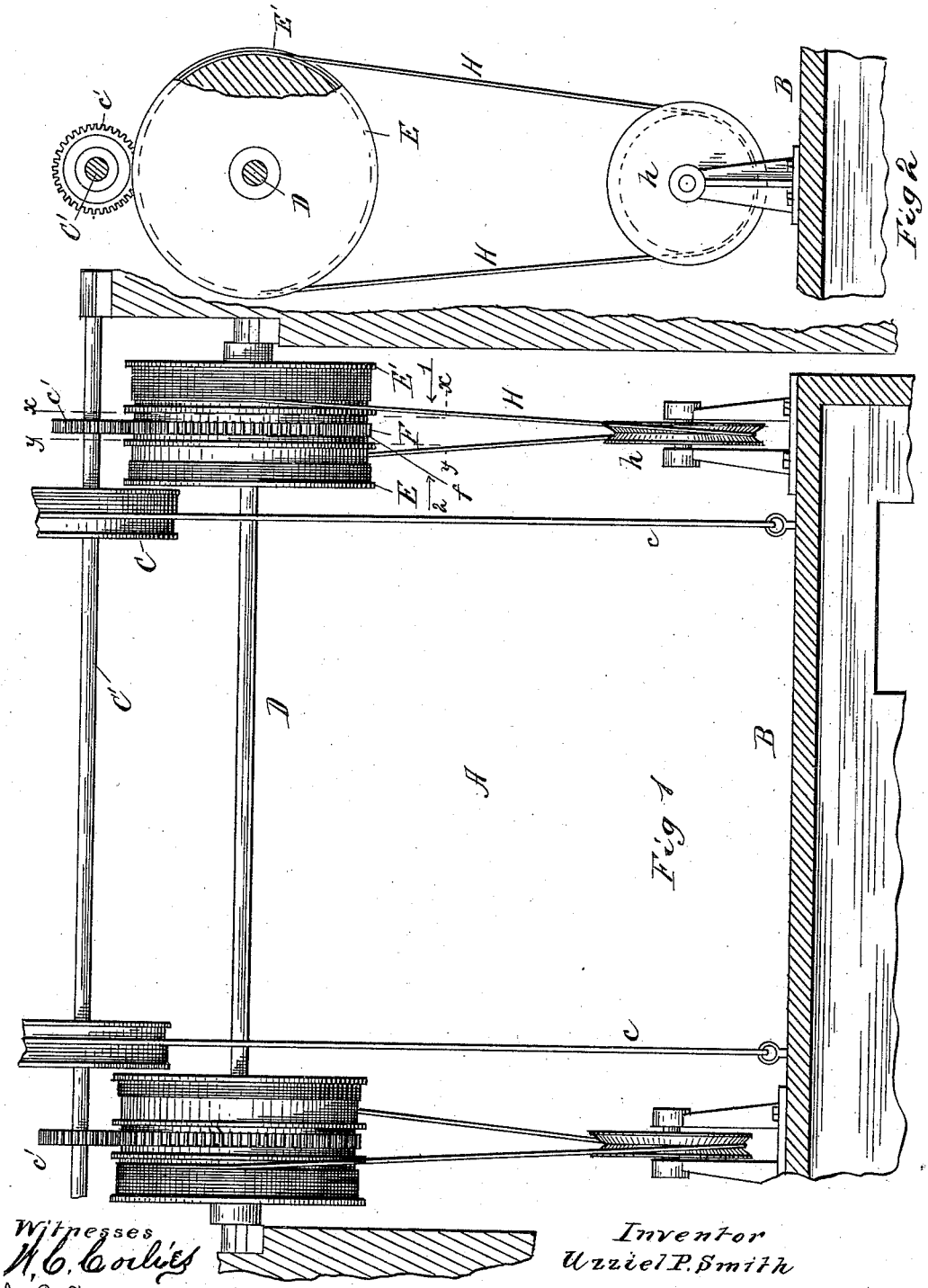
(No Model.)

2 Sheets—Sheet 1.

U. P. SMITH.

ELEVATOR.

No. 344,687. Patented June 29, 1886.



Witnesses
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(No Model.)

2 Sheets—Sheet 2.

U. P. SMITH.

ELEVATOR.

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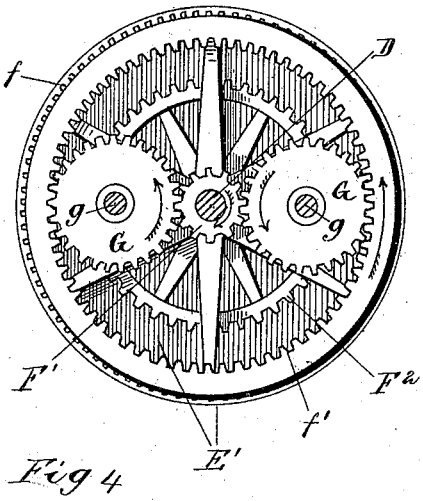

Fig 4

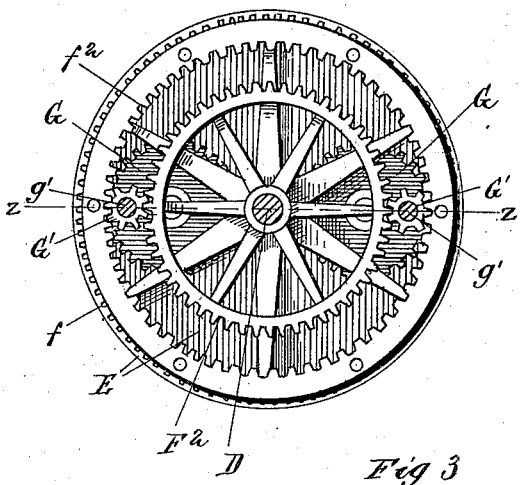

Fig 3

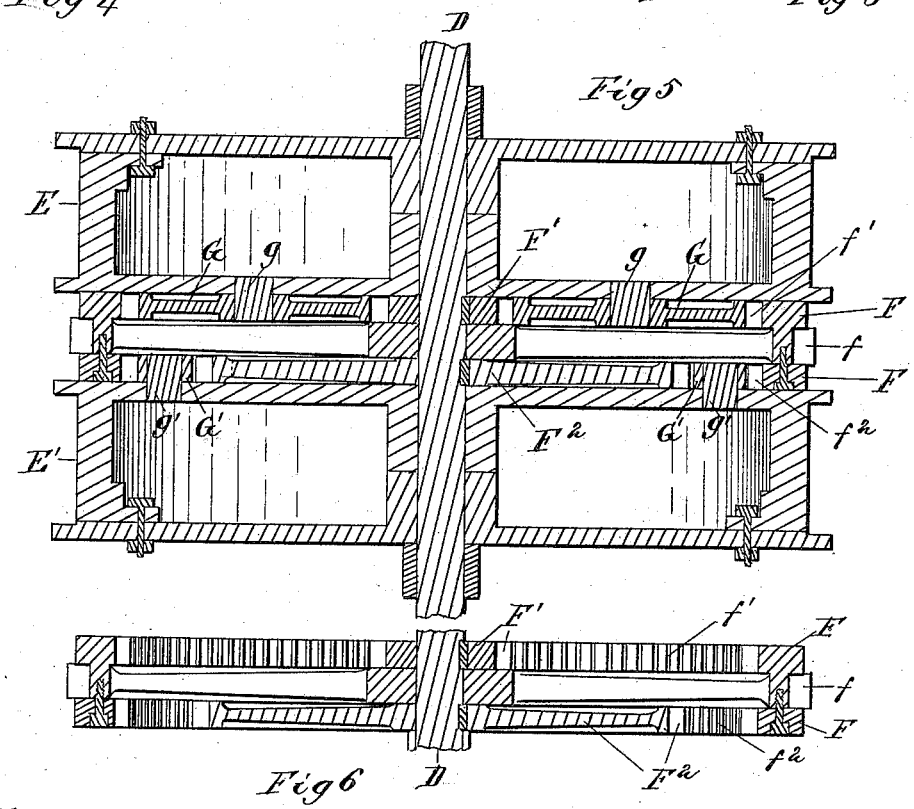

Fig 5

Fig 6

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UNITED STATES PATENT OFFICE.

UZZIEL P. SMITH, OF CHICAGO, ILLINOIS.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 344,687, dated June 29, 1886.

Application filed October 12, 1885. Serial No. 179,727. (No model.)

To all whom it may concern:

Be it known that I, UZZIEL P. SMITH, a citizen of the United States, and residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Elevators, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a front elevation of a mechanism embodying my invention; Fig. 2, a side elevation of the same; Fig. 3, a sectional view taken on the line *x x* of Fig. 1, looking in the direction of the arrow 1; Fig. 4, a sectional view taken on the line *y y* of Fig. 1, looking in the direction of the arrow 2; Fig. 5, a sectional view taken on the line *z z* of Fig. 4, and on an enlarged scale; and Fig. 6, a similar sectional view of the central gears, the drums being removed.

Like letters refer to like parts in all the figures of the drawings.

My invention relates to elevators or hoisting apparatus for buildings and other places, it being in the nature of an improvement upon the device set forth in Letters Patent No. 314,736, granted to me March 31, 1885.

I will now proceed to describe a construction in which I have practically carried out my invention in one form, and will then point out definitely in the claims the particular improvements which I deem to be new and desire to protect by Letters Patent.

In the drawings, A represents an elevator-well of usual construction, in which the car B is suspended by means of ropes *c* from drums C on the drum-shaft C'. This drum-shaft may be operated by any suitable means to raise and lower the car, and is provided near each end with a pinion, *c'*.

Below the drum-shaft C' is arranged a fixed shaft, D, on which are mounted near each end a pair of drums, E E', the said drums being mounted loosely on the shaft so as to revolve freely thereon.

The construction and arrangement of each pair of drums being identical, one pair only will be described, it being of course understood that the same description is equally applicable to the other.

Mounted on the shaft D, between the drums E and E', is a gear-wheel, F. This gear is mounted loosely on the shaft so as to revolve freely thereon, and is provided on its outer periphery with a set of gear-teeth, *f*, and on the inner edge of its rim with two sets of internal gear-teeth, $f' f^2$, as shown in detail in Fig. 6 of the drawings.

On one side of the gear-wheel F is a pinion, F', fixed on the shaft D, so as to be stationary, and on the opposite side of the gear-wheel F is located a similar fixed pinion, F^2. The relative size of these two fixed pinions may be varied, for the purposes hereinafter described.

The drum E is provided on its inner face with one, two, or more pinions, G, mounted on stud-journals *g*, or in any other suitable manner. These pinions mesh with the fixed pinion F', and also with the internal gear-teeth, *f'*, on the gear-wheel F. The drum E' is also provided on its inner face with similiar pinions, G', mounted on similar stud-journals, *g'*, and meshing with the fixed pinion F^2 and with the internal gear-teeth, f^2, on the gear-wheel F.

H indicates a rope, which is attached to and wound partially upon one of the drums—say the drum E—and passes around a pulley, *h*, mounted on the car B, it being then carried up the other drum, E', where it is attached, thus forming a connection between the said drums and the car.

The operation of the device is as follows: Upon the rotation of the shaft C' the car B will be raised or lowered in an obvious manner, according to the direction in which the said shaft is rotated. At the same time the pinion *c'*, meshing with the gear-wheel F, will cause the same to rotate upon the fixed shaft D. The internal gear-teeth on the pinion F will cause the pinions *g g'* on the drum E E' to rotate, and as these pinions mesh with the fixed pinions F' F^2 a rotary motion will be imparted to the drums in an obvious manner, the pinions G G' traveling around the fixed pinions F' F^2 during this rotation. The relative rate of speed of the drums E E' depends of course upon the relative size of the fixed pinions F' F^2, it being of course understood that the relative size of the pinions G and G' is determined by the relative size of the pinions F' F^2. In the construction shown the pinion F' is much smaller than the pinion F^2, the pinions G being, therefore, considerably larger than the pinions G'. As a consequence of this

construction, the drum E will travel at a greater rate of speed than the drum E′, so that the rope H will be uncoiled from or coiled upon the drum E faster than it will be coiled upon or uncoiled from the drum E′. The length of the rope depending from the drums is thus varied to accommodate itself to the travel of the elevator in either direction.

In the construction hereinbefore shown and described, my invention has been set forth as forming a safety device for use in conjunction with the ordinary hoisting apparatus represented by the ropes *c*, drums C, and drum-shaft C′. In this construction, in case the main hoisting apparatus gives way, the weight of the car and its load falls upon the ropes H, which being wound upon the drums E and E′ in opposite directions will tend to move the said drums in opposite directions. Such a movement of the drum is, however, rendered impossible by means of the train of gearing connecting the two, which train is composed of the fixed pinions F′ F², loose pinions G G′, and gear-wheel F. It is obvious that any tendency of the drums to move in opposite directions will immediately cause this train of gearing to lock and render the drums absolutely stationary, thus checking the descent of the car in case of the failure of the main hoisting apparatus from any cause. My invention is not limited, however, in its application to an auxiliary safety apparatus, but may be employed independently of other hoisting apparatus to raise and lower the elevator. In this case the rotation of the drums may be effected by the application of power to either of the drums, or to the gear-wheel F, in any suitable manner, or it may be effected through the medium of the rope H from the car itself in an obvious manner.

By varying the relative size of the pinions F′ and F² more or less power or a higher or lower rate of speed may be obtained for the elevator. It is obvious that as these pinions approach each other in size the difference in the speed of the two drums will decrease, thus decreasing the speed of the elevator, but at the same time increasing the power of the apparatus, and, conversely, the greater the difference in the size of these pinions the greater will be the difference in the speed of the drums and the greater the speed of the elevator, although this increased speed will of course be obtained at the sacrifice of power.

In the construction shown in my Letters Patent hereinbefore referred to, and upon which the construction set forth in the present application is an improvement, I have employed two drums loosely mounted on a fixed shaft, one drum being provided with two sets of gear-teeth—one external and the other internal—and the other drum being provided with one or more pinions to mesh with the internal gear-teeth of the other drum and with a fixed pinion on the shaft between the two drums. In the present improved construction neither drum is provided with a series of gear-teeth, and a loose gear-wheel is mounted on the shaft between the two drums, the said gear-wheel being provided with one set of external gear-teeth and two sets of internal gear-teeth. Each drum is provided with one or more pinions, which mesh with one of the sets of internal gear-teeth on the loose gear-wheel and also with a fixed pinion on the shaft. The difference in size between the fixed and loose pinions of one drum and the size of those of the other regulates the speed and power with relation to each other, as hereinbefore pointed out.

It will be readily seen that the construction set forth in the present application is a different construction from that set forth in my Letters Patent hereinbefore specified.

It is obvious that various modifications in the construction and arrangement of the mechanism may be made without departing from the principle of my invention. For instance, although two pairs of drums are shown, a single pair only may be employed, if desired. The number of the pinions G and G′ intermediate between the fixed pinions and the revolving gear-wheel may be varied, one pinion only to each drum being sufficient for the operation of the device, although I prefer the use of two or more. It is also obvious that various other modifications in the details of construction may be made, and I therefore do not wish to be understood as limiting myself strictly to the precise details shown in the drawings.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an elevator, the combination, with the fixed shaft, of the loose wheel mounted thereon and provided with internal gear-teeth, the fixed pinions of different sizes arranged on each side of the said wheel, and drums mounted loosely on the shaft and provided with one or more pinions to mesh with the fixed pinions and the internal gear-teeth of the loose wheel, substantially as and for the purposes specified.

2. The combination of the shaft D, loose wheel F, provided with gear-teeth f' f^2, fixed pinions F′ F², and drums E and E′, provided with pinions G and G′, to mesh with the pinions F′ F² and gear-teeth f' f^2, respectively, substantially as and for the purposes specified.

3. The combination, with the car and a suitable hoisting apparatus, of one or more pairs of drums connected with the elevator by a rope wound around them in opposite directions, the said drums being provided with pinions meshing with fixed pinions and with the internal gear-teeth of a gear-wheel driven from the drum-shaft of the hoisting apparatus, substantially as and for the purposes set forth.

UZZIEL P. SMITH.

Witnesses:
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C. FEIGEL.