E. D. SMITH.

FLUID PRESSURE HOIST.

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910,426.

Patented Jan. 19, 1909.

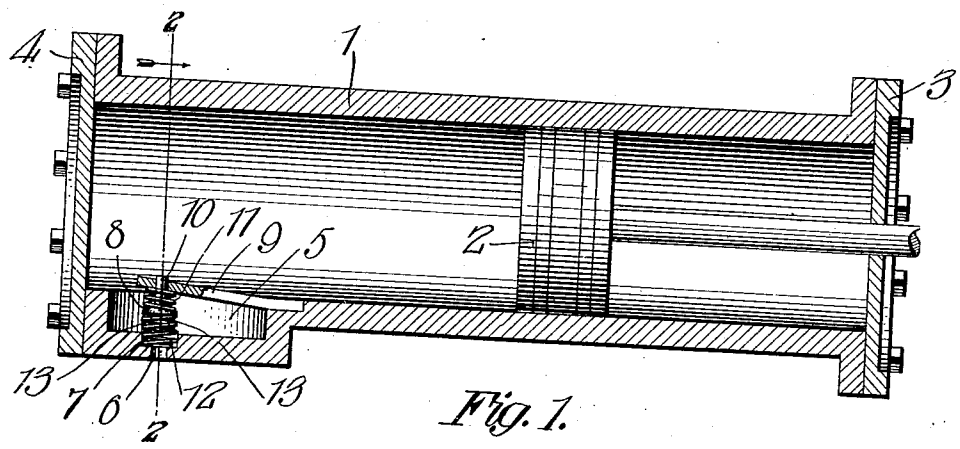


Fig. 1.

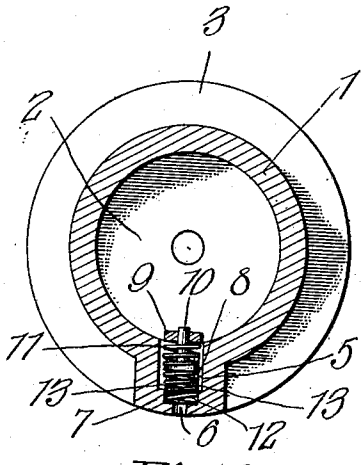


Fig. 2.

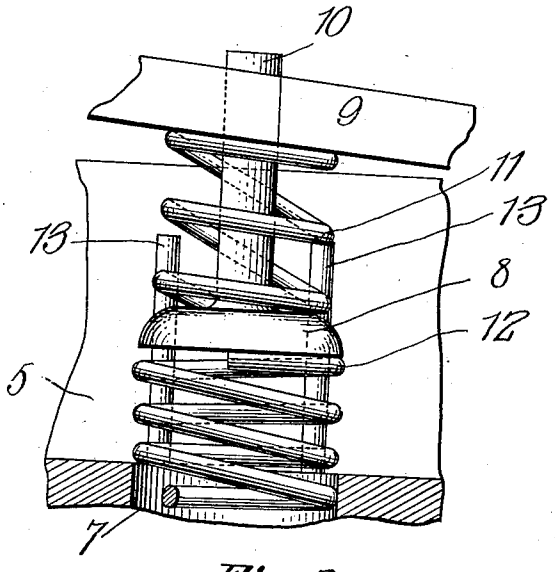


Fig. 3.

Witnesses

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EARL D. SMITH, OF DELPHI, INDIANA.

FLUID-PRESSURE HOIST.

No. 910,426. Specification of Letters Patent. Patented Jan. 19, 1909.

Application filed June 29, 1908. Serial No. 440,860.

To all whom it may concern:

Be it known that I, EARL D. SMITH, a citizen of the United States, residing at Delphi, in the county of Carroll, State of Indiana, have invented certain new and useful Improvements in Fluid-Pressure Hoists; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to improvements in fluid-pressure hoists, and it contemplates primarily the formation of an air-cushion at one end of the cylinder for preventing the piston from being brought into violent contact with the adjacent head of the cylinder upon its full upward or forward stroke. In connection with this feature the invention resides to a material extent in the employment of a particular form of check valve which is carried by a lever secured to the inner wall of the cylinder, the lever being flexed by the passage of the piston head thereacross during such in or upstroke, so as to move the valve into the seated inner end of a port formed through the cylinder wall, thus shutting off the flow of the motive fluid through said port, the valve being raised from its seat by the action of a spring as soon as the piston starts its movement in the opposite direction, the air admitted through the port into the interior of the cylinder overcoming the partial vacuum formed therein.

The preferred embodiment of the invention is illustrated in the accompanying drawings, in which corresponding parts or features, as the case may be, are designated by the same reference numerals throughout the several views.

Of the said drawings, Figure 1 is a longitudinal sectional view of the complete invention. Fig. 2 is a transverse section taken on the line 2—2 of Fig. 1. Fig. 3 is an enlarged detail view of the valve and its attendant parts.

Referring more particularly to the drawings, 1 designates generally the cylinder within which the fluid actuated piston 2 is movable, the ends of the cylinder being closed by the front and rear caps or heads 3 and 4. Adjacent the last-mentioned head, there is formed in the inner face of the side wall of the cylinder a longitudinal seat 5 through whose bottom wall opens an outlet port 6, the inner end of said port being slightly enlarged, as shown, to provide a seat 7 for the reception of a valve 8. That portion of the side wall of the cylinder in which the seat 5 is formed, is flared, as will be understood, said portion projecting beyond the outer face of said wall.

The valve 8 above referred to is connected to the free end of a lever 9 which is disposed longitudinally of the seat 5 and projects at its other end therebeyond, at which point, it is secured to the cylinder wall. At its first-mentioned end, the lever is provided with an opening through which the stem 10 of the valve loosely extends, said valve being thus capable of an independent movement with respect to the lever towards and from the outlet port 6, as hereinafter described, being forced yieldingly towards said port by an expansible coil-spring 11 which embraces the stem portion and bears at opposite ends against the under face of the lever and the upper face of the valve body, said spring being preferably connected at its upper end to the lever. The tension of the spring 11 is more than counterbalanced, however, by the provision of a second expansible spring 12, which is interposed between the valve body and the seated inner end 7 of the port 6, in which end the adjacent end of the spring is received. The last-mentioned spring is held against displacement with respect to the valve by means of a series of pins 13 which are set into the bottom wall of the seat 5, the pins surrounding said spring in such a manner as to form guides therefor. The disposition of the valve-carrying lever is such that the head of the piston 2 is arranged to travel directly across the same, so as to force said lever and the valve towards the outlet port, against the action of the spring 12.

From the foregoing, it will be apparent that when the piston has moved a predetermined distance inwardly of the cylinder, under the influence of the steam or other motive fluid admitted thereinto in any preferred manner, its head will travel across the valve-carrying lever, forcing the same, and with it, the valve towards the seated end of the outlet port, which latter is closed by the valve before the piston reaches the limit of its in-stroke. During the inward movement of the piston, the steam or other fluid between the piston head and the rear end of the cylinder will exhaust through the outlet port, until the latter is closed by

the movement of the valve, sufficient fluid being thus retained within the chamber between the piston head and the adjacent end wall of the cylinder to form a cushion which prevents said piston head from being brought into violent contact with said end wall. When the piston starts upon its outstroke and its head has moved beyond the valve, the latter is raised out of the seated end of the valve passage by the action of the spring 12, the tension of which is, as stated, sufficiently greater than that of the spring 11 to more than counterbalance the action of the latter. This movement of the valve outwardly of the seat 7 will admit air into the interior of the chamber above referred to, thus destroying the partial vacuum formed therein.

What is claimed is:

1. The combination of a cylinder provided adjacent one end with an outlet port; an interiorly-located member having a valve secured to one end thereof and movable towards and from said port for opening and closing the same; means for normally forcing said valve away from said port; and a fluid-actuated piston movable within the cylinder and having its head arranged to travel across said member, to force the latter and said valve towards said port.

2. The combination of a cylinder having an outlet port formed through its side wall adjacent one end thereof; an interiorly-located member secured at one end to said side wall, and provided at the other end with a valve arranged for movement towards and from said port to open and close the same; means for normally forcing said valve away from said port; and a fluid actuated piston movable within the cylinder and having its head arranged to travel across said member, to force the latter and said valve towards said port.

3. The combination of a cylinder having an interiorly-located seat formed in its side wall adjacent one end thereof and an outlet port opening through the seat; a member disposed within said seat and secured at one end to said side wall beyond said seat, said member being provided at the other end with a valve arranged for movement towards and from the port, to open and close the same; means for normally forcing said valve away from said port; and a fluid-actuated piston movable within the cylinder and having its head arranged to travel across said member, to force the latter and said valve towards said port.

4. The combination, of a cylinder having an interiorly-located seat formed in its side wall adjacent one end thereof and an outlet port opening through the seat; a member disposed within said seat and secured at one end to said side wall beyond said seat, said member being provided at the other end with a valve arranged for movement towards and from the port, to open and close the same; a spring disposed within said seat and bearing against said valve, to normally force the same away from said port; and a fluid-actuated piston having its head arranged to travel across said member, to force the latter and said valve towards said port.

5. The combination, of a cylinder having an outlet port formed in its side wall adjacent one end thereof; an interiorly-located member secured at one end to said side wall, and provided at the other end with a pivoted valve arranged for movement towards and from said port, to open and close the same; means carried by said member and arranged for engagement with said valve to force the same in the direction of said port; a spring interposed between said port and said valve, for forcing the latter away from the port against the action of the first-mentioned means; and a fluid-actuated piston movable within the cylinder and having its head arranged to travel across said member to force the latter and said valve towards said port.

6. The combination, of a cylinder provided adjacent one end with an outlet port; an interiorly-located member provided at one end with an independently movable valve disposed in alinement with said port; means carried by said member and arranged for engagement with said valve to normally force the latter in the direction of said port; means for forcing said valve away from said port against the action of the first-mentioned means; and a fluid-actuated piston movable within the cylinder and having its head arranged to travel across said member, to force the latter and said valve towards said port.

7. The combination, of a cylinder having an interiorly-located seat formed in its side wall adjacent one end thereof, and an outlet port opening through the seat; a member disposed within said seat and secured at one end to said side wall beyond said seat, said member being provided at the other end with an independently-movable valve disposed in alinement with said port; means carried by said member and arranged for engagement with said valve, to normally force the latter in the direction of said port; means disposed within said seat between the bottom wall thereof, and the valve, for forcing the valve away from said port against the action of the first-mentioned means; and a fluid-actuated piston movable within the cylinder and having its head arranged to travel across said member, to force the latter and said valve towards said port.

8. The combination, of a cylinder having an interiorly-located seat formed in its side wall adjacent one end thereof, and an outlet port opening through the seat; a member

disposed within said seat and secured at one end to said side wall, said member being provided at the other end with an independently-movable valve; a spring carried by said member for yieldingly forcing said valve in the direction of said port; a spring disposed within said seat between said port and said valve, for yieldingly forcing the latter away from said port; means for holding the last mentioned spring against displacement; and a fluid-actuated piston movable within the cylinder and having its head arranged to travel across said member, to force the latter and said valve towards said port against the action of said last-mentioned spring.

In testimony whereof, I affix my signature, in presence of two witnesses.

EARL D. SMITH.

Witnesses:

THOMAS E. MALIA,

FRANCIS A. DRAKE.