

Nov. 16, 1971

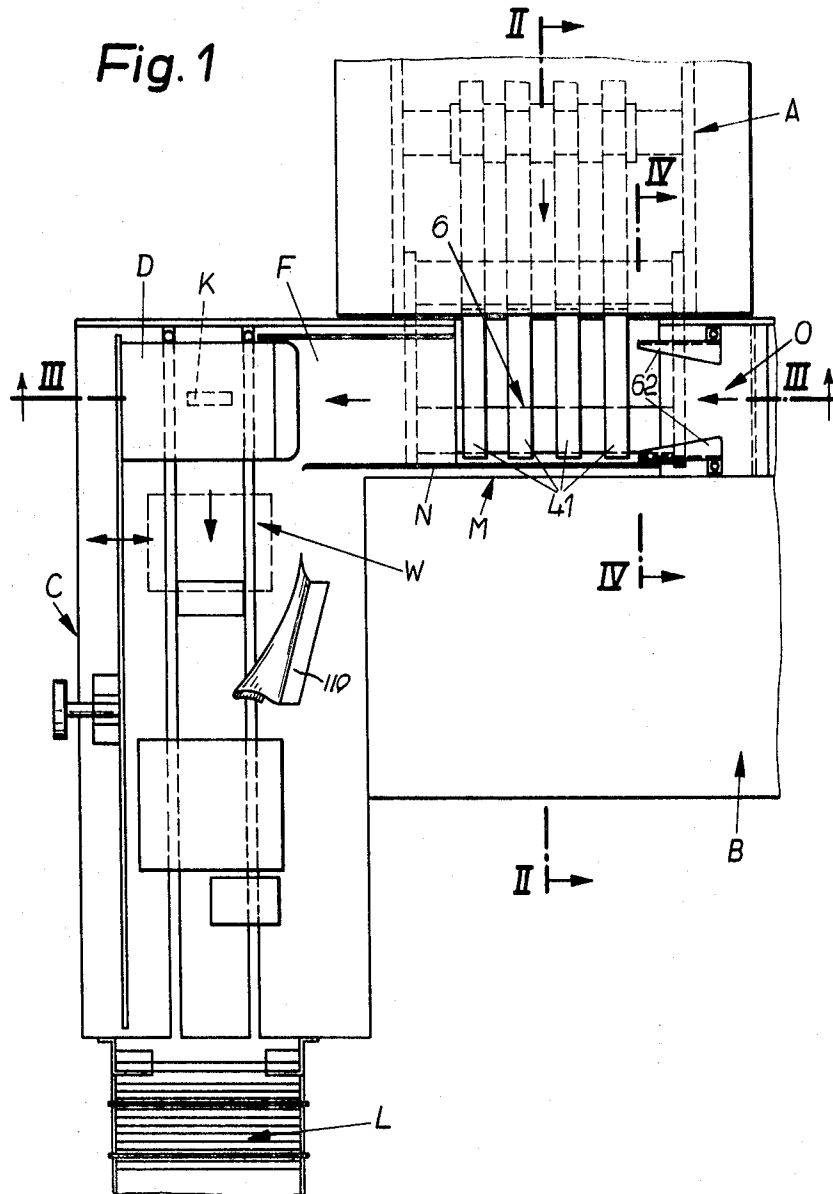
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3,619,973

SEMI-AUTOMATIC PACKING MACHINE FOR TEXTILES

Filed Nov. 14, 1968

8 Sheets-Sheet 1



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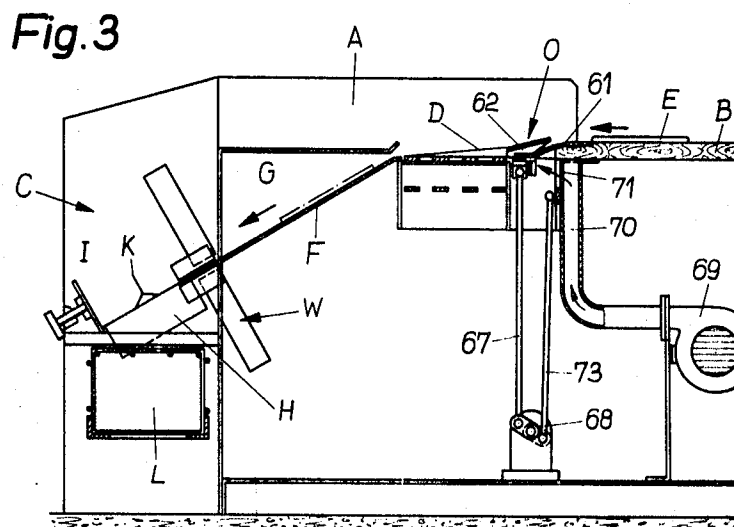
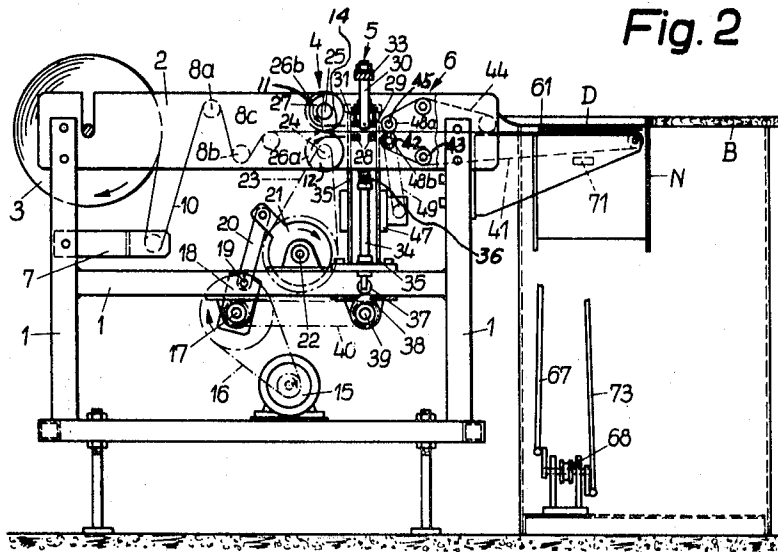
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SEMIAUTOMATIC PACKING MACHINE FOR TEXTILES

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8 Sheets-Sheet 2



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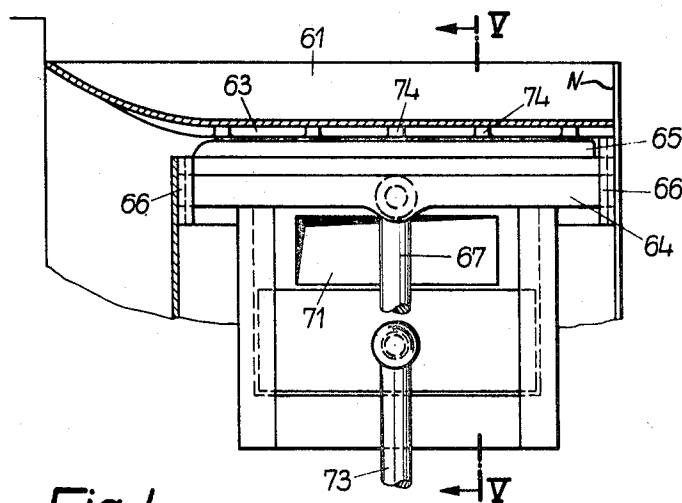


Fig. 4

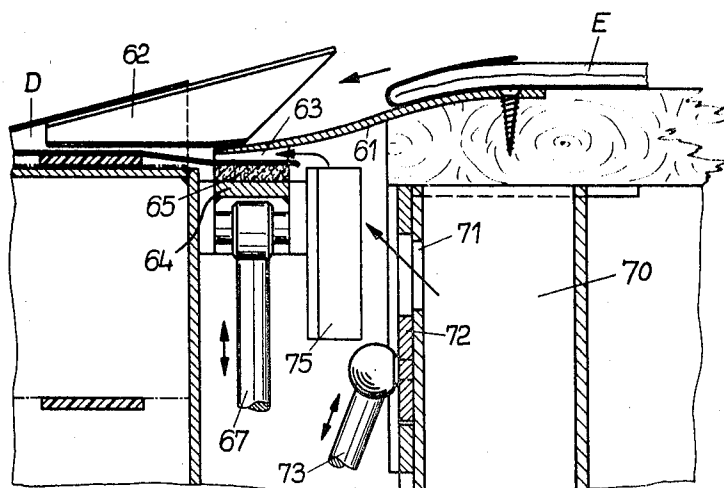


Fig. 5

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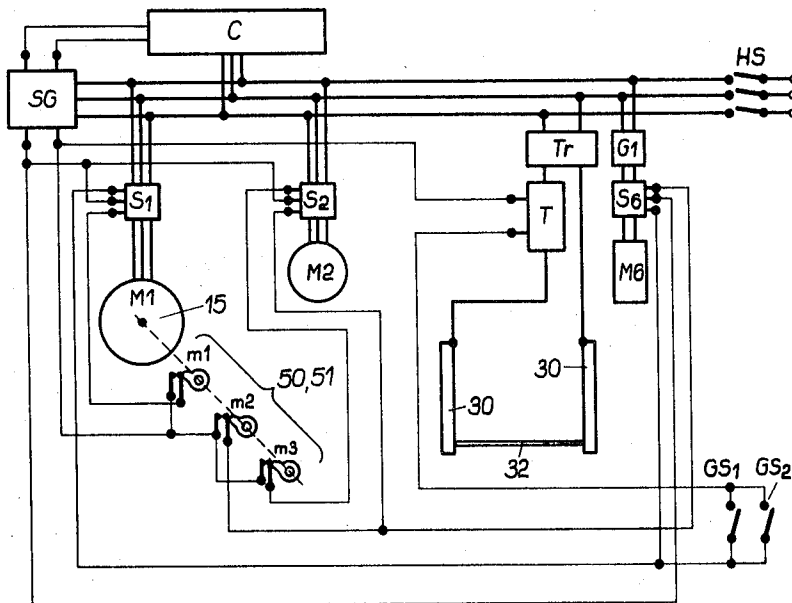


Fig. 6

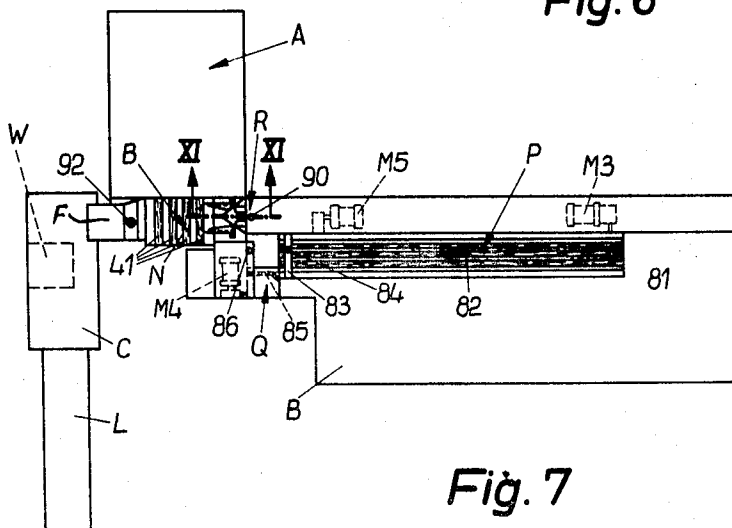


Fig. 7

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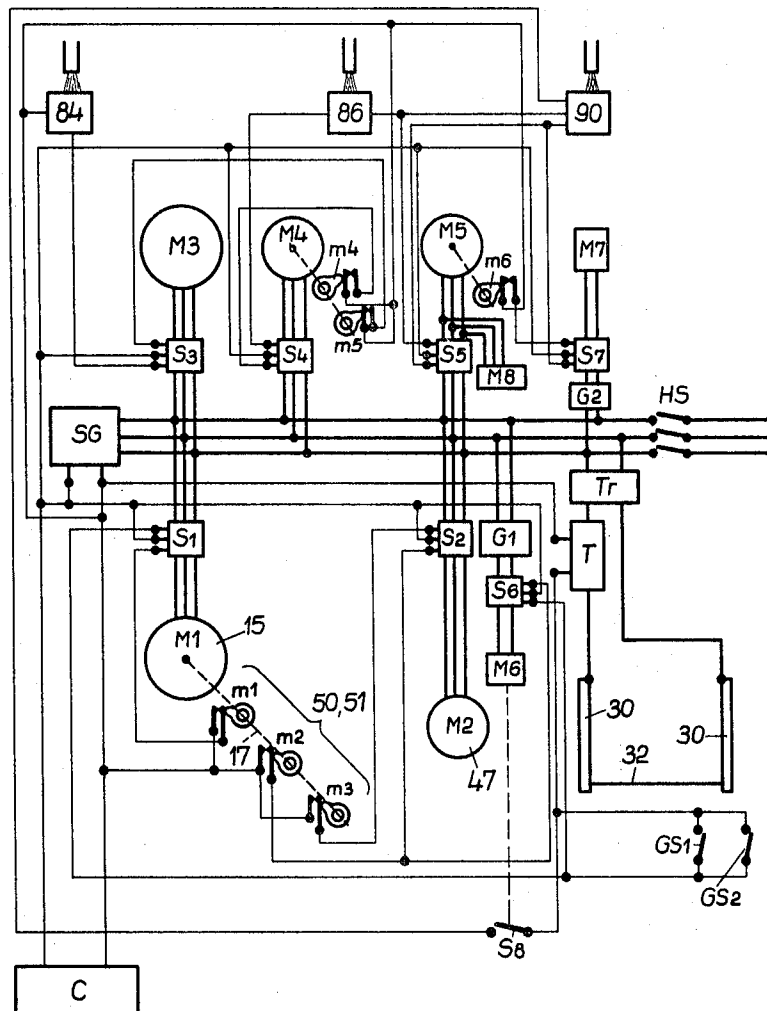
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Fig. 8



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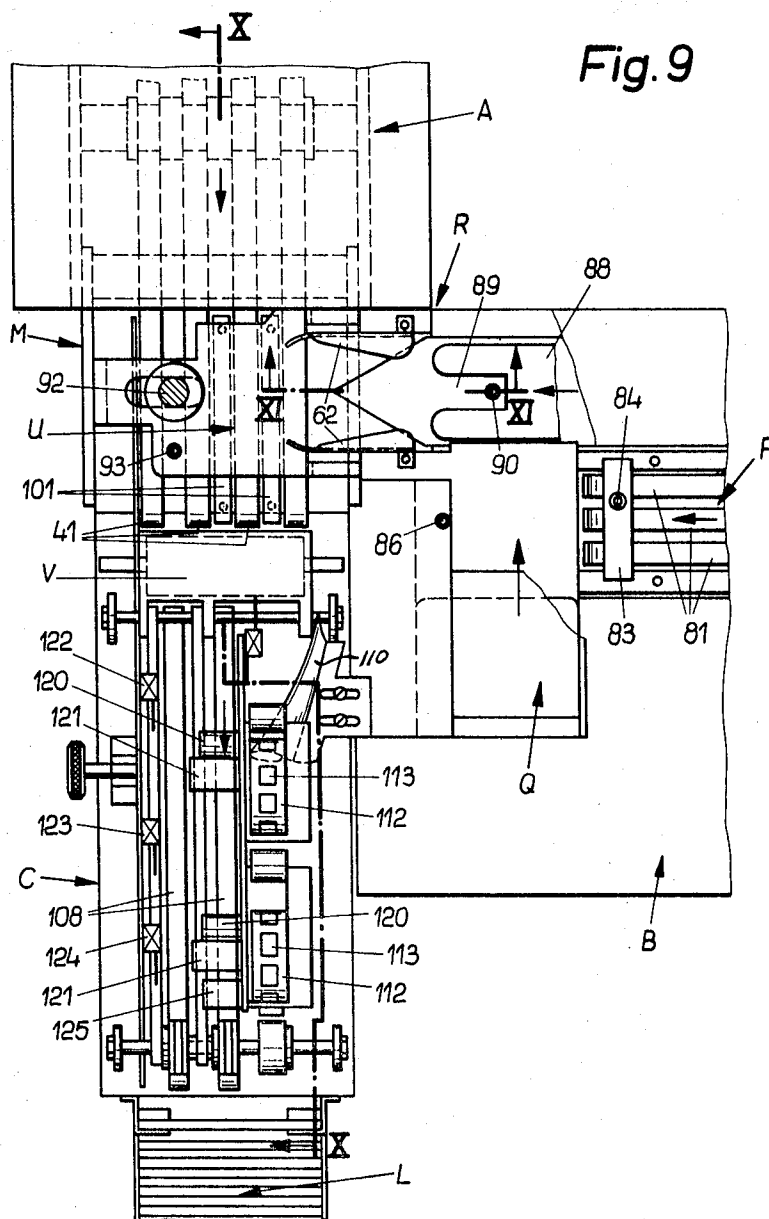
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8 Sheets-Sheet 6



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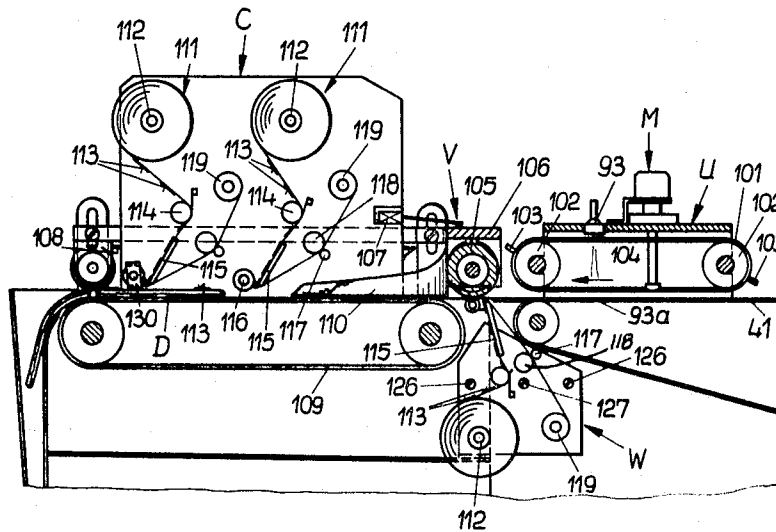
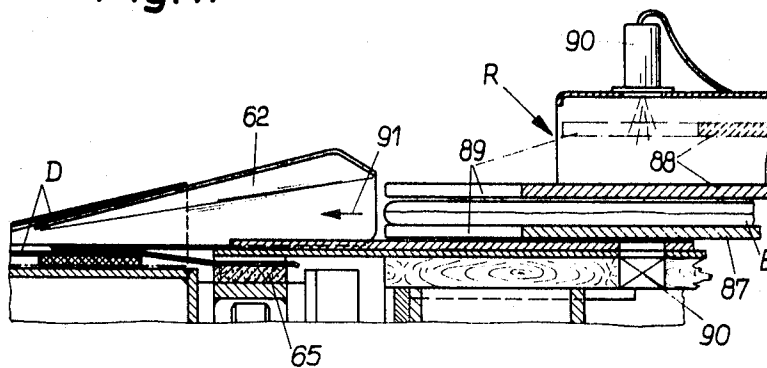


Fig. 10

Fig. 11



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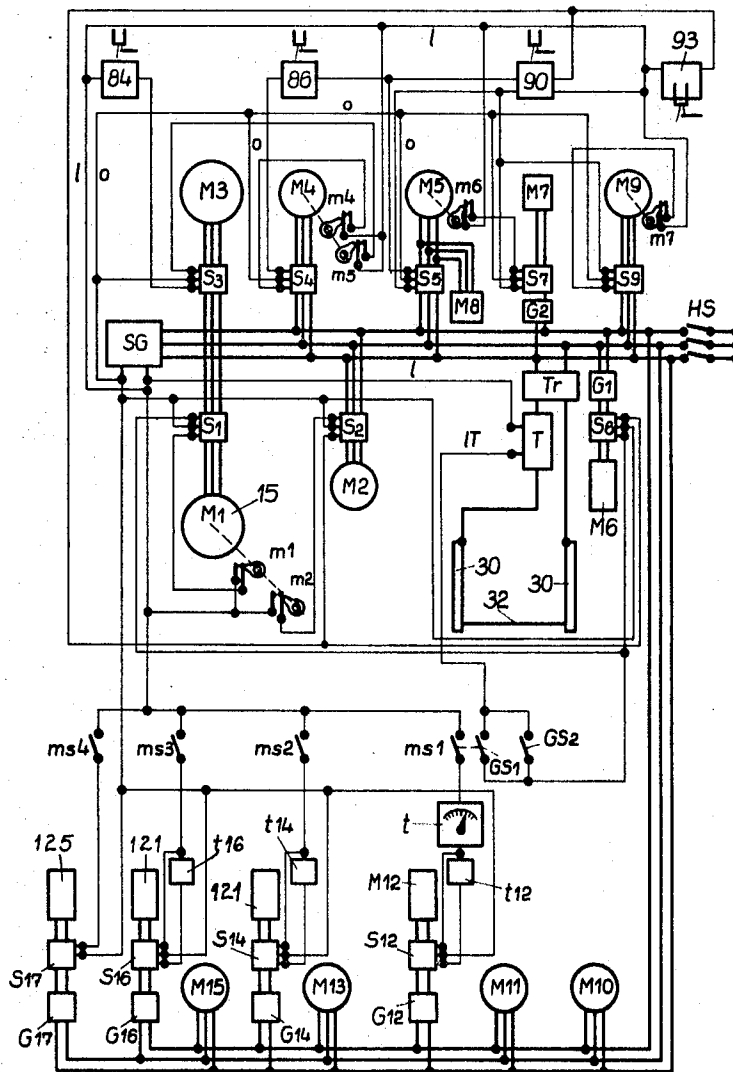
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SEMI-AUTOMATIC PACKING MACHINE FOR TEXTILES

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Fig. 12



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3,619,973 SEMI-AUTOMATIC PACKING MACHINE FOR TEXTILES

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U.S. Cl. 53—64 21 Claims

ABSTRACT OF THE DISCLOSURE

A packing machine for textile goods including a bag forming device, a bag filling station, and a bag closing device which simultaneously applies suitable labels to one side of the bag. The bags may be filled manually or automatically by a novel sliding feed assembly which inserts the goods into the bag and simultaneously removes the bag from a bag holding clamp. An additional novel labelling device may be provided to apply labels to the other side of the bag.

BACKGROUND OF THE INVENTION

This invention relates to a semiautomatic packing machine for packing folded goods, especially textiles, such as hosiery, underwear and similar goods, in welded plastic bags. The invention refers especially to semiautomatic packing machines consisting of a device for forming or welding bags from a plastic semi-tubular foil, preferably having sides of different lengths, which device ejects the finished bags by means of travelling endless conveyor belts to a packing table on which the bags are opened and the folded goods are inserted thereinto. The filled bags are then passed to a closing device which closes the bags, preferably with a flap, and applies designations concerning size and quality of the goods to the bags.

In the case of the known semiautomatic packing machines of this type, the primary disadvantages are that the machines operate at relatively slow speeds and that the bags ejected by the welding device are very difficult to open and fill because of the electrostatic charge which has accumulated thereon. In prior art machines, this electrostatic charge is caused by the fact, that the ejection conveyor belts of the welding device are relatively wide and of a relatively great length, and therefore have a relatively large contact surface with the bags. As a result, each time a finished welded bag is held in reverse between the conveyor belts prior to ejection to the packing table the bag can be charged electrostatically.

SUMMARY OF THE INVENTION

Accordingly, the primary object of this invention is to provide a speedy, semiautomatic packing machine in which the bag is easily opened and filled and is guided speedily through the machine from the bag welding device to the filled bag closure device.

This object is accomplished by the invention in which the ejection device of the bag welding device includes at least two relatively narrow, lower laterally spaced, endless conveying belts made of plastic material running in parallel, these belts extending into the region of the packing table and forming the support for the bags at the filling station of the packing table which station extends perpendicularly across the belts. One end of the filling station constitutes a material feed side for the goods and is provided with a bag holding device, a bag opening device, and a filling device for placing the goods into the bag. The other end of the filling station is provided with a discharge mechanism for delivering the filled bag to the closing de-

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vice. In this manner, the machine of the invention ensures that the bag is held between an upper pressing device and the lower conveyor belts only for such a length of time until its second welding seam is produced. As soon as the bag has been finished by the formation of the second welding seam, it is immediately ejected from the welding device and delivered to the filling station, where it is opened and filled. The upper pressing device also includes at least two travelling belts, hence the bag during ejection is no longer subjected to a surface friction after its manufacture. The contact surface between the bag and the relatively narrow conveying belts is relatively small, so that any unavoidable electrostatic charges are limited locally and can be isolated from the opening edge of the bag.

In the invention, it is particularly advantageous if the conveying belts and the upper pressing device are suitably controlled to operate intermittently so that they will run only during the bag ejection process. As a result, the friction between the conveying belts and the pressing device, which is required to tighten the foil sector employed to form the next bag, is decreased to a minimum.

In order to free the plastic semi-tubular foil of electrostatic charges which could perhaps accumulate inside the foil package or during the unrolling prior to the welding process, it is advantageous according to the invention to guide the plastic foil across metal rollers provided with electric grounding before the foil is delivered to the welding device.

In order to achieve a high degree of operational safety with as low cost drive mechanism of the ejection device as possible and of the foil feed device to the welding device, the invention advantageously provides a main control circuit for controlling the driving arrangements for the foil feed supply, for the vertical reciprocal movement of the welding head and for the bag ejection device delivering the bags from the welding device. The control circuit contains a first control switch controlled automatically by the bag closing device, a second control switch operated by hand or foot and arranged on the packing table, and a safety and time switch controlled by the heating circuit for the cutting and welding element in the welding device.

In one embodiment of the invention, the filling station is designed such that the goods are inserted by hand into the bag with the filled bag subsequently pushed from the filling station to the closing device. However, for a more speedy permanent operation, according to another embodiment of the invention, automatic insertion devices for the goods are provided and include a tong-like slide-in device, which grasps the goods and is guided for sliding movement into the bag as the bag is held open at the filling station. An electromagnetically operated and controlled holding device is provided for holding the goods and the bag during the return movement of the slide-in device out of the bag. In this latter embodiment of the invention, the slide-in device may include a lower metal plate to carry the goods into the bag and an upper metal late which is moved up and down and which descends upon the goods as the legs of a tong, with the plates having recesses on their front sides into which the holding device extends in the forward bag inserting position of the slide-in device and through which, in the retracted position of the slide-in device, a photoelectric cell operates to control the slide-in device. To reliably feed the goods into the bag filling slide-in device, a transverse conveying device is advantageously provided to laterally feed goods between the plates of the slide-in device with the slide device controlled by a photoelectric cell responding to the presence of goods between the plates.

In this same embodiment of the invention, the transverse conveying device is arranged adjacent a goods trans-

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port conveyor passing along a goods folding table provided with several operating positions, whereby the transport conveyor is controlled by a photoelectric cell located at the end of the transport conveyor and feeds individual goods to the transverse conveying device.

To prevent an electrostatic charge from accumulating on the bag after the goods are placed into the bag, the bag holding device, arranged on the goods feeding end of the filling station, is designed as a clamping holder which grasps or seizes the bag, the bag holder being controlled and operated by a motor or an electromagnet. The clamping force of the bag holder must be overcome at the end of the goods insertion process by the continued forward movement of the slide-in device after the goods have been introduced into the bag. This manner in which the bag is held in the filling station and separated after the goods have been introduced into the bag can be employed both when the goods are introduced by hand or when the goods are introduced automatically by the slide-in device.

In another varied embodiment of the invention, the bag closing device includes a bag conveyor mechanism longitudinally aligned with the conveyor belts of the bag welding ejecting device to form a continuous path of movement for the bags. The closing bag conveyor mechanism including an unloading device provided with fingers which reach behind the bag after it is filled and push the bag away from the filling station and onto the closing device. In this embodiment, the closing device is arranged at the same elevational level as the filling station, thus the filled bags are carried along the continuous path and are not directed angularly downwardly from the filling station as in the other embodiments. To provide a smooth and reliable transfer of the filled bags from the filling station into the closing device, the closing bag conveyor mechanism advantageously includes a roller transfer device to move the bags out of the filling station.

In a further embodiment of the invention, a gap is provided between the filling station and the closing conveyor mechanism, the gap being considerably narrower than the width of the bag and receiving an additional labeling device which is arranged below the filling station and extends into the gap. In this manner the bag is provided with labels on both sides, since the bag closing device similarly includes a particularly simple labeling device to close the flap of the bag by applying self-adhesive labels thereto. The additional labeling device, therefore, is provided for the purpose of attaching labels on the front side of the bag, whereas the bag closing device places labels on the rear side of the bag. A printing system can additionally be provided for one or several of these labeling devices by which statements concerning size, color and price may be printed onto the labels.

While the upper labeling devices provided as part of the bag closing are adjusted, as a rule, in such a manner that the flap of the bag will be closed with two labels, one label at each end, the arrangement of the label on the front side of the bag can be suitably arranged by adjustably mounting the additional labeling device obliquely relative to the closing bag conveyor mechanism. The control circuit for the additional labeling device and roller transfer device includes a variably adjustable electrical delay element which positions the bag to enable a label to be applied at any desired place on the front side of the bag. In order then to permit a label of the front side of the bag, to be applied at any point, the bag transfer device may project up to the filling station, and, if need be, beyond the ejection conveying belts of the bag welding device.

DESCRIPTION OF THE DRAWINGS

Several embodiments of the invention will now be described in detail with reference to the drawings in which:

FIG. 1 is a plan view schematically illustrating a first embodiment of the packing machine of the invention;

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FIG. 2 is an elevation view taken along line 2—2 of FIG. 1 and illustrating the bag welding device and the packing platform;

FIG. 3 is an elevation view taken along line 3—3 of FIG. 1 and illustrating the packing and bag filling station and the conveying device system for the closing device;

FIG. 4 is an enlarged, partially sectioned view taken along line 4—4 of FIG. 1 illustrating the bag filling station and bag holding device;

FIG. 5 is a partially sectioned view taken along line 5—5 of FIG. 4;

FIG. 6 is a schematic electric control circuit for the bag welding device which may be controlled automatically by the closing device or manually;

FIG. 7 is a plan view schematically illustrating a second embodiment of the packing machine according to the invention;

FIG. 8 is a schematic electrical control circuit for the packing machine embodiment according to FIG. 8;

FIG. 9 is a plan view illustrating a third embodiment of the packing machine according to the invention;

FIG. 10 is a sectional view taken along line 10—10 of FIG. 9;

FIG. 11 is a sectional view taken along line 11—11 of either FIG. 7 or FIG. 9 and illustrating the bag-filling device for a packing machine according to the embodiments of FIG. 7 or FIG. 9; and

FIG. 12 is a schematic electric control circuit for controlling the packing machine embodiment according to FIGS. 9 and 10.

DESCRIPTION OF SEVERAL EMBODIMENTS

In the embodiments shown in the drawings, the packing machine according to the invention consists of a device A for forming or welding bags from plastic semitubular foil or a plastic web longitudinally folded over upon itself with one side longer than the other to provide a bag flap, a textile goods folding and packing table B, and a bag closing device C.

In the embodiment according to FIGS. 1 to 6, the bag D ejected from the bag welding machine A is opened on the folding and packing table B and the folded goods E are introduced by hand into the bag D. When the goods E are fully inserted into the bag D, continued forward motion of the operator's hand will release bag D from the bag clamp and push the filled bag onto a downwardly inclined sliding surface F, as shown in FIG. 3 by the dash-dot line. The bag then slides in the direction of arrow G onto the conveying mechanism H of the bag closing device C against a support and guide rail I. When filled, bag D is initially deposited on conveyor H and activates operating element K to close control switch GS1 (see FIG. 6), which functions to turn on the bag welding machine A to form the next packing bag and also initiate operation of the closing device C.

The bag closing device C is constructed in a known manner and serves to close the flap of the filled bags D and to provide the bags with descriptions of the goods concerning size and quality. The closed packages are then delivered from the closing device C into a storage space L.

As shown particularly in FIG. 1, the bag welding machine A projects with its bag discharge and ejection device 6 into the filling station M of the folding and packing table B. The bag discharge and ejection device 6, as shown in the example, includes four lower, relatively narrow laterally spaced, parallel running conveying belts 41 which project into the region of table B and form the support for the bags at the filling station M of packing table B. Filling station M includes a front wall guide member N and has at one end a bag holding and opening device O which cooperates with a feed mechanism to insert the goods E into the bag. At the other end of filling station M is downwardly inclined chute F by which the filled bags are delivered to conveyor H. The upper pressing device

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44, which comprises a plurality of endless belts correspondingly aligned with conveying belts 41, is relatively short, that is, equal in length to about one bag width, and, therefore, will not extend into the region of the packing table B and filling station M as do lower belts 41.

As illustrated in FIG. 2, the bag welding or forming machine includes a machine frame 1 supporting a roll 3 of semitubular or longitudinally folded foil 10, a foil feeding device 4, a welding device 5 and a bag discharge and ejection device 6 on two upper supporting and bearing plates 2, which are parallel and laterally spaced from each other. A foil stretching and guiding device is arranged between the roll 3 and the feeding device 4, and comprises a foil stretcher 7 pivotally attached to the machine frame 1 and guide rollers 8a, 8b, and 8c mounted on and extending between the holding and bearing plates 2.

The foil feeding device 4 consists of two oppositely rotatable rubber rollers 11 and 12 having peripheral grooves with which wiper elements 14 engage in order to guide foil 10 safely into the operational area of the welding device 5.

The drive assembly for the foil feed device 4 includes an electric motor 15 provided with a built-in, automatically locking drive unit. Motor 15 drives a control shaft 17 via a chain drive 16, with shaft 17 driving the cam operated mechanism which reciprocates the welding device 5 and also being provided with electric control elements for the machine. A crank 18 is disposed on one end of control shaft 17, with the actual crank element 19 being radially adjustable on element 18 relative to shaft 17. A connecting rod 20 is connected to the crank assembly 18, 19 and drives a rocking lever 21 which when oscillated in the direction of the arrow produces a partial revolution of shaft 22, but which when oscillated in the opposite direction runs freely on shaft 22. As a result, for every revolution of the crank 18, 19, shaft 22 is partially rotated in the direction of the arrow, with the amount rotation of shaft 22 determined by the radial adjustment of the crank element 19. This partial revolution is transferred to the axis 24 of the lower rubber roller 12 via a chain drive 23. The upper rubber roller 11 is driven by the lower rubber roller 12 at an equal speed but in an opposite direction by cooperating intermeshing spur gears 26a and 26b which are attached respectively to lower roller driving shaft 24 and upper roller driving shaft 25. In addition, a reverse drive lock mechanism 27 is mounted on shaft 25 and permits rotation of shaft 25 and upper roller 12 only in the foil feed direction indicated by the arrows and locks shaft 25 against rotation in the opposite direction thereby preventing a length of foil from being pulled backwardly through rollers 11 and 12 once it has been fed to the welding device 5.

The welding device 5, as FIG. 2 shows, contains two lower fixed clamping bars 28, which are provided on their upper side with a coating on which the foil 10 will not slip. A pair of perpendicularly movable clamping strips 29 are arranged above foil 10 opposite the fixed clamping bars 28. These clamping strips 29 are vertically movably mounted on and across spaced guide arms 30 which themselves are vertically movable relative to plates 2 at each side of foil 10, the strips 29 being pressed downwardly by compression springs 31. A heated foil cutting and welding wire 32 extends between the guide arms 30. At their upper end, the two guide arms 30 are connected to a guide bar 33 extending transversely across the machine, each end of the bar 33 being attached to the upper end of a guide rod 34 each of which is movable vertically in a guide frame 35 attached to bearing plate 2 on the outside of the machine frame 1 with the operating spring 36 pressing rod 34 downwardly. Each guide rod 34 carries a cam follower roller 37 at its lower end, with roller 37 running on rotating cam 38. The pair of cams 38 are arranged on each side of the machine and mounted on a common cam shaft 39, which is driven from the control shaft 17 via chain drive 40. The cams 38 are normally positioned to retain the

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welding device 5 in a raised rest position as in FIG. 2 against the bias of springs 36. As soon as the cams are rotated, the springs 36 will urge the welding device 5 downwardly, whereby initially the clamping strips 29 will press the foil 10 firmly against the clamping bars 28 and then, upon continued downward movement of bars 30, the hot separating and welding wire 32 will pass through the foil 10 and, in doing so, will cut the latter and will weld the two developing resulting severed edges. As cams 38 continue to rotate, the welding device 5 will again be raised to its upper rest position.

The bag discharge and ejection device 6 arranged immediately after welding device 5 comprises a plurality of laterally spaced, parallel running, lower conveying belts 41, each of which is pulled across a driving roller 42 provided with peripheral grooves and a stretching and guide roller 43. An equal number of aligned pressing belts 44 are provided above the conveying belts 41, with belts 44 also being driven by a driving roller 45 provided with peripheral grooves and drawn across stretching and guide rollers 46. A separate drive motor 47 is provided to drive the discharge and ejection device 6 and is controlled by switch assemblies 50 arranged on the control shaft 17 (see FIG. 6). To uniformly drive the conveying belts 41 and the pressing belts 44, the drive shafts of the driving rollers 45 and 42 have respective intermeshing spur gears 48a and 48b, with a common drive being accomplished by the driving motor 47 via a chain drive 49 to the shaft of the driving roller 42. The driving motor 47 is such that the running speed of the conveying belts 41 and pressing belts 44 is always higher than the peripheral speed of the rubber feed rollers 11 and 12, thereby rapidly removing a finished bag from the welding device.

The method of operation of the bag welding machine A will now be described in more detail with particular reference to the control circuit of FIG. 6. When the main switch HS is closed, the heating circuit for the separating and welding wire 32 is immediately energized via a transformer TR or a series resistance. Moreover, upon closure of main switch HS, a control voltage device SG which feeds control current to the various circuits of the foil welding machine is also energized. The main control circuit of the bag welding machine runs from the control voltage device SG to a safety and time switch T, the operation of which is controlled by the heating circuit of the separating and welding wire 32. Upon closure of main switch HS and flow of heating current to the separating and welding wire 32, a time element contained in the safety and time switch T will operate only after a certain period of time has elapsed to permit the main control circuit to be closed, the period of time being sufficient to heat the separating and welding wire 32 to its required operating temperature. This insures that the welding wire is sufficiently hot to weld the severed foil edges before the welding device 5 is activated.

In the schematic of FIG. 6, the main control circuit includes the safety and time switch T and instrument switch GS1 which is operated by the operating element K positioned at the beginning of the closing conveyor or mechanism H (see FIGS. 1 and 3) and will be automatically closed when a filled bag D engages the operating element K. A second instrument switch GS2 arranged in parallel with switch GS1, is attached to the packing table B and may be operated by hand or foot. The main control circuit runs from instrument switches GS1 and GS2 to the energizing coil of switch S1 for drive motor 15 from which the foil feeder device 4 and the welding device 5 are driven. Motor 15 when energized causes a revolution of the control shaft 17 on which the cams 51 for the control switches 50 have been arranged. As described above, a revolution of shaft 17 causes a partial revolution of shaft 22 and corresponding rotation of rubber rollers 11 and 12 to feed a predetermined length of foil 10 from roll 3 across stretcher 7 and guide rollers 8a, 8b and 8c to welding device 5, the length being determined by the radial

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adjustment of crank assembly 18, 19. Guide rollers 8a, 8b and 8c are preferably made of metal especially when foil 10 is a semi-tubular foil having sides of differing lengths, with the rollers being electrically conductively connected to the machine frame, which itself is grounded via the zero conductor of the main circuit connection. Therefore, the metal rollers 8a, 8b and 8c discharge any possible electrostatic charge from the semi-tubular foil 10. The length of foil drawn off by the rubber rollers 10 and 11 is guided via the wipers 14 through the area of the welding device 5 and is grasped by the discharge end ejection device 6. To control the drive motor 47 of the discharge and ejection device 6, a switch m3 is provided in the cam and switch assembly 50, 51 of the control shaft 17 and controls the flow of current from the control voltage instrument SG to the energizing coil of switch S2 of motor 47. Thus, the discharge and ejection device 6 will be operated by this secondary control circuit immediately after completion of the cyclic movement of welding device 5 to eject the welded finished bag and to grasp and receive the next length of foil delivered by the rubber rollers 11 and 12 to pre-tension it for the next welding process. The time necessary to complete the cyclic movement of the welding device 5 is provided by the motion of the crank and free wheeling drive elements 18, 19, 20, 21 which initially move through a no-load stroke with lever 21 rotating freely on shaft 22 in a direction opposite that of the arrow and subsequently, move through a drive stroke in which lever 21 rotates in the direction of the arrow to rotate shaft 22 and rubber rollers 11 and 12.

At the end of the revolution of control shaft 17, switches m1 and m2 will be closed. Closure of switch m1 supplies current from the control voltage instrument SG to the deenergizing coil of the switch S1 to thereby deenergize motor 15. Closure of switch m2 supplies current from the control voltage instrument SG to the deenergizing coil of the switch S2 to thereby deenergize motor 47. The switches S1 and S2 can be provided in a known manner with mechanical or electrical automatic stop devices, which will keep the motor switches closed during the time between the operation of the energization coil and the operation of the deenergization coil.

During a bag forming process, a predetermined tension is maintained on the foil 10 between the roll 3 and feed rollers 11 and 12 by the reverse lock mechanism 27 on the upper rubber roller 11 and through the brake provided in the customary manner on the roll 3. The tension on the predetermined length of foil extending from the feed rollers 11 and 12 through the area of the welding device 5 and grasped by the ejection device 6 will also be maintained by the self-locking ejection drive motor 47. The drive for the feed device 4 will only become effective whenever the bag welding or forming process has been completed, the welding device 5 is again in its rest position, and the discharge and ejection device 6 has already started to eject the finished bag. Because of the tension constantly prevailing on the foil 10, any play in the drive system for the rubber feed rollers 11 and 12 will also be neutralized or eliminated before the feed rollers become effective to deliver the next length of foil to the welding device.

By controlling the movement of the lower conveying belts 41 and upper pressing belts 44, so that they move at the same speed only when a bag is being ejected, thereby reducing sliding friction forces between the belts and the bag, the development of electrostatic charges on the bags will be eliminated or minimized in the ejection device 6. Moreover, the outside belts 41 and 44 adjacent the open end of the bag into which the goods are fed, are positioned a distance from the edge of the bag opening, so that under no circumstances would any electrostatic charge build up at this edge which might render opening of the bag difficult.

The bag holding, bag opening, and goods feeding devices are positioned at one end O of filling station M. As

shown particularly in FIGS. 3-5, the feed device includes a feed strip 61 leading from the plane of the packing table 12 downwardly to the plane of the conveyor belts 41. Mounted below the transition strip 61 and the packing table B are pneumatic bag opening devices and a bag clamping device, which holds the flap of the bag which is formed by the leading edge of the longer bottom side of bag D. In addition, conventional pivotable wedge-shaped bag openers 62 reach into the bag openings to expand the bag and aid in introducing the goods E into bag D.

As illustrated in FIGS. 4 and 5, the bag holding device consists essentially of a pressure pad 63 attached to the underside of the feed strip 61 and constructed of resilient material, e.g., foam plastic, and of a vertically movable clamping bar 64 having an upper foam plastic pad layer 65 coacting with the pressure pad 63. The clamping bar 64 is guided for vertical movement by guideways 66. A connecting rod 67 is attached to the bottom of clamping bar 64 and is controlled by a motor via a crank drive 68.

The pneumatic bag opening device as shown in FIGS. 3 and 5, consists of a blower 69, whose exhaust channel 70 has an opening 71 at its upper end below the transfer strip 61, and a slide 72 serving to open and close opening 71. The slide 72 is vertically operated by connecting rod 73 from the crank drive 68 in push-pull fashion with connecting rod 67. As a result, the exhaust opening 71 is opened as soon as the clamping bar 64 is moved upwardly to clamp the bag flap between the pads 63 and 65. The pad 63 is provided with slots 74 through which air is blown into the bag. A deflection shield 75 is positioned below the feed strip 61 to direct air from the exhaust opening 71 into slots 74.

Referring to FIG. 6, automatic control of the above described bag holding, bag opening, and goods feed devices is accomplished by a motor or an electromagnet M6 which is connected with the power supply by a rectifier G1 and a contact switch S6. The contact switch S6 is energized by the cam switch m2, so that upon stopping motor M2 of the ejection device 6 of the bag welding machine, operation of the bag holding, bag opening, and goods feed devices is initiated.

As soon as the bag has been fully expanded by the air from blower 69, the wedge-shaped bag openers 62 swing into the position shown in FIGS. 1, 3 and 5, in which they reach into the bag opening and hold it open for the introduction of the goods. When this occurs, the air flow through opening 71 is interrupted by closing slide 72 through the proper adjustment of the crank drive 68. The folded merchandise E according to the embodiment of FIGS. 1 to 6, is then inserted by hand into the bag D. By continuing the forward movement of the operator's hand, the filled bag D is pushed forwardly so that its flap will be released from between the foam plastic pads 65 and 63. The filled bag then reaches the inclined surface F over which it slides downwardly to the conveying mechanism H of the closing device C where it engages actuator K to close switch GS1 to initiate operation of the bag welding machine and a switch (not shown) to initiate operation of the bag closing device C to close the bag which has just been filled. Upon closure of the switch GS1, the bag welding machine is controlled to form the next bag and simultaneously therewith the deenergizing coil of the contact switch S6 is activated, so that the electromagnet M6 for the bag holding, bag opening, and feed devices is deenergized. The bag closing device C, as FIG. 6 shows, is connected with its control elements and with the control instrument SG in circuit with the main supply line of the machine. The construction and control of the bag closing device C, however, will be explained in more detail below when referring particularly to the embodiments of FIGS. 9 to 12.

In the embodiment shown in FIGS. 7 and 8, the folding and packing table B is provided with two work stations. At the rear of the folding and packing table B, a convey-

ing path P consists of endless conveying belts 81 which move in the direction of arrow 82 to carry the folded goods placed thereupon by operators to the transverse conveyor mechanism Q. At the end of conveying path P, a photoelectric device 84 is mounted on a bridge-like cross support 83 under which the goods pass piece by piece. The photoelectric device 84 includes a light source mounted on the bridge 83 and a photoelectric receiver element arranged between the conveyor belts 81. Photocell 84 stops movement of conveying belts 81 when a piece of goods is positioned below bridge 83 and when the transverse conveying device Q is not yet ready to receive that piece of goods. In this manner the folded goods are introduced piece by piece onto the transverse conveying device Q only when device Q is ready to receive the goods.

Essentially, the transverse conveying device Q includes a traversing cross slide 85, which is moved forward transversely relative to the conveying path P by means of a motor. A photoelectric device 86 is provided to control movement of the cross slide 85. As soon as the cross slide 85 is in its starting position, it will switch on the drives of the conveying belts 81 of the conveying path P. The conveying belts 81 are then driven to transfer a first piece of merchandise which has been held in readiness underneath bridge 83 into the path of cross slide 85 and to move a next piece of goods into the light area of photocell 84 which stops movement of conveyors 81. The first piece of merchandise will enter the light path of photocell 86, thereby causing the drive motor for the cross slide 85 to be energized to move the slide 85 forwardly and introduce the piece of merchandise laterally into the feed and insertion device R. The cross slide 85 is then returned to its starting position immediately and the cyclic operation repeated.

As shown in FIGS. 7 and 11, the mechanical device R which introduces the merchandise into the bag contains a tong-like insertion device, which consists of a lower sheetmetal plate 87 and an upper sheetmetal plate 88 between which the merchandise is placed by slide 85. The two sheetmetal plates 87 and 88 have on their front surfaces grooves 89 through which the light of photoelement 90 passes when the inserting device R is in the rest position. When the merchandise E is placed between the sheetmetal plates 87 and 88 by the cross slide 85, it interrupts the light path of the photoelement 90 which operates to switch on the closing circuit of the tong-like insertion device R, causing upper metal sheet 88 to lower from its normal rest position shown in a dash-dot line in FIG. 11 into pressing engagement with merchandise E by means of an electromagnet acting against a biasing opening spring. Simultaneously, the feed motor M5 for the insertion device R is energized to push the plates 87 and 88 with the merchandise E lying between them through the bag openers 62 into the bag D which has already been expanded and is held open. The construction and control of such bag openers 62 per se are known and are the same as in the embodiment given by way of example in FIGS. 1 to 6.

The forward movement of the sheetmetal plates 87 and 88 and the merchandise E lying between them is continued far enough so that the bag D with its flap will be pulled away from the holding device 65 and will be pushed forwardly as far as the inclined support surface F. A clamping holder 92 is positioned above the inclined surface F and includes an operating electromagnet, which at the end of the forward stroke of the insertion device R, is energized by the drive mechanism for insertion device R. This causes clamping holder 92 to extend through the front recesses 89 of the sheet metal plates 87 and 88 and seize the bag D and the merchandise E, holding the latter firmly during the return movement of the insertion device R, so that plates 87 and 88 will slip out of bag D, while the merchandise E remains therein. The plates 87 and 88 of the insertion device R are returned to their starting position, at which time photo-

element 90 will again conduct, causing the electromagnet of the clamping holder 92 to be deenergized whereby the clamping holder 92 releases the bag D and the merchandise E. The filled bag then slides along the surface F into the bag closing device C, the operation of which continues in the same manner as in the embodiment shown in FIGS. 1 to 6. Moreover, the photodevice 90 releases the control for the cross slide Q and, if need be, also the control for the conveying path P, so that the next working cycle can be initiated. The bags are closed and labeled with the necessary information as they pass through the closing device C into the storage space L.

The method of operation of the packing machine according to the embodiment of FIG. 7 will be explained in more detail in the following paragraphs with particular reference to the circuit diagram shown in FIG. 8.

The control circuit of FIG. 8 incorporates the circuit diagram of FIG. 6 for the bag welding machine and the motor arrangement for the bag clamp and blower at the packing station B, with identical elements being indicated by like reference symbols. In addition FIG. 8 in its upper part shows control circuits for the conveying path P, the transverse conveying arrangement Q, the insertion device R and the clamping holder 92.

Whenever the bag welding machine A has completed a bag forming cycle and motor M2 of the discharge and ejection device 6 has been stopped after the bag is delivered to the filling station at table B by closure of cam switch m3 to energize the motor coil of the contact switch S2, the motor-on coil of switch S6 will receive current simultaneously through the cam switch m3. As a result, the operating arrangement M6 for the bag opener 62, the clamp support 64, 65, the air valve 72, and blower 69 is energized through the rectifier G1. In so doing, the flap of the bag will be clamped between pads 63 and 65, the bag openers 62 will swing into the bag, and the air flow from blower 67 will fully expand the bag. Thus, the bag D is ready to receive the merchandise E. The operating arrangement M6, upon conclusion of its operating cycle will close switch S8 to apply a control voltage to the photosensitive device 90, so that the insertion device R is ready to insert the merchandise E into the bag D. When the cross slide 85 of the transverse conveying device Q is in its normal rearmost position, the motor M3 is switched on by the cam switch m5 operated by the motor M4 of the transverse conveying device 9 through the motor-on coil of switch S3. As a result, the conveying path P will move a first ready piece of merchandise E from underneath the cross slide 85 into the forward path of travel of slide 85 to interrupt the light path of photoelement 86, which energizes the motor-on coil of switch S4 to operate motor M4 through switch S4, the operation of motor M4 causing cam switch M5 to open. However, the motor M3 will continue to run for such a length of time until the next piece of merchandise interrupts the light path of photoelement 84 to energize the motor-off coil of switch S3, thereby stopping motor M3 and conveying path P with the next piece of merchandise placed in a ready position underneath bridge member 83.

As the motor M4 completes its full operating cycle, the cross slide 85 is moved forward and returned to its rest position. Since the photoelement 90 controls and overrides photoelement 86, it is, of course, assumed that the insertion device R is free and ready to receive a piece of merchandise before motor M4 is permitted to proceed through its operating cycle. At the end of the return movement of cross slide 85, motor M4 is switched off by the closure of cam switch m4, driven by the motor itself, to energize the motor-off coil of the switch S4.

The piece of merchandise introduced from conveyor Q into the insertion device R interrupts the light path of photoelement 90 to apply current to the motor-on coil of switch S5 controlling motor M5. As a result, motor

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M5 and a closing magnet M8 which draws plates 87 and 88 together, are energized to compress the merchandise between plates 87 and 88 and at the same time move the plates in the direction of arrow 91 in FIG. 11. The forward movement of plates 87 and 88 and of the piece of merchandise E pressed therebetween extends to a point where the plates and merchandise E reach the bottom seam of the bag D and continues further until the flap of the bag is pulled away from the clamping device 65 and the bag is pushed forwardly as far as the inclined surface F. When this forwardmost position is reached, motor M5 will close the cam switch m6 thereby causing the switch S7 to be switched on. As a result, magnet M7 of the clamping device 92 will receive power through the rectifier G2, so that the clamping device 92 will extend into the front recesses 89 of the sheetmetal plates 87 and 88 and grasp the bag D and the piece of merchandise E. The sheetmetal plates 87 and 88 are then withdrawn from the bag D by the continued running operation of motor M5. When the sheetmetal plates 87 and 88 have reached their initial starting position, photodevice 90 will again conduct light through plate recesses 89 to feed current to the motor-off coil of switch S5 and magnet-off coil of switch S7 to respectively deenergize motor M5 and magnet M8, and magnet M7. The upper plate 88 will return under spring action to its upper raised position, shown in FIG. 11 by the dash-dot line, and the clamping arrangement 92 will release the filled bag D onto surface F leading downwardly to the closing devices C, whereupon the filled bag D engages the operator K to close switch SG1 and thereby initiate the complete operating cycle over again.

A third embodiment of the packing machine constructed according to the invention is illustrated in FIGS. 9 to 12. This embodiment is similar to the embodiment shown in FIGS. 7 and 8 in that it contains a bag welding machine A, a folding and packing table B including two work stations, the conveying path P, and an insertion device R, constructed identically to those of FIGS. 7 and 8, with like elements being indicated by like reference symbols.

The embodiment of FIGS. 9 to 12 differs from the previously described embodiments, in that the bag closing device C is arranged in longitudinal alignment with the conveying belts 41 of the bag welding machine A to form a continuous direction of movement of the bags past the filling station M. To assist in this movement, a removal arrangement U is provided above the filling station M to push the filled bags from belts 41 at the filling station to a transfer or take-over device V from which they are delivered to the closing device C.

As FIG. 10 shows, the filled bag removal installation U includes two laterally spaced conveying belts 101, each of which is guided across a front and a rear roller 102 and has outwardly projecting fingers 103, which, in the position shown in FIG. 10, are in a readiness position to permit the right hand finger to push a filled bag off belts 41 in the direction of arrow 104. The filled bag is pushed by a finger 103 into the operating region of the transfer device V, which includes a roller 105 mounted in bearing block 106 which is connected to the machine frame. When a filled bag engages roller 105, the roller and its bearing block 106 are lifted upwardly and, as a result, operate a microswitch 107 which serves to control an additional labeling arrangement W which applies labeling to the bottom of the bag, as described more fully below. The filled bag pushed into the take-over arrangement V is then grasped by the continuously running upper and lower conveying belts 108 and 109 of the bag closing device C and is carried and guided therethrough.

Another difference between the embodiment of FIGS. 9-12 and given by that of FIGS. 7 and 8 is that the clamping holder 92 is positioned above the filling station M. Also, since the filled bags in the embodiment of FIGS. 9 to 12 are removed from the filling station M in the

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direction of movement of the ejection conveying belts 41 it is not possible to employ a guide and bag stop N as in the previous embodiments. Instead, a light reflecting photoelectric device 93 is provided at the filling station and operates to direct a ray of light through an opening 93a in the table at the filling station, the light ray disappearing below the filling station M until the leading edge of a bag from the ejection device 6 intercepts the light ray and reflects at least a portion of it back to a receiver element of photodevice 93 to stop movement of ejection conveyors 41 and, thereby, properly locate the bag for filling. In addition, the reflecting photodevice 93 may also be used for anticipatory control of the insertion device R, the transverse conveying device Q and the conveying path P.

The construction of the closing device C will now be described with reference to FIGS. 9 to 12 wherein it is shown in detail. However, the closing device C in each of the previously described embodiments is of identical construction.

Closing device C includes an inwardly closing curve element 110 which folds the bag flap as the bag goes by so that the flap overlies the top or rear side of the bag. The closing device also includes two closing and labeling arrangements 111 each of which places a self-sealing label over the edge of the folded flap and the top side of the bag. Each of these closing and labeling arrangements 111 has a supply roller 112 which carries a band having self-adhesive labels 113 located thereon. The band with the labels 113 is guided by a stabilization roller 114 onto a plate 115 and is then pulled across the sharp edge of the plate, so that the self-adhesive labels 113 are removed from the band and pressed by a roller 116 or other suitable pressure system onto the bag as it passes by. The empty band is passed between a drive roller 117 and a pressing roller 118 and is wound on a take-up roller 119. The driving roller 117 is driven continuously by an electric motor 120. In order to move the band with labels 113 in a step-by-step fashion, the electromagnets 121 will be periodically energized to press roller 118 into driving engagement with drive roller 117, and thereby intermittently drive the band positioned therebetween. The take-up rollers 119 will be driven continuously by the motor 120 through a slip clutch arrangement. To control the step-by-step movement of the band, microswitches 122 and 123 are mounted on support brackets and are engaged by the filled bags D as they move past the respective brackets, thereby energizing the electromagnets 121, so that each time a label 113 will be pressed across the folded flap and top side of the bag. Another microswitch 124 controlling electromagnet 125 is provided for the printing pressure roller system 130. As a bag engages and moves past the microswitch 124, electromagnet 125 is energized to press the printing roller 130 against the label 113 which has just been applied to the bag. A color ribbon may be provided between the printing roller 130 and the label, so that the data previously embossed or set on printing roller 130 may be printed on the label.

The additional labeling device W is basically constructed in the same manner as the closing and labeling arrangements 111, therefore, like reference symbols have been used to indicate like parts. The additional labeling device W, in the example shown, has been attached to the machine frame below the filling station M, by two guide rods 126 and a spindle 127. The additional labeling device W can be adjusted by means of the spindle 127 transversely across the ejection conveying belts 41 at the filling station, so that the location or height of attachment of the label on the bottom or front side of the bag is adjustable. The driving roller 117 and take-up roller 119 receiving the empty band are again driven continuously by an electric motor and a slip clutch respectively. The pressing roller 118 of arrangement W is controlled by a microswitch 107. In order to apply the label on the bottom side of the bag at a desired position, an electronic

time delaying member *t*, as shown in FIG. 12, has been inserted between the microswitch 107 and the electromagnet M12 controlling the pressing roller 118 of the additional labeling arrangement W. Depending upon the setting of delay member *t*, the transfer device V will move the bag a greater or lesser distance past the additional labeling arrangement W before the electromagnet M12 is energized to move pressing roller 118 into driving engagement with drive roller 117, and thereby apply a label to the bottom or front side of the bag. The label can be applied at practically any desired place on the front side of the bag by suitably adjusting the electrical delay member *t* and the arrangement W on spindle 127.

The method of operation of the packing machine embodiment of FIGS. 9 to 12 can be best understood from a description of the circuit diagram of FIG. 12.

To initiate operation of the packing machine, the main switch HS is closed which then energizes control instrument SG and supplies heating current from transformer TR to the separating-welding wire 32. As before, the safety time switch T is provided in the heating circuit of the separating-welding wire 32 across a branch of the main control line 1 to insure the wire is sufficiently heated before the bag welding process begins. The arm 1T of the main control line leading from the safety and time switch T is connected to the instrument switches GS1 and GS2. After the safety heating time has lapsed, production of the first bag in the bag welding machine A can begin upon closure of the manual switch GS2, which energizes the motor-on coil of switch S1 to operate motor M1. The bag forming or welding process then proceeds in the same manner as explained in connection with the embodiment of FIGS. 1 to 6. The finished bag is then ejected by the draw-off and ejection device 6 which is driven by motor M2. However, differing from the embodiment of FIGS. 1 to 6, the draw-off and ejection device motor M2 is not stopped by a cam switch *m*3 but rather is stopped by the reflecting photodevice 93 positioned above the filling station M and responding to the leading edge of the ejected bag as above described. Simultaneously with the stopping of the motor M2, photodevice 93 energizes the motor-on coil of contact switch S6 to activate electromagnet M6 for the bag holding and bag opening arrangement O including clamp 65, blower 69, valve 72, and opening elements 62. The bag is then opened and ready to receive the merchandise and the insertion of the mechanidse into the bag takes place in the same manner as described in connection with the embodiment of FIGS. 7 and 8 up to the return of the inserting device R to its starting position. When inserting device R returns to its starting position, photodevice 90 will again be conductive and, as in the embodiment of FIGS. 7 and 8, will energize the motor-off coil of contact switch S7 to deactivate electromagnet M7 controlling clamp 92 which then releases the filled bag for removal from the filling station. Simultaneously, photodevice 90 energizes motor M9 to drive belts 101 of the bag removal device U, so that the bag is removed from the filling station M in the above described manner. A cam switch *m*7 stops movement of motor M9 and belts 101 and upon a half revolution of the belts 101 of the removal arrangement U, switch *m*7 will close to supply the motor-off coil of the contact switch S9 with current to thus stop the motor M9.

As the lower circuit portion of FIG. 12 illustrates, the driving motor M10 for the belt conveyors 108 and 109 of the bag closing device C is continuously operated upon closure of main switch HS. Transfer roller 105 of the take-over device V is also continuously driven from motor M10 so that from the beginning of the bag removal process, the filled bag is grasped by the take-over device V and is pulled away from the filling station M. As the roller 105 of the take-over device V is lifted onto the filled bag as above described, it will operate the microswitch 107 to close the switching contacts GS1 and *ms*1. Upon closure of contacts GS1, which are in parallel with manually oper-

ated switch GS2, the previously described operation will be repeated to form and fill the next bag.

The pair of contacts *ms*1 serve to control the additional labeling device W. As described above, the additional labeling device W includes a continuously running motor 11 continuously driving roller 117, with an electromagnet M12 controlling the pressing roller 118. The control circuit for electromagnet M12 includes an adjustable time delay switch member *t*, which may be adjusted as desired to vary the response time between the instant microswitch 107 is operated by the lifting of roller 105 and the instant electromagnet M12 is energized, thereby permitting the label to be attached at any desired lateral position on the bottom or front side of the bag. The electric signal generated upon closure of contacts *ms*1 is, thus initially delayed in the time switch member *t*, and subsequently, after expiration of the predetermined time, is applied to the motor-on coil of contact switch S12 to thereby energize magnet M12. Energization of electromagnet M12 presses roller 118 into engagement with drive roller 117 to move the label band and apply a label to the bottom or front side of the bag. To guarantee that the electromagnet M12 remains energized a sufficient length of time to ensure that the entire width of the label is applied to the bag, the signal emitted from the time switch member *t* can also be directed to an additional electronic delaying member *t*2, which, after a predetermined period of time, will be applied to the motor-off coil of the contact switch S12 to deenergize electromagnet M12.

As shown in the lower part of FIG. 12, the bag closing device C includes two closing and labeling arrangements 111 each having a respective continuously running electric motor M13 and M15. These electric motors also continuously drive the driving rollers 117, while electromagnets 121 are provided to operate respective pressing rollers 118. Electromagnets 121 are controlled by respective microswitches 122 and 123 as described above, with microswitch 122 containing a pair of contacts *ms*2 and microswitch 123 containing the pair of contacts *ms*3. The electrical signal from contacts *ms*2 or *ms*3 is delivered through the motor-on coil of the respective contact switch S14 or S16 and in each case the signal may be delivered through a respective time delay member *t*14 or *t*16 to the motor-off coil of the respective contact switch S14 or S16, so that the respective electromagnet 121 will be energized only after the full width of the label has been applied to the bag.

FIG. 12 also shows in its lower part the control circuit for the printing device 130. As explained above, the printing device 130 is operated by electromagnet 125 which is controlled by microswitch 124 containing the contacts *ms*4. Since the printing device must strike the label just applied to the bag for only a brief period of time, contact device S17 is preferably a polarized relay which responds briefly to the signal received from the contacts *ms*4 and then drops off quickly, so that electromagnet 125 will only be briefly energized.

Thus, it is apparent that the closing device C is controlled independently of the remaining parts of the packing machine. Furthermore, it is evident that the bag closing device C and its control system may also be employed in the embodiments according to FIGS. 1 to 6 and FIGS. 7 and 8.

It is also understood that the additional labeling device may be readily incorporated in the embodiments of FIGS. 1-6 and FIGS. 7 and 8 as in any other packaging machine.

If desired, the additional labeling device W may also be provided with a printing device 130. All that would have to be done would be to connect the above described control for electromagnet 125 in the control circuit for electromagnet M12, if need be, by way of an additional electronic delaying member.

The invention may be embodied in other specific forms without departing from the spirit or essential character-

istics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by Letters Patent is:

1. A semiautomatic machine for packing goods into welded plastic bags comprising a welding device for forming bags, a filling station for inserting goods into bags received from said welding device, a bag closing device including a conveyor mechanism receiving filled bags from said filling station, and a labeling device located between said filling station and conveyor mechanism and positioned below said filling station to apply labels to the bottoms of said bags as they pass from said filling station to said conveyor mechanism.

2. A semiautomatic machine for packing folded merchandise, such as stockings, underwear, etc., in welded plastic bags, comprising a welding device for forming bags from a plastic semi-tubular foil or a longitudinally folded foil with the sides of said foil preferably being of unequal length and the upper portion of the longer side forming a bag flap, said welding device including bag ejection means for delivering the formed bags to a packing area at which the bags are opened and filled with folded merchandise, and a bag closing device adjacent said packing area and operative to close the flap of said filled bags and apply designating labels to said filled bags, said welded bag ejection means comprising at least two lower relatively narrow, laterally spaced, parallel running conveying belts of a synthetic material, said conveying belts extending into a filling station of said packing area and supporting said formed bags as they are filled with merchandise, said bag ejection means further comprising at least two upper laterally spaced, parallel running pressing belts each being aligned with a respective lower conveying belt and terminated short of said bag filling station, said upper and lower belts being driven at the same running speed and at least the conveying belt and aligned pressing belt closest adjacent the open end of the formed bag being spaced from the edge of the bag opening, said filling station including means for opening and holding said bags as merchandise is placed therein, and means for discharging the filled bags toward said closing device.

3. A semiautomatic machine for packing folded merchandise, such as stockings, underwear, etc., in welded plastic bags, comprising a welding device for forming bags from a plastic semitubular foil or a longitudinally folded foil with the sides of said foil preferably being of unequal length and the upper portion of the longer side forming a bag flap, said welding device including bag ejection means for delivering the formed bags to a packing area at which the bags are opened and filled with folded merchandise, and a bag closing device adjacent said packing area and operative to close the flap of said filled bags, said welded bag ejection means comprising bag conveying means extending into a filling station of said packing area and supporting said welded bags as they are filled with merchandise, said filling station including means for opening and holding said bags as merchandise is placed therein, means for discharging the filled bags toward said closing device, drive means for feeding foil to said welding device and for operating said welding device in sequence to form said bags, said welding device including a heated severing and welding element, means for driving said bag ejection means, and a main control circuit including means for sequentially operating said foil drive means and said ejection drive means, a manually operated switch arranged in parallel with an automatically operated switch which responds to a filled bag at said closing device, either of said switches

being operable to start said packing machine, and a heating circuit for said welding element including a time element which delays operation of said foil drive means until said element has been sufficiently heated.

4. A semiautomatic machine for packing folded merchandise, such as stockings, underwear, etc., in welded plastic bags, comprising a welding device for forming bags from a plastic semitubular foil or a longitudinally folded foil with the sides of said foil preferably being of unequal length and the upper portion of the longer side forming a bag flap, said welding device including bag ejection means for delivering the formed bags to a packing area at which the bags are opened and filled with folded merchandise, and a bag closing device adjacent said packing area and operative to close the flap of said filled bags, said welded bag ejection means comprising bag conveying means extending into a filling station of said packing area and supporting said welded bags as they are filled with merchandise, said filling station including means for opening and holding said bags as merchandise is placed therein, means for discharging the filled bags toward said closing device, said filling station comprising means for inserting merchandise into the open end of a bag as the bag is retained by said holding means, said insertion device including a tong-like member guided for movement into said open end of said member and being forwardly movable to fill said bag and release said bag from said bag holding means, and an electromagnetically operated holding device adjacent the discharge end of said filling station and operable to hold said filled bag as said tong-like member is withdrawn therefrom.

5. A semiautomatic machine for packing folded merchandise, such as stockings, underwear, etc., in welded plastic bags, comprising a welding device for forming bags from a plastic semitubular foil or a longitudinally folded foil with the sides of said foil preferably being of unequal length and the upper portion of the longer side forming a bag flap, said welding device including bag ejection means for delivering the formed bags to a packing area at which the bags are opened and filled with folded merchandise, and a bag closing device adjacent said packing area and operative to close the flap of said filled bags, said welded bag ejection means comprising bag conveying means extending into a filling station of said packing area and supporting said welded bags as they are filled with merchandise, said filling station including a tong-like member adapted to grasp said merchandise, means for moving said tong-like member forwardly into a bag being filled to place said merchandise within said bag and means for opening and holding said bags as merchandise is placed therein, and means for discharging the filled bags toward said closing device, said bag holding means comprising a clamp assembly exerting a clamping force adapted to be overcome by the forwardly moving tong-like member during the bag filling process to release the filled bag for discharge to the closing device.

6. A semiautomatic machine for packing folded merchandise, such as stockings, underwear, etc., in welded plastic bags, comprising a welding device for forming bags from a plastic semi-tubular foil or a longitudinally folded foil with the sides of said foil preferably being of unequal length and the upper portion of the longer side forming a bag flap, said welding device including bag ejection means for delivering the formed bags to a packing area at which the bags are opened and filled with folded merchandise, and a bag closing device adjacent said packing area and operative to close the flap of said filled bags, said welded bag ejection means comprising bag conveying belt means extending into a filling station of said packing area and supporting said welded bags as they are filled with merchandise, said filling station including means for opening and holding said bags as merchandise is placed therein, means for discharging the

filled bags toward said closing device, said bag closing device comprising a conveying mechanism in substantial longitudinal alignment with said conveying belt means to establish a continuous direction of movement for said bags, and a bag removal device overlying said ejection conveying belt means for pushing filled bags from said conveying belt means onto said bag closing conveying mechanism.

7. A packing machine according to claim 2, comprising metal guide rollers over which the plastic foil passes before it is fed to said welding device, said metal rollers provided with an electrical ground connection to remove any electrostatic charge accumulated on said foil.

8. A packing machine according to claim 3, said main control circuit including a secondary control circuit for said ejection drive means, said secondary circuit being controlled by said foil drive means.

9. A packing machine according to claim 4, said tong-like member comprising a lower plate onto which folded merchandise is positioned, an upper plate movable relative to said lower plate to grasp said merchandise therebetween, said plates having front recesses which, when said member is in a forward position, enable said electromagnetic holding device to grasp said bag and the merchandise therein and, when said member is in a retracted rest position, permit a photoelectric device to be operative.

10. A packing machine according to claim 4, comprising a merchandise slide conveying device transversely arranged relative to said tong-like member, said slide device being operative to laterally insert the merchandise into said tong-like member and being controlled for movement by a photoelectric element responsive to the presence of said merchandise in front of said slide device.

11. A packing machine according to claim 10, wherein said slide conveying device is also arranged transversely to a conveying path on which operators place folded merchandise, the movement of said conveying path being controlled by a photoelectric device positioned at the end of said conveying path adjacent said slide conveying device to supply individual pieces of merchandise to said slide conveying device.

12. A packing machine according to claim 6, said bag closing conveying mechanism comprising a bag transfer device immediately adjacent the discharge end of said ejection conveyor belts.

13. A packing machine according to claim 12, wherein a gap is located between said ejection conveyor belts at the discharge end of said filling station and said bag transfer device, said gap being narrower than the width of a bag, and a labeling device disposed below said filling station and being operative to apply a label to the bottom side of a filled bag as it passes through said gap.

14. A packing machine according to claim 13, said labeling device being controlled by a switch element operated by said bag transfer device when said device transfers a bag.

15. A packing machine according to claim 14, said labeling device being mounted for lateral adjustment relative to said closing conveying mechanism, an electric circuit for said labeling device including an adjustable time delay element arranged between said switch element and drive means for said labeling device, whereby a label may be applied at any position on said filled bag.

16. A machine for packing goods in flexible plastic bags comprising means for forming bags in succession

from a supply of plastic foil, means defining a packing station, means for delivering the formed bags to said station, periodically operated bag holding means at said station, means actuated in timed relation with the operation of said bag holding means for opening each formed bag for insertion of goods, means for delivering each filled bag to a bag closing station, and means responsive to the presence of a filled bag at said closing station for controlling actuation of said bag forming means.

17. In the machine defined in claim 16, said bag forming means including an electric drive motor and an electrically heated foil severing element, a circuit containing said motor and element and timing means operable upon energization of the circuit to delay actuation of the motor until said element has reached foil severing temperature.

18. A semiautomatic machine as defined in claim 5, comprising means for rearwardly moving said tong-like member to withdraw it from a bag after a bag is filled with said merchandise and means synchronized therewith for clamping the filled bag during said withdrawal.

19. A machine for packing goods in flexible plastic bags comprising means for forming a supply of plastic foil into a succession of bags, means providing a packing station for insertion of goods into each bag, means for delivering each formed bag in succession to said station and for holding and opening the bag to receive the goods, means for inserting goods into each bag at said station comprising lower and upper holding elements, conveying means adapted to load goods to be inserted into a bag between said holding elements, means for imparting forward movement to said holding elements to enter a bag held in open condition at said station to place the goods held therebetween within said bag and for imparting rearward movement to said holding elements for withdrawal from said bag, and means for retaining said goods within the bag during said withdrawal of the holding elements.

20. In the machine defined in claim 19, said holding elements being rigid plates the upper of which is mounted for movement between an upper goods loading position and a lower insertion position, and said plates each having a front recess through which said retaining means extends into engagement with a filled bag.

21. In the machine defined in claim 20, said retaining means comprising a clamping holder positioned above the said station and adapted to be pressed downwardly onto the bag and the said goods inserted into the bag in the region of the said front recesses of the said plates to retain the inserted goods in the said bag during the reverse movement of the said plates.

References Cited

UNITED STATES PATENTS

2,659,520	11/1953	Reitzes	53—137
3,197,936	8/1965	Messmer	53—29
3,339,338	9/1967	Brinck et al.	53—189
3,427,781	2/1969	Kral	53—182 X

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53—137, 183, 187, 385