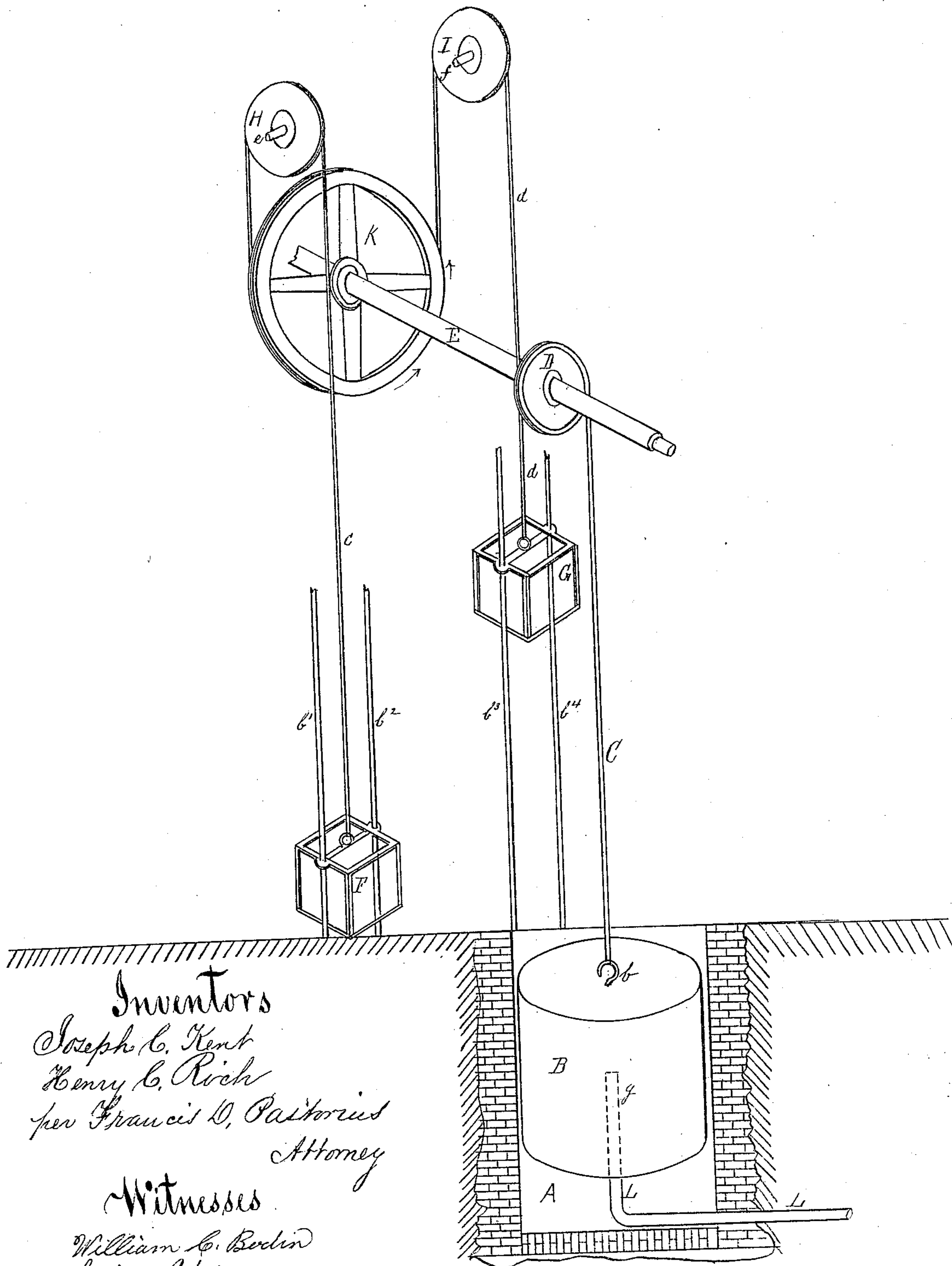


*Kent & Rich,*

*Pneumatic Hoist.*

*No. 102275.*

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*Inventors*

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*per Francis D. Pastorius*  
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*Witnesses*

*William C. Berlin*

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# United States Patent Office.

JOSEPH C. KENT AND HENRY C. RICH, OF PHILLIPSBURG, NEW JERSEY.

Letters Patent No. 102,275, dated April 26, 1870; antedated April 18, 1870.

## IMPROVEMENT IN PNEUMATIC HOISTS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern :

Be it known that we, JOSEPH C. KENT and HENRY C. RICH, both of Phillipsburg, in the county of Warren and State of New Jersey, have invented a Pneumatic Hoist for iron and other smelting works; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing and to the letters of reference marked thereon.

Our invention consists of a pneumatic hoist, the cars or lifting cradles of which are of unequal weights, so that the unloaded heavy car in its descent elevates the light car with its load, and the heavy car and its load are raised to the top of its lift by the descent of a pneumatic chamber or cylinder, aided by the descending light car or cradle.

The accompanying perspective drawing gives the general arrangement and construction of the machinery, the framing being omitted to show the several parts.

A is a well placed at any convenient point of the works; it is walled and cemented to be perfectly water tight; a cylinder, B, open at the lower end and closed at the top, works up and down in this well; a rope or chain, C, has one end fixed to a hook, *b*, of the cylinder and the other end attached to the periphery of the grooved pulley D, on the transverse shaft E of the hoist. F G are stock-raising cars or cradles, on opposite sides of the shaft E; they are guided in raising and lowering by guide-rods, *b*<sup>1</sup>, *b*<sup>2</sup>, *b*<sup>3</sup>, *b*<sup>4</sup>, fixed at top and bottom of the framing. *c* *b* are ropes or chains; one end of each is attached respectively to the cars F G, while the other ends, passing over the grooved pulleys H I, whose axes *e* *f* are at right angles, or thereabout, to and above the shaft E, are attached oppositely on the periphery of the large grooved pulley K on the shaft E. They are of such length that one car is at the bottom while the other is at the top of its lift. The car G is proportionately heavier than the car F, to overbalance and raise it, together with its load, to the point of its elevation. The rope or chain C of the cylinder B, and the rope or chain *c* of the light car, are so fixed to their respective pulleys that they have a simultaneous ascending and descending motion.

A pipe L, from the receiver, blast-pipe, or tapped at any convenient place, is carried into the bottom of the well, turned up in the center of the cylinder B, and brought to within a convenient distance of its top.

The well is filled to the proper depth with water, which rises equally on the outside and inside of the cylinder; the end *g* of the blast-pipe L rises above its level.

The car F being down, as shown, is loaded with stock. On opening the stop-valve of the blast-pipe L, the blast from the blowing engine of the works presses against the top of the cylinder in proportion to its density and the superficial area of the end of it, and causes it to ascend, which relieves the heavy car G of its weight, acting as a counter-balance. As before stated, the weight of the car G is greater than the car F and its load, consequently it overbalances and

raises both in its descent. Its rope or chain *d* unwinds from and turns the wheel K in the direction of the arrow, which winds the rope *c* of the light car F around the same wheel, thereby elevating it. The revolution of the pulley K turns the shaft E and the pulley D of the cylinder B, taking or winding up its rope as it ascends. When the light car arrives at the top of its lift the stop-valve of the blast-pipe is partially closed, and the cylinder B is prevented from descending by the elasticity of the blast, until the car F is unloaded and the car G loaded, when the stop-valve of the blast-pipe L is closed and the escape-valve of the cylinder opened sufficiently to allow the air to escape, and it to descend by its own gravity, without any perceptible concussion. In its descent it turns the shaft E, by means of its rope C and pulley D. The pulley K being on the same shaft winds the rope *d* of the heavy car G, raising it and its load, and unwinds the rope *c* of the light car F, causing it to descend, whereby it assists the cylinder in raising the heavy car and its load, by its weight acting on the pulley K.

The hoist, as shown and described, is simple in design and construction, perfectly free from concussion; the control of its motion is equally perfect in ascending and descending; the friction of its parts is imperceptibly small, no packing being used to create it; and it is the only pneumatic hoist that is perfectly free from blast-escape.

It will take, ordinarily, about three pounds of blast to work the hoist, but it runs with from one to ten pounds of blast to the square inch, according to its density and amount and the superficial area of the end of the cylinder.

We do not claim to be the inventors of the cylinder B in connection with the well A and the blast-pipe L, knowing that they have been used before, where the cylinder performed the office of a carrying platform, the loaded cars being placed immediately on top of it.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. A pneumatic hoist, the relative weights of the cars of which being such that the heavier the car when lowering, unloaded, raises the lighter car and its load, and the heavier car with its load is raised to the top of its lift by the descent of a pneumatic cylinder, aided by the lighter car while lowering.

2. The combination and arrangement of the well A, cylinder B, blast-pipe L, rope C, pulley D, shaft E, and its pulley K, cars F G, with their guides *b*<sup>1</sup>, *b*<sup>2</sup>, *b*<sup>3</sup>, *b*<sup>4</sup>, ropes *c* *d*, and pulley H I, substantially as and for the purpose shown and described.

In testimony whereof we sign our names to this specification in presence of two subscribing witnesses.

JOSEPH C. KENT.  
HENRY C. RICH.

Witnesses:

WM. M. DAVIS,  
A. M. GAW.