(No Model.)

F. MARIS.

AUTOMATIC CLUTCH FOR FLUID OPERATED HOISTS.

No. 579,885. Patented Mar. 30, 1897.

Fig. 1.

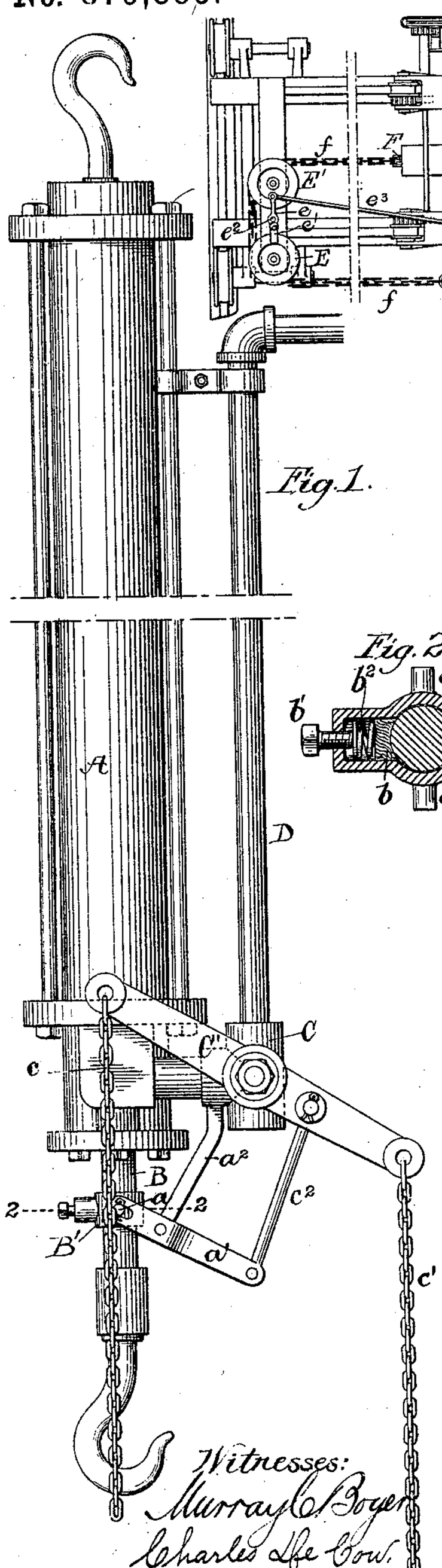


Fig. 2.

Fig. 3.

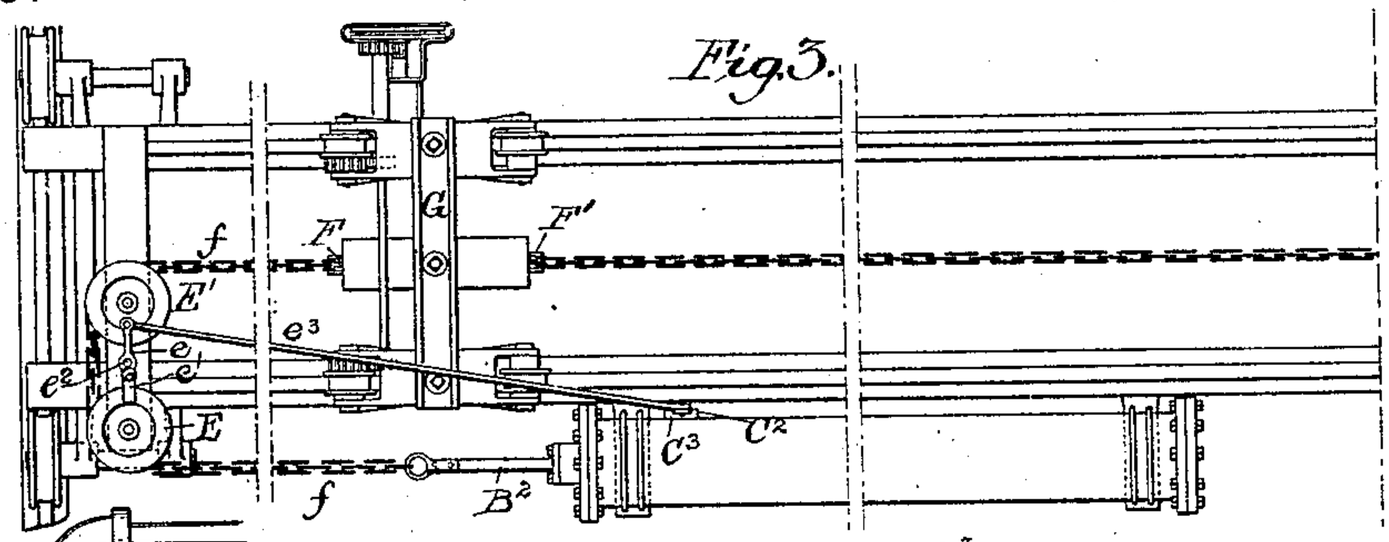


Fig. 4.

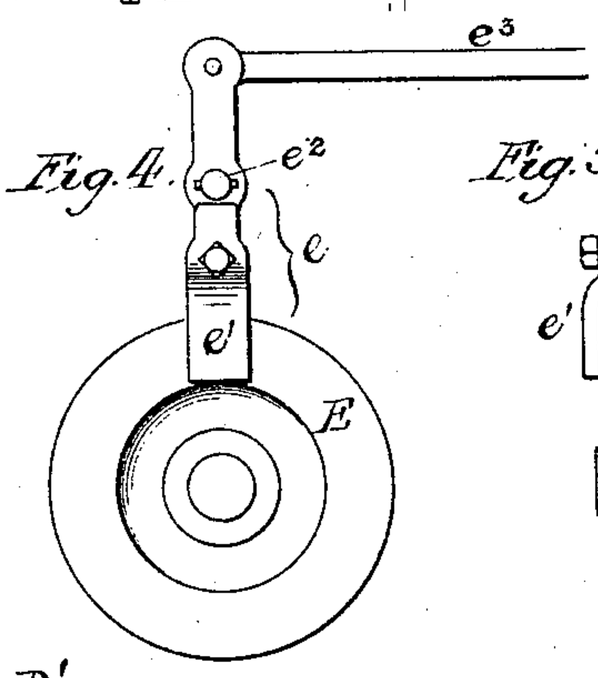


Fig. 5.

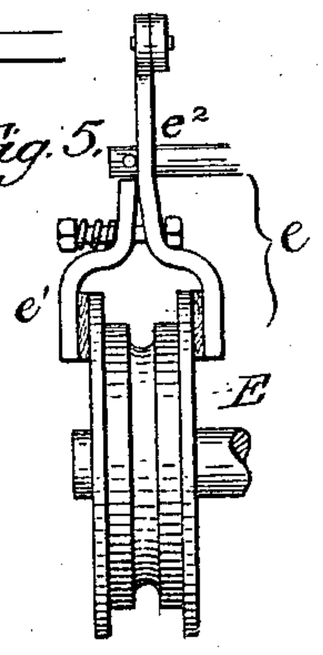


Fig. 6.

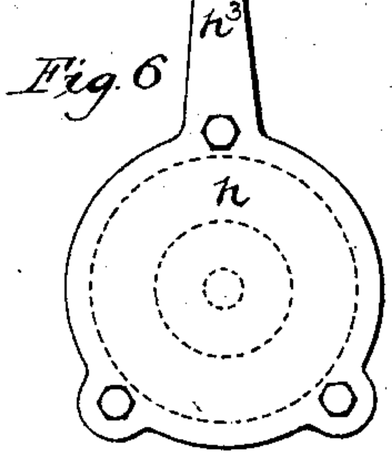


Fig. 7.

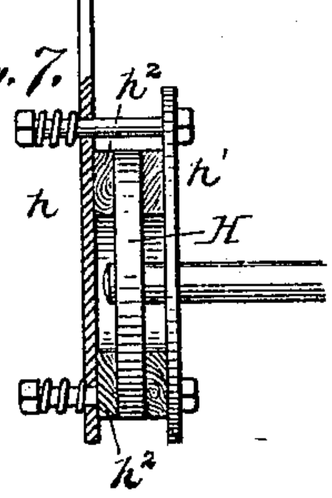


Fig. 8.

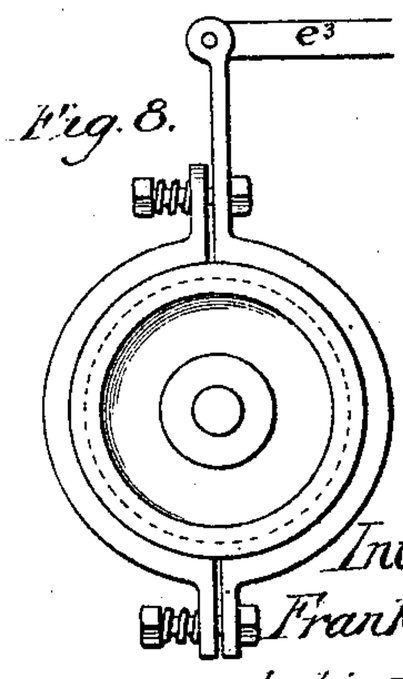
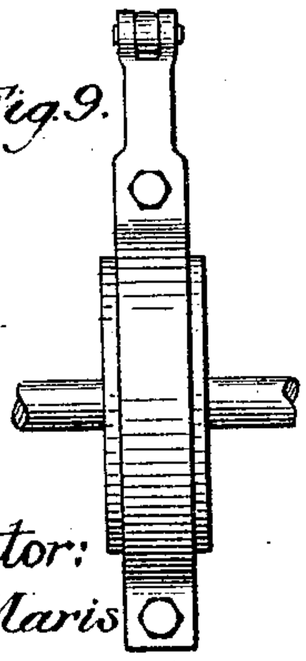


Fig. 9.



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UNITED STATES PATENT OFFICE.

FRANK MARIS, OF PHILADELPHIA, PENNSYLVANIA.

AUTOMATIC CLUTCH FOR FLUID-OPERATED HOISTS.

SPECIFICATION forming part of Letters Patent No. 579,885, dated March 30, 1897.

Application filed May 23, 1896. Serial No. 592,735. (No model.)

To all whom it may concern:

Be it known that I, FRANK MARIS, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Automatic Clutches for Fluid-Operated Hoists, of which the following is a specification.

My invention relates to that class of hoisting apparatus in which motive fluid is admitted to a cylinder and caused to act upon a piston capable of traveling therein, said piston being connected to a rod to which the load is hung.

My invention consists of a clutch adapted to engage with the piston-rod or other movable portion of the hoist which supports the load, said clutch being connected to the valve which supplies the motive fluid to the cylinder, whereby said valve will be opened to supply motive fluid to the cylinder should the load lower accidentally or will be opened to exhaust motive fluid from the cylinder should there be any tendency of the load to raise by reason of expansion of the fluid in the cylinder.

My invention is fully illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation illustrating my invention as applied to an air-hoist having a vertically-moving piston. Fig. 2 is a section on the line 2 2, Fig. 1. Fig. 3 is a plan view of a traveling hoist provided with a horizontally-moving piston-rod which operates a chain for lifting the load, this view showing a modified form of my invention. Figs. 4 and 5 are respectively enlarged plan and end views of the device shown in Fig. 3, and Figs. 6, 7, 8, and 9 are views illustrating further modifications of my invention.

In Fig. 1, A is the cylinder of the hoist; B, the piston-rod; C, the chest containing the governing-valve, and D the pipe for conveying motive fluid to the cylinder. Surrounding the piston-rod B is a friction-collar B′, held in contact therewith by means of a friction-block, as *b*, and a suitable adjusting-screw *b′*, Fig. 2, a spring b^2 being preferably interposed between the friction-block and the adjusting-screw. The valve in the chest C may be any ordinary form of three-way valve, and it is provided with a two-armed lever C′, whereby the valve may be moved either to the inlet, cut-off, or exhaust position, as may be desired, suitable operating-chains *c c′* being connected to the lever, as shown in Fig. 1. By "inlet" position I mean that adjustment of the valve which provides for a flow of motive fluid into the cylinder, by "cut-off" position that adjustment which cuts off either inlet or escape of motive fluid, and by "exhaust" position that adjustment which provides for the flow of motive fluid from the cylinder through the valve and its chest to the air.

Hung to studs *a* on the side of the friction-collar B is a yoke-lever *a′*, carried by a bracket a^2, which is suspended from the valve-chest C. Connecting the yoke-arm *a′* with the lever C′ is a link c^2, which serves to transmit to the lever C′ any movement of the piston-rod which is transmitted to the friction-collar B′.

In Fig. 3 I have shown the clutch in the form of a yoke-lever *e*, having a spring-pressed arm *e′*, the two arms of the yoke being adapted to engage a sheave, such as E, around which the chain *f*, carrying the load, passes. The chain in this instance is connected to the piston-rod B^2 of a horizontal cylinder, passes around the sheaves E and E′, over the sheave F, through the hoisting-block, and over the sheave F′, carried by the trolley G, and is connected at the rear of the hoist at a point not shown in the drawings. The yoke-lever *e* is pivoted at e^2 to the frame of the hoist and is connected at its outer end to the rod e^3, which operates the lever C^2, controlling the valve in the chest C^3.

In Figs. 6, 7, 8, and 9 I have shown modified forms of clutches of the general style shown in Figs. 3, 4, and 5. In Figs. 6 and 7, H represents an auxiliary friction-wheel carried by the shaft or spindle of a sheave, as E, friction-plates *h* and *h′* flanking this friction-wheel, and annular wooden strips h^2 being interposed between the plates and the wheel for better frictional contact. The plate *h* is provided with an arm h^3, connected to the rod which operates the lever controlling the supply-valve. In Figs. 8 and 9 a two-part spring-pressed band-brake is shown adapted to a flanged sheave carried, as in the forms shown

in Figs. 6 and 7, by the spindle of a sheave, as E, one part of the brake having an arm connected to the rod which operates the valve.

My invention is particularly adapted for arresting the accidental lowering of a load supported by any motive-fluid hoist, such lowering, for instance, as would be due to any leakage from the cylinder.

The operation of the device is as follows: The hoist in Fig. 1 is shown with the hook in the raised position at the point where the load is to be supported, the valve in the chest C having been closed by pulling down on the chain c' of the lever C'. The admission of motive fluid to the cylinder is thereby cut off, and the load is held by the motive fluid admitted beneath the piston. While the hoisting operation was in progress, the piston-rod slipped through the friction-collar, as the latter could not move with it, being held in position owing to its connection with the lever C', which was held in position by the attendant; but should the piston after the closing of the valve descend from any cause it will carry the friction-block with it, and the downward movement of the friction-block will be imparted to the yoke-lever a', and thence to the lever C', through the medium of the link c^2, thereby raising said lever and opening the valve in the chest C for the admission of motive fluid to the cylinder. As the piston rises the friction-block moves with it and operates the lever C', so as to close the valve again by the time the load has been lifted to the proper height. It is obvious also that any accidental movement of the piston in an upward direction, such as might be caused by expansion in the cylinder or by a reduction of weight on the rod, will carry the friction-collar with it, and this movement imparted to the lever C' will cause the valve to open to the exhaust and allow a certain quantity of the motive fluid contained within the cylinder to escape, so as to bring the load back to its original position. Thus it will be seen the load is constantly kept in a state of complete equilibrium.

In all cases the frictional connection is such that it will slip on the moving part when and so long as the lever C' is held in position by hand, but when said lever is released after adjustment to the cut-off position it is then under control of the friction device and any movement of the latter in one direction or the other is imparted to said lever.

I claim as my invention—

1. The combination in a fluid-actuated hoist, of the hoisting-cylinder, its piston-rod, a valve controlling the flow of motive fluid into the cylinder, a friction-clutch constantly in operative engagement with a movable portion of the hoist, and a connection between said clutch and the valve, whereby the latter will be automatically opened by accidental or unintentional movement of the hoist, substantially as specified.

2. The combination in a fluid-actuated hoist, of the hoisting-cylinder, its piston-rod, a valve controlling the flow of motive fluid into and from the cylinder, a friction-clutch constantly in operative engagement with a movable portion of the hoist, and a connection between said clutch and the valve, whereby the latter will be automatically operated by accidental or unintentional movement of the hoist in either direction, substantially as specified.

3. The combination in a fluid-actuated hoist, of the hoisting-cylinder, its piston-rod, a valve controlling the flow of motive fluid into the cylinder, a friction-clutch in engagement with the piston-rod, and a connection between said clutch and the valve, whereby the latter will be automatically opened by accidental or unintentional movement of the hoist, substantially as specified.

4. The combination in a fluid-actuated hoist, of the hoisting-cylinder, its piston-rod, a valve controlling the admission of motive fluid to the cylinder, a friction clutch or collar encircling the piston-rod, a lever carrying said clutch, a two-armed lever for operating the fluid-supply valve, and a link connecting the friction-clutch lever with the lever controlling the valve, substantially as described.

5. The combination in a fluid-operated hoist, of the hoisting-cylinder, its piston-rod, a valve controlling the flow of motive fluid to the cylinder, a collar encircling the piston-rod and in frictional contact with the same, said collar having a contact-piece held against the piston-rod by a spring and a suitable adjusting-screw, and a connection between the friction-collar and the fluid-supply valve, whereby said valve will be opened when the piston-rod is accidentally moved, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK MARIS.

Witnesses:

MURRAY C. BOYER,

JOS. H. KLEIN.