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ADJUSTABLE STROKE RAM AND PISTON ASSEMBLY

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FIG. 1.

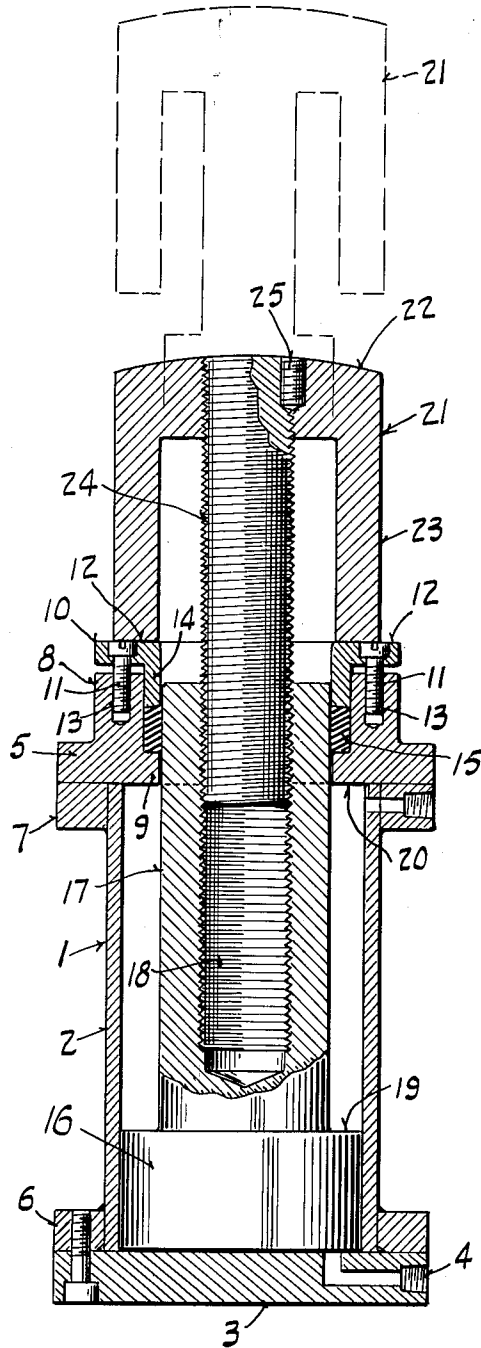
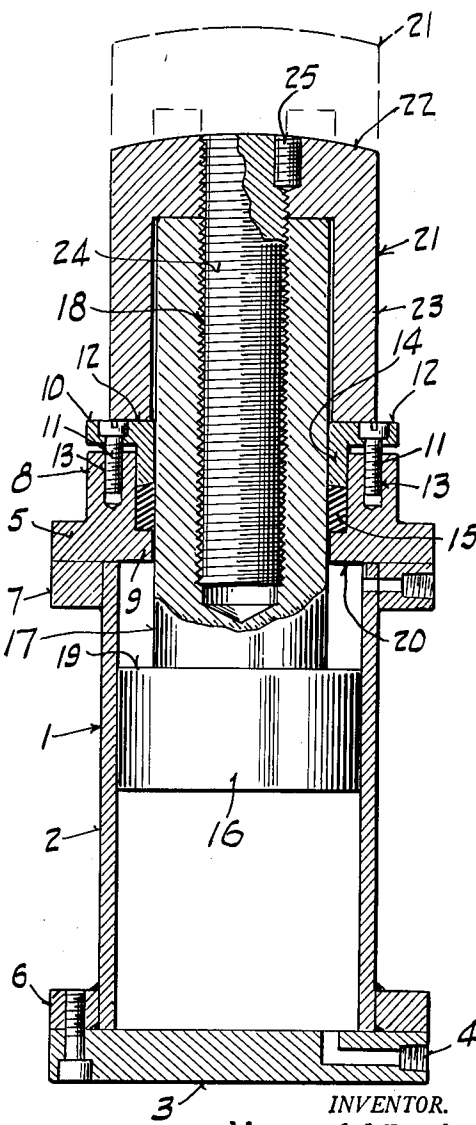


FIG. 2.



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ADJUSTABLE STROKE RAM AND PISTON ASSEMBLY

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1 Claim. (Cl. 121—38)

This invention relates generally to a hydraulically actuated piston disposed within a cylinder and having a ram adjustably secured to one end of the piston whereby the stroke of the piston within the cylinder may be quickly and easily adjusted to vary the length of the stroke of the piston.

One object of the invention is to provide a hydraulically actuated piston having a ram adjustably secured to one end of the piston whereby rotation of the ram relative to the piston will cause movement of the ram relative to the piston to increase or decrease the piston stroke.

A further object is to provide a hydraulically actuated piston whereby variation of the piston stroke may be accomplished in an expeditious manner by rotation of an element disposed outside the cylinder to obviate the necessity of complicated structure to accomplish the desired result.

Another object is to provide a hydraulically actuated piston which is adapted to permit substantially micrometer adjustment of the piston relative to its cylinder to vary the piston stroke.

Another object of the invention is to provide a piston structure which comprises relatively few parts and is therefore easy to build at substantially low cost.

These and other objects will appear from the following description when read in connection with the drawing, in which:

Figure 1 is a vertical section, taken centrally, of the mechanism of the invention and showing the parts thereof adjusted for maximum piston stroke; and

Fig. 2 is a view similar to Figure 1 and showing the parts thereof adjusted for minimum piston stroke.

The mechanism shown in the drawing to illustrate the invention comprises a cylinder 1 which consists of a tubular body 2 closed at its lower end by a base or cap 3 rigidly secured to the lower end of the body 2. A fluid inlet 4 is provided in the base 3.

The opposite end of the tubular body has a head 5 rigidly secured to the body. Strengthening flanges 6 and 7 circumscribe the opposite ends of the tubular body and are welded to the body as well as to the base 3 and head 5 respectively.

The cylinder head 5 is provided with an upwardly disposed body portion 8 and an inwardly disposed circular flange 9 at the lower end of the portion 8. A circular stuffing box gland 10 is removably secured to the upper surface of the body 8 by a plurality of screws 11 which are spaced around the circumference of the gland and threadedly secure the two members together. The heads of the screws 11, when in set-up condition, are flush with the top surface 12 of the gland 10. The opposite ends of the bolts are threaded into a plurality of spaced threaded apertures 13 in the body portion 8 of the cylinder head.

The stuffing box gland is provided with a depending circular flange 14. Suitable packing 15 is disposed between the upper surface of the flange 9 and the lower circumferential surface of the flange 14 to provide a

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seal against loss of the fluid which actuates the mechanism.

A piston 16 having an upstanding rod 17 is disposed within the cylinder. The piston has a sliding fit within the cylinder so that fluid pressure applied against the bottom thereof will cause the piston to travel upwardly in the cylinder 1.

The piston rod 17 has an axially disposed threaded aperture 18 of relatively fine pitch extending throughout a greater portion of its length. The outer diameter of the piston rod 17 is only slightly less than the inner diameters of the flanges 9 and 14 thereby permitting the rod to travel up and down within the inner confines of the flanges and through the packing 15. The upward travel of the piston is limited by its upper circumferential surface 19 coming into contact with the lower circumferential surface 20 of the inwardly disposed flange 9, the length of stroke of the piston being determined by the distance between the stated circumferential surfaces.

Ram 21 consists of a head 22 with an annular depending wall 23, centrally of which is disposed a depending threaded shaft 24. The shaft 24 is in threaded engagement with the aperture 18 in the piston rod.

The upper end of the shaft 24 is threaded into the ram head 22 where relative rotation between the head and the shaft is prevented by a screw 25 disposed in a threaded aperture one half of which is in each the head and the shaft. The screw 25 is flush with the surface of the ram head.

The upper surface of the ram head 22 may be of any desired shape, that shown in the drawing being merely illustrative.

The lower end of the ram abuts the stuffing box gland 10 and gland 10 limits the downward travel of the ram and consequently the downward travel of the piston to which the ram is removably secured.

The stroke of the piston may be varied turning the ram in one direction or the opposite. If the ram is turned in one direction the interiorly threaded piston, with which the shaft 24 is in threaded engagement, is moved upwardly in the cylinder thereby decreasing the length of stroke of the piston. If the ram is turned in the opposite direction, an opposite movement of the piston results thereby increasing the length of stroke. In the drawing Figure 1 depicts the piston disposed to provide maximum stroke while in Figure 2 the piston is shown disposed to permit minimum stroke. The stroke of the piston may of course be varied between these limits. By virtue of the threads on the inner surface of the piston and on the ram shaft being of relatively fine pitch, substantially micrometer adjustment may be had to vary the piston stroke.

Various embodiments of the invention may be employed within the scope of the accompanying claim.

I claim:

55 A variable stroke hydraulic ram and piston assembly comprising a hollow cylinder having a base and a head secured to opposite ends thereof with said cylinder having aperture means therein for flow of hydraulic fluid into and out of said cylinder, said head being provided with an axial opening therein, a piston rod slidably received within said opening, a piston connected to the inner end of said rod and adapted for sliding movement in said cylinder in response to the pressure of said hydraulic fluid, a ram having an axial recess therein adapted to receive the outer end of said piston rod, a threaded shaft secured to the base of said recess and threadably engaged with the outer end of said piston rod to move said ram longitudinally in relation to said piston to vary the stroke of the piston at any given relative position between said ram and said piston, the outer stroke of the piston being limited by contact of said piston with the head

of said cylinder and the inner stroke of the piston being limited by contact of said ram with the head of said cylinder.

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