

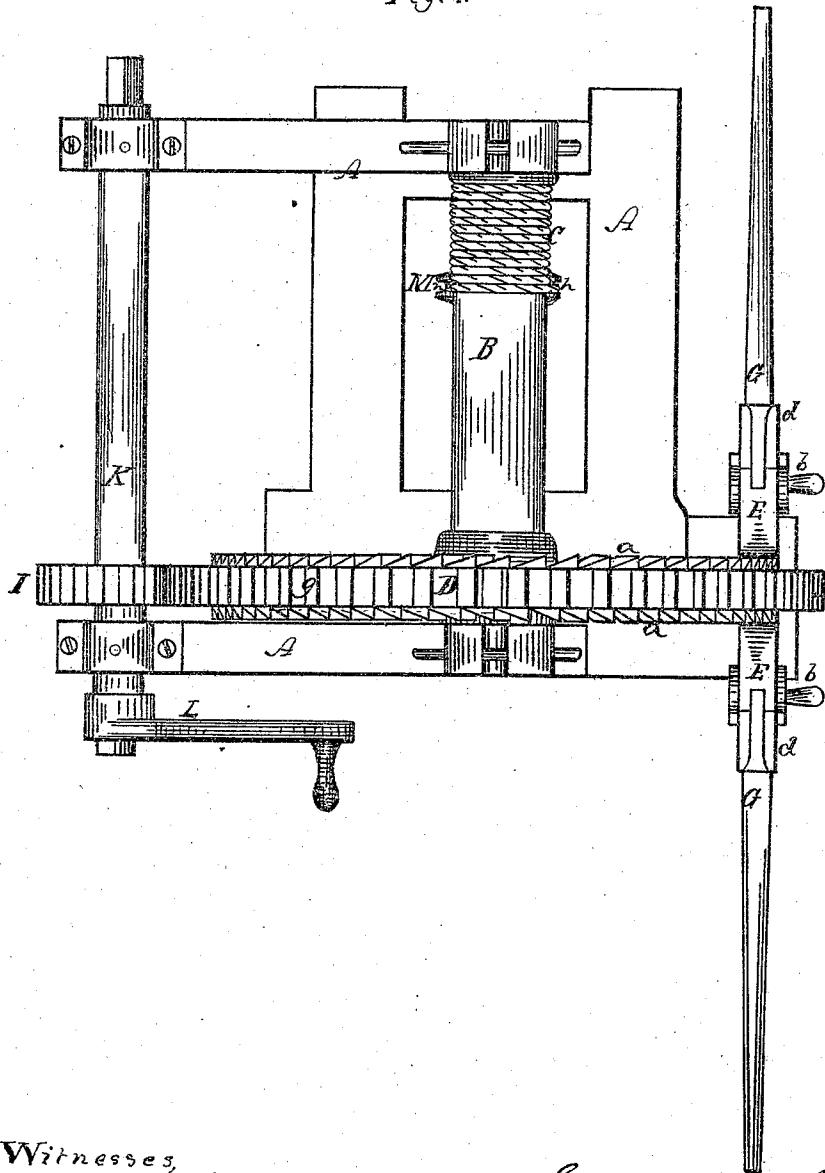
EMERY R. GARD.

Improvement in Hoisting Apparatus.

No. 118,447.

Patented Aug. 29, 1871.

Fig. 1.



Witnesses,
C. P. Mott, C. A. L.

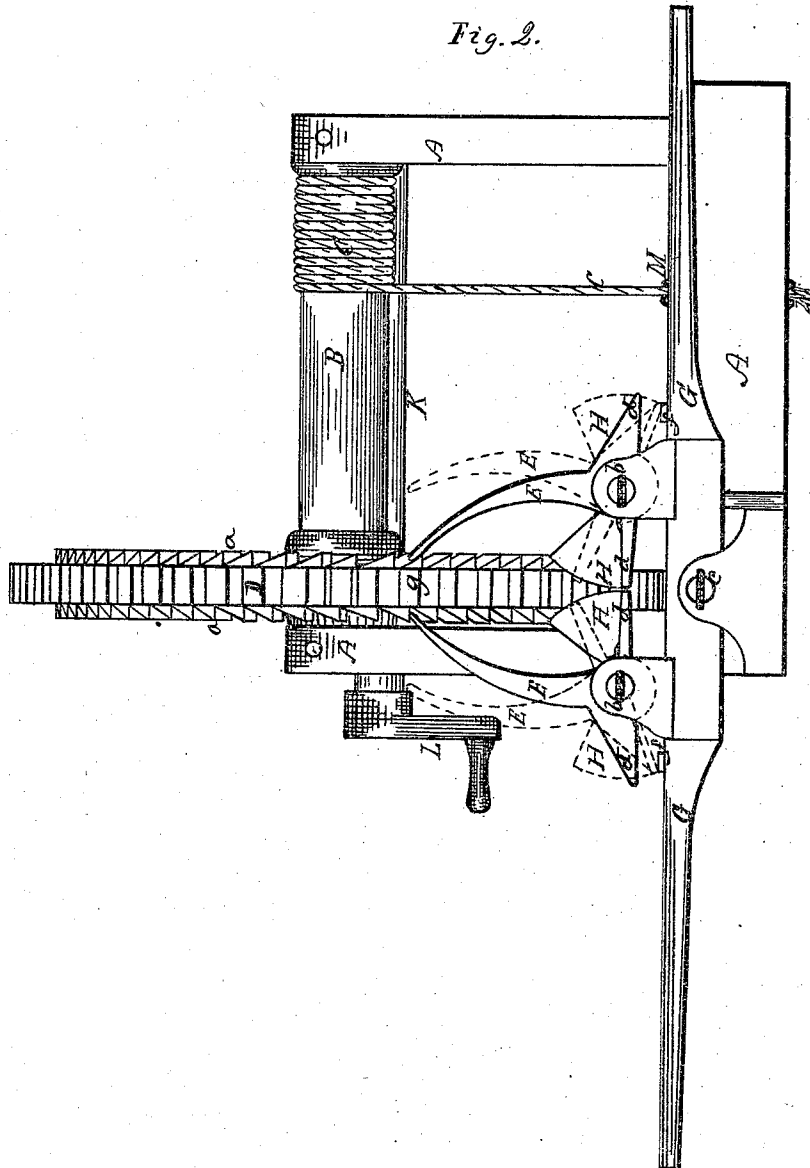
Emery R. Gard,
By his Attorney,
J. S. Brown.

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Witnesses,
C. J. Smith & Co.

Emery R. Gard,
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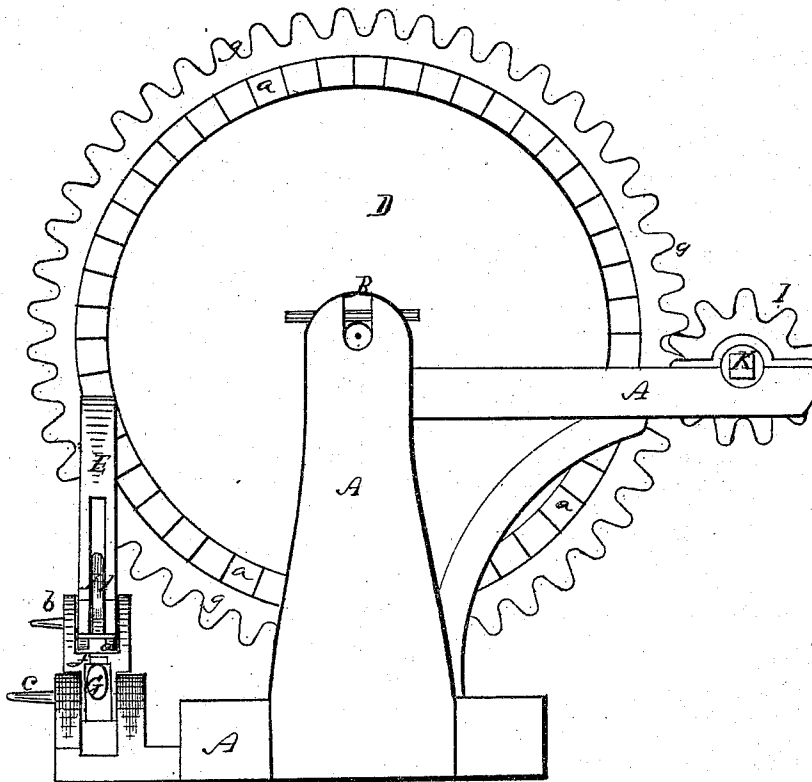
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Fig. 3.



Witnesses,
E. M. H. Egan

Emery R. Gard,
By his attorney,
J. S. Brown.

UNITED STATES PATENT OFFICE.

EMERY R. GARD, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN HOISTING APPARATUS.

Specification forming part of Letters Patent No. 118,447, dated August 29, 1871.

To all whom it may concern:

Be it known that I, EMERY R. GARD, of Chicago, in the county of Cook and State of Illinois, have invented an Improved Hoisting Apparatus; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing making part of this specification—

Figure 1 being a top view of the machine; Fig. 2, a front elevation of the same; Fig. 3, a side elevation thereof.

Like letters designate corresponding parts in all of the figures.

The nature of my invention consists in the several features of improvement hereinafter specified.

Let A represent a suitable frame in which the working parts of the machine are mounted; B, a windlass or winding-shaft turning therein; and C, a hoisting-rope or chain to be wound upon the winding-shaft. First, upon the winding-shaft B I secure a wheel or disk, D, which has two ratchets or sets of ratchet-teeth, *a a*, respectively on its two faces or sides near its periphery, extending around the entire circle. Second, into these ratchets, respectively, two pawls, E E, work, the pawls being pivoted at *b b* to a vibratory double lever, G, pivoted to the frame A at *c*, equidistant between the pivots *b b* of the pawls. The positions of the pivots *b b* are such as to bring the pawls to the ratchets at suitable angles of inclination thereto, and the length of the two long arms of the lever is such in relation to the distance between the respective pivots *b b* and the pivot *c* as to produce any desired leverage in actuating the pawls thereof. Third, each pawl E has a shifting-weight, H, secured to and turning with its pivot *b*, and it has two lateral projections, *d d*, one extending inward and the other outward, on which the weights rest, respectively, whether turned inward, as shown by full lines in Fig. 2, or turned outward, as shown by dotted lines in the same figure. Each pivot *b* has a flattened projection on its front end by which to readily shift the weight with the thumb and finger. When these shifting or reversible weights are turned inward the pawls are held by gravity to the ratchets so as to work therein, and when the weights are turned outward the pawls are by gravity held away from the ratchet so that the ratchet-wheel is free to turn backward. But, fourth, when these pawls are thus turned outward, their outer projections *d d*, respectively,

rest on the lever in such positions that the vibrations of the lever, extended through longer vibrations than in lifting by the pawls, will reverse the motion of the ratchet-wheel and lower the weight. And, fifth, to enable each pawl successively to release itself from the ratchet after it lowers the ratchet-wheel through the extent of its vibration, and the other pawl receives the reacting pressure of the ratchet-wheel, and to prevent breaking the teeth of the ratchets or any part, it is necessary that the latter pawl in each vibration should be allowed to yield a little outward and backward, or downward, by the application of a little further lifting movement at its end of the lever. For this purpose I locate a spring, or elastic block or cushion, *f*, under the outer projection *d* of each pawl where it rests on the lever, the cushion yielding enough to allow the movement required, and yet ordinarily holding the pawl up in its required position. Any equivalent construction or arrangement to effect the purpose may be used instead of the elastic blocks *f f*. These pawls E E, and their shifting-weights H H and elastic blocks *f f*, are all applicable to straight ratchets for simple lifting jacks and analogous uses, and I intend thus to apply them. Sixth, upon the ratchets *a a* I generally employ a set of cog-gearing, *g*, upon the periphery, and a pinion, I, gearing into the same, the said pinion being secured to a revolving shaft, K, mounted in the frame A and provided with a crank or cranks, L, to turn it with. This combined device not only enables the winding-shaft to be readily turned backward for unwinding the rope with comparative speed when no weight is on, but it serves to raise light weights more quickly than with the lever and pawls alone, which are intended for very slow hoisting of very heavy weights. A still more rapid hoisting may be effected by attaching cranks or winches immediately to the winding-shaft B.

This hoisting apparatus is equally applicable to direct hoisting from below, and to indirect hoisting to higher places, as by cranes and derricks. When hoisting from below a self-adjusting friction-pulley, M, receives the rope or chain C in its peripheral groove *h* and traverses a shaft in the frame A.

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

1. The ratchet-wheel D constructed with the two endless ratchets *a a* upon its faces, substantially as and for the purposes herein specified.

2. In combination with the double ratchet-wheel D, the pawls E E and double lever G, arranged and operating substantially as and for the purposes herein specified.

3. The shifting-weights H H, in combination with the pawls E E, operating substantially as and for the purposes herein specified.

4. The springs or elastic blocks *ff* between the pawls E E and lever D, substantially as and for the purpose herein specified.

5. The arrangement of the pawls E E upon the lever G in relation to the ratchet-wheel D so that the vibrations of the lever will reverse the movement of the wheel and lower the weight.

EMERY R. GARD.

Witnesses:

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R. H. WALLACE.