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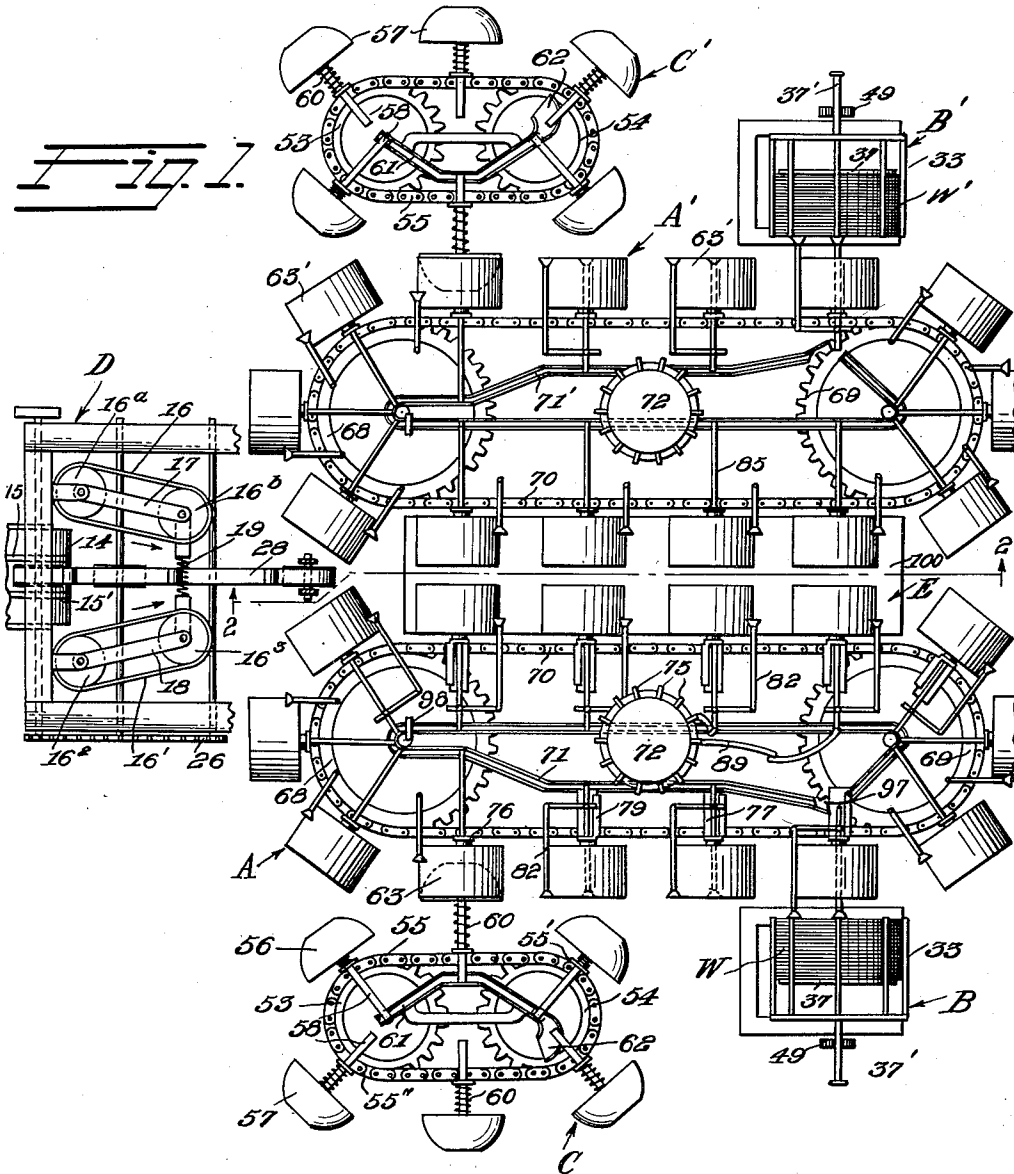
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2,090,559

WRAPPING MACHINE

Filed March 3, 1936

5 Sheets-Sheet 1



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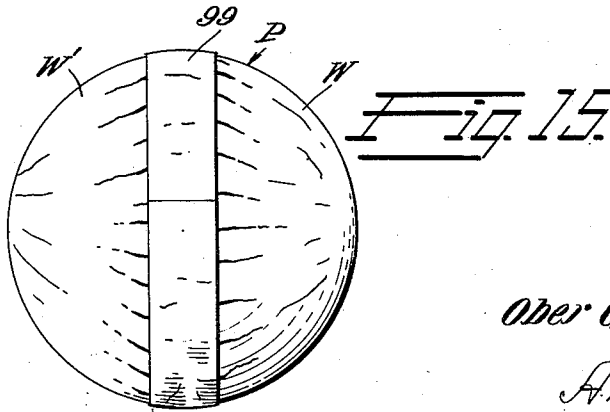
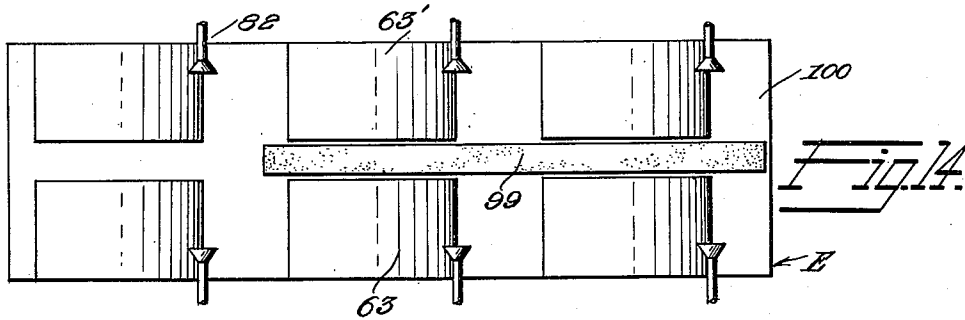
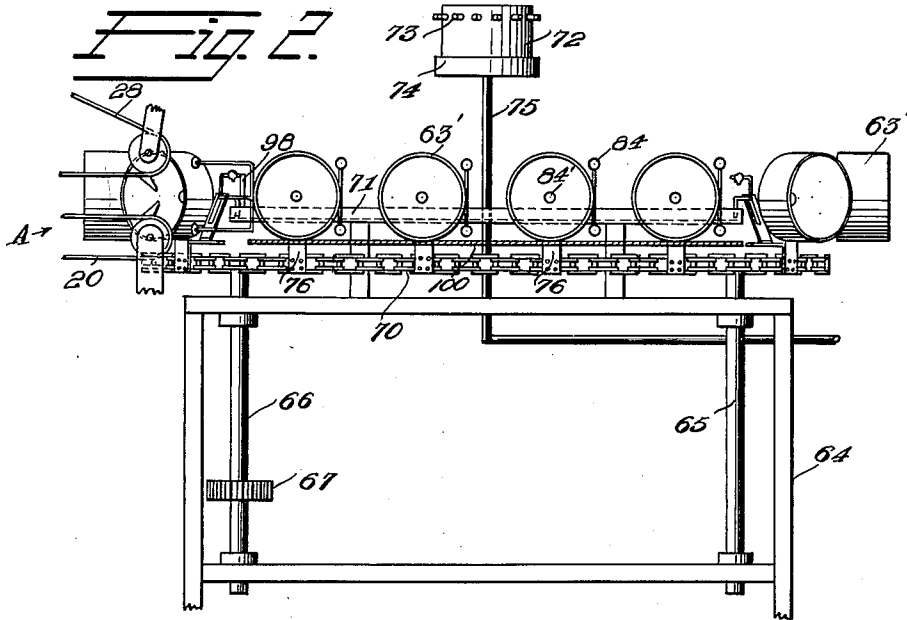
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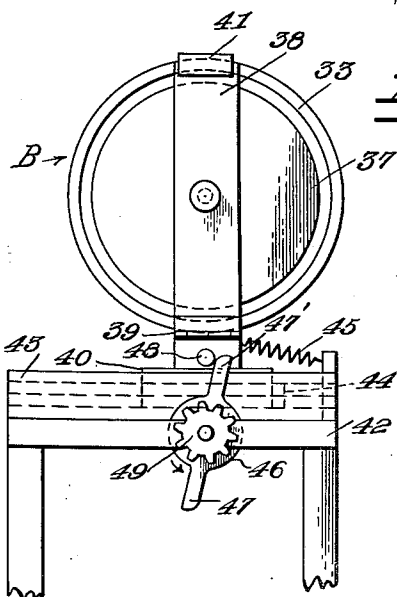
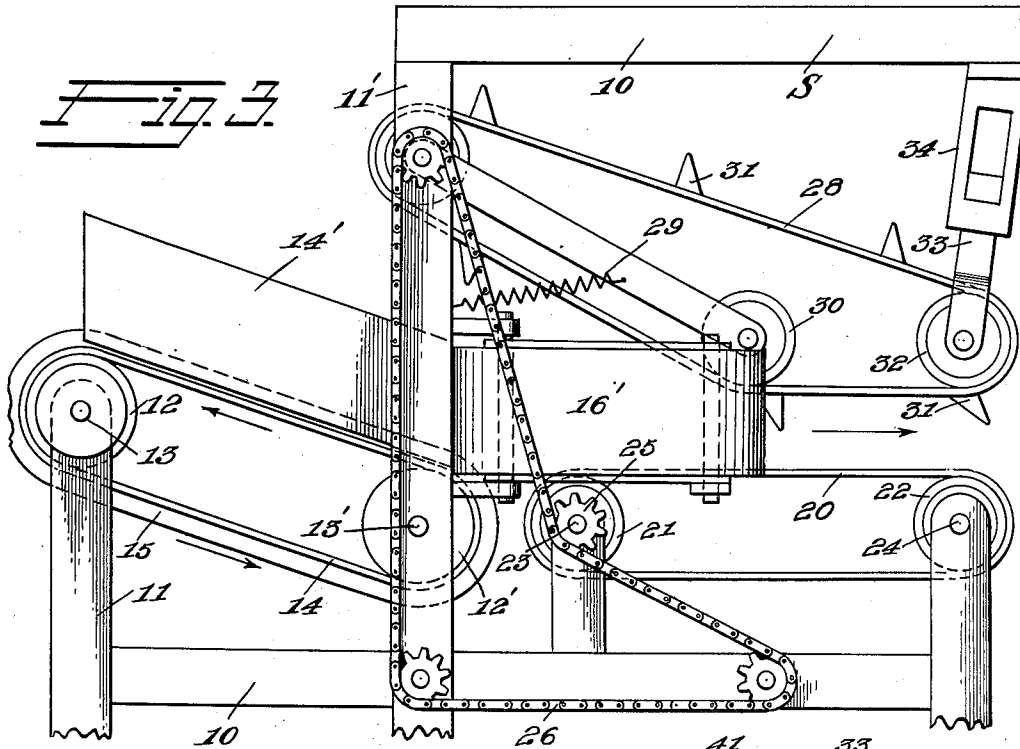
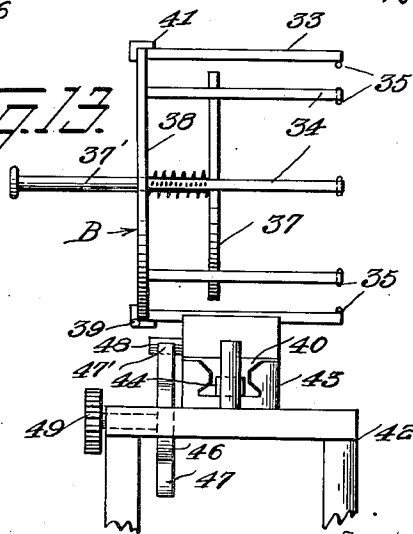


Fig. 12

Fig. 13



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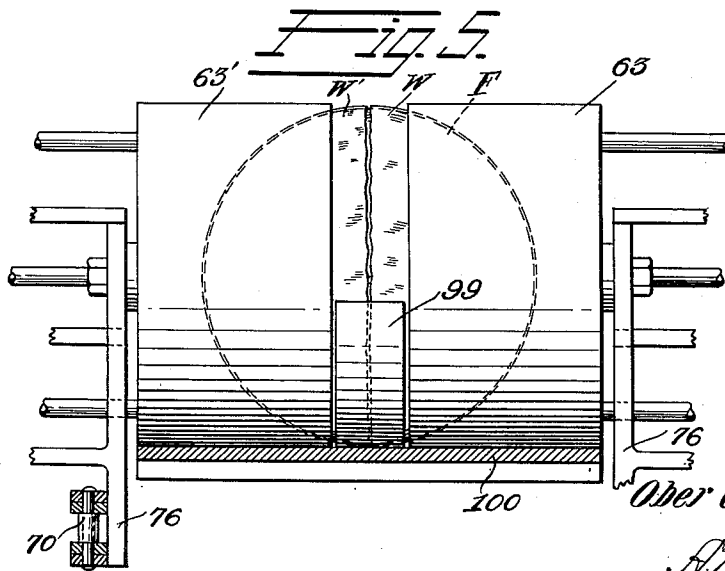
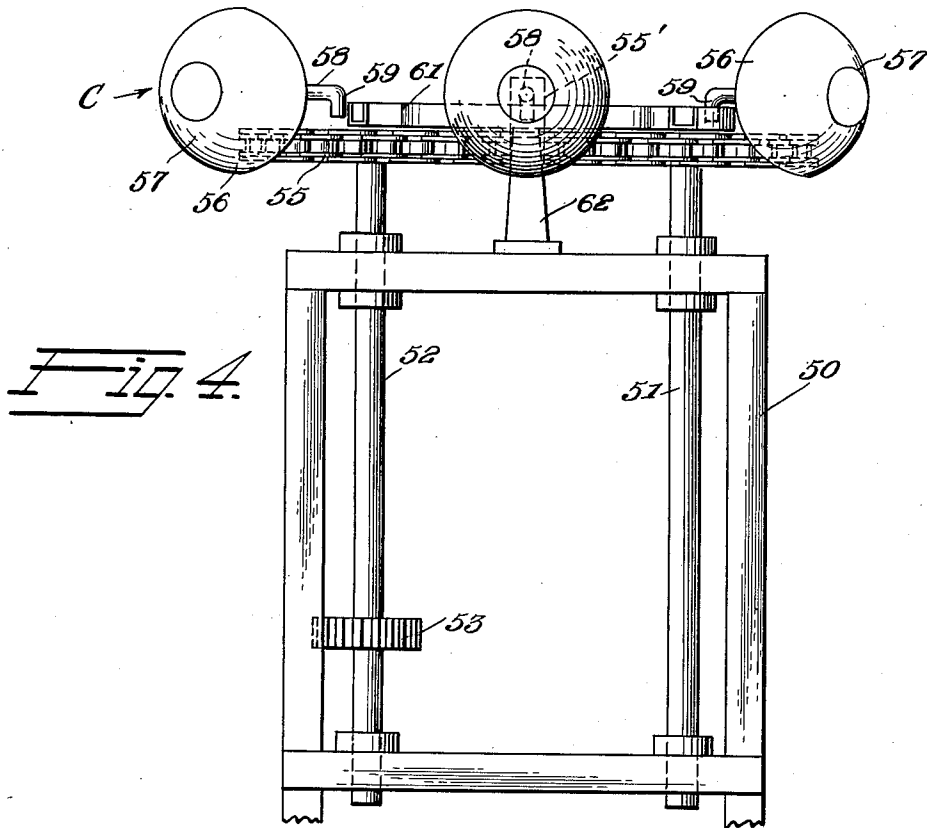
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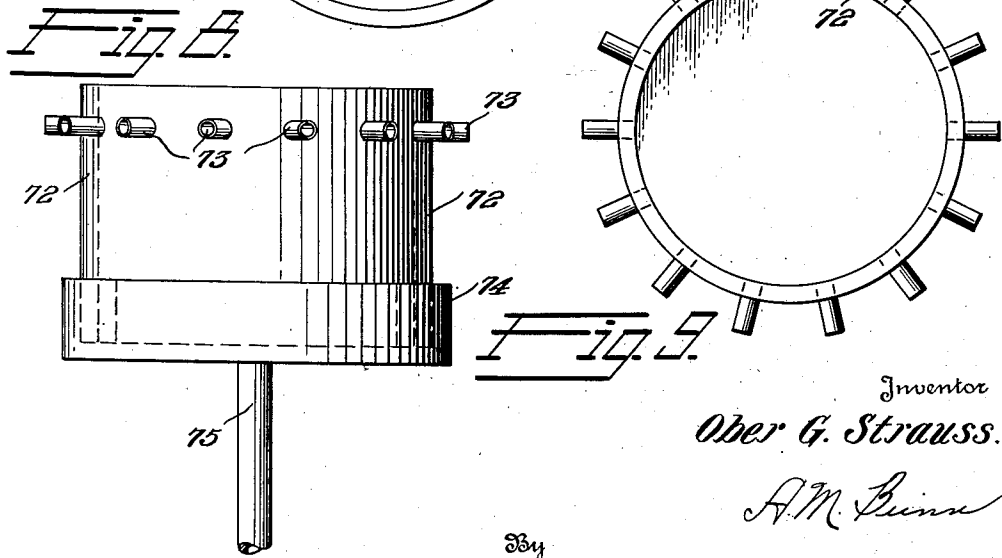
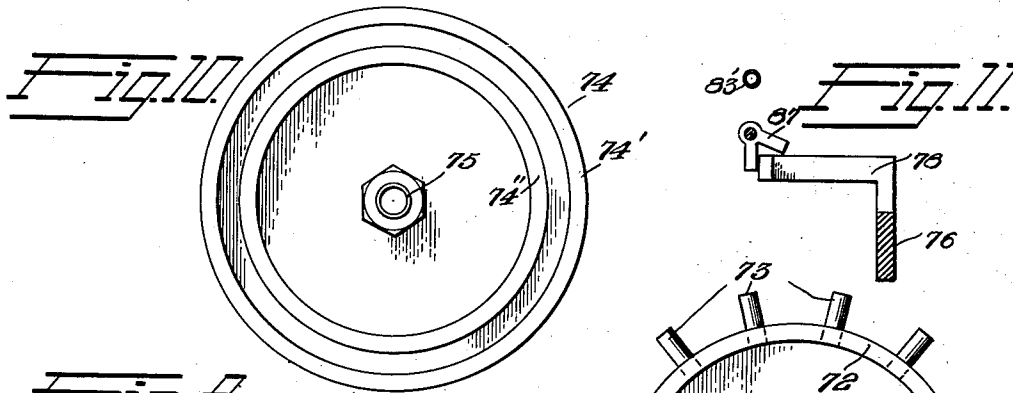
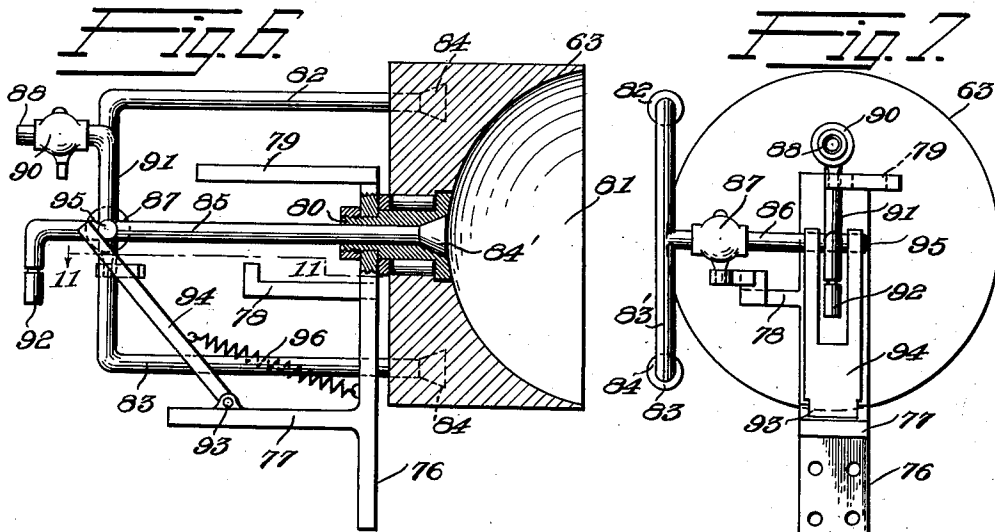
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WRAPPING MACHINE

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5 Claims. (Cl. 93—2)

The instant invention relates to wrapping machines for wrapping spherical, oblate and ovate objects, such as oranges, grapefruit, apples and objects of similar shape, and more particularly to a machine for wrapping such objects by using more than one piece of wrapping material.

Heretofore it has been customary in the art to wrap articles of shapes above referred to by applying a single wrapper thereto, the wrapper being held in place by twisting the mouth thereof about the orange, grapefruit, or other object being treated. None of these devices appear to have considered the problem of arranging the fruit in proper position for efficient wrapping. The twist in the wrapping according to prior practice was apt to come at any point on the object. While twisting a single wrapper about an oblate or similar object can be rapidly done by a machine, or manually, nevertheless, it has been found that much difficulty frequently arises because of the fact that failure to properly twist the wrapper will cause the latter to leave the fruit or to insecurely cover same. In fact this difficulty has been so well recognized that it has been designated as "wadding." Furthermore, when using twisted wrapping methods the wrapped fruit does not have that well finished appearance which creates appeal to the eye of a prospective purchaser, the value of such eye appeal being well recognized and much desired in modern merchandising.

One of the aims of this invention, therefore, is to obviate the above difficulty by providing a machine which wraps fruit without twisting of the wrapper and which employs a wrapper formed of two portions, the portions being secured to each other adjacent their line of meeting by a glued strip or a strip applied with adhesive or the like.

Another purpose is to create a wrapping machine which employs a wrapper such as tissue or cellophane, and to provide means for withdrawing sheets of such wrapping material from a wrapper feeder and to position two sheets about an object being wrapped.

Other aims and purposes will be apparent from the detailed description hereinafter appearing, when taken in conjunction with the appended drawings forming a part hereof and to which reference is now made, and in which:—

Fig. 1 is a top plan view showing the entire machine which embodies means for feeding the fruit shown partly broken away at the left of the view; also means for feeding the wrapping

material and for positioning the same about the fruit;

Fig. 2 is a vertical sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a side elevational view of the fruit feeding portion of the machine;

Fig. 4 is a side elevational view of the plunger unit of the machine which forces the wrapper into position within forming cups prior to application of the wrappers to the fruit;

Fig. 5 is a front elevational view showing the strip applying unit (in vertical section) located at the exit section of the machine, and operative to apply a glued strip or a strip supplied with adhesive to the wrapped object;

Fig. 6 is a view partly in section and partly in elevation of one member of the suction unit which operates to withdraw a wrapper from a wrapper feeding unit, and which receives a single plunger from a plunger unit so that the wrapper may be formed within the concave walls of the forming cups of the suction unit member.

Fig. 7 is a rear view of the structure shown in Fig. 6.

Fig. 8 is a side elevational view of a suction chamber which is operatively connected to each of a series of suction members or cups.

Fig. 9 is a bottom plan view of the rotary portion of Fig. 8.

Fig. 10 is a top plan view of the bottom or fixed portion of the chamber of Fig. 8.

Fig. 11 is a view taken on the line 11—11 of Fig. 6, showing the suction valve control associated with the suction member of Fig. 6.

Fig. 12 is a rear view of the wrapper holding frame.

Fig. 13 is a side elevational view of the frame of Fig. 12.

Fig. 14 is a plan view of the strip applying means.

Fig. 15 is an elevational view of the wrapped and sealed object as it leaves the machine.

The improved wrapping machine may be best described by sub-dividing it into individual units, and it will be understood that while each of these performs a distinctive operation, nevertheless all are arranged for synchronous operation from a power source and cooperate with each other to produce a unitary result. By reference to Fig. 1 it will be seen that the fruit feeding and positioning unit has been designed as D, the wrapper holder or container as B, the plunger unit as C, the wrapping unit as A, and the strip applying unit as E. There is one each of units D and E, but there are duplicates of A, B and C which are

identified by characters A', B' and C'. Units A', B' and C' cooperate with units A, B and C and occupy positions which are essentially that of an object and its mirror image. For the sake of clearness a detailed description will be given only of each of units A, B and C, and it will be understood that A', B' and C' are structural duplicates thereof, cooperating however with each other to produce a single unitary objective, namely, individually wrapped spherical, oblate and similar objects.

Referring first to unit D which is the fruit feeding and positioning portion of the machine, it will be seen, Fig. 3, that it is characterized by a framework S, constructed of horizontal beams 10, joined to vertical beams 11, 11', for supporting a pair of pulleys 12, 12', mounted for rotation on horizontal axes 13, 13' respectively. The axis 13 of pulley 12 is located vertically above that of axis 13' of pulley 12', and a broad, flat, inclined endless belt 14 passes over the pulleys. One of the pulleys may be driven from a suitable source of power to rotate in a counter-clockwise direction so that belt 14 travels in the direction indicated by the arrows in Fig. 3. The belt 14 is disposed between laterally spaced members 14', which form the sides of a chute, the bottom of which is provided by the belt 14, and the belt 14 is provided with a pair of rubber ribs 15, 15' which are suitably secured to the belt and which extend throughout the length thereof. The ribs 15, 15', as is more clearly indicated in Fig. 1, are equally spaced from the center of the belt, as well as the lateral edges thereof, and provide a space for maintaining the fruit in the center of the chute. It will now be seen that fruit placed upon the belt 14 will commence rolling down the belt by the action of gravity in a direction opposite to the direction of movement of the belt. This action tends to spin the fruit sufficiently to throw it on its axis in which position it is guided between the ribs 15, 15' to the lower end of the chute centrally thereof.

As the fruit leaves the chute spinning in its axis it passes between a pair of broad, endless idler belts 16, 16', which converge into a substantially V-formation, the mouth of the V being toward the ribs 15, 15'. The idler belts 16, 16' pass over freely rotatable pulleys 16^a, 16^b, 16^c, 16^d respectively. These pulleys are mounted for rotation on vertical axes as will be understood. While these belts have been described as of substantial V-formation, it will be seen by reference to Fig. 1 that they do not actually touch each other to form an apex, but merely taper as required.

While pulleys 16^a and 16^c are mounted on stationary brackets, pulleys 16^b and 16^d are journaled on pivoted brackets 17 and 18, said brackets joined to each other by a tension spring 19. When a fruit passes between belts 16, 16' and applies pressure thereto, the belts will diverge adjacent pulleys 16^b and 16^d against tension of spring 19, to permit the fruit to pass on, any conventional means being employed, such as stops, to maintain pulleys 16^b and 16^d in a definite spaced relation when a fruit is not passing between belts 16, 16'. With the construction just described the fruit is firmly held in the position in which it leaves inclined belt 14, yet can be freely moved forward in a manner now to be set out.

An endless belt 20 travels in a horizontal plane centrally below belts 16, 16', that is to say, forms a movable floor therefor. Endless belt 20 passes over pulleys 21, 22, mounted on horizontal axes 23, 24, pulley 21 having a sprocket 25 fixed there- to for operation by sprocket chain 26, actuated

from a suitable source of power to drive the belt 20 in the direction indicated by the arrow. Cooperating with the belt 20 and positioned thereabove is an inclined endless belt 28, constructed similar to belt 20, and provided with spring means 29 which holds a tension pulley 30 in contact with the inner surface of belt 28. Fingers 31 on belt 28 remove the fruit from the idler belts 16, 16'. It will be understood that the spacing of the fingers 31 on the belt 28 is such that the fruit is fed in timed relationship to wrapping unit A. Pulley 32 is mounted on a bracket 33 which is freely slidable within support 34 secured to the framework S. The yieldable belt construction permits fruit of different sizes to pass freely from the feeder and positioning unit D, yet sufficient pressure is constantly maintained on each fruit until it leaves said last mentioned unit.

Referring to Figs. 12 and 13, there is shown in some detail the design of unit B, that is, the holder or container adapted to supply wrappers to unit A. As previously indicated, a duplicate B' is located directly opposite B, and, as these are of identical construction, a recital of unit B will suffice. The holder proper comprises essentially a cage 35, made up of individual spaced bars 36, arranged to enclose an annular space. Each bar 36 has a roller 37 at its tip for the purpose of retaining wrappers W within the cage, and for releasing a single wrapper when suction is applied to the exposed surface of the latter. A spring actuated follower 37 presses against the bottom of the stack of wrappers W, said follower being secured to a rod 37' extending through an aperture in a plate 38 hinged at 39 to the cage 35. A snap lock or the like 41 holds the plate 38, said lock permitting the plate to be pivoted about its hinge 39 for withdrawal of follower 37 for the insertion of a stack or package of wrappers W within the cage 35. The cage 35 is rigidly supported on a carriage 40 which is reciprocally mounted in a track 43 fixed on a support 42, which in turn has a stop 44 defining the limit of movement of the carriage to the right as shown in Fig. 12. A coiled spring or the like 45, normally draws the carriage against said stop. Carried by the support 42 is a rotatable pawl 46 formed with oppositely extending striking projections 47, 47' for cooperation with a pin 48 on the carriage. Pinion 49 imparts rotation to pawl 46 from a suitable source of power for synchronous operation with the rest of the machine. From the above it will be seen that rotation of pawl 46 causes its projections 47, 47' to alternately strike stop 48, to move the carriage 40 and cage 35 to the left, as seen in Fig. 12, against tension of spring 45, and when the projections ride by the pin 48, the spring forces the cage and carriage back in track 43 against stop 44. The limited movement of cage 35 and its wrappers W is essential in that it furnishes a sufficient time interval for the proper withdrawal of a single wrapper by the suction elements of unit A, to be shortly described.

Taking up unit C and its duplicate C', by reference to Figs. 1 and 4, it will be noted that each comprises a supporting frame member 50, journaling a pair of vertically rotatable shafts 51 and 52, the last mentioned shaft having a driving pinion 53' keyed thereto, which in turn is driven from a motor or other source of power for synchronous operation with the other units. Keyed to the upper end of respective shafts 51 and 52 above the framework 50, for rotation in a horizontal plane are a pair of sprocket wheels 53 and

54, provided with an endless sprocket chain 55. Carried by sprockets 55', suitably supported by links 55'' of the chain 55, are a plurality of spaced plungers 56, each having a rubber head 57 carried by a stem 58, the latter terminating in a downwardly bent track engaging hook 59. Intermediate each head 57 and the bracket 55', carried by the chain link 55'', and encircling stem 58, is a compression spring 60. An irregularly shaped trackway 61 is supported in a plane parallel to, but above the plane of the sprocket wheels, by standards 62 resting on the framework 50. Rotation of shaft 52 by driving pinion 53' causes rotation of the sprocket wheels 53, 54 and the associated chain 55 and brings the hook 59 of a plunger stem 58 to the entrance 62 of the trackway 61. The irregular shape of the trackway causes alternate contraction and expansion of spring 60, and also a relative movement of the rubber head 57 of each plunger toward and away from the trackway, as will be apparent from inspection of Fig. 1. In the fully extended position of each plunger head 57 it is adapted to enter a forming cup 63 of unit A, as will be seen.

Each unit A comprises a supporting frame 64, journalling a pair of spaced vertical shafts 65, 66, the last mentioned shaft having a pinion 67 keyed thereto for operation synchronously with the other units from a suitable source of power. Secured to the upper end of shaft 66 is a sprocket wheel 68 rotatable in a horizontal plane above framework 64, while a similar sprocket wheel 69 is keyed to the upper end of shaft 65. An endless chain 70 embraces sprocket wheels 68 and 69. Situated on the framework 64 within the area enclosed by the chain 70, is an irregular trackway 71. Also centrally above this area and mounted above the framework 64 is a reduced-pressure chamber 72 having a series of outlet pipes 73. The body of chamber 72 rests on and is rotatable in a dished stationary bottom 74, a seal being maintained between chamber 72 and bottom 74 by means of oil or other fluid, in the space between flanges 74' and 74'' on the bottom 74. A hollow pipe 75 connects chamber 72 through bottom 74 to a vacuum pump (not shown), which maintains a reduced air pressure within chamber 72 and produces a suction through each of the hollow outlet pipes 73. Secured to and movable with sprocket chain 70 are a series of upright brackets 76, each having a plurality of parallel horizontally extending arms 77, 78 and 79, formed integrally therewith, said arms extending inwardly toward the area encircled by chain 70. Rotatably mounted on a bearing 80, secured to a bracket arm 76, is a forming cup 63 having a substantially hemispherical concave portion 81. A pair of parallel hollow suction pipes 82, 83 having a hollow connecting pipe section 83', forming a U-shaped pipe assembly, is located at one side of the axis of forming cup 63, each of pipes 82, 83 terminating in a rubber lip 84.

Movable axially in bearing 80, and in the axis of cup 63, is a pipe 85, similar to pipes 82, 83 and also terminating in a rubber lip 84'. A short hollow pipe section 86 is provided with a valve 87 which cooperates with arm 78 in a manner that will be pointed out shortly. Joining an outlet pipe 73 to an inlet pipe 88 is a flexible hose connection 89, said inlet pipe 88 having a valve 90 for cooperation with arm 79 upon inward movement of the various pipes. Leading from valve 90 is a short hollow pipe length 91 operatively connected to pipes 85 and 86. Pipe 85

has a downwardly extending hook portion 92 which rides in irregular track 71. Pivoted at 93 on bracket 77 is a trigger arm 94 which contacts a pin 95, as well as pipe 86. A tension spring 96 tends to maintain contact between trigger arm 94 and pin 95.

As hook portion 92 riding in irregular trackway 71 reaches point 97 in its journey, that is, as it rounds sprocket 69, it momentarily leaves the trackway which is disconnected at this point and, accordingly, pipes 82, 83 and 85 are forced forwardly through action of spring operated trigger 94, pipe 85 being moved centrally through cup 63, and at this moment lips 84, 84' of the pipes contact the outer surface of a wrapper W in cage 33, the latter moving a short distance with cup 63, as set out in the description of unit B. Forward movement of these pipes brings valves 87 and 90 in contact with respective arms 78 and 79 to open said valves, thus permitting suction to be created therethrough, whereby a single wrapper is grasped from cage 33 by said lips and whereby said wrapper is withdrawn from the cage. As chain 70 continues on its journey hook 92 re-engages in track 71, withdrawing all pipes to bring the wrapper W to the edge of cup 63, while further movement of the chain brings a forming cup to a position where a plunger head 56 enters the cup, forcing the wrapper to conform to the concave surface 81 thereof, and simultaneously forcing all pipes rearwardly. This rearward movement operates valve 87 through arm 78 cutting off the suction to pipes 82, 83, but still maintaining a suction in pipe 85, which holds the wrapper in its conforming position to concave surface 81 of cup 63, even after the plunger has been withdrawn from the cup. In this condition two cups 63 from units A, A' pass the exit of unit D and approach each other in opposing relationship, the units being timed so that the cups embrace a fruit as it leaves unit D. At the same time a catch 98 situated in the path of movement of valve 90 contacts and closes the latter, thus cutting off the suction in the pipe 85. Also at this point of the operation of the machine a fruit F, Fig. 5, is held between cups 63, 63', which roll on their axes through rolling contact with a floor 100', bringing the edges of wrappers W, W' into a strip applying unit E, which applies a glued strip 99, placed on the floor 100, of said unit. The finished wrapped product P is shown in Fig. 15. After the strip has been applied in any conventional manner, the wrapped fruit P is discharged from the machine as the cups 63, 63' separate the path around their respective sprockets.

Although the invention has been described in some detail, it is to be understood that various modifications and structural features may be made, and it is intended to cover all such and to be limited in this respect by the claims hereto appended.

I claim:—

1. A wrapping machine comprising means for positioning a substantially spherical object to be wrapped, means for feeding a pair of individual wrappers, means for shaping the wrappers each to conform to the shape of half the object, means for bringing the shaped wrappers into opposing relation with the object therebetween, means for releasing the wrappers into position about the object, and means for sealing the wrappers on the object.

2. A wrapping machine comprising means for

bringing an object into position to be wrapped, means for shaping a plurality of individual wrappers to conform substantially to the shape of a portion of the object being wrapped, and means for conveying a pair of the pre-shaped wrappers to the object and applying same thereto from opposed sides thereof.

3. A wrapping machine comprising means for feeding objects in succession into a position to be wrapped, means synchronized with said feeding means for shaping a plurality of individual wrappers to conform substantially to the shape of a portion of the object being wrapped, and means for successively conveying a pair of the pre-shaped wrappers to each object for application thereto from opposed sides thereof.

4. A wrapping machine, a unit for feeding objects in succession into position to be wrapped, object holding and wrapper positioning means

movable in succession past said feeding unit for cooperation with said objects, means for supplying individual wrappers to said object holding and wrapper positioning means, and means for shaping said wrappers within said object holding and wrapper positioning means prior to engagement thereof with the objects to be wrapped.

5. A wrapping machine comprising means for feeding objects into position to be wrapped, a plurality of cups movable in succession in opposed pairs past said feeding means, means for supplying an individual wrapper to each of said cups prior to its reaching said feeding means, and means intermediate said wrapper supplying means and said feeding means for shaping said wrappers to conform with the shape of the objects to be wrapped.

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