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(54) **MANUAL WRAPPING APPARATUS AND METHOD**

MANUELLE VERPACKUNGSVORRICHTUNG UND VERFAHREN

APPAREIL D'EMBALLAGE MANUEL ET MÉTHODE

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to the field of food wrapping and packaging machines, and more particularly to the field of manual food wrapping machines.

BACKGROUND OF THE INVENTION

[0002] Food wrapping machines are known. In use, usually, food is inserted into an open-top vessel or container, typically in a size of a plate, and then, a sealing film is put on top of the container, the sealing film is soldered to the perimeter of the container, and finally, the sealing film is cut, and the sealed container is taken out in order to make room for another container.

[0003] Some examples to these kinds of machines are shown by "TPS MINI TRAYPACKER" by "HENKOVAC", or by "FP BASIC" Sealer by "RTG" Roberts Technology Group, Inc. In these kinds of machines, the soldering is done by the pressure of a pneumatic piston and therefore the machines require a connection to a pressurized air line, a great disadvantage in small stores that, contrary to large plants, are not provided with pressurized air infrastructure. The rolling of the wrapping film is done by an electric motor, and the controlled environment is done by suction of a vacuum pump. The cutting of the wrapping film is "shaped", i.e., around and adjacent the lip of the packed container.

[0004] Other tray sealer machines, e.g., S 220 SP by "VAC-STAR" AG, have shape cutting but do not have automatic rolling of the film. This kind of machine suffers from the following disadvantages; (a)- requires a pressurized air line, (b)- has relatively high energy consumption, (c)- slow working speed, due to the manual rolling.

[0005] Other types of sealer machines are manual machines, like, e.g., VS300 Tray Sealer Udder by "SMS", or, Sealing Machine DF25 by "Duni Store". These machines suffer from the following disadvantages; (a)- perform soldering only, (b)- do not provide a controlled environment, (c)- the rolling is done totally manual, by pulling and arranging the film, (d)- bad appearance, due to un-shaped cutting of the film according to the trays' shape, (e)- requires a pressurized air line, (f)- relatively high energy consumption, (g)- slow working speed, due to the manual rolling.

[0006] The wrapping machines vary in their size and functionality. Typically, these wrapping machines are large and require a specially assigned room for operation, therefore, they are not suitable for operation on a limited space of a grocery store or the like.

[0007] There are wrapping machines for wrapping food in a controlled environment. These machines require a large surrounding envelope or room. During operation, these machines are inserted into the surrounding envelope when the container with the food is about to be sealed. In this position, the air is sucked away from the surrounding envelope, and another gas, e.g., nitrogen or carbon-dioxide, is inserted into the surrounding envelope. In other cases, no other gas is inserted into the surrounding envelope, and the food is wrapped in vacuum. Now, the container with the food is sealed with a sealing film that is soldered to the perimeter of the container.

[0008] These kinds of machines suffer from the disadvantage that they require a large volume for operation, and spend a lot of energy and controlling gases in order to replace the entire environment in the surrounding envelope.

[0009] A solution to this problem is disclosed in US Pat. No. 6,912,828 to Yamay. The '828 patent discloses a packaging method and apparatus for wrapping food in a controlled environment. This is done by introducing a container having a cap shape and a rigid or semi rigid body. The container is provided with a rim, and, a closure-forming member is placed adjacent the rim and slightly distanced away therefrom. A replacement gas is flown through an inlet to an outlet, and, in its way, replaces at least a substantial portion of the gas originally contained in the container.

[0010] Other types of manual food wrapping machines have means for soldering a sealing film to the rim of the container containing the food. However, these types of machines suffer from several disadvantages. First, the sealing film is not automatically pulled and dispensed to the required length and stretched over the lid of the container. Second, if the machine is provided with means for cutting the sealing film, they are usually in a form of a knife that is acting in a straight line, in a direction perpendicular to the pulling direction of the sealing film. This action leaves unnecessary portion of sealing film attached to the container, a fact that causes unnecessary spending of sealing film, and, causes bad visual appearance of the sealed container, since the cut sealing film is not in the form of the lid of the container.

[0011] WO 2012/005678 discloses an apparatus and method in accordance with the preambles of claims 1 and 27 respectively.

[0012] It is the object of the present invention to provide a manual food wrapping apparatus that significantly reduces or overcomes the aforementioned disadvantages.

[0013] It is a further object of the present invention to provide a manual food wrapping apparatus that is easy to implement and use.

[0014] It is still a further object of the present invention to provide a manual food wrapping apparatus that enables food wrapping in a controlled environment.

[0015] It is still yet a further object of the present invention to provide a manual food wrapping apparatus that enables a set or dispensed rolling and pulling of the sealing film, neatly stretching the sealing film, and shaped-cutting thereof according to the shape of the container to be sealed.

[0016] It is also an object of the present invention to provide a manual food wrapping apparatus that performs

the several steps of food wrapping in a controlled environment, in a single manual movement.

[0017] It is another object of the present invention to provide a manual food wrapping apparatus that is smaller than similar industrial machines performing similar tasks, and is easily transported and placed on top of any table or 5 refrigerator, thus enabling its use in small grocery stores.

[0018] It is still another object of the present invention to provide a manual food wrapping apparatus that provides food wrapping in a controlled environment, thus extending shelf-life of the product within the sealed container.

[0019] It is still yet another object of the present invention to provide a process for manual food wrapping in a controlled environment.

[0020] It is also another object of the present invention to provide a process for neatly, quickly, easily and efficiently, wrap and seal a top of a food container in a controlled environment.

SUMMARY OF THE INVENTION

[0021] In accordance with the present invention there is provided a manual wrapping apparatus for wrapping a tray with a sealing film with the features specified in claim 1. The apparatus according to the invention comprises:

a lower frame and an upper arm hinged to the lower frame,
the lower frame comprising a tray receiving bracket for receiving therein the tray, wherein
manually closing the upper arm toward the lower frame manually feeds forwardly the sealing film, replaces the atmosphere within the tray, solders the sealing film to the tray, and, cuts the sealing film around the tray.

[0022] Commonly, the apparatus is a food wrapping apparatus.

[0023] The apparatus of the invention comprises a feeding system comprising a feeding system rear portion and a feeding system front portion,
the feeding system rear portion comprises:

a feeding cam, provided with a feeding gear, that is connected to the upper arm, the feeding cam forms a sector of 45° to 90° that rotates around a main operation axis (A) of the upper arm with respect to the lower frame,
a film driving roll and a film tightening roll that is parallel to the film driving roll and interconnected therewith,
an engagement member connects between the feeding system rear portion and the feeding system front portion,
the feeding system front portion comprises:
a front film driving roll and a front film tightening roll that is parallel to the front film driving roll and interconnected therewith,
at the feeding system rear portion the sealing film passes between the film driving roll and the film tightening roll, at the feeding system front portion the sealing film passes between the front film driving roll and the front film tightening roll, and, wherein
movement of the upper arm toward the lower frame, between an open position of the upper arm to a closed position of the upper arm, causes the feeding gear to turn the feeding system rear portion and the feeding system front portion at the same amount thus feeding forwardly the sealing film at a constant and measured value.

[0024] In some embodiments, the feeding cam forms a sector of 70°.

[0025] Practically, the film tightening roll and the front film tightening roll are provided with a plurality of equally spaced apart grooves, and, a tightening ring is received within each of the grooves.

[0026] Further practically, the sealing film remains straight and tight by being squeezed by the tightening rings of the corresponding film tightening roll and the front film tightening roll against the corresponding film driving roll and the front film driving roll.

[0027] Conveniently, the apparatus is provided with a film positioning bracket for easy loading the sealing film into a working position, the film positioning bracket is rotatable with respect to the main operation axis (A) and comprising the film driving roll and the front filth driving roll, and wherein in an open position of the film positioning bracket the sealing film may be freely put on the tray receiving bracket.

[0028] If desired, the lower frame comprises a right side bracket and a left side bracket that are connected inbetween by means of tightening rods, and
the film positioning bracket is locked to the right side bracket and to the left side bracket by means of bracket secure knobs, each of the bracket secure knobs having a securing pin that is located within a pin receiving hole formed in the film positioning bracket.

[0029] Advantageously, the tray receiving bracket is interchangeable.

[0030] Typically, the tray receiving bracket comprising:

a tray receiving aperture for receiving the tray therein,
a tray receiving shoulder, peripherally surrounding the tray receiving aperture, for receiving thereon a peripheral shoulder of the tray,
a knife receiving groove extending peripherally around the tray receiving shoulder and bounded by a bracket top surface,
the tray receiving bracket further comprising:

at least one gas inlet hole that opens at least to the knife receiving groove,
at least one gas outlet hole that opens at least to the knife receiving groove, and a gas valve operating switch,

[0031] If desired, the at least one gas inlet hole opens to the knife receiving groove and to the bracket top surface.

[0032] Practically, the gas valve operating switch protrudes upwardly from the bracket top surface.

[0033] Advantageously, the tray receiving shoulder comprises a vertically formed seal slot extending at an entire periphery of the tray receiving shoulder, and
a sealing element located within the seal slot and on top of the tray receiving shoulder.

[0034] In most cases, the engagement member connecting between the feeding system rear portion and the feeding system front portion constitutes a belt.

[0035] Practically, the belt is toothed according to a belt driving gear of the feeding system rear portion and according to a belt receiving gear of the feeding system front portion.

[0036] Typically, the upper arm comprises a pressing plate that is urgedc downwardly and hanged from a base plate of the upper arm by means of pressing plate hanging members, and wherein
the pressing plate hanging members may freely pass through the base plate such that the distance between the pressing plate and the base plate may vary during various steps of operation of the apparatus.

[0037] If desired, a lower portion of the pressing plate is provided with a pressing gasket.

[0038] Typically, the upper arm comprises a soldering platform that is urged downwardly and hanged from the base plate of the upper arm by means of soldering platform hanging members, and wherein
the soldering platform hanging members may freely pass through the base plate such that the distance between the soldering platform and the base plate may vary during various steps of operation of the apparatus.

[0039] Practically, the soldering platform comprises a heating element in an upper portion thereof and a soldering lip in 'a lower portion thereof.

[0040] Typically, a knife is surrounding the soldering platform slightly distanced away therefrom, an upper portion of the knife is bounded by a knife base that is rigidly connected to the base plate, and, a lower portion of the knife constitutes a cutting edge.

[0041] Advantageously, the lower frame comprises a tray removing mechanism for urging upwardly the tray.

[0042] Practically, the tray removing mechanism comprises a tray removing handle that is oppositely positioned to a lifting lever with respect to a handle shaft, and wherein
urging the tray removing handle in a downward direction urges the lifting lever in an upward direction for urging upwardly the tray.

[0043] If desired, the apparatus comprising an operating handle extending along a width dimension of the apparatus and rotatable with respect to the upper arm, the operating handle comprising:

a holding portion, and
a stroke releasing handle, and wherein
in a non operating position of the stroke releasing handle the operating handle may rotate a first given stroke, and
in an operating position of the stroke releasing handle the operating handle may rotate a second given stroke that is larger than the first given stroke.

[0044] Typically, a stroke releasing lever extends from the stroke releasing handle, the stroke releasing lever ends with a protrusion nested within a locking slot formed in the upper arm, and

[0045] pressing the stroke releasing handle toward the holding portion releases the protrusion from the locking slot thus enabling further rotation of the operating handle.

[0046] Practically, the holding portion extends between two operating frames, each of the operating frames comprises a sliding buffer comprising:

a flat slanted surface at a forward portion of the sliding buffer,
a sliding surface extending rearwardly from the slanted surface, and
a sliding limiting wall rearwardly to the sliding surface, and wherein
the lower frame is provided with a pressure support rod located adjacent the slanted surface prior to operating the stroke releasing handle, and
a downward movement of the operating handle urges the sliding buffer to gradually enter under the pressure support rod thus gradually urging downwardly the upper arm.

[0047] Typically, the weight of the upper arm is counterbalanced by two balancing pistons.

[0048] Advantageously, the feeding system rear portion is provided with at least one ratchet for enabling forward feeding of the sealing film during downward movement of the upper arm, and, preventing rearward pulling of the sealing film during upward movement of the upper arm.

[0049] Further in accordance with the present invention there is provided a method for manually wrapping a product within a cup-shaped tray in a controlled environment by a sealing film, the method comprising the steps of:

(a) Providing an apparatus according to the invention having an upper arm hinged to a lower frame, and a sealing film roll is seated within a sealing film support portion of the lower frame.
(b) Inserting the tray into a tray receiving aperture

formed in a tray receiving bracket that is connected to the lower frame,

(c) Pulling down a holding portion of an operating handle, between an open position of the upper arm and a closed position of the upper arm, for operating a feeding system for feeding forwardly the sealing film at a constant measure, holding the sealing film in position, soldering the sealing film to the tray, and, cutting the sealing film around the tray.

(d) Removing the tray by pressing a tray removing handle of a tray removing mechanism.

[0050] If desired, the method further comprising in step (c), after soldering the sealing film to the tray, the step of:

(e) Providing a stroke releasing handle that is pulled in order to enable further stroke of the holding portion for cutting the sealing film around the tray.

BRIEF DESCRIPTION OF THE DRAWINGS

[0051] For a better understanding of the present invention and to show how the same may be carried out in practice, reference will now be made to the accompanying drawings, in which:

Fig.1 is a perspective view of a manual food wrapping apparatus according to the present invention;

Fig. 2 is a top view of the apparatus of Fig. 1;

Fig. 3 is a side view of the apparatus of Fig, 1;

Fig. 4 is a side cross-sectional view of the apparatus of Fig. 1, taken along line IV-IV in Fig. 2, shown in an open position;

Fig. 5 is a side cross-sectional view of the apparatus of Fig, 1, taken along line IV-IV in Fig. 2, shown in a closed position;

Fig. 6 is a partial perspective view of the rear portion of the feeding system;

Fig. 7 is a front view of the partial rear portion of the feeding system shown in Fig. 6;

Fig. 8 is a side view of the partial rear portion of the feeding system shown in Fig. 6;

Fig. 9 is a partial perspective view of the front portion of the feeding system;

Fig. 10 is a perspective view of the apparatus with the film positioning bracket in a lifted position;

Fig. 11 is a top view of the tray receiving bracket;

Fig. 12 is a cross-sectional view of the tray receiving bracket taken along line XII-XII in Fig. 11;

Fig. 13 is a cross-sectional view of the tray receiving bracket taken along line XIII-XIII in Fig. 11;

Fig. 14 is a partial cross-sectional view of the apparatus in a first wrapping stage taken along line XIII-XIII in Fig, 11;

Fig. 15 is a partial cross-sectional view of the apparatus in a second wrapping stage taken along line XIII-XIII in Fig. 11;

Fig. 16 is a partial cross-sectional view of the apparatus in a third wrapping stage taken along line XIII-XIII in Fig. 11;

Fig. 17 is a partial cross-sectional view of the apparatus in a fourth wrapping stage taken along line XIII-XIII in Fig. 11;

Fig. 18 is a partial cross-sectional view of the apparatus taken along line XII-XII in Fig, 11 in a position prior to removing the tray;

Fig. 19 is a partial cross-sectional view of the apparatus taken along line XII-XII in Fig. 11 in a tray removing position;

Fig. 20 is a partial side cross-sectional view of the locking handle in the first wrapping stage;

Fig. 21 is a partial side cross-sectional view of the locking handle in the fourth wrapping stage;

DESCRIPTION OF PREFERRED EMBODIMENTS

[0052] Attention is drawn to Figs. 1 to 5 that show a manual food wrapping machine or apparatus **10** according to the present invention. For a matter of simplicity, the manual food wrapping or packaging apparatus **10** will hereinafter be called "apparatus".

[0053] Since the apparatus **10** is mainly used in the food industry, it is preferable that it is made from stainless steel, so it will not rust and be easy to clean. The apparatus 10 comprises a lower frame **12** and an upper arm **14** hinged to the lower frame **12.** The upper arm **14** rotates around a main operation axis **A** with respect to the lower frame **12,** and the weight of the upper arm **14** is counterbalanced by two balancing pistons **16.**

[0054] Each of the balancing pistons **16** is located at an opposite side of the apparatus **10,** namely, a first balancing piston **16** is located at a right side **18** of the apparatus **10,** and a second balancing piston **16** is located at a left side **20** of the apparatus **10.** Each of the balancing pistons **16** is hinged to the lower frame **12** at a piston lower end **22,** and to the upper arm **14** at a piston upper end **24.**

[0055] The lower frame **12** comprises a right side bracket **26** that is connected to a left side bracket **28** by a multitude of tightening rods **30.** Typically, each of the tightening rods **30** is tightened, at both ends thereof, to each of the brackets **26, 28** by means of a tightening bolt **32.**

[0056] It should be noted that directional terms appearing throughout the specification and claims, e.g. "forward", "rear", "upper", "lower" etc., are used as terms of convenience to distinguish the location of various surfaces relative to each other. These terms are defined with reference to the figures, however, they are used for illustrative purposes only, and are not intended to limit the scope of the appended claims.

[0057] A rear end **34** of the lower frame **12** comprises a sealing film support portion **36.** The sealing film support portion **36** comprises two support rods **38** that are located parallel to each other and connected, at both ends there-

of, to the right side bracket **26** and to the left side bracket **28.** The support rods **38** are typically hollow pipes made of PVC or plastic, however, they may be equally formed from stainless steel or the like. Each of the support rods **38** may freely rotate, with respect to the lower frame **12,** around a support rod longitudinal axis **B.** The free rotation of each of the support rods **38** is enabled by means of a bearing or a bushing (not specifically shown).

[0058] A spacer **40** is rigidly mounted on each end of the support rods **38.** Each spacer **40** is slightly distanced from the adjacent bracket **26, 28** and is free to rotate together with the support rod **38** that is inserted within. A sealing film roll **42** of a sealing film **43** is placed on the support rods **38.** The sealing film roll **42** has a sealing film roll axis **C**, and is placed parallel to the support rods **38** and between the spacers **40.** The purpose of the spacers **40** is to assure that while the sealing film roll **42** rolls on the support rods **38,** by the pulling of the sealing film **43** as will be later described, the sealing film roll **42** is centered with respect to the right side bracket **26** and the left side bracket **28** therefore assuring even pulling and feeding of the sealing film **43** so that it constantly looks tight and has no wrinkles.

[0059] According to a specific mode of use of the present invention, the sealing film roll **42** is directed such that the sealing film **43** is pulled from an upper portion of the sealing film roll **42,** however, if required, the sealing film roll **42** may be directed such that the sealing film **43** is pulled from a lower portion of the sealing film roll **42.** Typically, the sealing film **43** is directional-related, i.e., both sides of the sealing film **43** have different qualities and it is pre-set which side will be subjected to the sealing heat and which side will be soldered to the food tray.

[0060] Attention is now drawn to Figs. 6 to 9 that show a feeding system **44** of the apparatus **10.** Generally, the feeding system **44** comprises a feeding system rear portion **46,** shown in Figs. 6 to 8, and, a feeding system front portion **48,** shown in Fig. 9. The feeding system **44** is symmetrical, unless otherwise mentioned, with respect to a longitudinal median plane **P** of the apparatus **10** (see Fig. 2), Therefore, for a matter of simplicity, only a right side of the feeding system **44** will be described, i.e., the side adjacent the right side bracket **26.**

[0061] The feeding system **44** comprises a feeding cam **50** that is connected to the upper arm **14.** The feeding cam **50** is the only part of the feeding system **44** that is connected to the upper arm **14** and all the other parts of the feeding system **44,** as will be now described, are connected to the lower frame **12.**

[0062] The feeding cam **50** forms a sector of 45° to 90° that rotates around the main operation axis A. According to a specific embodiment of the present invention, the feeding cam **50** forms a sector of 70°. A front portion of the feeding cam **50** is toothed and forms a portion of a feeding gear **52.**

[0063] The feeding gear **52** is engaged with a feed receiving gear **54** that forms a part of a film driving roll **56** that rotates around a film driving roll axis **D.** The film driving roll **56** is provided with a driving gear **58** that is engaged with a drive receiving gear **60.** The drive receiving gear **60** forms a part of a film tightening roll **62** that rotates around a film tightening roll axis **E.**

[0064] A ratchet **63** is connected, preferably at each side of the film driving roll **56,** between the feed receiving gear **54** and the driving gear **58.** The purpose of the ratchet **63** is to enable forward feeding of the sealing film **43** during downward movement of the upper arm **14,** and, to prevent rearward pulling of the sealing film **43** during upward movement of the upper arm **14.**

[0065] The film tightening roll **62** is provided with a plurality of equally spaced apart grooves **64.** Each groove **64** has a semi-circular cross-section in order to receive therein a tightening ring **66** which is elastic and can be made from silicone, rubber, or the like. For a purpose of demonstration, Fig. 7 shows the film tightening roll **62** with one of the tightening rings **66** removed so that the groove **64** underneath can be seen.

[0066] The film driving roll axis **D** is parallel to film tightening roll axis **E** and distanced away therefrom such that during operation of the apparatus **10,** the tightening rings **66** are slightly squeezed against the film driving roll **56,** thus, when the sealing film **43** passes between the film driving roll **56** and the film tightening roll **62,** it remains flat and tight.

[0067] The film tightening roll **62** is provided, at one end thereof, with a belt driving gear **68** for driving a belt **70.** Typically, the belt **70** is toothed in an inward portion thereof. The teething of the belt **70** corresponds to the teething of the belt driving gear **68.**

[0068] The feeding system front portion **48** comprises a front film driving roll **72,** and, a front film tightening roll **74** that rotates around a front film tightening roll axis **G** that is parallel to a front film driving roll axis **F.** The front film tightening roll **74** is provided with a plurality of grooves (not shown), and a tightening ring **66** is located in each of the grooves, similar to the matter as was described with respect to the film tightening roll **62.**

[0069] At one end thereof, the front film tightening roll **74** is provided with a belt receiving gear **76** for receiving thereon the belt **70.**

[0070] As can be best seen in Fig. 10, the film driving roll **56** and the front film driving roll **72** are assembled onto a film positioning bracket **78** that is rotatable with respect to the main operation axis **A.** The film positioning bracket **78** enables easy loading of the sealing film **43** into a working position. During rotation of the film positioning bracket **78,** the feed receiving gears **54** of the film driving roll **56** advance on their corresponding feeding gear **52** of the feeding cam **50.** The front film driving roll **72** freely rotates with respect to the film positioning bracket **78** around the front film driving roll axis **F.**

[0071] The film positioning bracket **78** is secured in position by means of a pair of bracket secure knobs **80** (see the enlargement portion in Fig. 10) that are connected to the lower frame **12.** A first bracket secure knob **80** is connected to the right side bracket **26** and a second

bracket secure knob **80** is connected to the left side bracket **28.** The bracket secure knobs 80 are retractable with respect to the side bracket **26,28** they are mounted thereon. Each of the bracket secure knobs **80** has a protruding securing pin **82** that is positioned, in a locked position of the film positioning bracket **78,** within a corresponding pin receiving hole **84.**

[0072] A central portion of the lower frame **12** comprises a tray receiving bracket **86.** The tray receiving bracket **86** is supported by a pair of bracket support rods **88** that are attached to the lower frame **12** by means of securing bolts **90** that can be easily disassembled in order to enable replacing the tray receiving bracket **86** with another tray receiving bracket having different shape or size.

[0073] The tray receiving bracket **86** comprises a tray receiving aperture **92** that is peripherally bounded by a tray receiving shoulder **94.** A top surface of the tray receiving shoulder **94** is covered with a flexible sealing element **96** for supporting the tray to being sealed. Typically, the sealing element **96** is made of silicone, however, other materials may be equally applied. According to some embodiments, the sealing element **96** is T-shaped, having a vertical leg and a horizontal leg connected thereto, thus, the vertical leg can be inserted into a corresponding vertical seal slot **98** formed in an upper portion of the tray receiving shoulder **94.** In this manner, the sealing element **96** is properly held in position without any risk of being moved during time.

[0074] The sealing element **96** performs several functions; (a) supporting the tray, (b) preventing squeezing of the tray, (c) preventing the tray from touching metal, and, (d) providing flexibility during soldering of the sealing film **43** to the tray.

[0075] A knife receiving groove **100,** having a closed form, extends peripherally between the tray receiving shoulder **94** and a bracket top surface **102.** Two gas inlet holes **104,** located at a first side **106** of the knife receiving groove **100,** open into the knife receiving groove **100** and the bracket top surface **102.** Three gas outlet holes **108** open into the knife receiving groove **100,** at a second side **110** of the knife receiving groove **100** that is opposite the first side **106** of the knife receiving groove **100.**

[0076] A gas valve operating switch **112** protrudes upwardly from the bracket top surface **102.** When the gas valve operating switch **112** is pressed, it mechanically operates a mechanical valve (not shown) that releases a compressed gas, from a gas container/reservoir outside the apparatus **10,** for replacing the atmosphere within the tray as will be later described. Typically, the compressed gas is fed to the apparatus **10** through rigid/flexible piping, from a conventional compressed gas container/cylinder that is located adjacent the apparatus **10.** However, there are facilities having a bulk reservoir of a compressed gas or a compressed gas generator. In this case, the compressed **10** gas may be fed directly, through rigid/flexible piping, to the apparatus **10.**

[0077] The upper arm **14** comprises a pressing, soldering, and cutting mechanism **114,** as can be best seen in Figs. 14-17, that, for sake of convenience, will hereinafter be called the "PSC mechanism".

[0078] The upper arm **14** comprises a base plate **116** that forms a rigid part with the upper arm **14.** The PSC mechanism **114** comprises a pressing plate **118** that is hanging from the base plate **116** by means of hanging bolts **120** constituting pressing plate hanging members. Typically, four hanging bolts **120** are used, however, any other number of hanging bolts may be used according to design needs. The pressing plate **118** has a size and a shape that are in conformity with the size and the shape of the tray receiving bracket **86.** A pressing gasket **122** is attached to a lower portion of the pressing plate **118.** The pressing gasket **122** is relatively flexible and typically is made of silicon, however, other gasket materials may be chosen provided that they enable adequate sealing and flexibility.

[0079] Each hanging bolt **120** freely passes through a bolt aperture **124,** formed in the base plate **116** (marked in Fig. 15 but not specifically shown). An upper end of each of the hanging bolts **120** is provided with a stroke limiting nut **126** that is larger than the bolt aperture **124** and cannot pass therethrough. A downwardly urging spring **128** is assembled on each of the hanging bolts' **120,** between the base plate **116** and the pressing plate **118.** The downwardly urging spring **128** has a diameter that is larger than the bolt aperture **124** and, therefore, cannot pass therethrough.

[0080] According to the described above, it may be appreciated by a person skilled in the art that the pressing plate **118** is "floating" with respect to the base plate **116,** i.e., the distance between the pressing plate **118** and the base plate **116** may very during various steps of operation of the apparatus **10.**

[0081] A soldering platform **130,** having a soldering lip **132** in a lower portion thereof, is attached to the base plate **116** by means of soldering platform hanging members. A heating element **134** is installed within a heating element groove **136** formed in an upper portion of the soldering platform **130.** The soldering platform **130** is attached to the base plate **116** in a similar manner (not specifically shown) as the pressing plate **118** is attached to the base plate **116.** Therefore, also the soldering platform **130** is "floating" with respect to the base plate **116,** i.e., the distance between the soldering platform **130** and the base plate **116** may vary during various steps of operation of the apparatus **10.**

[0082] A knife **138** is surrounding the soldering platform **130,** slightly distanced away therefrom, The knife **138** is in a form of a peripherally closed thin metal sheet. An upper portion of the knife **138** is bounded by a knife base **140** that is rigidly connected to the base plate **116.** A lower portion of the knife **138** is toothed. Typically, each knife tooth (not specifically shown) is flat, in an inward direction of the knife **138,** i.e., toward the adjacent portion of the soldering platform **130,** and, is beveled ground in an outward direction of the knife **138,** i.e., toward the adjacent portion of the pressing plate **118.**

[0083] Reference will now be made to Figs. 18 and 19 for describing a tray removing mechanism **142.** For sake of clarity, a tray **144** is hand marked in the figures. The tray **144** comprises a tray body **146,** having a tray bottom **148,** and a tray wall **150** rising upwardly from the tray bottom 148. A tray shoulder **152** extends peripherally outwardly from an upper portion of the tray wall **150.** A lower portion of the tray shoulder **152** constitutes a support surface **154** on which the tray **144** lies on the sealing element **96** of the tray receiving shoulder **94.** An upper portion of the tray shoulder **152** constitutes a soldered surface **156** on which the sealing film **43** is being soldered.

[0084] During previous stages of operation, i.e., during pressing, soldering and cutting, the tray **144** is positioned within the tray receiving aperture **92,** and the support surface **154** of the tray shoulder **152** firmly lays on the sealing element **96.** When it is desired to remove the tray **144** after the film is being soldered thereto, as will be later described, a tray removing handle **158** is being pressed.

[0085] The tray removing handle **158** is connected to a handle shaft **160** at a first end of the handle shaft **160.** A second end of the handle shaft **160** is connected to a lever support arm **162.** A lifting lever **164** is connected to the lever support arm **162** at an end of the lever support arm that is remote from the handle shaft **160.** According to some embodiments, the lifting lever **164** is connected to a lever support arm **162** at both ends thereof. In this case, one lever support arm **162** is connected to a handle shaft **160** that is connected to the left side bracket **28,** and another lever support arm **162** is connected to a handle shaft **160** that is connected to the right side bracket **26.** However, if desired, the lifting lever **164** may be operated by a single lever support arm **162.**

[0086] Reference will now be made to Figs. 1, 3-5 and 20-21 for describing an operating handle **166** of the apparatus **10.** For sake of effectiveness and ease of operation, the operating handle **166** extends along the width of the apparatus **10** and is symmetrical with respect to the longitudinal median plane **P.**

[0087] The operating handle **166** comprises a holding portion **168** that extends between two operating frames **170.** The two operating frames **170** are connected to a common operating axle **172** that rotates with respect to the upper arm **14.** An up rotating spring **174** is connected to the operating axle **172,** at a first end thereof, and, to the upper arm **14,** at a second end thereof. The up rotating spring **174** urges the holding portion **168** upwardly, as shown by the arrow showing spring urging direction **176** in Fig. 20.

[0088] The operating handle **166** is provided with a stroke releasing handle **178** that is connected to the operating frame **170** by a stroke releasing lever **180** at either side of the stroke releasing handle **178.** Each stroke releasing lever **180** is rotatable with respect to its corresponding operating frame **170** around a stroke releasing axle **182.** In a non-operated position of the stroke releasing handle **178,** it is distanced from the holding portion **168** of the operating handle **166** by means of a stroke urging spring **184** that is assembled on the stroke releasing axle **182.**

[0089] Each stroke releasing lever **180** is provided, in an inward portion thereof, with a protrusion **186.** In a non-operated position of the stroke releasing handle **178,** the protrusion **186** rests within a looking slot **188** formed in the upper arm **14.** The locking slot **188** is larger than the protrusion **186,** therefore, the holding portion **168** of the operating handle **166** may be freely pressed downwardly a certain stroke until the protrusion **186** abuts against an end wall of the locking slot **188.**

[0090] At this stage, in order to release the protrusion **186** from the locking slot **188,** the stroke releasing handle **178** is pulled toward the holding portion **168** of the operating handle **166,** with the same hand holding the holding portion **168.** Thus, and with counter pressure urged by the stroke urging spring **184,** the protrusion **186** is retracted from the locking slot **188** and the holding portion **168** of the operating handle **166** may continue its downward movement.

[0091] A lower portion of each of the operating frames **170** is provided with a sliding buffer **190** that is made from a relatively soft and rigid material such as PVC, plastic, or the like. The sliding buffer **190** comprises, in a forward portion thereof, a flat slanted surface **192.** A sliding surface **194** extends rearwardly from the slanted surface **192** and ends with a sliding limiting wall **196.** The lower frame **12** is provided with a pressure support rod **198** that is connected between the right side bracket **26** and the left side bracket **28,** and is located adjacent the slanted surface **192** of the sliding buffer **190** prior to operating the stroke releasing handle **178.**

[0092] When the stroke releasing handle **178** is operated, the operating frames **170** continue their downward movement until the slanted surface **192** of each of the sliding buffers **190** meets the pressure support rod **198.** At this stage, the pressure support rod **198** urges the entire upper arm **14** downwardly and the sliding surface **194** gets under the pressure support rod **198.**

[0093] At this stage, continuing lowering the holding portion **168** of the operating handle **166** assures the downwardly directed pressure by the upper arm **14,** since the distance between the sliding surface **194** and the operating axle **172** is larger adjacent the slanted surface **192** than adjacent the sliding limiting wall **196.** Thus, as much as the holding portion **168** is lowered, the downwardly directed pressure applied by the upper arm **14** is increased.

[0094] The operation of the apparatus **10** will now be described. When it is necessary to load the film into the apparatus **10,** the sealing film roll **42** is positioned on the support rods **38** between the spacers **40.** Then, the upper arm **14** is lifted and remains in an upright position by means of the balancing pistons 16. Now, the bracket secure knobs **80** are pulled outwardly in order to retract the securing pins **82** out of their corresponding pin receiving

holes **84.** At this stage, the film positioning bracket 78 is not locked to the lower frame **12** and it is lifted upwardly by lifting the front film driving roll **72,** typically with one hand.

[0095] Now, the film is pulled by the other hand and freely positioned over the tray receiving bracket **86,** with a tray **144** positioned therein, and beyond the front film tightening roll **74.** At this stage, the film positioning bracket **78** is lowered into a working position and the bracket securing knobs **80** are pulled outwardly and released in order to insert the securing pins **82** into their corresponding pin receiving holes **84,** for locking the film positioning bracket **78** in the working position.

[0096] When the upper arm **14** is lowered, the rotation of the feeding cam **50** with respect to the main operation axis **A** operates the entire feeding system **44,** i.e., the feeding system rear portion **46** and the feeding system front portion **48.**

[0097] At the feeding system rear portion **46,** the rotation of the feeding gear **52** turns the film driving roll **56** through the feed receiving gear **54,** and then, the rotation of the film driving roll **56** rotates the film tightening roll **62** through the mutual rotation in opposite directions of the driving gear **58** and the drive receiving gear **60.** Thus, the sealing film **43** that is squeezed between the film driving roll 56 and the tightening rings **66** of the film tightening roll **62** is fed forwardly during the downward movement of the operating handle **166.**

[0098] Simultaneously, the belt **70,** which is driven by the belt driving gear **68,** rotates the belt receiving gear **76.** Thus, in a similar manner as described above, the front film tightening roll **74** is rotated. However, in contrary to the feeding system rear portion **46** where the film tightening roll **62** is connected to the film driving roll **56** through two gears, i.e., the drive receiving gear **60** and the driving gear **58,** correspondingly, the front film driving roll **72** is not connected to the front film tightening roll **74** through two gears. In this case, the front film driving roll **72** is rotated through the pressure applied thereon by the tightening rings **66** of the front film tightening roll **74,** when the sealing film **43** passes therebetween. Thus, the sealing film **43,** at the feeding system front portion **48,** is fed forwardly during the downward movement of the operating handle **166** simultaneously and at the same measure as the forward feeding imposed by the feeding system rear portion **46.**

[0099] Since the stroke of the operating handle **166** between an open position and a closed position is constant, the constant rotation of the feeding cam **50** causes a constant feeding of the sealing film **43.** The sealing film **43** remains straight and stretched due to the even pressure applied thereon by the tightening rings **66** of the film tightening roll **62** against the film driving roll **56,** and, by the tightening rings **66** of the front film tightening roll **74** against the front film driving roll **72.**

[0100] Thus, as explained above, a single motion of the operating handle **166** provides a constant and measured forward feeding of the sealing film **43.**

[0101] The process of utilizing the apparatus according to the present invention involves the following steps:

1- Film feeding, at a constant measure.
2- Gas insertion.
3- Soldering.
4- Film cutting.
5- Removing the soldered tray.

[0102] Thus, upon the end of the first step, i.e., film feeding, the sealing film **43** is stretched over the tray **144.** Now, continuation of lowering of the operating handle **166** enables the pressing plate **118,** through the pressing gasket **122,** to press the gas valve operating switch **112** located on the bracket top surface **102** of the tray receiving bracket **86.**

[0103] At this stage, the pressing on the gas valve operating switch **112** releases an inert gas, as was described above. The inert gas enters through the gas inlet holes **104,** rapidly flows between the tray **144** and the sealing film **43** which is still slightly distanced from the tray **144,** and exits through the gas outlet holes **108.** The quick flow of the inert gas replaces, partially or entirely, the atmosphere within the filled tray.

[0104] Now, continuation of lowering of the operating handle **166** brings the entire pressing plate **118,** through the pressing gasket **122** to press the sealing film **43** against the bracket top surface **102.** This keeps the sealing film **43** stretched and tight, and without any possibility to move with respect to the tray **144** during the soldering and cutting processes.

[0105] Since the pressing plate **118** "floats" with respect to the upper arm **14** due to the assembly of the hanging bolts **120,** further lowering of the operating handle **166** brings the soldering lip **132** to press the sealing film **43** against the soldered surface **156** of the tray shoulder **152.**

[0106] The heating element **134** seated within the heating element groove **136** of the soldering platform **130** is operated through two control switches (located on the upper arm **14** but not specifically shown). A first switch is the main power switch which is turned on while the apparatus **10** is in operation. Typically it is not recommended to switch off the main power switch for short intervals since it takes time to re-heat the heating element **134** after it has being cooled.

[0107] A second switch is a thermostat switch which controls the temperature of the heating element **134.** The set temperature varies according to the; (1) sealing film **43** material, (2) sealing film **43** thickness, (3) tray shoulder **152** size, (4) tray material, (5) environmental temperature and humidity.Typically, after the satisfactory result has been achieved, i.e., the sealing film **43** has been properly soldered to the tray **144,** the same soldering temperature is being used, with slight temperature modifications up or down. Typically, the thermostat switch is calibrated from 60°C to 200°C.

[0108] The soldering process continues as long as the

operator continues pressing the operating handle **166.** According to some embodiments, it is the operator who decides when continuing to the next step, namely, cutting the sealing film **43.** However, according to other embodiments, the apparatus **10** is provided with a signaling unit (not specifically shown) that signals the operator when the soldering time has been elapsed and it is possible to continue to the next step, namely, cutting the sealing film **43.**

[0109] According to some embodiments, the signal is a light signal in the form of a light source that is lit or extinguishes according to need. Thus, e.g., a red bulb is lit when the soldering should be continued, and, a green bulb is lit when the soldering has been finished and it is possible to continue to the cutting stage. According to some embodiments, the signal is an audio signal. In which case, a buzzer sounds when it is possible to continue to the cutting stage. The signal may be defined according to a measured soldered temperature, or, according to a measured soldering time.

[0110] At the next step, when the soldering has been finished and it is possible to continue to the cutting stage, the operator pulls the stroke releasing handle **178** toward the holding portion **168** of the operating handle **166,** with the same single hand that was used so far, and continues the pressing of the holding portion **168**.

[0111] At this stage, as was described above, the protrusion **186** of the stroke releasing lever **180** is retracted from the locking slot **188** and the holding portion **168** of the operating handle **166** may continue its downward movement. Since the pressing plate **118** and the soldering platform **130** are both independently "floatable" with respect to the upper arm **14,** the downward movement of the operating handle **166** enables the pressing plate **118** and the soldering platform **130** to remain in their current position, i.e., against the bracket top surface **102** and the tray shoulder **152,** correspondingly, while the knife **138** moves downwardly.

[0112] Thus, the knife **138** protrudes downwardly with respect to the pressing plate **118** and the soldering platform **130,** and cuts the stretched sealing film **43** while freely nesting within the knife receiving groove **100** of the tray receiving bracket **86,** The cut obtained is neat and clean, follows the perimeter of the tray shoulder **152,** and it may be close to the tray **144** as much as required.

[0113] As can be seen in Fig. 11, the external contour of the knife receiving groove **100** is not following exactly the contour of the tray receiving shoulder **94,** and, at two corners **200** of the knife receiving groove **100** it is more distanced from the tray receiving shoulder **94.** Correspondingly, the knife 138 follows the contour of the knife receiving groove **100.** Thus, when the knife **138** performs the cutting action, it leaves two film "tongues" at two edges of the tray **144.** These "tongues" (not specifically shown) serve as a gripping portion when it is necessary to use the content of the sealed tray by tearing off the soldered sealing film **43.**

[0114] Finally, in order to remove the sealed tray, the operating handle **166** is lifted upwardly until the upper arm **14** gets to a fully open position as shown in Fig. 4. Then, the tray removing handle **158** is pressed in a releasing direction as shown by the arrow **202** in Fig. 19. This causes the lifting lever **164** to urge upwardly a front end **204** of the tray **144.** Now, the sealed tray may be easily grabbed and removed from the tray receiving bracket **86** and a new filled tray **144** may be located within the tray receiving aperture **92** for starting a new cycle of tray wrapping as was described above.

[0115] Thus according to the process described above, an inert sealed food tray is obtained, Since there is practically no oxygen within the sealed tray, it enables to substantially increase the shelf life of the product within the tray. According to the described above, the present invention provides a sealed tray having an inert atmosphere within. This is done through a manual operation in a single stroke that may last 2-3 seconds. Namely, the downward movement of the operating handle **166** performs the following steps: (1) sealing film **43** feeding, at a constant measure, (2) gas insertion and atmosphere replacing, (3) soldering of the sealing film **43** against the tray **144,** (4) cutting the sealing film 43 around the tray shoulder **152,** and, finally, (5) removing the sealed tray by means of the tray removing handle **158.**

[0116] It should be noted that the. only supply of electrical power to the apparatus 10 is for heating the heating element **134,** and all the other operations described above are solely manual.

[0117] Although the present invention has been described to a certain degree of particularity, it should be understood that various alterations and modifications could be made without departing from the spirit or scope of the invention as hereinafter claimed.

[0118] For example, the tray receiving bracket is not limited to receive only one tray and other tray receiving brackets are fitted to receive a multitude of trays therein.

[0119] The material in which the food trays are made of are, and not limited to, polypropylene, polyethylene, polystyrene. The number of the gas inlet holes and the number of gas outlet holes is not limited to the described in the above embodiment and other number of holes may be applied, for example, 1, 2, 3, 4 or more. Furthermore, the holes do not have to be rounded, and narrow slots may be equally applied according to design needs.

[0120] The knife teeth do not have to be beveled from one side only and they may be beveled at both sides. Furthermore, if it is desired, the knife may be produced without distinctive teeth. In which case, the lower portion of the knife is made as a continuous and adequately ground cutting edge.

[0121] The apparatus is not limited to provide an inert atmosphere to food products only, and it may be used for other kinds of products requiring inert atmosphere for extension of the product shelf life and for oxidation prevention.

[0122] These products may consist of pasts, compounds, paints, chemicals or the like.

[0123] The knife does not necessarily have to leave two "tongues" of film to serve as a gripping portion, and any other number may be chosen according to specific needs. Furthermore, at some embodiments it is required to leave no gripping tongues.

[0124] The bracket seeming knobs **80** may be formed such that they do not have to be pulled outwardly and released in order to insert the securing pins **82** into their corresponding pin receiving holes **84.** Alternatively, the securing pins may be formed such, for example, by being rounded, that when the film positioning bracket **78** is lowered into a working position, the securing pins automatically get into their corresponding pin receiving holes **84** thus locking the film positioning bracket **78** in its working position.

[0125] The feeding system front portion does not have to be connected to the feeding system rear portion by means of a belt and other engagement members may be used, for example, a chain or the like.

Claims

1. A manual wrapping apparatus (10) for wrapping a tray (144) with a sealing film (43), the apparatus comprising:

a lower frame (12) and an upper arm (14) hinged to the lower frame,
the lower frame comprising a tray receiving bracket (86) for receiving therein the tray,

characterized in that

manually closing the upper arm toward the lower frame manually feeds forwardly the sealing film, replaces the atmosphere within the tray, solders the sealing film to the tray, and, cuts the sealing film around the tray, and that
the tray receiving bracket (86) comprises:

a tray receiving aperture (92) for receiving the tray therein,
a tray receiving shoulder (94), peripherally surrounding the tray receiving aperture, for receiving thereon a peripheral shoulder of the tray,
a knife receiving groove (100) extending peripherally around the tray receiving shoulder and bounded by a bracket top surface (102),
the tray receiving bracket further comprising:

at least one gas inlet hole (104) that opens at least to the knife receiving groove,
at least one gas outlet hole (108) that opens at least to the knife receiving groove, and
a gas valve operating switch (112);

the at least one gas inlet hole (104) opens to the knife receiving groove (100) and to the bracket top surface (102);
the tray receiving shoulder (94) comprises a vertically formed seal slot (98) extending at an entire periphery of the tray receiving shoulder, and
a sealing element (96) located within the seal slot and on top of the tray receiving shoulder;

that the apparatus (10) comprises a feeding system (44) comprising a feeding system rear portion (46) and a feeding system front portion (48), and
the feeding system rear portion comprises:

a feeding cam (50), provided with a feeding gear (52), that is connected to the upper arm, the feeding cam forms a sector of 45° to 90° that rotates around a main operation axis (A) of the upper arm with respect to the lower frame,
a film driving roll (56) and a film tightening roll (62) that is parallel to the film driving roll and interconnected therewith,
an engagement member (70) connects between the feeding system rear portion and the feeding system front portion, and
the feeding system front portion comprises:

a front film driving roll (72) and a front film tightening roll (74) that is parallel to the front film driving roll and interconnected therewith, wherein
at the feeding system rear portion (46) the sealing film (43) passes between the film driving roll (56) and the film tightening roll (62), at the feeding system front portion (48) the sealing film passes between the front film driving roll (72) and the front film tightening roll (74), and, wherein
movement of the upper arm (14) toward the lower frame (12), between an open position of the upper arm to a closed position of the upper arm, causes the feeding gear (52) to turn the feeding system rear portion and the feeding system front portion at the same amount thus feeding forwardly the sealing film (43) at a constant and measured value;
that the upper arm comprises a pressing plate (118) that is urged downward-

ly and hanged from a base plate (116) of the upper arm by means of pressing plate hanging members (120), and wherein the pressing plate hanging members may freely pass through the base plate such that the distance between the pressing plate and the base plate may vary during various steps of operation of the apparatus;
wherein the upper arm comprises a soldering platform (130) that is urged downwardly and hanged from the base plate (116) of the upper arm (14) by means of soldering platform hanging members, and wherein
the soldering platform hanging members may freely pass through the base plate such that the distance between the soldering platform and the base plate may vary during various steps of operation of the apparatus;
wherein the soldering platform (130) comprises a heating element (134) in an upper portion thereof and a soldering lip (132) in a lower portion thereof; and that a knife (138) is surrounding the soldering platform slightly distanced away therefrom, wherein an upper portion of the knife is bounded by a knife base (140) that is rigidly connected to the base plate, and, a lower portion of the knife constitutes a cutting edge.

2. The apparatus according to claim 1, wherein the apparatus (10) is a food wrapping apparatus.

3. The apparatus (10) according to claim 1, wherein the feeding cam (50) forms a sector of 70°.

4. The apparatus (10) according to claim 1, wherein the film tightening roll and the front film tightening roll are provided with a plurality of equally spaced apart grooves (64), and, a tightening ring (66) is received within each of the grooves.

5. The apparatus (10) according to claim 4, wherein the sealing film (43) remains straight and tight by being squeezed by the tightening rings (66) of the corresponding film tightening roll (62) and the front film tightening roll (74) against the corresponding films driving roll (56) and the front film driving roll (72).

6. The apparatus (10) according to claim 1, wherein the apparatus is provided with a film positioning bracket (78) for easy loading the sealing film into a working position, the film positioning bracket is rotatable with respect to the main operation axis (A) and comprising the film driving roll and the front film driving roll, and wherein in an open position of the film positioning bracket the sealing film may be freely put on the tray receiving bracket (86).

7. The apparatus (10) according to claim 6, wherein the lower frame comprises a right side bracket (26) and a left side bracket (28) that are connected inbetween by means of tightening rods (30), and
the film positioning bracket (78) is locked to the right side bracket and to the left side bracket by means of bracket secure knobs (80), each of the bracket secure knobs having a securing pin (82) that is located within a pin receiving hole (84) formed in the film positioning bracket.

8. The apparatus (10) according to claim 1, wherein the tray receiving bracket (86) is interchangeable.

9. The apparatus (10) according to claim 1, wherein the gas valve operating switch (112) protrudes upwardly from the bracket top surface (102).

10. The apparatus (10) according to claim 1, wherein the engagement member connecting between the feeding system rear portion (46) and the feeding system front portion (48) constitutes a belt (70).

11. The apparatus (10) according to claim 10, wherein the belt (70) is toothed according to a belt driving gear (68) of the feeding system rear portion and according to a belt receiving gear (76) of the feeding system front portion.

12. The apparatus (10) according to claim 1, wherein a lower portion of the pressing plate (118) is provided with a pressing gasket (122).

13. The apparatus (10) according to claim 1, wherein the lower frame (12) comprises a tray removing mechanism (142) for urging upwardly the tray (144).

14. The apparatus (10) according to claim 13, wherein the tray removing mechanism comprises a tray removing handle (158) that is oppositely positioned to a lifting lever (164) with respect to a handle shaft (160), and wherein
urging the tray removing handle in a downward direction urges the lifting lever in an upward direction for urging upwardly the tray.

15. The apparatus (10) according to claim 1, wherein the apparatus comprising an operating handle (166) extending along a width dimension of the apparatus and rotatable with respect to the upper arm; the operating handle comprising:

a holding portion (168), and
a stroke releasing handle (178), and wherein

in a non operating position of the stroke releasing handle the operating handle may rotate a first given stroke, and
in an operating position of the stroke releasing handle the operating handle may rotate a second given stroke that is larger than the first given stroke.

16. The apparatus (10) according to claim 15, wherein a stroke releasing lever (180) extends from the stroke releasing handle (178), the stroke releasing lever ends with a protrusion (186) nested within a locking slot (188) formed in the upper arm, and
pressing the stroke releasing handle toward the holding portion releases the protrusion from the locking slot thus enabling further rotation of the operating handle (166).

17. The apparatus (10) according to claim 15, wherein the holding portion (168) extends between two operating frames (170), each of the operating frames comprises a sliding buffer (190) comprising:

a flat slanted surface (192) at a forward portion of the sliding buffer, a sliding surface (194) extending rearwardly from the slanted surface, and a sliding limiting wall (196) rearwardly to the sliding surface, and wherein
the lower frame is provided with a pressure support rod (198) located adjacent the slanted surface prior to operating the stroke releasing handle (178), and
a downward movement of the operating handle urges the sliding buffer to gradually enter under the pressure support rod thus gradually urging downwardly the upper arm (14).

18. The apparatus (10) according to claim 1, wherein the weight of the upper arm (14) is counterbalanced by two balancing pistons (16).

19. The apparatus (10) according to claim 1, wherein the feeding system rear portion (46) is provided with at least one ratchet (63) for enabling forward feeding of the sealing film (43) during downward movement of the upper arm (14), and, preventing rearward pulling of the sealing film (43) during upward movement of the upper arm (14).

20. A method for manually wrapping a product within a cup-shaped tray (144) in a controlled environment by a sealing film (43), the method comprising the steps of:

(a) Providing an apparatus (10) according to any one of claims 1-19, having an upper arm (14) hinged to a lower frame (12), and a sealing film roll (42) is seated within a sealing film support portion (36) of the lower frame.
(b) Inserting the tray into a tray receiving aperture (92) formed in a tray receiving bracket (86) that is connected to the lower frame.
(c) Pulling down a holding portion (168) of an operating handle (166), between an open position of the upper arm and a closed position of the upper arm, for operating a feeding system (44) for feeding forwardly the sealing film at a constant measure, holding the sealing film (43) in position, soldering the sealing film to the tray, and, cutting the sealing film (43) around the tray (144).
(d) Removing the tray by pressing a tray removing handle (158) of a tray removing mechanism (142).

21. The method according to claim 20, further comprising in step (c), after soldering the sealing film to the tray, the step of:

(e) Providing a stroke releasing handle (178) that is pulled in order to enable further stroke of the holding portion (168) for cutting the sealing film around the tray.

Patentansprüche

1. Manuelles Wickelgerät (10) zum Einwickeln eines Tabletts (144) mit einer Siegelfolie (43), wobei das Gerät Folgendes umfasst:

einen unteren Rahmen (12) und einen oberen Arm (14), der an dem unteren Rahmen angelenkt ist,
wobei der untere Rahmen eine Tablettaufnahmehalterung (86) zum Aufnehmen des Tabletts umfasst, **dadurch gekennzeichnet, dass**
das manuelle Schließen des oberen Arms zu dem unteren Rahmen manuell die Siegelfolie vorwärts zuführt, die Atmosphäre innerhalb des Tabletts ersetzt, die Siegelfolie an das Tablett lötet und die Siegelfolie um das Tablett schneidet, und dass
die Tablettaufnahmehalterung (86) Folgendes umfasst:

eine Tablettaufnahmeöffnung (92) zum Aufnehmen des Tabletts,
eine Tablettaufnahmeschulter (94), die die Tablettaufnahmeöffnung umfänglich umgibt, um darauf eine umfängliche Schulter des Tabletts aufzunehmen,
eine Messeraufnahmenut (100), die sich umfänglich um die Tablettaufnahmeschulter erstreckt und von einer oberen Halterungsfläche (102) abgegrenzt wird,

wobei die Tablettaufnahmehalterung ferner Folgendes umfasst:

mindestens ein Gaseinlassloch (104), das sich mindestens zu der Messeraufnahmenut öffnet,
mindestens ein Gasauslassloch (108), das sich mindestens zu der Messeraufnahmenut öffnet, und
einen Gasventil-Betätigungsschalter (112);

wobei sich die mindestens eine Gaseinlassöffnung (104) zu der Messeraufnahmenut (100) und zu der oberen Halterungsfläche (102) öffnet;
die Tablettaufnahmeschulter (94) einen vertikal ausgebildeten Dichtschlitz (98) umfasst, der sich an einem kompletten Umfang der Tablettaufnahmeschulter erstreckt, und
ein Dichtelement (96), das sich innerhalb des Dichtschlitzes und auf der Oberseite der Tablettaufnahmeschulter befindet;

dass das Gerät (10) ein Zuführsystem (44) umfasst, das einen hinteren Zuführsystemabschnitt (46) und einen vorderen Zuführsystemabschnitt (48) umfasst, und
der hintere Zuführsystemabschnitt Folgendes umfasst:

einen Zuführnocken (50), der mit einem Zuführzahnrad (52) versehen ist, das mit dem oberen Arm verbunden ist, wobei der Zuführnocken einen Sektor zu 45° bis 90° bildet, der um eine Hauptbetätigungsachse (A) des oberen Arms in Bezug zu dem unteren Rahmen dreht,
eine Folienantriebsrolle (56) und eine Folienspannrolle (62), die zu der Folienantriebsrolle parallel und mit ihr gegenseitig verbunden ist,
ein Eingriffselement (70), das zwischen dem hinteren Zuführsystemabschnitt und dem vorderen Zuführsystemabschnitt verbindet, und
wobei der vordere Zuführsystemabschnitt ferner Folgendes umfasst:

eine vordere Folienantriebsrolle (72) und eine vordere Folienspannrolle (74), die zu der vorderen Folienantriebsrolle parallel und gegenseitig mit ihr verbunden ist, wobei
an dem hinteren Zuführsystemabschnitt (46) die Siegelfolie (43) zwischen der Folienantriebsrolle (56) und der Folienspannrolle (62) durchgeht,
die Siegelfolie an dem vorderen Zuführsystemabschnitt (48) zwischen der vorderen Folienantriebsrolle (72) und der vorderen Folienspannrolle (74) durchgeht, und wobei
eine Bewegung des oberen Arms (14) zu dem unteren Rahmen (12) zwischen einer offenen Position des oberen Arms zu einer geschlossenen Position des oberen Arms das Zuführzahnrad (52) veranlasst, den hinteren Zuführsystemabschnitt und den vorderen Zuführsystemabschnitt um dieselbe Menge zu drehen, so dass die Siegelfolie (43) mit einem konstanten und gemessenen Wert vorwärts zugeführt wird;
dass der obere Arm eine Pressplatte (118) umfasst, die nach unten gedrückt wird und von einer Basisplatte (116) des oberen Arms mittels Pressplattenhängeelementen (120) angehängt ist, und wobei die Pressplattenhängeelemente frei durch die Basisplatte derart durchgehen, dass der Abstand zwischen der Pressplatte und der Basisplatte während diverser Schritte des Betriebs des Geräts variieren kann;
wobei der obere Arm eine Lötplattform (130) umfasst, die nach unten gedrückt wird und von der Basisplatte (116) des oberen Arms (14) mittels Lötplattformhängeelementen angehängt ist, und wobei
die Lötplattformhängeelemente frei durch die Basisplatte derart durchgehen können, dass der Abstand zwischen der Lötplattform und der Basisplatte während diverser Schritte des Betriebs des Geräts variieren kann;
wobei die Lötplattform (130) ein Heizelement (134) in ihrem oberen Abschnitt und eine Lötlippe (132) in einem unteren Abschnitt aufweist;
und dass ein Messer (138) die Lötplattform leicht von ihr beabstandet umgibt, wobei ein oberer Abschnitt des Messers durch eine Messerbasis (140) abgegrenzt ist, die starr mit der Basisplatte verbunden ist, und ein unterer Abschnitt des Messers eine Schneidkante bildet.

2. Gerät nach Anspruch 1, wobei das Gerät (10) ein Nahrungsmitteleinwickelgerät ist.

3. Gerät (10) nach Anspruch 1, wobei der Zuführnocken (50) einen Sektor zu 70° bildet.

4. Gerät (10) nach Anspruch 1, wobei die Folienspannrolle und die vordere Folienspannrolle mit einer Vielzahl gleichmäßig beabstandeter Nuten (64) versehen sind, und ein Spannring (66) in jeder der Nuten aufgenommen ist.

5. Gerät (10) nach Anspruch 4, wobei die Siegelfolie (43) gerade und gespannt bleibt, indem sie von den Spannringen (66) der entsprechenden Folienspannrolle (62) und der vorderen Folienspannrolle (74) gegen die entsprechende Folienantriebsrolle (56) und vordere Folienantriebsrolle (72) gequetscht wird.

6. Gerät (10) nach Anspruch 1, wobei das Gerät mit einer Folienpositionierungshalterung (78) zum leichten Laden der Siegelfolie in eine Arbeitsposition versehen ist, wobei die Folienpositionierungshalterung in Bezug zu der Hauptbetätigungsachse (A) drehbar ist und die Folienantriebsrolle und die vordere Folienantriebsrolle umfasst, und wobei die Siegelfolie in einer offenen Position der Folienpositionierungshalterung frei auf die Tablettaufnahmehalterung (86) gegeben werden kann.

7. Gerät (10) nach Anspruch 6, wobei der untere Rahmen eine rechte Halterung (26) und eine linke Halterung (28) umfasst, die zwischen einander mittels Spannstangen (30) verbunden sind, und die Folienpositionierungshalterung (78) an der rechten Halterung und der linken Halterung mittels Halterungsabsicherungsknöpfen (80) verriegelt ist, wobei jeder der Halterungsabsicherungsknöpfe einen Absicherungsstift (82) hat, der sich innerhalb einer Stiftaufnahmebohrung (84) befindet, die in der Folienpositionierungshalterung ausgebildet ist.

8. Gerät (10) nach Anspruch 1, wobei die Tablettaufnahmehalterung (86) austauschbar ist.

9. Gerät (10) nach Anspruch 1, wobei der Gasventil-Betätigungsschalter (112) von der oberen Halterungsfläche (102) aufwärts vorragt.

10. Gerät (10) nach Anspruch 1, wobei das Eingriffselement, das zwischen dem hinteren Zuführsystemabschnitt (46) und dem vorderen Zuführsystemabschnitt (48) verbindet, einen Gurt (70) bildet.

11. Gerät (10) nach Anspruch 10, wobei der Gurt (70) gemäß einem Gurtantriebszahnrad (68) des hinteren Zuführsystemabschnitts und gemäß einem Gurtaufnahmerad (76) des vorderen Zuführsystemabschnitts verzahnt ist.

12. Gerät (10) nach Anspruch 1, wobei ein unterer Abschnitt der Pressplatte (118) mit einer Pressdichtung (122) versehen ist.

13. Gerät (10) nach Anspruch 1, wobei der untere Rahmen (12) einen Tablettentfernungsmechanismus (142) umfasst, um das Tablett (144) aufwärts zu drücken.

14. Gerät (10) nach Anspruch 13, wobei der Tablettentfernungsmechanismus einen Tablettentfernungsgriff (158) umfasst, der entgegengesetzt zu einem Hubhebel (164) in Bezug zu einer Griffwelle (160) positioniert ist, und wobei das Drücken des Tablettentfernungsgriffs in eine Abwärtsrichtung den Hubhebel in eine Aufwärtsrichtung drückt, um das Tablett aufwärts zu drücken.

15. Gerät (10) nach Anspruch 1, wobei das Gerät einen Betätigungsgriff (166) umfasst, der sich entlang eines Breitenmaßes des Geräts und in Bezug zu dem oberen Arm drehbar erstreckt; wobei der Betätigungsgriff Folgendes umfasst:

einen Halteabschnitt (168), und
einen Hubfreigabegriff (178), und wobei
der Betätigungsgriff in einer nicht betätigenden Position des Hubfreigabegriffs um einen ersten gegebenen Hub drehen kann, und
der Betätigungsgriff in einer betätigenden Position des Hubfreigabegriffs um einen zweiten gegebenen Hub, der größer ist als der erste gegebene Hub drehen kann.

16. Gerät (10) nach Anspruch 15, wobei sich ein Hubfreigabehebel (180) von dem Hubfreigabegriff (178) erstreckt, wobei der Hubfreigabehebel in einem Vorsprung (186) endet, der innerhalb eines Verriegelungsschlitzes (188), der in dem oberen Arm ausgebildet ist, verschachtelt ist, und das Drücken des Hubfreigabegriffs zu dem Halteabschnitt den Vorsprung aus dem Verriegelungsschlitz freigibt, so dass weitere Drehung des Betätigungsgriffs (166) ermöglicht wird.

17. Gerät (10) nach Anspruch 15, wobei sich der Halteabschnitt (168) zwischen zwei Betätigungsrahmen (170) erstreckt, wobei jeder der Betätigungsrahmen einen Gleitpuffer (190) umfasst:

eine flache schräge Fläche (192) in einem Vorwärtsabschnitt des Gleitpuffers, eine Gleitfläche (194) die sich von der schrägen Fläche nach hinten erstreckt, und
eine Gleitbegrenzungswand (196) nach hinten zu der Gleitfläche, und wobei der untere Rahmen mit einer Druckstützstange (198) versehen ist, die benachbart zu der schrägen Fläche vor dem Betätigen des Hubfreigabegriffs (178) liegt, und

eine Abwärtsbewegung des Betätigungsgriffs den Gleitpuffer drückt, um allmählich unter die Druckstützstange einzutreten und dadurch allmählich den oberen Arm (14) abwärts zu drücken.

18. Gerät (10) nach Anspruch 1, wobei das Gewicht des oberen Arms (14) durch zwei Auswuchtkolben (16) ausgeglichen wird.

19. Gerät (10) nach Anspruch 1, wobei der hintere Zuführsystemabschnitt (46) mit mindestens einer Schaltklinke (63) versehen ist, um das Vorwärtszuführen der Siegelfolie (43) während der Abwärtsbewegung des oberen Arms (14) zu ermöglichen, und das Rückwärtsziehen der Siegelfolie (43) während der Aufwärtsbewegung des oberen Arms (14) zu verhindern.

20. Verfahren zum manuellen Einwickeln eines Produkts innerhalb eines schalenförmigen Tabletts (144) in einer kontrollierten Umgebung durch eine Siegelfolie (43), wobei das Verfahren die folgenden Schritte umfasst:

(a) Bereitstellen eines Geräts (10) nach einem der Ansprüche 1 - 19, das einen oberen Arm (14) hat, der an einem unteren Rahmen (12) angelenkt ist, und wobei eine Siegelfolienrolle (42) innerhalb eines Siegelfolientragabschnitts (36) des unteren Rahmens sitzt.
(b) Einfügen des Tabletts in eine Tablettaufnahmeöffnung (92), die in einer Tablettaufnahmehalterung (86), die mit dem unteren Rahmen verbunden ist, ausgebildet ist.
(c) Abwärtsziehen eines Halteabschnitts (168) eines Betätigungsgriffs (166) zwischen einer offenen Position des oberen Arms und einer geschlossenen Position des oberen Arms, um ein Zuführsystem (44) zu betätigen, um die Siegelfolie mit einem konstanten Maß vorwärts zuzuführen, die Siegelfolie (43) in Position zu halten, die Siegelfolie an das Tablett zu löten, und die Siegelfolie (43) um das Tablett (144) zu schneiden.
(d) Entfernen des Tabletts durch Drücken eines Tablettentfernungsgriffs (158) eines Tablettentfernungsmechanismus (142).

21. Verfahren nach Anspruch 20, das ferner bei Schritt (c), nach dem Löten der Siegelfolie an das Tablett, folgenden Schritt umfasst:

(e) Bereitstellen eines Hubfreigabegriffs (178), der gezogen wird, um einen weiteren Hub des Halteabschnitts (168) zum Schneiden der Siegelfolie um das Tablett zu ermöglichen.

Revendications

1. Appareil d'emballage manuel (10) pour l'emballage d'un plateau (144) avec un film d'étanchéité (43), l'appareil comprenant :

un cadre inférieur (12) et un bras supérieur (14) articulé sur le cadre inférieur,
le cadre inférieur comprenant un support de réception de plateau (86) pour la réception du plateau à l'intérieur de celui-ci, **caractérisé en ce que**
la fermeture manuelle du bras supérieur vers le cadre inférieur alimente manuellement vers l'avant le film d'étanchéité, remplace l'atmosphère à l'intérieur du plateau, soude le film d'étanchéité au plateau, et, coupe le film d'étanchéité autour du plateau, et **en ce que** le support de réception de plateau (86) comprend :

une ouverture de réception de plateau (92) pour la réception du plateau à l'intérieur de celle-ci,
un épaulement de réception de plateau (94), entourant sur la périphérie l'ouverture de réception de plateau, pour la réception sur celui-ci d'un épaulement périphérique du plateau,
une rainure de réception de lame (100) s'étendant sur la périphérie autour de l'épaulement de réception de plateau et délimitée par une surface supérieure de support (102), le support de réception de plateau comprenant en outre :

au moins un trou d'entrée de gaz (104) qui s'ouvre au moins sur la rainure de réception de lame,
au moins un trou de sortie de gaz (108) qui s'ouvre au moins sur la rainure de réception de lame, et
un commutateur d'actionnement de soupape à gaz (112) ;

l'au moins un trou d'entrée de gaz (104) s'ouvre sur la rainure de réception de lame (100) et sur la surface supérieure de support (102) ;
l'épaulement de réception de plateau (94) comprend une fente d'étanchéité formée verticalement (98) s'étendant sur toute la périphérie de l'épaulement de réception de plateau, et
un élément d'étanchéité (96) situé à l'intérieur de la fente d'étanchéité et sur la partie supérieure de l'épaulement de réception de plateau ;

en ce que l'appareil (10) comprend un système d'alimentation (44) comprenant une portion arrière de système d'alimentation (46) et une portion avant de système d'alimentation (48), et
la portion arrière de système d'alimentation comprend :

une came d'alimentation (50), dotée d'un engrenage d'alimentation (52), qui est reliée au bras supérieur, la came d'alimentation forme un secteur de 45° à 90° qui tourne autour d'un axe de fonctionnement principal (A) du bras supérieur par rapport au cadre inférieur,
un rouleau d'entraînement de film (56) et un rouleau de serrage de film (62) qui est parallèle au rouleau d'entraînement de film et interconnecté avec celui-ci,
un élément de mise en prise (70) relie la portion arrière de système d'alimentation et la portion avant de système d'alimentation, et
la portion avant de système d'alimentation comprend :

un rouleau d'entraînement de film avant (72) et un rouleau de serrage de film avant (74) qui est parallèle au rouleau d'entraînement de film avant et interconnecté avec celui-ci, dans lequel
au niveau de la portion arrière de système d'alimentation (46), le film d'étanchéité (43) passe entre le rouleau d'entraînement de film (56) et le rouleau de serrage de film (62), au niveau de la portion avant de système d'alimentation (48), le film d'étanchéité passe entre le rouleau d'entraînement de film avant (72) et le rouleau de serrage de film avant (74), et, dans lequel
le mouvement du bras supérieur (14) vers le cadre inférieur (12), entre une position ouverte du bras supérieur à une position fermée du bras supérieur, amène l'engrenage d'alimentation (52) à faire tourner la portion arrière de système d'alimentation et la portion avant de système d'alimentation à la même quantité alimentant ainsi vers l'avant le film d'étanchéité (43) à une valeur constante et mesurée ;
en ce que le bras supérieur comprend une plaque de pression (118) qui est poussée vers le bas et suspendue à une plaque de base (116) du bras supérieur au moyen d'éléments de suspension de plaque de pression (120), et dans lequel les éléments de suspension de plaque de pression peuvent passer librement à travers la plaque de base de sorte que la distance entre la plaque de pression et la plaque de base peut varier pendant différentes étapes de fonctionnement de l'appareil ;
dans lequel le bras supérieur comprend une plateforme de soudage (130) qui est poussée vers le bas et suspendue à la plaque de base (116) du bras supérieur (14) au moyen d'éléments de suspension de plateforme de soudage, et
dans lequel
les éléments de suspension de plateforme de soudage peuvent passer librement à travers la plaque de base de sorte que la distance entre la plateforme de soudage et la plaque de base peut varier pendant différentes étapes de fonctionnement de l'appareil ;
dans lequel la plateforme de soudage (130) comprend un élément de chauffage (134) dans une portion supérieure de celle-ci et une lèvre de soudage (132) dans une portion inférieure de celle-ci ;
et **en ce qu'**une lame (138) entoure la plateforme de soudage légèrement éloignée de celle-ci, dans lequel une portion supérieure de la lame est délimitée par une base de lame (140) qui est reliée rigidement à la plaque de base, et une portion inférieure de la lame constitue un bord de coupe.

2. Appareil selon la revendication 1, dans lequel l'appareil (10) est un appareil d'emballage alimentaire.

3. Appareil (10) selon la revendication 1, dans lequel la came d'alimentation (50) forme un secteur de 70°.

4. Appareil (10) selon la revendication 1, dans lequel le rouleau de serrage de film et le rouleau de serrage de film avant sont dotés d'une pluralité de rainures espacées de manière égale (64), et, un anneau de serrage (66) est reçu à l'intérieur de chacune des rainures.

5. Appareil (10) selon la revendication 4, dans lequel le film d'étanchéité (43) reste droit et étanche en étant pressé par les bagues de serrage (66) du rouleau de serrage de film correspondant (62) et du rouleau de serrage de film avant (74) contre le rouleau d'entraînement de film correspondant (56) et le rouleau d'entraînement de film avant (72).

6. Appareil (10) selon la revendication 1, dans lequel

l'appareil est doté d'un support de positionnement de film (78) pour un chargement facile du film d'étanchéité dans une position de travail, le support de positionnement de film est rotatif par rapport à l'axe de fonctionnement principal (A) et comprenant le rouleau d'entraînement de film et le rouleau d'entraînement de film avant, et dans lequel dans une position ouverte du support de positionnement de film, le film d'étanchéité peut être placé librement sur le support de réception de plateau (86).

7. Appareil (10) selon la revendication 6, dans lequel le cadre inférieur comprend un support latéral droit (26) et un support latéral gauche (28) qui sont reliés entre eux au moyen de tiges de serrage (30), et
le support de positionnement de film (78) est verrouillé au support latéral droit et au support latéral gauche au moyen de boutons de fixation de support (80), chacun des boutons de fixation de support ayant une broche de fixation (82) qui est située à l'intérieur d'un trou de réception de broche (84) formé dans le support de positionnement de film.

8. Appareil (10) selon la revendication 1, dans lequel le support de réception de plateau (86) est interchangeable.

9. Appareil (10) selon la revendication 1, dans lequel le commutateur d'actionnement de soupape à gaz (112) fait saillie vers le haut de la surface supérieure de support (102).

10. Appareil (10) selon la revendication 1, dans lequel l'élément de mise en prise reliant entre la portion arrière de système d'alimentation (46) et la portion avant de système d'alimentation (48) constitue une courroie (70).

11. Appareil (10) selon la revendication 10, dans lequel la courroie (70) est dentée conformément à un engrenage d'alimentation de courroie (68) de la portion arrière de système d'alimentation et conformément à un engrenage de réception de courroie (76) de la portion avant de système d'alimentation.

12. Appareil (10) selon la revendication 1, dans lequel une portion inférieure de la plaque de pression (118) est dotée d'un joint de pression (122).

13. Appareil (10) selon la revendication 1, dans lequel le cadre inférieur (12) comprend un mécanisme de retrait de plateau (142) pour pousser le plateau (144) vers le haut.

14. Appareil (10) selon la revendication 13, dans lequel le mécanisme de retrait de plateau comprend une poignée de retrait de plateau (158) qui est positionnée de manière opposée à un levier de levage (164) par rapport à un arbre de poignée (160), et dans lequel la poussée de la poignée de retrait de plateau dans une direction vers le bas pousse le levier de levage dans une direction vers le haut pour pousser le plateau vers le haut.

15. Appareil (10) selon la revendication 1, dans lequel l'appareil comprend une poignée d'actionnement (166) s'étendant le long d'une dimension de largeur de l'appareil et rotative par rapport au bras supérieur ; la poignée d'actionnement comprenant :

une portion de maintien (168), et
une poignée de libération de course (178), et dans lequel dans une position de non fonctionnement de la poignée de libération de course, la poignée d'actionnement peut tourner d'une première course donnée, et
dans une position de fonctionnement de la poignée de libération de course, la poignée d'actionnement peut tourner d'une deuxième course donnée qui est supérieure à la première course donnée.

16. Appareil (10) selon la revendication 15, dans lequel un levier de libération de course (180) s'étend de la poignée de libération de course (178), le levier de libération de course se termine avec une saillie (186) logée à l'intérieur d'une fente de verrouillage (188) formée dans le bras supérieur, et
la pression de la poignée de libération de course vers la portion de maintien libère la saillie de la fente de verrouillage permettant ainsi une rotation supplémentaire de la poignée d'actionnement (166).

17. Appareil (10) selon la revendication 15, dans lequel la portion de maintien (168) s'étend entre deux cadres d'actionnement (170), chacun des cadres d'actionnement comprend un tampon coulissant (190) comprenant :

une surface inclinée plate (192) au niveau d'une portion avant du tampon coulissant, une surface coulissante (194) s'étendant vers l'arrière de la surface inclinée, et
une paroi de limitation coulissante (196) vers l'arrière de la surface coulissante, et dans lequel le cadre inférieur est doté d'une tige de support de pression (198) située de manière adjacente à la surface inclinée avant l'actionnement de la poignée de libération de course (178), et
un mouvement vers le bas de la poignée d'actionnement pousse le tampon coulissant à entrer progressivement sous la tige de support de pression poussant ainsi progressivement le bras supérieur (14) vers le bas.

18. Appareil (10) selon la revendication 1, dans lequel

le poids du bras supérieur (14) est contrebalancé par deux pistons d'équilibrage (16).

19. Appareil (10) selon la revendication 1, dans lequel la portion arrière de système d'alimentation (46) est dotée d'au moins un cliquet (63) pour permettre l'alimentation vers l'avant du film d'étanchéité (43) pendant un mouvement vers le bas du bras supérieur (14), et, empêcher la traction vers l'arrière du film d'étanchéité (43) pendant le mouvement vers le haut du bras supérieur (14).

20. Méthode d'emballage manuel d'un produit à l'intérieur d'un plateau en forme de coupelle (144) dans un environnement commandé par un film d'étanchéité (43), la méthode comprenant les étapes de :

(a) fourniture d'un appareil (10) selon l'une quelconque des revendications 1 - 19, ayant un bras supérieur (14) articulé sur un cadre inférieur (12), et un rouleau de film d'étanchéité (42) est logé à l'intérieur d'une portion de support de film d'étanchéité (36) du cadre inférieur.
(b) insertion du plateau dans une ouverture de réception de plateau (92) formée dans un support de réception de plateau (86) qui est relié au cadre inférieur.
(c) traction vers le bas d'une portion de maintien (168) d'une poignée d'actionnement (166), entre une position ouverte du bras supérieur et une position fermée du bras supérieur, pour l'actionnement d'un système d'alimentation (44) pour alimenter vers l'avant le film d'alimentation à une mesure constante, maintenir le film d'étanchéité (43) en position, souder le film d'étanchéité au plateau, et, couper le film d'étanchéité (43) autour du plateau (144).
(d) retrait du plateau par pression d'une poignée de retrait de plateau (158) d'un mécanisme de retrait de plateau (142).

21. Méthode selon la revendication 20, comprenant en outre dans l'étape (c), après le soudage du film d'étanchéité au plateau, l'étape de :

(e) fourniture d'une poignée de libération de course (178) qui est tirée afin de permettre une course supplémentaire de la portion de maintien (168) pour couper le film d'étanchéité autour du plateau.

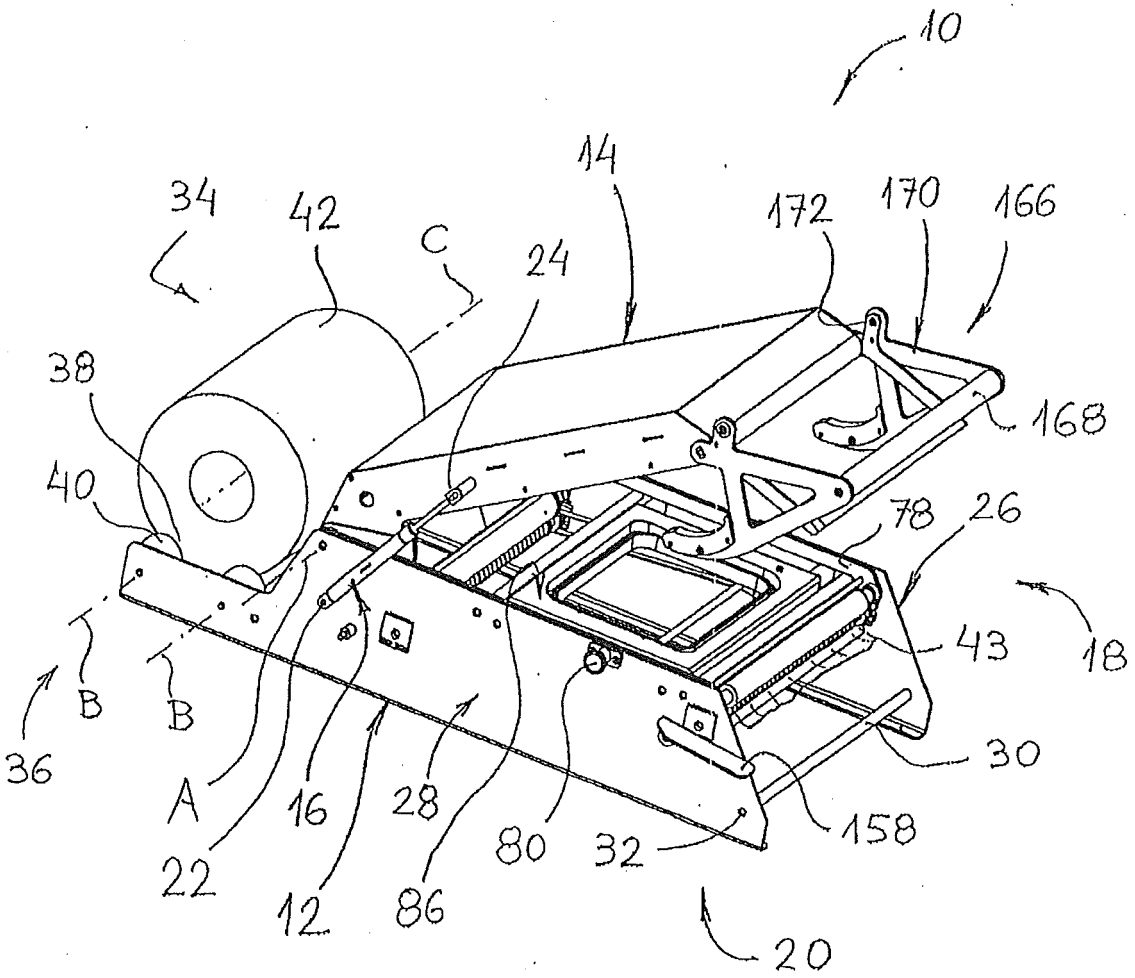

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Fig. 1

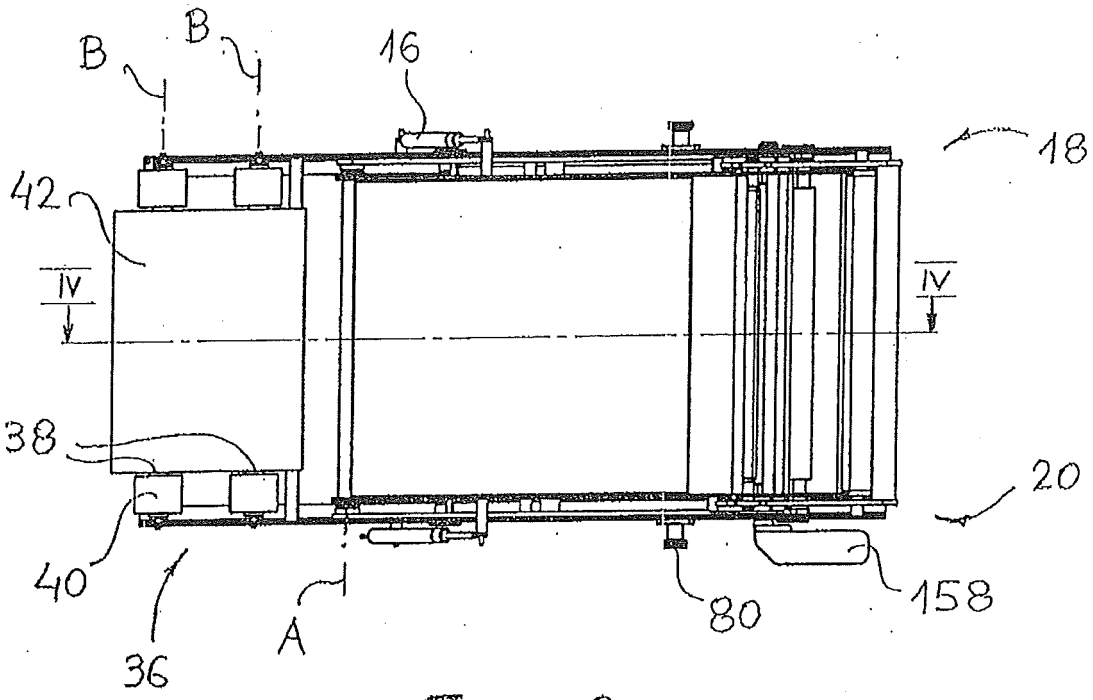

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Fig. 2

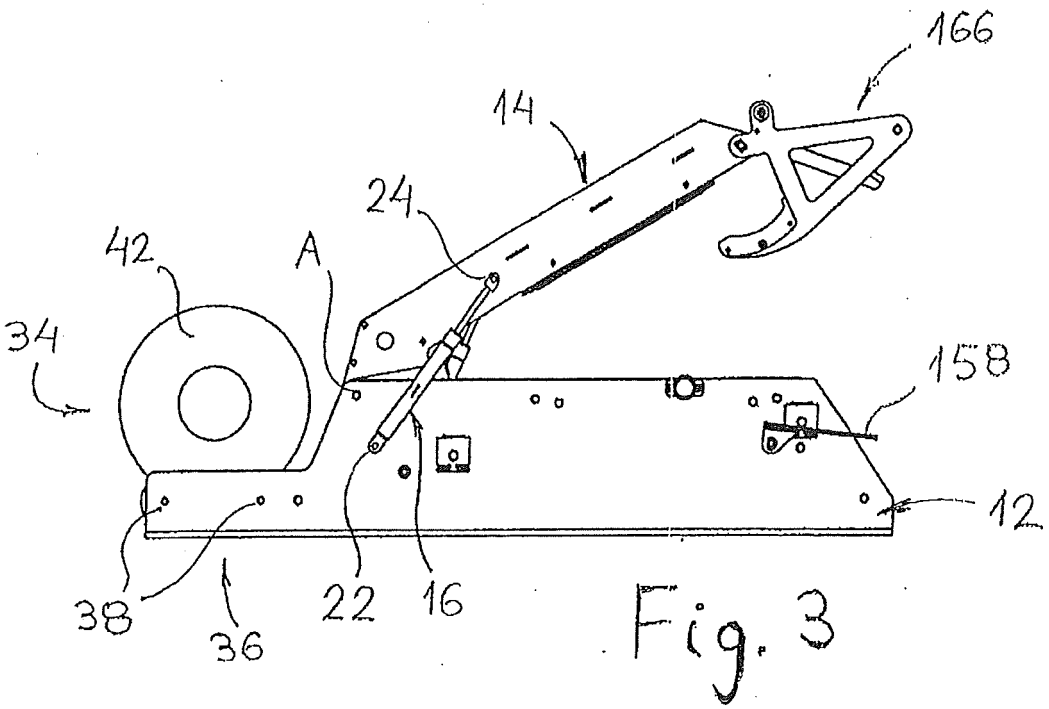

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22
16

Fig. 3

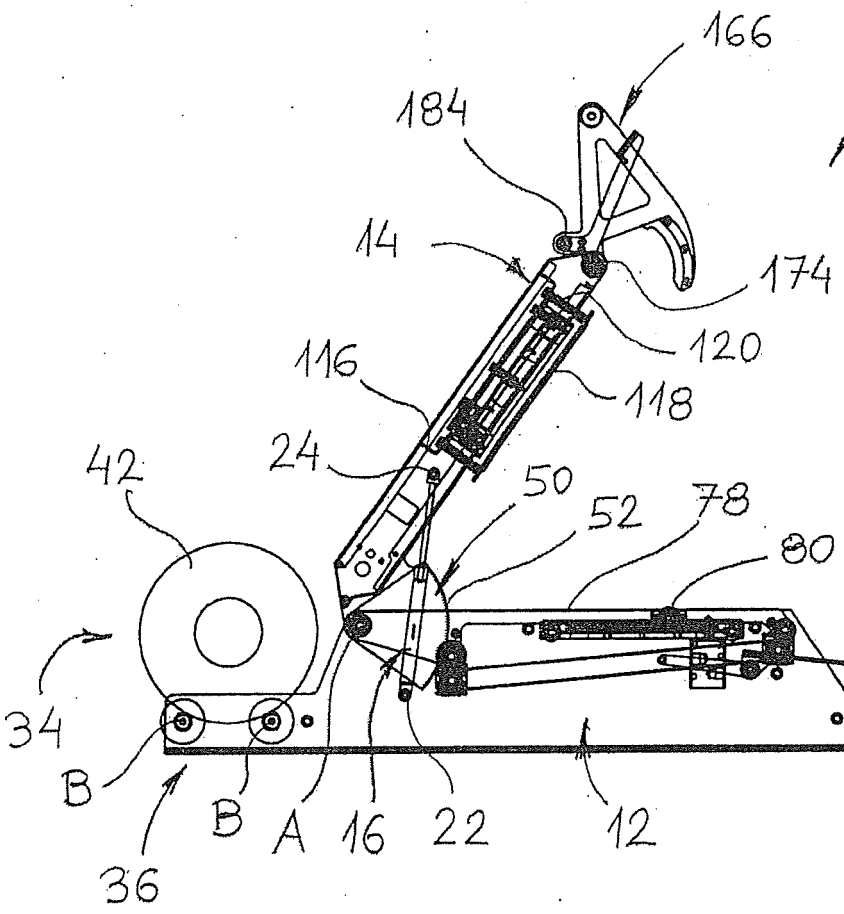

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B
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Fig. 4

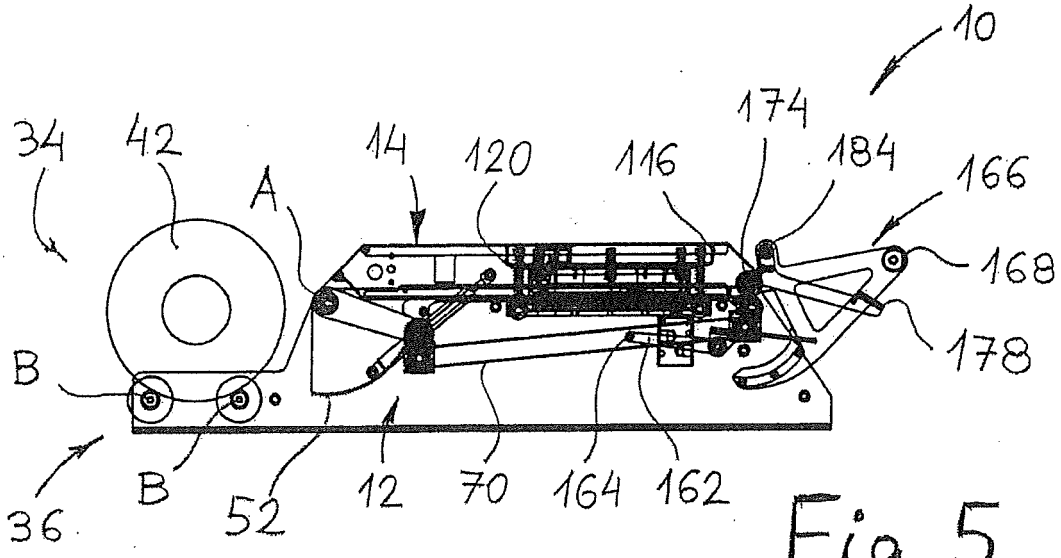

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166
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178
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162

Fig. 5

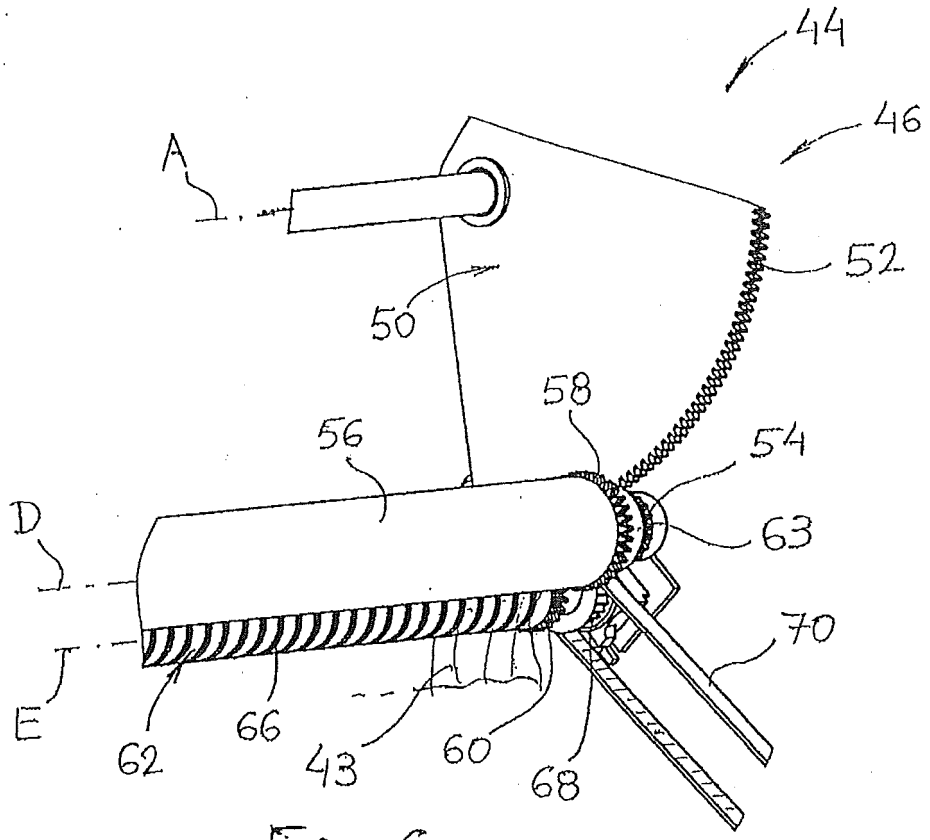

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Fig. 6

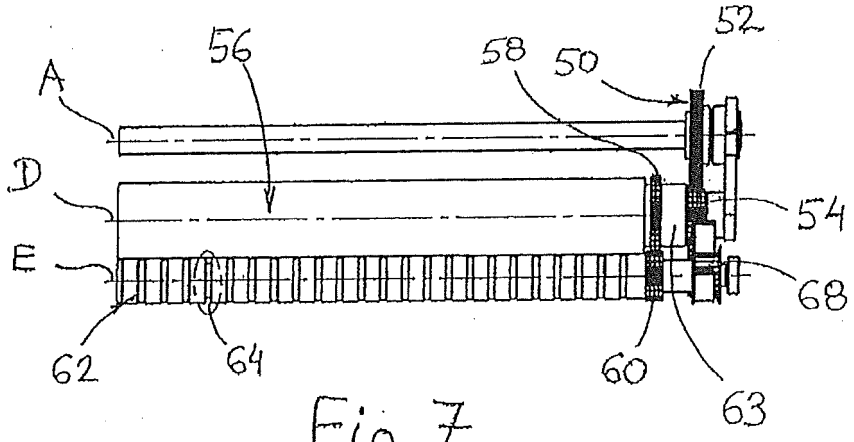

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Fig. 7

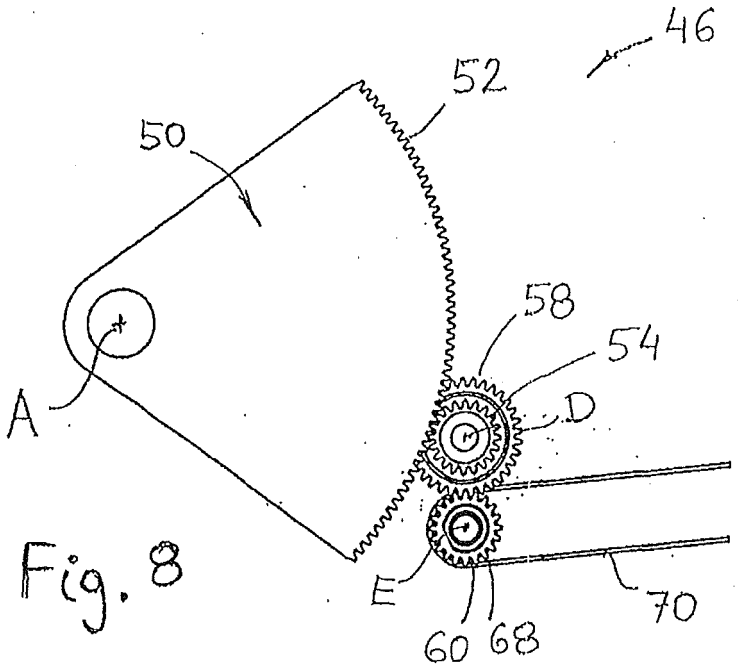


Fig. 8

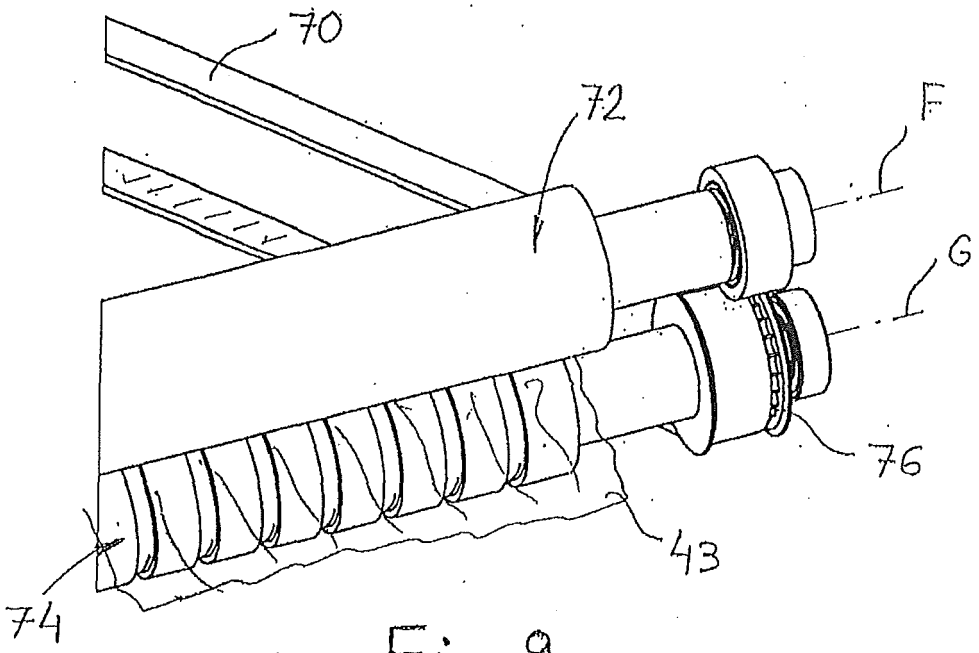


Fig. 9

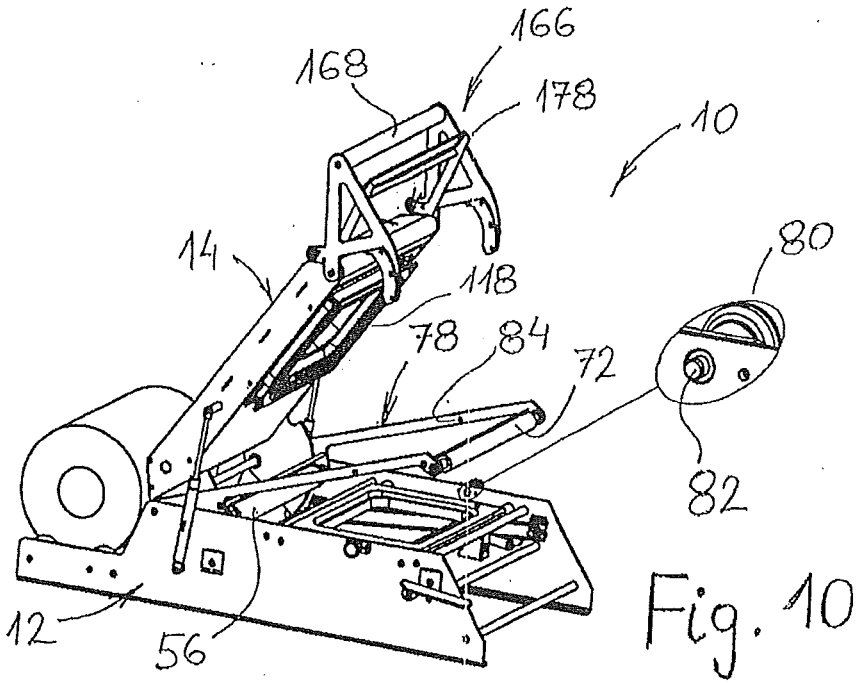

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Fig. 10

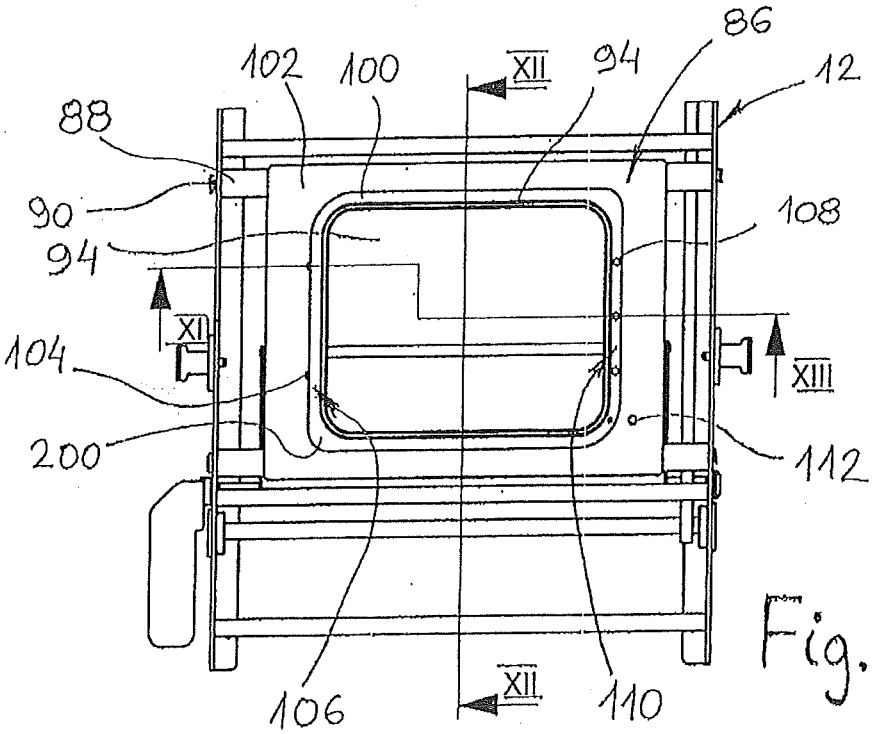

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108
XI
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XIII
200
112
106
XII
110

Fig. 11

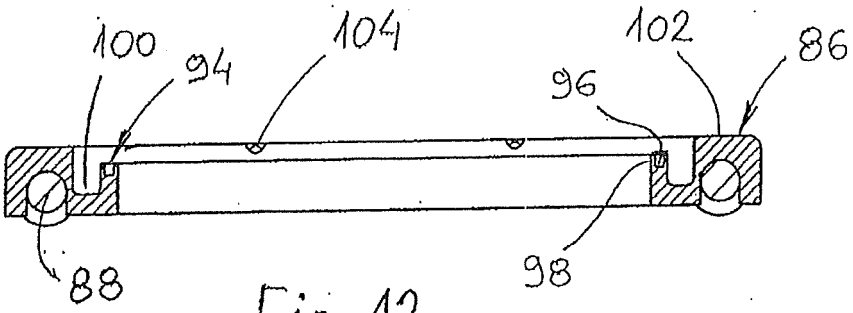


Fig. 12

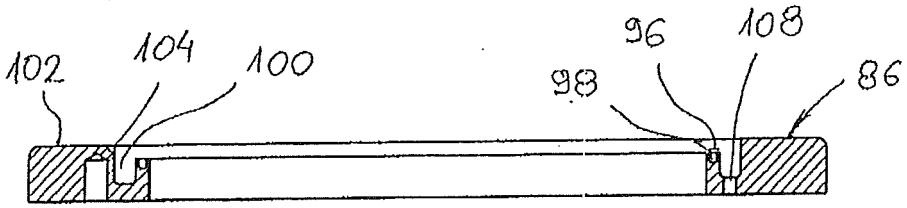


Fig. 13

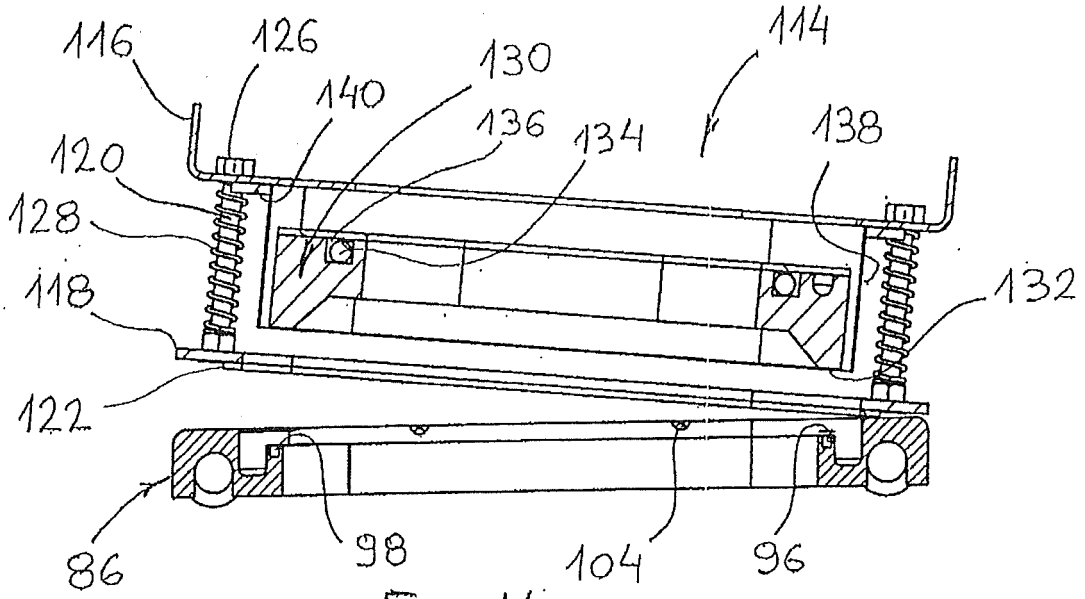

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Fig. 14

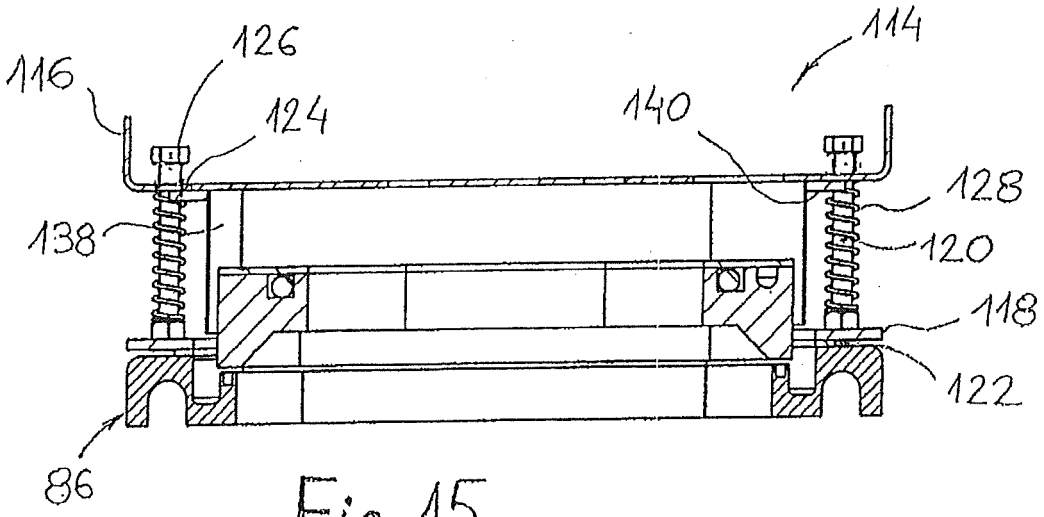

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Fig. 15

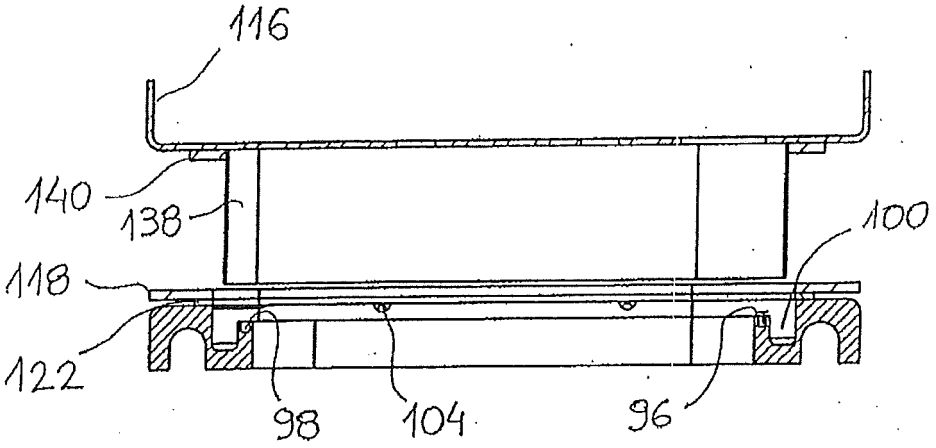


Fig. 16

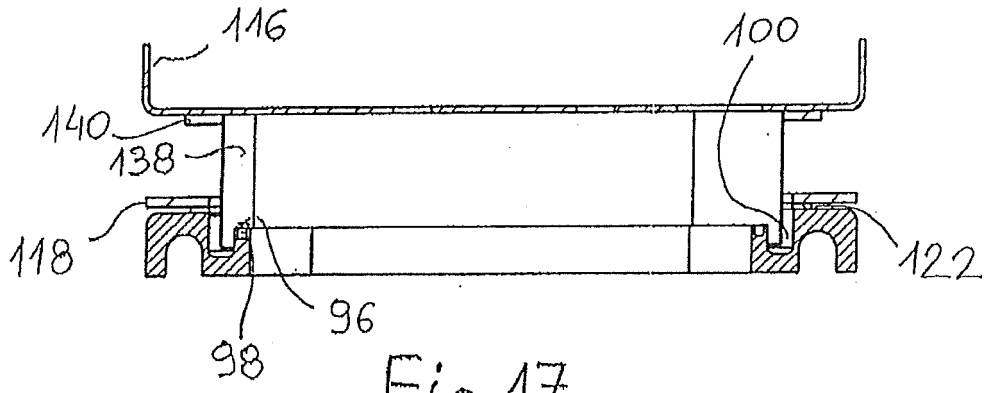


Fig. 17

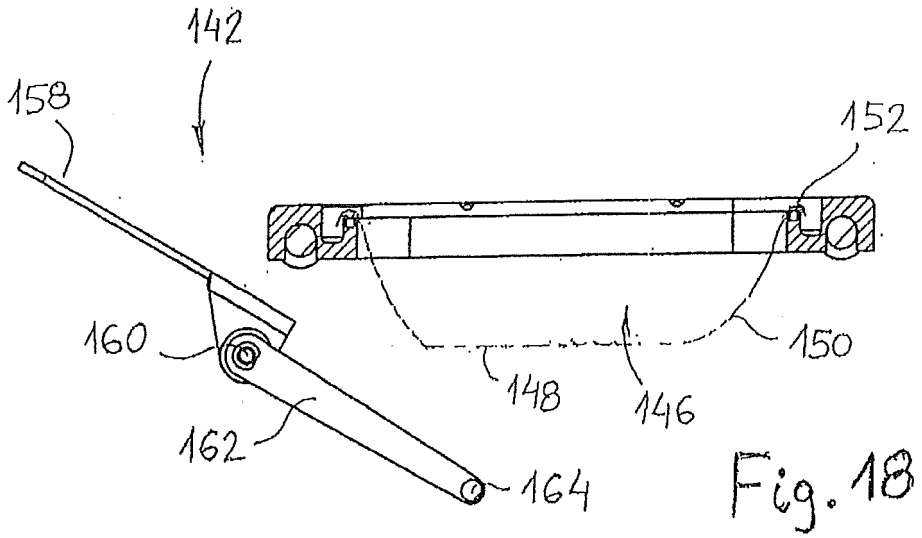

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Fig. 18

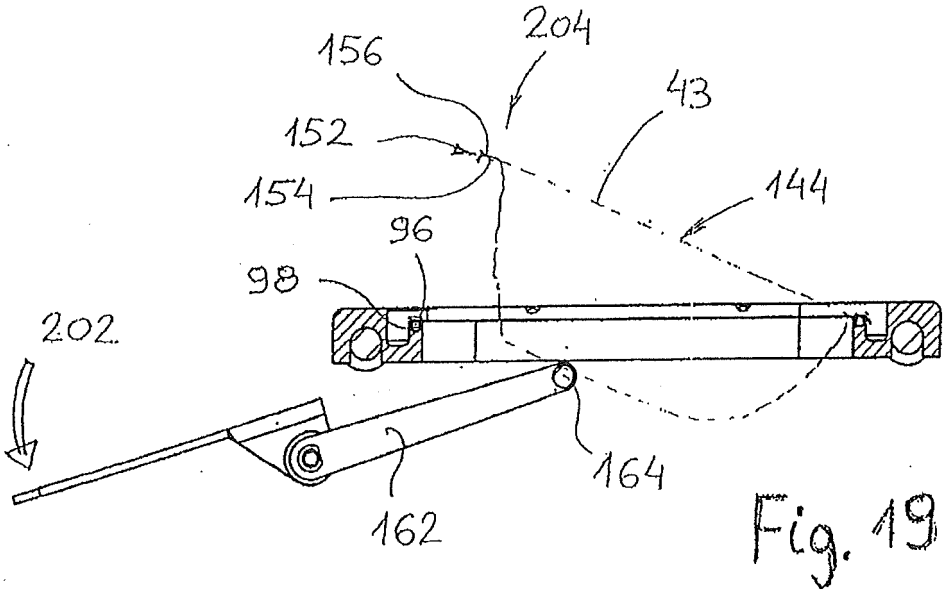

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Fig. 19

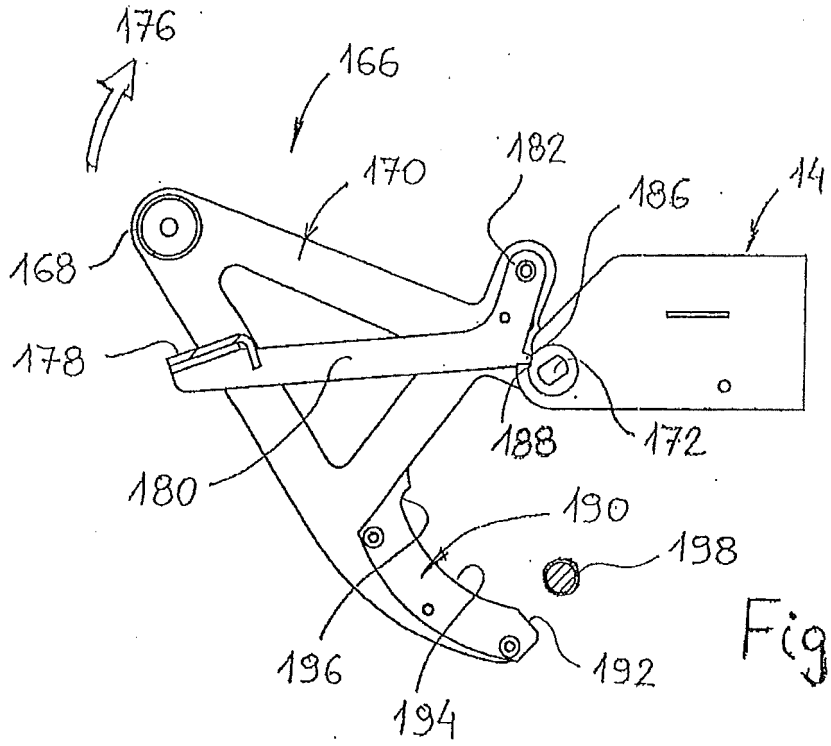

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Fig. 20

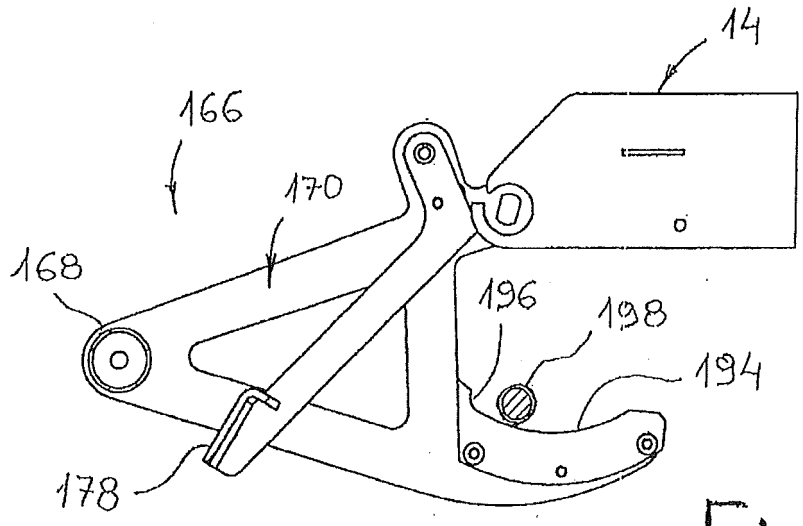

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Fig. 21

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- WO 2012005678 A **[0011]**