

Jan. 12, 1932.

C. H. MILLER

1,840,968

BY-PASS VALVE

Filed Oct. 24, 1929

Fig 2

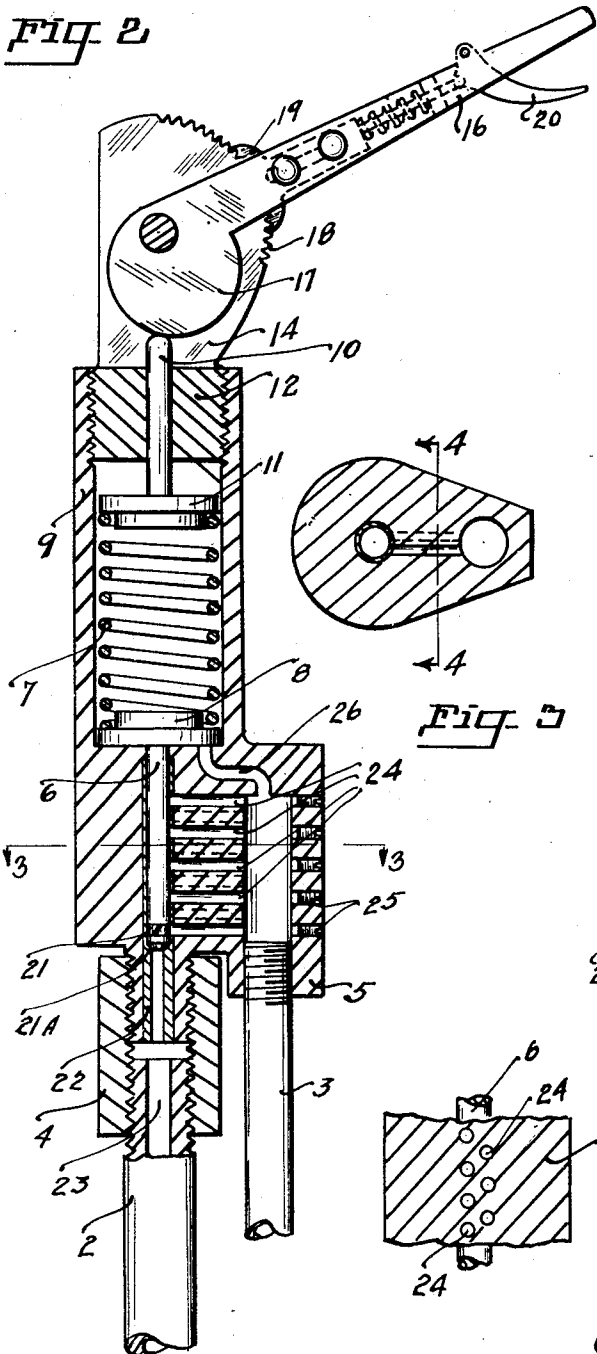


Fig 1

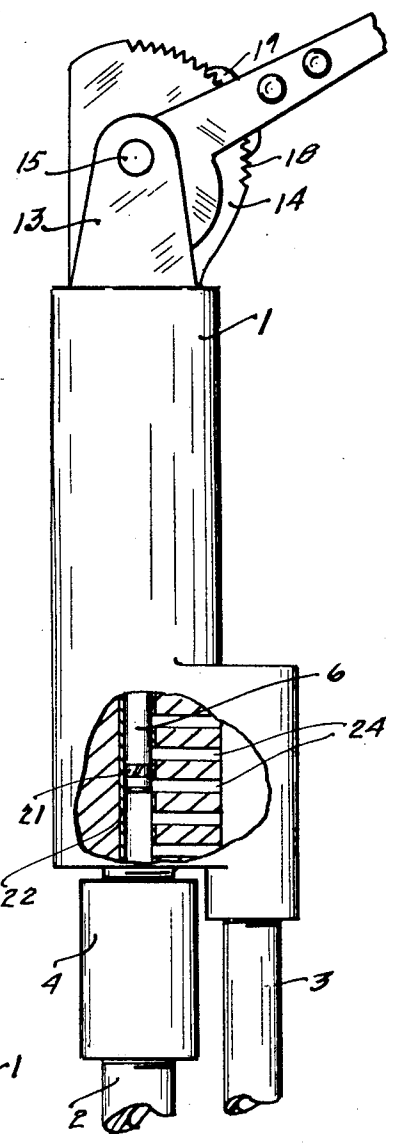


Fig 3

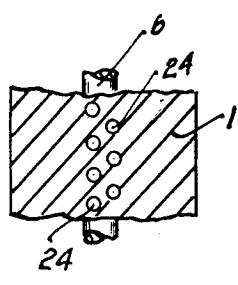


Fig 4

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BY-PASS VALVE

Application filed October 24, 1929. Serial No. 402,143.

My invention relates to valve controls for hydraulic cylinders and has for its primary purpose the regulating of effective pressure that may be developed within a hydraulic cylinder.

The invention consists primarily of a body element having inlet and outlet passageways leading to and from the interior of the body element and having a valve stem disposed between the passageways for cutting off the pressure and the flow of the fluid under pressure between the inlet and the outlet passageway to thereby regulate the effective pressure developed within the cylinder.

A further object of my invention is to provide a settable control mechanism for actuating a valve stem relatively to a plurality of passageways disposed between the inlet and outlet passageway for predetermining the effective pressure to be developed within the hydraulic cylinder.

A further object of my invention consists in providing, in simplified form, a hand manipulative pressure regulator for predetermining the amount of effective pressure that may be developed within a hydraulic cylinder.

With these and incidental objects in view, the invention consists in certain novel features of construction and combination of parts, the essential elements of which are set forth in the appended claims, and a preferred form of embodiment of which is hereinafter shown with reference to the drawings which accompany and form a part of this specification.

In the drawings:

Fig. 1 is a side elevation, partially in section of the assembled device.

Fig. 2 is a longitudinal, sectional, side elevation of the assembled device.

Fig. 3 is a cross section view taken on line 3-3 of Fig. 2 looking in the direction indicated.

Fig. 4 is a fragmentary, sectional, side view of the mechanism illustrated in Fig. 3, the same being taken on line 4-4 of Fig. 3 looking in the direction indicated.

Like reference characters refer to like parts throughout the several views.

I preferably form my device of a body element 1, having means associated with the body element for removably securing an inlet pipe 2 to the base and an outlet pipe 3. The inlet and outlet pipes are for the purpose of conducting the operating fluids through the body element. The inlet pipe may be secured to the base by a sleeve connection 4 or by any other suitable fastening means. The outlet pipe 3 may be directly threaded into the flange 5 disposed at the base. The inlet pipe 2 connects the body element with a hydraulic cylinder, not here shown, and the discharge pipe 3 leads to a sump or to any other discharge receiving station. A valve stem 6 is reciprocably disposed longitudinally of the body element and is normally maintained repressed through the action of a tensioned element, as a spring 7 disposed within the barrel 9 of the body element. The spring 7 rests directly upon the head 8 of the valve stem 6. A guide head 12 is threadedly disposed within the top of the barrel 9. An actuating stem 10 outwardly extends centrally through the guide head 12 and has a head 11 disposed upon its lower end against which the upper end of the compressible element rests. Bosses 13 and 14 upwardly extend from the guide head 12 and a journal pin 15 is disposed through the upper portion of the bosses. A hand actuating lever 16 is rotatably disposed about the journal pin 15 and a cam 17 terminates the inner, lower end of the actuating lever. The cam 17 is in direct alignment with the upper end of the stem 12 and rests upon the stem 10. The movement of the lever determines the position of the cam 17 upon the stem 10 and the position of the cam upon the stem determines the amount of compression that is placed upon spring 7. A quadrant 18 is disposed about the upper surface of one of the bosses. A hand actuator 20 is journaled upon the lever. A pawl 19 is secured to the free end of the actuator 20 and rests upon the graduated quadrant. The compression of the actuator actuates the pawl into and out of engagement with the quadrant and locks the hand lever 16 relative to the quadrant. A piston ring 21 is disposed upon the lower end

of the valve stem 6 and forms a close fitting connection between the stem and the cylinder 22. If pressure is developed within the hydraulic cylinder, not here shown, the actuating fluid within the cylinder flows through an outlet 23 of the pipe 2 and actuates the valve stem 6 against the compressible element 7 and thereby opens one or more of the discharge ports 24. The number of the ports 24 that are closed determines the effective pressure to be developed within the hydraulic cylinder and as the pressure increases the compressible element 7 is compressed and a larger number of the ported outlets are opened. The pressure exerted by the compressible element 7 may be predetermined by actuating the stem 10 through the manipulation of the hand lever 16. The pressure placed upon the compressible element 7 determines the amount of effective pressure that may be developed within the hydraulic cylinder by indirectly regulating the number of ported outlets that are opened through the movement of the valve stem 6. To facilitate the drilling or reconditioning of the ported outlets 24, I provide passageways 25 within the side walls of the body element that are in registering alignment with the ported outlets 24. A limited amount of leakage will pass the piston ring 21 and in doing so the operating fluid may enter the cylinder 9. Such fluid as may enter the cylinder 9 will by-pass through the outlet 26 into the discharge pipe 3.

While the form of mechanism herein shown and described is admirably adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention to the one form of embodiment herein shown and described, as it is susceptible of embodiment in various forms, all coming within the scope of the claims which follow.

What I claim is:

1. A device of the class described comprising a body element having an opening longitudinally therein said opening forming into a barrel near the top thereof, a plurality of horizontally disposed outlets communicating with the lower portion of the opening, an outlet chamber disposed in direct alignment with the outlet ports, an independent outlet communicating with the barrel portion of the opening and with the outlet chamber, a spring disposed within the barrel, a valve stem reciprocally disposed within the opening adapted to maintain the outlet ports closed, the head of said stem being adapted to hold the lower part of the spring, a valve stem reciprocally disposed through the top of the barrel, the head of said valve stem being adapted to hold the upper part of the spring, said spring adapted to be maintained compressed and resist the longitudinal movement of the valve stems, and a handle having

a cam disposed on one of its ends in direct alignment with the outwardly extending valve stem for regulating the compression upon the spring.

2. A device of the class described comprising a body element having an opening longitudinally therein said opening forming a barrel near the top thereof, a plurality of horizontally disposed outlets communicating with the lower portion of the opening, an outlet chamber disposed in direct alignment with the outlet ports, an independent outlet communicating with the barrel portion of the opening and with the outlet chamber, a spring disposed within the barrel, a valve stem reciprocally disposed within the opening adapted to maintain the outlet ports closed, the head of said stem being adapted to hold the lower part of the spring, a valve stem reciprocally disposed through the top of the barrel, the head of said valve stem being adapted to hold the upper part of the spring, said spring adapted to be maintained compressed and resist the longitudinal movement of the valve stems, a handle having a cam disposed on one of its ends in direct alignment with the outwardly extending valve stem for regulating the compression of the spring, means disposed through the body element in registerable alignment with the horizontally disposed outlet ports to facilitate the reconditioning of the outlet ports.

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