

March 10, 1953

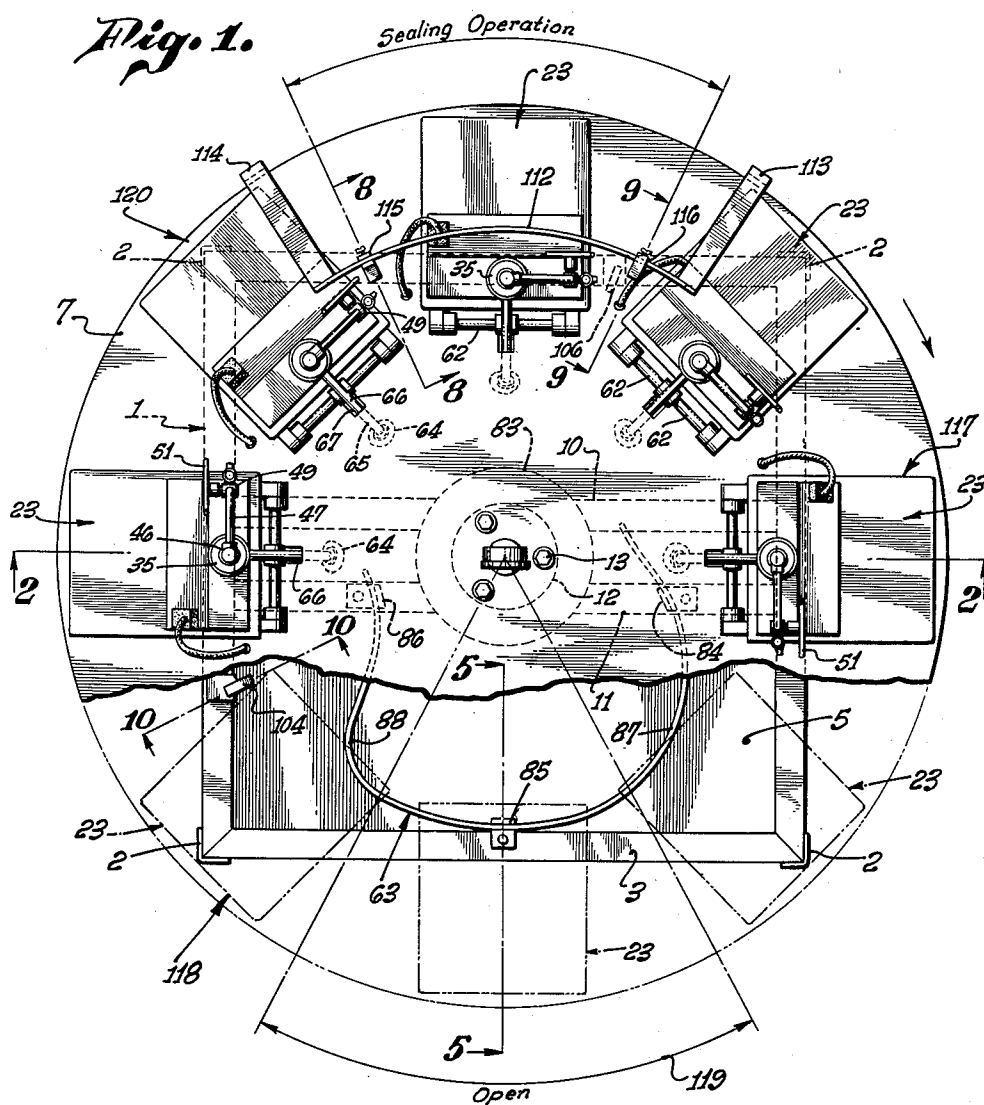
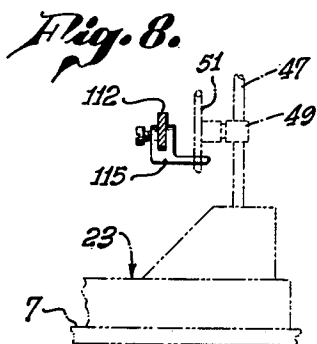
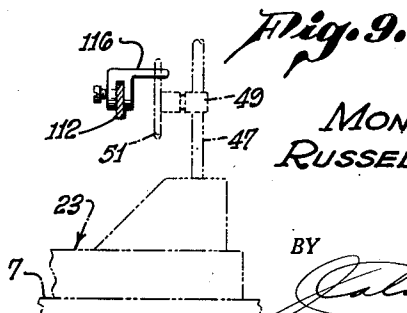
M. MOSES ET AL

2,630,955

VACUUM SEALING MACHINE FOR PACKAGES

Filed June 9, 1950

5 Sheets-Sheet 1



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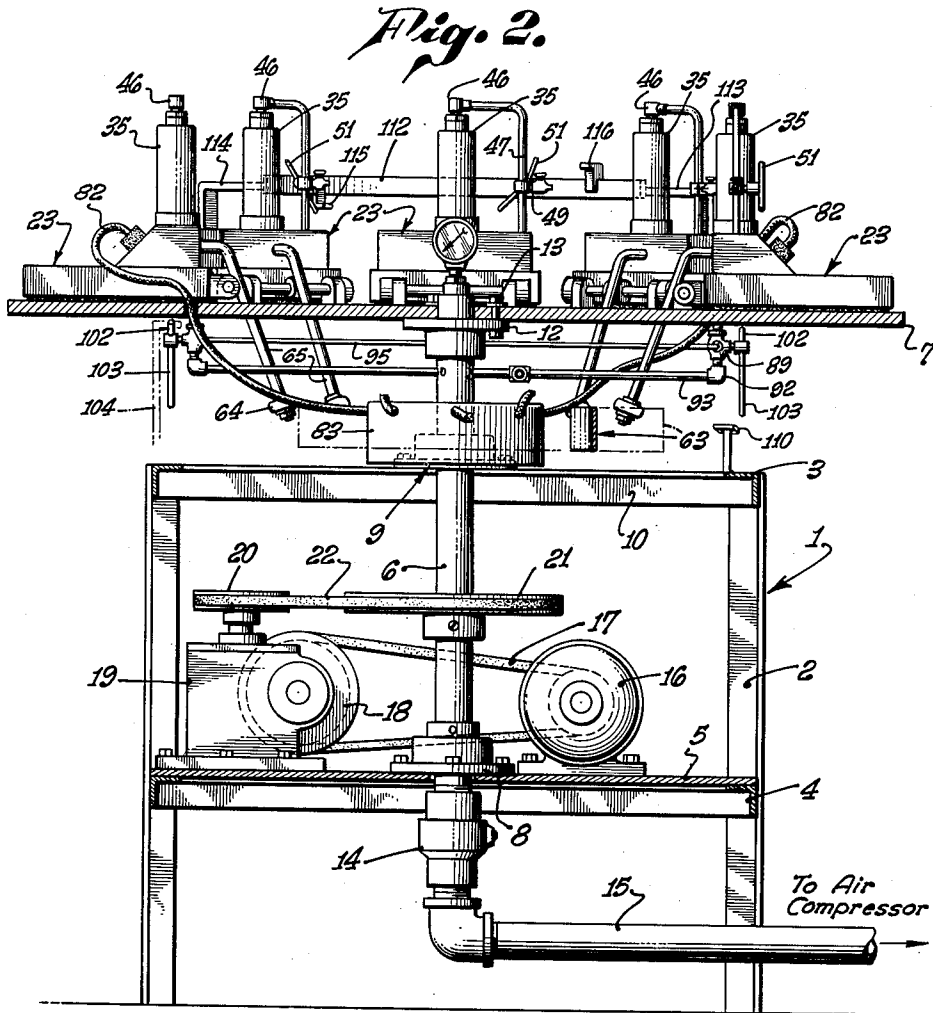
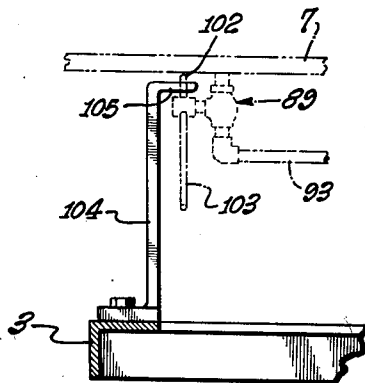
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5 Sheets-Sheet 2



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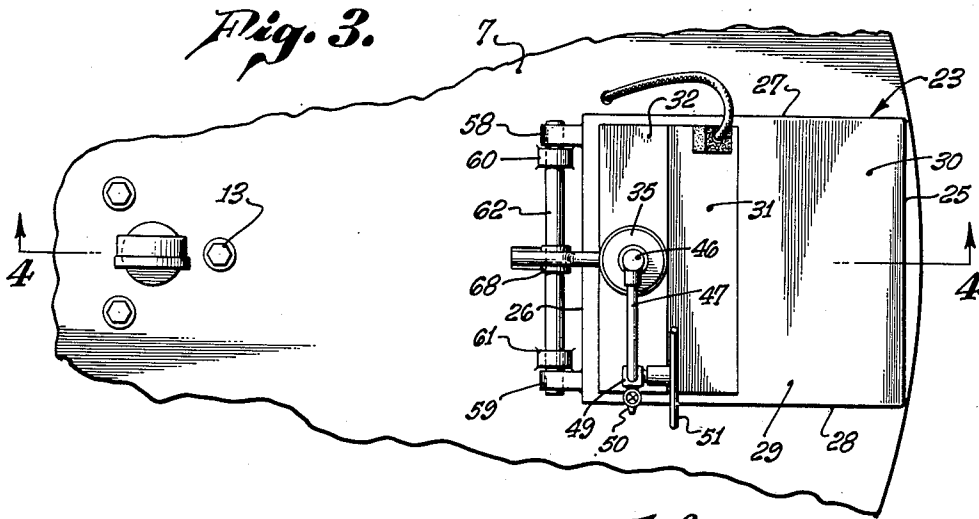
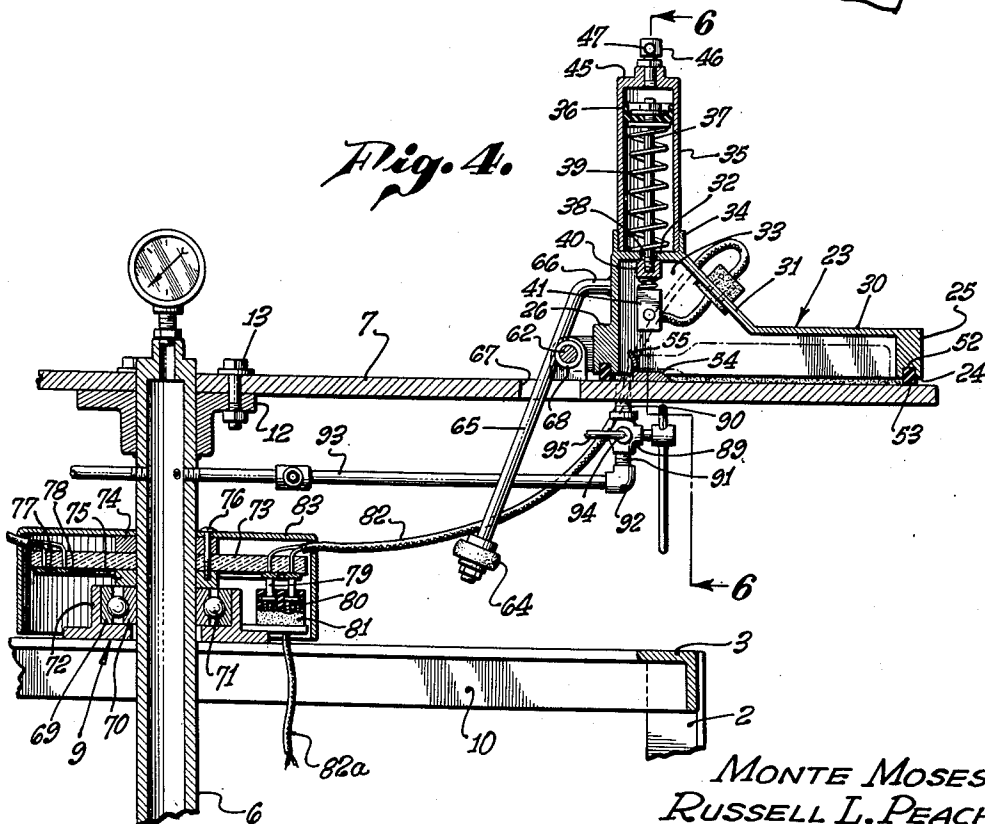
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VACUUM SEALING MACHINE FOR PACKAGES

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5 Sheets-Sheet 3



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5 Sheets-Sheet 4

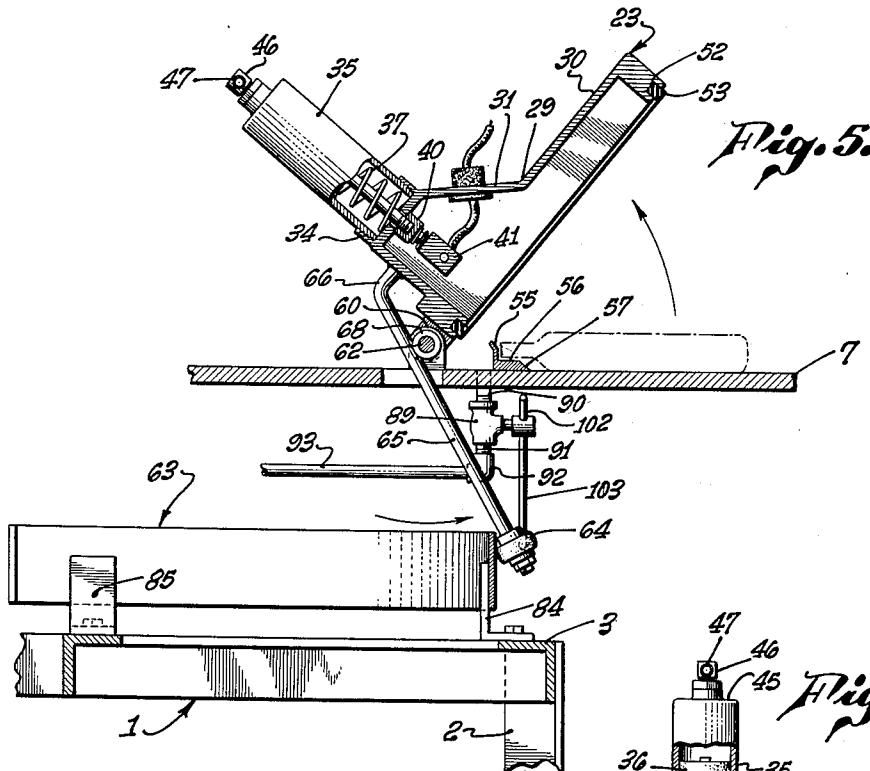


Fig. 5.

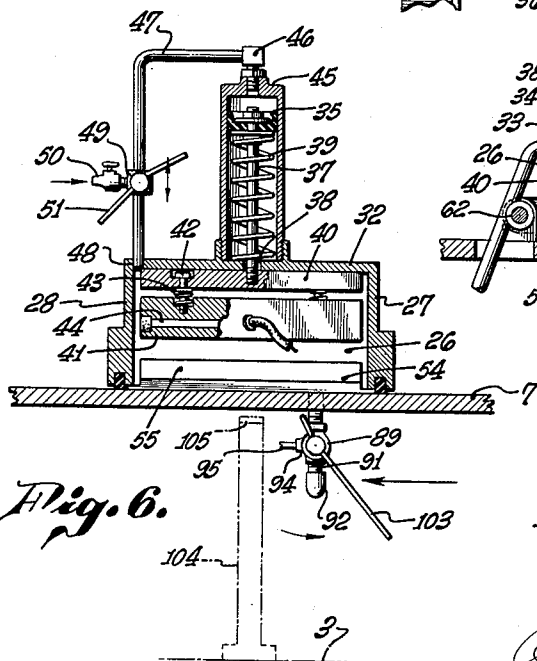


Fig. 6.

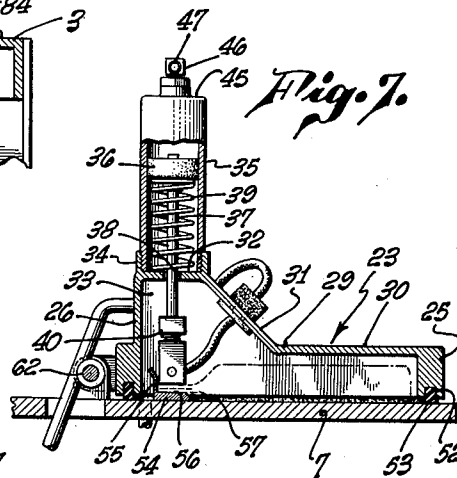


Fig. 7.

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Fig. 11.

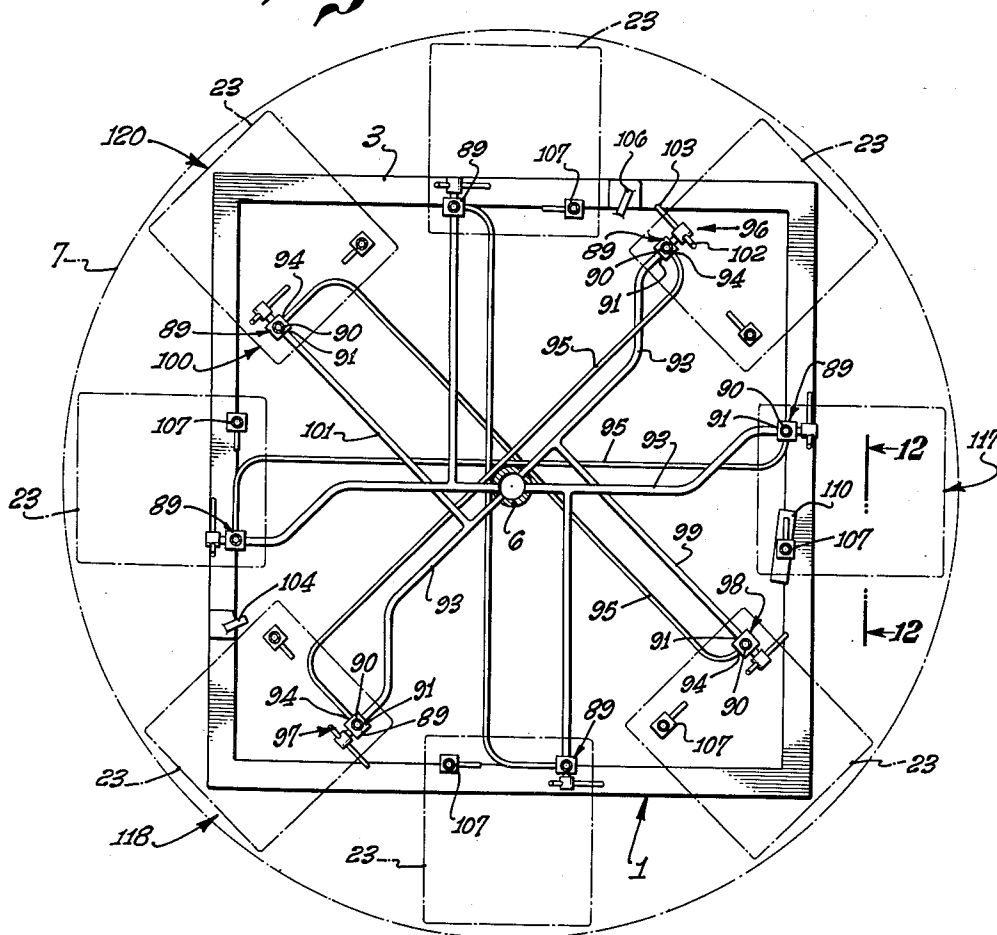
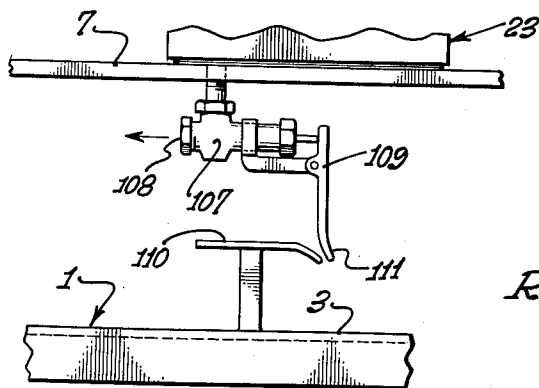


Fig. 12.

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UNITED STATES PATENT OFFICE

2,630,955

VACUUM SEALING MACHINE FOR PACKAGES

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mesne assignments, to Rancho Granada Co.,
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Application June 9, 1950, Serial No. 167,203

10 Claims. (Cl. 226—56)

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The present invention relates to a machine for packaging food products in a flexible container.

Specifically, we contemplate utilizing a container which is air-tight when sealed. We have found it expedient to utilize "Pliofilm," a rubber hydrochloride, for the container. We have found that a laminated "Pliofilm" structure performs satisfactorily in the practice of the present invention.

At the present time, it is not customary for meat packers to slice luncheon meats and place the same in a bag for sale to dealers. This is largely for the reason that so much time is consumed by the butcher in preparing the meats and placing the same in bags. Consequently, numerous meat markets and grocery stores now spend time in packaging luncheon meats, and other meats in a transparent bag or wrapping for sale to the customer. This is time consuming and expensive.

The present invention may operate in conjunction with an automatic slicer for meats, such as luncheon meats, which slicer incorporates standard means for regulating the number of slices to a stack, followed by delivery of said stacked meat to a point where it is encased within a suitable bag by the present invention.

The present invention has for an object the provision of a suitable means whereby meats, or other food products, are quickly and easily placed within a suitable air-tight bag, followed by exhausting the air from said bag, maintaining the bag under a vacuum, sealing the same, and thereafter removing the bag.

A further object is the provision of a machine which vacuum seals bags containing meat products in a rapid and economical manner, and with assurance that the meat product will be maintained in its original condition for a given period of time without deterioration or loss of flavor, and which permits the food product to be readily observed by the ultimate purchaser.

A further object is the provision of a packaging machine for food products, which may be operated by inexperienced help, is simple of construction, foolproof in operation, so designed as to have a large safety factor, with possible injury to a workman operating the machine reduced to a minimum, and which machine is superior to packaging machines now known to the inventors.

With the above-mentioned and other objects in view, the invention consists in the novel and useful provision, formation, construction, association and relative arrangement of parts, members and features, all as shown in a certain embodiment in the accompanying drawings, described generally, and more particularly pointed out in the claims.

In the drawings:

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Figure 1 is a fragmentary top plan view of the machine of the invention.

Figure 2 is a sectional view on the line 2—2 of Figure 1.

Figure 3 is a fragmentary plan view, showing one of the vacuum sealing devices,

Figure 4 is a fragmentary sectional view on the line 4—4 of Figure 3;

Figure 5 is a fragmentary sectional view on the line 5—5 of Figure 1;

Figure 6 is a fragmentary sectional view on the line 6—6 of Figure 4;

Figure 7 is a fragmentary sectional view of the sealing element in the act of sealing a package;

Figure 8 is a sectional view on the line 8—8 of Figure 1;

Figure 9 is a sectional view on the line 9—9 of Figure 1;

Figure 10 is a sectional view on the line 10—10 of Figure 1;

Figure 11 is a plan view of the vacuum circuit utilized in the practice of the invention; and,

Figure 12 is a fragmentary view on the line 12—12 of Figure 11.

Referring now to the drawings and specifically to Figure 2, we have provided a framework or framing 1 which may take any geometrical form and in the present instance is substantially square and provided with four corner legs designated generally at 2, which support a top framing 3 and an intermediate framing 4, adapted to support a shelf 5. The framing is conventional and may take other forms.

Centrally of the framing is a tubular shaft 6 supporting at its upper end a turntable 7 and which shaft is held in suitable bearings at 8 and 9, the bearing 8 being secured to the shelf 5 while the bearing 9 is supported by a pair of cross members 10 and 11 (see Figure 1). The upper end of the tubular shaft carries a flanged collar 12 and the turntable is bolted thereto, as shown at 13. Quite obviously other supporting means may be provided for the turntable.

A coupling 14 connects the lower end of the shaft 6 with a pipe 15 which leads to a compressor, as indicated in Figure 2. The coupling is conventional in form and is adapted to allow swinging movement of the pipe 15 as well as assuring a fluid tight seal between the tubular shaft 6 and the pipe 15. The tubular shaft 6 is adapted to be rotated, in order to rotate the turntable 7, and conventional means is provided for this purpose in that we have provided a motor 16, the sheave of which is adapted to have a continuous belt 17 passed therearound and around a sheave 18 for driving a gear reduction unit 19, the gear reduction unit, in turn, driving a sheave 20. A sheave 21 is secured to the shaft 6 and a continuous belt 22 is passed between the sheaves 20 and 21.

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The top surface of the turntable 7 is adapted to support a plurality of radially arranged housings or casings designated generally at 23. Any number of housings may be provided, although in the present instance, we have shown eight. As all of the housings are identical in form, one thereof will be described.

Referring specifically to Figures 4 to 7, inclusive, the housing 23 is substantially rectangular in form with the base 24 open to provide access to the interior thereof. The housing has end walls 25 and 26 and interconnecting side walls 27 and 28, with a top wall 29, joining the side and end walls. As shown in the drawings, the end walls are of different height, end wall 26 being higher than the end wall 25 and the side walls likewise differ in height. The top wall, as shown in the figures referred to, has a portion 30 which is substantially parallel to the base edge of the side and end walls, and an inclined portion 31 which connects with portion 32 which is parallel to portion 30. This provides a space or chamber 33 for housing other elements of the invention as hereinafter set forth. The portion 32 is provided with an annular flange 34 adapted to screw-threadedly receive a cylinder 35. Within cylinder 35 is a piston 36 provided with a rod 37, which is passed through an enlarged bore 38 in portion 32 of the top. A coil spring 39 is interposed between the portion 32 and the piston 36 and normally urges the piston in one direction. The rod 37 carries within the chamber 33 a bar 40 which transversely extends between the side walls 27 and 28, see Figure 6, and which bar has depending therefrom, a heating iron 41 which heating iron likewise extends transversely between the sides 27 and 28. The supporting means between the bar 40 and the heating iron 41 comprises a pair of bolts 42, each bolt being suspended slidably from the bar 40 and secured to the heating iron 41, with a coil spring 43 surrounding each bolt and interposed between the lower surface of the bar 40 and a socket portion in the top surface of the heating iron 41. The purpose of the construction is to allow movement of the heating iron relative to the bar 40 under control of the springs. The heating iron may be of conventional form and provided with a heating element 44.

Connected to the cylinder top 45 and having access to the interior of the cylinder is a fitting 46. This fitting receives one end of a pipe 47, the opposite end of said pipe being passed through a hole 48 in portion 32 and communicating with the interior of the casing or housing 23. Interposed within the piping 47 is a two-way valve 49. This valve has a fitting 50 leading to the atmosphere and a lever 51 for controlling valve action. It is intended that movement of the lever in one direction should move the valve and allow communication between the chamber 33 and the top of the cylinder, passage to the fitting 50 being closed, while movement of the lever to a second position closes passage to the bore 48 and opens the top of the cylinder to the atmosphere through fitting 50. The sides and ends of the casing or housing are grooved as indicated generally at 52 to receive a rubber gasket 53, which encircles the base edge of the casing or housing and extends beyond said portion for engagement with the top surface of the turntable 7. The turntable carries a cold iron 54, which is directly beneath the heating iron 41. This cold iron is provided with a flange 55 which is bent at its upper extremity so as to assure that when the heating iron de-

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scends, it will be guided to the plane surface 56 of the cold iron. A beveled edge 57 leads to the plane surface 56.

Each casing or housing is hinged to the turntable and the end wall 26 (Figure 3) is provided with a pair of perforated studs or knuckles 58 and 59, and the turntable is provided with a pair of upstanding knuckles 60 and 61 positioned intermediate of and in close proximity to the studs or knuckles 58 and 59. A pin 62 extends through the perforations in said knuckles for interconnecting the same and forming a hinge whereby the casing or housing may be tipped from table engagement to a position at an inclination to the table as shown in Figures 7 and 5.

The means for producing tipping movement of the casing or housing 23 includes a cam 63 carried by the framing 1 and particularly the top 3 thereof and a cam follower 64 carried on an end of an arm 65 which extends from the housing. The arm 65 has a bent end extremity 66 which is fastened to end wall 26 in any appropriate manner, the bent end extremity 66 being substantially at right angles to the outer surface of said end wall 26. As arm 65 extends beneath the turntable, the said turntable is provided with an elongated slot 67 through which the arm is passed, as shown in Figure 4. The pin 62 intermediate its ends carries a grooved roller 68 and the arm 65 engages said groove. The grooved roller assures that when the cam follower engages the cam, that the casing or housing is tilted properly at its hinge points.

The cam follower 64 may take any form desired and in the present invention, we have shown the follower as a roller bearing on the end of arm 65.

The bearing 9, as shown in Figure 4, is conventional in that a pair of races are provided at 69 and 70, with ball bearings 71 interposed therebetween, and which races are carried in a suitable housing 72, which is secured to the framing. Positioned above the races 69 and 70 is a disc 73 interposed between two annular members 74 and 75 which surround the tubular shaft 6. The said annular member and the disc are secured together by the means 76. The disc 73 carries on its lower surface a pair of spaced apart annular contact rings 77 and 78 and a pair of spring loaded contacts 79 and 80 are carried in a suitable insulation block 81, which block is supported by housing 72. There are wire connections 82 between the contact rings 77 and 78 and the heating element 44, and connecting elements 82a between contacts 79 and 80 and a source of electrical energy. We have provided a guard 83 having a top wall and a flange which encloses the disc 73 and the various electrical contacts, as a safety precaution.

The cam 63 is below the turntable and carried by the top framing 3. The cam assumes a position and is adapted to tip the various casings or housings as the turntable is rotated. Cam 63 is shown in a selected position in Figure 1 and comprises a narrow strip which is secured to brackets 84, 85, and 86. Brackets 84 and 86 are secured to the cross framing piece 11, while bracket 85 is secured to one of the top framing members. The cam strip is so bent as to cause a quick tipping of the casing or housing and a sudden lowering thereof, it being observed that the portion 87 of said cam allows an immediate raising of the casing or housing by swinging the same upon its hinges, followed by a sudden lowering thereof at the zone 88. This action

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is stated more fully in the statement of the operation of the invention.

In the practice of our invention, it is intended that when the casing or housing 23 is lowered to a horizontal position relative to the turntable or to a position where the gasket 24 engages the top surface of the turntable, that the interior of the housing should be placed under sub-atmospheric pressure. In order to accomplish this, a connection must be made to an air exhaustion apparatus, such as a compressor. Accordingly in the practice of the present invention, we have provided what is known as a vacuum control system and which is brought into operation during rotation of the turntable. Adapted to be positioned immediately below the turntable and in the zone of each of the casings or housings 23 is a three-way valve 89. One port 90 communicates with an opening in the turntable leading to the interior of a casing or housing when the casing or housing is engaging the top surface of the turntable, as shown in Figure 4. A second port 91 through a suitable elbow 92 connects with pipe 93, which leads to the tubular shaft 6 and communicates with the interior thereof as shown in Figure 4. The third port from said valve at 94 connects with a pipe 95. Assuming that we have eight of the casings or housings 23, arrangement is such that pipe 95 communicates with the third port of a valve 89 situated diametrically opposite the particular valve and casing or housing under discussion, see Figure 11. Thus assuming that a valve 89 in Figure 11 is situated at 96, this valve will have its third port 94 in communication with the three-way valve diametrically opposite thereto at 97, through the pipe 95. It will be seen that the pipes 93 for each of said valves 89 at 96 and 97 are in communication with the interior of the tubular shaft 6. However, not all of the three-way valves connect directly through a pipe 93 with the tubular shaft 6. For instance, the three-way valve 89 at 98 has a pipe 99 which connects with pipe 93 for the valve shown at 96 and the three-way valve 100 diametrically opposite the three-way valve at 98, connects through pipe 101 with pipe 93 for the valve shown at 97. Thus it will be seen that every other valve 89 has one port connecting directly with the tubular shaft 6, while intermediate three-way valves intersect or connect with the pipes 93. The reason for this construction is to eliminate excessive connections with the tubular shaft 6. Each of the three-way valves is controlled as to movement by an arm diametrically carried by the valve stem and which has, in each instance, upper and lower extensions 102 and 103. In the present instance, the upper extension 102 is of shorter length than the lower extension 103. As shown in Figures 1 and 10, the framing carries a post 104 which has an angular upper extension or arm 105, the upper extension being in position to engage the upper end of the arm 102. There is provided a shorter but similar post at 106, upper extension of which is adapted to engage the lower arm extension 103. The three-way valves, in each instance, control the vacuumizing of each housing or casing during a revolution of the turntable. In addition we provide means for atmospherizing each housing or casing. Thus, the turntable carries beneath each casing or housing a vent or bleeder valve 107, see Figures 11 and 12. One port of each vent or bleeder valve communi-

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cates, with a hole in the turntable leading to the area encompassed by the casing or housing 23 when it is in turntable engagement, as shown in Figure 2. A port 108 of valve 107 leads to the atmosphere, and the valve is actuated by an arm 109 carried by the valve casing. The framing top 3 is provided with an elevated cam 110 which engages the end 111 of the arm 109 during rotation of the turntable. Cam and arm engagement opens each valve to atmospherize the interior of each casing or housing in sequence.

The means for controlling operation of the valve 49 includes a curved rail 112, which is concentric with the turntable and which rail is supported above the turntable by means of brackets 113 and 114 secured to the framing top 3. The rail carries adjustable slides 115 and 116, the slide 115 has an arm positioned to engage the lower end of lever 51 to move the same and turn the valve 49 while the slide 116 has an arm positioned to strike the upper end of the lever 51 and revolve the valve in an opposite direction, see Figures 8 and 9.

The operation, uses and advantages of the invention just described are as follows:

It is intended that the present invention should operate in conjunction with and in close proximity to some means which may slice the luncheon meats. Machines for slicing meat are on the market and a suitable mechanism may stack a selected number of slices of meat. Thereafter through the medium of a conveyor the stacks are moved in proximity to the device of the present invention. Each selected stack is placed within a bag preferably formed of a transparent material and one which is air tight when sealed. Such a bag may be formed of "Pliofilm," by way of example. The bag has an open mouth and the operator picks up each filled bag in sequence and places it on the turntable so that the open mouth end of the bag faces inwardly in the manner shown in Figure 5, the casing or housing being raised as shown in said figure. The cold iron 54 is provided with the flange 55 which limits the inward movement of the mouth end of the bag. It is intended that when the bag with its food content is placed on the turntable, in the position shown in Figure 5, with the housing 23 raised as shown, that thereafter during rotation of the turntable, the housing or casing is lowered to the position shown in Figure 4. At this time the interior of the housing and the interior of the bag is under sub-atmospheric condition so as to exhaust air from both the housing and the bag. The turntable continues its rotation and the hot iron is lowered for engagement with the bag at the mouth portion in the manner shown in Figure 7 at which time the bag is heat sealed. Vacuum is still maintained within the housing 23, and thereafter the casing or housing is raised to the position shown in Figure 5 and the sealed bag is removed by the operator or it may be removed automatically. Assuming a turntable rotative rate of eight revolutions per minute, the present invention with eight of the housings or casings 23 will vacuumize and seal 64 bags per minute. The number of bags handled may be increased by enlarging the turntable and the number of casings or by increasing the rotative speed of the turntable.

For a fuller description, we will assume the movement of a single casing or housing 23 and the casing or housing at 117 as shown in Figures

1 and 11 is selected. The bleed valve 107 is about to be actuated so as to atmospherize the interior of the housing or casing, in the position shown, the position shown is that likewise illustrated in Figures 3 and 4, save and except that the bag has been sealed in the manner shown in Figure 7. However, the heating iron is raised, as shown in Figure 4. The cam follower 64 engages the side of the cam 63 and immediately tips the casing 23 to the position shown in Figure 5. The operator either manually or automatically removes the sealed package containing meat under vacuum and places a new bag containing meat with its mouth open in the position shown in Figure 5. The casing or housing remains in open position until the cam follower reaches the zone marked 88 in Figure 1, whereupon there is a closing of the casing or housing against the turntable. Roughly this is the position illustrated at 118 and is indicated by the sector shown at 119. The casing or housing is now closed as shown by way of example in Figure 4. As the turntable continues its rotation, the arm 105 of the post 104 engages the upper end 102 of the arm controlling movement of the three-way valve 89 and opens the same to vacuum through the line 93, which communicates with the interior of the tubular shaft 6 and which shaft through pipe 15 leads to an air compressor. The interior of the housing or casing is then placed under sub-atmospheric condition.

Sufficient time intervenes during rotation of the turntable to assure vacuumizing of the casing 23 and of the bag therein, whereupon the casing reaches the position indicated at 120. The slide 115 is in position to engage the lower portion of arm 51 and turn the valve 49, opening the top of cylinder 35 through pipe 47 and opening 50 to the atmosphere. The valve in so moving closes pipe 47 leading to chamber 33.

Prior to the aforementioned valve movement, the valve was closed to opening 50 which allows communication between the top and bottom of cylinder 35 and the interior of the casing. Thus, the interior of the cylinder is under sub-atmospheric pressure. When the top of the cylinder 35 is opened to the atmosphere, there exists a pressure differential above and below the piston 36 and the piston moves downwardly within the cylinder and carries with it the heating iron which clamps the bag mouth between the hot and cold irons to heat seal the bag. The turntable continues to rotate and the upper part of the arm 51 strikes slide 116 revolving the valve 49 to close opening 50 and again permitting communication between the top and bottom of the cylinder. Thus a vacuum condition is maintained in the housing during continued rotation of the turntable. The vacuum condition within the housing is of importance in the present invention. It will be observed that at the time the slide 116 closes the valve 49 to the atmosphere, the diametrically opposite housing at 118 has just closed and the three-way valve 89 is in position to be moved so as to be in communication through line 95 with the port 94 for the housing at 118. As the housing 118 is under atmospheric condition while the diametrically opposite housing is under vacuum, there is an immediate lowering of pressure in the housing at 118. Further rotation of the turntable actuates the lever controlling valve 89 so that said valve is in direct communication with the source of reduced pressure through piping 93. Such a turning of the valve 89 for the casing located at

116, shuts off communication between said valve and the diametrically opposite valve 89 through line 95. Hence, there is no loss of pressure in the first-named casing or housing as it is opened. Valve opening occurs after the vent valve or bleeder valve has its arm moved upon contact with the cam 110, see Figure 11. At the time of said venting, the cam follower 64 will engage the cam 63 to again tip the housing in the manner shown in Figure 5.

We have found that we obtain a lower vacuum in the housings by arranging the pipes and valves in the manner stated. We have also found it possible to heat seal the mouth of the bag by leaving the hot iron in contact with the bag until the bag has collapsed about the meat product therein. Raising the heating iron while the housing is under vacuum often results in a delamination blister in the packaging material where laminated Pliofilm is used for the bag material. Consequently, in the practice of the invention, it is intended that the slides 115 and 116 should be so adjusted as to properly hold the heating iron in engagement with the bag while the housing is under vacuum. Various incidental equipment may be used in the practice of the invention, as shown in the drawings just described, reference being had, for instance, to the pressure gauge at the top of the tubular shaft 6.

Further the cam 63 is adjustable relative to its holding brackets as are likewise the slides 115 and 116 whereby various changes in operation may be obtained not only to affect the raising and lowering of the housings but to control the sealing operation as well as to control the three-way valves.

We claim:

1. In a machine of the character disclosed, a turntable, means for rotating said turntable, a plurality of housings radially positioned on the turntable top, each housing having an open base, means for hinging each housing to the turntable to permit swinging movement of each housing relative to the turntable top, a fixed cam independent of and positioned beneath the said turntable and means for each housing adapted to engage the cam during rotation of the turntable to swing each housing on its hinge.

2. In a device of the character disclosed, a framing, a vertical shaft carried by said framing, a turntable secured to said shaft, and means for rotating the shaft to rotate the turntable, a housing, hinge means securing the housing to the turntable, an arm secured to the housing in the zone of said hinge means, a cam follower carried by said arm, and a cam secured to the framing, said cam follower engaging the cam during rotation of the turntable to swing said housing on the hinge means at an angle relative to the turntable top.

3. In a machine of the character disclosed, a framing, a tubular shaft vertically carried by said framing, a turntable secured to said tubular shaft, the top of said turntable lying in one plane, a housing with an open base hingedly secured to the top of said turntable, means for tipping said housing relative to its hinge point and for lowering said housing against the turntable top during rotation of the turntable, means for rotating the tubular shaft, means for maintaining the interior of said tubular shaft under sub-atmospheric pressure, a valve carried by said turntable and having a port in communication with the area included beneath the housing at its open base portion, means of communication between the said valve and the tu-

bular shaft and further means for actuating said valve during rotation of the turntable to place the interior of said housing under sub-atmospheric condition.

4. In a machine of the character disclosed, a framing, a tubular shaft vertically carried by said framing, a turntable secured to said tubular shaft, the top of said turntable lying in one plane, a housing with an open base hingedly secured to the top of said turntable, means for tipping said housing relative to its hinge point and for lowering said housing against the turntable top during rotation of the turntable, means for rotating the tubular shaft, means for maintaining the interior of said tubular shaft under sub-atmospheric pressure, a valve carried by said turntable and having a port in communication with the area included beneath the housing at its open base portion, means of communication between the said valve and the tubular shaft, further means for actuating said valve during rotation of the turntable to place the interior of said housing under sub-atmospheric condition, and valve means for atmospherizing the interior of said housing during a defined rotation of the turntable.

5. In a device of the character disclosed, a housing with an open base, a plane top supporting structure for said housing, hinge means between the housing and said supporting structure, means for effecting sealing engagement between the said housing and the plane top of said supporting structure when the said housing engages said supporting structure, said housing adapted to confine therein a thermo-plastic open mouthed bag, means placing the housing while confining the bag under sub-atmospheric pressure and further means for sealing the mouth of said bag while maintaining said sub-atmospheric condition within the housing, and means for atmospherizing the interior of the housing.

6. In a device of the character disclosed, a housing with an open base, a plane top supporting structure for said housing, hinge means between the housing and said supporting structure, means for effecting sealing engagement between the said housing and the plane top of said supporting structure when the said housing engages said supporting structure, said housing adapted to confine therein a thermo-plastic open mouthed bag, means placing the housing while confining the bag under sub-atmospheric pressure, further means for sealing the mouth of said bag while maintaining said sub-atmospheric condition within the housing, means for atmospherizing the interior of the housing, and further means for tipping the housing about its hinge point when the interior of the housing is under atmospheric condition.

7. In a device of the character disclosed, a turntable, a first and a second housing diametrically disposed on said turntable, a pair of three-way valves secured to said turntable, each valve of said pair provided with three identical ports, one identical port of each valve being in communication with the interior of each housing, a pipe interconnecting identical ports of each valve, and means interconnecting the remaining identical ports of said valves with a source of sub-atmospheric pressure.

8. In a device of the character disclosed, a turntable, a first and a second housing diametrically disposed on said turntable, a pair of three-way valves secured to said turntable, each valve of said pair provided with three identical ports,

one identical port of each valve being in communication with the interior of each housing, a pipe interconnecting identical ports of each valve, means interconnecting the remaining identical ports of said valves with a source of sub-atmospheric pressure, the first housing being under sub-atmospheric pressure and the second housing under atmospheric pressure; and separate means for actuating each valve during rotation of the turntable, the valve for the first housing being moved to effect communication with the second housing to equalize the pressures therein.

9. In a device of the character disclosed, a turntable, a first and a second housing diametrically disposed on said turntable, a pair of three-way valves secured to said turntable, each valve of said pair provided with three identical ports, one identical port of each valve being in communication with the interior of each housing, a pipe interconnecting identical ports of each valve, means interconnecting the remaining identical ports of said valves with a source of sub-atmospheric pressure, the first housing being under sub-atmospheric pressure and the second housing under atmospheric pressure, separate means for actuating each valve during rotation of the turntable, the valve for the first housing being moved to effect communication with the second housing to equalize the pressures therein, and the valve for the second housing then being actuated to effect direct communication between the housing and the source of sub-atmospheric pressure.

10. In a device of the character disclosed, a turntable, a first and a second housing diametrically disposed on said turntable, a pair of three-way valves secured to said turntable, each valve of said pair provided with three identical ports, one identical port of each valve being in communication with the interior of each housing, a pipe interconnecting identical ports of each valve, means interconnecting the remaining identical ports of said valves with a source of sub-atmospheric pressure, the first housing being under sub-atmospheric pressure and the second housing under atmospheric pressure, separate means for actuating each valve during rotation of the turntable, the valve for the first housing being moved to effect communication with the second housing to equalize the pressures therein, the valve for the second housing then being actuated to effect direct communication between the housing and the source of sub-atmospheric pressure, and a vent valve for atmospherizing the first housing upon continued rotation of the turntable, the second housing being maintained under sub-atmospheric pressure.

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