Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

Filed July 26, 1930 24 Sheets-Sheet 1

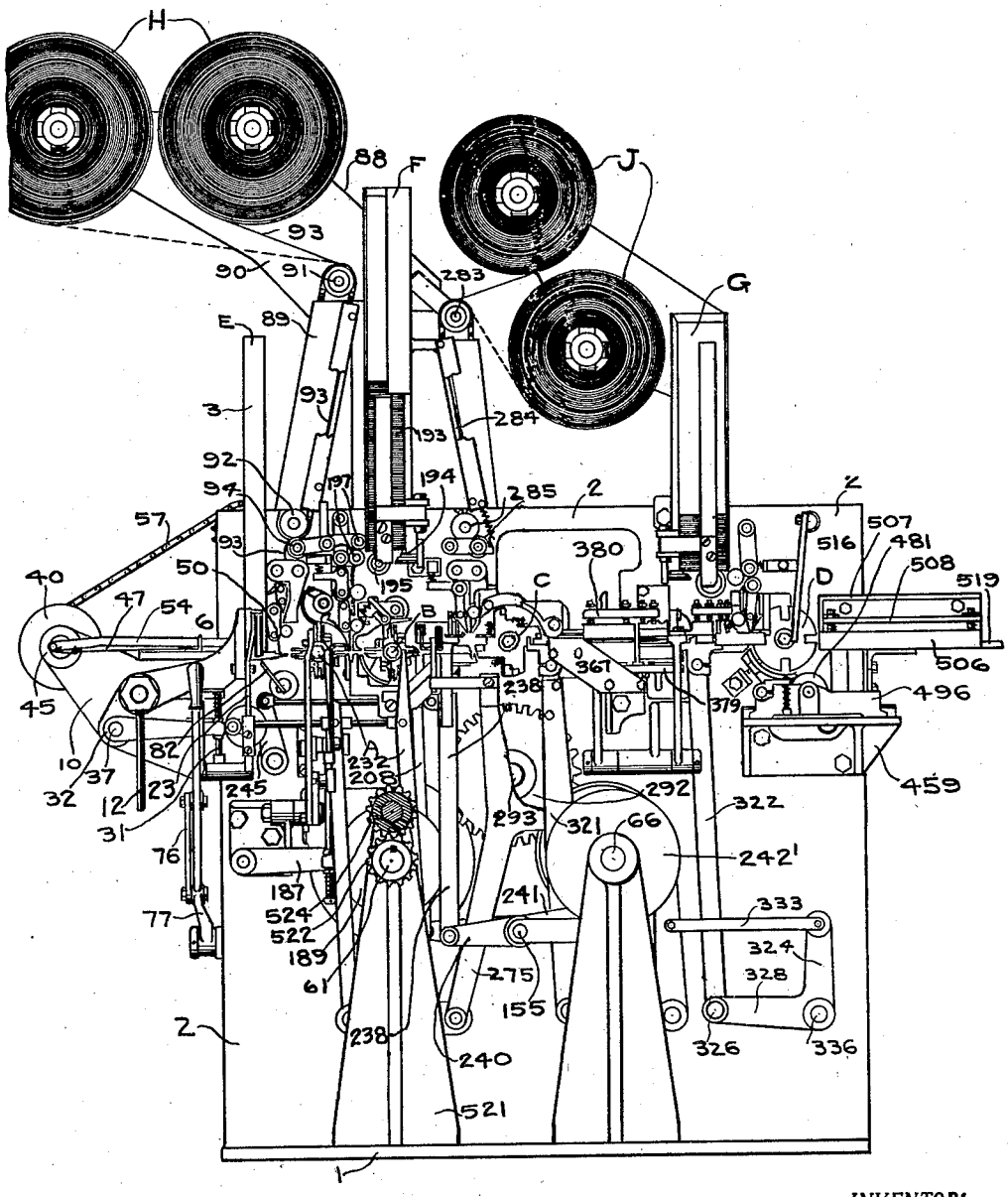


FIG. 1

INVENTOR:
Michael J. Milmoe,
BY Chas. M. Nissen,
ATTORNEY.

Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

Filed July 26, 1930 24 Sheets-Sheet 2

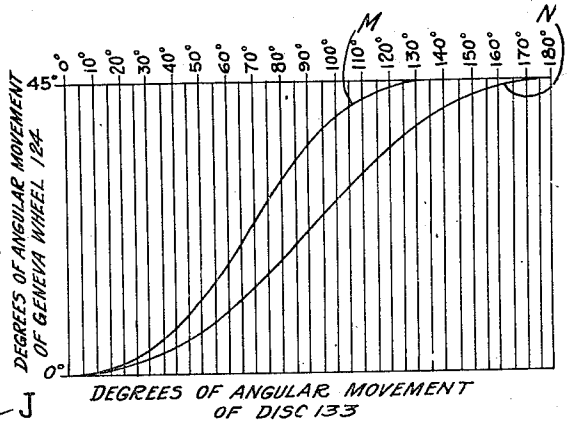


FIG. 93.

FIG 2

INVENTOR:
Michael J. Milmoe,
BY Chas. M. Nissen,
ATTORNEY.

Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

Filed July 26, 1930 24 Sheets-Sheet 3

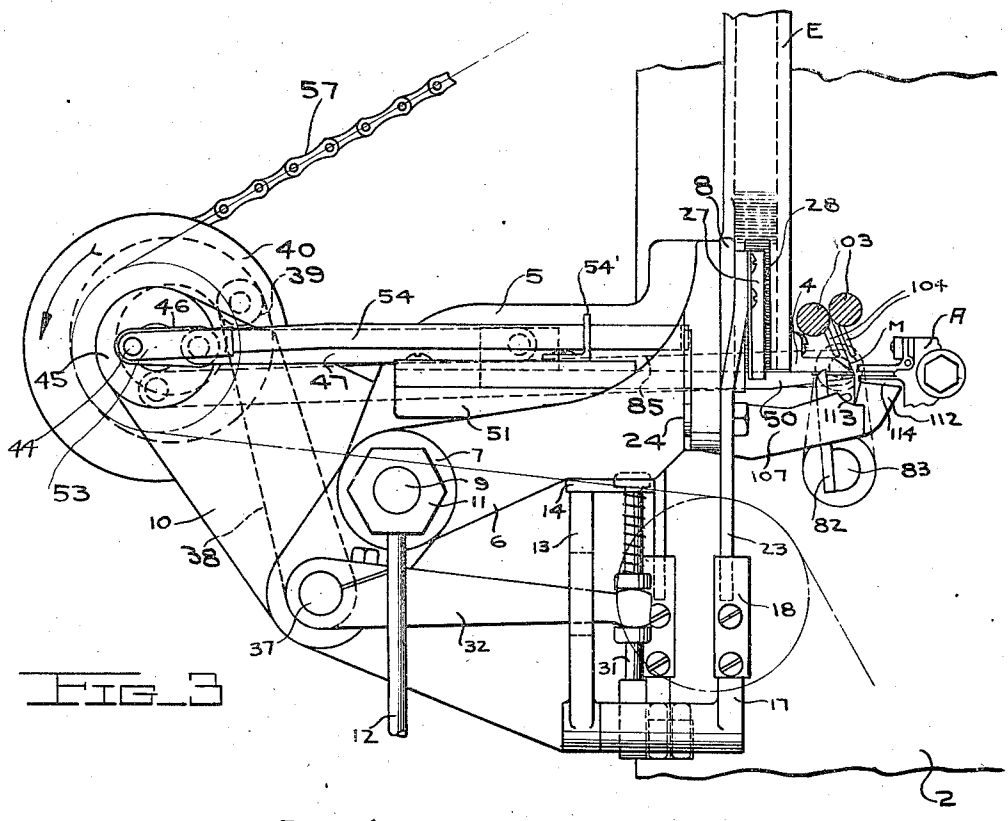


FIG 3

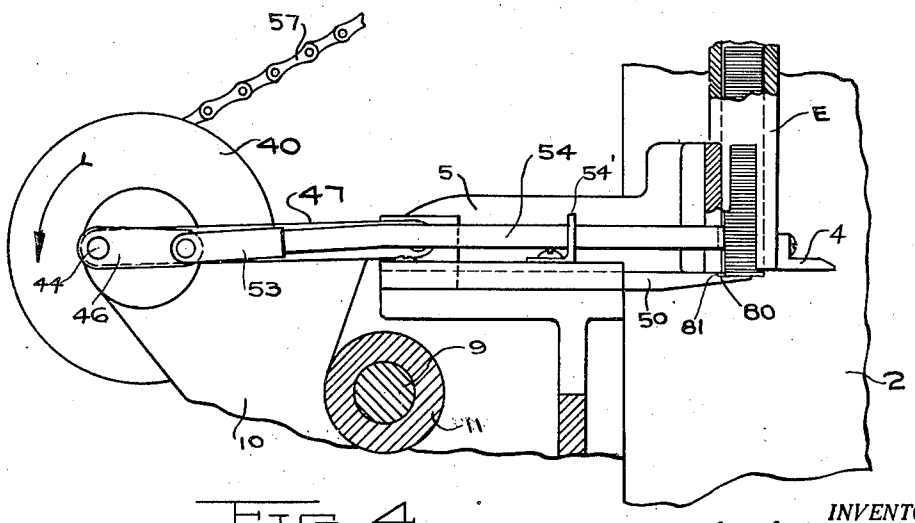


FIG 4

INVENTOR:
Michael J. Milmoe,
BY Chas. M. Nissen,
ATTORNEY.

Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

Filed July 26, 1930 24 Sheets-Sheet 4

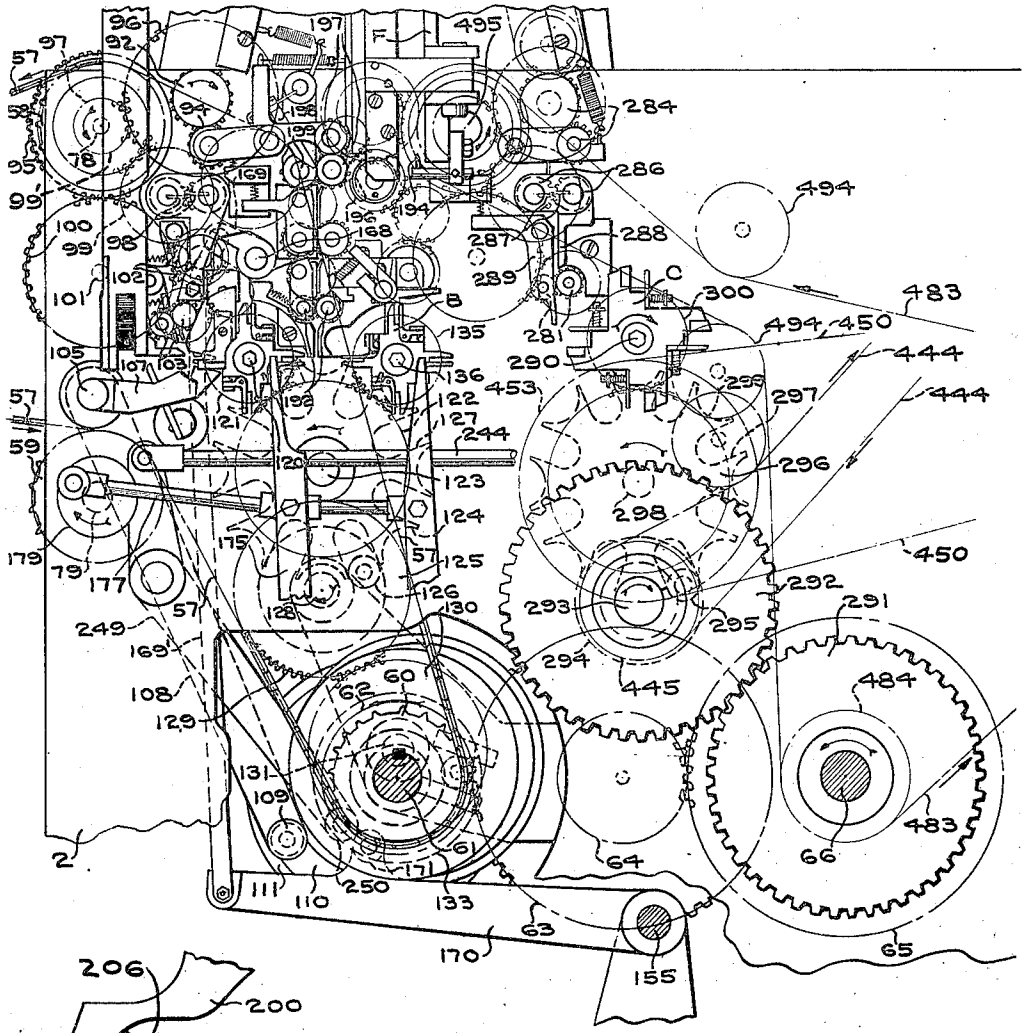


FIG. 5

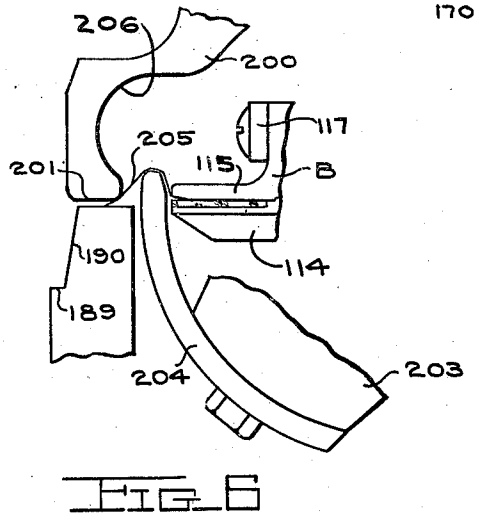


FIG. 6

INVENTOR:
Michael J. Milmoe,
BY Chas. M. Nissen,
ATTORNEY.

Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

Filed July 26, 1930 24 Sheets-Sheet 5

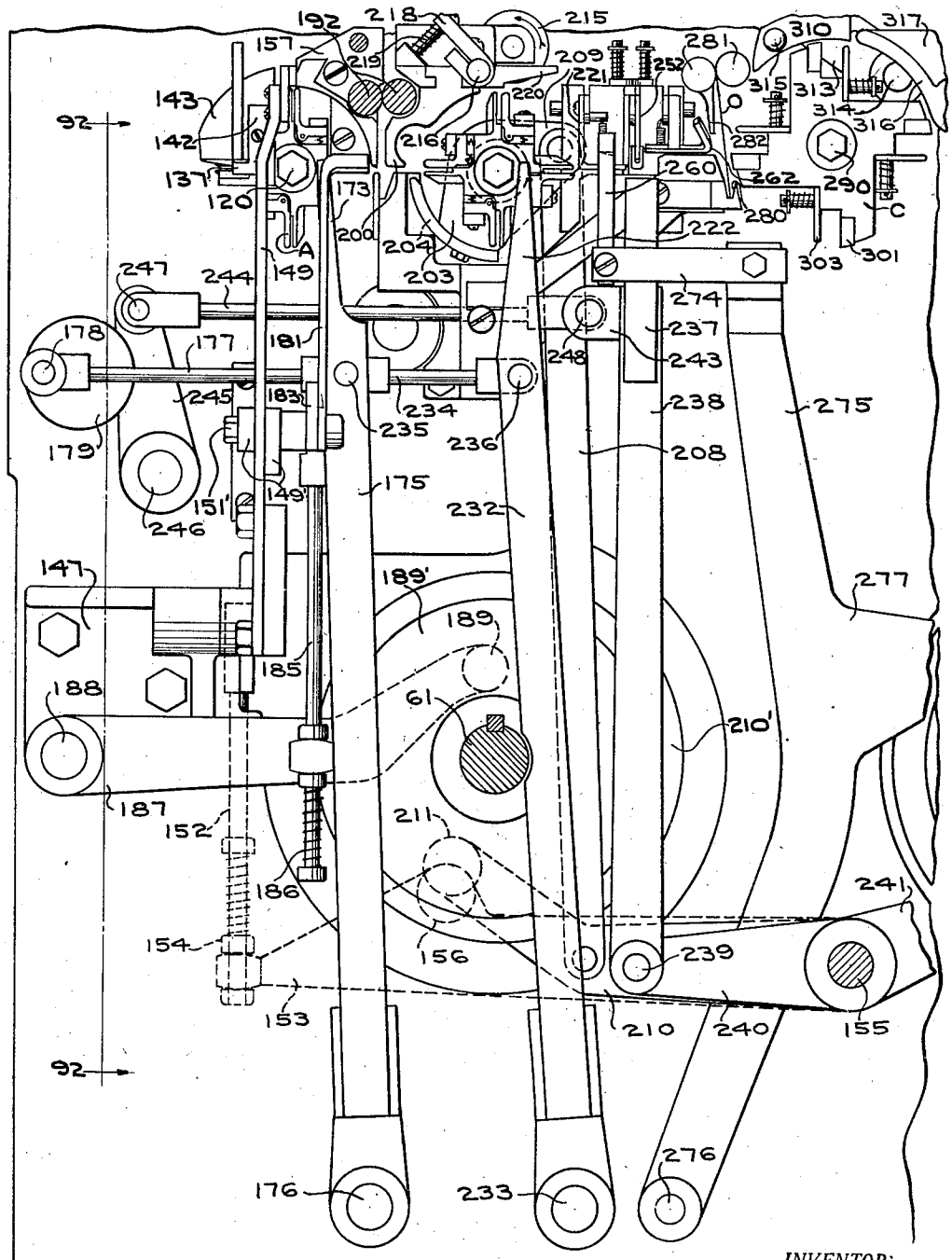


FIG. 7

INVENTOR:
Michael J. Milmoe,
BY Chas. M. Nissen,
ATTORNEY.

Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

Filed July 26, 1930 24 Sheets-Sheet 6

FIG. 8

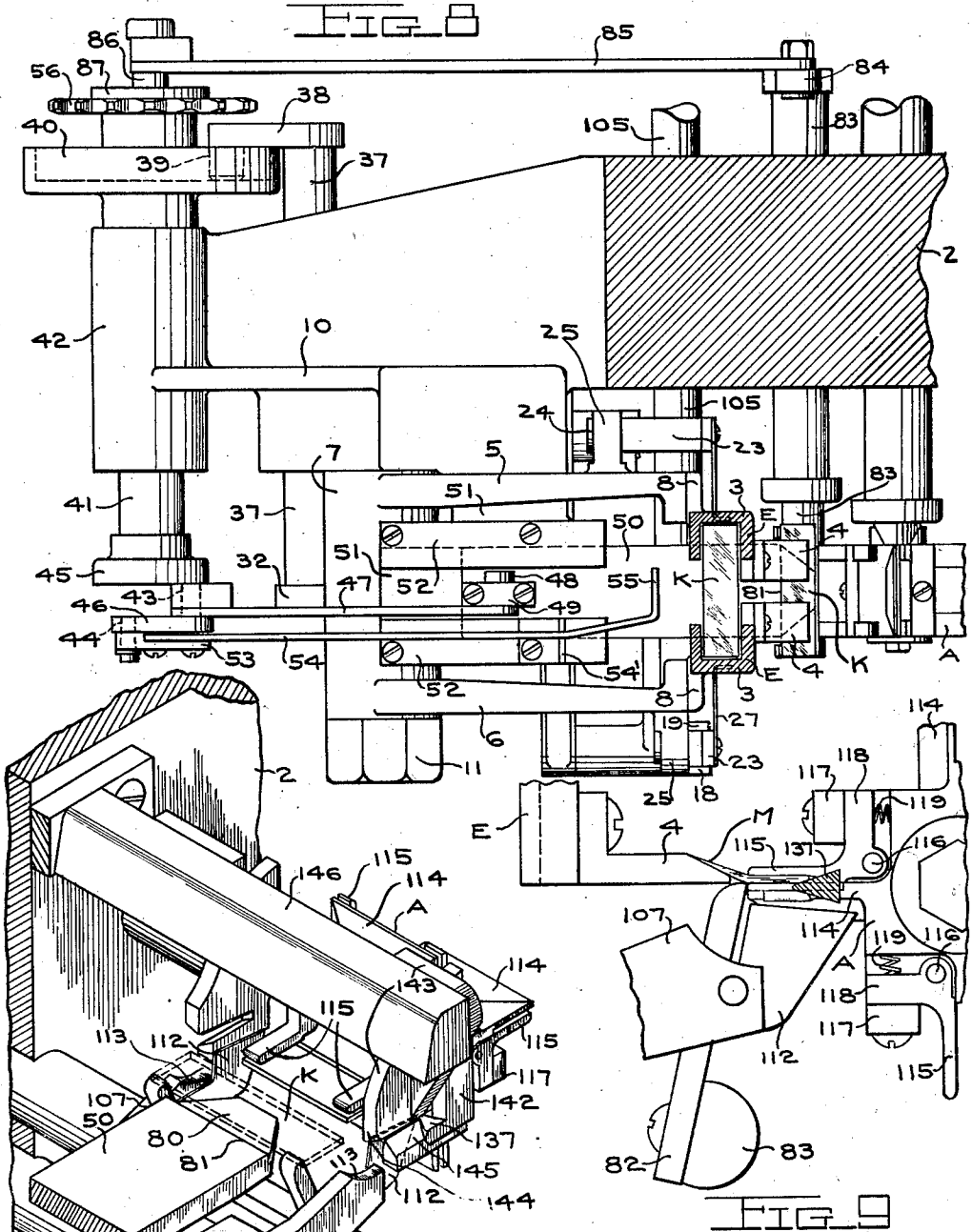


FIG. 9

FIG. 10

INVENTOR:
Michael J. Milmoe,
BY Chas. M. Nissen,
ATTORNEY.

Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

Filed July 26, 1930 24 Sheets-Sheet 7

FIG 11

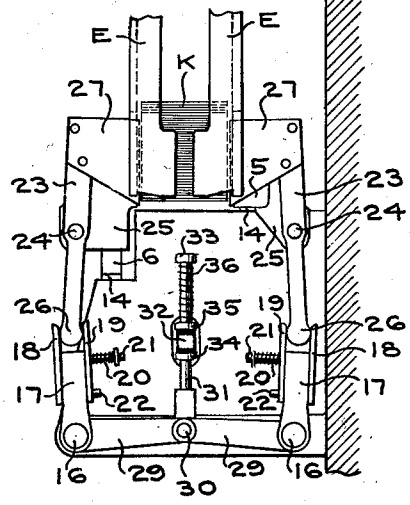


FIG 14

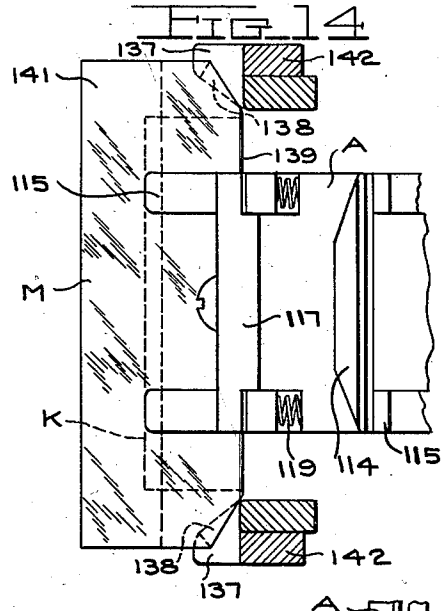
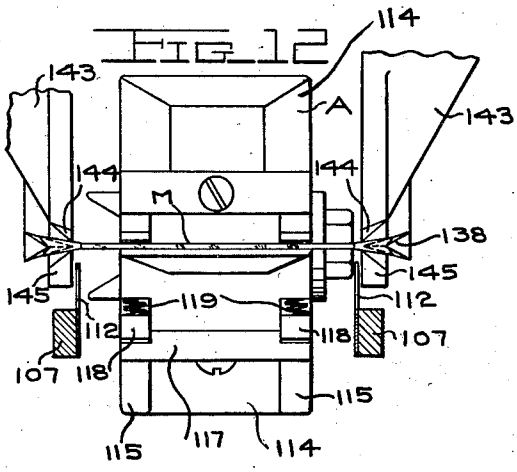


FIG 12



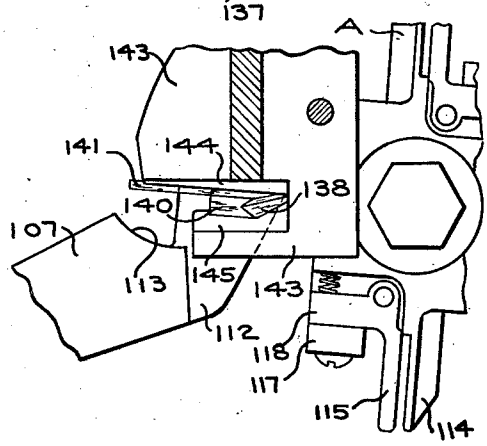


FIG 15

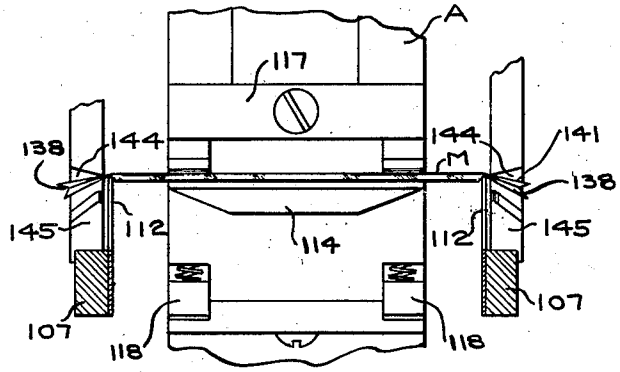


FIG 13

INVENTOR:
Michael J. Milmoe,
BY Chas. M. Nissen,
ATTORNEY.

Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

Filed July 26, 1930 24 Sheets-Sheet 8

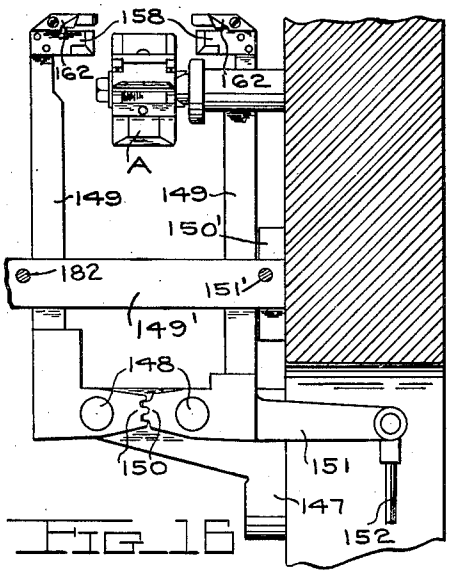


FIG. 16

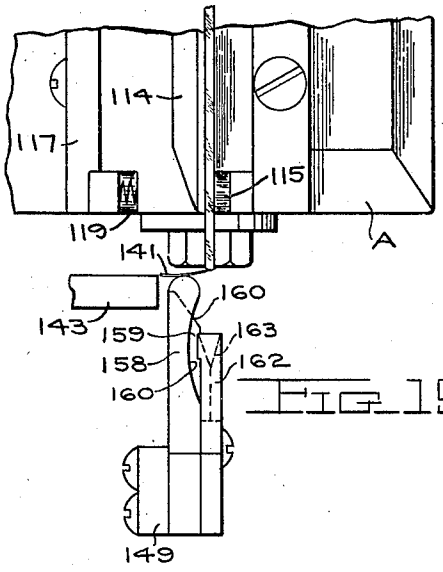


FIG. 19

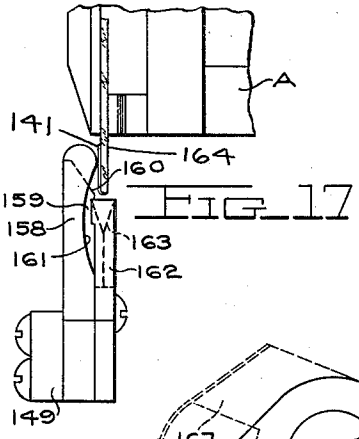


FIG. 17

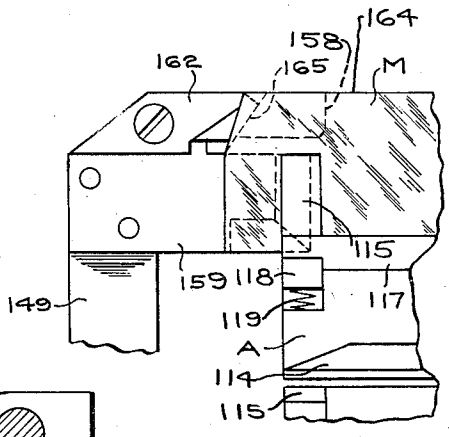


FIG. 20

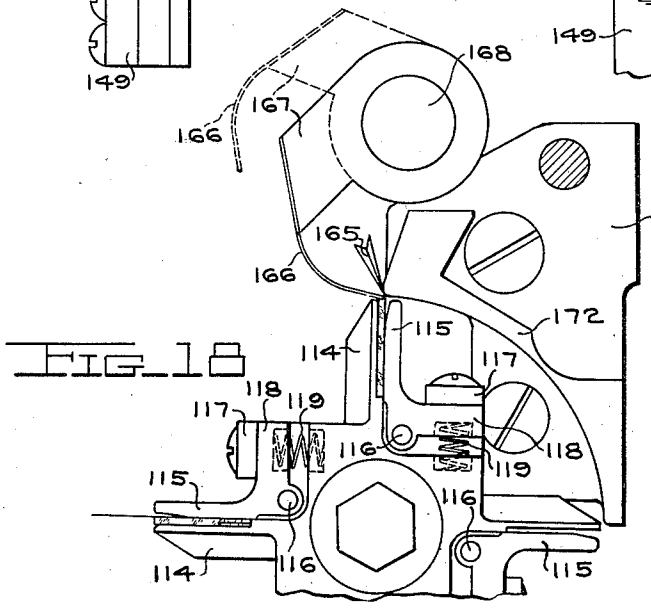


FIG. 18

INVENTOR:
Michael J. Milmoe,
BY Chas. M. Nissen,
ATTORNEY.

Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

Filed July 26, 1930 24 Sheets-Sheet 9

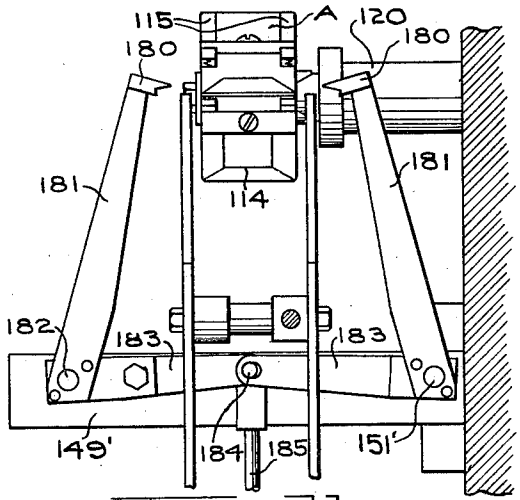


FIG. 21

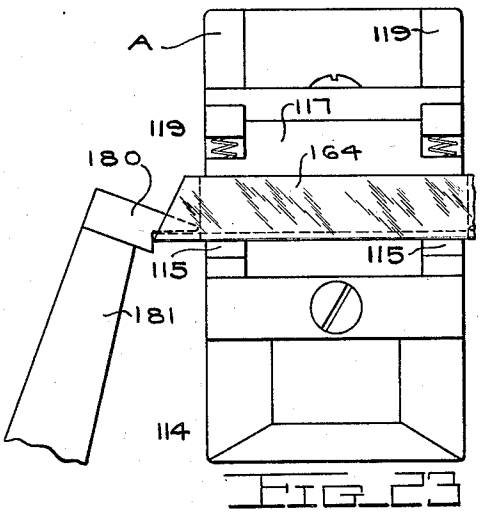


FIG. 23

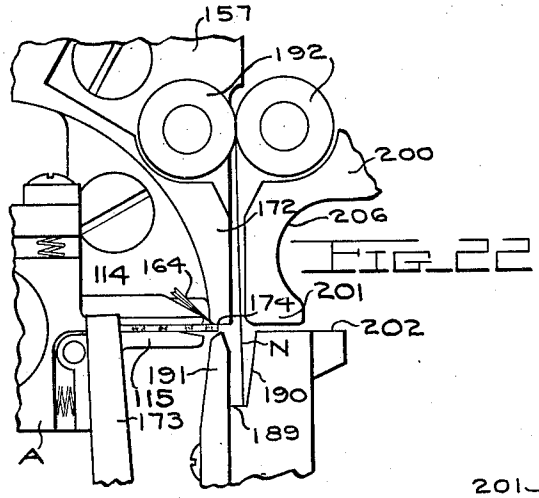


FIG. 22

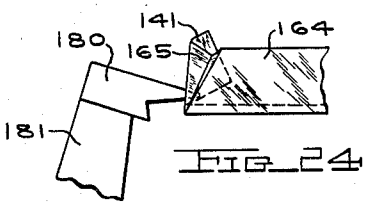


FIG. 24

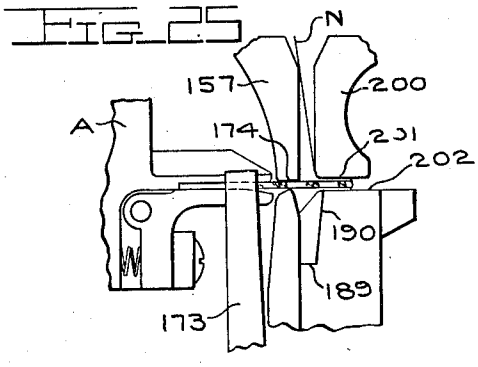


FIG. 25

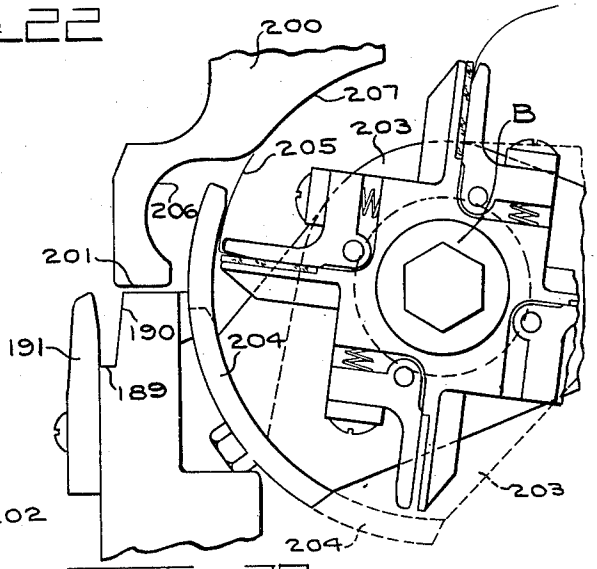


FIG. 26

INVENTOR:
Michael J. Milmoe,
BY Chas. M. Nissen,
ATTORNEY.

Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

Filed July 26, 1930 24 Sheets-Sheet 10

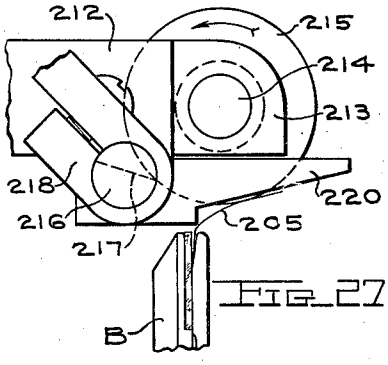


FIG. 27

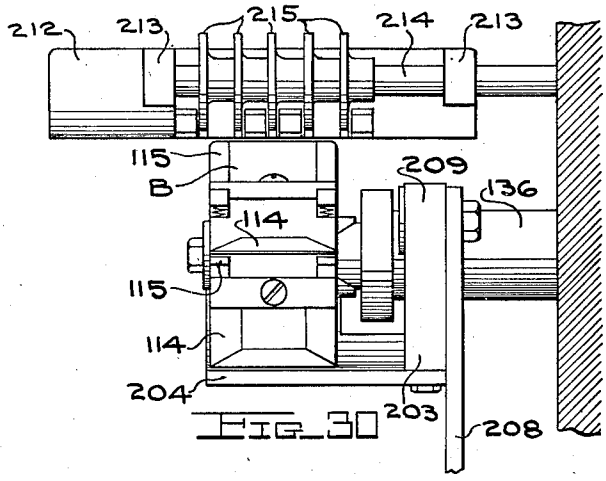
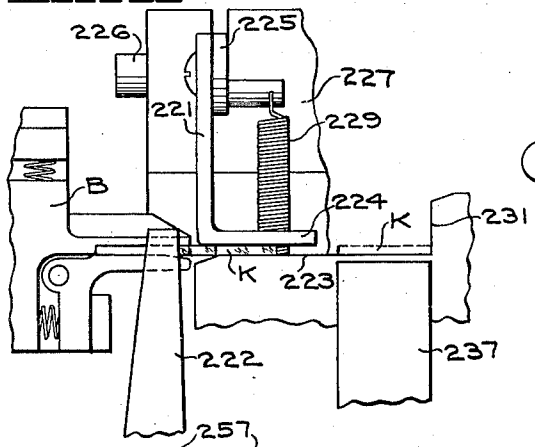


FIG. 30

FIG. 28



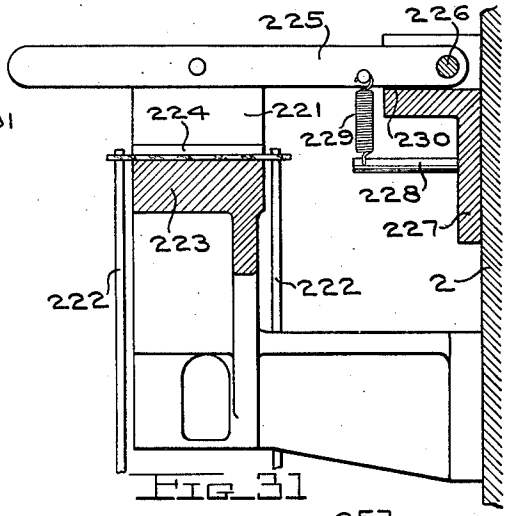


FIG. 31

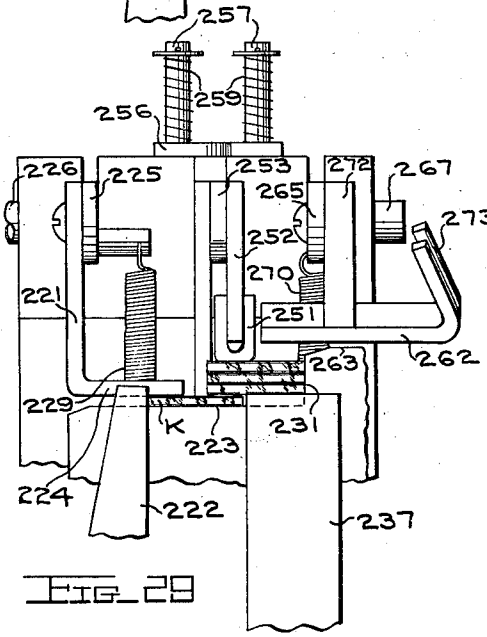


FIG. 29

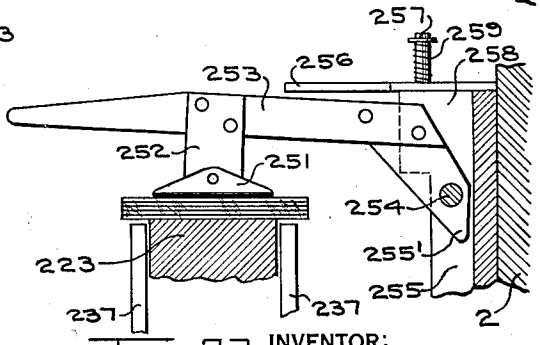


FIG. 32

INVENTOR:
Michael J. Milmoe,
BY Chas. M. Nissen,
ATTORNEY.

Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

Filed July 26, 1930 24 Sheets-Sheet 11

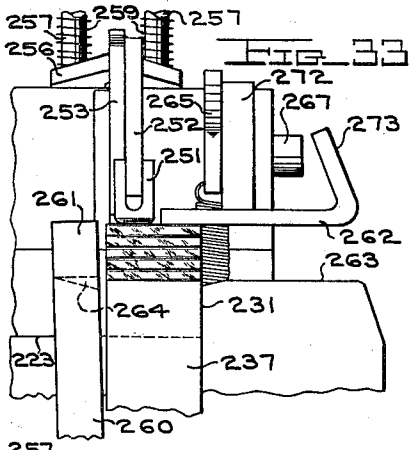


FIG. 33

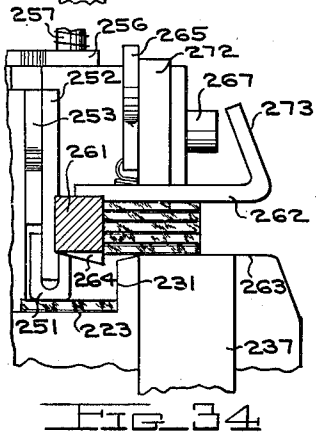
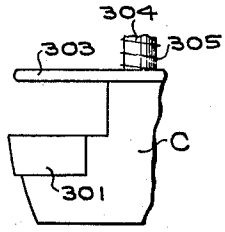


FIG. 34



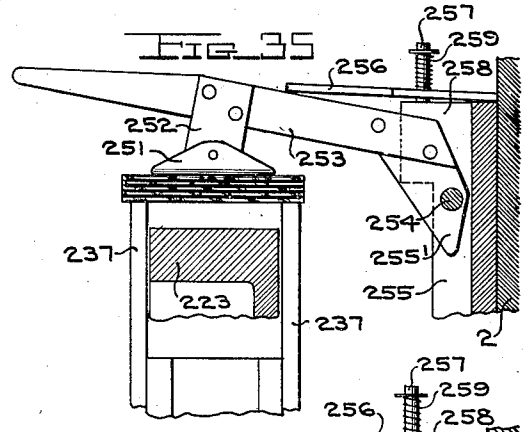


FIG. 35

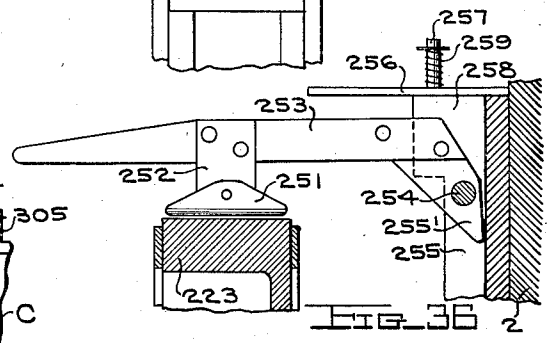


FIG. 36

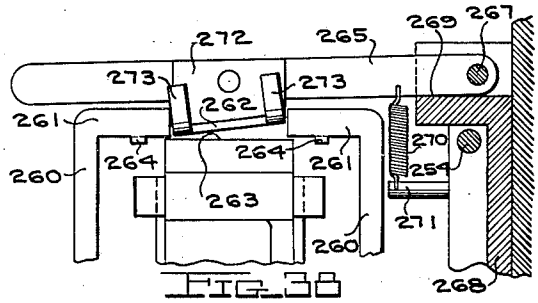


FIG. 38

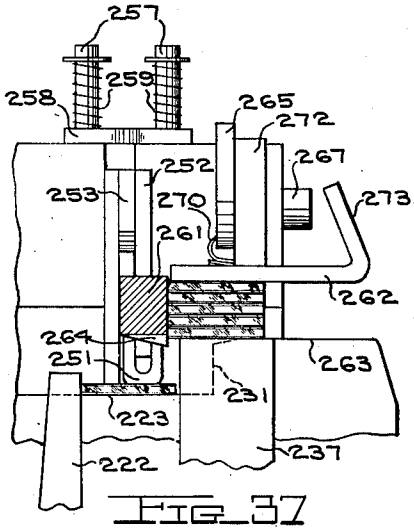


FIG. 37

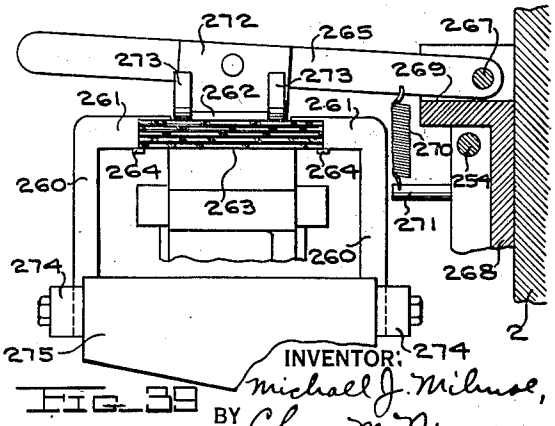


FIG. 39

INVENTOR:
Michael J. Milmoe,
BY Chas. M. Nissen,
ATTORNEY.

Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

Filed July 26, 1930 24 Sheets-Sheet 12

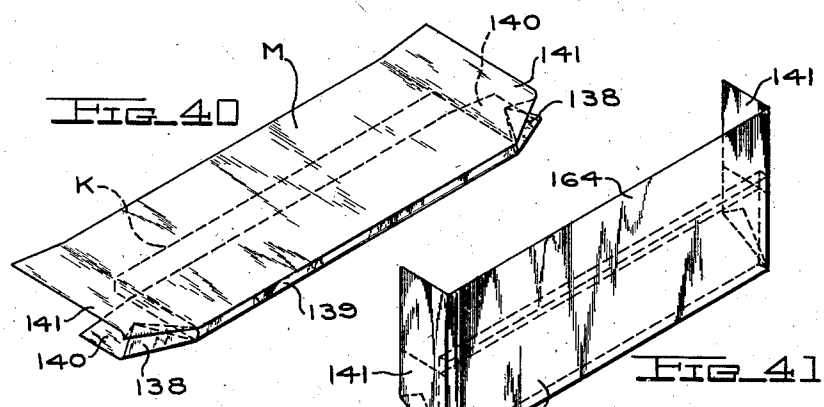


FIG. 40

FIG. 41

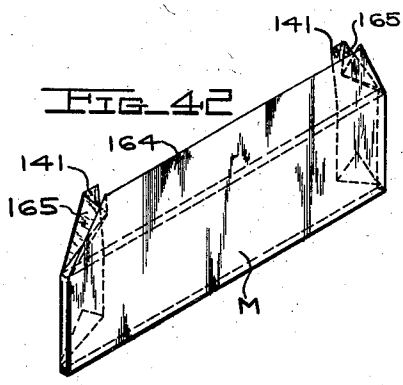


FIG. 42

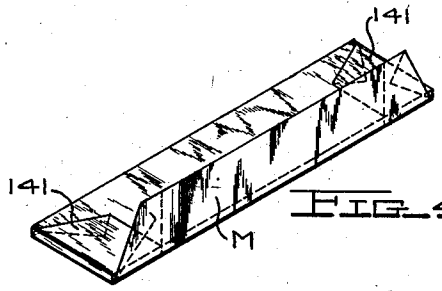


FIG. 43

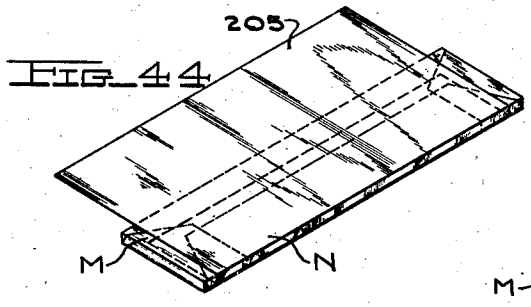


FIG. 44

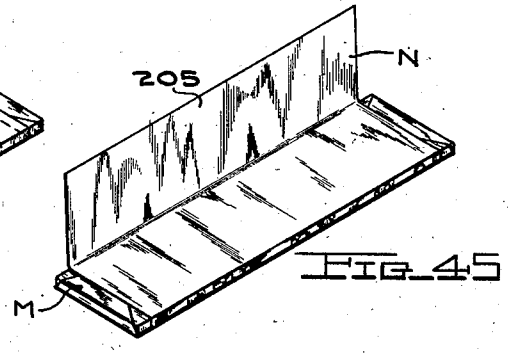


FIG. 45

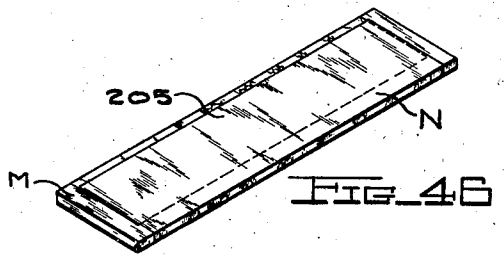


FIG. 46

INVENTOR:
Michael J. Milmoe,
BY Chas. M. Nissen,
ATTORNEY.

Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

Filed July 26, 1930 24 Sheets-Sheet 13

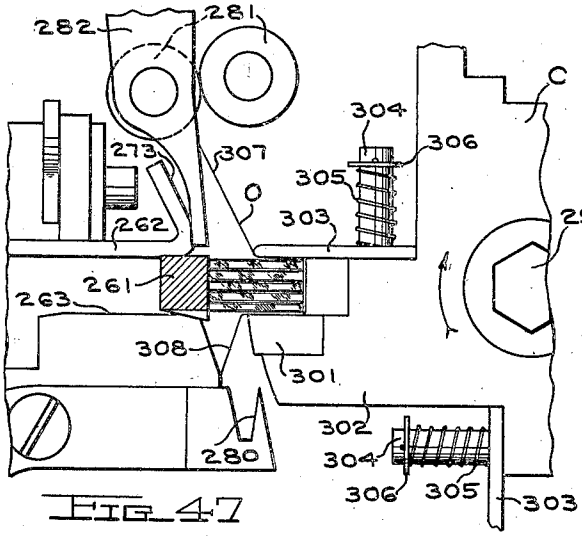


FIG. 47

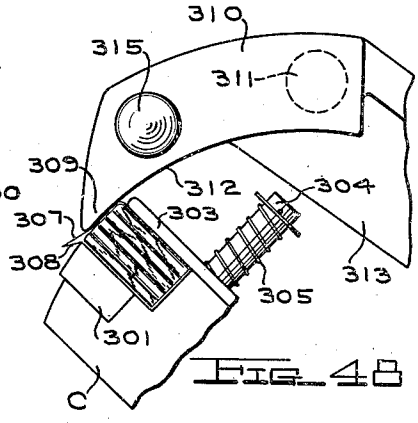


FIG. 48

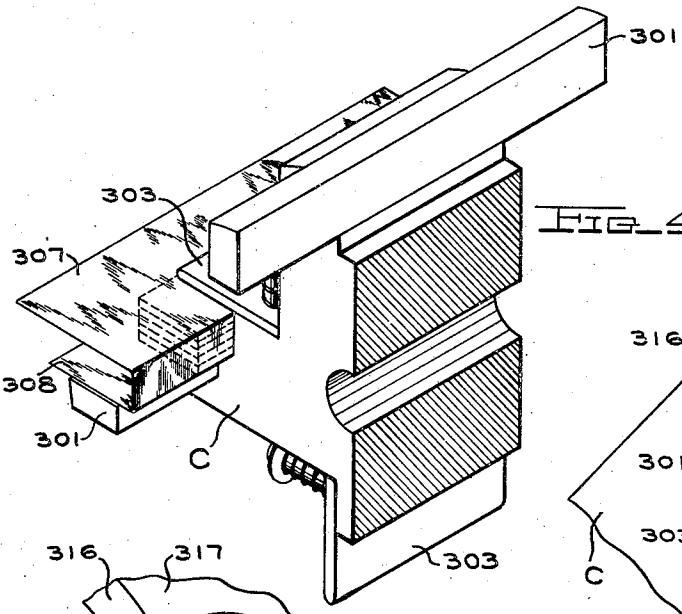


FIG. 49

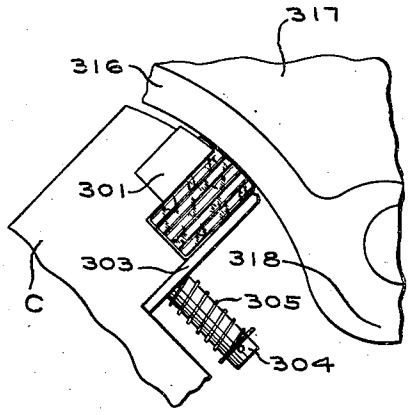


FIG. 51

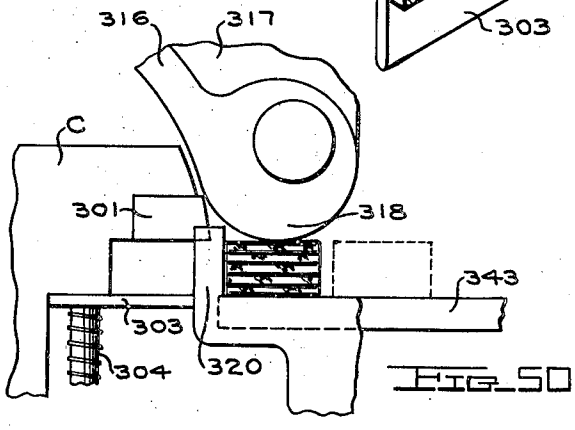


FIG. 50

INVENTOR:
Michael J. Milmoe,
BY Chas. M. Nissen,
ATTORNEY.

Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

Filed July 26, 1930 24 Sheets-Sheet 14

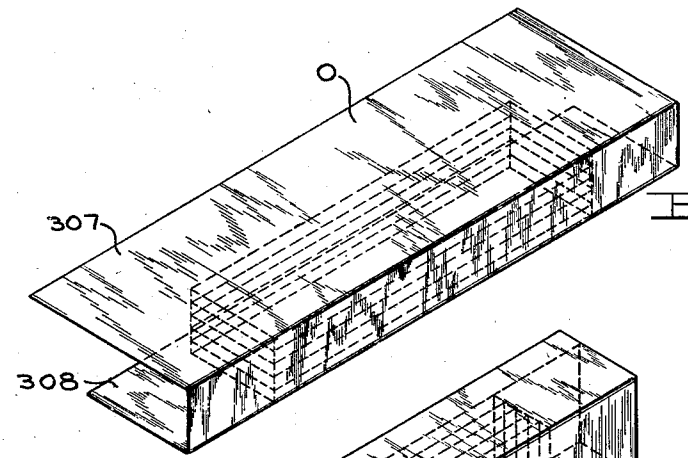


FIG. 52

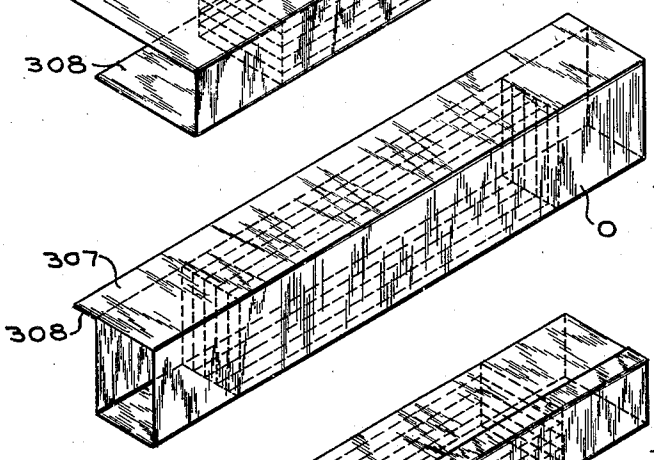


FIG. 53

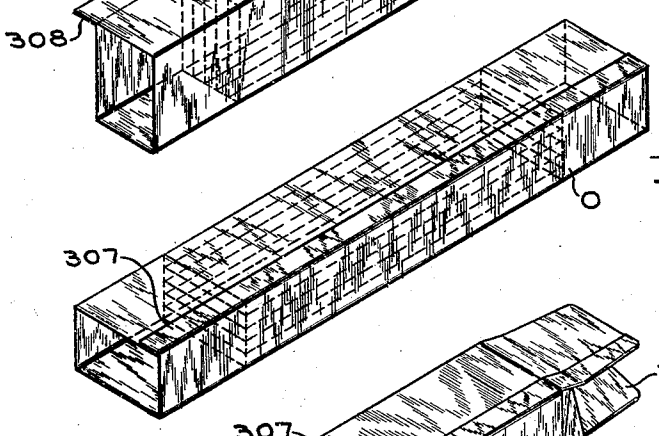


FIG. 54

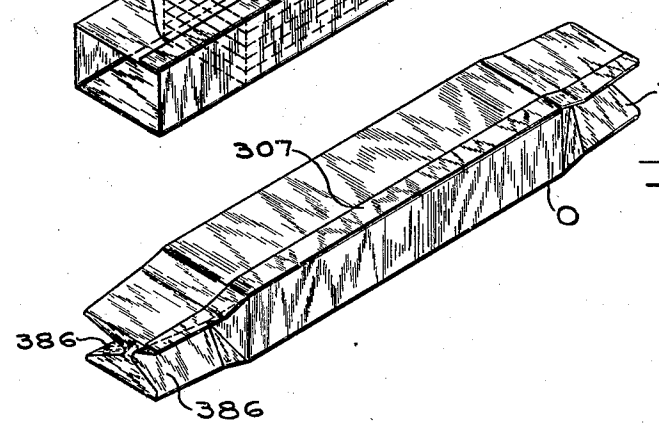


FIG. 55

INVENTOR:
Michael J. Milmoe,
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ATTORNEY.

Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

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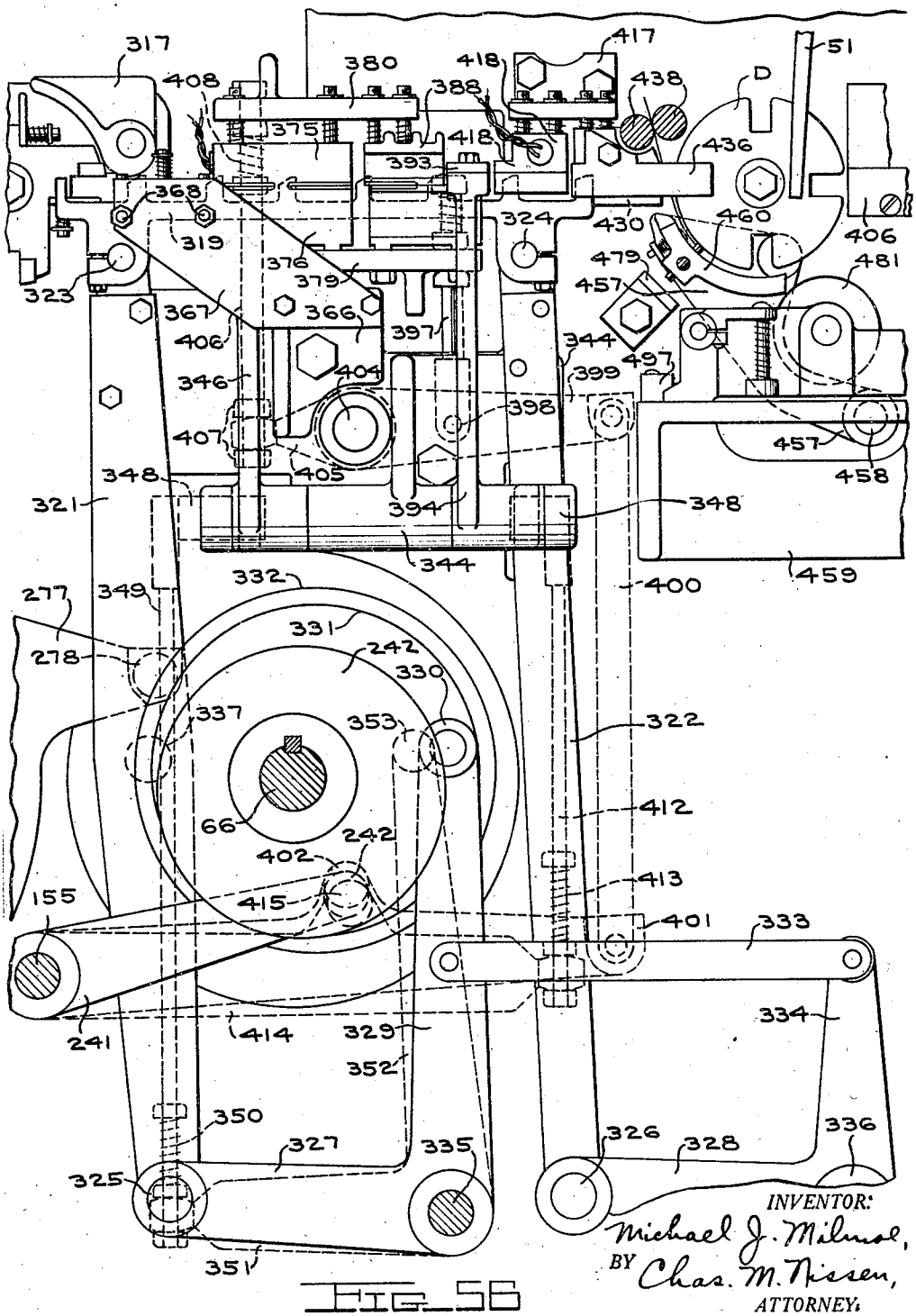


FIG. 56

INVENTOR:
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Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

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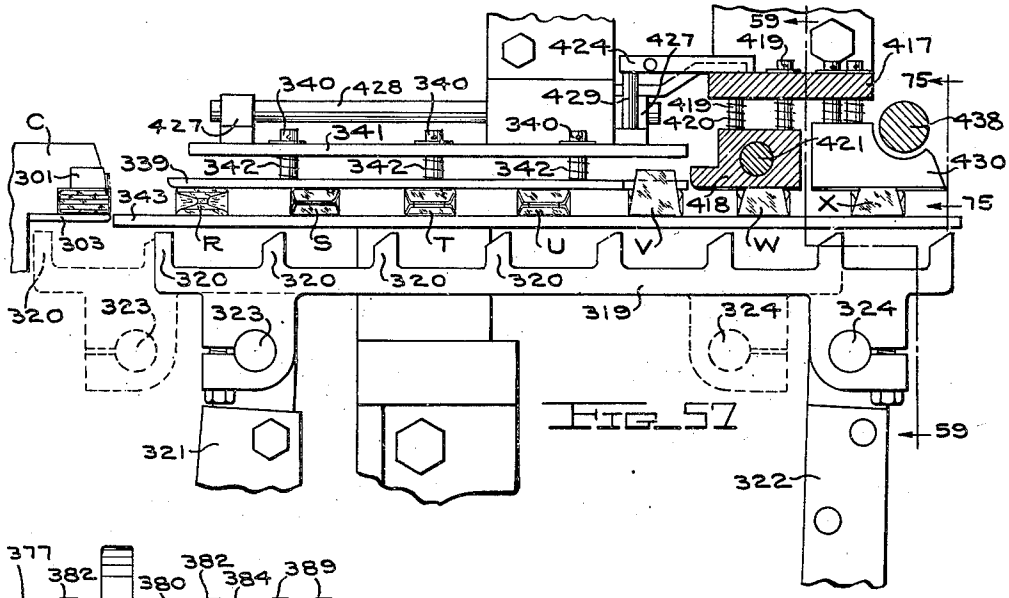


FIG. 57

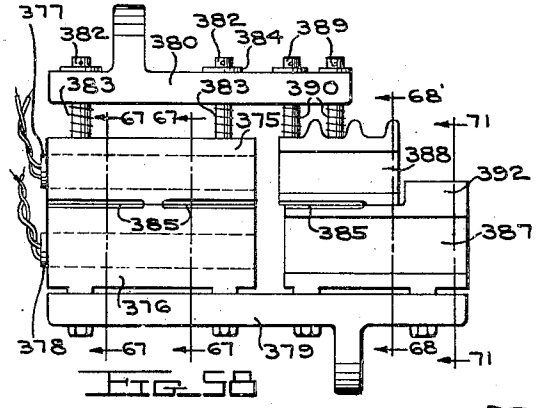


FIG. 58

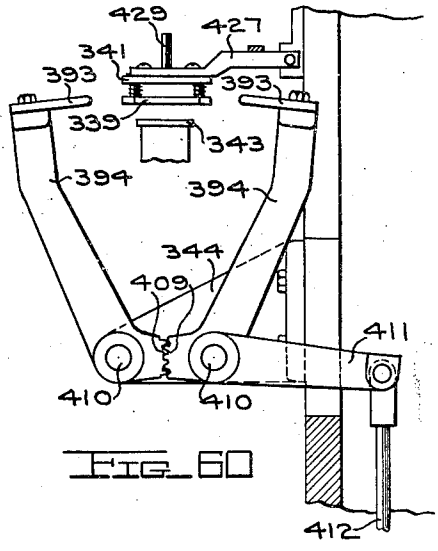


FIG. 60

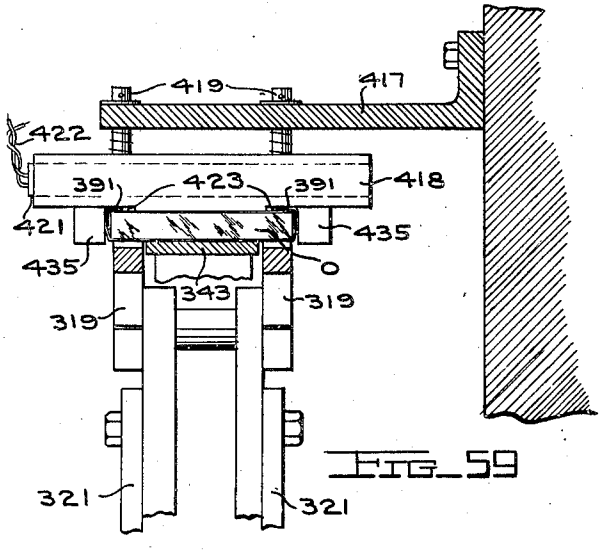


FIG. 59

INVENTOR:
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GUM WRAPPING MACHINE

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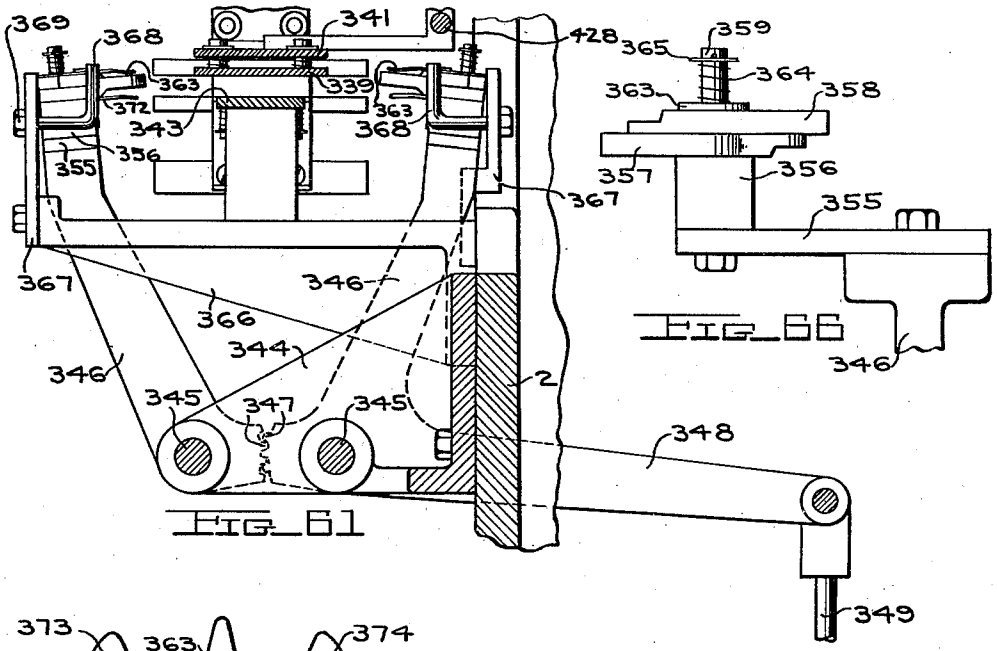


FIG. 61

FIG. 66

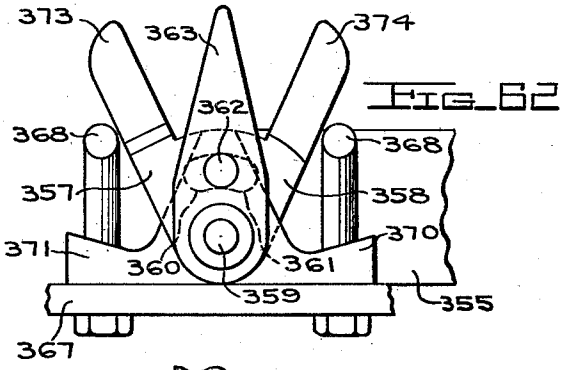


FIG. 62

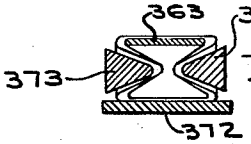


FIG. 64

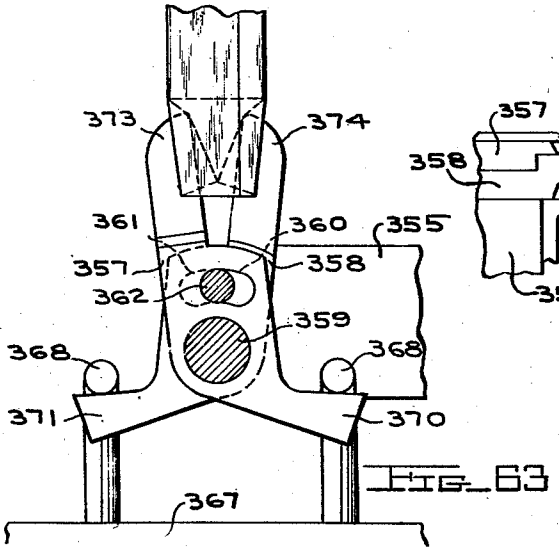


FIG. 63

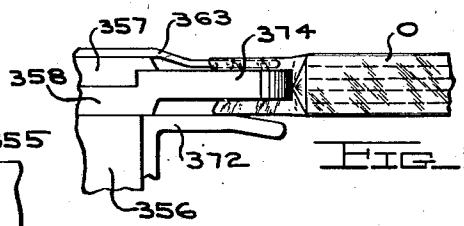


FIG. 65

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ATTORNEY.

Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

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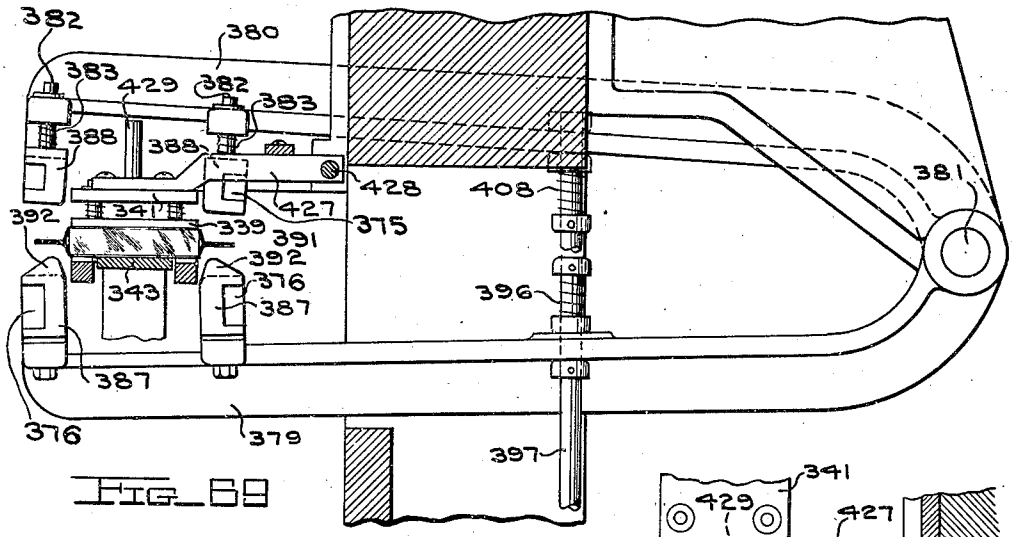


FIG. 69

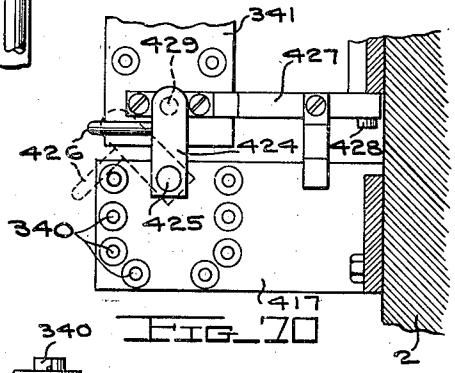


FIG. 70

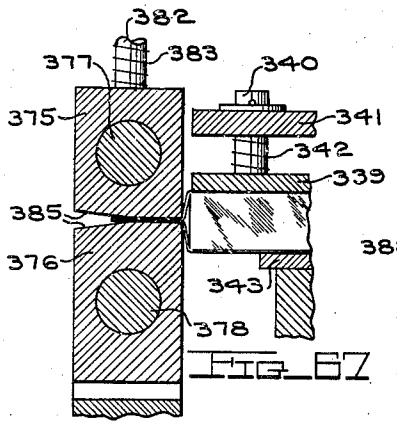


FIG. 67

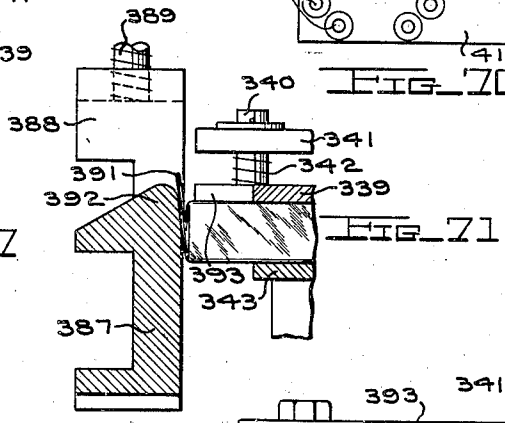


FIG. 71

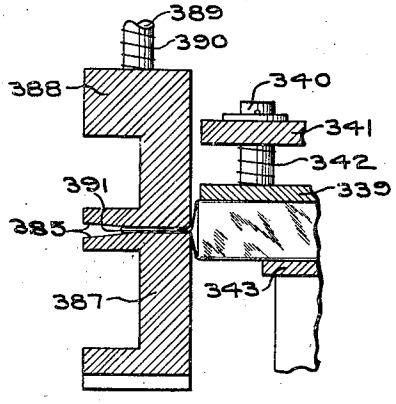


FIG. 68

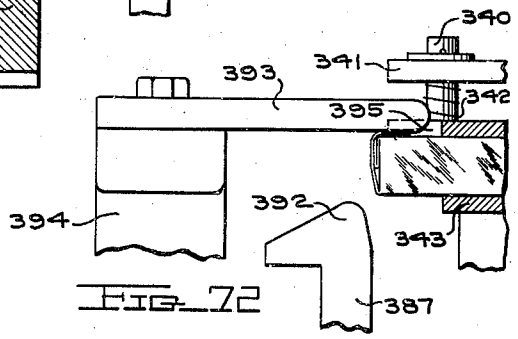


FIG. 72

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Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

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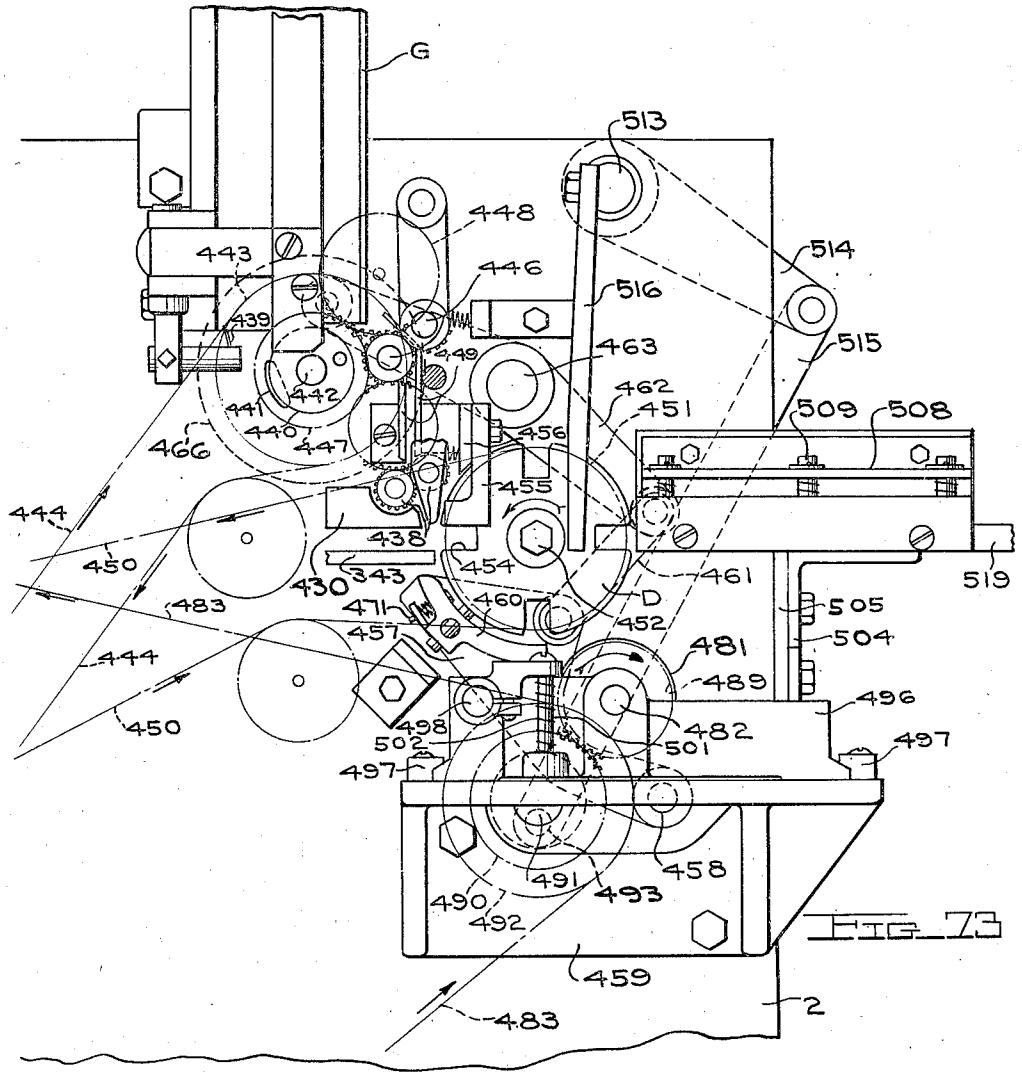


FIG 73

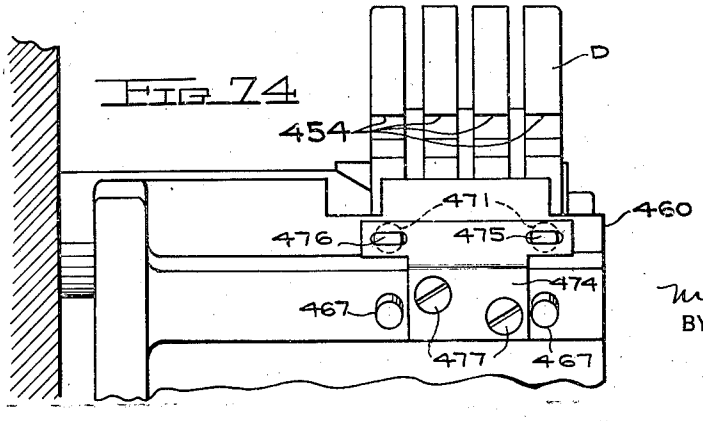


FIG 74

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Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

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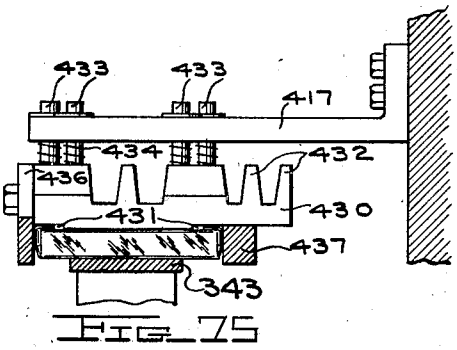


FIG. 75

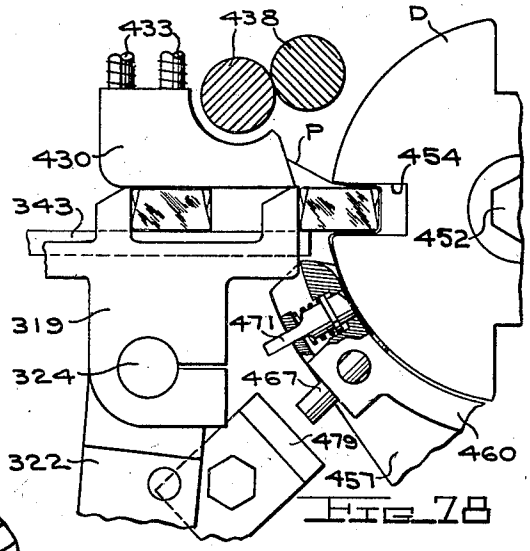


FIG. 78

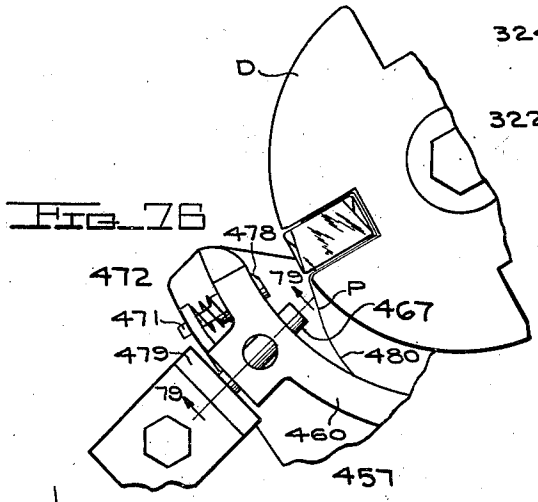


FIG. 76

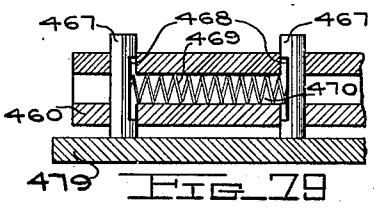


FIG. 79

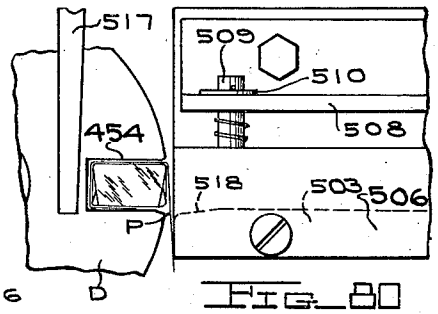


FIG. 80

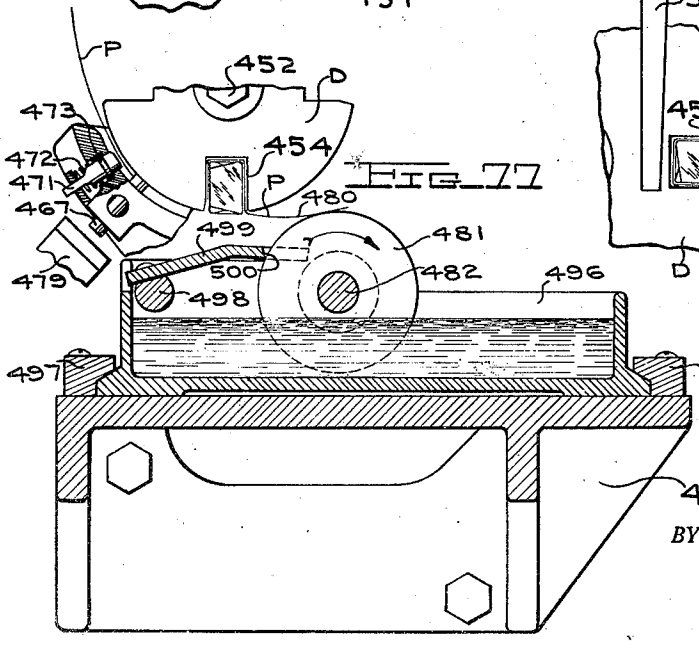


FIG. 77

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Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

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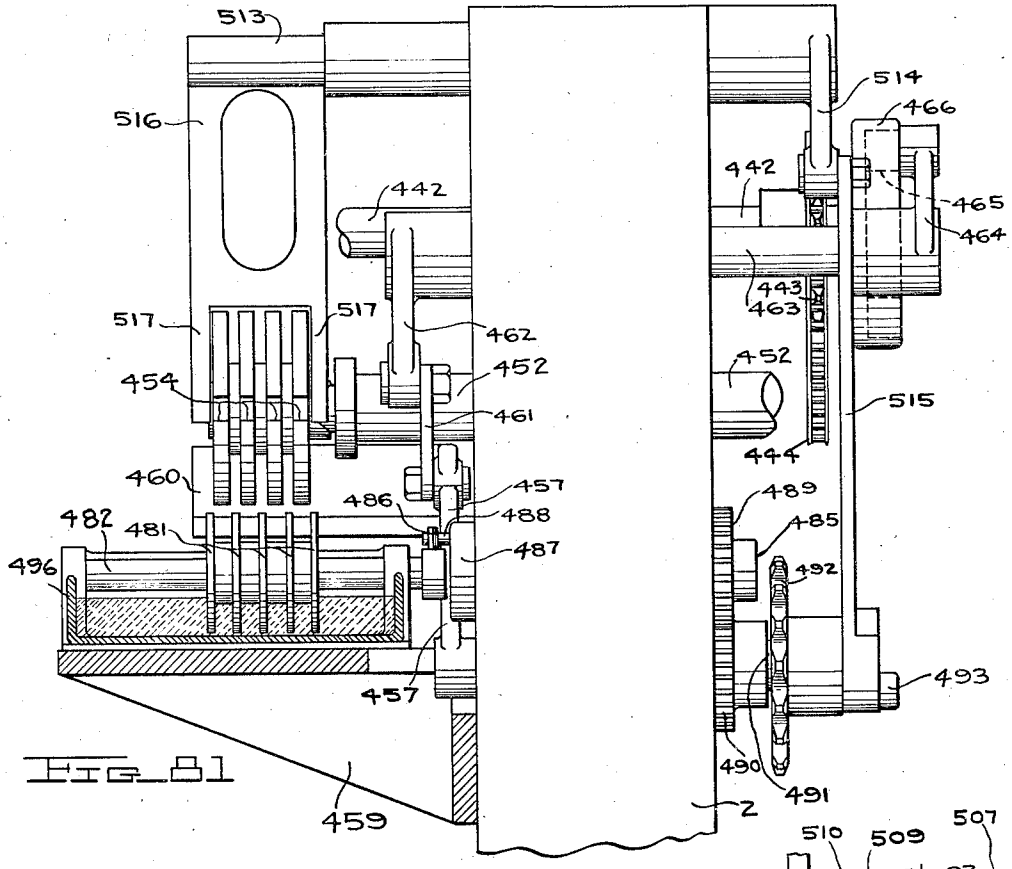


FIG_81

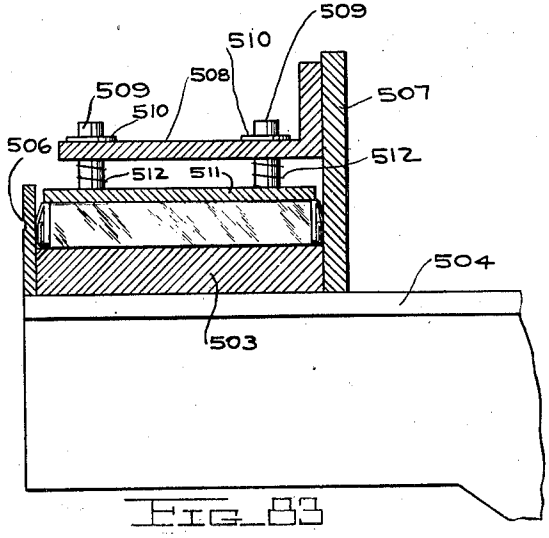


FIG_83

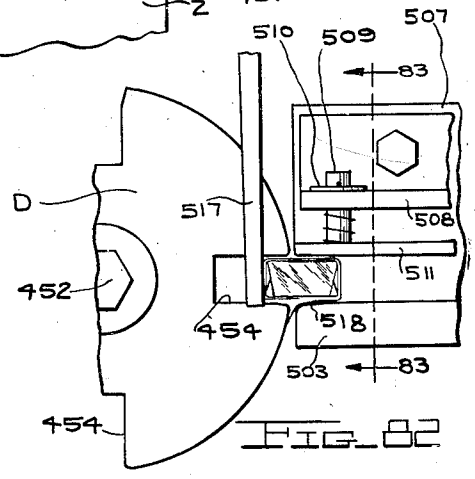


FIG_82

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Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

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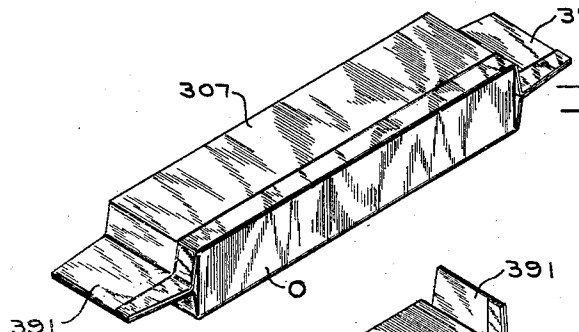


FIG. 84

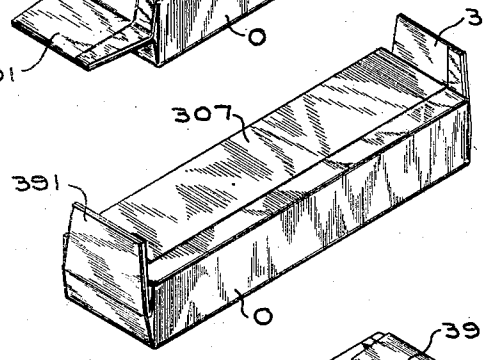


FIG. 85

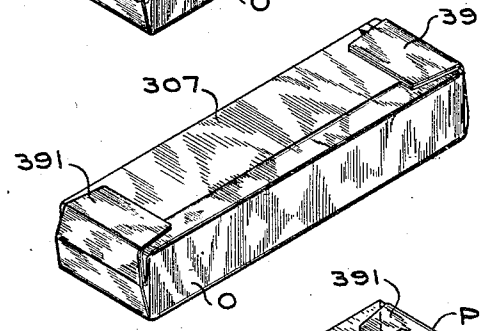


FIG. 86

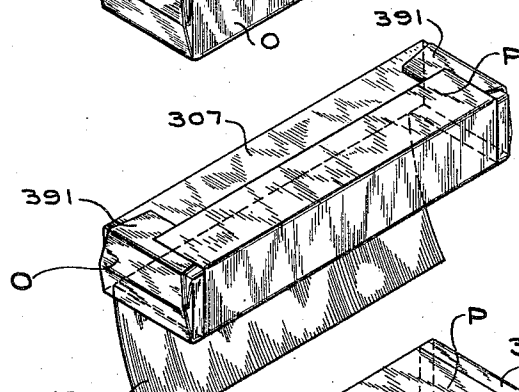


FIG. 87

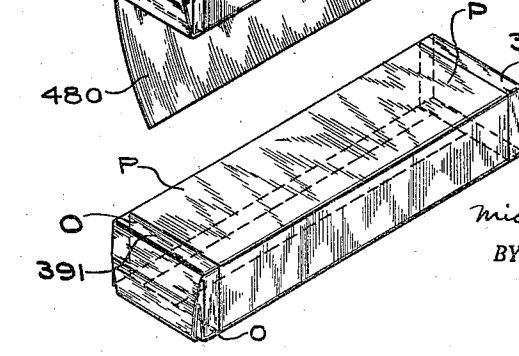


FIG. 88

INVENTOR:
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ATTORNEY.

Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

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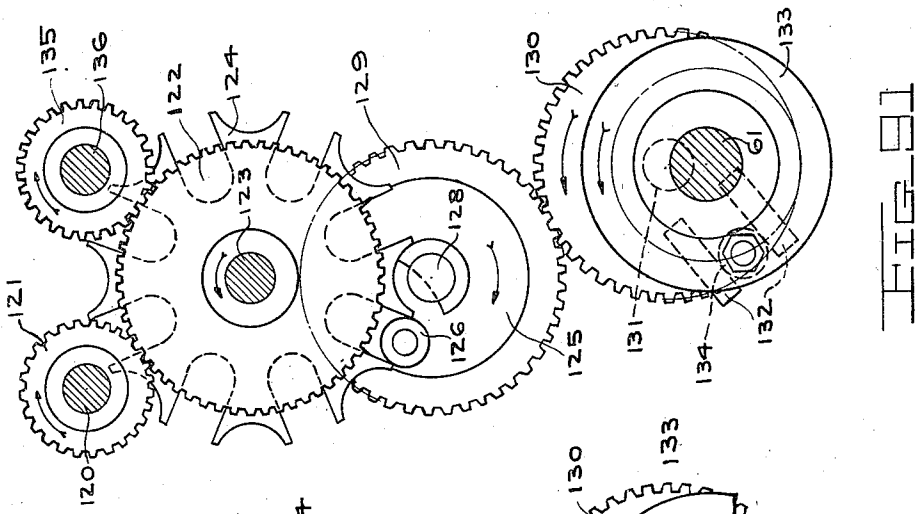


FIG. 91

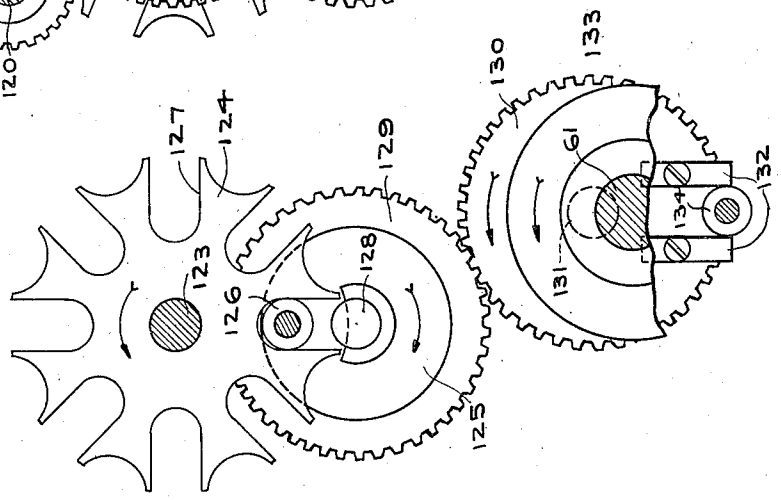


FIG. 90

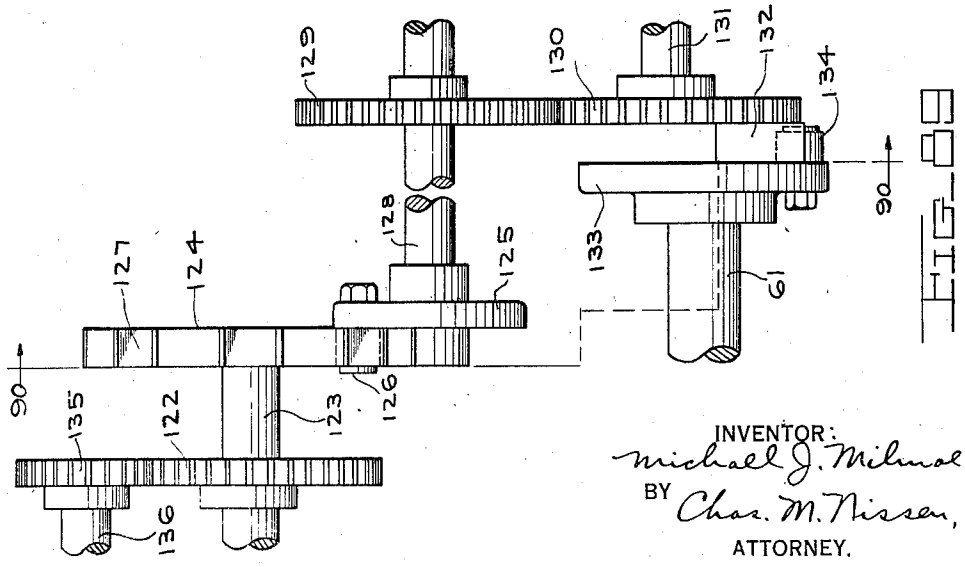


FIG. 89

INVENTOR:
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Feb. 4, 1936. M. J. MILMOE 2,029,934

GUM WRAPPING MACHINE

Filed July 26, 1930 24 Sheets-Sheet 24

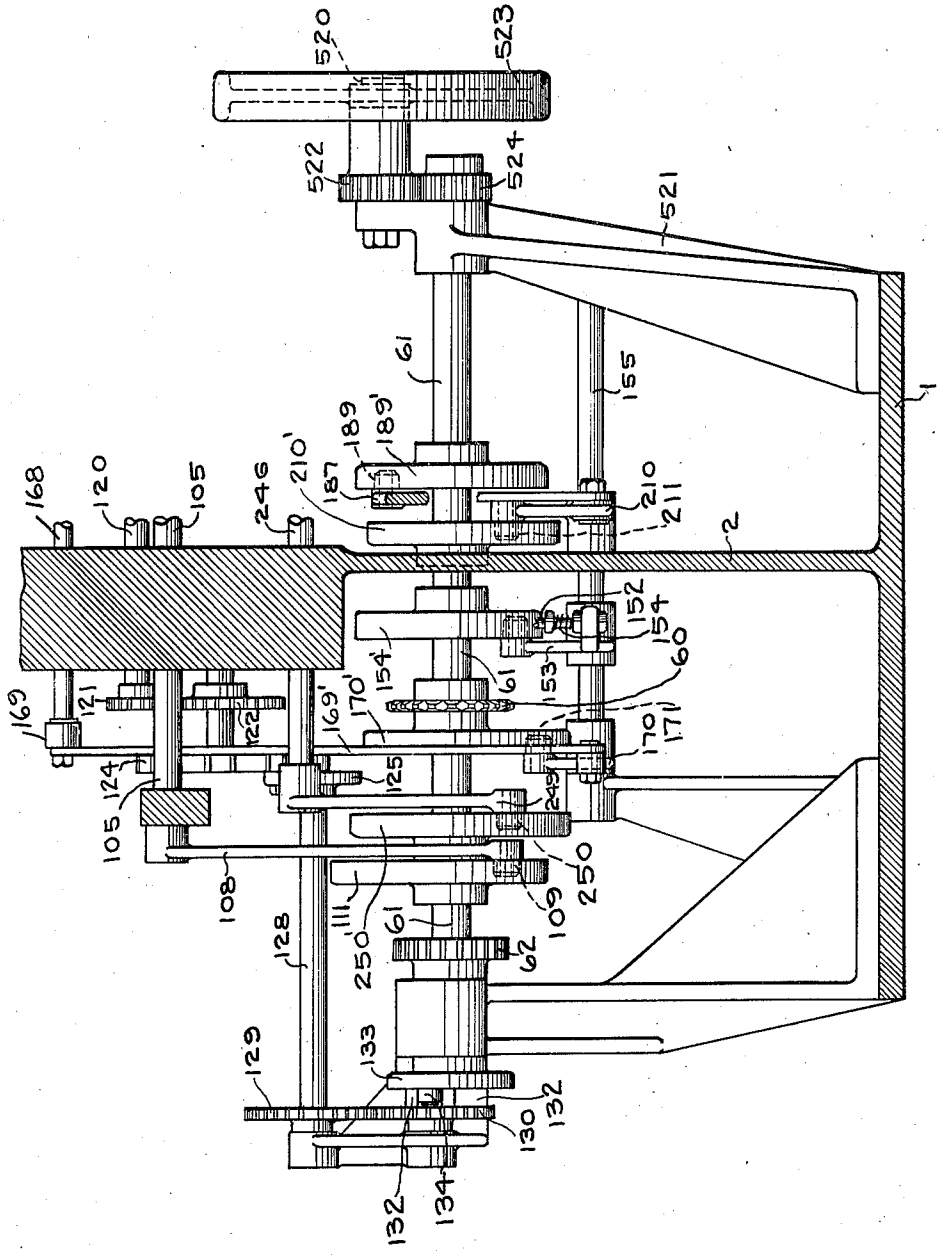


FIG. 92

INVENTOR:
Michael J. Milmoe,
BY Chas. M. Nissen,
ATTORNEY.

Patented Feb. 4, 1936 2,029,934

UNITED STATES PATENT OFFICE

2,029,934

GUM WRAPPING MACHINE

Michael J. Milmoe, Chicago, Ill., assignor to F. B. Redington Co., Chicago, Ill., a corporation of Illinois

Application July 26, 1930, Serial No. 471,035

37 Claims. (Cl. 93—7)

My present invention relates to a gum wrapping machine. The machine is designed to first place a wrapper about each stick of gum to entirely enclose the same; second to place a band about each wrapped stick; third to assemble a predetermined number of sticks and to enclose the said sticks in a single wrapper which is heat sealed to prevent air and moisture from coming into contact with the wrapped sticks, and fourth to wrap the gum by placing a band or label about the second wrapper thereby completing the package.

In carrying out my invention I use four turrets for handling the gum and for moving the gum to successive positions where the various necessary operations are performed while the gum is on the turret wheels as will be seen from the description which follows.

One object of this invention is an improved method of feeding the gum from the hopper to the first wrapping position. This means comprises a member for stripping a stick of gum from a stack of the same arranged within a hopper and a second means which continues the movement of the stick after it is removed from the hopper by the stripping member and for moving the gum towards the first wrapping position so that the gum has a continuous movement from the time it is stripped from the stack until it is fed into the first wrapping position or more specifically into the first pocket of the first turret. I will hereafter refer to this method of feeding the sticks from the hopper to the first wrapping position as the relay method.

Another object of this invention resides in the mechanism for providing an envelope type of wrapper for the gum.

Another object of this invention resides in the new envelope style of wrapper used for wrapping the gum.

Another object of this invention is to provide an improved means for wrapping and sealing the sticks of gum and for placing the band about said wrapper. This means includes means for heat sealing the wrapper to prevent the moisture and air from contacting with the sticks of gum which are wrapped.

In order to carry out the objects mentioned in the previous paragraph, I find it desirable to use a wrapper which has a waxed inner surface and preferably a foiled outer surface. The waxed surface permits the various folds of the outer wrapper to be heat sealed by a very simple yet efficient mechanism.

Another object of this invention is to provide an improved package for gum which will always keep the gum fresh even though the gum may not be sold for a considerable time after the same has been made. The one essential feature of this package is the heat sealed outer wrapper which is placed about the assembled sticks of gum.

Other objects of this invention will appear hereinafter as the description thereof proceeds, the novel features of the invention being pointed out in the appended claims.

In the drawings—

Fig. 1 is a front elevational view of a machine embodying my invention, some of the parts having been removed from this figure for the sake of clearness;

Fig. 2 is an end elevation of the machine shown in Fig. 1 and looking from the right in that figure;

Figs. 3 and 4 are detailed elevational views partly in cross-section and with the parts removed for the sake of clearness of the means for feeding the sticks of gum out of the hopper;

Fig. 5 is an enlarged detail view of part of the mechanism shown at the left in Fig. 1 and illustrates in part the mechanism for driving the various units;

Fig. 6 is a fragmentary view of a part of the mechanism for wrapping a band about a wrapped stick of gum;

Fig. 7 is an enlarged detailed elevational view of the first three turrets and some of the operating arms for folding the wrapper and for moving the gum;

Fig. 8 is a plan view of the mechanism shown in Figs. 3 and 4, some of the parts being shown in cross-section for the sake of clearness;

Fig. 9 is a fragmentary elevational view of the means for folding a portion of the wrapper about the gum after the gum is placed in the first turret;

Fig. 10 is an isometric view of a portion of the means for relaying the sticks of gum to the first turret and of the means for folding parts of the first wrapper;

Fig. 11 is a detailed view showing the mechanism for alining the sticks of gum in the hopper;

Figs. 12, 13, 14 and 15 are detailed views showing the means for folding the ends of the wrapper at right angles to the longitudinal dimension of the stick of gum as the first turret moves from its first position to its second position;

Figs. 16, 17, 18, 19 and 20 show the means for tucking in the ends of the wrapper and for

creasing the portion of the wrapper which extends beyond one edge of the gum;

Figs. 21, 22, 23 and 24 show the means whereby the portion of the wrapper which extends over the edge of the gum after the gum is in the position shown in Fig. 18 is folded against the body portion of the wrapper and also show the manner in which the wrapped stick is ejected from the turret;

Figs. 25 and 26 show the first step in the wrapping of the band about the wrapped sticks. Fig. 26 shows the second turret and Fig. 25 shows the first turret;

Fig. 27 shows the method of applying glue to the band while the gum is held in the second turret;

Fig. 28 shows the method of wrapping the glued flap of the band against the opposite end there;

Figs. 29, 30, 31, 32, 33, 34, 35 and 36 are detailed views showing the manner of assembling five sticks of gum at a predetermined position;

Figs. 37, 38 and 39 show the manner in which the assembled sticks are moved to a position adjacent the third turret in which the foiled wrapper is placed about the assembled sticks;

Figs. 40, 41, 42, 43, 44, 45 and 46 show the form which the wrapper and the band which are placed about the individual sticks assume as the wrapping of the stick proceeds;

Figs. 47, 48, 49, 50 and 51 show the means for forming a tubular wrapper about the assembled sticks of gum on the third turret, this tubular wrapper being heat sealed at adjacent edges;

Figs. 52, 53 and 54 show the tubular wrapper in the various stages of formation;

Fig. 55 shows the form which the tubular wrapper takes after the step of preparing the ends for the heat sealing operation;

Fig. 56 is an elevational view of the heat sealing apparatus for heat sealing the ends of the tubular wrapper;

Fig. 57 is an enlarged detail elevational view of the means for transporting the sticks of gum enclosed in the tubular wrapper through the various positions at which heat sealing and chilling operations are performed on the ends of the tubular wrapper;

Fig. 58 is a detailed view of the heating and chilling means used for sealing the ends of the tubular wrapper;

Fig. 59 is a section taken substantially along the line 59—59 of Fig. 57;

Fig. 60 is a detailed view showing the mechanism for folding the heat sealed ends over the top of the package;

Fig. 61 shows the mechanism for preparing the ends of the tubular wrapper for the heat sealing operation thereon;

Figs. 62, 63, 64, 65 and 66 are detailed fragmentary views of parts of the mechanism shown in Fig. 61;

Fig. 67 is a section taken along either of lines 67—67 of Fig. 58;

Fig. 68 is a section taken along the line 68—68 of Fig. 58;

Fig. 69 is an elevational view partly in section of the mechanism for chilling the heated ends of the wrapper after the same have been heat sealed;

Fig. 70 is a plan view of a portion of the means shown in Fig. 69;

Fig. 71 shows the mechanism for folding the sealed ends of the container at right angles to the longitudinal dimension of a package. This figure is a section taken along the line 71—71 of Fig. 58;

Fig. 72 shows the mechanism for folding the protruding ends of the wrapper against the package after the same occupy the position shown in Fig. 71;

Fig. 73 shows the mechanism for feeding the outer band or label to a position adjacent the fourth turret;

Fig. 74 is a fragmentary elevational view of the turret shown in Fig. 73 and part of the mechanism adjacent thereto. This view is a view looking from the left of Fig. 73;

Fig. 75 is a section along the line 75—75 of Fig. 57;

Figs. 76, 77 and 78 are detailed views partly in section of the mechanism for applying the band to the package on the fourth turret wheel. This means also includes the means for applying the glue to the band before the band is sealed about said package.

Fig. 79 is a section taken along the line 79—79 in Fig. 76;

Fig. 80 shows the package about to be ejected from the fourth turret wheel onto a support;

Fig. 81 is a view of part of the mechanism shown in Fig. 73 and looking from the right in that figure, parts of the mechanism being shown in section for the sake of clearness;

Fig. 82 shows the completed package being ejected from the fourth turret wheel and showing the manner in which the glued edge of the band is folded against the opposite edge thereof;

Fig. 83 is a section taken along the line 83—83 of Fig. 82;

Figs. 84, 85, 86, 87 and 88 show the various forms which the package takes beginning with the heat sealing of the ends and ending with the completed package;

Fig. 89 is an elevational view of the driving mechanism for the first two turrets as viewed from the right hand side of the machine in Fig. 1;

Fig. 90 is a section taken on the line 90—90 in Fig. 89;

Fig. 91 is a view of the mechanism shown in Fig. 89 and looking from the left in that figure;

Fig. 92 is a section taken substantially along the line 92—92 of Fig. 7; and

Fig. 93 is a chart which illustrates the action of the Geneva gears.

The general steps in the process are as follows:

The sticks of gum which are held in the hopper are removed from the hopper one by one and moved towards the first turret. During this movement, a relay arm engages the stick while it is still in motion and moves the stick against the first wrapper and into the adjacent pocket in the first turret. The edges of the pocket serve as a means for folding the wrapper about two sides and an edge of the gum. The first turret then moves through 90°, and as it begins this movement a creaser creases the wrapper adjacent the ends of the gum and as the turret continues its movement folding members engage the ends of the wrapper which protrude beyond the ends of the gum and fold the ends of the wrapper at right angles to the longitudinal dimension of the stick of gum. However, before the ends are folded, suitable crimping mechanism crimps the ends of the wrapper so that the same are in the form best illustrated in Fig. 40. When the first turret has moved from its first position to its

second position at 90° from its first position, the wrapper is in the form shown in Fig. 41.

At the second position of the first turret, the ends of the wrapper are folded inwardly against the gum and the portions of the wrapper contiguous with the portions which lie between the protruding edge of the wrapper and the ends thereof are crimped so that the wrapper is in the position illustrated in Fig. 42. The wrapper is then creased adjacent the unwrapped edge of the gum and as the turret moves to its third position, the extending portion of the wrapper is folded at right angles so that the same will appear as illustrated in Fig. 43. The gum is ejected at the third position and in doing so, the protruding flap is folded against the remaining portions of the wrapper to completely envelop the stick of gum.

After the stick is completely wrapped and ejected from the first turret, it is brought into engagement with a band which is wrapped about the first wrapper on the second turret, glue being applied to one end of the band so as to seal the ends of the band together when they are brought into engagement with each other.

This completes the wrapping of the individual sticks of gum and thereafter a plurality of sticks (usually five) are assembled at a predetermined position and then moved against a second wrapper and into a pocket of a third turret wheel. While carried on the third turret wheel, the opposed ends of the wrapper are brought around the five sticks of gum and have their inner surfaces sealed to each other while the same are projecting away from the package. These projecting ends are folded against the package as the same leaves the third turret wheel.

The next step in the process is to heat seal the open ends of the tubular wrapper. This is done by suitable heating and chilling means arranged between the third and fourth turret wheels. The ends are sealed while they extend away from the package, and are thereafter folded against the package as will be pointed out more fully as the description of this invention proceeds.

The final step is the placing of a wrapper or band about the package, and this band is utilized for the purpose of not only carrying suitable designations to indicate the kind of gum, or the manufacturer, or the like, but also serves to hold the ends of the second wrapper against the package.

In the drawings I have designated the four turret wheels as A, B, C and D, these being the first, second, third and fourth turret wheels respectively. The gum hopper is designated generally as E, the first band hopper is indicated as F and the second band hopper is indicated as G. The paper which is used for wrapping the sticks is supplied selectively from either of the rolls of paper H, and the paper used to form the wrapper about the five sticks of gum is supplied selectively from either of the rolls J. Two rolls are provided at H and two at J, so that when the paper in one roll has run out, the paper from the other roll may be fed through the machine without much loss of time. The roll that has run out may then be replaced by a full roll while the machine is in operation and before it becomes necessary to use the next roll.

The paper in the rolls at J is preferably a composition paper which is waxed on the surface which is to lie next to the sticks of gum and is foiled on the outer surface so as to make a wrapper which is impervious to moisture and prevent the wax from coming into contact with other packages and with other objects. The bands in the hoppers F and G, preferably are in the form of labels which designate the kind of gum which is wrapped in the package.

The frame of the machine comprises the base member 1, with the upstanding web portion 2. The web portion serves as a means for supporting suitable brackets necessary to support the various operative parts of the machine. Furthermore, some of the rotatable elements are journaled in the web portion 2, as well as being journaled in other brackets attached to the base and to the web.

Referring now more particularly to Figs. 1, 3, 4 and 8, it will be noted that the hopper E comprises two channel members 3 between which the sticks of gum K are stacked. The sides of the channels 3 guide the gum K for vertical movement. Suitable gates 4 arranged at the right of the hopper and near the bottom thereof are used to prevent any more than the desired number of sticks from being withdrawn from the hopper E.

A casting comprising the arms 5 and 6, and a bearing portion 7, is adapted to carry the channels 3. These channels have projecting lugs 8 which are secured by any suitable means to the ends of the arms 5 and 6 as best seen in Figs. 3 and 8. The bearing portion 7 is journaled on a shaft 9 which in turn is rigidly mounted on the bracket 10 integral with one end of the web 2. A nut 11 is screw threaded on the end of the shaft and has an operating handle 12 thereon. The bracket 10 carries an outstanding web section 13. The arms 5 and 6 each have wear plates 14 secured thereto on the lower side thereof, and these wear plates are adapted to contact with the upper edge of the web 13 as best illustrated in Figs. 3 and 11 to limit the clockwise movement of the arms about the shaft 9, and thus position the hopper E in desired relation to the remaining parts of the apparatus. The nut 11 may be tightened by the operating handle 12 in order to clamp the bearing 7 against the bracket 10 and thus prevent rotation of the arms 5 and 6 about the shaft. When it is desired to move the hopper E to an inoperative position for any desired purpose, it is only necessary to loosen the nut 11 and rotate the arms 5 and 6 in a counter-clockwise direction. This permits inspection of the hopper and also permits inspection of the mechanism which ordinarily is made accessible by the hopper being in the position shown in Fig. 3.

The web section 13 (see particularly Figs. 3, 8 and 11) also carries a pair of stub shafts 16, carrying the arms 17 which in turn carry the plates 18 and 19, the plates 19 being spring-pressed by means of the springs 20 towards the arms 17, but being slidable outwardly away from the arms 17 along the pins 21 and 22.

Arms 23 pivoted at 24 to extensions 25 carried by the arms 5 and 6 have the lower ends thereof rounded as at 26 and these rounded ends are adapted to be interposed between the plates 18 and 19. The upper ends of the arms 23 carry plates 27 which are L-shaped in horizontal section as best illustrated in Fig. 8 so as to provide flat surfaces adjacent the hopper E. The inner ends of the plates 27 extend through suitable openings 28 (see Fig. 3) and are arranged in position to engage the ends of the gum K in the hopper E. When the inner ends of the plates 27 are brought into engagement with the ends of the gum K the sticks of gum are alined in the hopper so that when a stick is stripped from the

bottom of the hopper, the same will be in proper alinement with the wrapper which is to be wrapped about the stick. However, it would not be advisable to have the plates 27 in engagement with the ends of the sticks at all times as this would make it difficult to withdraw the sticks from the hopper. Accordingly I have provided mechanism whereby the plates are periodically moved away from the gum as the stripping member, later to be described, strips a stick of gum from the bottom of the stack in the hopper. This mechanism is constructed as follows: The arms 17 which are rotatably mounted on the stub shafts 16 each form one arm of a bell crank, the other arm being shown at 29, see especially Fig. 11, and these arms 29 are pivotally connected by a pin 30 which has a small amount of lost motion with the arms 29 to permit a slight amount of rocking movement of the arms 29 about the shafts 16. Secured to the shaft 30 is an upstanding rod 31 extending through the end of an arm 32 and having a head 33 at the upper end thereof. The rod 31 is provided with a fixed collar 34 and a slidable collar 35 on opposite sides of the arm 32. A spring 36 is interposed between the head 33 and the collar 35 to yieldingly hold the end of the arm 32 between the collars 35 and 34 so that movement of the arm 32 is imparted to the rod 31, arms 29 and 17 and also to the arms 23 and plates 27 through the connections 26—18—19.

With this arrangement, it will be noted that an upward movement of the arm 32 rocks the plates 27 inwardly towards the sticks of gum and when these plates are in engagement with the ends of the gum, the spring 36 permits the arm 32 to continue its upward movement without imparting further movement to the plates 27. This enables one to aline the gum in the hopper and yet prevent excessive movement of the plates 27 as might be the case if a positive connection were provided between the arm 32 and the rod 31.

It will be noted that when the hopper E is moved in a counter-clockwise direction about its pivot in Fig. 3, that the rounded ends 26 will automatically be disconnected from the plates 18 and 19 and be automatically re-connected to the plates 18 and 19 when the hopper is again moved into operative position.

The arm 32 (see particularly Figs. 3 and 8) is secured to a shaft 37 which extends through the bracket 10 to the rear of the machine, and the rear end of the shaft 37 carries a crank arm 38 and a pin 39 which operates within a cam groove in the cam 40. The cam 40 is designed to impart rocking movement to the crank 38 and this movement is in turn imparted to the arm 32 by means of the shaft 37.

Referring more particularly to Figs. 1, 3, 4 and 8, it will be noted that the cam 40 is carried by a shaft 41, rotatable in the bearing 42 and this shaft carries at its forward end a double throw crank having the crank pins 43 and 44 carried by the crank disc 45 and crank arm 46 respectively. An arm 47 is rotatably mounted on the crank pin 43 and has a pivot 48 journaled in a bearing 49 on the separator or stripping member 50. The bracket 10 carries a laterally extending bracket member 51, and this in turn has secured thereto the guides 52 which extend over the separator 50 so that as the shaft 41 rotates, the arm 47 will reciprocate the separator 50 which is guided by the guides 52. The crank pin 44 carries a member 53 which is secured to the arm 54. The arm 54 has an offset portion 55 at the end thereof adjacent the hopper E and this is adapted to pass between the channels 3 into engagement with the gum in the hopper when the shaft 41 rotates and thereby causes the arm 54 to reciprocate. The arm 54 is guided in a vertical slot in the guide member 54' secured to one of the guides 52. The purpose of the arm 54 is to jar the gum in the hopper so as to insure that the gum will always travel downwardly towards the bottom of the hopper and into a position where a stick may be stripped from the bottom of the stack of gum in the hopper.

The shaft 41 has a sprocket 56 secured thereto, and this sprocket is adapted to be driven by a chain 57 which, as best illustrated in Figs. 5 and 92, is trained over sprockets 58, 59 and 60, the latter sprocket 60 being secured to the shaft 61 driven by means of the gears 62, 63, 64 and 65, the latter gear being on the shaft 66 which as best illustrated in Fig. 2 is driven by means of gears 67, 68, clutch 69 and gears 70 and 71 from the motor 72. Gear 67 is on shaft 66.

The clutch 69 is operated by means of a lever 73, arms 74 and 75, link 76 and handle 77 to either connect or disconnect the driving motor 72 and the shaft 66. The sprockets 58 and 59 are mounted on the shafts 78 and 79 respectively.

I will now proceed to explain the manner in which the sticks of gum are stripped from the stack in the hopper and fed into the first turret wheel A. Referring more particularly to Figs. 1, 3, 4, 8, 9 and 10, it will be noted that the separator 50 has a cutaway portion 80 of a depth not greater than the thickness of the stick of gum which is to be removed from the bottom of the hopper. In Fig. 4 the separator is shown at its extreme left hand position, with the rear edge 81 of the cutaway portion 80 to the left of the stack of gum in the hopper. As the shaft 41 rotates, the separator 50 will move to the right and carry with it the stick of gum located at the bottom of the stack. The gum is carried out beneath the gates 4 and before the separator 50 has completed its movement to the right, an arm 82 secured to the rocking shaft 83 engages the rear end of the gum as best illustrated in Fig. 10 and continues the movement of the gum towards the first turret wheel A. The separator then returns to the position shown in Fig. 4 to strip a second piece of gum from the stack in the hopper. In this manner the gum is given a continuous movement from the time it leaves the hopper until the time it is received in a pocket of the turret A. This is accomplished without having to impart too rapid a motion to the separator 50 or to the arms 82. In other words, if a single member were used to move the gum all the way into the turret, it would be necessary for it to be moved from the hopper into the pocket during half of the rotation of the shaft 41. This would mean that the first turret A would have to be in a position to receive the gum before the shaft 41 has completed a half of a revolution and would have to practically remain idle during the other half of the revolution of the shaft 41. Of course, this results in a great waste of time and also does not give sufficient time to properly place the wrapper in front of the pocket of the turret before the gum reaches the turret.

The rocking shaft 83 extends through the web 2 of the frame to the rear of the machine and as best illustrated in Fig. 8 carries a crank arm 84 connected by means of a link 85 to a crank pin 86 carried by the crank disc 87 on the shaft 41. It will be noted from an inspection of Fig. 3 that the gates 4 prevent the stick carried by the sepa-

rator 50 from being lifted vertically out of the cutaway portion 80. In other words, the gates also act as guides.

I will now proceed to describe the mechanism by which the wrapper is fed into a position between the gum carried by the separator, and the turret A. This means is best illustrated in Figs. 1, 5, and 6. The paper rolls H are rotatably mounted on a bracket 88 carried by the web portion 2 of the frame. The bracket 88 also has a web section 89 spaced in front of the main part of the bracket 88 a sufficient distance to permit the chain 90 which drives the rollers 91 and 92 to pass therebetween. The strip of paper 93 passes over the roller 91 and between the rollers 92 and 94 which are driven by means of suitable gears 95, 97 and 96 from the shaft 78 (see Fig. 5). The paper then passes downwardly between the knives 98 which are carried by rotatable members and have a shearing action as they come adjacent each other. These knives are driven by means of the gears 99 and 99', the latter being rotatably mounted on the shaft 78. After the paper is cut by the knives 98, it passes downwardly between the rollers 102 and then down between the rollers 103, suitable guides being provided for guiding the paper between pairs of rolls. The rollers 102 and 103 are driven by gears 95 and 100 which mesh with gears on the shafts which carry the rollers 102 and 103. The gear 100 rotates on shaft 101 secured on web 2. The rollers 102 and 103 travel at a greater rate of speed than the rollers 92 and 94 and at a greater speed than the knives 98 so that after a sheet of paper is cut from the strip 94, the rollers 102 and 103 will cause the same to travel at a greater rate of speed to a position between the separator 50 and the turret A. This is necessary in order to prevent jamming or piling up of the paper for the paper must come to rest for an interval of time between the separator and the turret, and if the paper were traveling at the same rate of speed at all times this could not be done.

The feeding mechanism just described does not form an essential part of my invention as any mechanism may be provided for supplying sheets of wrapping material which I shall designate as M to a position between the separator and the turret. The wrapper M is shown in position between the separator and the turret in Fig. 3, and is guided into position between the guides 104 which are arranged just below the feed rollers 103.

A shaft 105 (see Figs. 5, 8 and 10) has secured thereto blocks 106 and arms 107 so that as the shaft 105 is rocked, the arms 107 will move in a vertical direction a predetermined relatively small amount. As best seen in Figs. 5 and 92, the shaft 105 has an arm 108 secured thereto and this extends downwardly towards the base of the machine and has a roller 109 operating within a cam groove 110 of the cam 111 secured to the shaft 61. As the cam 111 rotates, the arm 108 and consequently the arms 107, are given a rocking movement.

Creasing members 112 are secured to the outer ends of the arms 107. See particularly Figs. 3, 9, 10, 12, 13 and 15, for a purpose which will appear later. The forward portions of the arms 107 are recessed at 113 and the wrapper M is received within these recesses and held within these recesses in a predetermined relation thereto by means of the sloping sides of the recesses and the creasing members 112 as best illustrated in Fig. 3.

The turret A carries a plurality of rigid abutments 114, each of which co-operates with the arms 115 pivoted at 116 to the main portion of the turret. A stop 117 secured to the main portion of the turret is adapted to engage the projections 118 rigid with the arms 115 for limiting their movement in a counter-clockwise direction about the pivots 116 so that the arms 115 will not be moved into engagement with the abutments 114, but will leave a space between the arms 115 and the abutments 114 slightly less than the thickness of the gum being wrapped. Springs 119 are interposed between the projections 118 and the body portion of the turret for urging the projections and consequently the arms 115 towards the abutments 114. The inner surfaces of the free ends of the arms 115 are slightly tapered as best illustrated in Fig. 18 so as to facilitate the entrance of a stick of gum into the pocket formed by the arms 115 and abutments 114.

The turret A rotates in a clockwise direction and moves through 90°, then has a period of rest followed by a second movement of 90° and a second period of rest, etc. In this description I shall refer to the pocket which lies adjacent the separator 50 as the pocket located at the first position thereof. I shall refer to the pocket located at the position 90° in a clockwise direction from the first position as the second position, and the pocket located at the position 180° from the first position as the third position. The fourth position is the position when the pocket is at the bottom of its travel 90° in a counter-clockwise direction from its first position.

The turret A is rotated by a Geneva movement best illustrated in Fig. 5 and in Figs. 89 to 91. This Geneva movement has a novel means for making the movement of the driven gear more uniform and for preventing the "whipping" action ordinarily resulting from the use of the common type of Geneva gear. In other words, the ordinary Geneva driving gear causes the driven gear to move at a relatively rapid rate at the mid-point between one position and its next succeeding position. This movement has a tendency to throw the articles held in the pockets out of the pockets, and consequently the maximum instantaneous speed of the turrets must be held down within certain limits in order to prevent the articles from moving out of the pockets. Therefore, if it is desired to increase production by increasing the number of revolutions per minute of the turret, something must be done to prevent the aforesaid disadvantages. I have devised a means whereby I have retained the advantages of the Geneva movement, and increased the number of revolutions per minute to thereby increase production and at the same time have not increased the maximum speed of the turret during its rotational movement.

I accomplish the above results by imparting a varied speed of movement to the driving gear of the Geneva movement, the driving gear being moved at its slowest speed when the gear is driving the Geneva wheel whereby the period of movement of the Geneva wheel is increased over that which is ordinarily imparted thereto by a driving gear moving at a uniform speed. In other words, the period of movement of the Geneva wheel is increased and the period of rest is decreased as will be seen by an inspection of Fig. 93 which shows a chart illustrating the period of movement for the ordinary Geneva wheel at M and that of the wheel shown in this application indicated at N. It will be noted that the horizontal coordinate indicates the period of move-

ment of the Geneva wheel, and the vertical coordinate indicates the amount of movement imparted to the Geneva wheel at various angular positions thereof. While maintaining the same general characteristics of the curve, it is very clear from an inspection of this figure that the curve N has a maximum slope which is very much less than the maximum slope M which means that the instantaneous maximum speed which is obtained by using this invention is decreased, and therefore the entire machine may have its main drive shaft driven at a higher rate of speed to increase the maximum instantaneous speed which is obtained by the modified Geneva movement shown herein to the amount which is permissible in a machine of this nature. As is clearly illustrated in Fig. 93, the period of movement of the Geneva wheel is increased 50° which means that the speed of the machine may be increased approximately 40% to obtain 40% more output for the machine.

Since the Geneva wheel directly actuates the turret A, as will subsequently appear, the modification of the movement of the Geneva wheel modifies the movement of the turret, but the movement of the turret is not changed to decrease the period of rest sufficient to prevent the proper operation of the turret. The period of rest is decreased but the turret still remains at rest a sufficient length of time to permit the proper insertion of the articles in the pockets.

The turret A is mounted on a shaft 120 and rotates therewith. This shaft extends through the web 2 of the frame and projects at the rear end thereof. This shaft carries a gear 121 at the rear of the web 2 which in turn meshes with a gear 122 secured to a shaft 123 which shaft also carries the driven Geneva gear 124. A driving Geneva gear 125 carries a pin 126 which successively enters slots 127 to impart rotation to the driven gear 124. The driving gear is mounted on a shaft 128 and rotates therewith. By this arrangement it will be seen, as with ordinary Geneva gears of this type, that when the pin 126 is between and in alinement with the shafts 123 and 128, maximum speed is being imparted to the Geneva gear 124. It is at this point that the whipping action occurs, and of course, since the turret A is geared to rotate at a speed proportional to the speed of rotation of the gear 124, naturally the whipping action would also occur in the turret if means were not provided for preventing this.

The shaft 128 which carries the Geneva gear 125 has a gear 129 carried thereby, which meshes with the gear 130 secured to the rotatable shaft 131. The gear 130 carries the opposed guide members 132 forming a slot therebetween which extends substantially radially outwardly from the shaft 131. A disc 133 is secured to the shaft 61, and rotates therewith. This disc carries a pin 134 which is arranged between the guide members 132. It will be noted that the shafts 131 and 61 are offset with relation to each other, and this offset relationship causes a variable speed to be imparted to the disc 130, it being understood that since the shaft 61 rotates at a constant speed, the disc 133 must also rotate at a constant speed.

Let us assume in Figs. 90 and 91 that the disc 133 is rotating at a constant speed in the direction of the arrow shown thereon. When the pin 134 is at its lowermost position (Fig. 90), the pin has a certain angular movement and during a fixed angular movement, the pin moves a predetermined distance which we will refer to as a unit distance. We will also refer to the angle through which the disc 133 moves as a unit angle. The unit angle and the unit distance will remain the same for all points during the rotation of the disc 133. When the pin 134 is at its lowermost position, it is at its farthest position from the shaft 131. In other words, the pin is arranged between the guides 132 at a greater distance from the shaft than when this pin 134 is at its uppermost position. Therefore, when the pin 134 moves from its lowermost position through a unit angle and unit distance, the unit distance through which the disc is moved subtends a lesser angle at the axis of the shaft 131 than it does at the axis of the shaft 61. This means that the angular movement of the disc 130 is less than the angular movement of the disc 133 when the pin 134 moves through a unit distance from the position shown in Fig. 90. Conversely when the pin 134 is at its uppermost position, the angle which the unit distance subtends at the center of rotation of the shaft 131 is greater than the angular distance which is subtended at the center of rotation of the shaft 61.

Briefly then the action of the pin 134 on the disc 130 is to impart a slow movement to the disc when the pin 134 is at its lowermost position and a fast movement of the disc when the pin is at its uppermost position.

In Fig. 90, the pin 134 is at the position which it occupies when imparting the slowest movement to the disk 130, the disk 130 being directly geared to the disk 125 and consequently imparting the slowest amount of movement to the pin 126. Since the pin 126 is in the mid position of its path of travel while actuating the Geneva wheel 124, the speed at which the pin 126 is traveling at this instant is the maximum speed at which it travels during the engagement thereof with the wheel 124 and determines the maximum critical instantaneous speed which may be imparted to the wheel 124. If the shaft 128 were driven at a uniform rate, with the same number of revolutions per minute as with the arrangement shown in Fig. 90, the speed of movement of the pin 126 at the position shown in Fig. 90 would be greater than that which results from this arrangement. Therefore, it is possible to speed up the movement of the shaft 128 to increase the speed of movement of pin 126 so that its maximum speed is not greater than the critical speed and yet due to the increased number of revolutions of the shaft 128 will impart more revolutions per unit of time to the Geneva wheel 124 than would be imparted thereto with the same maximum driving speed of 126 with the ordinary Geneva movement.

Then when the pin 126 leaves the slot 127, its movement gradually increases to make up for lost time and moves at a fairly rapid rate until it is again in position to move into a slot 127 whereafter it decreases its speed as has already been described. Therefore, the drive for the entire machine may be increased without increasing the maximum critical speed for the Geneva wheel 124 with the result that the output of the machine becomes greater than with the ordinary Geneva wheel.

It will be noted that the gear 122 also meshes with a gear 135 secured to the shaft 136 which carries the turret B. Therefore, the turrets A and B rotate in unison at the same speed and in the same direction.

I will now proceed to describe the manner in which the first wrapper M is placed about the stick of gum K. See particularly Figs. 3, 9, 10, 12, 13, 14, 15, 40 and 41. I have already referred to the fact that the rocker arm 82 relays the movement of the gum as it is being carried along by the separator 50. Just after the arm 82 starts to move the gum, the gum engages the wrapper M (see Fig. 3) and the rocker arm thereafter continues to move the gum into the pocket located at the first position. This pocket is formed by the members 114 and 115, and the edges of these members engage the wrapper and fold the same over the upper and lower surfaces of the gum and over the right hand surface thereof. At the same time the V-shaped crimping members 137 which are held in fixed position by means which I will presently describe, engage the portions of the wrapper which form extensions of the portion 139 wrapped about the edge of the gum and forms V-shaped crimps 138 therein which lie between adjacent layers 140 and 141 of the wrapper which protrude beyond the ends of the gum so that the wrapper assumes the form shown best in Fig. 40.

The V-shaped crimping members 137 are formed integral with the member 142 which in turn is secured to the bracket 143 fastened to the rod 146 mounted rigidly on the web 2 of the frame as best illustrated in Fig. 10. The bracket 143 has the projections 144 and 145 formed integral therewith and spaced from each other as best illustrated in Figs. 10, 12 and 15. These projections 144 and 145 are tapered on their opposed faces in a direction outwardly and away from the turret A as best seen in Fig. 12.

As stated before, these projections and the crimping members are rigidly held on the rod 146 and occupy such a position that they will permit the entrance of the extending portions 140 and 141 therebetween as the gum is moved into the pocket at the first position. However, these projections 144 and 145 prevent any substantial movement of the portions 140 and 141 away from each other adjacent the ends of the gum and assist in forming the crimp 138 when the wrapper comes into engagement with the crimping members 137.

After the gum has been moved all of the way into the pocket at the first position, the turret is rotated to carry the gum to the second position. As the turret begins its movement, the cam 111 (see Figs. 5 and 92) rocks the arms 107 and consequently the creasers 112 in an upward direction until the upper edges of the creasers 112 are in substantially horizontal alinement with the lower edges of the projections 144, and cooperate with the projections 144 to form a crease on the underside of the wrapper adjacent the ends of the gum, the turret by this time having moved through a very small angle as is best illustrated in Fig. 15. The continued movement of the turret causes the projections 144 to fold the ends 140 and 141 downwardly and at substantially right angles to the longitudinal dimension of the stick of gum, thus shaping the wrapper in the manner illustrated in Fig. 41.

As the gum approaches the second position of the turret A, suitable folding means operate on the end of the wrapper to hold them in the position illustrated in Fig. 41 so that when the gum arrives at the second position, certain other folding devices may operate to form a second pair of crimps in the wrapper and also crease the wrapper along the exposed edge of the gum. This means is best illustrated in Figs. 7, 16, 17, 18, 19, 20 and 92.

In Fig. 16, I have shown a bracket 147 carrying the pivots 148. Arms 149 are movably interposed between spaced brackets 149' spaced by means of the member 150' to which the members are secured by bolts 151'. These arms are pivoted on the pivots 148 and have gear teeth 150 meshing with each other so that movement of one arm 149 rotates the other arm in the opposite direction about its pivot. One of the arms 149 carries an extension 151 connected by means of a link 152 to the end of an arm 153 (Figs. 7 and 92) by means of the yielding connection 154 which is similar to the connection between the arm 32 and the rod 31 in Fig. 3. The arm 153 is pivoted to a shaft 155 and carries a cam roller 156 which engages a cam groove in a suitable cam 154' on the shaft 61. Therefore when rotation is imparted to the shaft 61, the arm 153 rocks the arm 149 through the link 152 and in timed relation with the movements of the turret A. This timed relation is such that the upper ends of the arms 149 move towards the turret either just as the gum arrives at the second position of turret A or possibly just shortly before the gum arrives at the second position. The arms 149 carry the folding and crimping mechanism for folding the wrapper in the manner illustrated in Fig. 42.

At the upper end of each of the rods 149 I mount a member 158 which has a rounded edge adjacent the turret. Just below the member 158 I mount a folding member 159 having a beveled surface 160. The member 158 is cut away at 161 as best illustrated in Figs. 17 and 19. Adjacent the member 158 I secure a crimping member 162 having a forward double beveled end 163 forming a V-shaped crimping member. This is best illustrated in Figs. 19 and 20. As the arms 149 move towards the turret, the rounded forward edge on each of the members 158 and the beveled surface 160 fold the extending portions 140 and 141 of the wrapper over the side or face of the partially wrapped gum so that the portion 141 which projects beyond the exposed edge of the gum is opposed to the free end 164 of the wrapper. Thereafter the V-shaped crimping member 163 moves in between the portions 141 and 164 and produces the crimp 165 best illustrated in Fig. 42, as well as in Fig. 20. The members 158 hold the folded edge portions of the wrapper in position until the creasing device 166, carried by the arm 167 which rocks back and forth between the dotted line position shown in Fig. 18 to the full line position shown in that figure, comes into engagement therewith as shown in full lines in Fig. 18 to crease the wrapper. The arm 167 is mounted to rotate with the shaft 168. The means for rocking the shaft 168 is shown in Figs. 5 and 92 and comprises an arm 169 secured to the shaft at the rear of the frame web 2 and this arm is connected by the link 169' pivoted at its lowermost end to the arm 170 rotatably mounted on shaft 155. This arm carries a cam roller 171 which is driven by means of a suitable cam 170' on the cam shaft 61.

After the creasing member 166 has creased the wrapper adjacent the exposed edge of the gum the turret begins its movement from its second position to its third position. In doing so, the outer ends of the members 114 and 115 pass adjacent the stationary member 157 which has a curved thickened portion 172. The curved face of the thickened portion 172 is of substantial

width in the direction of the axis of rotation of the turret so as to engage the end 164 of the wrapper throughout substantially its entire length. As best illustrated in Figs. 18 and 22, the movement of the turret to the third position causes the end portion 164 to be folded towards the body portion of the wrapper. The wrapper is then in the form illustrated in Fig. 43. When the gum reaches the third position shown in Figs. 22 and 25, an ejector 173 engages the inner edge of the gum and moves the gum to the right beneath the folding edge 174 of the member 157 thereby folding the end 164 against the body portion of the wrapper as the gum leaves the turret and passes beneath the folding edge 174. The wrapper is then in the form illustrated in Fig. 44.

The mechanism for operating the ejector 173 is perhaps best illustrated in Figs. 5 and 7. The ejector 173 is formed as a part of the arm 175 which is pivoted to a shaft 176 near the base of the machine. This arm is connected by means of a link 177 to a crank pin 178 on the rotating disc 179 which in turn is secured to the shaft 79 which is driven by the chain 57 through the sprocket 59. It will therefore be seen that as the crank disc 179 rotates the arm 175 will be rocked about the shaft 176 in timed relation to the movements of the turret so that the ejector 173 will eject the gum when it arrives at the third position of the first turret. Referring now to Figs. 21, 23, 24 and 7, it will be noted that a pair of folding members 180 mounted on the arms 181 pivoted at 151' and 182 have the arms 183 secured rigidly thereto and are pivoted together by means of the pin 184 which has a small amount of lost motion with at least one of the arms 183 to compensate for the angular movement of said arms. A rod 185 is also connected to the pin 184 and has a yielding connection 186 with the arm 187 which is quite similar to the yielding connection between the arm 32 and the rod 31 shown in Fig. 3. The arm 187 is pivoted at 188 and has a roller 189 on the end thereof which is adapted to operate within a suitable cam groove in the cam 189' mounted on the shaft 61. The arm 187 is periodically rocked in order to bring the folding members 180 against the end portions 141 of the wrapper as the wrapper arrives at its third position. This is for the purpose of insuring that the portions 141 are lying properly against the body of the wrapper while the same is being ejected by the ejector 173. In this manner it is insured that the crimp 165 will lie between the portions 141 and 164 of the wrapper when the wrapped stick of gum is ejected from the first turret.

As the gum is ejected from the first turret in a direction towards the second turret B, it engages a band N supported on a ledge 189 between the rigid projections 190 and 191. The wrapper N is fed into this position which is best illustrated in Fig. 22 by means of a pair of rollers 192. As the ejector 173 moves the wrapped stick of gum against the band, the band folds about two sides of the wrapper as best illustrated in Fig. 25 with the upper end of the band projecting beyond the left hand edge of the gum as viewed in either Figs. 25 or 6.

The mechanism for feeding the bands N down between the rollers 192 is best illustrated in Figs. 1 and 5. The web 2 carries the hopper F which in turn carries the bands 193, and these bands are adapted to be removed one by one from the bottom of the hopper. The bands rest on the pin 194 (Fig. 5) and on a starter roll 195 which has a rubber pad 196 on the outer surface thereof, this rubber pad extending only partially about the periphery of the roller. When the rubber pad engages the bottom part of the band, it draws the band out of the hopper and feeds the same between the rollers 197 and upwardly along the inclined guide 198. This is for the purpose of reversing the position of the band, the bands being placed in the hopper with the printed surfaces thereof uppermost so that the starter roll 196 will not become smudged by the ink on the printed surface on the band and in time cause the band to be streaked. After the band has been fed between the guide rollers 197, the end which leaves the rollers last, falls by gravity between the roller 199 and adjacent roller 197 and is fed downwardly between suitable guides and guide rollers shown in Fig. 5 directly below the guide roller 199 and adjacent roller 197 and until the band reaches the guide rollers 192. As stated before, the guide rollers 192 thereafter feed the bands to the position shown in Fig. 22 where they are engaged by sticks of gum as they are ejected from the first turret.

The member 200 (see particularly Figs. 22, 25, 26 and 6) has the lower surface 201 thereof substantially at the same level as the level of the folding edge 174 and opposed to this is the flat supporting surface 202 which is adapted to support the sticks of gum after they are ejected from the turret A. The ejector 173 carries the gum between the surfaces 201 and 202 into the pocket of the turret B located at the first position with respect to that turret. The turret B is constructed the same as turret A and similar reference numerals are used to designate the similar parts of turrets A and B.

In Fig. 26 I have shown an arm 203 rotatably mounted on the shaft 136 of the turret B and this arm 203 is adapted to be rocked about the shaft 136 from the dotted line position shown in Fig. 26 to the full line position shown in that figure, and back again to the dotted line position. Just before the turret begins its movement to move the gum to the second position, the arm 203 which has a curved finger 204 thereon, rotates in a clockwise direction to cause the finger 204 to engage the protruding end 205 of the band and move the same upwardly into the position shown best in Fig. 26, the member 200 being recessed at 206 to permit the end of the band to be thrown around into the position illustrated in Fig. 26. The member 203 then stays in the full line position shown in Fig. 26 as the turret begins its movement and forms substantially a continuation of the curved surface 207 of the member 200 so that the end of the band will remain in the position illustrated in Fig. 26 during its movement from the first position to the second position. The arm 203 is rocked in a counter-clockwise direction to the dotted line position shown in Fig. 26 in time to permit the next stick of gum to be moved into the pocket at the first position.

The mechanism for rocking the arm 203 is illustrated in Figs. 1 and 7. This mechanism comprises a link 208 pivotally connected to an extension 209 of the arm 203 and to an arm 210 pivoted on the shaft 155 and carrying a cam roller 211 which engages a cam groove in a suitable cam 210' secured to the shaft 61. When rocking movement is imparted to the arm 210 by means of its cam, the arm in turn imparts its movement to the arm 203 through the intermediary of the link 208.

In Figs. 27 and 30 I have illustrated the gluing

mechanism for applying glue to the band at the second position of turret B. This mechanism comprises a glue trough 212 on the forward edge of which are a plurality of lugs 213 carrying a shaft 214 which in turn supports the plurality of gluing rollers 215. These gluing rollers pass through slots in the forward edge of the glue box and have a relatively close fit with the edges of the slots so that as the gluing rollers rotate in the direction shown by the arrow (Fig. 7) only a small amount of glue is permitted to leave the glue box on the periphery of the rollers 215. A shaft 216 extends through the glue box parallel to the shaft 214 and has a flat portion 217, one edge of which is adapted to be arranged in close proximity to the periphery of the rollers 215 in order to scrape any excess glue from the periphery of the rollers and for cleaning the surfaces of the rollers when desired. The shaft 216 carries an arm 218 adjustable by means of the adjusting screw 219 to adjust the position of the flat surface 217.

Projections 220 extend between various ones of the rollers for the purpose of engaging the band and stripping the band from the gluing rollers after the glue has been applied to the bands.

As the bands move into the second position the ends 205 thereof have glue applied thereto by means of the rollers 215. As the turret moves from the second to the third position, the stripping members 220 strip the ends 205 of the bands from the gluing rollers.

The band after having glue applied thereto at the second position is moved to the third position of turret B and the free end 205 of the band engages the vertical portion of the plate 221 (Fig. 28) which acts as a folding member to fold the edge of the wrapper over the edge of the wrapped stick of gum into a position at substantially 180° from the position shown for this end in Fig. 26 or Fig. 45. A second ejector 222 thereafter engages the rear edge of the wrapped stick of gum and moves the same out of the pocket at the third position and between the supporting member 223 and the lower guiding surface 224 of the plate 221 thereby folding the glued end of the band over the end of the band which already lies flat against the surface of the wrapped stick of gum to complete the wrapping for the individual stick which is shown in Fig. 46.

The plate 221 is carried by means of an arm 225 (see particularly Figs. 28, 29 and 31) pivoted at 226 to a bracket 227 on the web 2. The pin 228 rigidly mounted on the bracket 227 is connected by means of a spring 229 to the arm 225 so as to yieldingly urge the arm in a downward direction. A surface 230 on the bracket 227 limits the downward movement of the arm 225 so that the portion 224 of the plate 221 will not move all of the way downwardly into engagement with the upper surface of the member 223 as this would be very likely to prevent the movement of the wrapped stick of gum beneath the portion 224 of the plate 221. The plate 221 therefore acts as a pressure member to press the glued end of the flap into engagement with the opposite end thereof to seal the ends together.

The ejector 222 carries the gum K into the dotted line position shown therefor in Fig. 28 and against an abutment 231 which is formed integral with the member 223. The ejector 222 is formed as an integral part of the arm 232 best shown in Fig. 7 and this arm is pivoted to a shaft 233 and connected by a link 234 to the arm 175, the link being pivoted at 235 and 236 to the arms 175 and 232 respectively. The pivot 235 also serves as a pivot for the link 177. In other words, the ejectors 173 and 222 move in unison with each other to eject the gum from the turrets A and B respectively.

The means for assembling the desired number of sticks for wrapping purposes is best illustrated in Figs. 7, 28, 29, 32, 33, 34, 35, 36, 37, 38 and 39. In Fig. 28, it will be noted that right below the dotted line position of the wrapped gum K is an elevator 237 which has a compound movement, the first movement of the elevator carries the same vertically and to the right to the position shown in Fig. 29 to raise all of the sticks of gum above the supporting surface of the member 223 and to permit the ejector to carry the next wrapped stick of gum beneath the sticks of gum which have been raised by the elevator 237. As the forward edge of the gum K being moved by the ejector is positioned below the previous sticks of gum which are held in raised position by the elevator 237, the elevator moves to the right ahead of the forward edge of the sticks of gum being moved by the ejector and then downwardly so as to be completely out of the way of the sticks of gum against the abutment 231. The elevator thereafter moves upwardly again to move the sticks of gum vertically so that the next succeeding stick may be placed thereunder by the ejector 222.

The elevator arms 237 are secured to an arm 238 pivoted at 239 to an arm 240 pivoted on the shaft 155. An extension 241 on the arm 240 which lies on the opposite side of the shaft 155 from the arm 240 has a cam roller 242 thereon (see particularly Fig. 56) engaging a suitable cam groove in the cam 242'. Referring again to Fig. 7, it will be noted that the arm 238 has a lug 243 thereon connected by means of a link 244 to a rocking arm 245 secured to the rotatable shaft 246. The link 244 is pivoted at 247 and 248 to the arm 245 and lug 243 respectively. The vertical movement of the elevator is obtained by means of the rocking arm 240 which transmits the vertical movement of the end thereof to the arm 238 secured to the elevator 237. The horizontal movement of the elevator for the purpose previously described is accomplished by means of the rocking arm 245.

The rocking arm 245 is rocked, of course, when the shaft 246 is rocked. This shaft 246 as best illustrated in Figs. 5 and 92 has an arm 249 connected thereto at the rear of the web 2 and this arm has a cam roller 250 adapted to operate within a suitable cam groove in a cam 250' mounted on the shaft 61.

It will be noted that the arm 245 obtains its movement from a cam on the shaft 61 whereas the arm 240 obtains its movement by a cam on the shaft 66. The gearing between the shafts 61 and 66 is such that the shaft 61 rotates five times while the shaft 66 is rotating once. The cam groove in the cam which actuates the arm 240 is so shaped that the elevator 237 is moved vertically four times during a single rotation of the cam to a height such as that shown in Fig. 29, and to a height substantially five times that shown in Fig. 29 once during the rotation of said cam. In other words there are four vertical movements of a height slightly greater than the thickness of the gum and one which is substantially five times the thickness of the gum or a little greater than five times the thickness of a stick of gum when wrapped. The purpose

of this is to first group five sticks of gum in the manner previously set forth and then raise the five sticks of gum to a position where the same may be moved as a unit into the third turret wherein the five sticks are enclosed within a second wrapper and heat sealed therein.

Referring again particularly to Figs. 28, 29 and 31 to 39 inclusive, it will be noted that the upper stick of gum above the elevator **237** is engaged by a pressure member **251** pivotally carried by a plate **252** secured to the arm **253**. This arm is pivoted at **254** to a bracket **255** mounted on the web portion **2** of the frame. A projection **255'** on the arm **253** engages the vertical surface of the bracket **255** to limit the counter-clockwise movement of the arm **253** and for the same reason that the counter-clockwise movement of the arm **225** is limited by means of the abutment **230** during the four short vertical movements of the elevator **237**. The member **251** is normally moved downwardly by its own weight and the weight of the arm **253** and the plate **252**, but on the fifth and greatest movement of the elevator **237** the upper edge of the arm **253** is engaged by the spring-pressed plate **256** which is slidably mounted on the pin **257** and yieldingly urged towards the abutment **258** by means of a spring **259**. By this arrangement on the fifth movement of the elevator, the five sticks of gum are tightly pressed together and when the elevator reaches its extreme vertical position which is best illustrated in Figs. 33 and 34, the arms **260** which carry the projections **261** can be moved to the right as viewed in Fig. 33 to bring the projections **261** into engagement with the ends of the sticks and move the ends of the sticks between the lower surface of the plate **262** onto the supporting surface **263**. The projections **261** are provided with auxiliary projections **264** which extend downwardly a slight amount below the supporting surface **263**. It will be noted that the elevator also moves to the right after it has lifted the five sticks of gum to the position shown in Fig. 33, and thereafter the elevator is returned to a position below the stick of gum which is then being moved into position while the previous sticks of gum are in elevated position. Figs. 33, 37, 34 and 28 illustrate the successive positions of the elevator from the time the five sticks of gum reach the vertical position shown in Fig. 33 until the elevator is in a position to raise the next succeeding stick positioned against the abutment **231** by the ejector **222**. It will be noted that the elevator comprises two arms which protrude upwardly on opposite sides of the support **223** (see particularly Figs. 31 and 32).

After the five sticks have been moved onto the support **263** they are carried into a position adjacent the third turret C and are ready to have the third wrapper wrapped thereabout. In order to hold the five sticks of gum together as the same are being moved into the pocket of the third turret at the first position, I provide an arm **265** pivoted at **267**, to a bracket **268**, the surface **269** of which abuts against the lowermost edge of the arm **265** as best illustrated in Fig. 38 to limit the counter-clockwise movement of the arm. A spring **270** is fastened to a rigid projection **271** and the arm **265** to normally urge the arm **265** in a counter-clockwise direction. A plate **272** is rigidly connected to the arm **265** and supports the plate **262**. The plate **262** has the upwardly inclined fingers **273** located at the edge thereof adjacent the turret C. When the elevator moves to its highest position the uppermost one of the sticks of gum engages the lower side of the plate **262** which presses the sticks of gum downwardly onto the surface **263** as the projections **261** on the arms **260** move the gum towards the turret C.

In Figs. 7 and 56, if taken in connection with each other, it will be noted that the arms **260** are carried by a laterally extending member **274** carried by an arm **275** pivoted at **276**. A projection **277** integral with the arm carries a roller **278** which engages a cam groove in the cam **279** (Fig. 2) on the shaft **66**. As the arm **275** rocks about the pivot **276**, the projections **261** move the five sticks of gum into engagement with the second wrapper O, which is formed from sheets of paper cut from one of the rolls of paper J. The wrapper O is arranged between the assembling position and the turret D and rests in a notch **280** (see particularly Fig. 7). The wrapper O is fed into the position shown in Fig. 7 between the rollers **281** a guide **282** assisting the rollers so as to guide the wrapper into proper position within the notch **280**.

The mechanism for feeding the wrappers to the position shown in Fig. 7 is best illustrated in Figs. 1 and 5. This mechanism is quite similar to that used for feeding the first wrapper to the first turret and comprises the guide roller **283** over which the paper is fed from one of the rolls J along a guide **284** and between guide rollers **285**. The paper then travels downwardly between the rolls **286** which carry the knives **287** which are similar to the knives **98**. Thereafter the paper passes downwardly between the guides **288** and **289** between the rollers **281**. It will be understood, of course, that the rollers **281** travel faster than the other rollers so as to prevent the cut strips of paper from piling up on top of each other in the notch **280**.

I will now proceed to describe the mechanism for wrapping the wrapper O about the five sticks of gum to form a package. I will first describe the means for forming a tubular open ended wrapper which is wrapped about the gum in the manner best illustrated in Figs. 52, 53 and 54. The mechanism for forming this wrapper is best illustrated in Figs. 1, 7, 47, 48, 49, 50, 51 and 56. Reference will be had particularly to Figs. 7, 47, 48, 49, 50 and 51.

It will be noted in Fig. 47 that as the members **261** continue their movement to the right the five sticks of gum are forced against the wrapper O and carried into the first pocket of the turret C. This turret is rotatably mounted on a shaft **290**, and rotates in a clockwise direction the same as do turrets A and B. The turret C rotates only one-fifth as fast as the turrets A and B for the reason that it is driven directly from the shaft **66** which as previously explained makes only one revolution for five revolutions of the shaft **61** which drives the turrets A and B. In Fig. 5 it will be noted that the shaft **66** carries a gear **291** secured thereto and arranged just in front of the web **2** as best illustrated in Fig. 2. A gear **292** secured to the rotatable shaft **293** meshes with the gear **291** on the shaft **66** and is driven thereby. A disc **294** is secured to the shaft **293** at the rear of the web **2**. The disc **294** carries a pin **295**, and this pin together with the disc **294** form the driving gear of the Geneva movement used to drive the turret. The driven gear is shown at **296** and has the notches **297** into which the pin **295** projects. This is the ordinary Geneva gear arrangement. The Geneva gear **296** is secured to the shaft **298** which has a gear **299** meshing with a gear **300** secured to the

shaft 290 upon which the turret C is secured. Therefore an intermittent rotary movement in a clockwise direction is given to the turret C by the mechanism just described. Considering again more particularly Figs. 47, 48, 49, 50, 51 and 7, it will be noted that the turret C has a plurality of hardened steel members 301 curved on the outer periphery thereof and arranged within a suitable notch in the body portion 302 of the turret. Opposed to the hardened steel members 301 are the plates 303 which are slidably mounted on the pins 304 and are spring-pressed towards the hardened steel members 301 by means of the springs 305 interposed between the collars 306 and the plates 303. This arrangement is somewhat similar t he arrangement for the first and second turre A and B but the member 301 performs a very novel function in the present instance. This function will appear presently.

When the sticks of gum are forced against the wrapper O and into the pocket formed by the members 301 and 30, the end portions 307 and 308 of the wrapper both protrude beyond the edges of the package of gum as best illustrated in Fig. 49 and also in Fig. 52. The end 308 does not project beyond the edges as far as does the end 307 as the portion 307 is adapted to be folded over the exposed edges of the wrapped gum and into engagement with the edge 308.

When the turret C is moved so as to rotate the pocket at the first position to the second position, the edge 307 first comes into engagement with the forward pointed end 309 of a combined heater and folding member 310. The pointed end of the heater folds the end 307 of the wrapper against the edges of the gum and brings the inner surface of the wrapper, which is the waxed surface, into engagement with the corresponding inner surface of the end 308. The foiled surface is on the outer side of the package. A heating unit 311 is arranged within the heater 310 and is preferably an electrical heating element that may be of any desired construction so as to heat the inner curved surface 312 of the member 310. The heater 310 is carried by an arm 313 pivoted at 314 (see particularly Fig. 7) and a handle 315 is used to raise or lower the heater as desired.

In Fig. 48 I have shown the edges 307 and 308 in engagement with each other and in a position such that a small amount of further rotative movement of the member C will cause these two ends to be pressed together against the hardened steel members 301 by the forward pointed end 309 of the heater 310. The heat from the heater causes the wax on the inner surface of the ends to melt as the ends move over the heater. It will be noted that the heater is still in engagement with the ends when the gum arrives at the second position of the third turret C.

When the gum is next moved by the turret from the second position to the third position which is at 90° from the second position, the melted wax is chilled by means of the chiller 316 which has the fins 317 to permit a quick heat transfer from the chiller to the surrounding atmosphere. As the chiller cools the melted wax between the ends 307 and 308, the inner surface of the ends are united so that when the package arrives at its third position, the wrapper is in the form shown in Fig. 53 with the projecting ends extending upwardly. The package with the tubular wrapper thereon is next moved out of the pocket at the third position and as a result the upwardly projecting edges 307 and 308 are folded against the top of the package by means of the rounded lower end 318 of the chiller 316.

The tubular wrapper is next moved through a plurality of positions arranged in a horizontal plane before being inserted in the last turret. While passing through these positions, the ends of the wrapper are folded, then heated and chilled to seal the same together and finally folded against the body of the package. I have clearly illustrated these positions in Fig. 57 and it will be noted that each of the positions is equi-distant from the adjacent positions. I shall refer to these positions as R, S, T, U, V, W and X.

The packages are moved through the successive positions from the third turret into the fourth turret by means of the transport bar 319 having the vertical projections 320 each of which is adapted to successively engage the left hand side of the packages as viewed in Fig. 57 located at various ones of the positions and move the packages to their next successive positions. The transport bar 319 is carried by means of a plurality of arms 321 and 322 which are pivoted at 323 and 324 to projections on the transport bar. The lower ends of the arms 321 and 322 are pivotally connected at 325 and 326 to the arms 327 and 328 of a pair of bell cranks, best illustrated in Fig. 56. The other arm 329 of the bell crank having the arm 327 is provided at its upper end with a roller 330 which engages a cam groove 331 in the cam 332.

A link 333 is pivotally connected to the arm 329 and the arm 334 of the bell crank which has the arm 328. The bell cranks are pivoted at 335 and 336 and the link 333 causes the bell cranks to be moved in unison with each other when the arm 329 is rocked by means of the cam 332. This arrangement is such that the rocking of the bell cranks raises the arms 321 to impart vertical movement thereto.

Lateral movement of the arms 321 and 322 is accomplished by means of the cam roller 337 on the arm 321 which is arranged within a cam groove in the cam 338. The combined movement which is imparted to the transport 319 is such that it moves from the position shown in full lines in Fig. 57 to the left or dotted line position shown in that figure, then vertically into the position shown in Fig. 56, then horizontally to move the packages to their next succeeding position and finally downwardly again to the position shown in full lines in Fig. 57.

As previously described as the package moves from the turret C to the position R, the projecting ends of the wrapper 307 and 308 are folded against the top of the package and are held in that position by the pressure plate 339 supported by means of the pins 340 on a plate 341 and spring-pressed towards the package by the springs 342 interposed between the plates 339 and 341, it being understood that the pins 340 are slidable in the plate 341. At the position R the open ends of the tubular wrapper are crimped into the position shown in Fig. 55 so as to prepare the ends for heat sealing. The ends are heat sealed at the positions S and T to produce a wrapper of the form illustrated in Fig. 84. At position U, the ends of the package are chilled and folded upwardly as illustrated in Fig. 85. This last operation takes place partially as the transport is moving the package from the position U to the position V. At position V the ends are folded over the top of the package. At W another heating apparatus heats the folded ends of the package to

re-set the wax in case the same has become broken during the folding operation in the positions U and V. At X the ends are cooled by a suitable chiller. From the position X the packages are moved into the adjacent pocket of the turret D. I will now proceed to describe the several operations and the mechanisms for carrying out the operations performed at the positions R to X inclusive.

The method for preparing the tubular ends for the heat sealing operations is best illustrated in Figs. 61 to 66 inclusive. The packages are carried by the transport through the various positions while supported on the plate 343. A bracket 344 secured to the web 2 carries the pivot pins 345 which in turn carry the pivoted arms 346, each of which have extensions thereon opposed to each other and carrying the meshing gear teeth 347 so that the rotation of one arm 346 about its pivot causes the other arm to move about its pivot in the opposite direction. One of the arms 346 is provided with an extension 348 pivoted to the link 349 which in turn is connected by means of the yielding connection 350 to an arm 351 of a bell crank, the other arm 352 of which has a roller 353 operating within a suitable cam groove in the cam 354. The bell crank is pivoted on the shaft 335. This mechanism is best illustrated in Figs. 2 and 56.

Fig. 66 is an elevational view of the mechanism supported on top of the left hand arm 346 as viewed from the left in Fig. 61, or as viewed from the front of the machine. Fig. 62 is a plan view of the mechanism shown in Fig. 66. Each of the arms 346 supports a plate 355 which extends from the arm 346 to a position adjacent the ends of the tubular package at the position R. It is also found necessary to offset the support for the mechanism which is now to be described in this manner in order to give proper clearance for the transport 319. On the plate 355 I mount a block 356 which carries a pair of scissors-shaped members 357 and 358 which are pivoted on the pin 359. The members 357 and 358 have slots 360 and 361 therein and a pin 362 on the block 356 extends through the slots 361 and 360. On the upper end of the pin 362 I slidably mount a plate 363 and this plate also has an opening through which the pin 359 extends. A spring 364 is interposed between the collar 365 and plate 363 for the purpose of yieldingly holding the members 357, 358 and 363 in contact with each other, it being understood that the pin 359 is secured in the block 356.

A bracket 366 is also secured to the web 2 and carries a plate 367 which is angularly offset to position the upper edge thereof, as viewed in Fig. 56, opposite the position R. This plate carries the inwardly and upwardly extending members 368 which are held in place on the plate 367 by means of the nuts 369. The members 357 and 358 have integral projections 370 and 371 respectively which are arranged between the upwardly extending portions of the members 368 and the plate 367 so that as the arms 346 are rocked about their pivots, the projections 370 and 371 alternately engage the members 368 and the plate 369, causing the members 357 and 358 to be rocked to the successive position shown in Figs. 62 and 63. As best illustrated in Fig. 65, the block 356 carries a projection 372 which extends inwardly towards the position R, the forward end of which extends slightly downwardly.

The plate 363 has the forward end thereof extending slightly downwardly and then inwardly again towards the position R as best illustrated in Fig. 65. The members 357 and 358 have the creasing members 373 and 374 respectively at the ends thereof adjacent the ends of the tubular container positioned at R. These members are V-shaped in cross-section as best illustrated in Fig. 64.

As the arms 346 move towards each other, each of the plates 363 engage the inner upper sides of the adjacent tubular ends of the wrapper and the projections 372 engage the lower outer surfaces of the adjacent ends. As best illustrated in Fig. 64. When the arms have been advanced sufficiently to bring the projections 370 and 371 into engagement with the respective upright portions of the members 368 the further movement of the arms will cause the members 373 and 374 to move towards each other to the position shown in Figs. 63 and 64 thereby crimping opposite portions of the open tubular ends of the wrapper O as best seen in Fig. 64 and as shown also in Fig. 55. The arms 346 are then moved away from each other to the position shown in Figs. 61 and 62, the plate 367 abutting against the projections 370 and 371 to move the projections 373 and 374 away from each other.

After the ends have been folded as described in the preceding paragraph the transport 319 moves the packages to the next position S. In this position and in the next succeeding position T the ends of the package are heat sealed. The purpose of providing two heating positions is to make it unnecessary to heat the wrapper too much at one position as such an arrangement has a tendency to cause the heat to be transmitted to the material being wrapped. I prefer therefore to use heating means at lesser temperatures and spread the heating operation over a longer period of time causing the efficient sealing of the ends without extreme temperatures. Due to the fact that the packages are moved rapidly through the various succeeding positions one could not use a low heat and a long period of heating unless several heating elements were provided as in this apparatus. I will therefore proceed to describe both of the heating means as they in reality perform the same function but at two of the positions instead of one. This means is best illustrated perhaps in Figs. 56 58, 67, 68 and 69. The upper and lower heating irons 375 and 376 respectively have heating elements 377 and 378 arranged longitudinally therein in the direction of movement of the package. The irons 375 and 376 are long enough to extend over two positions of the package and are arranged in pairs at opposite ends of the tubular wrapper, it being understood that both ends of the wrapper are wrapped in the same manner. The lower iron 376 is rigidly secured to an arm 379, while the upper iron 375 is supported yieldingly on the arm 380, the arms being pivoted at 381. The yielding mounting for the iron 375 comprises pins 382 secured to the iron and passing freely through the arm 380. Springs 383 surround the pins 382 and are interposed between the iron 375 and the arm 380. Collars 384 limit the movements of the pins through the arm 380. It will be understood that the wires leading from the heating elements may be connected to any suitable source of electrical energy or if desired I may substitute any other desired heating elements for the electrical heating elements 377 and 378. As best illustrated in Fig. 67, the heating irons 375 and 376 are recessed at 385 so as to provide a small amount of clearance between the irons at the outer side thereof. The arms

379 and 380 are rocked towards each other after the package arrives at the position S or T, and as a result the irons are brought into engagement with the opposite sides of the tubular ends, and these sides are therefore brought into engagement with each other with the crimped portions 386 lying therebetween. The waxed surfaces are in engagement with each other and the heated irons cause the wax to melt and run together, the preliminary heating taking place at the position S, and the final heating at the position T. The arms 379 and 380 are thereafter moved away from each other to permit the transport to move the package to the next succeeding position.

In order to have the heated ends set properly, it is desirable to cool the same and at the same time apply pressure thereto for if the wax remained heated, the tendency of the folded ends of the wrapper to open might break the bond between the waxed surfaces before the wax has cooled. Therefore, the purpose of heat sealing the ends would be defeated. I therefore mount on the arms 379 and 380 the chilling irons 387 and 388, the lower chilling iron 387 is rigidly secured to the arm 379 the same as is the iron 376 and the upper chilling iron 388 is yieldingly mounted on the plate 380 in the same manner as the iron 375 and by means of the pins 389 and springs 390. The chilling irons come into engagement with the heat sealed ends of the tubular package at the position U, and tend to set the wax which is heated between the sides of the tubular end portions of the wrapper.

After the ends of the wrapper have been chilled at the position U, the package is in the form illustrated in Fig. 84, and I shall hereafter refer to the heat sealed ends by the reference numeral 391.

In Figs. 58, 69, 71 and 72, it will be noted that there is a projection 392 on each of the irons 387 and these projections are arranged adjacent the position V, so that after the package is moved to the position V, the projections 392 move upwardly to fold the ends 391 against the end of the package and into the position shown in Figs. 71 and 85. While the ends 391 are in the positions shown in Figs. 71 and 85, the extreme portion of the end 391 is folded over at right angles against the top of the package as best illustrated in Figs. 72 and 86 and by means of the folding members 393 carried by the arms 394. The pressure plate 339 is cut away at 395 to permit the folding members 393 to accomplish their purpose.

The mechanism for operating the arms 379 and 380 is best illustrated in Figs. 2, 69 and 56. The arm 379 has the yielding connection 396 with a rod 397. This yielding connection is such as to provide a positive movement of the arms towards each other and yet permit yielding movement between the rod 397 and arm 379 as the arms are being moved from each other and is similar to the connection between the arm 32 and the rod 31 described more fully in connection with the description of those parts. The rod 397 is pivoted at 398 to the arm 399 which in turn is pivotally connected to a link 400 the latter in turn being pivotally connected to an arm 401 at its opposite end. The arm 401 is pivoted on the shaft 155 and carries a cam roller 402 adapted to travel in a suitable cam groove in the cam 403 (see Fig. 2). The arm 399 is pivoted to a shaft 404 best illustrated in Fig. 56. The arm 399 carries an extension 405 which extends on the opposite side of the pivot 404 and has operative connections with the rod 406 at the lower end thereof. This operative connection comprises a pair of collars 407 on the rod 406 which are arranged on opposite sides of the extension 405. The upper end of the rod 406 is connected by means of a yielding connection 408 similar to the connection 396. It will be noted from an inspection of Fig. 56 that when the link 400 is moved downwardly the rod 406 is moved upwardly and the rod 397 is moved downwardly thereby moving the arms 379 and 380 away from each other to the positions shown in Fig. 69. Opposite movement of the link 400 causes the arms 379 and 380 to be moved towards each other so that the heating irons and the chilling irons carried thereby will perform their intended functions.

The folding members 393 carried by the arms 394 are operated in the manner illustrated in Figs. 60, 56 and 2. Each of the arms 394 is pivoted to a pivot 410 and carries extensions which have gear sectors 409 thereon so as to cause the arms to move in opposite directions relatively to each other. An arm 411 secured to one of the shafts 410 which form pivotal points for the arms 394 is connected by means of a link 412, and a yielding connection 413 to an arm 414 pivoted on the shaft 155. The arm 414 carries a roller 415 which engages a suitable cam groove in the cam 416. Rotation of the cam 416 causes the link 412 to be moved vertically to rock the arms 394 and thereby cause the folding members 393 to move into engagement with the ends 391 and fold the same over the top so that the package takes the shape shown in Fig. 86. During the folding operations at the positions U and V, there is a tendency to break the bond between the sealed ends of the wrapper and therefore it is desirable to re-set the wax by applying heat to the ends thereof after the package takes the form shown in Fig. 86. In order to do this I provide mechanisms which operate on the package at the positions W and X, and I will now proceed to describe these mechanisms.

These mechanisms are best illustrated in Figs. 57, 59, 60, 56, 75 and 78. A bracket 417 secured to the web 2 extends outwardly over the path of travel of the packages and approximately above the positions W and X. A heating iron 418 carried by the pins 419 is yieldingly pressed towards the package by means of the springs 420 interposed between the bracket 417 and the iron 418, the pins 419 being slidable in the bracket 417 and limited in their downward movement the same as are the pins 340. A heating element 421 extends through the iron transversely to the direction of movement of the packages and is connected by suitable wires 422 to a source of electrical energy, it being understood that any other suitable type of heating iron may be used if desired. As best illustrated in Fig. 59, the lower surface of the heating iron is recessed as at 423 to provide surfaces which are spaced from the body of the wrapper O a distance sufficient to accommodate the folded end portions 391, the central portion of the heating iron being adapted to rest on the body portion of the wrapper. With this arrangement the central portion of the heating iron re-sets the wax of the folded edges of the wrapper which were folded on the third turret C, and the surfaces formed by the recesses 423 are adapted to re-set the wax which seals the end portions 391 as is very clearly shown in Fig. 59. The side of the iron 418 which lies adjacent the pressure bar 339 has the lower edge thereof slightly curved to permit the package to slide therebeneath as it

leaves the pressure bar under the influence of one of the projections 320 on the transport.

It will be noted in Figs. 57 and 70 that there is an arm 424 pivoted at 425 to the bracket 417, an operating handle 426 being provided for the purpose of operating the arm 424 the same being adapted to move either to the full line position shown in Fig. 70 or to the dotted line position shown in that figure. The plate 341 which carries the pressure bar 339 is in turn carried by a plurality of arms 427 pivoted at 428 to a bracket on the frame web 2. One of these arms, viz. the one which lies adjacent the bracket 417 carries a pin 429 (see Figs. 57 and 70) and when the arm 424 is in the full line position shown in Fig. 70, the pin 429 will abut against the lower surface of said arm thereby holding the pressure bar in operative position, the arm 424 being moved to the dotted line or inoperative position in order to release the pressure bar and permit the same to be raised into an inoperative position about the pivots 428. Thus in case it is necessary to relieve a jam which may occur during the operation of the machine, the pressure bar may be moved out of the way to permit one to relieve the jam.

As will be seen from an inspection of Fig. 75, the chilling iron 430 is also provided with recessed portions 431 adapted to perform the same functions as the recesses 423 with the difference that the iron 430 chills the melted wax after the same has been re-heated by means of the heating iron 418. Fins 432 are provided for radiating the heat from the chilling iron. The chilling iron 430 is carried by means of the pins 433 slidably mounted in bracket 417 and yieldingly urged towards the package by means of the springs 434.

It will be noted from an inspection of Fig. 59 that the heating iron is provided with members 435 which lie adjacent the ends of the package. These assist the lower surface of the heating iron to hold the ends of the package in the position illustrated in Fig. 86. Similarly, the chilling iron 430 is provided with the members 436 and 437 adapted to perform the same function. However, the members 436 and 437 extend outwardly beyond the edge of the chilling iron which lies adjacent the fourth turret D, so as to guide the package into the fourth turret D and prevent unfolding of the ends of the package (see Fig. 56).

The last projection 320 arranged at the right of the transport 319 moves the package from beneath the chilling iron 430 into the pocket of the turret D located at the first position thereof and in doing so causes the outer band P to be folded about two sides of the package, the band previously having been fed downwardly between the rolls 438 to a position between the chilling iron and the fourth turret. The mechanism for feeding the band into this latter position is best illustrated in Figs. 1, 5 and 73.

The bands are arranged in the hopper G and have suitable printing on one side thereof the same as the bands in the hopper F. The bands rest of their own weight on the needle-point 439, and feed roller 440 provided with a rubber friction member 441 is adapted to periodically withdraw a band from the hopper G and from the bottom of the stack of bands in the hopper G as described with reference to the roller used for withdrawing the bands from the hopper F. The roller 440 is mounted on a shaft 442 which carries a sprocket wheel 443 driven by a chain 444, this chain being trained over a second sprocket 445 secured to the shaft 293. As the bands are witbdrawn from the hopper by means of the roller 440, they are fed between the rollers 446 driven by means of the gears 447 and 448 from the shaft 442. The band then passes downwardly between the guides 449 and between the rollers 438, the latter rollers feeding the band into a position between the turret D and the chiller 430, it being understood that the rollers 438 are traveling at a more rapid rate than the rollers 436 so as to prevent piling up of the bands adjacent the turret.

The turret D is driven by means of a chain 450 which is trained over a sprocket 451 on the shaft 452 which carries the turret, and over the sprocket 453 secured to the shaft 298. It will be noted from an inspection of Fig. 5 that the sprocket 453 will rotate in a counter-clockwise direction since this is the direction of rotation of the shaft 298 and the Geneva gear 296. Consequently the turret D will rotate in a counter-clockwise direction. The turret D is provided with a plurality of pockets 454. In Fig. 73 there will be seen a member 455 which lies adjacent the end of the turret D and a similar member is arranged at the other end of the turret, the two members being carried by a bracket 456 secured to the web of the frame. These members lie between the members 436 and the ends of the turret and provide means whereby the folded ends 391 of the package are held against the top of the package while the members 436 and 437 are holding the same ends against the ends of the package. I will now describe the means for holding the band in predetermined position while the package is being moved thereagainst and into the pocket 454 located at the first position of the turret D.

These means are best illustrated in Figs. 56, 73, 76, 77, 78, 79 and 81. An arm 457 secured to a shaft 458 rotatably mounted in the web 2 carries a curved plate 460. The curvature of the plate adjacent the turret is substantially concentric with the curvature of the outer surface of the turret D. As best seen in Figs. 73 and 81, the arm 457 is connected by means of a link 461 to an arm 462 secured to the shaft 463. The shaft 463 extends through the web 2 to the rear thereof and carries an arm 464 on the rear end thereof. This arm carries a suitable cam roller 465 which operates in a suitable cam groove in the cam 466. The cam 466 is carried by the shaft 442 and rotates therewith. The cam 466 imparts a slight amount of rocking movement to the arm 457 through the connections just described so as to periodically bring the plate 460 adjacent the turret D or into the position illustrated in Fig. 78.

Before the cam 466 brings the plate 460 into the position shown in Fig. 78, it brings the same into the position shown in Fig. 77. The plate 460 is provided with a plurality of pins 467 which are slidably mounted in the plate for movement in a direction towards and from the turret. As best illustrated in Fig. 79, the pins 467 are recessed at 468 and the spring 469 arranged in a suitable recess 470 in the plate 460, abuts against the bottom of the recesses 468 to frictionally retard the movement of the pins 467 and to retain the pins in any position to which the same may be moved. As the member 460 is moved into the position shown in Fig. 77, the pins 467 abut against the outer surface of the turret and act as a stop against which the bands P abut as they are fed between the turret and the chiller. After the bands arrive at the position shown in Fig. 77, the plate 460 continues to move toward the turret

until the pins 471 abut against the band and hold the same against the surface of the turret. The pins 471 are pressed by means of the springs 472 towards the turret, the collars 473 limiting movement of the pins in a direction towards the turret when the plate 460 is moved away from the turret. A plate 474 (see particularly Figs. 74, 76, 77 and 78) has a plurality of slots 475 adapted to receive the flattened head portions 476 of the pins 471. This plate 474 is secured by means of screws 477 to the plate 460 and acts as an abutment for the springs 472 and as a means for preventing rotation of the pins 471 so that the beveled portions 478 thereof will always face in a direction towards the approaching bands. This beveled portion is for the purpose of preventing the bands from stopping if and when the same should strike the pins 471.

With the arrangement just described, it will be seen that the lower edge of the band P is positioned against the pins 467 and are held in this position by means of the spring-pressed pins 471 until the package has been moved into the pocket 454 by means of the transport 319. When the package has been positioned within the pocket 454, the plate 460 is retracted and the pins 467 abut against the plate 479 to reposition the pins a substantial distance beyond the surface of the plate 460 which lies adjacent the turret. (See particularly Fig. 76.) With this arrangement therefor the pins 467 strike the surface of the turret before the plate 460 has reached the full extent of its movement towards the turret. This insures that the pins 467 will be in position to form a stop for the band P before the same arrives at the position shown in Fig. 77.

It will be noted from an inspection of Figs. 76 and 78 that the pockets 454 have somewhat outwardly flared openings which facilitate the entry of the packages into the pockets, and assist in compressing the package sufficiently to hold the packages in the pockets during the rotation of the turret D. This turret is not rotating at a very great speed and no means is necessary to hold the packages in the pockets but if desired, a curved guide plate may be arranged adjacent the pockets concentric with the axis of rotation of the turret and lying closely adjacent to the outer edge thereof.

The glue applying apparatus for applying glue to the end 480 of the band P is best shown in Figs. 56, 73, 77 and 81. After the package has been placed in the pocket 454 of the turret D, the turret is located through 90° in a counter-clockwise direction to the position shown in Fig. 77, the curved plate 460 holding the end 480 in the position shown in Fig. 77 until the same approaches the positions of the glue applying rollers 481 which are mounted to rotate with a shaft 482. The end 480 is thereafter permitted to engage the surfaces of the glue applying rollers 481 it being clearly illustrated in Fig. 77 that it is the inner surface of the end 480 to which the glue is applied. The shaft 482 which carries the glue applying rollers has a projection 486 extending laterally therefrom as best illustrated in Fig. 81. A disc 487 carrying a pin 488 is secured to a shaft 485 rotatably mounted in the web 2. A gear 489 is secured to the shaft 485 at the rear of the web and this gear meshes with a second gear 490 rotatably mounted on a stud shaft 491 which is rotatably mounted in the web 2. The shaft 491 also carries a sprocket 492 and a crank pin 493. A chain 483 is trained over the sprocket 492 and over a sprocket 484 secured to the shaft 66. The rotation of the shaft 66 causes the chain to move and as a result rotates the gears 490 and 489. The chain 483 also passes over idler sprockets 494 and a sprocket on the shaft 495 (see Fig. 5), the latter driving various ones of the feed rollers for feeding the bands to the second turret and the wrapping paper to the third turret through gear trains provided at the rear of the web 2.

As the gear 489 rotates in a clockwise direction (Fig. 73), the pin 488 engages the pin 486 and thereby causes the rotation of the shaft 482 which carries the glue applying roller 481. The shaft 482 is mounted to rotate in suitable bearings on opposite sides of the glue box 496 secured in place on the bracket 459 by means of the screw-held lugs 497. The shaft 498 also rotatably carried by the sides of glue box carries a scraper 499, this scraper having a plurality of scraping edges 500 adjacent the peripheries of the rollers 481. The position of the scraping edges 500 is regulated by means of the adjusting screw 501 and a spring 502. The portions of the scraper 499 which lie between adjacent rollers are adapted to scrape the glue from the sides thereof.

By the arrangement just described it will be seen that while the package is at the position shown in Fig. 77, and during a portion of the rotation of the turret before and after that position, the glue applying rollers will be in contact with the end 480 of the band P and apply glue thereto. It will be noted that the turret D is composed of a plurality of discs each notched to form the pockets 454 (see Fig. 81). The discs are staggered with relation to the glue applying wheels 481 so that glue on the band is not transferred to the turret discs when the band is folded as in Fig. 82.

As the package moves to the third position which is that position shown in Fig. 80, the extending end of the band P is folded against the outer edge of the package by its engagement with the end of the supporting plate 503, the glued surface of the band being towards the turret D. The plate 503 is carried by a bracket 504 secured to a flange 505 formed integral with the web 2 and at one end thereof. Guide plates 506 and 507 are secured to the plate 503 and the guide 507 carries the outwardly extending plate 508 which have the pins 509 slidably mounted therein and limited in their downward movement by suitable collars 510. The lower ends of the pins 509 carry a pressure bar 511 and springs 512 yieldingly urge the plate 511 in a downward direction towards the supporting plate 503.

A shaft 513 is rotatably mounted in the web 2 and carries a crank arm 514 on the end thereof to the rear of the web 2. The crank arm 514 is connected by means of the link 515 to the crank pin 493 on the shaft 491. Therefore as the shaft 491 rotates the arm 514 is caused to rock through the connections just described. The outer end of the shaft 513 carries a plate 516 having the fingers 517 arranged at the lower ends thereof and extending adjacent opposite ends of the turret D as best illustrated in Figs. 73, 80 and 81. As the plate 516 rotates in a counterclockwise direction as viewed in Fig. 73, the same engages the ends of the package in the pocket 454 and moves the same towards the right and between the pressure bar 511 and the supporting plate 503, the forward upper edge of the plate 503 being tapered at 518 to facilitate the entrance of the package between the pressure bar 511 and the supporting plate 503. (See particularly Figs. 80 and 82.) It will be noted from an inspection of

Fig. 82 that as the package moves between the pressure bar 511 and plate 503, the end 480 of the band is folded against the opposite end thereof and the pressure exerted by the pressure bar 511 seals the ends together, the glue serving as the binder between said ends.

This forms the completed package and as successive packages are formed they push the preceding package which is arranged between the pressure bar and supporting plate to the right. When the packages emerge from beneath the pressure bar at the right thereof they are supported on an extension 519 where the same may be gathered and put into suitable cartons either by hand or by machinery. However, since my invention is not concerned with this part of the packaging process, no means for accomplishing this result is illustrated.

It will be noted that the outer band (see Figs. 87 and 88) is sufficiently long to overlie the folding ends 391 and thus assist in retaining the ends in folded position. Fig. 88 shows the completed package.

Obviously other means may be used for rotating the various essential parts of my apparatus and therefore I do not wish to be restricted to the precise driving mechanisms shown, nor do I wish to limit myself to the particular kinds of turrets shown in the drawings, in fact it may be possible to carry out the various steps of my process by conveyers other than turrets, since the turrets merely form conveying means for the articles as they are passed through the machine. The advantage of using turrets is that when moving the article being wrapped from one turret to another, a band or wrapper may be quickly positioned over three sides thereof or over two sides and an edge.

In describing my apparatus in many instances I have described only a single member which is utilized in accomplishing a given result and explains its function and operation. It is to be understand however, that wherever similar parts are referred to by the same reference numeral, then those parts operate the same as the part described.

In Figs. 1, 2 and 92, it will be seen that shaft 61 has a gear 524 carried thereby and a stub shaft 520 mounted to rotate in bracket 521, which also supports shaft 61, carries a gear 522 meshing with gear 524. A fly-wheel 523 secured to shaft 520 is used to manually rotate the shaft 61 through the gearing just described so that the operator may manually position the parts of the machine in desired relation to each other.

Obviously those skilled in the art to which this invention pertains may make other changes in the arrangement and construction of the various parts of my apparatus without departing from the spirit of the invention, the novel features of which are pointed out in the appended claims.

Having thus fully described an embodiment of my invention, what I desire to secure by Letters Patent of the United States is:—

1. An article packaging machine comprising means for supporting a plurality of articles to be packaged, a reciprocating member, means for removing an article to be packaged from a stack supported by said first means and for moving the same towards a position where a wrapping operation is to take place, and supplemental means for moving said article toward said position after said article has been moved a predetermined distance by said article removing means and while said reciprocating member is returning to its original position, said supplemental means being adapted to begin its action upon said article while the article is still under motion due to being moved by said removing means.

2. In an article wrapping machine, means for holding a stack of articles to be wrapped, reciprocable means for selecting an article from said stack and for moving said article a portion of the distance along a predetermined path towards a wrapping position, and supplemental moving means for moving said article an additional distance along said path toward said position, said supplemental means engaging said article to continue the movement of said article while said article is still moving under the influence of said selecting means and while said reciprocating member is returning to its original position.

3. A wrapping machine comprising a hopper for a number of the articles to be wrapped, a reciprocating separator for separating one of said articles from the remainder, a holder, means for feeding wrappers into a position between said hopper and holder and across the path of said reciprocating separator, means for moving said separator and while said separator returns to its original position from said hopper towards said holder to carry said article to a position adjacent said holder, a relay arm for moving said article into said holder, said relay arm acting to move said article while said article is still in motion under the influence of said separator, said article engaging said wrapper as it moves toward said holder, and means to partially fold said wrapper about said article before the same is arranged entirely within said holder.

4. In a wrapping mechanism, the combination with a turret having a pocket therein, means for forcing an article having a wrapper folded thereabout with portions extending outwardly at opposite ends of said article into said pocket, means operative after said partially wrapped article is positioned in said pocket for moving into engagement with said wrapper adjacent the ends thereof to create the same, means for moving said turret and means for folding said extending portions along said creases as said turret is moved away from said loading position, said creaser moving with said turret until said folding means substantially completes its folding operation.

5. In a mechanism for wrapping a stick of gum which has two faces, two side edges lying between said faces and two end edges, the combination with a turret, having a pocket therein, of a means for moving said turret to several positions of adjustment, means for positioning a wrapper adjacent one position, means operable when said pocket is in said last mentioned position to move a stick of gum against said wrapper and into said pocket so that said wrapper is folded about said faces and one side edge with one edge of said wrapper protruding beyond the opposite side edge of said gum, means for crimping that portion of the wrapper extending beyond the end edges of said gum and contiguous with that portion of the wrapper which is folded over said first side edge, said crimped portion lying between the portions of said wrapper contiguous with the portions folded over said faces and extending beyond the ends of said gum, means movable in the same direction as said turret and operable as said turret moves from said first mentioned position to a second position for creasing the wrapper adjacent the ends of the gum, and means for thereafter folding said ex-

tending portions of said wrapper along said crease.

6. In a mechanism for wrapping a stick of gum which has two faces, two side edges lying between said faces and two end edges, the combination of a turret, having a pocket therein, of a means for moving said turret to several positions of adjustment, means for positioning a wrapper adjacent one position, means operable when said pocket is in said last mentioned position to move a stick of gum against said wrapper and into said pocket so that said wrapper is folded about said faces and one side edge with one edge of said wrapper protruding beyond the opposite side edge of said gum, means for crimping that portion of the wrapper extending beyond the end edges of said gum and contiguous with that portion of the wrapper which is folded over said first side edge, said crimped portion lying between the portions of said wrapper contiguous with the portions folded over said faces and extending beyond the ends of said gum, means movable in the same direction as said turret and operable as said turret moves from said first mentioned position to a second position for creasing the wrapper adjacent the ends of the gum, means for thereafter folding said extending portions of said wrapper along said crease, said portions which are folded along said creases extending at a substantial angle to said faces, means for folding said last mentioned portions towards the face of said gum so that sections of said portions are opposed to the portion of said wrapper protruding over said side edge of said gum, means for crimping the portions of said wrapper which connect said opposed protruding portions and means for folding all of said last mentioned portions towards said gum and over the side edge of said gum which lies adjacent said portions.

7. Mechanism for wrapping an article having faces joined by contiguous side and end edges, comprising means for wrapping a wrapper about two faces, a side edge and said end edges so that only one side edge is exposed and so that a portion of said wrapper extends beyond said exposed side edge from both of said faces and another portion joins said last mentioned portions and is contiguous with the portions of said wrapper lying against said end edges, means for crimping said contiguous portions, means for creasing said wrapper adjacent said exposed edge, means for folding said portions protruding beyond said exposed edge over said exposed edge and against a portion of said wrapper covering one of said faces, and means for thereafter folding the remaining protruding portions of the wrapper about the article.

8. A wrapping machine comprising a movable member having a means for holding articles therein with a wrapper arranged about said articles, the opposite ends of said wrapper extending away from said articles, an abutment on said member, a heated abutment arranged in the path of movement of said ends for engaging said ends as said member is moved adjacent said heated abutment for moving said ends against each other and against said first abutment to heat seal said ends together while said ends are extending away from said articles.

9. A device as set forth in claim 8 in which a means is provided for folding said sealed ends against the portion of the wrapper about said articles.

10. A wrapping machine comprising mechanism for forming tubular wrappers about articles with the ends of said tubular wrappers extending beyond said articles, means for heat sealing the extending ends of said wrappers together, means for folding said sealed ends against the body portions of said wrappers, and means for re-heating said ends after they are folded to set said ends in folded position.

11. A wrapping machine comprising mechanism for forming tubular wrappers about articles with the ends of said tubular wrappers extending beyond said articles, means for heat sealing the extending ends of said wrappers together, means for folding said sealed ends against the body portions of said wrappers, means for re-heating said ends after they are folded to set said ends in folded position, and means for chilling said ends after each heating operation.

12. In a wrapping mechanism the combination with a means for wrapping articles in tubular wrappers, of means for heat sealing the ends of said tubular wrappers while in extended position, means for cooling said heat sealed extending ends and means forming part of said cooling means for folding said extending ends against the body of said wrapper after the heat sealing thereof.

13. Wrapping mechanism comprising mechanism for placing bands about articles comprising a member having means for receiving said articles, means arranged adjacent said member for positioning bands in desired position and for holding one end of each of said bands in a desired relation with said member comprising a limiting stop against which an edge of each of said bands is moved as the band is moved in an edgewise direction toward said stop, and a clamp for thereafter holding said band against shifting movement, means for moving articles against said bands and into said receiving means to position said wrappers about said articles with an end of each of said bands extending outwardly from said articles amounts determined by said positioning and holding means, and means for releasing said positioning and holding means.

14. Wrapping mechanism comprising mechanism for placing bands about articles comprising a member having means for receiving said articles, means arranged adjacent said member for positioning bands in desired position and for holding one end of each of said bands in a desired relation with said member comprising a limiting stop against which an edge of each of said bands is moved as the band is moved in an edgewise direction toward said stop, and a clamp for thereafter holding said band against shifting movement, means for moving articles against said bands and into said receiving means to position said bands about said articles with an end of each of said bands extending outwardly from said articles amounts determined by said positioning and holding means, means for releasing said positioning and holding means, means for applying glue to said extended ends, and means for folding said extended ends against the opposite ends of said bands and with the glue arranged therebetween.

15. Wrapping mechanism comprising a movable member having pockets therein, a plate adjacent said member, a stop on said plate fixed against movement in the direction of movement of the band against said stop, means for feeding bands edgewise to position one edge thereof against said stop and with a portion of each of said bands arranged over a pocket while said pocket is at one position, means for moving the articles to be wrapped against said band and

into said pocket, means for holding one end of each of said bands against said member while said articles are being moved into said pockets so that the desired portions of said bands will be wrapped about said articles, means for releasing said ends after said articles are positioned in said pockets, and means for sealing the free ends of said bands against the other ends thereof.

16. Mechanism for wrapping a group of articles comprising means for assembling a plurality of articles beneath a presser bar by inserting each successive stick beneath the previous stick positioned beneath said presser bar, means for moving all of the sticks assembled beneath said presser bar at a predetermined time into a position to be wrapped by suitable wrapping mechanism, said wrapping mechanism comprising a member having a pocket, means for positioning a wrapper between said pocket and said articles, means for moving said articles into said pocket thereby carrying said wrapper therewith so that said wrapper is wrapped about said articles, and means for increasing the force exerted by said presser bar on said articles just prior to the time said articles are moved into said pocket.

17. In a mechanism for wrapping a stick of gum, which has two faces, two side edges lying between said faces, and two end edges, the combination with a conveyer having a pocket therein, of means for moving said conveyer to several positions of adjustment, means for positioning a wrapper adjacent one of said positions, means operable when said pocket is in said last mentioned position to move a stick of gum against said wrapper and into said pocket so that said wrapper is folded about said faces, and one side edge thereof with one edge of said wrapper protruding beyond the opposite side edge of said gum, stationary means for crimping that portion of the wrapper extending beyond the end edges of said gum and contiguous with that portion of the wrapper which is folded over said first side edge, said crimped portion lying between the portions of said wrapper contiguous with the portions folded over said faces and extending beyond the ends of said gum, means movable in the same direction as said conveyor and operable as said conveyer moves from said first mentioned position to a subsequent position for creasing the wrapper adjacent the ends of the gum and for withdrawing same from said stationary creasing means, and means for thereafter folding said extending portions of said wrapper along said crease.

18. In a mechanism for wrapping a stick of gum, which has two faces, two side edges lying between said faces, and two end edges, the combination with a turret, having a pocket therein, of a means for moving said turret to several positions of adjustment, means for positioning a wrapper adjacent one position, means operable when said pocket is in said last mentioned position to move a stick of gum against said wrapper and into said pocket so that said wrapper is folded about said faces and one side edge with one edge of said wrapper protruding beyond the opposite side edge of said gum, means for crimping that portion of the wrapper extending beyond the end edges of said gum and contiguous with that portion of the wrapper which is folded over said first side edge, said crimped portion lying between the portions of said wrapper contiguous with the portions folded over said faces and extending beyond the ends of said gum, means movable in the same direction as said turret and operable as said turret moves from said first mentioned position to a second position for creasing the wrapper adjacent the end of the gum, means for thereafter folding said extending portions of said wrapper along said crease, said portions which are folded along said creases extending at a substantial angle to said faces, means for folding said last mentioned portions toward the face of said gum so that sections of said portions are opposed to the portion of said wrapper protruding over said side edge of said gum, means for clamping the portions of said wrapper which connect said opposed protruding portions, and means for thereafter folding all of said last mentioned portions toward said gum and over the side edge of said gum which lies adjacent said portions.

19. In a wrapping machine, the combination with a turret, of a guide member arranged along one side of said turret substantially concentrically therewith and having the face thereof which is facing away from said turret arranged to act as an abutment against which a wrapper is fed, a cooperating abutment spaced from said guide having a face substantially in alignment with said first face, means for feeding a wrapper into position adjacent said faces, means for feeding an article against said wrapper and into the space between said guide and said abutment and into a pocket in said turret with an edge of the wrapper extending outwardly beyond the edge of the article and beyond the turret, means for thereafter moving said edge peripherally about said turret to position said edge substantially concentrically with respect to said turret and extending in the direction in which the turret is to be moved, means for actuating said turret, said guide holding said edge extended as the turret is moved to a glue applying position, glue applying means occupying a fixed position adjacent the path of travel of said edge to apply glue thereto as said edge moves by the glue applying apparatus, and means for thereafter wrapping said edge about said article into engagement with an opposite side thereof whereby to provide a sealed wrapper therefor.

20. In a wrapping machine, the combination with a turret, of a guide member arranged along one side of said turret substantially concentrically therewith and having the face thereof which is facing away from said turret arranged to act as an abutment against which a wrapper is fed, a cooperating abutment spaced from said guide having a face substantially in alignment with said first face, means for feeding a wrapper into position adjacent said faces, means for feeding an article against said wrapper and into the space between said guide and said abutment and into a pocket in said turret with an edge of the wrapper extending outwardly beyond the edge of the article and beyond the turret, means for thereafter moving said edge peripherally about said turret to position said edge substantially concentrically with respect to said turret and extending in the direction in which the turret is to be moved, means for actuating said turret, said guide holding said edge extended as the turret is moved to a glue applying position, glue applying means occupying a fixed position adjacent the path of travel of said edge to apply glue thereto as said edge moves by the glue applying apparatus, and means for thereafter wrapping said edge about said article into engagement with an opposite side thereof whereby to provide a sealed wrapper therefor, comprising a pair of abutment mem-

bers located at a discharge position for said turret, and means for moving said article out of said turret and between said abutment members with the edge of the article from which said edge extends entering the space between said abutments first whereby said edge is caused to be folded against a portion of said wrapper.

21. In a wrapping machine, the combination with a hopper for a stack of articles, a conveyer having pockets therein into which articles arranged in said hopper are adapted to be inserted, a reciprocating ejector for stripping an article from the stack of articles in said hopper having a supporting surface for the article, and an abutment for pushing the article toward the conveyer while said article is on said supporting surface, said ejector moving said article into a position adjacent said conveyer in alignment with a pocket therein, and supplemental means movable prior to the time when said reciprocating ejector begins its return movement toward the hopper for engaging the article and continuing the movement of the article in the same general direction into the pocket in the conveyer.

22. In a wrapping machine, the combination with a hopper for a stack of articles, a conveyer having pockets therein into which articles arranged in said hopper are adapted to be inserted, a reciprocating ejector for stripping an article from the stack of articles in said hopper having a supporting surface for the article and an abutment for pushing the article toward the conveyer while said article is on said supporting surface, said ejector moving said article into a position adjacent said conveyer in alignment with a pocket therein, supplemental means movable prior to the time when said reciprocating ejector begins its return movement toward the hopper for engaging the article and continuing the movement of the article in the same general direction into the pocket in the conveyer, and means for feeding a wrapper between the article and pocket before the article enters the pocket whereby the movement of the article into the pocket also moves the wrapper into the pocket and causes said wrapper to be partially wrapped about said article.

23. In a wrapping machine, the combination with a hopper for a stack of articles, a conveyer having pockets therein into which articles arranged in said hopper are adapted to be inserted, a reciprocating ejector for stripping an article from the stack of articles in said hopper having a supporting surface for the article, and an abutment for pushing the article toward the conveyer while said article is on said supporting surface, said ejector moving said article into a position adjacent said conveyer in alignment with a pocket therein, supplemental means movable prior to the time when said reciprocating ejector begins its return movement toward the hopper for engaging the article and continuing the movement of the article in the same general direction into the pocket in the conveyer with the ends of said wrapper extending beyond the ends of said pocket and article, creasing means thereafter movable into engagement with the portions of the wrapper which extend beyond the article and engaging said portions adjacent said article, and folding means engaging said same portions on the opposite sides from said creasers for folding said portions substantially at right angles to their original positions while said creaser remains in place.

24. A device as set forth in claim 23 in which said creasers come into operation at the beginning of the movement of said conveyer to its next position and are caused to move with the conveyer during the first part of its movement to that next succeeding position and in which said folding members are stationary projections arranged in the paths of travel of said portions.

25. In a wrapping machine, the combination with a hopper adapted to receive a stack of articles, slots in opposite sides of said hopper, a pair of aligning members movable into and out of said slots and adapted to engage the opposite sides of articles arranged within said hopper to align said articles, means for moving said aligning members into and out of said slots including means for causing a yielding engagement of said aligning members with said articles, an ejector for removing articles from the end of said stack and moving them to a subsequent position, and means for timing the operation of said ejector and aligning members to move said aligning members out of engagement with the articles while said ejector is removing an article from the stack, whereby the stack of articles may move in a direction to position the next succeeding article in proper position to be ejected from the stack without being under the retarding influence of said aligning members, said hopper being appreciably larger than the outer dimensions of said articles to permit said articles to rest freely within said hopper.

26. A device as set forth in claim 23 in which said creasers come into operation at the beginning of the movement of said conveyer to its next position and are caused to move with the conveyer during the first part of its movement to that next succeeding position in which said folding members are stationary projections arranged in the paths of travel of said portions, means operable at the next succeeding position of said conveyer for creasing the portion of said wrapper which extends outwardly from the side edge of said article and outwardly from said conveyer, and a stationary folding means operable as said conveyer moves to its next succeeding position for folding said remaining portion of said wrapper at substantially right angles to its former position, and maintaining that portion substantially parallel to the path of movement of said conveyer, means operable at the next succeeding position of said conveyer for ejecting the partially wrapped article from said conveyer, and a stationary abutment operable on that portion of said wrapper last mentioned for folding that portion against the article as said article is ejected from said conveyer.

27. In a stack assembling mechanism for wrapping machines, the combination with means for positioning successively a series of articles at a stack assembling position, an elevator for raising each article as it arrives at stack assembling position in a direction at a substantial angle to its path of movement into stack assembling position to permit the next succeeding article to be arranged therebeneath, and successively raising each article and the articles previously raised until the required number of articles are arranged above said elevator at assembling position, and means operable as the last of the stack of articles is assembled for materially increasing the pressure on said articles, and means for moving the stack of articles out of stack assembling position toward a wrapping position.

28. In a wrapping machine, the combination with means for moving articles through successive wrapping positions, partially enveloping said

articles in a wrapper with portions of said wrapper protruding from a side of said article, said wrapper having heat softenable material forming a part thereof, means engaging opposite sides of the protruding portions of said wrapper for bringing said portions together including a first set of heating elements engaging opposite sides thereof and operable at one position of said article along its path of movement, and a second set of heating elements actuated at the next position of said article for again applying heat and pressure to said protruding portion whereby to melt the heat softenable material on the wrapper and cause portions thereof to flow together to hold the protruding portions in sealed relation with each other, both sets of elements being substantially equally heated.

29. In a wrapping mechanism, the combination with a conveyor having a pocket therein, means for forcing an article having a wrapper folded thereabout with portions extending outwardly at opposite ends of said article, into said pocket, means operative after said partly wrapped article is positioned in said pocket for moving into engagement with said wrapper adjacent the ends thereof to crease the same, means for moving said conveyor, and means for folding said extending portions along said creases as said turret is moved away from said holding position, said creaser moving with said conveyor until said folding means substantially completes its folding operation.

30. A wrapping machine comprising a movable member having means for holding articles therein with a wrapper arranged about said articles, the opposite ends of said wrapper extending away from said articles, an abutment on said member, a stationary heated abutment arranged in the path of movement of said ends for engaging said ends as said member is moved adjacent said heated abutment for moving said ends against each other and against said first abutment to heat seal said ends together while said ends are extending away from said articles.

31. In a wrapping mechanism the combination with means for wrapping articles in tubular wrappers, of means for heat sealing the ends of said tubular wrappers while in extended position, comprising means for heat sealing protruding open ends of said wrapper while in extended position, means for cooling said heated ends while in extended position, and means forming a continuation of said cooling means for thereafter folding said extending ends against the body of said wrapper.

32. Wrapping mechanism comprising means for grouping a series of articles together in a stack, a member having a recess therein, means for moving a wrapper into a position over said recess, means for moving said stack against said wrapper and into said recess to position said stack in said recess, opposite edges of the wrapper extending from the same side of said stack, means for moving said member along a predetermined path, a stationary abutment arranged in the path of movement of said ends for engaging said protruding edges, and for moving same into engagement with each other but not against the portion of the wrapper which envelopes the stack and into abutting relation with a portion of said member having the recess therein, and means for heat sealing said edges together while said edges are between said stationary abutment and said member.

33. A device as set forth in claim 32 in which the heat sealed edges are thereafter moved against adjacent portions of said wrapper enveloping said stack.

34. A device as set forth in claim 32 in which said heat sealed edges extend to one side of said recess and in which there is a stationary abutment located adjacent the position where said stack is ejected from said member for engaging the extending sealed edges of said wrapper and for moving said edges against the portion of the wrapper about said articles as said articles are ejected from said recess, and means for ejecting said group of articles from said recess past said second mentioned stationary abutment.

35. A device as set forth in claim 32 in which said heat sealed edges extend to one side of said recess and in which there is an abutment located adjacent the position where said stack is ejected from said member for engaging the extending sealed edges of said wrapper and for moving said edges against the portion of the wrapper about said articles as said articles are ejected from said recess, and means for ejecting said group of articles from said recess past said second mentioned abutment.

36. A wrapping machine comprising a movable member having a means for holding articles therein with a wrapper arranged about said articles, the opposite ends of said wrapper extending away from said articles, an abutment on said member, a heated abutment arranged in the path of movement of said ends for engaging said ends as said member is moved adjacent said heated abutment for moving said ends against each other and against said first abutment to heat seal said ends together while said ends are extending away from said articles, means for moving said wrapped articles off said member, and an abutment arranged in the path of travel of said ends for folding said sealed ends against the portion of the wrapper about said articles as said articles are moved off said member.

37. In a wrapping machine, a stacking mechanism for successively stacking a plurality of articles in superimposed relation, a presser member for maintaining pressure on the articles to hold them together during stacking, means for moving an assembled stack of articles from the stacking to a wrapping position, and means for increasing the pressure of said presser member to further compress the articles together just prior to the time the stack is moved into wrapping position.

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