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HYDRAULIC SYSTEM

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Fig. 1

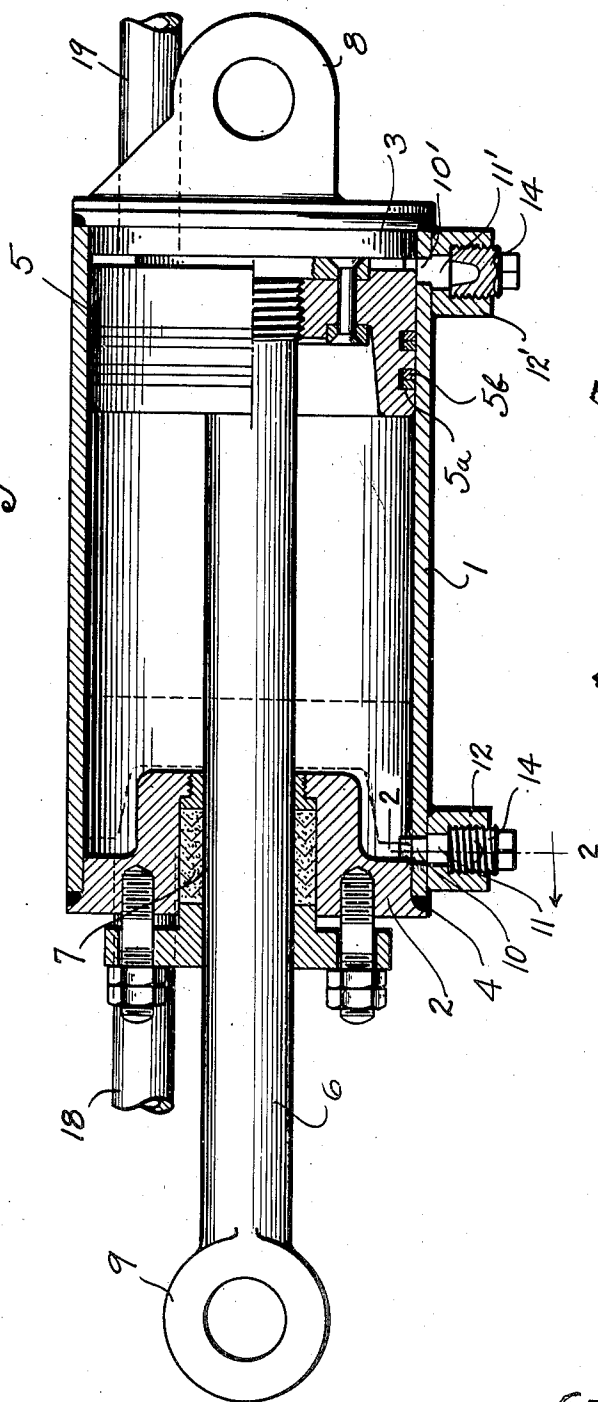
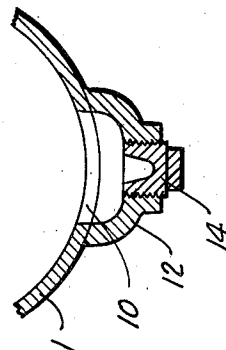


Fig. 2



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HYDRAULIC SYSTEM

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2 Claims. (Cl. 121—1)

This invention relates to improvements in hydraulic jacks, hydraulic hoists and other hydraulic power systems employing metal cylinders in which metal pistons are fitted for reciprocal travel under the force of a hydraulic pressure medium or where the piston operates to effect pressure through the hydraulic medium; such jacks, or hoists, being used extensively at the present time in road building and dirt hauling equipment, as will be disclosed by reference to Patent No. 2,072,998, issued to me March 9, 1937, and to the application filed by me under Serial No. 76,594 on April 27, 1936, although it is understood that it is not to be confined to such equipment.

Explanatory to the present invention, it will here be stated that it is the case, especially when the hydraulic cylinders are horizontally disposed, that the cylinder walls will become scored along the lower side by reason of foreign matter, such as metal chips, shavings, or filings being picked up between the piston and cylinder wall. This foreign matter may come from the pipes, tanks, castings or other parts of the system in contact with the hydraulic circuit and by reason of the circulation of the hydraulic medium; will ultimately find its way into the cylinder, and, by reason of the reciprocal action of the piston, will work its way into the joint between the piston and cylinder walls, with the result that the cylinder walls become scored. This scoring of the cylinder wall is detrimental to the operation of the device, as will be understood by those familiar with the art, it is damaging to the equipment, and any leakage materially reduces its efficiency, especially when high pressures are to be held by the piston.

In view of the above, it has been the principal object of this invention to provide a cylinder construction that will overcome the destructive and detrimental effects of any foreign matter that may collect in the cylinder.

It is a further object of this invention to provide the cylinders in such use with sumps for the collection of such material and to provide for its removal from the sumps.

Still further objects of the invention reside in the details of construction of the sumps and the relationship to the limits of travel of the piston in the cylinder.

In accomplishing these and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawing, wherein—

Fig. 1 is a longitudinal, sectional view of a hydraulic cylinder having cylinder sumps in accordance with the present invention.

Fig. 2 is a cross sectional detail on the line 2—2 in Fig. 1.

Referring more in detail to the drawing—

1 designates a hydraulic cylinder having its opposite ends closed by the cylinder heads 2 and 3, which may be permanently secured to the cylinder either by the welding, as indicated at 4, or by any other suitable means. The cylinder is fitted with a piston 5 having encircling grooves 5a fitted with packing rings 5b of the conventional form. Connected with the piston is a piston rod 6 which extends through a packing gland 7 in the cylinder head 2. The cylinder head 3 is equipped with a mounting lug 8, and the rod 6, at its outer end, is equipped with a cross head or bearing 9, whereby it may be attached to operating part to be operated by, or which may actuate the piston.

As was previously mentioned, the cylinder is disposed horizontally, and is provided in its lower side wall, at the opposite ends, with cross slots 10—10', which open respectively into sumps 11 and 11', formed in housings 12 and 12', that may be welded to or formed integral with the cylinder body. Each sump is provided with a drainage or clean-out opening, and a plug 14 is removably threaded into the opening.

One feature of this invention resides in the fact that the cross slots 10 are so located that the opposite edges of the piston will, as the piston moves to its opposite limits of travel, overlap therewith to the extent indicated in Fig. 1.

Pipes 18 and 19 connect with the opposite ends of the cylinder through the cylinder heads 2 and 3, and when a hydraulic medium is used to actuate the piston, any suitable means, pump or the like, not herein shown, may be utilized for effecting the delivery of the liquid pressure medium through the pipes into the cylinder.

Assuming that the device is so constructed and assuming also that the pressure medium is admitted into and from the opposite ends of the cylinder in accordance with any necessary mode of operation whereby the piston will be reciprocally actuated between the limits of travel indicated by the full line position and the dotted line position, it will then be quite apparent that any foreign substance, such as a metal chip, shaving or the like, on entering the cylinder, will settle to the bottom and will be pushed by the piston, in its reciprocal action, into the sumps. There will be, in effect, a wiping action of the lower edge

portions of the piston across the edges of the slots into the sumps and this will operate to remove any of the foreign matter that would otherwise cling to the piston edge. In view of the fact that the foreign material does not have the opportunity of entering the joint between the piston and cylinder wall, the detrimental scoring effect will not take place.

While I have described the invention in connection with hydraulic cylinders disposed horizontally, it is to be understood that this has reference to cylinders in any position that would permit foreign matter to settle against the bottom wall of the cylinder, as distinguished from settling against a cylinder head. The cylinder may be horizontal, or it may be inclined to a substantial degree between horizontal and vertical positions, and still can employ sumps of this character to advantage.

Cylinders are in use at the present time which have very effectively demonstrated the practicality and utility of this construction for it is quite readily apparent that, periodically, the sump may be cleaned of debris, and if this is done before the sumps fill up, there will be no occasion for any damage being done to the cylinder walls or piston by reason of the collection of foreign matter in the system.

The construction, while applicable particularly to hydraulic jacks and hoists, may be utilized in cylinders for various other purposes with the same advantageous results. Therefore, it is the intent that the claims be given an interpretation that is commensurate with the invention disclosed.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent is—

1. In a hydraulic system, a hydraulic cylinder and a piston reciprocally movable therein; said cylinder having cross slots in its bottom wall at the opposite limits of travel of the piston, housings fixed to the cylinder and forming closed sumps to receive sediment passing through the slots.

2. In a hydraulic system, a hydraulic cylinder and a piston reciprocally movable therein; said cylinder having cross slots in its bottom wall at the opposite limits of travel of the piston, housings fixed to the cylinder and forming closed sumps to receive sediment passing through the slots, and said sumps having clean out ports and plugs removably threaded into the ports.

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