

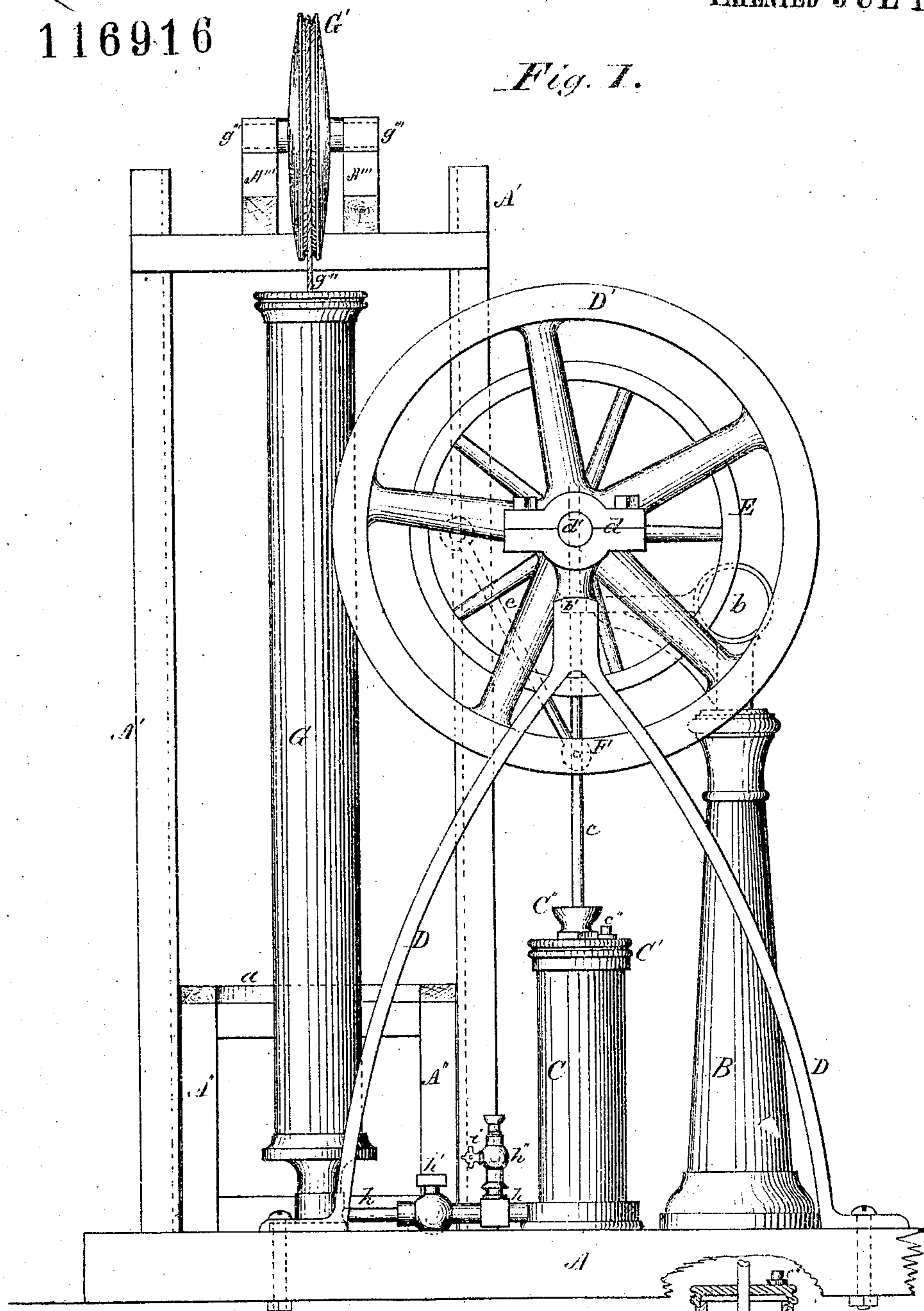
*J. R. Anderson & P. C. Harlan.*

*Impt. in Hoisting Machine.*

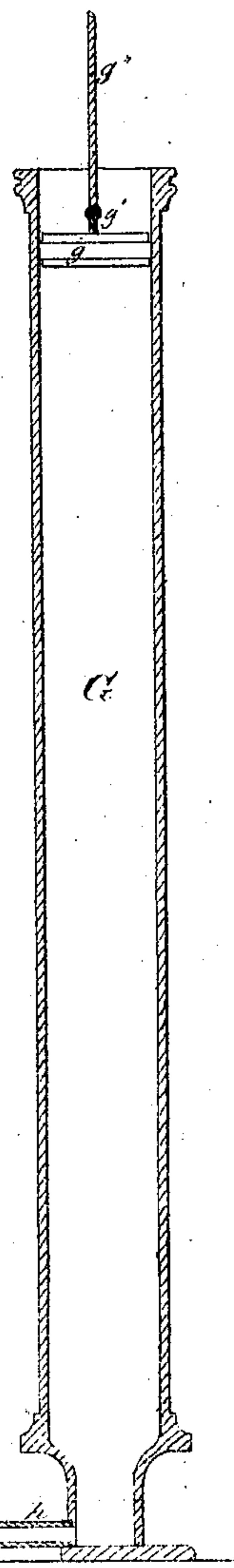
PATENTED JUL 11 1871

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*Fig. 1.*



*Fig. 2.*



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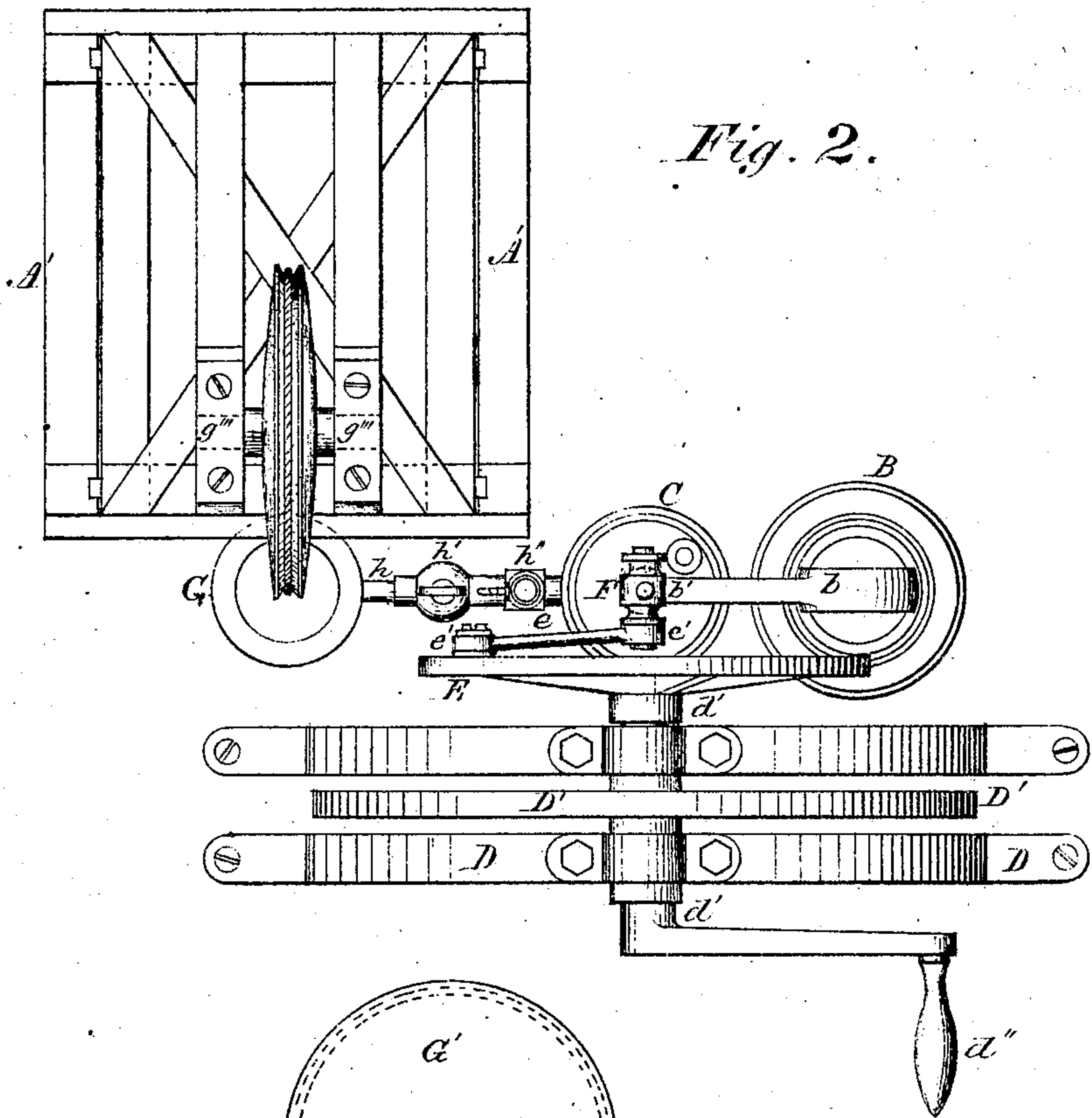
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*Atty.*

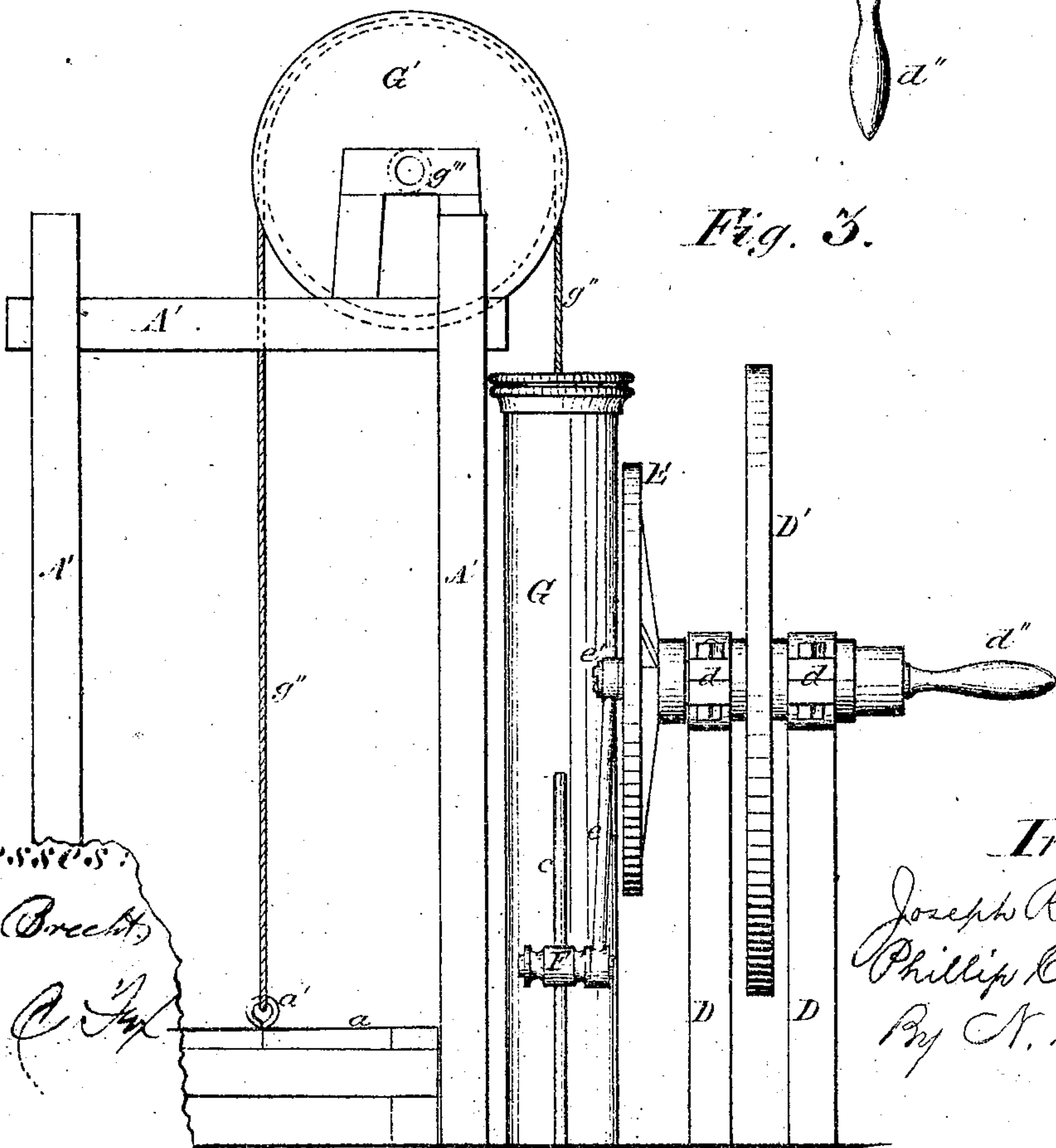


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*Fig. 2.*



*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

JOSEPH R. ANDERSON AND PHILLIP C. HARLAN, OF FREEPORT, PENNSYLVANIA.

## IMPROVEMENT IN PNEUMATIC HOISTING-MACHINES.

Specification forming part of Letters Patent No. 116,916, dated July 11, 1871.

*To all whom it may concern:*

Be it known that we, JOSEPH R. ANDERSON and PHILLIP C. HARLAN, of Freeport, in the county of Armstrong, in the State of Pennsylvania, have invented certain Improvements in Hoisting-Machines, of which the following is a specification:

The object of this invention is to furnish those in want a machine that is cheap, light, easily operated and managed, that is perfectly safe, and that can be transported with facility from place to place, and will occupy but little space; and it consists in the construction and arrangement of the several parts, and their relation to the actuating power and the hoisting-staging or platform.

In the drawing, Figure 1 is an upright side view of the machine. Fig. 2 is a top view. Fig. 3 is a side view at right angle with view in Fig. 2; and Fig. 4 is an upright sectional view of the air-pump, the air-cylinder, valves, connecting-pipe and cocks.

A is a platform or floor that sustains the whole machine. A' is an upright framing in which the hoisting-platform *a* is made to slide vertically. A'' is a frame underneath of and supports the platform *a*, and surmounting the framing A' is a frame, A''', that supports the axle of a pulley. B is a post or upright that supports a horizontal arm. *b* is a horizontal arm made fast in the top of post B and projecting in a direction to have a piston-rod freely reciprocate in a vertical hole, *b'*, in its end, and thereby preserve the parallel position of the piston-rod in its reciprocations. C is the cylinder of the exhaust-air pump, having cap C' on its top, securely packed so as to make it air-tight on the cylinder when attached thereto. On the top of cap C is an oil-cup, C'', and in which is an opening for the piston-rod *c* to freely slide in, as is usual and common. Also, on cap C, is an exhaust or discharge-opening, *c'*, for the free discharge of air. *c'* is the piston-rod, which is made to reciprocate in the cylinder of the air-pump, and has the ordinary escape-valve to freely pass the air that is forced through it in its downward reciprocation, while in its upward or reverse reciprocation the valve, being closed, forces the air that has previously passed through to be discharged through the exhaust-opening *c'* in cap C'. *c''* is a flap-valve at the lower end of the pump-cylinder, and opens into a horizontal tube, *h*, having valve-seat and opening *c'''*. D D are the legs

of two supports, their feet firmly bolted to the platform A, and are spread wide apart at their feet, uniting at their top ends, where they sustain the bearings of axle *d'*. *d d* are boxes in which axle *d'* revolves, and are supported by the legs D. D' is a fly or balance-wheel, secured to axle *d'*, and revolves with the axle. *d''* is a crank or winch-handle, attached to axle *d'*, by which the axle may be revolved. E is a crank-wheel, also fast on and revolves with axle *d'*. *e* is a connecting-rod attached to crank-wheel E by the crank-pin *e'*. F is a connecting-block by which the rod *e* is connected to the piston-rod *c*; and by the revolution of wheel E a reciprocating motion is given to the piston-rod *c* through rod *e* and its block F. G is an upright air-cylinder, of such size or diameter as may be necessary in order to get the required pressure of the atmosphere to raise what is desired, with its base resting upon and fastened to the platform A. On the side toward the air-pump, and at the bottom of cylinder G, is a connecting-pipe, *h*, which has a direct communication with cylinder C, and to which it is connected by an air-tight joint, as it is at its other end to cylinder G. Between the cylinders C and G, and inserted in the connecting-pipe *h*, is stop-cock *h'*, and by turning which the communication between the air-cylinder G and pump-cylinder C is cut off, or by opening the cock free communication is had. *h''* is an open-mouthed pipe for the admission of air into cylinder G through pipe *h*, and is provided with a stop-cock, *i*, jointed into pipe *h*, so that the orifices in the two pipes are open to each other, and when the stop-cock *i* is closed, no air can be received into cylinder G through pipe *h''*. G' is a pulley, made fast on axle *g'''*, and revolves in bearings in a frame, A''', that is mounted on frame A', and is grooved on its periphery so as to admit a rope or chain, *g''*, to pass over the pulley and in said groove. *g* is a valve within the bore of cylinder G, and is fitted to be air-tight, and yet can easily slide up or down within it, and has one end of the rope or chain *g''* attached by an eyebolt or other device, *g'*, thereto, while the rope or chain goes over the grooved pulley G, and its other end is made fast to the platform or stage *a* by means of eyebolt *a'*. The platform *a* is made to rise with what is placed upon it by the pressure or weight of the atmosphere upon a valve that slides within a cylinder, having the air in the



cylinder on the opposite side of the valve exhausted, causing a vacuum, or partial vacuum, as may be desired to exist, which enables it to raise the same weight (less the weight and friction of the parts) that the atmospheric pressure would be upon the valve in cylinder G, the size of which must always be proportioned to the weight the machine is required to raise, as in no instance will it raise more than fifteen pounds to the square inch of the pressure surface of the valve *g*, less the friction.

When the machine in all its parts is ready for operation, with what is to be raised placed upon platform *a*, the crank-wheel E is revolved by means of the crank-handle *d''* on shaft *d'*, or by any power at command, which may be horse, steam, water, or other motive power that will give to piston-rod *c* and piston *c'* a reciprocating movement in the cylinder C; the stop-cock *h'* in pipe *h* being open, and stop-cock *i* in open pipe *h''* closed, the air in cylinder G below valve *g* will be exhausted, and as it is so exhausted the pressure of the atmosphere upon valve *g* causes the valve to be depressed in the cylinder, and as it is forced down the rope or chain that is attached to it and the platform, passing over pulley G', will be acted upon, and the platform and what is upon it will be raised as fast as the air in cylinder G is so exhausted. The height at which the platform rises is governed by the height of the air-cylinder G, which can be of any desired length or height to answer the occasion; but it is not necessary to hoist the platform to its full capacity when it is not needed, for the platform, and what is being raised upon it, can be arrested at any point of its upward reciprocation, by simply stopping the air-pump from exhausting the air in cylinder G below valve *g*, or by turning the stop-cock *h'* so as to stop the pipe *h* from communicating with cylinder G, or by opening the stop-cock *i* in pipe *h''*, and letting the air pass into cylinder G through pipe *h*. The de-

scend of the platform can also be arrested at any point in its descent by turning the stop-cock *h'* to cut off the ingress of air into the cylinder G through pipes *h* and *h''*, or it can be governed in its motion by opening stop-cock *i* in pipe *h''*, and open stop-cock *h'*, more or less, as may be desired. The ease and certainty with which the platform and what it has upon it can be made to ascend or descend, and be controlled or completely arrested at any point of its movement, make the machine valuable.

The machine is capable of adaptation to any purpose of raising, whether it be the materials used in the construction of buildings, bridges, elevating the guests in hotels, or generally for purposes of hoisting anything, or in almost any situation.

We lay no claim to the air-pump of itself for exhausting the air, as that is in use for other purposes.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The air-pump C and its operating parts, in combination with the pipe *h* and its inlet-pipe and cock, air-cylinder G, pressure-valve *g*, rope or chain *g''*, pulley G', and platform *a*, constructed and arranged to operate in the manner and for the purpose described.

2. The stop-cock *h'*, in combination with the connecting-pipe *h*, open pipe *h''* having stop-cock *i*, with the air-cylinder G and valve *g*, arranged in the manner and for the purpose described.

3. The hoisting-machine herein described, when composed of the parts recited in the claims above, and they arranged with relation to each other to operate as a whole, in the manner as shown and set forth.

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Witnesses:

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