No. 715,365. Patented Dec. 9, 1902.

A. W. FRENCH.

REGULATING MEANS FOR HYDROSTATIC PRESSES.

(Application filed Feb. 3, 1902.)

(No Model.)

Fig. 1.

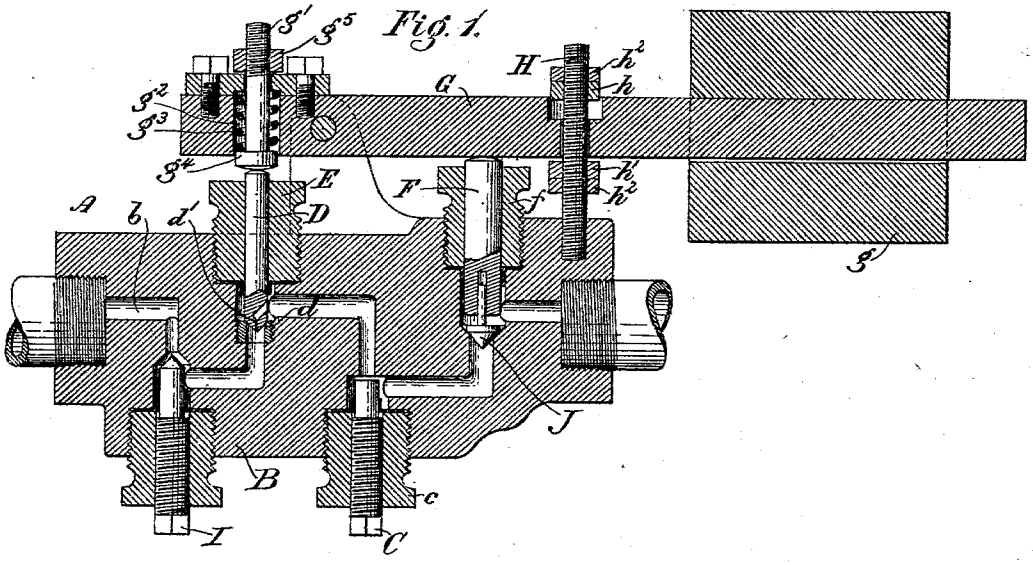


Fig. 2.

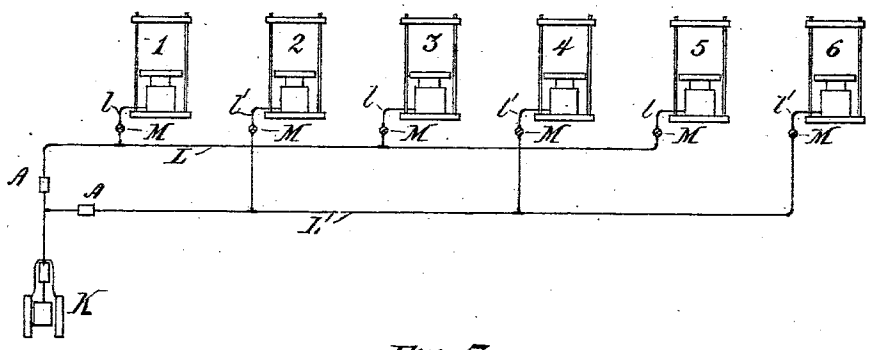
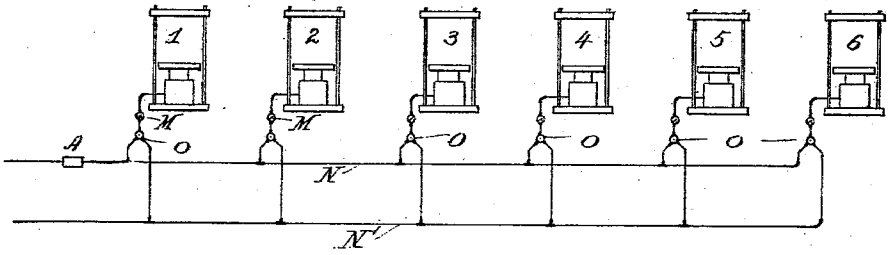


Fig. 3.



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UNITED STATES PATENT OFFICE.

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REGULATING MEANS FOR HYDROSTATIC PRESSES.

SPECIFICATION forming part of Letters Patent No. 715,365, dated December 9, 1902.

Application filed February 3, 1902. Serial No. 92,297. (No model.)

To all whom it may concern:

Be it known that I, ALFRED W. FRENCH, a citizen of the United States, residing at Piqua, in the county of Miami and State of Ohio, have invented new and useful Improvements in Regulating Means for Hydrostatic Presses, of which the following is a specification.

This invention relates to a regulating device for hydrostatic presses used for expressing oil from seeds, meal, and other oleaginous substances or for analogous purposes. In operating such presses it is common to confine the oil-bearing meal or other substance in bags or cloths and place a number of such bags or cloths in the press one above the other. When the press-plunger is moved to express the oil, a considerable portion of its travel is required to take up the slack or crowd the bags together, and the oil does not begin to run from the oleaginous substance until a certain pressure—say two or three hundred pounds per square inch—due to the resistance offered by the material in the press, is reached. In expressing from certain substances, if the speed of the plunger is considerable when this pressure is attained the oil will be expressed so rapidly at first as to cause the meal to wash to the sides and ends of the bags or cloths, with the result of destroying the bags or cloths, getting meal over the press, and "foots" or fine meal in the oil. On the other hand, if the press-plunger travels so slowly from the commencement of its movement as to prevent such rapid expression of the oil a great deal of time is lost while the plunger is taking up the slack. To obtain the best results, therefore, it is desirable to have the press-plunger move rapidly while taking up the slack and then slow down as soon as the oil begins to run.

The object of the present invention is to provide a very simple means, controlled by the pressure of the operating liquid for the press, which will permit a rapid flow of the operating liquid to the press while the slack is being taken up and which as soon as the pressure due to the resistance offered by the material in the press becomes sufficient to express the oil will automatically operate to obstruct the liquid-supply passage, and thus lessen the speed of the press-plunger.

In the accompanying drawings, Figure 1 is a sectional view of a regulating device embodying the invention. Fig. 2 is a diagrammatic view showing the application of the device to a system of presses supplied with operating liquid by a single pump. Fig. 3 is a diagrammatic view showing the application of the device to a system of presses fed from separate high and low pressure sources.

Like letters of reference refer to like parts in the several figures.

A represents the regulating device, which may be variously constructed without departing from the invention.

The device illustrated in the drawings is constructed as follows:

B represents a casing which is provided with a passage *b*, extending through the same and connecting at one end with the supply passage or pipe leading from the source of operating liquid for the presses and at the other end with the passage or pipe which leads to the press or presses. The passage thus constitutes a portion of the supply passage or pipe.

C represents a valve or plug for more or less obstructing the passage, which in order to regulate the flow of the liquid through the passage is adjustable. As shown, the valve is in the form of a screw-plug, which works in a suitable stuffing-box *c* and the inner end of which extends into the liquid-passage. By adjusting this valve in or out the effective size of the passage can be regulated to permit the proper flow of the liquid to operate the press or presses at the maximum desired speed, and the danger of too sudden a discharge from the accumulator, if one is used to supply the liquid to the presses, is avoided.

D represents an automatic choker. As shown in the drawings, it is in the form of a cylindrical valve having a conical inner end adapted to seat on a valve-seat *d* provided therefor, so as to obstruct the passage *b*, and is provided with a small duct or passage *d'*, which affords a by-pass for the liquid when the choker is on its seat *d*. The duct is smaller than the passage left by the regulating-valve, and when the liquid is compelled to pass therethrough by the seating of the movable choker the flow is restricted and the speed of the press-plunger lessened. The movable choker is slidably mounted to move

toward and from its seat in a bearing-opening formed in a screw-plug E, which is screwed into a screw-threaded opening in the casing. The movable choker is so arranged relative to the supply-passage *b* that the pressure of the liquid in passing therethrough is directed against the inner end of the movable choker and lifts the latter off of its seat, so that the liquid can freely pass the choker. A suitable packing of any usual or preferred kind is interposed between the movable choker and the bearing-plug. The choker is automatically moved in or to its seat to choke the passage by any suitable means operated by the pressure in the passage when the pressure due to the resistance offered by the material in the press is sufficient to cause the oil to run. The means shown in the drawings for this purpose is constructed as follows:

F represents a piston slidably mounted in the case, with its inner end extending into the liquid-passage *b*, so as to be lifted or moved outwardly by the pressure of the liquid in the passage on its inner end. The piston is provided with a suitable stuffing-box *f*.

G represents a lever pivoted intermediate of its ends on the casing A and having a long arm which extends over and rests on the piston F and a short arm which extends over the movable choker. The lever is provided with a weight *g*, adjustable on the long arm thereof toward and from the fulcrum, and the short arm is preferably provided with an adjustable bearing pin or bolt *g'*, which is adapted to strike the outer end of the movable choker to move it to its seat. When the pressure on the inner end of the piston is sufficient to overcome the gravity of the weighted lever, the piston moves outwardly and through the lever moves the choker inwardly to its seat. The device can be set to operate at any predetermined pressure by adjusting the weight toward or from the lever-fulcrum. In order to prevent injury to the movable choker or its valve-seat due to the pressure exerted thereon by the operating piston and lever, the bearing pin or bolt *g'* is yieldingly mounted on the lever, preferably as follows: The bolt passes through a cavity or socket g^2 in the lever, and in the cavity surrounding the pin or bolt is a coiled spring g^3, which abuts at its outer end against the end of the cavity and at its inner end against an enlargement or head g^4 on the pin or bolt. The pressure of the spring is regulated by a nut g^5, screwed on the outer screw-threaded end of the pin or bolt and engaging the outer side of the lever. The spring is adjusted so that it exerts a somewhat greater pressure on the outer end of the movable choker than the liquid in the passage *b* does on the inner end of the choker. When, therefore, the long arm of the lever is lifted by the piston, the choker is moved to its seat; but the spring permits a further movement of the lever without undue pressure on the choker. Suitable means is preferably provided for limiting the inward and outward movement of the lever. That shown consists of a screw-bolt H, secured to the casing and passing through an opening in the long arm of the lever and having stop-nuts *h h'* thereon, one inside and the other outside of the lever.

h^2 represents lock-nuts for holding the stop-nuts in the position to which they are adjusted.

I represents an ordinary throttle-valve for more or less or completely closing the liquid-passage when found necessary, and J represents the usual check-valve for preventing a return flow in the supply-main. This check-valve may be located as shown or at any other suitable point in the supply-main.

The improved regulating means above described may be incorporated at any point in the supply-main for the operating liquid to the press, or where a number of presses are employed each may be provided with one of the regulating devices, located in the branch pipe leading from the supply-main to that press; but it is not necessary to provide each press with a separate regulating device, as will be now explained.

In Fig. 2 is represented the improved regulating device applied to a series of presses all operated from a single source of liquid-supply, such as a compressing-pump. 1 2 3 4 5 6 represent the presses; K, the pump; L, a supply-main leading from the pump and connecting with certain of the presses—say the alternate presses 1 3 5—by branch pipes *l*, and L' a second supply-main leading from the pump and connecting with the remainder of the presses by branch pipes *l'*. M represents the usual check-valves, one in each branch pipe. A regulating device A is located in each supply-main between the pump and the first branch pipe. The presses are usually filled and operated successively. When the operating liquid is admitted to press No. 1 by opening its supply-valve, the liquid passes freely through the regulating device in the supply-main L, and the press-plunger moves rapidly to take up the slack. As soon as the slack is taken up and the oil begins to flow the back pressure in the passage *b*, due to the resistance offered to the plunger by the material in the press, immediately through the mechanism described moves the movable choker D to its seat and lessens the speed of the press-plunger. The operating liquid is then admitted to press No. 2, and as its supply passes from the supply-main L' through the other regulating device the first regulating device is not affected and the slack in the press No. 2 is taken up and its choker operated as in the first case. As it only takes a few seconds to take up the slack, press No. 1 is expressing oil nearly the full time until press No. 3 is started. When the liquid is admitted to press No. 3, as it takes its liquid from the same main as press No. 1, the pressure on the press side of the first choker is immediately reduced, so that the weighted lever is permitted

to drop and the choker to rise from its seat, thus permitting a rapid flow of the liquid to press No. 3 until the oil begins to run in this press, when the choker is again seated, as before. This rapid flow of the liquid through the first regulating device does not have any injurious effect on press No. 1, for the pressure in the latter has reached or nearly reached its maximum during the time before press No. 3 is operated. When press No. 4 is operated, the second regulating device operates in the same manner as the first one just explained. Thus all of the presses can be successively operated, and the speed of the plunger of each is automatically checked at the proper moment.

In Fig. 3 is represented the application of the regulating device to the well-known system in which the presses are first supplied with operating liquid from a low-pressure accumulator or the like and then with liquid from a high-pressure accumulator or the like, which is automatically or otherwise brought into action when the resistance offered by the material in the press equals the maximum pressure from the low-pressure accumulator. N represents the supply-main from the low-pressure accumulator and N′ the supply-main from the high-pressure accumulator. In this instance only one regulating device is necessary, which is placed in the low-pressure main in advance of the first press. When the liquid is admitted to press No. 1, its plunger is first moved rapidly to take up the slack, and when the oil begins to run its speed is slackened, as before explained. By the time that press No. 2 is ready for operation the pressure in press No. 1 has reached the maximum of the low-pressure source and the automatic change-cock O has operated to cut off the low-pressure supply and admit the high-pressure supply to press No. 1. When, therefore, the liquid is admitted to press No. 2, it passes freely through the regulating device until the slack is taken up, when the choker is immediately operated again to obstruct the passage. The action for each of the succeeding presses is the same.

It has been attempted to regulate the supply of liquid to the press by automatically throttling the steam-supply to the compressing-pump; but such an arrangement is not satisfactory where a single pump furnishes the pressure for a plurality of presses which are filled and operated successively, for the supply of operating liquid to all of the presses is thus lessened at the same time, whereas the supply to each should be lessened just at the time when the oil begins to run. Such controlling means is also of no avail where the presses are operated from an accumulator. The very simple regulator herein described can be supplied to the presses of systems now in operation at a nominal expense where the pressure is supplied either directly from the pump or from accumulators, and, as before explained, it can also be employed in connection with the automatic change-cocks now in use for supplying first a low and then a high pressure to the presses.

I claim as my invention—

1. The combination with a press, and a supply-passage for the press-operating liquid, of a choker controlled by the liquid-pressure in said passage and operated automatically to partially obstruct the passage when a predetermined pressure is reached and to open said passage when the pressure in the passage between said choker and the press falls below said predetermined amount, together with means for actuating the choker, said means comprising a part located in said passage between the choker and the press and actuated by back pressure from the press, substantially as set forth.

2. The combination with a press, and a supply-passage for the press-operating liquid, of a choker which is movable to partially obstruct said passage, the movement of the choker being controlled by the liquid-pressure in said passage between said choker and the press, together with means for actuating said choker, said means comprising a part located in said passage between the choker and the press and actuated by back pressure from the press, substantially as set forth.

3. The combination with a press, and a supply-passage for the press-operating liquid, of a movable choker arranged to control said passage, and which in one position partially obstructs said passage, and means controlled by the liquid-pressure in said passage between said choker and the press for operating said choker, substantially as set forth.

4. The combination with a press, and a supply-passage for the press-operating liquid, of a movable choker which in one position obstructs said passage, a by-pass passage through which the liquid passes when said supply-passage is obstructed, and independent means controlled by the liquid-pressure in said supply-passage for operating said choker to obstruct and open said passage, substantially as set forth.

5. The combination with a press, and a supply-passage for the press-operating liquid, of a choker arranged to obstruct said passage and provided with a duct for the passage of the liquid when the passage is obstructed, and independent means controlled by the liquid-pressure in said passage for operating said choker, substantially as set forth.

6. The combination with a press, of a supply-passage for the press-operating liquid provided with a surrounding valve-seat, a choker movable toward and from said seat and provided with a duct for the passage of the liquid when the valve is seated, an independent device operated by the liquid-pressure in said passage, and connections between the same and said choker for operating the latter, substantially as set forth.

7. The combination with a press, and a supply-passage for the press-operating liquid, of

a choker arranged to partially obstruct said passage, an independent device movable in said passage and operated by the liquid-pressure therein, and connections between said device and said choker for operating the latter, substantially as set forth.

8. The combination with a press, and a supply-passage for the press-operating liquid, of a choker movable to obstruct said passage and provided with a duct through which the liquid can pass when said passage is obstructed, a piston operated by the liquid-pressure in said passage, and a weighted lever which is operated by said piston and which operates said choker, substantially as set forth.

9. The combination with a press, and a supply-passage for the press-operating liquid, of a choker arranged to obstruct said passage, a device movable in said passage and operated by the liquid-pressure therein, and a yielding connection between said device and said choker for operating the latter, substantially as set forth.

Witness my hand this 29th day of January, 1902.

ALFRED W. FRENCH.

Witnesses:
CHAS. W. PARKER,
JNO. J. BONNER.