C. R. OTIS.

Improvement in Steam-Hoisting Apparatus.

No. 131,895. Patented Oct. 1, 1872.

Fig 2.

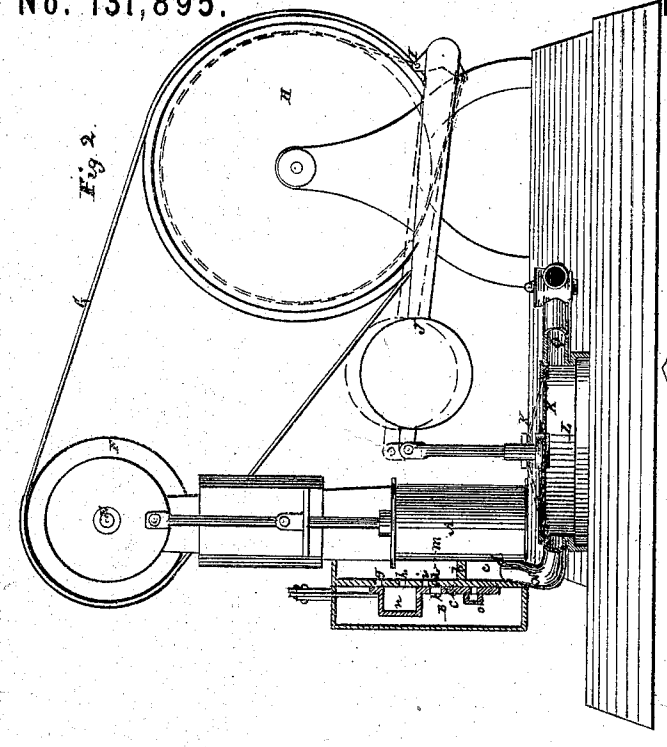
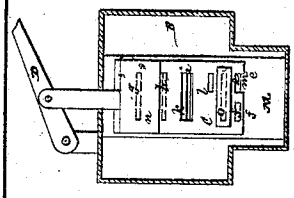


Fig. 5.



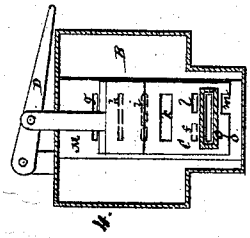


Fig 4.

Fig 1.

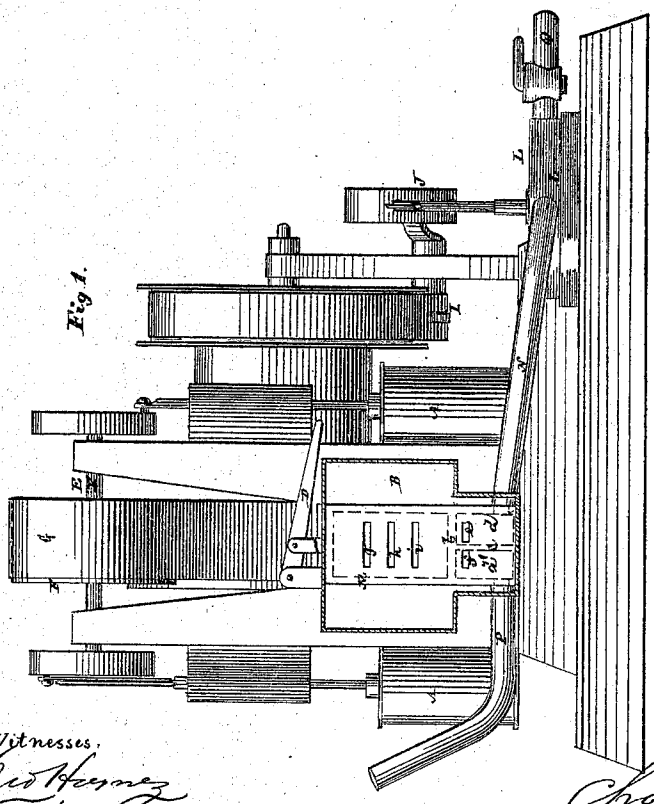
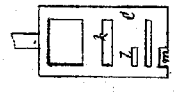


Fig. 6.



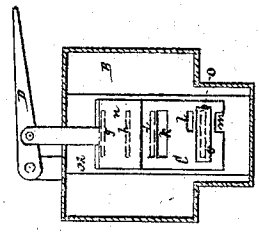


Fig 3.

Witnesses.

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Charles R. Otis

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Attorneys

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

UNITED STATES PATENT OFFICE.

CHARLES R. OTIS, OF YONKERS, NEW YORK.

IMPROVEMENT IN STEAM HOISTING APPARATUS.

Specification forming part of Letters Patent No. **131,895**, dated October 1, 1872.

CASE G.

To all whom it may concern:

Be it known that I, CHARLES R. OTIS, of Yonkers, in the county of Westchester and State of New York, have invented a new and useful Improvement in Steam Hoisting Apparatus; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents a rear elevation of a steam hoisting apparatus having my improvement applied, and with the cover of the steam-chest and valve operating therein removed; Fig. 2, a partly sectional side elevation of the same; Figs. 3, 4, and 5 are rear views of a stop and reversing valve within the steam-chest of the engine, together with ports or passages controlled by it for stopping or reversing the motion of the engine, and for simultaneously releasing or applying a brake—said views showing the valve in different positions; and Fig. 6 is a face view of said valve detached.

Similar letters of reference indicate corresponding parts throughout the several figures of the drawing.

This invention relates to means whereby a brake applied to the hoisting-drum is brought or permitted to come into operation by the act of closing the stop-valve of the engine which drives the hoisting apparatus, and is thrown out of operation by the act of opening such valve to admit steam to the engine, irrespective of the direction in which the latter is required to travel. To this end the invention, generally, consists in a combination, with the brake of a steam hoisting apparatus, of an elastic diaphragm, controlled by the steam, for actuating or releasing the brake by the motion of the valve that stops, starts, and reverses the engine, and so that when the engine is started in either direction of its travel the brake is released, and when steam is shut off from the engine the brake is applied. In the accompanying drawing the brake is shown as operated by a weight, and as being released from action by the pressure of the steam upon an elastic diaphragm connected with the brake; but this order of things may be reversed—that is, a weight be used to throw off the brake, and steam, acting on the elastic diaphragm, be employed to apply it; or by admitting steam alternately, or, as required, to both sides of the elastic diaphragm, steam pressure may be used to both apply and release the brake. The stopping, starting, and reversing valve, and the ports or passages controlled by it, may accordingly be variously constructed to attain the desired result.

A A represent the cylinders of a double-cylinder engine, and B its steam-chest, fitted with a stopping, starting, and reversing valve, C, which may be actuated by a hand-lever, D, and which is independent of the regular induction valve or valves of the engines, although controlling the supply of steam according to the direction in which the engine is required to run. E is the engine-shaft, having a pulley, F, on it for giving motion by a belt, G, to the hoisting and lowering drum H. I is a brake applied to the drum H, and operated by a weighted lever, J. Said brake is released by pressure of the steam as applied to a flexible diaphragm, K, which is suitably connected with the weighted lever J for the purpose, and covers a steam chamber or cylinder, L. The stopping, starting, and reversing valve C is arranged so as to be capable of sliding up and down or over a raised seat, M, in the steam-chest B. Said seat, which is hollow, has its lower portion divided by horizontal and vertical partitions *b c* into chambers *d d'*, communicating with which, through the face of the seat, are ports *e f*. The upper portion of the raised hollow seat M may contain the induction valve or valves, and is provided with ports *g*, *h*, and *i*, the upper and lower ones, *g* and *i*, of which control, respectively, the run of the engine in its two directions of travel, while the center passage *h* communicates with the exhaust. The valve C has ports or passages *k*, *l*, and *m*, through it, and cavities *n o*. When the valve is in the position represented in Fig. 3, then the ports *g* and *i* are closed against the admission of steam to drive the engine in either direction, and the engine is stopped. Communication also is then established between the

chambers *d d'* by the cavity *o* in the valve C and the ports *e f*, to pass steam by a pipe, N, from the diaphragm-chamber L to and out through an exhaust-pipe, P. This allows of the weighted lever J to drop and apply the brake to the hoisting-drum. When, however, the valve is shifted to the position shown in Fig. 4, or to that represented in Fig. 5, then one or other of the ports *g i* will be open to admit steam from the chest B to work the engine forward or backward, as required, and at the same time the cavity *o* will be out of line with the ports *e f*, and the port *l* or the port *m* will be brought over the port *e*, whereby steam is admitted along the pipe N to the chamber L, and the diaphragm K raised by the pressure of the steam, to release the brake. Q is a pipe, fitted with a cock, for drawing off water of condensation from the chamber L.

As hereinbefore observed, the valve C may be variously constructed, and it may be limited to stopping, starting, and reversing the engine, and a distinct valve be used for passing the steam to and from the diaphragm K. Furthermore, as in some hoisting-engines the induction and eduction valves themselves are made to serve as reversing-valves; by a sidewise or other movement of them, the use of a separate reversing-valve may be dispensed with. In other of such engines, again, a supplementary valve, in direct connection with the induction and eduction valves, is used to effect reversal of the engine. Hence, the control of the diaphragm K to apply the brake when the engine is stopped, and to release it when the engine is started in either direction of its travel, may be variously effected. Its operation, as described, might, in fact, be accomplished by connecting the diaphragm-chamber L with passages between the induction-valve and the cylinder of the engine.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The combination of the flexible diaphragm K with the brake of a steam hoisting apparatus, substantially as and for the purposes described.

2. The combination of the flexible diaphragm K and brake of a steam hoisting apparatus with the valve for stopping, starting, or reversing the engine, essentially as specified.

CHAS. R. OTIS.

Witnesses:

JAS. HENDERSON,

JOHN H. LOCKWOOD.