

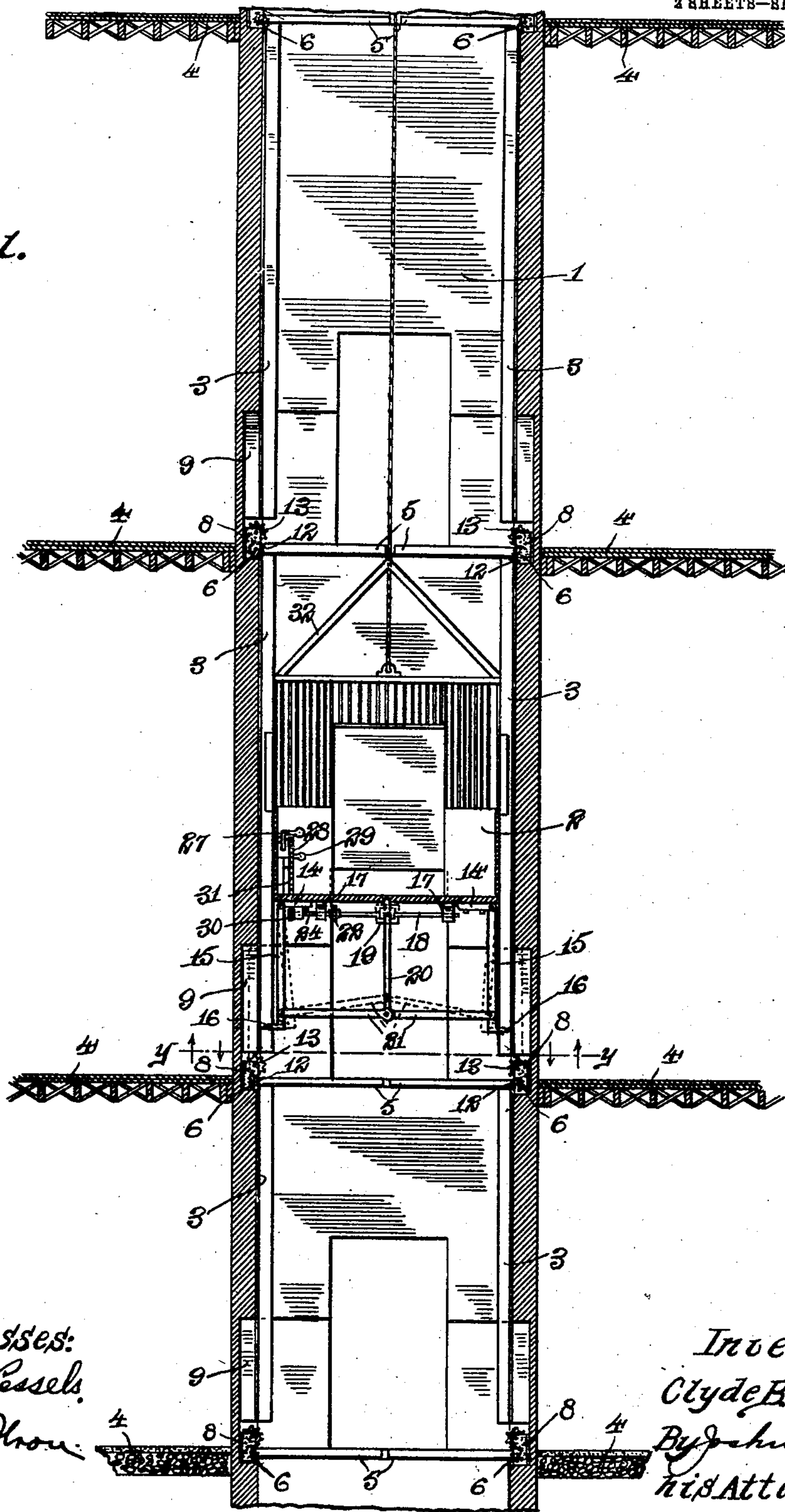
C. B. NORRIS.  
SAFETY DEVICE FOR ELEVATORS.  
APPLICATION FILED FEB. 16, 1910.

969,557.

Patented Sept. 6, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:  
E. B. Wessels.  
A. A. Olson.

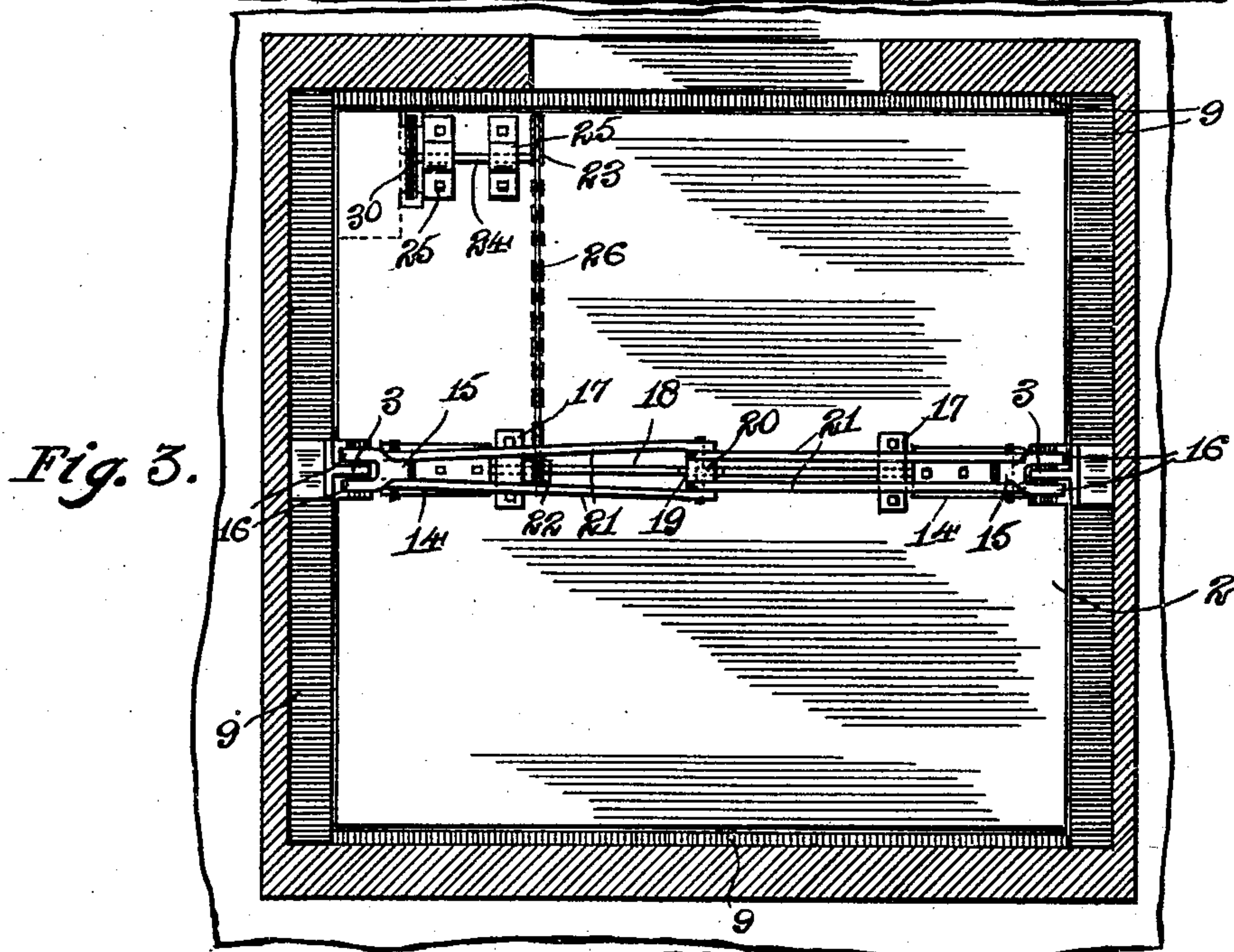
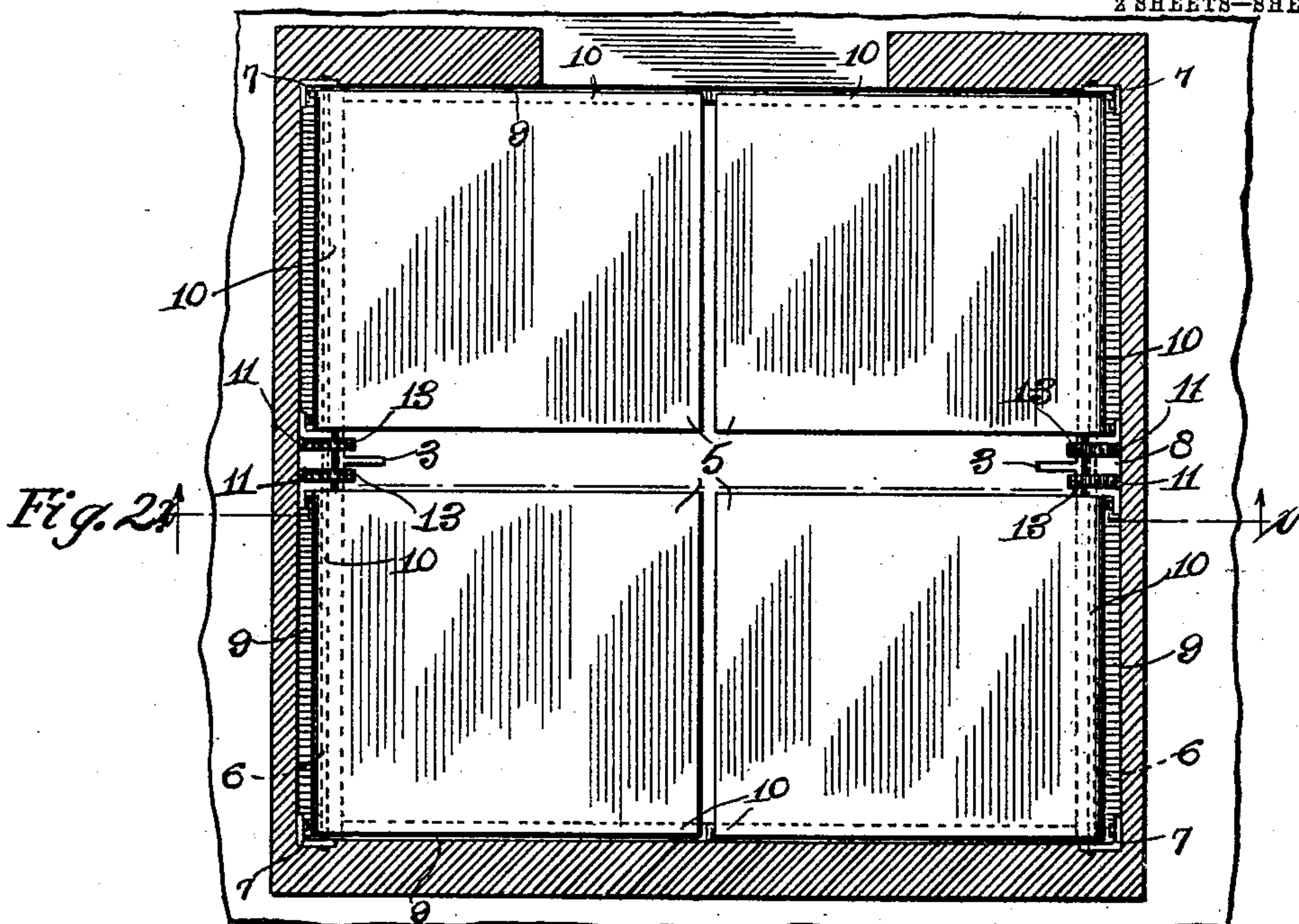
Inventor:  
Clyde B. Norris  
By *John A. Norris*  
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969,557.

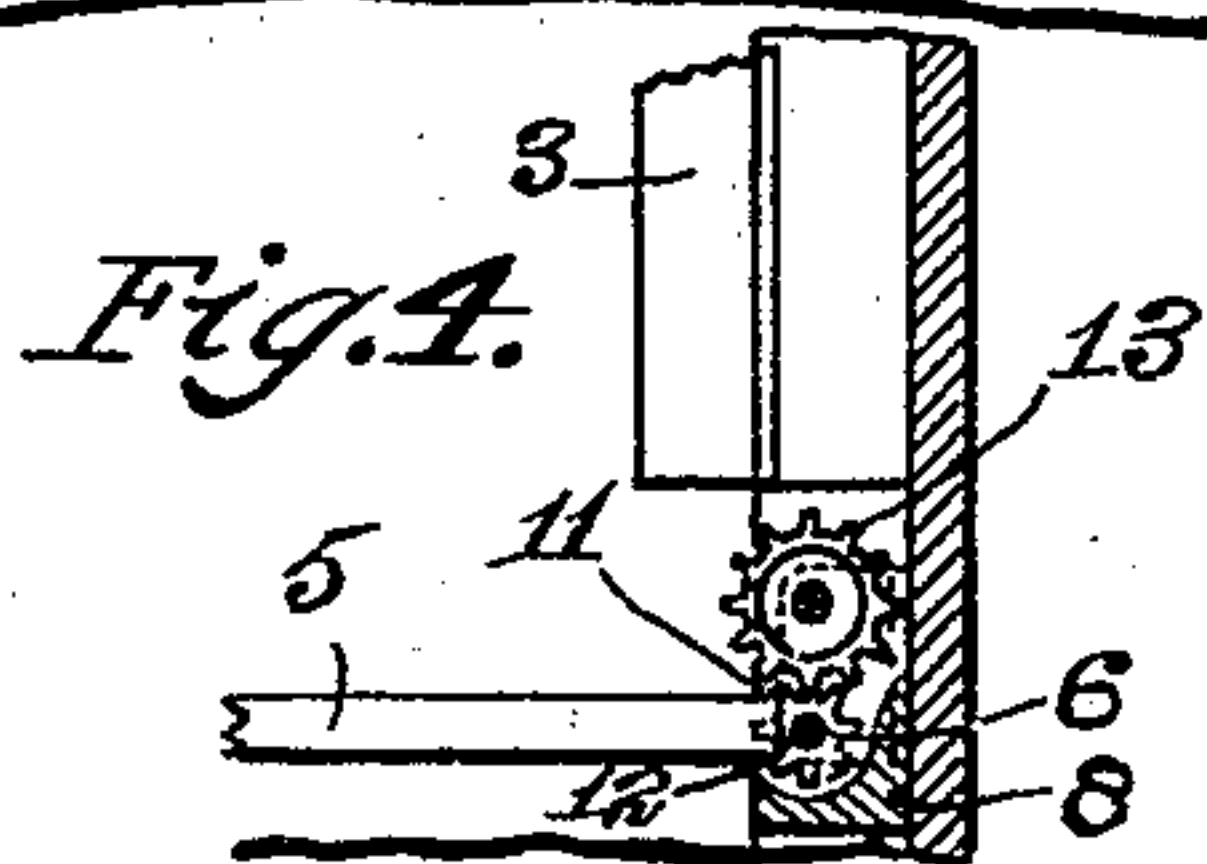
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2 SHEETS—SHEET 2.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

CLYDE B. NORRIS, OF EAST CHICAGO, INDIANA.

## SAFETY DEVICE FOR ELEVATORS.

969,557.

Specification of Letters Patent.

Patented Sept. 6, 1910.

Application filed February 16, 1910. Serial No. 544,156.

*To all whom it may concern:*

Be it known that I, CLYDE B. NORRIS, a citizen of the United States, residing at East Chicago, county of Lake, and State of Indiana, have invented certain new and useful Improvements in Safety Devices for Elevators, of which the following is a specification.

My invention relates to elevators and more specifically to safety devices therefor.

The object of my invention is the provision of a device of the nature stated adapted for arrangement in an elevator shaft to prevent the accidental falling of the elevator car down the latter and also to prevent the falling of persons or other articles into an open elevator shaft.

A further object is to provide a device of the character mentioned which will be positive and thoroughly efficient in its operation and which will be strong, durable and economical of construction.

Other objects will appear hereinafter.

With these objects in view my invention consists generally in the arrangement at intervals in an elevator shaft of swinging normally horizontally disposed hatch doors positioned therein preferably directly opposite or in horizontal alinement with the floors or landings intersected by the shaft; and in means carried by the elevator car adapted normally, upon the approach of the latter to said hatch doors, to effect the swinging of the latter to vertical or inoperative position to permit of the passage of the elevator car.

My invention further consists in means readily and easily operable by the elevator operator whereby, upon the accidental dropping of the elevator car, said hatch doors may be caused to remain in horizontal intercepting position; the invention further consisting in certain details of construction and arrangement of parts all as will be hereinafter fully described and more particularly pointed out in the appended claims.

My invention will be more readily understood by reference to the accompanying drawings forming a part of this specification, and in which,

Figure 1 is a vertical longitudinal section through an elevator shaft equipped with the preferred form of my safety device, the section being taken on substantially the line  $x-x$  of Fig. 2, Figs. 2 and 3 are horizontal transverse sections taken on the line  $y-y$  of

Fig. 1, the former looking downward therefrom and the latter upward, and Fig. 4 is an enlarged fragmentary detail of a portion of one of the hatch doors showing the meshing gears embodied in the operating mechanism thereof.

Referring now to the drawings, 1 indicates an ordinary elevator shaft rectangular in cross section and 2 the elevator car vertically movable therein upon the usual guide rails 3 provided upon the lateral walls thereof.

4 indicate the landings or floors intersected by the shaft 1. Hinged at intervals in the shaft 1, preferably directly opposite in horizontal alinement with the landings 4 are hatch doors 5, the same being mounted in pairs upon shafts 6 provided at opposite sides of the shaft 1 and which are journaled at their centers in bearing brackets 8 centrally secured to and inwardly projecting from the shaft walls, the guide rails being cut away to receive the same, and at their extremities in bearing plates 7 provided in each of the corners of the elevator shaft, such construction being clearly shown in Fig. 2. Said doors are so arranged that by their own gravity they are normally disposed in horizontal or closing position.

In order to accommodate the doors 5, the inner walls of the elevator shaft are cut away forming seats or depressions 9, the latter being so arranged that the outer edge portions 10 of the doors 5, when the latter are in horizontal position, will rest thereon to support the latter.

Fixed to each of the shafts 6, the same being centrally arranged thereon in slots 11 formed in the brackets 8 for the reception thereof, are pinions 12. Also mounted in said slots in said brackets above the pinions 12 are gears 13 meshing with the latter. Said gears are so proportioned that by turning the gears 13 through approximately one-eighth of a rotation the pinions 12 will be rotated through one-quarter of a rotation, in other words said gears are preferably of a ratio 2:1.

Having their upper extremities swingingly secured to hinge plates 14 centrally secured to the under side of the elevator car 2 adjacent the latter edges thereof are depending arms 15 the offset lower extremity of each of which is bifurcated forming two rack teeth 16 so spaced as to be adapted, upon the operation of the elevator to each



engage one of the gears 13 to cause the operation of the hatch doors, said arms being of such a length as to just permit of the passage of said hatch doors beneath the elevator car bottom without said doors contacting the latter. As shown in Fig. 3 the bifurcated ends of the arms 15 embrace the guide rails 3 which evidently also act as a guide therefor.

Centrally mounted beneath the elevator car in bearing brackets 17 secured to the under side of the latter is a crank shaft 18. Having its upper end connected to crank 19 centrally formed in said shaft 18 is a depending rod 20. Having their inner extremities pivotally secured to the lower extremity of the rod 20 and their outer extremities similarly secured to the arms 15 close to the lower ends thereof are connecting rods 21, two being shown connected to each of said arms 15 one at either side thereof. If desired a single rod 21 connecting each of the arms 15 with the rod 20 could be employed, two however being preferably employed to insure strength and rigidity.

Keyed to the shaft 18 is a sprocket wheel 22. Traveling around said sprocket and a similar sprocket 23 carried by a counter shaft 24 mounted in brackets 25 secured to the under side of the elevator car is a sprocket chain 26. Mounted within the car, the same being positioned therein adjacent the car operating lever 27 or in any other desired location readily accessible by the elevator operator, is a sprocket 28 upon which is secured a projecting handle 29 by means of which the same may be rotated. Connecting said sprocket and a second sprocket 30 fixed to the shaft 24 is a sprocket chain 31. With the construction described it will be seen that an operative connection is established between the handled sprocket 28 and the toothed arms 15 whereby, by a slight rotation of the former, the lower ends of the latter, when in normal or outermost operative position, will be drawn inwardly to inoperative position or to a position as shown in dotted lines in Fig. 1.

The top of the elevator car is formed with an inverted V-shaped construction 32 which, upon the ascent of the elevator car will evidently engage the hatch doors approached by the latter swinging the same to vertical position.

The operation of the device is evident. In the descent of the elevator car, upon the latter approaching a set of hatch doors, the arms 15 held in operative position by the rods 21 engage the sets of gears 13 operatively connected with said doors causing the upward swinging of the hatch doors, permitting of the passage of the car; said doors, as the car descends below the same swinging back to horizontal closing position by their own gravity. Upon the ascent of

the car the construction 32, as before described, elevates the successive sets of doors as each is approached; the toothed members 15, upon the engaging extremities thereof being brought to engagement with the gears of the previously opened doors reversely rotate said gears to positively close said doors, the latter provision is only an additional means of insuring the positive closing of said doors since, as before described, were such provision not made, the same would close of their own weight. Now upon the accidental dropping of the elevator car, all that is required in order to check or stop the same is that the elevator operator turn the handle 29 through a partial rotation. Upon so doing, the arms 15 as before described are drawn inwardly to inoperative position, whereupon the normally closed hatch doors immediately thereunder, upon being approached, will not be elevated, but will remain in horizontal traversing position, hence will act as a stop preventing further dropping of the car. By arranging the hatch doors at the same level as the floors, the same will evidently prevent persons or articles dropping down the elevator shaft.

While I have shown what I deem to be the preferable form of my device, I do not wish to be limited thereto as there might be various changes made in the details of construction and arrangement of parts without departing from the spirit of the invention comprehended within the scope of the appended claims.

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

1. The combination with an elevator shaft and an elevator car movable therein, of normally horizontally disposed swinging hatch doors hinged at intervals in said shaft adapted in horizontal position to traverse the passage through said shaft, rack and pinion means adapted normally, upon the descending operation of the elevator car, to successively swingingly elevate said doors to permit of the passage of said car, and manually operable means operatively connected with said last named means whereby the inoperative positioning of said last named means relative to said doors may momentarily be effected, substantially as described.

2. The combination with an elevator shaft and an elevator car movable therein, of horizontally disposed rotary shafts arranged in pairs at intervals in said elevator shaft, normally horizontally disposed hatch doors fixed to said shafts adapted in horizontal position to traverse the passage through said elevator shaft, there being depressions formed in the inner walls of said elevator shaft for the reception of said doors when in elevated position, the outer edge portions of said doors, when in horizontal position, be-



ing supported upon ledges formed by said depressions, pinions fixed to each of said door shafts, means carried by and depending from the elevator car adapted through the medium of said pinions, upon the descending operation of said car, to swingingly elevate said doors to permit of the passage of the elevator car, and means manually operable from said car for effecting the inoperative positioning of said last named means, substantially as described.

3. The combination with an elevator shaft and an elevator car movable therein, of rotary shafts arranged in pairs at intervals in said elevator shaft, normally horizontally disposed hatch doors fixed to said shafts adapted in horizontal position to entirely close the passage through said shaft, there being depressions formed in the walls of said elevator shaft for the reception of said doors in vertical position, pinions fixed to said shafts, gears meshing with said pinions, depending rack bars secured to the under side of said elevator car adapted normally, upon the operation of said elevator car to operatively engage said gears to actuate said doors to permit of the passage of said car, and means operable from within said car for swinging said rack bars to inoperative position, substantially as described.

4. The combination with an elevator shaft and an elevator car movable therein, of rotary shafts arranged in pairs in said elevator shaft in horizontal alinement with the landings intersected by the latter, normally horizontally disposed hatch doors fixed to said shafts adapted in horizontal position to traverse the passage through said shaft, seats formed in the walls of said elevator shaft for the reception of said doors in elevated position, pinions fixed to said door shafts, gears meshing with said pinions, depending rack bars swingingly secured to the under side of the elevator car, means for normally holding said bars in position to engage said gears, rotary means arranged in said car operatively connected with said last named means whereby said rack bars may be swung to inoperative position, and means arranged at the top of said car adapted, upon the ascending operation of the latter, to contact and to swingingly elevate said doors, substantially as described.

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

CLYDE B. NORRIS.

Witnesses:

HELEN F. LILLIS,

JOSHUA R. H. POTTS.