No. 798,286. PATENTED AUG. 29, 1905.

H. J. KIMMAN.

HOIST BRAKE.

APPLICATION FILED OCT. 10, 1904.

2 SHEETS—SHEET 1.

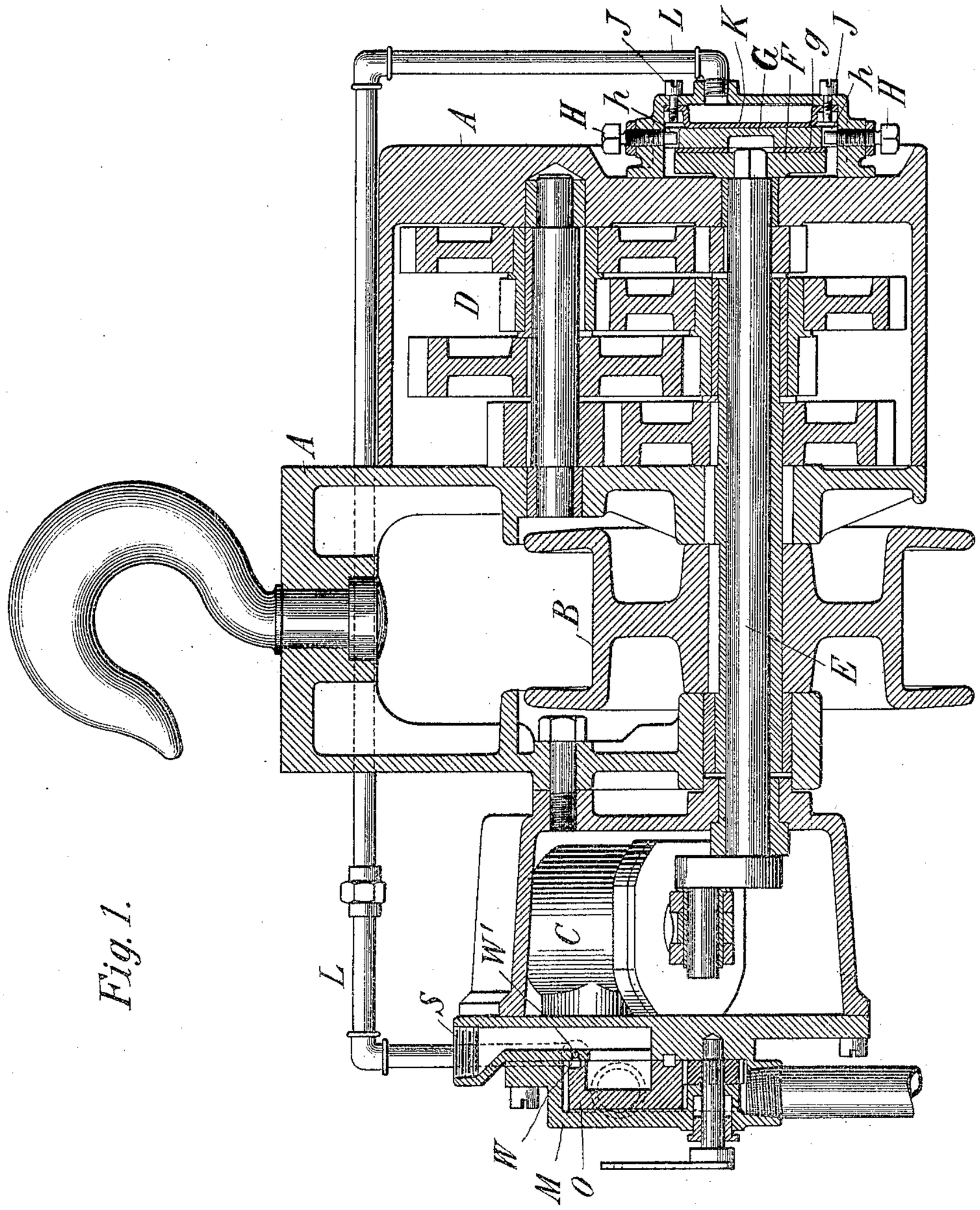

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 3.

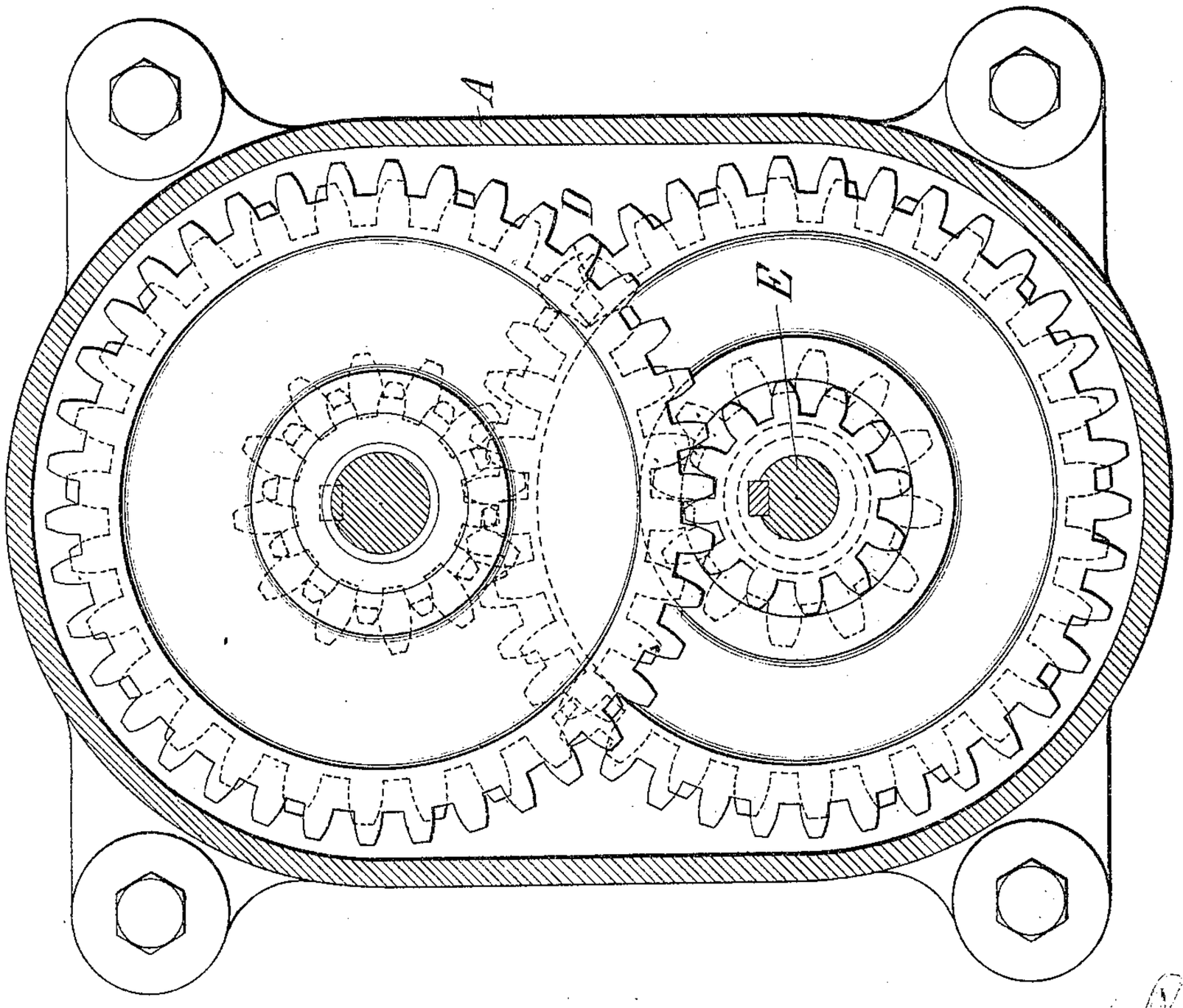
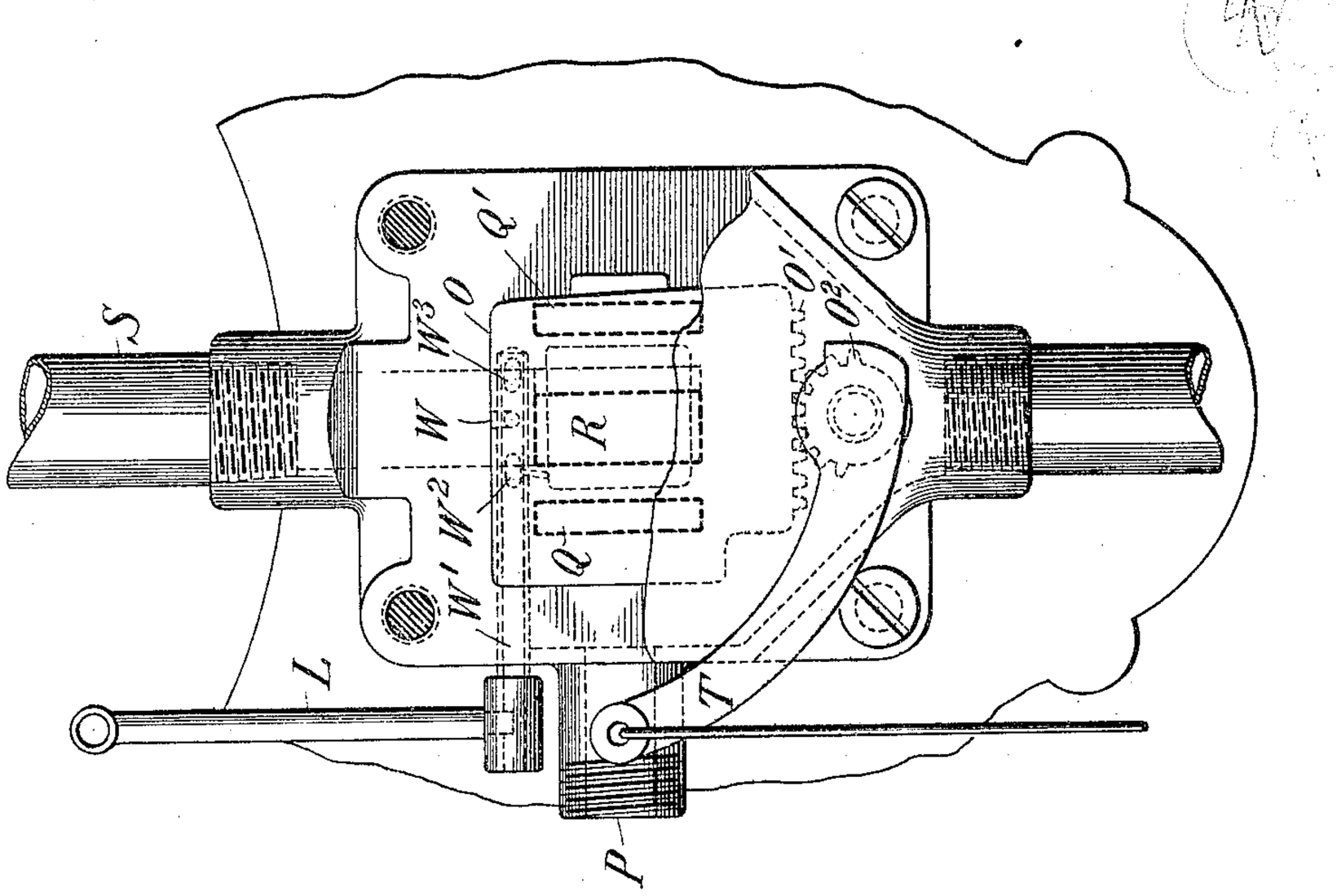


Fig. 2.



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UNITED STATES PATENT OFFICE.

HENRY J. KIMMAN, OF CLEVELAND, OHIO, ASSIGNOR TO CHICAGO PNEUMATIC TOOL COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

HOIST-BRAKE.

No. 798,286. Specification of Letters Patent. Patented Aug. 29, 1905.

Application filed October 10, 1904. Serial No. 227,803.

To all whom it may concern:

Be it known that I, HENRY J. KIMMAN, a citizen of the United States, residing at Cleveland, county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Hoist-Brakes, of which the following specification and accompanying drawings illustrate one form of the invention which I now regard as the best out of the various forms in which the invention may be embodied.

In the drawings, Figure 1 is a longitudinal section of a hoist equipped with my invention. Fig. 2 is an end elevation of the controlling means, partly in section; and Fig. 3 is a transverse section through the gearing.

My invention relates to pressure-operated hoists, especially those in which compressed air is the operating medium, and involves means for the automatic application of the pressure-brake when the pressure-supply is cut off from the operating-motor.

Turning to the drawings, A is the housing of a hoist, B is the winding-drum, C is the operating-motor, and D is the gearing between the motor-shaft E and the drum B. On the end of the motor-shaft E is secured a brake-disk F, against which a brake-shoe G is applied whenever it is desired to stop the mechanism. The brake-shoe may be provided with a facing of leather *g*, if so desired. The brake-shoe G is guided in its movement by screws H H, inserted from the outside, with their inner ends resting loosely in guide-grooves *h h* in the periphery of the shoe. The backward play of the brake is limited by the screws J J. The brake-shoe G is secured to the inside of a flexible diaphragm K, in the rear of which the fluid-pressure may be admitted through a pipe L. When the pressure is applied to the rear of the diaphragm, it serves to force the brake-shoe G into close contact with the brake-disk F, and so stop the machine. The pipe L leads back to the controlling and reversing valve, which in its movement uncovers a port leading into the said pipe when it is in position to shut off the air from the motor. When, however, it is in either its forward or backward position to give the motor either a forward or backward direction of rotation, the valve will close the port which communicates with the said pipe L to cut off the pressure therefrom and at the same time put the said pipe in communication with the atmosphere to release the pressure previously existing therein.

M is the chest containing the sliding valve O and is in communication with the source of pressure-supply, which enters by the pipe P. The said chest also communicates with the two terminal ports Q Q′ of the engine, Fig. 2, and with a port R, leading to the exhaust-pipe S. The valve O is reciprocated by any desirable means—as, for example, by a rack O′ engaging a pinion O^2 on the shaft of an operating-lever T—and when in one of its extreme positions it puts the terminal port Q in communication with the exhaust-port R, leaving the port Q′ in communication with the valve-chest, and in its other extreme position it puts the latter port Q′ in communication with the exhaust and the former port Q in communication with the valve-chest, thereby reversing the direction of movement of the motor. In the intermediate position (shown in Fig. 2) it shuts off the exhaust-port R, leaving both of the terminal ports Q and Q′ in communication with the valve-chest. This stops the motor, the pressure being equalized at both of its terminal ports, and air-flow thereby prevented by reason of the lack of any effective or unbalanced pressure.

Turning to the sectional view of valve O appearing in Fig. 1, it will be seen that in the upper right-hand corner thereof there is cut a notch W, which when the valve is in the intermediate position admits the pressure from the valve-chest into an opening W′, extending horizontally through the wall of the housing and communicating with the pipe L. By this means the intermediate position of the valve will admit pressure to the said pipe and through it to the rear side of the diaphragm K, carrying the brake-shoe G. When, however, the valve is in either of its extreme positions, the notch W is moved out of coincidence with the port of the passage W′ and one or the other of the two chambers W^2 W^3 comes over the said port and puts it into communication with the exhaust-pipe S. This serves to release the pressure in pipe L and in consequence the pressure upon the brake. Each of the chambers W^2 and W^3 is in communication with the central chamber of the valve, which at all times is in communication with the exhaust-pipe S, so that whicheyer one of them happens to be over

the port leading to the pipe L serves to put that pipe into communication with the exhaust. By this means the supply-pipe L, leading to the brake, is connected alternately to the pressure-supply and to the exhaust, while the operating pressure is admitted alternately to the motor and to the brake, the respective pipes to the brake and to the motor being branches from the main supply, into which branches the air flows alternately.

It will be understood that the details of this apparatus may be widely varied without departing from the essential spirit of the invention, which I illustrate by the particular construction I have shown and described herein.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a hoist operated by fluid-pressure, of a pressure-brake therefor, a supply-pipe for the motor of the hoist, a branch connection leading to the brake, an exhaust-pipe, a valve-chest containing three motor-ports, two of them terminal ports and the third an exhaust-port, a valve connecting the exhaust-port to the two terminal ports alternately, and means for admitting pressure to the brake when the said valve is in its intermediate position.

2. The combination with a hoist having a rotary motor, gearing and drum, of a brake-disk therefor, a brake-shoe connected to a flexible diaphragm forming one wall of a pressure-chamber, and means for admitting pressure to and exhausting it from the said chamber.

3. The combination in a hoist, of a fluid-pressure motor, a drum, gearing between the motor-shaft and drum, a brake-disk on the motor-shaft, a brake-shoe for said disk, an expansible pressure-chamber having its movable part connected to said shoe, a branch connection leading to said chamber from the main pressure-supply, and a common controller for the motor and the brake.

4. The combination, in a hoist, of a fluid-pressure motor, a drum, gearing between the motor-shaft and the drum, a brake-disk, a brake-shoe concentric with said disk, a diaphragm connected to said shoe and means for admitting pressure to the rear of said diaphragm.

5. The combination, in a hoist, of a fluid-pressure motor, a drum, gearing between the motor and drum, a brake-disk connected to a diaphragm covering a pressure-chamber, a valve-chest having ports leading both to the motor and to the said chamber and having also an exhaust-port, a valve for alternately exhausting the motor and the said chamber, and an operating device for said valve provided with a handle on the outside of said chest.

6. The combination, in a hoist, of a drum, a motor and gearing, with a brake-disk on one end of the motor-shaft, a brake-shoe concentric therewith, guides for said shoe, a movable diaphragm to which the shoe is connected covering a pressure-chamber, a valve-chest, a pipe connecting said chest and chamber, a communication leading into said chest from the main pressure-supply, a valve in the chest and means outside of said chest for manually operating said valve.

7. The combination in a hoist, of a drum, a motor, gearing between the drum and motor, a brake-disk on one end of the motor-shaft, a coöperating non-rotative brake-disk, a pressure-chamber having a flexible diaphragm forming one of its walls and exerting pressure on said non-rotative brake-disk to set the brake, a supply-pipe having a branch leading to said chamber, and valve mechanism controlling both the motor and said branch.

8. The combination in a hoist, of a drum, a motor, gearing between the drum and motor, a brake-disk on one end of the motor-shaft, a coöperating axially-shiftable non-rotative brake-disk, a brake-casing, adjustable studs mounted on said casing and engaging the edge of said non-rotative disk to keep it from rotating, a pressure-chamber having a flexible diaphragm forming one of its walls and exerting pressure on said non-rotative disk to set the brake, a supply-pipe having a branch leading to said chamber, and valve mechanism controlling both the motor and said branch.

In witness whereof I have hereunto set my hand, before two subscribing witnesses, this 16th day of September, 1904.

HENRY J. KIMMAN.

Witnesses:
A. P. SCHMUCKER,
M. MILLARD.