June 17, 1941. F. R. CLARK 2,246,243

MACHINE FOR WRAPPING LOLLIPOPS

Filed Sept. 26, 1938 18 Sheets-Sheet 1

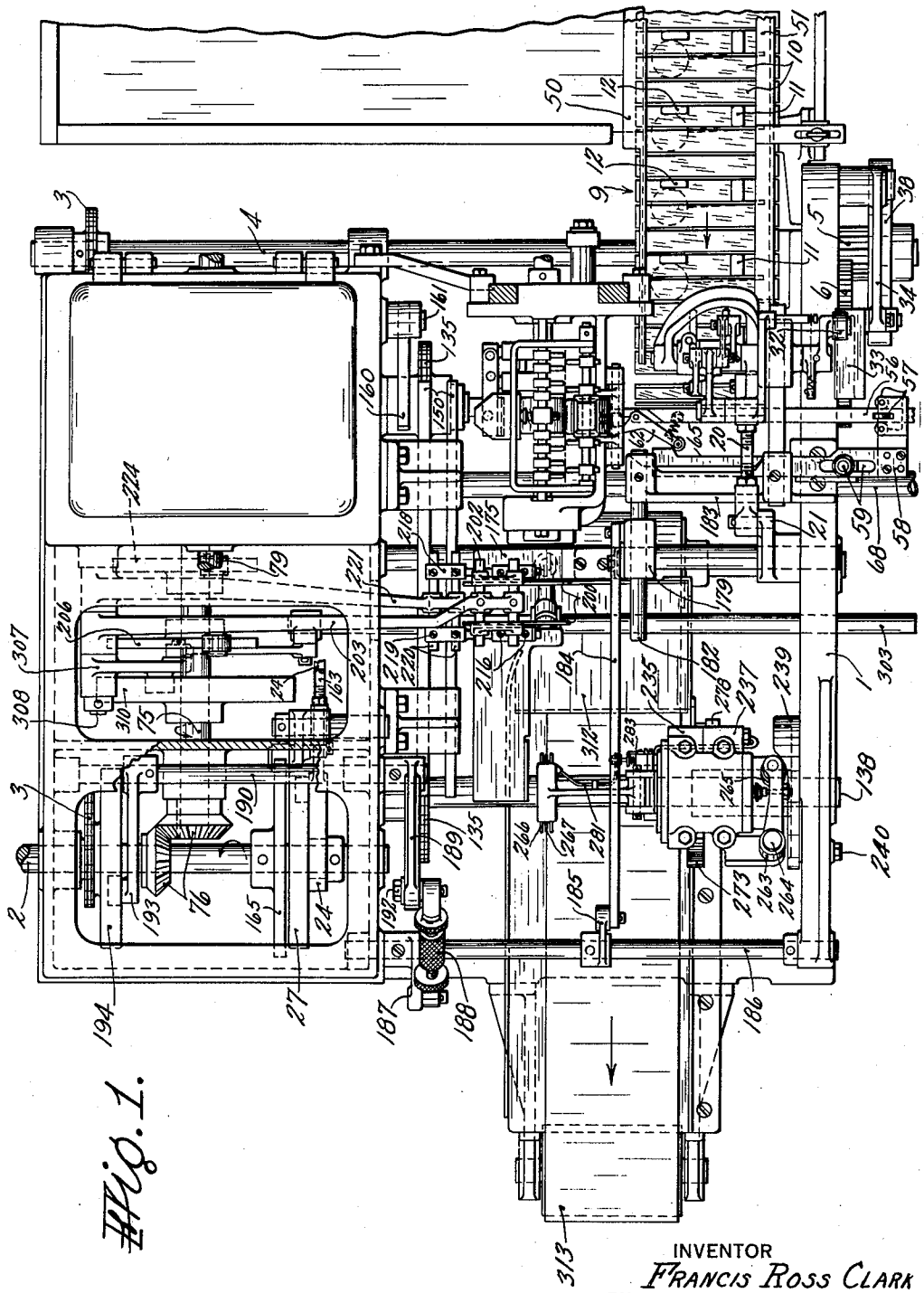

Fig. 1.

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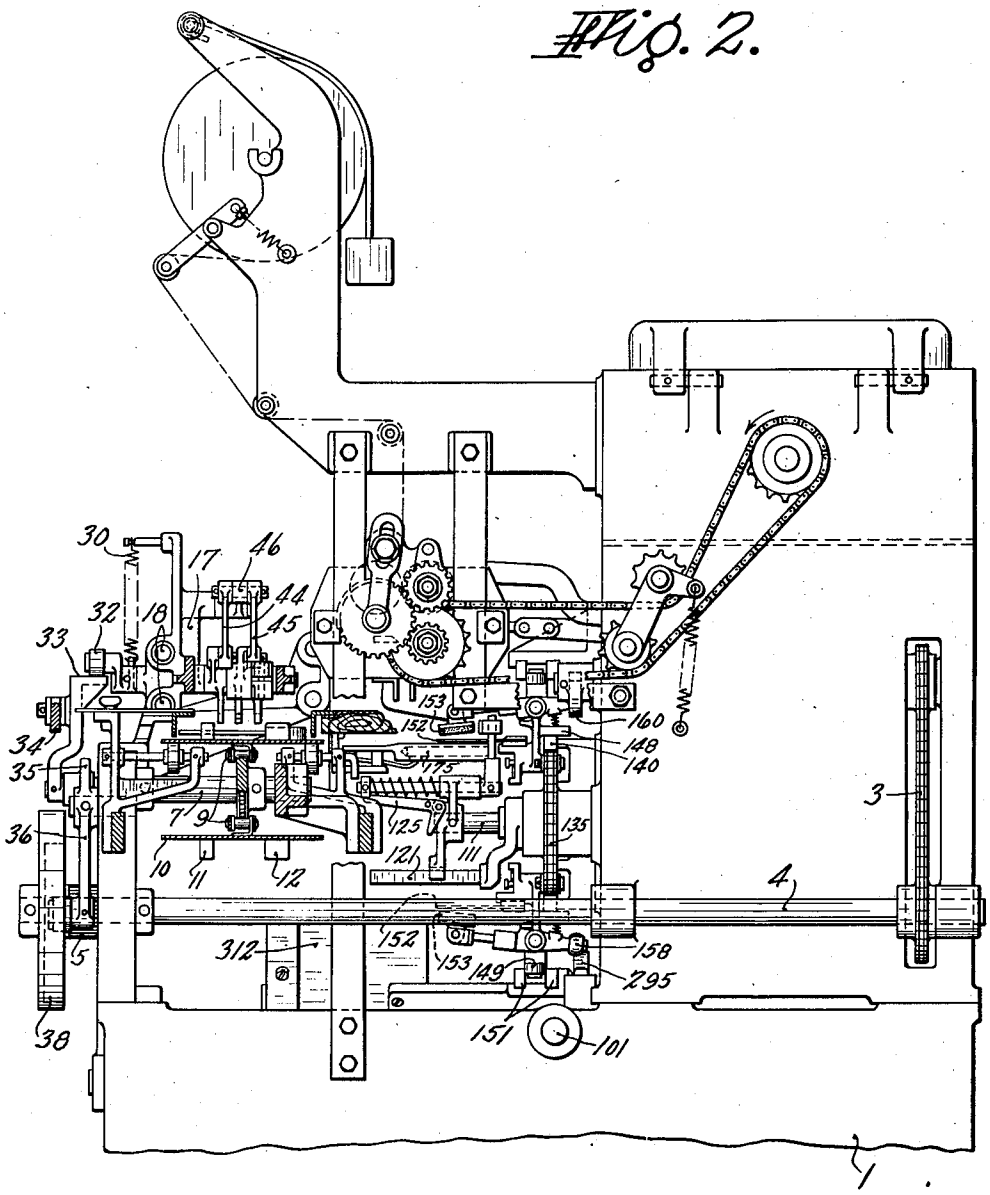
June 17, 1941. F. R. CLARK 2,246,243

MACHINE FOR WRAPPING LOLLIPOPS

Filed Sept. 26, 1938 18 Sheets-Sheet 2

Fig. 2.



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June 17, 1941. F. R. CLARK 2,246,243

MACHINE FOR WRAPPING LOLLIPOPS

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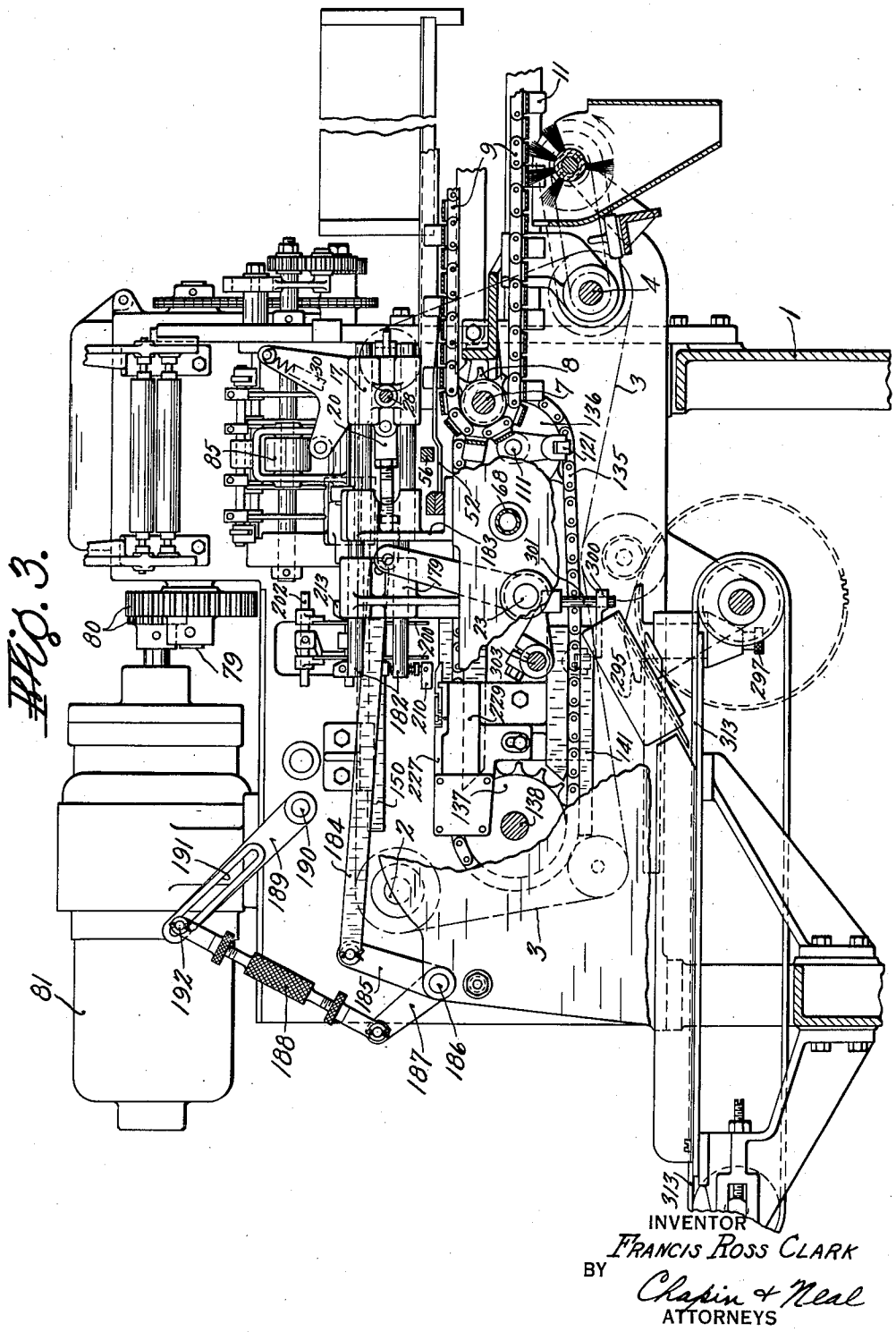

Fig. 3.

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June 17, 1941. F. R. CLARK 2,246,243

MACHINE FOR WRAPPING LOLLIPOPS

Filed Sept. 26, 1938 18 Sheets-Sheet 4

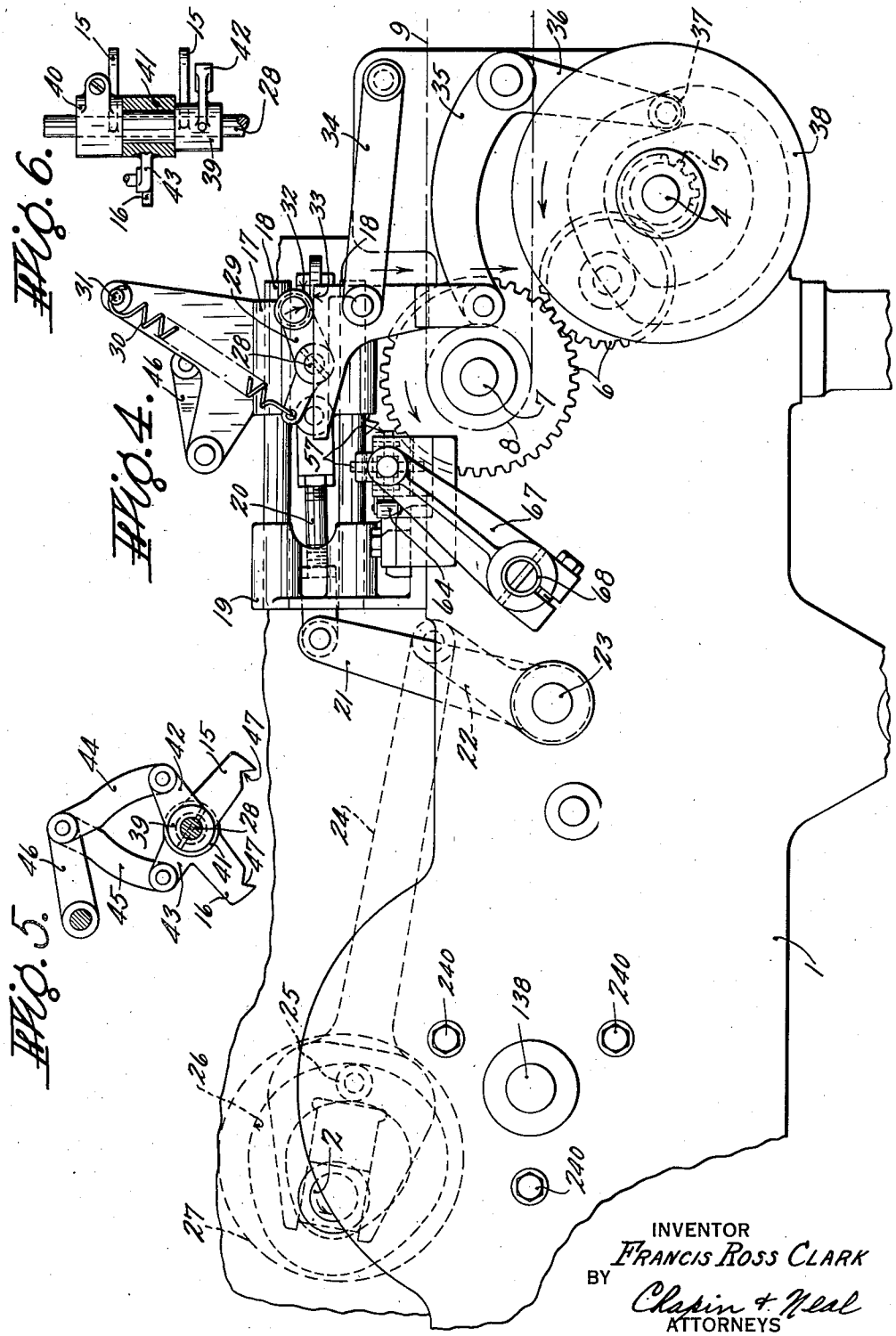

Fig. 6.

Fig. 4.

Fig. 5.

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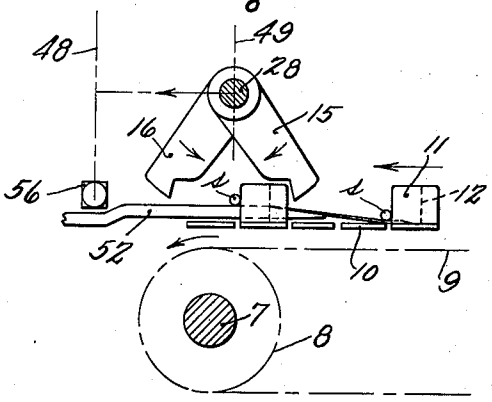
June 17, 1941. F. R. CLARK 2,246,243

MACHINE FOR WRAPPING LOLLIPOPS

Filed Sept. 26, 1938 18 Sheets-Sheet 5

Fig. 7.



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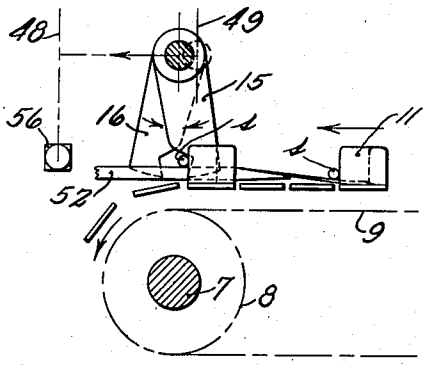

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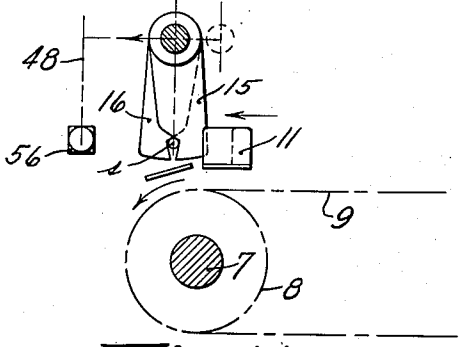
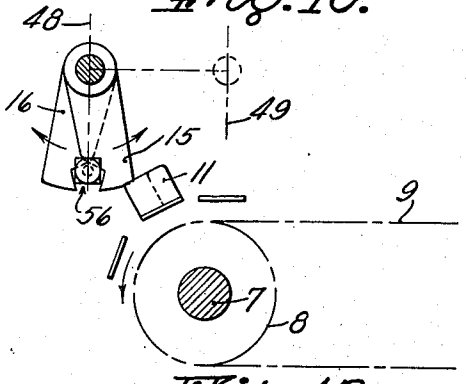


Fig. 10.



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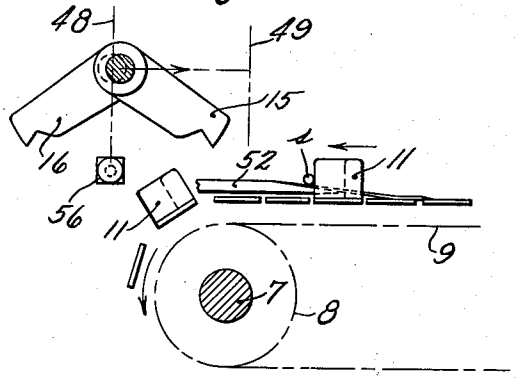

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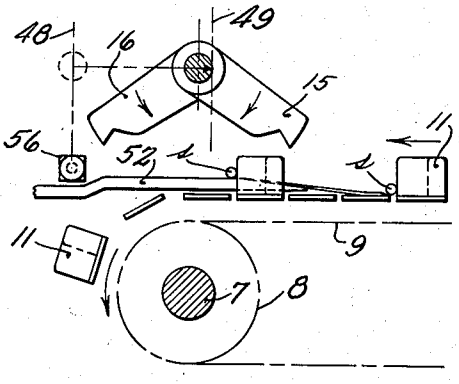

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June 17, 1941. F. R. CLARK 2,246,243

MACHINE FOR WRAPPING LOLLIPOPS

Filed Sept. 26, 1938 18 Sheets-Sheet 6

Fig. 13.

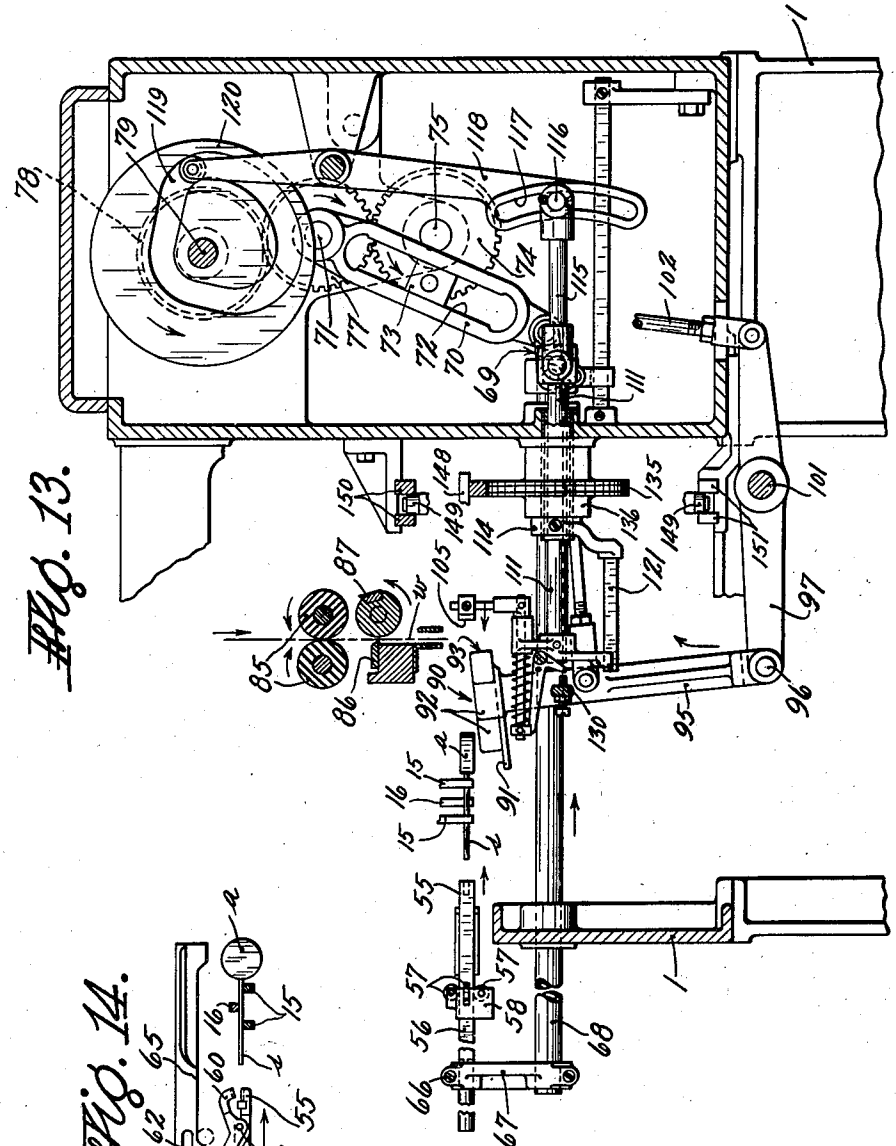

Fig. 14.

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June 17, 1941. F. R. CLARK 2,246,243

MACHINE FOR WRAPPING LOLLIPOPS

Filed Sept. 26, 1938 18 Sheets-Sheet 7

Fig. 15.

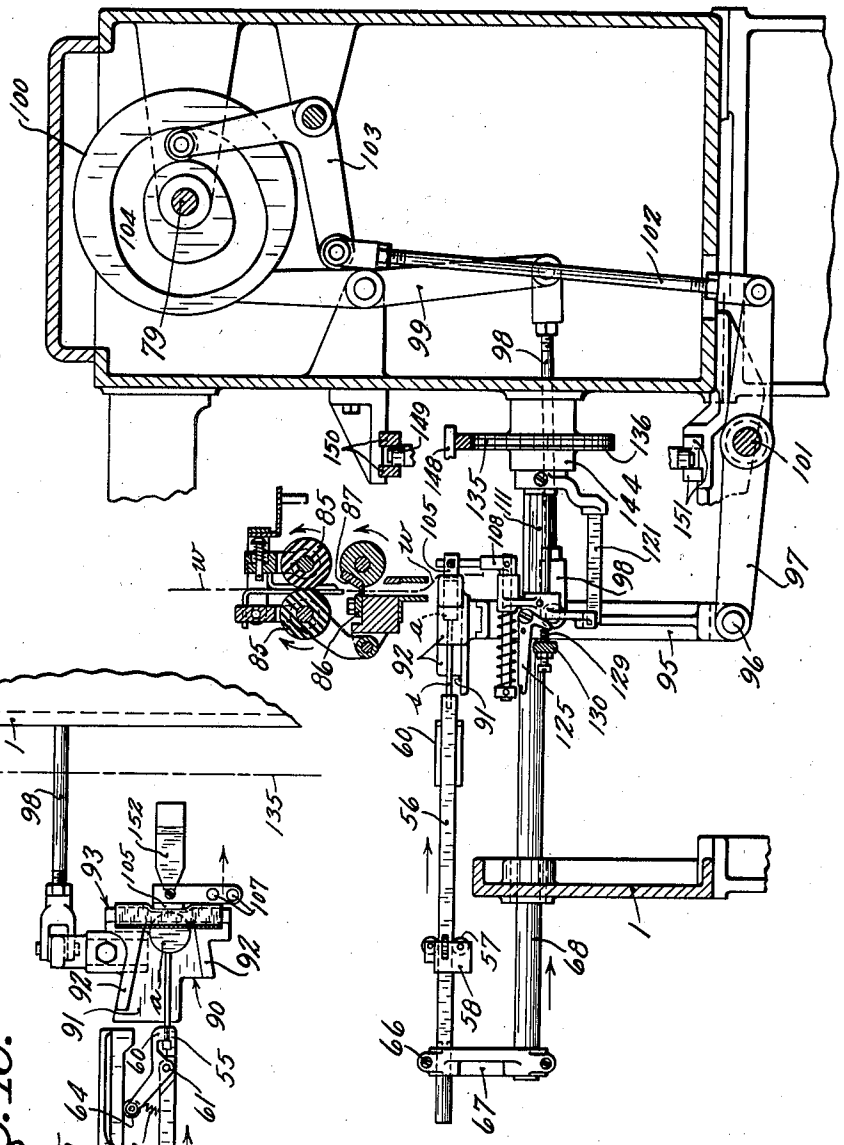

Fig. 16.

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June 17, 1941. F. R. CLARK 2,246,243

MACHINE FOR WRAPPING LOLLIPOPS

Filed Sept. 26, 1938 18 Sheets-Sheet 8

FIG. 17.

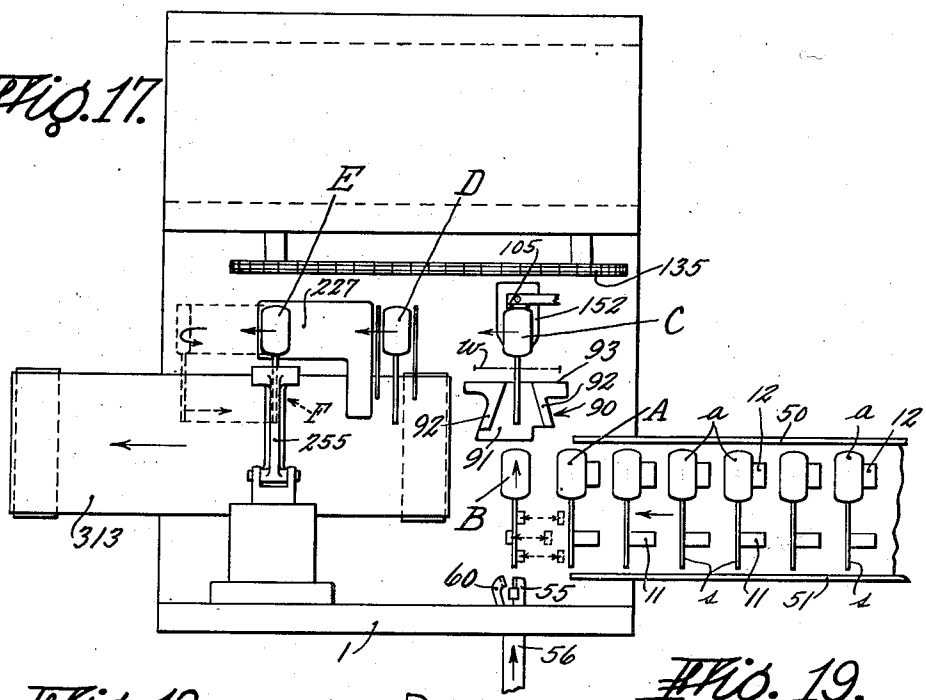
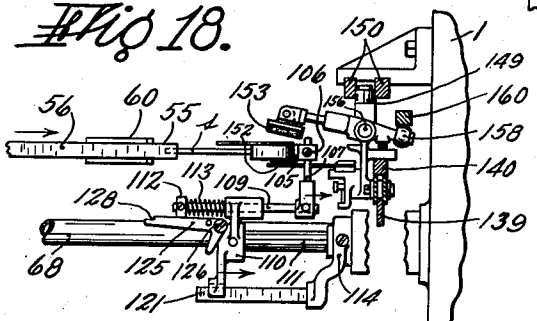


FIG. 18.



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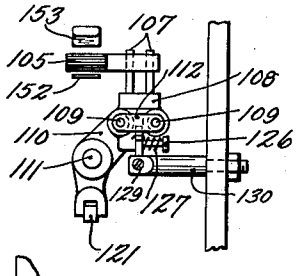
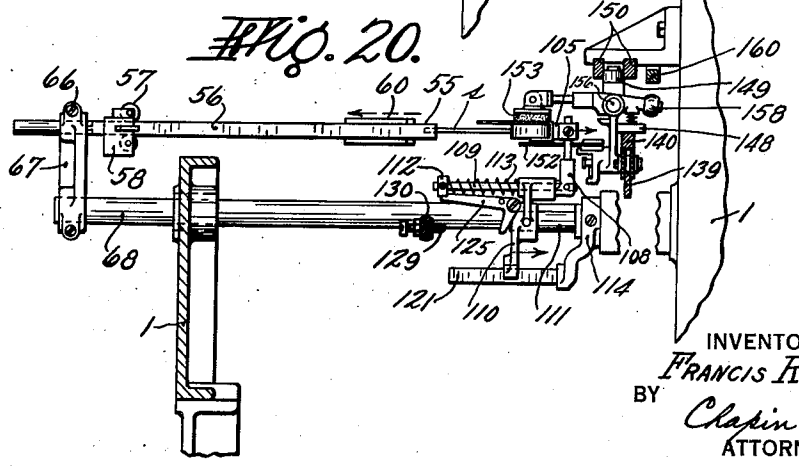


FIG. 20.



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BY Clapin & Neal
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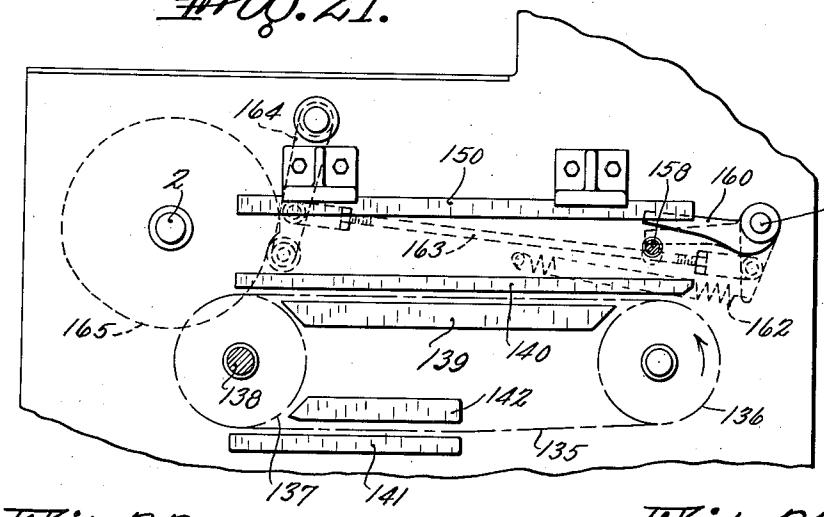
June 17, 1941. F. R. CLARK 2,246,243

MACHINE FOR WRAPPING LOLLIPOPS

Filed Sept. 26, 1938 18 Sheets-Sheet 9

Fig. 21.



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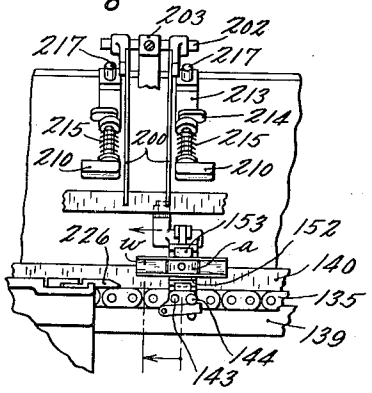

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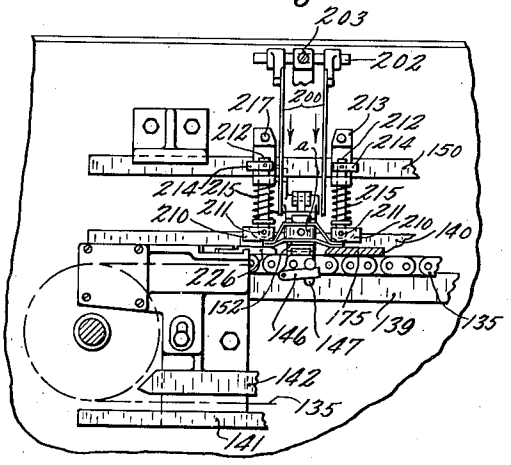

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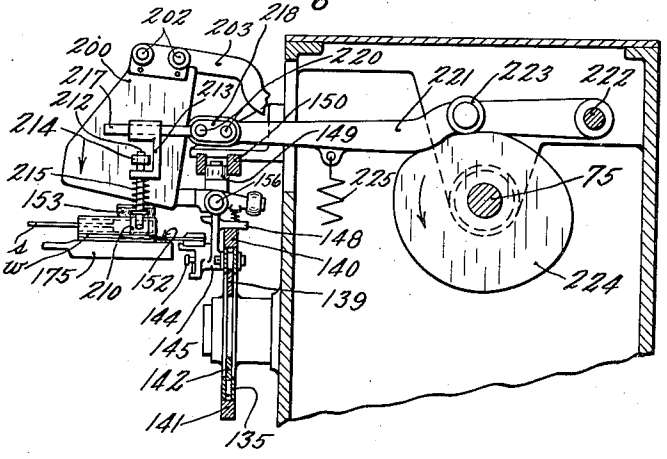

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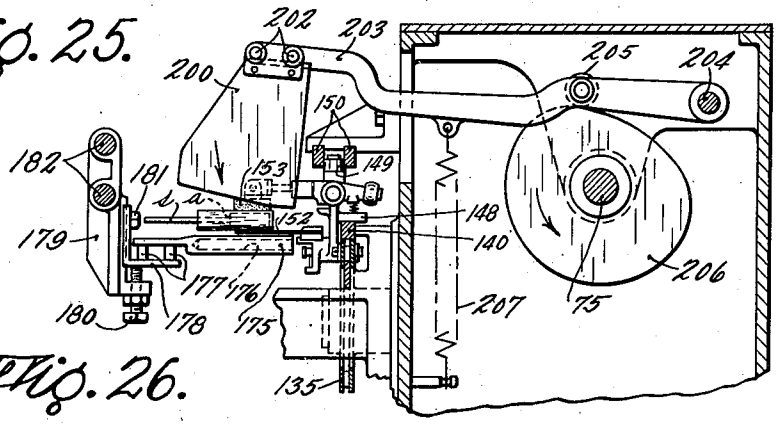
June 17, 1941. F. R. CLARK 2,246,243

MACHINE FOR WRAPPING LOLLIPOPS

Filed Sept. 26, 1938 18 Sheets-Sheet 10

Fig. 25.



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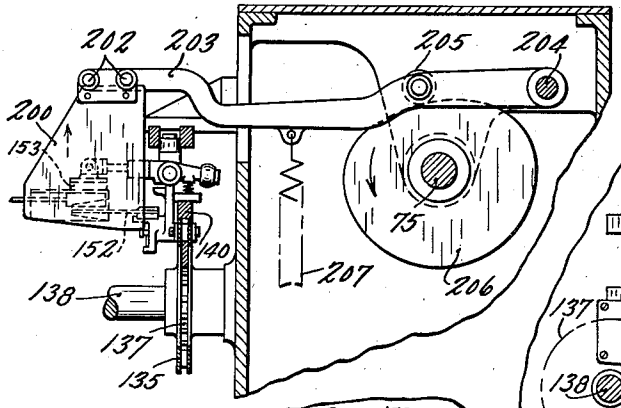

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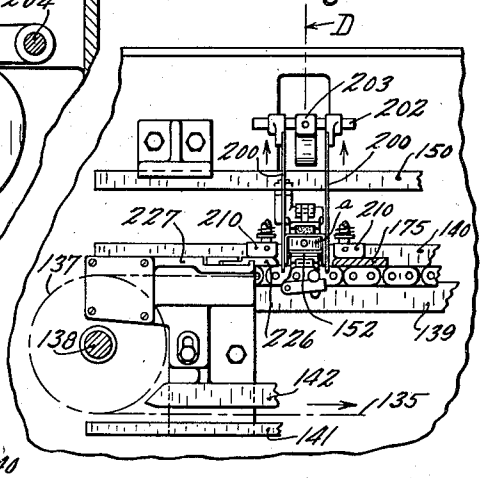

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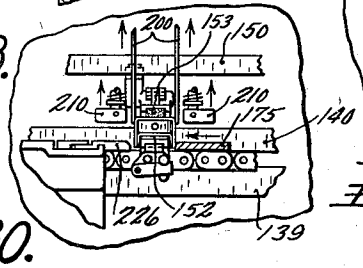

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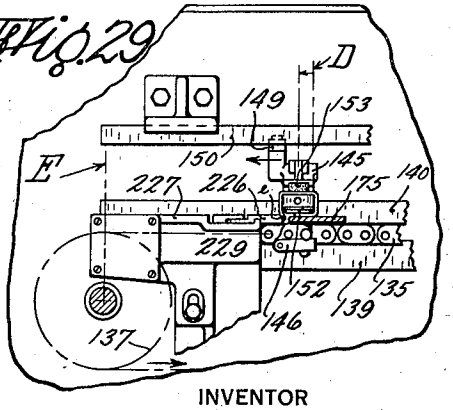

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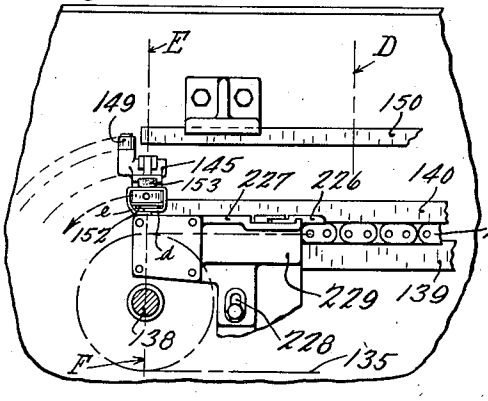

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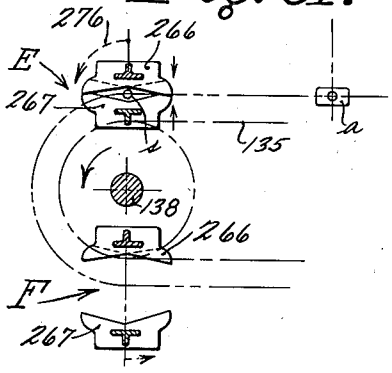
ATTORNEYS

June 17, 1941. F. R. CLARK 2,246,243

MACHINE FOR WRAPPING LOLLIPOPS

Filed Sept. 26, 1938 18 Sheets-Sheet 11

Fig. 31.



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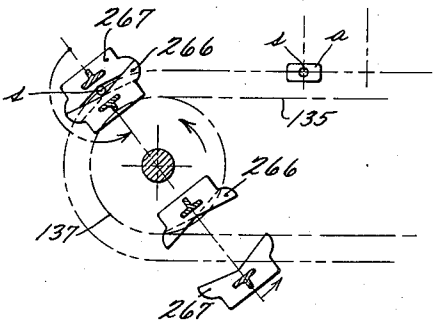

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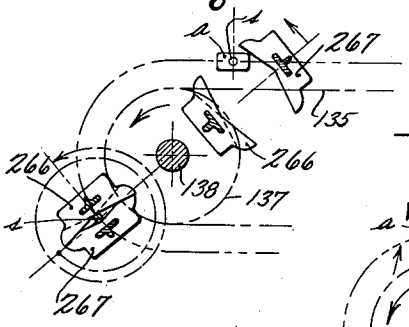

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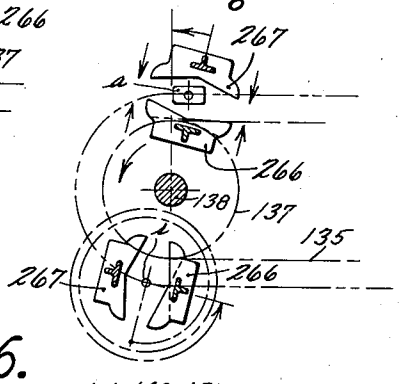

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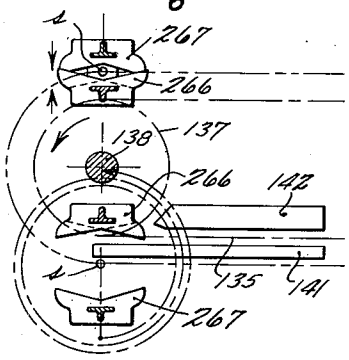

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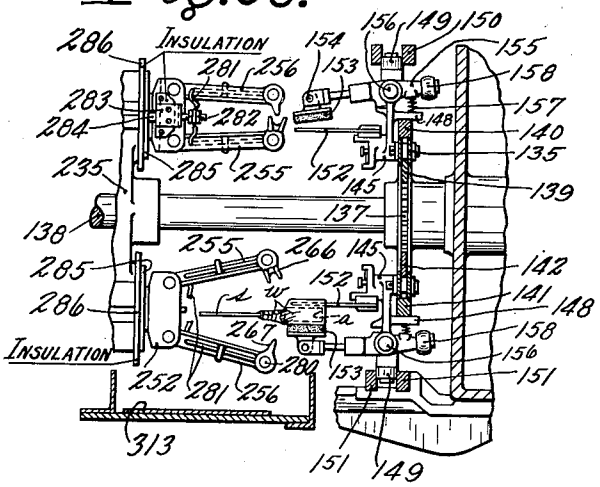

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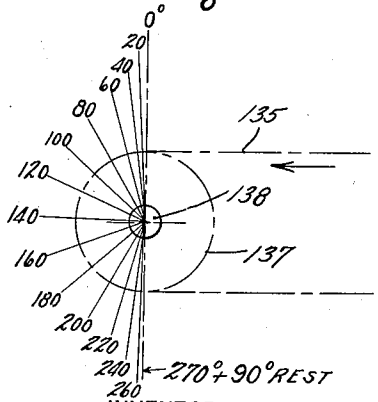

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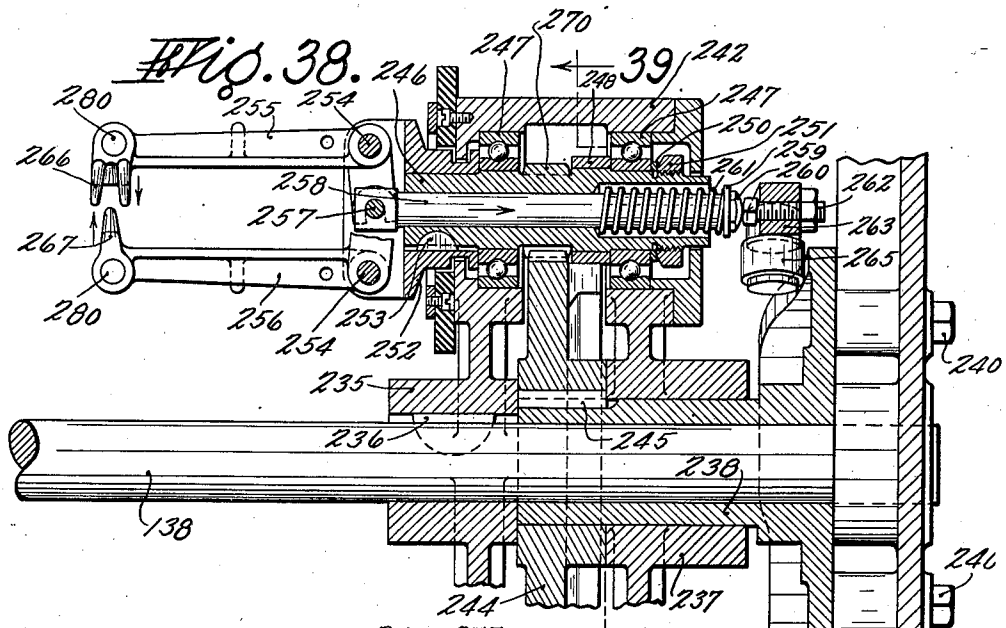
June 17, 1941. F. R. CLARK 2,246,243

MACHINE FOR WRAPPING LOLLIPOPS

Filed Sept. 26, 1938 18 Sheets-Sheet 12

Fig. 38.



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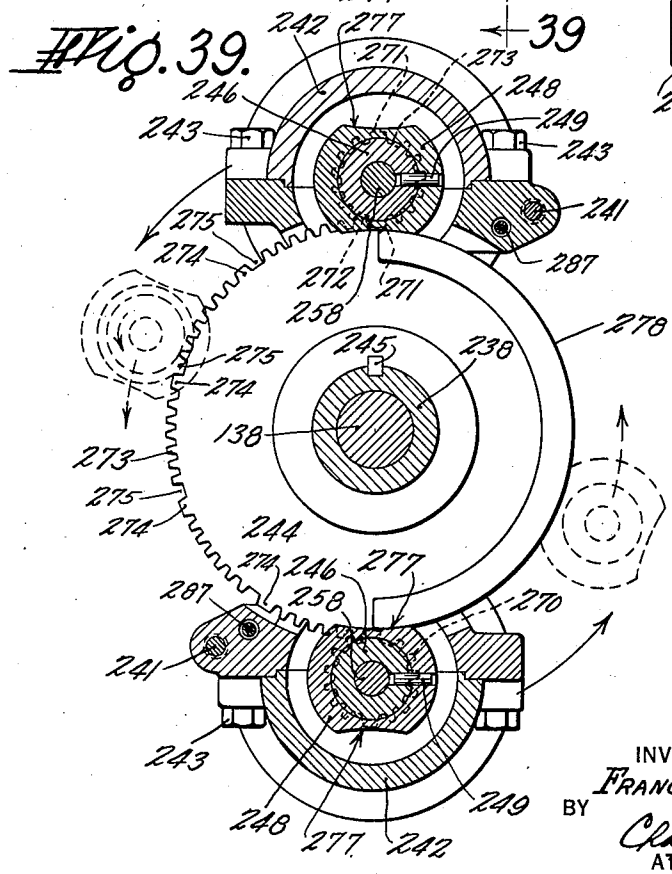

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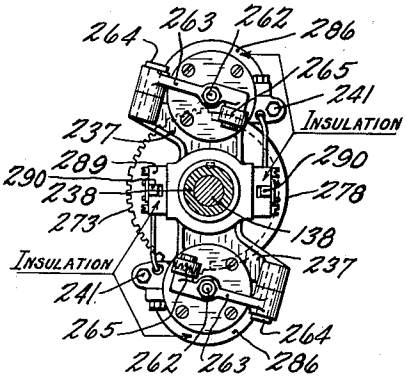
ATTORNEYS

June 17, 1941. F. R. CLARK 2,246,243

MACHINE FOR WRAPPING LOLLIPOPS

Filed Sept. 26, 1938 18 Sheets-Sheet 13

Fig. 40.



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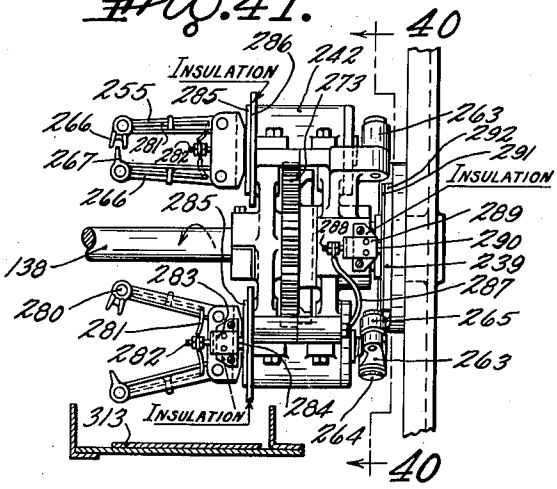

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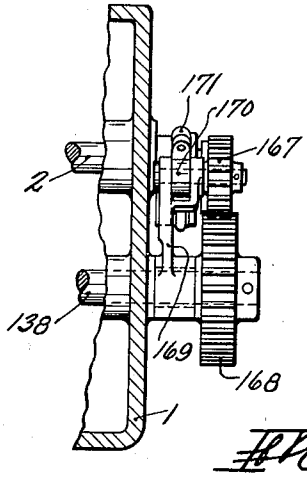

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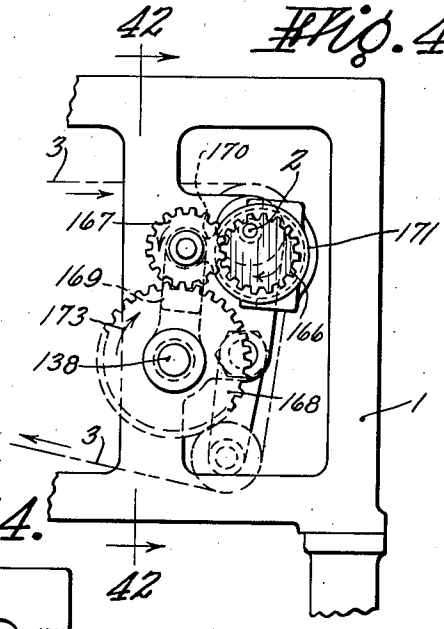

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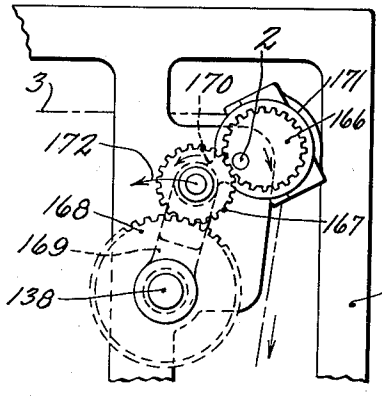

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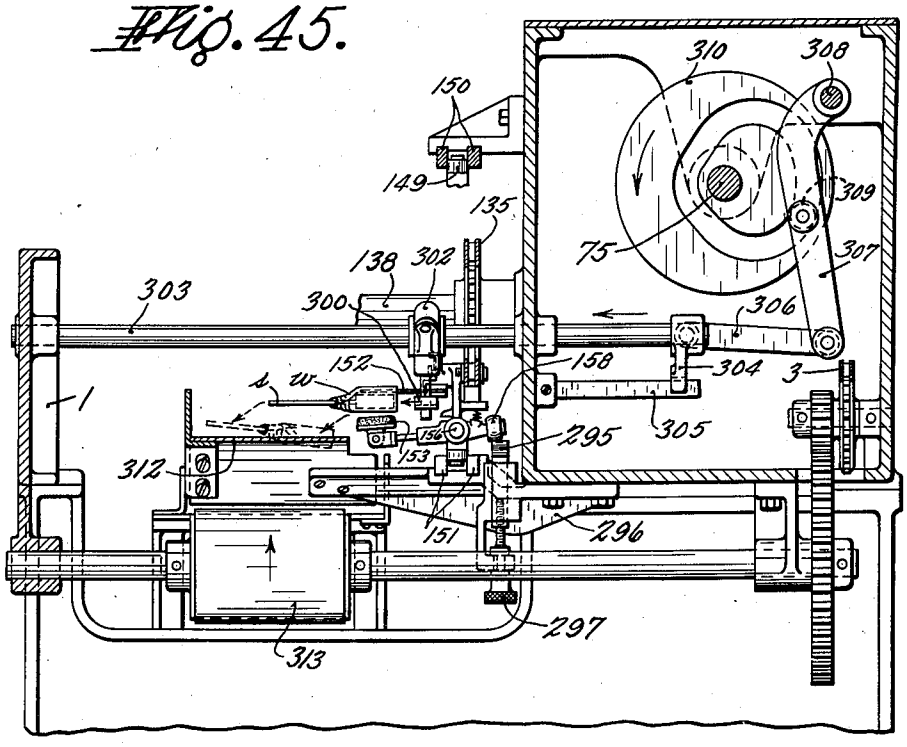
Clapin & Neal
ATTORNEYS

June 17, 1941. F. R. CLARK 2,246,243

MACHINE FOR WRAPPING LOLLIPOPS

Filed Sept. 26, 1938 18 Sheets-Sheet 14

Fig. 45.



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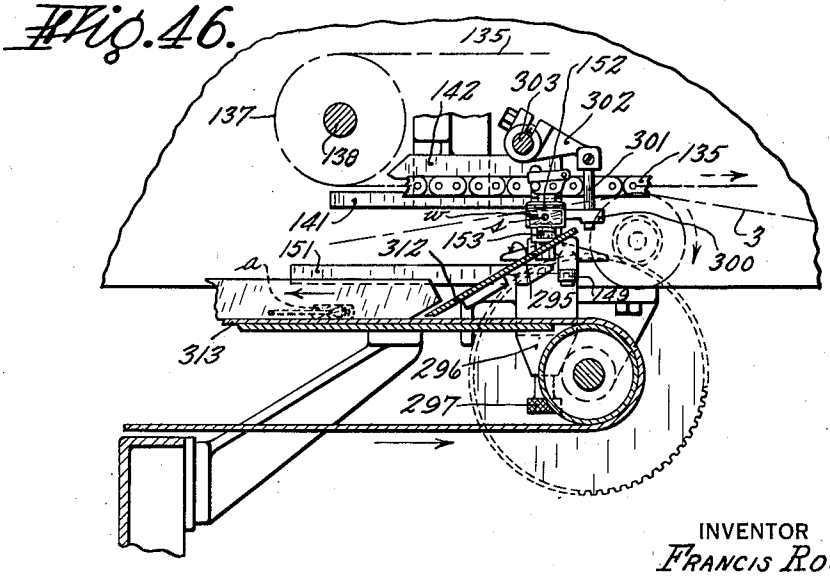

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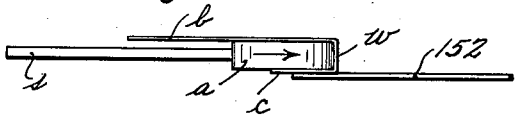
Clapin & Neal
ATTORNEYS

June 17, 1941. F. R. CLARK 2,246,243

MACHINE FOR WRAPPING LOLLIPOPS

Filed Sept. 26, 1938 18 Sheets-Sheet 15

Fig. 47.



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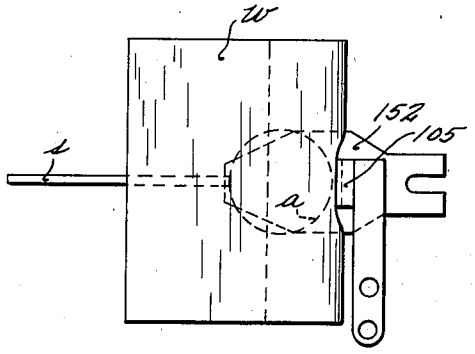

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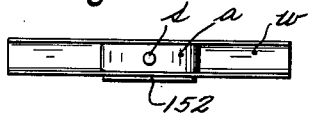

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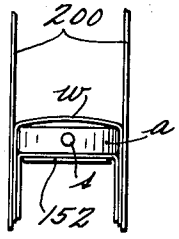

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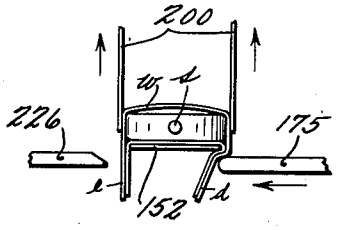

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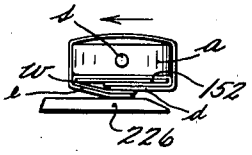

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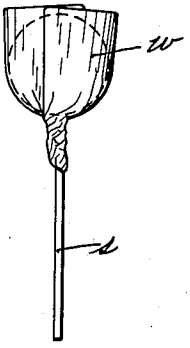

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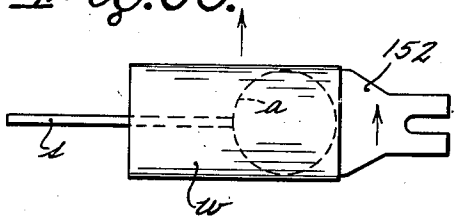

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June 17, 1941. F. R. CLARK 2,246,243

MACHINE FOR WRAPPING LOLLIPOPS

Filed Sept. 26, 1938 18 Sheets-Sheet 16

Fig. 55.

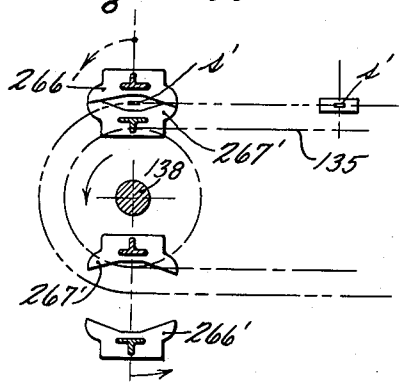


Fig. 56.

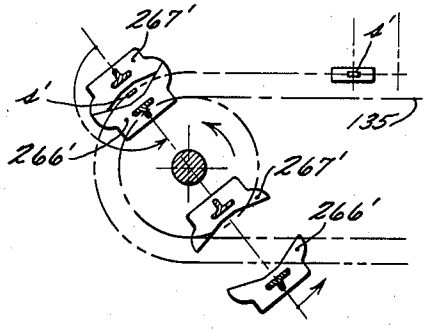


Fig. 57.

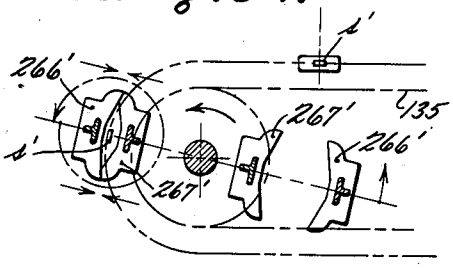


Fig. 58.

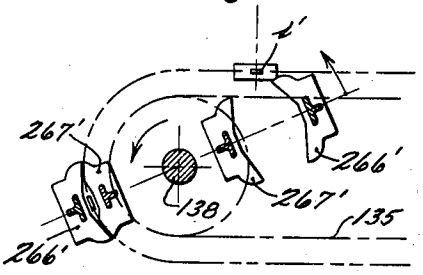
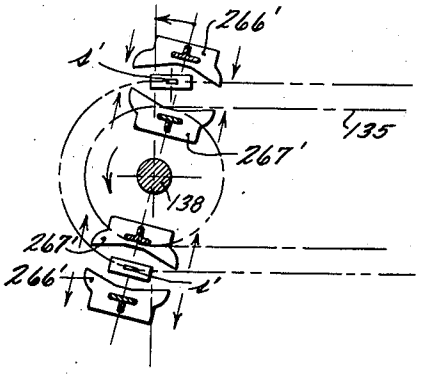


Fig. 59.



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June 17, 1941. F. R. CLARK 2,246,243

MACHINE FOR WRAPPING LOLLIPOPS

Filed Sept. 26, 1938 18 Sheets-Sheet 17

Fig. 60.

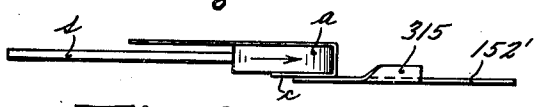


Fig. 62.

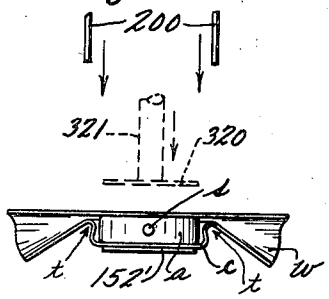


Fig. 61.

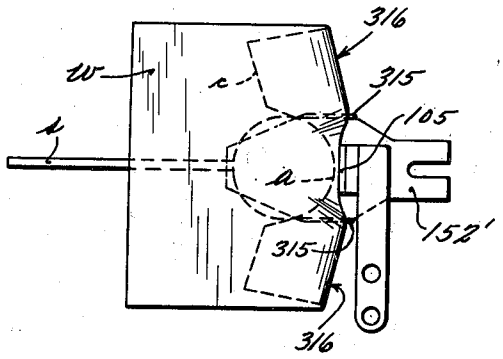


Fig. 63.

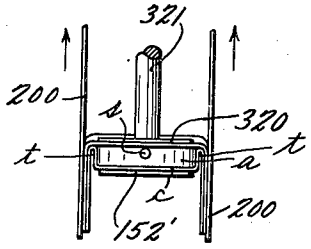


Fig. 64.

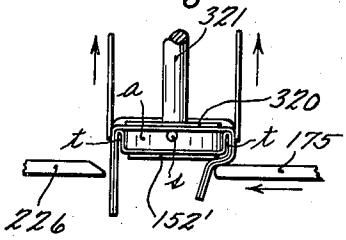


Fig. 65.

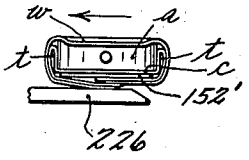


Fig. 67.

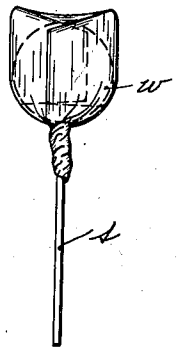
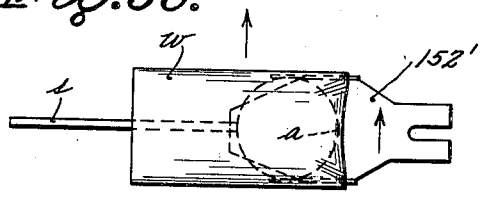


Fig. 66.



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MACHINE FOR WRAPPING LOLLIPOPS

Filed Sept. 26, 1938 18 Sheets-Sheet 18

Fig. 68.

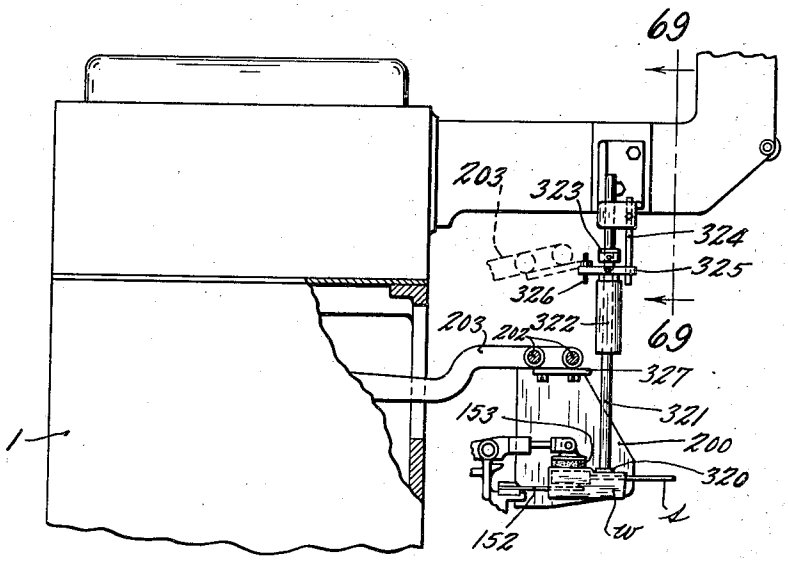
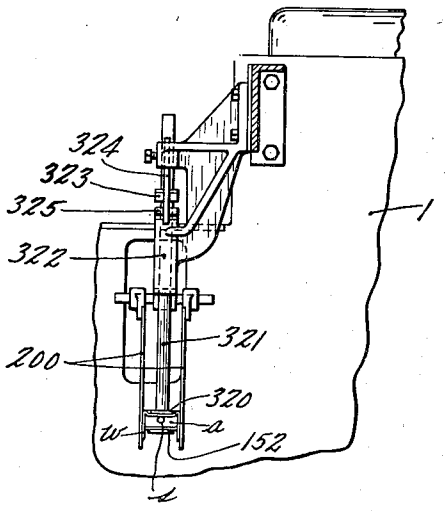


Fig. 69.



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2,246,243

UNITED STATES PATENT OFFICE

2,246,243

MACHINE FOR WRAPPING LOLLIPOPS

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Application September 26, 1938, Serial No. 231,779

34 Claims. (Cl. 93—5)

The present invention relates to a method and to a machine for wrapping lollipops. These articles are composed of a head portion formed generally of hard candy and a supporting stick, one end of which is embedded in the head. Due to the method by which the candy heads are formed they are irregular in shape and the sticks may vary in the position in which they are inserted into the head and may also become warped along their length. The wrapping of lollipops is a difficult problem due mainly to the difficulty of holding the wrapper in place upon the irregular head during the formation of the folds. In prior practice the only way of insuring against defective wrapping has been to use a wrapper sufficiently large to cover up any gaps which might be left by slippage.

In accordance with the present invention the wrapper is positively held in place upon the head of the lollipop throughout the wrapping operation, and in general the folds are formed by mechanism which does not depend upon the head of the lollipop itself for determining the shape given to the wrapper or to its folds. The manner in which this is accomplished will be best understood after a consideration of the method followed and the mechanism used, and permits a substantial reduction in the amount of wrapping material used for each article. This is particularly important where the modern transparent cellulosic wrapping materials are being used, these materials being relatively expensive. In addition to the foregoing object, the invention includes improvements in the manner in which the lollipop is handled in its travel through the machine, improvements in the folding mechanism, and improvements in the mechanism by which the wrapper is twisted around the lollipop stick. The nature of these improvements can be considered better in connection with a description of the particular mechanism employed.

Referring to the drawings—

Fig. 1 is a top plan view of the machine with certain parts broken away;

Fig. 2 is a side elevation, looking from the right in Fig. 1;

Fig. 3 is a front elevation with certain parts broken away;

Fig. 4 is a detail of the operating mechanism controlling the fingers which centralize the lollipops for their initial contact with the wrapper;

Fig. 5 is a detail elevation of the stick centering fingers;

Fig. 6 is a plan view of the centering fingers, partly broken away;

Figs. 7 to 12 are diagrammatic views showing successive stages in the operation of the centering fingers;

Fig. 13 is a transverse section through the machine showing the mechanism which carries the lollipops from the centering fingers into contact with the wrappers, and the operating cams for causing back and forth motion of said mechanism and of the initial wrapper-forming mechanism;

Fig. 14 is a detail plan of a certain lollipop transporting device shown in Fig. 13;

Fig. 15 is a transverse section, similar to Fig. 13, but showing the parts at a later period in the cycle, and illustrating the mechanism for causing vertical and horizontal motion of the wrapper forming mechanism;

Fig. 16 is a partial top plan of the lollipop forwarding and the wrapper-forming mechanism, at the same period of operation as in Fig. 15;

Fig. 17 is a diagrammatic top plan view illustrating the travel of the lollipops through the machine;

Fig. 18 is a detailed elevation, taken at a slightly later time than that of Figs. 15 and 16, showing the mechanism which receives the lollipop and wrapper from the former;

Fig. 19 is a front view of certain mechanism shown in Fig. 18;

Fig. 20 is a view similar to Fig. 18 but showing the parts at a later period of the cycle;

Fig. 21 is a detail showing the mechanism for controlling the opening and closing of the carrier chain gripper to receive a lollipop and wrapper;

Fig. 22 is a detail of the mechanism at the side folding station, at a time shortly before the arrival of a lollipop and wrapper;

Fig. 23 is a similar view showing the start of the side folding operation;

Fig. 24 is a side elevation of the side folding mechanism at the same period in the cycle as Fig. 23, showing the cam mechanism for operating the side fold grippers;

Fig. 25 is a similar view at the same period, but with the side fold grippers omitted and showing the mechanism for operating the side folders;

Fig. 26 is a view similar to Fig. 25, but taken at a later period in the cycle;

Fig. 27 is a front view of the mechanism shown in Fig. 26 at the same period;

Fig. 28 is a detail of parts appearing in Fig. 27 but at a later period in the cycle, the lower rear folder having started to move in;

Fig. 29 is a detail of the partially wrapped lollipop being carried away from the side folding station to the twisting station;

Fig. 30 is a similar detail showing the lollipop just arrested at the twisting station;

Figs. 31 to 35 are diagrammatic views illustrating the operation of the twisting mechanism;

Fig. 36 is a side view of the twisting mechanism in the position of Fig. 35, showing its relation to the carrier fingers;

Fig. 37 is a timing chart showing the variable motion given to the carrier chain and twister fingers;

Fig. 38 is a detail section showing the construction of the twister fingers;

Fig. 39 is a section on line 39—39 of Fig. 38;

Fig. 40 is a section on line 40—40 of Fig. 41;

Fig. 41 is a detail of the twister fingers in the position of Fig. 36;

Fig. 42 is a side elevation of the gearing for driving the carrier chain and twister head, taken on line 42—42 of Fig. 43;

Figs. 43 and 44 are front views, at different periods of the cycle, of the gearing for driving the carrier chain and twister head;

Fig. 45 is a side elevation of the mechanism for ejecting the lollipop from the carrier chain;

Fig. 46 is a front view of part of the mechanism shown in Fig. 45;

Figs. 47 to 54 are diagrammatic views showing successive steps in the wrapping of a lollipop by the mechanism described;

Figs. 55 to 59 are diagrammatic views showing a modification of the twister mechanism of particular utility when the lollipops are provided with flat instead of round sticks;

Figs. 60 to 67 are diagrammatic views showing successive steps in the wrapping of a lollipop with certain modifications of the folding mechanism;

Fig. 68 is a detail of a modification; and

Fig. 69 is a section on line 69—69 of Fig. 68.

The machine is mounted on a frame 1 in which is journaled a drive shaft 2 driven from any desired source of motive power. This shaft is joined by a chain and sprocket connection 3 with a cross shaft 4 from which the infeed conveyer and certain other parts are driven. A gear 5 on shaft 4 drives through gears 6 (Fig. 4) a shaft 7 which bears a sprocket 8 driving the infeed chain conveyer 9. The lollipops are generally fed to the machine by hand, being laid upon the slats 10 of the infeed conveyer at intervals determined by blocks 11 and 12. As is best seen in Fig. 1, the two sets of blocks are of differing widths, the blocks 11 being positioned to engage the stems of the lollipops and the blocks 12 being offset rearwardly to engage the heads of the lollipops while keeping the stems at substantially right angles to the conveyer. The infeed conveyer moves continuously, and the lollipops are picked from it and centralized with respect to the wrapper by mechanism best shown in Figs. 4 to 12.

This mechanism comprises stem grasping mechanism comprising spaced fingers 15 and an intermediate opposed finger 16 (Figs. 5 and 6) which are caused by suitable mechanism to go through the sequence of operation shown in Figs. 7 to 12. These fingers are mounted, in a manner to be described, upon a carriage 17 (Fig. 4) reciprocable horizontally upon a pair of vertically spaced rods 18 carried by a standard 19 secured to the frame. A link 20 couples this carriage to an arm 21 mounted, together with a second arm 22, on a shaft 23. A link 24 is pivoted at one end to the arm 22 and at the other is forked to embrace the shaft 2 (Figs. 1 and 4). A cam roll 25 on the link fits into a groove 26 (Fig. 4) in a cam 27 (Fig. 1) secured to the shaft. By this means the carriage 17 is given one reciprocation to carry the fingers 15, 16 from the position of Fig. 7 to that of Fig. 10 and back again at each cycle.

Journaled in the carriage 17 is a cross shaft 28 having at one end a rocker 29. One end of the rocker is joined by a tension spring 30 with a pin 31 on the carriage; the other end bears a roll 32 riding on a rail 33. The rail is supported by a parallel linkage 34, 35, both pivoted to the frame; the former serving as a part of the supporting linkage only, the latter having an integral arm 36 carrying a cam roll 37 running in a groove of a face cam 38 on shaft 4. As the lever 35 is rocked the rail 33 is raised and lowered, causing oscillation of the rocker 29 and hence of the shaft 28 irrespective of the longitudinal position of the carriage. The fingers 15 are secured one to a collar 39 and the other to a collar 40 fast on the shaft 28. The intermediate finger 16 is carried by a collar 41 loose on the shaft. Collar 39 bears an arm 42 and collar 41 an arm 43, coupled by links 44 and 45 respectively to a single rocker 46 (Figs. 2, 4, and 5) pivoted to the carriage. As the shaft 28 is rocked the loose collar 41 bearing the intermediate finger 16 is caused by the linkage described to rotate in the opposite direction. This causes the fingers 15 and 16 to open and close so that they may grasp and centralize the stick of a lollipop; the fingers being provided with inwardly facing notches 47 for this purpose. Due to the running connection between the rocker 29 and the rail 33 it will be understood that the opening and closing of the fingers can occur independently of their longitudinal movement.

The action of the fingers is shown in Figs. 7 to 12. In the motion of the carriage to the right as viewed in Fig. 12, the fingers are open sufficiently so that the fingers 15 pass above the oncoming lollipop stick *s* so as to clear it. The infeed conveyer is moving continuously, carrying the stick to the left as the fingers gradually close as in Figs. 7 and 8. As the fingers close toward the position of Fig. 8 they also start their bodily motion to the left, gradually accelerating until their linear speed is greater than that of the conveyer. When the fingers have closed, as in Fig. 9, they contact the stick at three longitudinally spaced points (see also Figs. 13 and 14) and due to their notches 47 assume the complete support of the stick and carry it off the still continuously advancing conveyer into an ultimate position indicated by the center line 48 (position B of Fig. 17). Here the lollipop is received by a transfer plunger or stick gripper to be described below. Upon delivery of the lollipop to the transfer plunger the fingers 15, 16 again open, the opening movement being sufficiently rapid near the start of the rearward reciprocation of the carriage so that the jaw 15 does not interfere with the stick *s*. With the jaws still open they return until they reach the extreme right-hand center line 49 (position A of Fig. 17), to receive the lollipop being forwarded by the next flight.

As the lollipops are placed manually on the infeed conveyer they are guided by adjustable side guides 50 and 51, set so that the lollipops will be approximately centralized but with sufficient distance between them so that the inevitable variations in length of the lollipops can be accommodated. As the lollipops progress totowards the gripping fingers the ends of the sticks ride up on a rail 52 (Figs. 3, 11, and 12) which elevates the stick above normal into position to be picked up by the fingers. The fingers being spaced apart along the stick (Fig. 13) and being notched to give a definite bearing location, the stick will be straightened out as the fingers close, and the head of the lollipop will be raised into the same line as the stick, bringing it up out of engagement with the conveyer.

When the fingers have delivered the lollipop to their furthest position away from the infeed conveyer (B in Fig. 17), the stick of the lollipop is grasped by a reciprocating gripper and carried head on in a direction at right angles to that of its initial movement. Its ultimate destination in this second direction is shown at C in Fig. 17. During this journey a wrapper *w* is picked up and partially wrapped around the head of the lollipop, the lollipop and wrapper being delivered at C to a gripper carried by a conveyer chain which advances parallel to the infeed conveyer. The gripper which grasps the stick at position B is shown in plan in Fig. 14. One jaw 55 is borne by the end of a squared rod 56 reciprocable transversely of the frame in a guide composed of four rollers 57 supported on a bracket 58 (Fig. 1) adjustably secured to the frame as by a bolt and slot connection 59. The movable jaw 60 is pivoted at 61 to the squared rod 56 and has a tail 62 constantly pressed in a direction to close the gripper by a compression spring 63. The tail 62 also carries a roller 64 riding on a track 65 formed on the bracket 58. Each end of the track extends outwardly, so that as the reciprocating gripper moves it will be opened at both ends of its stroke and closed during its intermediate travel. At its rearward end of its stroke shown in Fig. 14 the gripper has a substantial amount of travel with its jaws open, backing away to clear a lollipop being advanced by the fingers 15, 16 and then moving ahead to pick it up and closing on the stick rapidly as the roll 64 runs off the high part of the cam into the dotted line position of Fig. 14. In the forward position shown in Fig. 1 the gripper just rides up on the cam enough to release the stick, the head of the lollipop having been grasped by the carrier jaws.

The rounded end of the square rod 56 is adjustably clamped at 66 to a connecter 67 (Figs. 4 and 13) secured to one end of a shaft or tube 68 reciprocating in the frame. This tube is guided in the frame by a yoke and bar connection 68' and is coupled at its inner end by a link 69 (Fig. 13) with a lever 70 pivoted upon a shaft 71 and slotted at 72 to receive a crank block 73 on the face of a gear 74. This gear is mounted on a long cam shaft 75 coupled through bevel gears 76 (Fig. 1) with the shaft 2 previously referred to. An idler gear 77 on the shaft 71 couples the gear 74 with a gear 78 on an upper cam shaft 79. This latter shaft may conveniently serve as the main drive shaft, being coupled by gears 80 (Fig. 3) with a motor 81. As the lower cam shaft 75 revolves in the direction of the arrow in Fig. 13 the lever 70 will be given a slow swing to the right, serving to move the stick gripper in a direction to carry the lollipop from station B to station C (Fig. 17); and then a rapid swing to the left, returning the gripper quickly into position to receive another stick.

No adjustment of the stroke of the stick gripper is necessary to accommodate sticks of differing lengths. Since the motion is in the direction of the length of the stick, a change in stick length will shift the initial and terminal points of the travel of the end of the stick the same amount in the same direction. Adjustment for varying stick lengths can, therefore, be obtained merely by shifting the cam track 65 longitudinally by means of the bolt and slot connection 59. Vertical adjustment for differing thicknesses of the lollipop head is likewise unnecessary. As stated above, the transfer fingers raise the lollipop to their own plane, when they close upon the stick, the amount the lollipop is raised being sufficient to compensate for any variations in thickness of the head.

On its way from position B to position C of Fig. 17 the lollipop picks up a wrapper *w* fed into its path by any form of mechanism. In the case shown the feeding mechanism comprises feed rolls 85, a stationary cutter 86, and a revolving cutter 87; the feed rolls and revolving cutter being driven in a definite relation to the wrapping mechanism by any suitable mechanism. Since this form of paper feed is no part of the present invention, it has not been illustrated in detail. It may be remarked, however, that it is preferred to have the cutters sever the wrapper from the web just as the wrapper is gripped in the wrapping mechanism, so that the wrapper is always suspended until it is so gripped and need not be supported from below.

The head of the lollipop is generally curved and irregular, and a better wrap will be secured if the initial fold is made by some means other than the lollipop itself. For this purpose a wrapper former 90 is used, shown in Figs. 13, 15, 16, and 17. This former has a base 91 and upstanding sides 92, the sides being flared sidewardly to form front 93 the full width of the paper. The sides diverge towards the oncoming lollipop, so that if the stick gripper is not holding it correctly or if the stick is warped the head of the lollipop will nevertheless be presented squarely to the wrapper.

The former has a forward and back movement along the line of advance of the lollipop, so that as shown in Figs. 15 and 16 it can contact the wrapper slightly in advance of the head of the lollipop. In addition, it has an up and down movement which combines with the horizontal one on its return stroke in order to cause the former to descend below and to clear the stick of the lollipop when this moves from position C to position D (Fig. 17), but its only active function is accomplished by substantially horizontal advance. Striking the wrapper slightly in advance of the head of the lollipop it folds the upper part of the wrapper down upon it as shown in Figs. 47, 48, and 49. It will be observed that the wrapper is fed by the wrapper feeding mechanism so that only a short length projects below the head of the lollipop (Figs. 15, 18, and 47) the bulk of the wrapper length being on top, all the wrapper later to be twisted around the stick coming from this long side. As will be pointed out in detail below, the possibility offered by the novel mechanism of using a markedly unbalanced wrapper without danger of slippage constitutes one of the main advantages of the present invention. The upper flap *b* is initially laid

upon the former and is subsequently transferred to the head of the lollipop as shown in Fig. 47.

The former is carried on an arm 95 pivoted at 96 to a rocker 97 as shown in Fig. 15. Attached to an intermediate point of the arm 95 is a link 98 pivoted at the bottom end of a rocking lever 99. The upper end of this lever carries a cam-roll (not shown) engaging a groove in the back of a cam 100 on the upper cam shaft 79. The rocker 97 is pivoted at 101 to the frame, and is coupled by a link 102 to a bell crank 103 having a cam roll running in a groove 104 in the face of cam 100. The former is shown in Figs. 15 and 16 in its forward position in which it engages the paper. In Fig. 13 it is shown in its rearmost position and about half way up from its lowermost position, in which it is lowered sufficiently to allow the stem of a lollipop moving from position C to position D to pass over its side walls.

As the former moves ahead into the hanging wrapper it brings the wrapper against a clamp or yielding abutment 105. This clamp is mounted as by a set screw 106 (Fig. 18) on parallel rods 107 (Fig. 19) to permit of adjustment or replacement if the type of lollipop being wrapped is changed. The rods are carried on a bracket 108 carried by parallel rods 109 extending freely through an arm or carrier 110 fixed on a shaft 111. The rods 109 are connected at their ends by a strap 112, and a spring 113 is compressed between it and the arm 110. The clamp is thus guided for parallel movement and mounted to exert a yieldable pressure against the end of the lollipop which is forced against it by the continued forward motion of the stick gripper.

The clamp supporting arm 110 is moved ahead of the advancing lollipop at a speed somewhat slower than that with which the lollipop itself is being advanced by the stick gripper, so that the springs are compressed and the wrapper held firmly against the front of the lollipop. For this purpose the shaft 111 passes through a bushing 114 fixed to the frame, and is connected to a link 115 which has an adjustable coupling 116 with a slot 117 in the end of a rocking arm 118, the upper end of which has a cam roll running in a groove 119 in a cam 120 secured to the upper cam shaft 79. By changing the position of the coupling 116 the stroke given to the clamp can be changed without at the same time changing its position, since the slot 117 is concentric with the point of coupling of the link 115 to the shaft 111. The bushing 114 preferably carries a square rod 121 upon which a forked extension of the arm 110 rides to keep the clamp upright.

After the lollipop has been deposited in a carrier chain pocket at position C the clamp 105 must remain in contact with it until the carrier chain is about to move out of the way. It then moves back to contact the next lollipop being forwarded by the stick gripper, and due to its enforced wait at the end of its stroke while the stick gripper was already receding it must move very rapidly. The machine is designed to be capable of wrapping at a very high rate of speed, and when this high rate is utilized it is found that the clamp may lag in its return due to the spring mounting. In order to avoid this lag, and at the same time to prevent the springs thus compressed from causing the clamp to strike the head of the next lollipop forcibly instead of being in a rest position in which the lollipop contacts with it, it has been found desirable to provide a positive lock between the rods 109 and the arm 110, operable only during the return stroke. The lock comprises a bell crank 125 pivoted to the arm 110 on a pin 126 (Fig. 19), around the shank of which is a torsion spring 127. The horizontal arm of the bell crank is swung upwardly by the spring, and is formed with a shoulder 128 (Fig. 18) which can engage the strap 112 as shown in Fig. 20. When the arm is carried as far to the right (as viewed in Fig. 20) as possible, the tension on the springs 113 relaxes and the latch swings up into the position shown in that figure. On the subsequent return stroke of the arm the strap 112, and consequently the clamp 105, will be carried along positively. The latch is ultimately released by the lower arm of the bell crank striking an adjustable set screw 129 (Fig. 15) on a fixed part 130 of the machine.

In the operations described the lollipop has been handled by its stick, although the actual guiding of the head of the lollipop into contact with the wrapper was by contact with the converging sides of the former. First the stick was picked up by the transfer fingers 15, 16, and then it was picked up by the stick gripper 55, 60 and forwarded into contact with the wrapper. The actual folding of the wrapper was first done by the advance of the former 90 which draped the wrapper across its top with a comparatively short depending flap *c*. During this initial folding operation the clamp 105 holds the wrapper firmly against the head of the lollipop. Irregularities in the form of the lollipop head produce no effect in causing irregular folding or slippage of the wrapper, since there is but one point of contact between the wrapper and the lollipop at the time this first fold is made; and the wrapper is not only firmly clamped there but this contact is inoperative as far as making the initial fold is concerned.

The subsequent handling of the lollipop, however, is all done by its head. This includes the making of the side folds and tucks as well as the twisting operations, and is in that respect an important departure from previous practice. Not only are the sticks likely to be warped, but the centralization of the heads upon them is not likely to be good. Both causes contribute to an irregularity of fold which could in prior machines be rectified only by the use of an excessive amount of wrapping material. In the present machine the head is initially centrally located with respect to the wrapper by the former, and thereafter the wrapper is kept tightly clamped upon the head so that no shifting can occur.

The clamps which receive successively the heads of the lollipops being advanced by the stick gripper are mounted on a conveyer chain 135 passing around a sprocket 136 journaled on the bushing 114 and around a sprocket 137 fixed to a shaft 138. On its upper run the chain 135 passes over a rail 139 and under a rail 140; and during a part of its lower run the chain passes over a rail 141 and under a rail 142, all fixed to the frame. The chain is thus held against sagging or vibration. At intervals along the chain are pairs of elongated pintles 143 and 144 (Fig. 22) the latter of which has an enlarged head as shown in Fig. 24. A carrier 145 slips over each pair of pintles, a spring clip 146 being adapted to underlie the enlarged head of pintle 144 to hold the carrier in position. A lug 147 on the carrier holds the clip against accidental displacement. By this means the carrier and its attendant parts can be replaced when desired,

in order to adapt the machine for a different type of lollipop; the carrier being brought into the position of Fig. 30 for this purpose to avoid interference of the carrier with other parts.

Each carrier has an extension 148 bearing upon the top of the rail 140 (Fig. 24) and carries at its outer end a roller 149 running between rails 150 fixed to the frame to further steady it. Similar rails 151 steady the carrier along the active portion of the bottom run of the chain. The carrier carries a blade 152 which serves both to support the lollipop and as a folding means. On each carrier is also a pad 153, preferably of sponge rubber, hinged at 154 (Fig. 36) to a rocker 155 pivoted at 156 on the carrier and pressed counterclockwise as viewed in the figures (see the free position at the top of Fig. 36) by a compression spring 157. Each rocker carries at its end a roll 158 which, when the carrier arrives at approximately position C, underlies one arm 160 (Fig. 21) of a bell crank pivoted at 161 to the frame; the second arm of the bell crank being coupled by a spring 162 to the frame and by a link 163 to an arm 164 bearing a roll resting on the surface of a cam 165 on shaft 2. When the carrier approaches the station C the roll 158 rides under the arm 160, which is depressed by its cam to keep the pad elevated and thus permit the introduction of a lollipop and wrapper between the jaws composed of the blade 152 and the pad 153 (Fig. 18). The cam 165 immediately lowers the pad 153 (Fig. 20) causing the lollipop to be held firmly between the blade and the pad and the wrapper to be clamped tightly in place. The lollipop and wrapper continue in this clamped-together condition until the wrapping is completed.

The conveyer chain 135 is given an intermittent motion, causing a complete dwell for a quarter of the cycle, giving ample time for the performance of those operations which require the carrier to be at rest. In the present case mechanism is employed for giving this intermittent motion which gives a much smoother motion to the conveyer than the conventional Geneva gear. This mechanism, which is shown in Figs. 42, 43, and 44, consists of three gears 166, 167, and 168, mounted as follows: The gear 166 is fixed eccentrically upon the end of the shaft 2. The gear 167 is mounted freely upon a stub shaft which is carried by a forked lever 169 pivoted upon the shaft 138 and pivotally connected by a link 170 with an eccentric strap 171 concentrically surrounding the hub of gear 166. Gear 168 is fixed to the shaft 138 bearing the chain sprocket 137. The shafts rotate in the directions shown by the arrows in Figs. 43 and 44.

In Fig. 44 the parts are shown at the beginning of the dwell period of the conveyer. Further motion of the eccentrically mounted gear 166 both rotates the gear 167 in the direction of the arrow and pushes it bodily, due to the link 170, in the direction of the arrow 172. The teeth on gear 166 are at this time but a short distance from the axis of rotation, and succeed in rotating the gear 167 on its axis only as fast as it is rolled along the surface of gear 168 by the eccentric. No rotation of the gear 168, therefore, results. By the time that the position of Fig. 43 is reached the effective radius of gear 166 has increased sufficiently so that it more than makes up for the rocking movement of gear 167, and motion of gear 168 in the direction of the arrow 173 (Fig. 43) therefore starts. The gear 167 is gradually swung by the eccentric to a maximum displacement away from the position shown in Fig. 44 and then is caused to return. During the intermediate portion of this motion the speed of gear 168 reaches a maximum and finally dwindles to rest as the position of Fig. 44 is again resumed.

The shaft 138 is driven by gear 168 and partakes of this variable motion. In turn the shaft transmits this motion to the carrier chain 135 and to certain twisting mechanism to be considered later. The variation in the movement of the carrier chain is shown diagrammatically in Fig. 37. In that figure the degrees represent the period in the machine cycle, with zero taken as the termination of the dwell period in the movement of the carrier chain. The different marks around the periphery of the sprocket 137 are indicative of the amount of movement of the chain in equivalent periods of time. It will be observed that the chain comes to rest at 270°, and remains there for 90°. During this rest period certain operations are performed upon articles carried by the conveyer.

The chain is at rest when the lollipop and wrapper are fed to it at station C, and remains at rest while the clamp 153 closes. The conveyer then starts up and carries the lollipop to station D (shown in Figs. 22 to 28) where the chain again comes to rest. During this motion the lollipop is supported upon plate 152 of the carrier clamp, with the wrapper draped around it in U-form, as shown in Figs. 22, 47, 48, and 49. Between stations C and D the lollipop, thus supported, passes over a rear bottom folder 175, but since the wrapper is all above the plate 152 no operation is performed upon it by the folder. Since the folder does not become active until a later period it has been omitted from Fig. 22, where it should in strictness be shown as underlying the lollipop and obscuring certain parts. The folder 175 contains an electric heating cartridge 176 (Fig. 25) and is supported upon insulators 177 on a bracket 178 adjustably held to a carriage 179 by an adjusting screw 180 and a clamp screw 181. The carriage 179 is supported upon parallel rods 182 (see also Figs. 1 and 3) projecting from a support 183. The carriage is connected by a link 184 with an arm 185 on a cross shaft 186. Also fixed to this shaft is a second arm 187 joined by a variable length link 188 with an arm 189 on a cross shaft 190. The arm 189 is slotted at 191, the link 188 being coupled to it by an adjustable pivot 192. By this means the stroke and position of the folder 175 may be adjusted. Shaft 190 has an arm 193 bearing a roll running in a groove in a cam 194 on shaft 2 (Fig. 1).

When the conveyer has brought the lollipop to rest at station D the projecting sides of the U-shaped wrapper are folded downwardly as in Fig. 50 by a pair of parallel blades 200. As shown in Figs. 25, 26, and 27, these blades are mounted, preferably adjustably, as by set screws, upon cross rods 202 extending laterally from an arm 203 pivoted to the frame at 204. The arm bears a roll 205 riding on a cam 206 fixed to the lower cam shaft 75. A spring 207 assists in maintaining the roll firmly against the cam. The blades are thus given a vertical reciprocation, once during each cycle, so as to fold the outstanding side portions of the wrapper down past the sides of the lollipop.

With some types of wrapping material and some types of lollipop it may be desirable to clamp the sides of the wrapper as they are

folded down by the blades 200. This tightens the folds and creases the flaps as they are drawn out from under the clamping means by the descent of the blades. With other types of wrapping these clamps may be omitted. When used, the clamps are in the form of pads 210 pivotally mounted as shown at 211 in Fig. 23 at the lower ends of rods 212 which can reciprocate vertically in holes formed in the lower wall of channel-shaped members 213. Lugs 214 at the top of the rods prevent their rotation by contact with the face of the channel, while springs 215 press the pads constantly downwards. The members 213 are held as by set screws 216 (Fig. 1) on rods 217 extending from carriers 218. These carriers are adjustable as by set screws 219 on rods 220 extending laterally from an arm 221 pivoted to the frame at 222. The arm bears a roll 223 bearing upon a cam 224 on the shaft 75, and is held downwardly by a spring 225. By the adjustable connections described the pads may be varied in their spacing apart or in their position longitudinally of the lollipop stick, or they may be removed entirely if their presence is not desired.

The cams operating the blades 200 and the pads 210 are so timed that the pads descend first, flattening the side extensions of the wrapper respectively against the folder 175 and a stationary plate 226, somewhat as shown in Fig. 23, before the blades 200 descend. The blades are lowered, as in Figs. 26 and 27, while the pads are still down, causing the folds to be drawn out from underneath the pads and, therefore, both tensioned and ironed. Once drawn free of the pads the flaps are pushed down between the plate 152 and the folder 175 on one side and the plate 226 on the other, as in Fig. 27. The blades then rise as in Fig. 28 to clear the lollipop and the pad 153 before the conveyer starts to move. The folder 175 begins its advance slightly before the conveyer, Fig. 28 showing the folder having commenced its forward movement. At first the folder moves faster than the conveyer, bending the rear fold *d* underneath the plate 152 as shown in Figs. 29 and 51. Due to the heat imparted to the folder by the electrical cartridge 176 the springiness of the folded wrapper is reduced and any heat sealing material in the composite fold *d* softened. As the conveyer proceeds, the forward flap *e* rides up on the plate 226 (Fig. 29), folding this flap *e* over on the flap *d* as shown in Figs. 52 and 30. The folds pass off the plate 226 onto a plate 227 secured to the frame for vertical adjustment by a bolt and slot connection 228 (Fig. 30) and provided with an electrical heating unit 229. The overlying folds are thus ironed down and heat sealed together; leaving the wrapper in the condition of Figs. 52 and 53.

It should be recalled that during this entire procedure the lollipop is being supported on the thin plate 152. The folds made by the members 175 and 226 are underneath this plate, which is between these folds and the under fold *c* made when the lollipop first passed into the carrier on the conveyer. The plate is thus wrapped into the folds, serving to form the folds in a better manner than the irregularly shaped head of the lollipop could do of itself, and to prevent the heat of the folders from melting the confectionery head of the lollipop.

The wrapper is now complete except for the final twisting of its skirt around the stick. There are two twisting finger units, rotatable around the same axis as the sprocket 137 and at the same rate, the two units engaging alternate lollipops. The carrier in its movement from the tucking station D brings the lollipop to rest at position E which is just at the top of the sprocket 137. It is in the neighborhood of this station that the twisting fingers engage the wrappers, remaining in engagement until about position F, which is at the bottom of the sprocket. In contrast with most of the other operations the twisting is all performed while the lollipop is in motion, the stops at stations E and F being enforced by the necessities of the mechanism and being without function as far as the twisting operation itself is concerned.

The mechanical structure of the twisting mechanism is shown in Figs. 36 and 38 to 41, and its cycle of operation in Figs. 31 to 35. The entire twister mechanism, bearing two similar twister heads, is mounted on the intermittently rotated shaft 138 so as to turn with it. The supporting means for the two heads is formed in longitudinally divided sections, one member 235 being keyed to the shaft at 236 (Fig. 38) and the second member 237 being freely rotatable upon a sleeve 238. This sleeve is preferably integral with a crown cam 239 fastened to the frame 1 by bolts 240 (Fig. 1). The two sections 235 and 237 of the support are held together by tie bolts 241 and also by cap pieces 242 held in place by bolts 243. Between the two sections is a stationary gear and cam disk 244, held to the sleeve 238 by a key 245. The structure and function of this disk will appear below.

The two spindles are identical, and a description of one will suffice. It is mounted on a sleeve 246 journaled in bearings 247 within the housing formed collectively by the supporting members 235 and 237 and the cap 242. Against one side of one of these bearings, which are preferably of the radial-thrust type, bears a collar 248 pinned to the spindle at 249 (Fig. 39). Against the other side of this bearing rests a washer 250 held in place by a lock nut 251. A sleeve 252 is held to the spindle by a Woodruff key 253, and is bifurcated to receive transverse pivots 254. Upon these pivots are mounted bell cranks 255 and 256, the short ends of which overlap and are coupled by a pin 257 located adjacent the end of a rod 258 extending freely through a hole in the spindle. A washer 259, held by a nut 260, contacts the end of a spring 261 which surrounds the shaft and extends into a recess in the spindle. The spring acts to force the rod 258 always towards the right in Fig. 38, thus causing the free ends of the bell cranks 255, 256 to close together. To cause the bell cranks to move in the opposite direction a tappet 262 is mounted in an arm 263 pivoted at 264 (Fig. 40) to the member 237 and bearing a roll 265 which contacts with the stationary cam 239.

The bell crank 255 bears at its end a two-tined twister 266 and the bell crank 256 a single tined twister 267 having its tine extending between the tines of the other twister as shown in Fig. 38. The tines are broadly V-shaped in end view, as shown in Fig. 31, so that they close around the lollipop stick while securing a good grip on the sides of the flattened wrapper. The V-shaped form has the further advantage that as the wrapper twists up it becomes thicker, moving at the same time towards the apices of the V's where there is more room available.

The twister jaws not only rotate orbitally around the shaft 138 but the spindle carrying

each pair of jaws rotates during half of this revolution to cause twisting of the wrapper around the stick. For this purpose each spindle 246 is formed intermediate its length with a gear 270 having, as shown in Fig. 39, opposed wide teeth 271, each with a space 272 next to it, the remainder of the teeth being of normal width. This gear meshes with a semi-circular gear 273 on the disk 244, this gear also having wide teeth 274 with adjacent spaces 275, the remainder of the teeth being normal. Since the small gear turns through a number of revolutions in passing around this semi-circle, there will be more wide teeth in the large gear than in the small one. In the preferred case the small gear rotates two and a half times in passing through its active semi-circle of travel and then remains without rotation on its axis through the inactive semi-circle. Since this changes the position of the small gear through 180° in each cycle, there will need to be two wide teeth provided in it, this requiring five wide teeth in the large gear. The purpose of these wide teeth is to give ample strength for initiating the rotation of the spindles; which, with their associated parts, have a substantial weight.

At the start of the rotation, the twisters are in the position of Fig 31. Considering the uppermost one only, it starts from rest at station E with one wide tooth on gear 270 abutting one wide tooth on gear 273. As the conveyer starts to move the twister head moves with it at the same rate, causing the twisters to revolve on their axis as is indicated by the dotted arrow 276. By the time the position of Fig. 32 is reached the twisters will have turned a half turn, the two-tined twister 266 being now inside rather than outside. In the position of Fig. 33 they have turned one and three-quarters revolutions; in Fig. 34, two and one-quarter revolutions; and in the position of Fig. 35, two and a half revolutions. At this position the conveyer has come to rest and the twisters stop both their rotation and their orbital motion. Throughout the second half of their orbital motion the twisters are held against rotation on their axis by contact of the concave surface 277 of collar 248 with a semi-cylindrical surface 278 on the side of disk 244, which it will be recalled is stationary due to its connection with the cam 239.

The non-rotation of the twisters during the idle half of their orbital motion is of importance in releasing one lollipop stick and engaging the next one. As the twisters approach their lowermost position (Fig. 34) they are opening, due to the action of roll 265 on the stationary cam 239. When they come to rest in the position of Fig. 35 the opposed jaws are tangential to their orbit, and remain so during the passage through the positions of Figs. 32, 33, 34, and 35 (upper position). During the first part of this tangential movement they clear the stick of the lollipop around which the wrapper has just been twisted; and during the latter part they pass around and finally close in on the wrapper of an oncoming lollipop at the top of the chain.

It is preferable to heat the twister jaws so that the wrapper will be ironed into twisted form and will also be sealed if the wrapper is made of heat sealing material. For this purpose a heating cartridge 280 is mounted in a socket in each twister. A wire 281 extends from each cartridge to a binding post 282 on the mounting 283 of a brush 284 spring-pressed against a slip ring 285 mounted on an insulating disk 286 on the twister carrier adjacent the rotating head. A wire 287 leads from each of the rings 285 to a binding post 288 on the mounting 289 of a brush 290 bearing against a stationary slip ring 291 mounted on the frame on suitable insulation 292 inside the crown cam 239. The wiring described accounts for one side of the circuit, the other side being grounded as is customary.

After passing the twisters the lollipops are carried by the conveyer chain towards the ejector station. In their passage between these stations the lollipop heads are freed from restraint by the clamping pad 153, which is moved away from the plate 152 by contact of the roll 158 with a stationary cam plate 295 vertically adjustable in a bracket 296 by a screw 297 (Fig. 45). It will be apparent that the pad, which was originally above the plate while the conveyer was in its upper run, will be underneath the plate as the conveyer moves along its lower run from the twisting station. The mere removal of the pad from contact with the article will not, however, be sufficient to free the latter, since as has been pointed out, the wrapper is folded and sealed around the plate. The lollipop will thus remain suspended from the plate 152 by the wrapper, as shown in Fig. 45, and it is necessary to push the lollipop towards the left in this figure sufficiently to free the folds from the plate.

This is done by an ejector 300 mounted on a rod 301 carried by a bracket 302. The bracket is clamped to a shaft 303 reciprocably mounted in the frame and having a forked member 304 secured to it and embracing a bar 305 mounted on the frame. The shaft is connected by a link 306 with an arm 307 pivoted at 308 and having a roll 309 running in a groove in a cam 310 on the cam shaft 75. The ejector moves in between successive carriers on the conveyer to a point where the ejector bar 300 is behind the plane of the lollipop head. When the lollipop comes within range the ejector is moved rapidly to cause the lollipop to become stripped from the plate 152 and to fall off onto a deflecting plate 312 as indicated in dotted lines in Fig. 45. It should be noted that ejector supporting rod 301 lies directly in the path of the plate 152, and is, therefore, offset from the operating plane of the ejector as indicated in Fig. 46; the speed with which the ejector moves being sufficient to avoid any interference. The ejected lollipops slide down the plate 312 and are carried away by a conveyer 313.

A slight modification of the twister mechanism is sometimes useful with lollipops of special form. It is here described as operating upon lollipops having flat sticks *s'*. With this type of stick a better twisting will result if but a single twist is given to the wrapper and the twisted material then pressed between the heated twister fingers and the stick. The operation is shown in Figs. 55 to 59. In Fig. 55 the two jaws, 266' and 267', have just closed upon the wrapper. The jaws are not brought all the way in immediately, as it is desired to twist the wrapper rather loosely at first around the stick. This is accomplished by an obvious change in contour of cam 239. The rotation given to the twisters is also changed, by decreasing the length of gear 273 and increasing the length of the segment 276, so that only one complete rotation is given; this being completed by the time the twisters have reached the position of Fig. 57. The cam 239 then causes the twisters to close further as in Fig. 58, pressing the wrapper firmly against the

flat sides of the stick. This being done, the twisters then open to release the stick, as in Fig. 59.

A further modification may produce a type of fold more pleasing in appearance to some. The change is accomplished only by a slight redesign of the plate 152, as shown at 152' in Fig. 60. The change consists simply of forming the plate with raised edges 315 which, when the lollipop is being pushed over the plate, engage the lower flap *c* and form tucks or creases *t* in it (Fig. 62). This draws in the ends of the folded-over portion of the wrapper as shown at 316 in Fig. 61. This slanting characteristic is preserved throughout the wrapping, as shown in Fig. 67. It is preferred that the sides 315 possess an overall width no greater than the lollipop itself, so that the wrapper will still be tight when the plate is removed. As shown in Fig. 61, this means that the sides 315 are positioned as prolongations of the widest portions of the head *a*, rather than alongside of that head.

In addition to this, an improvement in the regularity and closeness of the wrapping is secured by holding to the stick the portion of the wrapper adjacent the head while the folders 200 and 175 are acting. This prevents the wrapper from buckling upwardly and thus destroying the intended form of the folds. The holding of the wrapper against the stick is preferably done by a platen 320 (Figs. 63, 64, 68, 69) mounted on the lower end of a rod 321 journaled for reciprocation in spaced bearings in a bracket 322. A collar 323, mounted on the rod between the bearings and having a leather upper face, limits the upward movement of the rod. A guide 324, carried by the bracket, engages a cross piece 325 on the rod to keep the latter from turning. To raise the rod to release one article and to prepare for receiving the next, the cross piece 325 carries a tappet 326 positioned to be struck by a ledge 327 carried by the arm 203 which carries the tuckers 200 as this arm rises to the dotted line position of Fig. 68.

I claim:

1. A machine for wrapping lollipops comprising an endless conveyer having a straight run and a semi-circular run, a series of clamps carried by the conveyer each formed to engage opposite sides of the partially wrapped head of a lollipop with the lollipop stick extending at right angles to the direction of travel of the clamp, means to deliver to each of said clamps a lollipop having a wrapper draped in U-form around its head with an intermediate portion of the wrapper extending across the end of the head and the ends of the wrapper extending in the direction of the stick, folding means adjacent the straight run of the conveyer to complete the folding of the wrapper around the head of the lollipop while the wrapper and lollipop head are held by said clamp, and twisting means adjacent the semi-circular run of the conveyer to twist the wrapper around the lollipop stick while the wrapper and lollipop head are still held by said clamp.

2. A machine for wrapping lollipops comprising an endless conveyer having a straight run and a semi-circular run, a series of clamps carried by the conveyer each formed to engage opposite sides of the partially wrapped head of a lollipop with the lollipop stick extending at right angles to the direction of travel of the clamp, means to deliver to each of said clamps a lollipop having a wrapper draped in U-form around its head with an intermediate portion of the wrapper extending across the end of the head and the ends of the wrapper extending in the direction of the stick, folding means adjacent the straight run of the conveyer to complete the folding of the wrapper around the head of the lollipop while the wrapper and lollipop head are held by said clamp, and twisting means adjacent the semi-circular run of the conveyer to twist the wrapper around the lollipop stick while the wrapper and lollipop head are still held by said clamp, said twisting means comprising opposed jaws rotatable upon a common axis and movable as a unit adjacent said semi-circular run at the same speed as the conveyer.

3. In a machine for wrapping lollipops, a conveyer having a plurality of receivers adapted to grasp the head of the lollipop together with an encircling wrapper, a lollipop feeding conveyer, a reciprocable jaw-carrying frame, opposed stick grasping jaws on said frame, means for closing said jaws at one period of the reciprocation of said frame to grasp the stick of a lollipop on said feeding conveyer, means for reciprocating said frame to carry the lollipop so grasped to a position free of the feeding conveyer, a stick grasping device reciprocable to receive the stick of a lollipop held by said jaws and to move said lollipop headfirst into a receiver on said conveyer, and means for supplying a wrapper to the head of the lollipop during the last-named movement.

4. In a machine for wrapping lollipops, a clamp comprising a plate-like member to engage one side of the lollipop head and a movable member to engage the opposite side of the lollipop head, a stick gripper operable to grasp the stick of the lollipop leaving its head free and movable to carry the lollipop headfirst between said clamping members, means for draping a wrapper about the head of the lollipop as it is being so carried, means to open said clamping members to receive a lollipop head and to close them when said head is received between them, and means for completing the wrapping of the wrapper about the lollipop head while the latter is so held by the clamping members.

5. In a machine for wrapping lollipops, an intermittently movable conveyer having a series of clamps each comprising a plate-like member to engage one side of the lollipop head and a movable member to engage the opposite side of the lollipop head, a stick gripper operable to grasp the stick of a lollipop and movable in a direction at right angles to the direction of movement of the conveyer to carry the lollipop headfirst between said clamping members during a period of rest of the conveyer, means for draping a wrapper about the head of a lollipop as it is being so carried, means to open said clamping members to receive a lollipop head and to close them during said period of rest of the conveyer when said head is received between them, and means for completing the wrapping of the wrapper about the lollipop head while the latter is so held by the clamping members.

6. In a machine for wrapping lollipops, an intermittently movable conveyer having a series of clamps each comprising a plate-like member to engage one side of the lollipop head and a movable member for engaging the opposite side of the lollipop head, means to open said clamping members and to close them during a period of rest of the conveyer, a reciprocable stick gripper to engage the end of a lollipop stick and reciprocable in a direction at right angles to the direction of movement of the conveyer from a

receiving position to a position in which the head of the lollipop is positioned between said clamping members, cam means to open the stick gripper at each end of its reciprocation, means to position a lollipop to be grasped by the stick gripper, and means for draping a wrapper about the lollipop head as it is being advanced towards the conveyer by the stick gripper.

7. In a machine for wrapping lollipops, an intermittently movable conveyer having a series of clamps each comprising a plate-like member to engage one side of the lollipop head and a movable member to engage the opposite side of the lollipop head, means to open said clamping members and to close them during a period of rest of the conveyer, a reciprocable stick gripper to engage the end of a lollipop stick and reciprocable in a direction at right angles to the direction of movement of the conveyer from a receiving position to a position in which the head of the lollipop is positioned between said clamping members, means to reciprocate the stick gripper with a relatively rapid return stroke, cam means to open the stick gripper at each end of its reciprocation, means to position a lollipop to be grasped by the stick gripper, and means for draping a wrapper about the lollipop head as it is being advanced towards the conveyer by the stick gripper.

8. In a machine for wrapping lollipops, a conveyer having clamping means for the head of a lollipop, a stick gripper movable to receive the stick of a lollipop and to carry it headfirst into said clamping means in a direction at right angles to the path of movement of the conveyer, a wrapper feed operable to position a wrapper in the path of movement of the lollipop head as it is being carried by the stick gripper, a wrapper former shaped to form a first fold in the wrapper about the wrapper head, and means for moving the wrapper former along with the lollipop head to contact the wrapper and carry it into said clamping means.

9. In a machine for wrapping lollipops, a conveyer having clamping means for the head of a lollipop, a stick gripper movable to receive the stick of a lollipop and to carry it headfirst into said clamping means in a direction at right angles to the path of movement of the conveyer, a wrapper feed operable to position a wrapper in the path of movement of the lollipop head as it is being carried by the stick gripper, a wrapper former shaped to form a first fold in the wrapper about the wrapper head, and means for moving the wrapper former along with the lollipop head to contact the wrapper and to carry it into said clamping means and then rearwardly and out of the plane of the lollipop stick as the lollipop is carried along by the conveyer.

10. In a machine for wrapping lollipops, a stick gripper movable to grasp the stick of a lollipop and to advance the lollipop headfirst, a wrapper feed positioning a wrapper in the path of a lollipop being so advanced, a wrapper former movable with the head of the lollipop to make a first fold in the wrapper, a clamp operable to clamp the so folded wrapper upon the head of the lollipop, and means for completing the wrapping of the wrapper about the lollipop head while it is so clamped.

11. In a machine for wrapping lollipops, a stick gripper movable to grasp the stick of a lollipop and to advance the lollipop headfirst, a wrapper feed positioning a wrapper in the path of a lollipop being so advanced, a wrapper former movable with the head of the lollipop to make a first fold in the wrapper, said wrapper former having a tapered slot with an open top for receiving and positioning the head of the lollipop and having wings of substantially the height of the lollipop head for contacting and folding the wrapper, a clamp operable to clamp the so folded wrapper upon the head of the lollipop, and means for completing the wrapping of the wrapper about the lollipop head while it is so clamped.

12. In a machine for wrapping lollipops, a stick gripper movable to grasp the stick of a lollipop and to advance the lollipop headfirst, a wrapper feed positioning a wrapper in the path of a lollipop being so advanced, a yielding abutment against which the head of the lollipop presses the wrapper during such advance, clamping members gripping the wrapper to opposed sides of the lollipop head while the wrapper is pressed against the lollipop head by the yielding abutment, and means for completing the wrapping of the wrapper about the lollipop head while the wrapper is so gripped to the lollipop head by said clamping members.

13. In a machine for wrapping lollipops, a stick gripper movable to grasp the stick of a lollipop and to advance the lollipop headfirst, a wrapper feed positioning a wrapper in the path of a lollipop being so advanced, a wrapper former movable with the head of the lollipop to make a first fold in the wrapper during such advance, a yielding abutment movable with the lollipop and against which the head of the lollipop presses the wrapper during such advance, clamping members gripping the folded wrapper to opposed sides of the lollipop head while the wrapper is pressed against the lollipop head by the yielding abutment, and means for completing the wrapping of the wrapper about the lollipop head while the wrapper is so gripped to the lollipop head by said clamping members.

14. In a machine for wrapping lollipops, a stick gripper movable to grasp the stick of a lollipop and to advance the lollipop headfirst, a wrapper feed positioning a wrapper in the path of a lollipop being so advanced, an abutment against which the head of the lollipop presses the wrapper during such advance, a reciprocable carrier carrying said abutment substantially in the line of travel of the lollipop, a yielding connection between the abutment and the carrier, a latch operable to couple the abutment positively to the carrier during its return stroke, clamping members gripping the wrapper to opposed sides of the lollipop head while the wrapper is pressed against the lollipop head by the yielding abutment, and means for completing the wrapping of the wrapper about the lollipop head while the wrapper is so gripped to the lollipop head by said clamping members.

15. In a machine for wrapping lollipops, a stick gripper movable to grasp the stick of a lollipop and to advance the lollipop headfirst, a wrapper feed positioning a wrapper in the path of a lollipop being so advanced, an abutment against which the head of the lollipop presses the wrapper during such advance, a reciprocable carrier carrying said abutment substantially in the line of travel of the lollipop, means for moving the carrier in the direction of the advancing lollipop at a speed less than that of the lollipop and for returning it at a relatively high speed, a yielding connection between the abutment and the carrier, a latch operable to couple the abutment positively to the carrier during its return stroke,

clamping members gripping the wrapper to opposed sides of the lollipop head while the wrapper is pressed against the lollipop head by the yielding abutment, and means for completing the wrapping of the wrapper about the lollipop head while the wrapper is so gripped to the lollipop head by said clamping members.

16. In a machine for wrapping lollipops, a conveyer chain, a plurality of carriers carried thereby, each having opposed clamping members to grasp the head of a lollipop, one of said members being in the form of a plate and the other a yielding pad, means for separating said members and for closing them upon a lollipop head, means for delivering a lollipop with a wrapper draped around it between said clamping members, means for folding the wrapper around the lollipop head and around said plate, and means for stripping the wrapped lollipop endwise from said plate.

17. In a machine for wrapping lollipops, a conveyer chain, a plurality of carriers carried thereby each having opposed clamping members to grasp the head of a lollipop, one of said members being in the form of a plate and the other a yielding pad, means for separating said members and for closing them upon a lollipop head, means for releasably securing said carriers to the chain to permit of replacement, means for delivering a lollipop with a wrapper draped around it between said clamping members, means for folding the wrapper around the lollipop head and around said plate, and means for stripping the wrapped lollipop endwise from said plate.

18. In a machine for wrapping lollipops, a conveyer chain, a plurality of carriers carried thereby each having opposed clamping members to grasp the head of a lollipop, one of said members being in the form of a plate and the other a yielding pad, means for separating said members and for closing them upon a lollipop head, said plate having upturned sides embracing the sides of the lollipop head, means for delivering a lollipop with a wrapper draped around it between said clamping members, means for folding the wrapper around the lollipop head and around said plate, and means for stripping the wrapped lollipop endwise from said plate.

19. In a machine for wrapping lollipops, clamping means for the head of the lollipop comprising a plate of substantially the width of the lollipop head and a yielding clamp, means for introducing a lollipop head, with a wrapper draped around it, between the plate and the clamp, spaced folding blades movable past the sides of the lollipop head to fold the side extensions of the wrapper into flaps extending past the head and past the plate, and means for folding and sealing the flaps underneath and in contact with the plate.

20. In a machine for wrapping lollipops, clamping means for the head of the lollipop comprising a plate of substantially the width of the lollipop head and a yielding clamp opposing the plate, means for introducing a lollipop head, with a wrapper draped around it, between the plate and the clamp, opposed members exerting a frictional pressure upon the side extensions of the wrapper, spaced folding blades movable past the sides of the lollipop head and between it and said frictional pressure means to fold the side extensions of the wrapper into flaps extending past the head and past the plate, and means for folding and sealing the flaps underneath and in contact with the plate.

21. In a machine for wrapping lollipops, clamping means for the head of the lollipop comprising a plate of substantially the width of the lollipop head and a yielding clamp, means for introducing a lollipop head, with a wrapper draped around it, between the plate and the clamp, spaced folding blades movable past the sides of the lollipop head to fold the side extensions of the wrapper into flaps extending past the head and past the plate, means for folding and sealing the flaps underneath and in contact with the plate, and means for twisting the wrapper around the stick of the lollipop.

22. In a machine for wrapping lollipops, clamping means for the head of the lollipop comprising a plate of substantially the width of the lollipop head and a yielding clamp, means for introducing a lollipop head, with a wrapper draped around it, between the plate and the clamp, opposed members exerting a frictional pressure upon the side extensions of the wrapper, spaced folding blades movable past the sides of the lollipop head and between it and said frictional pressure means to fold the side extensions of the wrapper into flaps extending past the head and past the plate, means for folding and sealing the flaps underneath and in contact with the plate, and means for twisting the wrapper around the stick of the lollipop.

23. In a machine for wrapping lollipops, clamping means for the head of the lollipop comprising a plate of substantially the width of the lollipop head and a yielding clamp, means for introducing a lollipop head, with a wrapper draped around it, between the plate and the clamp, spaced folding blades movable past the sides of the lollipop head to fold the side extensions of the wrapper into flaps extending past the head and past the plate, and means for holding the wrapper against the stick during the action of the folding blades.

24. In a wrapping machine, a carrier for partially wrapped articles movable in a circular arc, a twister head movable through a circular arc coaxial therewith, means for giving to the twister head a definite number of revolutions during its travel through said arc, a pair of opposed twister fingers carried by said head, and means for opening said fingers at the start and finish of said arcuate travel and closing them during said travel.

25. In a wrapping machine, a carrier for partially wrapped articles movable through opposed straight runs and through a semi-circular arc connecting said runs, a twister head movable in a circular path coaxial with said semi-circular arc, means for giving to the twister head a definite number of revolutions during its travel parallel to said arc, a pair of opposed twister fingers carried by said head, and means for opening said fingers at the start and finish of said travel to receive and release a wrapper and for closing them during said travel to twist the wrapper.

26. In a wrapping machine, a conveyer movable through opposed straight runs and through a semi-circular arc connecting said runs, a plurality of carriers for partially wrapped articles spaced apart on said conveyer at intervals equal to the length of said semi-circular arc, a pair of twister heads movable in diametrically opposed positions in a circular path coaxial with said semi-circular arc and timed so that each travels through a similar semi-circular arc parallel to the first-named arc in registry with one of said carriers, means for giving to each twister head a definite number of revolutions during its movement through the second-named arc, a pair of

twister fingers carried by each head, means for holding each pair of fingers open at the start and finish of said arcuate travel to receive and release a wrapper and for closing them during said travel to twist the wrapper, and means for holding the heads against rotation during the remainder of the circular path with the fingers positioned so that a wrapper projecting from articles on said carriers will be received in the space between the open fingers.

27. A twisting mechanism for wrapping machines comprising a rotatable member having a plurality of twister heads thereon, each head having a pair of twister fingers rotatable upon an axis parallel to the axis of rotation of the member, means for rotating each pair of fingers through a predetermined number of revolutions during a predetermined active arc of rotation of the member leaving the fingers substantially tangential to the path of travel of their supporting head at the beginning and end of said active arc, means for holding the fingers open at the beginning and end of the active arc, means for closing the fingers during their travel through said active arc, and means for delivering between said fingers when open a wrapper to be twisted and carrying said wrapper around an arc parallel to said active arc.

28. A twisting mechanism for wrapping machines comprising a rotatable member having a plurality of twister heads thereon, each head having a pair of twister fingers rotatable upon an axis parallel to the axis of rotation of the member, each finger of each pair being broadly V-shaped and one finger of each pair being bifurcated so as to receive between its bifurcations the wings of the V of the other finger, means for rotating each pair of fingers through a predetermined number of revolutions during a predetermined active arc of rotation of the member leaving the fingers substantially tangential to the path of travel of their supporting head at the beginning and end of said active arc, means for holding the fingers open at the beginning and end of the active arc, means for closing the fingers during their travel through said active arc, and means for delivering between said fingers when open a wrapper to be twisted and carrying said wrapper around an arc parallel to said active arc.

29. A twisting mechanism for wrapping machines comprising a rotatable member having a plurality of twister heads thereon, each head having a pair of twister fingers rotatable upon an axis parallel to the axis of rotation of the member, means for rotating each pair of fingers through a predetermined number of revolutions during a predetermined active arc of rotation of the member leaving the fingers substantially tangential to the path of travel of their supporting head at the beginning and end of said active arc, means for holding the fingers open at the beginning and end of the active arc, means for closing the fingers during their travel through said active arc, an electrical heating element for at least one of said fingers, means for supplying electric current to the fingers during their rotation including a slip ring and brush associated with each head, a second slip ring and brush associated with the rotatable member, and means for delivering between said fingers when open a wrapper to be twisted and carrying said wrapper around an arc parallel to said active arc.

30. A twisting mechanism for lollipop wrapping machines comprising a rotatable member having a plurality of twister heads thereon, each head having a pair of twister fingers rotatable upon an axis parallel to the axis of rotation of the member, means for rotating each pair of fingers upon their common axis through a predetermined number of revolutions during a predetermined active arc of rotation of the members leaving the fingers substantially tangential to the path of travel of their supporting head at the beginning and end of said active arc, means for holding the fingers open at the beginning and end of the active arc, means for closing the fingers during their travel through said active arc, and means for delivering between said fingers when open at the beginning of said active arc a lollipop with its stick and the stick enclosing extension of the wrapper extending between said fingers and coaxial with the axis of rotation thereof and carrying said lollipop around an arc parallel to said active arc with its stick remaining in said coaxial relation.

31. A twisting mechanism for lollipop wrapping machines comprising a rotatable member having a plurality of twister heads thereon, each head having a pair of twister fingers rotatable upon an axis parallel to the axis of rotation of the member, means for rotating each pair of fingers upon their common axis through a predetermined number of revolutions during a portion of a predetermined active arc of rotation of the members leaving the fingers substantially tangential to the path of travel of their supporting head at the beginning and end of said active arc, means for holding the fingers open at the beginning and end of the active arc, means for closing the fingers partially during their travel through said active arc, and fully closing them to press the wrapper against the lollipop stick during their travel through said active arc and after their rotation upon their common axis has ceased, and means for delivering between said fingers when open at the beginning of said active arc a lollipop with its stick and the stick enclosing extension of the wrapper extending between said fingers and coaxial with the axis of rotation thereof and carrying said lollipop around an arc parallel to said active arc with its stick remaining in said coaxial relation.

32. A twisting mechanism for lollipop wrapping machines comprising a rotatable member having a plurality of twister heads thereon, each head having a pair of twister fingers rotatable upon an axis parallel to the axis of rotation of the member, means for heating the fingers, means for rotating each pair of fingers upon their common axis through a predetermined number of revolutions during a portion of a predetermined active arc of rotation of the members leaving the fingers substantially tangential to the path of travel of their supporting head at the beginning and end of said active arc, means for holding the fingers open at the beginning and end of the active arc, means for closing the fingers partially during their travel through said active arc, and fully closing them to press the wrapper against the lollipop stick during their travel through said active arc and after their rotation upon their common axis has ceased, and means for delivering between said fingers when open at the beginning of said active arc a lollipop with its stick and the stick enclosing extension of the wrapper extending between said fingers and coaxial with the axis of rotation thereof and carrying said lollipop around an arc parallel to said active arc with its stick remaining in said coaxial relation.

33. A machine for wrapping lollipops compris-

ing a carrier, clamps on the carrier to engage opposite sides of the partially wrapped head of a lollipop, a lollipop stick gripper movable in a direction at right angles to the path of the carrier and supporting the stick with the head of the lollipop projecting forwardly in the path of movement of the gripper and between it and the carrier, means for supporting a wrapper in the path of the lollipop head whereby the lollipop will be delivered to the clamp with a wrapper draped across the head of the lollipop and extending in U-form towards the stick, and folding means adjacent the path of movement of the carrier to complete the folding of the wrapper around the head of the lollipop while the wrapper and the lollipop head are held by said clamp.

34. A machine for wrapping lollipops comprising a carrier, clamps on the carrier to engage opposite sides of the partially wrapped head of a lollipop, a lollipop stick gripper movable in a direction at right angles to the path of the carrier and supporting the stick with the head of the lollipop projecting forwardly in the path of movement of the gripper and between it and the carrier, means for supporting a wrapper in the path of the lollipop head whereby the lollipop will be delivered to the clamp with a wrapper draped across the head of the lollipop and extending in U-form towards the stick, folding means adjacent the path of movement of the carrier to complete the folding of the wrapper around the head of the lollipop while the wrapper and the lollipop head are held by said clamp, and twisting means adjacent the path of movement of the carrier to twist the wrapper around the lollipop stick while the wrapper and lollipop head are still held by the clamp.

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