

J. W. NELSON.
 DEVICE FOR CONTROLLING HYDRAULIC PRESSURE.
 APPLICATION FILED JAN. 21, 1908.

914,165.

Patented Mar. 2, 1909.

2 SHEETS—SHEET 1.

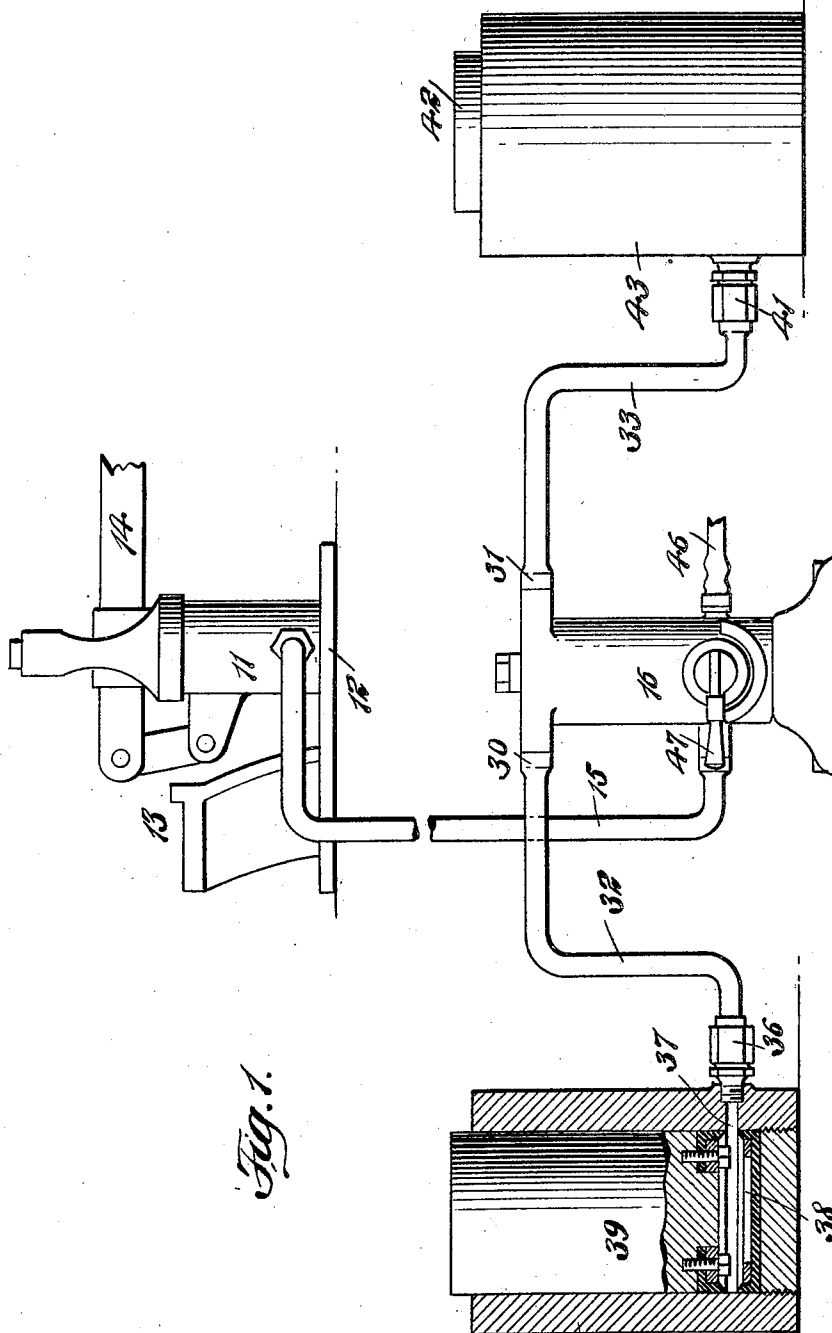


Fig. 1.

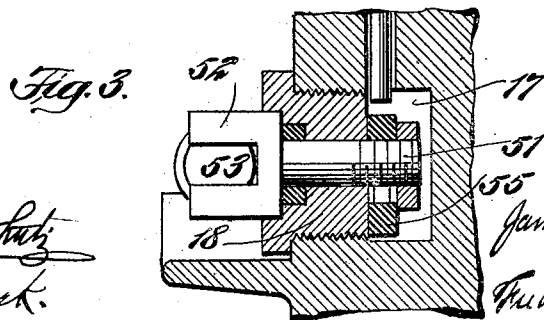
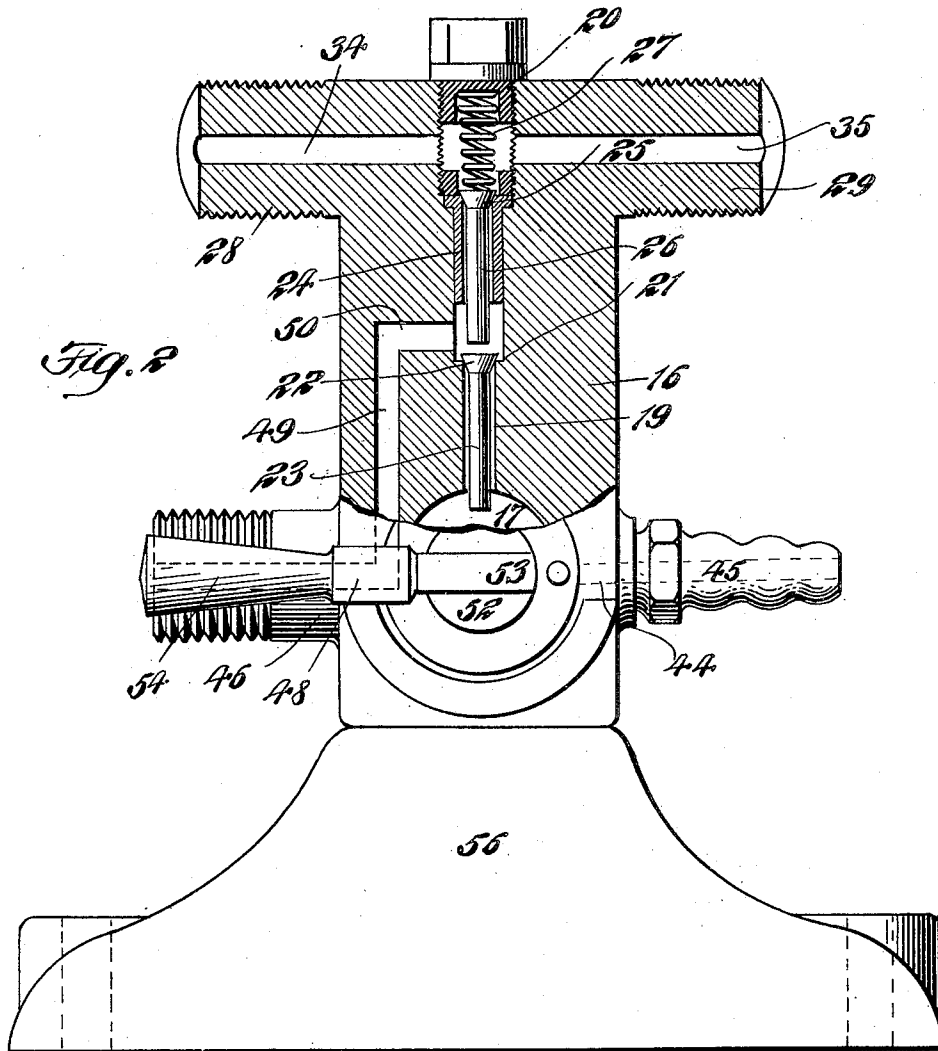
WITNESSES:
James W. Nelson
P. G. Lamm

INVENTOR
James W. Nelson
 BY *Edw. A. Rowland*
 ATTORNEY

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WITNESSES:
Julius K. Smith
R. T. Smith

INVENTOR
James W. Nelson
 BY
Frederic H. Powers
 ATTORNEY

UNITED STATES PATENT OFFICE.

JAMES W. NELSON, OF NEW YORK, N. Y.

DEVICE FOR CONTROLLING HYDRAULIC PRESSURE.

No. 914,165.

Specification of Letters Patent.

Patented March 2, 1909.

Application filed January 21, 1908. Serial No. 412,026.

To all whom it may concern:

Be it known that I, JAMES W. NELSON, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Devices for Controlling Hydraulic Pressure, of which the following is a specification.

This invention relates to individual devices for controlling the flow of liquid to and from the pump and to and from the ram or rams in apparatus for generating and applying hydraulic pressure, with particular reference to apparatus adapted for employment under conditions where it is necessary or desirable to apply the pressure at some distance from the point at which it is generated.

In an earlier application, filed January 20, 1908, Ser. No. 411,613, I have shown and described somewhat similar mechanism for carrying out the same general features of construction, arrangement and operation.

The present invention contemplates no material departure from the principles involved in the copending application aforesaid, the more recent improvements, about to be described, residing, first, in features of greater convenience, under some conditions, and, second, in equipping the device with valves which are seated in a downward direction, thereby securing certain advantages many of which are set forth in another copending application, filed Oct. 29, 1907, Ser. No. 399,739.

My invention will be more readily understood by reference to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a diagrammatic view of a complete apparatus embodying the preferred form of my invention; Fig. 2 is a central and partly sectional elevation of the individual valve-containing member, and Fig. 3 is a fragmentary transverse section through the lower portion of the valve-container.

Referring now to the drawings in detail, numeral 11 refers to an hydraulic pump which, for the purposes of this description, may be considered as being of the single-piston type. I have shown this pump 11 mounted upon a base-plate 12 which is provided with an abutment-platform 13 for the purpose of bracing the pump against the operative stroke of the pump-lever 14. The pump-chamber underneath the piston is

open through a suitable duct or bore in the pump-cylinder (not shown in the drawings) with the pipe 15.

The valve-container 16 preferably comprises a cylindrical body of suitable metal which is laterally bored to provide a chamber 17. The bore which provides this chamber is interiorly screw-threaded at its extremity to receive the correspondingly-threaded screw-plug 18 by means of which said chamber is sealed. From this chamber 17 leads the bore 19, the upper end of which is sealed by means of the screw-plug 20. This bore 19 is increased in diameter at 21 to provide a seat for the valve 22 which has a downwardly-directed stem 23 projecting into the chamber 17. In the widened portion of the bore 19 I prefer to place the removable cylindrical plug 24, which again reduces the effective area of said bore and provides a seat for the valve 25 which has a downwardly directed stem 26 extending nearly but not quite to the valve 22. The valve 25 is preferably spring-seated, as shown, the spring being located in the small chamber 27 in which the bore 19 terminates.

The valve-container 16 is provided at its upper end with the lateral arms 28 and 29, respectively, each of these arms being suitably provided with screw-threaded extremities for the reception of couplings or connections 30 and 31, respectively, at the end of pipes 32 and 33. Each of these arms 28 and 29 is provided with a longitudinal duct leading from the chamber 27 to the end of said arms, the duct 34, therefore, communicating with the pipe 32, and the duct 35 communicating with the pipe 33.

The pipe 32 leads through the coupling 36 and the duct 37 to the pressure chamber 38 underneath the ram 39 in the cylinder 40. The pipe 33 leads through the connection 41 to a corresponding pressure-chamber underneath the ram 42 in the cylinder 43.

In the valve-container 16, a duct 44 (shown by the dotted lines in Fig. 2) leads to the nipple 45, to which may be attached the rubber or other flexible hose or pipe 46 leading to a suitable source of liquid supply. The valve-container 16 is further provided with an arm 46 terminating in a screw-threaded portion for the reception of a connection or coupling 47 at the end of the pipe 15. This arm 46 is provided with a longitudinal bore 48 (see dotted lines in Fig. 2) which is open through said connection 47 to

the pipe 15. This duct 48 communicates with the duct 49 and thence through the duct 50 with the bore 19 between the valves 22 and 25.

5 The plug 18 provides bearings for a short shaft 51 having a head 52 at its outer extremity which is slotted for the reception of the bearing portion 53 of a lever 54 which is pivoted in said head. On the inner end of
10 said shaft 51 is mounted a cam 55 in coöperative positional relation to the end of the stem 23 of the valve 22. Under normal conditions, this cam 55 is non-interferent with the usual automatic action of the valve
15 22, but upon operation of the lever 54 to rotate the shaft 51, the cam 55 will first impinge against the stem 23 and unseat the valve 22 and hold the latter positively off its seat. Further rotation of the shaft 51, in
20 the same direction, will force the valve 22 still farther off its seat, causing it ultimately to impinge against the stem 26 of the valve 25 and similarly hold the latter valve off its seat.

25 As was fully explained in the first-mentioned copending application aforesaid, this particular type of apparatus is designed for employment where the ram or rams are necessarily or desirably located at some distance from the pump, and is for the general
30 purpose of enabling the operator at the ram or rams, who is in position to note the progress and effect of the work, to absolutely control—without the necessity for easily-misunderstood signals to the operator or
35 workman at the pump—the application of increased pressure and the partial or total relief of the pressure which has been generated and applied. The valve-container 16
40 is designed to be located in close proximity to the ram or, if more than one ram is shown, in close proximity to all thereof.

From the foregoing description it will be apparent that upon the upstroke of the pump-lever 14, a partial vacuum will be created in
45 the pump-chamber beneath the piston in the pump 11. The inequality of pressure thus created will result in the unseating of the valve 22 and a flow of liquid from the source of supply through the duct 44, into the chamber 17, through the lower portion of the bore
50 19, past the valve 22, and through the ducts 50, 49 and 48 and the pipe 15 to the pump-chamber. Upon the downstroke of the lever
55 14, the force of gravity augmented by the pressure of the pump, will seat the valve 22, and the pressure will operate to unseat the valve 25, the liquid flowing through the upper portion of the bore 19 and into the chamber 27, where it is divided between the ducts
60 34 and 35 in the arms 28 and 29, respectively, flowing under equal pressures through the pipes 32 and 33 to the ram-chambers.

When it is desired for any purpose to temporarily check the application of increased

pressure, the operator at the rams (which, as has been explained, are in close proximity to the valve-container 16) will turn the lever 54 through an arc sufficient to unseat the valve 22 only, without interfering with the
70 normal automatic operation of the valve 25. Under such conditions, the existing pressures in the ram or rams is maintained, but even should the pumping operation be continued, the liquid, following the path of least
75 resistance, will flow idly back and forth past the valve 22 to and from the source of supply. Should it be desired to again render the pumping operations effective, the lever 54 is returned to the position indicated in Fig. 2, 80 whereupon operation of the valve 22 again becomes automatic and the pumping operation effective.

When it is desired to relieve the pressure in the ram-chamber, or the chambers of the
85 two or more rams, the lever 54 is turned through a greater arc, sufficient to cause the cam to unseat both valves 22 and 25 in the manner hereinbefore described. In this manner a passage is opened from each ram-
90 chamber to the source of supply, and the rams will be lowered, each under its own weight, for the purposes of removal or re-adjustment.

For reasons fully set forth in my second-
95 mentioned application aforesaid, there is much to be gained through the employment of downwardly-seating valves, and in order that the valve-container 16 may be invariably placed in such a position that the valves
100 will be downwardly seating, I prefer to provide the heavy supporting standard or base 56, which may of itself be heavy enough to normally retain the device in a vertical position, or which may be, if desired, secured
105 to a temporary floor or platform in any suitable manner.

The pipes 15, 32 and 33 are preferably of copper metal, which, as is well known, is sufficiently flexible to permit of any one of
110 the individual elements of the apparatus herein shown and described to be movable with respect to another or others. Copper pipe, however, while desirable from the standpoint of its flexibility, is subject to
115 hardening or tempering under the action of long-continued periods of pressure. In such cases, it must either be discarded, or put through a more or less expensive process of annealing.

120 With respect to my invention, attention is particularly called to the fact that the pipes 32 and 33, leading from the valve-container to the rams, may be of exceedingly short lengths, and these two pipes only are
125 subject to continuous pressure during operation of the ram. The longer pipe 15, as will be apparent, is only subjected to pressure during the down stroke of the pump-piston, the check or pressure valve 25 relieving said
130

pressure the moment the upstroke of said piston is commenced.

Many modifications of minor details of my improved device for controlling hydraulic pressure will doubtless readily suggest themselves to those skilled in the art to which it appertains, and I therefore do not desire to limit my invention to the specific construction herein shown and described.

I claim as new and desire to secure by Letters Patent:

1. In combination, a pump and means apart therefrom for applying the generated pressure, the pump-valves seating downwardly in a fitting interposed between said pump and said applying means and having flexible connection with said pump.

2. In combination, a pump, and means separate therefrom for applying the generated pressure, the pump-valves seating downwardly in a fitting interposed between said pump and said applying means and having flexible connections with each thereof.

3. In combination, a pump, means apart therefrom for applying the generated pressure, the pump-valves seating downwardly in a fitting interposed between said pump and said applying means and having flexible connection with said pump, and means for retaining said fitting in a proper vertical position during operation of the device.

4. In combination, a pump, means apart therefrom for applying the generated pressure, the pump-valves seating downwardly in a fitting interposed between said pump and said applying means and having flexible connection with each thereof, and means for retaining said fitting in a vertical position during operation of the device.

5. In combination, a pump, means apart therefrom for applying the generated pressure, the pump-valves seating downwardly in a fitting interposed between said pump and said applying means and having flexible connection with said pump, and means for controlling said valves.

6. In combination, a pump, means apart therefrom for applying the generated pressure, the pump-valves seating downwardly in a fitting interposed between said pump and said applying means and having flexible connection with each thereof, and means for controlling said valves.

7. In combination, a pump, means apart therefrom for applying the generated pressure, the pump-valves seating downwardly in a fitting interposed between said pump and said applying means and having flexible connection with said pump, means for controlling said valves, and means for retaining said fitting in a proper vertical position during operation of the device.

8. In combination, a pump, means apart therefrom for applying the generated pressure, the pump valves seating downwardly

in a fitting interposed between said pump and said applying means and having flexible connection with each thereof, means for controlling said valves, and means for retaining said fitting in a vertical position during operation of the device.

9. In combination, a pump and means apart therefrom for applying the generated pressure, the pump-valves seating downwardly in a fitting interposed between said pump and said applying means and having flexible connection with said pump, said fitting being provided with means for unseating one or more of said valves.

10. In combination, a pump, and means apart therefrom for applying the generated pressure, the pump valves seating downwardly in a fitting interposed between said pump and said applying means and having flexible connection with each thereof, said fitting being provided with means for unseating one or more of said valves.

11. In combination, a pump and means apart therefrom for applying the generated pressure, the pump-valves seating downwardly in a fitting interposed between said pump and said applying means and having flexible connection with said pump, said fitting being provided with means for unseating one or more of said valves and with means for insuring vertical operation of said valves during use of the device.

12. In combination, a pump and means apart therefrom for applying the generated pressure, the pump-valves seating downwardly in a fitting interposed between said pump and said applying means and having flexible connection with each thereof, said fitting being provided with means for unseating one or more of said valves and with means for insuring vertical operation of said valves during use of the device.

13. In combination, a pump, means apart therefrom for applying the generated pressure, the pump-valves seating downwardly in a fitting interposed between said pump and said applying means and having flexible connection with said pump, and means for positively unseating the lower of said valves, said means being further operable to unseat all of said valves.

14. In combination, a pump, means apart therefrom for applying the generated pressure, the pump-valves seating downwardly in a fitting interposed between said pump and said applying means and having flexible connection with each thereof, and means for positively unseating the lower of said valves, said means being further operable to unseat all of said valves.

15. In combination, a pump, means apart therefrom for applying the generated pressure, the pump-valves seating downwardly in a fitting interposed between said pump and said applying means and having flexible

connection with said pump, means for positively unseating the lower of said valves, said means being further operable to unseat all of said valves, and means for insuring vertical operation of said valves during use of the device.

16. In combination, a pump, means apart therefrom for applying the generated pressure, the pump-valves seating downwardly in a fitting interposed between said pump and said applying means and having flexible connection with each thereof, means for positively unseating the lower of said valves, said means being further operable to unseat all of said valves, and means for insuring vertical operation of said valves during use of the device.

17. In combination, a pump, a ram-cylinder and ram, a flexible connecting conduit therebetween, a member located intermediate the ends of said conduit in which is located all pump and pressure valves, and means for supplying liquid to the pump-chamber through said member from a point below said valves which seat downwardly in said member.

18. In combination, a pump, a ram-cylinder and ram, a flexible connecting conduit therebetween, a member located intermediate the ends of said conduit, said member containing all pump and pressure valves and being provided with means for their manual control, and means for supplying liquid to

the pump-chamber through said member from a point below said valves which seat downwardly in said member.

19. In combination, a pump, a ram-cylinder and ram, a flexible connecting conduit therebetween, a member located intermediate the ends of said conduit in which is located all pump and pressure valves, means for supplying liquid to the pump-chamber through said member from a point below said valves which seat downwardly in said member, and means for insuring vertical operation of said valves during use of the device.

20. In combination, a pump, a ram cylinder and ram, a flexible connecting conduit therebetween, a member located intermediate the ends of said conduit, said member containing all pump and pressure valves and being provided with means for their manual control, means for supplying liquid to the pump chamber through said member from a point below said valves which seat downwardly in said member, and means for insuring vertical operation of said valves during use of the device.

In testimony of the foregoing, I have hereunto set my hand in the presence of two witnesses.

JAMES W. NELSON.

Witnesses:

H. CROCKER,
JAS. MOORE.