

May 31, 1960

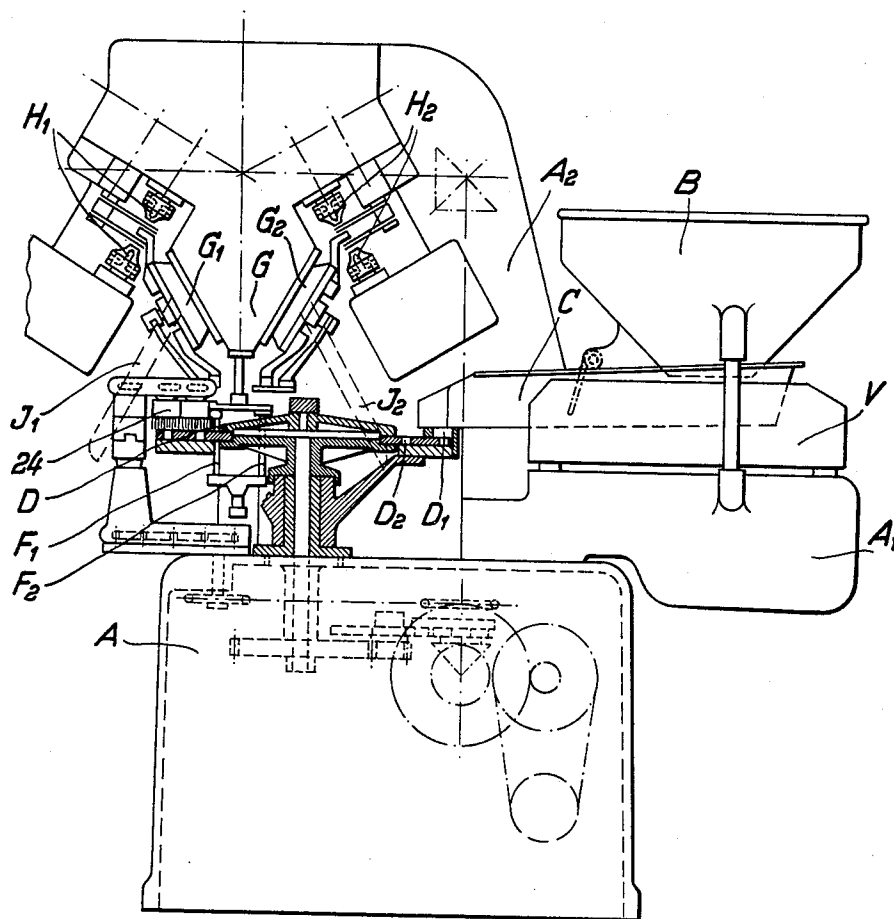
H. LESCH
WRAPPING MACHINES

2,938,320

Filed June 17, 1958

18 Sheets-Sheet 1

Fig. 1



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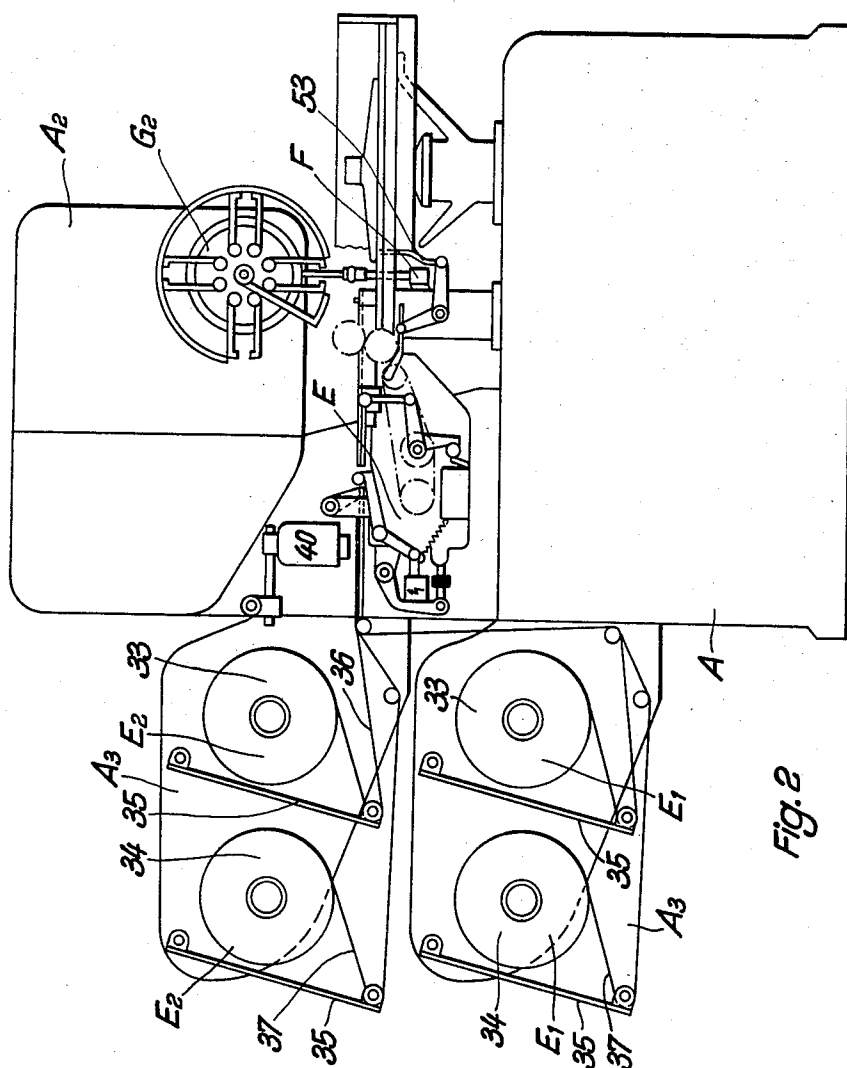


Fig. 2

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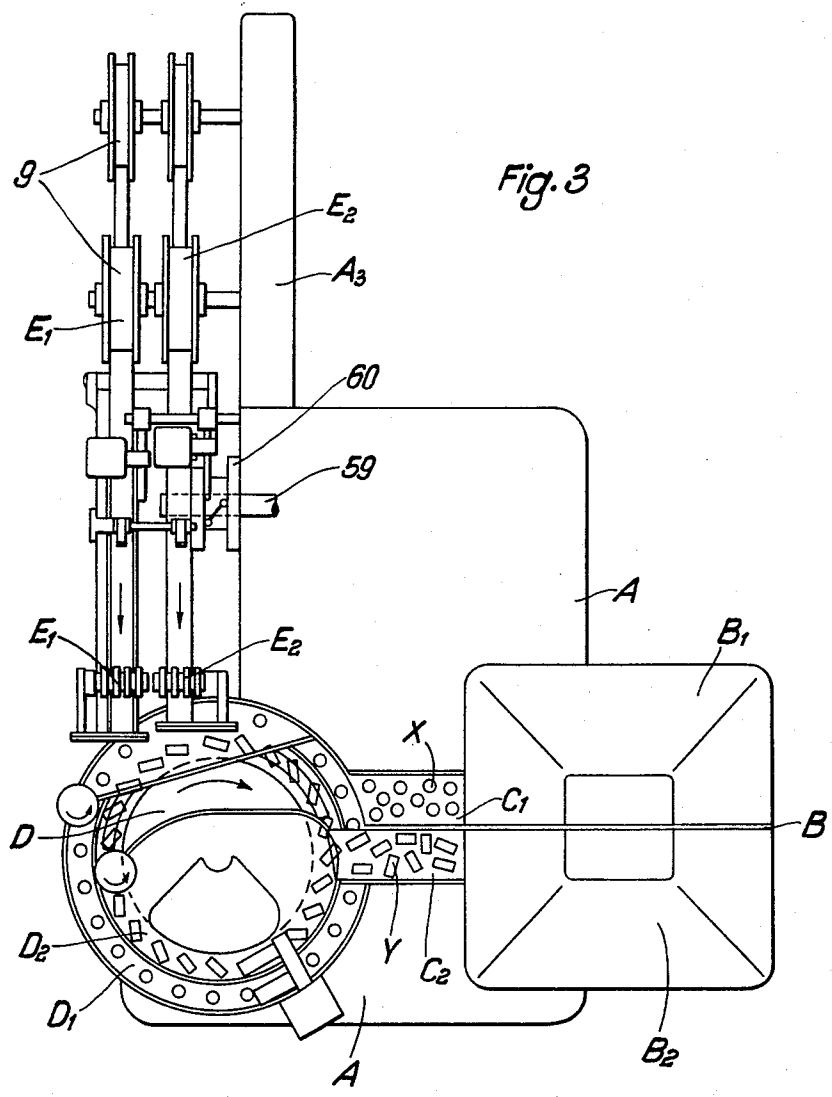
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2,938,320

Filed June 17, 1958

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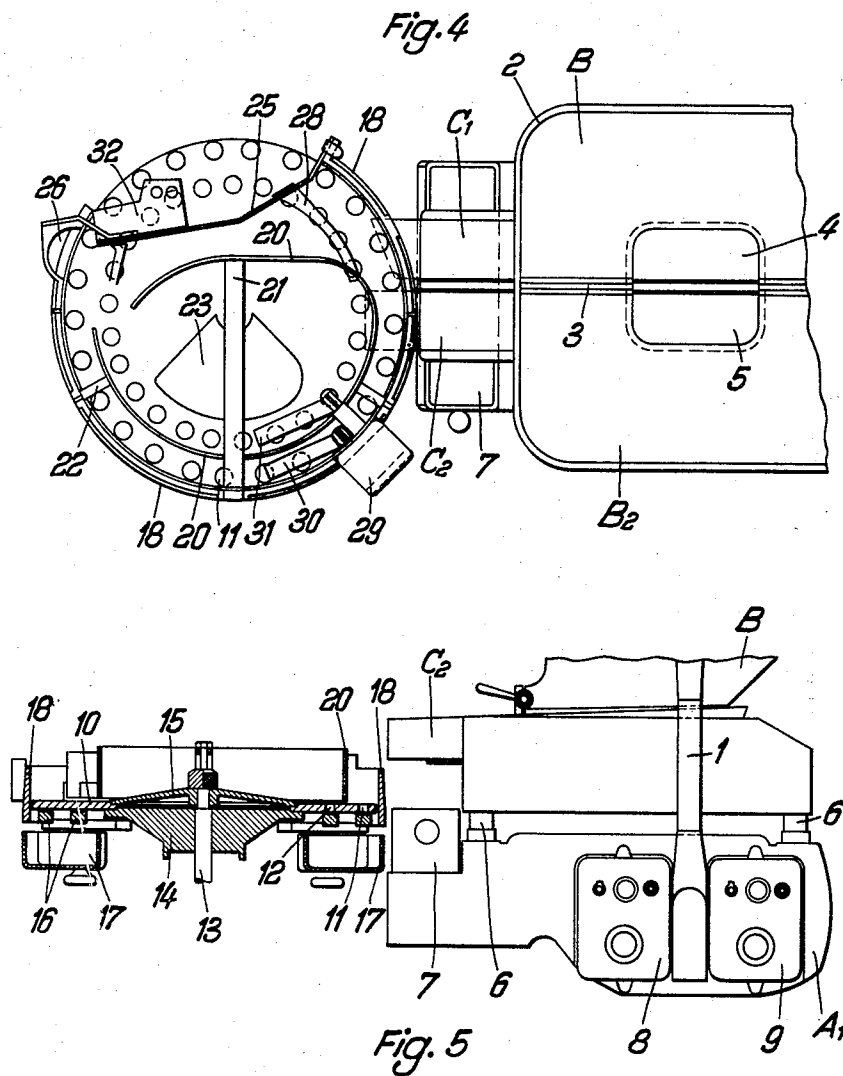
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2,938,320

Filed June 17, 1958

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Fig. 6

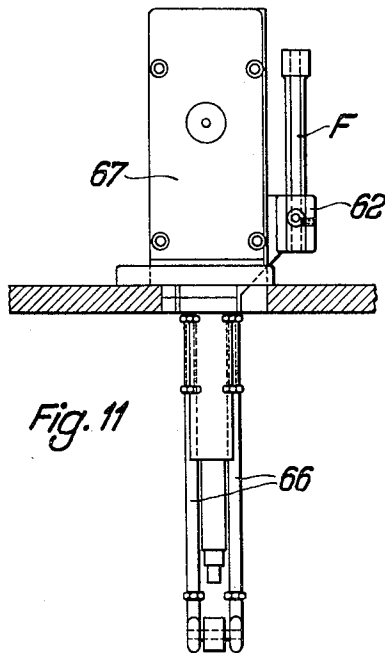
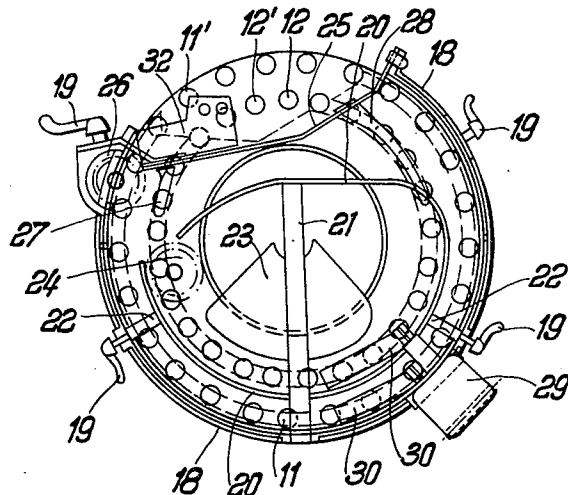


Fig. 11

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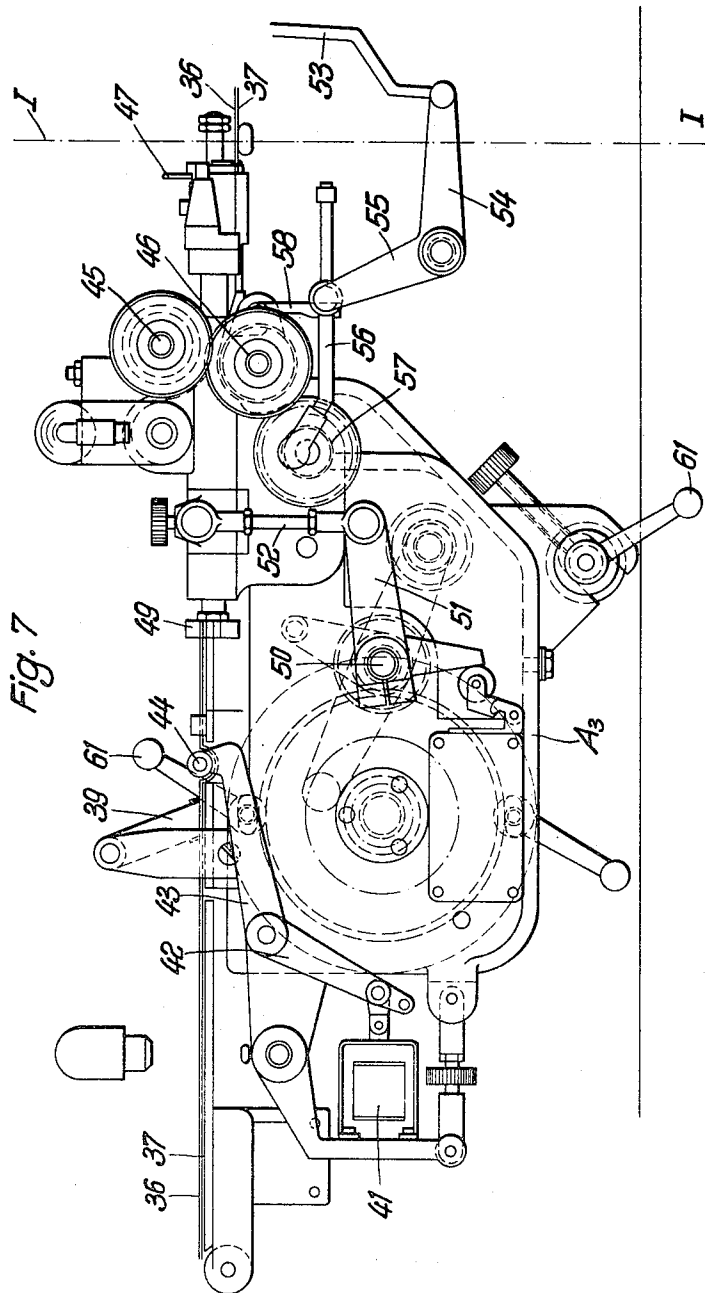
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WRAPPING MACHINES

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18 Sheets-Sheet 6



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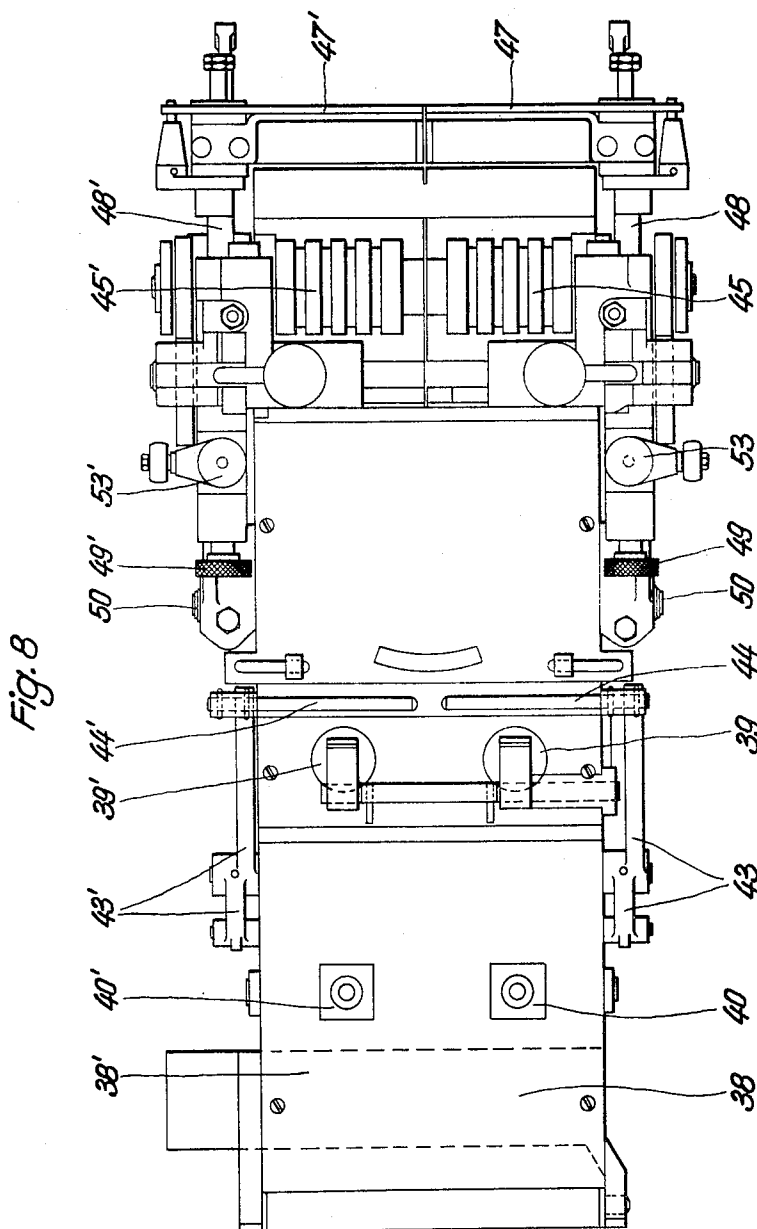
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2,938,320

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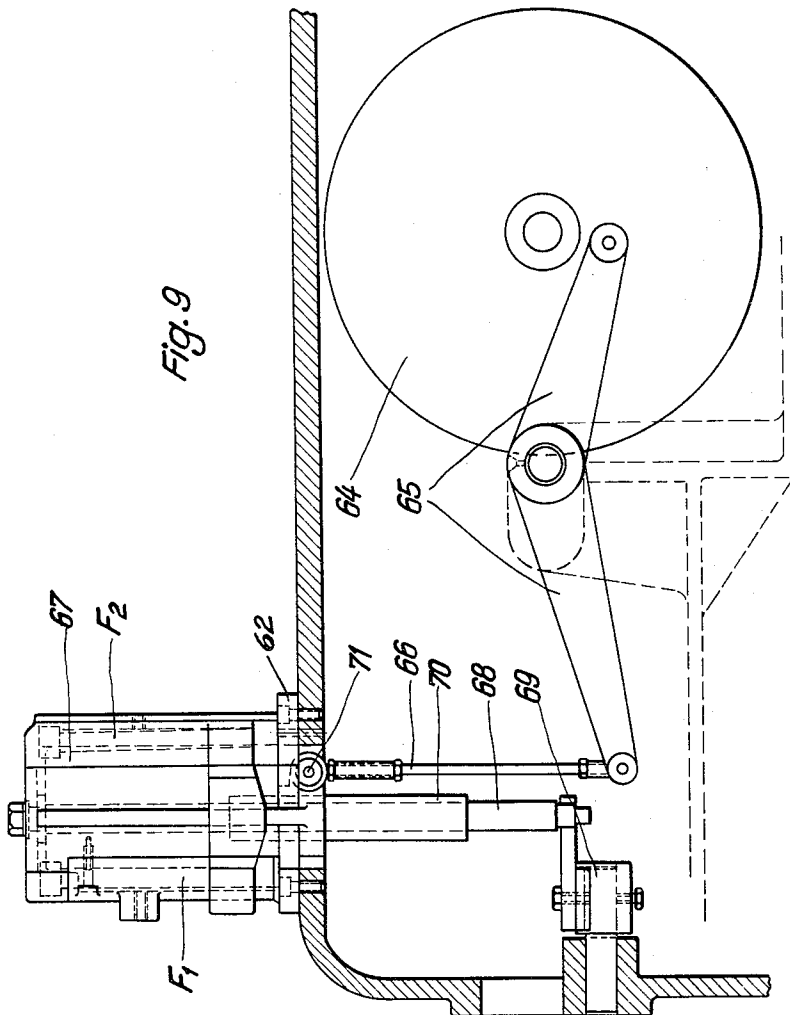
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2,938,320

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18 Sheets-Sheet 8



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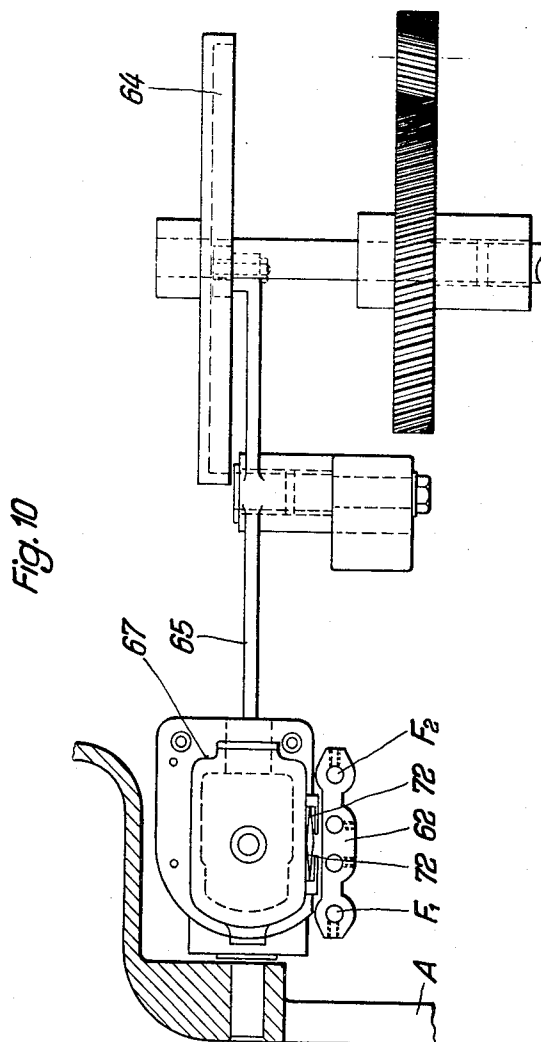
May 31, 1960

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WRAPPING MACHINES

2,938,320

Filed June 17, 1958

18 Sheets-Sheet 9



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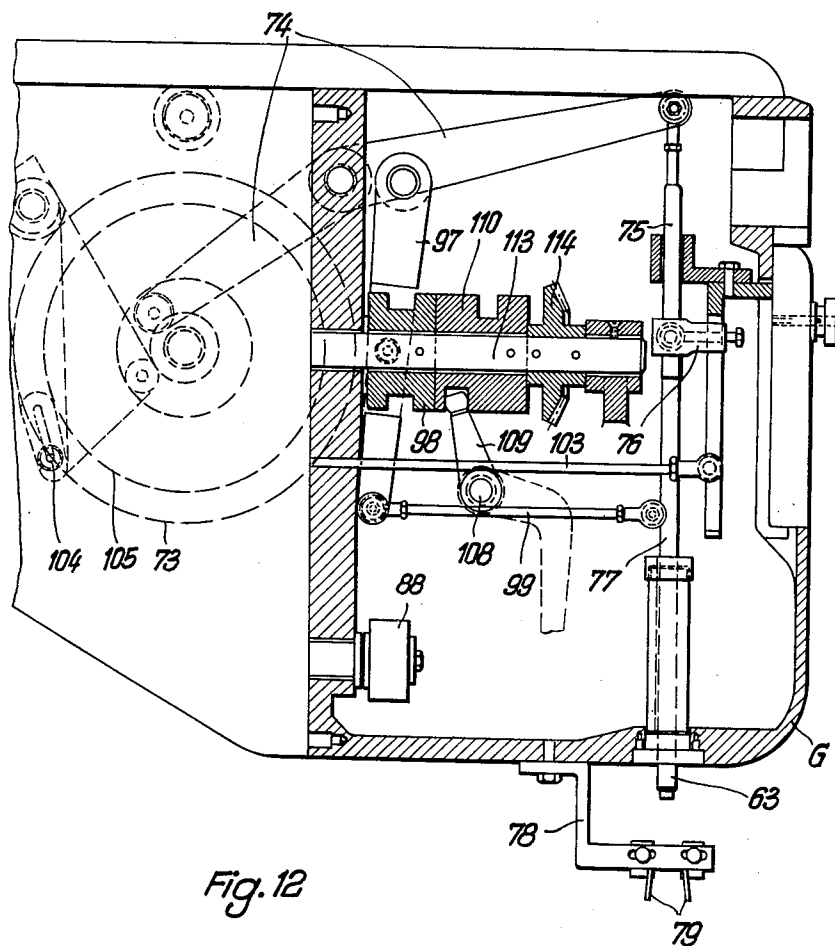
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2,938,320

Filed June 17, 1958

18 Sheets-Sheet 10



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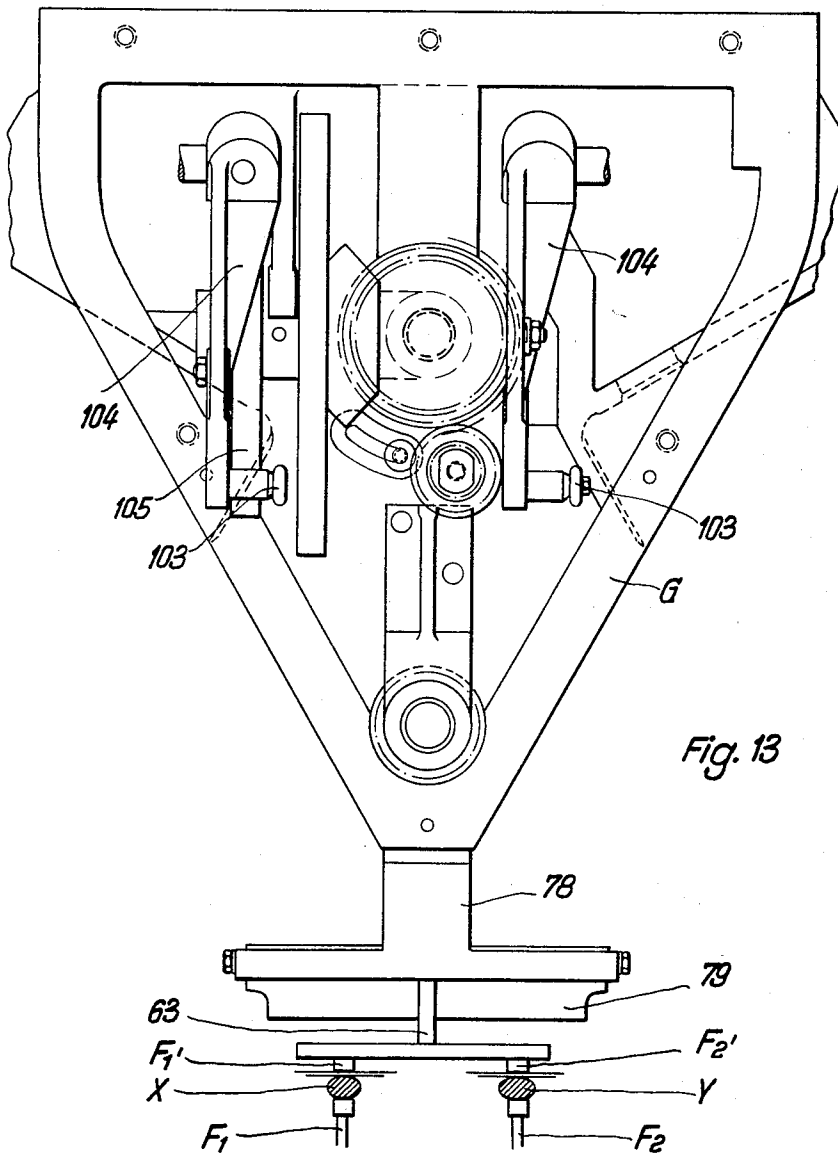
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WRAPPING MACHINES

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18 Sheets-Sheet 11



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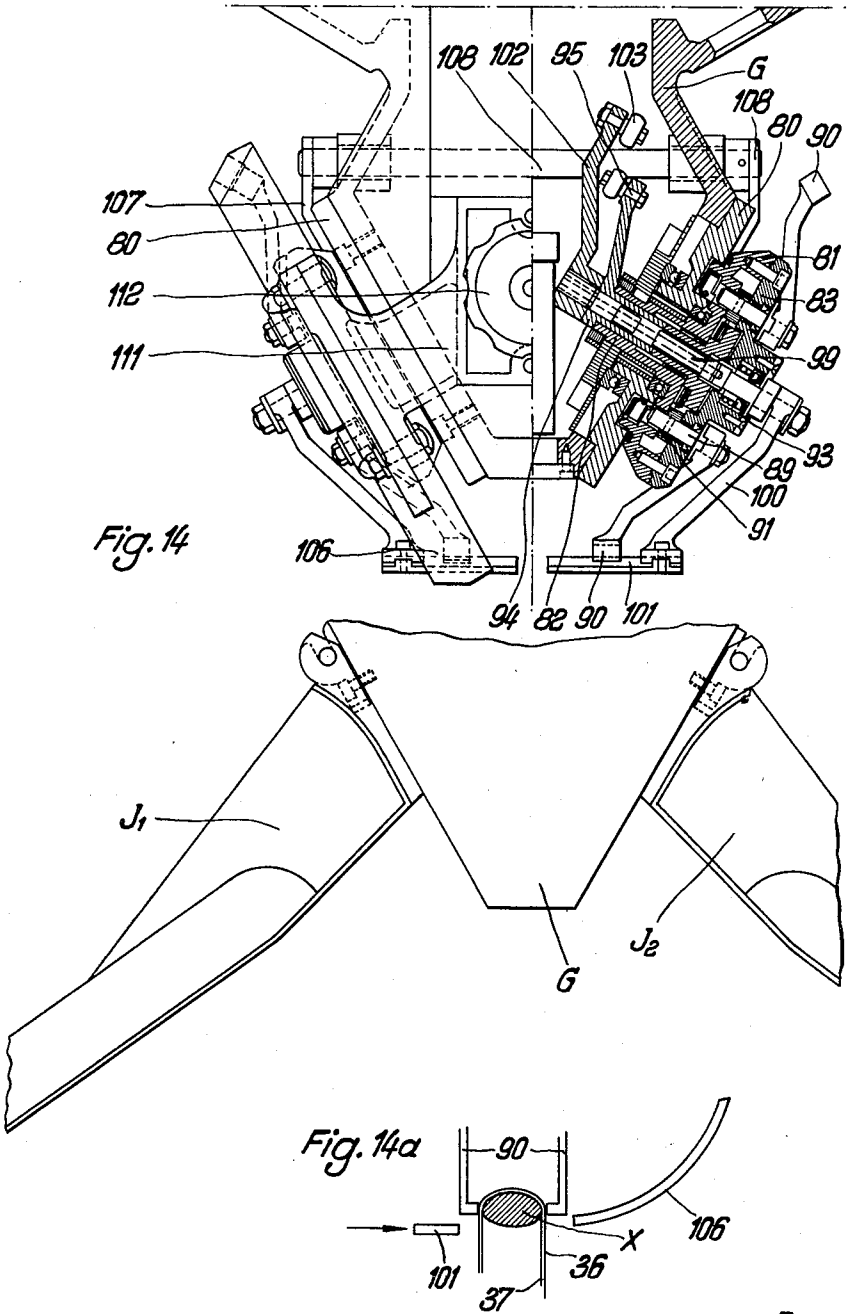
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Filed June 17, 1958

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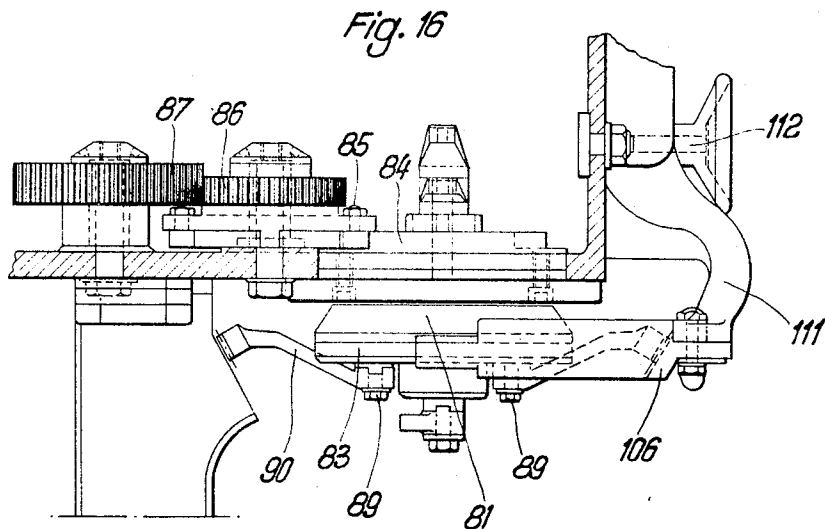
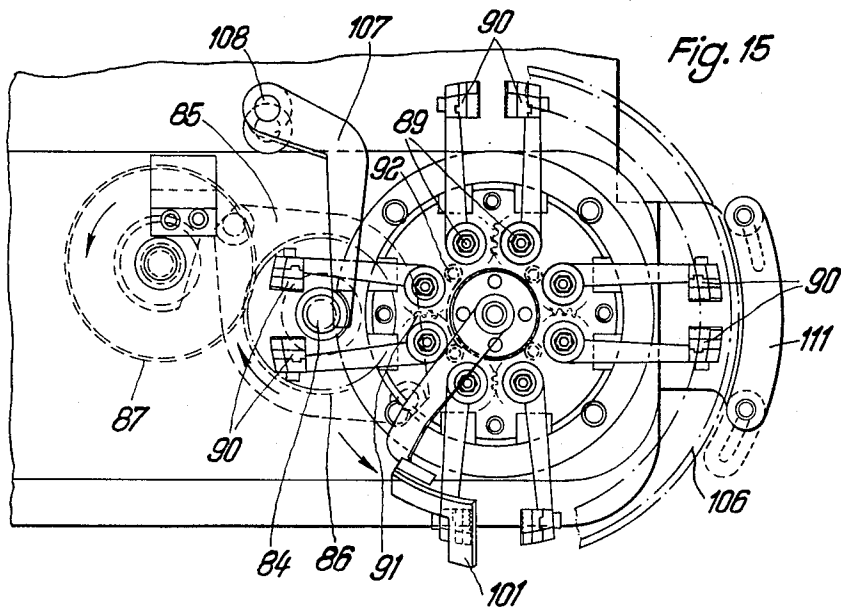
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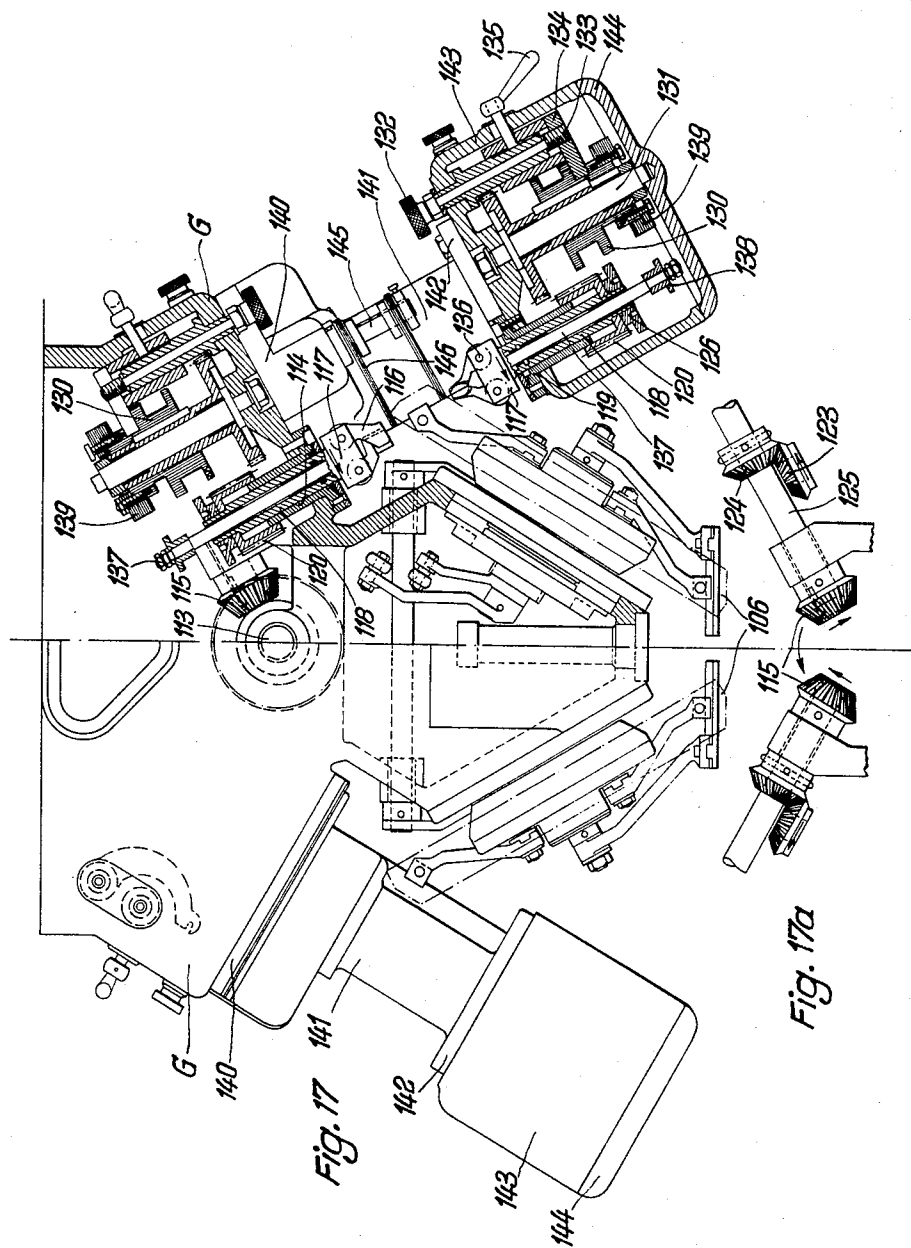
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18 Sheets-Sheet 14



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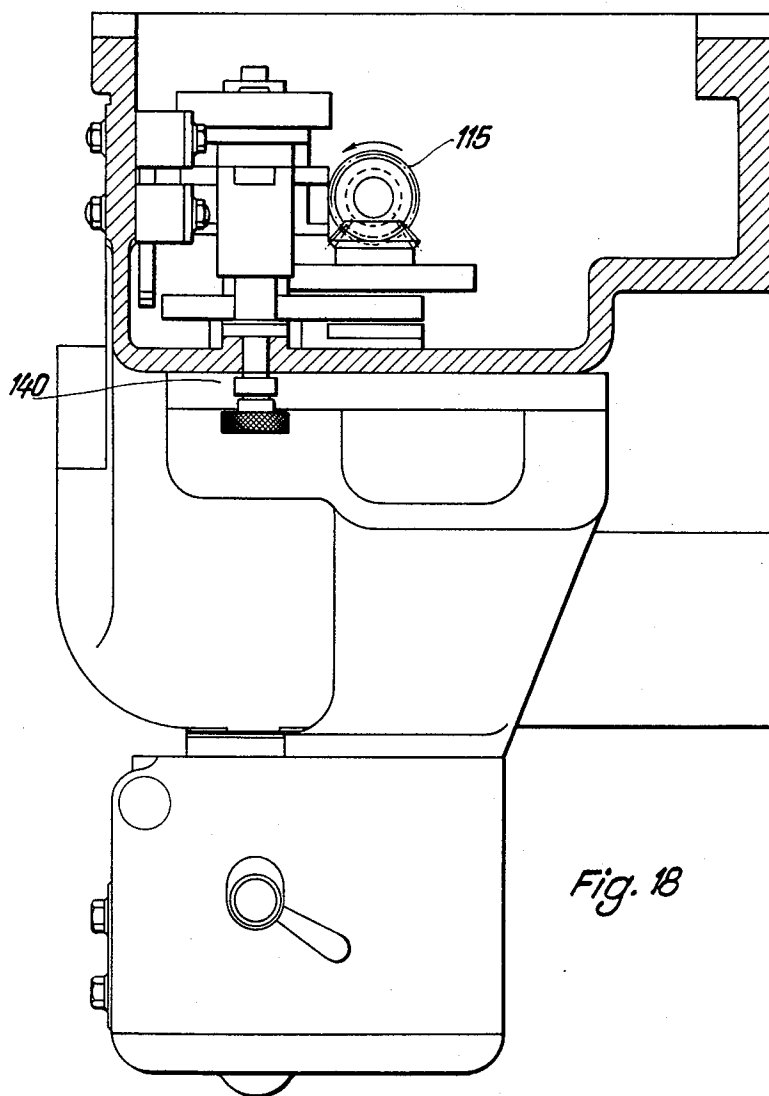


Fig. 18

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WRAPPING MACHINES

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Fig. 19

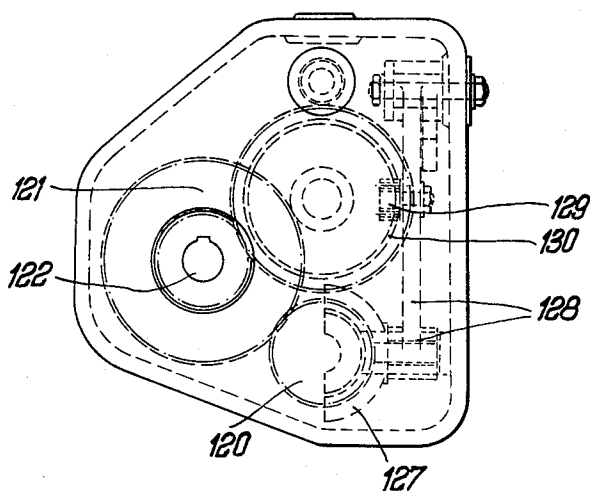
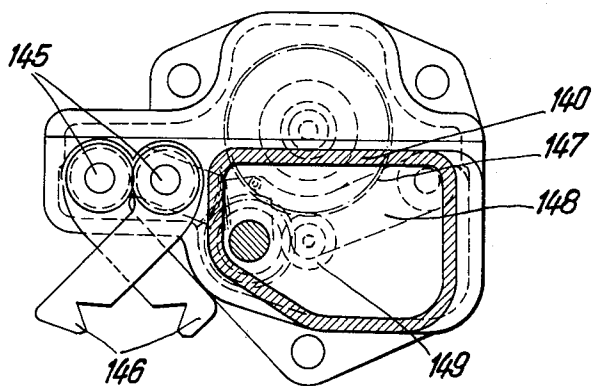


Fig. 20



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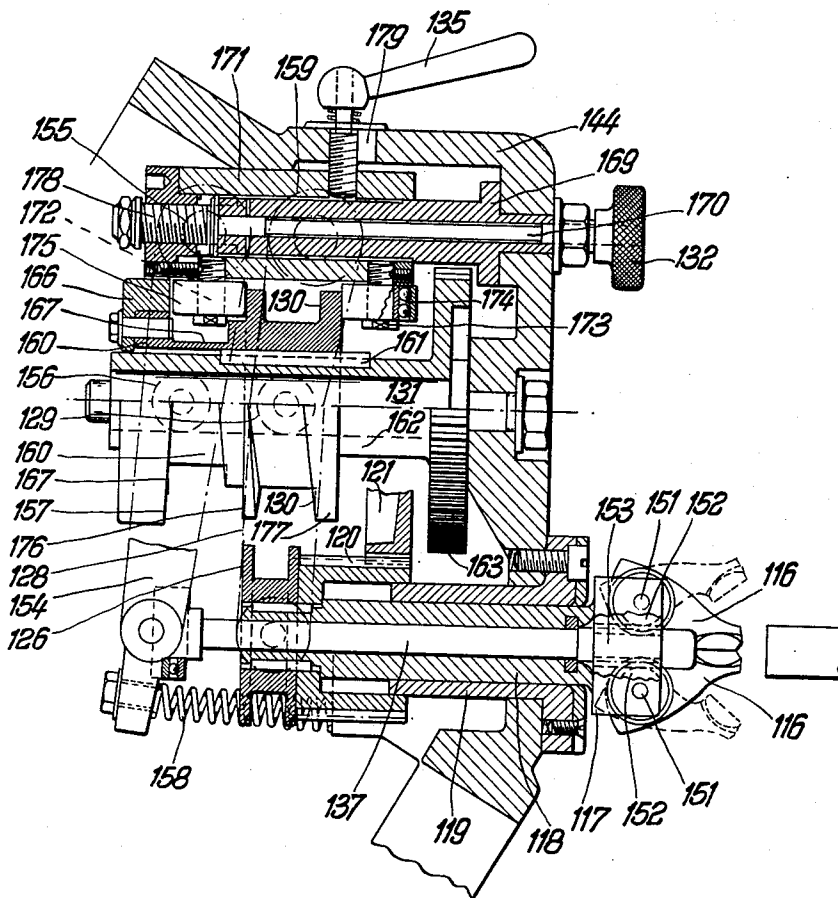
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Fig. 21



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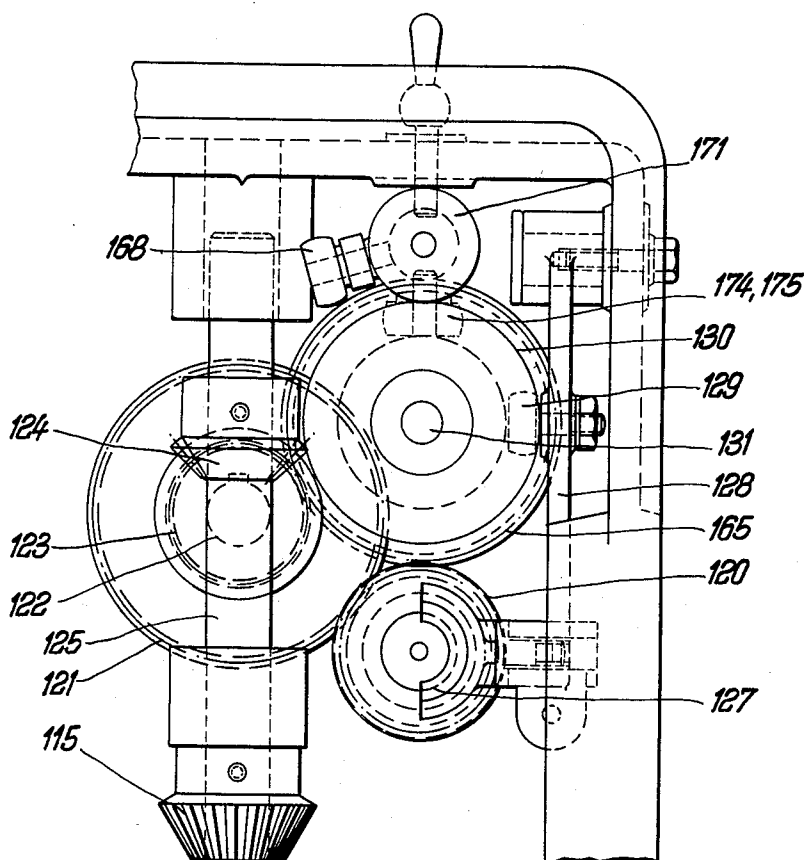
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Fig. 22



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WRAPPING MACHINES

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Filed June 17, 1958, Ser. No. 742,976

28 Claims. (Cl. 53—234)

The present invention relates to a wrapping machine for chocolate articles, candy, sweets, and the like and particularly describes an apparatus which operates according to a method in which several stamps and folding means or folding and closing members are supplied with the articles to be wrapped at the same time and actuated simultaneously from a common drive, whereupon the pre-packed articles are transferred from the stamps and the folding tunnels to separately operating members which twist or fold projecting parts of the wrapper to completely close the wrapping.

It is one object of the present invention to provide an apparatus which has a far greater output than a conventional wrapping machine, and which also handles delicate articles satisfactorily.

It is another object of the present invention to provide an apparatus which wraps two pieces of candy at the same time and which has a common drive to increase the efficiency of the machine. The feed plates receive several candies at a time, and it is possible to wrap different types of candy in different wrappers on the same machine at the same time.

It is yet another object of the present invention to provide an apparatus which ensures that the various tools can operate without interfering each other, and in which the units are arranged to carry the folding and closing members in form of a V so that the partially wrapped candies which leave the folding tunnels are transferred from these pre-folding members to the side.

It is yet another object of the present invention to provide a machine frame which also accommodates the drive means, and which is provided with a stamp unit comprising several individual stamps. Beside the stamp unit an intermittent feed device with several feeding channels, each of which supplying one of the stamps, is arranged and operates in accordance with the stroke cycle of the stamps. Furthermore, a separate wrapping paper supply system is provided for each stamp. Above the stamps a carrier is arranged which accommodates guide means and drive means for the counter stamps and which has gripper heads which are journaled rotatably about an axis inclined relative to the direction of movement of the stamps, one gripper head being provided for each stamp. On both sides of the feeding device for the articles to be wrapped, stationary or movable folding members are operating. Furthermore, twisting, folding, or other closing means to close any projecting wrapping material are provided for each gripper head at one point of the path of travel of the grippers, opposite the point of transfer of the partially wrapped articles. All of the drive and control members of the devices co-operating with each other are adapted so that the articles, as for instance candies or the like, which have to be wrapped, are supplied simultaneously but independently from each other, whilst at the same time the different paper feed mechanismus feed a cut piece of wrapping material to each of the stamps. The articles together with the cut piece of wrapping material which is held in position by the counter stamps are moved by

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the stamps, through the folding means to the gripping device arranged above, from where they are transferred, by means of the grippers, to the twisting, folding, or closing members. These complete the wrapping operation. It is of no importance, whether a twist wrap or an end fold on both ends of a twist wrap on one end and an end fold on the other end has to be made, or a sack wrap is required. Finally, the completely wrapped articles are automatically discharged.

The machine is designed so as to require a minimum of floor space. Furthermore, the different units may be exchanged individually or adapted to enable a versatile operation and numerous variations with respect to the different types of wrappers. Preferably, the twisting heads used for twist wraps are displaceable towards the article to compensate for the shortening of the wrapping material during the twisting operation and to prevent the material from being damaged. In order to achieve a particularly stiff twist wrap, the control means for the axial displacement of the twisting head is adjustable or disengageable.

With these and other objects in view, which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawings, in which:

Fig. 1 is a front end view of the machine, the feed table being illustrated in section;

Fig. 2 is a side elevational view of the machine;

Fig. 3 is a top plan view of the machine, the wrapping unit being taken off for the purpose of better illustration;

Fig. 4 is a fragmentary view of the feed device from above;

Fig. 5 is a front end view of the feed device according to Fig. 4, the feed table being shown in section;

Fig. 6 is a top plan view of the feed table on an enlarged scale;

Fig. 7 is a side elevational view of the paper feed mechanism on an enlarged scale;

Fig. 8 is a top plan view of the mechanism shown in Fig. 7;

Fig. 9 is a front end view of the lower stamp and its drive, the housing being shown in section;

Fig. 10 is a top plan view of the stamp shown in Fig. 9;

Fig. 11 is a side view of the stamp shown in Fig. 9;

Fig. 12 is a sectional view of the upper stamp and its drive which co-operates with the lower stamp;

Fig. 13 is a side view of the upper stamp shown in Fig. 12;

Fig. 14 is a front end view of the wrapping head, partially in section, with outlet chutes for the wrapped candies;

Fig. 14a is a diagrammatic view of the wrapping operation (see also Fig. 2);

Fig. 15 is a side view of the wrapping head shown in Fig. 14;

Fig. 16 is a top plan view of the wrapping head shown in Fig. 15;

Fig. 17 is a sectional view of the complete wrapping head housing including the drive means and the twisting head arrangement;

Fig. 17a is a detail of the showing of Fig. 17 in a simplified illustration;

Fig. 18 is a top plan view on the twisting head with its drive means, partially in section;

Fig. 19 is a view of the twisting head, as seen in the direction of the arrow X in Fig. 17;

Fig. 20 is a sectional view along the lines C—D of Fig. 18; and

Figs. 21 and 22 are sectional and side views of a particularly suitable embodiment of the twisting head drive.

Referring now to the drawings, for the purpose of a

better understanding, Figs. 1 to 3 are views of the complete machine. The following figures show, on an enlarged scale and partially in section, the various individual operating units of the machine.

On a machine frame A, which accommodates the main drive unit, a housing A₁ is mounted, carrying the feed hopper B with feed channels C and a vibrator V arranged below. On the upper side of the frame A and at the side of the hopper B, a feed plate D is arranged which in the illustrated embodiment is provided with two inlet openings D₁ and D₂. These openings correspond to the shape of the candies to be wrapped. In the embodiment shown, the feed hopper has two compartments B₁ and B₂, for round candies X and rectangular candies Y, respectively. Each of the two compartments B₁ and B₂ has its own feed chute C₁, C₂ which are arranged so that the round candies X from the compartment B₁ reach the opening D₁ of the feed table D through the chute C₁, and the rectangular candies Y from the compartment B₂, the opening D₂ through the chute C₂.

On a rear housing A₃, a paper supply mechanism E is arranged formed of the units E₁ and E₂. The latter supply the wrapping material. It is important that one of these units supplies wrapping material different from the other one, to account for the different types of candy X and Y. Usually, each paper feed mechanism feeds a protective wrapper and an outer wrapper which are cut to the required length by means of a pair of scissors.

The feed table D which moves intermittently in the direction of the arrow shown in Fig. 3, takes one piece of candy X and one piece Y to a stamp device (Fig. 2) formed of a lower stamp and an upper or counter stamp. The wrapping material supply units E₁ and E₂ feed the wrapping material to the same place (F). The stamp device comprises two pairs of stamps F₁ and F₂ which are actuated by a common drive. It is the purpose of the stamp device to simultaneously discharge one piece of candy, type X and one of the type Y from the feed plate D and to take them together with the cut pieces of wrapping material to the wrapping unit G where they are seized by the grippers of the wrapping devices G₁ and G₂. These are arranged so that they pass the candies and the wrapping material received from the stamps to the side and to the twisting devices H₁ and H₂ where the projecting parts of the wrapping material are closed by a twisting operation.

The wrapping devices G₁ and G₂, as well as the twisting devices H₁ and H₂ and their drive means are journaled in a housing A₂ on the machine frame A. Finally, the completely wrapped candies are discharged through chutes J₁ and J₂ and removed.

A. The feeding device

The feed unit for the candies is illustrated, in detail and on an enlarged scale, in Figs. 4 to 6. The feed plate in this embodiment is provided with two rows of similar openings to receive the candies. Supports 1 on an arm A₁ carry a big-capacity hopper which, through means of a separating wall 3 is divided in two compartments B₁ and B₂. Each compartment is provided with a bottom outlet 4 and 5, respectively, through which the candies fall into the chute C₁ or C₂ arranged below. To separate the candies from fragments and split-off small pieces, the bottom of the chutes is perforated, so that the fragments can be collected in a container 7.

The chutes C₁ and C₂ are resiliently mounted on a vibrator V which in turn is mounted on rubber blocks 6 on the machine frame, which arrangement is known per se.

Through means of control elements 8 and 9 the vibration frequency of each of the chutes C₁ and C₂ may be controlled so that the amount of candies supplied can be adapted to the amount required by the machine.

The feed plate substantially comprises a ring 10, having two rows of openings 11 and 12 to receive the candy. The ring 10 is arranged on a central body 14 mounted on a shaft 13, and its upper side is covered by a plate 15

which is also rotating. Below the ring 10 rails 16 are arranged below the openings 11 and 12 to prevent the candy from falling down. The rails 16 are not as wide as the diameter of the openings 11 and 12 so that fragments of the candies can fall down into a container 17.

Part of the ring 10 is enclosed by a wall 18. To facilitate cleaning of the machine, the wall 18 forms several sections which are fastened by means of clamps 19.

Furthermore, the upper side of the feed plate is provided with a so-called central wall 20 which is arranged concentric to the plate center and which separates the openings 11 and 12. The upper end of the wall 20 is bent to the inside (Fig. 6) so that an opening for the candy remains between its two ends. An arm 21 and supports 22 retain the wall in its position. Projecting into the chamber enclosed by the wall 20 is a guide means 23 which is also carried by the arm 21.

In front of the opening for the candy a brush 24, rotatable about a vertical axis, is journaled to brush the surface of the feed plate. When rotating in the direction of the arrow shown in Fig. 6, candies which did not fall into an opening 12 are returned into a compartment formed of the central wall 20 and the guide means 23. The feed chute C₂ which bridges the row of openings 11 also ends in the same compartment.

Another wall 25 is provided, connecting the ends of the outer wall 18 as shown in Fig. 6. The outer wall 18, the wall 25, and the central wall 20 enclose a chamber which receives the candy to be placed in the openings 11. The chute C₁ accordingly opens into this chamber. Immediately in front of the wall 25 another brush 26, rotating about a vertical axis in the direction of the arrow, is arranged which returns the candy which did not fall into the openings, to the feed station. To prevent these candies from reaching empty openings 12 in the inner row of openings, flat tongues 27 and 28 are provided which rest on the upper side of the feed plate.

The number of candies supplied to the feed plate is automatically controlled. For this purpose, an electric switch 29 having feelers 30 and 31 is mounted on the outer wall 18. Each of the feelers extends to one of the rows of openings 11 and 12. On the other hand, the switch 29 is connected to the control elements 8 and 9 which control the operation of the vibrators. Depending on the amount of candy on the inner or outer row of openings, the feeler 30 or 31 is lifted more or less which action results in an automatic variation of the vibration frequency of the feed chutes C₁ and C₂ so that further supply of candies is interrupted or re-started.

The control of the candy supply as described above and, on the other hand, the brushes 24 and 26 ensure that all openings 11 and 12 of the feed plate rotating intermittently in the direction of the arrow, are filled with candies. It does not matter whether similarly of differently shaped candies are supplied. In any case, the openings 11 take one type of candy and the openings 12 the other type. Upon intermittent rotation of the feed plate one piece of candy each reaches a position 11' and 12', respectively. Here, they are near the stamp arrangement which will be described later, which discharges the candy, together with the cut piece of wrapping material which in the meantime has been supplied to this station, off the feed plate 10.

On the rear of the wall 25 a cover plate 32 is arranged which rest on the plate 10 and prevents the candy from accidentally leaving the openings 11 and 12 when the control finger of the paper feed mechanism hits the candy in the opening from below. If an opening 11 or 12 should not contain a piece of candy, the paper supply is interrupted through means of the control finger.

B. The wrapping material feed mechanism

It is an important feature of the present invention that only one drive unit operates two paper feed mechanisms at the same time and parallel to each other. Each of

the two paper feed units supplies the wrapping station with the material for the outer wrap and with the material for the protective inner wrap. The inner reels 33 (Fig. 2) carry the material for the outer wrap, while the protective strip is on the outer reels 34.

Springs 35 tension the paper supplied to the machine. The strip of paper 36 forming the outer wrap enters the machine above the strip of paper 37 forming the protective wrap.

In Figs. 7 and 8 the wrapping material feed mechanism is illustrated in detail, the different paper reels 33 and 34 being not known. One on the other, the strips of wrapping material 36 and 37 are supplied over a guide table 38 and 38'. Each feed unit incorporates a return stop 39 and 39' which is known per se and which prevents the paper from being returned by accident. A photo-electric feeler 40 and 40' arranged above the path of the paper controls the paper supply and the correct position of the printed wrapping material. It controls, photo-electrically, through means of a magnet 41 and links 42, 43 a roller 44 which rests on the paper and controls the wrapping material feed by temporarily retracting it. The strips of paper 36, 37 are drawn off by rollers 45, 46, and 45', respectively. The upper rollers 45 are rubber rollers, while on the lower roller 46 a segment is mounted which determines the length of the paper to be drawn off. Drive of the draw-off device is in the usual manner from a drive means accommodated in the housing A₃.

The position of the candy to be wrapped is determined by the axis I—I. The protective paper 37 and the outer wrapper 36 are in a position above the candy. To adapt the size of the pieces of paper cut by the cutting device 47 and 47' to the size of candy to be wrapped, it is necessary to arrange the cutting device displaceably in the direction of the paper feed. For this reason, the cutters are mounted in longitudinal guides 48 and 48'. These guides extend through the machine and along the material supply and are adjustable by means of adjusting screws 49 and 49'. While the lower cutter is stationary, the upper cutter can be moved up and down to carry out the cutting operation. Both upper cutters 47 and 47' are actuated by a common drive 50 through means of levers 51, pull rods 52, links 53 and 53', and rods 48 and 48', all of which being arranged on either side of the machine.

Each paper feed has a feeler 53 which controls, before each movement, whether a candy is actually contained in the feed plate. The feeler is oscillated by a drive wheel 57 through means of levers 54, 55, 56. If there is no candy in the feed plate, the resulting movement of the feeler 53 and the linkage 54, 55 connected with it, raises the upper rubber roller 45 through means of intermediate levers 58 and cams which are not illustrated so that the paper is not drawn off and thus no paper supplied to the feed plate.

To ensure that the strips of paper 36, 37 are always close above the candy X and cut there, it is necessary to adjust the height of the paper feed mechanism because the feed plate is always working at the same height, and because the different types of candy, which may be of different size, will project above the feed plate to different heights.

In the embodiment described, this adjustment is possible because the complete mechanism is adjustably journaled on a drive shaft 59 in a flange 60. The feed mechanism may pivot about the drive shaft 59 and may be fixed in any position by applying a clamp 61. The drive means for the complete paper feed mechanism is accommodated in the machine frame A. Drive is transmitted through the shaft 59.

C. The transfer device

The transfer device passes the candy on the feed plate together with the cut piece of wrapping material on

it, to the grippers of the wrapping station. The transfer device is illustrated in Fig. 9 to 13, Fig. 9 to 11 showing the lower stamp and its drive, and Fig. 12 and 13 the upper stamp and its drive. According to Fig. 9 the lower stamp is arranged in pairs. It comprises two push-rods F₁ and F₂, arranged on a common carrier 62 and extending through one opening 11' and 12' each. Above the stamps F₁ and F₂ the upper stamps F₁' and F₂' are mounted on a common carrier 63 (Figs. 12 and 13).

The lower stamp is driven by a cam disc 64 through means of levers 65 and a push-rod 66, all of which being housed inside the machine frame A. To guide the lower stamp, the upper side of the machine frame A is provided with a guide housing 67 which accommodates a guide rod 68. On this rod 68 which is supported on a bracket 69, a guide bush 70 is displaceably arranged together with the carrier 62 for the stamps F₁ and F₂. During rotation of the cam disc 64 the lower stamps are moved up and down in the operating cycle of the machine through means of the bell crank 65 and the push-rods 66 which are connected to the pivot pin 71. The carrier 62 for the lower stamps F₁ and F₂ extends laterally out of the guide housing 67. To prevent candy fragments from entering the interior of the stamp guide, brushes 72 are arranged along the gap at the guide which return foreign matter and seal the gap at the guide sleeve.

Directly above the lower stamps, in the housing G, the upper stamps F₁' and F₂' are arranged so as to be vertically displaceable on a common carrier 63. Drive is from a drive wheel 73 through means of an intermediate lever 74 and a pull-rod 75 which with its lower end is connected to an abutment 76. A guide rod 77 which is adjustable and carries the carrier 63 for the upper stamps passes through the abutment 76. By adjusting the abutment 76, the position of the upper stamps can be adapted to different candy sizes. At the underside of the housing G, a carrier 78 is provided with the folding means 79 between which the candy with the cut piece of wrapping material is passed through, whereby the protective wrapper and the outer wrapper are folded around the candy in the form of a U.

D. The wrapping device

The lower and upper stamps moving up and down pass the candy which is held between them, after moving it through the folding means 79, to the grippers of the wrapping devices, illustrated in Figs. 14 to 16. Reference is also made to Figs. 12 and 13.

The wrapping devices are arranged laterally on bearing caps 80 of the housing G, the rotating axis of the grippers being inclined for about 60 degrees relative to the vertical line. This arrangement allows for the candy to be wrapped, to be passed to the side out of the working floor of the lower and upper stamps when the grippers rotate so that sufficient space is provided in the machine for the twisting device which will be described later.

Substantially, the gripper device forms a round housing which at its lower part 81 has a bushing 82 through means of which the gripping device is journaled in the cap 80. On the upper side of the housing part 81 a cover 83 is fixed which together with the lower part 81 of the housing forms a chamber to accommodate the drive means which will be described later. The complete gripping unit 81, 83 is rotatably journaled in the cap 80. Its drive is effected by means of a Geneva wheel 84 which is mounted inside the housing G on the bushing 82 extending to the inside. The drive member 85 for the Geneva wheel is fitted on a shaft 84 and is driven by gears 86 and 87. For each gripping unit a drive gear 87 is provided, both being driven by a gear 88. In each lower part 81 and the corresponding cover 83 bearing seats are formed for pins 89 which carry, at the ends projecting from the gripping unit, the grippers 90. Inside the gripping unit, toothed segments 91 are keyed to the pin 89, the segments of one pair of grippers engaging

each other. One of the segments is provided with a suitable lever having a roller 92 which rolls on a cam disc 93 journaled inside the gripping unit. A compression spring (not illustrated) forces the lever and the roller 92 against the cam disc 93 and consequently the grippers 90 into closing position. Due to the engagement of the the toothed segments the closing position of the grippers is always centered.

The cam disc 93 is operated through means of a bushing 94 and a control lever 95 mounted thereon and actuated through means of the pull-rod 96 (Fig. 12), the lever 97, and the cam 98.

The cam disc 93 for opening and closing the grippers 90 effects an oscillating movement which is combined with the rotary movement of the gripping unit and the grippers so that each pair of grippers is opened when reaching the discharge position and when moving into the position to receive another candy, whereupon it is closed.

The bushing 94 is traversed by a shaft 99, which at its outer end has a lever 100 for the lower folding means, while at the inside end of the shaft 99 a control lever 102 is provided which is actuated by the pull-rod 103 (Fig. 12) through means of a pair of levers 104 and a cam disc 105 common to both of the lower folding means.

The diagrammatic view in Fig. 14a shows an X-type candy enclosed, in the form of a U, by a protective wrapper 37 and an outer wrapper 36. It is held by grippers 90 while the lower folding means 101 described above, is about to move inwardly in the direction of the arrow, to make the inner fold. After this operation, the movement of the gripping unit starts, the candy X being passed along the folding means 106 in the direction of the arrow indicated in Fig. 14a, to produce a tube-like wrapping enclosing the candy.

Each gripping unit moves in the direction of the arrow shown in Fig. 15, i.e. in counter-clockwise direction. The pair of grippers projecting downwardly, receives the candy enclosed by the wrapping material. After further travel for 90 degrees in counter-clockwise direction the tube-like wrapping has been produced. After another 90 degrees turn the candy has reached the twisting station which will be described later and which closes the tube-like wrapping. After rotation for another 90 degrees the grippers open again and discharge the candy by means of the member 107. The discharge member 107 is journaled on a shaft 108 and swings periodically in the direction of the arrow according to Fig. 15. The position of the shaft 108 which is controlled by the drum cam 110 through means of a lever 109, can be seen from Fig. 12.

With respect to the operation of the device it is of importance that the folding means 106 are arranged adjustable on a common carrier 111 which is fixed, by means of a handle 112, to the front side of the housing G. After loosening the handle 112, both folding means 106 may be removed to facilitate cleaning of the device. The folding means 106 are arranged on the carrier in slots and oblong holes so that their position can be varied according to the shape and size of the candy.

When the completely wrapped candies are discharged from the grippers 90 by the members 107, they fall into the discharge chutes I_1 and I_2 arranged at the side of the housing G from where they are removed by conveyor means or the like.

E. The twisting device

In accordance with the arrangement of the two wrapping units and their grippers, one twisting device each is provided. Its design can be seen from Fig. 17 to 22. Corresponding to the inclined position of the two wrapping devices (60 degrees relative to the vertical line), the twisting devices are also inclined. They are arranged on an axis which is inclined 30 degrees relative to the vertical line.

If the wrapper has to be closed by twisting on both sides, the twisting device is double-acting. If the wrapper is closed by twisting at one end only and on the other end by folding, the outer part of the twisting device is removed and replaced by a folding means, which produces a fold on one side when the candy is transferred from the stamps to the grippers. Each twisting device is a self-contained unit which is removable and replaceable.

Both twisting devices are driven by a shaft 113 (Fig. 12) journaled in the center of the housing G and a bevel gear 114 mounted on this shaft. Two bevel gears 115 engage this first-mentioned bevel gear. The gears 115 transmit the drive to the twisting tools. Each twisting unit substantially comprises two tongues 116 which are moved towards each other and journaled pivotally on a common carrier 117. The rotary shaft 151 of each tongue 116 is provided with a toothed segment 152 which is in engagement with the toothed part 153 of the operating rod 137. This rod is longitudinally displaceable in a sleeve 118 which is provided, at its end, with the carrier 117 for the tongues 116 and, at the opposite end, with a cam disc 126. The unit is journaled in a stationary bearing bush 119 which is fitted in the housing 144. Fixedly connected with the grooved disc 126 is a drive gear 120 which is somewhat wider and in engagement with the gear 121.

Opening and closing of the tongues 116 is effected by axially displacing the rod 137 (Fig. 21). The rod is driven by a control lever 154 which is pivotally arranged on a pin 155 in the housing 144 and which rests, through means of a cam disc 156, against the inside of a cam disc 157. A compression spring 158 which acts on the free end of the lever 154 provides for the positive engagement of the cam roller 156 and the cam disc 157, so that only the forward movement of the rod 137 is positively actuated, while the reserve movement of the rod 137 which results in the closing of the tongues 116 is effected by the compression spring 158.

During its rotation, the sleeve 118 is also axially displaced to account for the wrapping material becoming shorter. To axially displace the sleeve 118, a control lever 128 is provided which, through means of a slot 127 engages the cam disc 126 and which is guided in the groove 130 by means of the cam roller 129. The lever 128 is journaled on a shaft 159 in the housing 144. The sleeve 118 and consequently the twisting device is rotated by the gears 120 and the gear 121 from the main drive shaft through means of the bevel gear 115, the shaft 125, the bevel gears 123 and 124, and the shaft 122.

To vary the distance of the twisting tongues 116 relative to the candy it is necessary to axially displace the drum 130 on the shaft 131. In the embodiment shown in Fig. 17 this is done by means of the screw 132 which on its threaded end has a guide 134 which extends beneath the drum 130 to axially displace it on its drive shaft 131. The knob 135 fixes the parts in their position.

In an improved embodiment illustrated in Figs. 21 and 22, the cam disc 130 forms a sleeve 160 which is guided, by means of a wedge 161, on another bushing 162 to be axially displaceable. The bushing 162 is freely rotatable on a shaft 131 fixed in the housing 143, 144 and has a gear 163 which is also driven by the shaft 122 through gears 164 and 165.

The above mentioned cam 157 to control the lever 154 is arranged on the inside of a disc 166 which is bolted to the bushing 160 from the side. Beside the drum 130, on the same bushing 160, there is another cam 167 to guide a roller 168 which will be described later.

During rotation of the gear 133 and the bushing 160 mounted thereon, the control levers 128 and 154 are moved, in accordance with the cams 130 and 157 in a manner necessary for the twisting operation. To vary or eliminate the swinging movement, an adjusting spindle 170 is guided in a bushing 169 in the housing 143 parallel

to the pin 131. At its outer end, the spindle has an adjusting knob 132. On the bushing 169 another bushing 171 is mounted on which two bearing pins 172 and 173 having loose rollers 174 and 175 are mounted one behind the other on the same axis. The rollers 174 and 175 are arranged so that the plane lateral surfaces 176 and 177 of the cam disc 130 are exactly between them, thus securing the cam arrangement on the bushing 160 in its axial position.

Axial adjustment is effected in that, by turning the knob 132, the spindle 170 is more or less screwed into the thread 178 which is provided on the outer end of the bushing 171. Before this is done, however, the knob 135 which extends through the bushing 171 and the slot 179 in the housing 144, has to be loosened.

On the same level as the bolt 172 and the roller 174, a loose roller 168 is mounted, displaced for 90 degrees, on a pin on the bushing 171. As compared to the roller 174, the loose roller 168 is arranged at a greater radial distance from the bushing 171 and has a smaller diameter. It is the object of the roller 178 to operate in a groove 167 which is arranged beside the cam disc 130 on the bushing 160 in opposite direction as compared to the disc 130.

The roller 168 is put into working position in that in the end position of the spindle 170, upon further turning of the knob 132, the bushing 171 is taken along and turned for 90 degrees. During this movement the rollers 174, 175 release the cam disc 130, 176, 177. The roller 168, however, enters the groove 167. This groove alone now controls the axial movement of the cam roller arrangement and the bushing 160 in that the cam 130 actuating the lever 128 is displaced on the bushing 162 for the same distance as it rises, i.e. there is no more axial displacement of the twisting device but only the opening and closing operation of the tongues 116 which is effected through means of the control lever 154.

The bushing 171 may be fixed in any position by actuating the knob 135. When the knob 135 has been loosened, the device may be readjusted, by turning the knob 132, into the one or other position, i.e. it is possible to work, alternatively, with an axially movable or axially stationary twisting device. The rotary movement of the twisting device, as well as the opening and closing movement of the tongues 116 is not affected.

The housings 143 of the outer twisting devices are fitted to a flange 142 of a hollow carrier 141 which in turn is mounted outside the machine frame G through means of a plate 140.

Furthermore, it is pointed out that all housings are oil-tight, and that all drive members operate in an oil bath, including the wrapping and the twisting devices, the paper feed unit and the main drive of the machine.

An auxiliary device shown in Fig. 20 may be used in connection with the twisting device as described above. It comprises pincers 146 on shafts 145. It is the object of the pincers to pinch-off and center the tube-shaped wrapping material extending beyond the candy, immediately before the twisting tools begin their twisting operation. The arrangement of the tongues can also be seen from Fig. 17. It is important to employ two pairs of pincers or centering sheets 146, one pair of which being provided on each side of the candy. The shafts 145 which are connected with each other by toothed segments, are journaled in the housing 140 and driven through means of drive members 147, 148, 149, and 150.

Operation of the device is as follows:

To enable two wrapping stations to be supplied from one feeding station and to be operated by a single drive unit, it is necessary to arrange the operating members completing the wrapping operation remote from the members beginning with the wrapping operation. For this reason, the wrapping device and the twisting device are arranged in the form of a V relative to the central plane in which the lifting stamps are operating.

With regard to the fact that two different types of candy have to be wrapped, the one type, the round ones for instance, will be filled into the compartment B₁, and the other type, rectangular ones for instance, into the compartment B₂ of the feed hopper B. The candies then pass through separate chutes C₁ and C₂ to the feed plate D which according to Fig. 3 is provided with an outer ring of round openings and another inner ring of rectangular openings. The plate D moves intermittently in the direction of the arrow. The chutes C₁ and C₂, each being positioned on a vibrator, are of different length so that one type of candy is supplied into the one chamber on the feed table 10, 15 which is enclosed by the wall 20 (Figs. 4 to 6) and the member 23. The candy enters the openings 12. The shorter chute C₁ supplies the outer ring of openings 11 which is enclosed by the walls 18 to 25 on the upper side of the table. A grid or the like prevents the candies from falling through the openings. However, fragments and broken-off pieces can fall down into a collecting container 17. By adjusting the vibrator, the amount of candy supplied through the chutes can be exactly controlled. Any candy in excess of the amount required which accumulates on the upper side of the table is brushed off by brushes 24, 26 and returned to the feeding station.

The candy in the openings of the feed table is then moved into positions 11' and 12' (Fig. 6) above a stamp F₁ and F₂ (Figs. 9, 10, 11, 13).

Cut pieces of wrapping material are supplied to the same place, i.e. a separate paper feed mechanism according to Figs. 7 and 8 supplies a protective strip and an outer wrapper, one on the other, to each piece of candy. Both strips of paper are severed, at the required length, from an endless paper roll, by a cutting device 47 and 47'. A protective strip and an outer wrapper are placed on each candy in the position 11' and 12' (Fig. 13) whereupon the upper stamp 63 with cheeks F₁ and F₂ is lowered onto the candy and the wrapping material.

During the following operation, the upper and lower stamp together with the candy and the wrapping material between them are moved upward, the wrapping material projecting at the sides being folded around the candy like a U, by means of the folding members 79, as shown in Fig. 14a. In the upper end position each candy is seized by grippers 90 (Figs. 14 and 15). A lower folding member 101 moves to the inside after the lower stamp has been returned, and produces the inner fold of the wrapping material.

Now the gripping device is actuated and both grippers 90 swing to the outside, thus producing the outer fold through means of the member 106.

As can be seen from the drawings, two gripping units (Fig. 17) are provided and arranged in the form of a V so that both candies arriving on the stamps are simultaneously seized and passed away to the side.

After a 180 degree turn of the grippers, the candies are within reach of the twisting devices 116 to 146. The twisting devices, too, are arranged like a V on each side of the machine. The candy held by the grippers reaches the folding members 146 which force the wrapping material together on both sides of the candy. Then the projecting ends are seized by the tools 116 and 117 and twisted.

Each of the twisting devices is exchangeable and may be replaced by a folding device so that it is also possible to make the end fold of the wrapping material by folding members. In the case of a bag-like wrapping a folding device may be arranged on one side, and a twisting device on the other. By eliminating the axial movement of the twisting devices in the arrangement shown in Figs. 21 and 22 a very stiff twist is achieved when using a somewhat stiffer wrapping material.

Upon further movement of the gripping device according to Fig. 14, the completely wrapped candies are transferred to the outside through discharge chutes J₁ and J₂.

Discharge of candies which have been wrapped at the same time, is of course, simultaneously.

While I have disclosed one embodiment of the present invention, it is to be understood that this embodiment is given by example only and not in a limiting sense, the scope of the present invention being determined by the objects and the claims.

I claim:

1. Wrapping machine for candies, chocolate bodies, or the like, comprising a machine frame, drive means accommodated in said machine frame, a stamp device provided on said machine frame and consisting of several individual stamps, a feeding device comprising several feed lines each of which supplies one of said stamps and operates intermittently in accordance with the stroke cycle of the stamps, a paper feed mechanism for each of said stamps, a housing arranged above said stamp device, a gripping device provided with grippers, upper stamps and guide means and drive means therefor, said guide means and said drive means for said upper stamps being accommodated in said housing and said gripping device being journaled in said housing to be rotatable about an axis which is inclined relative to the direction of movement of said stamps, one gripping device being provided for each of said stamps, folding means arranged at both sides of the path of movement of the objects to be wrapped, means to close the projecting wrapping material for each of said gripping devices arranged at a position in the path of movement of said grippers opposite the receiving station of the partially wrapped objects, drive means and control means for said various devices adapted to co-operate so that the objects to be wrapped and supplied into said feeding device are supplied simultaneously but independently from each other, while at the same time said different paper feed mechanisms supply each of said stamps with the necessary piece of wrapping material, whereupon the objects together with the piece of wrapping material held between said lower stamps and said upper stamps are passed by said stamps through said folding means to said gripping device arranged above, the grippers of said gripping device taking said partially wrapped objects within reach of said closing means, and discharging said objects after completion of the wrapping operation.

2. The wrapping machine, as set forth in claim 1, in which said feeding device comprises a feed hopper for the objects to be wrapped, and a feed table, said feed hopper being divided into several compartments, each having a separate outlet opening, and said feed lines comprise separate feed channels ending above said feed table, said feed channels being individually adjustable to control the feeding speed.

3. The wrapping machine, as set forth in claim 2, which includes vibrating means for said feed channels, and feeler means, the operation of said vibrating means being adjustable at will and by said feeler means to control the amount of candy on said feed table.

4. The wrapping machine, as set forth in claim 1, in which said feeding device comprises a feed table which on its circumference is provided with a plurality of rows of openings for the objects to be wrapped, the number of rows of openings corresponding to the number of stamps, and each row, on its upper side, being separated from the adjacent row by separating means and being supplied with candies from a separate feed line.

5. The wrapping machine, as set forth in claim 4, in which the part of said feed table provided with said rows of openings is replaceable.

6. The wrapping machine, as set forth in claim 4, in which the openings of one of the rows of openings in said feed table have a different shape than those openings of other of said rows of openings.

7. The wrapping machine, as set forth in claim 1, in which said feeding device comprises a feed table rotating intermittently about a vertical axis and being provided with several rows of openings, and said feed lines com-

prise several feed channels to supply each row of said openings in said feed table from a feed hopper, each row of said openings in said feed table being enclosed on the upper side to form chambers above which end said different feed channels, and a feeler device which controls the amount of candy in each chamber and which controls the feeding speed of the corresponding one of said feed channels.

8. The wrapping machine, as set forth in claim 7, in which one feeding channel is provided for all rows of said openings in said feed table.

9. The wrapping machine, as set forth in claim 1, in which said stamp device comprises a carrier, two vertical push-rods arranged on said carrier and below said feed table so as to extend, during the upward stroke, through one opening of each of the different rows of said openings in said feed table.

10. The wrapping machine, as set forth in claim 1, in which two paper feed mechanisms working parallel are adjustable and controllable independently from each other, each of said feed mechanisms supplying one stamp of said stamp device with a cut piece of wrapping material and a protective strip thereon.

11. The wrapping machine, as set forth in claim 10, in which the component parts of said paper feed mechanism are replaceable and adjustable to enable changes in paper size and type.

12. The wrapping machine, as set forth in claim 10, in which a feeler device is provided for said two paper feed mechanisms, the feelers of which control the openings for the candy in said feed table and cause interruption of the paper supply to the corresponding stamp as soon as the latter is not supplied with a candy from said feeding device.

13. The wrapping machine, as set forth in claim 1, in which said feeding device and said stamp device are arranged on a machine table to work in a horizontal plane, in which said closing means comprises a twisting device to close the wrapping and in which the gripping device for each stamp and said twisting device to close the wrapping are journaled in a part of said machine frame projecting beyond said feeding device.

14. The wrapping machine, as set forth in claim 1, in which two of said gripping devices are arranged above the axis of said stamp device in the form of a V and rotate about an axis which is inclined relative to the vertical line to remove the candies passed through said folding means by said stamp device out of reach of said stamp device and to take them sideways within reach of said closing means, for completion of the wrapping operation.

15. The wrapping machine, as set forth in claim 1, in which each of said gripping devices is provided with four rotatable pairs of grippers journaled in a common carrier, and in which separate drive means are provided for moving said carrier and initiating the opening and closing movement, respectively, of said grippers, said drive means being operated from a main drive controlling both of said gripping devices.

16. The wrapping machine, as set forth in claim 15, in which each axis of both of said gripping devices is inclined for 30 degrees relative to the horizontal, while the rotary axis of said twisting devices which are arranged above said gripping devices is inclined 60 degrees relative to the horizontal, so that the partially wrapped candies received by said grippers of said gripping device from said stamp device come within reach of said twisting devices after a 180 degrees turn.

17. The wrapping machine, as set forth in claim 1, in which said closing means comprises twisting devices on either side of the central axis of said stamp device and above said gripping device, said twisting devices being arranged in the form of a V to produce the end fold, said twisting devices being individually exchangeable, and replaceable by folding means.

18. The wrapping machine, as set forth in claim 17, in

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which said twisting devices are formed of two units, each of which operates on one side of the candy held by said grippers, and both of the units of said twisting devices being separately removable and exchangeable for folding means.

19. The wrapping machine, as set forth in claim 18, in which the drive of said twisting devices is actuated by a common main drive through means of transmission members, separate drive means being provided to initiate the opening and closing movement, respectively, and further transmission means to initiate the rotary movement.

20. The wrapping machine, as set forth in claim 1, in which pincers are provided for each of said twisting devices, said pincers compressing the wrapping material tube close to the candy immediately before the twisting operation begins.

21. The wrapping machine, as set forth in claim 1, which includes control means to axially displace each twisting device upon the latter's rotation, the lifting cams of said control means being designed so that during the twisting operation said twisting device is axially displaced towards the object to be wrapped at a rate at which the projecting part of the wrapping material is shortened during the twisting operation.

22. The wrapping machine, as set forth in claim 21, in which said control means are adjustable according to the wrapping material used.

23. The wrapping machine, as set forth in claim 21, in which said control means can be switched off to enable a particularly stiff twist.

24. The wrapping machine, as set forth in claim 23, in which said control means for each twisting device comprises three control cams which are rigidly connected

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with each other, one of said control cams controlling the axial displacement of said twisting device, the second one of said control cams controlling the opening and closing movement of said pincers, and the third one of said control cams forming a cam opposing said first one and being put to operation only when the axial movement of said twisting device is not desired.

25. The wrapping machine, as set forth in claim 24, in which said three control cams are formed on rigidly connected cam discs and pivoting levers are provided having rollers which bear on the cams and act on said twisting device to axially displace said twisting device and to initiate the opening and closing movement, respectively, of said pincers.

26. The wrapping machine, as set forth in claim 25, in which said control cams are rigidly connected by a sleeve which is axially displaceable on a rotating shaft and supported on an abutment inside the housing of said machine.

27. The wrapping machine, as set forth in claim 26, in which the rollers which bear on said cams are arranged displaceable and adjustable on a common carrier inside the housing of said machine.

28. The wrapping machine, as set forth in claim 27, in which the abutment for said sleeve is arranged adjustable inside said housing.

References Cited in the file of this patent

UNITED STATES PATENTS

974,453	Wilbur	Nov. 1, 1910
1,352,629	Remington	Sept. 14, 1920
1,392,683	Hackett et al.	Oct. 4, 1921
2,037,631	Hultin	Apr. 14, 1936
2,744,370	Seragnoli	May 8, 1956