two vertical rods i^6 connecting said bars. These rods of the frame reciprocate up and down in tubular guides i^7 . The lower cross-bar i^5 carries a roller i^8 , which is acted on by a cam H, fixed on the third cross-shaft C². This cam H serves to raise and lower the upper plunger i .

The vertically-moving knife j is attached to a cross-head, (shown in section in Fig. 2,) which has movement in a bridge-piece j^1 , that

spans the table-top near the hopper-tube. This bridge-piece has a central hole j^2 , through which a vertical rod j^3 works up and down, the rod being attached to the said knife cross-head. An arm I has a bifurcated end which is attached to the vertical rod j^3 , and this arm is pivoted at j^4 on a rock-shaft and moves the knife j up and down. Another arm I' is attached to the same rock-shaft and projects downward, and thus the two arms I I' from a side view (see Fig. 1) form an angle-arm similar to a bell-crank lever. The arm I' has a spiral spring j^5 attached, which draws this arm and serves to press the knife-arm I downward. The lower end of arm I' carries a roller j^6 , which is acted on by a cam k , that presses this arm in the direction opposite that which the spring draws it. It will thus be seen that the cam k raises the vertically-moving knife j , which cuts the wrapper, and the action of the spring j^5 lowers said knife. The cam k has on its side a pinion k^1 , which meshes with another pinion k^2 , fixed on the third cross-shaft C².

Two reciprocating crimpers l n first move in a direction endwise of the machine to fold the long sides of the wrapper, and then two reciprocating crimpers o p move in a direction crosswise of the machine to fold the short ends of the wrapper after the long sides have been folded. Each of the two crimpers o p , which fold the ends of the wrapper, fit in a cross-groove cut in the table-top, and down in this groove at the center of the table is the opening m , through which the lower plunger h moves. The size of the plunger-head h and the opening m correspond with the article (in this instance the gum) and the wrapper around it. The two crimpers l n and their action will be understood by reference to Figs. 2, 8, 9, and 10. These crimpers lie flat on the table-top, with their confronting ends, which act on the wrapper, normally flush with the sides of the opening m , Figs. 2 and 9. The crimper l has on its lower side a lug l^1 , which is engaged by the upper end of a lever l^2 , whose lower end carries a roller l^3 , that is acted on by a cam J, fixed on the first cross-shaft C. A spring-bolt q works in a socket in the table-top, and one end of the bolt presses against the upper end of lever l^2 . A spring acts on the bolt and yields when the cam J forces the lever in the opposite direction. Thus the spring-bolt q keeps the crimper l normally drawn back, while the cam J imparts a quick forward movement to the crimper. The crimper l projects from slot l^4 . (See Figs. 6 and 11.) The crimper n also has a lug n^1 , which is engaged by the upper end of a lever n^2 , whose lower end carries a roller n^3 , that is acted on by a cam J', fixed on the third cross-shaft C². This crimper has a spring-bolt q' , which is arranged in a socket in the table-top and operates exactly like the other spring-bolt already described. Before the crimpers l n can act both plungers h i , with the gum z' and wrapper between them, must

move downward to bring the gum in position into the cross-groove, as shown in Fig. 9, and thereby the sides of the wrapper are bent or folded upward. This leaves the upward-projecting sides of the wrapper in front of the ends of the two crimpers *ln*. The upper plunger *i* then moves up, as shown in Fig. 10. The two cams *JJ'*, which impart a quick forward movement to the two crimpers *ln*, respectively, are so "timed" that the crimper *l* will first move forward and fold one side of the wrapper on top of the gum *z'*, and as it recedes the other crimper *n* follows with a quick movement and folds over the opposite side of the wrapper, so as to lap upon the first-named fold. The ends are still unfolded. The upper plunger *i* then descends on the folded sides of the wrapper and the gum is thereby clamped between the lower and upper plungers. Both plungers and partly-wrapped gum then descend into the opening *m*. This movement serves to fold the ends of the wrapper upward, as shown in Fig. 11, leaving the said upward-folded ends in front of the ends of the crimpers *op*. The upper plunger *i* then rises and the crimpers *op* move toward each other and above the gum and fold down said upward-folded wrapper ends. The crimpers *op* then recede and the lower plunger rises and brings the wrapped gum against the upper plunger and subjects it to spring-pressure, which is the finishing operation of folding. Both plungers and gum then rise until the lower plunger *h* is even with the table-top, as seen in Fig. 2, and then the wrapped gum is ejected.

The two end-crimpers *op* are plainly shown in Figs. 6, 7, and 11. These crimpers consist of two movable cross-bars, one at each side of the table-top. The confronting ends of the crimpers are normally adjoining the ends of the opening *m* in the table-top. Each of these crimpers has on its upper side two pins *r*, separated by a space, in which is a small spiral spring *s*, and an upright lever *L* has at its upper end a lateral prong or arm *t*, that takes between said two pins and bears upon the small spring *s*. Each of the two upright levers has a pivot-bolt *t'*, which secures it at the side of a rigid arm *N*, depending below the table-top. The lower end of each upright lever *L* has a small lateral lug *u*, projecting toward the side of the cam *h'* on second cross-shaft *C'*, and the side of this cam has a small beveled lug *u'*, which strikes the lug on the lever and moves the lower end of said levers outward, causing their upper ends and the two crimpers *op* to move inward toward each other and thereby fold down the upward-projecting wrapper ends seen in Fig. 11. A spiral spring *v* (see Fig. 7) has one end attached to a fixed pin *v'* and the other end attached to the upper end of the lever *L*. This spring serves to move the lever and end-crimper outward. Thus the end-crimpers *op* are moved outward or spread apart by

the springs *v* and are moved inward to fold the ends of the wrapper by action of the beveled lugs *u* and *u'*.

From the foregoing description it will be seen that the sides 1 of the wrapper are bent or folded upward, as shown in Figs. 9 and 13, by contacting with the sides of the cross-groove and opening *m* in the top of the table when the plungers *i* *h* first move the package downward. The upward-bent sides are folded flat one after the other on top of the article, as shown in Figs. 14 and 15. Then the ends 2 of the wrapper are turned upward, as in Figs. 11 and 16, by contacting with the ends of the opening *m* when the plunger makes the second movement downward of the package. Finally the upward-turned ends 2 are folded simultaneously flat on top of the article, as in Fig. 17.

The forward end of the pusher-plate *F* carries two flexible-wire pushers *w*, whose function is to push forward a wrapped package when it is completely wrapped. These two pushers *w* are attached at either side of the forward end of the pusher-plate, and the front end of each wire is bent at an angle, as at *w'*, and point toward each other. The two bent ends *w'* are far enough in front of the forward end of the pusher-plate to allow space for the gum *z'* that is to be wrapped. When the pusher-plate *F* has receded, the wire-pusher ends *w'* will remain forward of the stack of chewing-gum in the hopper-tube, as indicated by broken lines in Fig. 7. Accordingly the operation is as follows: The pusher-plate *F* moves forward and pushes the requisite number of strips of chewing-gum from the bottom of the hopper-tube. The upper plunger *i* descends and clamps the chewing-gum, as seen in Fig. 8. Then the pusher-plate recedes, and the two wire pushers will spring apart or spread enough to clear the chewing-gum held between the plungers and draw back behind said clamped chewing-gum. Now the pusher-plate *F* remains back until the wrapper has been folded and the package is free to be pushed away. Then as the pusher-plate moves forward again to act on the chewing-gum in the hopper-tube the bent-wire pushers *w'* will force the said wrapped package forward.

At the discharge end of the machine is an inclined spout or conductor *P*, down which the wrapped packages slide.

A suitable tension device is provided for the paper-roll *d*³ to prevent it from unwinding too freely. This consists of a strap *x*, split at one end and forming two branches *x'*, which are secured to the slide-trough. The said strap passes over the paper-roll *d*³ and hangs down, and at its end a weight *y* is attached. The size of this weight of course determines the degree of tension applied to the roll.

From this description of the parts and the action of each part the operation of the machine will be understood.

The attendant who operates the machine has only to supply the hopper-tube with strips of gum or whatever article is to be wrapped and to occasionally place a fresh roll of tin-foil and paper in position. The operations of the machine are all entirely automatic. The ordinary capacity or speed of the machine is to deliver about forty wrapped packages a minute, though this might be somewhat increased.

Having thus described my invention, what I claim is—

1. In a wrapping-machine the combination of three cross-shafts all geared together by wheels of equal size; a table-top on which the wrapper slides, and provided with parallel slots; oscillatory arms below the table-top and projecting up through said slots to feed the said wrapper; a cam on the first cross-shaft and which actuates the said arms; a lower plunger having a vertical movement through the table-top and carried by a cross-head; cams on the second cross-shaft which actuate the said cross-head and lower plunger; an upper plunger directly above the lower plunger and carried by a vertically-reciprocating frame; a cam on the third cross-shaft and which actuates the said frame and upper plunger; two reciprocating crimpers to fold the sides of the wrapper; two reciprocating crimpers to fold the ends of the wrapper; and mechanism connecting the said cross-shafts and crimpers.

2. In a wrapping-machine, the combination of a vertical hopper-tube; a table-top on which the wrapper slides and provided with parallel slots; an angle-lever, e^2 , whose pivots are loose in oblong bearings whereby the lever can tilt and also lift slightly and wrapper-feed arms carried by said angle-lever and their free ends projecting up through said parallel slots to act on the wrapper; a shaft having a cam, f^6 , which lifts the said angle-lever; and another shaft having a cam, f^3 , which tilts the angle-lever and thereby imparts motion to the said feed-arms.

3. In a wrapping-machine, the combination of a vertical hopper-tube; a table-top on which the wrapper slides and provided with parallel slots; a reciprocating pusher-plate to force the article to be wrapped from the bottom of the hopper-tube; an angle-lever below the table-top and carrying wrapper-feed arms whose free ends project up through said parallel slots to act on the wrapper and said angle-lever also carrying throw-arms, g^2 , which connect with the said pusher-plate; and a shaft

having a cam, f^3 , which tilts the said angle-lever.

4. In a wrapping-machine, the combination of a table-top on which the wrapper slides and provided with a slot; an angle-lever below the table-top and having a socket with a side set-screw; a feed-arm, e , having at one end a groove and said end fitted loosely in the socket on the angle-lever and the arm retained by the said set-screw; a spring pressing said arm outward; and a shaft having a cam, f^3 , which tilts the angle-lever and thereby imparts motion to the said feed-arm.

5. In a wrapping-machine, the combination of a vertical hopper-tube; an upper plunger parallel with said tube—said plunger to press the article to be wrapped; a bridge-piece, j' , spanning the table-top between the hopper-tube and upper plunger; a vertically-moving knife, j , carried by a head in said bridge-piece; and a pusher-plate, F , which forces the article to be wrapped from the hopper-tube, below the knife, and under the said plunger.

6. In a wrapping-machine, the combination of a table-top having an opening, m ; a vertical hopper-tube; a reciprocating pusher-plate, F , to force the articles to be wrapped from the hopper-tube; a lower plunger, h , movable up and down in said opening; an upper plunger, i , movable up and down in said opening; two crimper-plates, l , n , reciprocating endwise of the machine for folding the sides of the wrapper; two crimper-plates, o , p , reciprocating crosswise of the machine for folding the ends of the wrapper; and a knife to cut the wrapper—said knife movable between the hopper-tube and upper plunger.

7. In a wrapping-machine, the combination of a table-top having an opening, m ; a vertical hopper-tube; a lower plunger, h , movable up and down in said opening; an upper plunger, i , movable up and down in said opening; a knife to cut the wrapper—said knife movable between the hopper-tube and upper plunger; a reciprocating pusher-plate, F , to force the article to be wrapped from the hopper-tube to the said plungers; and two flexible-wire pushers carried by said pusher-plate to push forward a wrapped package from the plungers.

In testimony whereof I affix my signature in the presence of two witnesses.

JOHN F. HARGRAVES.

Witnesses:

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CHAPIN A. FERGUSON.