Feb. 28, 1939. E. H. MERRITT 2,148,704

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Filed Sept. 15, 1934 4 Sheets-Sheet 1

Fig. 1.

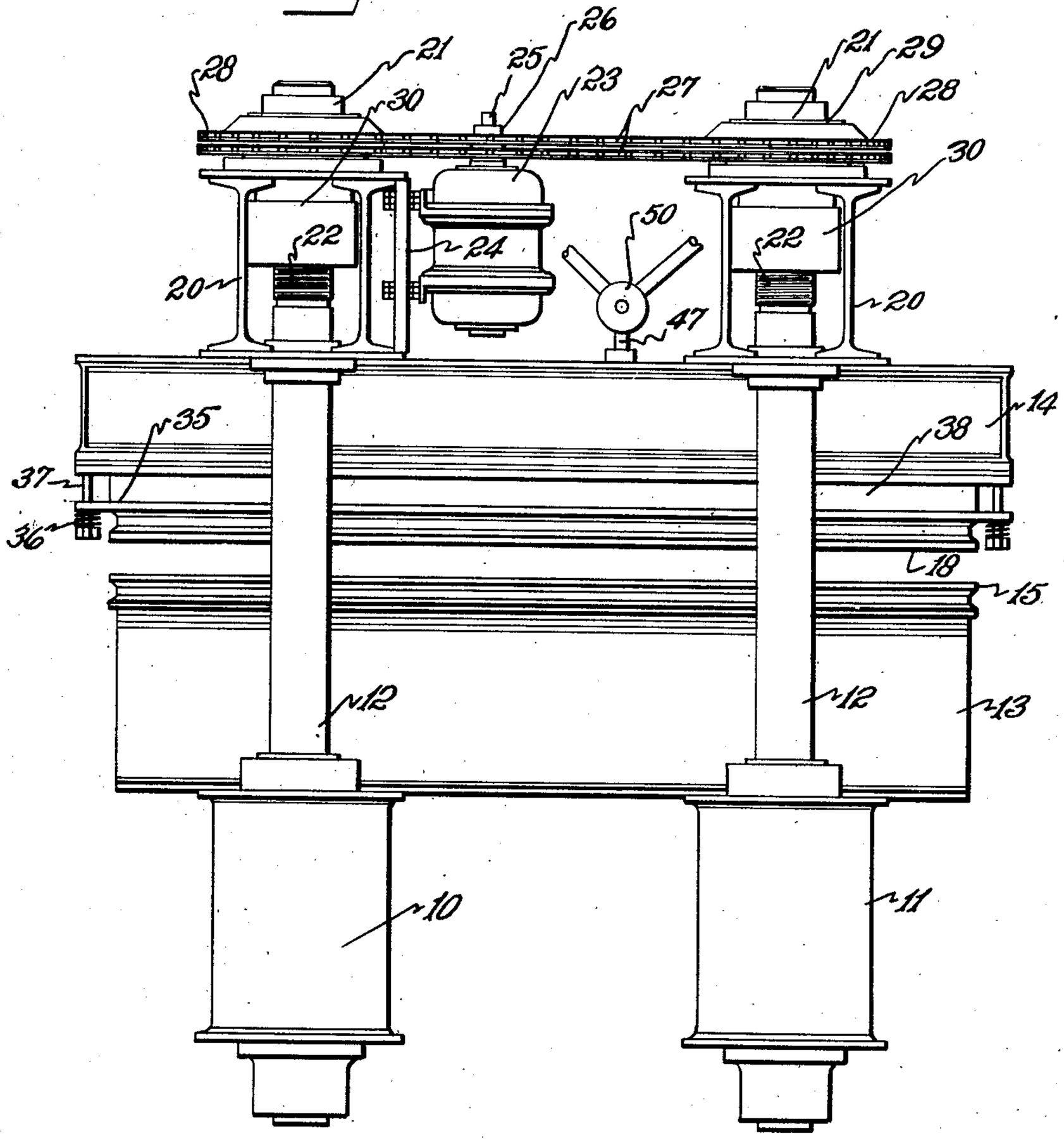

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Fig. 2.

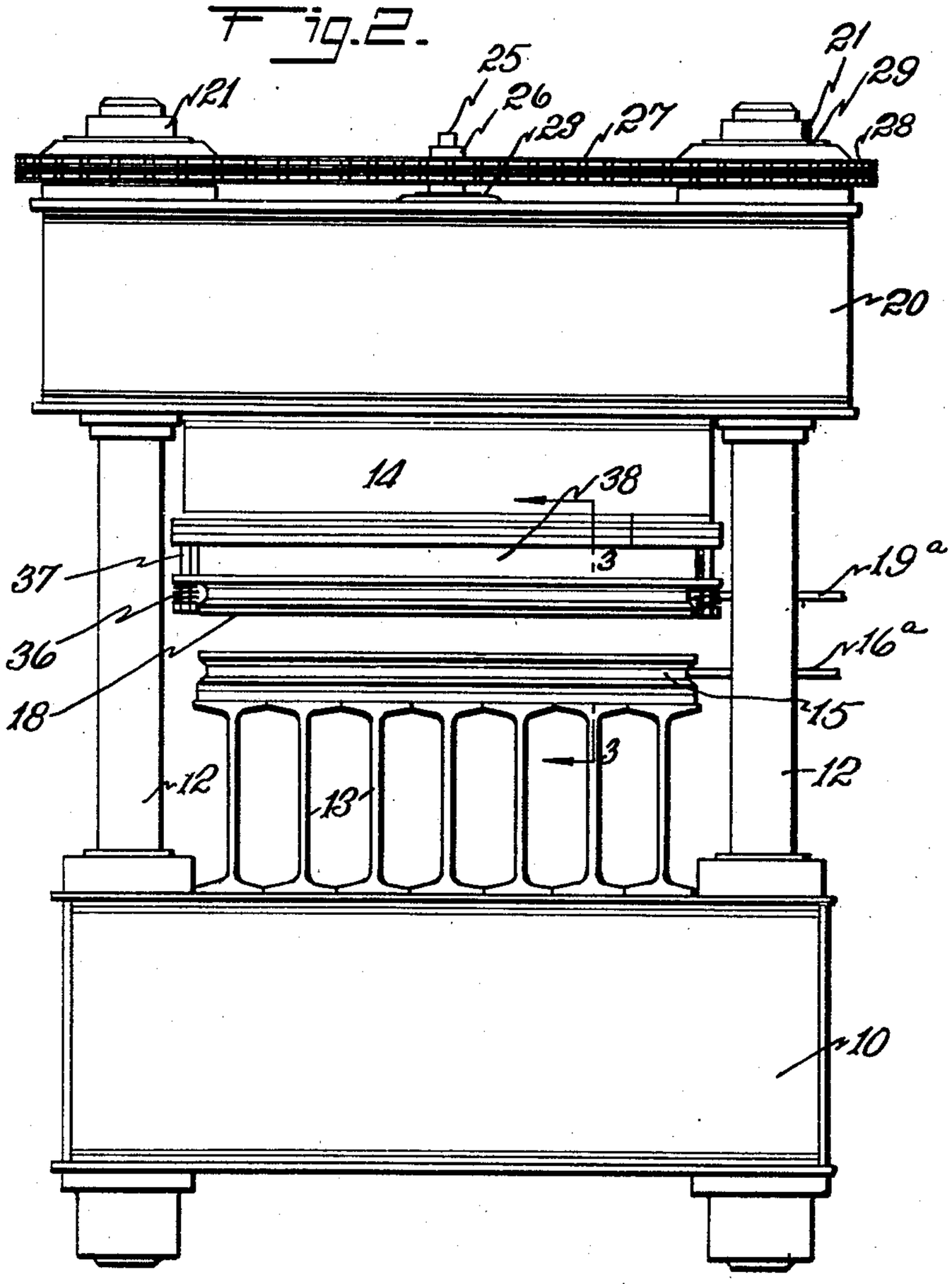

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Fig. 4.

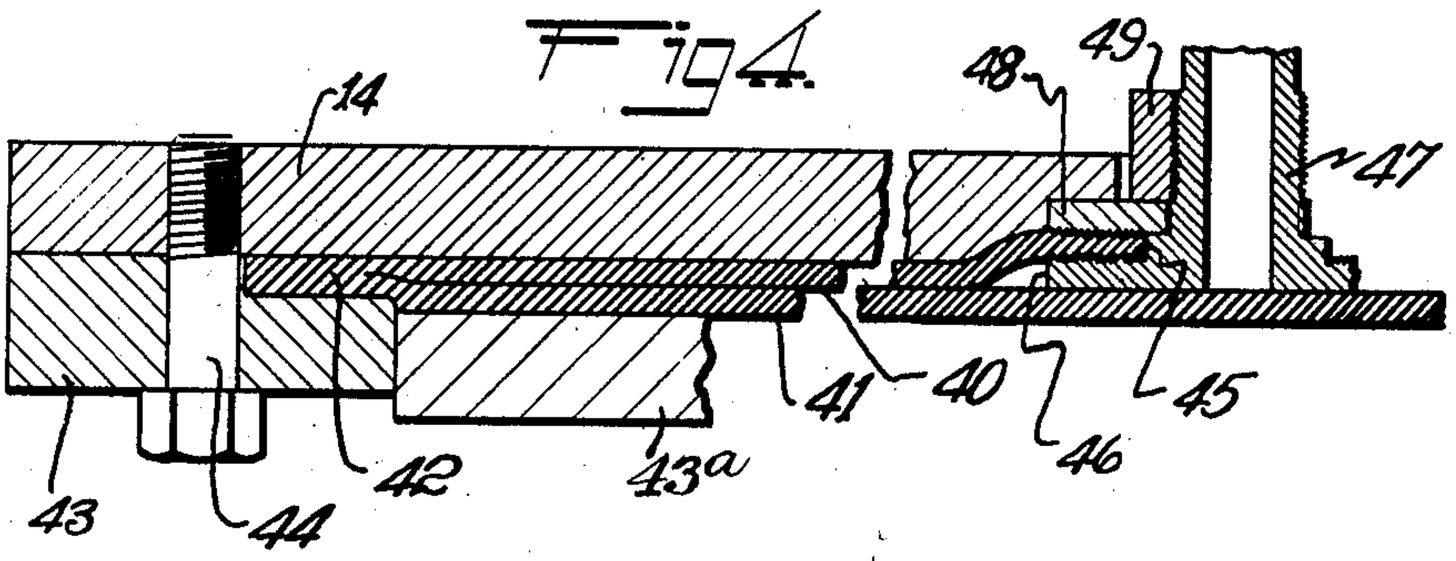

Fig. 3.

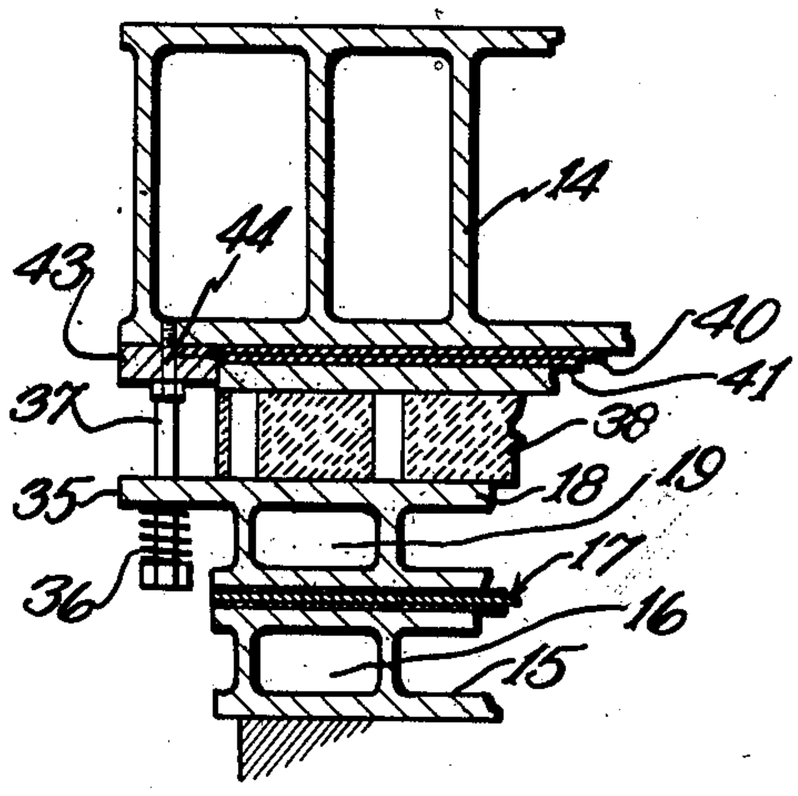

Fig. 5.

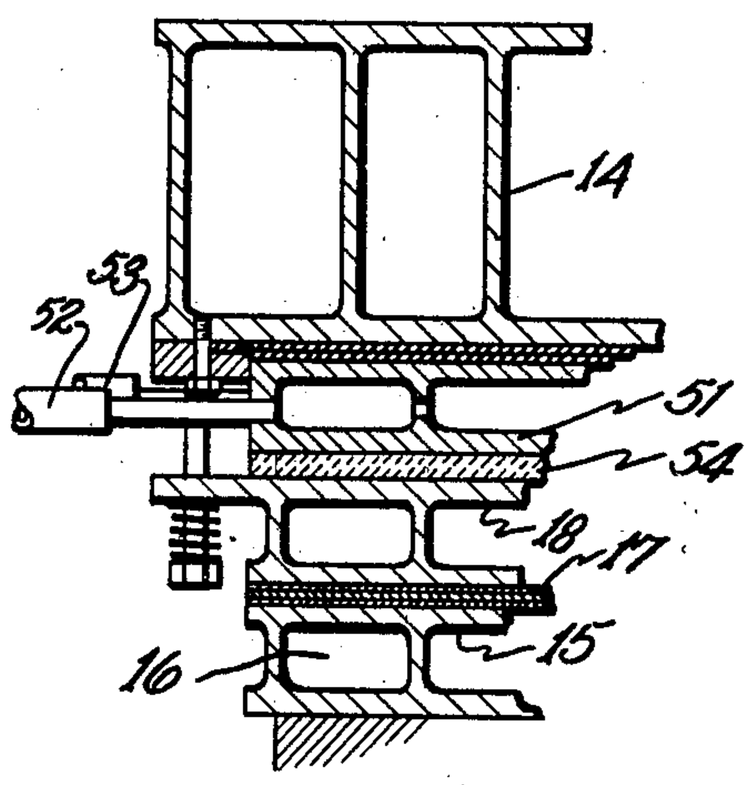

Fig. 6.

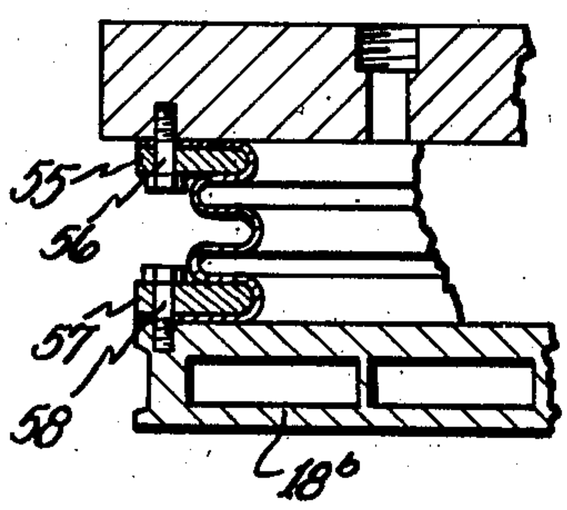

Fig. 7.

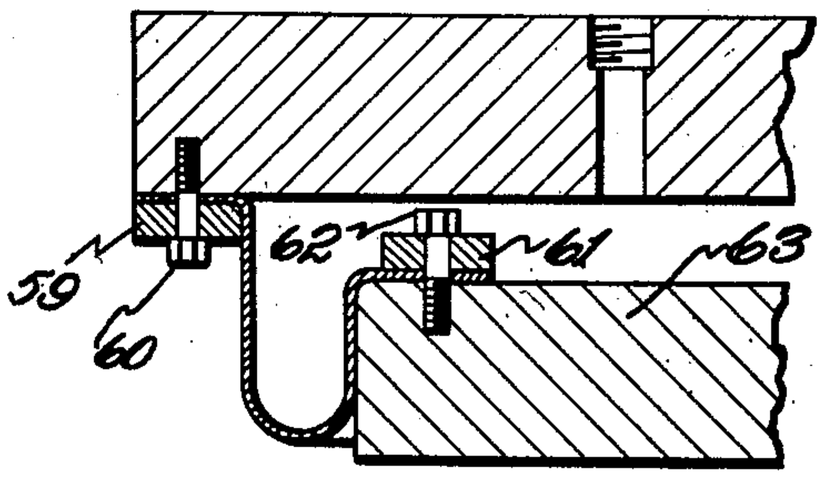

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Fig. 8.

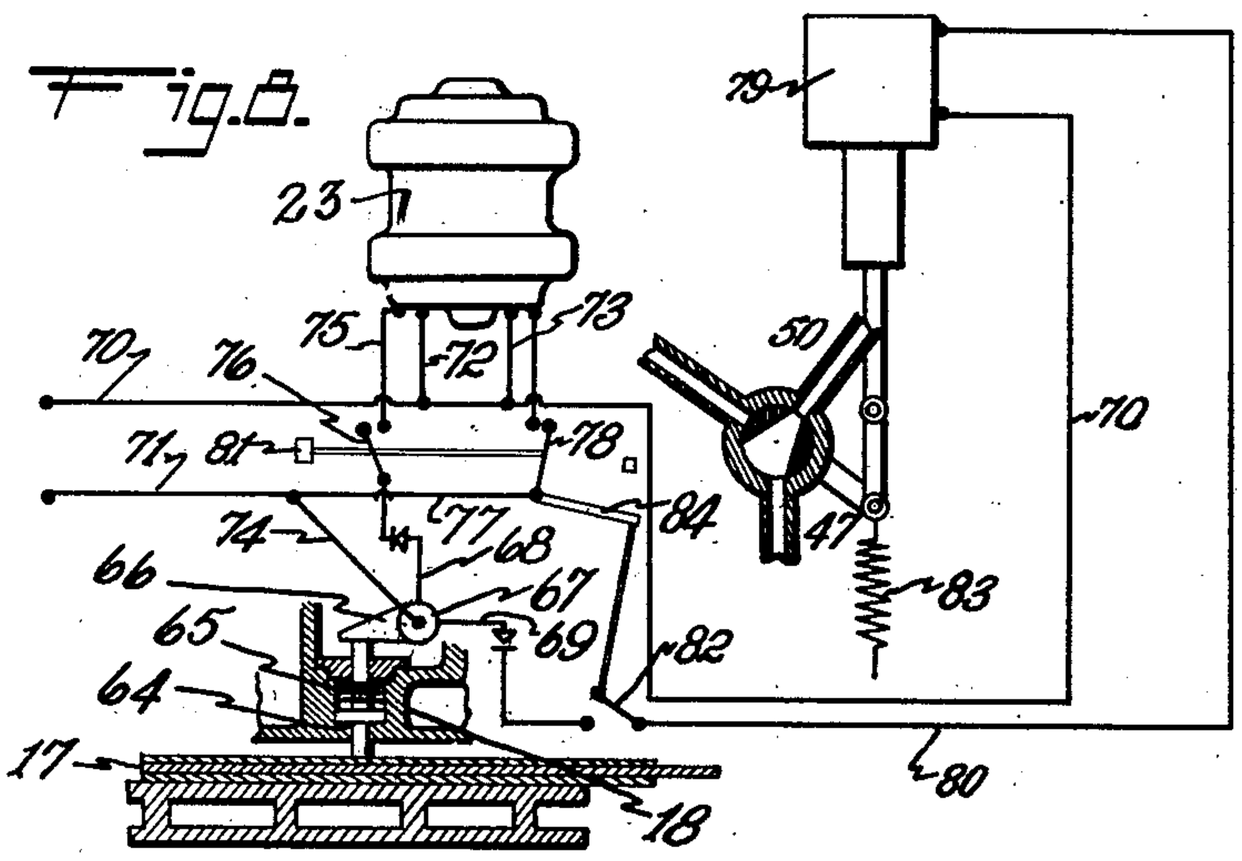
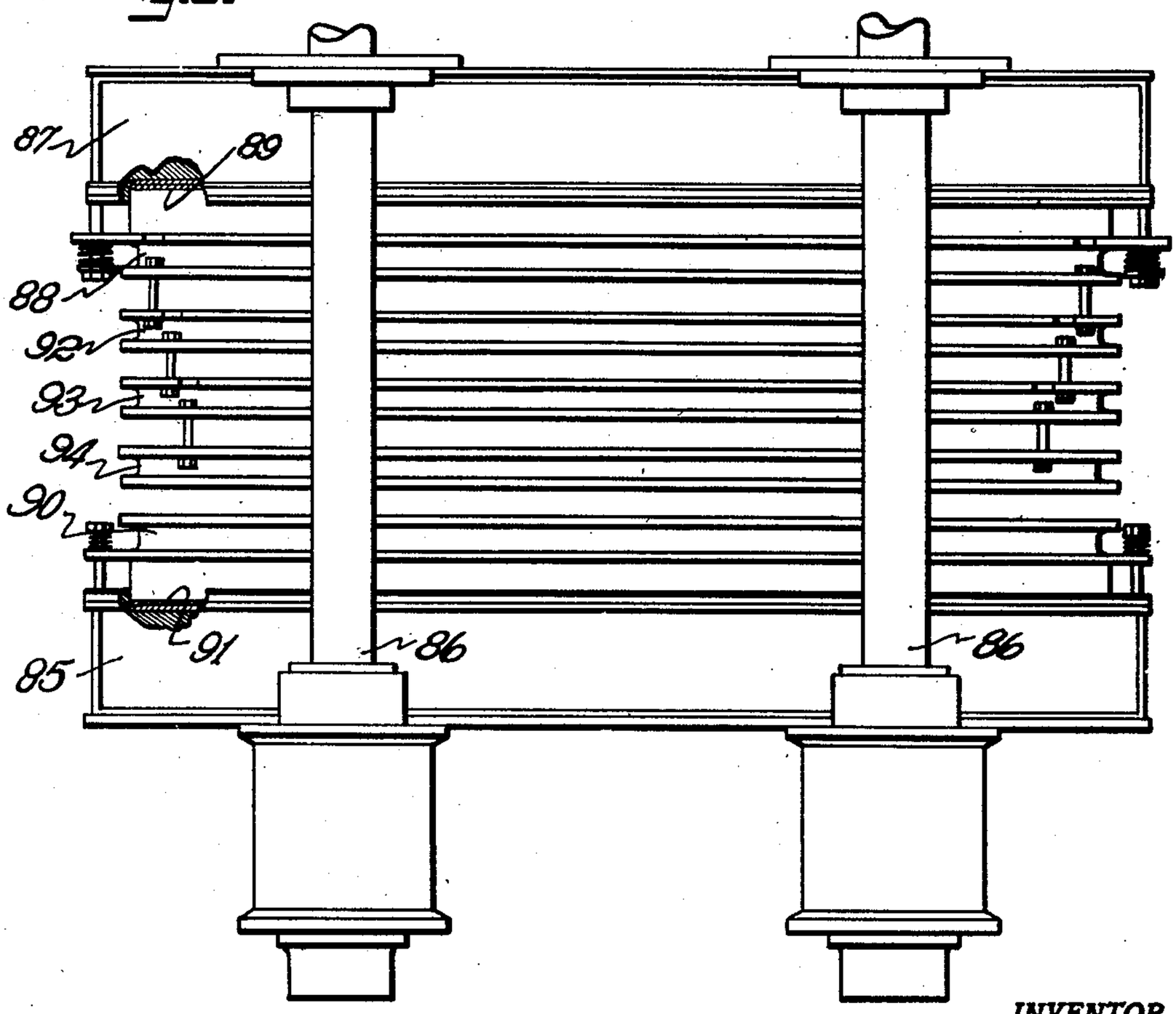


Fig. 9.



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Patented Feb. 28, 1939 2,148,704

UNITED STATES PATENT OFFICE

2,148,704

VENEER PRESS

Ericsson H. Merritt, Lockport, N. Y., assignor to Merritt Engineering & Sales Company, Inc., Lockport, N. Y., a corporation of New York

Application September 15, 1934, Serial No. 744,132

16 Claims. (Cl. 144—281)

This invention relates to presses and more particularly to veneer presses such as utilized in the formation of plywood and the like.

An object of the invention is to provide a device of the character described which is simple in construction, economical to operate and which will effectively and efficiently perform the purposes for which it is intended.

More specifically it is an object of the invention to provide a press in which a high effective pressure can be obtained and which can be built and operated with extreme ease and economy.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Figure 1 is a side view of a press embodying the invention;

Fig. 2 is an end view thereof;

Fig. 3 is a detail sectional view along the line 3—3 of Fig. 2 showing certain of the parts on an enlarged scale;

Fig. 4 is a detail view showing the diaphragm means and the associated members on an enlarged scale;

Fig. 5 is a view similar to Fig. 3 showing a modification;

Fig. 6 is a detail view similar to Fig. 4 showing a modification;

Fig. 7 is a view similar to Fig. 6 showing a further modification;

Fig. 8 is a diagrammatic view of one type of control mechanism; and

Fig. 9 is a side view of a multiple-opening press embodying the invention.

Hydraulic ram presses are still in general use for hot plate and other high pressure types of pressing arrangements for veneering, plywood formation, and similar operations. Their use, however, is subject to the marked drawback of high cost of operation because of the necessity of using the fluid pressure not only to move the platen or platens, but also to move the heavy member on which the platen or platens are carried. They also require glands and packing subject to high fluid pressure, and high pressure pipes and fittings, and run into a high initial cost. In spite of these and other drawbacks the art continues to rely on such presses for high pressure work.

With the foregoing and other considerations in mind the present invention contemplates the provision of a press wherein all the advantages of the usual hydraulic press are obtained and which at the same time is highly economical in operation.

In accordance with the invention, there is provided mechanical means for raising or lowering the platen or platens and the members associated therewith, and diaphragm means whereby the final pressure may be obtained. The arrangement of such means may be considerably varied, several modifications being specifically exemplified.

The press illustrated in Fig. 1 comprises supports 10 and 11, each of which carry in the present instance a pair of posts 12. Resting on the members 10 and 11 is a head member 13, and spaced above this is a bolster member 14 which is vertically adjustable with respect to the posts. Upon the head member is a platen 15 arranged in the present instance with orifices 16 for the introduction of live steam, as thru a pipe 16*a*. The platen 15 is composed of metal so that by the introduction of steam into the orifices the surface may be rapidly brought to a high heat so as to hot-press plywood assemblies, as indicated at 17 in Fig. 3, or other material to be hot-pressed. Supported from the bolster member is a second metal platen 18 having orifices 19 into which live steam may be introduced, as thru a pipe 19*a*.

In accordance with the invention the bolster member is adjustably supported by means wherein it can be readily lowered until the platen 18 rests against the work, and there is interposed between the bolster member and the platen 18 means whereby a high pressure may be developed so as to exert the necessary pressing of the work for bonding or other purposes.

As exemplified, the means for adjustably supporting the bolster member 14 comprises supports 20 carrying internally-threaded rotatable members 21 which fit over externally-threaded portions 22 on each of the posts. In order to rotate the members 21 there is provided suitable means which may include a two-way electric motor 23 carried on an arm 24 secured to one of the supports 20.

The shaft 25 of the motor is provided with sheaves 26 connected by suitably-disposed belts 27 to sheaves 28 on rotatable portions 29 which are integral with the portions 21 and each of

which is journaled in a portion 30 of its support 20. Accordingly when the motor is operated, the bolster member 14 and the parts carried thereby are readily lowered against the work 17. As the platen 18 comes against the work the motor may be turned off by any suitable means, one type of which is hereinafter exemplified.

Since the rotation of the members 21 by the motor does not exert sufficient pressure for the usual bonding operation or other operations to be performed by the press, there is provided, between the platen 18 and the bolster member 14, diaphragm means whereby a chamber for the reception of fluid pressure is provided. In the present instance the upper platen 18 is carried on a plate 35, which is resiliently supported on springs 36 carried from the bolster 14 by means of rods 37, and an insulating portion 38 is provided above the plate 35. At the bottom of the bolster there is provided diaphragm means consisting, in the present exemplification, of sheets of rubber 40 and 41, vulcanized together throughout their entire periphery as indicated at 42. The periphery of the sheets is clamped between an element 43 and the bolster member by means of bolts 44. The lower diaphragm 41 is a continuous sheet, whereas the upper diaphragm is formed with a central opening at 45, the interior edges of this diaphragm being clamped between a flange 46 on a tubular member 47 and an annulus 48 which is pressed downwardly by means of a threaded member 49. The diaphragms, though held in proximity to each other by the springs 36 provide a chamber therebetween for the reception of fluid pressure. Fluid, for example, water, introduced under pressure through the tubular member 47 readily works its way under the flange 46 and between the diaphragms, forcing the diaphragms apart and exerting a downward pressure upon the upper platen 18 sufficient to perform the required pressing action between the platens. Such a pressure may, for example, be 200 pounds per square inch in the case of the pressing of an ordinary plywood assembly. The spreading movement of the diaphragms may desirably be about one-eighth or three-sixteenths of an inch. Since fluid pressure needs to exert no work except the actual pressing, and since there are no members to lift, it will be apparent that very large economies are obtained over the usual type of hydraulic press. With the use of such a flexible diaphragm, moreover, there is a uniform distribution of pressure over the surface of the platen, in contrast to the tendencies toward unevenness involved in the use of a ram press. As shown, the resilient diaphragms are entirely surrounded by firm supporting members at all times. As the lower diaphragm 41 expands downwardly away from diaphragm 40, it gives an even pressure over the entire face of the element 43*a*, lying just beneath the diaphragm 41. The element 43*a* therefore becomes analogous to the ram of the hydraulic cylinders known heretofore. The presence of the flexible diaphragms within the hydraulic cylinder, however, gives a uniform pressure over the entire length and breadth of the plate 43*a*, unlike the uneven pressures found in the old ram presses. Thus not only is economy of construction effected, but the tendencies toward deflection in ordinary presses is overcome.

When the pressing operation is complete, all that is necessary is to open a release valve 50 for the fluid pressure, and to energize the motor in the opposite direction so as to cause such rotation of the members 21 as will lift the bolster member and lift the platen 18 from the work which can then be removed.

In certain instances it is undesirable to rely on ordinary insulation to protect the diaphragms from the heat of the platen and in such cases there may be utilized an arrangement such as shown in Fig. 5 wherein the insulating portion 38 is replaced by an insulating portion 51 having orifices through which a cooling fluid such, for instance, as cold water may be continuously passed during the operation of the pressing. The water may be introduced through a flexible inlet pipe 52 and continuously withdrawn through a flexible outlet pipe 53. If desired, water in the same circulating system may be used for exerting pressure on the diaphragm and for providing the cooling fluid. A supplemental insulating portion 54 may also be provided.

As will be apparent, the heating of the platens may be dispensed with, although presses embodying the invention lend themselves with particular readiness to use in hot plate work.

In instances where the use of rubber diaphragm members is undesirable, these may be replaced by diaphragm members composed of rubberized fabric, synthetic rubber-like materials, for example, Duprene, or other suitable strong flexible material. In certain instances metal diaphragm means such as shown in Figs. 6 and 7 may be used. In Fig. 6 there is shown an arrangement wherein a flexible metal portion of bellows construction has one edge clamped by means of a member 55 and bolts 56, and the other edge clamped to the upper platen 18*b* by means of a member 57 and bolts 58. In Fig. 7 a continuous strip of flexible metal is clamped to the bolster by a member 59 and bolts 60, and bent downwardly and then upwardly. Its inner edge is clamped by a member 61 and bolts 62 to a member 63 secured to the lower platen.

In instances where it is desired to operate the press automatically, there may be utilized an arrangement such as shown diagrammatically in Fig. 8. In this arrangement the platen 18 carries a plunger 64 provided with a spring 65 which normally holds the plunger in a downward position with its lower end projecting below the face of the platen. Above the plunger is a pivoted arm 66 carried on a shaft 67. Accordingly, as the platen 18 is lowered by the motor the lower end of the plunger contacts with the work 17, the plunger moves relatively to the arm 66 and the upper end of the plunger acts to swing the arm 66 upwardly and to rotate the shaft. The shaft 67 may have radially fixed thereto contact arms 68 and 69. When the arm 66 is in normal position and out of contact with plunger 64, the arm 66 holds the shaft 67, which is fixed to arm 66, in such a position that the arm 68, to which shaft 67 is also fixed, keeps the circuit of the motor 23 closed. When the arm 66 is in normal position and out of contact with the plunger 64, the arm 66 holds the shaft 67, which is fixed to arm 66, in such a position that the arm 69, to which shaft 67 is also fixed, keeps open an electrical circuit which, if shut, would operate the pressure valve 50 to admit pressure between the diaphragms. These circuit arrangements as exemplified include main conductors 70 and 71. Leads 72 and 73 run from the conductor 71 to opposite poles of the motor. A branch lead 74 from the conductor 71 connects with one pole

through shaft 67, the contact arm 68 and the lead 75 in which there is a switch 76. A branch lead 77, also from conductor 71, runs through a switch 78 to the other pole of the motor 23. When the switch 76 is closed, the motor is energized to move the bolster downwardly. The conductor 70 runs to one end of an operating solenoid 79 for the valve 50, and a lead 80 runs from the other end of the operating solenoid 79 to a contact against which the contact arm 69 rests when shaft 67 has been moved by the motion of plunger 64.

The operation of bringing the platens together with pressure against the work is as follows: Assume that the platens are apart, the work lying on the lower platen. The plunger 64 is not yet in contact with the work and arm 66 is in its lower position, which position determines the angular position of the shaft 67, and the latter determines that the arm 68 keeps, as far as it is concerned, the circuit of the motor 23 closed. The angular position of the shaft 67, before the device has begun to operate, also determines that the arm 69 is out of contact with the lead 80, and hence the solenoid 79 is inoperative and the valve 50 does not admit pressure between the diaphragms. The various parts being in the position described, the switch 76 is closed manually or otherwise. The closing of the switch 76 permits electricity to pass through the circuit, comprising elements 71, 74, 67, 68, 76, 75, 23, 72 and 70. The motor 23 begins to turn, causing the upper platen to be lowered. The plunger 64 comes in contact with the work 17, is moved upwardly itself and pushes arm 66 upwardly. The latter causes the shaft 67 to rotate, which in turn separates the current-carrying arm 68 from the switch 76. Current no longer passes through the motor 23, the motor 23 stops, and the upper bolster ceases its downward motion. At the same time as contact arm 68 is disconnected from its circuit, contact arm 69 connects with the lead 80 and electric current passes through the elements 71, 74, 67, 69, 82, 80, 79 and 70. The solenoid 79 is activated and in turn operates the valve 50 so as to admit pressure into the diaphragms. This last gives a final uniform pressure to the work which is desired. Thus as the platens are brought together by the mechanical means, the mechanical means are automatically halted and the opening of the valve 50 initiates the operation of the fluid-pressure means, which fluid-pressure means are to exert the final pressure.

Reversal of the motor and release of the fluid pressure may be accomplished by moving an arm 81 to close the switch 78 so that the current will pass through the motor in a reverse direction. The arm 81 is also arranged to open the switch 76. The arm also operates a switch 82 in the lead 80 to break the circuit through the solenoid and permit a spring 83 to return the valve 50 so as to permit the release of the fluid pressure. A timing device of any suitable or well known type may be utilized to move the arm 81, if desired. There may be provided an arm 84 operated by the upward movement of the bolster to disconnect the switch 78 at the proper time.

In Fig. 9 there is shown a press having a multiplicity of platens and both upper and lower diaphragm means. This press comprises a head 85, posts 86 similar to the posts 12 and having generally similar upper portions (not shown), and a bolster 87. The bolster carries a platen 88 mounted similarly to the platen 18 and arranged to be given a final downward pressure by fluid pressure in a diaphragm means 89. The head 85 carries a platen 90 supported for upward movement in the same way that the platen 88 is supported for downward movement, there being provided a diaphragm means 91 for giving it a final upward pressure. Intermediate platens 92, 93 and 94 are provided. The introduction of fluid pressure into the two diaphragm means acts to move the diaphragms 88 and 89 together and compress the pieces of work between the various pairs of diaphragms.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A press comprising a pair of relatively movable members, a platen carried by one of said members, a second platen movably carried by the other of said members, mechanical means to move at least one of said members to bring the platens nearer together to hold material to be pressed, diaphragm means providing an expansible chamber between said movable platen and the member by which it is carried, means to introduce fluid pressure into said chamber to press said platens tightly against the material, and automatic means for halting the operation of the mechanical means and initiating the operation of the fluid pressure means when the plates are brought together against the material.

2. A press comprising the combination with supporting means, of a pair of relatively movable members supported by the supporting means, a platen carried by one of the said members, a second platen movably carried by the other of the said members, means to move at least one of the said members to bring the platens nearer together to hold material to be pressed, diaphragm means providing an expansible chamber between the movable platen and the member by which it is carried, means to introduce fluid pressure into the chamber to press the platens tightly against the material, and mechanism for stopping the platen-moving means when the platen reaches a fixed distance from the work and for initiating operation of the fluid pressure introducing means to introduce fluid pressure into the said chamber incident to the stopping of the movement of the said platen-moving means to force the said platen into pressing engagement with the work.

3. A press comprising the combination with supporting means, of a pair of relatively movable members mounted on the supporting means, a platen carried by one of the members, a second platen movably carried by the other of the said members, mechanical means to move at least one of the said members to bring the platens nearer together to hold material to be pressed, diaphragm means providing an expansible fluid chamber for exerting final fluid pressure on the material to be pressed, the said mechanical means including control mechanism for rendering the said mechanical means inoperative incident to movement of the movable platen to a fixed distance from the work, and instrumentalities op-

erable by the said control mechanism for introducing fluid pressure into the chamber as the said mechanical means become inoperative.

4. A press comprising the combination with supporting means, of a pair of relatively movable members supported by the supporting means, a platen carried by one of the said members, a second platen movably carried by the other of the said members, means to move at least one of the said members to bring the platens nearer together to hold material to be pressed, diaphragm means providing an expansible chamber between the movable platen and the member by which it is carried, means to introduce fluid pressure into the chamber to press the platens tightly against the material, and mechanism for automatically controlling the movement of the member carrying the movable platen responsively to approach thereof to a fixed distance of the work.

5. A press comprising the combination with supporting means, of a pair of relatively movable members supported by the supporting means, a platen carried by one of the said members, a second platen movably carried by the other of the said members, means to move at least one of the said members to bring the platens nearer together to hold material to be pressed, diaphragm means providing an expansible chamber between the movable platen and the member by which it is carried, mechanism for automatically controlling the movement of the member carrying the movable platen responsively to approach thereof to a fixed distance of the work, and means for automatically introducing fluid pressure into the expansible chamber incident to operation of the control mechanism.

6. A press comprising the combination with supporting means, of a pair of relatively movable members supported by the supporting means, a platen carried by one of the said members, a second platen movably carried by the other of the said members, means including a reversible motor to move at least one of the said members to bring the platens nearer together to hold material to be pressed, diaphragm means providing an expansible chamber between the movable platen and the member by which it is carried, mechanism for automatically controlling the movement of the member carrying the movable platen responsively to engagement thereof with the work, and means for automatically introducing fluid pressure into the expansible chamber incident to operation of the control mechanism, the said control mechanism comprising a motor circuit, means adapted to engage a work upon movement of the platen towards the work for a fixed amount, devices in the motor circuit operable upon contact of the work-engaging means and work to break the circuit to stop the motor, and means for reversing the motor upon completion of the pressing for freeing the platen from the work.

7. A press comprising the combination with supporting means, of a pair of relatively movable members supported by the supporting means, a platen carried by one of the said members, a second platen movably carried by the other of the said members, means including a motor to move at least one of the said members to bring the platens nearer together to hold material to be pressed, diaphragm means providing an expansible chamber between the movable platen and the member by which it is carried, mechanism for automatically controlling the movement of the member carrying the movable platen responsively to engagement thereof with the work, and means for automatically introducing fluid pressure into the expansible chamber incident to operation of the control mechanism, the said control mechanism comprising a motor circuit, a rotary switch in the motor circuit operable upon a predetermined approach of the platen and work to break the circuit to stop the motor, the said switch maintaining the motor circuit closed during adjustment of the platen, and means adapted to engage the work upon approach of the platen and work to cause rotation of the switch into circuit-breaking position.

8. A press comprising the combination with supporting means, of a pair of relatively movable members supported by the supporting means, a platen carried by one of the said members, a second platen movably carried by the other of the said members, means including a motor to move at least one of the said members to bring the platens nearer together to hold material to be pressed, diaphragm means providing an expansible chamber between the movable platen and the member by which it is carried, mechanism for controlling the movement of the member carrying the movable platen responsively to engagement thereof with the work, and means comprising a fluid control valve, a solenoid for operating the valve and a circuit through the solenoid for actuating the solenoid for automatically introducing fluid pressure into the expansible chamber incident to operation of the control mechanism, the said control mechanism comprising a motor circuit, a rotary switch in the motor circuit and provided with contacts operable upon approach of the platen to a predetermined distance of the work to break the motor circuit to stop the motor while closing the solenoid circuit to energize the solenoid thereby opening the said valve as the motor stops, the said switch automatically maintaining the motor circuit closed and the solenoid circuit open until engagement is made between the platen and work, and means adapted to engage the said work upon the predetermined approach of the platen to the work and operable by engagement with the work to cause rotation of the switch into position to stop the motor and to energize the solenoid.

9. A press comprising the combination with supporting means, of a pair of relatively movable members supported by the supporting means, a platen carried by one of the said members, a second platen movably carried by the other of the said members, means including a reversible motor to move at least one of the said members to bring the platens nearer together to hold material to be pressed, diaphragm means providing an expansible chamber between the movable platen and the member by which it is carried, mechanism for controlling the movement of the member carrying the movable platen responsively to engagement thereof with the work, means comprising a fluid control valve, a solenoid for operating the valve and a circuit through the solenoid for actuating the solenoid for automatically introducing fluid pressure into the expansible chamber incident to operation of the control mechanism, the said control mechanism comprising a motor circuit for operating the motor to advance the platen towards the work, a switch in the motor circuit provided with contacts operable upon a predetermined advance of the platen towards the work to break the said motor circuit to stop the motor while closing the sole-

noid circuit to energize the solenoid thereby opening the said valve as the motor stops, the said switch automatically maintaining the motor circuit closed and the solenoid circuit open until the platen has completed its predetermined advance towards the work, means operable by engagement with the work at the end of the predetermined advance to cause actuation of the switch into position to stop the motor and to energize the solenoid, a second circuit for reversing the motor upon completion of the pressing period to retract the platen from the work, thereby reversing the operation of the said switch, and means for reversing the operation of the valve responsively to the reversing of the motor to cut off fluid pressure to the said chamber.

10. A press comprising a pair of relatively movable members, a platen carried by one of said members, a second platen movably carried by the other of the said members, mechanical means actuable to move at least one of the said members to bring the platens nearer together to hold material to be pressed, means adapted to engage the said material as the platens approach each other, instrumentalities operable responsively to contact between the said material engaging means and the material for automatically stopping the actuation of the said mechanical means for stopping the movement of the said platen upon engagement of the said material engaging means with the said material, and diaphragm means providing an expansible chamber between the movable platen and the member by which it is carried.

11. A press comprising a pair of relatively movable members, a multiplicity of relatively movable platen structures carried between the members, mechanical means to move the said members to bring the platen structures nearer together to hold material to be pressed between various pairs of platens, diaphragm means providing an expansible chamber between each of the said members and the platen adjacent thereto, means which provide relatively rigid walls adjacent to the movable parts of the diaphragm means, the said rigid walls clamping the diaphragm means in position therebetween, the platen structures being movable responsively to expansion and contraction of the diaphragm means, and including a member defining a movable wall which is adapted to move relatively to the clamping walls as the diaphragm members change their shape while being at all times in contact with its adjacent walls, and means to introduce fluid pressure into the said chambers to press the platens tightly against the material responsively to resulting expansion of the said diaphragm means.

12. A press comprising a head, a bolster movably mounted above the said head, a lower platen carried by the head, an upper platen movably carried by the bolster, mechanical means to move the bolster to bring the upper platen against a piece of work supported on the lower platen, diaphragm means providing an expansible chamber between the upper platen and the bolster, the diaphragm means including a pair of diaphragms united about their peripheries, one of the diaphragms being provided with an opening, means which provide relatively rigid walls adjacent to the movable parts of the diaphragm means, the said rigid walls clamping the diaphragm means in position therebetween, the movable platen being movable relatively to the clamping walls as the diaphragm members change their shape, a movable wall for the expansible chamber engaging the diaphragm while being at all times in contact with the rigid walls, means interconnecting the movable wall and platen and means to introduce fluid pressure into the said chamber through the said opening.

13. A press comprising the combination with supporting means, of a pair of relatively movable members mounted on the supporting means, a platen carried by one of the members, a second platen movably carried by the other of the said members, motor-operated means to move at least one of the said members to bring the platens nearer together to hold material to be pressed, driving mechanism for operating the said motor-operated means, diaphragm means providing an expansible chamber between the movable platen and the member by which it is carried, means for forcing fluid into the diaphragm means for expanding the same, thereby to force the platen into high-pressure engagement with the work, and pressure-actuated instrumentalities operable upon movement of the platen to a fixed distance relative to the work for automatically stopping the said driving mechanism incident to the approach of the said movable platen towards the said work.

14. A press comprising the combination with supporting means, of a pair of relatively movable members mounted on the supporting means, a platen carried by one of the members, a second platen movably carried by the other of the said members, mechanical means to move at least one of the said members, to bring the platens nearer together to hold material to be pressed, motor driving mechanism for operating the said mechanical means, diaphragm means providing an expansible chamber between the movable platen and the member by which it is carried, control instrumentalities for the motor driving mechanism including pressure-actuated means operable responsively to contact thereof with the work upon approach of the movable platen to a fixed distance of the work for automatically stopping the said motor driving mechanism incident to pressure contact of the said means and the said work, and mechanism also operable by the said control instrumentalities for introducing fluid pressure into the said chamber incident to the stopping of the movement of the said platen.

15. A press comprising the combination with supporting means, of a pair of relatively movable members supported by the supporting means, a platen carried by one of the said members, a second platen movably carried by the other of the said members, means including a motor to move at least one of the said members to bring the platens nearer together to hold material to be pressed, diaphragm means providing an expansible chamber between the movable platen and the member by which it is carried, mechanism for automatically controlling the movement of the member carrying the movable platen responsively to approach thereof to a fixed distance of the work, means for engaging the work to actuate the said mechanism, and means for automatically introducing fluid pressure incident to operation of the control mechanism, the said control mechanism comprising a current supply circuit for the motor and devices in circuit with the motor and operable upon contact of the said work-engaging means and the work to break the circuit through the motor.

16. A press comprising a pair of relatively movable members, a platen carried by one of the

members, a platen structure movably carried by the other of the members, means to move at least one of the members to bring the platens nearer together to hold material to be pressed, diaphragm means providing an expansible chamber between the movable platen and the member by which it is carried, means which provide relatively rigid walls adjacent to the movable parts of the diaphragm means, the said rigid walls clamping the diaphragm means in position therebetween, the platen structure being movable responsively to expansion and contraction of the diaphragm means and including a member defining a movable wall which is adapted to move relatively to the clamping walls as the diaphragm means change their shape while being at all times in contact with the rigid clamping walls, and means for intoducing fluid into the said chamber to cause expansion of the said expansible chamber.

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