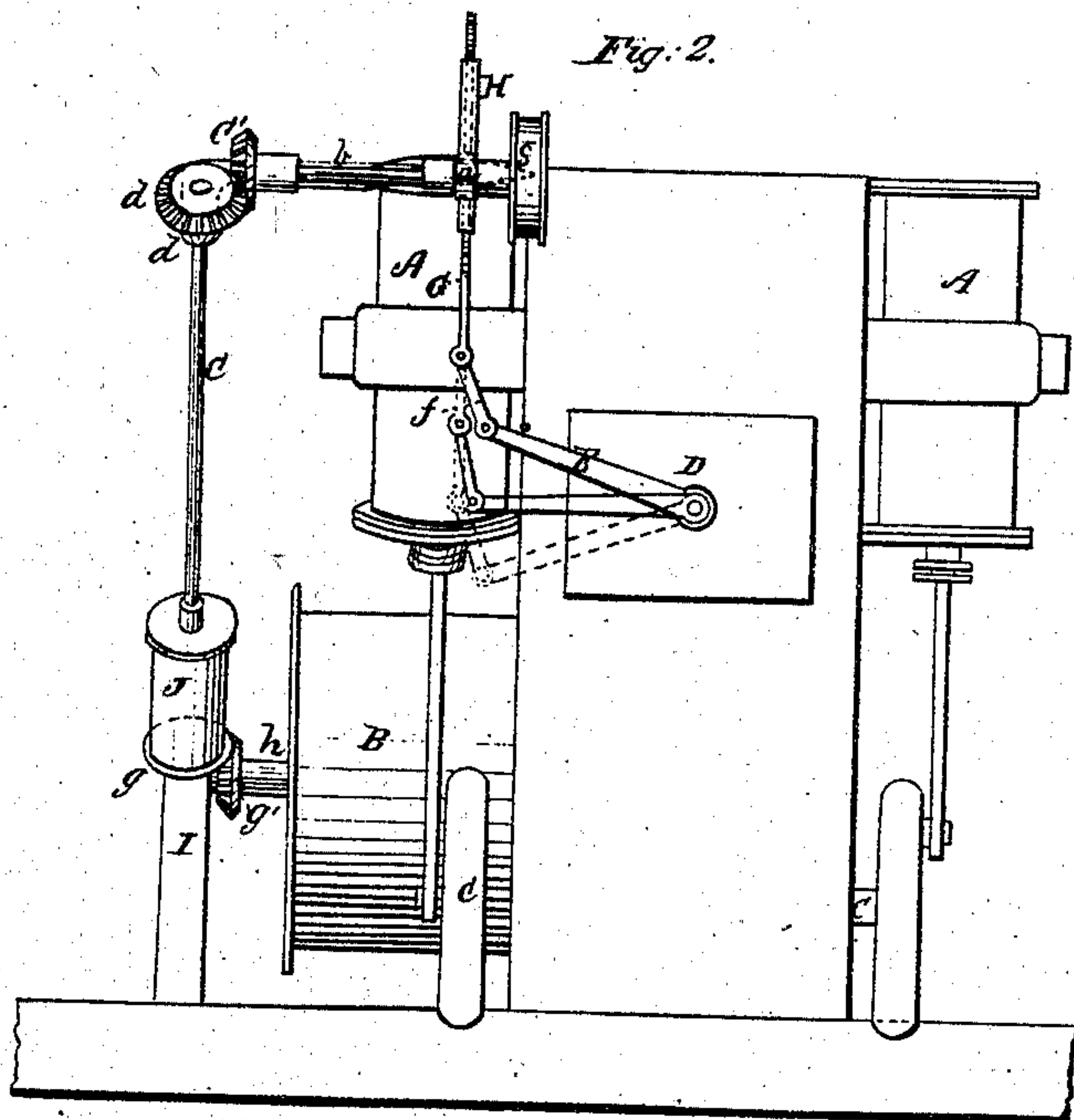
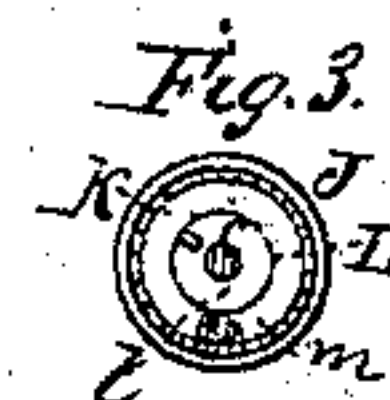
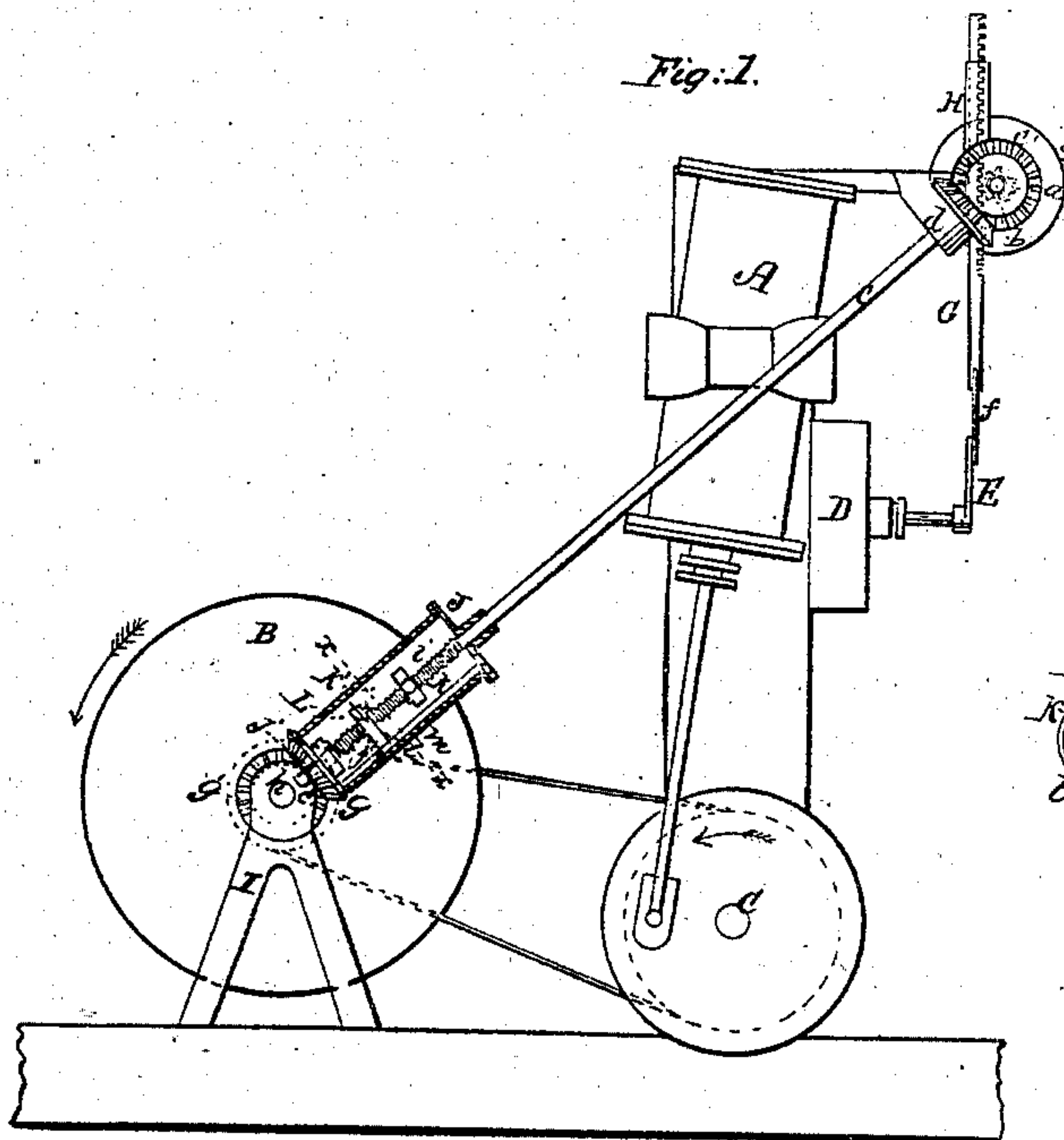


C.R. Otis,
Steam Hoisting Apparatus,
No 47,773,
Patented May 16, 1865.



Witnesses:
J.W. Crambs
G.W. Reed.

Inventor.
Chas. R. Otis

UNITED STATES PATENT OFFICE.

CHARLES R. OTIS, OF YONKERS, NEW YORK, ASSIGNOR TO HIMSELF AND
NORTON P. OTIS, OF SAME PLACE.

IMPROVEMENT IN STEAM-HOISTING APPARATUS.

Specification forming part of Letters Patent No. 47,773, dated May 16, 1865.

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 drawings, forming a part of this specification, in which—

Figure 1 is a side elevation of the engine and main drum of a steam-hoisting apparatus with my invention applied. Fig. 2 is a front elevation of the same. Fig. 3 is a transverse section of the stopping and reversing device in the plane indicated by the line *x x* in Fig. 1.

Similar letters of reference indicate corresponding parts in both figures.

The object of this invention is to effect the automatic stoppage of the engine of a hoisting apparatus on the arrival of the platform at the top or bottom of the hoistway or at any given point in the height thereof, either in the ascent or descent, or on the hoisting-drum having made a given number of revolutions in either direction; and it consists in a novel and very simple device whereby this result is effected.

To enable others to make and apply my invention, I will proceed to describe it with reference to the drawings.

A A represent the cylinders of a double engine used for driving the main drum *B* of the hoisting apparatus by a belt from a pulley on the crank-shaft *C*. *D* is a steam-chest, common to both cylinders, and containing a valve of any known or suitable kind by which steam may be shut off from the engine or admitted in such manner as to produce the revolution of the crank-shaft in either direction, according as it may be desired to raise or lower the platform or load. *E* is the lever for working the said valve (shown in Fig. 2) in three positions, the middle position being that in which the valve is closed to stop the engine, the upper one being that in which the valve is opened to produce the revolution of the crank-shaft *C* and drum *B* in the directions indicated by arrows in Fig. 1 for raising the hoisting platform or load, and the lower one being that in which the valve is opened to produce the revolution of the crank-shaft and drum in the

opposite direction for lowering the platform or load.

The lever *E* is connected by a link, *f*, with a toothed rack, *G*, which works in a fixed upright guide, *H*, attached to the framing of the engine, and which gears with a pinion, *a*, on a horizontal shaft, *b*, which works in fixed bearings attached to the said framing. This shaft *b* is geared at its upper end by a pair of bevel-gears, *c' d'*, with a shaft, *c*, which works in a fixed bearing, *d*, attached to the engine-framing and a bearing at *e* in one of the standards *I*, which contains the bearings of the hoisting-drum. The said shaft has upon its lower part a clutch-box, *J*, of cylindrical or other form, which is fitted to turn freely upon it, but prevented from moving lengthwise of the said shaft; and this clutch-box is geared by a pair of bevel-gears, *g g'*, with the shaft *h* of the main drum *B* of the hoisting apparatus. The portion of the shaft *c* within the clutch-box *J* has a screw-thread, *i*, on its exterior. At the bottom of this screw-thread there is firmly secured to the said shaft one piece, *j*, of a clutch, and on the upper part of the said thread there is firmly secured to the said shaft one piece, *k*, of another clutch. Between the clutch-pieces *j* and *k* there is fitted to turn on the screw-thread *i* a double clutch-piece, *L*, on the lower surface of which there is a tooth, *j'*, to engage with the clutch-piece *j*, and on the upper surface of which there is a tooth, *k'*, to engage with the clutch-piece *k*; and this clutch-piece *L* has on one side a pin, *l*, which enters and fits to slide easily within a longitudinal groove, *m*, or straight guide in the clutch-box *J*, and compels the said clutch-piece *L* to turn with the clutch-box while permitting it to move lengthwise of the shaft *C* upon the screw-thread *i*.

The operation is as follows: During the hoisting operation, when the drum *B* rotates in the direction of the arrow shown near it in Fig. 1, the bevel-gear *g'*, acting upon the bevel-gear *g*, turns the clutch-box and clutch-piece *L* in the direction of the arrow shown upon the latter, and the said clutch-piece is caused to move upward upon the screw-thread *i* on the shaft *c*, the latter being kept stationary by the friction of the gearing *d' c' a G* until the tooth *k'* of the clutch-piece *L* comes into contact with the tooth of the clutch-piece *k* and turns

the shaft *c*, thereby causing the gearing *d' c* *a* to depress the rack *G* and lever *E*. A few revolutions of the shaft *c* brings the lever *E* to the middle position, (shown in Fig. 2,) and so closes the valve in the chest *D*, and stops the engine and hoisting-drum. When the drum is to be reversed, the lever *E* is further depressed to the lowest position shown in Fig. 2 by the operator pulling a cord connected with a pulley, *s*, on the shaft *b*, and thereby reversing the engine. The clutch-box and clutch-piece *L* then turn in the opposite direction to that first described, the shaft *c* remaining stationary until the tooth *j'* of the clutch-piece *L* is brought by the downward movement of the said piece upon the screw-thread *i* into contact with the tooth on the clutch-piece *j*, when the said shaft is caused to rotate with the clutch-box, and so, by means of the gearing *d' c' a*, to raise the rack *G* and the valve-lever, and bring the latter to the middle position to close the valve and stop the hoisting-drum. When the engine is to be started again for hoisting, the operator pulls the cord attached to the pulley *S*, and so brings the valve-lever to the highest position.

The clutch-pieces *j k L* should have their teeth so constructed as to permit *j* and *k* to turn nearly a whole revolution independently of *L* in order to permit the shaft *c* to turn in-

dependently of the clutch-box when the shaft *b* is turned by pulling the cord attached to the pulley *s*, to start the engine. The gear *g'*, for driving the clutch-box, may be arranged upon any other rotating shaft or counter-shaft of the hoisting apparatus instead of upon the shaft of the main drum.

The clutch-pieces *j* and *k* may be adjustable upon the screw-thread to produce the stoppage of the hoisting-platform at any height in its ascent or descent, or to produce the stoppage of the drum after any number of revolutions.

Instead of the clutch-box being geared with the hoisting apparatus, and the screw-shaft *c* being geared with the valve, the clutch-box might be geared with the valve and the screw-shaft with the hoisting apparatus.

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

Combining the stop-valve of the engine of a steam hoisting apparatus with the shaft *h* of the main drum, or with any other shaft or counter-shaft of the hoisting apparatus, by means of a stop-motion constructed, applied, and operating substantially as herein specified.

CHAS. R. OTIS.

Witnesses:

HENRY T. BROWN,
J. W. COOMBS.