

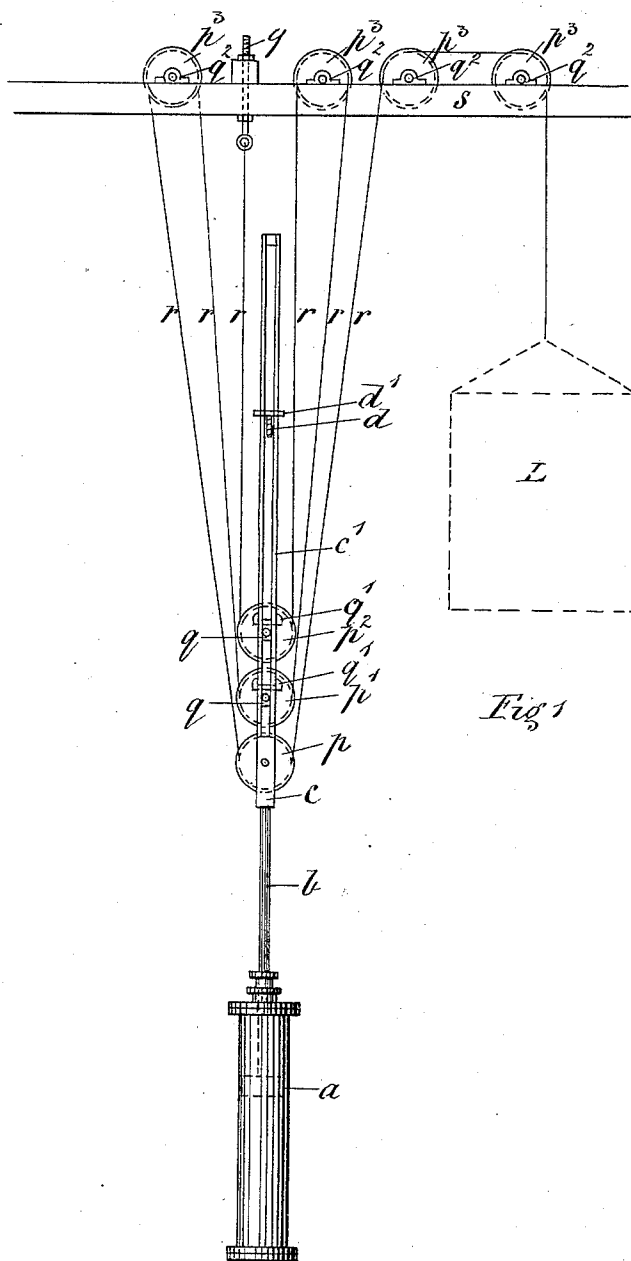
(No Model.)

5 Sheets—Sheet 1.

A. W. D. BELL & J. WELSBY.
ELEVATOR.

No. 469,368.

Patented Feb. 23, 1892.



Witnesses -

Henry Hughes Jr^r

W. E. Hughes

Inventors

{ Arthur Wilbraham & Son Bell
John Wells
per Henry J. Fuller,
attorney.

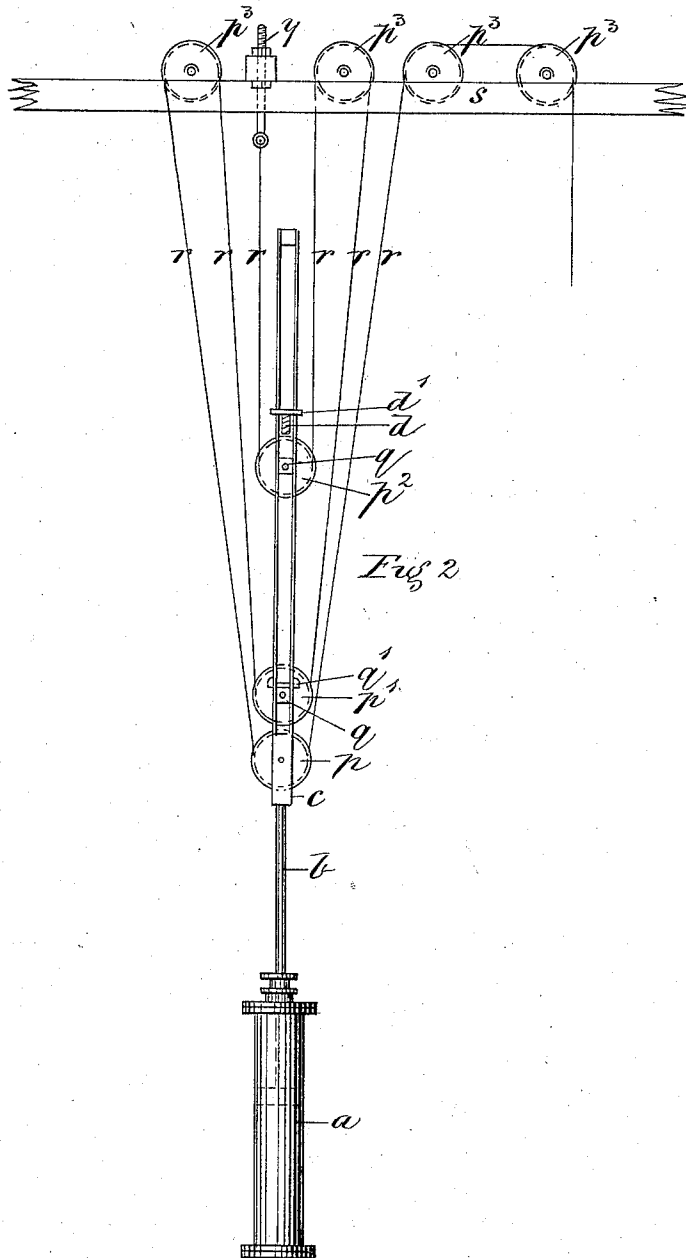
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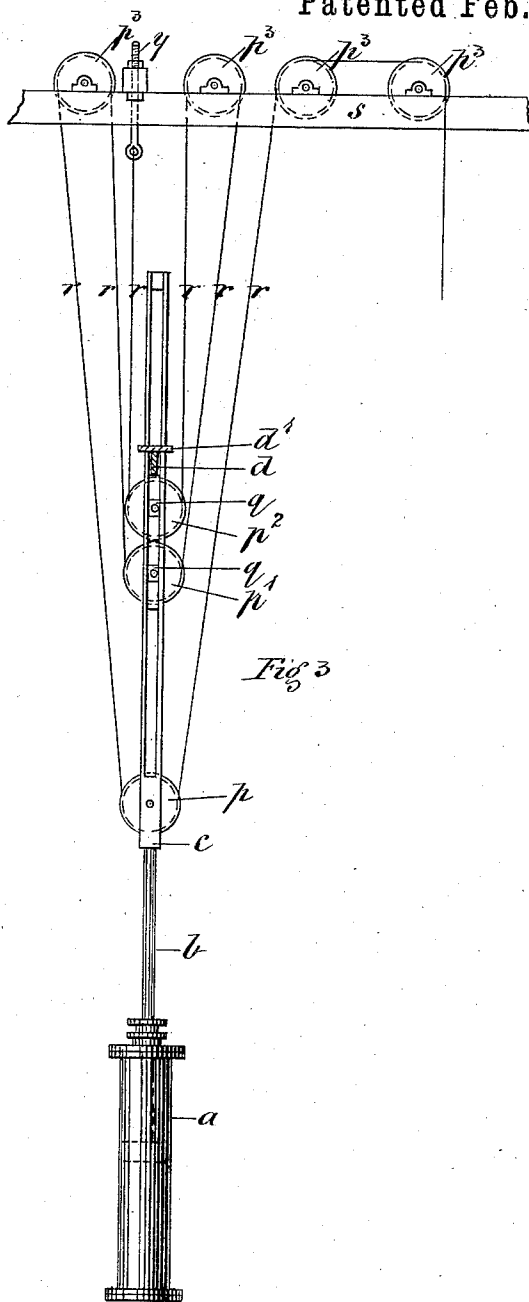


Fig. 3

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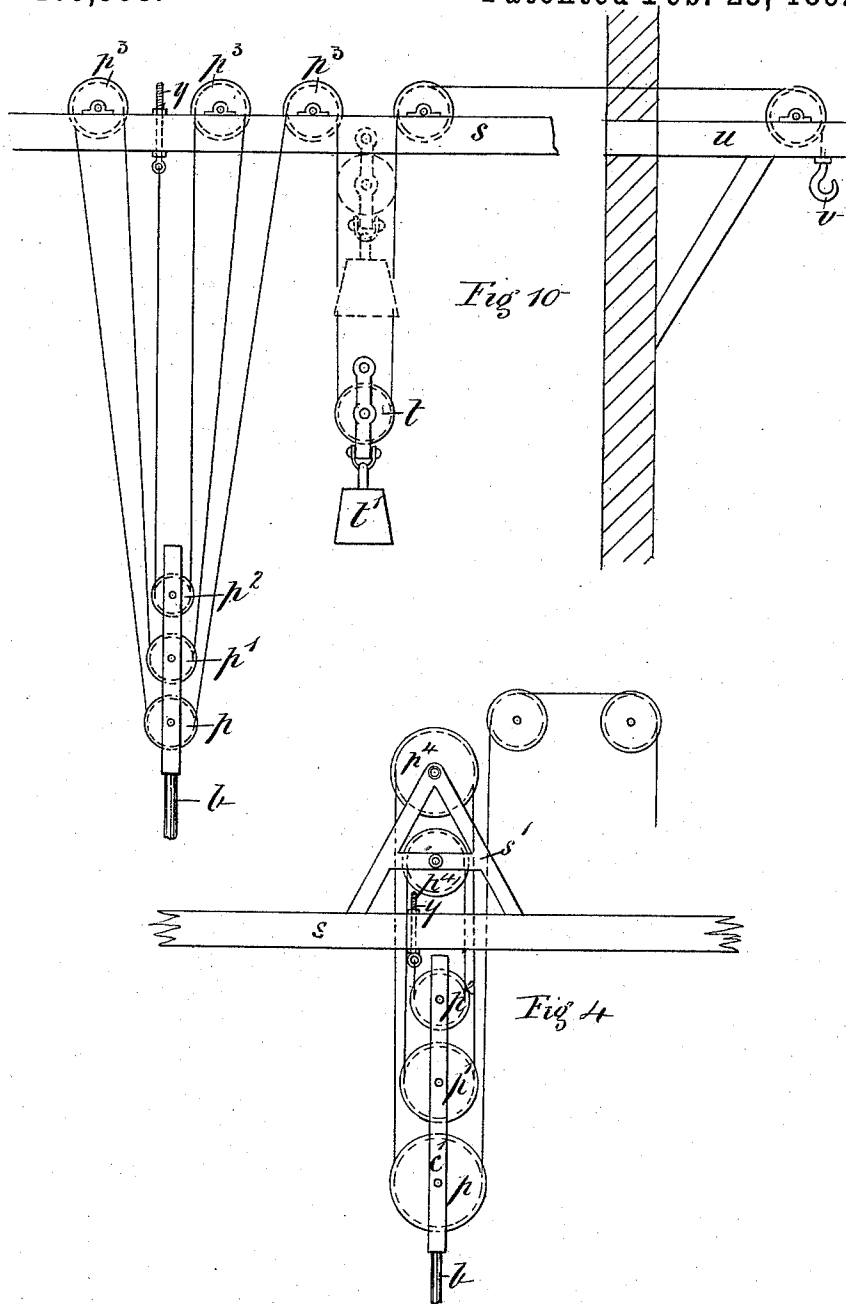
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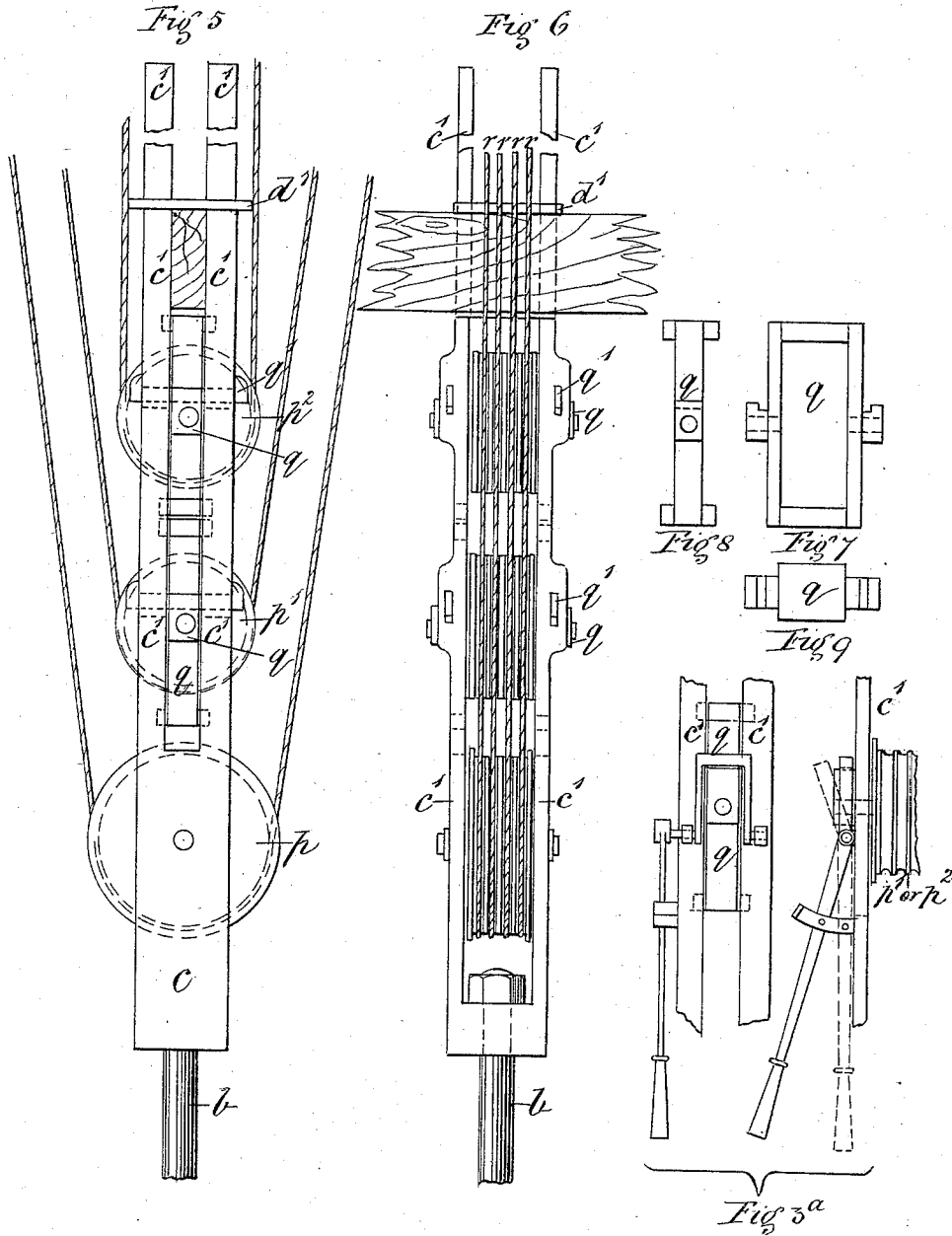
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UNITED STATES PATENT OFFICE.

ARTHUR WILBRAHAM DILLON BELL AND JOHN WELSBY, OF WELLINGTON,
NEW ZEALAND.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 469,368, dated February 23, 1892.

Application filed April 23, 1891. Serial No. 390,143. (No model.)

To all whom it may concern:

Be it known that we, ARTHUR WILBRAHAM DILLON BELL and JOHN WELSBY, subjects of the Queen of England, residing at the city of Wellington, in the Colony of New Zealand, have invented new and useful Improvements in Apparatus for Actuating Lifts, Elevators, and Similar Machinery, of which the following is a specification.

Our invention relates to improvements in apparatus for actuating lifts, elevators, and similar machinery, and more particularly to the method of arranging the ropes and pulleys of such machinery.

The principal objects of our invention are, first, so to arrange the ropes and pulleys that a single rope or multiple ropes may be arranged with pulleys so placed that either the power or velocity may be readily increased or diminished with greater simplicity in working than heretofore, and accurate adjustment of the tension on the single or several ropes and in such a way that each rope lies in a vertical plane throughout its length; second, to remove the liability of the ropes becoming entangled and reduce the friction at the same time that the speed of the lift can be readily increased or diminished, and, third, to provide a simple differential apparatus for lifts and elevators. We attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a front view of our apparatus showing treble gear in action. Fig. 2 is a front view of the same, but with double gear in action. Fig. 3 is a front view of the same with only single gear in action. Fig. 4 shows alternative method of arranging the upper pulleys. Fig. 5 is a front view of the lower part of our apparatus in detail and drawn to a larger scale. Fig. 6 is a side view of the same. Fig. 7 is a front view of the pulley-frame. Fig. 8 is an end view of the same. Fig. 9 is plan of the same. Fig. 10 shows a method of lifting from a jib or cat-head.

Similar letters refer to similar parts throughout the several views.

a is the cylinder commonly used for lifts or elevators actuated by steam or water power.

b is the piston and rod of the same.

c is the cross-head, attached to the piston-rod b and carrying pulleys p , p' , and p^2 .

c' are guide bars or rods fastened to the cross-head c and extending upward, so as to form guides for a purpose to be hereinafter described.

d is a beam or support, to which is attached a guide-piece d' , through which the bars or rods c' slide freely.

r are the ropes or chains, which may be either single or in duplicate or of any number desired or required for safety and working parallel with one another in grooves formed in the pulleys for the purpose. (See Fig. 6.)

p' p^2 are pulleys to receive the lower ends of the ropes, turning freely in bearings q , which are capable of sliding in the guides c' .

p^2 are the upper guide-pulleys for the ropes, working in bearings fastened to a beam or support s .

p^4 are the upper guide-pulleys, placed on suitable supports s' in a vertical position in places where this arrangement is more convenient.

q' are cotters or wedges for securing or releasing the bearings q , and for a purpose to be hereinafter described.

t is a snatch-block having a weight t' , for a purpose to be hereinafter described.

u is a jib or cat-head.

v is a lifting-hook for the rope or chain.

y are set-bolts to receive the terminal ends of the ropes.

It will be seen from this description of the several parts and by reference to the drawings that our invention consists in arranging the ropes and pulleys attached to an ordinary elevator or hoisting machinery in such a manner that a series of pulleys p p' p^2 are in a vertical plane with the piston-rod; that these pulleys may be arranged to take one or more ropes, such ropes working all truly parallel with one another, each capable of bearing the whole load in case of accident; that these ropes are guided over pulleys p p' , &c., in the manner of ordinary pulley-blocks, but placed separately in such a manner that each set of ropes is in the same plane, and therefore do not cross or chafe, thus rendering them much less likely to become deranged, which is a very

important feature in working with long lifts and short cylinders.

The apparatus, as shown in the drawings, elevates the load by the depression of the piston, the power being applied above the piston and the load being elevated to a greater distance than the stroke of the cylinder.

The pulleys p' p^2 are capable of being fixed in position in the guides c' by means of the cotters q' , in which case the pressure on the piston is free to act on all the ropes equally, all the three pulleys being fixed in position in the guides c' and rising and falling with the said guides and the piston-rod b , thus giving a speed to the load L of six to one of the piston speed. (See Fig. 1.) When the cotter q' of the uppermost pulley is withdrawn and its slide q released, the said pulley will assume the position shown in Fig. 2 and will remain in that position during the stroke of the piston-rod b . The ropes attached to this pulley then receive no power or pull from the piston and the only acting pulleys are the two below, which then give a speed of four to one to the load L in comparison to the piston speed as shown in Fig. 2. In like manner if the cotter q' of the second pulley is also withdrawn the pulley p alone will be actuated and the speed of the load will be as two to one of the piston speed as shown in Fig. 3.

In Fig. 3 is shown a method of throwing the pulleys p' and p^2 out of gear without the use of cotters q' .

We thus have the facility of rapidly regulating the height of the lift or the load to be lifted, the greater weight being deposited on the lower floors of a building, if desired, and the lighter weights on the upper floors at the same time, that by two or more liftings from one floor to the other the heaviest weights may be lifted as high as desired. By the set-bolts y the tension on each rope may be set to the greatest nicety, so that all may act exactly together.

In Fig. 10 is shown a jib or cat-head, over which one of the four ropes working in the grooves of the pulleys may be carried, so as to lift weights at the same time that the other ropes are attached to a cage or elevator or

weight, thus making the apparatus suitable for lifting weights and actuating hoists. We prefer this to be done in the following manner: One of the ropes being led through the snatch-block t and over the jib or cat-head u and pulley u' , the weight t' descends and holds the hook against a stop on the cat-head or jib and out of the way when not in use; but so soon as the rope is required to be put in action for lifting the ram or piston descends, lifting the snatch-block t' , which is then pinned to the cat-head, allowing the hook v to descend and pick up a load, which is lifted by the return of the actuating-piston. It is evident that the pulleys p p' p^2 might be placed on this method with a like effect in cases where the lift is actuated by a downwardly-working piston or ram in the cylinder, pull-rods being attached to the cross-head on the ram and connected to the pulley-frame, and also that increased speed may be obtained by increasing the number of pulleys.

We are aware that prior to our invention lifts and elevators have been actuated by ropes working together parallel with one another on the same sheaves, this being done for safety in case one rope should break, and also that double power has been obtained by the arrangement of such ropes acting over a pulley. We therefore do not claim such a combination, broadly. It is further evident that in some cases the differential gear is not required. The slide-bars c' can be dispensed with and a plain cross-head used of the type shown in Fig. 4; but

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

The combination, in a hoisting apparatus, of the cross-head c , a stationary guide d' for said bars, and the pulleys p' p^2 , having movable bearings q , slidable between the bars c' , whereby said pulleys can be thrown out of gear to give differential action to the load to be lifted, all substantially as described.

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