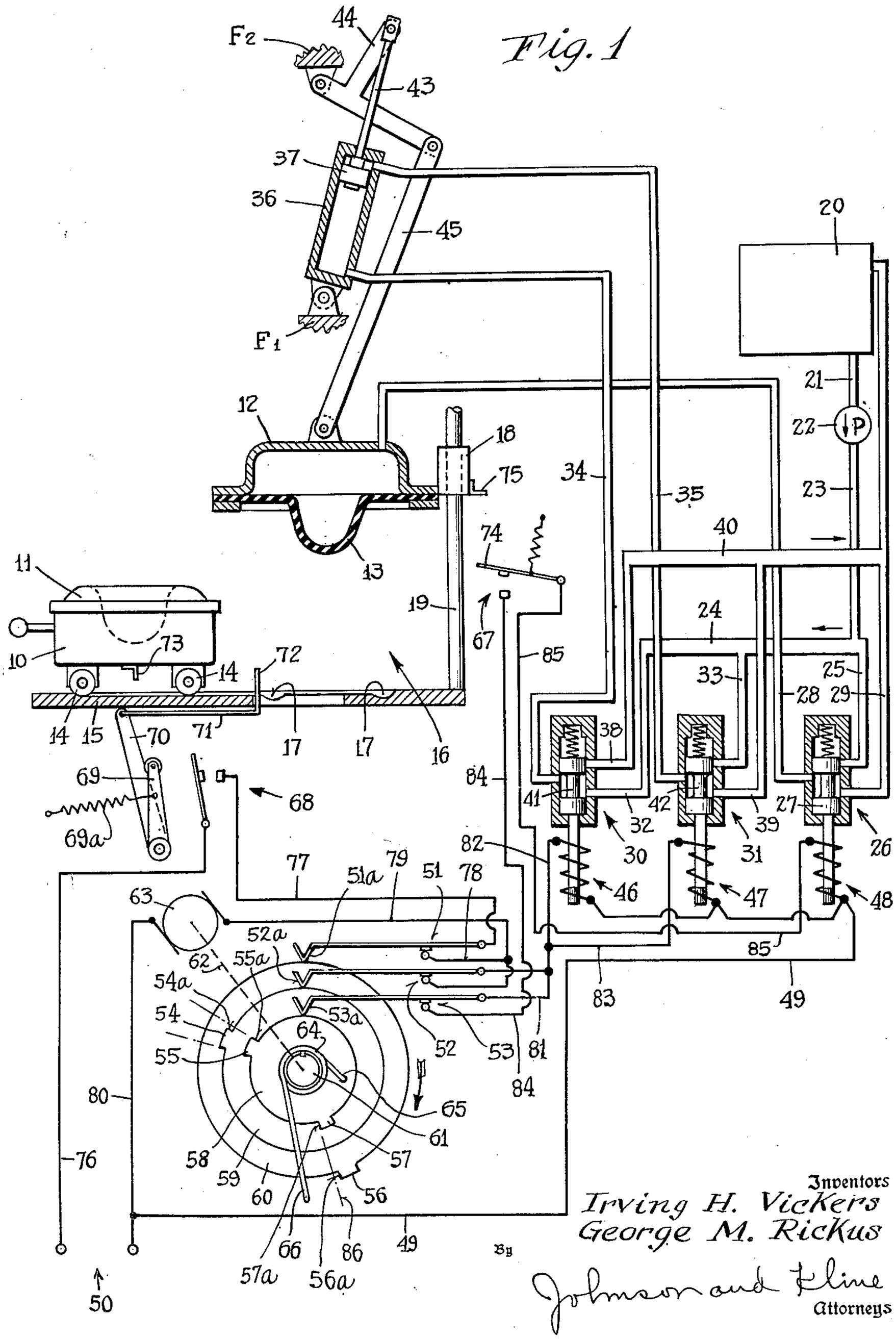
Jan. 6, 1953 I. H. VICKERS ET AL 2,624,495

HAT PRESSING APPARATUS

Filed Sept. 8, 1949 2 SHEETS—SHEET 1

Fig. 1




Inventors
Irving H. Vickers
George M. Rickus

By Johnson and Kline
Attorneys

Jan. 6, 1953

I. H. VICKERS ET AL

2,624,495

HAT PRESSING APPARATUS

Filed Sept. 8, 1949

2 SHEETS--SHEET 2

Fig. 3

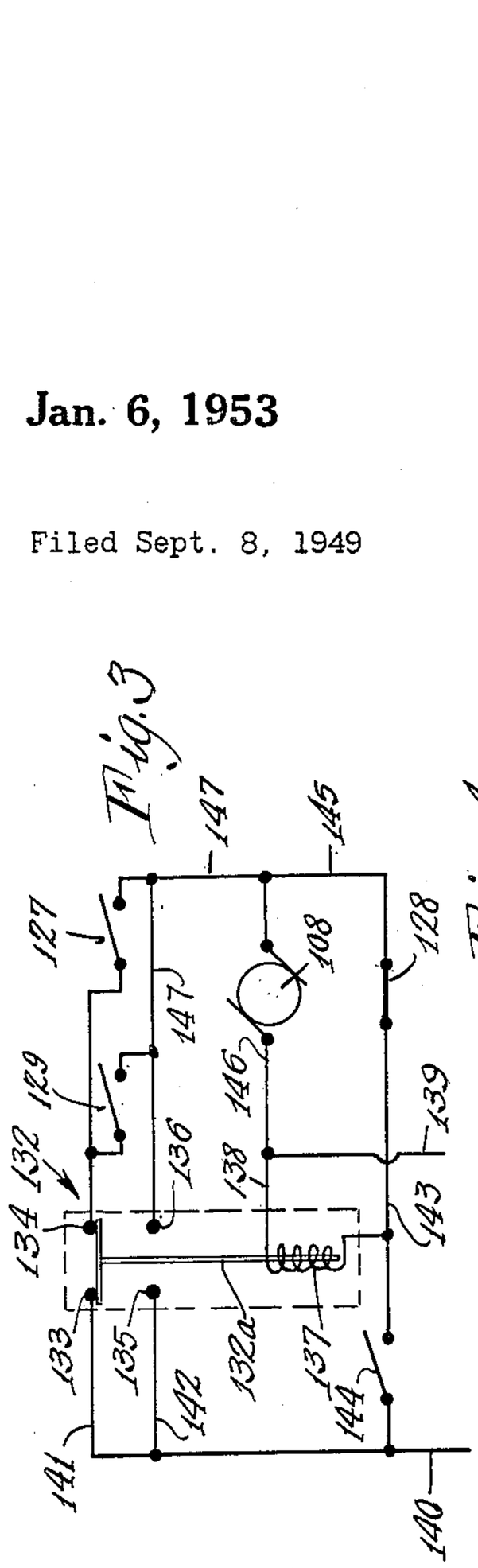



Fig. 4

OPERATION CHART

| DESCRIPTION OF OPERATION | 144 | 129 | 129 | 127 | 95 | 96 | 97 | 98 | RELAY 132 |
|---|---|---|---|---|---|---|---|---|---|
| | SWITCHES | | | | VALVES | | | | |
| AT REST | O | C | O | O | O | C | C | O | UP |
| START | C | | O | O | O | C | C | O | DOWN |
| RAISE RAM | O | | C | C | C | O | C | C | UP |
| APPLY PRESSURE | | | C | C | C | O | C | C | STOP |
| RELEASE PRESSURE | | | O | O | O | C | C | O | GO |
| LOWER RAM | | | C | C | C | O | C | C | STOP |
| RAISE RAM | | | O | O | O | C | C | O | GO |
| DUMP | | | | | | | | | |
| APPLY PRESSURE | | | C | C | C | O | C | C | STOP |
| RELEASE PRESSURE | | | O | O | O | C | C | O | GO |
| LOWER RAM | | | C | C | C | O | C | C | STOP |
| STOP | | | O | O | O | C | C | O | GO |




Fig. 2.

Inventors

Irving H. Vickers

George M. Rickus

By

Johnson and Kline

Attorneys

Patented Jan. 6, 1953 2,624,495

# UNITED STATES PATENT OFFICE

2,624,495

## HAT PRESSING APPARATUS

Irving H. Vickers, Fairfield, and George M. Rickus, Norwalk, Conn., assignors to Hat Corporation of America, Norwalk, Conn., a corporation of Delaware

Application September 8, 1949, Serial No. 114,594

17 Claims. (Cl. 223—13)

1

This invention relates to hat presses.

An object of the invention is to provide an improved semi-automatic power-operated hat press which quickly and efficiently shapes and presses a hat body, and provides an improved, consistently uniform pressing thereof at all times.

A further object of the invention is to provide an improved hat press as above, which is simple in construction and economical to fabricate, and reliable in operation.

Each of the embodiments of the invention illustrated herein, by which these objects are accomplished, comprises a mould for a hat body, and a cooperable pressing head having an inflatable rubber bag shaped to be received by the mould. The mould and pressing head are mounted for positioning either apart from each other whereby a hat body may be placed in or removed from said mould, or close together whereby they may cooperate with each other to press the hat body. Power-operated means are provided, triggered either by manually-effected movement of the hat mould from a loading and unloading position to the operating station, as illustrated in one embodiment, or merely by a push button switch as disclosed in another embodiment for automatically carrying out a pressing cycle wherein the mould and pressing head are brought together and held so for a predetermined interval of time and the rubber bag inflated under sufficient pressure to press a hat body carried in the mould, the bag being then deflated and the head separated from the mould, and wherein at some predetermined time during said pressing interval the bag is automatically momentarily deflated and the head momentarily separated from the mould to effect a desirable, controlled "bumping" of the hat body, i. e. allowing the escape of moisture therefrom. By this organization the bumping of the hat body is accurately and reliably provided for during each pressing operation, and a close regulation may be had of the time interval, pressures employed, etc. whereby desirable efficiency and uniformity of the pressing operation is accomplished.

Another object of the invention is to provide an improved semi-automatic hat press arranged to automatically bump a hat body during the pressing operation, wherein the actuation of the pressing head and inflation of the rubber bag are effected from the same power source.

Other features and advantages will hereinafter appear.

In the accompanying drawings:

Figure 1 is a diagrammatic representation of an improved hat press apparatus made according to the invention, the frame of the apparatus not being shown.

2

Fig. 2 is a diagrammatic representation of an improved hat press constituting another embodiment of the invention.

Fig. 3 is a schematic circuit diagram of the hat press shown in Fig. 2, and

Fig. 4 is a chart showing the operations of the parts of the hat press of Figs. 2 and 3 during a single cycle.

The apparatus shown in Fig. 1 comprises a hat mould 10 having the usual saddle 11, and a pressing head 12 provided with an inflatable rubber bag 13. The mould 10 is movably mounted by means of wheels 14 and a track 15, and may be positioned at two different locations, at a loading and unloading station shown in the figure, and at an operating station the location of which is generally indicated by an arrow 16.

The tracks 15 have depressions 17 in which the wheels 14 of the mould 10 may rest when the mould is at the operating station, whereby the mould is accurately positioned and yieldably retained in this position.

The pressing head 12 is provided with bearing sleeves 18 whereby it may be slidably carried on vertical bars 19 connected in predetermined relation with the tracks 15, thereby to enable the head to occupy a raised or retracted position as shown in the figure, or a lowered position at the operating station 16.

In accordance with the invention power-operated means are provided, triggered by movement of the mould 10 from the loading position shown toward the operating station 16, for automatically carrying out a pressing cycle wherein the pressing head 12 is lowered and held for a predetermined interval of time in cooperable relation to the mould 10 while both are at the operating station 16, and the rubber bag 13 inflated under sufficient pressure to press a hat body carried in the mould. The pressing cycle is terminated by deflation of the bag 13 and raising of the pressing head 12 whereupon the mould 10 may be returned to the loading position shown for removal of the pressed hat body.

The present invention provides for a desirable, automatic release of moisture, generated in the hat body being pressed, during the pressing operation, and in accomplishing this the bag 13 is automatically momentarily deflated and the head 12 momentarily raised and separated from the mould at a predetermined time during the pressing cycle. Once the said cycle has been initiated it is automatically carried out to completion and the pressing time and pressures and bumping of

the hat body closely controlled, whereby a highly desirable, uniformly efficient pressing of the hat body is effected. Moreover, by the present invention, the power required to actuate the pressing head 12 and also to inflate the rubber bag 13 may be derived solely from a single source.

In accomplishing the above, a source of fluid under pressure is provided, which may comprise a tank 20 having an outlet pipe 21 connected with a pump 22 which in turn feeds into a pipe 23 joined to a manifold 24.

From the manifold 24 a pipe 25 leads to a valve 26 having a plunger 27 and an outlet through a pipe 28 which connects with the interior of the pressing head 12 whereby fluid under pressure may be fed to the head to inflate the rubber bag 13. The valve 26 has a second outlet connected with a pipe 29 which is joined to the storage tank 20, and it will be understood from an inspection of the figure that when the valve 26 is in the position shown, fluid pressure is relieved from the water bag 13 and fluid may flow therefrom through the pipes 28, 29 to the tank 20. If the plunger 27 of the valve 26 should be raised, it will cut off communication to the pipe 29, and will enable the pipes 25 and 28 to communicate with each other whereby fluid will be forced into the bag 13 and cause inflation thereof.

Raising and lowering of the pressing head 12 is accomplished by actuation of valves 30 and 31 respectively, said valves having intake ports connected with pipes 32 and 33 which are joined to the manifold 24. The valves 30 and 31 respectively have outlet ports connected with pipes 34 and 35 which respectively connect with opposite ends of a cylinder 36 pivotally mounted on a frame member $F_1$ and carrying a piston 37.

The valves 30 and 31 also have outlet ports connected with pipes 38 and 39 which are in turn connected with a manifold 40 joined to the pipe 29 leading to the tank 20.

The valves 30 and 31 have plungers 41 and 42 respectively, and when said plungers are in the positions shown fluid under pressure will exist in the pipes 32 and 34, and in the cylinder 36 so as to maintain the piston 37 in the raised position indicated. If the valve plungers 41 and 42 should be raised, the pipe 34 will be made to communicate with the pipe 38 whereby fluid may flow out of the lower portion of the cylinder 36 through the said pipes, and through the pipes 40 and 29 to the storage tank 20. At the same time, fluid under pressure from the pump 22 will flow through the pipes 33 and 35 and into the upper end of the cylinder 36, and will force the piston 37 downward to a lowered position in the cylinder.

Movements of the piston 37 are utilized to shift the pressing head 12 between its raised position shown and its lowered position at the operating station 16. To accomplish this, the piston 37 is connected with a piston rod 43 which is pivotally joined to one arm of a bell crank 44 carried by a frame member $F_2$; the other arm of the crank is pivotally connected by a link 45 to the pressing head 12.

In accordance with the invention means are provided for automatically actuating the valves 26, 30 and 31 to carry out the pressing and bumping cycle mentioned above in response to movement of the hat mould 10 to the operating position 16. This means includes solenoids 46, 47 and 48 respectively connected to actuate the valve plungers 41, 42 and 27. The solenoids each have one terminal connected with a wire 49 which leads to one of two electrical supply terminals 50.



For controlling the solenoids 46, 47 and 48 three single pole, single throw switches 51, 52 and 53, which may be microswitches are provided, arranged in a bank and having cam portions 51*a*, 52*a* and 53*a* arranged to be actuated by lugs or projections 54, 55, 56 and 57 provided on disks 58, 59 and 60 rigidly secured to a common shaft 61. A mechanical drive is provided, indicated by the broken line 62, between the shaft 61 and an electric motor 63 whereby the disks 58, 59 and 60 may be rotated clockwise as indicated by the arrow. A releasable friction clutch (not shown) may be provided in the drive between the motor 63 and the disks 58, 59 and 60, and a helical coil spring 64 may be carried by the shaft 61 and anchored to the disks at 65, the other end 66 of the spring being anchored to a frame member of the apparatus (not shown). The spring 64 is adapted to yieldably oppose the clockwise movement of the said disks. By this organization, when the mechanical drive between the shaft 61 and the motor 63 is disconnected by the friction clutch mentioned, the spring 64 may function to return the disks to a starting position, such as for example the position shown in the figure.

The control organization is completed by a pair of limit switches 67 and 68 actuated respectively by the pressing head 12 and the hat mould 10. The switch 68 is closed by engagement with a pivoted arm 69 which is normally urged to the position shown by spring 69*a* and is rigid with a second pivoted arm 70 connected to a link 71 having an upwardly extending projection 72 adapted to be engaged by a depending lug 73 on the underside of the mould 10. The adjustment is such that the switch 68 will be closed when the mould 10 reaches the operating station 16.

The switch 67 is a normally open switch and has an arm 74 engaged by a lug 75 carried by the bearing sleeves 18 which mount the pressing head 12, the adjustment being such that the switch 67 will be closed when the head reaches its lowermost position at the operating station 16 where it is cooperable with the mould 10.

Connections between the switches and solenoids described above are as follows. From one of the supply terminals 50 a wire 76 leads to the switch 68; a wire 77 connects the other terminal of the switch to the cam switch 51. The other terminal of the switch 51 is connected by a wire 78 with a terminal of the switch 52, and by a wire 79 with one terminal of the motor 63 the other terminal of which is connected by a wire 80 to the wire 49. The remaining terminal of the switch 52 is connected by a wire 81 with one terminal of the switch 53 and by wires 82 and 83 to the remaining terminals of the solenoids 46 and 47. The remaining terminal of the switch 53 is connected by a wire 84 with the switch 67, and the remaining terminal of the latter connected by a wire 85 with the remaining terminal of the solenoid 48.

Considering the arrangement of the lugs 54, 55, 56 and 57 on the disks 58, 59 and 60, a preferred relationship is that shown wherein for a uniform speed of rotation of the disks the width of the lug 54 will be approximately equal to ¼ of the arc of the disk 59 disposed between the said lug and the camming portion 52*a* of the switch 52. Also the width of the lug 54 will be approximately ⅛ of the arc of the disk 59 disposed between the said lug and dot-and-dash line 86 projected from the foremost or leading edge 57*a* of the lug 57. The speed of travel of the disks 58, 59 and 60 is preferably such that one minute will

elapse before the lug 55 begins to engage the cam portion 53*a* of the switch 53; also such that the camming portions 52*a* and 53*a* of the switches will be engaged by the lugs 54 and 55 respectively for an interval of approximately 15 seconds and thereafter an interval of two minutes will ensue before the leading edge 57*a* of the lug 57 engages the camming portion 53*a* of the switch 53. Cycles having other sequential periods may be provided as required.

It will be understood that the switch 68 acts as a master switch for the control device; also, that when the switches 68, 51 and 52 are closed the solenoids 46 and 47 will be energized, causing the pressing head 12 to be lowered. When these switches are opened, the said solenoids will be deenergized, resulting in the pressing head 12 being raised. Moreover, when the switches 68, 51, 52, 53 and 67 are closed the solenoid 48 will be energized causing the rubber bag 13 to be inflated, and whenever any of these switches is opened, the solenoid will be deenergized resulting in deflation of the bag 13. Normally such deflation is accomplished solely by the opening of the switch 53 during the normal operation of the apparatus, inasmuch as the leading edges 55*a* and 57*a* of the lugs 55 and 57 are positioned slightly ahead of the leading edges 54*a* and 56*a* of the lugs 54 and 56 respectively.

Operation of the hat press apparatus of the invention is as follows: With the various parts in the "at rest" positions shown, a hat body is placed in the mould 10. The mould is then manually pushed inwardly or to the right as viewed in the figure, the wheels 14 of the mould coming to rest in the depressions 17 of the tracks. By this operation, the switch 68 will have been closed, thereby energizing the motor 63 and driving the disks 58, 59 and 60 in a clockwise direction. The closing of the switch 68 will also result in energization of the solenoids 46 and 47, and actuation of the valves 30 and 31. This will result in the pressing head 12 being lowered, and as said head reaches the operating station 16 wherein it is cooperable with the mould 10 the switch 67 will be closed. This will result in energization of the solenoid 48 and actuation of the valve 26 whereby fluid under pressure is supplied to the inside of the rubber bag 13, inflating the latter. The disks 58, 59 and 60 will rotate slowly in a clockwise direction for approximately one minute, whereupon the lug 55 will first actuate the switch 53 to open the same and then the lug 54 will open the switch 52. Opening of the switch 53 will deenergize the solenoid 48 and result in actuation of the valve 26 to cause deflation of the rubber bag 13. Immediately following this the opening of the switch 52 will cause deenergization of the solenoids 46 and 47 and actuation of the valves 30 and 31 whereby the pressing head 12 will be raised. Momentary raising of the pressing head is termed "bumping," and is for the purpose of allowing moisture to escape from the hat body being pressed in the mould 10. Continued rotation of the disks 58, 59 and 60 will result in, after an interval of 15 seconds approximately, the lugs 54 and 55 leaving the camming portions 52*a* and 53*a* of the switches whereupon the latter will be again closed. This will cause the pressing head 12 to be lowered and cause the rubber bag 13 to be again inflated. As the disks continue to rotate an interval of approximately two minutes will elapse, during which pressing of the hat body in the mould 10 is continued. After this two-minute interval, the lugs 57 and 56



(in the order named) will engage the camming portions 53*a* and 52*a* of the switches, first releasing pressure from the rubber bag 13 and then again raising the pressing head 12. After this has occurred, a declutching of the drive between the shaft 61 and the motor 63 may be effected in any suitable manner, whereby the spring 64 will automatically return the disks 58, 59 and 60 to the position shown, as determined by suitable stops (not shown).

The hat mould 10 may now be manually pulled forward to the position shown, to remove the pressed hat body.

According to the above organization a quick and efficient pressing of hat bodies may be readily accomplished, without requiring skill on the part of the operator. The pressing time and pressures may be closely controlled and regulated; and the bumping operation whereby moisture is allowed to escape from the hat body may be reliably provided for and accurately controlled as to its duration. The structure by which the above is automatically accomplished is relatively simple and economical to fabricate, and is reliable in operation whereby a distinct improvement is effected in the art of pressing hat bodies.

Another embodiment of the invention is illustrated in Figs. 2, 3 and 4. In this embodiment the positions of the hat mould and pressing head are opposite to those previously described, the mould 87 shown in Fig. 2 being uppermost and pressing head 88 being below the mould and carried on a ram 89 which is vertically movable on guides 90 of the hat press.

The control mechanism of this embodiment of the invention is also different in that it mainly involves cam-operated hydraulic valves, there being but a single relay device in the control, in contradistinction to the previously described control wherein cam-operated switches and solenoid-operated valves were utilized.

As seen in Fig. 2, the ram 89 has a plunger or piston 91 movable in a hydraulic cylinder 92 connected by a pipe line 93 with a valve head 94 which carries valves 95, 96, 97 and 98 operated by cams 99, 100, 101 and 102 respectively the cams being carried on a cam shaft 103. The shaft 103 may have a hand wheel 104 for hand operation, but preferably is driven by means of a sprocket wheel 105 and chain 106, and by a sprocket wheel 107 of a motor unit 108.

The valve head 94 includes ball-check valves 109 and 110 respectively connected by passages 109*a* and 110*a* with the valves 96 and 97, and includes passages 111, 112, and 113, respectively connecting the valves of the pairs 95 and 109, 96 and 97, and 110 and 98.

The pipe line 93 connects with the passage 111, and a discharge pipe line 114 leads from the valve 95 to a fluid supply tank 115. A branch pipe line 116 leads from the valve 98 and joins with the pipe line 114. From the tank 115 a pipe line 117 is extended, having a motor-driven pump 118 interposed in it, the pipe 117 connecting with the passage 112 of the valve head 94. A relief valve 119 is connected between the pipe lines 114 and 117 as shown, for purposes which are well understood. From the passage 113 a pipe line 120 extends to the pressing head 88, the line having branches 121 and 122 passing through reducing valves 123 and 124 and connecting with the body portion 125 and rim portion 126 of the pressing head. Preferably the said head is formed of resilient expansible material such as rubber.

The valve head 94 and valve mechanism asso-

ciated therewith together with the cams just described constitute part of the automatic control for operating the pressing head 88. This control further comprises a limit switch 127 carried by the mould 87 and actuated by the ram 89 when the latter is in raised position, and comprises switches 128 and 129 actuated respectively by cams 130 and 131 carried on the shaft 103.

The electrical circuit diagram of the improved hat press shown in Fig. 2 is illustrated in Fig. 3. In this diagram an electrical relay 132 is shown, having normally closed contacts 133 and 134, and normally open contacts 135 and 136. The relay 132 has a coil 137 connected by a wire 138 with a supply wire 139 which latter has a counterpart supply wire 140 connected by wires 141 and 142 respectively to the relay contacts 133 and 135. The other end of the relay coil 137 is connected to a wire 143 which connects with a starting push button switch 144 connected to the supply wire 140. The wire 143 also connects with the switch 128 actuated by the cam 130, the said switch in turn being connected by a wire 145 with the motor unit 108 which is connected by a wire 146 with the supply wire 139. The relay contacts 134 and 136 are connected with the switches 128 and 127 to place these in multiple, and a wire 147 connects the wire 145 with the relay contact 136.

Operation of the device shown in Figs. 2 and 3 is clearly illustrated by the operation chart shown in Fig. 4. In this chart the latters O indicate "open" and the letters C indicated "closed." When the device is at rest the parts are in the positions indicated in Figs. 2 and 3, and the "at-rest" position in the chart of Fig. 4 shows that the switches 144, 129 and 127, and the valves 95 and 98 are all open, and that the switch 128 is closed, as well as the valves 96 and 97. To start the device, the push button switch 144 is closed momentarily as indicated in the "start" zone of the chart. Upon this occurring, the relay armature 132*a*, Fig. 3, will be pulled down, opening the contacts 133 and 134 and closing the contacts 135 and 136. The motor 108 will be energized, and the various cams and the cam shaft 103 will rotate. Closing of the circuit between the contacts 135 and 136 will institute a holding action, causing the relay 132 to remain energized after the push button switch 144 has been released.

The cams 99, 100, 101, 102, 130 and 131 are so shaped and arranged that the following sequence of operations takes place: Shortly after the cam shaft 103 has started to rotate, the cams 99 and 100 will respectively close and open the valves 95 and 96. This will cause hydraulic fluid to enter the pipe 93, and consequently the cylinder 92, and will raise the piston 91 and the ram 89, together with the pressing head 88. It will be understood that previous to starting the operation of the press, a hat body which is to be pressed will have been placed over the pressing head 88. As the ram starts to ascend, the continued rotation of the cams and shaft 103 will result in the switch 128 being opened, and this will deenergize the relay 132 and halt the motor 108, stopping further rotation of the cams and the cam shaft.

The ram 89 however continues to ascend, and when it reaches its uppermost position it will actuate the limit switch 127, closing the same and thereby causing the motor unit 108 to be reenergized and to drive the cams and the cam shaft 103. After a short interval of rotation of the cams and cam shaft, the switch 129 will be closed by the cam 131, and at the same time the valves 96 and 98 will be closed by the cams 100 and 102.



Closing of the switch 129 will not at this time affect anything since this switch is in parallel with the switch 127 already closed. Closing of the valve 96 will shut off pressure from the cylinder 92, and closing of the valve 98 will prevent any venting of fluid through the discharge pipe 116. As the cams and cam shaft continue to rotate the valve 97 will be opened, and hydraulic fluid will be conducted through the pipe 120 and branches 121 and 122, and inflate the pressing head 88. This corresponds with the zone labeled "apply pressure" shown in the chart and continued rotation of the cams and shaft 103 will then result in the valves 97 and 98 being respectively closed and opened, causing a release of pressure from the pressing head 88. Further rotation of the cams will cause the switch 127 and the valve 95 both to be opened. Opening of the switch 127 does not cause anything to happen at this time since the parallel-connected switch 129 remains closed. Opening of the valve 95 enables hydraulic fluid to be discharged through the pipe 114 from the cylinder 92, and enables the ram 89 to be lowered. This action effects the "bumping" operation and enables moisture to be released from the hat body being pressed. Further rotation of the cams causes the valves 95 and 96 to be respectively closed and opened, thereby again raising the ram, and during this raising the cam 31 opens the switch 129, resulting in a stopping of the motor 108 and the cams and cam shaft 103. As the ram 89 reaches its uppermost position it closes the switch 127, causing the motor 108 to be again energized and to drive the cams and the cam shaft 103. Further rotation of the cams causes the switch 128 and the valves 96 and 98 to be closed. Closing of the switch 129 does nothing, since the switch 127 is already closed. Closing of the valves 96 and 98 respectively removes pressure from the cylinder 92 and closes the vent through the pipe 116. Further rotation of the cams results in the valve 97 being opened, whereupon pressure is applied through the pipe 120 to the pressing head 88. This corresponds to the second "apply pressure" zone in the chart. As the cams continue to rotate, the valves 97 and 98 will be respectively closed and opened, releasing pressure from the pressing head, and thereafter the switch 127 and the valve 95 will be opened, the latter enabling the ram to be lowered and the switch 127 not affecting anything since switch 129 is still closed. Further rotation of the cams causes the switch 129 to be opened, halting the cams, and immediately prior to the latter being halted the switch 128 is closed, by virtue of the inertia of the parts causing the cams to continue moving for a short interval of time. This will result in the device coming to a halt with the ram 89 lowered, whereupon the hat body which was pressed may be removed from the device and another hat body applied, for a repetition of the cycle just described.

By the above apparatus and organization we have found that hat bodies may be very quickly and effectively automatically pressed, without requiring any skill on the part of an operator, and that extremely uniform pressing of the hat bodies is accomplished in a minimum of time. The apparatus is relatively simple and inexpensive to fabricate, and is fool-proof and reliable in its operation.

Variations and modifications may be made within the scope of the claims and portions of the improvements may be used without others.

We claim:

1. A hat press comprising a mould movable between an inoperative position and a operating station; a pressing head including a member movable in response to fluid pressure, cooperable with said mould; power-operated means for bringing together and separating said head and mould at said operating station; power-operated means providing fluid under pressure for moving said member, said means being operable to relieve said fluid pressure; automatic control means including a controller for each power-operated means and means operating said controllers in a predetermined sequence for operating both said power-operated means in a cycle whereby the pressing head and mould are held together at said operating station during consecutive predetermined intervals and fluid under pressure is applied to said member, to move the same toward the mould and whereby the head and mould are held apart in the intervening time and the fluid pressure is relieved from said member; and means for initiating said cycle automatically in response to movement of said mould from inoperative position to said operating station.

2. A hat press comprising a mould; a pressing head including a rubber bag, cooperable with said mould; power-operated means for bringing together and separating said head and mould; power-operated means for introducing fluid under pressure into said bag and venting the latter; and automatic control means for operating both said power-operated means in a cycle whereby the pressing head and mould are held together during consecutive predetermined intervals and fluid pressure is exerted on the inside of said bag, and whereby the head and mould are held apart in the intervening time and the bag vented, said control means including a valve connected to said second power-operated means and controlling the flow of fluid to the bag, and including a solenoid for opening the valve and a pair of switches all connected in a series circuit, both of said switches remaining closed when the head and mould are together, and remaining open when the head and mould are separated whereby accidental over-expansion and rupture of the bag are prevented.

3. A hat press comprising a mould adapted to receive a hat body; means mounting the mould for positioning either at an operating station or at a point remote therefrom; a pressing head including a member movable in response to fluid pressure and cooperable with said mould; means mounting said head for positioning either at said operating station or at a second point remote therefrom; a pair of switches respectively operated by the mould and head in their movements to and from said station; means controlled by said switches, supplying fluid under pressure to said member only when both the mould and head are at said station; means controlled by the mould switch, for automatically moving the pressing head to the operating station in response to movement of the mould to said station; and means automatically operative at a predetermined time after operation of said preceding means, for actuating the head moving means to momentarily move the pressing head away from the station, and then return it to said station, thereby to provide for escape of moisture from a hat body being pressed in the mould.

4. A hat press comprising a mould adapted to receive a hat body; means mounting the mould for positioning either at an operating station or a point remote therefrom; a pressing head including a member movable in response to fluid pressure and cooperable with said mould; means mounting said head for positioning either at said operating station or at a second point remote therefrom; means supplying fluid under pressure to said member only when both the mould and head are at said station; means for automatically moving the pressing head to the operating station in response to movement of the mould to said station; and means automatically operative at a predetermined time after operation of said preceding means, for actuating the head moving means to momentarily move the pressing head away from the station, and then return it to said station, thereby to provide for escape of moisture from a hat body being pressed in the mould.

5. A hat press comprising a mould adapted to receive a hat body; means mounting the mould for positioning either at an operating station or a point remote therefrom; a pressing head including a member movable in response to fluid pressure and cooperable with said mould; means mounting said head for positioning either at said operating station or at a second point remote therefrom; a pair of switches respectively operated by the mould and head in their movements to and from said station; means including a solenoid valve controlled by said switches, and including a pump supplying fluid under pressure to said member only when both the mould and head are at said station; means including a solenoid valve controlled by the mould switch, and including a fluid operated piston and cylinder means connected with the pump for automatically moving the pressing head to the operating station in response to movement of the mould to said station; and means automatically operative at a predetermined time after operation of said preceding means, for momentarily reversing the operation of the piston and cylinder means to and then again reversing the piston and cylinder move the pressing head away from the station, and then again reversing the piston and cylinder means to return it to said station, thereby to provide for escape of moisture from a hat body being pressed in the mould.

6. A hat press comprising a mould adapted to receive a hat body; means mounting the mould for positioning either at an operating station or a point remote therefrom; a pressing head including a member movable in response to fluid pressure and cooperable with said mould; means mounting said head for positioning either at said operating station or at a second point remote therefrom; means supplying fluid under pressure to said member only when both the mould and head are at said station; and means automatically operative at a predetermined time after the mould and pressing head are brought together, for actuating the head moving means to momentarily move the pressing head away from the station, and then return it to said station, thereby to provide for escape of moisture from a hat body being pressed in the mould.

7. A hat press comprising a mould adapted to receive a hat body; means mounting the mould for positioning either at an operating station or a point remote therefrom; a pressing head including a rubber bag inflatable by fluid under pressure and cooperable with said mould; means mounting said head for movement to po-

sitions either at said operating station or at a second point remote therefrom; means supplying fluid under pressure to said bag only when both the mould and head are at said station and together; and means automatically operative at a predetermined time after the mould and pressing head are brought together, for actuating the means supplying fluid to the bag to first remove fluid pressure from the bag and then momentarily actuate the head moving means to move the pressing head away from the station, and for thereafter returning said head to said station and then actuating the means supplying fluid to the bag to again inflate said bag, thereby to provide for escape of moisture from a hat body being pressed in the mould.

8. A hat press comprising a mould adapted to receive a hat body; means mounting the mould for positioning either at an operating station or a point remote therefrom; a pressing head including a member movable in response to fluid pressure and cooperable with said mould; means mounting said head for positioning either at said operating station or at a second point remote therefrom; means supplying fluid under pressure to said member only when both the mould and head are at said station; means for automatically moving the pressing head to the operating station in response to movement of the mould to said station and for thereafter separating the pressing head from the mould after the elapse of a predetermined interval of time; and means automatically operative at a predetermined time in said interval, for momentarily actuating the head moving means to move the pressing head away from the station, and then returning it to said station, thereby to provide for escape of moisture from a hat body being pressed in the mould.

9. A hat press comprising a mould adapted to receive a hat body; a pressing head including a member movable in response to fluid pressure; power-operated means for bringing together and separating said head and mould; power-operated means providing fluid under pressure for moving said member, said means being operable to relieve said fluid pressure; means including a plurality of cams connected together to operate simultaneously, for controlling said power-operated means according to a predetermined plan; driving means for said cams; and automatic means controlling said driving means throughout a predetermined cycle including an electric circuit having a manually controlled starting switch and a second switch actuated by movement of the pressing head into pressing relation whereby the cams are driven through a cycle to cause the pressing head and mould to be brought together and maintained together during consecutive predetermined intervals and fluid under pressure to be applied to said member to move the same toward the mould, and to cause the head and mould to be separated and held apart in the intervening time and the fluid pressure to be relieved from said member.

10. A hat press comprising a mould adapted to receive a hat body; a pressing head including a member movable in response to fluid pressure; power-operated means for bringing together and separating said head and mould; power-operated means providing fluid under pressure for moving said member, said means being operable to relieve said fluid pressure; means including a plurality of cams connected together to operate simultaneously and including valves actuated by said cams, for controlling said power-operated means according to a predetermined plan; driving means for said cams; and automatic means including a limit switch actuated by said mould and head, controlling said driving means to move the cams throughout a predetermined cycle to cause the pressing head and mould to be brought together and maintained together during consecutive predetermined intervals and fluid under pressure is applied to said member to move the same toward the mould, and to cause the head and mould to be separated and held apart in the intervening time and the fluid pressure is relieved from said member.



11. A hat press comprising a mould adapted to receive a hat body; a pressing head including a member movable in response to fluid pressure; power-operated means for bringing together and separating said head and mould; power-operated means providing fluid under pressure for moving said member, said means being operable to relieve said fluid pressure; means including a plurality of cams connected together to operate simultaneously, for controlling said power-operated means according to a predetermined plan; an electric motor driving said cams; and automatic means including an electric circuit for said motor controlling said driving means throughout a predetermined cycle whereby the pressing head and mould are brought together and maintained together during consecutive predetermined intervals and fluid under pressure is applied to said member to move the same toward the mould, and whereby the head and mould are separated and held apart in the intervening time and the fluid pressure is relieved from said member, said automatic means including a restart device in said electric circuit for said driving means, made operative when the head and mould are together, and including means halting said driving means and cams in those parts of said cycle during which the head and mould are being brought together.

12. A hat press comprising a mould adapted to receive a hat body; a pressing head including a member movable in response to fluid pressure; power-operated means for bringing together and separating said head and mould; power-operated means providing fluid under pressure for moving said member, said means being operable to relieve said fluid pressure; means including a plurality of cams connected together to operate simultaneously, for controlling said power-operated means according to a predetermined plan; electrical driving means for said cams; and automatic means controlling said driving means throughout a predetermined cycle whereby the pressing head and mould are brought together and maintained together during consecutive predetermined intervals and fluid under pressure is applied to said member to move the same toward the mould, and whereby the head and mould are separated and held apart in the intervening time and the fluid pressure is relieved from said member, said automatic means including a relay having normally closed circuit contacts, and including a pair of shunt-connected switches in series with said relay contacts, one of said switches being controlled by relative movements of the mould and pressing head and the other switch being controlled by one of said cams, and said switches and contacts being connected to control said driving means.

13. A hat press comprising a mould adapted to receive a hat body; a pressing head including a member movable in response to fluid pressure; power-operated means for bringing together and

separating said head and mould; power-operated means providing fluid under pressure for moving said member, said means being operable to relieve said fluid pressure; means including a plurality of cams connected together to operate simultaneously, for controlling said power-operated means according to a predetermined plan; electrical driving means for said cams; and automatic means controlling said driving means throughout a predetermined cycle whereby the pressing head and mould are brought together and maintained together during consecutive predetermined intervals and fluid under pressure is applied to said member to move the same toward the mould, and whereby the head and mould are separated and held apart in the intervening time and the fluid pressure is relieved from said member, said automatic means including a relay having normally closed circuit contacts, including a relay-control switch operated by one of said cams, and including a pair of shunt-connected switches in series with said relay contacts, one of said switches being controlled by relative movements of the mould and pressing head and the other switch being controlled by one of said cams, and said switches and contacts being connected to control said driving means.

14. The invention as defined in claim 11, in which the driving means is electrically powered, in which the means halting the driving means includes a switch operated by one of said cams, and in which said restart device includes a second switch in parallel with said first switch.

15. A hat press comprising a mould; a pressing head including a member movable in response to fluid pressure, cooperable with said mould; power-operated means for bringing together and separating said head and mould; power-operated means providing fluid under pressure for moving said member, said means being operable to relieve said fluid pressure; and automatic control means for operating both said power-operated means in a cycle, said automatic control means including a control device actuated incident to the closing of the head and mould in pressing relation, valve means connected to each of said power-operated means, and operating means for said valves actuated in a predetermined sequence whereby the pressing head and mould are held together during consecutive predetermined intervals in the pressing cycle and fluid under pressure is applied to said member, to move the same toward the mould and whereby the head and mould are held apart in the intervening time and the fluid pressure is relieved from said member.

16. A hat press comprising a hat-supporting mould; a pressing head including a rubber bag, cooperable with said mould to press a hat carried thereby; power-operated means for moving



the pressing head toward and away from the mould to insert and remove the bag from the hat during a pressing cycle; power-operated means for introducing fluid under pressure into said bag and venting the latter; and automatic control means for operating both said power-operated means in a cycle including an electrohydraulic system having switch means actuated by the movement of the pressing head into pressing relation with the mould, valve means connected to each of said power-operated means, and actuators for said valve means controlled by said switch means, whereby the pressing head and mould are held together during consecutive predetermined intervals in the pressing cycle and fluid pressure is exerted on the inside of said bag, and whereby the head and mould are held apart in the intervening time and the bag vented.

17. A hat press comprising a hat supporting mould; a pressing head including a rubber bag, cooperable with said mould; power-operated means for moving the pressing head toward and away from the mould to insert and remove the bag from the hat during a pressing cycle; power-operated means for introducing fluid under pressure into said bag and venting the latter; and automatic control means for operating both said power-operated means in a cycle including an electrohydraulic system having manually operated switch means to initiate said cycle, a second switch means actuated by the movement of the pressing head into pressing relation with the mould, a plurality of valves connected to said power-operated means, and actuators for said valves operating in a predetermined sequence and controlled by said pair of switch means whereby the pressing head and mould are held together during consecutive predetermined intervals in the pressing cycle and fluid pressure is exerted on the inside of said bag, and whereby the head and mould are held apart in the intervening time and the bag vented, said control means providing for application of fluid under pressure to the bag subsequent to the bringing together of the head and mould, and providing for venting of the bag prior to separation of the head and mould.

IRVING H. VICKERS.
GEORGE M. RICKUS.

## REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 1,891,344 | Casse | Dec. 20, 1932 |
| 2,017,965 | Hanney | Oct. 22, 1935 |
| 2,258,954 | Jensen | Oct. 14, 1941 |
| 2,330,319 | Tornberg | Sept. 28, 1943 |
| 2,480,960 | Press | Sept. 6, 1949 |