

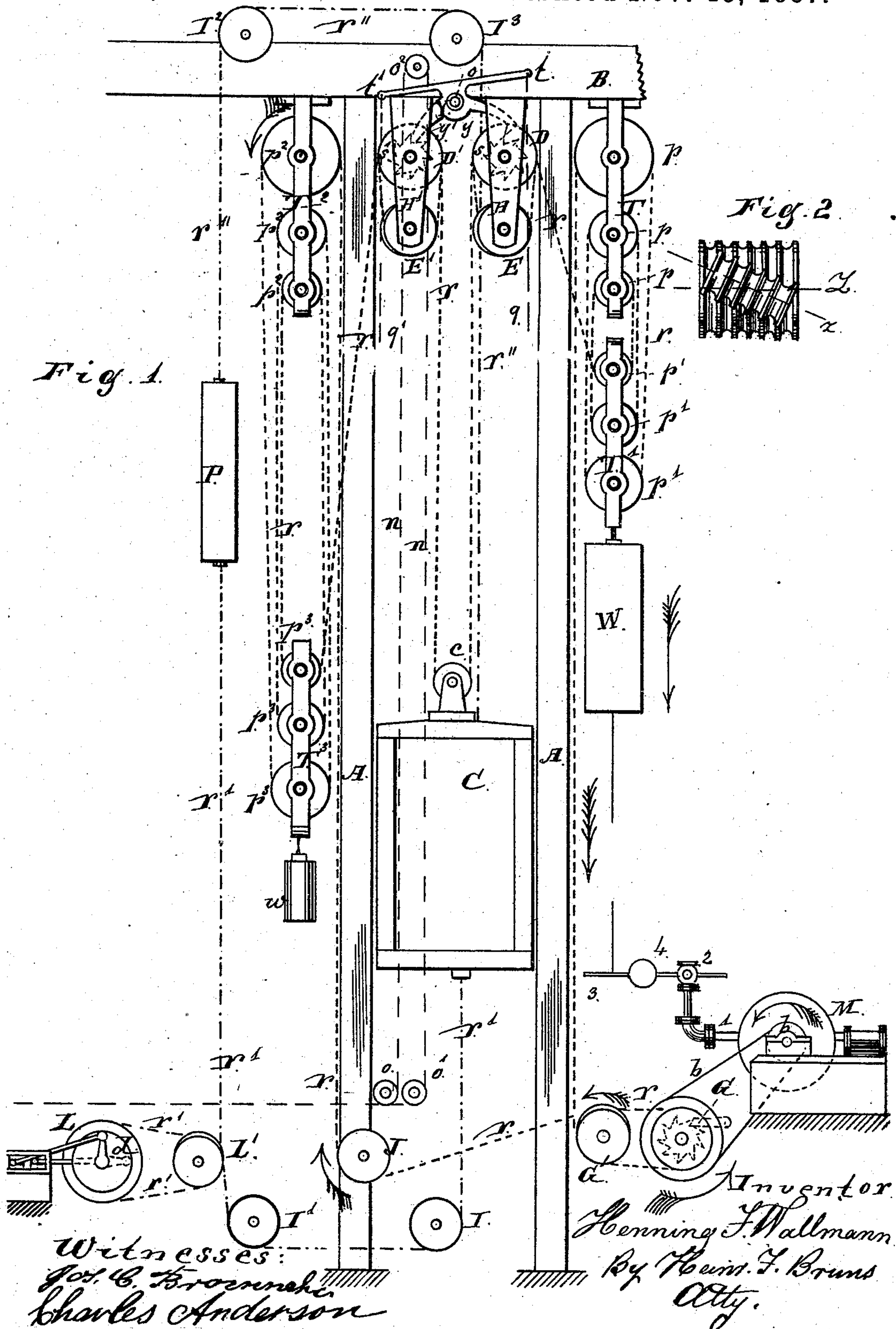
(No Model.)

2 Sheets—Sheet 1.

H. F. WALLMANN.
ELEVATOR.

No. 373,114.

Patented Nov. 15, 1887.



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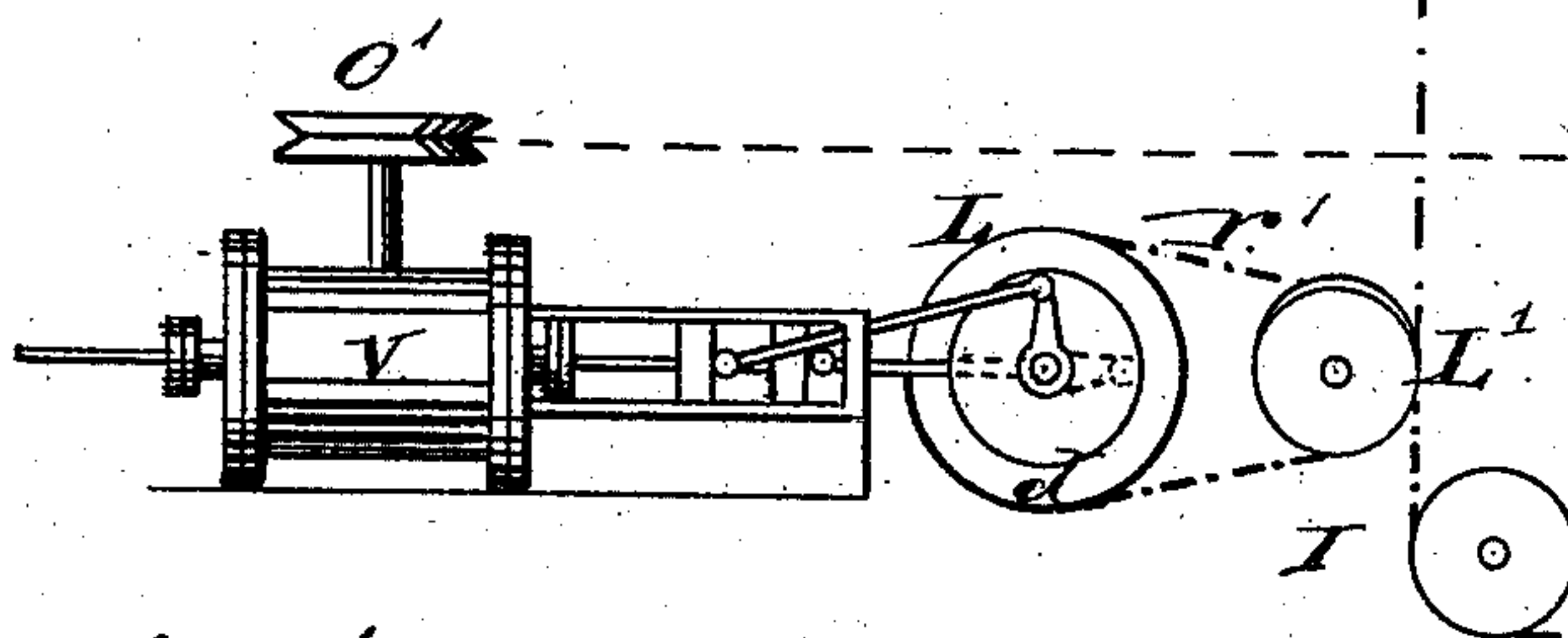
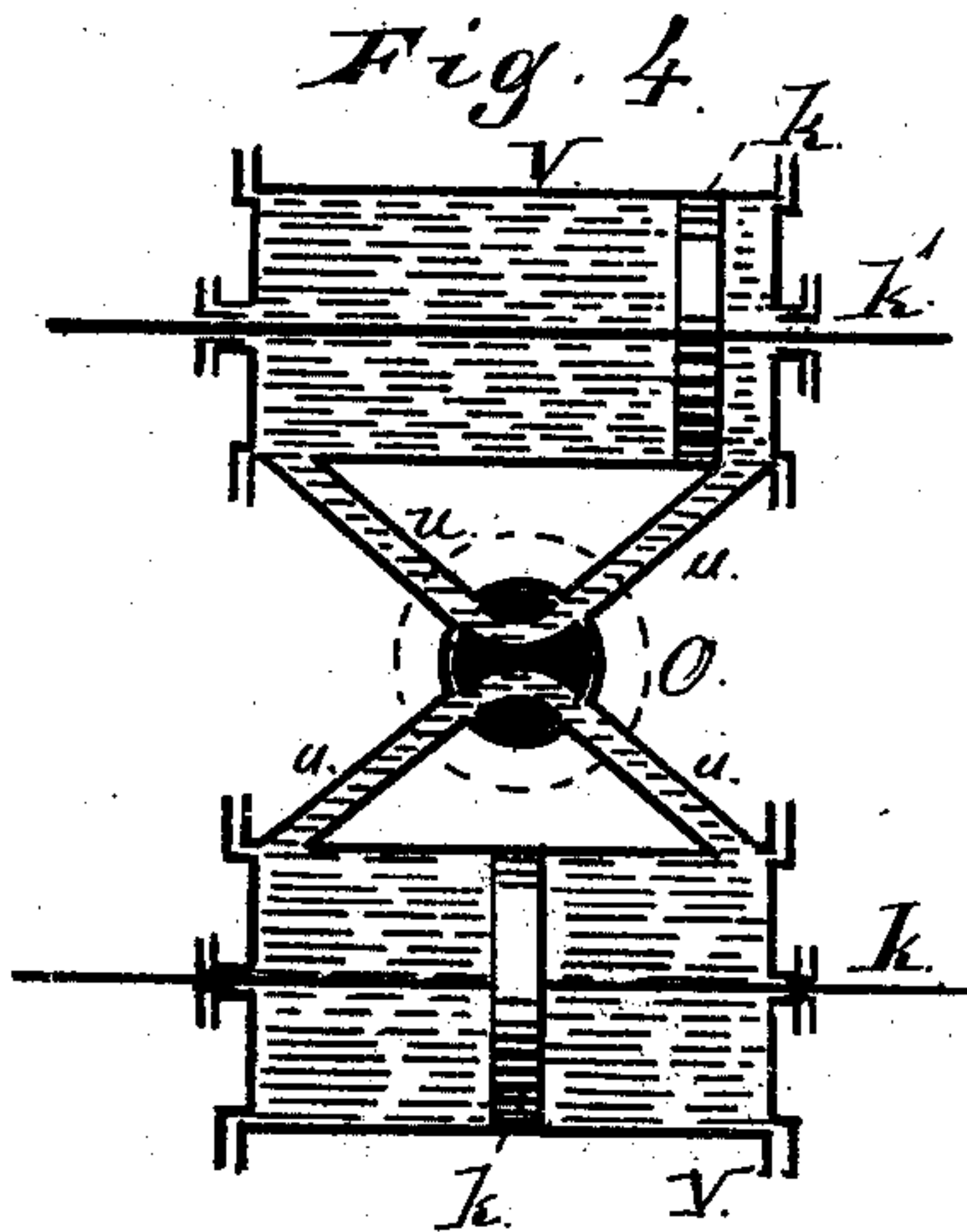
2 Sheets—Sheet 2.

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Fig. 3.



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UNITED STATES PATENT OFFICE.

HENNING F. WALLMANN, OF CHICAGO, ILLINOIS.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 373,114, dated November 15, 1887.

Application filed April 5, 1887. Serial No. 233,812. (No model.)

To all whom it may concern:

Be it known that I, HENNING F. WALLMANN, a subject of the Emperor of Germany, residing at the city of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Elevators or Hoisting-Machines, of which the following is a specification.

My invention relates to elevators or hoisting-machines.

The object of the invention is to accumulate the power of an engine or any other motor continuously raising a weight by means of an endless cable, the power in such a manner accumulated to be used to raise a car or load. The endless cable is arranged over and under a system of fixed and movable pulleys, and a part of the cable all the time, when the weight is not used as a motor to lift the car or load, is firmly held by a mechanism adapted to prevent the weight from going downward and exercising any influence whatever upon the car or load, unless the car or load is to rise, in which case said part of the cable will be made movable by the mechanism employed, so as to allow of the weight going downward, thereby drawing up the car. The weight may effect the movement of the car or load directly by having weight and car suspended on the same endless cable, as hereinafter will be shown and explained; but the power so accumulated in the weight may be used for effecting the movement of the car indirectly like any other power. By arranging that part of the cable carrying the weight over and under any number of fixed and movable pulleys, while the car itself is suspended upon the endless cable by means of only one pulley, the weight in raising the car will descend only a fraction of the entire height the car will rise in arriving at its highest possible point. Thus the weight may be used as a motor to raise the car more than once independently of the engine or motor by which the weight is raised; but as the engine or motor for raising the weight is intended to be continuously in operation, unless the weight has reached its highest possible point, the weight when used for raising the car will not descend the distance it otherwise would when the engine or motor for raising the weight is not in operation. Thus the weight by raising the car will descend the height in

proportion that the car will rise less the length the weight is prevented from falling by the engine or motor pulling the weight continuously up. To regulate the speed or to effect the stoppage of the car, I make use of the particular arrangements as will hereinafter be described.

In the accompanying drawings, Figure 1 represents an elevation of my elevator, all the main features of the same being shown side by side for clearness. Fig. 2 is a detail showing the arrangement of a pair of drums. Fig. 3 is an elevation of a regulating and stopping device, shown separately. Fig. 4 is a detail in section of two closed cylinders provided with pistons and connected by pipes.

A A are two guide-posts. B represents a timber, and C the car sliding between the posts A A and suspended by means of a pulley, c, on the endless cable v. To the timber B are fastened the hangers H and H', each of which supports a pair of drums, D E and D' E', both provided with grooves running around them parallel to each other, so as to form a series of united sheaves or pulleys. The endless cable being led in these grooves surrounds both drums in so many windings as will be found necessary to hold it firmly by friction and prevent it from sliding as soon as the drums are stopped rotating. As will be seen by Fig. 2 in the drawings, the axes of these drums, indicated by Z and z, are not in one and the same vertical plane, but placed to each other so as to prevent the cable from traveling sidewise.

I do not limit myself to the use of this device, well known and used in elevators. A single sheave provided with grippers as made by Fowler or any other clip-pulley may be used.

s s' are ratchet-wheels firmly secured to the drums D and D'. A double pawl, Y, is pivoted at v, having arms y and y' to catch in the same; also levers t and t' for hand-ropes q and q'. T is a fixed and T' a movable pulley-block, supporting the sheaves p p p and p' p' p', respectively, the movable one, T', also carrying the weight W. There is another pair of drums, G G', constructed and arranged as described above and shown in Fig. 2. They are in connection with a small engine, M, by means of the pulleys b b' and belt b''.

In the drawings the engine M is represented as having an inlet-pipe, 1, provided with a valve, 2, operated by a lever, 3, having a weight, 4. The weight 4 is intended always to keep the valve open, and thereby the engine running, unless the weight W has reached its highest point, thereby having raised the lever 3 by means of a cord connecting it with the lever and closed the valve 2 and stopped the engine; but as soon as the weight W is to go down the weight 4 on the lever 3 will open the valve 2, thus starting the engine. When the elevator is connected with any engine which is, besides, driving other machinery, or with a motor which to stop running would not be advisable, a fast and a loose pulley may be made use of in connection with the drums G G' and a ratchet device secured thereto, so as to prevent them from turning in the other direction, as is indicated in dotted lines in Fig. 1. The endless rope or cable r , having the car suspended by means of the pulley c , passes in one direction in the grooves of the drums D and E, over and under the same alternately, so as to envelop them in its windings; in the other direction in the same manner, there being the drums D' and E', and in leaving the upper drum, D, passes around the small end pulley or sheave, p^1 , in the block T', and having passed over and under all the sheaves in the blocks T and T', respectively, descends to the drums G and G' to become arranged in the same manner as described above in regard to the drums D and E, and, passing under the guide-wheel J, is led over the large end sheave, p^2 , in the fixed block T², and having connected all the sheaves p^2 p^2 p^2 and p^3 p^3 p^3 in the fixed block T² and the movable one, T³, returns to the drums D' and E'.

I I' I² I³ are guide-pulleys, and r' and r'' are cables, the ends of which are attached to the car C and a weight, P. The cable r' , attached to the bottom of the car, passes around the guide-pulleys I and I' to become arranged around the drums L and L' (in the same way as described before in regard to the drums D and E) and to be fastened to the weight P. The cable r'' also is attached to the weight P, and is passed over the guide-pulleys I² and I³ to the top of the car C.

V V are closed cylinders (filled with a fluid) in communication with each other by means of the pipes u u and a valve, O, to be regulated by means of the hand-rope n , connecting the pulleys O' and o o' o''. The pistons k k in the cylinders V V are moved by the piston-rods k' k' , pitmen i i , and crank-shaft d , to which the large drum L is secured. When the car is to rise, the weight W should be at a sufficient height. The raising of the weight is the object of the machine M, which only ceases to run when the weight W is in its highest position and needs to be prevented from being raised any farther; but as soon as the weight W is allowed to go downward the valve 2 will

be opened by the weight 4, and the machine will be started again, tending to raise the weight W.

As indicated by the arrows in Fig. 1 of the drawings, the elevator is represented as rising, the pawl y and ratchet-wheels being disengaged, so as to allow the drums D and E to rotate and the weight W to fall, thereby raising the car C, while one part of the cable, r , is firmly held on the drums D' and E' by means of the pawl y' and ratchet-wheel s' , as the ratchet-wheel s' is rigidly attached to the drum D', or both may be cast in one piece. Thus the pawl y' , engaging with the ratchet-wheel s' , will prevent the drum D' from rotating, and the cable surrounding in several windings the drums D' and E' consequently will be held by friction. The pawls y y' and ratchets s s' are operated by means of the hand-ropes q q' , attached to the levers t t' and intended to be in the reach of the attendant of the elevator. The length the weight W will go downward depends upon the height the car is to be raised, also on the number of sheaves the pulley-blocks T and T' contain, and also on the speed the engine M is pulling the cable, thereby relatively raising the weight W. The weight W being used only as a motor to raise the car, the descent of the same will be effected by its own weight by raising the pawl y' out of the ratchet-wheel s' and engaging the pawl y with the ratchet-wheel s , thus allowing of the cable being pulled from the pulley-blocks T² and T³ over the drums D' and E', at the same time receiving that part of the cable which is delivered by the engine M over the drums G and G'.

To prevent the loose part of the cable leaving the drums G and G' from becoming entangled while on its way to the drums D' and E', it is led around the sheaves p^2 p^2 p^2 and p^3 p^3 p^3 in the pulley-blocks T² and T³, and a small weight, w , is attached to the pulley-block T³ for keeping it strained; but any other suitable device may be used to accomplish the same.

When the car is to be stopped, it will be necessary to prevent the drums D and D' from rotating, which will be accomplished by both pawls y and y' catching in the ratchet-wheels s and s' at the same time.

The ratchet-wheels s and s' may be attached to the drums D and D' by coupling them, and be provided with any well-known yielding device or cushion, so as to avoid shocks when the car is stopped by bringing the pawls suddenly in contact with the ratchet-wheels.

Instead of ratchet-wheels, air-brakes, or any other kind of brakes, also the hydraulic regulating device shown in Figs. 3 and 4, may be applied for stopping the drums rotating or regulating their speed.

In regulating the speed of the car when in motion, or to effect its stoppage, I make use of the contrivance illustrated in Figs. 3 and 4. By attaching the cables r' and r'' to the car C and weight P, and arranging the cable r' with the drums L and L', and the motion of the

weight P, acting as a counterpoise, being dependent upon the motion of the car, as it is going up or down in the same way, all the mechanisms connected with the cable r' depend upon the motion of the car. The drum L is firmly secured to a shaft provided with cranks $d d$, so as to revolve with the same. The cranks $d d$ are connected with the pistons $k k$ in the cylinders V V by means of the piston-rods $k' k'$ and pitmen $i i$. Consequently the movements of the mechanisms depend upon each other, and their speed will vary in the same degree as the speed of the fluid circulating in the cylinders V V through the pipes $u u$.

The pipes $u u$ are provided with a valve, O, which, by means of the pulley O' and $o o' o''$ and the cord n , may be opened partly or in whole or closed entirely by the attendant, thus regulating the speed or stopping the motion of the car at will. In this way the contrivance, in combination with my invention, will act also as a safety device if the main cable should break or become deranged or otherwise useless.

In the drawings only one endless cable is shown; but two or more may be arranged in the same way as described, side by side.

I claim—

1. In an elevator or hoisting-machine, the combination of the car C, the weight W, for raising the car C, endless cable or chain r , arranged over a system of pulleys, and means for continuously pulling said endless cable or chain r for raising the weight W toward its highest possible point, all arranged substantially as and for the purpose specified.

2. In an elevator or hoisting-machine, the combination of the guide posts A A, car C, and weight W, both suspended on an endless cable, r , arranged over a system of pulleys in such a manner that the car C can be raised by dropping the weight W, while a motor, M, is continuously in operation to pull the weight W up toward its highest possible point, substantially as and for the purpose specified.

3. In an elevator or hoisting-machine, in combination with the drums D E and D' E', provided with a device to stop or allow their rotation, the endless cable r , the car C, and weight W, the cable r being in connection with the motor M, substantially as specified.

4. In an elevator or hoisting-machine, the car C, being suspended by means of a pulley, c , upon the endless cable r , arranged over drums D E and D' E' and the sheaves in the pulley-blocks T and T' for supporting the weight W and over the sheaves in the pulley-blocks T² and T³ in such a manner as to keep the loose part of the cable in a working condition, all said parts combined substantially as and for the purpose specified and shown.

5. An elevator or hoisting-machine comprising the car C, the endless cable r , arranged over a system of pulleys and carrying the weight W, the motor M, and a hydraulic device adapted to regulate the speed of the moving car or stop its motion entirely, and a hand-rope or operating-cable, n , substantially as and for the purpose specified.

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Witnesses:

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