J. W. NELSON.

PRESSURE CONTROLLING MEANS FOR HYDRAULIC PUMPS.

APPLICATION FILED JAN. 20, 1908.

914,164. Patented Mar. 2, 1909.

2 SHEETS—SHEET 1.

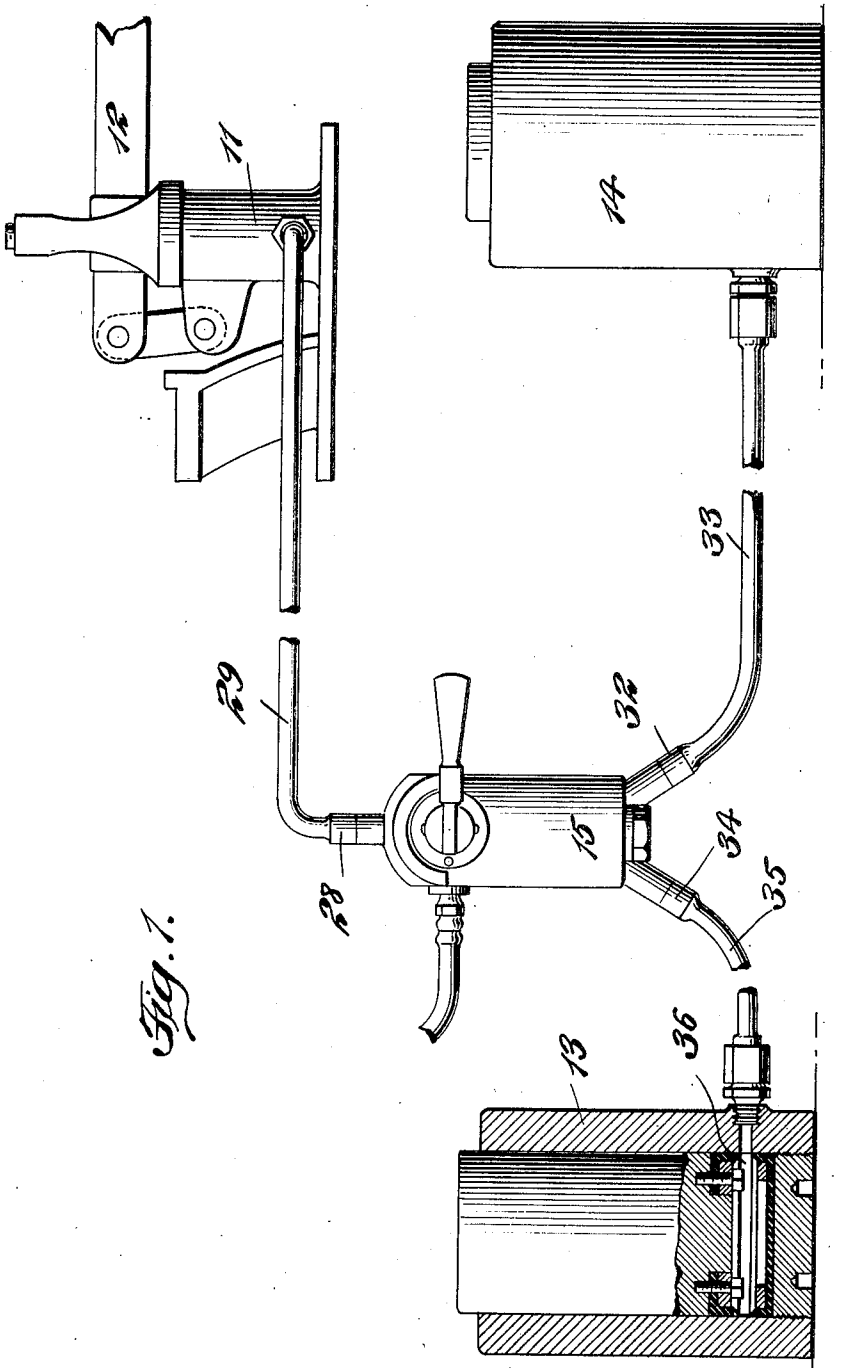


Fig. 1.

Witnesses
Julius A. Smith
P. G. Lovell.

James W. Nelson Inventor
By his Attorney
Thos. H. Bowerscox

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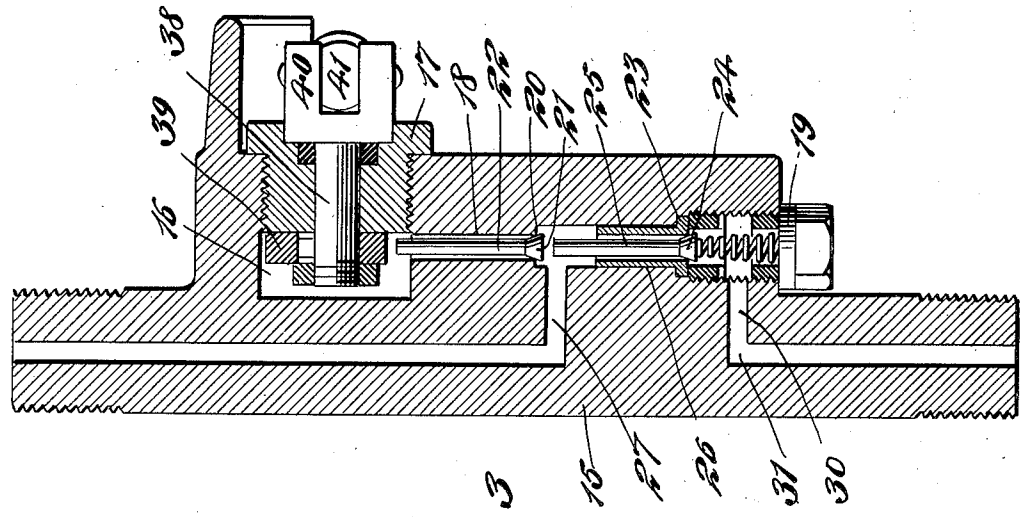


Fig. 3

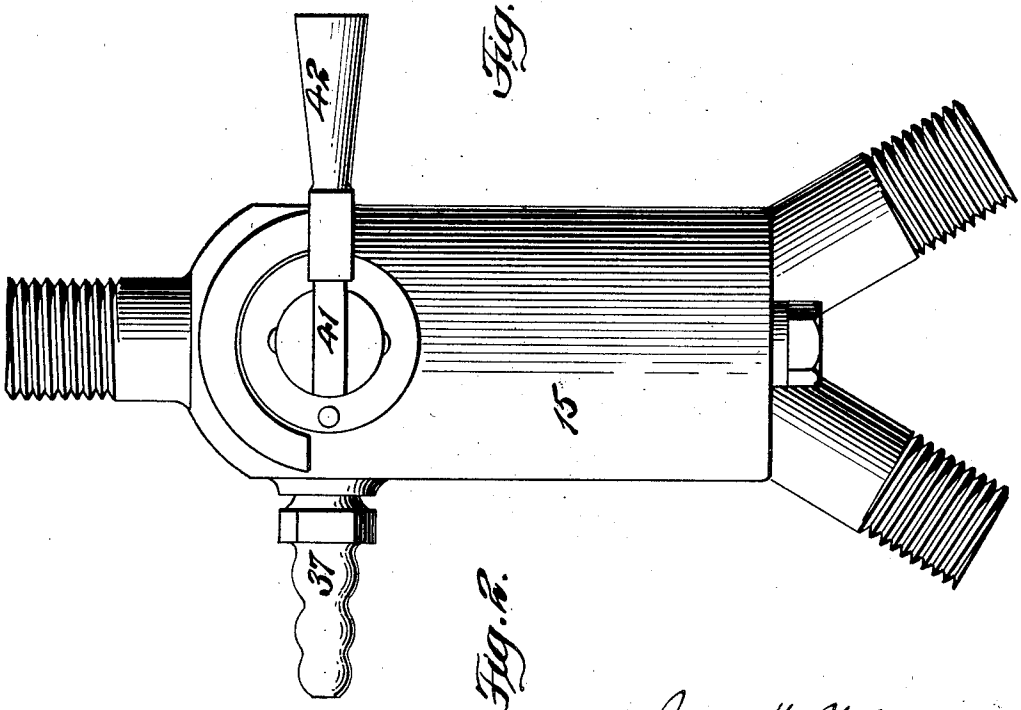


Fig. 2.

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UNITED STATES PATENT OFFICE.

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

PRESSURE-CONTROLLING MEANS FOR HYDRAULIC PUMPS.

No. 914,164. Specification of Letters Patent. Patented March 2, 1909.

Application filed January 20, 1908. Serial No. 411,613.

To all whom it may concern:

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

This invention relates to apparatus for the generation and application of hydraulic pressure.

The principles of the self-contained hydraulic jack are well known, such device being adapted for interposition between a suitable abutment and the work or load and including within itself both pump and ram. It not infrequently happens that the pressure must be applied at points where it is inconvenient, if not impossible, to perform the pumping operation, which makes it necessary to separate the cylinder and ram from the pump, providing suitable connecting conduits therebetween for the transmission of the liquid. Under such circumstances it is possible, of course, to locate the necessary pump valves in the pump member itself, or, as shown and described in my copending application filed October 29, 1907, Ser. No. 399,740, to locate these valves and the means for their manual control in or contiguous to the ram chamber. The former construction is subject, under some conditions, to certain disadvantages not present in the latter, which enables the operator at the ram, who is in position to note the progress and effect of the work, to control both the generation and the application of the pressure although the pumping operation may be continuous, and, therefore, eliminate the necessity of easily-misunderstood signals from the operator at the ram to the operator at the pump. Still other conditions, however, render it at times desirable to separate the pressure-controlling means from both the pump and the ram, which may be located at some distance from each other. For instance, it is sometimes desirable to simultaneously apply the generated pressure at two different points, necessitating the employment of two rams which may themselves be located at some little distance from each other. In such case, it would be manifestly inconvenient, if not under some conditions impossible, to attempt to satisfactorily control the effect of the pumping operation and the relief mechanism from either of the ram members or from the pump.

The general object of the present invention is to provide what may be termed an individual valve chamber, to which a suitable conduit may lead from the pump, and from which a similar conduit or conduits may lead to the pressure chamber or chambers underneath the ram or rams.

My invention and its application 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 my invention, one of the ram members being shown partly in section; Fig. 2 is an enlarged plan view of the individual valve member, and Fig. 3 is a longitudinal central section thereof.

Referring now to the drawings in detail, numeral 11 refers to an hydraulic pressure pump having the usual pump lever 12, and which, for the purposes of the present invention, is of the single-piston type. It may be desired to apply the pressure generated by this pump at one point, in which case there would be necessity for a single ram only. In the present case, however, I have illustrated an apparatus designed to apply an equal pressure at each of two different points, necessitating the employment of the two ram members 13 and 14, which for such purpose are identical in size and construction.

Interposed between the pump and the two rams is the member 15, designed to provide a container for all of the necessary valves of the apparatus and the means for this manual control. This member 15 preferably comprises an integral body of suitable metal which is bored to provide a chamber 16 interiorly threaded for the reception of the screw-plug 17 which seals said chamber. From this chamber 16 leads the longitudinal valve-bore 18, the other end of which is sealed by means of the screw plug 19.

The bore 18 is provided with a seat 20 for the valve 21, which has a stem 22 projecting upwardly into the chamber 16. This bore 18 is similarly provided with a seat 23 for the valve 24, the latter having a stem 25 which, when said valves are seated, extends nearly but not quite to the valve 21. The valve 24 is preferably spring-seated, as shown, and in case the valve bore 18 is increased in diameter to provide the seat 20 for the valve 21, as shown, I prefer to provide a removable

cylindrical plug 26 to again reduce the diameter of said bore and provide the seat for the valve 24.

Leading from the bore 18 at a point intermediate the valves 21 and 24, is the duct 27, open through the coupling 28 to the pipe 29 which leads to the pump-chamber underneath the piston in the pump 11. From the end of the bore 18 opposite the chamber 16, leads the duct 30 which at 31 is divided, one branch thereof leading through the connection 32 to the pipe 33 which connects with the pressure chamber in the ram member 14, and the other branch leading through the connection 34, to the pipe 35 and thence to the pressure chamber 36 in the ram member 13.

The valve member 15 is provided with an aperture, leading to the chamber 16, in which is suitably secured the plug or nipple 37 for the reception of one end of the rubber or other suitably flexible tube or hose leading from a source of liquid supply.

The plug 17 is provided with the short shaft 38 carrying at its inner end, within the chamber 16, the cam 39, which is located in coöperative positional relation to the upper end of the valve stem 22. The outer end of the shaft 38 is provided with a head 40 suitably recessed for the reception of the bearing portion 41 of the lever 42 which is pivoted therein. It will now be apparent that by means of the lever 42 the shaft 38 may be rotated to operate the cam 39, which, in its various positions of rotation, may be made to effect, first, the unseating of the valve 21 and, therefore, the rendering ineffective of continued operations of the pump, or, second, continued movement of the valve 21 until it impinges against the stem 25 and unseats the valve 24, whereupon an open passage is provided from both pressure chambers in the rams back to the source of liquid supply, thereby relieving the pressure and effecting the lowering or contraction of the ram members for removal or readjustment of the parts.

The pipes 29, 33 and 35 are preferably of copper and, therefore, to a certain extent flexible. This being the case, it will be seen that the pump 11 may be located at any convenient and easily accessible point, and the rams 13 and 14 be properly adjusted to the work at some distance from the pump and, possibly, even out of sight of the operator of the pump. The interposed valve member 15 should be conveniently located as near both of the rams as possible or practical, whereby the operator stationed at said valve member will be in position to note the progress and effect of the work.

It will be apparent that should it become desirable to temporarily check the application of increased pressure, the workman at the valve member will rotate the lever 42 through an arc sufficient to effect the unseating of the valve 21 without action upon the valve 24. The pumping operation may now be continued, but no more liquid will be forced into the ram chambers, as with said valve 21 open it will simply pass back and forth between the pump chamber and the source of supply. To again make the pumping operations effective, the lever 42 is returned to its original position, whereupon the action of the valve 21 again becomes automatic and liquid is forced into the ram chambers.

When the work has been done, and it is desired to remove or readjust the rams, the lever 42 may be rotated through an additional arc to effect, in the manner hereinbefore described, the successive unseating of both of the valves 21 and 24, whereupon, even should the pumping operations be continued, the weight of the rams will force the liquid from their respective ram chambers back to the source of supply.

It will be noted that only the comparatively short pipes 33 and 35 will be subject to continuous pressure, the longer pipe 29 being subject to pressure only during the effective stroke of the piston in the pump 11. It is well known that long-continued periods during which a copper pipe is subjected to pressure ultimately effect the hardening or tempering of the metal, and in order to preserve or restore the desirable flexibility, frequent annealing is necessary. In view of the exceedingly short periods of time during which the longer pipe 29 is subject to pressure, the useful life of this pipe is lengthened and only the shorter pipes 33 and 25 will be subject to frequent annealing or replacement.

As hereinbefore suggested, while I have shown and described an independent valve chamber adapted to direct the liquid under pressure to each of the two ram chambers, the present invention is equally adapted to control the operation of a single ram.

Many other modifications of minor details of my improved pressure controlling means for hydraulic pumps 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 and arrangement herein shown and described.

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

1. In combination, means for generating hydraulic pressure, a plurality of devices apart therefrom for applying said pressure, and means apart from all of said elements for controlling the effect of operation of said generating means and for equalizing and finally relieving the applied pressures.

2. In combination, means for generating hydraulic pressure, a plurality of devices apart therefrom for applying said pressure, and means apart from all of said elements

and movable with respect to said generating means for controlling the effect of operation of the latter and for equalizing and finally relieving the applied pressures.

3. In combination, means for generating hydraulic pressure, a plurality of devices apart therefrom for applying said pressure, and means apart from all of said elements and having flexible connection with each thereof for controlling the effect of operation of said generating means and for equalizing and finally relieving the applied pressures.

4. In combination, a pump, means apart therefrom for applying generated pressure, and requisite valves all located in a member interposed between said pump and said applying means, said member having flexible connection with said pump.

5. In combination, a pump, means apart therefrom for applying the generated pressure, and requisite valves all located in a member interposed between said pump and said applying means and having flexible connections with each thereof.

6. In combination, a pump, means apart therefrom for applying generated pressure, and requisite valves all located in a member interposed between said pump and applying means, said member having flexible connection with said pump and being provided with means for manually controlling said valves.

7. In combination, a pump, means apart therefrom for applying the generated pressure, requisite valves all located in a member interposed between and having flexible connections with said pump and said applying means, and means for manually controlling said valves.

8. In combination, a pump, means for applying the pressure generated thereby at a plurality of selective points, requisite valves all located in a member interposed between and having flexible connections with said pump and said applying means, and means for manually controlling said valves.

9. In combination, a pump, a ram-cylinder and ram, a flexible connecting conduit therebetween, and a member located intermediate the ends of said conduit in which is located the pump and pressure valves.

10. In combination, a pump, a conduit leading therefrom having branches to a plurality of rams, and a member at the union of said branches containing the pump valves and means for their manual control.

11. In combination, a pump, a conduit leading therefrom having branches to a plurality of rams, and a member at the union of said branches into which the liquid is directed from the source of supply and which contains the pump and pressure valves.

12. In combination, a pump, a conduit leading therefrom having branches to a plurality of rams, and a member at the union of such branches into which the liquid is directed from the source of supply and which contains all valves and means for their manual control.

13. In combination, a pump, a conduit leading therefrom having branches to a plurality of rams, and a member at the union of said branches into which the liquid is directed from the source of supply and which contains all valves and means for positively unseating one or all thereof.

14. In combination, a pump, a flexible conduit leading therefrom having branches to a plurality of rams, and a member at the union of said branches into which the liquid is directed from the source of supply, said member containing the pump valves and being provided with means for unseating one of said valves or all thereof.

15. In combination, a pump, a ram, and a container for the pump and pressure valves, each of said members being independently movable with respect to the others.

16. In combination, a pump, a plurality of rams, a flexible conduit from the pump chamber and to each ram chamber, said conduits uniting in an individually-movable fitting, requisite pump and pressure valves in said fitting, and means for controlling said valves to render operation of said pump ineffective.

17. In combination, a pump, a plurality of rams, a flexible conduit from the pump chamber and to each ram chamber, said conduits uniting in an individually-movable fitting, requisite pump and pressure valves in said fitting, and means for controlling said valves to render operation of said pump ineffective and to relieve the pressure in the ram chambers.

18. In combination, a pump, a plurality of rams, a flexible conduit from the pump chamber and to each ram chamber, said conduits uniting in an individually-movable fitting, requisite pump and pressure valves in said fitting, and means for unseating one of said valves, said means being further operable to unseat all of said valves.

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

JAMES W. NELSON.

Witnesses:
JAS. MOORE,
HELEN CROCKER.