Nov. 1, 1949. J. H. SCHREIBER 2,486,615

PISTON AND CYLINDER CONSTRUCTION

Filed April 23, 1948

Fig. 1.

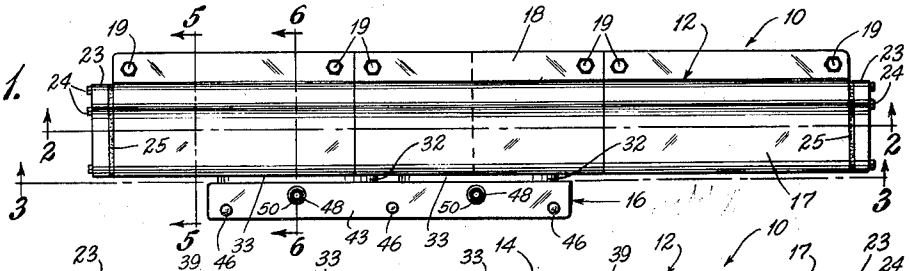


Fig. 2.

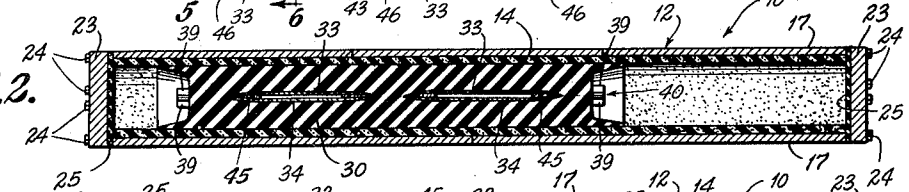


Fig. 3.

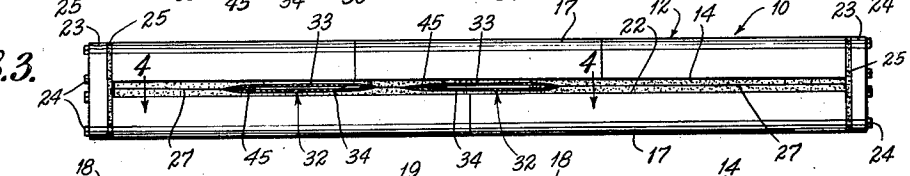


Fig. 4.

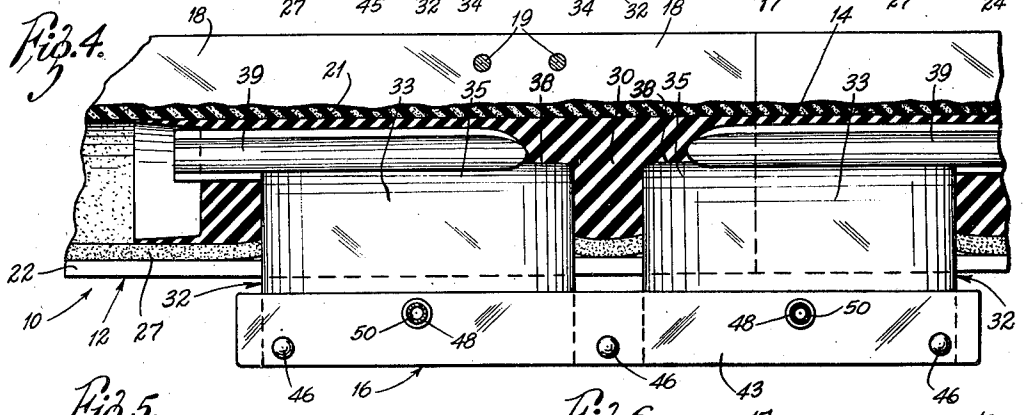


Fig. 5.

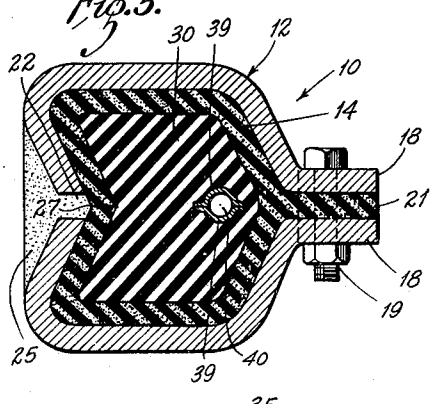


Fig. 6.

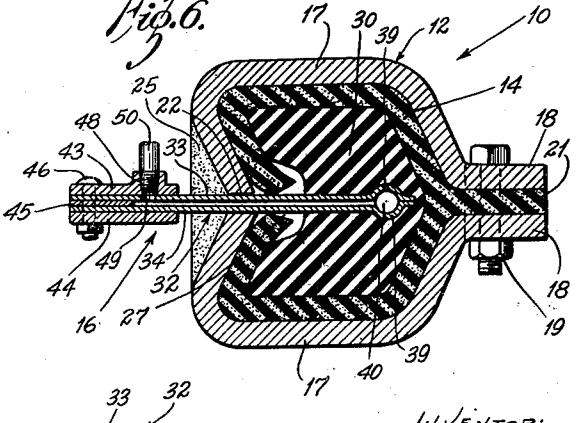
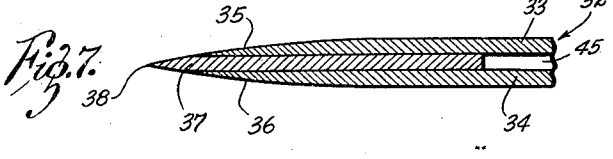


Fig. 7.



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PISTON AND CYLINDER CONSTRUCTION

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5 Claims. (Cl. 121—1)

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The present invention relates generally to piston and cylinder mechanisms, and more particularly to a hydraulic piston and cylinder mechanism having a power takeoff projection extending through the side of the cylinder rather than from one of the ends thereof.

The present device is a further development of my piston and cylinder mechanism disclosed and claimed in my copending applications, Serial No. 726,923, filed February 6, 1947, and Serial No. 738,107, filed March 29, 1947.

An object of the present invention is to provide a novel piston and cylinder construction of the side power takeoff type.

Another object is to provide a novel piston and cylinder construction in which a metal casing is provided which is split longitudinally and which encloses an internal coextensive lining of plastic material formed to seal the longitudinal split of the casing, in which is disposed a plastic piston to which is secured a power takeoff which incorporates mechanism for applying fluid under pressure into the lined casing at the ends of the internally disposed plastic piston.

Another object is to provide a novel piston and cylinder construction of the side power takeoff type in which means is provided for maintaining the cylinder sealed against leakage of power fluid.

Other objects are to provide a novel piston and cylinder construction of the type mentioned, which is efficient in operation, which is relatively inexpensive to fabricate, which is positive in action in respect to the sealing device for the longitudinal opening in the cylinder, which requires minimum maintenance, and, hence, is low in operational cost, and which finds wide adaptation.

The foregoing and other objects and advantages are apparent from the following description taken with the accompanying drawing, in which:

Fig. 1 is a side elevational view of a piston and cylinder construction formed in accordance with the teachings of the present invention;

Fig. 2 is a central longitudinal cross-sectional view taken on substantially the line 2—2 of Fig. 1;

Fig. 3 is a longitudinal cross-sectional view taken on substantially the line 3—3 of Fig. 1, showing the cylinder in bottom plan view;

Fig. 4 is an enlarged vertical cross-sectional view on substantially the line 4—4 of Fig. 3;

Fig. 5 is an enlarged transverse cross-sectional view on substantially the line 5—5 of Fig. 1;

Fig. 6 is an enlarged transverse cross-sectional view on substantially the line 6—6 of Fig. 1; and

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Fig. 7 is an enlarged cross-sectional view of a fragment of one of the plows.

Referring to the drawing more particularly by reference numerals, 10 indicates generally a piston and cylinder construction incorporating the teachings of the present invention, which includes an exterior casing 12 of metal or other form retaining material (Fig. 6), an inner lining 14 of pliable material, such as rubber, or the like, and a power takeoff mechanism 16.

The cylinder 12, in a preferred form, is of the cross section shown in Figs. 5 and 6, and includes two identical halves 17, each having a flange 18 secured to each other by suitable nut and bolt assemblies 19. Between the flanges 18 is a web 21 of the lining 14. The casing 12 is formed with a longitudinal opening 22 opposite the secured flanges 18. At each end of the casing 12 is a head 23 secured thereto by suitable bolts 24, there being a gasket 25 between each head 23 and the end of the casing 12 for sealing purposes.

The lining 14 is of substantially the same cross section as the casing 12 and includes a longitudinal slit 27 opposite the longitudinal opening 22. The slit 27 is closed by contact of the adjacent end surfaces of the lining 14 forced into engaging relation by pressure in the casing 12 and by a piston described below. As is clear from Fig. 2, the lining 14 is coextensive with the casing 12.

Within the lining 14 is a piston 30 of yieldable material, such as hard rubber, or the like, the length of which, in respect to the length of the casing 12, being dependent upon the job to be performed by the present construction 10. The power takeoff mechanism 16 is supported by the piston 30. The mechanism 16 includes a pair of plows 32, each of which is formed of a pair of spaced plates 33 and 34. The plates 33 and 34 are bevelled at the ends at 35 and 36, respectively, and include between them at each end a plate 37 bevelled to provide a plow point 38 (Fig. 7), which preferably are brazed together to form a unitary piece. At its inner side edge, plates 33 and 34 are formed with a channel 39 which extends outwardly from the outer edge thereof, as is clear from Figs. 4, 5 and 6. When the two plates 33 and 34 are assembled, the opposed channels 39 form a conduit 40. The two pairs of plates 33 and 34 are engaged along the outer sides by two strips 43 and 44, a sealing and spacer strip 45 being disposed between the opposed plates 33 and 34 and preferably brazed thereto to form a unitary construction (Fig. 6). Suitable nut and bolt assemblies 46 maintain the strips 43 and 44 in place during brazing and may then be re-

moved. Suitable openings 48 are provided through the strip 43 and suitable openings 49 are provided through each of the plates 33 for the introduction of fluid into the space between the plates 33 and 34. A fitting 50 is mounted in each of the openings 48.

Operation

The assembly of the present piston and cylinder construction 10 is manifest from the foregoing. It is clear that the plows 32 separate the lining 14 at the slit 27 as the piston 30 is moved in either direction and the trailing edges of the plows 32 permit ready resealing of the lining 14 without loss of any operating fluid within the casing 12 and lining 14.

The piston 30 is moved in either direction by the introduction of fluid under pressure into the spaces at the ends thereof. It is palpable that operating fluid is introduced through the fittings 50 and passes between the respective plates 33 and 34 into the channel 40 and thence into the end of the construction 10 desired. It is, of course, understood that the fittings 50 are connected into a suitable supply of liquid under pressure, and that the necessary manual or automatic valves are provided for reciprocating the piston and power takeoff mechanism 16 as required.

It is obvious that there has been provided a piston and cylinder construction which fulfills the objects and advantages sought therefor.

The power takeoff mechanism 16 may be employed as a mechanical means to receive power for reciprocating said piston 30 if desired, as, for example, for pumping purposes.

It is to be understood that the foregoing description and the accompanying drawing have been given by way of illustration and example. It is also to be understood that changes in form of the elements, rearrangement of parts, and substitution of equivalent elements, which will be obvious to those skilled in the art, are contemplated as within the scope of the present invention which is limited only by the claims which follow.

What is claimed is:

1. Hydraulic piston and cylinder construction comprising a cylinder including a form retaining casing having an open longitudinally extending slit therein, means normally closing said slit, and a piston disposed in said cylinder having a power takeoff connected thereto and extending through the slit of said casing, said power takeoff including plows separating said slit closing means and being in sealing relation therewith, said plows being formed as fluid passages for introduction of operating fluid into and removal from said cylinder.

2. Hydraulic piston and cylinder construction comprising a cylinder including an outer casing of form retaining material, said casing having a longitudinal open slit therein, a lining in said casing coextensive therewith including a normally closed slit opposite the open slit of said casing, a piston in said cylinder, and a power takeoff secured to said piston and extending through both of said slits, said power takeoff including plows in sealing relation with and for opening said lining slit as the piston is actuated and for permitting said lining slit to close after passing a point.

3. Hydraulic piston and cylinder construction comprising a cylinder including an outer casing of form retaining material, said casing having a longitudinal open slit therein, a lining in said casing coextensive therewith including a normally closed slit opposite the open slit of said casing, said lining at each side of the slit being inwardly directed to form a V with the juncture at the slit so that internal pressure exerts a slit closing effect, a piston in said cylinder, and a power takeoff secured to said piston and extending through both of said slits, said power takeoff including plows in sealing relation with and for opening said lining slit as the piston is actuated and for permitting said lining slit to close after passing a point.

4. Hydraulic piston and cylinder construction comprising a cylinder including a casing of form retaining material, a longitudinal open slit in said casing of predetermined length, a lining within said casing of resilient material having a normally closed slit aligned with the open slit of said casing, said lining conforming to the internal shape of said casing, a piston in said cylinder, a power takeoff secured to said piston and including a portion extending through and adapted to ride in said lining and casing slits, and means for introducing operating pressures into the casing at opposite ends of said piston to reciprocate the same and to maintain said lining slit sealed.

5. Hydraulic piston and cylinder construction comprising a cylinder including a casing of form retaining material, a longitudinal open slit in said casing of predetermined length, the casing wall adjacent and defining said slit being directed inwardly, a lining within said casing of resilient material having a normally closed slit aligned with the open slit of said casing, said lining conforming to the internal shape of said casing, a piston in said cylinder, a power takeoff secured to said piston and including a portion extending through and adapted to ride in said lining and casing slits, and means for introducing operating pressures into the casing at opposite ends of said piston to reciprocate the same and to maintain said lining slit sealed.

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No references cited