United States Patent [19]

Koenders

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[54] **PACKING MACHINE**

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[51] **Int. Cl.**... **B65b 11/02,** B65b 11/12, B65b 49/08

[58] **Field of Search** ..... 53/3, 33, 198 R, 53/206, 209, 210, 218, 219, 230

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Primary Examiner—Othell M. Simpson
Assistant Examiner—Neil Abrams
Attorney—Armstrong & Wegner

[57] **ABSTRACT**

A packing machine, especially for packing articles in stretch foil, comprising a feeding device for the article to be packed, a support device on which the article can rest during packing, a foil feeding device for the supply of foil in the proximity of the product to be packed, swivable folding arms with gripping jaws for engaging foil and folding it around the article, means for folding up foil wound around the product, and a discharge device. The gripping jaws of the folding arms are provided with an elastic diaphragm which can clamp the edge of the stretch foil under the influence of a pressure medium.

9 Claims, 11 Drawing Figures

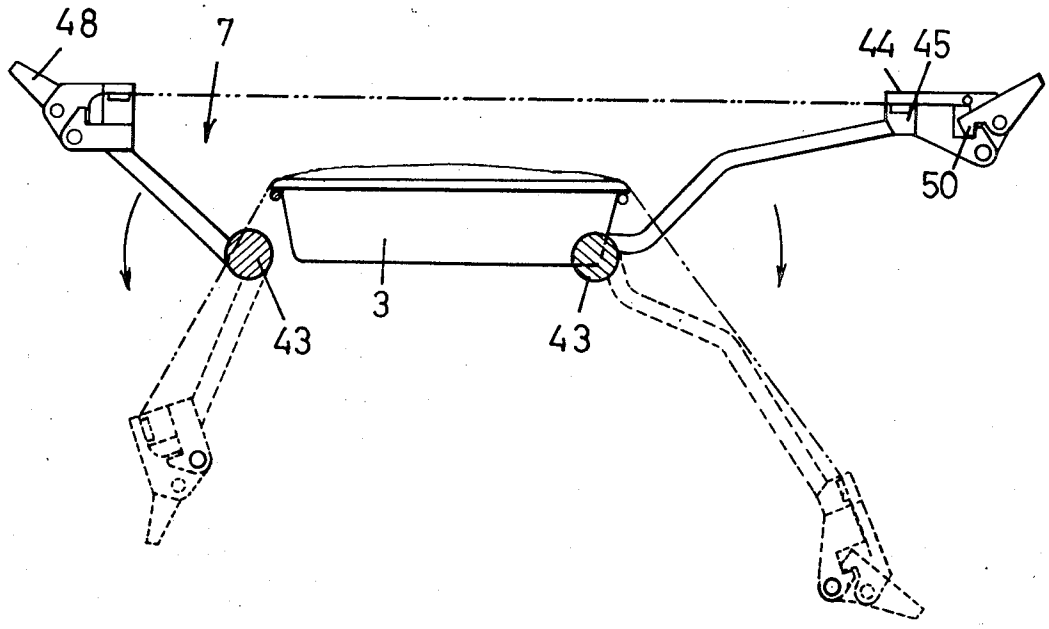
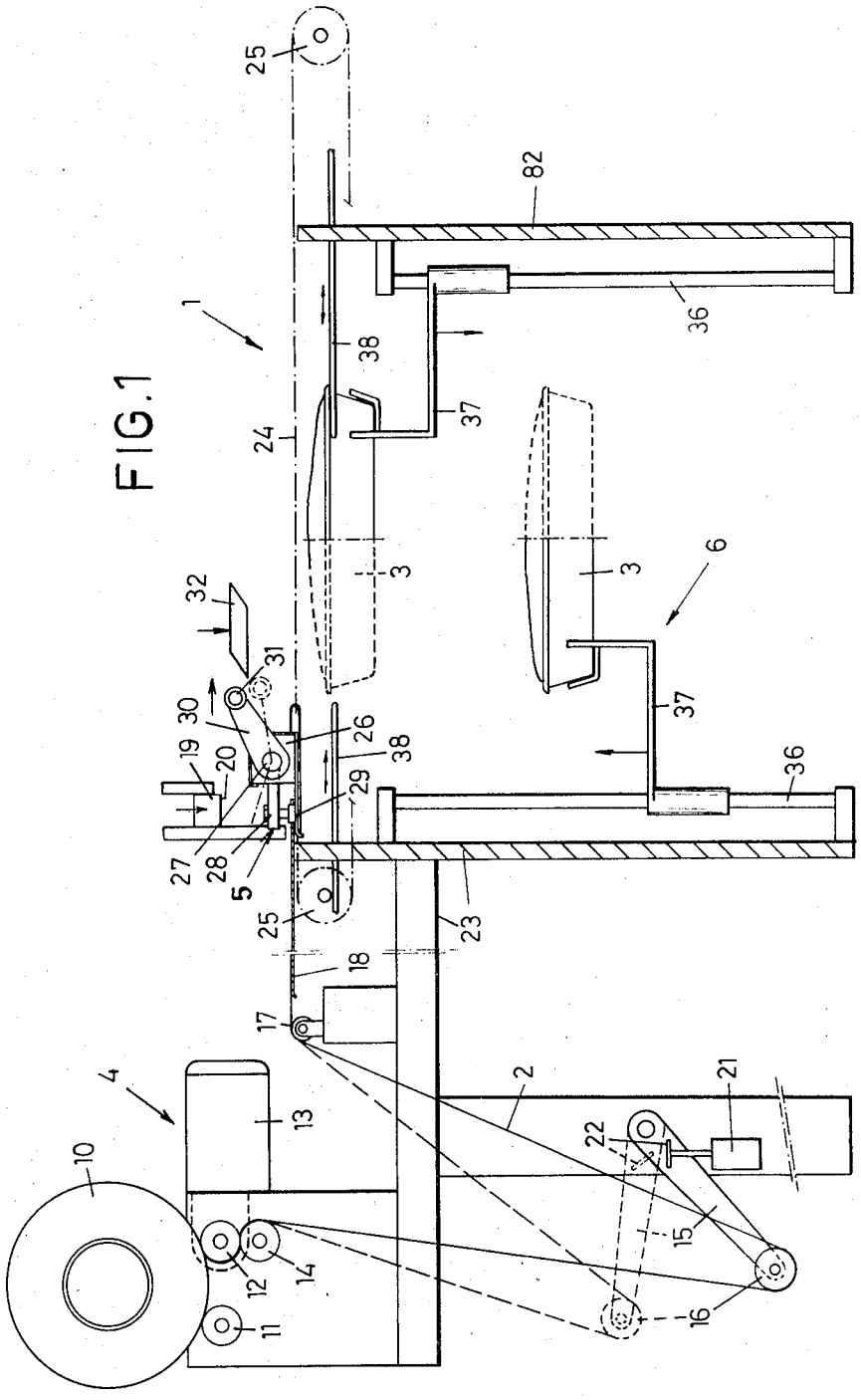


FIG. 1


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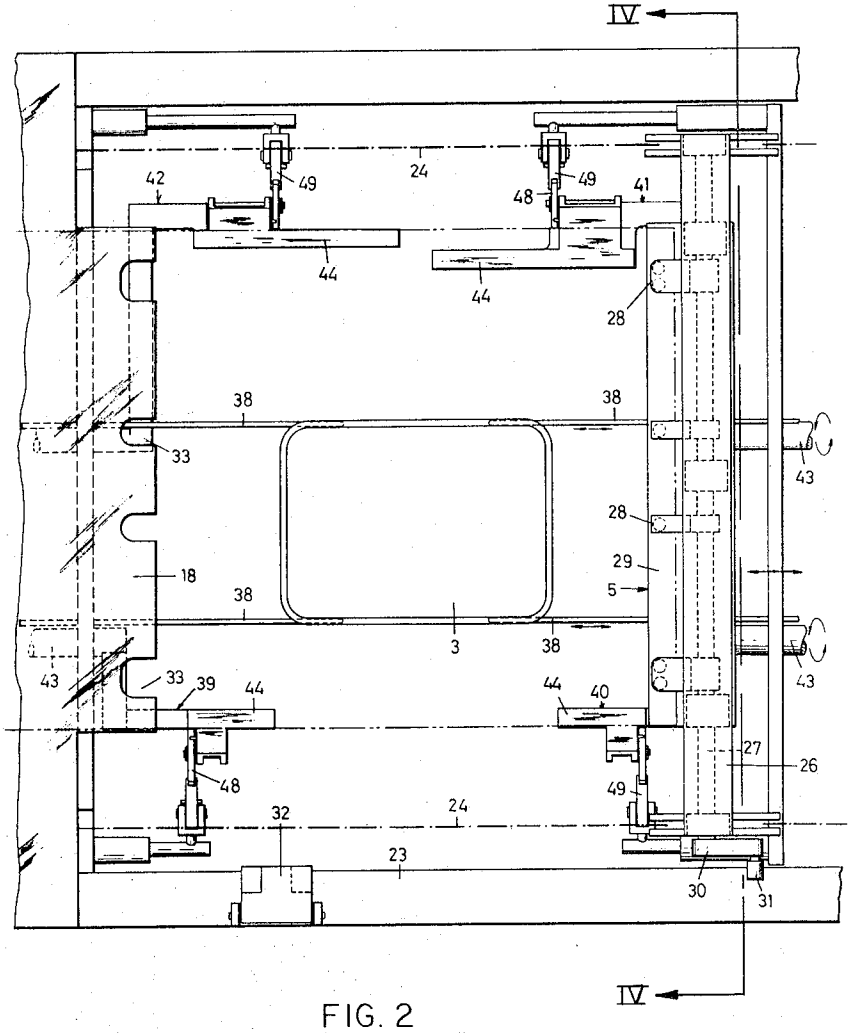

IV
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IV

FIG. 2

FIG. 3a

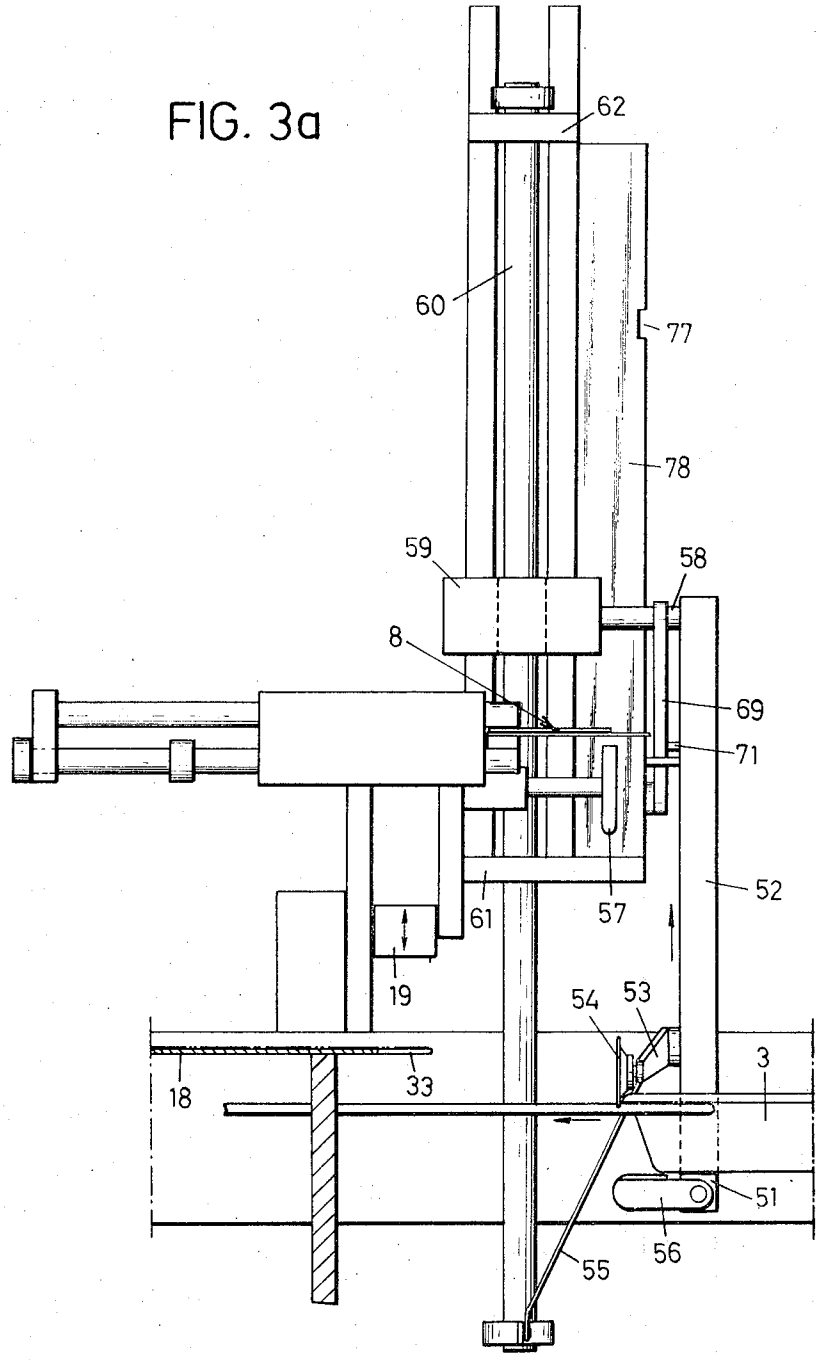


FIG. 3b

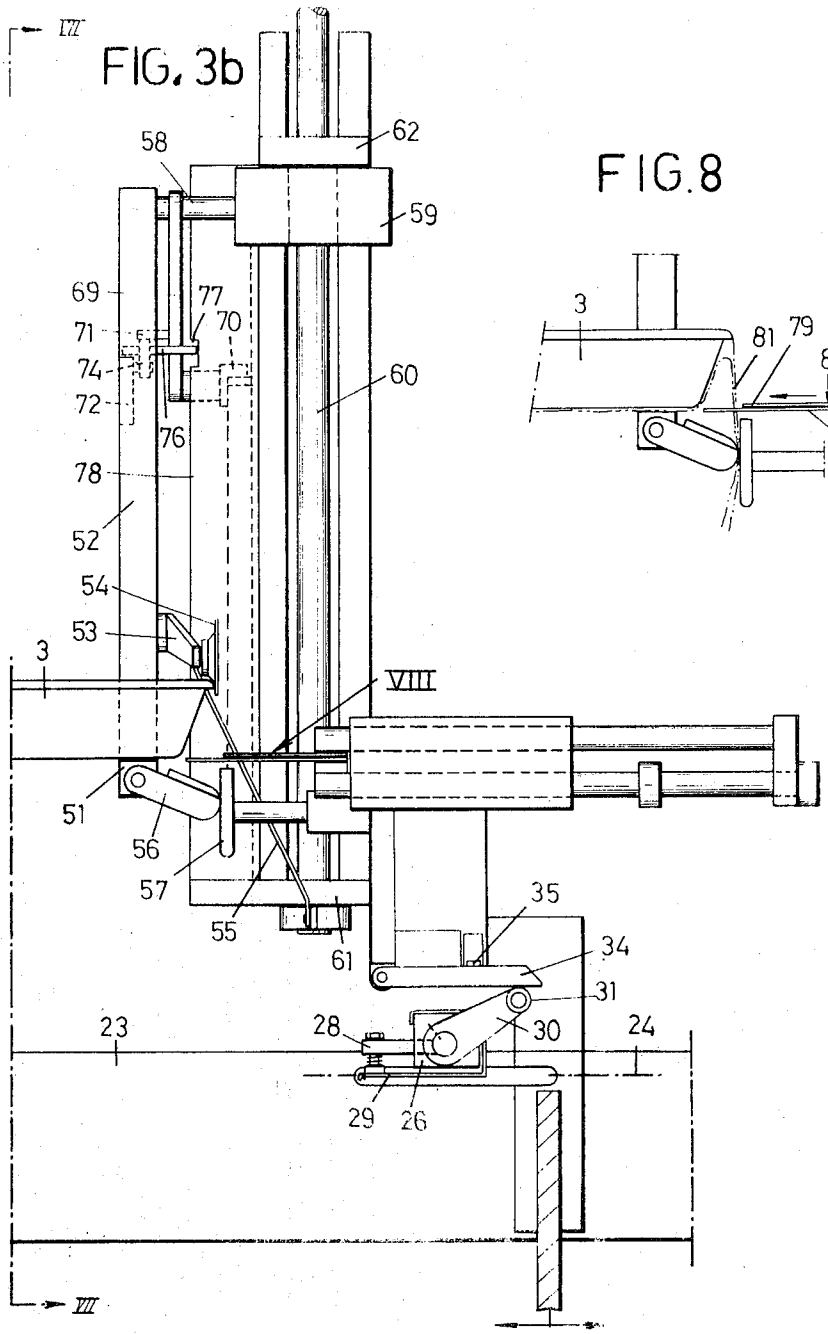

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FIG. 8

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79
8
80

FIG.4

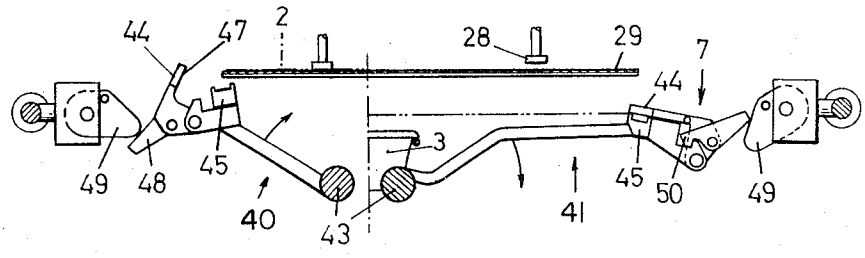


FIG.5

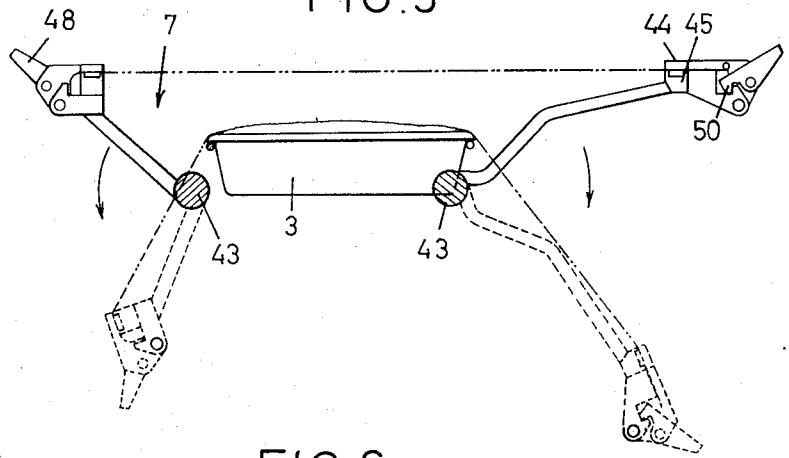
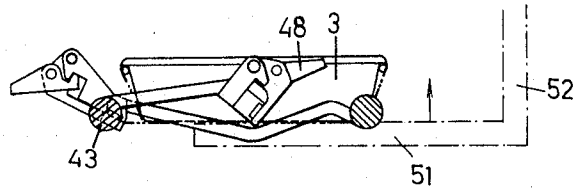


FIG.6



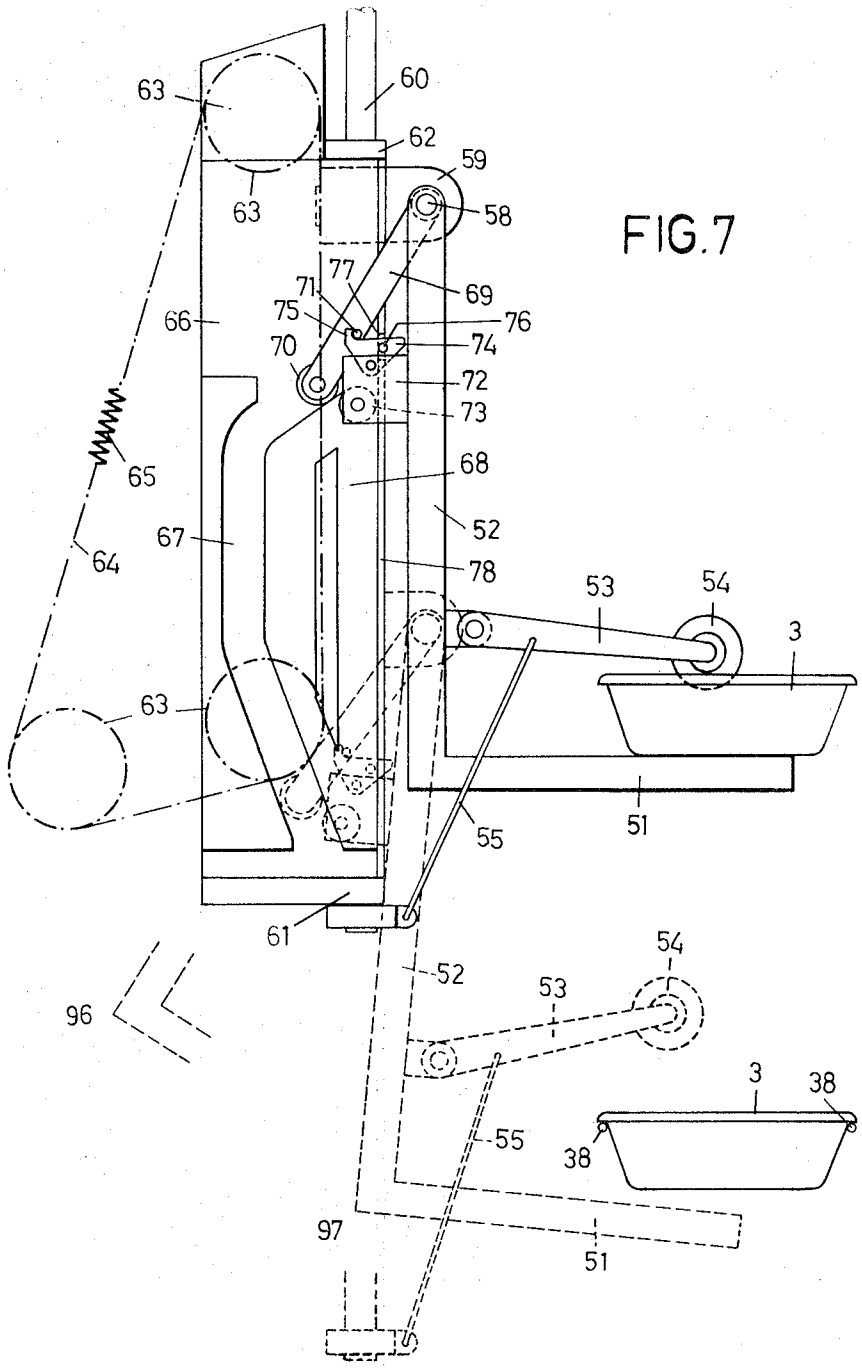

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FIG.7

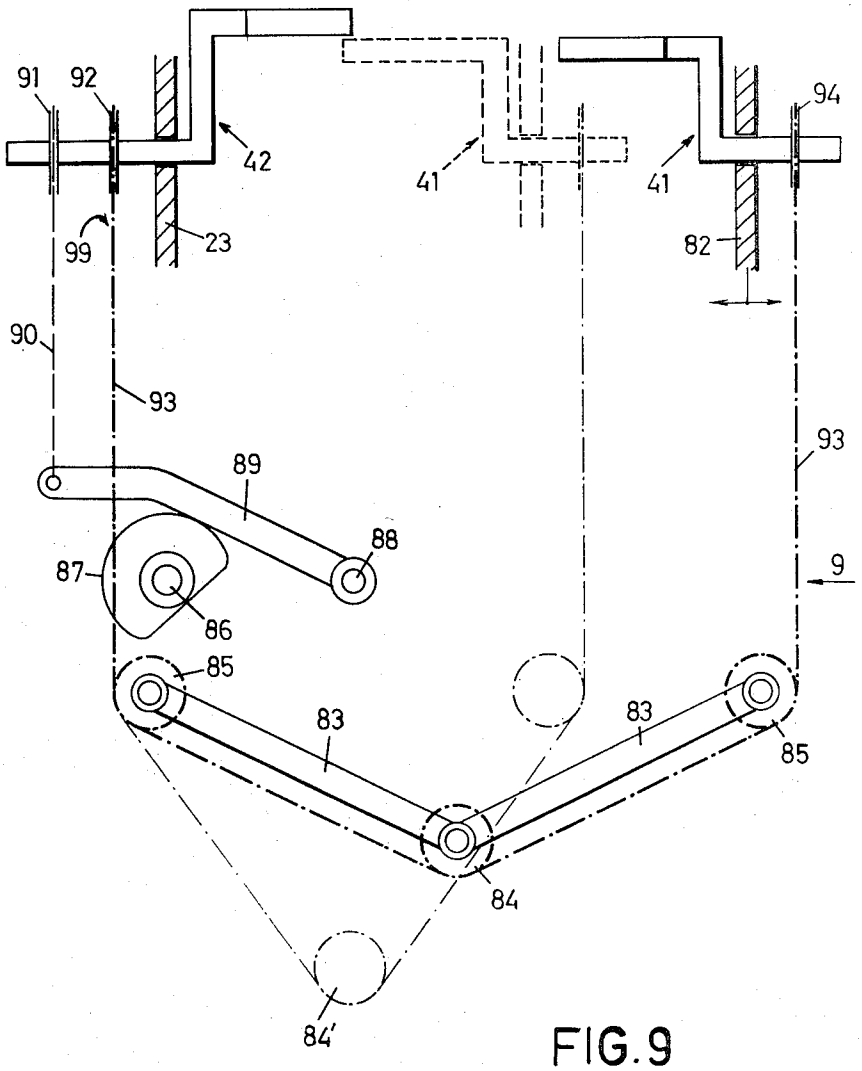


FIG.9

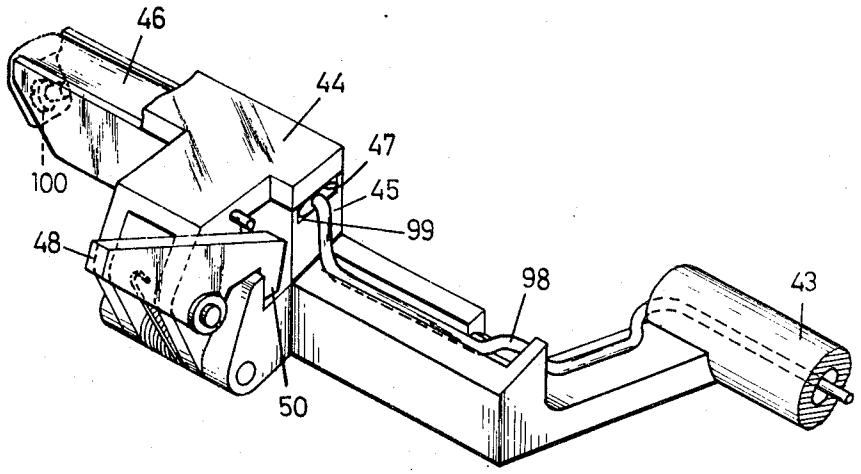


FIG.10

PACKING MACHINE

The invention relates to a packing machine, in particular for packing with stretch foil, as well as to a method applied thereby.

Stretch foil, which has several trade-names and is mostly manufactured of modified types of polyvinyl chloride, is a popular product for packing several kinds of perishable goods, inter alia in view of its favourable gas-permeable properties and the characteristic of not imparting an odour to the packed goods.

Such a stretch foil, which in dependence on the use is employed in thicknesses of 0.0125–0.025 mm, must preferably be subjected to a considerable stretch, for example 20 percent, and afterwards be wound about the product to be packed and sealed. Owing to the elastic stretch of the material the foil will closely fit around the packed product, which produces a visually attractive packing and a mechanically strong wrap. This type of foil has special electrostatic properties, as a result of which it crumples very easily and assumes an unsightly aspect, but which can be used to close a packing provisionally. Owing to local forces occurring during stretching of the material, said material is apt to tear along the edges.

In view of the above properties, mainly manual handling of stretch foil so far appeared to produce the best results. One of the resons for this is that with mechanical packing several grippers have to be used, which must alternatingly grip and release the foil, while after folding up the packing the gripper used must be released again in some way or other. This requires complicate constructional provisions, in which the generally used mechanical gripper, having several projections, may damage the stretch foil during release.

The object of the invention is to provide a stretch foil packing machine with which a product can reliably and fully automatically be packed and with which a high production rate can be realized.

To this end such a stretch foil packing machine is provided with a feeding device for the product to be packed, a support device on which the product can rest during packing, a foil-feeding device for the feed of foil in the proximity of the product to be packed, swivelling folding arms with gripping jaws for gripping the foil and folding it around the product, means for folding up foil wound around the product, and a discharge device for the packed product, the gripping jaws of the folding arms being provided with an elastic diaphragm which can clamp the edge of the stretch foil under the influence of a pressure medium.

By using a pressure diaphragm in the gripping jaws it is possible to engage a foil over a larger distance with a very evenly distributed force, while for releasing the foil after folding, the pressure medium needs only to be released, with no mechanically moving parts which may damage the foil being required.

In order to open the gripping jaws sufficiently for easily engaging a foil web and to reliably take up the forces occurring during clamping, it is possible according to the invention to provide a stationary gripping jaw portion connected to the folding arm and a movable gripping jaw portion hinged thereto, the two gripping jaw portions being lockable relative to each other in a closed position by means of a locking arm. Preferably the locking device is spaced from the free end of the gripping jaws. Thus only the relatively narrow gripping jaw portions themselves have to project over a larger distance into the packing during folding up, which promotes easy release.

In order to pack trays filled with goods in stretch foil, use is preferably made of two concentrically movable short folding arms which in the folding position reach beyond the terminal edges of the tray and two at least substantially concentrically movable long folding arms which in the folding position reach around the short folding arms to adjoin the edge of the tray to be packed.

In such a packing machine the foil can furthermore be fed by means of a foil pulling device with grippers movable in the feeding direction above a product to be packed, in which for the release of the pulling gripper there is provided an elastic pressure diaphragm which is so connected with a pressure medium source that when the folding arms clamp, the grippers of the pulling device are released.

As the invented packing machine is particularly for packing trays of constant width but varying length, the packing machine can be constructed substantially symmetrically in a further embodiment of the invention, wherein half the elements which move during packing are arranged in an auxiliary frame movable relative to the other half, the drives for the two parts having a symmetrically movable construction.

The invention will be elucidated in more detail with reference to the accompanying schematical drawings showing a preferred embodiment of a packing machine according to the invention. In said drawings,

FIG. **1** is a side view of part of the machine, showing the feed of packing material and of products to be packed;

FIG. **2** is a top view of the folding members of the packing section showing the foil pulling device in the right hand most position;

FIG. **3A** and **3B** are side views in accordance with FIG. **1**, showing the left hand and the right hand half, respectively of the upper folding-up portion of the packing section during two stages of the packing operation, as well as a foil pulling device;

FIGS. **4**, **5** and **6** show different stages during the folding of the packing material around the product substantially in elevation on the line IV—IV in FIG. **2**;

FIG. **7** shows in elevation, substantially on the line VII—VII in FIG. **3b**, two stages of packing during folding up, the elevational line VII—VII in FIG. **3b** substantially corresponding to line IV—IV in FIG. **2**;

FIG. **8** shows a detail view indicated by VIII in FIG. **3**;

FIG. **9** shows in side view the drive for one of the movements of the packing machine and the adjusting possibility thereof; and

FIG. **10** shows a folding arm with gripper in greater detail.

A machine **1** shown in the drawings is intended for packing in particular meat products or other perishable goods contained in a tray **3** in stretch foil **2**. In general the machine shown comprises a stretch foil feeding device **4** with a foil pulling device **5**;

a product feeding and lifting device **6**;

a foil folding device **7**;

a foil folding-up device **8**;

a packing discharge device not shown;

a drive **9** for the several movements.

With the exception of the stretch foil feeding and pulling devices 4 and 5, respectively, the machine is substantially symmetrically constructed. The foil feeding and pulling device is integral with the non-adjustable left-hand portion of the packing machine (FIG. 1, 2, 3A, 3B and 9). The right-hand portion in this drawing is displaceable in the horizontal direction to adapt the machine to different sizes of the trays to be packed.

The stretch foil feeding device 4 comprises a stretch foil supply roll 10, resting on two support rollers 11 and 12, whose rubber-coated roll 12 can be driven by an electric motor 13 with transmission. The foil web coming from the roller runs in FIG. 1 on the left along roll 12, between this roll and a resilient hold-down roll 14, downwardly along a downwardly—forced tension roll 16 mounted on levers 15, and subsequently via guide roll 17 over a guide plate 18. On the right-hand end of said plate there is a hollow cutter 19 having an incandescent filament 20, which will cut the foil web when it moves downwardly. One of the levers 15 operates in a lowermost position a switch 21 for the electric motor 13 by means of an abutment 22.

Normally the motor 13 will be energized, but it will be stopped if the lever 15 reaches the lowermost position. Thus, the feed rate of the stretch foil from the supply roller is independent of the feed-through rate in the packing section, whereby the tension in the variance of the stretch foil web owing to the mass inertia of the supply roller is prevented. The main frame of the machine is generally indicated by 23.

The foil pulling device 5 (FIGS. 1 and 2) comprises two intermittently reciprocable parallel chains 24 on sprockets 25. The centers of these sprockets are stationary with respect to the left-hand portion of the machine. A clamping bar 26 is provided between the two chains. The displacement of the chain drive with the clamping bar is governed by adjustable end switches not shown, which also control a chain drive motor not shown either. In the clamping bar there is provided a horizontal shaft 27. This shaft includes four spaced gripping jaws 28 which are urged by spring action against a lower gripping plate 29 connected to the clamping bar. At the end of shaft 27 there is provided a lever 30 with roller 31, which is adapted to coact with a stationary lozenge-shaped abutment 32 for engaging the edge of the foil web at the guide plate 18. In this arrangement the gripping jaws 28 are received in recesses 33 of the guide plate (FIG. 2). In this arrangement the lever 30 with roller 31 also coacts with a lever 34 mounted on the adjustable portion of the machine, which lever can open the gripping jaws in the right-hand end position of the foil pulling device under the influence of a hydraulic diaphragm 35 (see FIG. 3B).

Of the product feeding and lifting device 6, FIG. 1 only shows lifting arms 37 vertically movable along a guide 36. In the lowermost position of these lifting arms, each time a filled tray 3 is fed perpendicularly to the plane of the drawing by means of an intermittently reciprocable chain conveyor not shown. In the uppermost position of the lifting arms the tray 3 is taken over by horizontally movable support rods 38 (see FIG. 1 on the right).

The folding device 7 (FIGS. 2 and 4-6) comprises four folding arms 39, 40, 41 and 42 swivelling about horizontal shafts 43 extending in the feeding direction of the foil, which folding arms are on their extremities provided with moveable (—swivelling—) and stationary gripping jaw portions 44 and 45, respectively, connected to the arm. In the stationary jaw portion 45 (see FIG. 10) there is provided a diaphragm or hose 46 adapted to coact with a clamping face 47 on the movable jaw portion. For swivelling the movable gripping jaw portion 44, there is provided an arm 48 which can also lock the two gripping jaw portions relative to each other and which cooperates with a resilient abutment 49. The gripping jaws 44 and 45 are normally kept closed under spring action and locked by the locking arm 48 with a hook 50. In case of a downward movement of the folding arms 39—42, the abutment 49 will resiliently yield under the influence of the locking arm 48 (FIG. 4 on the right) but in case of an upward movement (FIG. 4 on the left) the gripping jaws will be opened. As appears from FIG. 2, the four folding arms together with the gripping jaws 44 and 45 engage the foil fed by the pulling device 5 over a great part of the longitudinal edges. After this the pulling grips 28 are released and the foil is cut. By swivelling the folding arms the foil is partly stretched and tightly drawn over the product to be packed (FIGS. 4–6).

After the foil has been folded around the tray, the partly packed tray is taken over by two horizontal support arms 51 of the folding-up device 8 (FIGS. 3A, 3B 6 and 7). These support arms 51 are attached to a vertical support rod 52, which is also provided with a hold-down roller 54 mounted on an arm 53. The arm 53 can be swivelled by a rod 55. On the horizontal arms 51 there is mounted a movable pad 56 which can coact with a guide face 57.

The movement of support arm 51 and hold-down roller 54 appears most clearly from FIG. 7. The upper end of the support rod 52 is hinged at 58 to a lug 59, which forms part of a guide rod 60.

This rod is reciprocable in stationary upper and lower guides 61 and 62, respectively, by means of a chain 64 arranged around three sprockets 63, the extremities of which chain are kept tensioned by a spring 65. A frame portion 66 in which the sprockets 63 are included and to which the guides 61 and 62 are attached is provided with a vertically bent guide 67 and a trapezoidal guide 68. In the pivot 58 there is provided an arm 69 which can move along the guide 67 with a roller 70. On the arm 69 there is positioned a connecting pin 71. On the vertical support rod 52 there is secured a projection 72, having a roller 73 movable in the guide 68. On this projection there is furthermore hinged a small connecting block 74 with hook 75 and control pin 76. This control pin is received, in the position shown in FIG. 7 in full lines, in a recess 77 located on the upper extremity of a vertical guide face 78 along which the control pin normally moves.

FIGS. 3A and 3B and 8 furthermore show two sliding plates 79 and 80 mounted one upon the other and movable in horizontal direction, which plates can fold in the flaps 81 of the packing.

As already observed, the packing section of the machine has a symmetrical construction, wherein in FIG. 1 the left-hand portion is secured to the frame of the machine, while the various movable elements of the right-hand portion are mounted, with the exception of the foil pulling device, on an auxiliary frame 82, which can be moved towards and away from the left-hand portion in the horizontal direction. Thus, the machine can be rendered suitable for packing products having

longitudinally different dimensions. The various elements of the left-hand and right-hand portions of the machine must move synchronously and to that end the various movable elements in the embodiment are provided with a chain drive. FIG. 9 shows by way of example a drive 9 for one set of elements, comprising symmetrically —hinged connecting rods 83 with gears 84 and 85.

A main drive shaft 86 is provided with a cam disc 87. This cam disc operates an arm 89 swivelling about a shaft 88. This arm 89 is urged against the cam disc 87 by spring action, while one end of the arm can move one of the moving elements, in this instance one of the folding arms 42, via a chain 90 and a sprocket 91. The movement of the folding arm is transmitted via a separate sprocket 92 and a chain 93 via the gears 84 and 85 to a corresponding sprocket 94 on the opposite folding arm 41. It is observed that the chain 93 may also be located opposite the chain 99 at the end of the arm 89, during which the spring force can engage the loose part of the chain wound over the sprocket 94 of folding arm 41. FIG. 9 shows in broken lines the position for packing shorter products. In this instance the sprocket 84 takes the position 84' between the rods 83.

The operation of the machine is as follows. Assuming that the lever 15 assumes its lowermost position, by which switch 21 takes such a position that the roller drive motor 13 is not energized, foil pulled through the foil pulling device 5 will move the tension roller 16 with levers 15 upwardly, so that the switch 21 is operated and the roller drive 13 is actuated again. In case of displacement of the foil pulling device 5 from the right to the left as shown in FIG. 1, the lever 30 will roll under abutment 32, whereby the gripping jaws 28 are opened. The gripping plate 29 will come under the guide plate 18 and when the abutment 32 is passed, the lever 30 springs upwardly again, so that the gripping jaws 28 will engage the foil adjacent the recesses 33 in the guide plate. On the leading edges of the guide plate 18 there can be provided springing grippers (not shown). These grippers keep the leading edge of the foil tight, so that it does not drop in the recesses 33, while it is thereby moreover prevented that under the influence of the tension roller 16 the foil will move backwardly over the guide plate 18. If the foil pulling device 5 is displaced, to the right in FIG. 1, the foil will be drawn to the right over the guide plate 18 and under the springing grippers into an extreme position defined by abutments.

During this displacement the roller 31 will move over the lozenge-shaped abutment 32, which is possible owing to a springing connection between lever 30 and gripping jaws 28. When the end position is reached, on the right in FIG. 3b, the roller 31 is freely disposed just under lever 34. The foil is therefore still being clamped by the foil pulling device 5.

Meanwhile a tray 3, for example filled with meat, and laterally fed in a conventional manner, will have been lifted via the lifting arms 37 along the guides 36 to just below the foil web. After this the horizontal support rods 38 will support the edges of the tray, after which the lifting arms 37 will move downwardly again. The foil above the tray 3 will subsequently be clamped by the four folding arms 39—42. These arms, which during the supply of the foil are positioned below the feeding path of the foil pulling device, are now swivelled upwardly. During this, the locking arm 48 moves along the abutment 49, whereby the jaws 44 and 45 are opened. The moment the lower gripping jaw portion 45 rests substantially against the foil, the locking arm 48 is released from the abutment 49, and the clamp 44 falls on the lower jaw by spring action. The two gripping jaw portions are thereby locked with respect to each other by a hook 50 on locking arm 48. As can best be seen from FIG. 4 on the right, this is due to the fact that the two hinge joints for the locking arm and for the movable gripping jaw portion are eccentrical with respect to each other. It is apparent from FIG. 10 that the stationary gripping jaw portion 45 is provided with a small hose 46. Oil is pumped into this small hose in a manner to be explained in more detail, so that this little hose, which originally has a flat shape, start bulging and forces the foil against the clamping face 47. From the same source, oil is also passed to a similar diaphragm-like hose 35 above the lever 34 (FIG. 3B). Owing to this, the lever 34 will swivel downwardly and release the grips 28 by means of the lever 30. In this manner a continuous engagement of the foil and a flexible take-over by the various grips is effected. At the same time the cutter 19 will move downwardly (FIG. 3A), as a result of which the incandescent filament 20, located therebelow, will cut the foil just before the leading edge of the guide plate 18.

As soon as the foil is clamped exclusively by the lateral folding arms 39–42, they start swivelling downwardly. As is best apparent from FIG. 5, the grippers are subjected to an outward displacement when said movement is initiated, as a result of which the foil is stretched. It has appeared that a stretch of about 20 percent does not only produce a particularly tightly packed product, but that owing to this stretch the resistance against penetration of the packing increases. The movements of the arms are such that the shortest arms 39 and 40 swivel completely inwardly, while the ends of these clamping arms move along the end walls of the container 3 up to the top edge, as is apparent from FIGS. 2 and 6. Somewhat later on the arms 41 and 42 swivel around arms 39 and 40 to the position shown in FIG. 6. The tray is now wound in the stretch foil on all sides, while the ends are still open.

After this the support arms 51 start moving to below the tray 3. This causes the rollers 54 to press on the top edges of the tray, so that the foil is clamped between the bottom of the tray and the support arms 51. Subsequently the support rods 38 are displaced outwardly, while the oil is drained from the grippers of the folding arms, so that the latter release. The support arms 51 then displace the tray upwardly, the foil between the gripping jaws being pulled away from the folding arms. During this upward movement the foil edges releasing from the grippers and the still unfolded flaps 81 are bent downwardly and pulled tight under friction between the guide faces 57 and the springing pads 56 on the arms 51. Subsequently the horizontal folding plates 79 and 80 move inwardly, as appears from FIG. 8, and the downwardly folded flaps 81 are pressed between the bottom of the tray 3 and the support arms 51. In this way the tray with the product contained therein is on all sides enclosed in the stretch foil. In the upper position of the support arms 51 the tray is discharged in transverse direction from the machine by a conveyor belt not shown, the bottom of the tray being passed over a heating plate sealing the foil at the bottom.

FIG. 7 shows the operation of the support arms 51 with support rolls 54. In the position drawn in full lines,

in which the arm **51** is in its uppermost position, the tilting pad **74** connects the vertical rod **52** to the arm **69.** During the downward movement, in which roller **70** initially performs a movement to the left, the lower part of rod **52** swivels outwardly to in the extreme position indicated by **96.** When the arm **51** reaches the lowermost position it will swivel inwardly substantially in the position as indicated by **97.** When the movement is further inwardly, the connecting rod **55,** connected to the lower end of the guide rod **60,** urges the roller **54** onto the edge of the tray **3,** and consequently the tray onto the support arm **51.**

In the lowermost position the control pin **76** of the tilting pad **74** rests against the vertical guide face **78,** as a result of which this tilting pad tilts away and the hook **75** releases the connecting pin **71.** Thus, during the upward movement, the rod **52** assumes the vertical position as drawn. While the roller **70** moves uwpardly via the guide **67,** the guide roller **73** moves through the right-hand branch of the trapezoid guide **68.** When the uppermost position is reached, the control pin **76** is received by the recess **77** of the upper end of the guide face **78,** so that the tilting pad **74** engages again with its hook **75** behind the connecting pin **71** and as a result of which the roller **73** follows the left branch of the trapezoid guide **68** during the subsequent downward movement. Owing to the fact that the hold-down roller **54** is then released again from the tray, said tray can easily be taken over by the horizontal discharge conveyor.

It is observed that the packing machine described is constructed for packing products of a predetermined width and a varying length. The width of the trays is in general 13.5 cm, while the length may vary from 8 to 27 cm. By moving the two halves of the packing section away from each other, the machine can simply be adapted to the length of the products to be packed. This displacement can be performed either by hand or controlled by end switches. When adapting the packing machine to different packing lengths the connecting rods **83** shown in FIG. **9** will perform a symmetrical movement, so that the total length of the chains provided around the sprockets **84** and **85** will not change, so that this displacement does not influence the synchronisation of the several components of the packing machine.

It is also observed that the two short folding arms **39** and **40** can be constructed identically, because they are always located beyond the ends of the trays. On the other hand, the folding arms **41** and **42** extend with their grips along the side edges of the trays. To engage the largest possible part of the foil on one side and to thereby prevent that the two grippers contact each other, the gripping jaws are mounted in a somewhat staggered relation with respect to each other, as is shown in FIG. **2,** so that in case of a shorter package than indicated in FIG. **2** the gripping jaws can lie one beside the other.

FIG. **10** shows a folding arm in greater detail. A small hydraulic conduit **98** is passed through the hollow swivel shaft **43** along the arm and to the stationary gripping jaw portion **45.** This conduit communicates with the small hose **46** mounted in a recess **99.** This small hose is made of polyvinyl chloride and is deformed to a flat oval by flattening in a hot condition. The extremity is passed around the end of the stationary gripping jaw portion and is tightened down by a small bolt **100.** If a hydraulic medium is supplied, the small hose will again tend to assume the circular form, as a result of which the stretch foil will be tightened, in case of a closed gripping jaw, against the clamping face **47** of the movable gripping jaw portion **44.** By loosening the small bolt **100** the diaphragm can be relieved. Of course, it is possible to use instead of a hydraulic medium also compressed air for deforming the hose diaphragm. Whereas in case of a hydraulic medium use is made of a hydraulic cylinder moved by means of a cam on the drive shaft, said cylinder being forced back by spring action, it is possible with compressed air to control valves by the cam, wherein the air of an existing compressed air conduit can be utilized.

For the sake of simplicity the drive of the machine is not shown further. As distinct from schematical FIG. **9,** the main drive shaft **86** extends in longitudinal direction of the machine and is provided with a number of eccentrics or cams **87.** On these eccentrics or cams press the several levers **89,** with which levers the rotary movement is converted into a reciprocal movement. One of these levers is used for reciprocating a hydraulic cylinder, by which in dependence on the rotation of the main shaft, which is driven by a geared electric motor, the grippers **28** can be alternatingly opened and engage the grippers of the folding arms and vice versa. A second cam disc serves for the horizontal feeding conveyor, not shown, for the trays **3,** with which said trays are fed on the lifting arms **37.** The same drive is utilized for the horizontal movement of the slide plates **79** and **80.** A third cam serves for lifting the lifting arms **37.**

Furthermore there is provided a separate drive for the swiveling movement of the two short folding arms **39** and **40,** as well as a cam disc for the swiveling movement of the folding arms **41** and **42.** A sixth cam disc serves for the vertical movement of the support arms **51** with gripping rollers **54** and also serves for the discharge of the trays from the support arms to the discharge conveyor. Finally, a seventh cam controls the horizontal movement of the support rods **38.** With the exception of the cam for the hydraulic cylinder the remaining six cams each time effect a symmetrical movement in the two halves of the packing machine. Use is made of two slide plates **79** and **80** moveble one above the other, the upper slide plate being provide with projecting edges corresponding with the shape of the bottom, so that if the flaps **81** are folded inwardly, they are slightly folded on the edges in conformity with the shape of the tray.

Not only the machine itself but also the feeding and discharge conveyor will be incrementally operable, while the seal plate mounted in the discharge conveyor will be thermostatically controlled in such a manner that the residence time of a packed tray is sufficient to make the portions of the stretch foil seal to each other.

Moreover, provisions may be made on the main drive motor for exhausting detrimental vapours formed during cutting of the foil. To this end, the cutter is hollow and has an opening directed to the incandescent filament therebelow. The vapours formed during cutting are then exhausted via said hollow sleeve to prevent the formation of rust on the various parts of the packing machine and any other damage.

It is observed that many parts of the machine may also have a different construction.

Thus, the supply of the products to be packed can also take place vertically upwardly, from the rear to the

fore, or from the left to the right. Also for the discharge of the packed products such variations are within the reach of a person skilled in the art.

The folding device **8** can also be constructed in a different, known per se manner.

Furthermore, a different construction can be chosen for the symmetrical drive of the two halves of the machine, if so desired. For example by using a long horizontal drive shaft with a very long gear along which a drive gear of the movable part of the machine is displaceable or by connecting a gear with a sliding key connection with such a drive shaft. The desired result can also be realized by synchronous, hydraulic or electric drive of the two machine parts.

I claim:

1. In a packing machine for packing a product in stretch foil including supporting means for supporting said product during packing operation, product feeding means for transporting said product to said supporting means, foil feeding means for supplying said foil to the vicinity of said product, swivable folding arm means provided with gripping jaws for engaging said foil and folding said foil around said product in a given direction, leaving, in the direction transverse to said given direction, a pair of opposite open ends loosely overlapped by the edges of said foil, folding means for folding said edges of said foil around said opposite ends of said product, and discharged means for discharging said product after packing in said foil from said packing machine, the improvement comprising an elastic diaphragm adapted to clamp the edge of said foil under the influence of a pressure medium provided in each of the gripping jaws of the folding arm means.

2. A packing machine according to claim **1**, characterized in that each gripping jaw comprises a first gripping jaw portion connected to said folding arm means and a second gripping jaw portion hinged thereto, the two gripping jaw portions being lockable with respect to each other in closed position by means of a locking arm.

3. A packing machine according to claim **2**, characterized in that the locking device is spaced from the free end of the gripping jaw.

4. A packing machine according to claim **1** for packing trays filled with goods in stretch foil, wherein said folding arm means comprise two concentrically movable short folding arms which extend in the folding position beyond the end edges of the tray, and two at least substantially concentrically movable long folding arms which in the folding position around the short folding arms extend to beside the edge of the tray to be packed.

5. A packing machine according to claim **1** wherein said foil feeding means includes foil pulling means with pulling grippers for holding and pulling said foil movable in the feeding direction above a product to be packed, an elastic pressure diaphragm for releasing the pulling grippers from engagement with said foil which diaphragm is so connected to a pressure medium member that upon engagement of said foil by said folding arm means of the pulling means are released.

6. A packing machine according to claim **1** wherein said machine is substantially symmetrically constructed, half of the elements moving during packing being arranged in an auxiliary frame displaceable with respect to the other half, the drives for the two parts being symmetrically movably constructed.

7. A packing machine for wrapping a product in stretch foil having a width sufficient for enclosing said product in the width wide direction said machine comprising retractable supporting means for supporting said product during the wrapping operation, product feeding means for transporting said product to said supporting means, foil feeding means for advancing a length of said foil sufficient for enclosing said product in the lengthwise direction lengthwise toward and over the position established by said product in said supporting means, swivable folding arm means swivable in planes transverse to the lengthwise direction of said foil and having gripping jaws provided with elastic diaphragms adapted to clamp the lengthwise edges of said foil under the influence of a pressure medium, said swivable folding arm means being adapted to stretch said foil widthwise around said product leaving a pair of open ends with short edges in the lengthwise direction of said foil, folding means for folding the short edges of said foil around said pair of open ends, and discharge means for discharging said product from said packing machine after wrapping in said foil.

8. A packing machine according to claim **7**, further comprising support arm means for engaging said product to hold said foil in the position achieved after being wrapped widthwise around said product so as to permit the release of said gripping jaws of said swivable folding arm means of said foil.

9. A packing machine according to claim **8** wherein said foil feeding means includes a means for advancing an indeterminate length of said foil lengthwise toward and over the position established by said product and severing means for severing said indeterminate length of said foil to yield a length of foil sufficient for enclosing said product in the lengthwise direction.

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