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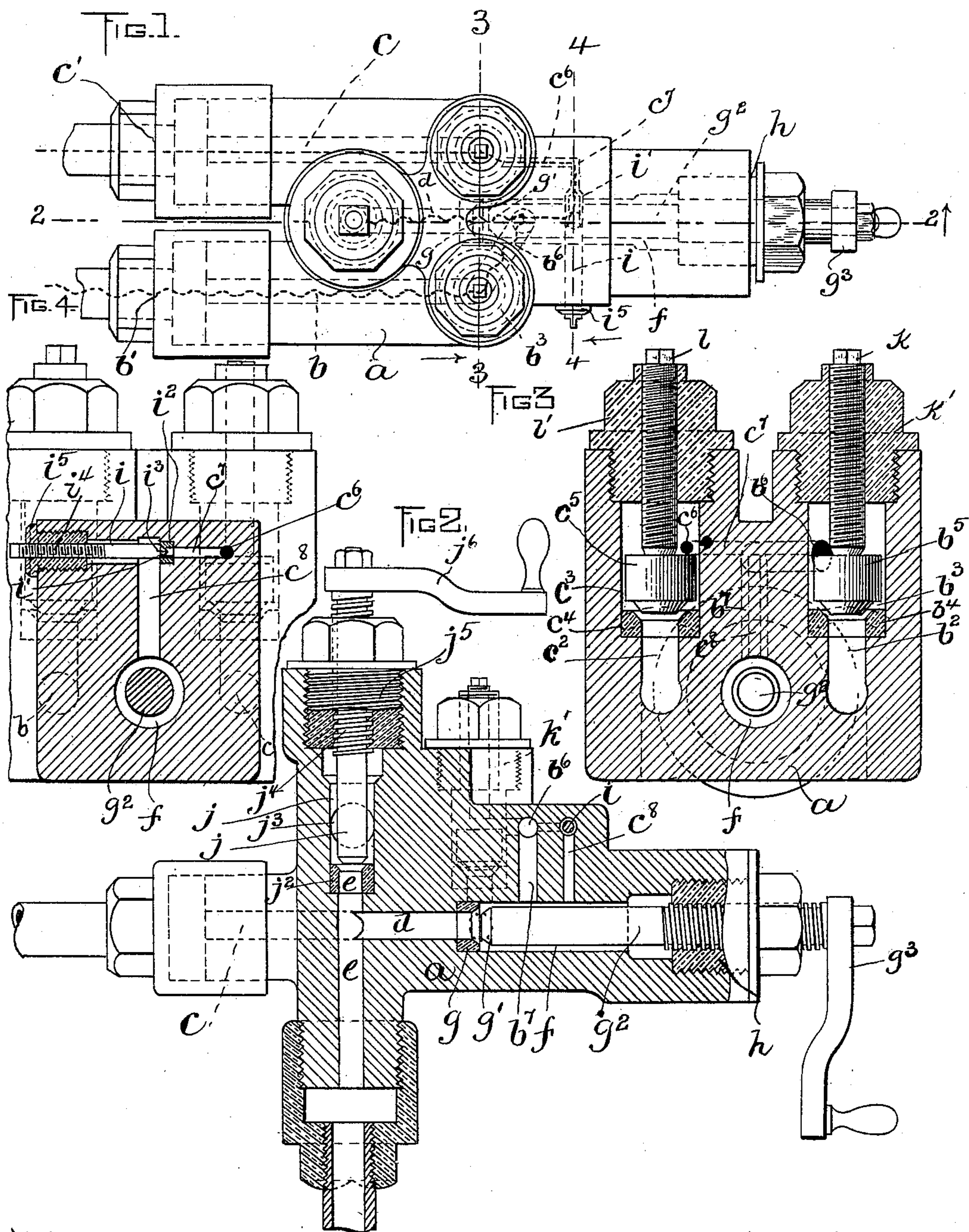
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W. W. PRICE.

PRESSURE CONTROLLING VALVE MECHANISM FOR HYDRAULIC PRESSES.

(Application filed Apr. 8, 1897.)

(No Model.)



WITNESSES:
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UNITED STATES PATENT OFFICE.

WILLIAM W. PRICE, OF HOUSTON, TEXAS.

PRESSURE-CONTROLLING VALVE MECHANISM FOR HYDRAULIC PRESSES.

SPECIFICATION forming part of Letters Patent No. 613,716, dated November 8, 1898.

Application filed April 8, 1897. Serial No. 631,253. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. PRICE, of Houston, in the county of Harris and State of Texas, have invented certain new and useful
5 Improvements in Pressure-Controlling Valve Mechanism for Hydraulic Presses, of which the following is a specification.

The present invention relates to an apparatus or mechanism for controlling the admission of fluid-pressures to hydraulic presses; and its prime object is to provide an arrangement of valves which will permit of the successive operation of the two pressures, low and high, by the manipulation of a single valve, in
15 contradistinction to former arrangements requiring a second manipulation to admit the high pressure when the low pressure has done all the work of which it is capable. In some of the former mechanisms the high-pressure valve is opened by hand when the low pressure has completed its work, while in other mechanisms the high-pressure valve is opened automatically as soon as the press-resistance equals the low pressure. By my arrangement
20 the manipulation of a single valve in the first instance will be productive of successive operation of the low and high pressures without the opening of any other valve, and when the high pressure asserts itself at the time the low pressure has completed its work the low pressure will be cut off automatically and may be directed to another press.

With the above-stated object in view the invention consists in certain novel arrangements and combinations of parts recited in the appended claims.

The drawings which accompany and form part of this specification illustrate an embodiment of the invention.

40 Figure 1 shows a top plan view of the apparatus with a broken-line representation of the various passages. Figs. 2, 3, and 4 show sections taken on lines 2 2, 3 3, and 4 4, respectively, of Fig. 1, looking in directions indicated by arrows crossing said lines.

45 The letter *a* designates the casing of the valve mechanism, which at the left-hand end, as seen in Fig. 1, is bifurcated, forming two arms or nipples bored longitudinally to provide two passages *b* and *c* and equipped at
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their outer ends with unions *b'* *c'* for coupling with low and high pressure pumps or other suitable fluid-pressure producers. The passages *b* and *c* communicate, respectively, with short vertical passages *b² c²*, which enter, respectively, cylindrical chambers *b³ c³*, having
55 seats *b⁴ c⁴* for conical valves *b⁵ c⁵*, the latter being check-valves to permit passage of pressures to the press, but to prevent backflow.

Having thus far indicated the respective
60 courses of the two pressures, I shall leave them for the present and designate a passage *d*, which extends longitudinally in the middle of the main casing, and hence out of alinement with both the before-mentioned
65 passages *b c*. This passage *d* communicates at one end with a passage *e*, extending at right angles to it and leading to the press, and said passage *d* opens at the other end into a chamber *f*, having a seat *g* for a conical valve
70 *g'*, whose stem *g²* extends out of one end of the casing and is equipped with a handle *g³*. The said stem has a screw-threaded portion working in a nut *h*, fixed to the casing, so that upon turning the handle *g³* the valve
75 may be moved toward and from its seat. Reverting now to the high and low pressure passages *c* and *b*, the latter is connected with the chamber *f* by a diagonal passage *b⁶*, leading from the check-valve chamber *b³*, and a
80 vertical passage *b⁷*, leading from the diagonal passage into the said chamber *f* at a point in proximity to the valve-seat *g*. The high-pressure passage *c* is also connected with the chamber *f*, but at a point more remote from
85 the said valve-seat, the connection being made through a longitudinal passage *c⁶*, leading out of the chamber *c³*, a transverse passage *c⁷*, leading from said longitudinal passage, and a vertical passage *c⁸*, leading from said trans-
90 verse passage into the chamber *f*. The passages *c⁶ c⁷ c⁸* are small in cross-sectional area as compared with the low-pressure passages, and there is arranged between the passages *c⁷* and *c⁸* a throttling device or choker *i*, which
95 will be specifically described hereinafter.

The operation of the apparatus thus far described is as follows: The pressure producers or accumulators being connected with the couplings *b'* and *c'* and in communication
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with the passages *b* and *c*, respectively, in order to put the press in operation it is simply necessary to turn the handle *g*³ in a direction to unseat the valve *g*¹, whereupon communication is established between the press-passage *d* and both the high and low pressure accumulators, the communication with the low pressure being by way of passages *b* *b*², chamber *b*³, diagonal passage *b*⁶, vertical passage *b*⁷, and chamber *f*, and communication with the high pressure being by way of passages *c* *c*², chamber *c*³, passages *c*⁶ *c*⁷ *c*⁸, and chamber *f*.

The high pressure is so restricted in its passage to the press that it does not at the outset assert itself, and the low pressure rushes to the press and performs its work of moving the press-plunger through a preliminary traverse before the high pressure can assert itself; but eventually, when the low pressure has performed all it is capable of performing in the press, the high pressure is felt in the press and the operation of pressing is completed. At the same time the low pressure is cut off by the closing of the check-valve *b*⁵ by the superior pressure between it and the press. It will thus be seen that the manipulation of a single valve is followed by successive operations of the low and high pressures without requiring any other valve to be opened subsequently to admit the higher pressure. In this connection it will be observed that the low-pressure check-valve is so far removed from the path of the high pressure as not to be immediately affected thereby. Otherwise the higher pressure might prevent any opening of this check-valve.

A relief-valve *j* is arranged in a chamber *j*¹, communicating with the press-passage *e* and having a suitable valve-seat *j*², above which is an opening *j*³ for escape of the pressure. The stem *j*⁴ of the valve *j* has a screw-threaded portion which engages a nut *j*⁵, suitably fastened in the casing, and a handle *j*⁶ is secured to the projecting end of the stem for the manipulation of the valve.

When for any reason it becomes necessary to cut off the flow from the high and low pressure passages to the chamber *f*, the two check-valves *b*⁵ and *c*⁵ may be held to their seats by means of stems *k* and *l*, arranged over them and having screw-threaded portions engaging nuts *k*¹ and *l*¹ in the casing, so that said stems may be screwed down upon the valves. This expedient will be resorted to when it becomes necessary to remove the throttling device *i* for cleaning or other purposes. This throttling device is of the following-described construction and arrangement. It consists of a comparatively small steel stem, entered through the side of the casing opposite the high-pressure check-valve and having a long tapered end *i*¹, which is ground to a fit with a correspondingly-formed seat *i*² at the end of the passage *c*⁷. A small longitudinal groove

*i*³ is made in one side of the tapered end *i*¹, and this constitutes the only means of communication between the passages *c*⁷ and *c*⁸, for when the apparatus is in operation the conical end of the stem is in intimate contact with its seat. The stem is screw-threaded through a portion of its length, as shown at *i*⁴, and engages a nut *i*⁵, fastened in the casing. Should the groove become stopped up, it is only necessary to turn back the stem to an extent sufficient to allow any foreign matter in the groove to be washed out. Of course the groove can be made any size required. If in the operation of the apparatus said groove becomes too large, the stem can be removed entirely and its tapered end turned down to reduce the size of the groove, after which the stem will be reinserted and screwed down tight to its seat.

Having thus described my invention, what I claim is—

1. In a pressure-controlling mechanism for hydraulic presses, the combination of check-valved passages leading from high and low pressure producers respectively and interrupted only by the check-valves; a passage leading to the press from said check-valved passages, the low-pressure passage communicating with the said press-passage at a point in advance of that where the high-pressure passage communicates with said press-passage, and the check-valve of the low-pressure passage being removed from the path of communication between the high-pressure passage and the press; and a single manually-operated valve whose manipulation establishes communication for both pressures simultaneously to the press; substantially as described.

2. In a valve mechanism for hydraulic presses, the combination of a single passage leading to the press; a manually-operated valve controlling said passage; a check-valved passage leading from the high-pressure producer to the said press-passage and interrupted only by the check-valve; a throttling device in said high-pressure passage; a passage leading from the low-pressure producer into the press-passage at a point in advance of the high-pressure passage; and a check-valve in the low-pressure passage located out of the path of communication between the high-pressure passage and the press.

3. In a pressure-controller for a hydraulic press, the combination of high and low pressure passages leading to the press, and a single manipulative valve constituting the only obstruction to the flow of high as well as low pressure to the press, whereby the opening of said valve admits the two pressures simultaneously, substantially as and for the purpose described.

4. In a pressure-controller for a hydraulic press, the combination of high and low pressure passages leading to the press, means for restricting the flow through the high-pressure

passage, and a single manipulative valve constituting the only obstruction to the flow of high as well as low pressure to the press, whereby the opening of said valve admits the
5 two pressures simultaneously, substantially as and for the purpose described.

In testimony whereof I have signed my

name to this specification, in the presence of two subscribing witnesses, this 2d day of January, A. D. 1897.

WILLIAM W. PRICE.

Witnesses:

J. M. McCORD,

A. A. MOORE.