A. R. HULTIN.

APPARATUS FOR CONTROLLING FRICTION CLUTCHES.

APPLICATION FILED MAY 29, 1914.

1,163,541.

Patented Dec. 7, 1915.

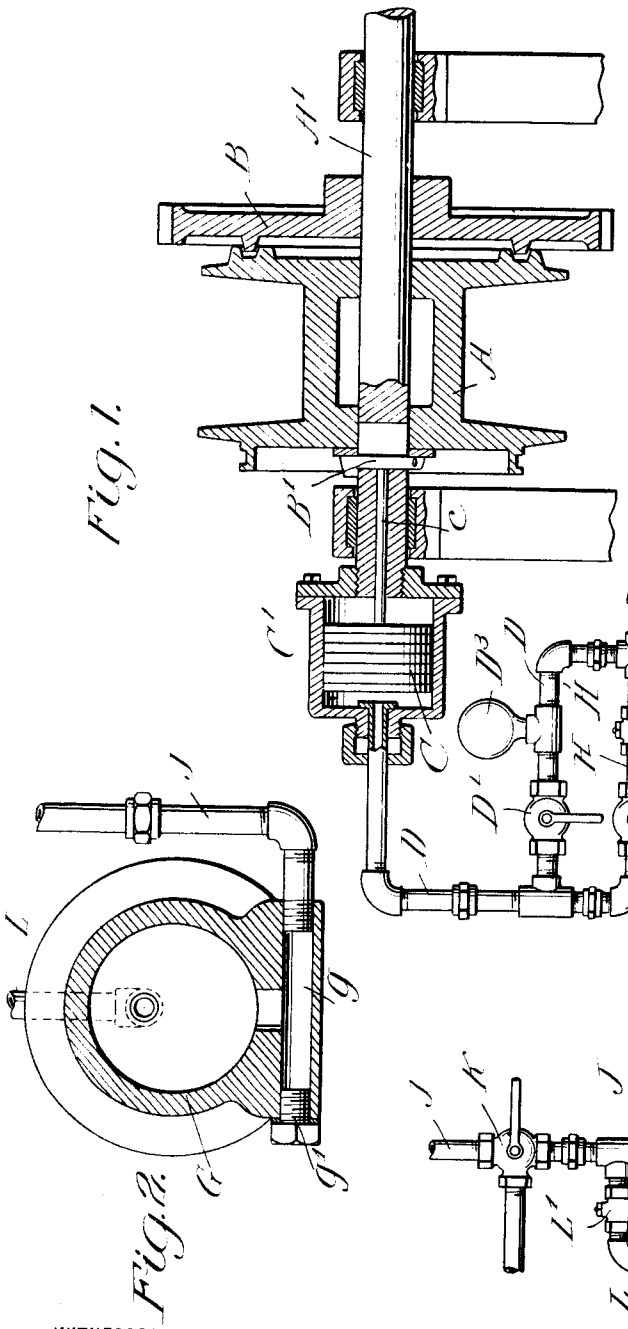


Fig. 1.

Fig. 2.

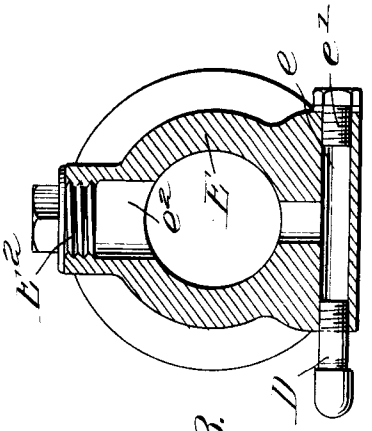


Fig. 3.

WITNESSES

Samuel E. Wade

Myron G. Bear.

INVENTOR

Adolph R. Hultin

BY Munn & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

ADOLPH R. HULTIN, OF PROSPER, OREGON.

APPARATUS FOR CONTROLLING FRICTION-CLUTCHES.

1,163,541. Specification of Letters Patent. Patented Dec. 7, 1915.

Application filed May 29, 1914. Serial No. 841,951.

To all whom it may concern:

Be it known that I, ADOLPH R. HULTIN, a citizen of the United States, and a resident of Prosper, in the county of Coos and State of Oregon, have made certain new and useful Improvements in Apparatus for Controlling Friction-Clutches, of which the following is a specification.

My invention relates generally to an apparatus for controlling friction clutches, and more particularly to an apparatus in which a non-expansive fluid medium, such as oil is utilized directly against a piston connected to the movable clutch member, and is operated by an expansive fluid such as steam.

The object of my invention is to provide certain improvements with respect to the controlling means and the fluid connections thereof, whereby the application and release of the clutch may be controlled and whereby certain other advantages, to be hereinafter particularly pointed out, may be obtained.

In the accompanying drawings illustrating my improvements Figure 1 is a view partly in side elevation and partly broken away and in section, illustrating my improvements, Fig. 2 is a transverse vertical section through the steam cylinder taken substantially on line 2—2 of Fig. 1, and Fig. 3 is a similar view taken through the liquid cylinder substantially on line 3—3 of Fig. 1.

Referring now to these figures, I have shown a drum at A, utilized for instance in connection with all donkey and hoisting engines, and movable on its shaft A′ into engagement with a friction block B by which it is clutched in engagement with the shaft, the shaft being provided with a transversely extending movable key B′ upon the relatively opposite side of the drum A, and which is carried by the piston rod *c* of a piston C. This piston C is movable in a fluid cylinder C′ to cause movement of the key B′ toward and away from the drum A, its former movement resulting in forcing the drum against the friction block B and into clutched position, and its latter movement permitting release of the drum from the friction block.

Into the outer end of the application cylinder C′ leads the outer end of the liquid pipe D, the inner end of which is led into either end of a transverse channel *e* adjacent the head end of the liquid cylinder E, the opposite end of which channel *e* is closed by means of a plug *e′*. The liquid piston E′ is connected by a piston rod F to the fluid piston G, which piston passes through an abutment F′ between which and the fluid piston G is compressed a spring F^2 bearing at one end against the piston G and at its opposite end against the said abutment. The fluid piston G is of substantially greater diameter than that of the liquid piston E′ and is movable within the fluid cylinder G′ which is integral and axially alined with the liquid cylinder. Thus when through the supply of steam within the cylinder G′, the liquid piston is moved toward the head end of its cylinder E, fluid is forced through the pipe D and into the application cylinder C′. It will be noted that the pipe D has a regulating valve D′ at an intermediate point and a cut-off valve D^2 adjacent the liquid cylinder E, and that it is further provided with an air chamber D^3 whereby to give the desired elasticity to the liquid when the cut-off valve D^2 is closed in order to hold the pressure in the application cylinder C′ and furnish an expansible agent for this purpose in case of slight leaks. Furthermore, in order to permit the emergency release of pressure in the application cylinder C′, I provide a supplemental pipe H, the ends of which are connected to the pipe D at separate points to form a by-pass, this supplemental pipe or by-pass H having a check valve H′ which opens away from the application cylinder C′ and also having a regulating valve H^2. Ordinarily the pressure flows out of the application cylinder slowly upon the rearward movement of the liquid piston E′, but with the valve H^2 open as well as the valve D′ the pressure may be speedily reduced through the check valve H′. Thus supposing regulating valve D′ to be partly closed, the operator wishing to retain the same in adjusted position may, at the time of opening the cut-off valve D^2, open bypass valve H^2, in order to quickly release the clutch, the release of which will be comparatively slow through the partly closed valve D′.

The steam cylinder G′ is supplied through a supply pipe J and under control of a three-way valve K, the pipe J entering one end of a transverse channel *g* which communicates with the steam cylinder adjacent its head end and the other end of which channel is closed by a plug *g′*. A branch pipe L also leads from the supply pipe J and into the head end of the steam cylinder

G′ and is provided with a check valve L′ opening toward the steam cylinder. Thus spaces are formed in the ends of the cylinders E and G′ beyond their respective channels *e* and *g* so as to form cushions to prevent the pistons E′ and G from destructive engagement with the cylinder heads. When the piston G has encountered the cushion by its passage beyond its channel *g*, steam may be supplied to the cylinder G′ by proper manipulation of the three-way valve K, the steam passing into the cylinder through the branch pipe L and its check valve L′ until the piston has been moved forwardly beyond its channel. When the steam is so supplied and the piston G moved forwardly the spring F^2 is compressed and forward movement imparted to the liquid piston E′ which force the liquid through the pipe D under proper control, as before mentioned, to the application cylinder C′, the piston C of which is then moved forwardly in order to move the drum A to clutched position. When the three-way valve K is turned to cut off the steam pressure the spring F^2 causes rearward movement of the pistons and the pressure is released, this release ordinarily taking effect slowly and evenly through the proper control by valve D′ with valve H^2 closed. As stated before, however, a speedy release in emergency is effected by opening valves D′ and H^2 to the full extent. The liquid cylinder E has an upper opening e^2 which is normally closed by a screw plug E^2 and through which the cylinder may be filled.

Thus a controlling device constructed as shown and described may be attached for operation in connection with practically any donkey or hoisting engine now in use and will permit of movement of the drum to clutched position without sudden shocks or danger of breakage due to the fact that a non-expansive medium is utilized and the fact that both the liquid and the fluid may be properly controlled at all times.

I claim:

1. In a controlling device of the character described, the combination of a pair of axially alined cylinders, one of which is of greater diameter than the other, pistons arranged in the said cylinders, a piston rod connecting the pistons whereby to effect their simultaneous movement, means for supplying fluid to the larger cylinder to move the pistons in one direction, a spring for moving the pistons in the opposite direction, an application cylinder, a piston movable therein and having connection with the parts to be controlled, liquid connections between said application cylinder and the smaller cylinder of the two cylinders first mentioned, controlling and cut-off valves within said liquid connections, an air chamber also within said connections whereby to hold the liquid pressure within the application cylinder when the cut-off valve is closed, and a by-pass formed in said connections and having a cut-off valve and a check valve opening away from the application cylinder, all for the purpose described.

2. In a controlling device of the character described, the combination of a liquid cylinder, a piston therein, means for moving the piston in relatively opposite directions, an application cylinder, a piston movable in the application cylinder and having communication with the parts to be controlled, and liquid connection leading from said liquid cylinder to said application cylinder, having an air chamber and a regulating and cut-off valve therein and provided with a valved by-pass the ends of which are connected thereto upon opposite sides of the regulating valves, all for the purpose described.

3. In a controlling device of the character described, the combination of a liquid cylinder, a piston therein, means for moving the piston in relatively opposite directions, a fluid pipe leading from the said cylinder, an application cylinder to which the said fluid pipe also leads, a piston in said application cylinder having connection with the parts to be controlled, regulating and cut-off valves in the connecting pipe, an air chamber also within the connecting pipe to hold the liquid pressure within the application cylinder when the cut-off valve is closed, and a supplemental pipe communicating at its ends with the connecting pipe at points therein upon opposite sides of the said regulating valve and provided with a cut-off valve and with a check valve opening away from the application cylinder, all for the purpose described.

ADOLPH R. HULTIN.

Witnesses:
JOHN NIELSON,
EDWIN ELLINGSEN..