

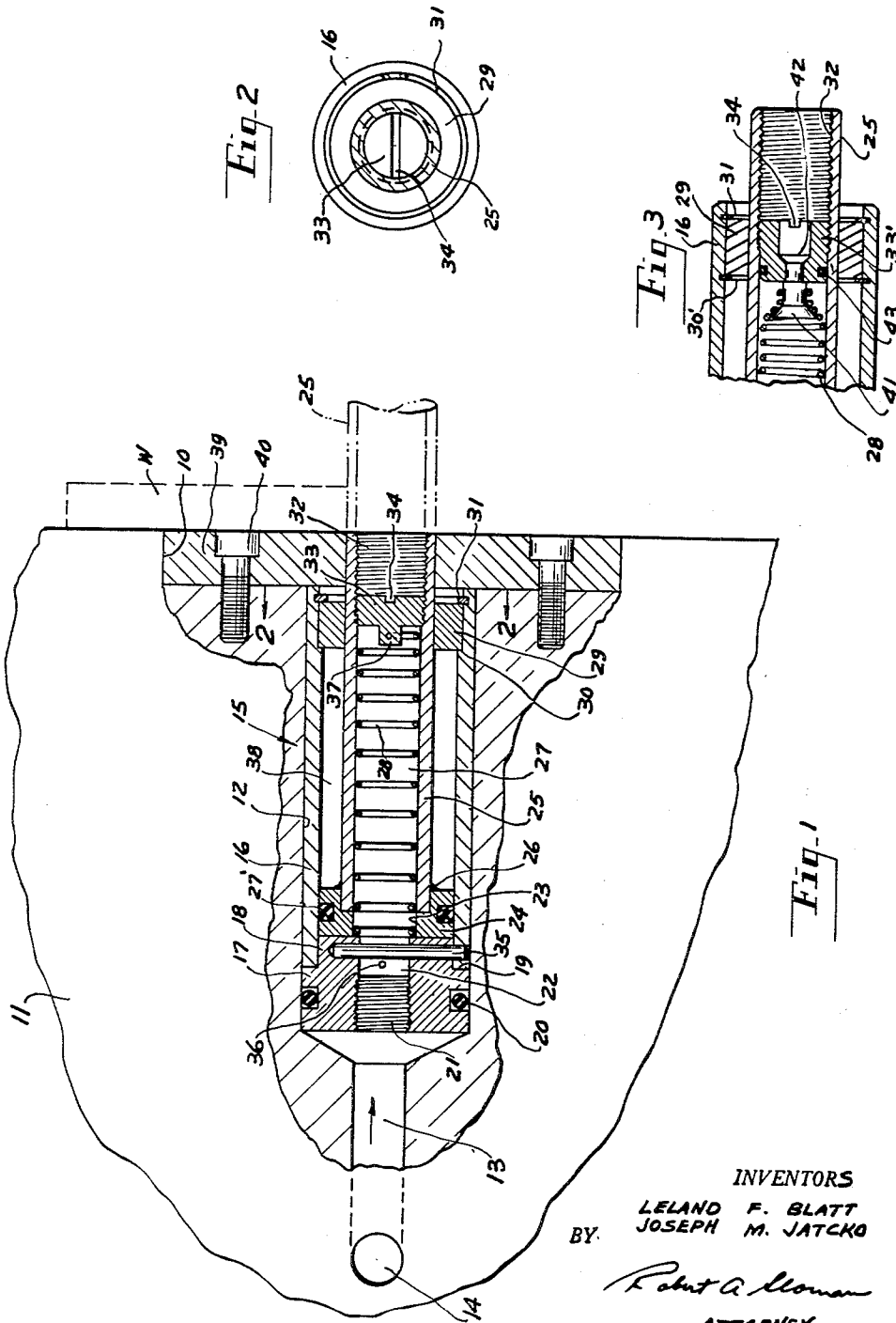
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CYLINDER ASSEMBLY

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CYLINDER ASSEMBLY

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1 Claim. (Cl. 121—38)

This invention relates to cylinder assemblies and more particularly to a fluid operated piston which is normally spring-biased in one direction.

It is the object of the present invention to construct the cylinder and piston in such a manner that the spring employed therein will not interfere with the full longitudinal employment of the piston between cylinder heads.

It is a further object to provide a hollow piston rod communicating with a reciprocating piston and with a coiled tension spring nested within the piston rod and at one end adjustably secured thereto and with the opposite end of the spring secured to a portion of the cylinder.

It is a further object to provide an adjustable end wall construction closing off the outer end of the piston rod by which the initial tension of the spring may be regulated.

It is a further object to provide a cylinder assembly which is particularly adapted for use in dies such as for locating workpieces upon the working surface thereof.

These and other objects will be seen from the following specification and claim in conjunction with the appended drawing in which:

Fig. 1 is a fragmentary broken away and sectioned view of a die with the present cylinder assembly mounted therein.

Fig. 2 is a fragmentary section taken on line 2—2 of Fig. 1.

Fig. 3 shows a different spring connection to the rod closure.

It will be understood that the above drawing illustrates merely a preferred embodiment of the invention and that other embodiments are contemplated within the scope of the claim hereafter set forth.

Referring to the drawing, a portion of a die 11 is fragmentarily shown, as illustrative of one environment of use of the present cylinder assembly, said die having at its right end a working surface over which is slidably positioned the workpiece W shown in dotted lines and which is adapted for registry with the edge of the piston rod for purposes of location.

Longitudinal bore 12 is formed within die 11 and terminates at one end in a tapered opening which joins passage 13 having an inlet 14 by which fluid under pressure may be applied to the working cylinder hereafter described.

The opposite end of bore 12 terminates in the counter-bore 10 of increased diameter adapted to receive cylinder retaining disc 39 secured to the die by the socket bolts or fasteners 40.

The cylinder assembly, generally indicated at 15, includes elongated barrel 16 having at one end thereof cylinder head 17 whose reduced cylindrical portion 18 snugly projects into the bore of said barrel. Said cylinder head is fixedly secured to the barrel at points 19 by welding or brazing or by swedging.

Cylinder head 17 has an exterior annular groove sup-

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porting the O-ring seal 20 which cooperatively engages the adjacent wall of die 11 defining bore 12.

Head 17 is centrally apertured and threaded at 21, and is adapted to receive a fitting, or otherwise is in communication with passage 13 in order to receive fluid under pressure which may be compressed air or liquid. The threaded opening 21 terminates in axial passage 22 which communicates with the internal bore 23 of piston 24 positioned within barrel 16.

Elongated hollow piston rod 25 having bore 27 projects into one end of piston 24 and is fixedly secured thereto as by the welds 26.

Elongated tension spring 28 is positioned within piston rod 25. One end of said spring is looped at 36 around transverse retaining pin 35 which extends through a portion of cylinder head 17 and across passage 22 therein for effectively anchoring one end of said spring.

An axially apertured second cylinder head 29 is snugly positioned within barrel 16 at its opposite end against shoulder 30 and is retained therein by a conventional locking ring 31. Said cylinder head may be secured within said barrel by any other means such as by welding or swedging.

Piston rod 25 is slidably positioned through cylinder head 29 and is adapted for movement within a central aperture of retaining disc 39. Upon the application of fluid pressure piston rod 25 will move to the dotted line position shown beyond the work surface of die 11, i.e., beyond the outer face of disc 39, thus serving as a locating means for workpiece W.

With piston 24 in the retracted inoperative position shown under the action of spring 28, the outer end of rod 25 registers with the outer surface of disc 39. Said outer end is interiorly threaded at 32 for adjustably receiving the rod closure 33. Transverse slot 34 is formed in the outer surface of said closure to facilitate threaded adjustment of said closure down into the end of rod 25.

Axial boss 37 projects inwardly from said closure and is transversely apertured to retainingly receive the opposite free end of coiled spring 28.

Piston 24 has an annular groove receiving the V-seal 27' for cooperative sliding engagement with the bore of barrel 16 completing the assembly of the cylinder shown in Fig. 1.

In normal operation pressure fluid delivered at inlet 14 and through passage 13 is transmitted through openings 21 and 22 to the interior of piston rod 25 applying initial pressure upon the interior surface of closure 33. This will cause initial longitudinal movement of said piston rod against the tension of spring 28. After an initial movement pressure fluid is additionally applied to the outer end surface of piston 24 and said piston and piston rod move longitudinally of the cylinder barrel.

It is noted that piston 24 is free to move the full length of the bore of cylinder barrel 16 and may engage cylinder head 29. In other words the use of the coiled spring does not in any way interfere with the full stroke of piston 24 between the cylinder heads. Upon the release of the pressure fluid and the exhausting thereof, spring 28 will return the piston and piston rod to the solid line position shown in Fig. 1.

While pin 35 has been shown as one means of anchoring spring 28 to cylinder head 17, it is contemplated that said spring may be otherwise secured to said cylinder head for accomplishing the same purpose. Disc 39 provides an effective means for anchoring the cylinder assembly within die 11.

Fig. 3 fragmentarily shows a swivel connection of spring 28 with the rivet 41 at one end, the other end of said rivet secured at 42 to closure 33', which is centrally apertured. O-ring seal 43 is nested in an annular groove in said closure for sealing engagement with the

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bore of piston rod 25. Cylinder head 29 is anchored within the bore of barrel 16 by the inner snap ring 30 retained in an annular slot therein. Outer snap ring 31 engages the outer end of head 29.

Having described our invention reference should now be had to the following claim.

We claim:

In combination with a die having an elongated bore therein terminating at one end in counterbore of increased diameter adjacent its working surface, there being a passage in said die joining the other end of said bore and adapted for connection to a source of fluid under pressure, a cylinder snugly projected into said bore, including axially apertured heads on its opposite ends, one head communicating with said passage, a centrally apertured reciprocating piston in said cylinder, a hollow rod in said cylinder axially secured at one end to said piston communicating with its interior, with its other end slid-

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ably projecting through the other head, a closure for said other end, and a coiled tension spring within said rod secured at one end to said one head with its other end secured to said closure, and a retaining disc apertured to receive said rod, nested in said counterbore and secured to said die.

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