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WORK SUPPORTING ATTACHMENT FOR HOISTS

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FIG. 1.

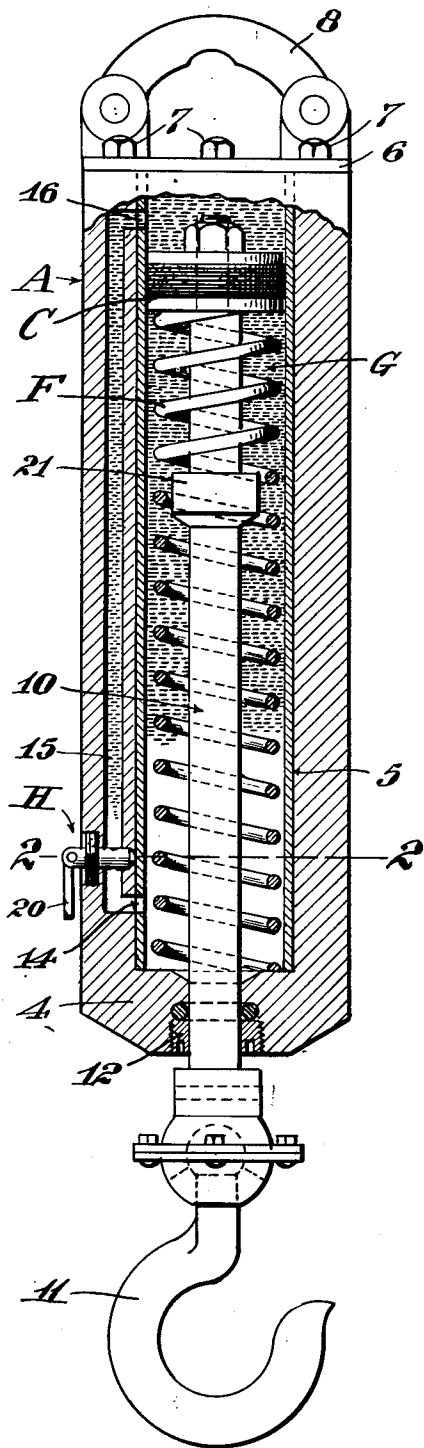


FIG. 2.

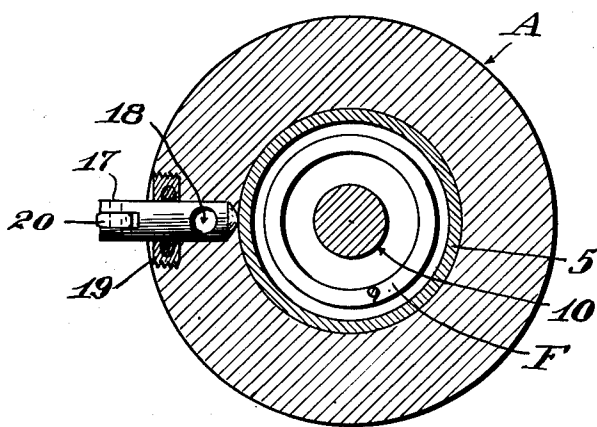
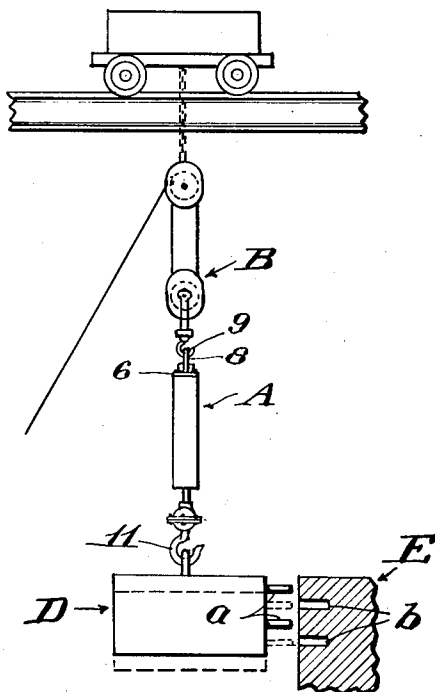


FIG. 3.



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WORK SUPPORTING ATTACHMENT FOR
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5 Claims. (Cl. 287-1)

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This invention relates to an auxiliary lowering attachment for hoists and has as its primary object the provision of a device for use in connection with a hoist, such as a block and tackle, employed in the assemblage of heavy structures, in cases where it is necessary to bring a suspended part into accurate alignment or assemblage with a stationary part to which it is to be united, and whereby the suspended part may be lowered independent of the hoist from a position slightly above the position it is to occupy when assembled, and whereby proper positioning of the suspended piece may be more readily effected than through the medium of the hoist alone.

Another object is to provide a lowering device by means of which a load may be lowered with extreme slowness whereby the load may be set down or positioned on a determined plane with a high degree of accuracy as in disposing a suspended heavy structure in a position in which side openings or projections thereon are brought into register or alignment with side openings or projections on another structure.

Another object is to provide an auxiliary lowering attachment for hoists which is hydraulically controlled and in which the lowering operation is effected through the manipulation of a control valve to permit discharge of entrapped fluid beneath a load supporting piston to allow the latter to move downwardly in accordance with the volume of the released fluid.

Another object is to provide a construction whereby the load carrying piston may be automatically restored to normal on being relieved of its load but under the control of a hydraulic control valve.

A further object is to provide an arrangement whereby a load carrying piston in moving under the influence of the load imposed thereon will move in opposition to the resistance of hydraulic fluid passing through a restricted orifice and also against the increasing resistance of a coiled spring tensioned to oppose movement of the piston under its load.

With the foregoing objects in view, together with such other objects and advantages as may subsequently appear, the invention resides in the parts and in the combination, construction and arrangement of parts hereinafter described and claimed, and illustrated by way of example in the accompanying drawing, in which:

Fig. 1 is a view of the attachment as seen in vertical section with parts shown in elevation;

Fig. 2 is a detail horizontal section taken on the line 2-2 of Fig. 1; and

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Fig. 3 is a diagram in side elevation illustrating the application and mode of operation of the invention.

Referring to the drawings more specifically A indicates an elongated tubular housing formed with an end wall 4 constituting a lower end wall when the housing is disposed in an upright or vertical position. The interior of the housing A is formed with a cylindrical interior which is preferably lined with a replaceable cylinder 5 which snugly fits the inner surface of the housing and extends from the lower end wall 4 to the other or upper end of the housing, which latter is provided with a removable cap 6 closing the upper end of the cylinder 5. The cap 6 is detachably secured to the upper end of the housing A as by bolts 7. The cap 6 is fitted with a yoke 8 for engagement with the hook 9 of the conventional block and tackle B as illustrated in Fig. 3, or other suitable hoist, whereby the housing A may be suspended in its vertical position.

Arranged within the cylinder 5 is a piston C fixed on a stem 10 projecting through the lower end wall 4 of the housing and fitted on its lower end with a swivel hook 11 for engagement with piece D to be raised and lowered in relation to a fixed piece E. A packing gland 12 is carried by the end wall 4 and encompasses the stem 10 to afford a seal therearound. A coiled spring F is interposed between the piston C and the end wall 4 of the housing and is tensioned to yieldably oppose downward movement of the piston and also to restore the piston to its uppermost position when freed of a load after having been depressed.

Formed in the lower end portion of the cylinder 5 is a port 14 which opens to a passage 15 in the housing A leading to the interior of the cylinder above the piston C adjacent the upper end of the cylinder through a port 16. The cylinder 5 and the passage 15 is filled with a suitable fluid G such as a hydraulic oil; the fluid completely filling the spaces within the housing A and cylinder 5 on opposite sides of the piston C. A cut-off valve H is provided in the passage 15 which when closed confines the fluid G in the portion of the cylinder 5 beneath the piston C so that the piston will then be held against movement longitudinally of the cylinder.

The valve H is here shown as comprising a cylindrical stem 17 which extends laterally into the wall of the housing A across the passage 15 and is formed with an opening 18 extending diametrically through the stem adapted to be po-

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sitioned in and out of communication with the passage 15. The stem 17 is encompassed by a packing gland 19 and is fitted with a handle 20 by which it may be turned to open or close the valve B.

A collar 21 is fixed on the stem 10 in suitable spaced relation to the wall 4 to serve as a stop to limit downward movement of the piston; the collar being adapted to abut the end wall 4 when the stem 10 is advanced therethrough the determined distance.

In the application and operation of the invention the housing A is suspended from the hoist B with the piston C in its uppermost position in the cylinder and with the valve H closed. The piece D to be suspended is attached to the hook 11 and the hoist B is operated to elevate the piece to a plane slightly above the position that the piece D is to occupy when assembled with its companion piece E as shown in full lines in Fig. 3. Having thus disposed the piece D proximate its assembled position the valve H is operated to partially open the passage 15 thereby permitting the flow of fluid G from beneath the piston C under the load imposed thereon, thus permitting the piston to move downwardly in opposition to the spring F. The piece D is thus lowered to the desired point whereupon the valve H is closed, thereby cutting off the flow of the fluid G from beneath the piston C and preventing further downward movement of the latter within the cylinder. The piece D will then be held suspended in its secondary lowered position, as illustrated by dotted lines in Fig. 3 with projections *a* on the piece D aligned with holes *b* in the piece E so that the projections may then be readily inserted in the holes. If perchance the piece D is thus lowered beyond the point of or below the plane of its assemblage with the piece E it may again be elevated by the hoist B and if need be the valve H again manipulated to effect the lowering of the piece to the required position.

During the downward movement of the piston C under the load of the piece D the spring F is placed under compression so as to resist downward movement of the piston and which resistance increases progressively as the piston moves downwardly. The spring F thus yieldably opposes downward movement of the piston C which with the control afforded by the valve H enables extremely delicate regulation of the lowering of the piece D relative to the hoist B.

While we have shown and described a specific embodiment of our invention we do not limit ourselves to the exact details of construction set forth, and the invention embraces such changes, modifications and equivalents of the parts and their formation and arrangement as come within the purview of the appended claims.

We claim:

1. In a supplemental lowering attachment for hoists, a housing, an enclosed cylinder within

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said housing, a piston in said cylinder, a stem attached to said piston having an end portion extending exteriorly of said housing, a load engaging member on said stem, a hydraulic fluid within said housing filling said cylinder on opposite sides of said piston, a passage connecting the opposed end portions of said cylinder, a regulating valve in said passage, and a coiled spring wound around said stem in said cylinder yieldably opposing movement of said piston in one direction under the urge of a load on said stem and operable to restore the piston from an advanced to a normal position when the stem is free of a load and when the valve is open.

2. In a supplemental lowering attachment for hoists, a tubular housing, an end wall on said housing, a cylinder lining the interior of said housing having a port adjacent each of its ends, said housing being formed with a passage leading between said ports, a removable cap on said housing closing one end of said cylinder, a piston within said cylinder, a stem extending through said end wall on which said piston is mounted, a coiled spring interposed between said piston and end wall yieldably opposing movement of said piston in one direction and operable to move the piston in the opposite direction, a hydraulic fluid occupying the space within said cylinder on opposite sides of said piston and filling said ports and passage, and a control valve in said housing arranged to close said passage and cut off flow of fluid therethrough and operable to open said passage to the flow of the fluid therethrough.

3. The structure called for in claim 2 together with a collar on the stem cooperable with the end wall to limit movement of said stem in one direction.

4. In a supplemental lowering attachment for hoists, a cylinder, a piston therein, a stem carrying said piston, a housing encompassing said cylinder having an end wall through which said stem projects, said cylinder having a port adjacent each end thereof and said housing having a passage connecting said ports, a hydraulic fluid filling said cylinder on opposite sides of said piston and occupying said ports and passage, a control valve for regulating the flow of fluid through said passage and for preventing such flow, means for attaching said housing to a hoist in a suspended position, and means for suspending a load on said stem.

5. The structure called for in claim 4 together with spring means for yieldably opposing advance movement of said stem in one direction under the influence of a load imposed thereon and operable to move the stem in the other direction after having been advanced on being relieved of a load.

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No references cited.

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