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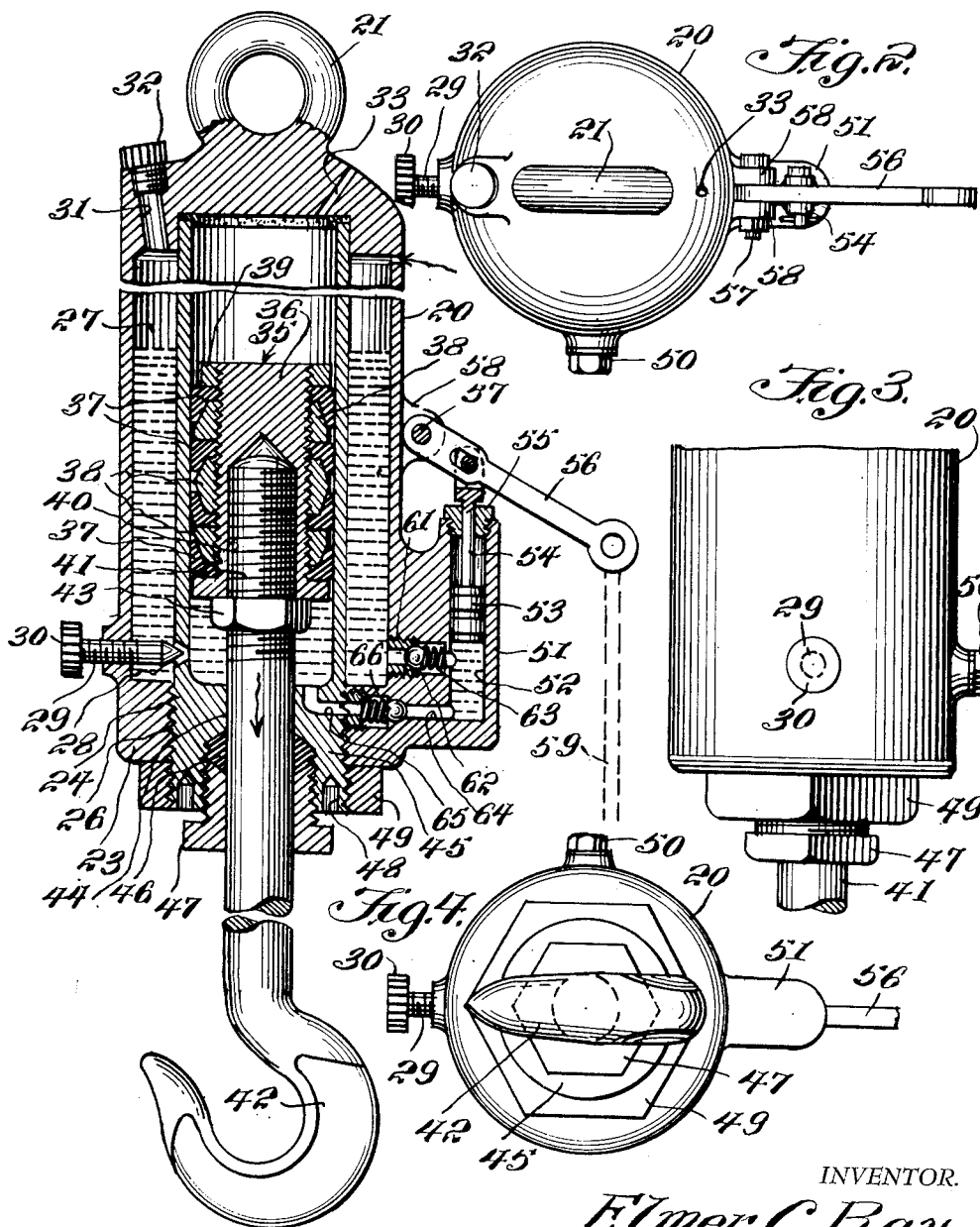
2,620,160

HYDRAULIC HOOK FOR HOISTS

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2 SHEETS—SHEET 1

Fig. 1.



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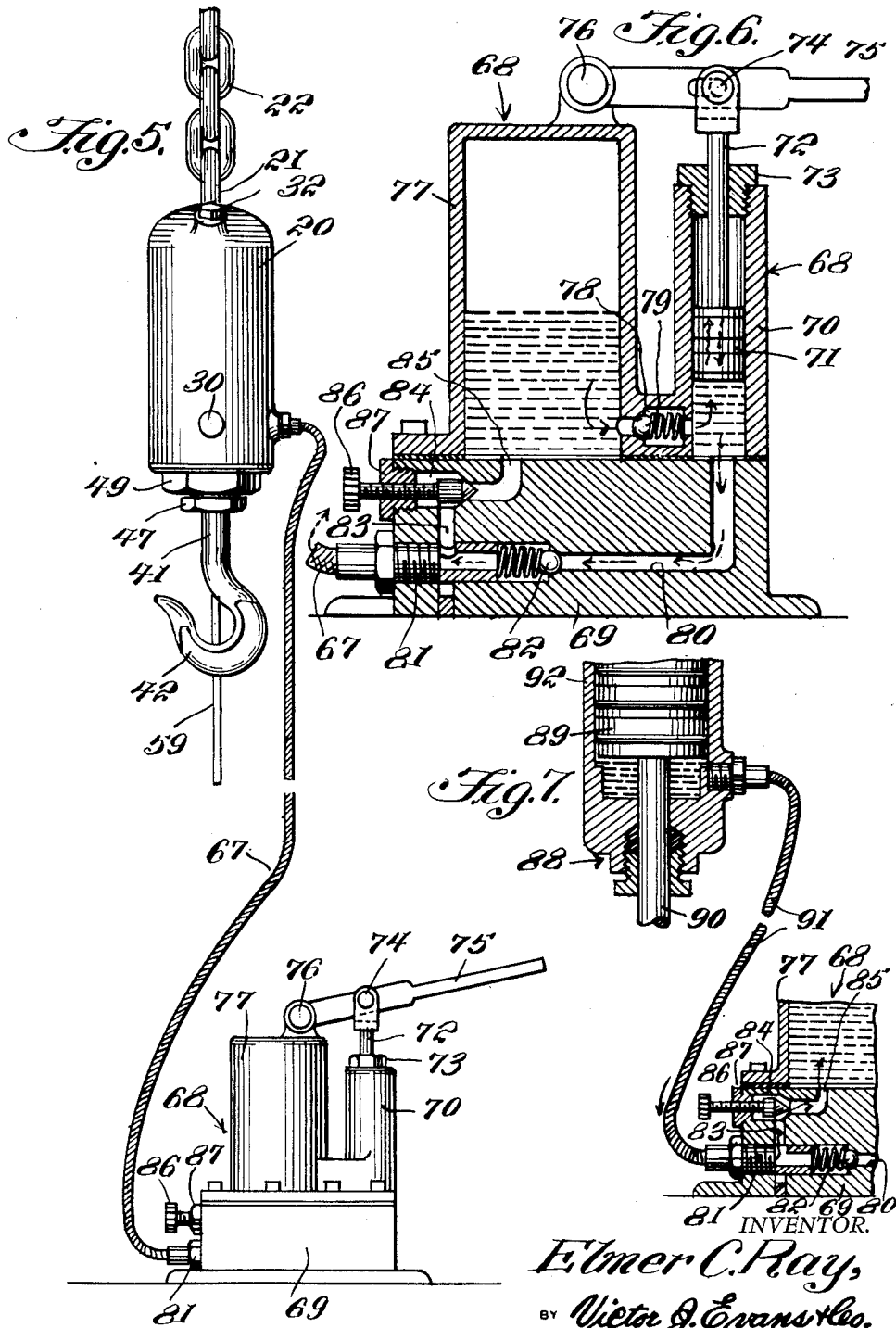
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HYDRAULIC HOOK FOR HOISTS

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3 Claims. (Cl. 254-93)

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This invention relates to a hoist, and more particularly to a fluid actuated hook for a hoist.

The object of the invention is to provide a grab-hook for a hoist wherein the hook is actuated by hydraulic fluid pressure in order to accurately adjust the position of the hook.

Another object of the invention is to provide a hydraulic hook for hoists whereby the hook can be adjusted accurately and smoothly from the ground so that there will be no jerking of the article being handled.

A further object of the invention is to provide a hydraulic hook which is extremely simple and inexpensive to manufacture.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this application, and in which like numerals are used to designate like parts throughout the same

Figure 1 is a central vertical longitudinal sectional view of the hydraulic hook, according to the present invention;

Figure 2 is a top plan view of the hook;

Figure 3 is a fragmentary elevational view of the hook;

Figure 4 is a bottom plan view of the hydraulic hook;

Figure 5 is an elevational view of the hook attached to a chain of a hoist and illustrating a modified arrangement for actuating the hook;

Figure 6 is a vertical central sectional view of the ground pumping unit for use in actuating the hydraulic hook; and

Figure 7 is a sectional view illustrating a modified hydraulic hook for use with the pump of Figure 6.

Referring in detail to Figures 1 to 4 of the drawings, the numeral 20 designates a housing having a ring 21 formed integral with, or secured to the top thereof, whereby the housing may be readily attached to a link of a chain 22 that is connected to a hoist or crane (not shown). The housing 20, Figure 1, is hollow, and has its lower end 23 provided with a central threaded aperture 24. A cylinder 25 fabricated of suitable material is arranged longitudinally in the housing 20, the cylinder 25 being provided with a threaded exterior portion 26 for engagement with the threaded aperture 24 so that the cylinder remains immobile in the housing.

The cylinder 25 coacts with the housing 20 to define an annular reservoir 27 for holding hydraulic fluid. A tapered opening 28 is arranged in the wall of the cylinder 25 for the egress there-

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through of hydraulic fluid into the reservoir 27. For controlling the rate of discharge of fluid from the cylinder 25 through the opening 28 into the reservoir 27, a release valve 29 is threaded into the housing 20, there being a knurled head 30 on one end of the valve 29 for rotating the latter. The other end of the valve 29 is shaped to define a tapered end for movement into and out of bridging relation with respect to the opening 27. For filling the reservoir as described, a passageway 31 communicates with the reservoir 27, there being a plug 32 for normally closing the passageway 31. The upper end of the housing 20 also includes an inclined recess 33 which serves as an air vent as the piston 35 is moved in the cylinder 25.

The piston 35 includes an exteriorly threaded body member 36 and a plurality of leather cups 37 arranged in spaced relation on the body member 36. Interposed between each pair of cups 37 is a metal spacer element or nut 38 which is threaded on the body member 36. A lock nut 39 is threaded onto the top of the body member 36 to maintain the piston in assembled relation. Extending upwardly into the body member 36 is an interiorly threaded socket 40 for receiving therein the threaded shank 41 of a hook member 42. A castle nut 43 prevents the hook member 42 from accidentally working from the piston 35. The shank 41 slidably projects through an opening 44 which is arranged in the lower end portion 45 of the cylinder 25. A fluid-tight connection is provided around the shank 41 by means of suitable packing 46 which is held in place by a packing gland 47. The lower end 45 of the cylinder 25 is provided with a plurality of spaced recesses 48 for receiving a suitable tool whereby the cylinder 25 may be readily screwed into the housing 20. A castle nut 49 is arranged in engagement with the lower projecting portion of the cylinder 25 for maintaining the latter in the housing 20. The housing 20 is also provided with a normally closed tap 50 for a purpose to be later described.

Formed integral with the housing 20 is a casing 51 provided with a vertically extending bore 52. A plunger 53 is slidably arranged in the bore 52 and a rod 54 has one end secured to the plunger 53. The rod 54 slidably projects through an apertured closure member 55 and the upper end is pivotally connected to a bar 56 intermediate its ends. The bar 56 has one end pivotally connected by means of a pin 57 to a pair of spaced ears 58 which project from the housing 20 and

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the other end of the bar 56 is pivotally connected to an actuating lever 59.

A first passageway 60 is arranged in the casing 51 and connects the reservoir 27 to the bore 52 for conveying hydraulic fluid from the reservoir 27 to the bore 22 as the plunger 53 is reciprocated. A valve means permits fluid to flow from the reservoir 27 through the passageway 60 but prevents fluid from flowing in the opposite direction. This valve means comprises a tubular bushing 61 which provides a seat for the ball 62 and the spring 63 normally urges the ball 62 into bridging relation with respect to the bushing 61. A second passageway 64 is arranged in the casing 51 and this passageway registers with a passageway 65 in the lower end 45 of the cylinder 25 whereby hydraulic fluid will be conveyed from the bore 52 to the cylinder 25. A valve 66 permits fluid to flow from the bore 52 to the cylinder 25 but prevents flow in the opposite direction.

In using the hydraulic hoist of Figures 1 to 4, the actuating lever 59 is moved to thereby cause the plunger 53 to move up and down in the bore 52 whereby fluid will be drawn from the reservoir 27 and forced into the cylinder 25. This will cause the piston 35 to rise and thus the hook member 42 can be accurately adjusted as desired. The hook member 42 can be locked in a desired position by moving the release valve to thereby close the opening 28. To lower hook member 42, the release valve is moved away from the opening 28, and the fluid will flow from the cylinder 25 back to the reservoir 27.

Referring to Figure 5, there is shown a slightly modified mechanism for actuating the hook member 42. Thus, a cable or hose 67 has one end connected to the tap 50 whereby fluid can be conveyed directly to and from the cylinder 25. The other end of the hose 67 leads to a hydraulic pump assembly 68 which is preferably positioned on the ground. This pump assembly is shown also in Figure 6 and comprises a base 69, a vertically disposed cylinder 70 supported on the base 69, there being a piston 71 slidably arranged in the cylinder 70. A rod 72 slidably projects through an apertured closure member 73 and has one end pivotally connected by a pin 74 to an actuating handle 75. The handle 75 is pivotally connected as at 76 to the top of a reservoir 77 for holding hydraulic fluid therein. A passageway 78 connects the reservoir 77 to the cylinder 70 and a valve 79 permits fluid to flow from the reservoir 77 to the cylinder 70 but prevents flow in the reverse direction. A passageway 80 is arranged in the base 69 and one end thereof communicates with the bottom of the cylinder 70 and its other end communicates with a bushing 81 which leads to the hose 67. A valve 82 permits fluid to flow out from the cylinder 70 through the passageway 80 only in the direction of the arrows. Communicating with the passageway 80 is a channel 83 which leads to a chamber 84 that is connected by a passageway 85 to the reservoir 77. A release valve 86 supported by a closure plug 87 regulates the amount of fluid flowing through the passageway 85.

In using the hoist hook with the ground pump of Figures 5 and 6, the handle 75 is moved to reciprocate the piston 71 whereby fluid will be drawn from the reservoir 77 and forced through the passageway 80 and into the hose 67 and into the cylinder 25 to raise the hook member without jerking and with great accuracy. The ground pump may be used by itself to actuate the hook or it may be used in conjunction with the lever

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59 to control the movement of the hook member 42.

In Figure 7, there is shown a modified hydraulic hook 88 which is actuated by the ground pump 68, there being a hose 91 leading from the pump to the hook 88. The hook 88 includes a cylinder 92 having a piston 89 slidably arranged therein and secured to the piston 89 is a shank 90 which terminates in a depending hook member (not shown). For lowering the hook member, when the pump of Figures 5 to 7 is being used, the release valve 86 is moved out of bridging engagement with the passageway 85 whereby fluid will return to the reservoir 77, as shown in Figure 7.

While various changes may be made in the detail construction, it shall be understood that such changes shall be within the spirit and scope of the present invention as defined by the appended claims.

I claim:

1. In combination, a housing, a ring secured to the top of said housing and adapted to be connected to a chain, the lower end of said housing being provided with a central threaded aperture, a cylinder arranged longitudinally in said housing and provided with a threaded exterior portion engaging said aperture, a reservoir for hydraulic fluid arranged in surrounding relation with respect to said cylinder, valve means for controlling the flow of fluid from said cylinder to said reservoir, said valve means comprising a release valve arranged in threaded engagement with said housing and mounted for movement into and out of closing relation with respect to a tapered opening in said cylinder, there being a passageway communicating with said reservoir, a plug for normally closing said passageway, there being an inclined recess in the upper end of said housing providing an air vent, a piston slidably arranged in said cylinder, said piston including an exteriorly threaded body member, a plurality of leather cups arranged in spaced relation on said body member, there being an interiorly threaded socket extending upwardly from the body member, a hook member having a threaded shank engaging the socket in said piston and projecting out of said cylinder for engagement with a work piece, means for conveying hydraulic fluid under pressure from said reservoir to said cylinder to raise said hook member, said means comprising a casing formed integrally with said housing, said casing having a bore extending therethrough for a portion of its length, a plunger slidably arranged in said bore, a rod secured to said plunger and projecting out of said bore, a bar having one end pivotally connected to said housing and pivotally connected to said rod, an actuating lever pivotally connected to the other end of said bar for causing movement of said plunger in said bore, and means for connecting said bore to said reservoir and to said cylinder.

2. In combination, a housing, a ring secured to the top of said housing and adapted to be connected to a chain, the lower end of said housing being provided with a central threaded aperture, a cylinder arranged longitudinally in said housing and provided with a threaded exterior portion engaging said aperture, a reservoir for hydraulic fluid arranged in surrounding relation with respect to said cylinder, valve means for controlling the flow of fluid from said cylinder to said reservoir, said valve means comprising a release valve arranged in threaded engagement with said housing and mounted for movement into and out of closing relation with respect to a tapered open-

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ing in said cylinder, there being a passageway communicating with said reservoir, a plug for normally closing said passageway, there being an inclined recess in the upper end of said housing providing an air vent, a piston slidably arranged in said cylinder, said piston including an exteriorly threaded body member, a plurality of leather cups arranged in spaced relation on said body member, there being an interiorly threaded socket extending upwardly from the body member, a hook member having a threaded shank engaging the socket in said piston and projecting out of said cylinder for engagement with a work piece, means for conveying hydraulic fluid under pressure from said reservoir to said cylinder to raise said hook member, said means comprising a casing formed integrally with said housing, said casing having a bore extending therethrough for a portion of its length, a plunger slidably arranged in said bore, a rod secured to said plunger and projecting out of said bore, a bar having one end pivotally connected to said housing and pivotally connected to said rod, an actuating lever pivotally connected to the other end of said bar for causing movement of said plunger in said bore, and means for connecting said bore to said reservoir and to said cylinder, said last-named means comprising a pair of passageways, and a check valve interposed in each of said passageways.

3. In a hydraulically operated hook, a housing, a ring secured to the top of said housing and adapted to be connected to a chain, the lower end of said housing being provided with a central threaded aperture, a cylinder arranged longitudinally in said housing and provided with a threaded exterior portion engaging said aperture, a reservoir for hydraulic fluid arranged in

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surrounding relation with respect to said cylinder, valve means for controlling the flow of fluid from said cylinder to said reservoir, said valve means comprising a release valve arranged in threaded engagement with said housing and mounted for movement into and out of closing relation with respect to a tapered opening in said cylinder, there being a passageway communicating with said reservoir, a plug for normally closing said passageway, there being an inclined recess in the upper end of said housing providing an air vent, a piston slidably arranged in said cylinder, said piston including an exteriorly threaded body member, a plurality of leather cups arranged in spaced relation on said body member, there being an interiorly threaded socket extending upwardly from the body member, a hook member having a threaded shank engaging the socket in said piston and projecting out of said cylinder for engagement with a work piece, and means for conveying hydraulic fluid under pressure from said reservoir to said cylinder to raise said hook member.

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