Nov. 4, 1958 R. A. MAHAFFY ET AL 2,858,655

MACHINE AND PROCESS FOR EVACUATING, GASSING AND SEALING FLEXIBLE CONTAINERS

Filed Feb. 18, 1955 13 Sheets-Sheet 1

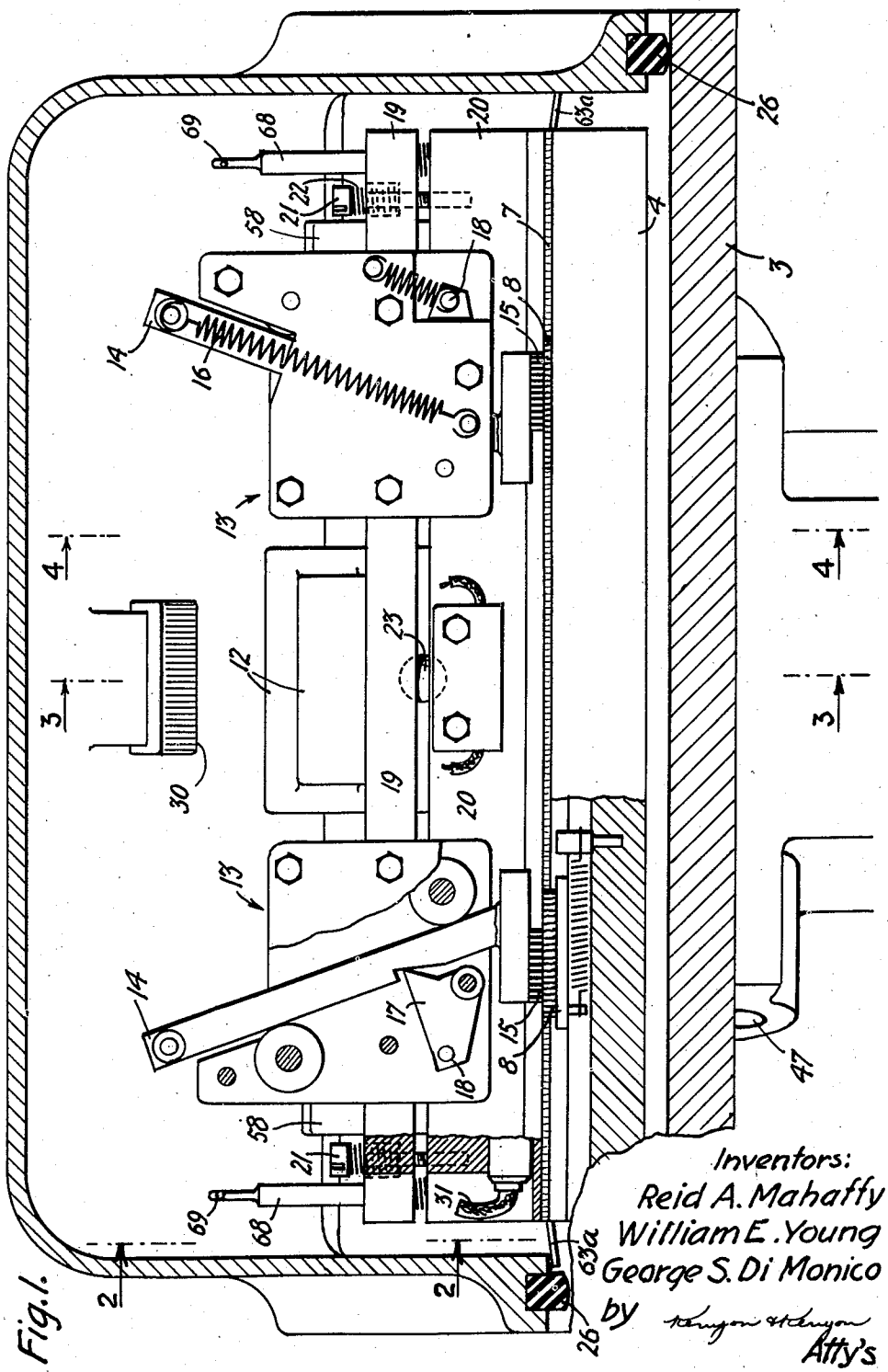


Fig. 1.

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Filed Feb. 18, 1955 13 Sheets-Sheet 2

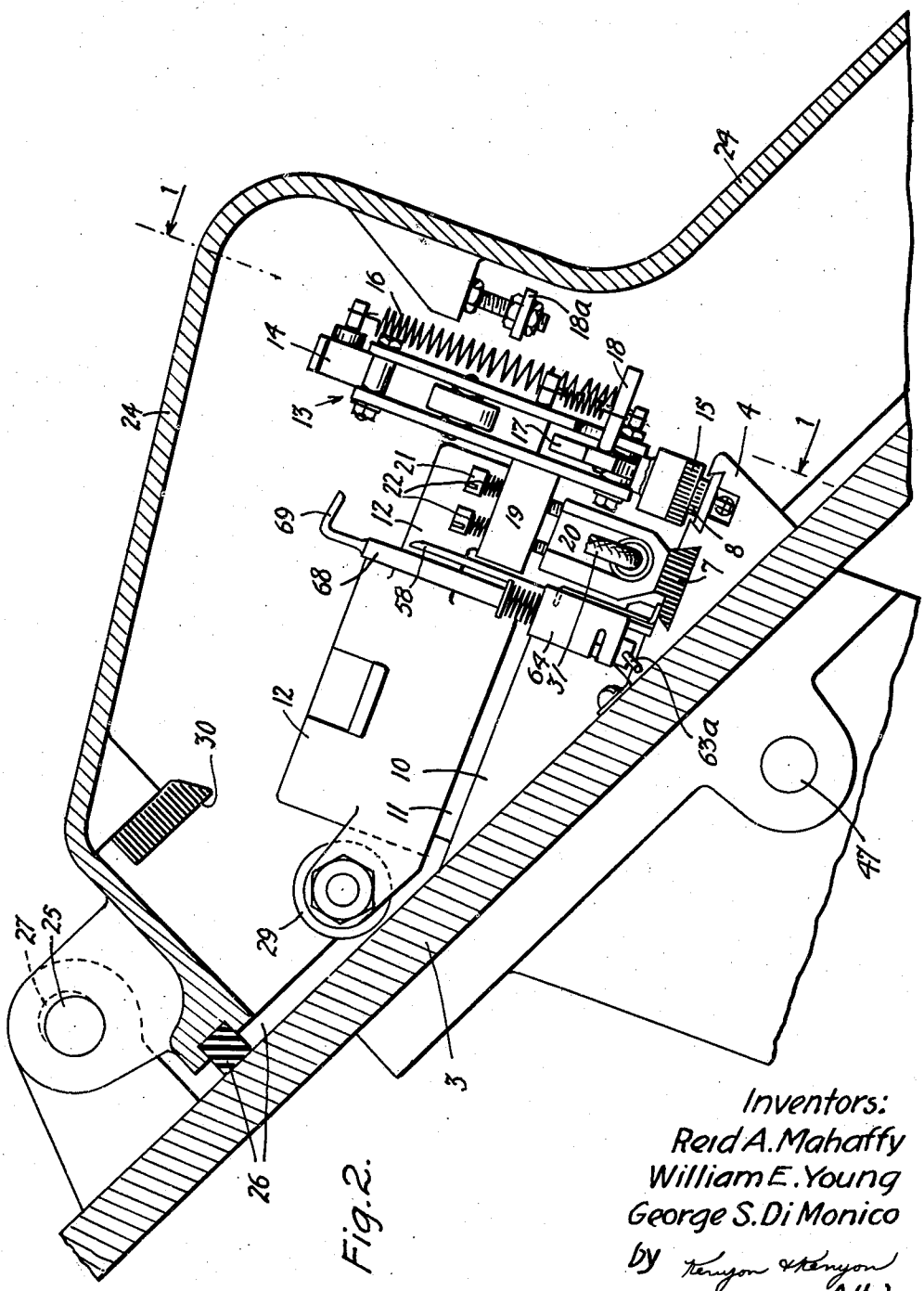


Fig. 2.

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MACHINE AND PROCESS FOR EVACUATING, GASSING AND SEALING FLEXIBLE CONTAINERS

Filed Feb. 18, 1955 13 Sheets-Sheet 3

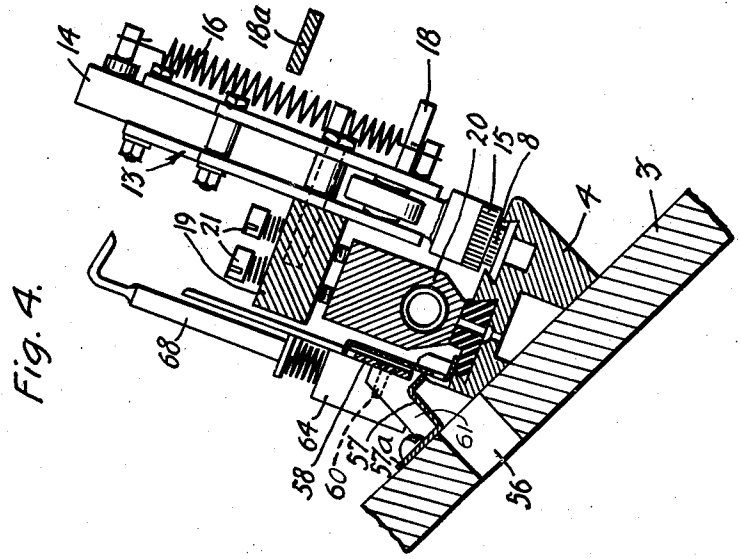


Fig. 4.

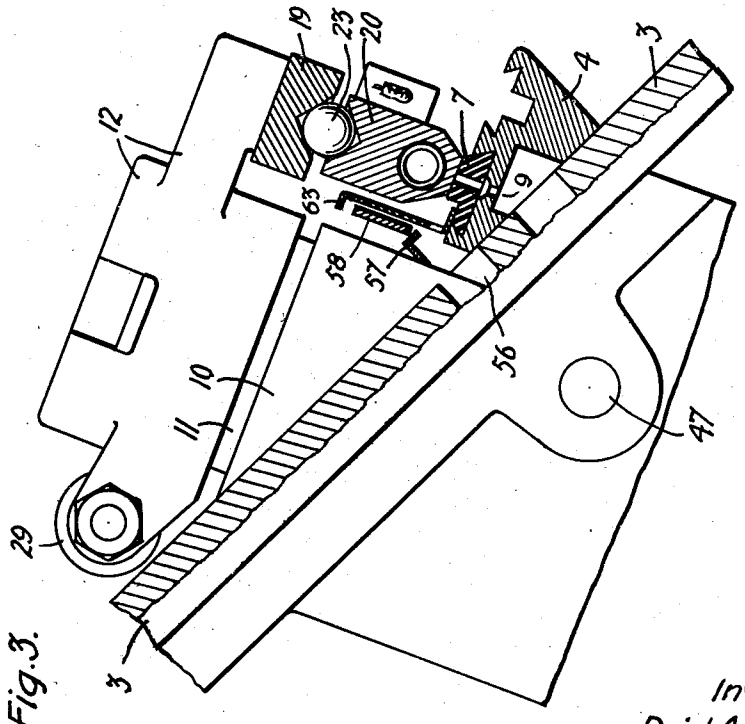


Fig. 3.

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Filed Feb. 18, 1955 13 Sheets-Sheet 4

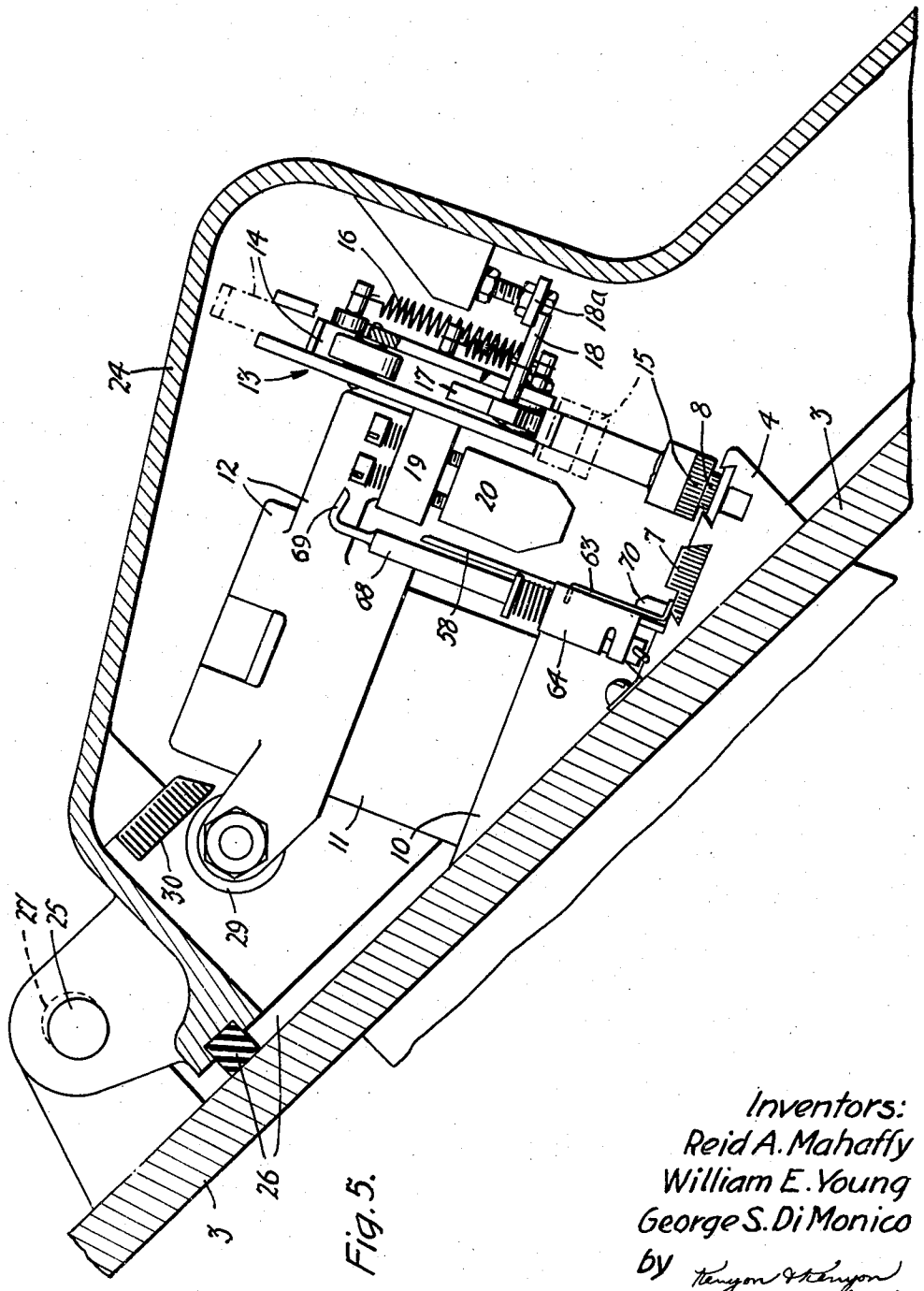


Fig. 5.

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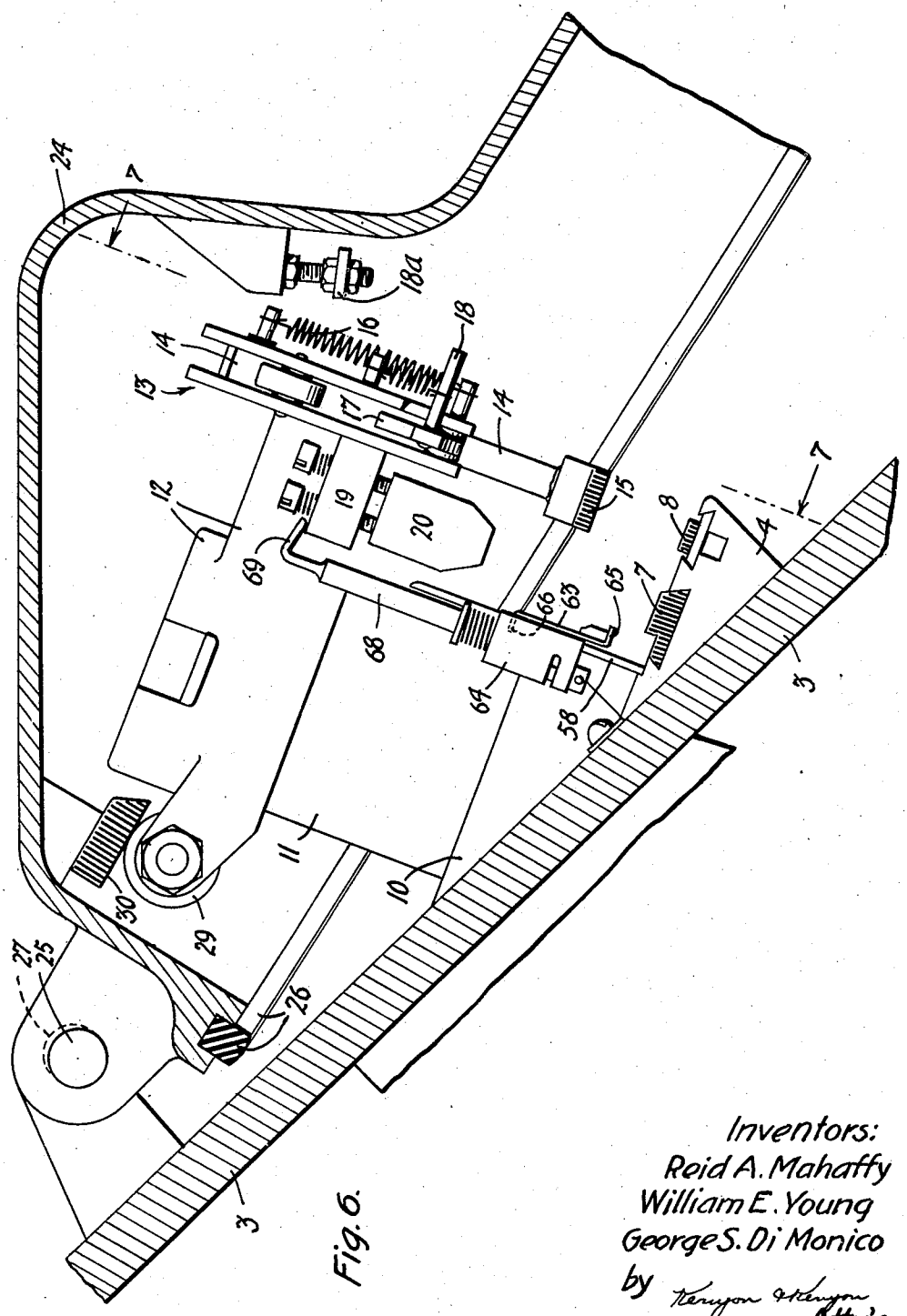


Fig. 6.

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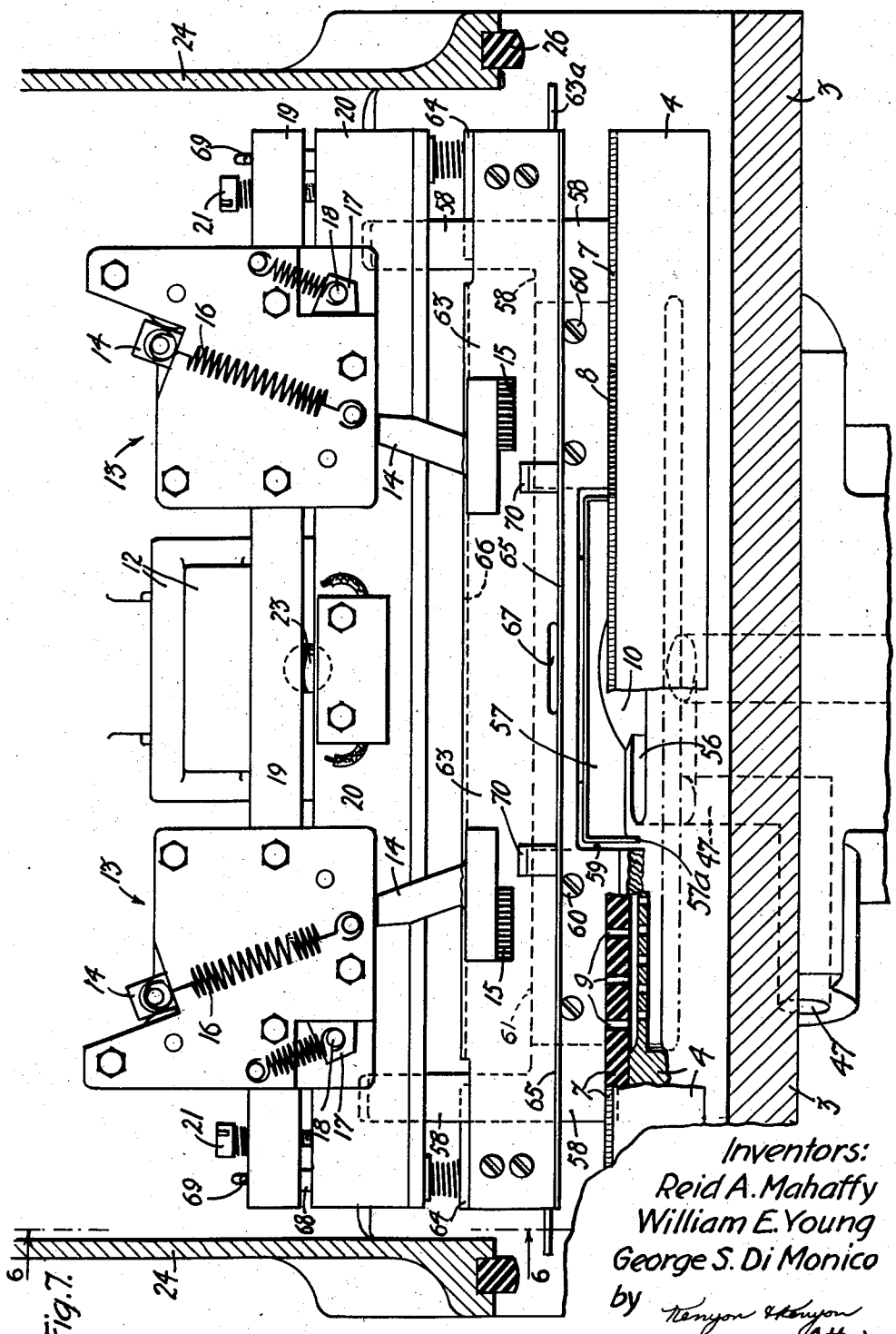


Fig. 7.

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MACHINE AND PROCESS FOR EVACUATING, GASSING AND SEALING FLEXIBLE CONTAINERS

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Fig. 8.

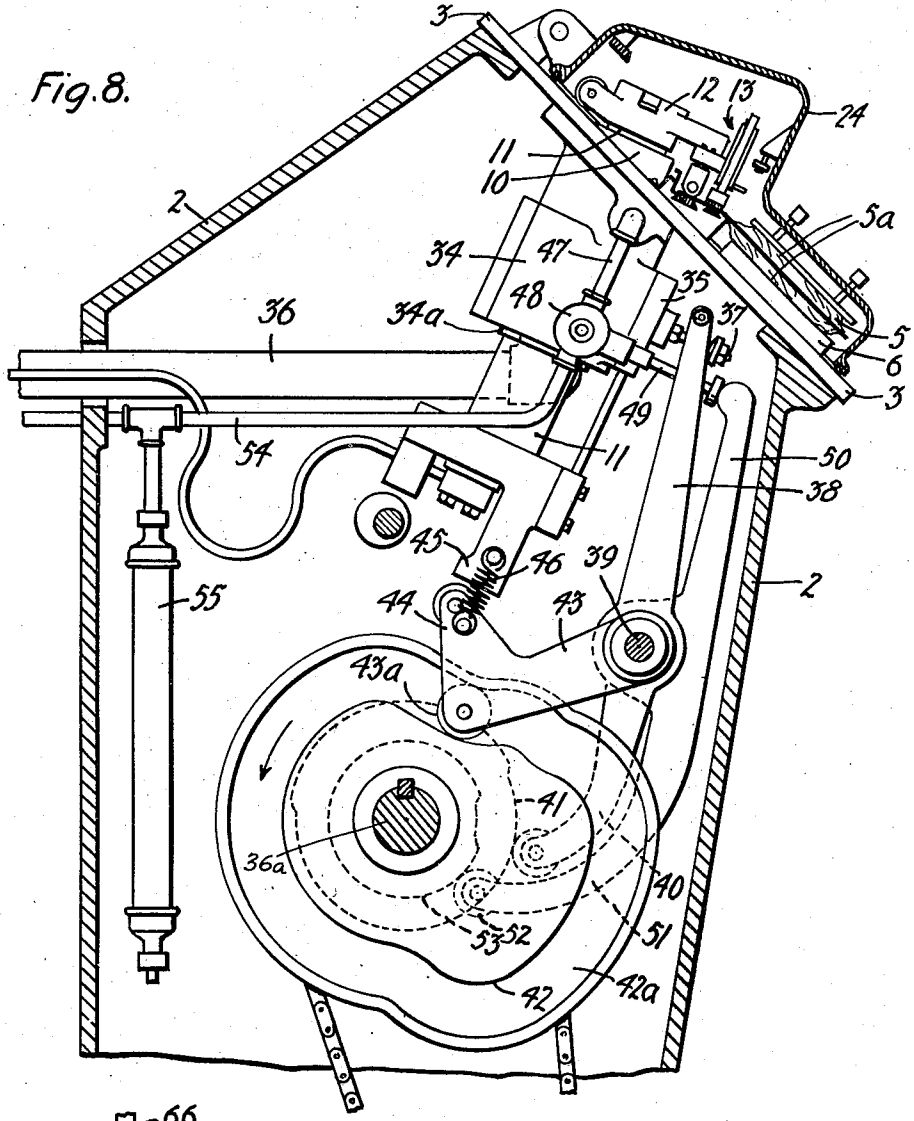


Fig. 13.

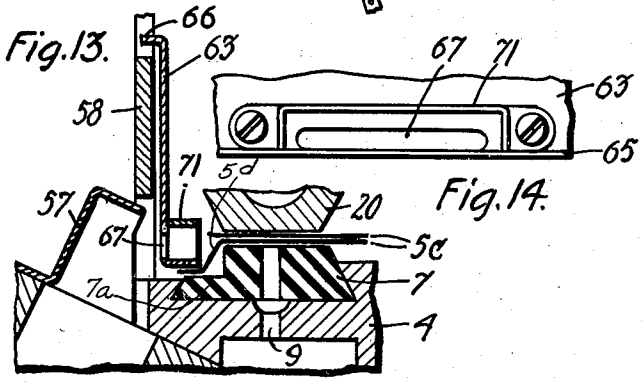


Fig. 14.

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MACHINE AND PROCESS FOR EVACUATING, GASSING AND SEALING FLEXIBLE CONTAINERS

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Fig. 10.

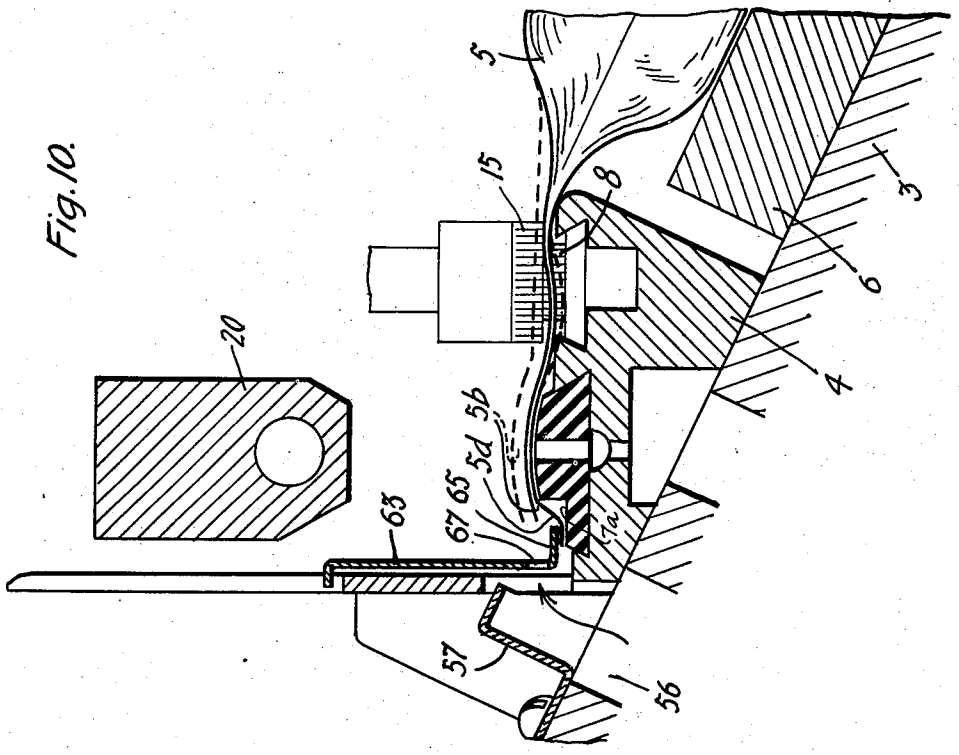
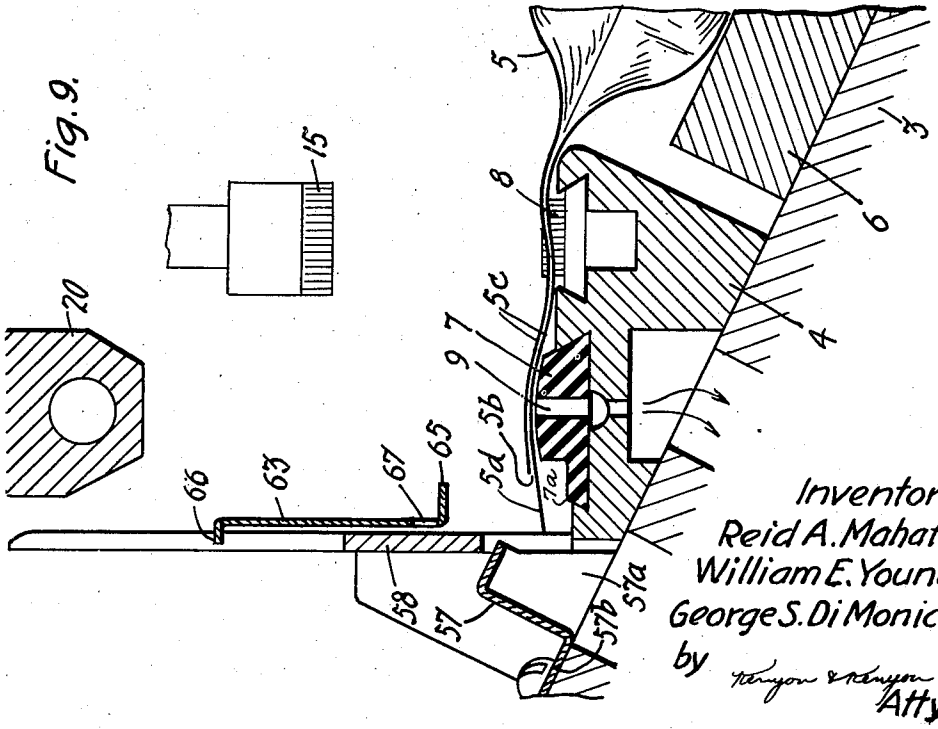


Fig. 9.



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MACHINE AND PROCESS FOR EVACUATING, GASSING AND SEALING FLEXIBLE CONTAINERS

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Fig. 16.

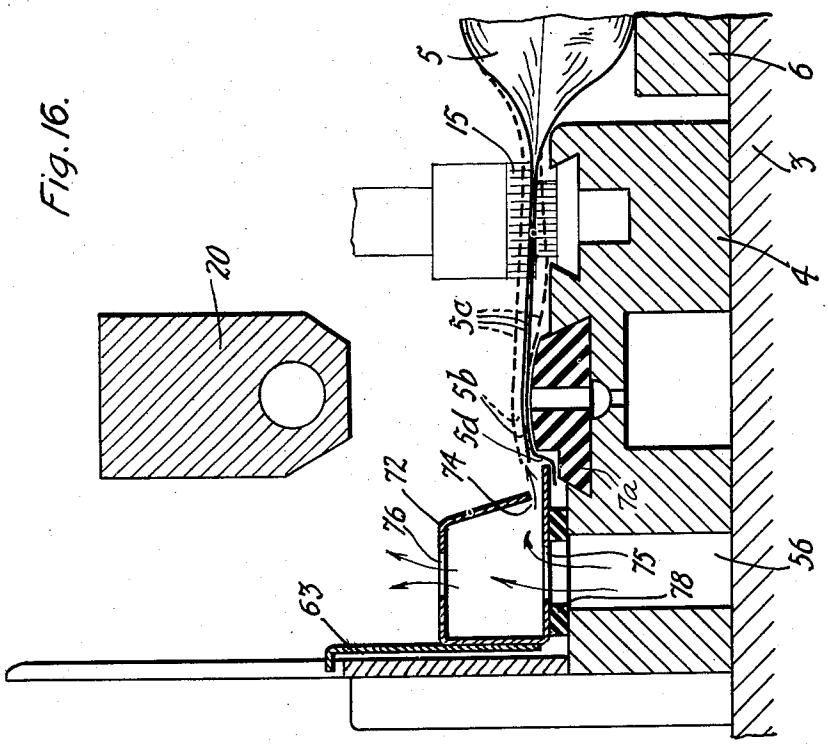
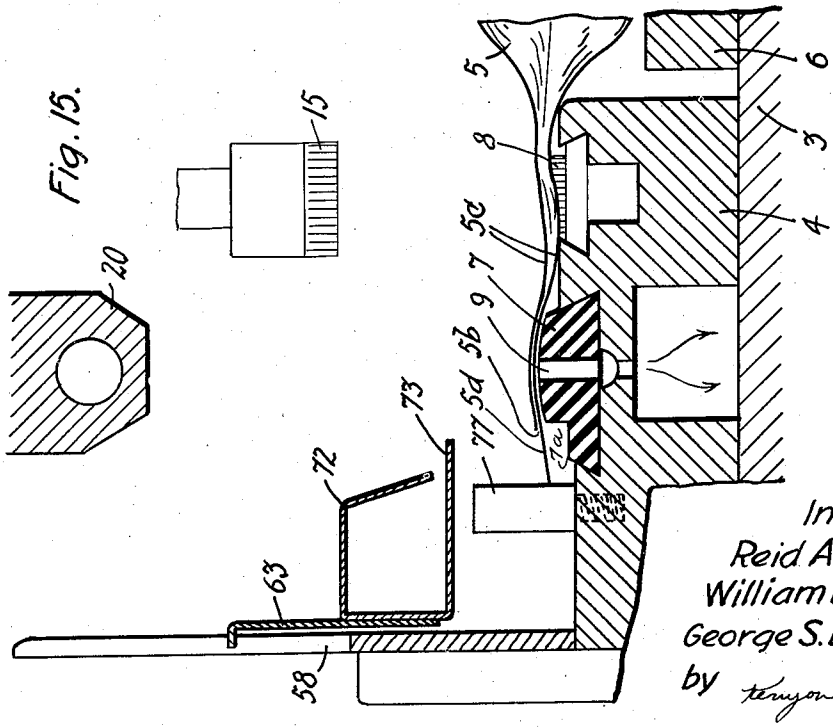


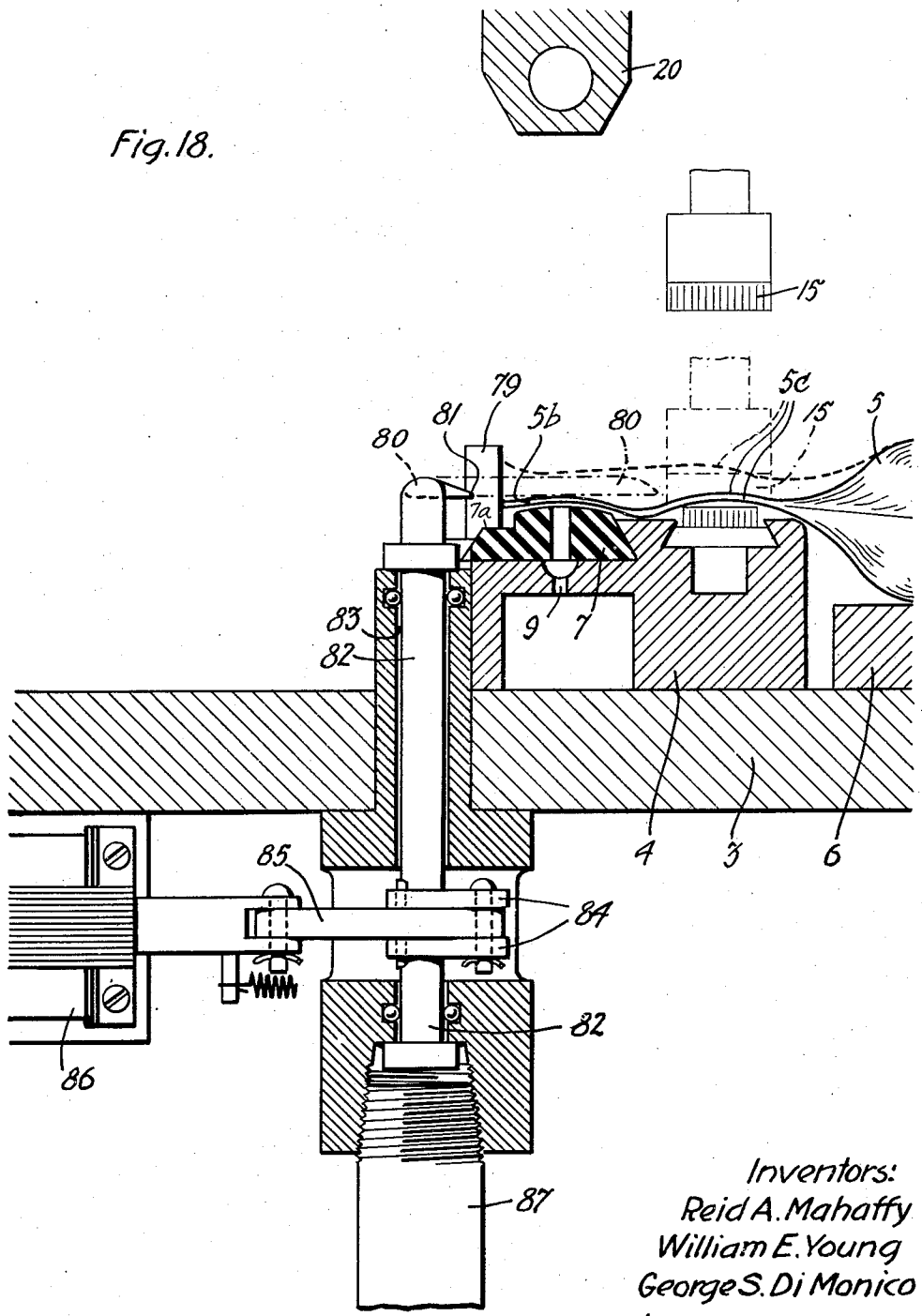
Fig. 15.



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MACHINE AND PROCESS FOR EVACUATING, GASSING
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Fig. 18.



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MACHINE AND PROCESS FOR EVACUATING, GASSING AND SEALING FLEXIBLE CONTAINERS
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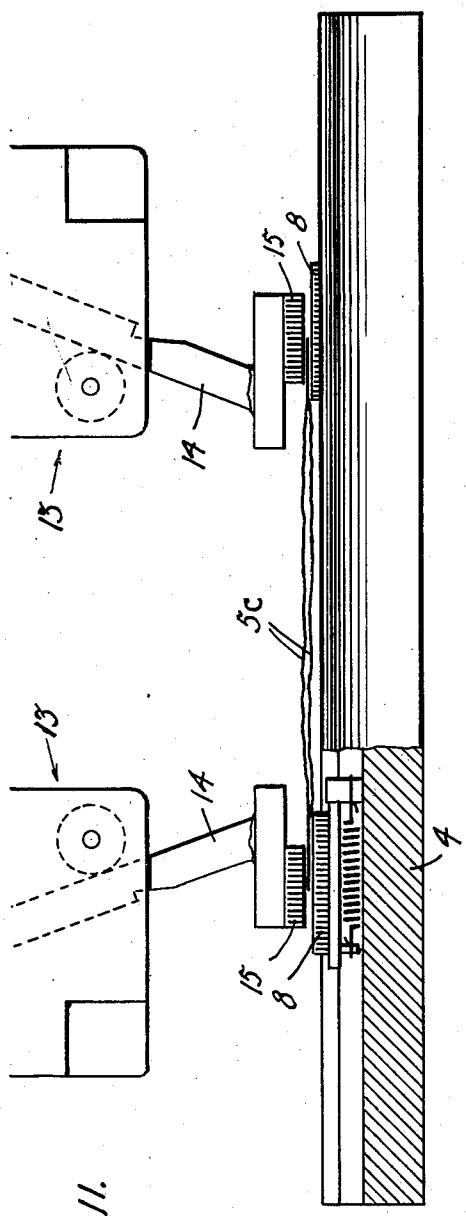


Fig. 11.

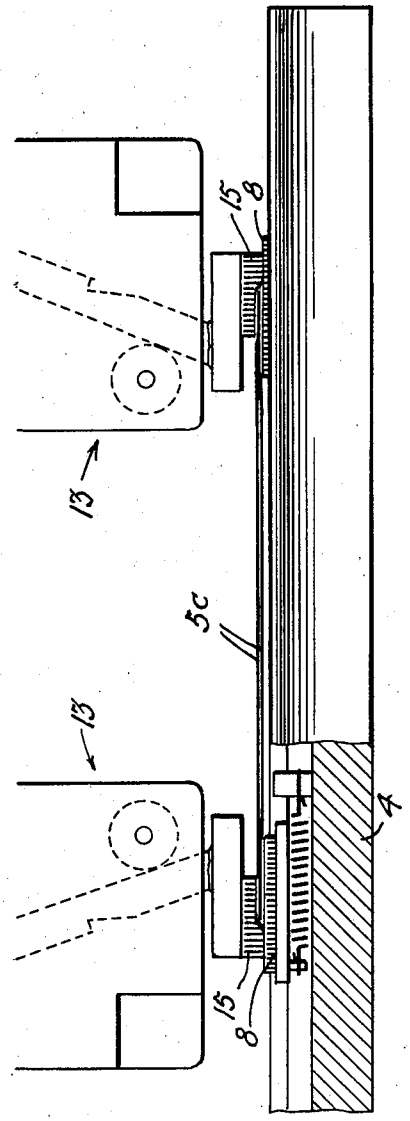


Fig. 12.

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MACHINE AND PROCESS FOR EVACUATING, GASSING AND SEALING FLEXIBLE CONTAINERS

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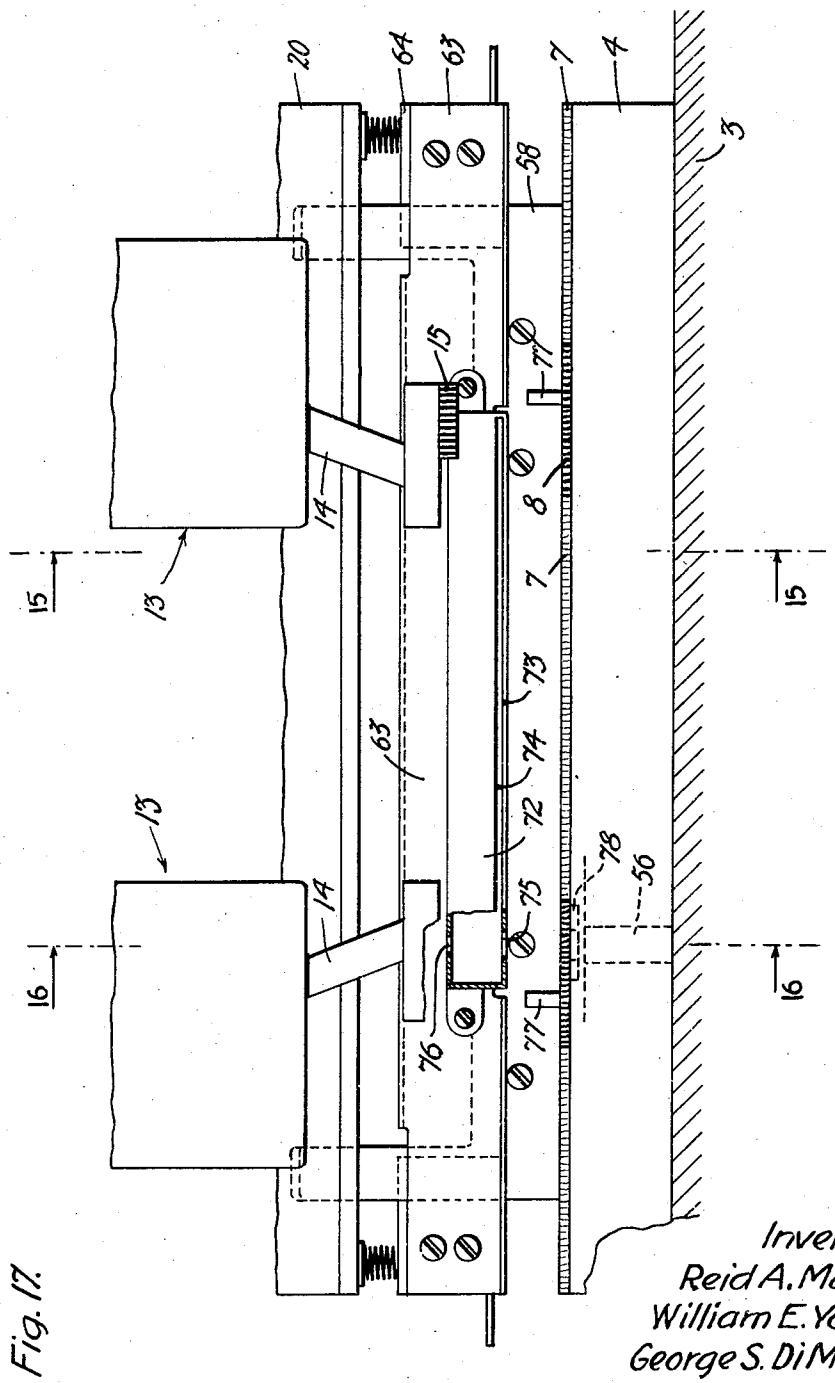


Fig. 17.

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Fig. 19.

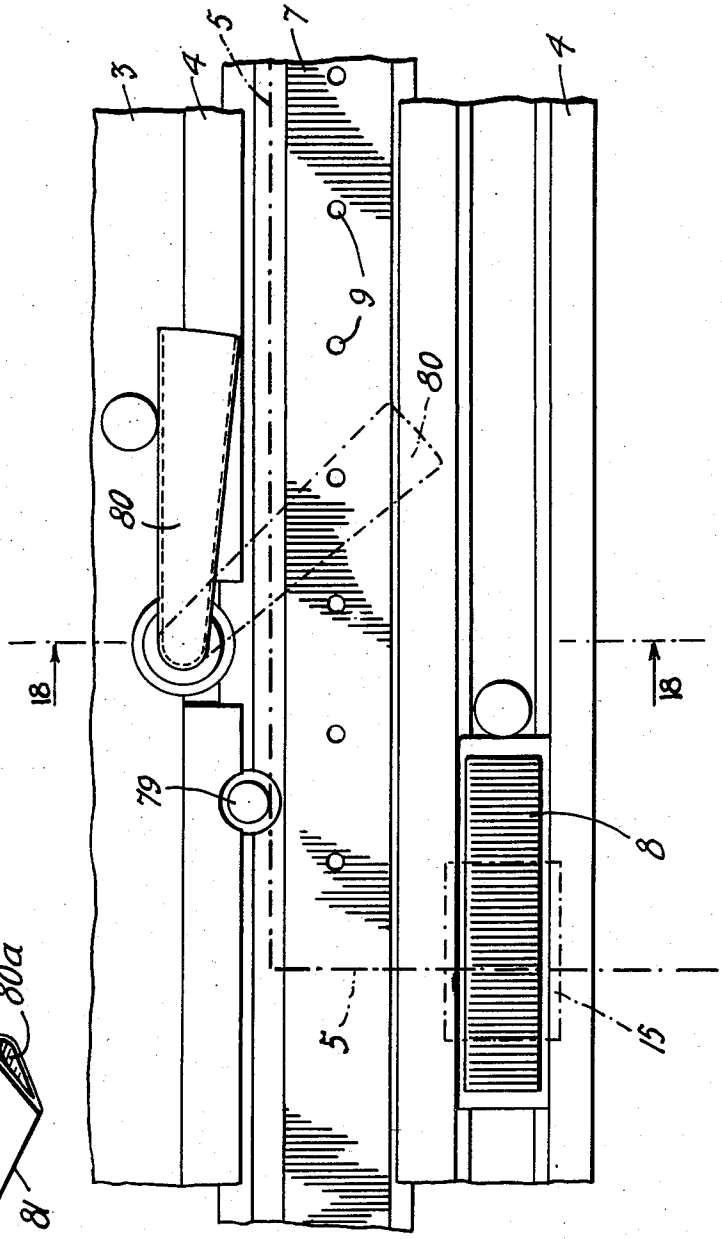
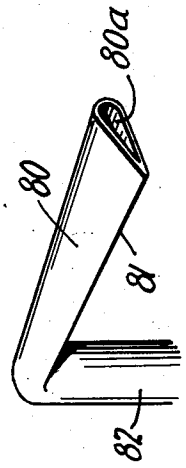


Fig. 20.



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United States Patent Office 2,858,655 Patented Nov. 4, 1958

2,858,655

MACHINE AND PROCESS FOR EVACUATING, GASSING, AND SEALING FLEXIBLE CONTAINERS

Reid A. Mahaffy, Cedar Grove, William E. Young, Ramsey, and George S. Di Monico, East Paterson, N. J., assignors to Standard Packaging Corporation, New York, N. Y., a corporation of Virginia

Application February 18, 1955, Serial No. 489,216

19 Claims. (Cl. 53—86)

This invention relates to a machine and process for evacuating, gassing and sealing flexible containers.

Food and other products are packaged commercially in flexible bags made of gas-tight flexible material, seamed in a gas-tight manner and having a mouth which is hermetically sealable. Usually, the wall portions adjacent to the mouth are heat sealable as to their inner, interfacing, surfaces at least, so that the bag mouth may be heat-sealed closed hermetically.

Machines are in use commercially for evacuating and heat sealing such bags after the food or other products have been placed in the bags. Examples of these machines are disclosed and claimed by the Mahaffy et al. patent applications Serial 392,120, filed November 16, 1953, which issued as Patent No. 2,778,177, dated Jan. 22, 1957 and Serial 394,963, filed November 30, 1953, which issued as Patent No. 2,808,690, dated Oct. 8, 1957. Generally speaking, these machines have a table on which a product-loaded bag is placed, an open-bottomed enclosure or head which closes over the bag and seals with the table's top surface, and, of course, a means for evacuating the head so as to evacuate the bag. Bag mouth stretching fingers may be located inside of the head so as to stretch the bag mouth transversely, and, also inside of the head, is a heat sealing bar which heat seals the bag mouth while the head is under the vacuum. Room atmosphere is then admitted to the head so that it may be opened, the atmospheric pressure collapsing the evacuated, flexible, bag walls against the food or other product in the bag. Practically speaking, the full atmospheric pressure is applied to the bag walls and since they are very flexible the food or other product is compressed by the full atmospheric pressure. Although the vacuum in the bag may not be perfect it is an extremely low pressure as compared to the atmospheric pressure.

Many products may be packaged most effectively in the above manner. However, this kind of packaging procedure introduces problems in connection with certain products. For example, a stack of sliced swiss cheese with its traditional holes creates the problem that the heavy pressure causes the cheese layers to extrude or mold into the holes of adjacent layers, which is considered to be undesirable. Frankfurters, conventionally containing a considerable amount of air, are compacted by the pressure so much that their diameter diminishes with attendant wrinkling of their skins. Other examples can be cited but these suffice to show the problem.

It does not require imagination to see that the above type of difficulty, or any other trouble caused by the high atmospheric pressure, can be avoided by reducing or eliminating the pressure differential between the inside and the outside of the bag. Since the usual object of vacuum packaging is to prevent oxygen from contacting the packaged product, it is equally clear that no imagination is required to substitute nitrogen for the air that would be in the package if the package were closed without the evacuation procedure. As a process it might appear to be simple to reduce the pressure on the packaged product by introducing nitrogen, or other inert, inhibitive or preservative or other gases, to the package while it is in the head with the head and the package under the vacuum.

However, when the described kind of machine is operating under commercial conditions and the nitrogen or other gas is injected in the head after the vacuum has been drawn, it is impossible to drive the gas consistently into the bag within the head when operating in accordance with the prior art relating to gassing of rigid containers generally. In the case of these flexible bags the wall portions forming the bag mouth tend to close like a check valve when the pressure in the head is raised by the injection of the gas.

With the foregoing in mind, one of the objects of the present invention is to provide a machine and process for effecting the described gassing during the evacuation and heat sealing of the bags under commercial conditions. Another object is to provide a means for gassing the bags packaged by the presently available commercial machines and which means is capable of incorporation into the machines without affecting their general reliability or increasing the manufacturing and servicing costs of these machines unduly. In other words, the purpose of the present invention is to provide for the gassing of flexible containers loaded with almost any kind of product including those which are normally processed into the form of evacuated flexible container packages having the full atmospheric pressure bearing on the product. Ordinarily nitrogen is the gas used and normally the bag or container should be gassed to a pressure such as gives a finished package having substantially the same pressure on its inside as the outer atmospheric pressure when the bag or container walls are not displaced outwardly from their normal locations where they lightly contact the packaged product. Any suitable gas may be used instead of nitrogen.

Specific examples of the invention are illusrated by the accompanying drawings in which:

Fig. 1 is a generally vertical cross section taken through the head of a commercial type of evacuating and sealing machine at a location slightly in front of the bag mouth stretching and heat sealing mechanism, this illustrated machine incorporating the principles of the present invention;

Fig. 2 is a longitudinal section of the head taken in a vertical plane on the line 2—2 in Fig. 1;

Fig. 3 is a vertical section taken on the line 3—3 in Fig. 1;

Fig. 4 is a similar section but is taken on the line 4—4 in Fig. 1;

Fig. 5 is a view similar to Fig. 2 excepting that in Fig. 2 the heat sealing bar is shown in its fully closed position whereas in Fig. 5 the heat sealing bar is opening;

Fig. 6 is also like Fig. 2 excepting that here the heat sealing bar, and incidentally the mechanism which operates it as well as the bag mouth stretching mechanism, are all shown at a more advanced opening or lifting phase;

Fig. 7 is a cross section taken on the line 7—7 in Fig. 6;

Fig. 8 is a vertical longitudinal section, extending from the front to the back, of one commercial type of machine incorporating the present invention, certain of the parts being shown somewhat differently from the commercial parts to facilitate the illustration of the construction and operation;

Fig. 9 is an enlarged view of details shown by Fig. 3 with the parts appearing in a general schematic manner as they are after a packed bag is first placed in the machine and the evacuating head is ready to descend or close;

Fig. 10 is the same as Fig. 9 excepting that it shows the parts as they appear during the gassing phase which follows the evacuation;

Fig. 11 is a front view of the bag mouth holding and stretching elements as they appear after the head is closed and during the evacuation and gassing phases;

Fig. 12 is like Fig. 11 excepting that this figure shows the transverse stretching action which occurs just prior to the heat sealing action;

Fig. 13 is generally similar to Fig. 10 except that it shows a modification;

Fig. 14 is a front view of Fig. 13;

Fig. 15 is similar to Fig. 9 excepting that in this instance a modification or second example is illustrated;

Fig. 16 shows this modification and otherwise corresponds to Fig. 10;

Fig. 17 is a front view of the modification shown by the preceding two figures, the section lines in this figure showing the planes on which the correspondingly numbered two preceding figures are taken;

Fig. 18 is a section similar to Figs. 9, 10, etc., but shows a second modification or third example of equipment incorporating the general principles of the present invention;

Fig. 19 is a top view of Fig. 18; and

Fig. 20 is a perspective view showing an important detail of Figs. 18 and 19.

Referring to these drawings, the illustrated machine includes a hollow housing **2** which mounts a slanting or declining table **3** at a convenient height for placing the containers or bags thereon by an operator standing in front of the machines. The general or overall shape of the machine is shown best by Fig. 8, the unillustrated lower portion of the housing **2** being supported by the usual legs or base on the floor of the room where the machines are located. An anvil platform **4** is mounted transversely on top of the table **3** at a location spaced above the lower edge of the table as is shown by Fig. 8. This platform **4** also declines but with less of an angularity than does the table top **3**, so the lower edge of the platform **4** is spaced above the top of the table **3** for a substantial distance. In Fig. 8 one of the described kind of bags **5** is shown with the central areas **5***a* of its opposite walls bulged apart by a product placed within the bag. As shown by Fig. 9, for example, when first placed in the machine the mouth **5***b* of the bag is open and the wall portions **5***c* adjacent to this mouth **5***b* tend to flatten together, the product in the bag being located below these portions **5***c* so as to interspace the adjacent bag wall areas and trap the atmosphere therein.

This platform **4** forms a support for the bag portions **5***c* when the bag is laid on top of the table **3** with these portions overlying the platform **4**. This arrangement has the advantage that the operator necessarily deflects the bag mouth portions **5***c* onto the platform **4**, the deflection being angular with respect to the balance of the bag and tending to smooth and flatten together the bag portions **5***c*. A support **6** may be removably secured to the top of the table in front of the platform **4** so as to hold the bag, the height of this support **6** depending upon the thickness of the bag as caused by its wall portions **5***a* being bulged apart by the product in the bag.

Now the above arrangement is of considerable advantage in connection with the heat sealing operation, or other sealing action, because it brings the bag mouth portions **5***c* flatly together with their inside surfaces more or less intercontacting. In the present instance these inner surfaces are heat sealable. At the same time, this bag mouth condition is disadvantageous in connection with any attempts to gas the bag after the evacuation phase.

The platform **4** supports an elastic heat sealing bar anvil **7** and transversely reciprocatively pressure finger anvils **8**, as shown by Figs. 1 and 2 for example, these being arranged parallel to each other and close together so that the mouth portion **5***c* of the bag may overlie both of them. Holding vacuum holes **9** extend through the platform **4** and the heat sealing bar anvil **7** so that by drawing a vacuum through these holes **9** the lower one of the mouth portions **5***c* is anchored in place once the container is positioned as described. The declination of the table top **3** is sufficient to cause the containers to slide gravitationally downwardly from the table top, and the holding vacuum arrangement just described permits the operator manually to place the bag or container in position so that the container is then anchored by the holding vacuum. Any termination of this vacuum releases the container so that it slides automatically downwardly from the table top.

Above the platform **4** and projecting through a hole in the table top **3** a bearing **10** angles forwardly respecting the machine and in which a tubular mount **11** is reciprocatively arranged. The top of this mount extends above the top of the table **3** and rigidly mounts a bracket **12** which overhangs the platform **4**. This bracket mounts an assembly **13** above the finger pad anvils **8** and this assembly provides guideways which extend diagonally inwardly from the ends of the platform **4**. The pressure finger arms **14** are slidably arranged in each of these guideways and are provided with fingers **15** on their lower ends which press against the bag mouth portion above the anvils **8** and move apart from each other as the bracket **12** moves downwardly with downward motion of the tubular mount **11**. These finger arms **14** are biased downwardly by springs **16**, relative to the assembly **13**, and once the arms are moved upwardly, by the described action, they are held against downward movement, during upward motion of the assembly, by a latch **17** having a release **18** which when moved permits the arms to spring downwardly again. This arrangement is for the purpose of smoothing out the container top prior to its being sealed and, after sealing to prevent the top bag portion from being rumpled which would otherwise occur as the assembly **13** moves upwardly upon completion of the sealing. The mode in which the releases **18** are actuated will be described later.

The bracket **12** mounts the assembly **13** through a cross head **19** which also supports a heat sealing bar **20** located behind the assembly **13**. It is to be understood that the bags have the mouth portions **5***c* which are heat sealable on their insides, whereby the sealing may be effected by heating sealing means. This heat sealing bar **20** has screws **21** extending upwardly from both of its ends through holes formed in the ends of the cross head **19**, the screws **21** fitting these holes in a loose manner. Compression springs **22** between the heads of the screws **21** and the top of the cross head **19** serve to continuously pull the heat sealing bar **20** towards the cross head in an elastic manner, and centrally both the cross head **19** and the heat sealing bar **20** have sockets fitted by a single ball **23**, whereby the heat sealing bar is mounted for limited universal motion with respect to the cross head **19**.

As described so far provision has been made for stretching or smoothing the container or bag mouth portions **5***c* transversely and for heat sealing this mouth portion. As previously explained the container should first be evacuated.

Evacuation of the container is possible because of a bag enclosure by a hollow head **24** having its rear end pivoted to the top of the table top **3** by pivots **25**, this head **24** being shaped to substantially enclose the top of the tubular mount **11**, its bracket **12**, and the parts carried by this bracket, both when the mount is moved up or down, and so as to also enclose the portion of the table top **3** occupied by the container **5** and any support **6** which may be used under the container. This head **24** has an open bottom and an edge seal **26** which seats in a substantially airtight manner on top of the table top **3** when the head is swung downwardly and

closed. When the head is lifted or opened, by swinging it upwardly on its pivot 25, complete freedom is provided for the operator to position the container as has been described.

When the head is lowered and a vacuum is drawn inside of the head, the head is locked to the table by the atmospheric pressure. To permit the seal 26 to seal properly the pivots 25 are in the form of pins fixed to the head 24 and working in elongated openings 27 formed in brackets 28 mounted on the table top. These holes 27 are elongated at right angles to the table top 3 so as to not only permit the head to seat itself properly on the table top but also to permit the head to lift in a vertical direction for a short distance before swinging pivotally when lifting force is applied to the head. This action permits the seal to be lifted cleanly away from the table top without any relative sliding action between the two such as would gradually wear the seal.

The head 24 closes gravitationally and is opened by upward motion of the tubular mount 11, the bracket 12 mounting a roller 29 and the head 24 internally having an abutment 30 engaged by this roller 29 so that the head lifts with lifting motion of the tubular mount. The locations of the roller 29 and abutment 30 are such that when the tubular mount moves downwardly it permits the head to close completely prior to the mount's reaching its lowermost limits, this making allowance for the mount to move further downwardly to actuate the pressure fingers 15, which engage the container mouth portion just about when the head fully closes, and to thereafter bring the heat sealing bar downward to heat seal the mouth portion.

The tubular mount 11 functions as a duct to both evacuate and vent the inside of the head 24. The word "vent" is used in the sense that the part is connected to the atmosphere. The mount also functions as a passageway for a power line 31 for supplying heat to the heat sealing bar 20 which is electrically heated in this instance. The tubular mount 11 is provided with a closure and ports are formed through the side of the tubular mount 11 above this closure and this portion of the tubular mount 11 is surrounded by a manifold 34 through which the tubular mount 11 may slide in a substantially air-tight or sealed manner.

The above sealing is effected by a sliding seal 34*a* which is fitted around the mount 11 directly at the bottom of the manifold 34 which is otherwise a closed unit connected directly to the bottom of the table 3. Thus this single seal seals all of the moving parts which connect with the inside of the head when the head is closed on the table top, insofar as concerns parts required to open the head and to actuate the elements inside of the head.

This manifold 34 includes a valve section 35 through which the manifold connects with a large vacuum pipe 36 which goes to source of vacuum. The valve section 35 contains the valves which are illustrated as being operated by a single operation stem 37. This stem is reciprocated by a lever 38 pivoted on a shaft 39 and having a lower arm 40 which engages a cam 41 keys to the shaft 36*a*. Another cam 42 is shown as also being keyed to the shaft 36*a*, and this cam 42 works a lever 43 having an upstanding arm 44 which engages and lifts an abutment 45 secure to the lower end of the tubular mount 11. The cam 42 has a cam track 42*a* and the lever 43 connects with this cam by way of a follower 43*a* which rides within this track so that the cam positively moves the lever 43 up and down. This, in turn, moves the mount 11 up and down, the bracket 45 being connected with the lever 43 through a tension spring 46.

In operation the contour of the cam track 42*a* causes the mount 11 to be lifted so as to open the head 24 while also lifting the heat sealing bar 20 and the assembly 13 to their uppermost positions. During this lifting

the releases 18 engage the abutments 18*a* mounted within the head 24 so that the springs 16 pull the arms 14 downwardly. At this time the operator places the packed bag on the support 6 with the bag portions 5*c* arranged as previously described. The shaft 36*a* continuously rotates and the contour of the track 42*a* next causes the tubular mount 11 to be pulled downwardly to a position where the fingers 15 press on the bag mouth portions lightly so as to mechanically hold the bag in position the head 24 closing at this time. The cam 41 is contoured so that next the lever 38 is operated to connect the head 24 with the vacuum pipe 36 through the inside of the tubular mount which upwardly opens into the head 24. The valve action may be such as to close all connections with the holding holes 9 at the time the bag was mechanically engaged to hold it in place.

After the full vacuum is drawn within the head 24 the track 42*a* pulls the mount 11 down further so that the fingers 15 are spread apart so as to stretch the bag mouth portions, Fig. 11 showing the initial position of the fingers while Fig. 12 shows the stretching action. The heat sealing bar 20 continues downwardly until the cam follower 44 leaves the abutment 45 slightly so that the mount 11 is pulled downwardly by the full force of the tension spring 46. Continued rotation of the cam 42 then lifts the assembly so as to open the head 24.

The valve section 35 is also arranged so as to connect with the room atmosphere and the cam 42 functions to connect the inside of the head 24 with the room atmosphere prior to the lifting of the head 24.

In the commercial machine the operation is somewhat more complex, but it is not considered that a full explanation is required to understand the present invention.

It can be seen that there is a short dwell between the time the full vacuum is drawn within the head 24 and the time when the mount 11 is pulled further downwardly to effect the bag mouth stretching and sealing operation. If necessary the cam track 42*a* may be contoured to extend this dwell time.

Since the head and the bag are both evacuated during the above dwell it would seem that simply by connecting the head with a source of nitrogen gas, for example, that both the head and the bag would fill immediately with nitrogen gas. This was attempted only to find that few if any of the bags became gassed properly so that the finished bag would have an internal pressure balancing the atmospheric pressure on the outside. Next, efforts were made to eject a jet of the nitrogen gas into the mouth of the bag, as by the partial insertion of a hollow needle or the like. Again it was found that many if not the majority of the finished bags did not contain any substantial amount of the nitrogen gas.

Observation of the bag action by using a transparent vacuum head then showed that if the vacuum is drawn within the head rapidly enough, as is possible with this kind of machine, that the air, trapped within the spaces formed by the bag's bulged apart portions 5*a*, would rush out and puff, blow or bulge apart the bag mouth portions 5*c* and the bag mouth 5*b* itself. As is shown by Fig. 11 both portions 5*c* are gripped at their transverse edge areas by the fingers 15, and the bottom one of these portions 5*c* rests on the heat sealing bar anvil 7. However, the upper one of the portions 5*c* between the fingers 15 is free to puff or blow upwardly to a slight degree when the air rushes from within the bag. This momentarily separates the two bag mouth portions 5*c*. Thus the bag mouth portions may be opened completely longitudinally for at least a part of their transverse extents.

It was then found that when the pressure within the head 24 is suddenly increased by the introduction of

the nitrogen or other gas, at a pressure substantially higher than the low evacuated pressure although possibly less than atmospheric pressure, that the gas attempts to rush into the bag. The bag mouth portions 5c then promptly snap shut with a check valve action so that even though the head is filled with the nitrogen gas, at a pressure approaching or even equalling or exceeding atmospheric pressure, none of this gas may get into the bag. It appears to be a matter of chance as to whether or not the bag becomes gassed, the percentage of gassed bags obtained being far below what is acceptable in most instances.

After considerable study and experimental work a theory was developed along the lines that when the gas rushes into the evacuated bag its velocity through the bag mouth portions is sufficiently great to cause a drop in the pressure between the inner surfaces and the outer surfaces of these portions 5c. The head itself is, of course, rapidly increasing in pressure as it became gassed and this pressure exceeds the pressure inside of the bag mouth whereby to produce the snapping shut of the bag mouth in the fashion of a check valve. This theory is difficult to substantiate by proof but it does serve to account for the peculiar action which prevents consistent gassing of the bags during the dwell just after the bag mouth has been puffed open by the escaping atmosphere and prior to the heat sealing action. Incidentally, the time periods involved are in all cases very short because the described kind of machine must operate at high speed to attain a production rate suitable for commercial purposes. Therefore, both the evacuation and gassing must involve rapid fluid flow rates.

With the discovery of this described theory it then became apparent that some means must be provided for holding open the bag mouth during the gassing period. This period is necessarily very short and the gas must literally rush into the head at a rapid rate to effect the gassing.

According to the present invention the bag mouth may be held or restrained open during the brief gassing period by ejecting at least a part of the gas simultaneously over both the inside and outside surfaces of the free or displaceable one of the bag mouth portions 5c immediately after this portion has been puffed up slightly by the escaping atmosphere from the bag. By maintaining the high velocity over the outside surface the pressure on the inside and outside are equalized to a sufficient degree to prevent or retard adequately the previously described check valve or snapping shut action. In this fashion the bags may be gassed consistently with the machine otherwise operating at its usual high speed. It is also possible to hold the bag mouth open mechanically by swinging in an open-ended conduit providing this penetrates into the bag mouth far enough to reach at least close to the bulged apart bag wall portions. If the penetration is not deep enough the action described above occurs and the bags are not gassed consistently. In the first instance the pressure on the outer surface of the upper bag wall portion is counteracted by pneumatic means which, in effect, applies an opening force by reducing this pressure with respect to that on the inner surface. In the second case a mechanical prop is used on the inner surface.

Referring now again to the drawings, it can be seen that in the preferred form of the invention the usual machine is modified by being provided with a gas duct 47. This duct is controlled by a valve 48 having an operating stem 49 worked by a lever 50 which is pivoted on the shaft 39 and has a lower end 51 provided with a follower 52 which bears on a cam 53 keyed to the shaft 36. This cam 53 is contoured so as to momentarily open the valve 48 just about the time or after the vacuum connection with the inside of the head 24 is terminated under the control of the cam 41 and just about the time or before the tubular mount is drawn downwardly to effect the bag mouth stretching and sealing operations. The machine works so fast that these phases may overlap somewhat. This time period is short and the gas must be introduced at high velocity. Therefore, the gas supply line 54 which connects the valve 48 with the gas supply, has a large chamber 55 connected with it close to the valve 48. This chamber 55 provides a large supply of gas for introduction to the head 24 during the described short time periods, the chamber 55 refilling during the time periods that the valve 48 is closed. Of course, if the source of gas under pressure, such as a large tank of compressed nitrogen, is positioned very close to the machine it may be possible to eliminate this chamber 55.

This duct 47 travels upwardly through the machine and through a hole 56 formed through the table 3 at a location just in front of the bearing or bushing 10. This hole 56 is in the form of a transversely elongated slot into which the bearing 10 subjects to some extent, the slot extending transversely well beyond both sides of the bearing 10. The slot is located just behind the platform 4 and, therefore, just behind the rubber heat sealing bar anvil 7. The duct 47 is relatively large and a large volume of gas can be introduced into the head 24 through this slot 56 in a very short time interval, the gas being supplied to the valve 48 under a relatively high pressure if desired. The time period during which the valve 48 is opened determines the quantity of gas and, therefore, the internal gas pressure attained within the head 24, this pressure normally being somewhat less than atmospheric pressure although it may be the same or even greater. It is also possible to have the gas source substantially at the desired pressure, the use of adequately large ducts and piping combined with the fact that the head 24 is under an almost perfect vacuum serving to give the proper gas pressure within a very short time period.

The general shape of this opening 56 can be understood by looking at Fig. 7. As previously explained the bags cannot be gassed properly by permitting a gust or short blast of nitrogen or other gas to pass through the opening 56 so as to enter the evacuated head.

With the above in mind, a hood or canopy or deflector 56 is positioned above the hole 56 so as to deflect the injecting gas generally towards the anvils 7 and 8. This deflector 57 extends for the length of the long hole or slot 56 and has end panels 57a, the deflector having base portions 57b which are screwed to the table top closely in back of the hole 56.

A long flat guide plate 58 is mounted in an upstanding position above the deflector 57, this plate having a cut-out portion 59 so that the plate straddles the deflector. This plate extends horizontally for a considerable distance to either side of the center line of the tubular mount 11 and it is supported by being fastened with screws 60 to supports 61 which are connected to the platform 4 and located on either side of the bearing or bushing 10. Each end of the plate 58 is extended upwardly to form upstanding guides 62.

In front of this upstanding guide plate 58 and its extension 62 is located a combination bag mouth lip pressing device and gas flow directing device. These devices are combined in the form of a long horizontal upstanding plate 63 which slides up and down on the front faces of the guide parts 58 and 62 against which this plate 63 is held by being provided with guide blocks 64 at both of its ends which extend behind the upstanding part 62. Thus this plate member 63 is guided reciprocatively up and down. Springy pins 63a project from each block so that they are engaged by the edge of the head 24 as the latter descends, its weight forcing the blocks and the plate 63 downwardly.

The lower edge of the plate 63 has a forwardly projecting flange 65 while its upper edge, inwardly from the upstanding parts 62, is formed into a rearwardly extending stiffening flange 66. Centrally the plate 63 has a

horizontally arranged, relatively narrow, slot **67**, the lower edge of this slot being about flush with the upper surface of the forwardly projecting flange **65**. The lower forwardly projecting flange **65** presses downwardly towards a rearwardly extending extension **7***a* of the rubber anvil **7** so that these two elements form a clamp, when the plate **63** is moved downwardly and at this time the slot **67** is registered with the deflector **57** so that gas is ejected forwardly through this slot **67**. The flange **65** separates from the part **7***a* when the plate **63** is lifted, the gas supply being cut off at this time.

For use with this new machine the bags are made with one bag wall longer than the other so that the long wall forms a lip **5***d*. As shown by Fig. 9 this lip **5***d* extends over the extension **7***a* of the rubber anvil when the bag is placed under the head of the machine with the long wall downwardly and against the anvil. When the plate **63** is lowered its flange **65** engages the bag lip **5***d* and anchors that one of the wall portions downwardly. As noted, the bags are placed in the machine with the wall forming the lip **5***d* facing downwardly.

This up and down motion of the plate **63** is effected by rods **68** which project upwardly from the blocks **64**. These rods **68** have hooked ends **69** which are engaged by the cross head **19** when the mount **11** moves upwardly, thus lifting the plate **63**. When the mount moves downwardly the plate **63** is lowered so that its flange **65** presses on the extension of the heat sealing bar anvil and, therefore, on the bag lip **5***d* so as to press the latter downwardly. The weight of the head forces the plate downwardly, the springy pins **63** then being flexed slightly. The rod is rotatively connected to the blocks **64** in each instance so that each rod may be rotated to turn its hooked end **69** to an inoperative position. This is done when the gassing operation is not desired.

With this new machine and using the bags with the long lip **5***d* the evacuating cycle occurs as usual, this evacuation being now done rapidly enough to cause the air in the bag to blow open the upper one of the bag mouth portions **5***c* to at least the limited extent described, it being remembered that the lip **5***d* is anchored downwardly. Promptly after this evacuation step the head is cut off from the source of vacuum by the action of the valve stem **37**, and the lever **50** then opens the valve **48** momentarily so that a short blast of gas, such as nitrogen, is ejected through the opening **56**. A great deal of this gas leaks into the head around the edges of the plate **63** since the latter does not seal tightly with the deflector **57**. A high velocity blast at the same time issues through the slot **67** so as to blow or flow over both the upper and lower surfaces of the upper one of the bag mouth portions **5***c*. This equalizes the pressure so that the upper one of the portions **5***c* does not collapse or snap downwardly and the bag, therefore, fills with gas. Simultaneously, the entire head fills with gas because of the leakage described. This leakage flow, or its equivalent, should be aimed away from the bag mouth. The plate **63** protects the bag mouth from any high velocity gas stream other than that ejected through the slot **67** and aimed substantially at the edge of the upper wall forming the bag mouth **5***b*. The leakage is necessary to cause the bag and the head to fill at about the same rate of pressure increase, this giving the fastest action.

After the gassing the machine goes through the balance of its cycle so as to hermetically seal the gas in the bag and permit the admission of atmospheric pressure to the head **24** so that the latter may be opened. This may not be necessary if the gassing is at atmospheric pressure or greater.

When the hooks **69** are turned to render the plate **63** inactive the machine may be used in its usual fashion. Lugs **70** project forwardly from the plate **63** to function as bag guides when this plate **63** stays downwardly because of its rendered inactiveness as described, thus permitting the use of lipless bags. In such a case the valve **48** is, of course, rendered inactive in its closed condition.

The arrangement described by the foregoing is designed to permit its use with the currently available commercial machines. In some instances better operation may be obtained by surrounding the slot or orifice **67** with a flow guide or hood **71** which is attached to the face of the plate **63**. This is shown by Figs. 13 and 14.

Figs. 15 through 17 show a modification or a second form of the invention. In this case a manifold **72** is secured to the front of the plate **63**, the bottom flange of the latter being cut appropriately to clear this manifold. The forward edge of the manifold **72** has a presser foot **73** above which is a long slot **74** through which the gas is ejected in the manner previously described. In this case gas is carried to the inside of the manifold **72** by reason of the latter having a bottom hole **75** which registers with the duct **56** or its equivalent when the plate **63** is moved downwardly. The gas is also ejected into the head through an orifice **76** which points upwardly. Therefore, there is again the introduction of gas into the head away from the bag mouth in conjunction with the jet-like ejection of the gas over the upper and lower surfaces of the upper one of the bag mouth portions **5***c*. Appropriately located pins **77** assist in proper location of the bag mouth in this instance. The duct **56** may be modified as required to register with the holes **75**. A sealing gasket **78** serves to seal between the duct **56** and the holes **75**. As an interesting point, if this gasket **78** is eliminated fairly effective bag gassing is obtained even though the hole **76** is closed, the leakage due to the missing gasket providing the gas flow directed away from the bag mouth.

A different kind of arrangement is shown by Figs. 18 through 20. This arrangement permits the use of a bag which does not have the lip previously described or, if a lipped bag is used the bag may be positioned with the lip side uppermost. In this case again the pins **79** locate the mouth **5***b* of the bag. A gas duct **80** having a relatively sharp side edge **81** is located within the enclosure formed by the head so that this duct may be swung like a knife in the plane of the bag mouth **5***b* to cause the side edge **81** to cut in or enter the bag mouth which is partly opened because this action occurs while the bag mouth is blown open by the evacuation. This duct **80** is shown as projecting upwardly through the table **3** or its equivalent. The duct having a shaft-like portion **82** which extends downwardly through a sealed hole **83** to below the table **3** where it is connected by a crank **84** and connecting rod **85** with an electric solenoid **86** which may be either manually or automatically actuated. This permits quick removal of the duct or prop so that the heat sealing action may follow.

With the above arrangement actuation of the solenoid **86** rotates the duct **80** so that it enters between the bag mouth portions **5***c* far enough to hold the bag mouth open positively by propping up the inner surface of its portion which would otherwise tend to close when the gas is passed through the duct **80** and out its end **80***a*. The rotative duct portion **82** is connected in a suitable manner with a gas pipe **87** which carries the gas, such as nitrogen, to the open bottom end of the duct portion **82**. A suitable valve may be used to control the flow.

This last arrangement is effective but it has the disadvantage of mechanically moving parts. The other forms of the invention permit the gas flow itself to hold open the bag mouth so that the gas may be forced into the bag. In the last arrangement the gas flows from the bag so as to fill the enclosure. There is no need for any auxiliary leakage flow to fill the enclosure in this case.

In this art the terms containers and bags are used interchangeably. Sometimes one side wall of the container is flat and the other side wall is shaped. However, the present invention is applicable in all cases where the mouth is formed by flexible wall portions which are flatly superimposed so as to define the type of mouth dis-

closed herein. The term "bag" as used in the claims is intended to mean any container having such a mouth.

We claim:

1. A machine for evacuating, gassing and sealing a bag having superimposed flexible walls with interspaced areas containing the atmosphere and having a mouth with the portions of said walls adjacent to said mouth tending to flatten together and said portions being hermetically sealable and said bag being gas-tight when said portions are sealed, said machine including an enclosure for said bag and which opens and closes to permit said bag to be inserted and removed from said enclosure, means within said enclosure for supporting said bag with the said wall portions substantially flat and at least one of said portions free to open from the other of said portions completely in a longitudinal direction for at least a part of its transverse extent, means for sucking the atmosphere from said enclosure to cause the atmosphere in said bag to blow therefrom and force said free wall portion to open while evacuating said enclosure and said bag to a pressure substantially less than atmospheric pressure, means for introducing a gas at a relatively higher pressure than said evacuated pressure into said enclosure while restraining said open bag wall portion from closing until said gas is sucked into said bag and said enclosure, and means within said enclosure for sealing said bag wall portions prior to opening of said enclosure.

2. A machine for evacuating, gassing and sealing a bag having superimposed flexible walls with interspaced areas containing the atmosphere and having a mouth with the portions of said walls adjacent to said mouth tending to flatten together and said portions being hermetically sealable and said bag being gas-tight when said portions are sealed, said machine including an enclosure for said bag and which opens and closes to permit said bag to be inserted and removed from said enclosure, means within said enclosure for supporting said bag with the said wall portions substantially flat and at least one of said portions free to open from the other of said portions completely in a longitudinal direction for at least a part of its transverse extent, means for sucking the atmosphere from said enclosure to cause the atmosphere in said bag to blow therefrom and force said free wall portion to open while evacuating said enclosure and said bag to a pressure substantially less than atmospheric pressure, means for introducing a gas at a relatively higher pressure than said evacuated pressure into said enclosure while restraining said open bag wall portion from closing until said gas is sucked into said bag and said enclosure, and means within said enclosure for sealing said bag wall portions prior to opening of said enclosure, said gas-introducing and wall-portion restraining means including a gas orifice within said enclosure and pointed to flow said gas towards said bag mouth over both the inner and outer surfaces of said free bag wall portion.

3. A machine for evacuating, gassing and sealing a bag having superimposed flexible walls with interspaced areas containing the atmosphere and having a mouth with the portions of said walls adjacent to said mouth tending to flatten together and said portions being hermetically sealable and said bag being gas-tight when said portions are sealed, said machine including an enclosure for said bag and which opens and closes to permit said bag to be inserted and removed from said enclosure, means within said enclosure for supporting said bag with the said wall portions substantially flat and at least one of said portions free to open from the other of said portions completely in a longitudinal direction for at least a part of its transverse extent, means for sucking the atmosphere from said enclosure to cause the atmosphere in said bag to blow therefrom and force said free wall portion to open while avacuating said enclosure and said bag to a pressure substantially less than atmospheric pressure, means for introducing a gas at a relatively higher pressure than said evacuated pressure into said enclosure while restraining said open bag wall portion from closing until said gas is sucked into said bag and said enclosure, and means within said enclosure for sealing said bag wall portions prior to opening of said enclosure, said gas-introducing and wall-portion restraining means including a gas orifice within said enclosure and pointed to flow said gas towards said bag mouth over both the inner and outer surfaces of said free bag wall portion, with the flow velocity over said outer surface at least substantially as high as the flow velocity over said inner surface.

4. A machine for evacuating, gassing and sealing a bag having superimposed flexible walls with interspaced areas containing the atmosphere and having a mouth with the portions of said walls adjacent to said mouth tending to flatten together and said portions being hermetically sealable and said bag being gas-tight when said portions are sealed, said machine including an enclosure for said bag and which opens and closes to permit said bag to be inserted and removed from said enclosure, means within said enclosure for supporting said bag with the said wall portions substantially flat and at least one of said portions free to open from the other of said portions completely in a longitudinal direction for at least a part of its transverse extent, means for sucking the atmosphere from said enclosure to cause the atmosphere in said bag to blow therefrom and force said free wall portion to open while evacuating said enclosure and said bag to a pressure substantially less than atmospheric pressure, means for introducing a gas at a relatively higher pressure than said evacuated pressure into said enclosure while restraining said open bag wall portion from closing until said gas is sucked into said bag and said enclosure, and means within said enclosure for sealing said bag wall portions prior to opening of said enclosure, said gas-introducing and wall-portion restraining means including a gas orifice within said enclosure and pointed to flow said gas towards said bag mouth over both the inner and outer surfaces of said free bag wall portion, and including at least another orifice within said enclosure and pointed to flow said gas into said enclosure away from said bag mouth simultaneously with the injection of said gas over said surface.

5. A machine for evacuating, gassing and sealing a bag having superimposed flexible walls with interspaced areas containing the atmosphere and having a mouth with the portions of said walls adjacent to said mouth tending to flatten together and said portions being hermetically sealable and said bag being gas-tight when said portions are sealed, said machine including an enclosure for said bag and which opens and closes to permit said bag to be inserted and removed from said enclosure, means within said enclosure for supporting said bag with the said wall portions substantially flat and at least one of said portions free to open from the other of said portions completely in a longitudinal direction for at least a part of its transverse extent, means for sucking the atmosphere from said enclosure to cause the atmosphere in said bag to blow therefrom and force said free wall portion to open while evacuating said enclosure and said bag to a pressure substantially less than atmoshperic pressure, means for introducing a gas at a relatively higher pressure than said evacuated pressure into said enclosure while restraining said open bag wall portion from closing until said gas is sucked into said bag and said enclosure, and means within said enclosure for sealing said bag wall portions prior to opening of said enclosure, and means within said enclosure for holding the one of said bag wall portions opposite to said free bag wall portion from moving towards the latter until said gas is sucked into said bag.

6. A machine for evacuating, gassing and sealing a bag having superimposed flexible walls with interspaced areas containing the atmosphere and having a mouth with the portions of said walls adjacent to said mouth tending to flatten together and said portions being hermetically sealable and said bag being gas-tight when said portions are

sealed, said machine including an enclosure for said bag and which opens and closes to permit said bag to be inserted and removed from said enclosure, means within said enclosure for supporting said bag with the said wall portions substantially flat and at least one of said portions free to open from the other of said portions completely in a longitudinal direction for at least a part of its transverse extent, means for sucking the atmosphere from said enclosure to cause the atmosphere in said bag to blow therefrom and force said free wall portion to open while evacuating said enclosure and said bag to a pressure substantially less than atmospheric pressure, means for introducing a gas at a relatively higher pressure than said evacuated pressure into said enclosure while restraining said open bag wall portion from closing until said gas is sucked into said bag and said enclosure, and means within said enclosure for sealing said bag wall portions prior to opening of said enclosure, said gas-introducing and wall-portion restraining means including a gas duct having an orifice located within said enclosure and movable between said open bag wall portion and the opposite one of said portions far enough into said bag to inject said gas into said bag while restraining said open wall portion from closing with the other of said portions until said bag and enclosure are filled with said gas.

7. A machine for evacuating, gassing and sealing a bag having superimposed flexible walls with interspaced areas containing the atmosphere and having a mouth with the portions of said walls adjacent to said mouth tending to flatten together and said portions being hermetically sealable and said bag being gas-tight when said portions are sealed, and said wall portions respectively being long and short so that the former forms a lip, said machine including an enclosure for said bag and which opens and closes to permit said bag to be inserted and removed from said enclosure, means within said enclosure for supporting said bag with said wall portion substantially flat and with said short wall portion free to open from said long wall portion completely in a longitudinal direction for at least a part of its transverse extent, means within said enclosure for clamping said lip to hold said long wall portion against movement, means for sucking the atmosphere from said enclosure to cause the atmosphere in said bag to blow therefrom and force said short wall portion to open while evacuating said enclosure and said bag to a pressure substantially less than atmospheric pressure, means for introducing a gas at a relatively higher pressure than said evacuated pressure into said enclosure and in the form of a flow directed towards said bag mouth and flowing over both the inner and outer surfaces of said short wall portion, until said gas is sucked into said bag and said enclosure, and means within said enclosure for sealing said bag wall portions prior to opening of said enclosure.

8. A machine for evacuating, gassing and sealing a bag having superimposed flexible walls with interspaced areas containing the atmosphere and having a mouth with the portions of said walls adjacent to said mouth tending to flatten together and said portions being hermetically sealable and said bag being gas-tight when said portions are sealed, and said wall portions respectively being long and short so that the former forms a lip, said machine including an enclosure for said bag and which opens and closes to permit said bag to be inserted and removed from said enclosure, means within said enclosure for supporting said bag with said wall portion substantially flat and with said short wall portion free to open from said long wall portion completely in a longitudinal direction for at least a part of its transverse extent, means within said enclosure for clamping said lip to hold said long wall portion against movement, means for sucking the atmosphere from said enclosure to cause the atmosphere in said bag to blow therefrom and force said short wall portion to open while evacuating said enclosure and said bag to a pressure substantially less than atmospheric pressure, means for introducing a gas at a relatively higher pressure than said evacuated pressure into said enclosure and in the form of a flow directed towards said bag mouth and flowing over both the inner and outer surfaces of said short wall portion, until said gas is sucked into said bag and said enclosure, and means within said enclosure for sealing said bag wall portions prior to opening of said enclosure, said gas-introducing means flowing a portion of said gas into said enclosure away from said bag mouth simultaneously with said flow directed towards said mouth.

9. A gas-tight flexible bag evacuating, gassing and sealing machine including an enclosure for the bag and means for successively evacuating and gassing this enclosure and thereafter sealing the bag, this machine being characterized by having a gas inlet orifice for the enclosure which orifice is directed to force at least some of the gas to flow over the outer surface of at least one of the bag walls during the gassing.

10. A gas-tight flexible bag evacuating, gassing and sealing machine including an enclosure for the bag and means for successively evacuating and gassing this enclosure and thereafter sealing the bag, this machine being characterized by having means for introducing the gas to the enclosure at a rate normally applying a closing force to the outer surface of at least one of the bag's mouth portions as the gas attempts to rush through the bag's mouth and by having means for at least balancing this closing force with an opening force applied to the inner surface of said portion.

11. A gas-tight flexible bag evacuating, gassing and sealing machine including an enclosure for the bag and means for successively evacuating and gassing this enclosure and thereafter sealing the bag, this machine being characterized by having means for introducing the gas to the enclosure at a rate normally applying a closing force to the outer surface of at least one of the bag's mouth portions as the gas attempts to rush through the bag's mouth and by having means for at least balancing this closing force with an opening force applied to the inner surface of said portion through the medium of pneumatic pressure.

12. A gas-tight flexible bag evacuating, gassing and sealing machine including an enclosure for the bag and means for sucessively evacuating and gassing this enclosure and thereafter sealing the bag, this machine being characterized by having means for introducing the gas to the enclosure at a rate normally applying a closing force to the outer surface of at least one of the bag's mouth portions as the gas attempts to rush through the bag's mouth and by having means for at least balancing this closing force with an opening force applied to the inner surface of said portion and through the medium of a mechanical support.

13. A machine for evacuating, gassing and sealing a bag having superimposed flexible walls with interspaced areas containing the atmosphere and having a mouth with the portions of said walls adjacent to said mouth tending to flatten together and having heat-sealing inner surfaces, said machine including an enclosure for said bag and which opens and closes to permit said bag to be inserted and removed from said enclosure, a reciprocating heat-sealing bar and an anvil therefor within said enclosure and means for supporting said bag with the said portions flat on said anvil and with the one of said portions located away from said anvil free to open from the other of said portions completely in a longitudinal direction for at least a part of its transverse extent, means for sucking the atmosphere from said enclosure to cause the atmosphere in said bag to blow therefrom and force said free wall portion to open while evacuating said enclosure and said bag to a pressure substantially below atmospheric pressure, means for introducing a gas at a relatively higher pressure than said evacuated pressure to said enclosure rapidly enough to apply a pneumatic clos-

ing pressure to the outer surface of said free wall portion before said bag fills with said gas, and means for applying at least enough opening force to the inner surface of said free bag wall portion to counteract said closing pressure.

14. A machine for evacuating, gassing and sealing a bag having superimposed flexible walls with interspaced areas containing the atmosphere and having a mouth with the portions of said walls adjacent to said mouth tending to flatten together and having heat-sealing inner surfaces, said machine including an enclosure for said bag and which opens and closes to permit said bag to be inserted and removed from said enclosure, a reciprocating heat-sealing bar and an anvil therefor within said enclosure and means for supporting said bag with the said portions flat on said anvil, and with the one of said portions located away from said anvil free to open from the other of said portions completely in a longitudinal direction for at least a part of its transverse extent, means for sucking the atmosphere from said enclosure to cause the atmosphere in said bag to blow therefrom and force said free wall portion to open while evacuating said enclosure and said bag to a pressure substantially below atmospheric pressure, means for introducing a gas at a relatively higher pressure than said evacuated pressure to said enclosure rapidly enough to apply a pneumatic closing pressure to the outer surface of said free wall portion before said bag fills with said gas, and means for applying at least enough opening force to the inner surface of said free bag wall portion to counteract said closing pressure, this last-named means comprising a mechanical support associated within said enclosure and movable into engagement with said inner surface prior to said gas introduction, far enough to prop said free wall portion completely open longitudinally and removable therefrom subsequently to permit said heat sealing bar to clamp said portions together as said anvil for heat sealing said portion's inner surfaces together.

15. A machine for evacuating, gassing and sealing a bag having superimposed flexible walls with interspaced areas containing the atmosphere and having a mouth with the portions of said walls adjacent to said mouth tending to flatten together and having heat-sealing inner surfaces, said machine including an enclosure for said bag and which opens and closes to permit said bag to be inserted and removed from said enclosure, a reciprocating heat-sealing bar and an anvil therefor within said enclosure and means for supporting said bag with the said portions flat on said anvil, and with the one of said portions located away from said anvil free to open from the other of said portions completely in a longitudinal direction for at least a part of its transverse extent, means for sucking the atmosphere from said enclosure to cause the atmosphere in said bag to blow therefrom and force said free wall portion to open while evacuating said enclosure and said bag to a pressure substantially below atmospheric pressure, means for introducing a gas at a relatively higher pressure than said evacuated pressure to said enclosure rapidly enough to apply a pneumatic closing pressure to the outer surface of said free wall portion before said bag fills with said gas, and means for applying at least enough opening force to the inner surface of said free bag wall portion to counteract said closing pressure, this last-named means comprising a gas orifice aimed to inject a high-velocity stream of the gas over the outer surface of said free bag wall portion, and means for feeding said orifice with at least a portion of the gas introduced into said enclosure.

16. A machine for evacuating, gassing and sealing a bag having superimposed flexible walls with interspaced areas containing the atmosphere and having a mouth with the portions of said walls adjacent to said mouth tending to flatten together and having heat-sealing inner surfaces, said machine including an enclosure for said bag and which opens and closes to permit said bag to be inserted and removed from said enclosure, a reciprocating heat-sealing bar and an anvil therefor within said enclosure and means for supporting said bag with the said portions flat on said anvil and with the one of said portions located away from said anvil free to open from the other of said portions completely in a longitudinal direction for at least a part of its transverse extent, means for sucking the atmosphere from said enclosure to cause the atmosphere in said bag to blow therefrom and force said free wall portion to open while evacuating said enclosure and said bag to a pressure substantially below atmospheric pressure, means for introducing a gas at a relatively higher pressure than said evacuated pressure to said enclosure rapidly enough to apply a pneumatic closing pressure to the outer surface of said free wall portion before said bag fills with said gas, and means for applying at least enough opening force to the inner surface of said free bag wall portion to counteract said closing pressure, said bag wall portions being respectively long and short so that the long portion may be positioned against said anvil to form a lip, and means within said enclosure for engaging said lip and holding it against movement towards said short wall portion during said gas introduction.

17. A machine for evacuating, gassing and sealing a bag having superimposed flexible walls with interspaced areas containing the atmosphere and having a mouth with the portions of said walls adjacent to said mouth tending to flatten together and having heat-sealing inner surfaces, said machine including an enclosure for said bag and which opens and closes to permit said bag to be inserted and removed from said enclosure, a reciprocating heat-sealing bar and an anvil therefor within said enclosure and means for supporting said bag with the said portions flat on said anvil and with the one of said portions located away from said anvil free to open from the other of said portions completely in a longitudinal direction for at least a part of its transverse extent, means for sucking the atmosphere from said enclosure to cause the atmosphere in said bag to blow therefrom and force said free wall portion to open while evacuating said enclosure and said bag to a pressure substantially below atmospheric pressure, means for introducing a gas at a relatively higher pressure than said evacuated pressure to said enclosure rapidly enough to apply a pneumatic closing pressure to the outer surface of said free wall portion before said bag fills with said gas, and means for applying at least enough opening force to the inner surface of said free bag wall portion to counteract said closing pressure, this last-named means comprising a gas orifice aimed to inject a high-velocity stream of the gas over the outer surface of said free bag wall portion, and means for feeding said orifice with at least a portion of the gas introduced into said enclosure, said bag wall portions being respectively long and short so that the long portion may be positioned against said anvil to form a lip, and means within said enclosure for engaging said lip and holding it against movement towards said short wall portion during said gas introduction.

18. A process for evacuating and gassing a flexible bag located within an enclosure, said process including applying suction to said enclosure and thereafter introducing gas into said enclosure so that this gas is sucked into said bag, said suction being applied rapidly enough to force said bag's mouth to open and said gas introduction being rapid enough so that suction within said bag tends to close said bag's mouth, said process further including applying a pneumatic opening force to said bag's mouth during said gas introduction.

19. A process for evacuating and gassing a flexible bag located within an enclosure, said process including applying suction to said enclosure and thereafter introducing gas into said enclosure so that this gas is sucked into said bag, said suction being applied rapidly enough to force said bag's mouth to open and said gas introduction being

rapid enough so that suction within said bag tends to close said bag's mouth, said process further including applying a pneumatic opening force to said bag's mouth during said gas introduction by forcing a jet of gas at high velocity over an outer surface of said bag's mouth and substantially parallel thereto.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

November 4, 1958

Patent No. 2,858,655

Reid A. Mahaffy et al.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 5, line 60, for "keys" read -- keyed --; column 8, line 18, for "subjects" read -- projects --; line 43, for "56", first occurrence, read -- 57 --; column 13, lines 33 and 34, for "in luding" read -- including --; line 52, for "enc osure" read -- enclosure --.

Signed and sealed this 3rd day of February 1959.

(SEAL)
Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents