

D. KNOWLES.  
Hoisting-Apparatus.

No. 140,421.

Patented July 1, 1873.

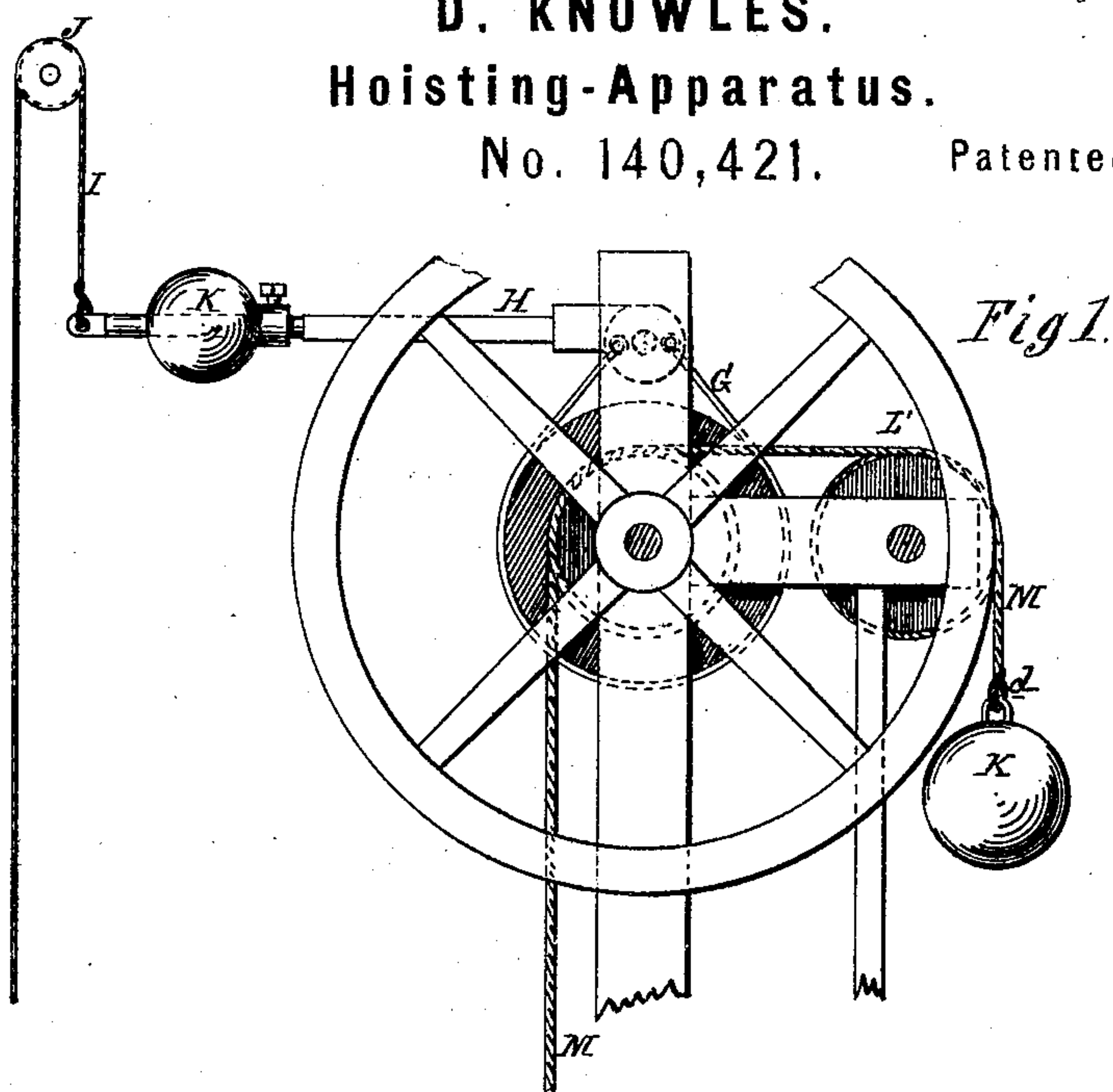


Fig 2

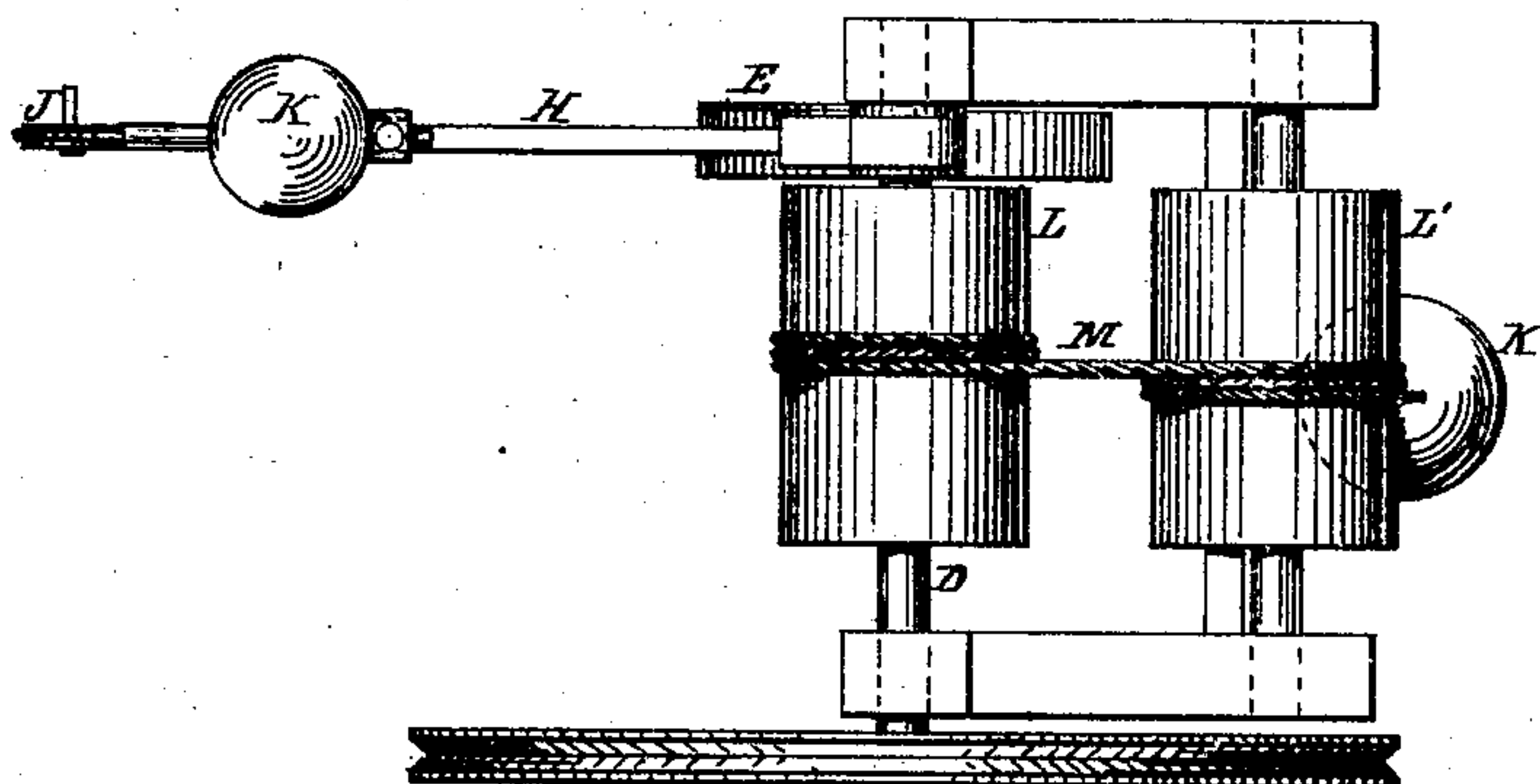


Fig 3

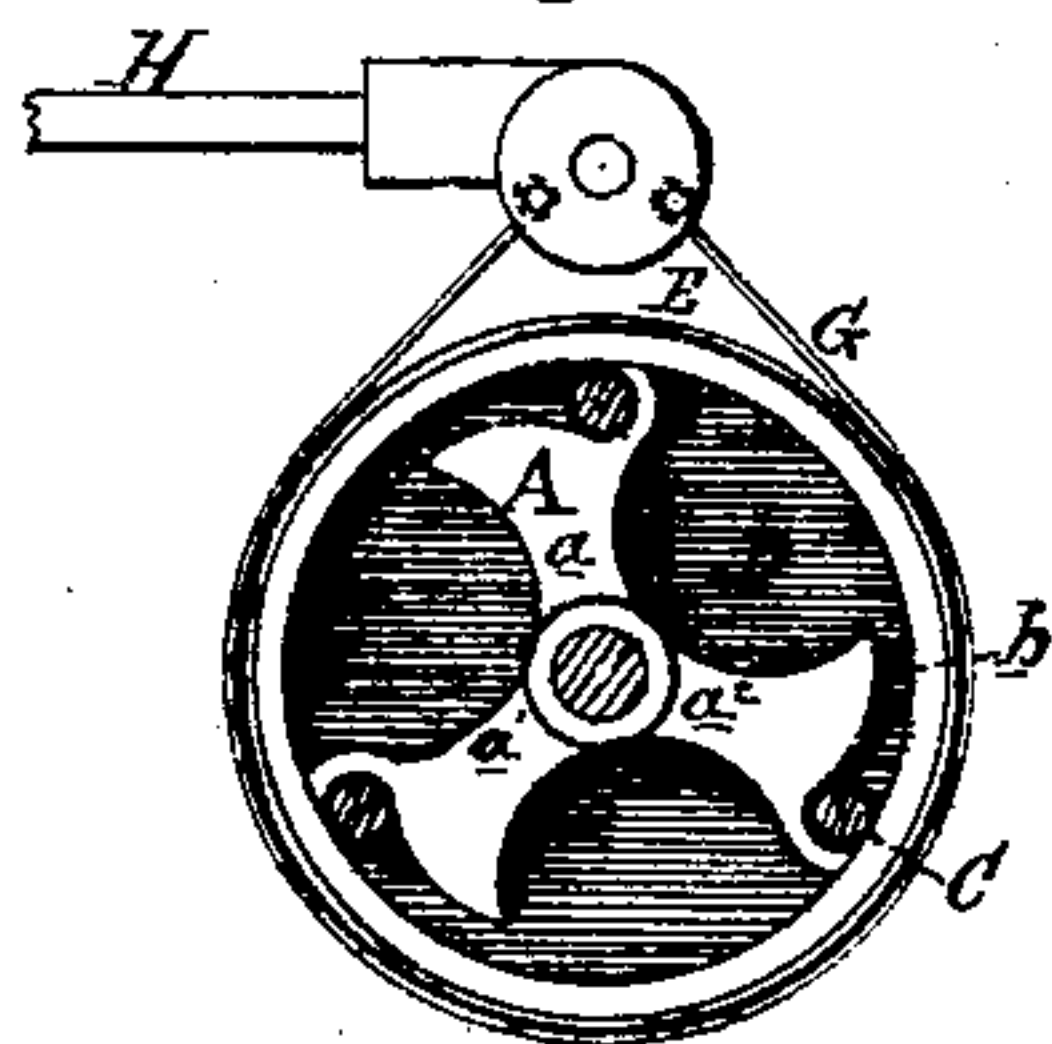
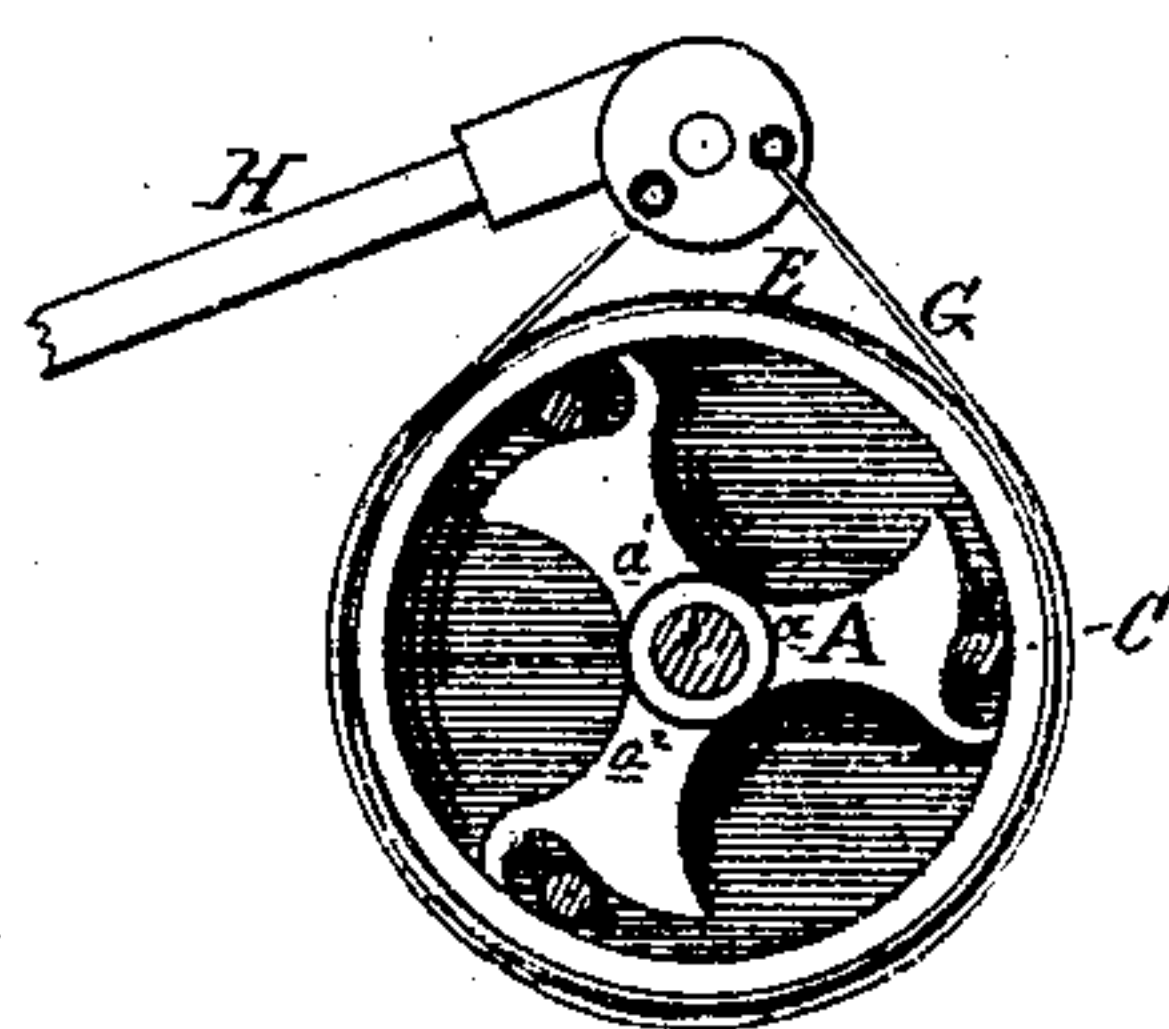


Fig 4



Witnesses.  
Isaac Immens  
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# UNITED STATES PATENT OFFICE.

DAVID KNOWLES, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN HOISTING APPARATUS.

Specification forming part of Letters Patent No. **140,421**, dated July 1, 1873; application filed May 8, 1873.

*To all whom it may concern:*

Be it known that I, DAVID KNOWLES, of the city and county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Hoisting Apparatus, of which the following is a specification:

The first part of my invention consists of a cam-wheel attached to the shaft of the hoisting-drum and operating in unison with friction-rollers within a hollow pulley or case, which is controlled by means of a weighted lever and brake-strap applied to the periphery, the object of which is to arrest the rapid descent of the cage or platform and to gradually and safely lower or hold the same at any point desired. The second part of my invention consists in arranging a supplementary drum to carry the hoisting-rope and to rotate in unison with the drum-proper by means of a weight attached to that end of the rope, which is coiled two or three turns around each drum, the object of which is to prevent the coils of the rope while winding around the drum from riding or passing one over the other, thereby avoiding the wear and chafing of the rope, and at the same time retaining the dependent portion to which the cage is attached at all times in a line as near perpendicular as possible.

Figure 1 is a side view of my invention as applied to a hoisting apparatus. Fig. 2 is a plan view of the same. Fig. 3 is a plan view, showing the interior of the pulley or case and the brake-strap loose from the periphery. Fig. 4 is a plan view of the same, showing the strap tightened on the periphery of the pulley.

The cam-wheel A, Figs. 3 and 4, consists of three or more arms,  $a$ ,  $a^1$ , and  $a^2$ , in the outer edges of each of which is formed a curved recess,  $b$ , in each of which is placed a friction-roller, C. The said cam-wheel is secured to the shaft D and is surrounded by a hollow pulley or case, E, centered loosely upon the shaft, the periphery of which is embraced by a brake-strap, G. The ends of this strap are attached to a lever, H, pivoted to one of the uprights of the framing and operated by a cord, I, passing over a pulley, J, Fig. 1.

When the lever H is raised and retained in a horizontal line, as shown in Figs. 1 and 3, the brake-strap is loose from the pulley, allowing it (the pulley) to revolve freely with the shaft.

In this case the friction rollers or balls C C C remain inactive within the sockets in the ends of the arms of the cam-wheel A, as shown in Fig. 3; but when the end of the lever is depressed by the weight K secured to it the brake-strap is tightened on the pulley, which checks the motion of the pulley and causes the friction rollers or balls to leave the sockets and pass around the curved recesses until they jam sufficiently tight against the rim of the case to hold and prevent the cam-wheel and shaft from turning. The same effect is produced if the lever is raised above a horizontal line.

The hoisting-rope M is coiled two or three turns around the drum L, and leads from thence to the drum L', around which it is also coiled the same number of turns. The dependent end  $d$  is then provided with a counterbalance, K', which moves within a suitable box or casing placed in the wall of the building.

When the apparatus is in motion and the platform ascending the hoisting-rope is wound perfectly parallel and straight from the hoisting-drum to the drum L' by means of the descending counterbalance K', the gravity of which equals the weight of the cage. By this arrangement of a supplementary drum the coils of the rope are prevented from riding over and abrading one another.

In lowering the cage the rope passes from the drum L' to the hoisting-drum in the same manner, the weight in this case keeping the rope sufficiently taut to guide it straight and even while passing from drum to drum.

The drum L' is made of the same length as the drum L, to compensate for any lateral movement of the rope, thereby retaining it at all times in a parallel position.

I do not wish to broadly claim a friction-retaining brake or stop apparatus as applied to a hoisting-machine, as I am aware that a brake wheel and strap has been used in cranes and other hoisting-machines; and that a pulley controlled by a brake and connected with the shaft by a pawl-and-ratchet device is shown in the patent of Joseph Moore, granted May 7, 1867; but

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

1. In combination with the pulley E and brake-strap G, the cam-wheel A composed of

the arms  $a$ ,  $a^1$ , and  $a^2$ , the extremities of which are provided with recesses to accommodate the friction rollers or balls C C C, which operate to bind within the pulley and arrest the motion of the shaft, when the brake-strap is tightened on the pulley, substantially as herein shown and described.

2. In combination with the hoisting rope and drum proper of a hoisting apparatus, the sup-

plementary drum  $L'$  and counterbalance  $K'$ , arranged to carry and guide the hoisting-rope, to prevent wear and chafing of the same, substantially in the manner as herein set forth and shown.

DAVID KNOWLES.

Witnesses:

ISAAC TOWNSEND,  
ISAAC R. OAKFORD.