

(No Model.)

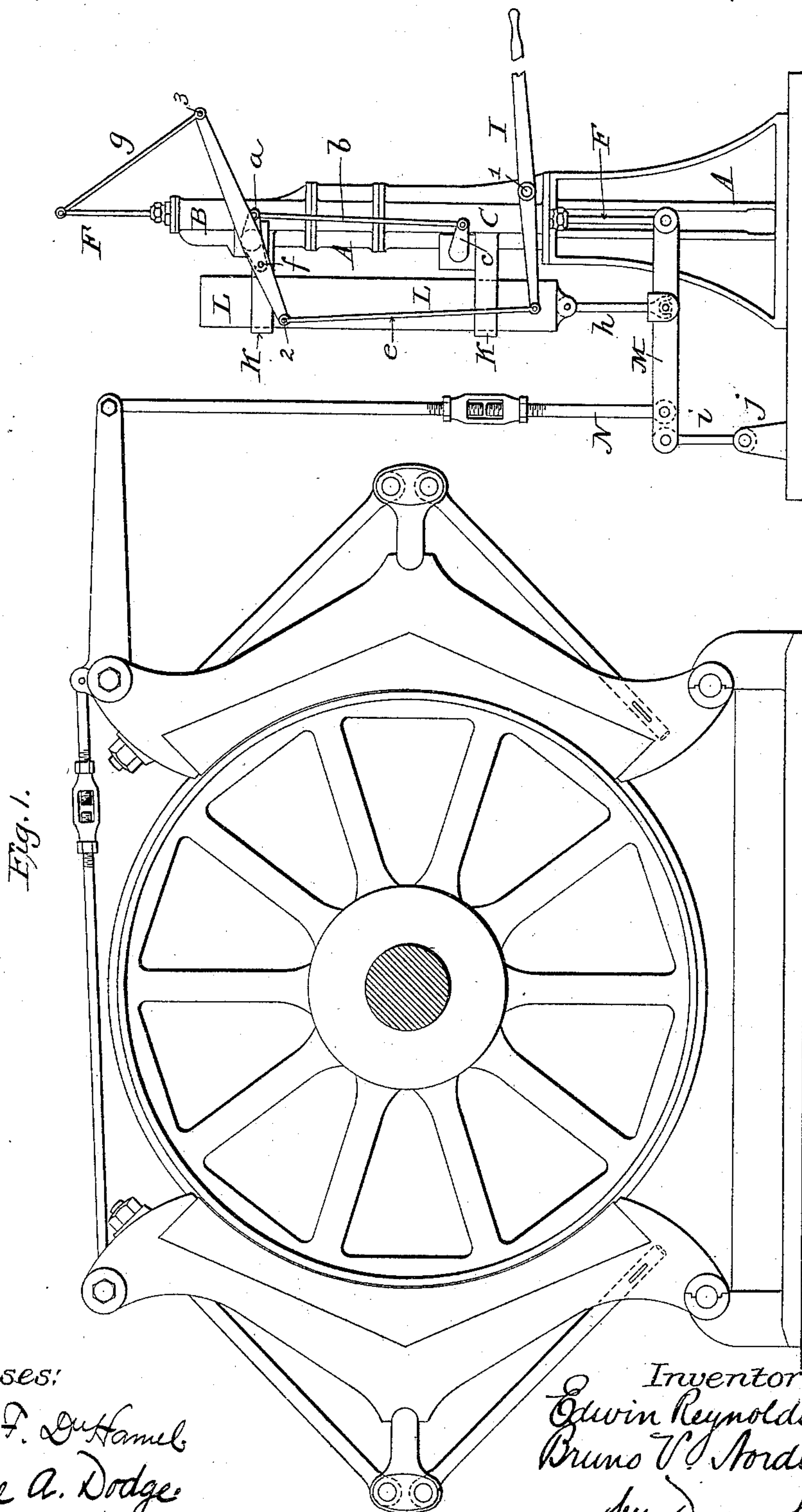
2 Sheets—Sheet 1.

E. REYNOLDS & B. V. NORDBERG.

BRAKE.

No. 395,717.

Patented Jan. 8, 1889.



Witnesses:

James F. Gifford  
Horace A. Dodge

Inventors:

Edwin Reynolds  
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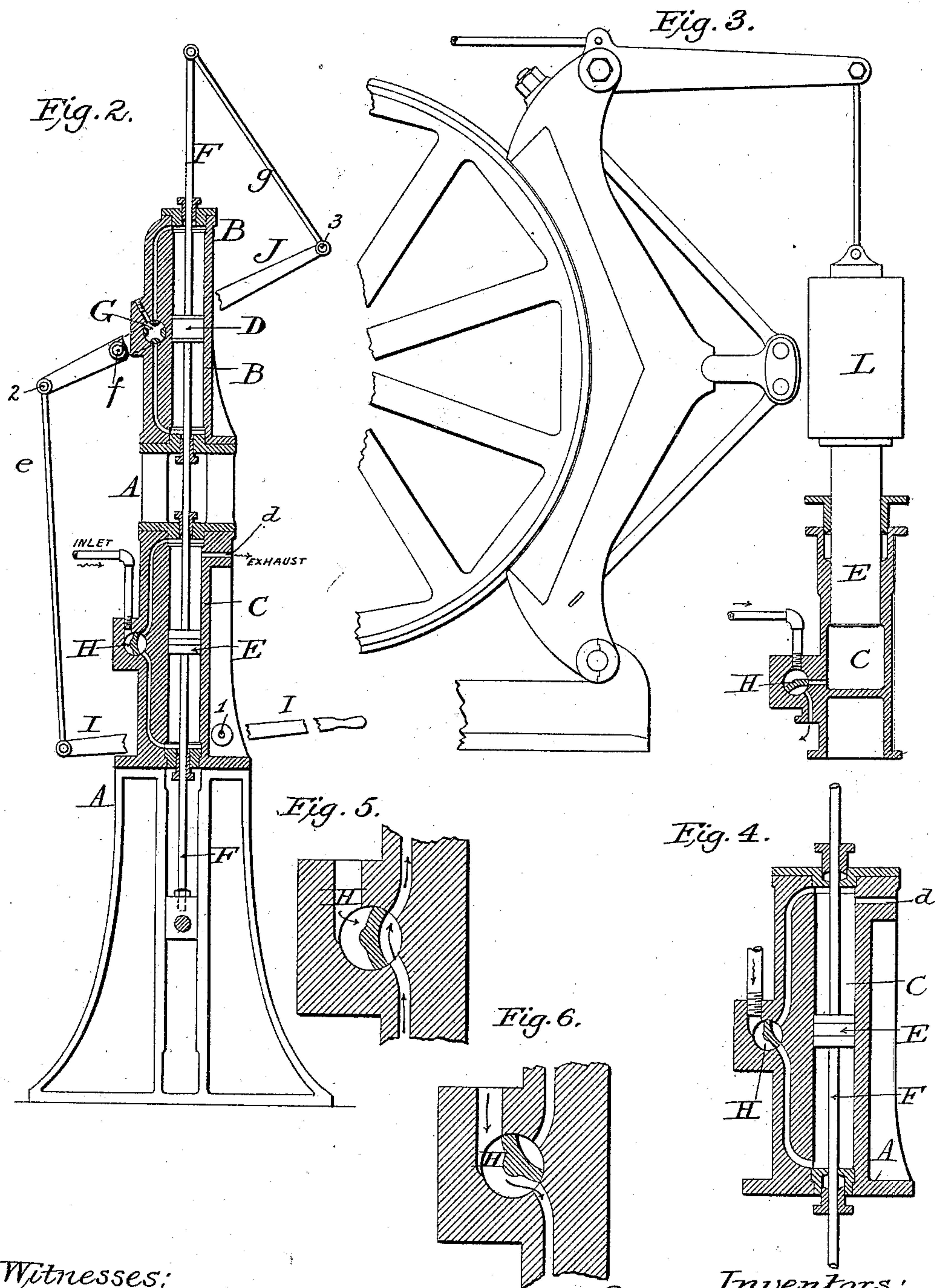
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2 Sheets—Sheet 2.

E. REYNOLDS & B. V. NORDBERG.  
BRAKE.

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Attys.



# UNITED STATES PATENT OFFICE.

EDWIN REYNOLDS AND BRUNO V. NORDBERG, OF MILWAUKEE, WISCONSIN.

## BRAKE.

SPECIFICATION forming part of Letters Patent No. 395,717, dated January 8, 1889.

Application filed September 4, 1888. Serial No. 284,548. (No model.)

*To all whom it may concern:*

Be it known that we, EDWIN REYNOLDS, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, and BRUNO V. NORDBERG, a citizen of the Grand Duchy of Finland, residing at Milwaukee, Wisconsin, have invented certain new and useful Improvements in Brakes, of which the following is a specification.

Our invention relates to brakes designed more especially for hoisting machinery, but equally applicable to other uses, and has reference more particularly to that class of brakes in which the force used is applied by means of a weight.

The invention consists in the combination, with such a brake mechanism, of a fluid-actuated piston arranged, substantially as hereinafter shown and described, to release the brake and to return the weight to its normal position.

The invention further consists in various other combinations and details, hereinafter referred to and claimed.

In the drawings, Figure 1 is a view showing our invention applied to the brake mechanism of a hoisting-machine; Fig. 2, a sectional view, on a larger scale, of the actuating mechanism; Fig. 3, a view illustrating a slight modification of the invention due to the use of an inelastic in lieu of an elastic fluid; and Figs. 4, 5, and 6 detail views.

A indicates a stand or support carrying an upper cylinder, B, and a lower cylinder, C, the said cylinders being provided, respectively, with pistons D and E, mounted upon a rod, F, projecting above and below the cylinders B and C. The upper cylinder, B, is provided with a valve, G, which is so made that it will put both ends of the cylinder in communication with each other whenever it is moved from its closed position. This cylinder is filled with oil or similar fluid, and is designed to serve as a cushion or buffer and to prevent the piston from being carried beyond the proper point, as hereinafter referred to.

The valve G is provided on its exterior with an arm, *a*, which is connected by a rod or link, *b*, with an arm, *c*, of the valve H of the lower cylinder, C, as shown in Fig. 1. This lower

cylinder, C, is adapted to receive steam in one end only, the other end being open, as at *d*, Figs. 1, 2, and 4, to permit the escape of steam.

In Fig. 5 the valve is shown in such position as to permit the escape of steam from beneath the piston E, while in Fig. 6 the valve is in such position as to admit steam beneath the piston, it being of course understood that steam is admitted only to the lower side of the piston.

I indicates a hand-lever pivoted at 1 to frame A, and pivotally connected at 2 by means of a rod, *e*, to a second lever, J, pivoted at a point, *f*, between its ends to one end of arm *a* of valve G, the opposite end of the lever J being connected at 3 to a rod or link, *g*, which in turn is connected with the upper end of the piston-rod, as shown in Figs. 1 and 2.

As the valves G H are connected together and with the piston-rod, it follows that the hand-lever and the piston-rod correspond to and follow each other in their movements.

K K indicate guides or ways secured to the frame A, and adapted to receive a weight, L, connected at its lower end by means of a link, *h*, with a lever, M, pivoted at one end to the lower end of the piston-rod, the opposite end of the lever being pivotally connected by means of a link, *i*, with a block, *j*, secured to the floor or to the frame A, as shown in Fig. 1. The lever M is also connected with the operating-rod N of the brake mechanism. It is not necessary to describe in detail the brake mechanism, for the reason that it forms, *per se*, no part of the present invention, and may be varied as desired without in any way affecting our invention.

In Figs. 1 and 3 of the drawings we have shown the invention as applied to the post-brake of a hoisting-machine; but it is obvious that it may be applied to a hand-brake or to any other form of brake.

The operation of the device is as follows: Suppose the hand-lever is moved in such direction that the point 2 moves downward. Then the lever J will swing from the point 3 as a fulcrum, and consequently as the arm *a* of valve G is connected to the lever at *f* this point or connection will also move downward. As the valves G and H are connected and move



simultaneously, and as the valve G is opened by the movement of lever J, above referred to, of course the valve H will also be opened and steam admitted to the cylinder beneath the piston. As the valve is made with practically no lap, these actions occur almost simultaneously, the piston instantly beginning to ascend under the pressure of the entering steam, thereby raising that end of lever J connected with the rod and swinging said lever slightly about the point or connection 2 as a fulcrum. The tendency of this action is to close the valves, and of course as soon as the valves are closed the piston stops. Now if the hand-lever be moved in the opposite direction the valve H will be thrown into the position represented in Fig. 5, to permit the escape of steam from the cylinder, and as the steam thus escapes from beneath the piston the weight, which is now free to fall, acting through the lever M, applies the brakes. The oil in the cylinder B on opposite sides of the piston D prevents the momentum of the pistons and weight from carrying the pistons beyond their proper positions, and it will be observed that as both valves close simultaneously the incompressible fluid in the cylinder B will cause the piston to stop at the instant the valve is closed.

The brake can be operated without much exertion, may be applied and removed quickly, while the force of the brake may be varied as desired. It will also be seen that the brake may be applied even if the steam should be cut off, and will remain on, no matter whether there be a steam-supply or not.

There are various other contrivances by means of which the movements of the valves and pistons may be controlled, and consequently we do not wish to be understood as limiting ourselves to the mechanism here shown.

In the construction shown in Fig. 3, in which an inelastic fluid is employed to raise the weight, only one cylinder C and one valve H are employed, the oil-cylinder and attendant parts being unnecessary.

Having thus described our invention, what we claim is—

1. In combination with a brake, a weight, a

a single-acting cylinder, a piston, a valve, a hand-lever, and intermediate connections, substantially such as shown, for causing the piston to follow the motion of the hand-lever.

2. In combination with a brake, a weight, a fluid-cylinder provided with a piston, a valve to control the admission and emission of fluid, a second cylinder provided with a piston and containing an inelastic fluid, and a piston-rod common to both pistons.

3. In combination with a brake, a weight, a fluid-cylinder and piston, a valve therefor, a second cylinder provided with a piston and containing a fluid, a valve for said cylinder, a piston-rod common to both pistons, and a connection between the two valves.

4. In combination with a brake, a weight, a single-acting cylinder provided with a piston adapted to release the brake, and a cushion, arranged substantially as shown, to counteract the momentum of the piston and weight.

5. In combination with a brake, a weight, a cylinder and piston adapted to release the brake, a valve for controlling the admission to and exhaust from said cylinder, a second cylinder provided with a piston and with a valve adapted to connect opposite ends of the cylinder, a piston-rod common to both pistons, a rod or link connecting the valves, a hand-lever, and intermediate connections between the hand-lever and the valves and pistons, all arranged substantially as shown, whereby the movements of the hand-lever and piston are caused to correspond.

6. In combination with a brake, a weight, a cylinder and piston to release the brake, a valve to control the admission and discharge from the cylinder, a hand-lever, and connecting-gear between the hand-lever and valve, whereby the movements of the hand-lever and piston are made to correspond, substantially as shown.

In witness whereof we hereunto set our hands in the presence of two witnesses.

EDWIN REYNOLDS.  
BRUNO V. NORDBERG.

Witnesses:

OTTO PUPIKOFER,  
GEO. G. PHILLIPS.