No. 610,211. Patented Sept. 6, 1898.

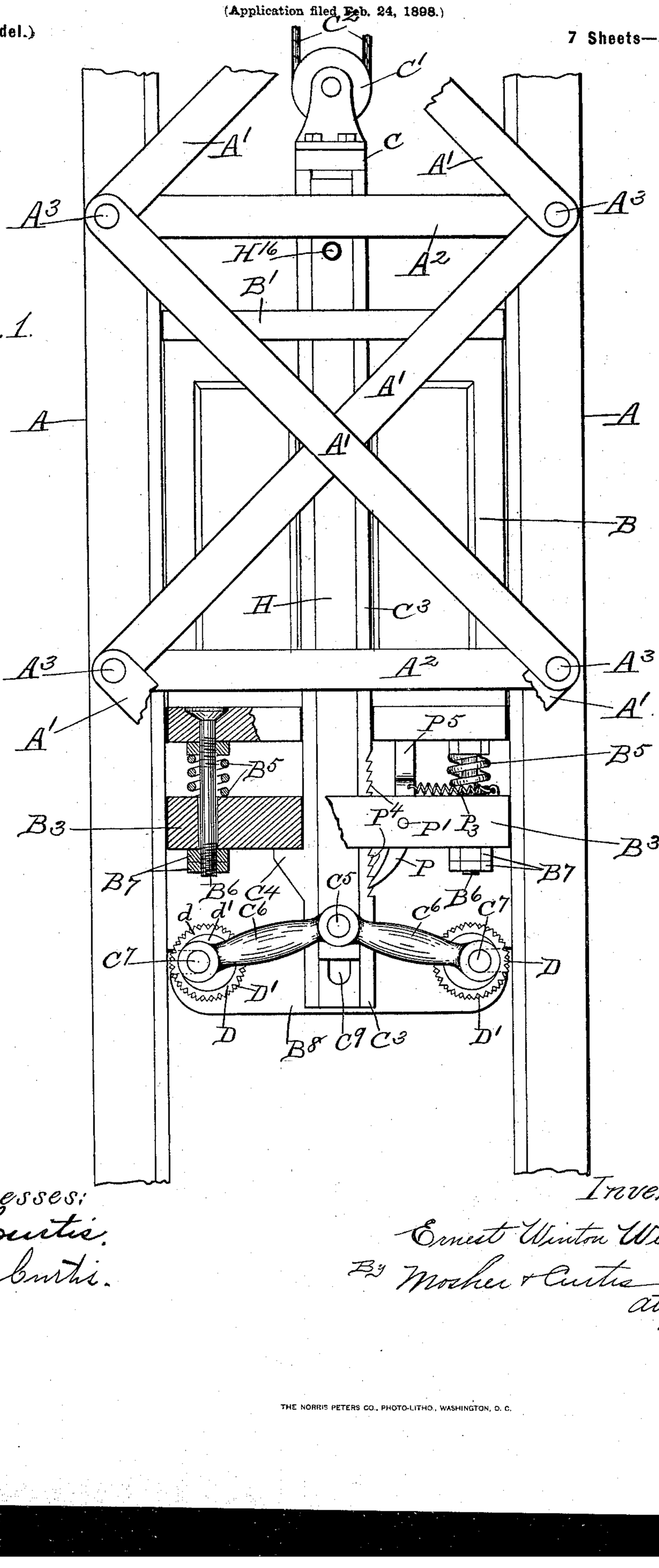
E. W. WEST.

SAFETY ELEVATOR.

(Application filed Feb. 24, 1898.)

(No Model.) 7 Sheets—Sheet 1.

Fig. 1.



Witnesses:
L. W. Curtis.
J. G. Curtis.

Inventor.
Ernest Winton West,
By Mosher & Curtis
attys.

No. 610,211. Patented Sept. 6, 1898.

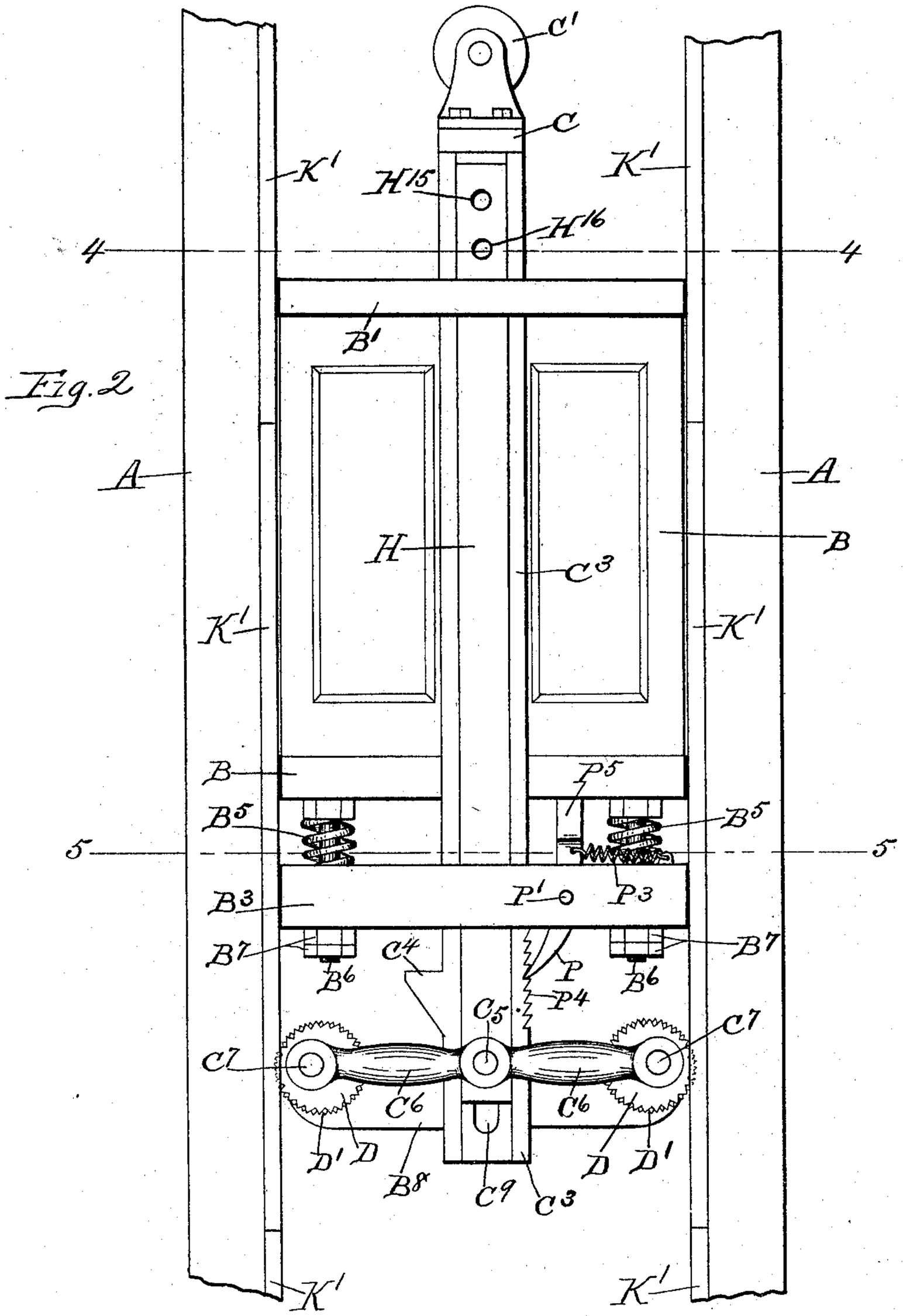
E. W. WEST.

SAFETY ELEVATOR.

(Application filed Feb. 24, 1898.)

(No Model.) 7 Sheets—Sheet 2.

Fig. 2



Witnesses:
L. H. Curtis.
J. G. Curtis.

Inventor:
Ernest Winton West.
By Mosher & Curtis
Attys.

No. 610,211. Patented Sept. 6, 1898.

E. W. WEST.

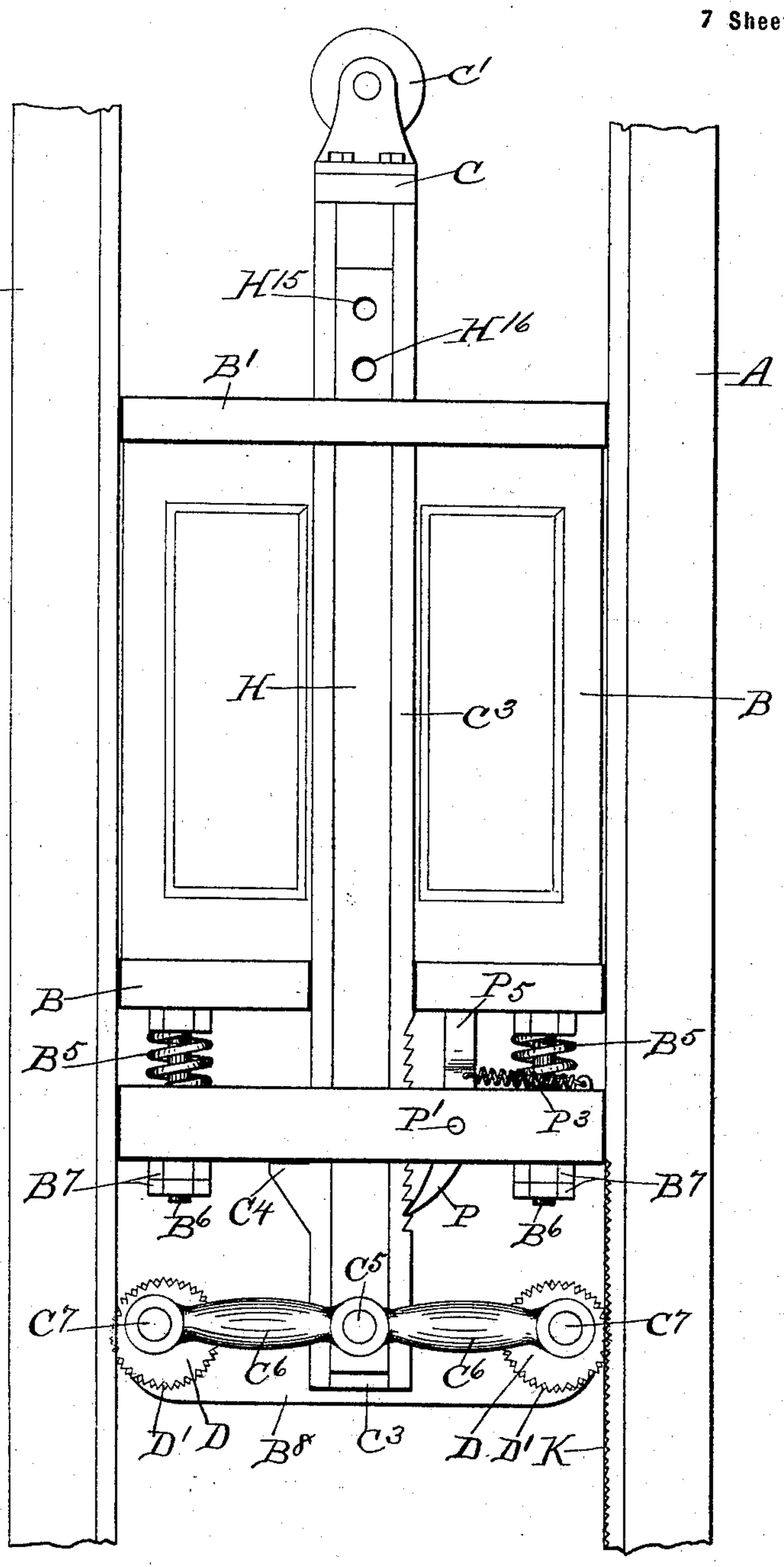
SAFETY ELEVATOR.

(Application filed Feb. 24, 1898.)

(No Model.)

7 Sheets—Sheet 3.

Fig. 3.



Witnesses:
G. H. Curtis
J. G. Curtis.

Inventor:
Ernest Winton West,
By Mosher & Curtis
Attys.

No. 610,211. Patented Sept. 6, 1898.

E. W. WEST.

SAFETY ELEVATOR.

(Application filed Feb. 24, 1898.)

(No Model.) 7 Sheets—Sheet 4.

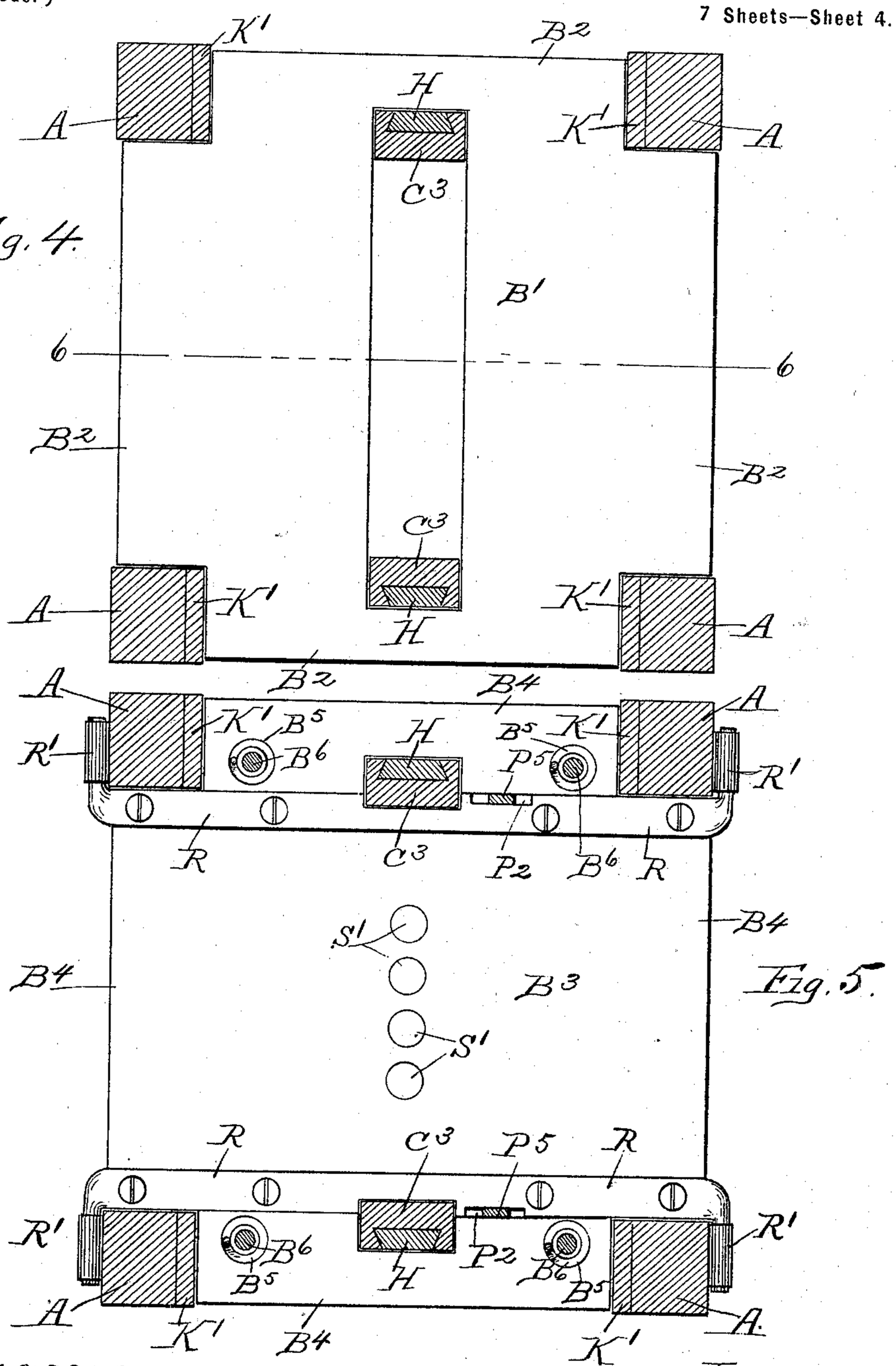


Fig. 4.

Fig. 5.

Witnesses:
G. H. Curtis.
J. L. Curtis.

Inventor:
Ernest Winton West,
By Mosher & Curtis
Attys.

No. 610,211. Patented Sept. 6, 1898.

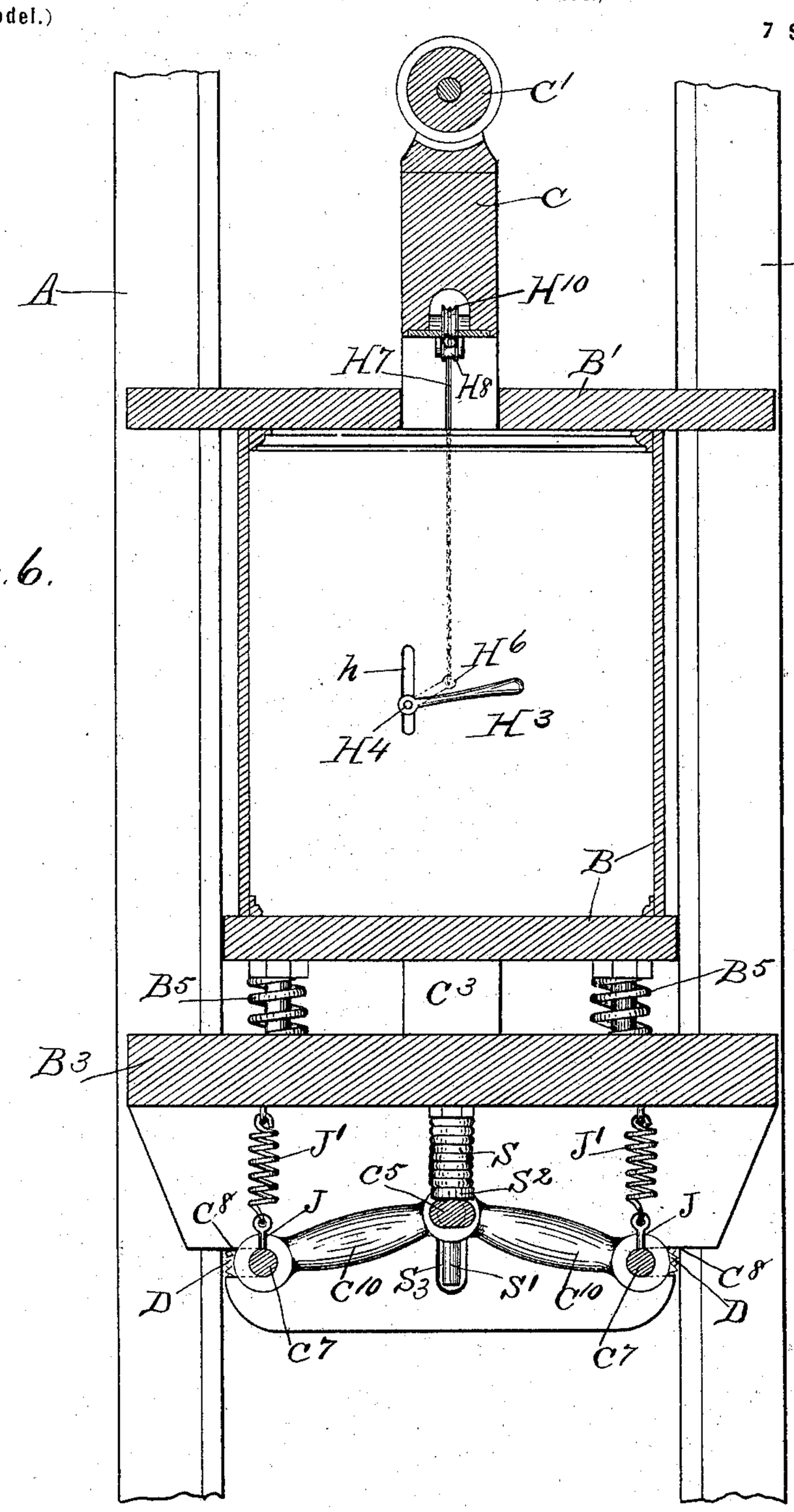
E. W. WEST.

SAFETY ELEVATOR.

(Application filed Feb. 24, 1898.)

(No Model.) 7 Sheets—Sheet 5.

Fig. 6.



Witnesses:
G. H. Curtis
J. G. Curtis.

Inventor:
Ernest Winton West,
By Mosher & Curtis
Attys

No. 610,211. Patented Sept. 6, 1898.

E. W. WEST.

SAFETY ELEVATOR.

(Application filed Feb. 24, 1898.)

(No Model.) 7 Sheets—Sheet 6.

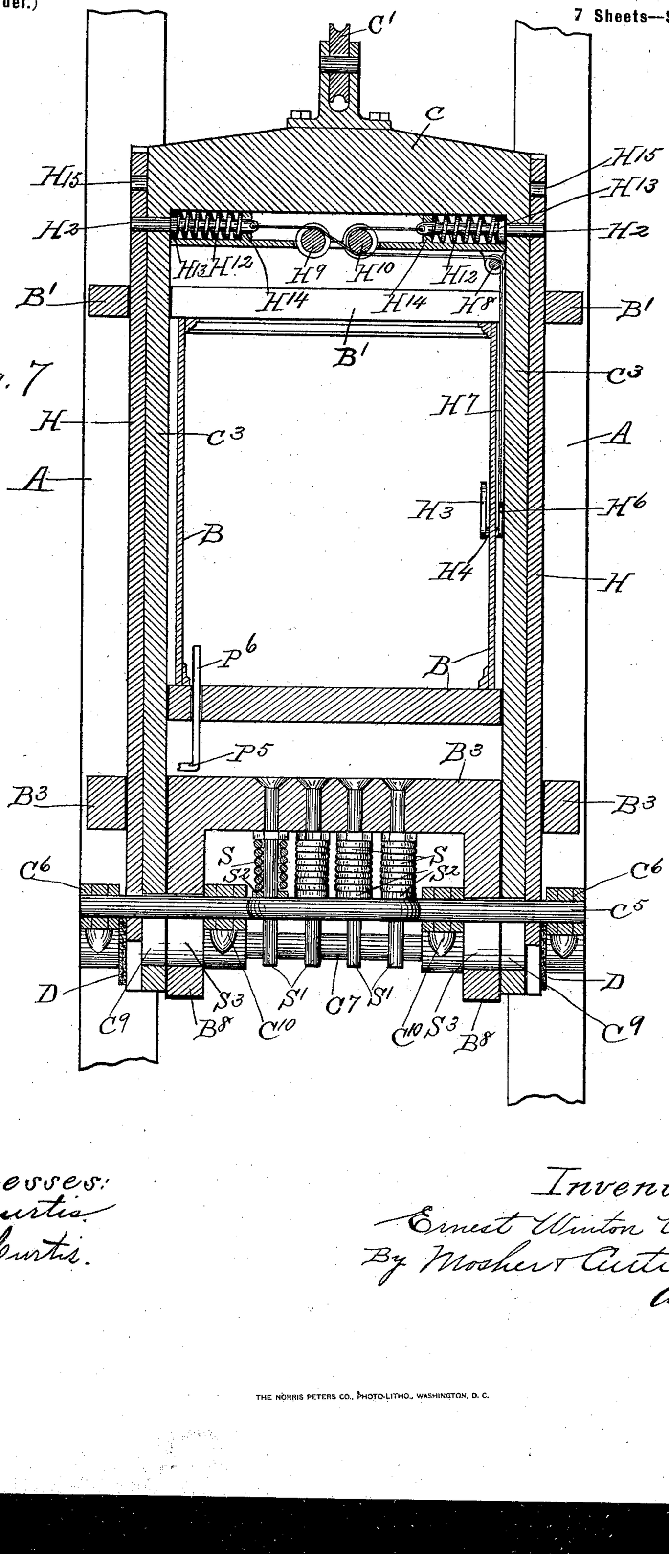


Fig. 7

Witnesses:
L. H. Curtis.
J. G. Curtis.

Inventor:
Ernest Winton West,
By Mosher & Curtis
Attys.

No. 610,211. Patented Sept. 6, 1898.

E. W. WEST.

SAFETY ELEVATOR.

(Application filed Feb. 24, 1898.)

(No Model.) 7 Sheets—Sheet 7.

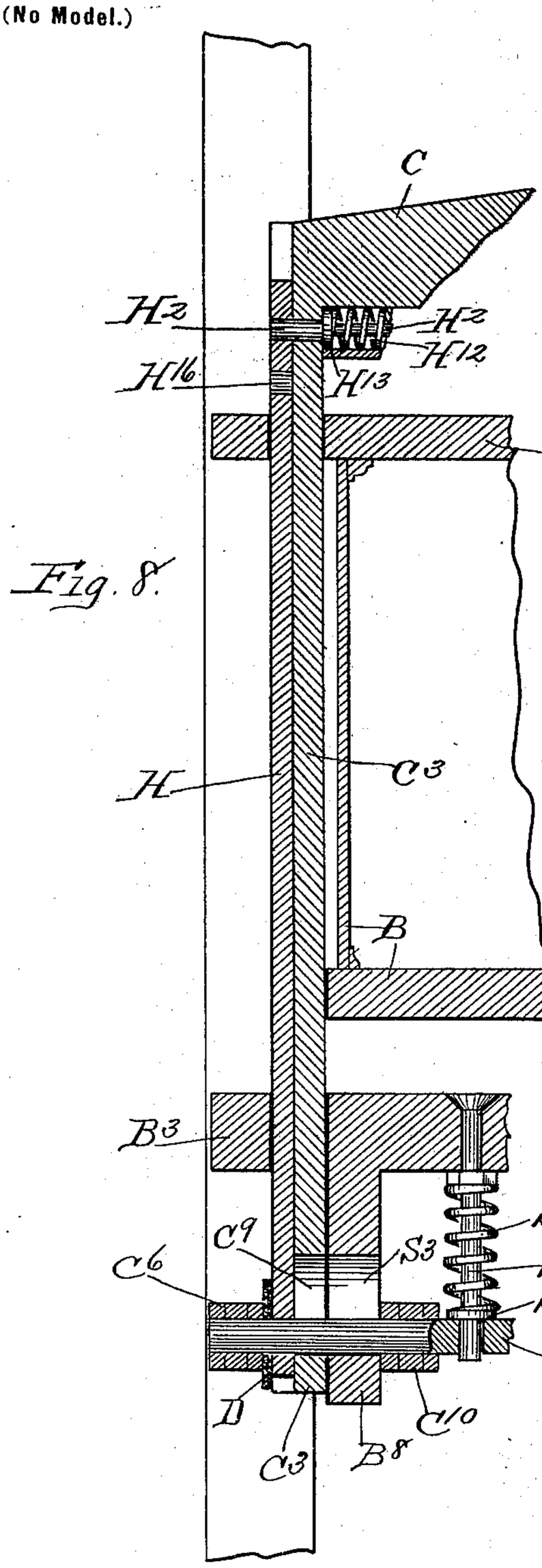


Fig. 8.

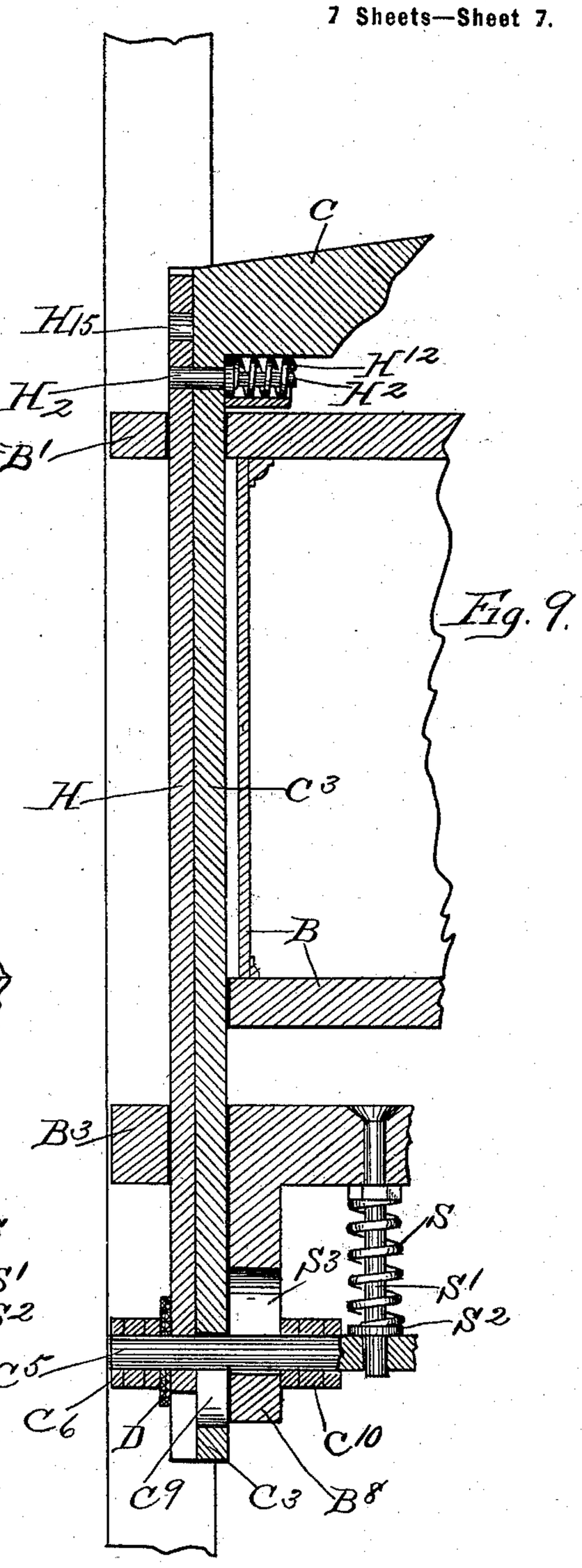


Fig. 9.

Witnesses:
L. H. Curtis.
J. G. Curtis.

Inventor:
Ernest Winton West,
By Mosher & Curtis
Attys.

UNITED STATES PATENT OFFICE.

ERNEST WINTON WEST, OF GLOVERSVILLE, NEW YORK.

SAFETY-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 610,211, dated September 6, 1898.

Application filed February 24, 1898. Serial No. 671,459. (No model.)

To all whom it may concern:

Be it known that I, ERNEST WINTON WEST, a citizen of the United States, residing at Gloversville, county of Fulton, and State of New York, have invented certain new and useful Improvements in Safety-Elevators, of which the following is a specification.

The invention relates to such improvements; and it consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings, and the letters of reference marked thereon, which form a part of this specification.

Similar letters refer to similar parts in the several figures therein.

Figure 1 of the drawings is a view in side elevation of my improved elevator, partly in vertical section and with parts of some of the braces broken away. Figs. 2 and 3 are similar elevations with the braces wholly removed and showing movements of parts of the stop mechanism. Fig. 4 is a horizontal section taken on the broken line 4 4 in Fig. 2. Fig. 5 is a similar section taken on the broken line 5 5 in Fig. 2. Fig. 6 is a vertical central section taken on the broken line 6 6 in Fig. 4. Fig. 7 is a vertical central section taken at right angles to the plane of the section shown in Fig. 6. Figs. 8 and 9 are views similar to Fig. 7, showing movements of parts, a portion of the apparatus being broken away.

The elevator-shaft is rectangular in horizontal section and is provided in each of the four corners with an upright guide-post A, supported in any known manner by the shaft-inclosing framework. (Not shown.) When desired, the posts may be additionally secured on two opposite sides by diagonal plates A′ or horizontal plates A^2, or both, secured to the posts by bolts A^3.

The car B has a roof B′, which projects on the four sides out into the spaces between the guide-posts, forming the four guide projections B^2, as seen in Fig. 4. The car is supported by the subjacent platform B^3, having similar guide projections B^4, as seen in Fig. 5, so that the car is guided by the projections on its roof and similar projections on the independent supporting-platform.

Between the bottom of the car and the platform are interposed the cushion-springs B^5, preferably one coil in each corner, and the bolts B^6, one bolt passing from the car-bottom through each spring and loosely down through the platform, where they are secured by the nuts B^7, which form stops to limit the upward movement imparted to the car by the springs. When the weight of the car and its load compresses the springs, the bolts are forced downwardly through the platform.

As a means for raising the platform and car I provide a yoke C over the roof of the car with a hoisting-pulley C′, which may be connected by cable C^2 with any known form of motor. (Not shown.) The yoke is provided with depending arms C^3, which loosely pass, respectively, down through openings in two opposite sides of the roof projections and the platform projections, as seen in Figs. 4, 5, and 7. The yoke-arms are preferably made up of a plurality of sections, as will be hereinafter more particularly set forth. The lower ends of the arms are each provided with a projection or supporting-bracket C^4, which engages the bottom of the platform to support the same, as seen in Fig. 1. The lower ends of the arms also support the cross-rod or pivot C^5 beneath the platform, crossing from one side of the platform to the opposite side. The ends of this cross-rod form each a pivotal support for the joint of a toggle connection C^6 between the rod and two other cross-rods C^7, oppositely disposed and parallel with the intermediate rod C^5. The oppositely-disposed rods are movable horizontally toward and from each other in supporting guide-slots C^8, contained in the depending side walls B^8 of the main platform.

Fixed upon each end of each horizontally-movable cross-rod is an eccentric D, in the form of a roll having a serrated or roughened periphery D′, adapted to prevent the roll from sliding without rotary movement when forced into engagement with the neighboring guide-post.

As a means for operating the toggle connections to force the eccentrics into engagement with the respective posts I provide a series of coil-springs S, interposed between the bottom of the platform and the cross-rod C^5. The coils are held in place by the vertical rods S′, secured at their upper ends to the

platform, with their lower ends passed loosely down through the enlarged cross-rod C^5, the ends of the springs bearing upon the washers S^2. These springs are compressed between the rod and platform so long as the cross-rod is held up in the upper ends of the vertically-elongated guide-slots S^3 in the side walls of the platform. They will be so compressed by the weight of the car as long as the car and platform are supported by the arms of the yoke; but if the actuating-cable should break the supporting function of the yoke-arms would cease and the springs S would force the cross-rod C^5 down the slots S^3, which would operate the toggle connections, changing their relative position from that shown in Fig. 1 to that shown in Fig. 2 and forcing the eccentrics into engagement with the guide-posts. As soon as the eccentrics engage the posts they begin to turn, bringing those portions having the larger radius into engagement until sufficient resistance is afforded to stop the platform and car.

As the yoke-arms descend relatively to the platform the pawl P, pivoted at P′ in the slot-aperture P^2, Fig. 5, upon the platform and controlled by spring P^3, slips over the teeth P^4 on the yoke-arm and finally engages with one of them to lock the cross-rod C^5 and eccentrics in the position shown in Fig. 2. The pawl is provided above its pivot with an offset P^5, Fig. 7, which extends beneath the floor of the car, from which point it is projected up through an open slot in the car-floor into the car and provided with a releasing-handle P^6. After the cable is repaired the pawl can be released by means of the handle and the elevator released by the usual action of the cable, the yoke, with its arms, being first raised to operate the toggle and withdraw the eccentrics from engagement with the posts. One or more of such pawls may be employed, as desired.

It is an important element of safety that the eccentrics and car cannot be released until the pawl is first released to permit of a relative movement of the yoke-arms and platform, after which the weight of the car maintains the springs between the platform and cross-rod C^5 in a state of compression, the arms holding the cross-rod up, so that the eccentrics are prevented from engaging the guide-posts so long as the platform and car are supported by the cable; but it sometimes happens that the cable operating or controlling mechanism becomes disabled or inoperative, and while the cable affords sufficient resistance to the downward movement of the car to maintain the springs between the platform and cross-rod in a state of compression, yet not sufficient to prevent a dangerous movement or velocity of the car, which may be either in an upward or downward direction. As a means for removing this element of danger I provide each of the yoke-arms with a movable section consisting of the plate H, which I have shown in Figs. 4 and 5 dovetailed into the side of the main section or arm of the yoke. This plate-section extends the length of the arm and is movable lengthwise on the main section.

It will be observed that the cross-rod C^5 passes through an elongated aperture or slot C^9 in the lower end of the main section, but passes through a closely-fitting aperture in the plate-section to permit of the relative vertical or lengthwise movement of the two sections.

At the upper end of the sections is a pin H^2, which passes through a close-fitting aperture in both sections, thereby preventing a relative movement until the pin is withdrawn. As a means for withdrawing these pins simultaneously one on each arm of the yoke I provide within the car a hand-lever H^3, pivoted upon the arm of the yoke by a pivot or rock-shaft H^4, which passes through a vertically-elongated slot *h* in the wall of the car. Fixed upon the inner end of this shaft is a hand-lever H^3 and upon the outer end a shorter lever H^6, to the end of which is secured a cord or cable H^7, which passes up over the guide-pulley H^8, where it is divided into two strands, one passing up over the guide-pulley H^9 and the other over guide-pulley H^{10}, the ends of the strands being respectively secured to the inner ends of the pins H^2. By means of the hand-lever both pins can be simultaneously withdrawn from the apertures in the plate-sections, and when the lever is released the controlling-springs H^{12}, bearing at one end upon the annular flange H^{13} on the pin-shank and at the other end upon the fixed guide H^{14}, will force the pins back into the plate-apertures when they register with the corresponding apertures in the main section.

It will be observed that the plate-sections have each a second pin-aperture H^{15}, located just above the other aperture H^{16}.

From the foregoing description it is apparent that if the hand-lever is operated to withdraw the pins from the plate-sections while the parts are in the position shown in Fig. 7 the compressed springs S will immediately force the cross-rod C^5 down into the lower ends of the slots S^3 in the depending walls of the platform and down into the lower ends of the slots C^9 in the main sections of the yoke-arms, forcing the plate-sections from the position shown in Figs. 7 and 1 down to the position shown in Fig. 3, which movement actuates the toggle connections and causes the eccentrics to engage the guide-posts, as shown in said Fig. 3 and as before explained, thereby stopping the car forthwith.

The pins H^2 are forced by their controlling-springs into the upper apertures H^{15} when the plate-section has descended until such apertures register with the pin-apertures in the main sections of the yoke-arms, whereupon the parts are locked as before, and the car cannot be moved until the operator withdraws the pins by means of the hand-lever, as before explained. The operator desiring

to start the car again must withdraw the pins H^2 and allow the main sections of the yoke-arms to pass down until the cross-rod C^5 again rests in the upper ends of the slots C^9 and the pins H^2 have been forced into the lower pin-apertures in the plate-sections, whereupon the parts will occupy the same relative positions as those shown in Fig. 2, the eccentrics being still held in a locked position. The car can then be released by releasing the pawl P and lifting the car, as before explained.

Fig. 8 shows the position of the parts after the car has been stopped by releasing the plate-section H by means of the hand-lever H^3, and Fig. 9 shows the position of the parts after the main section of the yoke-arms has been lowered to the position shown in Fig. 2, preparatory to releasing the car.

When the car is locked against movement by means of my improved mechanism, above described, the car, platform, and other parts are supported directly by the eccentrics and the cross-rods to which they are secured, the upper walls of the guide-slots C^8 in the platform side walls bearing upon such rods.

When desired, the toggle connections C^6 on the outer side of the side walls of the platform can be supplemented by a pair of similar toggle connections C^{10}, located between such side walls, as shown, whereby great strength and stability are imparted to the construction.

As a means for keeping the eccentrics in the proper position, with their sides having the shorter radius adjacent to the guide-posts A while out of active use, I provide the several shafts or cross-rods C^7, which support the eccentrics, with an upwardly-projecting arm J and connect its upper end with the lower side of the platform by means of a light coil-spring J', which will yield sufficiently to permit of the required rotary movements of the shafts in either direction. It is obvious that the eccentrics when once forced into engagement with the guide-posts will afford equal resistance whichever way they are turned on their axes, so that a runaway car can with equal facility be stopped during its upward movement by operating the hand-lever H^3.

The corner guide-posts A may be made of metal, if desired, in which case they should be serrated or roughened on the side engaged by the eccentrics, as shown at K in Fig. 3. I prefer, however, to make the posts of metal, with a facing K', formed of short lengths of hard wood, secured to the metal posts on the sides engaged by the eccentrics, and to make the eccentrics each of a metal sleeve or ring mounted upon a core of hard wood, as shown in Fig. 1. *d* represents the metal sleeve, and *d'* the wooden core.

In a generic sense the yoke, its sectional arms, and the cross-rod C^5 constitute a car-lifting frame, and as the cushion-springs between the car and platform may be omitted, if desired, and the platform made the bottom of the car the springs S are virtually compressed between the car-bottom and the lifting-frame and have the function of producing a vertical movement of the lifting-frame relatively to the car, and thereby operating the toggle connections and through such connections the eccentrics or stops.

By the term "car" I wish to include a freight-car, cage, or platform, as well as a passenger-car. The plate-sections of the yoke-arms of the car-lifting frame may be termed "releasing-sections," because they serve to release the spring-actuated toggle connections which directly actuate the stops when these sections are released from the main sections by withdrawing the pins H^2. My improved stop mechanism engages all four of the corner guide-posts of the elevator-shaft.

When desired, the corner-posts may be reinforced to resist the thrust of the eccentrics by means of a pair of yoke-plates R, secured to the platform B^3, and each provided with a pair of arms embracing two of the corner-posts on that side of the elevator-shaft. The yoke-arms may be provided each with a friction-roller R', adapted to engage the outer side of the corner-post, as shown in Fig. 5.

What I claim as new, and desire to secure by Letters Patent, is—

1. In an elevator, the combination with the upright guide-posts; the car; and stops on the car engageable with the posts; of a car-lifting frame movable vertically relatively to the car; means for imparting vertical movements to the frame relatively to the car; a pawl-and-ratchet connection between the car and frame for locking the parts in varying positions; and stop-actuating connections between the stops and lifting-frame, substantially as described.

2. In an elevator, the combination with the upright posts; the car; the stops on the car engageable with the posts; and a stop-actuating spring; of a main car-lifting frame; a releasing-section movable on and locked to the main frame; and controlling the stop-actuating spring; and means within the car for unlocking the releasing-section, substantially as described.

3. In an elevator, the combination with the upright guide-posts; the car; and eccentric-stops on the car engageable with the posts; of means for bringing the stops into engagement with the posts; and retraction-springs for controlling the rotative movements of the stops, whereby that side of each stop having the shortest radius is presented to the post while not actively engaged, substantially as described.

4. In an elevator, the combination with the upright posts; the car; and stops on the car engageable with the posts; of a stop-actuating spring; a main car-lifting frame having a lifting projection positively engageable with the car; a releasing-section movable on the main frame and controlling the stop-actuating spring; means for locking the releasing-

section at each end of its path of movement; and means within the car for unlocking the releasing-section, substantially as described.

5. In an elevator, the combination with four guide-posts and the car; of a lifting-frame movable vertically relatively to the car; compressed springs between the car and lifting-frame; depending vertical side walls connected to the car; a pair of cross-rods movable horizontally toward and from each other in horizontal slots formed in said side walls; stops on the opposite ends of each cross-rod engageable with the four posts respectively; toggle mechanism for operating the stops and cross-rods; and operating connections between the lifting-frame and several toggle mechanisms, substantially as described.

In testimony whereof I have hereunto set my hand this 8th day of February, 1898.

ERNEST WINTON WEST. [L. S.]

Witnesses:
A. B. PEAKE,
THOS. C. WEST.