

W. Smith,

Elevator.

N^o 44,895.

Patented Nov. 1, 1864.

Fig. 1.

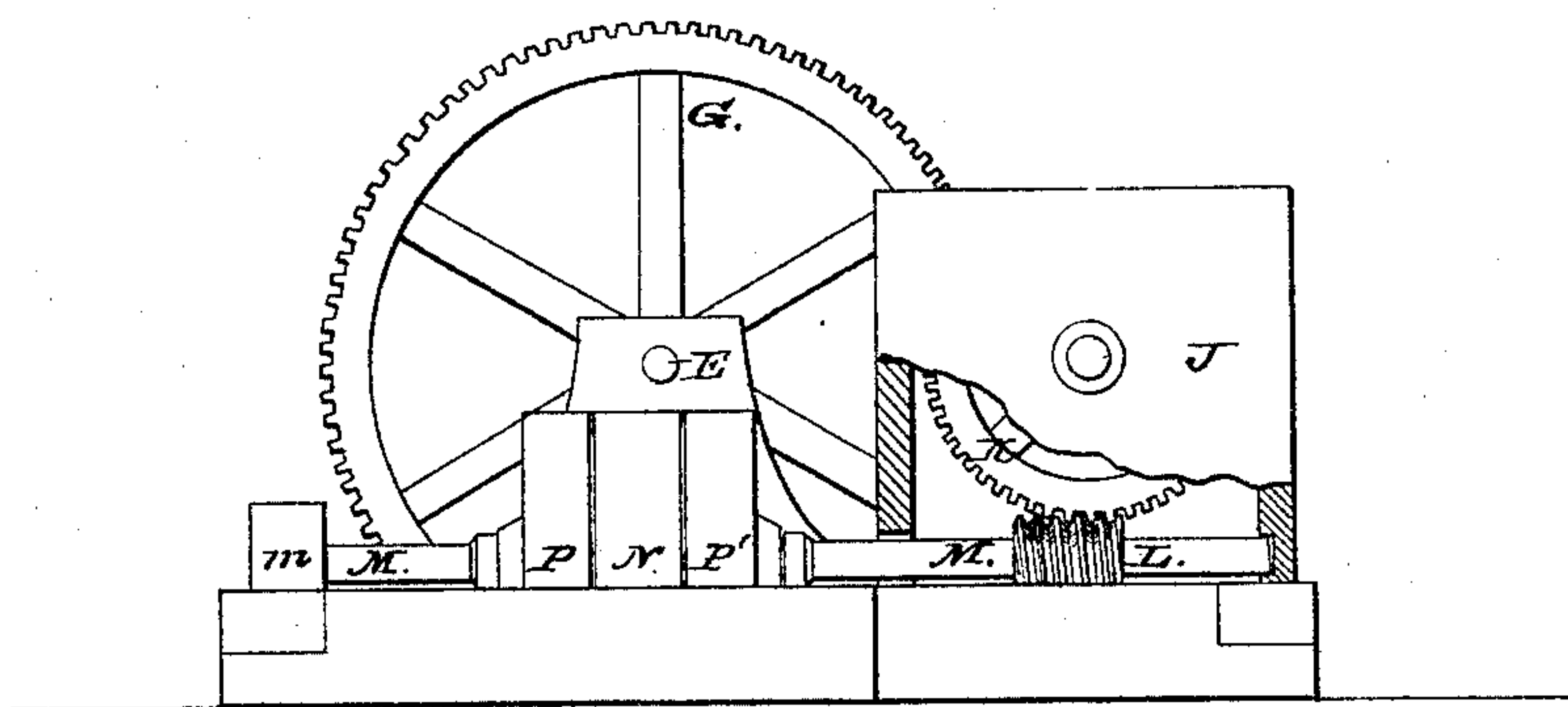
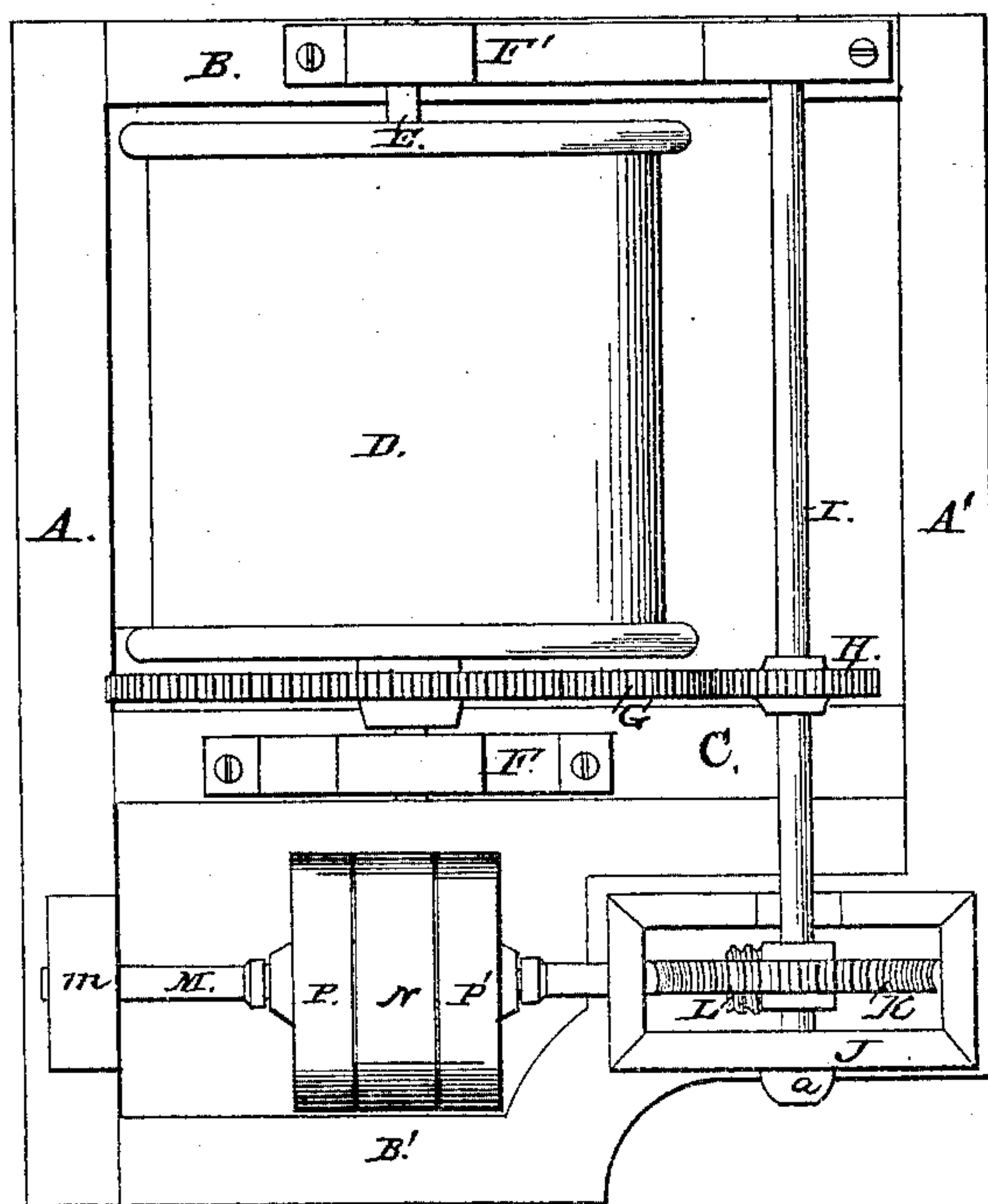


Fig. 2.



Witnesses:
Charles Foster.
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UNITED STATES PATENT OFFICE.

WILLIAM SMITH, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN HOISTING APPARATUS.

Specification forming part of Letters Patent No. 44,895, dated November 1, 1864.

To all whom it may concern:

Be it known that I, WILLIAM SMITH, of Philadelphia, Pennsylvania, have invented an Improvement in Hoisting Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists in the use in hoisting apparatus of an intermediate shaft with a pinion operated from a driving-shaft by a worm and worm-wheel, in combination with a cog-wheel on the hoisting-drum or drum-shaft, as described hereinafter, so that the hoisting apparatus may be of limited dimensions, and not require the use of braking devices to resist the tendency of the drum to turn back in hoisting heavy weights.

In order to enable others to make and use my invention, I will now proceed to describe its construction and operation.

On reference to the accompanying drawings, Figure 1 is an end view of my improved hoisting apparatus, and Fig. 2 a plan view.

The frame-work or foundation of my improved hoisting apparatus is composed in the present instance of the two side pieces, A and A', two end pieces, B and B', and the intermediate cross-piece, C. D is the drum for receiving the hoisting rope or chain, and is secured to a shaft, E, which turns at one end in the standard F, secured to the cross-piece C of the frame, and at the other end in a box or standard F', secured to the end piece, B, of the frame, a cog-wheel, G, being secured to the same shaft near one end of the drum. Into this wheel G gears a pinion, H, on the shaft I, which turns at one end in the frame F', and at the opposite end in a suitable bearing, a, secured to one side of a box, J, which is attached to or forms a part of the frame. Within this box is a worm-wheel, K, which is secured to the shaft I, and into this wheel gears a worm, L, on the shaft M, one end of which turns in the end of the box, the other end turning in a suitable bearing, m, on the frame. On this shaft are the two loose pulleys P and P' and the intermediate fast pulley N, two driving-belts—one straight and the other

crossed—being used in connection with these pulleys in the same manner and for the same purpose of obtaining a reverse motion as similar belts are used in connection with turning-lathes, planing-machines, &c.

The drums of hoisting-machines have been heretofore operated through the medium of worm and worm-wheels, but in all cases the drum has been secured directly to the shaft to which the worm is attached. There are to serious objections to this the ordinary arrangement of gearing for hoisting apparatus: First, it is necessary either to make the drum of smaller diameter, or else to increase the diameter of the worm-wheel to an extent which renders it unweildy in order to obtain the desired power; second, a heavy weight suspended to the hoisting rope or chain is apt to run down when not required, the worm and wheel being insufficient to resist this tendency of the weight to descend; hence it becomes necessary to use some braking apparatus to assist the worm and wheel in resisting the downward tendency of the weight. It is true that by reducing the drum in diameter or by increasing the diameter of the worm-wheel this difficulty might be in a measure obviated, but there are palpable objections to both of these modes of remedying the evil.

If it be determined to increase the diameter of the worm-wheel, the increase must be of such an extent as to render it unweildy and not convenient for adaptation to localities in which the hoisting apparatus has to be situated, and if the drum be decreased in diameter the rope will be injured by short bends, and it will be necessary to make the drum of additional length to take up the desired amount of rope. By the use of a pinion, H, on the worm-wheel shaft, and by causing this pinion to gear into the wheel G or the drum, or drum-shaft, as described, all these difficulties may be obviated. The wheel and pinion afford a leverage proportionate to their respective diameters, which leverage acts directly to resist the tendency of a weight to turn the drum; hence there is no necessity of employing complex and costly braking apparatus. At the same time the drum may be of large diameter and diminished length, the

worm-wheel K being also small in diameter, and in fact the whole apparatus may be of the desirable limited dimensions.

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

The use, in hoisting apparatus, of the intermediate shaft, I, with its pinion H, operated from the driving-shaft by a worm and worm-

wheel, in combination with the cog-wheel G on the hoisting-drum or drum-shaft.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

Witnesses: WM. SMITH.

HENRY HOWSON,

JOHN WHITE.