(No Model.)

P. G. BACKMAN.

LIFT, HOIST, &c.

No. 515,641. Patented Feb. 27, 1894.

Fig. 1.

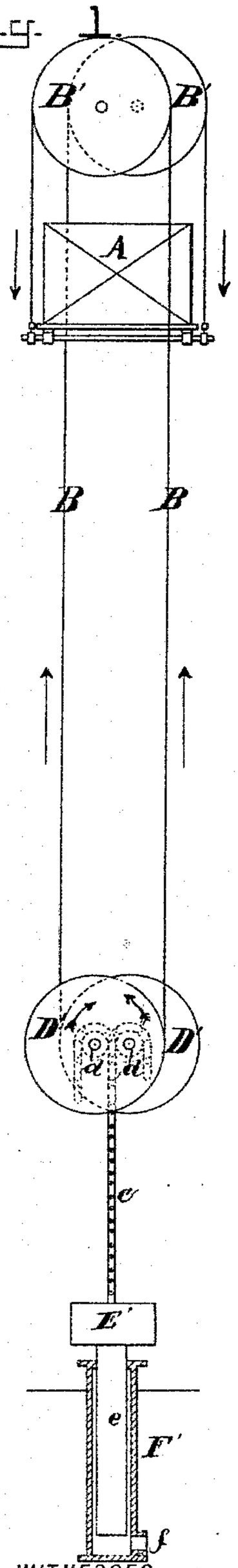


Fig. 2.

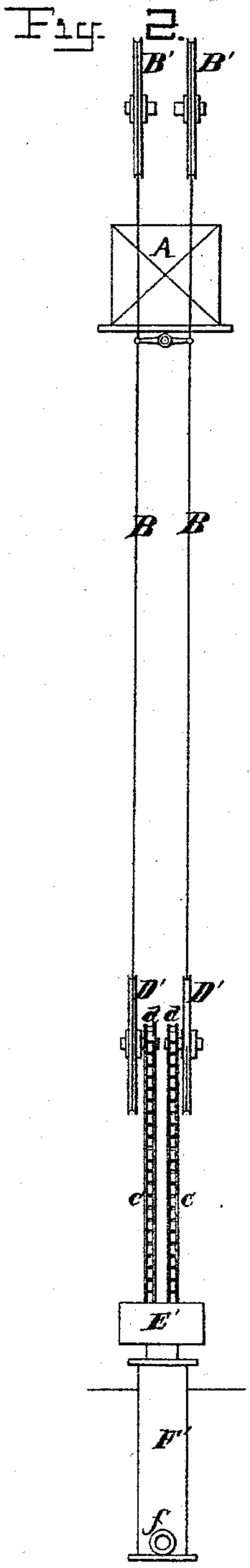


Fig. 3.

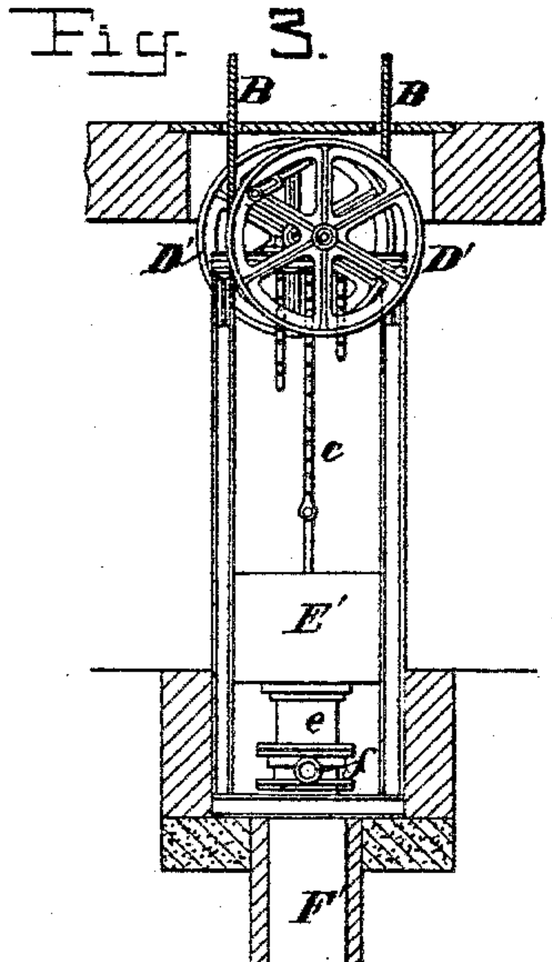
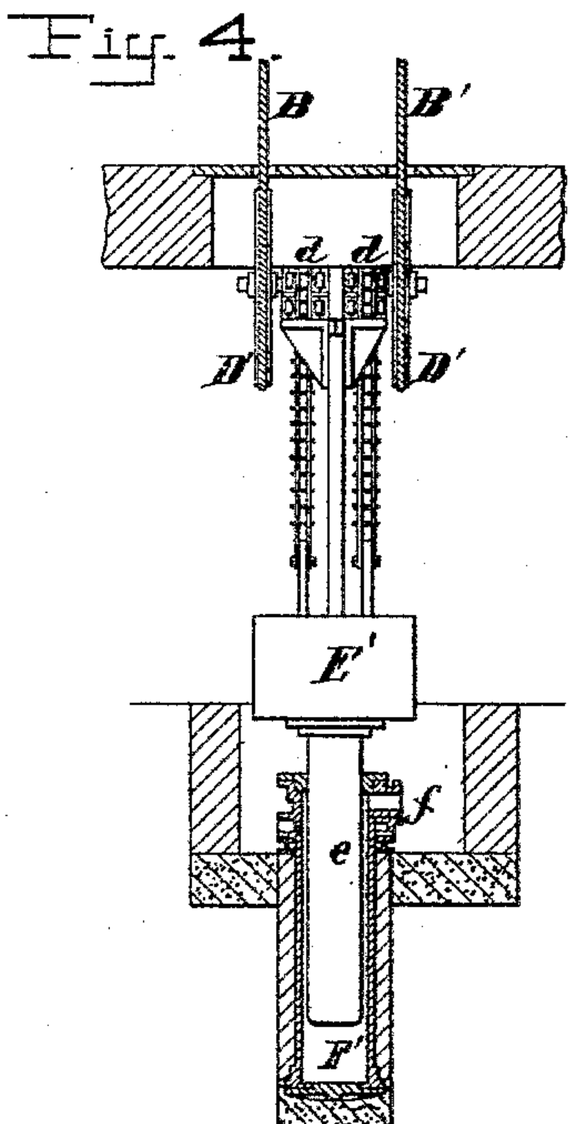


Fig. 4.



WITNESSES:

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LIFT, HOIST, &c.

SPECIFICATION forming part of Letters Patent No. 515,641, dated February 27, 1894.

Application filed August 4, 1891. Serial No. 401,719. (No model.) Patented in Sweden January 12, 1891, No. 3,546, and in England July 16, 1891, No. 12,120.

To all whom it may concern:

Be it known that I, PER GUNNAR BACKMAN, a subject of the King of Sweden and Norway, residing in Paris, (Seine,) Republic of France, have invented certain Improvements in and Relating to Lifts, Hoists, or other Elevating Apparatus, (for which I have obtained a Swedish patent, No. 3,546, dated January 12, 1891, and a British patent, No. 12,120, dated July 16, 1891,) of which the following is a specification.

My invention relates to lifts, hoists and other elevating apparatus.

It consists in a special arrangement of a hydraulic motor designed to set lifts in action and reduce the expenses of installation and also the space occupied by the motor for the lifts or hoists as hereinafter described and claimed.

In order to make my invention clearly understood I will proceed to describe the same in detail with reference to the accompanying drawings, in which—

Figures 1 and 2, represent in diagram the whole arrangement of a lifting apparatus or hoist constructed according to my invention. Fig. 3, is a side elevation of the motor and connections. Fig. 4, is a view at right angles to the plane of Fig. 3, partly in section.

In all the before mentioned figures corresponding parts are designated by similar letters.

The two cables, B, B, are fastened in a special manner to the cage, A, and after passing over the two upper guide pulleys, B′, B′, are fixed to the two lower drums, D′, D′. These cables may be attached to any approved form of safety devices carried by the elevator car, so that the breaking of either cable will throw the safety device into action. According to the direction of rotation of these drums the traction cables are simultaneously wound and unwound so as to cause the ascent or descent of the cage or platform, A. These drums although situated side by side are independent of each other and on their respective shafts are keyed pinions, *d d*, with which engage the chains, *c c*, which are free at one end and attached by the other to a counter weight, E′, fixed to a piston *e*, of a hydraulic press or cylinder, F′. By this independent arrangement of the drums and connections the load is equally distributed between the two cables. The details of the drums, D′ D′, of the pinions *d d*, the counter weight, E′, with plunger *e*, and the hydraulic cylinder, F′, are shown in Figs. 3 and 4.

While I have shown the counterweight attached to the piston it is obvious that the same result will be effected by making the cylinder movable while the plunger is fixed to the bed, and attaching the said counterweight to the cylinder, or the counterweight may be separate from the plunger and connected thereto in any suitable manner by a chain. It is also obvious that the cylinder may be divided into two compartments with a plunger in each attached to the drums D′ D′ respectively. Whatever the arrangement adopted or employed, the drums, D′ D′, have a diameter *n* times greater than that of the pinions, *d d*, so that the total movement of the piston *e*, is *n* times less than that of the cage, A, of the lift. From this it results that the counterweight, E′, should weigh *n* times more than the weight of the cage including its maximum load. When the water or other fluid under pressure is admitted into the cylinder, F′, through the pipe *f* the plunger piston *e* rises and the cage or platform, A, exercising the same traction on the suspension cables, B B, pulls the drums, D′ D′, which begin to move in the direction of the arrows (Fig. 1), that is to say in opposite directions and through the medium of the pinions, *d d*, stretch the chains, *c c*. When on the contrary the water is discharged, the counterweight and plunger, E′ *e*, cause the cage or platform to rise in a contrary direction. Accordingly the traction cables, B B, during the descent of the cage or platform, A, directly affect the rotation of the drums, D′, D′, held by the chains, *c c*, whereas during the upward movement the weight of the cage A acting through the traction cables, causes the movement of the drums. The admission and discharge of the water are effected through the medium of a valve easily actuated from any point by a cord extending the entire height of the cage and one portion of which runs

through the aforesaid cage. The mode of operation is quite optional.

I do not restrict myself in any way to the forms and dimensions of the parts constituting the lifts, hoists and other elevating apparatus hereinbefore described, and as to the various materials which may be employed in their construction.

What I claim is—

1. In lifts, hoists or other elevating apparatus, the combination with the cage or platform, of the cables, independent drums, upon which said cables wind, pinions on the shafts of said drums, chains and the counterweight, to which said chains are connected, substantially as described.

2. In lifts, hoists or other elevating apparatus, the combination with the hydraulic press and the cage or platform, of independent cables secured thereto at one end, independent drums on which said cables wind, pinions on the shafts of said drums, and chains each free at one end passing over said pinions and having their other ends attached to the hydraulic press, substantially as described.

3. In lifts, hoists or other elevating apparatus, the combination with the hydraulic press or motor and counterweight attached thereto, said counterweight with the piston of press being sufficient to overbalance the minimum load upon the cage, of the independent drums journaled above the motor, pinions on the shafts of said drums the diameter of each pinion bearing to the diameter of the drums the proportion of the length of piston stroke of the motor to the length of hoist, and independent chains connecting the pinions with the motor, whereby the space occupied by the motor may be reduced to a minimum, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

E. GUNNAR BACKMAN.

Witnesses:

JOHN FRANCKEN.

C. M. HOOPER.