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(54) FORM, FILL AND SEAL PACKAGING MACHINE

MASCHINE ZUM FORMEN, FÜLLEN UND SCHLIESSEN EINER VERPACKUNG

MACHINE DE CONDITIONNEMENT, FORMAGE, REMPLISSAGE ET SCELLEMENT

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(73) Proprietor: **Nicolle, Kenneth Arthur**
Victoria, BC V8S 1B3 (CA)

(72) Inventor: **Nicolle, Kenneth Arthur**
Victoria, BC V8S 1B3 (CA)

(74) Representative: **Schäfer, Matthias W.**
Patentanwalt
Schwanseestrasse 43
81549 München (DE)

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Description

FIELD

[0001] There is described a form, fill and seal packaging machine that is capable of forming, filling and sealing one or more inner bags within an outer bag.

BACKGROUND

[0002] United States Patent 8,015,783 (Iwasa et al) entitled "Form-Fill-Seal Machine" is an example of a form-fill-seal packaging machine.
Document DE 10 2008 029285 A1 teaches for packaging non liquid foodstuffs or semi-luxury goods, a packaging having a protective packaging containing an inner packaging which contains the material to be packaged. The two packagings are each produced from a strip, each strip being guided together to form a flexible tube. The outer packaging means is perforated and glued at one end to the inner packaging such that, when the outer packaging is torn open, the inner packaging, rather than being destroyed, remains attached to the one part of the torn-open protective packaging. The inner packaging preferably consists of a different material compared to the outer packaging means.

SUMMARY

[0003] There is provided a form, fill and seal packaging machine which includes a bagging chamber and a fill chamber disposed vertically above the bagging chamber. The fill chamber has a bottom closure that opens to facilitate movement of filled bags from the fill chamber to the bagging chamber. An outer bag forming assembly is provided which includes at least one outer bag forming film support for supporting a flexible sealable film for forming an outer bag and guide rollers to guide movement of sheets of the outer bag forming film. Feed rollers are used to advance the sheets of the outer bag forming film. Outer bag lengthwise edge sealing jaws are provided having opposed sealing surfaces which are movable from a rest position spaced from the sheets of the outer bag forming film to a sealing position where the sealing surfaces are brought together to compress and seal together lengthwise edges of the sheets of the outer bag forming film. Outer bag transverse sealing and cutting jaws are positioned transverse to the outer bag forming film. The outer bag transverse sealing and cutting jaws have opposed sealing and cutting surfaces which are movable from a rest position spaced from the outer bag forming film to a sealing position where the sealing and cutting surfaces are brought together to compress, seal and cut the sheets of the outer bag forming film to create an outer bag that is fed into the bagging chamber. An inner bag forming assembly is provided which includes at least one inner bag forming film support for supporting a flexible sealable film for forming an inner bag and guide rollers for guiding movement of sheets of the inner bag forming film. A feed nozzle is provided for supplying product located in a space between the sheets of the inner bag forming film. Feed rollers engage and advance the inner bag forming film in a downward direction over the feed nozzle in a controlled manner to a pre-set length into the fill chamber. Inner bag lengthwise edge sealing jaws are provided that have opposed sealing surfaces which are movable from a rest position spaced from the sheets of the inner bag forming film to a sealing position where the sealing surfaces are brought together to compress and seal the sheets of the inner bag forming film. Inner bag transverse sealing and cutting jaw are positioned transverse to the inner bag forming film. The inner bag transverse sealing and cutting jaws have opposed sealing and cutting surfaces which are movable from a rest position spaced from the sheets of the inner bag forming film to a sealing position where the sealing and cutting surfaces are brought together to compress, seal and cut the sheets of the inner bag forming film forming a transverse seal. An upper side of the transverse seal defines a bottom seal for the inner bag forming film entering the fill chamber and a lower side of the transverse seal defines a top seal for a filled inner bag exiting the fill chamber. The nozzle supplies a measured amount of fill product into the inner bag. An actuator opens the bottom closure of the fill chamber, resulting in the filled inner bag being lowered out of the fill chamber into the outer bag positioned in the bagging chamber. The outer bag sealing and cutting jaws serve to compress, seal and cut the sheets of the outer bag forming film forming a transverse seal. An upper side of the transverse seal serves as a bottom seal for the outer bag entering the bagging chamber and a lower side of the transverse seal serves as a top seal for a sealed outer bag containing one or more of the filled inner bags exiting the bagging chamber.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] These and other features will become more apparent from the following description in which reference is made to the appended drawings, the drawings are for the purpose of illustration only and are not intended to be in any way limiting, wherein:

FIG. 1 is a perspective view of a form fill and seal packaging machine.
FIG. 2 is a perspective view of a mid-frame assembly of the form fill and seal packaging machine illustrated in **FIG. 1,** with top frame section and lower support frame section removed.
FIG. 3 is an exploded perspective view of the mid-frame assembly illustrated in **FIG. 2.**
FIG. 4 is a perspective view of lengthwise sealing jaws.
FIG. 5 is a perspective view of a finger hole cutting assembly associated with the lengthwise sealing jaws illustrated in **FIG. 4.**

FIG. 6 is a perspective view of transverse sealing jaws used to seal inner bag.

FIG. 7 is a side elevation view, in section, of the transverse sealing jaws illustrated in **FIG. 6.**

FIG. 8 is a perspective view of transverse sealing jaws used to seal outer bag.

FIG. 9 is a side elevation view, in section, of the transverse sealing jaws illustrated in **FIG. 8.**

FIG. 10 is a perspective view of a feed roller assembly.

FIG. 11 is a perspective view of a bottom closure with inner bag support.

FIG. 12 is a perspective view of a drop control plate assembly.

FIG. 13 is a detailed side elevation view showing roll support detail for outer bag film material.

FIG. 14 is a detailed side elevation view showing roll support detail for inner bag film material.

FIG. 15 is a perspective view showing feed nozzle positioning in relation to sheets of an inner bag forming film.

FIG. 16 is a front elevation view showing feed nozzle and inner film support detail.

FIG. 17 is a detailed side elevation view of the actuator for the lengthwise sealing jaws illustrated in **FIG. 4.**

FIG. 18 is a side elevation view of a tensioning and release mechanism for the pinch rollers of the feed roller assembly illustrated in **FIG. 10.**

FIG. 19 is a perspective view of optical sensor positioning for feeding inner bag forming film.

FIG. 20 is a detailed side elevation view of actuator for the lower gripper of the transverse sealing assembly of **FIG. 7.**

FIG. 21 is a side elevation view of a lower end of a bottom closure for upper fill chamber and guide rollers for outer bag forming film.

FIG. 22 is side elevation view of the lower end of the bottom closure illustrated in **FIG. 21,** with positioning of lengthwise sealing jaws shown.

FIG. 23 is a perspective view of a bank of flavour system pumps.

DETAILED DESCRIPTION

[0005] A form, fill, and seal packaging machine, generally identified by reference numeral 10, will now be described with reference to **FIG. 1** through **23.**

STRUCTURE

[0006] Referring to FIG. 1, packaging machine 10 has a structural frame 12 which defines a lower bagging chamber 14 and an upper fill chamber 16. Fill chamber 16 is referred to as an "upper" chamber and it is disposed vertically above bagging chamber 14. Fill chamber 16 has a bottom closure, generally identified by reference numeral 18. Bottom closure 18 is not clearly visible in FIG 1, and will hereafter be further described with reference to FIG 3.

[0007] An outer bag forming assembly is provided, which is generally identified by reference numeral 20. As will hereinafter be further described, outer bag forming assembly 20 forms an outer bag which is fed into bagging chamber 14. An inner bag forming assembly is provided, which is generally identified by reference numeral 50. As will hereinafter be further described, inner bag forming assembly 50 forms an inner bag which is fed into fill chamber 16.

[0008] Referring to FIG. 3, the primary components of packaging machine 10 are shown in an exploded view with separate modules. It should be noted that some of these modules are common to both outer bag forming assembly 20 and inner bag forming assembly 50, and will be identified as such.

[0009] Referring to FIG. 3, outer bag forming assembly 20 includes at least one outer bag forming film support 22 for supporting a roll 24 of flexible sealable outer bag forming film 26 for forming an outer bag. Two outer bag forming film supports 22 have been illustrated. There will follow an explanation with respect to inner bag forming assembly 50, as to how a single bag forming filing support could be used in place of the two outer bag forming film supports 22 illustrated. Referring to FIG. 13, support 22 and a rotatable shaft 23 for roller 24 of outer bag forming film 26 is shown.

[0010] Referring to FIG. 3, guide rollers 28 are provided. Referring to FIG. 21, guide rollers 28 guide movement and provide a change of direction for sheets 30 and 32 of outer bag forming film 26. As will hereinafter be further described, guide rollers 28, as illustrated in FIG. 3, are similarly used for inner bag forming assembly 50.

[0011] Referring to FIG. 3, a feed roller assembly, generally identified by reference numeral 34 is provided to advance outer bag forming film 26. As will hereinafter be further described, feed roller assembly 34, as illustrated in FIG. 3, is similarly used for inner bag forming assembly 50. Referring to FIG 10, feed roller assembly includes a support frame 36, two rotatably mounted pinch rollers 38 mounted on shafts 39 and an electric drive motor 40 which serves to rotate at least one and preferably both of rollers 38. Referring to FIG. 18, a tensioning and release mechanism 41 is provided to move pinch rollers 38 apart for the purpose of threading bag forming film between pinch rollers 38 and then moving pinch rollers 38 into proper engagement with the bag forming film. Tensioning and release mechanism 41 includes a pivoting handle 43 which is attached to a shaft 45. Movement of handle 43 in one direction moves one of pinch rollers 38 away from the other of pinch rollers 38 and movement of handle 43 in the other direction moves the one pinch roller 38 toward the other of pinch rollers 38. A screw clamp 47 is provided for clamping the movable pinch roller 38 in the selected position.

[0012] Referring to FIG. 3, a pair of lengthwise edge sealing jaws 42 are provided. As will hereinafter be further

described, lengthwise edge sealing jaws 42, as illustrated in FIG. 3, are similarly used for inner bag forming assembly 50. Referring to FIG. 4, lengthwise edge sealing jaws 42 have opposed sealing surfaces 44. Sealing jaws 42 are movable along tracks in the form of support bars 46 from a spaced apart rest position, spaced from sheets 30 and 32 of outer bag forming film 26 to a sealing position where sealing surfaces 44 are brought together to compress and seal together lengthwise edges of sheets 30 and 32 of outer bag forming film 26 to form an outer tubular structure. Referring to FIG. 17, air cylinder actuator 49 is illustrated and the stroke provided by shafts 51 to move lengthwise one of edge sealing jaws 42.

[0013] Referring to FIG. 5, one of sealing jaws 42 has a projecting C shaped male portion 33 with interacts with a mating C shaped female portion 35 on the other of sealing jaws 42. As broad sealing band 37 is sealed along one lengthwise edge, a handle in taking the form of C shaped finger holes 39 are formed. The broad sealing band 37 will eventually become the "top" of the bag, as the orientation when passing through the machine is not the same as the orientation of the bag during use. The orientation of C shaped finger holes 39 is of importance. The rounded portion should bear the weight of the bag, as a reverse orientation leaves potential tear points.

[0014] Referring to FIG. 3, transverse sealing and cutting jaws 56 are provided. Referring to FIG. 8, transverse sealing and cutting jaws 56 are positioned transverse to the tubular structure which exits lengthwise edge sealing jaws 42. Transverse sealing and cutting jaws 56 have opposed sealing and cutting surfaces 58 which are movable from a rest position spaced from the tubular structure to a sealing position where sealing and cutting surfaces 58 are brought together to compress, seal and cut the tubular structure of sheets 30 and 32 of outer bag forming film 26 to create an outer bag that is fed into bagging chamber 14. Referring to FIG. 9, in addition to sealing and cutting jaws 56, there is provided lower grippers 57. Lower grippers 57 grip outer bag forming film 26, while sealing and cutting jaws 56 are activated. Movement of transverse cutting jaws 56 and lower grippers 57 is effected through the use of air cylinder actuators 61 that move shafts 63 back and forth that are attached to either lower rippers 57 or sealing and cutting jaws 56.

[0015] Referring to FIG. 3, inner bag forming assembly 50 includes a single inner bag forming film support 60 for supporting a roll 62 of flexible scalable inner bag forming film 64 for forming an inner bag. The reason only a single roll 62 is required is that inner bag forming film 64 is fed folded in a lengthwise direction to create two sheets 66 and 68. As will hereinafter be further described, this leaves only one lengthwise edge of inner bag forming film 64 open and requiring lengthwise sealing. Referring to FIG. 14, support 60 and shaft 65 about which roll 62 of inner bag forming film 64 rotates is shown.

[0016] Referring to FIG. 1, guide rollers 28, as described above, guide movement and provide a change of direction to sheets 66 and 68 of inner bag forming film 64 being drawn from roll 62 supported by inner bag forming film support 60.

[0017] Referring to FIG. 3, a feednozzle 70 is provided for supplying product to the inner bag. Feed nozzle 70 has an outlet 72 formed as a thin rectangular tube, a conduit 74 which allows outlet 72 to be positioned, a flow control valve 76 to control flow and an inner film support 78.

[0018] Referring to FIG. 1 , a feed rollers assembly 34, as described above with reference to FIG. 10, is used to engage and advance inner bag forming film 64 in a downward direction over feed nozzle 70 in a controlled manner to a pre-set length into fill chamber 16. Lengthwise edge sealing jaws 42, as described above, are used to compress and seal sheets 66 and 68 of inner bag forming film 64 to form an inner tubular structure. It is to be noted that instead of a pair of lengthwise edge sealing jaws 42, a single set of lengthwise edge sealing jaws 42 can be used as inner bag forming film 64 is folded in a length wise direction leaving only one lengthwise edge of inner bag forming film 64 open and requiring lengthwise sealing.

[0019] As will hereinafter be further described in relation to operation with reference to FIG. 15 and FIG. 16, feed nozzle 70 extends down between is positioned in a spacebetween sheets 66 and 68 of inner bag forming film 64.

[0020] Referring to FIG. 3, inner bag forming assembly 50 has transverse sealing and cutting jaws 48 that differ from transverse sealing and cutting jaws 56 used with outer bag forming assembly 20. Referring to FIG. 6 and FIG. 7, transverse sealing and cutting jaws 48 are movable along tracks in the form of support bars 54 from a spaced apart position to a position in which opposed sealing and cutting surfaces 52 are brought together to compress, seal and cut the tubular structure of sheets 66 and 68 of inner bag forming film 64 to create an inner bag that is fed into filling chamber 14. Transverse sealing and cutting jaws 48, as described above, are positioned transverse to inner bag forming film 64 and the resulting inner tubular structure. Sealing and cutting surfaces 52 are brought together to compress, seal and cut sheets 66 and 68 of inner bag forming film 64 forming a transverse seal. It is to be noted that an upper side of the transverse seal defines a bottom seal for inner bag forming film 64 entering fill chamber 16 and a lower side of the transverse seal defines a top seal for a filled inner bag exiting fill chamber 16. Referring to FIG. 7, in addition to sealing and cutting jaws 48, there is provided upper grippers 71 and lower grippers 73. Upper grippers 71 and lower grippers 73 grip inner bag forming film 64, while sealing and cutting jaws 48 are activated. As with transverse cutting and sealing jaws 56, cutting and sealing jaws 48 use an air cylinder actuator 61 which extends and retracts shafts 63. However, separate pairs of air cylinders 75 are used to extend upper grippers 71 and lower grippers 73.

[0021] Referring to FIG. 3, the inner bag, formed as described, rests in fill chamber 16 upon a bottom closure

18. Referring to FIG. 11, bottom closure 18 forms an inner bag support 80 having two movable portions 82 and 84 that supports both a bottom and opposed sides of the inner bag. Movable portions 82 and 84 slide along tracks in the form of support bars 86. Bottom closure 18 opens to provide access from fill chamber 16 to bagging chamber 14. Feed nozzle 70 is used to supply a measured amount of fill product into the inner bag. An air cylinder actuator 85 is then used to open bottom closure 18 of fill chamber 16, this cause movable portions 82 and 84 to move away from each other causing the inner bag to drop by force of gravity into bagging chamber 14.

[0022] Depending upon the nature of the product, it is not always desirable to have the inner bag freely by force of gravity. Referring to FIG. 3, a drop control assembly 87 is provide. Referring to FIG. 12, drop control assembly 87 consists of pivotally mounted drop control plates 88. By controlling the pivotal movement of drop control plates 88, a rate at the inner bag drops from fill chamber 16 into outer bag in bagging chamber 14 can be controlled. There are various ways of controlling movement of drop control plates 88, the preferred way being through the use of fluid filled cylinders. In the proto-types, the movement of drop control plates 88 was controlled by air cylinders.

[0023] Referring to FIG. 3 and FIG. 8, once the inner bag has dropped from fill chamber 16 into the outer bag in bagging chamber 14, transverse sealing and cutting jaws 56, as described above, serve to compress, seal and cut sheets 30 and 32 of outer bag forming film 26 forming a transverse seal. It is to be noted that an upper side of the transverse seal being a bottom seal for the outer bag entering bagging chamber 14and a lower side of the transverse seal being a top seal for a sealed outer bag containing one or more of the filled inner bags exiting bagging chamber 14. Referring to FIG. 3, a pivoting outer bag support and bottom closure 90 for bagging chamber 14 is provided which pivots to allow removal of the outer bag. Should dropping by force of gravity be undesirable, a drop control assembly 87 may be used, as described above.

[0024] Referring to FIG. 19, an optical sensor 94, known as an "eye mark" sensor is provided which detects the passage of a mark placed on the bag films. The PLC initiates and stops rotation of pinch rollers 38 of feed roller assembly 34, based upon the number of "marks" that have passed, as determined by optical sensor 94. The number of marks will be determined by the size of inner bag that is to be produced.

OPERATION

[0025] Referring to FIG. 1, the duel process form-fill-seal packaging machine system disclosed herein, uses a single roll 62 of folded scalable film and two rolls 24 of unfolded or flat stock sealable film with dispensing fitment attachment to produce a single package with an outer bag with a carry handle, comprising of a sealed inner bag filled with liquid, semi liquid or dry goods, sealed inside an outer bag shell with an integrated mobility handle. The operation of the apparatus components is controlled by a programmable logic controller (PLC) (not shown). Packaging machine 10 can produce one bag filled with product. At the same time making the outer bag in which the filled bag will be placed inside the outer carrying bag. There will be between 2 and 60 inner bags deposited into the outer bag. With the touch screen you can make mutable bags and place them in the outer carrying bag. Also you can have a different combination of flavours.

[0026] Referring to FIG. 1, roll 62 of folded inner bag forming film 64, such as a plastic film can be of different thickness depending on what strength is needed to support the weight of the product being packaged. Roll 62 is mounted on the outside of packing machine 10 and along its height. Referring to FIG. 14, roll 62 is mounted on support brackets 60 and a rotatable support shaft 65 securing the roll of folded inner bag forming film 64 in place. Referring to FIG. 1 , the roll of folded material passes over a mechanical station at which is controlled by the PLC. At which time the fitment is placed a ND sealed in place. Referring to FIG. 1 and FIG. 15, folded inner bag forming film 64 from roll 62 is moved along on a series of guide rollers 28 which guide and alter the direction of folded inner bag forming film 64. Referring to FIG. 10, folded inner bag forming film 64 is drawn from roller 62 by feed roller assembly 34 includes pinch rollers 38 driven by motor 40. Movement of pinch rollers 38 on rotatable shaft 39 promotes alignment of open side of folded inner bag forming film 64 with the sealing equipment of packaging machine 10. Referring to FIG. 1 and FIG. 15, a first guide roller 28 turns folded inner bag forming film 64 horizontally across the top of packaging machine 10 and a second guide roller 28, which is mounted at the very top of packaging machine 10, turns folded inner bag forming film 64 vertically to be advanced in a downward direction. Referring to FIG. 1 and FIG. 20, a further feed roller assembly 34 i s provide to draw folded inner bag forming film 64 downwardly onto inner bag support 80.

The draw time is controlled by the PLC to the length needed for the size of bag needed. Referring to FIG. 19, the positioning inner bag forming film 64 is detected by optical sensor 94, which operates as an "eye mark" sensor sensing marks placed upon inner bag forming film 64 at set intervals.

[0027] Referring to FIG. 15 and 16, feed roller assembly 34 pulls folded inner bag forming film 64 along a path so that a fixed vertically inner film support 78 and outlet 72 of feed nozzle 70 extends into a space between sheets 66 and 68 of folded inner bag forming film 64. Folded inner bag forming film 64 fully envelops film support 78 and outlet 72 of nozzle 70. Outlet 72 of nozzle 70 is vertically oriented and is made from two sheets bent to form a rectangular tube. When placed between sheets 66 and 68 of folded inner bag forming film 64, outlet 72 and film support 78 help guide folded inner bag forming film 64, while the inner bag is being formed, sealed and filled.

Referring to FIG. 15, folded inner bag forming film advances between upper conventional vertical pneumatic sealing equipment that includes sealing jaws 42. Referring to FIG. 20, feed roller assembly 34 (best illustrated in FIG. 10) is controlled by the PLC. Which will turn feed motor 40 on and off for a preset time. This will determined the width of the bag to be made. When the folded film is positioned in inner bag support 80, advancement of the film stops when the desired width of film has advanced.

[0028] Referring to FIG. 6, transverse sealing and cutting jaws 48, as described above, are positioned transverse to inner bag forming film 64. Sealing and cutting surfaces 52 are brought together to compress, seal and cut inner bag forming film 64 to form a transverse seal. As already noted, an upper side of the transverse seal defines a bottom seal for inner bag forming film 64 entering fill chamber 16 and a lower side of the transverse seal defines a top seal for a filled inner bag exiting fill chamber 16. This means that inner bag forming film 64 advancing to inner bag support 80 already has a bottom seal. This will be appreciated by a review of FIG. 20, which shows the relative positioning of inner bag support 80 relative to transverse sealing and cutting jaws 48. It should be noted that with air cylinder actuator 61 pulls rather than pushes transverse sealing and cutting jaws 48 into position.

[0029] Referring to FIG. 4 and FIG. 15, sealing jaws 42 are brought together to compress the film and seal the open vertical side of the folded inner bag forming film 64 advanced there between with heated sealing bans or wires. The sealing surfaces 44 of sealing jaws 42 are brought together to compress the film and seal the open side of folded inner bag forming film 64 with electrically heated wires or strips. The seal is close to the edge of the material. It should be noted that when sealing jaws 42 are closed, the filling cycle starts at the same time. The inner bag is filled with product such as liquids, semi liquid or dry goods to the desired level when supported within inner bag support 80. Referring to FIG. 23, a flavour system, generally identified by reference numeral 100 consisting of a bank of pumps 102 dispensing individual flavours is provided. A time set in the PLC located in the control panel, using a conventional PLC (logic Program Controller) controls the desired level.

Having a separate pump 102 for each flavour enables packaging machine 10 to change from flavour to flavour. The open topped bag in inner bag support dispenser 80 is filled from above down a tunnel formed by side sealing jaws 42. The inner bag is filled by feed nozzle 70. The outlet 72 of nozzle 70 is supplied by a supply conduit 74 controlled by supply valve 76. The fill material, such as liquid, is passed down through conduit 74 of nozzle 70 to outlet 72 and into the inner bag. The length of conduit 74 and outlet 72 will determine a bags width, which will enable the making of different size bags. Various sizes of nozzle 70 can be made for different sizes of inner bag. Referring to FIG. 11, the interior shape of inner bag support 80 is shaped to support the open topped inner bag during filling. Sealing jaws 42 can be water cooled or air cooled which aid in the cooling down process of the plastic seal, will speed up the opening of jaws 42 sooner enabling faster production cycles. When the fill cycle stops the drip cycle starts and the pre-heat starts for the inner cross cut and seal jaws 48. Referring to FIG. 6, side sealing is followed in sequence by the fill cycle and upper horizontal pneumatic cross seal and cut jaws 48 which move to compress the film to form a transverse seal widthwise across with heated strip. An electrically heated wire associated the heated strip cuts horizontally widthwise the sealed portion of the film across. Thus, the upper part of the seal forms a bottom seal for the next semi-formed bag film above jaws 48.

At the same time the seal portion at the lower part the transverse seal forms top seal of the bag which has just been filled and rests on inner bag support 80. When jaws 48 open, thereafter, movable portions 82 and 84 of inner bag support 80 move to a spaced apart position which opens the bottom of bottom closure 18. With bottom closure 18 opened, the filled inner bag is dropped and then bottom closure 18 is closed. It is preferable the sloped bottom of inner bag support 80 have a slippery surface to overcome inertia and initiate movement of the filled inner bag by force of gravity as soon as movable portions 82 and 84 separate.

[0030] Referring to FIG. 12, when it is desirable to control the drop rate of the inner bag, drop plates 88 are used. The filled and completely sealed inner bag drops down through spaced apart drop control plates 88 hinged from above and forming a channel slowing the descent of the filled inner bag. An oil control valve inside the control valve hydraulically controls the speed at which drop control plates 88 are able to open. Spring control valves then close drop control plates 88 to form a "V" tunnel wider at the upper entrance waiting for the inner next bag. The filled inner bag drops until it stops at the bottom of outer bag support 90. The outer bag material is held in place with aid of the outer side seal jaws 42. The inner bag production cycle is then repeated until a desired number of inner bags have been produced and deposited into the outer bag.

[0031] Before the filled inner bag can drop down in to an outer bag, the outer bag will have already been made and waiting for it. In order for this process to happen, there is a sequence occurring between the inner bagging and outer bagging process, as per the sequence keyed into the PLC at the control panel. With the PLC every sequence of the machine can be controlled and monitored.

[0032] Referring to FIG. 1 and FIG. 2, the outer bagging of the filled inner bag is accomplished by using two rolls of outer bag film 24 which are located on each side of the machine facing each other so when drawn inward they form each side of the outer bag. Referring to FIG. 13, the two rolls 24 are each supported by shafts 23 which rotate on supports 22. Referring to FIG. 21 and FIG. 22, the outer bag forming film 26 from the two rolls 24 are

pulled along over guide rollers 28 that turn the path of the outer bag forming film 26 to vertical to be advanced downwardly. As described above, with reference to FIG. 10, pinch rollers 38 of feed roller assembly 34 engage outer bag forming film 26 to advance it, with pinch rollers 38 being driven by means of motor 40. Referring to FIG. 4, lengthwise sealing jaws 42 compress outer bag forming film 26 forming a side seal at each of the open edges. Sealing jaws 42 stay closed immediately after sealing the outer bag side seals to prevent the seals from pulling apart from the weight of the incoming filled inner bag and to hold the outer bag material properly in place as the inner bag, full of product, passes from inner bag support 80 into bagging chamber 14. Referring to FIG. 5, mounted to sealing jaws 42 are gripping jaws 104. Gripping jaws 104 grip, but they do not seal. They are machined with matching groves that inner lock to hold the outer bag material in place. The configuration resembles that illustrated in FIG. 9. Referring to FIG. 5, also mounted to sealing jaw 42 (along what will eventually become the top of the outer bag) the knife described above, with C shaped male portion 33 mating with C shaped female portion 35 to cut a handle in the form of C shaped finger holes 39. This is done at the same time the side seals are done.

[0033] Referring to FIG. 8, transverse seal and cut jaws 56 form the bottom seal on the outer bag by compressing the material and cutting the film during the initial production set up. Referring to FIG. 9, grippers 57 hold the bag material in place to enable activation of transverse seal and cut jaws 56. Once the bottom and the sides of the outer bag have been sealed, the outer bag is pulled down by feed roller assembly 34 until it reaches the bottom of outer bag support 90, which has bottom that opens. At this stage the semi formed outer bag is ready to have the filled inner bag deposited inside of it. As described above, as the inner bags are formed and filled they pass from filling chamber 16 to bagging chamber 14 by force of gravity when inner bag support 80 of bottom closure 18 opens. Once a desired number of inner bags (between 2 and 60) are positioned in the outer bag support 90, transverse seal and cut jaws 56 compresses the outer bag film to cut and seal the outer bag forming a seal, to complete the outer bag form, fill, seal, double bagging process. Once the transverse seal and cut jaws 56 close and open, the lengthwise sealing jaws 42 open and remain open until material is drawn down for the next outer bag formation. The process is repeated.

[0034] Referring to FIG. 19, outer bag film width is controlled by a timer in the PLC to the feed motor or by marks printed on the material which is picked up by the means of optical sensor 94 that stops the feed motor this also locates the location of the printed material on the outer bag.

[0035] All sealing jaws and opening and closing of jaws are controlled by the PLC. The PLC is set up with a program in such a manner that allows this function to happen in a controlled manner. All sealing jaws can be opened and closed by air cylinders or electric motors.

[0036] All operations to start up with new rolls of material are done with the PLC and in manual position on the control screen. After all the necessary manual operations are done you switch over to the auto cycle. This cycle continues to make bags after each bag cycle is complete. In the PLC and on the screen there is a counter that can be pre-set to make the amount of bag required by pre-setting the number needed.

[0037] Flowing is the sequence in which the bagging machine will operate in the auto mode.

[0038] Numbers 1, 2, 3, etc. are cycles. A, B, C etc. are functions happening at the same time

1

A---side seal
B---fill

2

A---drip
B---pre heat lower seal and cut jaws

3

A---close cross seal and cut

4

A---open cross seal and cut jaw
B---open upper dumper
c---start material feed motor
d---close upper dumper

[0039] Note 1,2,3,4, are all done on the inner bag. When inner bag drops in to outer bag. The inner bag cycle starts again at the same time the outer bag cycle starts as follows

5

A---close cross seal and cut jaws

6

A---open cross seal and cut jaws
B---open lower side seal jaws
C---open lower dumper
D---pre heat outer side seals
E---start outer material feed motor

7

A---close lower outer dumper
B---close outer side seal and seal

[0040] This machine allows for the forming, filling and

sealing of bags containing different volumes of liquid, semi liquid or solids. The system and cycle of this machine allows making a bag inside a bag all in one machine.

[0041] The duel action of the feed nozzle 70 aids the bag material to be guided though the first stage of making and filling the bag. The high speed production machine is lightweight with a very small footprint and easily transportable.

[0042] Inner bag support 80 supports the bag filled with product so as when transverse sealing and cut jaws 48 close and heated the weight of the fill bag dose not pull the hot soft material from jaws. This same comment is true with respect to outer bag support 90 and transvers sealing and cut jaws 56. There is a cool down cycle in the PLC that allows cooling down time before the jaws open allowing the heated material to bond together creating a seal.

[0043] The small footprint reduces the floor space required for a bagging operation, thus reducing overheads.

[0044] It has been found that it is best not to attempt what may be termed the horizontal or transverse seal with the plastic film material under tension. For this reason, grippers support the bag to reduce tension on the plastic film material during the sealing process.

[0045] A series of safety measures have been built into the machine. A safety switch is positioned in the vicinity of the access doors, so that the sealing jaws will not operate when the access doors are open. The sealing jaws close under low pressure and then switch to high pressure only when sensors indicate that they are in contact. Until the sensor is tripped indicating that the jaws are closed, the jaws do not switch to high pressure and the heat does not come on to heat the sealing jaws.

[0046] The side seal assemblies have solid grippers. It is undesirable to have the increasing weight of the inner bag during the filling process rip the inner bag free of the grippers. There must be no movement of the inner bag, until it is time to drop the inner bag into the outer bag.

[0047] Referring to FIG. 23, when flavoured liquids are being dispensed, a different pump is provided for each liquid. This enables an outer bag to be filled with up to 60 small bags, while the small bags are filled with a variety of flavours.

[0048] The illustrated embodiments have been set forth only as examples and should not be taken as limiting a purposive interpretation of the claims.

Claims

1. A form, fill and seal packaging machine (10) for producing a single package with an outer bag with a carry handle, comprising a sealed inner bag filled with liquid, semi liquid or dry goods, sealed inside an outer bag shell with an integrated mobility handle comprising:

a bagging chamber (14);

a fill chamber (16) disposed vertically above the bagging chamber (14);

an outer bag forming assembly (20) comprising:

at least one outer bag forming film support (22) for supporting a flexible sealable film for forming an outer bag;

guide rollers (28) to guide movement of sheets (30, 32) of the outer bag forming film (26);

feed rollers (34) that advance the sheets (30, 32) of the outer bag forming film (26);

outer bag transverse sealing and cutting jaws (56) positioned transverse to the outer bag forming film (26) and resulting outer tubular structure, the outer bag transverse sealing and cutting jaws (56) having opposed sealing and cutting surfaces (58) which are movable from a rest position spaced from the tubular structure to a sealing position where the sealing and cutting surfaces are brought together to compress, seal and cut the sheets (30, 32) of the outer bag forming film (26) to create an outer bag that is fed into the bagging chamber (14);

an inner bag forming assembly (50) comprising:

at least one inner bag forming film support (60) for supporting a flexible sealable film for forming an inner bag;

guide rollers (28) for guiding movement of sheets (66, 68) of the inner bag forming film (64);

a feed nozzle (70) for supplying product located in a space between the sheets 66 and 68 of the inner bag forming film (64);

feed rollers (34) that engage and advance the inner bag forming film (64) in a downward direction over the feed nozzle (70) in a controlled manner to a pre-set length into the fill chamber (16);

inner bag lengthwise edge sealing jaws (42) having opposed sealing surfaces (44) which are movable from a rest position spaced from the sheets (66, 68) of the inner bag forming film (64) to a sealing position where the sealing surfaces (44) are brought together to compress and seal the sheets (66, 68) of the inner bag forming film 64 to form an inner tubular structure;

inner bag transverse sealing and cutting jaw (48) positioned transverse to the inner bag forming film (64) and resulting inner tubular structure, the inner bag transverse sealing and cutting jaws (48) having opposed sealing and cutting surfaces (52) which are movable from a rest position spaced from the sheets (66, 68) of the inner bag forming film (64) to a sealing position

where the sealing and cutting surfaces are brought together to compress, seal and cut the sheets (66, 68) of the inner bag forming film (64) forming a transverse seal, an upper side of the transverse seal defining a bottom seal for the inner bag forming film (64) entering the fill chamber (16) and a lower side of the transverse seal defining a top seal for a filled inner bag exiting the fill chamber (16);
the nozzle supplying a measured amount of fill product into the inner bag;
the outer bag sealing and cutting jaws (56) serving to compress, seal and cut the sheets (30, 32) of the outer bag forming film (26) forming a transverse seal, an upper side of the transverse seal being a bottom seal for the outer bag entering the bagging chamber (14) and a lower side of the transverse seal being a top seal for a sealed outer bag containing one or more of the filled inner bags exiting the bagging chamber (14),

characterized in that

the fill chamber (16) has a bottom closure (18) that forms an inner bag support (80) and opens to provide access from the fill chamber (16) to the bagging chamber (14),
an actuator for opening the bottom closure (18)of the fill chamber (16) and lowering the filled inner bag out of the fill chamber (16) into the outer bag is positioned in the bagging chamber (14);
outer bag lengthwise edge sealing jaws (42) have opposed sealing surfaces (44) which are movable from a rest position spaced from the sheets (30, 32) of the outer bag forming film (26) to a sealing position where the sealing surfaces (44) are brought together to compress and seal together lengthwise edges of the sheets (30, 32) to the outer bag forming film (26) to form an outer tubular structure;
wherein the inner bag forming film (64) is fed folded in a lengthwise direction leaving only one lengthwise edge of the inner bag forming film (64) open, the inner tubular structure having a heat sealed lengthwise edge of the folded inner bag forming film (64).

2. The form, fill and seal packaging machine (10) of claim 1, wherein the bottom closure (18) of the fill chamber (16) is comprised of pivotally mounted drop control plates (88), the drop control plates (88) being controlled in their pivot movement, thereby controlling a rate at which the inner bag drops from the fill chamber (16) into the outer bag in the bagging chamber (14).

3. The form, fill and seal packaging machine (10) of claim 2, wherein movement of the drop control plates (88) is controlled by air cylinders.

4. The form, fill and seal packaging machine (10) of claim 1, wherein the nozzles comprises
a thin rectangle tube which, when placed between the sheets (66, 68) of the inner bag forming film (64), helps guide the inner bag forming film (64).

5. The form, fill and seal packaging machine (10) of claim 1, wherein a pneumatic outer bag handle jaw cuts and heat seals a handle imprint into the outer bag at the time the horizontal top seal is being formed on the outer bag.

6. A method of making an integrated sealed dual bag with an outer bag enclosing a sealed inner bag filled with liquid, semi liquid or dry goods, sealed inside an outer bag shell with an integrated mobility handle of a form fill seal packing machine according to any of claims 1 - 5 comprising:

providing a fill chamber (16) vertically disposed above a bagging chamber (14), the fill chamber (16) having a bottom that opens to provide access from the fill chamber (16) to the bagging chamber (14);
advancing an outer bag forming film (26) comprising flexible sealable film for forming an outer bag;
heat sealing the outer bag forming film (26) lengthwise to form an outer tubular structure;
heat sealing the outer tubular structure widthwise to form a bottom seal completing formation of the outer bag;
advancing the outer bag into the lower bagging chamber (14);
advancing an inner bag forming film (64) comprising a flexible sealable film for forming an inner bag, wherein the inner bag forming film (64) is fed folded in a lengthwise direction leaving only one lengthwise edge of the inner bag forming film (64) open; heat sealing the inner bag forming film (64) lengthwise to form an inner tubular structure; heat sealing the inner tubular structure to form a bottom seal completing formation of the inner bag;
advancing the inner bag into the fill chamber (16);
filling the inner bag in the fill chamber (16);
heat sealing a top of the inner bag in the fill chamber (16);
opening the bottom of the fill chamber (16) to release the filled and completely sealed inner bag to drop by force of gravity into the outer bag positioned in the bagging chamber (14); and
heat sealing a top of the outer bag with the filled

inner bag.

7. The method of claim 6, including a step of slowing the drop of the filled inner bag from the fill chamber (16) to the bagging chamber (14) by having it fall through a channel formed by drop control plates (88) pivotally mounted in spaced relation, the drop control plates (88) being controlled in their pivot movement.

Patentansprüche

1. Maschine (10) zum Formen, Füllen und Schließen einer Verpackung zum Herstellen einer einzelnen Verpackung mit einer Außentasche mit einem Tragegriff, aufweisend eine abgedichtete Innentasche, welche mit flüssigen, halbflüssigen oder trockenen Waren gefüllt ist, welche innerhalb einer äußeren Taschenhülle mit einem integrierten Mobilitätsgriff versiegelt ist, aufweisend:

eine Absackkammer (14);
eine Füllkammer (16), welche vertikal über der Absackkammer (14) angeordnet ist; eine äußere Tasche bildende Baugruppe (20), aufweisend:

mindestens einen eine äußere Tasche formenden Folienhalter (22) zum Halten einer flexiblen, versiegelbaren Folie zum Formen einer äußeren Tasche;
Führungswalzen (28), um eine Bewegung von Bögen (30, 32) der eine äußere Tasche formenden Folie (26) zu führen;
Zuführwalzen (34), welche die Bögen (30, 32) der eine äußere Tasche formenden Folie (26) vorwärts bewegen;
eine äußere Tasche versiegelnde und schneidende querverlaufende Klauen (56), welche quer zu der eine äußere Tasche formenden Folie (26) und resultierenden äußeren rohrförmigen Struktur angeordnet sind, wobei die eine äußere Tasche versiegelnden und schneidenden querverlaufenden Klauen (56) gegenüberliegende, versiegelnde und schneidende Flächen (58) aufweisen, welche aus einer von der rohrförmigen Struktur beabstandeten Ruheposition in eine Versiegelungsposition bewegbar sind, in welcher die versiegelnden und schneidenden Flächen zusammen gebracht werden, um die Bögen (30, 32) der eine äußere Tasche formenden Folie (26) zusammenzudrücken, zu versiegeln und zu schneiden, um eine äußere Tasche zu bilden, welche in die Absackkammer (14) zugeführt wird; wobei eine innere Tasche formende Baugruppe (50) aufweist:

mindestens einen eine innere Tasche formenden Folienhalter (60) zum Halten einer flexiblen, versiegelbaren Folie zum Formen einer inneren Tasche;
Führungswalzen (28), um eine Bewegung von Bögen (66, 68) der eine innere Tasche formenden Folie (64) zu führen;
eine Zuführtülle (70) zum Versorgen eines Produkts, welches sich in einem Raum zwischen den Bögen (66) und (68) der die innere Tasche formenden Folie (64) befindet;
Zuführwalzen (34), welche mit der eine innere Tasche formenden Folie (64) eingreifen und sie in einer nach unten gerichteten Richtung über die Zuführtülle (70) in einer kontrollierten Weise um eine voreingestellte Länge in die Füllkammer (16) vorwärts bewegen;
eine innere Tasche an längsgerichtetem Rand versiegelnde Klauen (42) mit gegenüberliegenden Versiegelungsflächen (44), welche aus einer von den Bögen (66, 68) der eine innere Tasche formenden Folie (64) beabstandeten Ruheposition in eine Versiegelungsposition bewegbar sind, in welcher die versiegelnden Flächen (44) zusammen gebracht werden, um die Bögen (66, 68) der eine innere Tasche formenden Folie (64) zusammenzudrücken, um eine innere, rohrförmige Struktur zu formen;
eine innere Tasche versiegelnde und schneidende querverlaufende Klauen (48), welche quer zu der eine innere Tasche formenden Folie (64) und resultierenden inneren rohrformigen Struktur angeordnet sind, wobei die eine innere Tasche versiegelnden und schneidenden querverlaufenden Klauen (48) gegenüberliegende, versiegelnde und schneidende Flächen (52) aufweisen, welche aus einer von den Bögen (66, 68) der eine innere Tasche formenden Folie (64) beabstandeten Ruheposition in eine Versiegelungsposition bewegbar sind, in welcher die versiegelnden und schneidenden Flächen zusammen gebracht werden, um die Bögen (66, 68) der eine innere Tasche formenden Folie (64) zusammenzudrücken, zu versiegeln und zu schneiden, so dass eine querverlaufende Versiegelung gebildet wird, wobei eine obere Seite der querverlaufenden Versiegelung, welche eine untere

Versiegelung für die eine innere Tasche formende Folie (64) definiert, in die Füllkammer (16) eintritt und eine untere Seite der querverlaufenden Versiegelung, welche eine obere Versiegelung für eine gefüllte innere Tasche definiert, aus der Füllkammer (16) austritt;

wobei die Tülle eine bemessene Menge an Füllmaterial in die innere Tasche zuführt; wobei die eine äußere Tasche versiegelnden und schneidenden Klauen (56) dazu dienen, um die Bögen (30, 32) der eine innere Tasche formenden Folie (26) zusammenzudrücken, zu versiegeln und zu schneiden, so dass eine querverlaufende Versiegelung gebildet wird, wobei eine obere Seite der querverlaufenden Versiegelung, welche eine untere Versiegelung für die äußere Tasche darstellt, in die Absackkammer (14) eintritt und eine untere Seite der querverlaufenden Versiegelung, welche eine obere Versiegelung für versiegelte äußere Tasche darstellt, welche eine oder mehrere der gefüllten inneren Taschen enthält, aus der Absackkammer (14) austritt,

dadurch gekennzeichnet, dass

die Füllkammer (16) einen unteren Verschluss (18) aufweist, welcher einen inneren Taschenhalter (80) bildet und sich öffnet, um Zugang von der Füllkammer (16) zu der Absackkammer (14) bereitzustellen,

ein Aktuator zum Öffnen des unteren Verschlusses (18) der Füllkammer (16) und Absenken der gefüllten inneren Tasche aus der Füllkammer (16) in die äußere Tasche in der Absackkammer (14) angeordnet ist;

eine äußere Tasche an längsgerichtetem Rand versiegelnde Klauen (42) gegenüberliegende Versiegelungsflächen (44) aufweisen, welche aus einer von den Bögen (30, 32) der eine äußere Tasche formenden Folie (26) beabstandeten Ruheposition in eine Versiegelungsposition bewegbar sind, in welcher die versiegelnden Flächen (44) zusammengebracht werden, um längsgerichtete Ränder der Bögen (30, 32) der eine äußere Tasche formenden Folie (26) zusammenzudrücken und zusammen zu versiegeln, um eine äußere, rohrförmige Struktur zu formen;

wobei die eine innere Tasche formende Folie (64) gefaltet in einer längsgerichteten Richtung zugeführt wird, was nur einen längsgerichteten Rand der eine innere Tasche formenden Folie (64) offen lässt, wobei die innere rohrförmige Struktur einen heißversiegelten, längsgerichteten Rand der gefalteten, eine innere Tasche formenden Folie (64) aufweist.

2. Maschine (10) zum Formen, Füllen und Schließen einer Verpackung nach Anspruch 1, wobei der untere Verschluss (18) der Füllkammer (16) aus schwenkbar montierten Sinksteuerungsplatten (88) besteht, wobei die Sinksteuerungsplatten (88) in ihrer Schwenkbewegung gesteuert werden, wodurch eine Rate, mit der die innere Tasche aus der Füllkammer (16) in die äußere Tasche in der Absackkammer (14) sinkt, gesteuert wird.

3. Maschine (10) zum Formen, Füllen und Schließen einer Verpackung nach Anspruch 1, wobei die Bewegung der Sinksteuerungsplatten (88) durch Luftzylinder gesteuert wird.

4. Maschine (10) zum Formen, Füllen und Schließen einer Verpackung nach Anspruch 1, wobei die Tülle ein dünnes rechteckiges Rohr aufweist, welches, wenn es zwischen den Bögen (66, 68) der eine innere Tasche formenden Folie (64) angeordnet ist, hilft, die eine innere Tasche formende Folie (64) zu führen.

5. Maschine (10) zum Formen, Füllen und Schließen einer Verpackung nach Anspruch 1, wobei eine pneumatische Klaue für einen Griff einer äußeren Tasche eine Griffeinprägung in die äußere Tasche zu der Zeit schneidet und heißversiegelt, wenn die horizontale obere Versiegelung an der äußeren Tasche gebildet wird.

6. Verfahren zum Herstellen einer integrierten, versiegelten Doppeltasche mit einer äußeren Tasche, welche eine versiegelte, innere Tasche umschließt, welche mit flüssigen, halbflüssigen oder trockenen Waren gefüllt ist, welche innerhalb einer äußeren Taschenhülle mit einem integrierten Mobilitätsgriff versiegelt ist, von einer Maschine zum Formen, Füllen und Schließen einer Verpackung gemäß einem der Ansprüche 1 - 5, aufweisend:

Bereitstellen einer Füllkammer (16), welche vertikal über einer Absackkammer (14) angeordnet ist, wobei die Füllkammer (16) einen Boden aufweist, welcher sich öffnet, um Zugang von der Füllkammer (16) zu der Absackkammer (14) bereitzustellen;

Vorwärtsbewegen einer eine äußere Tasche formenden Folie (26), welche eine flexible, ver-

siegelbare Folie zum Formen einer äußeren Tasche aufweist;
längsgerichtetes Heißversiegeln der eine äußere Tasche formenden Folie (26), um eine äußere rohrförmige Struktur zu formen;
der Breite nach Heißversiegeln der äußeren rohrförmigen Struktur, um eine untere, vervollständigende Versiegelungsausbildung zu bilden;
Vorwärtsbewegen der äußeren Tasche in die untere Absackkammer (14); Vorwärtsbewegen einer eine innere Tasche formenden Folie (64), welche eine flexible, versiegelbare Folie zum Formen einer inneren Tasche aufweist, wobei die eine innere Tasche formende Folie (64) gefaltet in einer längsgerichteten Richtung zugeführt wird, was nur einen längsgerichteten Rand der eine innere Tasche formenden Folie (64) offen lässt;
längsgerichtetes Heißversiegeln der eine innere Tasche formenden Folie (64), um eine innere, rohrförmige Struktur zu bilden; Heißversiegeln der inneren, rohrförmigen Struktur, um eine untere, vervollständigende Versiegelungsausbildung der inneren Tasche zu bilden;
Vorwärtsbewegen der inneren Tasche in die Füllkammer (16); Füllen der inneren Tasche in der Füllkammer (16); Heißversiegeln eines oberen Teils der inneren Tasche in der Füllkammer (16); Öffnen des Bodens der Füllkammer (16), um die gefüllte und vollständig versiegelte innere Tasche freizugeben, um durch Gravitationskraft in die äußere Tasche, welche in der Absackkammer (14) angeordnet ist, zu sinken; und
Heißversiegeln eines oberen Teils der äußeren Tasche mit der gefüllten inneren Tasche.

7. Verfahren nach Anspruch 6, aufweisend einen Schritt des Verlangsamens des Sinkens der gefüllten inneren Tasche aus der Füllkammer (16) in die Absackkammer (14), indem sie durch einen Kanal fallen gelassen wird, welcher durch in beabstandetem Verhältnis schwenkbar montierte Sinksteuerungsplatten (88) gebildet ist, wobei die Sinksteuerungsplatten (88) in ihrer Schwenkbewegung gesteuert werden.

Revendications

1. Une machine pour le formage, le remplissage et le scellage d'emballages (10) pour la production d'un emballage unique avec un sac extérieur avec poignée de transport, comprenant un sac intérieur scellé rempli de produits liquides, semi-liquides ou secs, scellé à l'intérieur d'une enveloppe de sac extérieur avec poignée de mobilité intégrée, comprenant :

un compartiment d'ensachage (14) ;
un compartiment de remplissage (16) disposée verticalement au-dessus du compartiment d'ensachage (14) ;
un assemblage de formage de sac extérieur (20) comprenant :

au moins un support pour film de formage de sac extérieur (22) pour supporter un film flexible scellable pour former un sac extérieur ;
des rouleaux de guidage (28) pour guider le mouvement des feuilles (30, 32) de film de formage de sac extérieur (26) ;
des rouleaux d'alimentation (34) pour faire avancer les feuilles (30, 32) de film de formage de sac extérieur (26) ;
des mâchoires de découpe et de scellage transversal de sac extérieur (56) positionnées de manière transversale par rapport au film de formage de sac extérieur (26) et la structure tubulaire extérieure en résultant, les mâchoires de découpe et de scellage transversal de sac extérieur (56) présentant des surfaces de découpe et de scellage (58) opposées qui peuvent être déplacées d'une position de repos éloignée de la structure tubulaire à une position de scellage où les surfaces de scellage et de découpe sont rapprochées de manière à comprimer, sceller et couper les feuilles (30, 32) du film de formage de sac extérieur (26) pour créer un sac extérieur qui est déplacé dans le compartiment d'ensachage (14) ;

un assemblage de formage de sac intérieur (50) comprenant :

au moins un support pour film de formage de sac intérieur (60) pour supporter un film flexible scellable pour former un sac intérieur ;
des rouleaux de guidage (28) pour guider le mouvement des feuilles (66, 68) de film de formage de sac intérieur (64) ;
une buse d'alimentation (70) pour fournir le produit situé dans un espace entre les feuilles 66 et 68 du film de formage du sac intérieur (64) ;
des rouleaux d'alimentation (34) pour faire s'engager et avancer le film de formage du sac intérieur (64) dans une direction descendante au-dessus de la buse de manière contrôlée jusqu'à atteindre une longueur préconfigurée dans le compartiment de remplissage (16) ;
des mâchoires de scellage longitudinales du sac intérieur (42) présentant des surfa-

ces de scellage (44) opposées qui peuvent être déplacées d'une position de repos éloignée des feuilles (66, 68) du film de formage du sac intérieur (64) à une position de scellage où les surfaces de scellage (44) sont rapprochées de manière à comprimer et sceller les feuilles (66, 68) du film de formage de sac intérieur (64) pour former une structure tubulaire intérieure ;
des mâchoires de découpe et de scellage transversal de sac intérieur (48) positionnées de manière transversale par rapport au film de formage de sac intérieur (64) et la structure tubulaire intérieure en résultant, les mâchoires de découpe et de scellage transversale de sac intérieures (48) présentant des surfaces de découpe et de scellage (52) opposées qui peuvent être déplacées d'une position de repos éloignée des feuilles (66, 68) du film de formage du sac intérieur (64) à une position de scellage où les surfaces de scellage et de découpe sont rapprochées de manière à comprimer, sceller et couper les feuilles (66, 68) du film de formage de sac intérieur (64) formant un scellage transversal, un côté supérieur du scellage transversal correspondant à un scellage inférieur pour le film de formage de sac intérieur (64) entrant dans le compartiment de remplissage (16) et un côté inférieur du scellage transversal correspondant à un scellage supérieur pour un sac intérieur rempli quittant le compartiment de remplissage (16) ;
la buse délivrant la quantité mesurée de produit de remplissage dans le sac intérieur ;
les mâchoires de scellage et de découpe de sac extérieur (56) servant à comprimer, sceller et couper les feuilles (30, 32) du film de formage de sac extérieur (26) formant un scellage transversal, un côté supérieur du scellage transversal étant un scellage inférieur pour le sac extérieur entrant dans le compartiment d'ensachage (14) et un côté inférieur du scellage transversal étant un scellage supérieur pour un sac extérieur comprenant un ou plusieurs des sacs intérieurs remplis sortant du compartiment d'ensachage (14), **caractérisée en ce que**

le compartiment de remplissage (16) présente une fermeture inférieure (18) qui forme un support pour sac intérieur (80) et s'ouvre pour fournir un accès depuis le compartiment de remplissage (16) au compartiment d'ensachage (14),
un actionneur pour ouvrir la fermeture inférieure (18) du compartiment de remplissage (16) et abaisser et faire sortir le sac intérieur rempli hors du compartiment de remplissage (16) dans le sac extérieur est positionné dans le compartiment d'ensachage (14),
les mâchoires de scellage longitudinales du sac extérieur (42) présentent des surfaces de scellage (44) opposées qui peuvent être déplacées d'une position de repos éloignée des feuilles (30, 32) du film de formage du sac extérieur (26) à une position de scellage où les surfaces de scellage (44) sont rapprochées de manière à comprimer et sceller, de manière longitudinale, les arrêtes des feuilles (30, 32) du film de formage de sac extérieur (26) pour créer une structure tubulaire extérieure ;

étant précisé que le film de formage de sac intérieur (64) est inséré plié dans une direction longitudinale, ne laissant qu'une arrête longitudinale du film de formage de sac intérieur (64) ouverte, la structure tubulaire intérieure présentant une arrête longitudinale thermoscellée du film de formage de sac intérieur plié (64).

2. La machine pour le formage, le remplissage et le scellage d'emballages (10) selon la Revendication 1, étant précisé que la fermeture inférieure (18) du compartiment de remplissage (16) comprend des plaques de ralentissement de chute montées de sorte à ce qu'elles puissent pivoter (88), le pivotement des plaques de ralentissement de chute (88) étant contrôlé, contrôlant ainsi la vitesse à laquelle le sac intérieur tombe du compartiment de remplissage (16) dans le sac intérieur dans le compartiment d'ensachage (14).

3. La machine pour le formage, le remplissage et le scellage d'emballages (10) selon la Revendication 2, étant précisé que le mouvement des plaques de ralentissement de chute (88) est contrôlé par des cylindres pneumatiques.

4. La machine pour le formage, le remplissage et le scellage d'emballages (10) selon la Revendication 1, étant précisé que les buses comprennent un tube rectangulaire fin qui, lorsqu'il est placé entre les feuilles (66, 68) de film de formage de sac intérieur (64), aide à guider le film de formage de sac intérieur (64).

5. La machine pour le formage, le remplissage et le scellage d'emballages (10) selon la Revendication 1, étant précisé qu'une mâchoire pneumatique de poignée de sac extérieur découpe et thermo-scelle une empreinte de poignée dans le sac extérieur au moment où le scellage horizontal supérieur est appliqué sur le sac extérieur.

6. Un procédé de fabrication d'un sac double scellé avec un sac extérieur comprenant un sac intérieur scellé rempli de produits liquides, semi-liquides ou secs, scellé à l'intérieur d'une enveloppe de sac extérieur avec poignée de mobilité sur une machine de formage, remplissage et scellage d'emballages selon l'une quelconque des Revendications 1 à 5 comprenant les étapes consistant à :

fournir un compartiment de remplissage (16) disposé verticalement au-dessus d'un compartiment d'ensachage (14), le compartiment de remplissage (16) présentant un fond qui s'ouvre pour fournir un accès du compartiment de remplissage (16) au compartiment d'ensachage (14) ;
faire avancer un film de formage de sac extérieur (26) comprenant un film scellable flexible afin de former un sac extérieur ;
thermo-sceller le film de formage de sac extérieur (26) dans le sens de la longueur afin de former une structure tubulaire extérieure ;
thermo-sceller la structure tubulaire extérieure dans le sens de la largeur afin de former un scellage inférieur pour compléter la formation du sac extérieur ;
faire pénétrer le sac extérieur dans le compartiment d'ensachage (14) positionné plus bas ;
faire avancer un film de formage de sac intérieur (64) comprenant un film scellable flexible pour former un sac intérieur, étant précisé que le film de formage de sac intérieur (64) est inséré plié dans une direction longitudinale, ne laissant qu'une arrête longitudinale du film de formage de sac intérieur (64) ouverte ;
thermo-sceller le film de formage de sac intérieur (64) dans le sens de la longueur pour former une structure tubulaire intérieure ;
thermo-sceller la structure tubulaire intérieure pour former un scellage inférieur pour compléter la formation du sac intérieur ;
faire pénétrer le sac intérieur dans le compartiment de remplissage (16) ;
remplir le sac intérieur dans le compartiment de remplissage (16) ;
thermo-sceller un bord supérieur du sac intérieur dans le compartiment de remplissage (16) ;
ouvrir le fond du compartiment de remplissage (16) pour faire tomber le sac intérieur rempli et entièrement scellé gravitationnellement dans le sac extérieur positionné dans le compartiment d'ensachage (14) ; et
thermo-sceller un bord supérieur du sac extérieur avec le sac intérieur rempli.

7. Le procédé selon la Revendication 6 comprenant une étape consistant à ralentir la chute du sac intérieur rempli du compartiment de remplissage (16) au compartiment d'ensachage (14) en le faisant tomber à travers un canal formé par des plaques de ralentissement de chute (88) montées de sorte à pouvoir pivoter de manière espacée, le pivotement des plaques de ralentissement de chute (88) étant contrôlé.

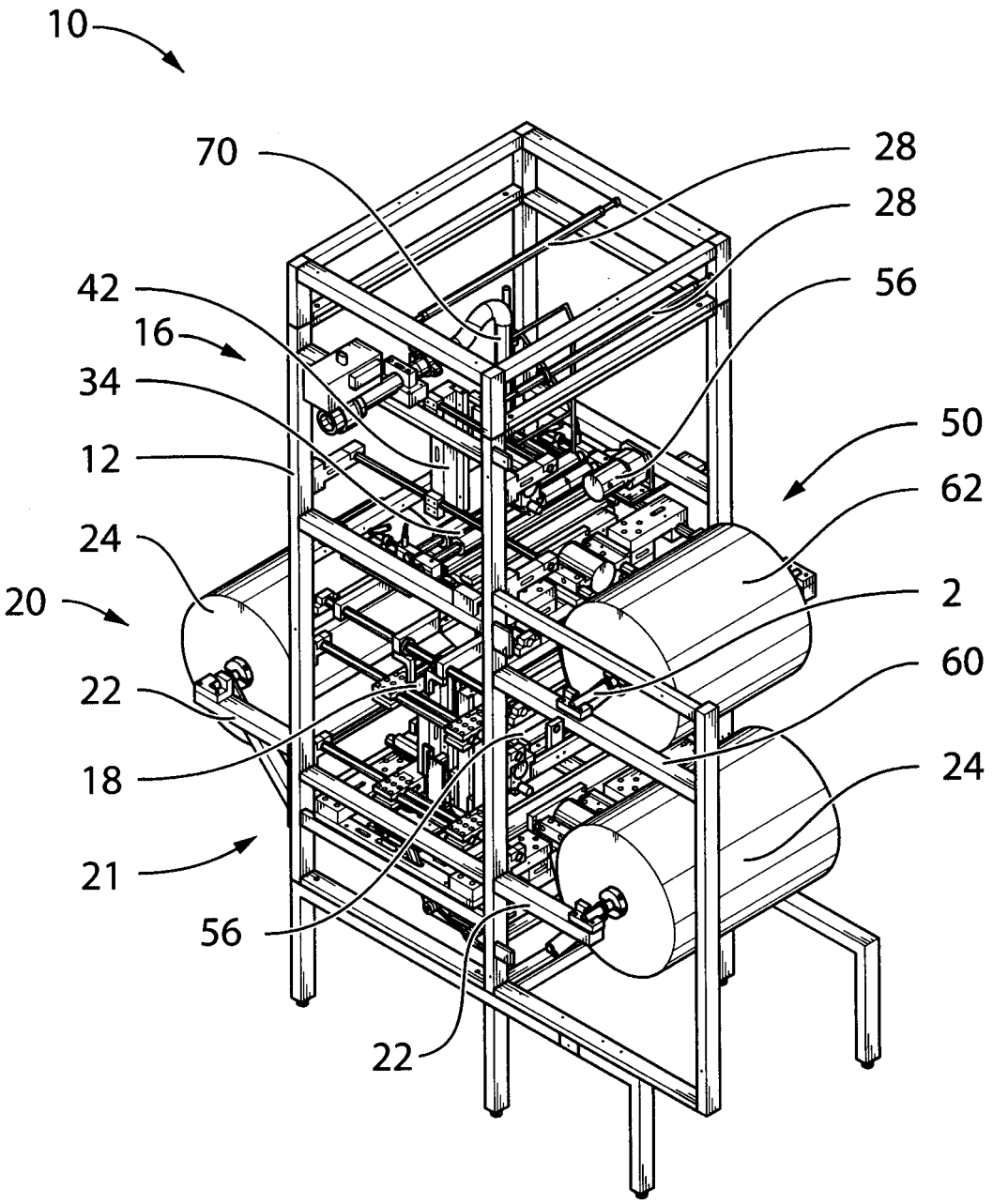

FIG. 1

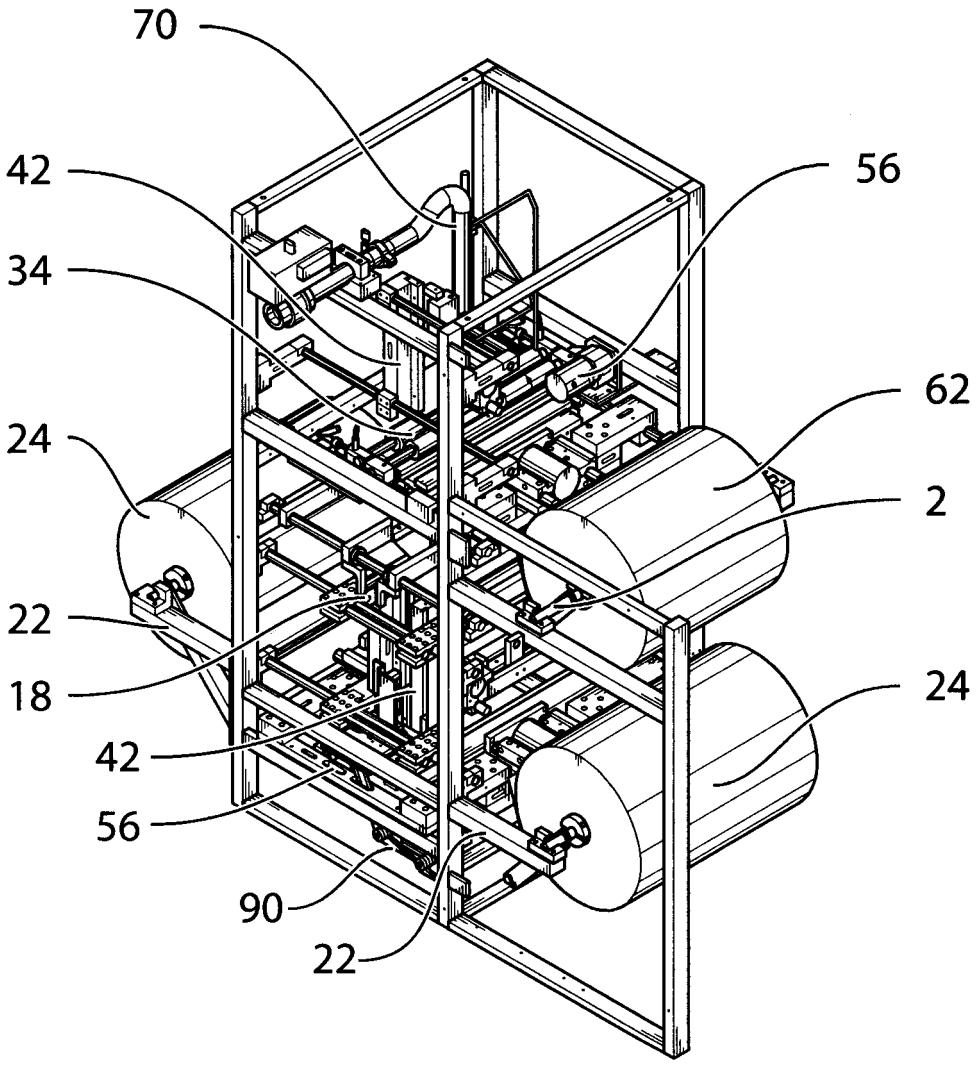

FIG. 2

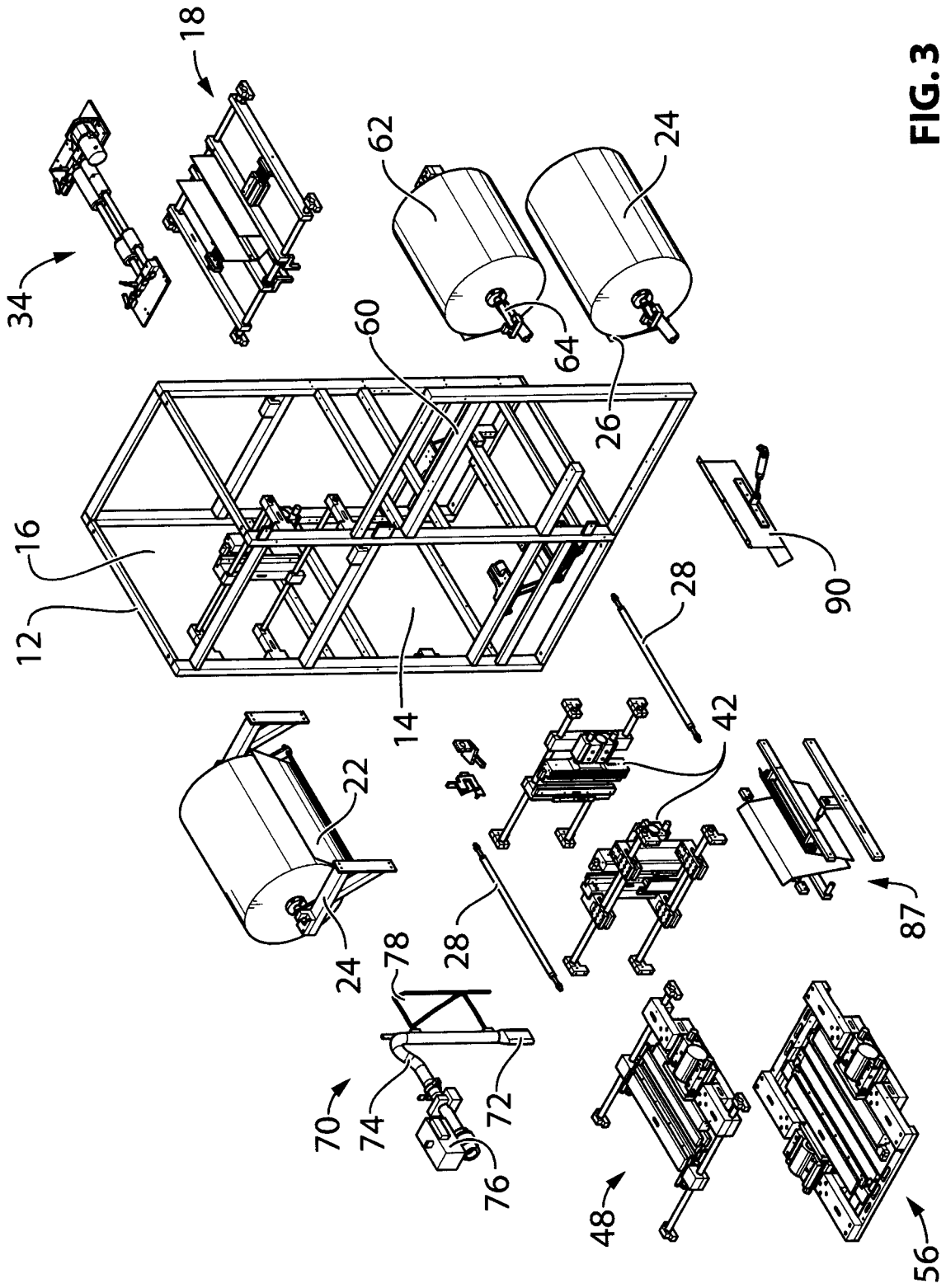

FIG. 3

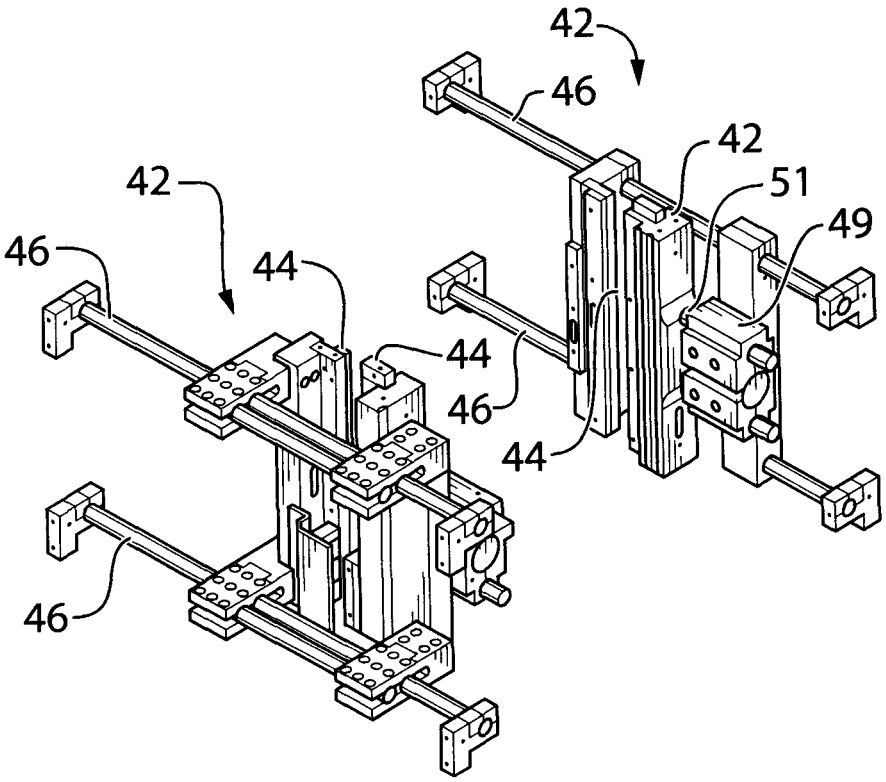

FIG. 4

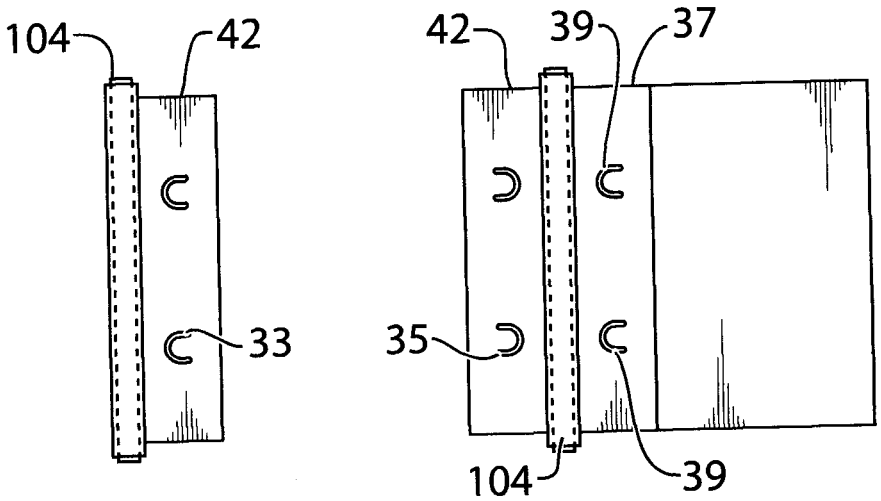

FIG. 5

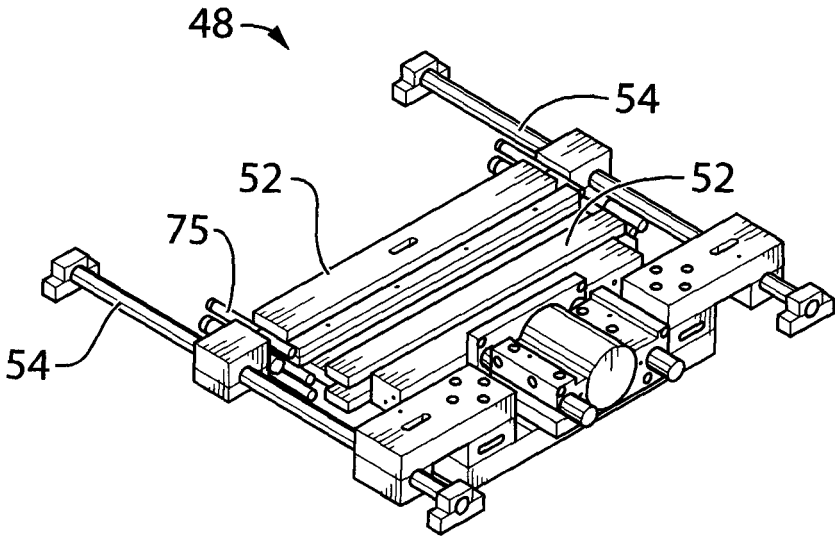

FIG. 6

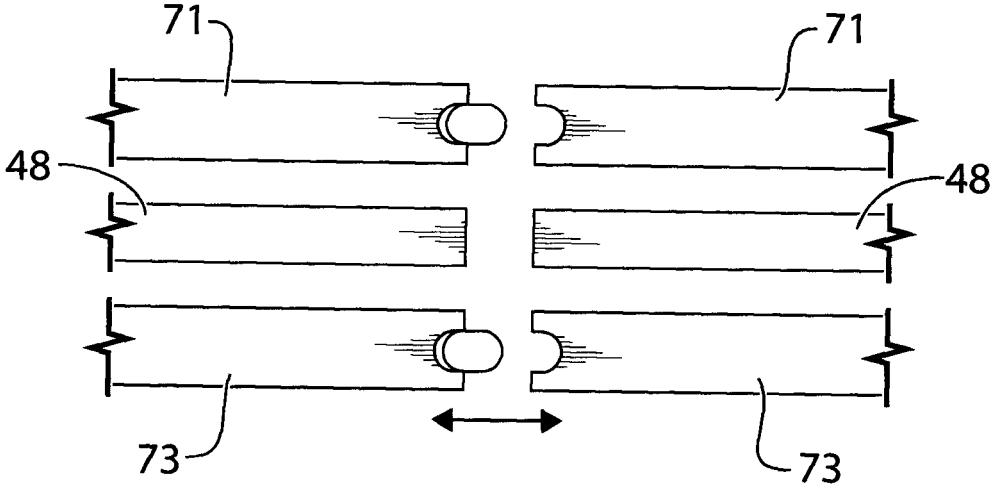

FIG. 7

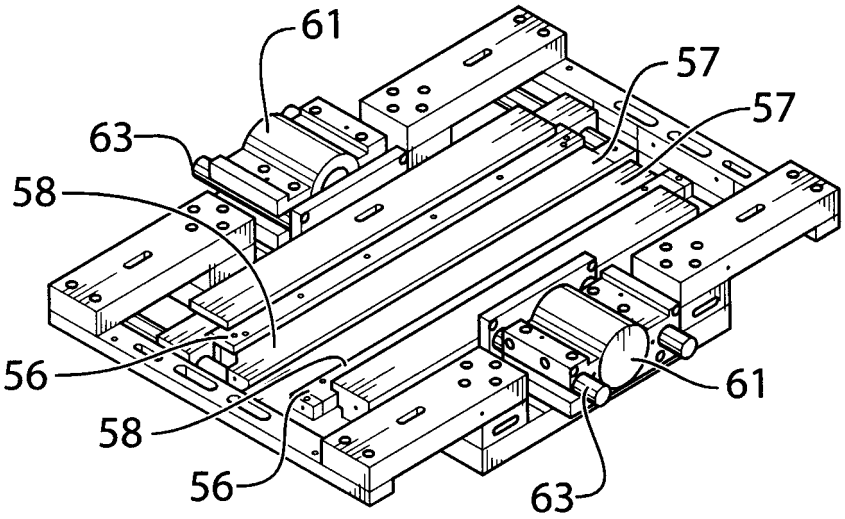

FIG. 8

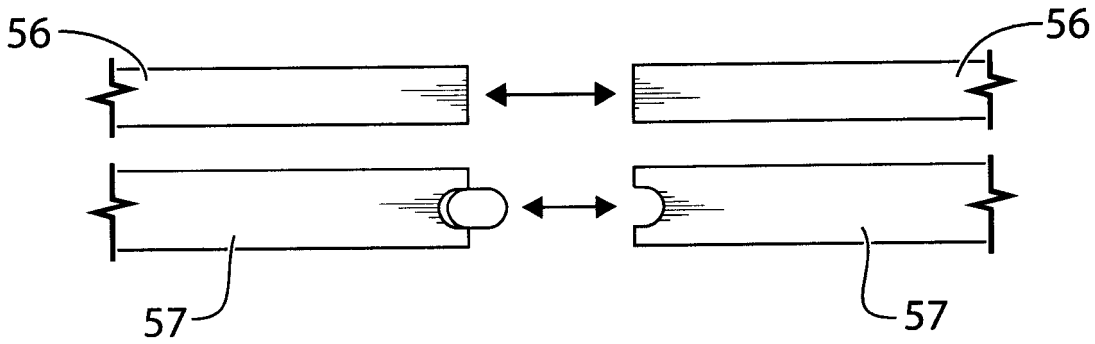

FIG. 9

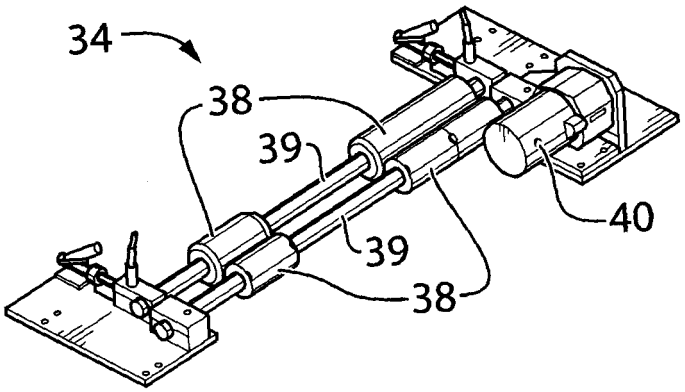

FIG. 10

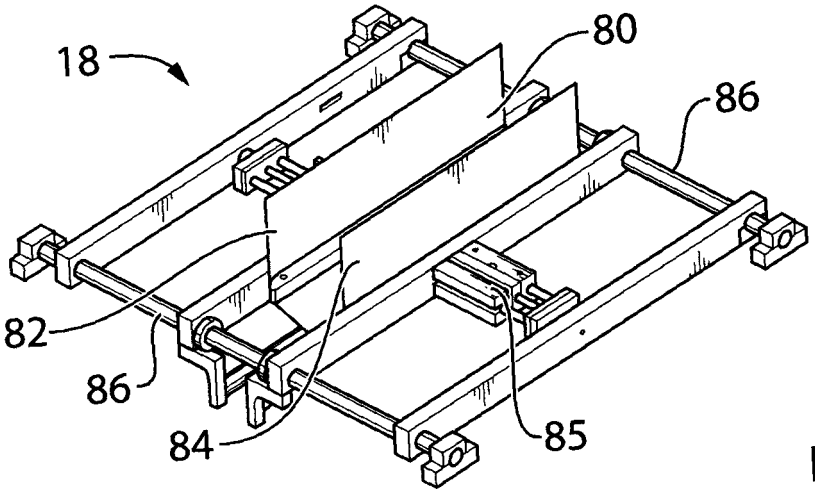

FIG. 11

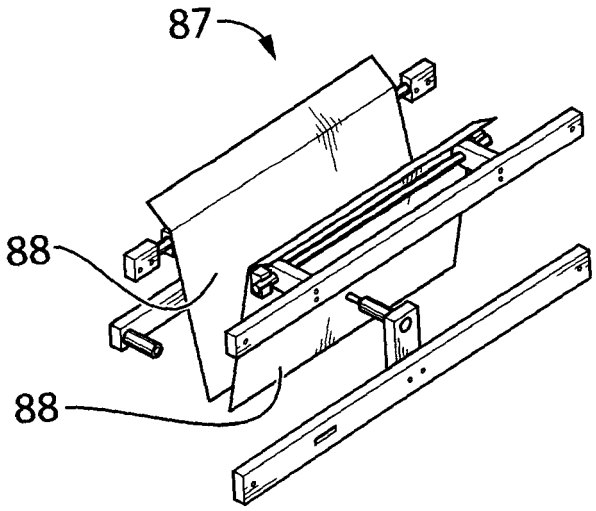

FIG. 12

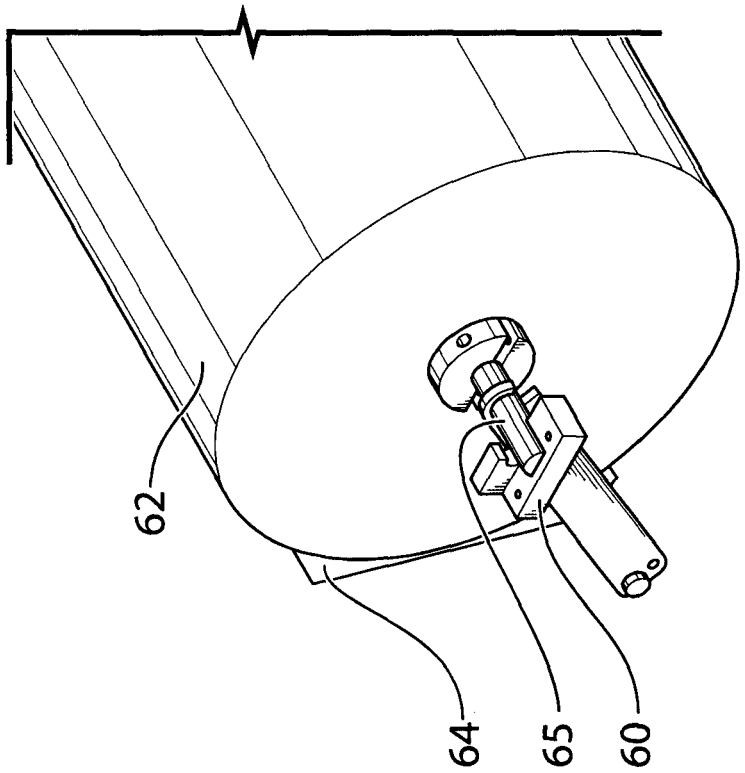

FIG. 14

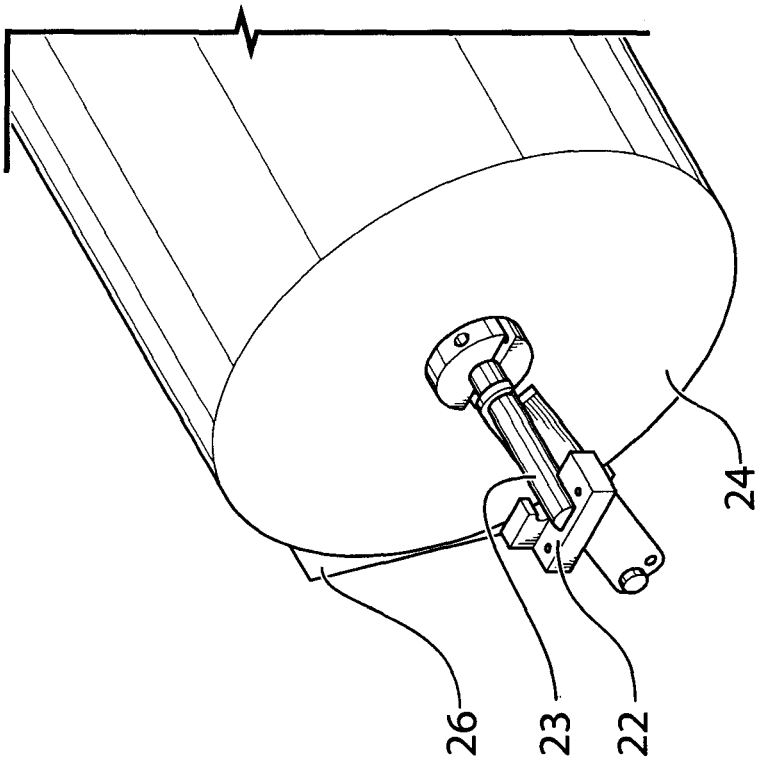

FIG. 13

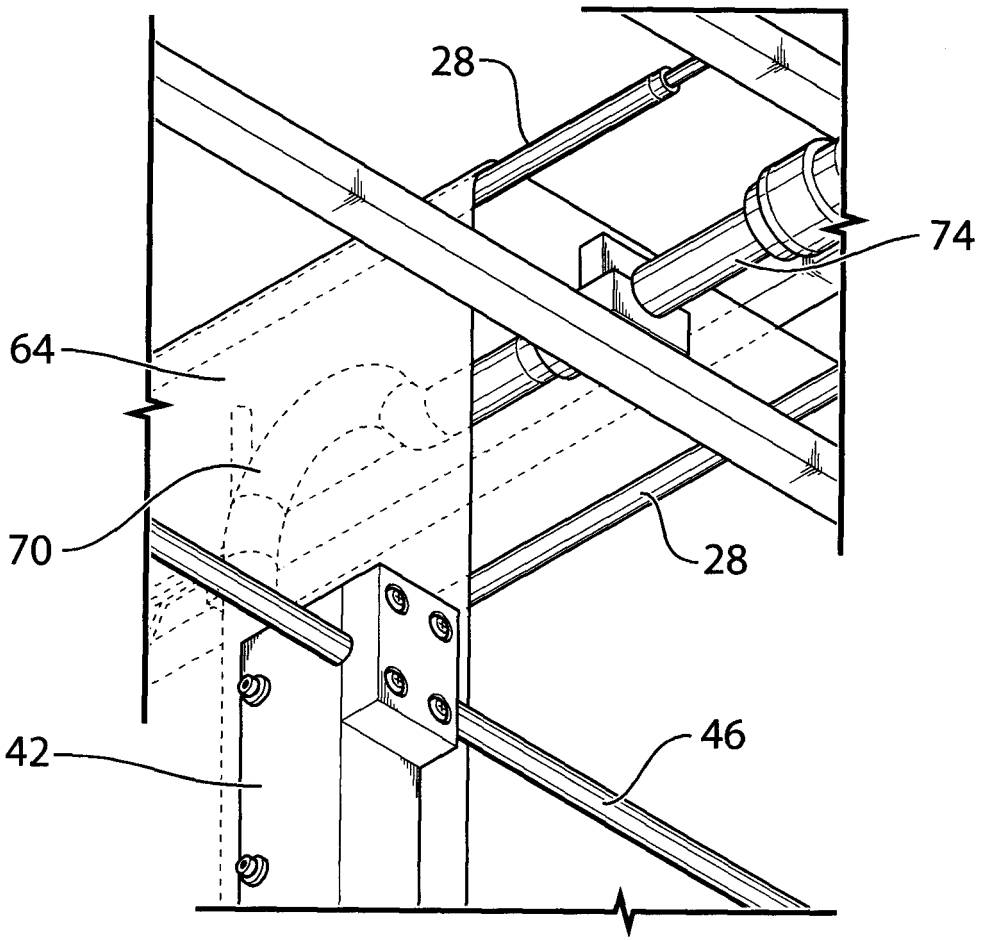

FIG. 15

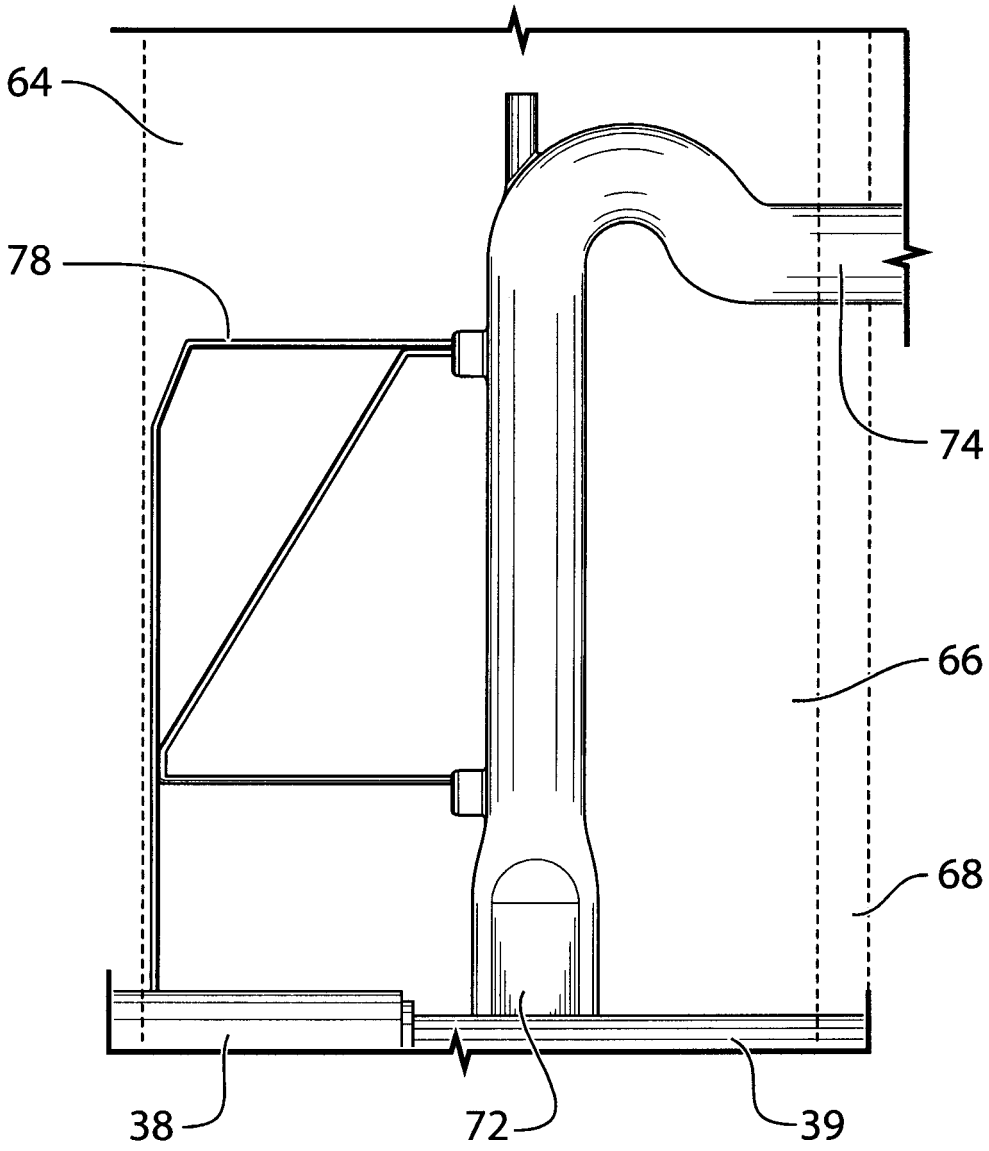

FIG. 16

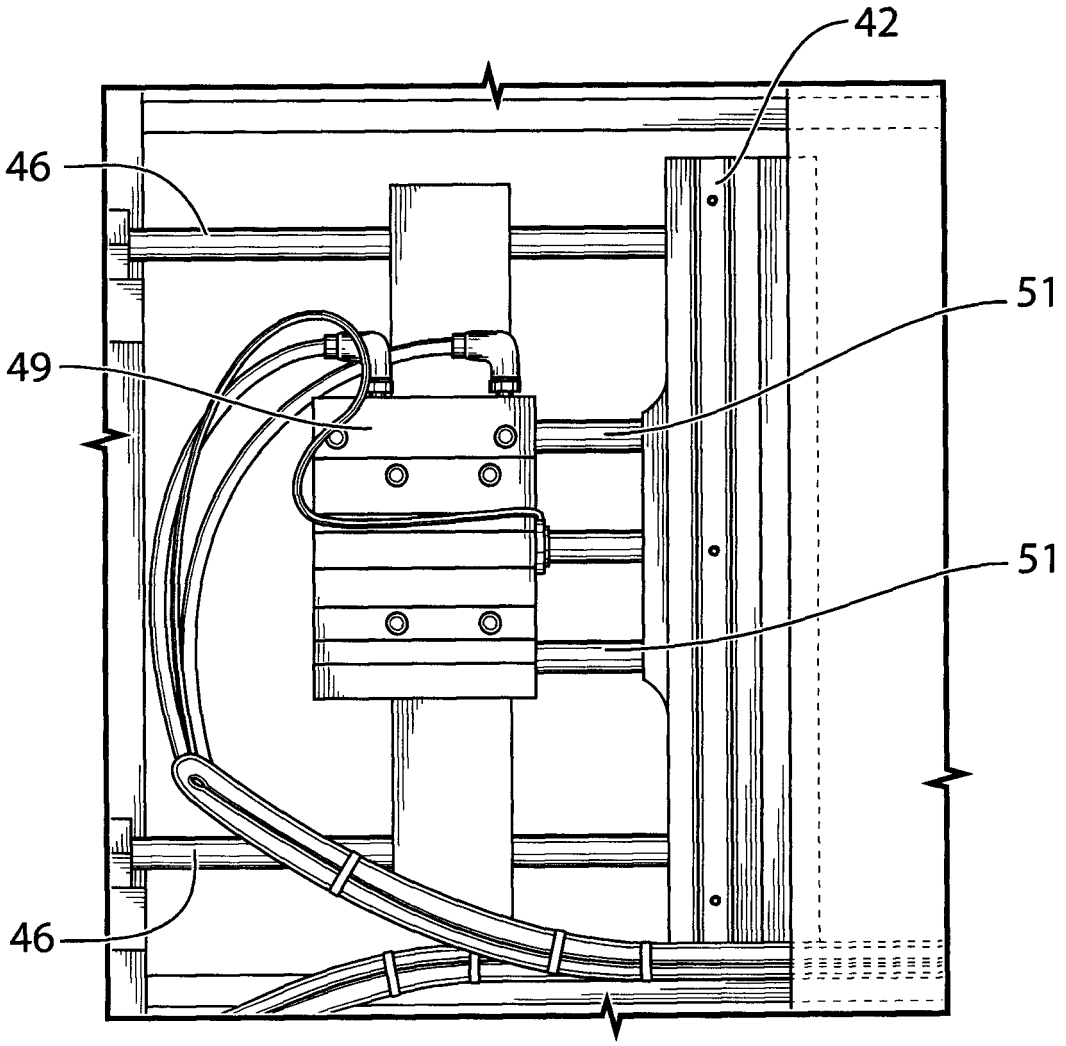

FIG. 17

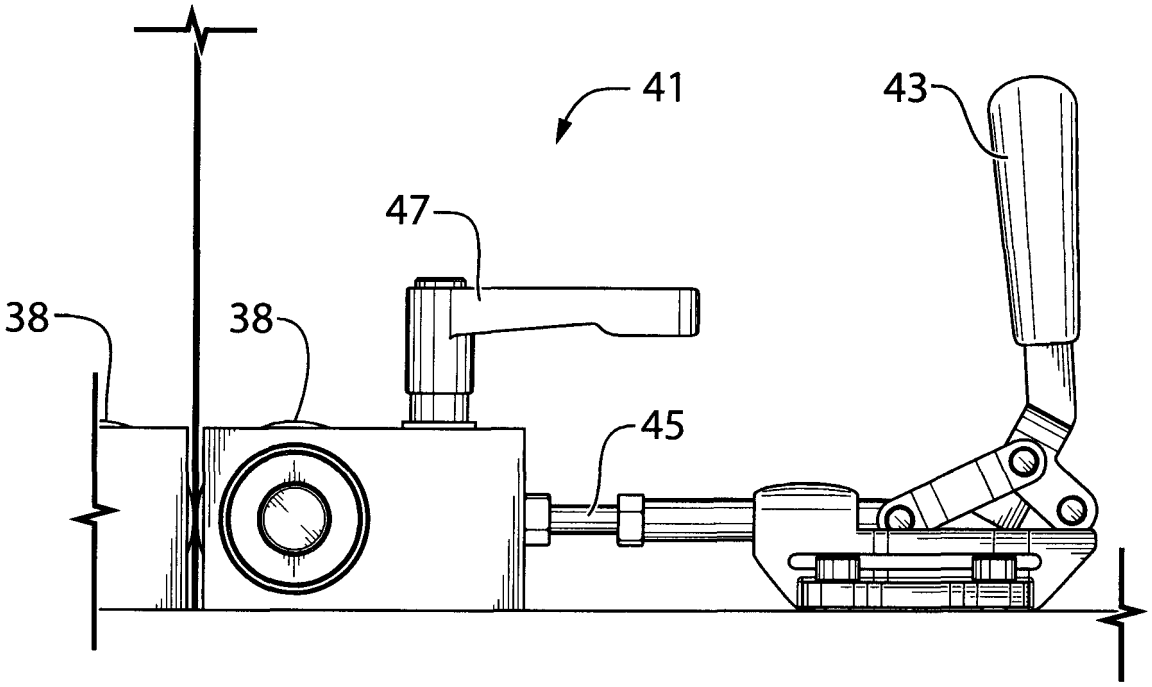

FIG. 18

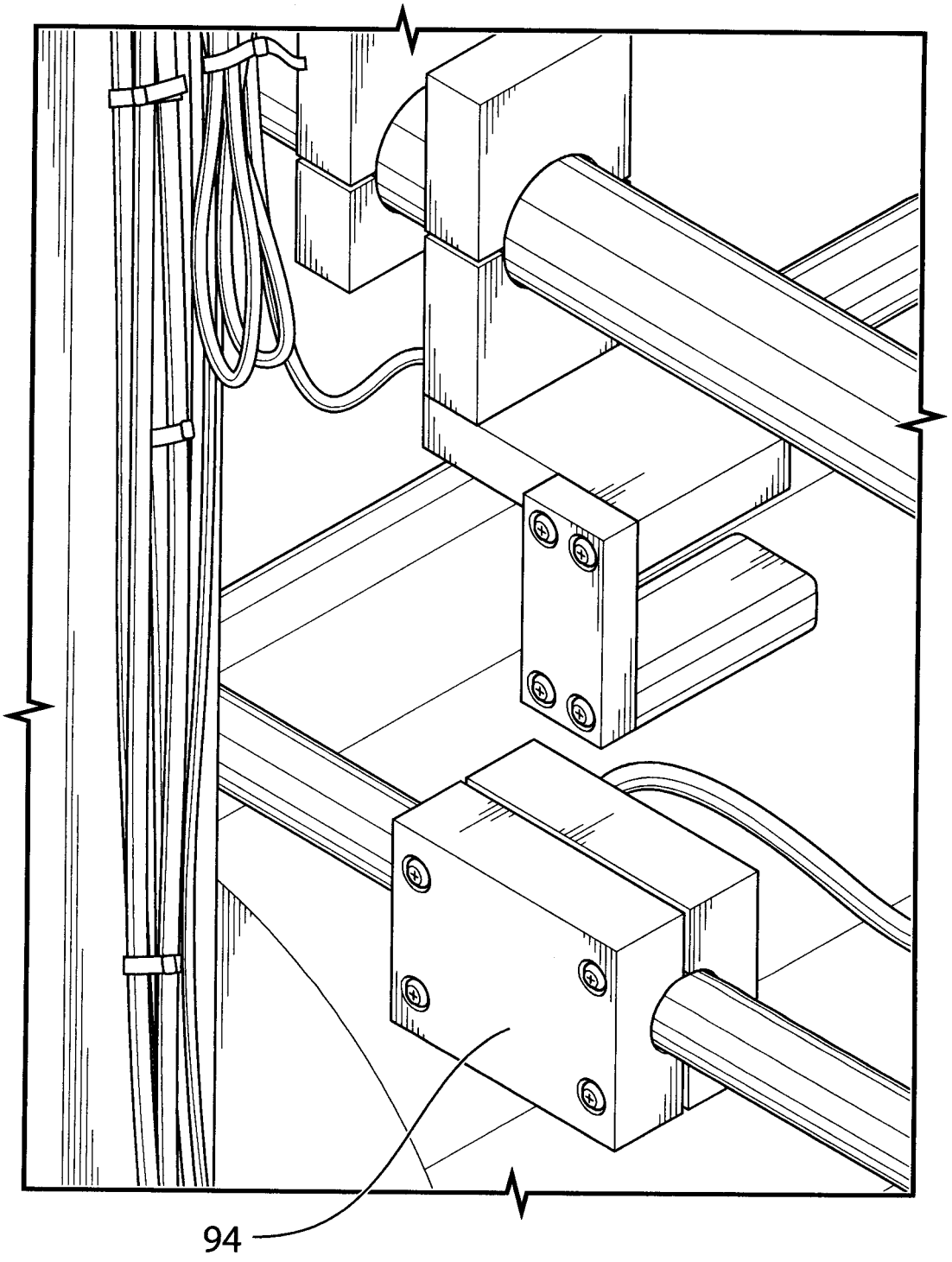

FIG. 19

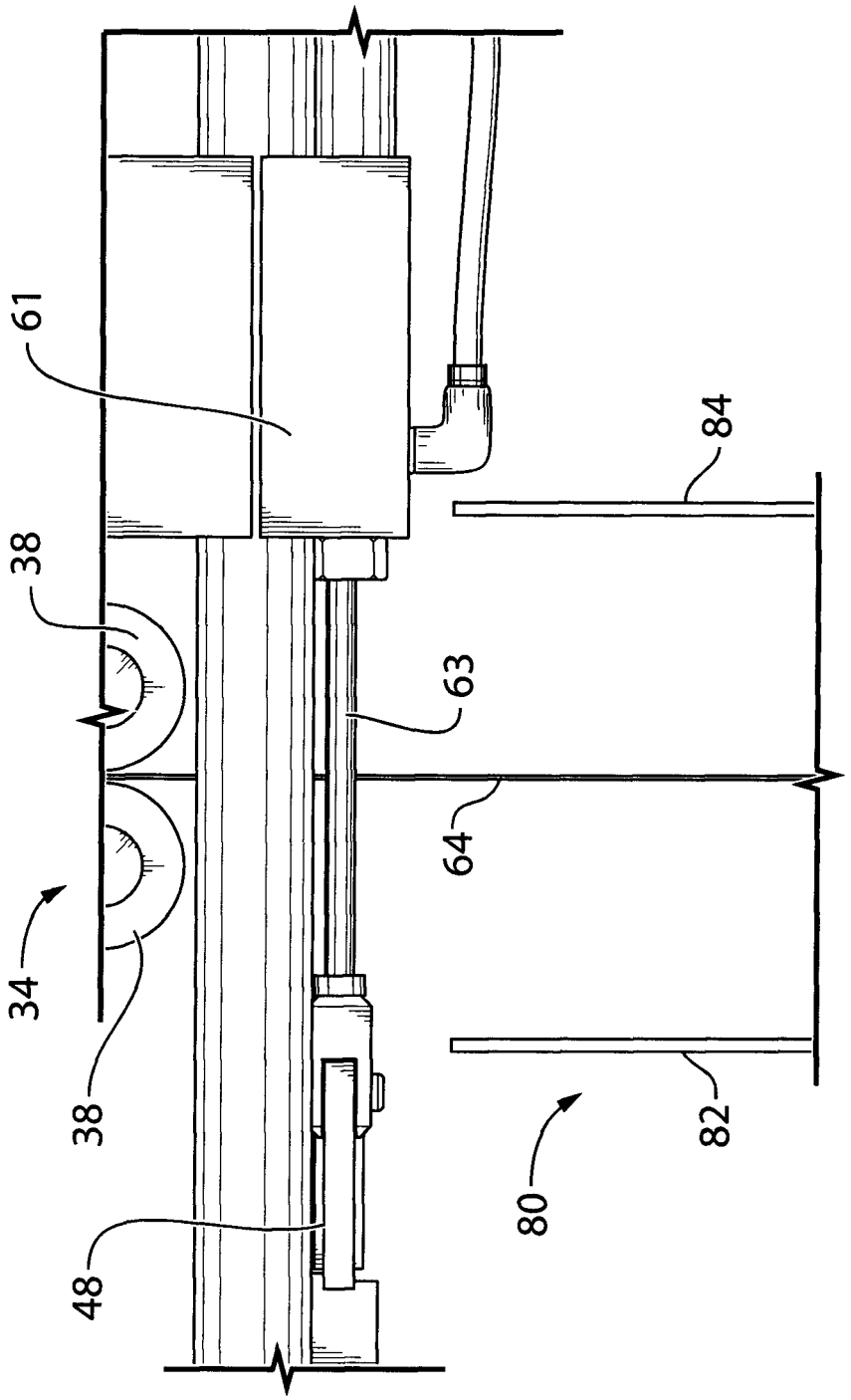

FIG. 20

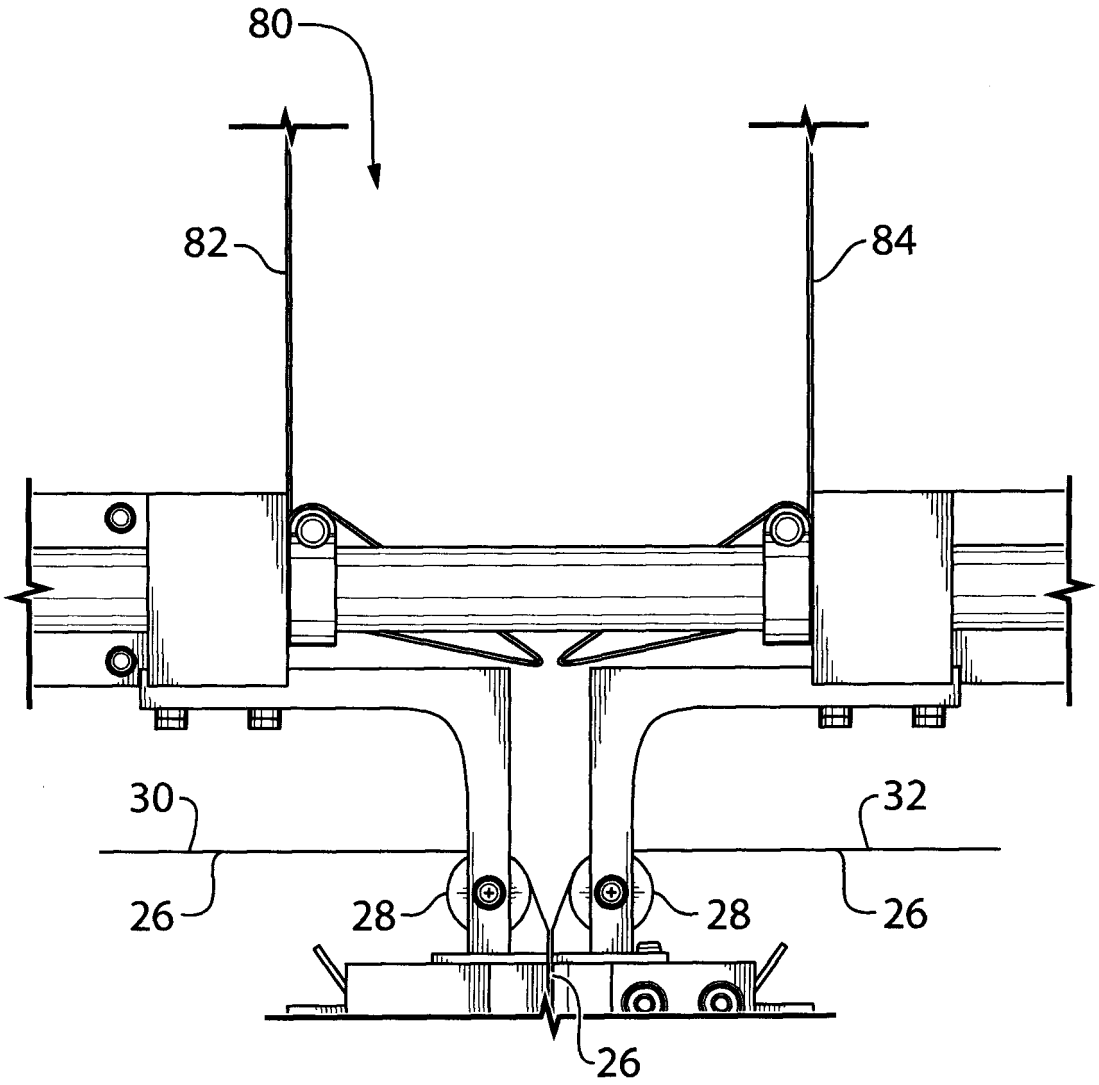

FIG. 21

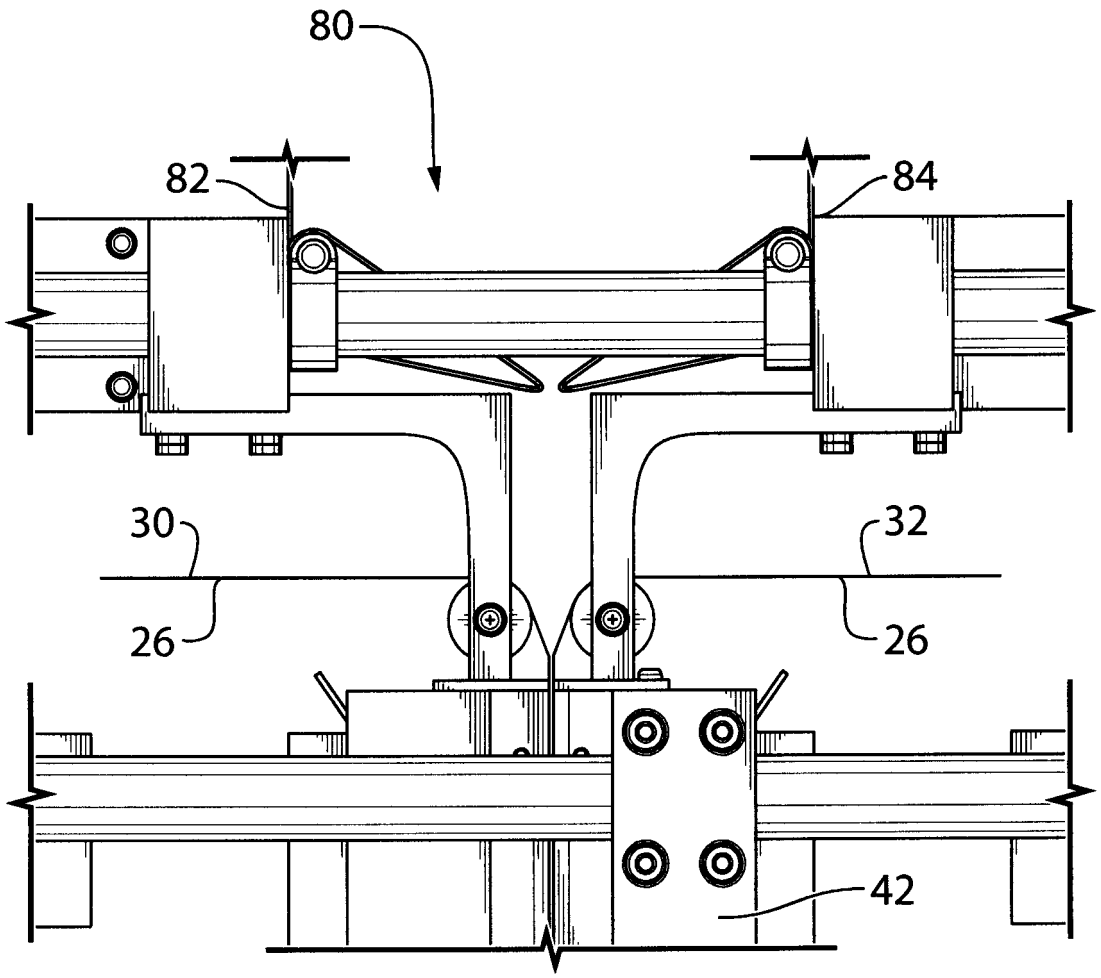

FIG. 22

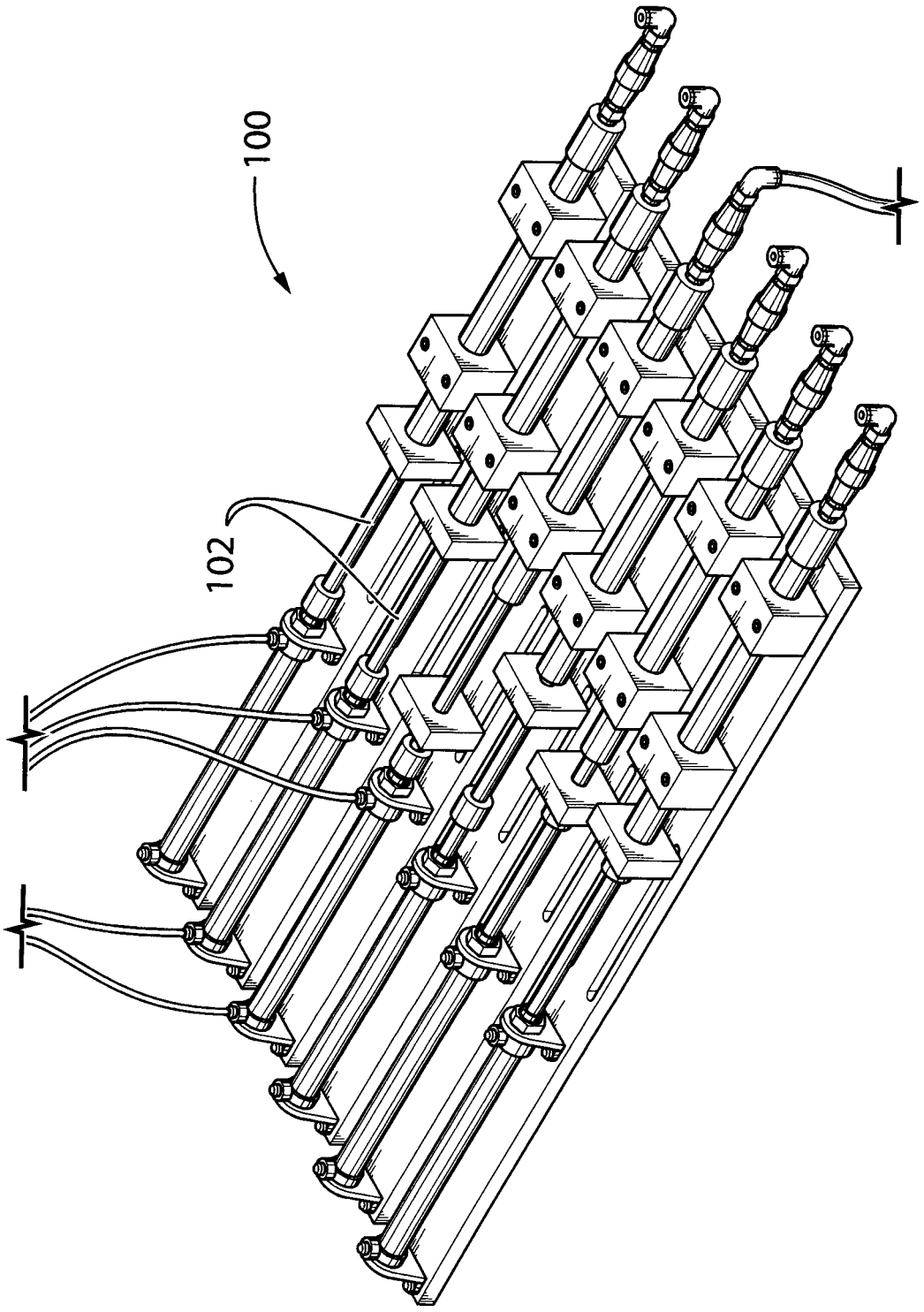

FIG. 23

REFERENCES CITED IN THE DESCRIPTION

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- DE 102008029285 A1 **[0002]**