

June 10, 1958

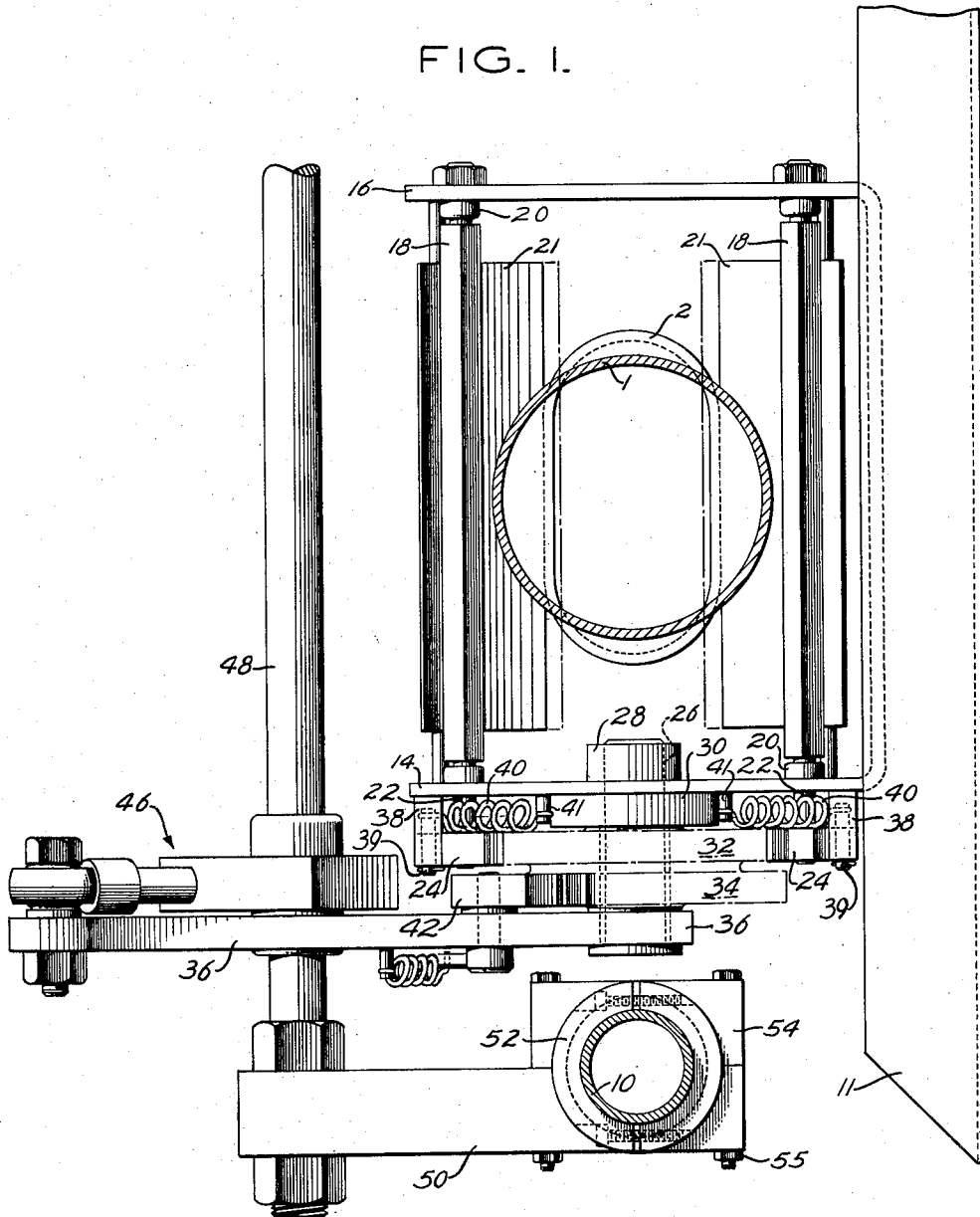
R. T. HULL
PACKAGE KNOCKER MECHANISM FOR
AUTOMATIC PACKAGING MACHINES

2,837,882

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3 Sheets-Sheet 1

FIG. 1.



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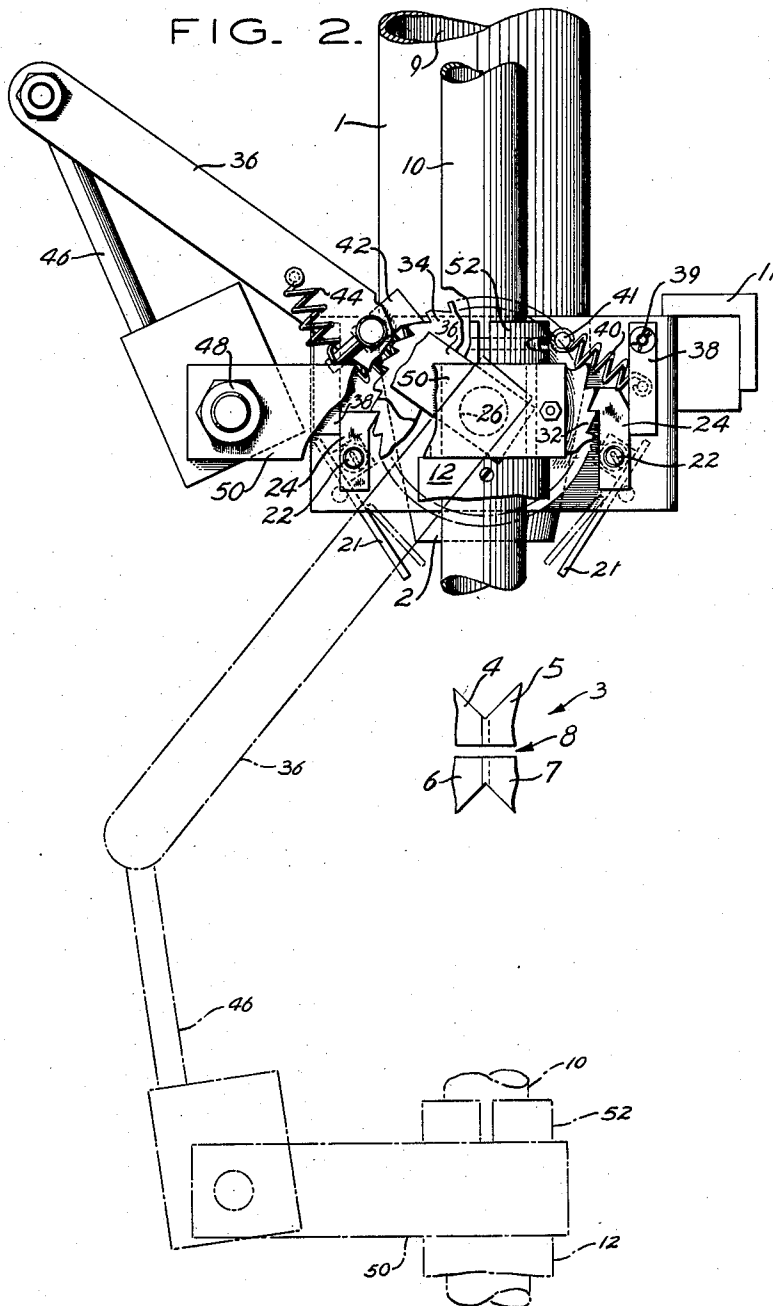
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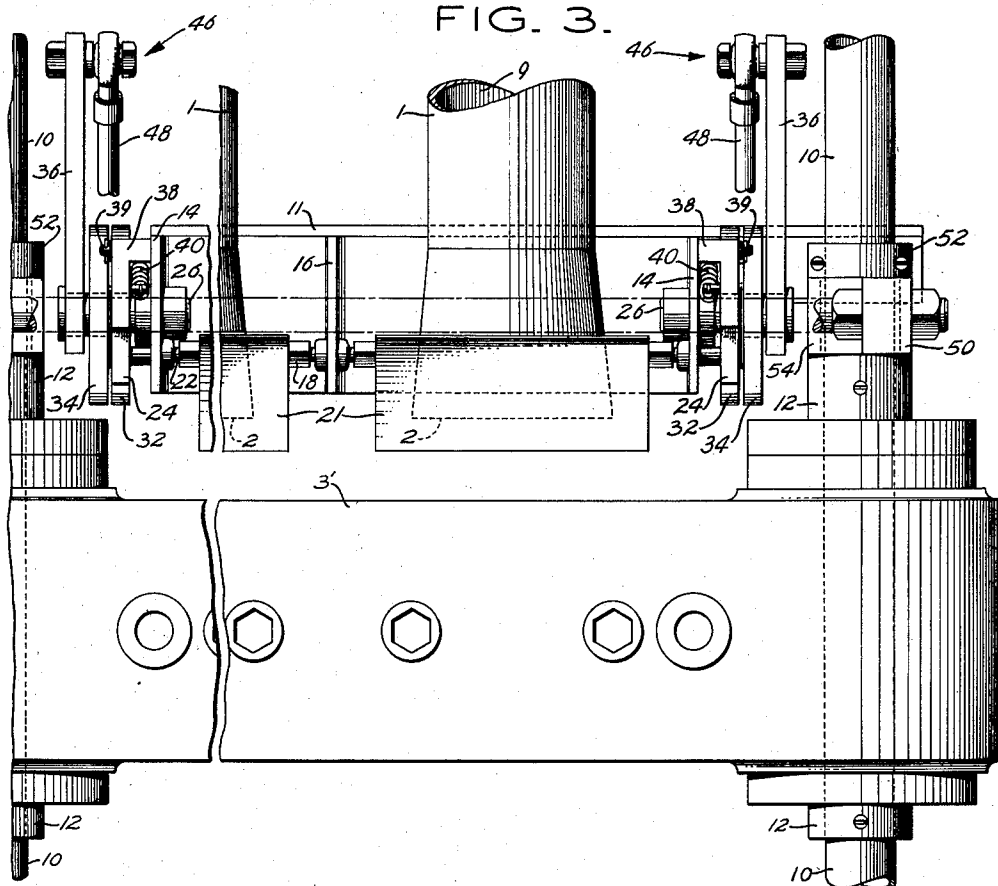
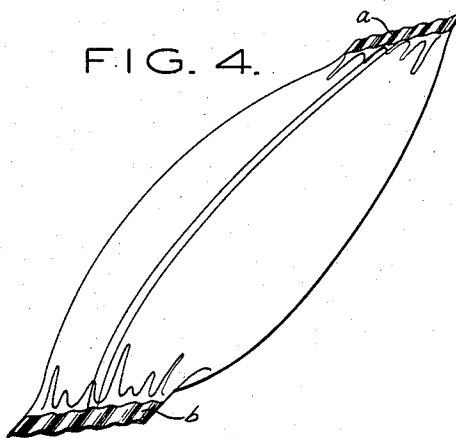
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PACKAGE KNOCKER MECHANISM FOR AUTOMATIC PACKAGING MACHINES

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4 Claims. (Cl. 53—124)

This invention relates to automatic packaging machines, particularly of the type disclosed in Patent No. 1,986,422 granted January 1, 1935, and has for an object to provide mechanism to knock the package and compact the contents received thereby prior to the final sealing of the same.

The machine of the above patent is well known in the trade. It is particularly directed to the packaging of articles such as small candies, various staples such as sugar, coffee etc., and other material or articles preferably those which will successfully feed by gravity. Generally the finished package is in the form of a tubular container sealed at both ends and commonly described as a "pillow" type of package. The machine forms the package from a strip of material, as from a reel, with the strip passing over a former for bending it into tubular shape and sealing the meeting side edges. From the former the tube of material may be drawn by clamping means which also serve to heat seal the tube transversely. Thus a receptacle bottom is provided for the portion of the tube being removed from the end of the former. In the successive formation of a series of packages the clamping means also serves to close and complete the top seal of the preceding package which may be filled by gravity flow of a measured quantity of material or articles either during the time a length of tube is being drawn off the former or while the clamp means is being moved back into position to draw and bottom seal a succeeding length of the tube.

In forming the packages the filling operation thus takes place between the successive operations of simultaneously sealing the bottom of one package and the top of the preceding filled package. Since each receptacle formed by a bottom seal is filled by gravity it will be seen that the bulk of a measured quantity of articles or material dropped into the package will necessitate gauging the stroke of the clamping means to make certain the location of the top seal is sufficiently above the contents dropped into the package to insure properly enclosing the same. Small wrapped candies, for example, may tend to fall loosely into the package and leave an undesirable amount of dead air space. Even where granular material is being handled the final amount may tend to fall loosely and irregularly and be concentrated in the center or at one side at the top of the package.

It is an object of this invention as above mentioned to compact the material received by the package. In doing so other objects and advantages are served. A compact package is formed in which the contents are enclosed more firmly so that in the case of many articles the packages are more easily controlled in subsequent handling operations as for shipment and ultimate distribution to the consumer. Less overall space is required so that shipping costs may be reduced. Less packaging material is used so that material costs for packaging operations are reduced. Additionally, certain materials or articles require special treatment while being pack-

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aged to avoid contamination or degeneration in the completed package so that less air space within the package means a faster treatment period during the packaging cycle and a saving in the costs of an agent for treating the package contents.

These and other objects and advantages of the invention will be seen from the following disclosure.

In the drawings illustrating a preferred embodiment of the invention,

Fig. 1 is a plan view of the mechanism operatively mounted in relation to certain adjoining parts of an automatic packaging machine;

Fig. 2 is a view of the same in end elevation with surfaces broken away and illustrating in dot-dash lines the position of the parts at the end of the downstroke of the reciprocatory package forming operation;

Fig. 3 is a view of the mechanism in side elevation showing the same as for a conventional duplex machine designed to simultaneously produce two series of packages; and

Fig. 4 is a view of a completed package as made by the packaging machine.

In the drawings conventional parts of a standard packaging machine of the type disclosed in the above mentioned patent are indicated only to the extent necessary for an understanding of the present invention.

The tube former, indicated by the numeral 1, is vertically disposed and around it the strip of packaging material is drawn downwardly to form a length of tube. As shown, the former at its lower end at 2 may be shaped into flattened tubular form in order to receive the contents of the package for a pillow type of bag or container. A finished package is shown by Fig. 4. The tube is drawn off the former 1 by clamping means indicated at 3 in Fig. 2. Jaws 4 and 5 of the clamping means are shown positioned at the top of the draw stroke underneath the end of the former 1. As will be understood the jaws are mounted on a draw bar (see at 3' in Fig. 3) adapted to bring the jaws together as illustrated by Fig. 2 so as to grip the tube transversely and to crimp and form by heat sealing the bottom seal ("b" in Fig. 4) for the length of tube being drawn off the former 1. At the same time a top seal ("a" in Fig. 4) for a preceding filled package is also formed by the jaws at 6 and 7. The jaws are then lowered to pull the tube downwardly to the extent desired for the length of the package; a knife (not shown) is introduced at 8 between the upper and lower jaws to sever the completed (top sealed) package; and the jaws are then parted to be carried upwardly at each side of the tube and again brought together at the top of the stroke to complete the cycle as described.

It will be understood that during either the downstroke or upstroke of the jaws the material or articles being packaged may be fed by gravity through the interior passage 9 of the former 1 and into the receptacle formed by the sealed bottom of the length of tube. As will also be understood the clamping means including the drawbar and jaws is actuated by a pair of vertically reciprocable shafts positioned laterally at opposite sides of the former. One of the shafts is shown at 10 by Figs. 1 and 2 and both are shown in the duplex apparatus of Fig. 3. It will be recognized that the shafts 8 are not only vertically reciprocated to lower and raise the drawbar jaws to draw the tube but also are rotated to bring the jaws together and part them at the top and bottom of the reciprocating stroke. The drawbar is mounted between the mounting clamps 12 of shafts 10 for the rotation of the shafts with respect to the drawbar all as will be understood by those skilled in the art.

The new mechanism disclosed for compacting the con-

tents received by the tubular package is mounted adjacent the end 2 of the tube former and comprises paddle means mounted on the frame and actuated by the vertically reciprocable shafts 10.

Referring to Fig. 1, a U-shaped member is fixed to a machine angle iron frame member at 11 and has spaced arms 14 and 16 extending outwardly beyond the former 1 on either side thereof. A pair of shafts 18 are pivoted in mountings as at 20 of the arms and lie at each side of the flattened end 2. Between the arms 14 and 16 on shafts 18 are fixed the depending paddles 21. The axles at 22 of shafts 18 extend through arm 14 and at their outer ends are fixed dogs at 24 (Fig. 2). Between the axles 22 a shaft 26 extends outwardly of arm 14, being carried in mountings 28 and 30 which flank either side of arm 14. Outwardly of the arm and journaled on shaft 26 is a driving member for the dogs 24 of the paddles. This member comprises a toothed paddle wheel 32 and a ratchet driven wheel 34 carried in fixed relation to each other. A crank operating arm 36 is independently pivoted on the outer end of shaft 26.

As shown by Fig. 2 the toothed wheels are provided with teeth facing in the same direction. The dogs 24 are each held in engagement between teeth at opposite sides of wheel 32 by a keeper 38 pivoted at 39 on arm 14 and bearing against each dog under pressure of springs 40 fixed to the keeper and to studs 41 of arm 14. In engagement with the teeth of wheel 34 is a driving pawl 42 pivoted on crank arm 36 and biased by a spring 44 anchored on the arm. Pivoted at the outer end of crank arm 36 is a link assembly 46 which at its inner end is pivoted on a frame tie rod 48 rigidly bridging a pair of frame members 50 extending outwardly from shafts 10. The members 50 at their inner ends are rotatably mounted on the shafts 10 as between the upper clamping collar 12 of the drawbar mounting and a collar 52 clamped in vertically spaced relation to collar 12. The rotatable connection is formed by a split block 54 with bolts at 55 embracing the shaft 10 and thus moveable vertically with the shafts while permitting the shafts to rotate at the top and bottom of the stroke.

It will be seen from the above, and with special reference to Fig. 2, that as the vertical shafts 10 are lowered, the frame of arms 50 and tie rod 48 is also lowered. This swings the link 46 so as to crank the arm 36 on its pivot on shaft 26. Pawl 42 on crank arm 36 thus rides over the teeth of the wheel (counterclockwise as in Fig. 2) and it will be noted that dogs 24 being engaged in the teeth of wheel 32 will prevent any tendency to rotate in this direction. As previously explained a length of tube is provided on the downstroke with a bottom seal and the jaws at 3 part for the return or upstroke of the shafts 10 as from the dot-dash line position of Fig. 2. On the upstroke the crank arm pawl 42 will be swung clockwise and engage a tooth of wheel 34 to rotate the same. Since wheels 34 and 32 are in fixed relation the latter will also rotate and thus cam the dogs 24 successively out of the toothed recesses. As the teeth sweep past the dogs 24 the axis of the paddles will rapidly flutter and cause the paddles to knock against the flattened side walls of the tube. The inner position of the paddles is indicated by dot-dash lines and it will be appreciated that the paddles will pivot into and out of engagement with the wall. In the arrangement shown the package is thus shaken or vibrated on the upstroke of the shafts 10 and preferably while the package is being filled. If desirable, as might be the case with certain articles, the filling operation can be completed prior to the upstroke; and in this event the paddles will engage the top of the container to vibrate and shake the contents into a more compact mass after the same have

been deposited. Alternatively the direction of the teeth of wheels 32 and 34 and disposition of the dogs 24 and pawl 42 may be reversed for jogging the package on the downstroke and during a simultaneous package forming and filling operation. The sequence of operations may thus be varied in order to suit the particular conditions found to exist with respect to specific materials and articles and the behavior thereof in filling the packages. Also as will be seen the shape and angular relation of the teeth engaging the dogs 24 to rock the paddle can be varied and the action of the paddles may thus be changed from a gentle massage against the walls to a vigorous slap or knocking action. In any case the contents may be settled more firmly prior to the top closure sealing operation and with the advantages previously mentioned.

What is claimed is:

1. In a packaging machine having a tube former through which material may be fed to a flexible tube formed thereby, clamp means to form a receptacle at the end of the tube and reciprocable means for actuating said clamp means; paddle means mounted adjacent the end of the tube former and movable against the wall of the tube removed from said former, and oscillating means to move said paddle means against the side of the flexible tube to settle the contents received in said receptacle, said paddle oscillating means having a drive connection from said reciprocable clamp actuating means.

2. The structure of claim 1 in which the drive connection between said paddle oscillating means and reciprocable clamp actuating means is a one-way drive to impart motion to the paddle means during one stroke only of the cycle of reciprocation of said reciprocable clamp actuating means.

3. The structure of claim 2 in which said drive connection for the paddle means includes a ratchet wheel and a pawl, and a crank arm carries said pawl, said arm being pivoted on the axis of the wheel with the outer end of the arm being linked to said reciprocable clamp actuating means and responsive to movement thereof.

4. In a packaging machine having a vertically disposed tube former through which material may be fed to a tube formed thereby, clamp means to form a receptacle at the end of the tube and a pair of vertically reciprocable shafts arranged at opposite sides of the former for actuating said clamp means; a pair of paddles pivoted adjacent opposite sides of the tube former at the end thereof, the free ends of the paddles being movable into and out of contact against opposite sides of the tube wall formed from said former, means for oscillating said paddles on the pivots thereof comprising a toothed ratchet wheel between said paddle pivots, a dog fixed on each pivot and biased into engagement with the teeth of said wheel at opposite sides thereof, a second ratchet wheel fixed for rotation with said first toothed wheel and a crank arm journaled on the axis of said wheels, said arm extending radially of said wheel axis and having a pawl engaging the teeth of said second wheel for driving the same in one direction of movement of said arm, a frame bar mounted on said vertically reciprocable shafts and reciprocable therewith with a link pivoted thereto and to the outer end of said arm for cranking the latter and rotating said toothed wheels on vertical movement of said reciprocable shaft during one stroke of the cycle of reciprocation.

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