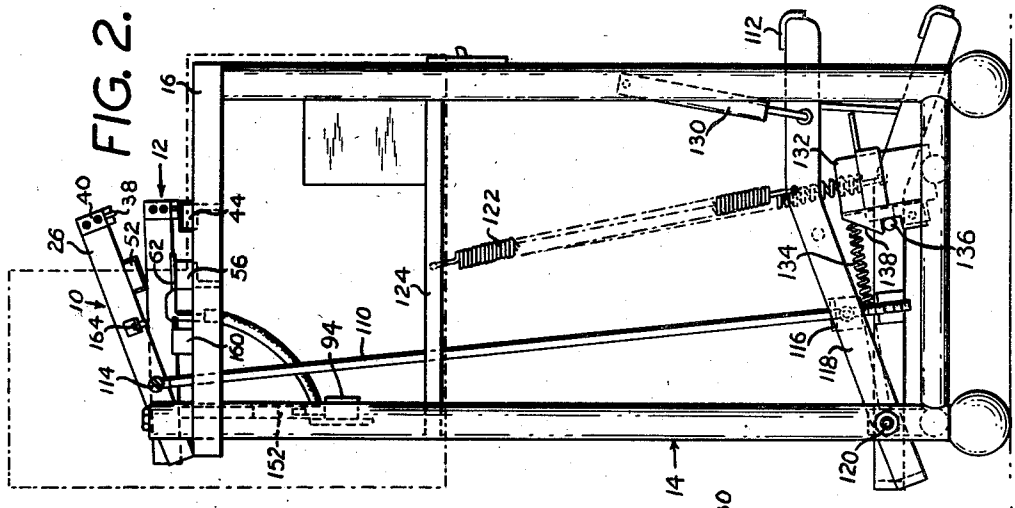
July 30, 1957 E. M. SCHILD 2,800,756

PEDAL OPERATED VACUUM FORMING AND HEAT SEALING PACKAGING MACHINE

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FIG. 2.



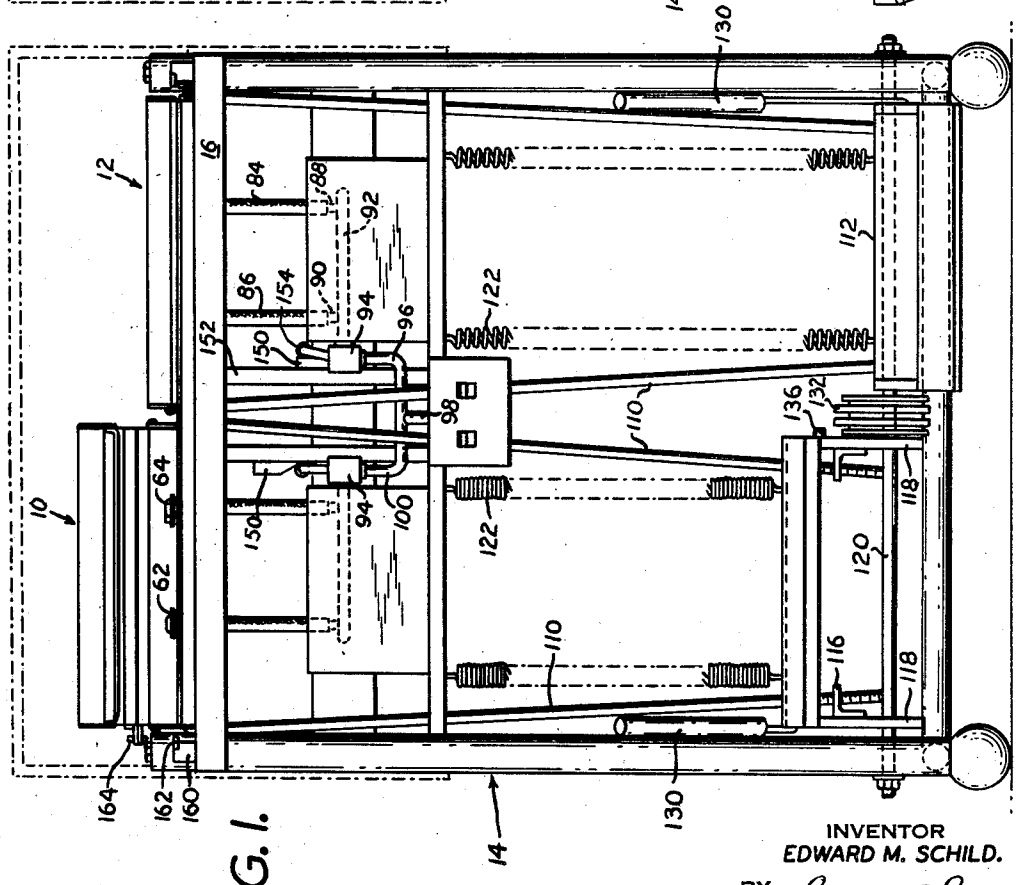


FIG. 1.

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FIG. 3.

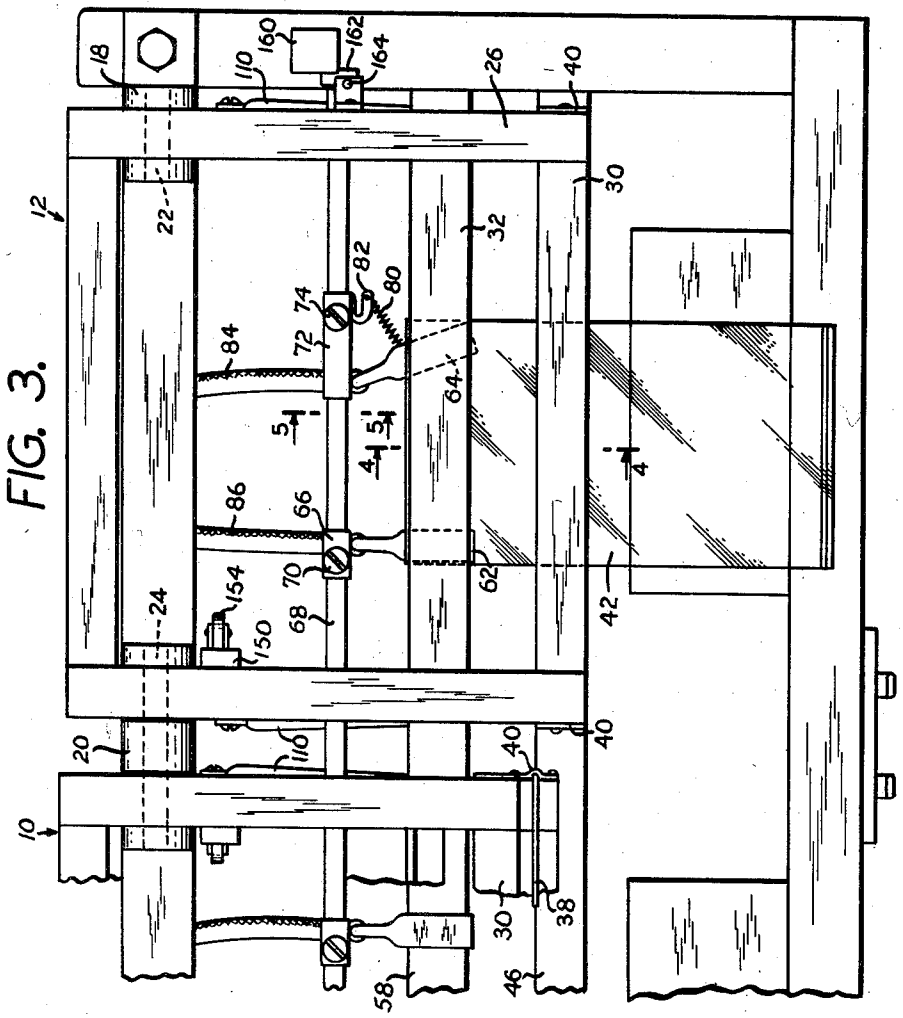


FIG. 4.

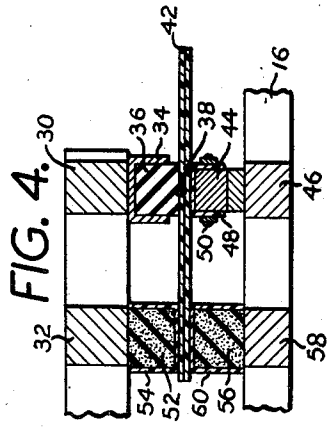


FIG. 5.

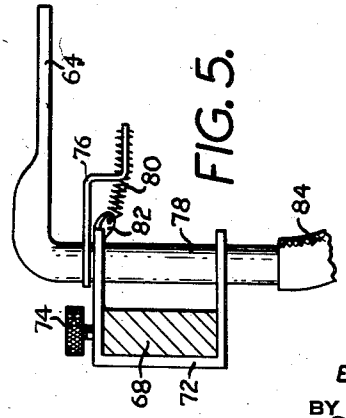
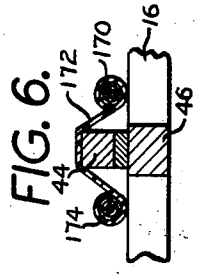


FIG. 6.



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United States Patent Office 2,800,756 Patented July 30, 1957

2,800,756

PEDAL OPERATED VACUUM FORMING AND HEAT SEALING PACKAGING MACHINE

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Application February 13, 1956, Serial No. 564,920

8 Claims. (Cl. 53—79)

This invention relates to a pedal operated vacuum forming and heat sealing packaging machine.

It constitutes an improvement over the machine covered by Patent No. 2,723,789 which was issued to me on November 15, 1955 in the sense that it involves a novel and substantial development of said machine to adapt it for prdouction runs.

My said patented machine comprises a single unit requiring the full-time services of an operator. In other words, a single operator would normally be unable to operate more than one such machine at a time. This limitation, naturally, limits the output of a given operator to the capacity of a given machine.

The principal object of the present invention is the provision of a mechanism which is connected to two machines of the character herein described to enable both machines to be operated by a single operator utilizing the full speed or capacity of both machines at the same time.

It will be understood that a complete working cycle for each such machine extends over a given period of time, depending on various factors which are individual to each type of packaging material and each type of food product or other product to be packaged therein. During a part of this work cycle the machine operates independently of the operator who is thereby free to turn his attention elsewhere. More specifically, as the operator actuates one of a pair of machines joined by the mechanism herein claimed, and prior to the time the working cycle of said machine terminates, he may turn his attention from said actuated machine to the other machine which awaits his attention. Once the second machine is actuated, the operator may return to the first machine to complete its working cycle while the second machine continues to function. Another working cycle may then be commenced on the first machine and attention may then be turned to the second machine to complete the working cycle there and to start a new one. In short, there is no interruption of the working cycle of each machine and no prolongation thereof nor is there any excessive time interval between working cycles of each machine and consequently a single operator may utilize the full capacity of two machines by means of the actuating mechanism herein described and claimed.

To be more specific, my patented machine and the machine herein claimed both involve the use of heat-sealnig means to seal a plastic bag or the like. Depending upon the material of which the bag is made and a number of other factors, a certain time interval is required between the application of the heat sealing means and the conclusion of the heat sealing operation to effect a good seal. An operator using my said patented machine or any other heat sealing machine known to the prior art, would mentally time the exposure of the bag to the heat sealing means, as by counting from one to a given number. This is clearly wasteful of the operator's time and in addition the results are not always good in view of the human element involved.

In the use of the present invention, the heat sealing means may be applied to a bag on one machine and the operator may then turn to the other machine to remove a sealed bag and to replace it with an unsealed bag and to apply the heat sealing means thereto. The time it takes to do these things corresponds to the time required for the heat sealing means on the first machine to seal the first mentioned bag properly so that the operator may now remove said sealed first bag from the first machine and replace it with an unsealed bag. There is no need in this procedure for the operator to mentally measure the time of each heating or sealing operation.

The mechanism herein claimed which enables a single operator to operate two machines includes automatic means for de-activating either of said machines when the other is activated. More specifically, when the heat sealing means is energized and applied to a bag on one machine, the heat sealing means on the other machine will automatically become de-energized and at the same time will disengage the bag on said other machine. A single treadle on each machine causes the heat sealing means to become energized and to be applied to the work. As each treadle is actuated, it automatically trips a catch on the other treadle and releases said other treadle to an inactive position.

There are other important features in the present invention. For example, each machine is provided with two nozzles which are adapted to enter the mouth of a bag and to stretch the bag out flat preparatory to the vacuum forming and heat sealing operations. Both nozzles are adjustably mounted to adapt the machine to bags of various sizes and one of said nozzles is pivotally mounted and spring-urged to automatically straighten the bag and spread it out as required. Another feature is the use of a straight wire or rod backed by a solid rubber support for applying a line pressure to the bag at the heat sealing station. This has the effect of localizing the pressure so as to concentrate it within a given area instead of dissipating it throughout a much larger area. Still another feature involves the use of replaceable coverings for the pressure pads and the heat sealing member.

The invention is illustrated in the accompanying drawing in which:

Fig. 1 is a front view of a machine or pair of machines made in accordance with this invention.

Fig. 2 is a side view thereof.

Fig. 3 is a fragmentary top view of said machine.

Fig. 4 is a fragmentary sectional view on the line 4—4 of Fig. 3.

Fig. 5 is another fragmentary section on the line 5—5 of Fig. 3.

Fig. 6 is a fragmentary section showing a modified form of covering for the heat sealing element.

There are two heat sealing and packaging machines 10 and 12 in the present invention which are mounted in the same frame 14 and are operated together in the manner herein described. The two machines are identical so that a description of one is a description of both. There is a common table 16 which relates to the two machines and is supported on the same frame 14. At the back of the table is a plurality of bearings, one at each end and designated 18 and one in the center designated 20. Bearings 18 support a pinion 22 and bearing 20 supports a pinion 24 and these pinions are in axial alignment with each other. They support a pair of frames 26, one for each machine, and said frames are pivotable about the common axis of said pinions as Fig. 2 clearly shows. Each

frame 26 may be considered and termed the head of the machine to which it is connected.

It will be observed that each head 26 is provided with a pair of crossbars 30 and 32 respectively. Crossbar 30 is situated at the front of head 26 and it supports a channel member 34 of inverted "U" shape. Mounted in said channel is a rubber bar 36 and it will be observed that a wire or rod 38 extends the full length of said rubber bar 36, along the bottom of said bar, and that the ends of said wire 38 are bent upwardly and clamped to the ends of said crossbar 30 by means of clamp members 40. This wire 38 serves as a pressure bar to press the open mouth of a plastic bag 42 flat upon itself and against a heating element 44 which heat seals the bag in conventional manner.

Heating element 44 is supported on a crossbar 46 on table 16. Said heating element is covered by a plastic channel 48 of inverted "U" shape. Said plastic channel is removably secured to the heating element 44 by means of fastening elements 50 so that it may be replaced when worn. A preferred plastic material for this purpose is Teflon made by E. I. du Pont de Nemours & Co., which is a plastic consisting of a tetrafluorethylene polymer.

Supported by crossbar 32 is a rubber pad 52 which is covered by a nylon covering 54 or any other covering capable of protecting it and suitable for the various purposes of this invention. Nylon is used in the present device because it is strong, flexible and resistant to abrasion, in addition to which it is easily kept clean. A similar rubber pad 56 is supported on a crossbar 58 carried by the table 16 and a nylon covering 60 is also provided on pad 56. Both of these rubber pads are quite resilient and capable of conforming to the contours of nozzles 62 and 64 as hereinafter described. Preferably, the rubber pads are made of foam rubber.

It will be understood from the foregoing, that when it is desired to heat seal a plastic bag 42, it is placed upon the heating element 44 and the rubber pad 56 and the two nozzles 62 and 64 are inserted into said bag. The head 26 is then brought down in order to press the pad 52 upon the open mouth of said bag to hold it flat against itself and against the two nozzles 62 and 64. As will hereinafter be seen, said nozzles are connected to a suction pump and it is by this means the bag may be evacuated. Bringing the head 26 down also brings the wire 38 into engagement with the bag below the nozzles and presses the bag against the heating element 44 so that after the bag is evacuated its open mouth may be heat sealed.

Turning now to the two nozzles 62 and 64, it will be observed that nozzle 62 is supported by a bracket 66 which is slidably mounted on a crossbar 68 supported by frame 14. A set screw 70 on said bracket 66 engages the crossbar 68 and locks the nozzle in any selected position thereon.

Nozzle 64 is similarly mounted on a bracket 72 but whereas nozzle 62 is fixedly supported by its bracket, nozzle 64 is swivelly mounted on bracket 72 as Fig. 3 clearly shows. Bracket 72 is slidably mounted on crossbar 68 and a set screw 74 on said bracket engages said crossbar to clamp the bracket at any desired location thereon. An arm 76 is secured to the vertical portion 78 of nozzle 64 and a tension spring 80 is secured at one end to said arm and at its opposite end to an arm 82 on bracket 72. Said spring acts upon nozzle 64 to urge it to pivot in counterclockwise direction as viewed in Fig. 3. Nozzle 62 abuts one end of the open mouth of bag 42 and nozzle 64 abuts the opposite end of said open mouth and applies spring tension thereto in order to spread the bag out as far as it will go. It will be noted that a tube 84 is connected at one end to the vertical portion 78 of nozzle 64 and a similar tube 86 is connected to the corresponding portion of nozzle 62. These two tubes are connected at their opposite ends to a vacuum pump as will shortly be seen.

Tubes 84 and 86 are connected to stud pipes 88 and 90 respectively which are joined to a manifold 92. This manifold is itself connected to a valve 94 which, in turn, is connected to a pipe 96. Pipe 96 is a branch which leads off from a main pipe 98, the opposite branch 100 leading to another valve 94 on the other machine. Main pipe 98 is connected to a suction pump (not shown) and it is by this means that a suction force may be applied through the nozzle to the bag.

It has been stated above that the two heads 26 are pivotally mounted and the means for operating them will now be described. Connected to each head 26 is a pair of long rods 110 and these rods extend downwardly to a treadle 112. The rods are pivotally secured at their uppper ends to the head 26 by means of bolts 114 and they are in screw-threaded adjustable engagement at their lower ends with brackets 116. These brackets are pivotally secured to the side frame members 118 of treadle 112. The side frame members themselves are pivotally secured at their back ends to the frame 14 by means of bolts 120. The normal position of treadle 112 is the upper position shown in Fig. 2 and it is normally maintained in said position by means of a pair of long tension springs 122 which are connected at their lower ends to the side frame members 118 of the treadle and at their upper ends to bars 124 of frame 14. It is necessary to step upon the treadle in order to push it downwardly against the action of springs 122, this movement being clockwise as viewed in Fig. 2.

Since the rods 110 link head 26 to the treadle 112, depressing the treadle will cause the head to pivot downwardly into operative position against the bag. In order to release the bag following the head sealing operation it is necessary to elevate the head and this can only be done when the treadle itself is elevated. The force which elevates the treadle is applied to it by the two springs 122 and in order to prevent a too energetic movement of the treadle and head in response to the spring action, a shock absorber 130 is provided between one of the side members 118 and the frame 14.

It will now be seen that operation of the treadle of either of the two machines 10 and 12 automatically releases the treadle of the other machine. Between the two treadles is a pair of pivotally mounted keepers 132 which are supported by the frame of the machines. A spring 134 is connected at one end to each of said keepers and at the opposite end to the frame of the machines. The action of spring 134 is to cause the keepers to pivot leftwardly or in counterclockwise direction as viewed in Fig. 2. It will now be seen that each treadle is provided with a laterally extending pin 136 which is engageable with one of said keepers when the treadle to which the pin is affixed is depressed to its lower position as shown in Fig. 2. The keepers are fixed to each other to move in unison and each is provided with an inclined cam edge 138. Assuming that one of the treadles is in its lower position with its pin 136 engaged by one of said keepers 132, when the other treadle is depressed, its pin 136 will engage the cam edge 138 of the other keeper and will cam said other keeper rightwardly, as viewed in Fig. 2, against the action of spring 134. Since the two keepers move integrally with each other, the first mentioned keeper will thereby be forced out of engagement with the first mentioned pin 136, thereby releasing the first mentioned treadle for upward movement in response to the action of springs 122. At the same time, the second mentioned treadle will be held in its lower position by reason of engagement of the second keeper with the pin on said second treadle, such engagement taking place as soon as said pin passes the cam edge 138 of said second keeper and enables the spring 134 to move said keeper leftwardly as viewed in Fig. 2 and into holding engagement with said pin.

It will now be observed that this alternate movement of the two treadles not only operates the two heads **26** but also controls the vacuum system. Each machine is provided with a cam **150** supported by a bar **152** which extends downwardly from the head **26**. A cam follower **154** is mounted on valve **94** which, in turn, is supported by the frame of the machine. As the head **26** descends to its operative position against a bag, cam **150** engages the cam follower **154** and opens the valve **94**, thereby applying suction to the bag through the nozzles. At the conclusion of a heat sealing operation, the head **26** is caused to move upwardly, thereby disengaging said cam follower **154** from the cam **150** and closing the suction valve.

The foregoing relates to the vacuum system of the machine but a similar process takes place at the same time in connection with the electrical system thereof. Reference is here made to a micro-switch **160** which has a switch arm **162** engageable by an adjustable screw member **164**. The micro-switch is mounted on the frame of the machine and the adjustable screw is mounted on the head **26**. When the head is brought down into operative position, the adjustable screw engages the switch arm and closes the circuit to the heating element **44**, thereby energizing said heating element and fusing the open mouth of the bag together. At the conclusion of the heat sealing operation the head is elevated and said adjustable screw disengages the switch arm and de-energizes the heating element.

The foregoing is illustrative of a preferred form of this invention and it will be understood that this preferred form may be modified and other forms may be provided within the board spirit of the invention and the broad scope of the claims. By way of illustration, Fig. 6 discloses a possible variation in the mounting and replacement of the Teflon covering on the heating element. It is shown in Fig. 6 that the Teflon may be provided in the form of a roll **170** which may be unwound to provide a covering **172** for the heating element **44** and the consumed or worn portion of said Teflon covering may be rolled up in the form of a second roll **174** which may ultimately be discarded when the supply from roll **170** is deplete.

I claim:

1. A pedal-operated vacuum forming and heat sealing machine for forming a vacuum in heat sealable bags and heat sealing the same, comprising a frame, first vacuum-forming and heat sealing means on one side of said frame, second vacuum forming and heat sealing means on the other side of said frame, treadles connected to said first and second vacuum forming and heat sealing means, said treadles being movable downwardly to operate said vacuum forming and heat sealing means and being movable upwardly to render said vacuum forming and heat sealing means inoperative, a pair of catches which are engageable with said treadles in their downward positions, and means for releasing the catch of either of said treadles when the other treadle is moved downwardly to engage the other catch and to operate the vacuum forming and heat sealing means to which it is connected.

2. A machine in accordance with claim 1, wherein the two treadles are spring-urged upwardly, the two catches are also spring-urged, said treadles being provided with laterally extending pins which are engageable with said catches, said catches being provided with cam faces which are engageable by said pins when the treadles are moved downwardly against the spring action upon them, said catches being connected to each other and movable integrally with each other into and out of engagement with said pins, whereby downward movement of one of said treadles brings its pin into camming engagement with the cam face of one of said catches and cams said catch and the other catch connected thereto to a position wherein said other catch is adapted to release the pin of the other treadle and whereby further downward movement of said first mentioned treadle causes its said pin to disengage the cam face of the first mentioned catch and to enable said catch to engage the pin and thereby to lock said first treadle in downward position.

3. A machine in accordance with claim 1, wherein each vacuum forming and sealing means comprises a sub-frame which is pivotally mounted on the frame of the machine, a pressure pad on said machine frame and a cooperative pressure pad on said sub-frame, a second pressure pad on the sub-frame and a cooperative heating element on the machine frame, and suction means on said machine frame between the first mentioned pressure pads on the sub-frame and machine frame, said suction means being insertable into the open mouth of a heat sealable bag and said sub-frame being pivotally movable downwardly to bring said first mentioned pressure pads into engagement with the bag to support it against said suction means and to seal the bag between the second mentioned pressure pad on the sub-frame and the heating element on the machine frame, said pivotable sub-frame being linked to one of said treadles, whereby downward movement of the treadle causes a downward pivotal movement of said sub-frame and upward movement of the treadle causes a corresponding upward movement of said sub-frame.

4. A machine in accordance with claim 3, wherein the suction means comprises a pair of nozzles which occupy a substantially common horizontal plane, one of said nozzles being laterally movable toward and away from the other nozzle and being provided with clamping means for clamping it in a selected position relative to said other nozzle, said other nozzle being also laterally movable toward and away from the first nozzle and being provided with means for clamping it in any selected position relative to the first nozzle, said other nozzle being also mounted for pivotal movement about a vertical axis independently of its lateral movement and being provided with spring means for urging it to swing pivotally away from the first nozzle, whereby, when a bag is placed over the two nozzles, the first nozzle will engage one side of the bag and the other nozzle will resiliently engage the opposite side of the bag, thereby spreading the bag to eliminate and avoid creases which might interfere with the heat sealing operation.

5. A machine in accordance with claim 3, wherein the two pressure pads on the sub-frame are fixed thereto against movement relative thereto, and the pressure pad on the machine frame and the heating element on the machine frame are fixed thereto against movement relative thereto, the two pressure pads on the sub-frame being positioned to register, respectively, with the pressure pad and heating element on the machine frame when the sub-frame is pivoted downwardly in the direction of the machine frame so as to bring the two pressure pads on the sub-frame into cooperative relation with the pressure pad and heating element on the machine frame.

6. A vacuum-forming and heating sealing machine for forming a vacuum in heat sealable bags and then heat sealing the same, comprising a frame, a pressure pad and a heat sealing element mounted on said frame on one side thereof, a sub-frame pivotally mounted on said frame adjacent said pressure pad and heat sealing element, said sub-frame being provided with a pair of pressure pads which are registrable with the pressure pad and heat sealing element on said frame when the sub-frame is pivoted downwardly in the direction of said frame, an additional pressure pad and an additional heat sealing element mounted on said frame on the opposite side thereof, a second sub-frame pivotally mounted on said frame adjacent said additional pressure pad and heat sealing element, a pair of pressure pads on said second sub-frame positioned to register with said additional pressure pad and heat sealing element when said second sub-frame is pivoted downwardly in the direction

of said frame, suction nozzles between the pressure pads on the frame and the registering pressure pads on the subframes, actuating rods connected at their upper ends to said sub-frames and at their lower ends to a pair of foot treadles pivotally mounted on said frame, one on each side thereof, spring means connected to said treadles and urging them to pivot upwardly in order to cause the sub-frames to pivot upwardly, thereby requiring foot pressure upon said treadles to pivot them downwardly against the action of said springs and thereby to pivot the sub-frames downwardly in the direction of the frame, a catch for each treadle which engages the treadle when it is pivoted downwardly to hold it in downward position, and release means on each catch operating to release the other catch so that as each treadle is pivoted downwardly the other treadle will be released to pivot upwardly.

7. In a vacuum-forming and heat sealing machine for forming a vacuum in heat sealable bags and heat sealing the same, wherein two separate vacuum-forming and heat sealing devices ae provided, each operated by a foot treadle and being spring-urged to inoperative position, a catch for each treadle to hold it in actuated position, and release means whereby the catch of a previously actuated treadle is released to release said treadle to inoperative position when the other treadle is subsequently actuated and held by its catch in operative position.

8. In a vacuum-forming and heat sealing machine in accordance with claim 7, wherein each catch is provided with a hook portion and a cam portion, the two catches being fixed against movement relative to each other and being mounted for pivotal movement relative to said treadles, each treadle being provided with a pin which is engageable with the cam portion of the catch which relates to said treadle in order to cam both catches about their pivotal axis from a first position to a second position when said treadle is actuated and thereby to enable said pin to approach the hook-portion of said catch, spring means being provided to urge the two cams from the second position to the first position when said pin disengages said cam portion to enable said hook portion to engage the pin and thereby to hold the treadle in actuated position.

No references cited.