Nov. 4, 1969 E. M. BICKHAM ET AL 3,475,880

SEALER FOR PACKAGING FOODSTUFFS AND THE LIKE

Filed Dec. 27, 1967 5 Sheets-Sheet 1

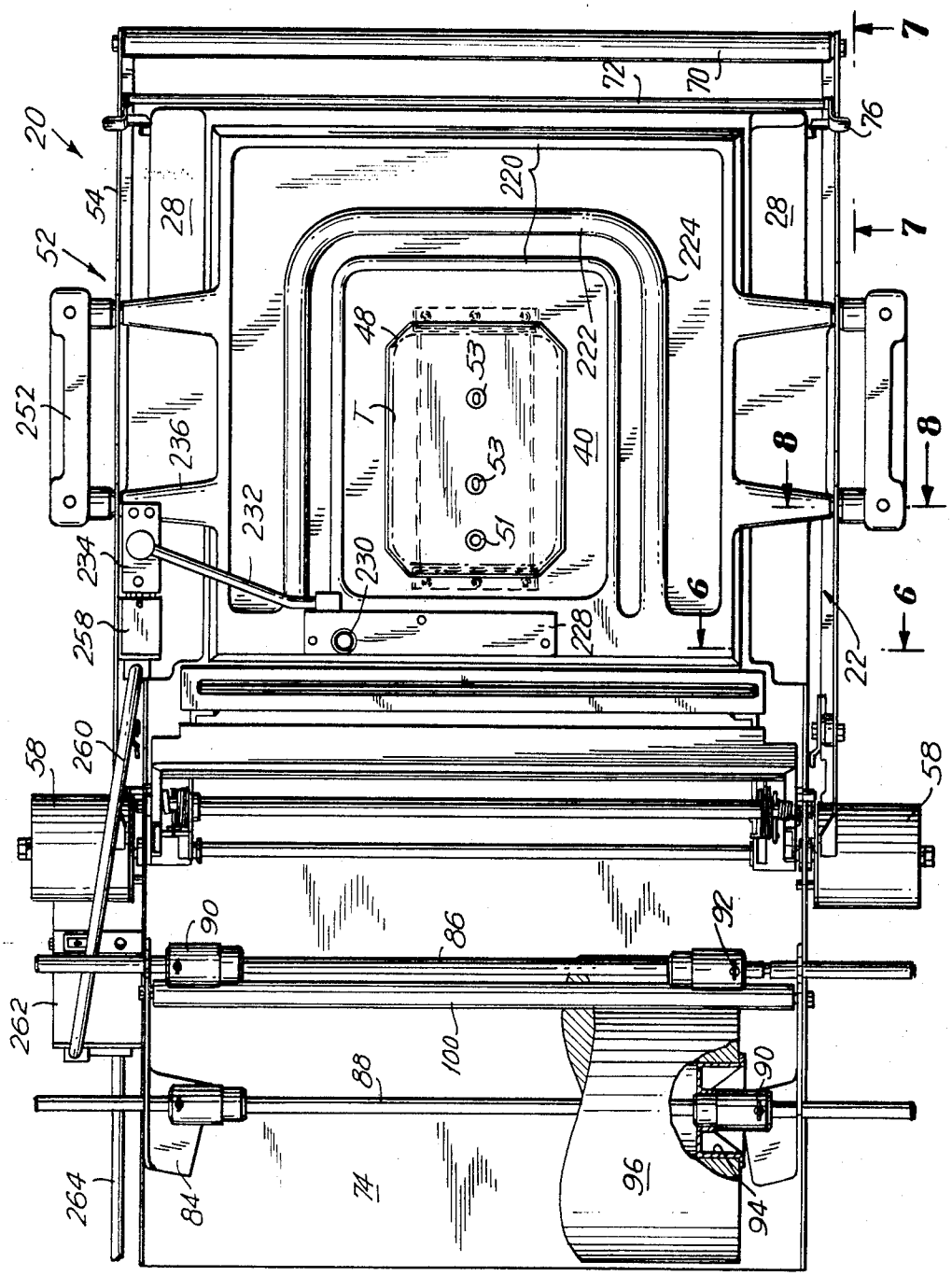


FIG. 1

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SEALER FOR PACKAGING FOODSTUFFS AND THE LIKE

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FIG. 8

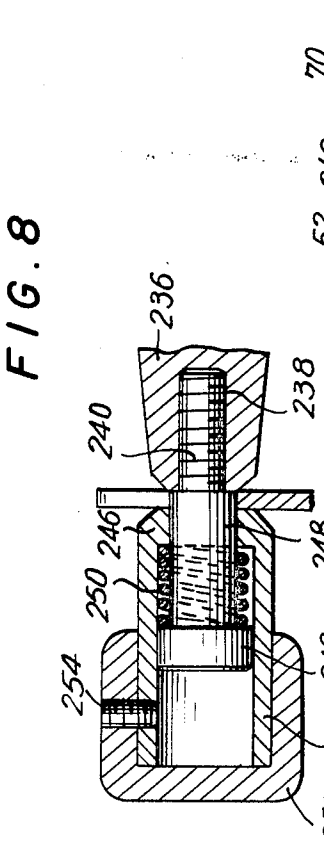


FIG. 2

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SEALER FOR PACKAGING FOODSTUFFS AND THE LIKE

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FIG. 3

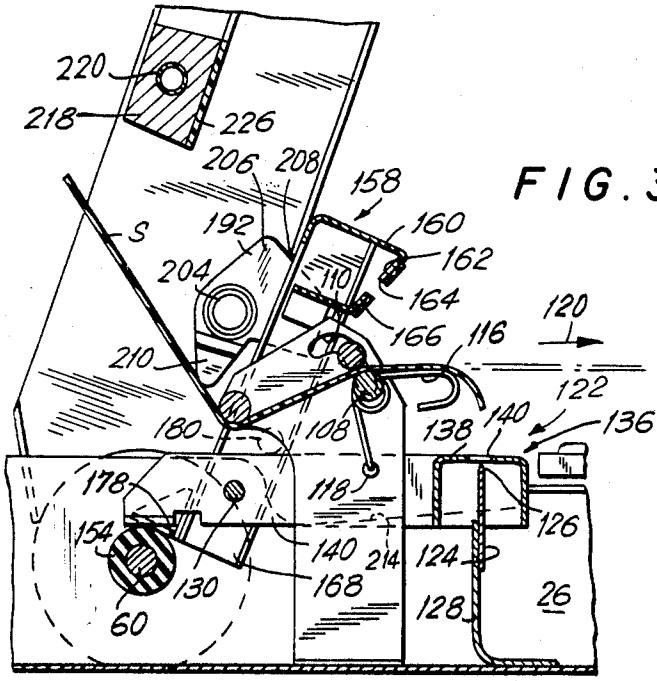


FIG. 4

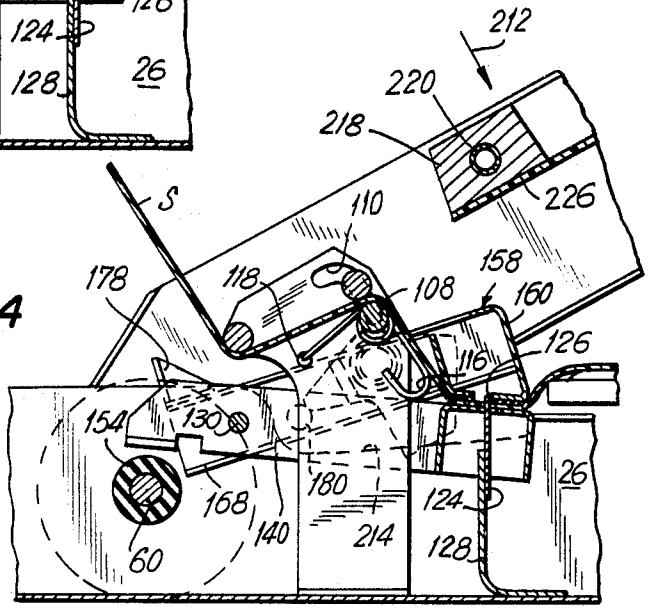
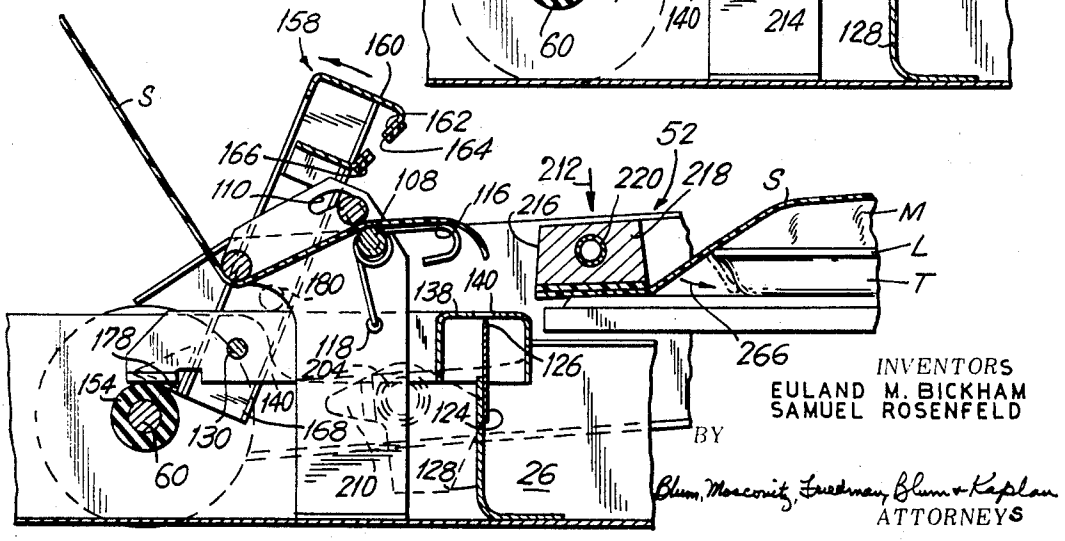


FIG. 5



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SEALER FOR PACKAGING FOODSTUFFS AND THE LIKE

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FIG. 6

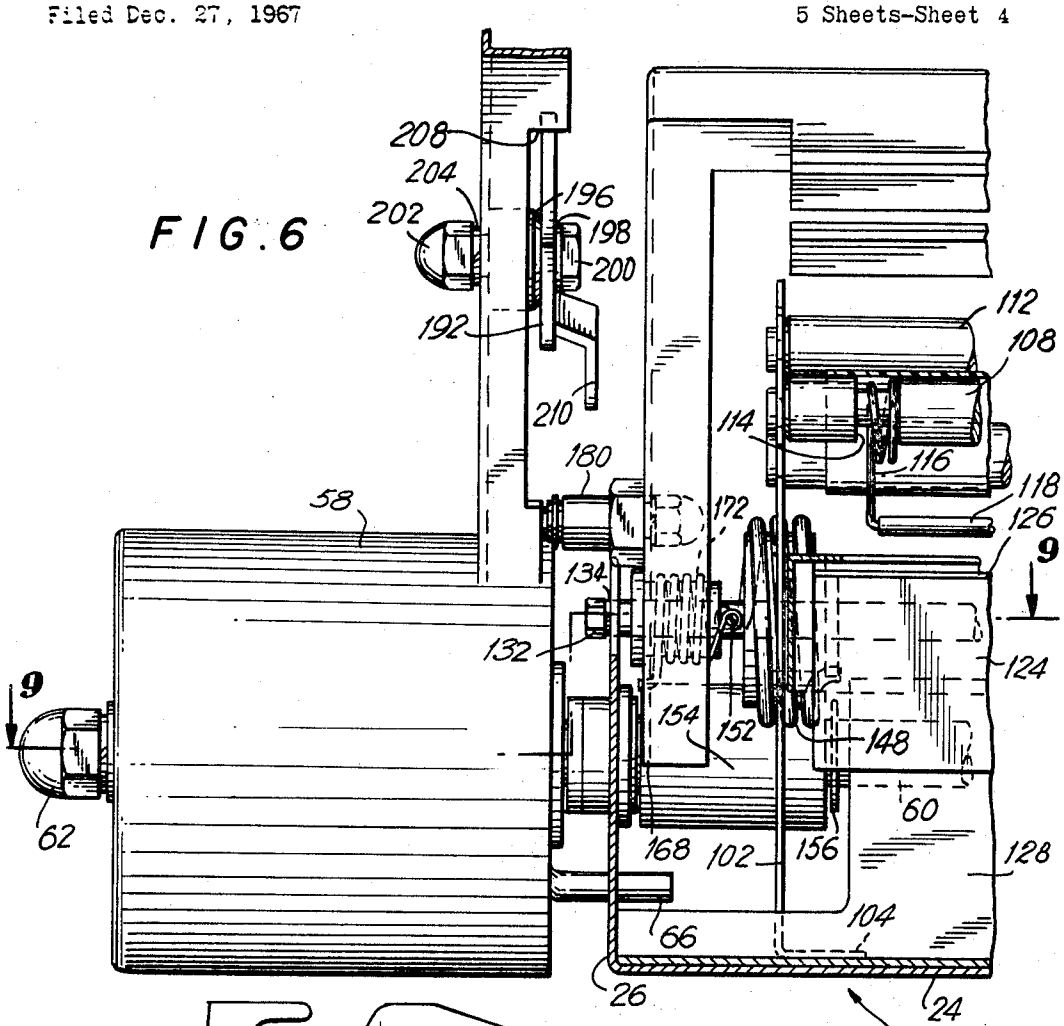
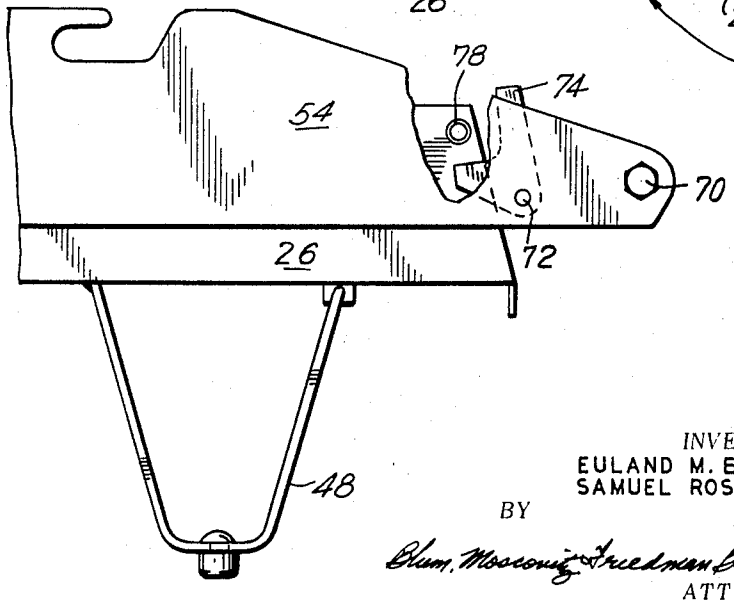


FIG. 7



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SEALER FOR PACKAGING FOODSTUFFS AND THE LIKE

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FIG. 9

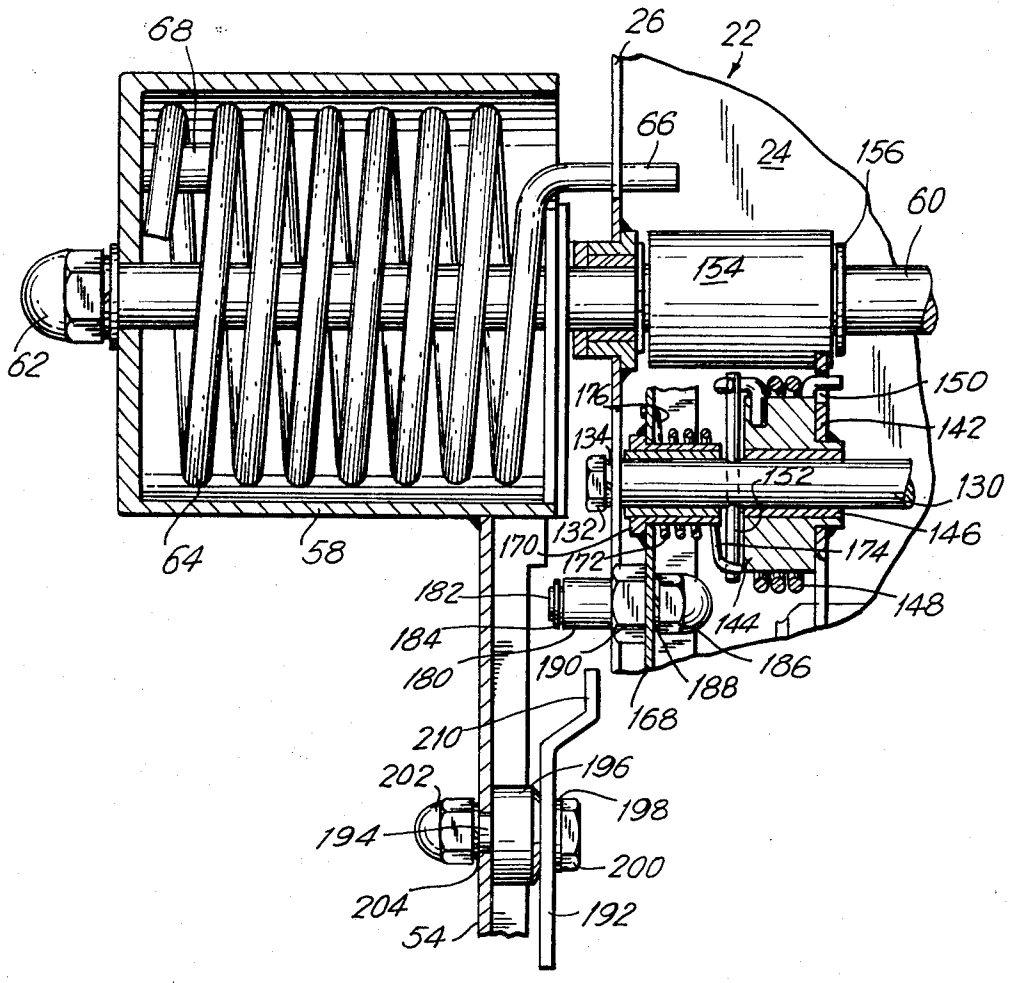
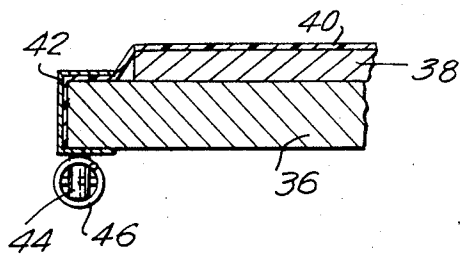


FIG. 10



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United States Patent Office 3,475,880 Patented Nov. 4, 1969

3,475,880

SEALER FOR PACKAGING FOODSTUFFS AND THE LIKE

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Filed Dec. 27, 1967, Ser. No. 693,976
Int. Cl. B65b 7/16, 53/02, 61/06
U.S. Cl. 53—141 14 Claims

ABSTRACT OF THE DISCLOSURE

A sealer for providing over a material such as foodstuff in a tray a sheet of heat shrinkable film which shrinks beneath a lip of the tray. The sealer has a support means which supports a tray in a position where the support means extends rearwardly, forwardly, and laterally beyond both sides of the tray, and a supply means is located rearwardly of the tray to supply a sheet of heat-shrinkable film to be drawn by the operator forwardly over the tray resting on the material therein and engaging the support means at an area which surrounds the tray. A manually operable means is displaceable from an upper rest position where it is located at least in part over the tray downwardly along a working stroke to an operating position located approximately at the elevation of the tray, and this manually operable means carries a heating means which burns through the film at the area of the support means which surrounds the tray to provide the film with a heated edge which shrinks automatically beneath the lip of the tray. A cutting means is carried by the support means rearwardly of the tray and responds to movement of the manually operable means along its working stroke for cutting from the film a section which is then acted upon by the heating means.

CROSS REFERENCE TO RELATED APPLICATION

After a package has been formed with the sealer of the present application it is directed through a heat tunnel shown in copending application Ser. No. 693,975 filed on Dec. 27, 1967.

BACKGROUND OF THE INVENTION

The present invention relates to a sealer for covering a material, such as foodstuffs, in a tray with a heat-shrinkable film which shrinks beneath a lip of the tray.

In the packaging of material such as foodstuffs, it is conventional to locate the materials in trays which have open tops where the material is accessible. The material together with the tray are conventionally overwrapped with a film which passes completely around the package. In addition to the inconvenience and time involved in providing such a complete overwrap, the view of the material in the tray is obstructed and a considerable cost is involved in supplying the film which is necessary for such overwrapping. In addition, the manipulations involved in such conventional packages requires an experienced operation, and the known structures are complex, expensive, and difficult to clean. Of course, when dealing with foodstuffs it is essential to provide a construction which can easily be cleaned for sanitary purposes.

SUMMARY OF THE INVENTION

It is accordingly a primary object of the present invention to provide a sealer which will avoid the above drawbacks.

In particular, it is an object of the invention to provide a sealer which will eliminate the necessity of completely overwrapping the tray with the material therein.

In particular, it is an object of the invention to provide a sealer which can eliminate 25 to 50% of the film conventionally required to overwrap packages according to the methods used most commonly at the present time in installations such as supermarkets and central packaging facilities.

In addition, it is an object of the present invention to provide a sealer which will offer an unobstructed view both of the top and the bottom of the package, with considerable advantages to the consumer as a result of the clear visibility of the material from all sides thereof.

Furthermore, it is an object of the present invention to provide a sealer which can readily be operated manually by an inexperienced operator.

Also, it is an object of the invention to provide a sealer which can complete the operations on any one package within an extremely short time, usually from 4–8 seconds, depending upon the dexterity of the operator. Thus, it is an object of the invention to reduce the time conventionally required in packaging operations so that a relatively large output of packages can be achieved in a relatively short time, and thus considerable economies are obtained when dealing with a large number of packages.

In addition, it is an object of the invention to provide a construction which can easily be assembled and disassembled for cleaning purposes and which is composed of materials which are very easily cleaned, so that the highest standards of sanitary conditions can be maintained with the sealer of the invention.

Also, it is an object of the present invention to provide a sealer which is of a relatively small size, taking into consideration the job which it performs, which is relatively inexpensive, and which at the same time is composed of rugged components which will operate very reliably.

Also, it is an object of the present invention to provide a sealer which can readily be adapted to handle packages of different shapes and sizes.

Furthermore, the objects of the present invention include the provision of a sealer which is capable of handling heat-shrinkable films of different widths while at the same time positioning the film so that it can conveniently be manipulated by the operator.

In accordance with the invention the sealer includes a support means for supporting a tray in a position where the support means extends forwardly, rearwardly and laterally beyond all sides of the tray. A supply means is situated to the rear of the tray for supplying a sheet of heat-shrinkable film to be drawn by the operator over the material in the tray, resting on this material and extending therefrom to an area of the support means which surrounds the tray. A manually operable means is located at least in part in a rest position over the tray on the support means and is manually displaceable downwardly along a working stroke to an elevation where the manually operable means is located approximately at the elevation of the tray. A cutting means is carried by the support means to respond automatically to movement of the manually operable means downwardly along its working stroke for cutting across the film to provide a separate section thereof which rests on the material in the tray and engages the area of the support means which surrounds the tray. The manually operable means carries a heating means which during movement of the manually operable means along its working stroke burns through the film all the way around the tray to provide the film with a heated edge which automatically shrinks beneath a lip of the tray.

Still other objects and advantages of the invention will in part be obvious and will in part be apparent from the specification.

The invention accordingly comprises the features of

construction, combinations of elements, and arrangement of parts which will be exemplified in the constructions hereinafter set forth, and the scope of the invention will be indicated in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the invention, reference is had to the following description taken in connection with the accompanying drawings, in which:

FIG. 1 is a partly fragmentary and partly sectional top plan view of a sealer according to the invention;

FIG. 2 is a fragmentary sectional side elevation of the sealer of FIG. 1 taken in a vertical plane extending longitudinally of the sealer substantially centrally therethrough;

FIG. 3 is a fragmentary sectional side elevation showing the coacting parts of the manually operable means and cutting means of FIG. 2 in a rest position thereof and at a scale which is enlarged as compared to FIG. 2;

FIG. 4 shows the parts of FIG. 3 during movement of the manually operable means downwardly along its working stroke at the instant just after the cutting means has cut through a sheet of film;

FIG. 5 shows the structure of FIGS. 3 and 4 during the continued downwardly movement of the manually operable means along its working stroke while the cutting means has returned to its initial position;

FIG. 6 is a transverse sectional elevation taken along line **6—6** of FIG. 1 in the direction of the arrows and showing at an enlarged scale the coacting components of the manually operable means and cutting means at one side of the sealer;

FIG. 7 is a fragmentary side elevation taken along lines **7—7** of FIG. 1 in the direction of the arrows, and showing a latching structure of the sealer;

FIG. 8 is a fragmentary sectional elevation taken along line **8—8** of FIG. 1 in the direction of the arrows and showing at an enlarged scale structure for removably mounting a heating means on the manually operable means;

FIG. 9 is a fragmentary sectional plan view of the structure of FIG. 6 taken along line **9—9** of FIG. 6 in the direction of the arrows; and

FIG. 10 is a fragmentary sectional elevation of a platen assembly of the support means taken along line **10—10** of FIG. 2 in the direction of the arrows and showing the structure on an enlarged scale as compared to FIG. 2.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now to the drawings, the sealer **20** disclosed therein has a support means **22**. This support means **22** includes a bottom wall **24** which extends completely across the sealer and from the front to the rear end thereof. The bottom wall **24** is integral at its side edges with a pair of upstanding side walls **26** of the support means **22**. At the region of the forward end of the support means these side walls **26** are integrally connected at their upper edges with inwardly directed horizontal flanges **28** which are shown in plan in FIG. 1. The bottom wall **24** carries a plurality of upwardly directed buttons **30** which are formed with transverse slots extending therethrough to receive the bottom ends of coil springs **32** which surround buttons **30** and extend upwardly therefrom. For example, four of these buttons **30** and coil springs **32** may be provided at the corners of a rectangular area.

The top ends of the coil springs **32** receive slotted buttons **34**, respectively, which are similar to the buttons **30** and which are fixed to and project downwardly from a plate **36** which is fragmentarily illustrated in FIG. 10. This plate **36** thus rests on the springs **32** and the plate **36** extends between the inner side edges of the flanges **28** of the support means. The side edges of the plate **36** are spaced slightly inwardly from the inner sides edges of the flanges **28** so that the plate **36** can be displaced vertically. This plate **36** carries at its upper surface a platen **38**, and the outer peripheral edge of the plate **36** extends beyond the peripheral edge of the platen **38**. A sheet of Teflon **40** covers the platen **38** and extends around the peripheral edge of plate **36**. An elongated channel **42** extends completely along the peripheral edge of the plate **36** and receives this peripheral edge in its interior with the sheet **40** extending around this peripheral edge, so that in this way the sheet **40** is clamped to the plate **36** and covers the platen **38**. As is shown most clearly in FIG. 2, the channel **42** is composed of a plurality of channel sections which abut each other in end-to-end relation, and each channel section has adjacent to its end a downwardly directed lug **44** connected to one end of a coil spring **46** the opposite end of which is connected to the lug **44** of the adjoining channel section, so that in this way the sections of the channel **42** are pulled into engagement with each other. As a result of this construction it is possible very easily to pull apart the sections of the channel **42** so that it can be removed easily for cleaning purposes, and also if enables the sheet **40**, platen **38**, and plate **36** to be disassembled from each other. Of course, the entire assembly of the platen **38** with the sheet **40**, the plate **36** and the channel assembly **42** can very easily be lifted from the springs **32** for cleaning purposes.

The entire structure is supported at a suitable elevation by way of a plurality of legs **48** fixed to and extending downwardly from the lower surface of the wall **24**, and one of these legs is visible in FIG. 7. The above-described support means **22** which includes the platen assembly is designed to support a tray T with a suitable material M therein, this material being any foodstuffs, for example. The tray T has a peripheral lip L at its upper edge. It will be noted that the support means when supporting a tray T extends both forwardly and rearwardly as well as laterally beyond both sides of the tray.

While the plate **36** and the platen **38** as well as the sheet **40** can be uninterrupted over their entire area so as to provide a perfectly flat top service for a tray, it is also possible to adapt the structure for use with relatively deep trays. For this purpose the platen **38** and the plate **36** therebeneath are formed with aligned octagonal openings **48**, having the configuration shown in FIG. 1, and in this case the sheet **40** is provided with a central opening and with tabs which extend around the edges of the platen **38** and the plate **36** at the aligned openings **48** thereof, these tabs being fixed to the underside of the plate **36** in any suitable way. At the underside of the plate **36** there is provided an elongated support **50**, shown most clearly in FIG. 2, this support having upper ends fixed to the underside of plate **36**, so that in this way a relatively deep tray can extend through the openings **48** to be carried by the support **50** with the lip of the deep tray located at about the same elevation as the lip L for the tray T in FIG. 2. With this construction an octagonal plate can be situated within the openings **48** resting on the upper ends of the support **50** with the upper surface of this filler plate flush with the upper surface of the sheet **40** which surrounds the openings **48**, so that either a tray as shown in FIG. 2 can be supported on such a filler plate or the filler plate can be removed and a relatively deep tray can be mounted on the support **50**. Thus, the support means is capable of being adapted to trays of different depths.

The support means carries any desired holders for holding the trays in the required positions, particularly trays which rest on the upper surface of an uninterrupted sheet **40**, and for this purpose the sheet is provided with openings through which a rear circular opening **51** and a pair of elongated grooves **54** are accessible. The opening **51** and grooves **54** can also be provided in a filler plate which fills the openings **48**. The holder for the tray T simply has a rear projection received in the opening **51** and a pair of forward projections received in the grooves

54, so that in this way the holder can be reliably located in the position to receive a tray T, this holder having upwardly directed elements at its sides which engage the exterior side surfaces of the tray T beneath the lip L thereof so that in this way a tray can be properly situated on the support means.

The sealer **20** is also provided with a manually operable means **52** having an upper rest position which is shown in FIG. 2, and this manually operable means **52** can be displaced by the operator downwardly from the rest position thereof shown in FIG. 2 along a working stroke where the manually operable means becomes situated approximately at the elevation of the tray T. The manually operable means **52** has a pair of side arms **54** provided at their bottom edges with inwardly directed flanges **56** which are spaced from each other by a distance greater than the distance between the side walls **26** of the support means **22**, with these side arms **54** being situated equi-distantly from a central vertical plane which extends longitudinally and centrally through the support means **22**, so that during lowering of the manually operable means **52** the side arms **54** will clear the side walls **26** which will become situated between the side arms **54** of the manually operable means, and one of the side arms **54** is shown in its lower operating position in FIG. 7 which shows the wall **26** behind the side arm **54**.

The side arms **54** are fixed, as by welding, at their rear ends to a pair of hollow tubular enclosures **58** which respectively have outer closed ends and inner open ends directed toward each other, and these enclosures are mounted on a through-rod **60** which extends horizontally through the enclosures **58** and through suitable bearings carried by the side walls **26** of the support means **22**, as shown most clearly in FIG. 9. The ends of the rods **60** are threaded to receive cap nuts **62** which engage suitable lock washers situated between the outer end walls of the tubular enclosures **58** and the nuts **62**, respectively.

A spring means is provided for yieldably maintaining the manually operable means **52** at its rest position which is illustrated in FIG. 2, where the manually operable means is located in part over a tray T on the support means **22**, and this spring means includes a pair of torsion springs **64** respectively situated within the tubular enclosures **58**. These torsion springs **64** respectively have inner ends **66** extending through openings formed in the side walls **26** of the support means. At their outer ends the torsion springs **64** respectively extend around pins **68** which are fixed to and extend inwardly from the outer end walls of the tubular enclosures **58**. In this way the springs **64** are capable of counter-balancing the weight of the manually operable means and maintaining the latter at the rest position illustrated in FIG. 2. Thus, the shaft **60** defines an axis of turning for the manually operable means, and this axis about which the manually operable means swings extends horizontally across the support means to the rear of the structure thereof which carries the tray T.

The side arms **54** are interconnected at their front ends by a transverse rod **70** made of wood, for example, so that it is not a good conductor of heat, and thus the operator standing at the front of the sealer can readily grasp the transverse rod **70** in order to lower the manually operable means **52** in opposition to the spring means **64** to the operating position as shown in FIG. 7.

The pair of side arms **54** of the manually operable means **52** are also interconnected by a transverse rod **72** situated just behind the manually-engageable rod **70**, and this rod **72** is supported for swinging movement about its axis in the side arms **54**. The rod **72** carries a pair of latch members **74** having the substantially L-configuration shown in FIG. 7 and having at their upper ends outwardly extending tabs **76** extending across and over the top edges of the side arms **54**. The latch members **74** are fixed to the rod **72** for swinging movement therewith, and they are close enough to the handle **70** so that the operator can engage either latch member with either hand in order to swing both latch members and the rod **72** therewith. At their upper front ends the side walls **26** carry a pair of outwardly laterally extending projections **78**, and when the tabs **76** are swung forwardly toward the handle **70** the latches **74** will clear these projections **78**. However, when the manually operable means is in its operating position as shown in FIG. 7, the operator can easily swing the latch members to the position shown in FIG. 7 where their lower rearwardly directed legs are situated beneath the pins **78**, so that the springs **64** will urge the latches into engagement with the pins **78**, thus enabling the operator to have the manually operable means maintained in its operating position for the required period of time, which may only be a few seconds, after which the operator can easily return the latch members to their forward positions where they will clear the projections **78**, and now all the operator needs to do is release the handle **70** so that the springs **64** will return in a fully automatic manner the entire manually operable means **52** and the structure carried thereby to the rest position in FIG. 2.

A supply means **80** is provided for supplying to the operator a sheet of heat-shrinkable film S, made of a plastic such as polyvinyl chloride or polyethylene, for example, and this clear, transparent sheet is capable of being pulled by the operator forwardly over the material M to rest thereon as well as to engage the area of the support means which surrounds the tray T, as will be apparent from the description below. The supply means **80** includes a pair of lateral stanchions **82** respectively having a bottom inwardly directed flanges **84** (FIG. 1) fixed to the upper surface of the wall **24** of the support means **22**, in any suitable way. These rugged stanchions **82** are provided at their top ends with notches for receiving a transverse roll-supporting rod **86**. The stanchions **82** which are in lateral alignment with each other extend upwardly and forwardly, and at their lower rear end portions they are provided with downwardly and forwardly inclined notches into which a lower roll-supporting rod **88** can be slipped. These rods respectively carry slidable sleeves **90** capable of being fixed at suitable locations along the rods by wing screws **92**. The sleeves **90** can extend into the opposed open ends of a core **94** which carries a roll **96** of the heat-shrinkable sheet material S. This structure which supports a lower roll **96** is fragmentarily illustrated in FIG. 1, and in the same way an upper roll **98** can be supported on the upper rod **86**. A guide roller **100** extends between and is turnably carried by the stanchions **82** and is supported for the free rotary movement thereby, so that when the sheet S is taken from the upper roll **98**, the sheet can be guided around the roller **100** and then downwardly to the structure of the sealer which is described below. The sheet S from the upper roll **98** is shown extending in this way around the roller **100** in FIG. 2. When the sheet is taken from the lower roll **96**, the guide roller **100** need not be used and the sheet material can be led from the lower roller **96** directly to the additional structure situated forwardly of the supply means **80**. In this way it is possible to mount on the rods **86** and **88** rolls of different widths so that the operator has a choice as to the width of sheet material which is to be used for a particular tray.

The supply means **80** further includes a pair of side brackets **102** which have lower inwardly directed flanges **104** fixed to the top surface of the bottom wall **24** of the support means, and these side brackets **102** are situated adjacent but spaced inwardly from the side walls **26** of the support means. At their upper ends the brackets **102** have rearwardly directed extensions which support between them a guide roller **106** around which the sheet material S is guided in the manner shown in FIG. 2, and this roller **106** is supported for free rotary movement by the brackets **102**. While the sheet from the upper roll **90** extends beneath and around the roller **106**, a sheet

from the lower roll **96** can extend either over or under the roller **106**. From this roll **106** the sheet S extends over a forward guide roller **108** supported for free rotary movement by the brackets **102** at the lower ends of a pair of curved slots **110** which extend upwardly and then rearwardly from the forward guide roller **108**. These slots accommodate just above the roller **108** a second forward roller **112** which can be displaced upwardly along the curved slots **110** to the rear ends thereof. The rollers **108** and **112** can simply have reduced ends extending through the slots **110**. When the sheet material is initially threaded through the supply means the upper roller **112** is displaced to the upper ends of the slots **110** so as to be maintained spaced from the lower roller **108**, and in this way the sheet material can easily be threaded between the rollers **108** and **112**, after which the roller **112** is returned to its position shown in FIG. 2 where it rests by gravity on the sheet material holding the latter in the nip between the rollers **108** and **112**.

As is shown most clearly in FIG. 6, the lower forward roller **108** is formed adjacent the brackets **102** with a pair of annular grooves **114** in which a wire spring **116** is coiled through a few convolutions, the free end of the wire spring **116** extending forwardly beyond the roller **108** to provide adjacent the opposite ends thereof a pair of sheet-supporting fingers **116** supporting the free end of a sheet in the manner shown most clearly in FIGS. 3 and 5. This finger assembly **116** includes downwardly extending wire spring portions which are curved inwardly toward each other and which are fixed to the opposed ends of an elongated counterbalancing rod or weight **118**, so that while the entire finger assembly **116** is capable of swinging freely around the rod **108** in the grooves **114** thereof, when there are no other forces acting upon the finger assembly it will automatically assume by gravity the condition shown in FIGS. 3 and 5 where it will support the free edge of a sheet at a position convenient for grasping by the operator to be pulled forwardly in the manner indicated by the arrow **120** in FIG. 3. The counterbalancing rod **118** extends completely across the space between and is connected to the bottom lower ends of the wire springs which form the finger assembly **116**, and in this way a finger assembly which is automatically oriented gravitationally is provided for conveniently supporting the sheet material in a position to be grasped by the operator so as to be conveniently pulled forwardly over the tray T.

The support means **22** of the sealer **20** carries to the rear of the platen part of the support means which carries the tray T a cutting means **122** the operation of which is illustrated in FIGS. 3–5 and details of which are illustrated in FIGS. 6 and 9 as well as FIGS. 1 and 2.

The cutting means **122** includes a stationary cutting blade **124** having an upwardly directed cutting edge **126** and fixedly carried in any suitable way by a transverse plate **128** of the support means, this plate being fixed to and extending upwardly from the bottom wall **24** of the support means, these latter details all being shown most clearly at the lower right portion of FIG. 6. The support plate **128** extends transversely across the sealer and the same is true of the cutting blade **124** which is situated just forwardly of the finger assembly, as indicated in FIGS. 2–5.

The stationary side walls **26** of the support means carry a stationary through-rod **130** of the support means and this through-rod **130** is fixed to the side walls **26** as by the nuts **132** and lock-washers **134** one of each of which are illustrated in FIG. 9. This stationary through-rod **130** of the support means **22** serves to support for rotary movement a pressure pad assembly **136** in the form of an elongated hollow rectangular member **138** having an open bottom through which the blade **124** extends into the interior of this member **138** when the pressure pad assembly **136** is in its rest position shown in FIGS. 2 and 3. The hollow member **138** has a top wall formed with an elongated slot **140** passing therethrough and registering with the blade **124** so that when the pressure pad assembly **136** is lowered, in a manner described below, the slot **140** will move downwardly with respect to the blade **124** so that the upper edge thereof will be situated higher than the slot **140**. The elongated rectangular hollow enclosure **138** of the pressure pad assembly **136** is fixed at its opposed ends to a pair of side arms **142**, respectively, and these side arms **142** are supported for free rotary movement on the rod **130** in the manner shown in FIG. 9 for one of the side arms **142**. The side arms **142** are mounted on a pair of rings **144**, respectively, which carry the bearings **146**, respectively, which directly engage the rod **130**. A spring means is provided for urging the pressure pad assembly **136** to the rest position thereof illustrated in FIG. 3 where its upper slotted wall is situated higher than the blade **124**, and this spring means takes the form of a torsion spring **148** surrounding the spring **144**, having an inner end extending into an opening **150** of side arm **142** and having an outer end pressing against a cross-pin **152** which extends through a bore of the rod **130** and which is fixed to the latter. This structure which is shown in detail in FIG. 9 for one of the side arms **142** is repeated for the other side arm **142** of the pressure pad assembly **136**, and these springs **148** urge the pressure pad assembly in a counterclockwise direction, as viewed in FIG. 3, around the rod **130**.

Just inwardly of the side walls **26** of the support means **22** the rod **60** which supports the manually operable means **52** for swinging movement carries a pair of elastic sleeves **154** made of soft rubber or the like and maintained in position on the rod **60** in any suitable way as by snap-rings **156** shown in FIG. 9. Thus, the rod **60** is provided in this way adjacent to the walls **26** with a pair of elastic covering members which act as stops for the side arms **142**, respectively, of the pressure pad assembly. FIG. 3 shows the rear end of one of the side arms **142** engaging the elastic stop sleeve **154** which is carried by the rod **60**. The spring means **148** urges the pressure pad assembly into engagement with the elastic stop **154** so that in this way the rest position of the pressure pad assembly **136** which is illustrated in FIG. 3 is determined.

The rod **130** also serves to support for swinging movement a hammer assembly **158** of the cutting means **122**. This hammer assembly also has an elongated hollow enclosure **160** which has the cross-sectional configuration most clearly shown in FIGS. 3–5, and this hollow enclosure has a bottom wall **162** which is formed with an elongated slot **164** of the same length and size as the slot **140** and precisely registering with the latter during downward swinging movement of the hammer assembly **158** in a manner described below. The lower surface of the wall **162** fixedly carries a pair of strips **166** of rubber or the like which extend respectively along the edges of the slot **164**. The slots **140** and **164** are slightly longer than the blade **124**, and during the downward swinging of the hammer assembly **158** the slot **164** thereof also becomes located at an elevation somewhat lower than the top cutting edge of the blade **124**, as indicated in FIG. 4, so that the blade **124** can also enter into the hollow elongated enclosure **160** of the hammer assembly **158** through the registering slots **140** and **164**.

The elongated enclosure **160** of the hammer assembly **158** is also fixed at its outer ends to a pair of side arms, and these side arms **168** are formed with aligned openings through which the rod **130** passes. The side arms **168** are situated outwardly of the side arms **142**, respectively, of the pressure pad assembly, and they are also supported for free swinging movement about the stationary rod **130** by way of the bearing assembly **170** shown in FIG. 9, this bearing assembly being duplicated at the other end of the rod **130** where the other arm **168**, which is not shown in FIG. 9, is located.

The spring means which includes the spring **148** for locating the pressure pad assembly **136** in its rest position

also includes a torsion spring **172** for situating the hammer assembly **158** in its rest position indicated in FIG. 3. This torsion spring **172** surrounds the bearing assembly **170** and has an inner end **174** engaging an end of the cross pin **152** opposite from the end thereof engaged by the spring **148** and an outer end **176** extending through an opening in the side arm **168**. This spring structure **172** is repeated at both ends of the rod **130** and coacts with both side arms **168** to urge the hammer assembly **158** to the rest position thereof illustrated in FIG. 3. At their rear ends the arms **168** of the hammer assembly fixedly carry perpendicularly extending stop projections **178** which are also urged into engagement with the elastic stop sleeves **154** in order to determine the rest position of the hammer assembly **158**.

Thus, it will be noted that with the above-described structure the pressure pad assembly **136** and the hammer assembly **158** have a common swing axis defined by the axis of the stationary rod **130**, and in addition their rest positions are determined by a common stop structure carried by the shaft **60**.

The side arms **168** of the hammer assembly fixedly carry a pair of coaxial outwardly directed projections **180**. The coaxial projections **180** which extend laterally from the side arms **168**, respectively, may, for example, take the form of rollers freely turnable on pins **182** and retained thereon by snap rings **184**, respectively, and these pins have inner headed ends **186** engaging lock washers **188**, respectively, and threadedly carrying nuts **190** which engage the outer surfaces of the side arms **168** (FIG. 9), so that in this way the lateral projections **180** are maintained mounted on the side arms **168** of the hammer assembly **158**.

The side arms **54** of the manually operable means **52** are situated outwardly beyond the side arms **168**, respectively, and at their rear regions, in the vicinity of the tubular enclosures **58**, these side arms **54** carry freely swingable pawls **192**. For this purpose the side arms **54** carry a pair of coaxial pins **194** extending through coaxial openings of the side arms **54** and each carrying a spacer **106** and a washer **198** between which each pawl **192** is freely swingable. The pin **194** is provided with an inner head **200** and at its outer threaded end carries a cap nut **202** which engages a lock washer **204**, and when the structure is fully assembled the pawls **192** are freely swingable about a common axis and are respectively situated at both of the side arms **54** just inside the latter.

The configuration of the pawls **192** are clearly apparent from FIG. 3 where one of the pawls is illustrated. It will be noted that each pawl has a relatively large portion **206** situated forwardly of the pin **204** and tending by gravity to swing the pawl in a clockwise direction, as viewed in FIG. 3, so that the pawls are gravitationally maintained in their positions shown for the pawl **192** of FIG. 3. The inwardly directed flanges **56** at the bottom edges of the side arms **54** are notched at the front edges of the pawls **192** so as to form stop edges **208** limiting the clockwise swinging of the pawls **192** to the position shown in FIG. 3.

At their opposite ends the pawls **192** are provided with rearwardly directed and inwardly angled fingers **210**, and is particularly apparent from FIGS. 6 and 9, the lateral projections **180** of the hammer assembly respectively extend through the vertical parallel longitudinal planes in which the rear fingers **210** of the pawls **192** are located.

The above-described cutting means **122** operates in the following manner:

It will be noted from FIG. 3 that when the sheet S rests on the finger assembly **116** in readiness to be grasped by the operator to be pulled forwardly in the direction of the arrow **120**, the sheet S extends between the pressure pad assembly **136** and the hammer assembly **158**. Thus, when the operator pulls the sheet forwardly to cover the material M in the tray T, the sheet S is situated above the pressure pad assembly **136** and below the hammer assembly **158**.

When the operator engages the handle **70** of the manually operable means **52** in order to swing the latter downwardly from its rest position along its working stroke, the pawls **192** which are carried by the side arms **54** of the manually operable means **52** will of course swing downwardly with the side arms about the axis defined by the rod **60**. As a result the common axis of the pawls **192** defined by the pins **204** which carry the latter will describe part of a cylinder whose axis coincides with the axis of the rod **60**, and in this way the pawls **192** will swing downwardly about the shaft **60** from the position of FIG. 3 into the position of FIG. 4. When the hammer assembly **158** is in its rest position determined by engagement of its rear projections **178** with the stop sleeves **154**, the lateral projections **180**, which necessarily swing about the axis of the rod **130**, are spaced from the axis of the shaft **60** by a radial distance which is somewhat greater than the distance of the rear tips of the fingers **210** from the axis of the shaft **60**, so that during the downward swinging movement of the manually operable means these fingers **210** will necessarily engage the lateral projections **180** of the hammer assembly **158**, and in this way the pawls **192** serve to transmit the movement of the manually operable means **52** to the hammer assembly **158** of the cutting means **122**, and thus the cutting means **122** is automatically actuated in response to displacement of the manually operable means **52** downwardly along its working stroke.

When the inwardly angled rear fingers **210** of the pawls **192** engage the lateral projections **180**, respectively, the hammer assembly **158** is constrained to turn downwardly with the manually operable means, and at this time the lateral projections **180** urge the pawls **192** to swing in a clockwise direction to engagement with the stop edges **208** of the flanges **56**, so that the pawls **192** remain in the position shown in FIGS. 3 and 4 while transmitting the rotary movement of the manually operable means to the hammer assembly through the lateral projections **180** of the latter.

As the hammer assembly thus swings in a clockwise direction about the shaft **130**, as viewed in FIG. 3, it will move down into engagement with the sheet S and will press the sheet downwardly against the pressure pad assembly **136** while the finger assembly **116** simply swings about the rod **108** inasmuch as the counterweight rod **118** permits the entire finger assembly **116** to swing freely about the rod **108** and only gravitationally maintains the finger assembly **116** in the position of FIG. 3 when a free end of the sheet S rests on the finger assembly **116**. Thus, the finger assembly **116** will not resist the downward movement of the sheet into engagement with the pressure pad **136**, and in this way the sheet S becomes clamped between the hammer assembly **158** and the pressure pad assembly **136**, extending across and situated between the slots **164** and **140** thereof, respectively.

The continued downward movement of the manually operable means in the direction of the arrow **212** of FIG. 4 will displace both the hammer assembly and the pressure pad assembly in opposition to the spring means formed by the springs **148** and **172** downwardly to the position shown in FIG. 4 where the slots of these assemblies are situated somewhat lower than the upper cutting edge **126** of the blade **124**, so that in this way the blade **124** cuts through the sheet S which is lowered in this way across the cutting edge **126**. In this way the cutting means will provide a separate section of sheet material S for covering the material M of the tray T.

It is to be noted that during the downward movement of the manually operable means **52**, the fingers **210** of the pawls **192** swing along a cylinder whose axis coincides with the axis of the shaft **60**, so that these fingers describe arcs of a predetermined radius, and this radius is substantially greater than the radius of swinging movement of the lateral projections **180** which swing about the

axis of the shaft **130** at a substantially shorter radius. Therefore, while the fingers **210** are still well above a horizontal plane which contains the axis of the shaft **60**, the lateral projections **180** are much closer to a horizontal plane which contains the axis of the rod **130**, and thus the fingers **210** while engaging the lateral projections **180** are displaced forwardly with respect thereto. In the position of the parts shown in FIG. 4 the movement of the lateral projection **180** illustrated therein is substantially vertical in a downward direction while the movement of the finger **210** illustrated in FIG. 4 still has a substantial component toward the right, as viewed in FIG. 4. Therefore, when the manually operable means is displaced downwardly in the direction of the arrows **212** of FIG. 4 through a distance only slightly lower than the elevation thereof shown in FIG. 4, the fingers **210** and the lateral projection **180** will no longer be in motion-transmitting cooperation with each other, and the spring means formed by the springs **148** and **172** will be free to return the hammer assembly and the pressure pad assembly to their rest positions shown in FIG. 3. However, the manually operable means will still be able to continue its downward movement along its working stroke, as shown by the arrow **212** of FIG. 5 where the hammer and pressure pad assemblies are shown returned to their rest positions while the manually operable means **52** is shown at the region of the end of its downward working stroke. When the spring means **64** returns the manually operable means to its rest position, the upper edges of the fingers **210** of the pawls **192** will of course engage the lateral projections **180** of the hammer assembly **158**, but this will only result in a slight swinging of the pawls **192** in a counterclockwise direction with respect to the side arms **54**, and it will be noted that the stop edges **208** permit such swinging of the pawls to be carried out. After the fingers **210** pass the projections **180** during the return movement of the manually operable means **52**, the center of gravity of the pawls **192** will return them to the positions shown for the pawl **192** of FIG. 3.

As is apparent from FIG. 4, the side walls **26** of the support means are provided along their top edges with notches **214** in order to provide clearance for the lateral projections **180**.

The manually operable means **52** carries a heating means **216** which is of endless configuration for extending around the tray T and engaging the film S to burn through the latter during movement of the manually operable means to the lower end portion of its stroke shown in FIG. 5. This heating means **216** is in the form, for example, of a light-weight aluminum casting **218** which has an elongated, electrically conductive tubular heater **220** embedded therein and extending along the same. While the rear transverse portion of the casting **218** is solid and of a trapezoidal cross section, the opposed elongated side portions and front transverse portion of the endless heating means **216** are of a thinner cross section and have at their inner and outer peripheries raised lips **222**. These side and front portions also have an intermediate raised portion **224** in which the heating element **220** is embedded. In this way the amount of metal required for the casting **218** is reduced and at the same time a rigid casting is provided. At its lower surface the casting **218** is provided with a coating of Teflon (polytetrafluoroethylene), so that because of the inherent non-stick characteristics thereof and because of its high-temperature stability, this coating will prevent sticking of the polyvinyl chloride and polyethylene types of films to the lower surface of the heating means in the melted condition of these films. It is for the same reason that the Teflon sheet **40** is used to cover the platen **38**.

The tubular heating element **220** is bent so as to conform to its final required configuration before it is embedded within the molten metal which is cast into the heating head **216**. The heating element has terminals which protrude out of the top of the casting at the rear central portion thereof, and these terminals are connected by suitable electrical wires to a thermostat assembly **228** carried by the rear portion of the heating head and situated within a suitable protective housing. This thermostat assembly has a suitable control **230** accessible to the operator for adjusting the extent to which the heating means **216** is heated. Suitable conductors **232** lead from the thermostat assembly **228** (FIG. 1) to a male connector assembly **234** which is carried by the heating head and which has rearwardly directed prongs for a purpose referred to below.

The elongated side portions of the endless heating means **216** are each provided with a pair of integral outwardly directed projections **236** each of which is formed with a threaded bore **238**, as shown in FIG. 8. This bore receives the threaded shank **240** of a screw **242** whose head is slidable in a hollow cylinder **244** having an inner end **246** formed with an opening through which a shank **248** of the screw **242**, which is larger than the threaded shank **240** thereof, slidably extends in the manner shown in FIG. 8. A spring **250** is coiled about the larger, smooth-surfaced shank **248** of the screw **242** and engages the head of the latter so as to urge the hollow cylinder **244** to the right and the screw **242** to the left, as viewed in FIG. 8. As a result the end **246** of the cylinder **244** is urged toward the outer free end of each projection **236**. The outer open end of the cylinder **240** is closed in any suitable way as by being received in the bore of a transverse handle **252** fixed by a set screw **254** to each hollow cylinder **244**. A pair of these handles **252** are provided extending across a pair of cylinders **244** at the outer lateral portions of the heating means **216**, and as a result of this construction it is possible for the operator to pull outwardly on the handle **252** to spread them apart from each other and thus expose portions of the shanks **248** which are adjacent the shanks **240**.

Each of the side arms **54** of the manually operable means **52** is provided along its upper edge with a pair of L-shaped notches **256** for receiving the exposed portions of the shanks **248**, respectively, and with this construction it is possible for the operator, while holding the handles **252** apart from each other in opposition to the springs **250**, to slip the exposed portions of the shanks **248** first downwardly into the notches **256** at the forward ends thereof and then rearwardly along the notches to the rear ends thereof, so that in this way a structure is provided for releasably connecting a heating means **216** to the manually operable means **52**.

As may be seen from FIG. 1, one of the arms **54** of the manually operable means **52** fixedly carries a female electrical connector assembly **258**, and during the rearward displacement of the heating means **216** along the notches **256**, the prongs of the male assembly **234** are received in the female connector **258**. This connector assembly **258** is connected by electrical leads **260** to a control box **262** carried by the exterior surface of one of the side walls **26** of the support means **22**, and this control box may house, for example, a switch for starting and stopping the sealer as well as a fuse. From the control box **262** an electrical lead **264** extends to be connected to any wall outlet or the like, so that in this way electrical energy can be supplied to the heating means **216**.

Thus, with this construction the mounting of a heating means **216** on the manually operable means **52** will result automatically in electrical connection of the heating element **220** into a suitable electrical circuit, and the heating means will be maintained at a proper temperature during operation of the sealer.

A given sealer is provided with a plurality of heating heads **216** which are of sizes necessary to seal the containers which will be placed on the particular sealer. The heads are formed with openings in which the trays are adapted to be received, and the size of the inner periphery of each head **216** is sufficiently great to conform to an industry standard container size plus a clearance around

the periphery of the tray T which allows for the proper amount of unburned film to lap around the container lip. The external dimensions of the heating means are determined by the amount of film required to cover the top of the container, engaging the material therein, draping downwardly from this material, which may be of varying heights, while still leaving enough film to be melted by the heating means and to provide for a proper sealing band under the lip L of the tray.

When the heating means **216** burns through the film, the heated peripheral edge of the latter will forcefully shrink and automatically shrivel up beneath the lip of the tray T, the film moving in the direction of the arrow **266** of FIG. 5 from the solid line position to the dot-dash-line position shown in FIG. 5 beneath the lip L at the left end of the tray T. This forceful contraction of the heated periphery of the sheet material into a wrinkled, shriveled sealing band engaging the tray T beneath the lip L thereof is sufficiently great to reliably pull the sheet S over the material M and hold the sheet S on the tray T forming with the latter a package for the material M.

Thus, in order to operate the sealer of the invention all that the operator need do is place a tray with material therein on the support means. Then the sheet of heat-shrinkable film is drawn over the tray and rests on the material therein while also engaging an area of the support means which surrounds the tray. The operator then displaces the manually operable means **52** downwardly so as to first actuate the cutting means to cut from the film a section thereof which remains in engagement with the material on the tray, and then the heating means **216** burns through the film all around the tray to cause the film to automatically shring itself up against the underside of the lip of the tray. The operator then releases the manually operable means which returns automatically to its rest position, whereupon the operator removes the tray so that it can then be further treated in a heat tunnel, which serves to draw the film even more tightly against the material in the tray.

It is apparent from the above-described structure of the heating means that it is a simple matter to exchange one heating means for another, so that the sizes of the heating means can be adapted to the size of the trays. The several heating means can be kept in a suitable rack with their female connectors **234** connected to suitable electrical structure which can be energized for any selected heating means prior to removal thereof from the rack to be placed on the manually operable means, and in this way it is possible to preheat a selected heating means just before it is placed on the manually operable means.

The downward movement of the manually operable means can be limited by suitable stops carried by the support means. The spring-supported platen assembly moves downwardly with the manually operable means **52** during the last part of the working stroke thereof.

All parts of the sealer are made of stainless steel or anodized aluminum, except for some bronze bearings, so as to offer a completely sanitary unit for the purposes of food handling.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above constructions without departing from the spirit and scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

What is claimed is:

1. In a sealer for covering material in a tray with a heat-shrinkable film which shrinks beneath a lip of the tray, support means for supporting a tray with said support means extending forwardly, rearwardly, and laterally beyond all sides of the tray, manually operable means having a rest position located over said support means at least at that part thereof where the tray is located, said manually operable means being movable downwardly from its rest position along a working stroke to an operating position located approximately at the elevation of a tray carried by said support means, supply means situated rearwardly of a tray on said support means for supplying a sheet of heat-shrinkable film to be drawn by the operator over a tray resting on the material therein and engaging the support means at an area thereof which surrounds the tray, cutting means carried by said support means and responding to downward movement of said manually operable means along said working stroke thereof for cutting across the sheet of film rearwardly of the tray to provide a separate film section extending from the material in the tray to said area of said support means which surrounds said tray, and heating means carried by said manually operable means and being displaced thereby during movement along said working stroke to a location surrounding said tray and engaging the film for burning through the latter to provide the film with a heated peripheral edge which automatically shrinks beneath the lip of the tray.

2. The combination of claim **1** and wherein said support means includes a platen situated beneath and supporting the tray and providing said support means with said area surrounding the tray to be engaged by the film, and spring means supporting said platen for downward movement with said manually operable means during a final part of said working stroke thereof.

3. The combination of claim **1** and wherein said manually operable means is swingably connected to said support means rearwardly of the tray for swinging movement with respect to said support means about a substantially horizontal axis, and spring means coacting with said manually operable means for yieldably maintaining the latter in said rest position and for automatically returning said manually operable means to said rest position upon release of said manually operable means after the operator has moved said manually operable means in opposition to said spring means along said working stroke thereof.

4. The combination of claim **1** and wherein said cutting means includes an elongated cutting blade situated to the rear of a tray on said support means and having an upwardly directed cutting edge, a pressure pad assembly having a well formed with a slot aligned with said cutting edge and through which said upper cutting edge of said blade is adapted to extend upon downward movement of said pressure pad assembly, said pressure pad assembly having a rest position where said wall thereof is located at an elevation higher than said blade and being operatively connected to said support means for movement downwardly with respect thereto to a location situated beneath said cutting edge and upwardly with respect thereto to a rest position located above said cutting edge, and a hammer assembly located over said pressure pad assembly and having a wall directed toward said wall of said pressure pad assembly and also formed with a slot through which said blade is adapted to extend, said hammer assembly also being connected to said support means for downwardly movement with respect thereto to a location situated beneath said cutting edge of said blade, said supply means directing the sheet of heat-shrinkable film beween said wall of said pressure pad assembly and said wall of said hammer assembly, spring means coacting with said assemblies for yieldably urging said pressure pad assembly to said location above said blade and said hammer assembly to said location over said pressure pad assembly, and said manually operable means coacting with said hammer assembly during move-

ment of said manually operable means along said working stroke thereof for lowering said hammer assembly toward said pressure pad assembly to clamp a sheet of film between said walls of said assemblies extending across said slots thereof and to then lower both assemblies to a location where their walls are lower than said cutting edge, so that the latter extends through said slots and cuts through the film at the part thereof which extends across said slots.

5. The combination of claim **4** and wherein both of said assemblies are operatively connected to said support means for swinging movement with respect thereto about a common axis.

6. The combination of claim **5** and wherein said manually operable means is operatively connected to said support means for swinging movement with respect thereto about an axis situated rearwardly of and extending parallel to said common axis.

7. The combination of claim **6** and wherein a rod extends along the axis about which said manually operable means swings and carries a resilient covering against which both of said assemblies are pressed by said spring means when said assemblies are returned to the locations where the walls thereof are situated above said cutting edge.

8. The combination of claim **7** and wherein each of said assemblies includes a pair of side arms extending rearwardly from said wall thereof and through which a pivot means at said common axis extends to pivotally support said arms and said assemblies for swinging movement about said common axis, said arms of said hammer assembly being situated outwardly beyond said arms of said pressure pad assembly and at least one of said arms of said hammer assembly carrying an outer projection which turns with said one arm about said common axis, said manually operable means having an arm situated outwardly of and extending along said one arm of said hammer assembly and swingably carrying a pawl part of which moves along a path intersecting said projection during swinging of said manually operable means along said working stroke thereof, the axis of swinging of said manually operable means providing for said pawl a path of movement which displaces it beyond said projection during continued downward movement of said manually operable means after said hammer assembly and pressure pad assembly have been lowered by engagement of said pawl with said projection to an elevation where said cutting edge of said blade extends upwardly through said slots, so that during the continued downward movement of said manually operable means along said working stroke thereof said pressure pad assembly and hammer assembly are returned by said spring means to their positions where said walls thereof are located over said blade.

9. The combination of claim **8** and wherein said arm of said manually operable means has a stop portion engaging said pawl to prevent swinging thereof with respect to said arm of said manually operable means while said pawl engages said projection to lower said hammer assembly and said pressure assembly therewith, said stop portion of said arm of said manually operable means releasing said pawl for swinging movement when said pawl engages said projection during return of said manually operable means to said rest position thereof.

10. The combination of claim **1** and wherein said heating means has an endless configuration for surrounding a tray and engaging the film which extends therefrom to burn through the film, said manually operable means having a pair of side arms between which said heating means extends, and connecting means releasably connecting said heating means to said side arms of said manually operable means so that a heating means of one size may be removed and replaced by a heating means of another size.

11. The combination of claim **1** and wherein said supply means includes a guide rod over which the film extends at the rear of a tray on said support means, and a finger assembly carried by said guide rod and extending therefrom beneath a sheet of film to support the latter in readiness to be grasped by the operator to be pulled over a tray on said support means.

12. The combination of claim **1** and wherein said support means includes a platen, a plate situated beneath said platen to carry the same and extending beyond said platen, a Teflon sheet covering said platen and extending around a peripheral edge of said plate, and an elongated channel assembly receiving said edge of said plate, extending along said edge, and clamping said sheet to said edge, said channel assembly being composed of a plurality of sections situated in end-to-end relation, and releasable spring means holding said sections together so that by way of said spring means the channel assembly can be removed from said plate.

13. The combination of claim **1** and wherein a spring means coacts with said manually operable means for yieldably maintaining the latter in said rest position thereof and for returning said manually operable means to said rest position upon release of said manually operable means after the operator has displaced said manually operable means in opposition to said spring means through said working stroke thereof, and latch means carried in part by said support means and in part by said manually operable means to be manipulated by the operator for releasably latching said manually operable means in said operating position thereof.

14. The combination of claim **1** and wherein said heating means is of an endless configuration for surrounding a tray when said manually operable means is in said operating position thereof to burn through the film which extends from the tray, said manually operable means removably supporting said heating means so that a heating means of one size may be replaced by a heating means of a different size, said heating means including an electrical heating element and an electrical connecting structure, and said manually operable means carrying an electrical structure which coacts with that of said heating means when the latter is mounted on said manually operable means for supplying energy thereto.

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