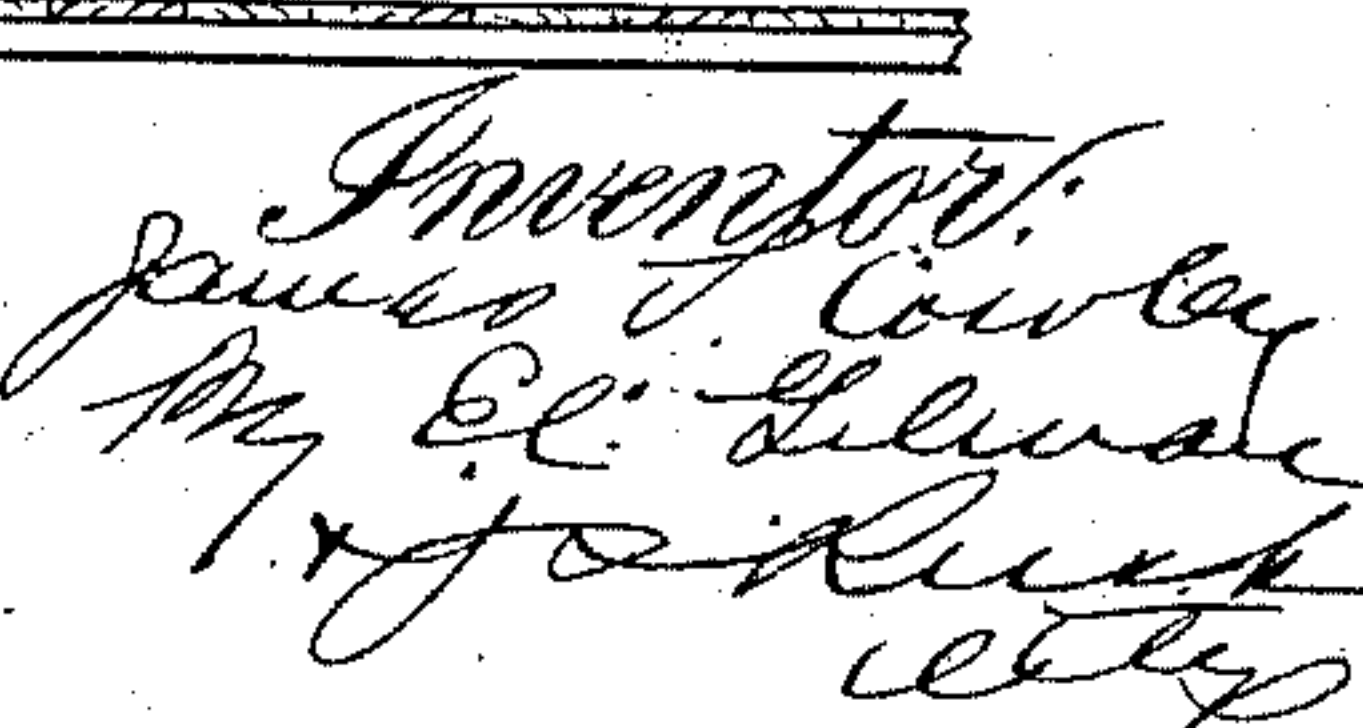


ELEVATOR.

Patented July 20, 1909.

5 SHEETS--SHEET 1.



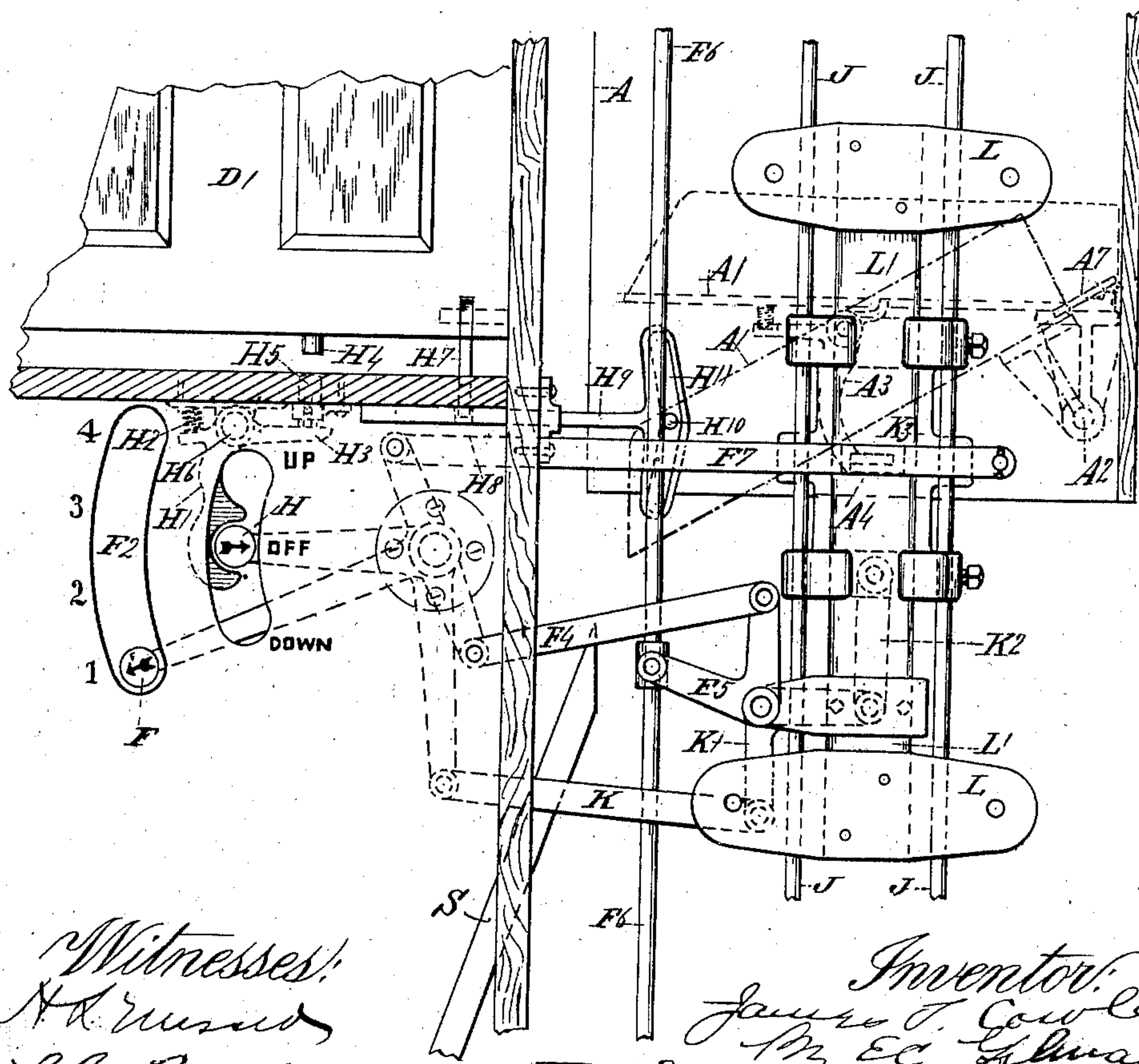
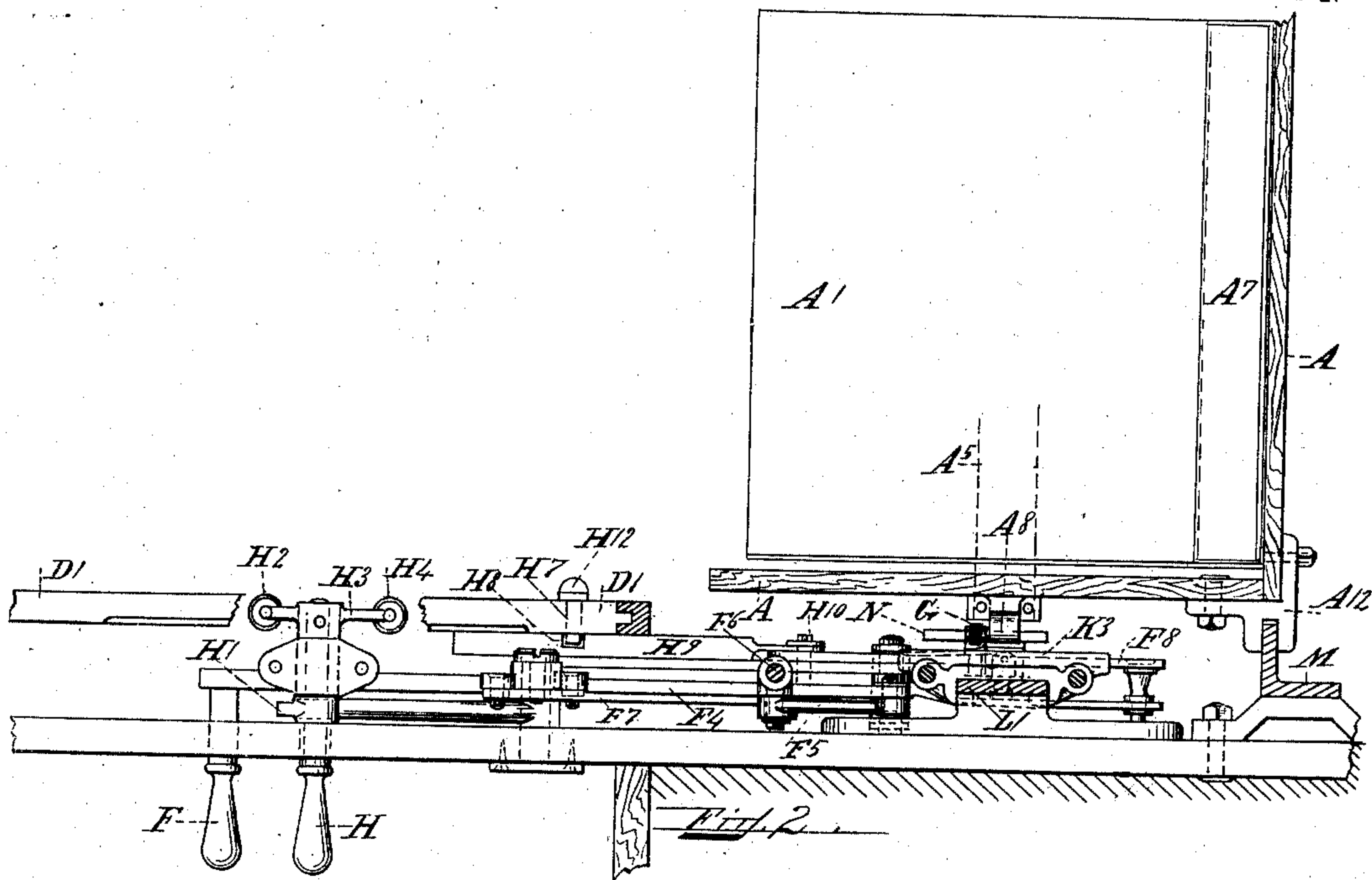
928,364.

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ELEVATOR.

APPLICATION FILED JULY 17, 1905.

Patented July 20, 1909.

5 SHEETS—SHEET 2.



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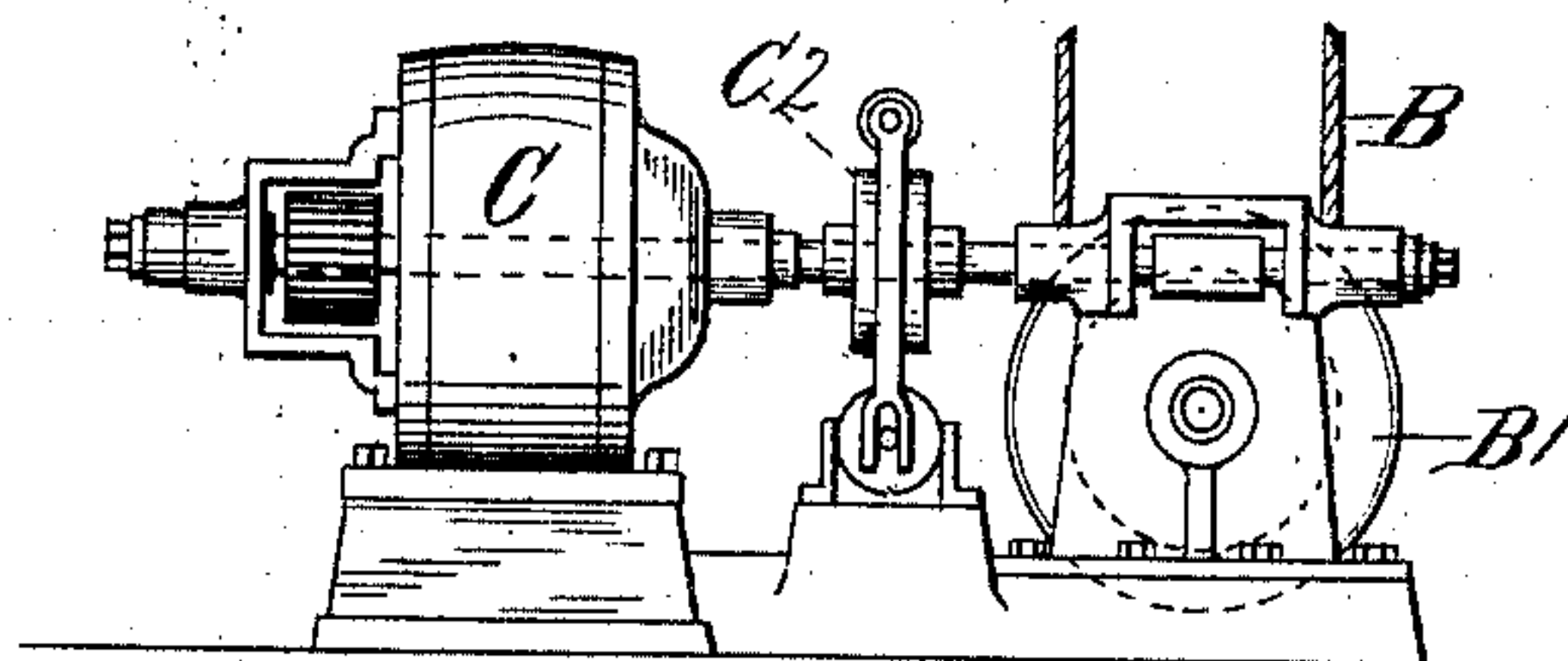
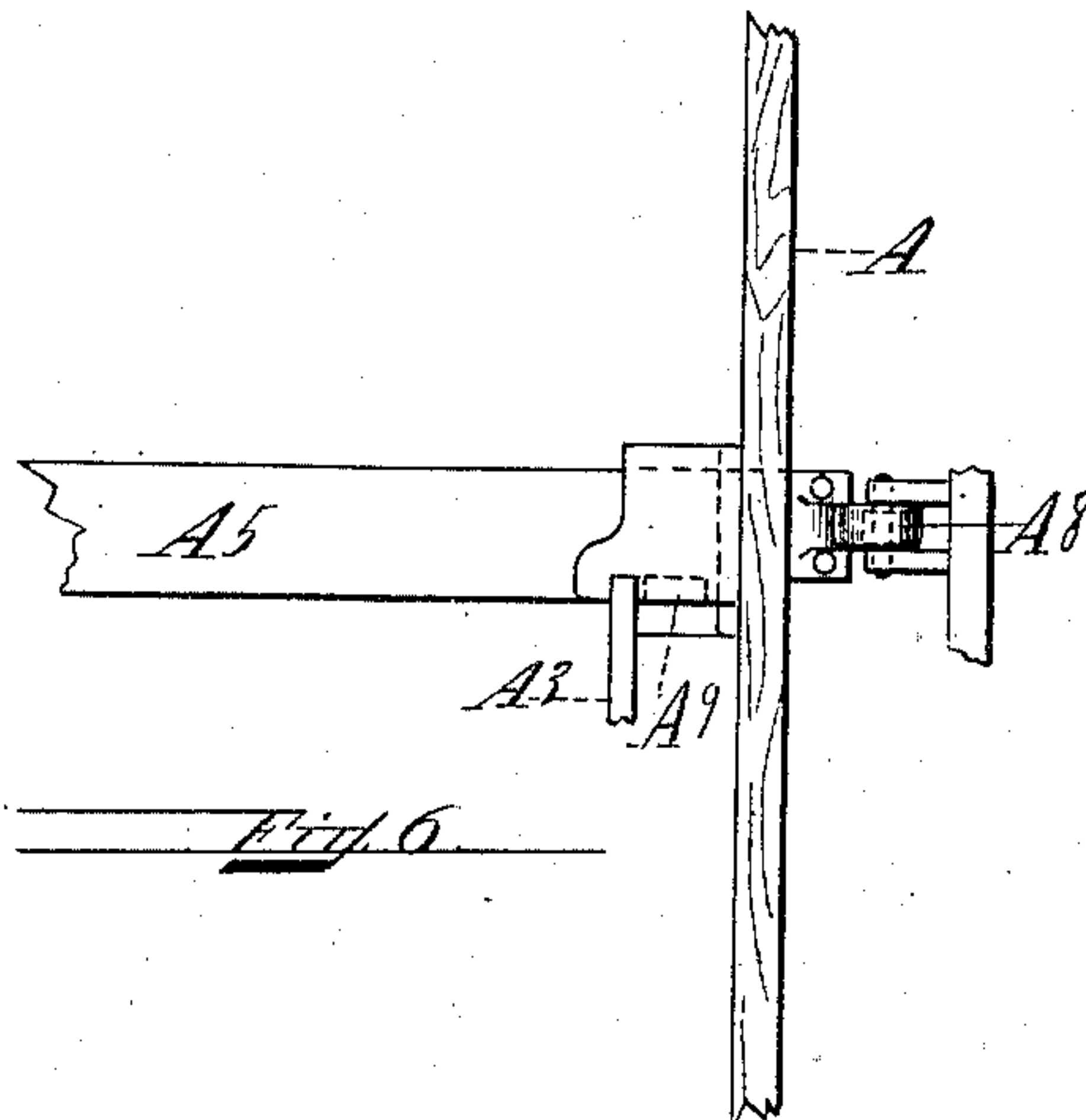
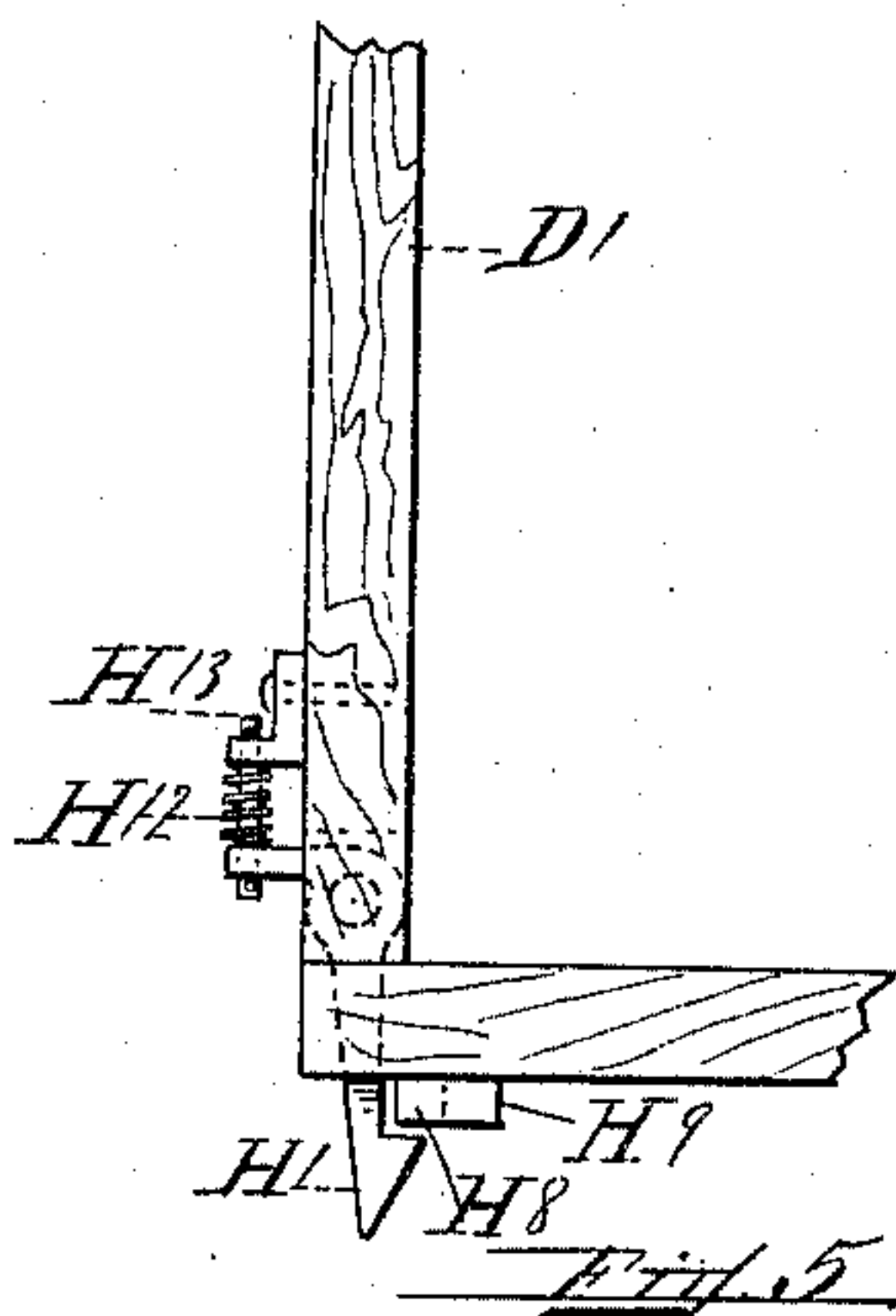
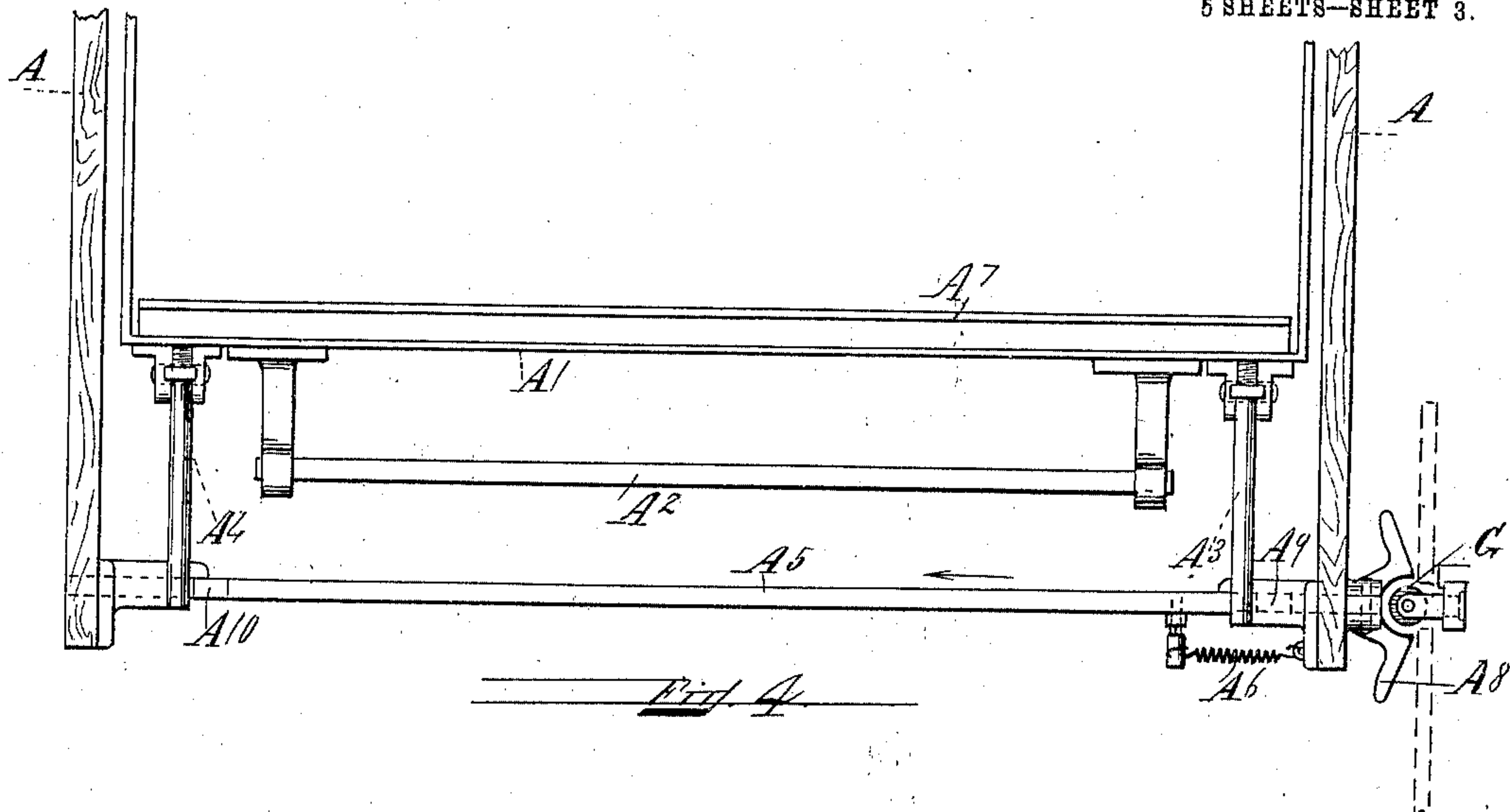
ELEVATOR.

APPLICATION FILED JULY 17, 1905.

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928,364.

5 SHEETS—SHEET 3.



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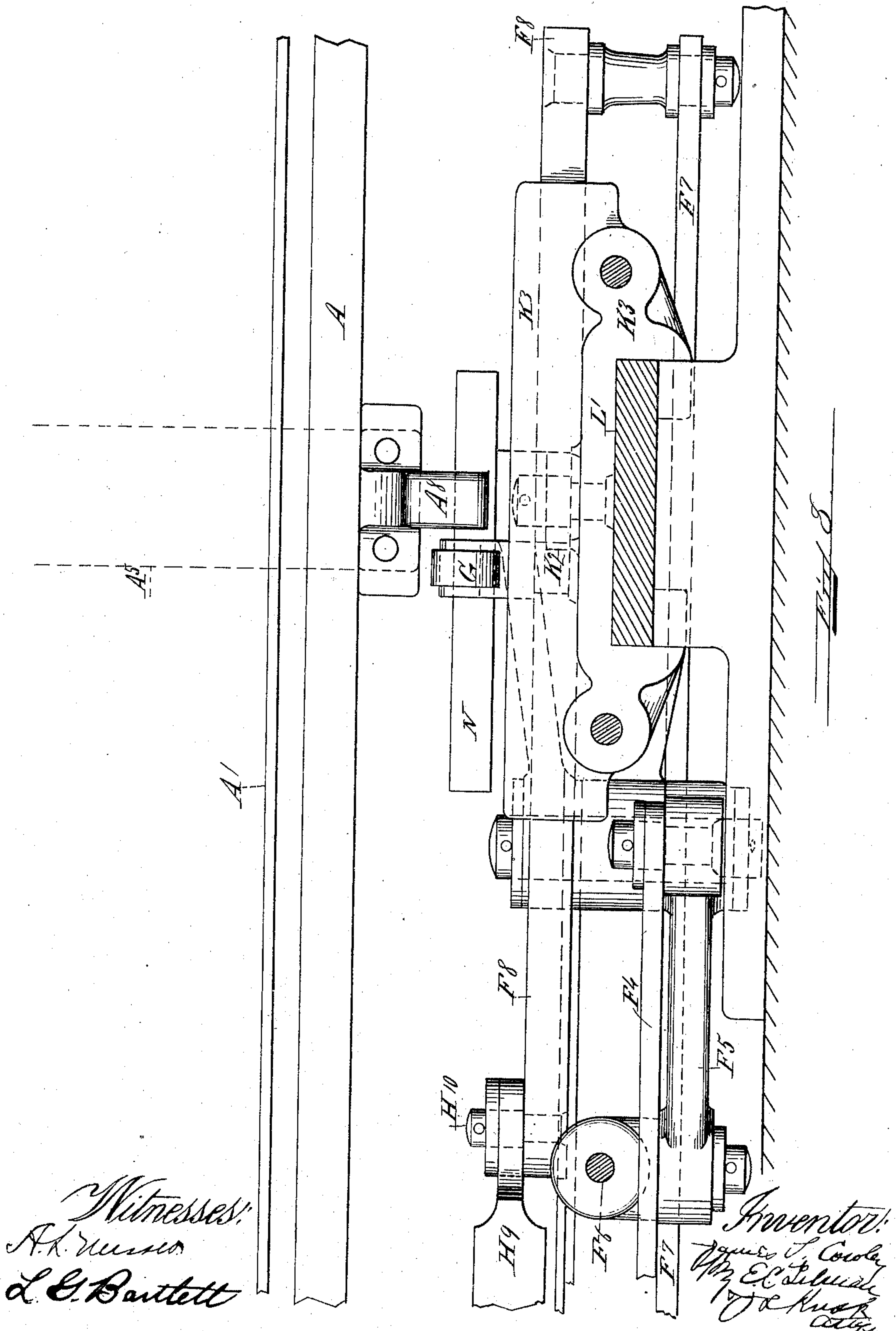
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6 SHEETS—SHEET 4.



J. T. COWLEY.

ELEVATOR.

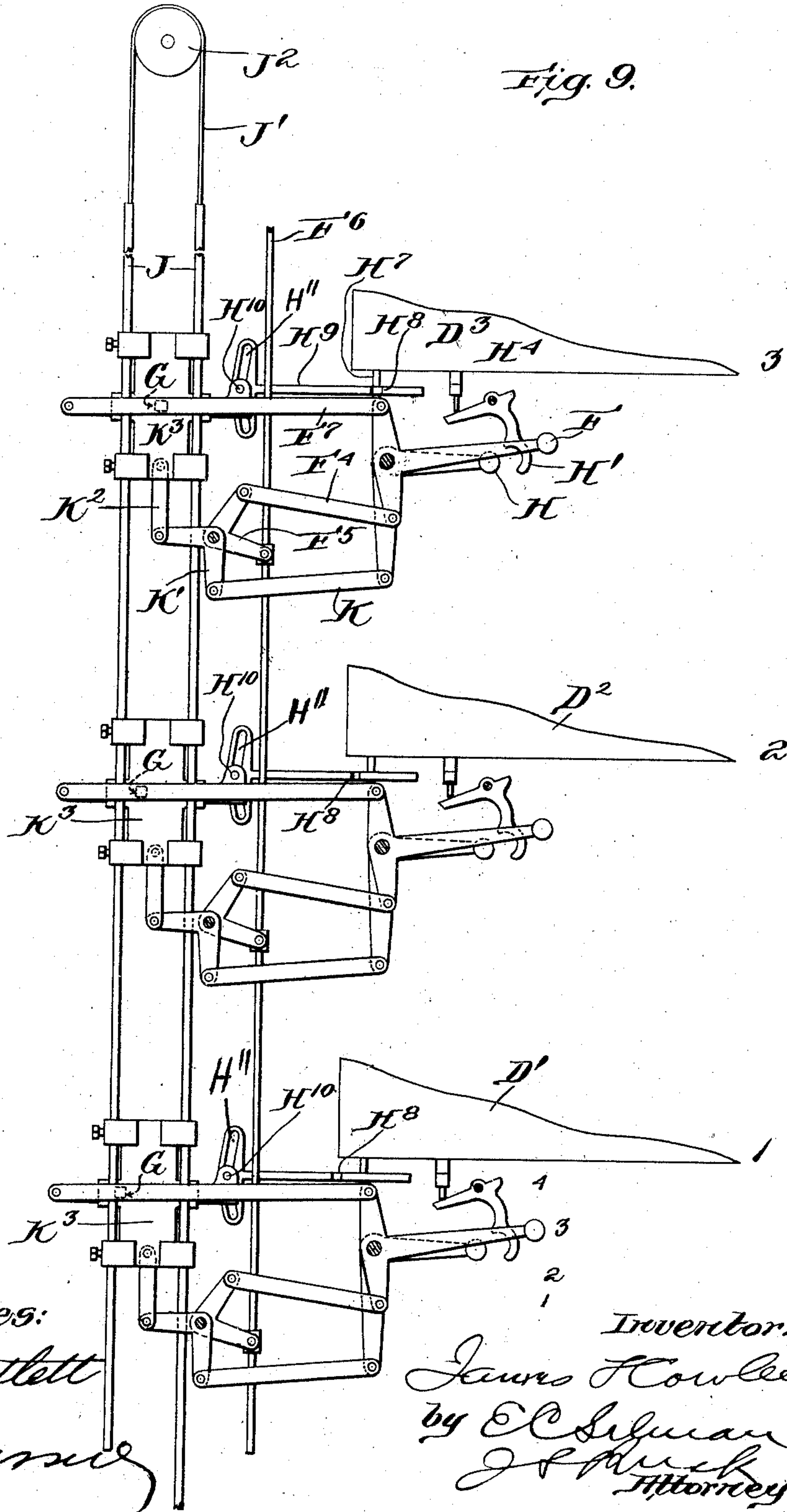
APPLICATION FILED JULY 17, 1905.

928,364.

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5 SHEETS—SHEET 5.

Fig. 9.



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UNITED STATES PATENT OFFICE.

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ELEVATOR.

No. 928,364.

Specification of Letters Patent.

Patented July 20, 1909.

Application filed July 17, 1905. Serial No. 269,974.

To all whom it may concern:

Be it known that I, JAMES T. COWLEY, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Elevators, of which the following is a specification.

My invention relates to elevators and the like and has for its object to provide an elevator apparatus wherein the car may be started from any one of its stopping points and sent to any other selected one of its stopping points and automatically stopped there.

Also it is the object of my invention to provide an elevator apparatus which can be operated only when all of the doors of the well through which access may be had to the car are closed.

Furthermore it is the object of my invention to provide for locking all of the doors of the apparatus except the one at which the car is stopped or to be stopped.

To these ends my invention is an elevator apparatus comprising a car, means to operate the car, a plurality of stopping points along the path of said car, and means to select any one of these stopping points to the exclusion of the others and automatically stop the car at that point. In the preferred form of my invention a selecting device is provided at each stopping point and interconnected car-stopping devices are provided, one at each stopping point, all of which may be controlled by any one of the selecting devices. These stopping devices are so constructed that any one of the selecting devices may be used to throw them successively into operative condition so that any one of them may be rendered operative to the exclusion of the others. In this way the car may be made to stop at any selected one of its stopping points.

Another feature of my invention in its preferred form is that a door is provided at each stopping point which is the only means of access to the car and automatic means is provided for controlling these doors so that when the car is running or about to be started all of these doors are shut and locked except the door at the selected stopping

point. Preferably, also, these doors control the elevator-operating means so that the car cannot be started except when all of the doors are closed.

Other features of my invention are hereinafter pointed out.

In the accompanying drawings which illustrate one form of my invention—Figure 1 is a side elevation of an elevator apparatus showing general arrangement. Fig. 2 is a plan view of the mechanism located at each floor and showing section of the elevator car. Fig. 3 is a side elevation of the parts shown in Fig. 2. Fig. 4 is a front view of the lower part of the car. Fig. 5 is an edge view of the lower part of the slide or door showing latch and controlling bar for same. Fig. 6 is a plan view of a portion of Fig. 4. Fig. 7 is an enlarged view of motor and cable drum. Fig. 8 is an enlarged view of a portion of Fig. 2, and Fig. 9 is a diagram showing the mechanisms at three of the stopping points and the manner in which they are connected together, the parts being in the positions they would occupy when any one had been adjusted so as to stop the car at stopping point or floor number 3.

Referring to the drawings, 1, 2, 3, and 4 represent the floors of a building through which the elevator well extends. Within the well is the car A carried by rope B, supported near the top of the building by a sheave B² on a shaft B³ journaled in a suitable hanger. In the basement of the building is a motor C that drives a drum B' around which the rope B passes and this motor is controlled by a rheostat C'. At the different floors of the building the elevator is accessible through doors D', D², D³, and D⁴ which slide vertically in ways.

The starting of the elevator is effected through a bell crank H (Figs. 2 and 3) connected by a link K with a smaller bell crank K' connected by a link K² with a slide K³ mounted on a vertical bar L'. The bar L' which carries the slide K³ is fixed at its ends to brackets L fastened to the wall of the elevator well. This slide K³ is made with bosses through which extend two rods J connected at their upper ends by a belt or chain J'

passing over a sheave J^2 . One of the rods J is fastened rigidly to the slide K^3 and the other rod J slides loosely through the bosses of said slide and at its lower end said rod is
 5 connected by a bell crank C^4 and links C^3 with the motor-controlling rheostat C' so that vertical movement of that rod J starts and stops the motor C . The reason for employing the two rods J connected by the belt
 10 or chain J' as described is so that one rod will serve to counterbalance the other, thus reducing the labor in operating that rod J which is connected with the controller C' . It will thus be seen that by means of the
 15 bell crank H the motor C may be started, said motor being stopped automatically as described later.

In order to prevent the operation of the car A when any of the doors D' , etc., are
 20 open, or in other words, in order to permit of operating the car A only when all of the doors are closed each bell crank H is controlled by a latch H' which in turn is controlled by its respective door. This latch H'
 25 is pivoted at H^6 and a spring H^2 tends to hold said latch in engagement with the bell crank H but when the door is closed a stud H^4 on the door engages a pin H^5 sliding in any suitable fixture and acting through said
 30 pin H^5 engages the arm H^3 of the latch H' thereby freeing the bell crank H so that the latter may be operated to start the car A up or down. The "off" position of the bell
 35 crank H is midway between the extremes of its movement which is the case also with the arm of the controller C' so that if the bell crank H is swung down the controller arm is swung in one direction and a motor C is
 40 started in one direction and if the bell crank H is swung in the opposite direction the controller arm is swung in the opposite direction and the motor C is started in the opposite direction. It will be seen, however, that
 45 if the door is open the latch H' locks the bell crank H in its "off" position and the car cannot be operated.

The studs which carry the bell cranks F and H are fixed to a wall E' , E^2 , etc., on the
 50 different floors. This wall may be part of the building within which the apparatus is located.

As will be seen from Fig. 9 all of the slides K^3 are rigidly connected by the rod J that is fastened to said slides and therefore if
 55 any of the doors is open and its respective bell crank H is locked none of the other bell cranks can be operated even though their respective doors are closed and consequently in order to start the car in either direction
 60 all of the doors must be closed.

In accordance with the invention it is desired to be able to start the car from any floor and automatically stop it at any of the
 65 other landings or stopping points and in order to accomplish this the selecting and

stopping devices now to be described are provided.

Mounted loosely on the same stud with the bell crank H is a double bell crank F which has connected to it two links F^4 and
 70 F^7 . The link F^4 is connected through a bell crank F^5 pivoted on the bar L' with an interlocking rod F^6 which is common to all of the bell cranks F , all of said bell cranks being
 75 connected in similar manner with said rod. The other link F^7 is connected with a slide F^8 mounted in transverse ways on the slide K^3 . This slide F^8 carries a roll G and a pin H^{10} . There is an index alongside of
 80 the bell crank F corresponding to the stopping points or floors of the building and the rolls are so placed on their respective slides F^8 that when the bell crank F is
 85 opposite 1 on the index then the roll G of the first floor or stopping point is in the path of a cam A^8 carried by the car and all the other rolls G are out of the path of
 90 said cam. When a bell crank F is shifted opposite 2, 3, or 4 on the index, then the roll G of the floors 2, 3, or 4, is brought into the path of the cam A^8 while the other rolls G
 95 will be out of the path of said cam. The doors D' , etc., each carries a latch H^7 normally held by a spring H^{12} surrounding a pin H^{13} in engagement with a slide H^9 . This
 100 slide H^9 is made with a notch H^8 which serves as a passageway for the hook of the latch H^7 when the notch is brought into the path of said hook. The notches H^8 of the
 105 different slides are positioned so that when the bell crank F is opposite 1 on the index, notch H^8 of the floor 1 is on the path of the latch H^7 of that floor while all the other
 110 latches H^7 are in locking engagement with the slides H^9 . Likewise the notches H^8 of the floors 2, 3, and 4 free their latches H^7 only when the bell crank F is opposite 2, 3,
 115 or 4 on the index. That is to say, only one latch H^7 is freed at a time and that when the bell crank F is opposite the number on the index that corresponds to the floor of the
 120 latch that is free so that only one door of the whole series is free to be opened at one time. The slide H^9 is engaged by the pin H^{10} on the slide F^8 and when the bell crank F
 125 is shifted to select the stopping point for car A the roll G at the stopping point selected on the index adjacent the bell crank F is brought into the path of the cam A^8 and at
 130 the same time the pin H^{10} shifts the slide H^9 at the selected stopping point so as to free the latch H^7 that coöperates therewith. This selection having been made the operator
 135 throws the bell crank H up or down according to the direction in which he desires the car to travel. As soon as the cam A^8 strikes the roll G at the selected stopping point the car is automatically stopped and dumped. The stopping is effected as follows: The
 140 cam A^8 lifting on the roll G raises the slide

K³, rod J, as well as all of the other slides K³ that are connected with said rod which results in a downward movement of the loose rod J thereby shifting the controller C' so as to stop the motor C. It will thus be seen that the car A may be started from any floor and automatically stopped at any selected one of its stopping points and that the door at that stopping point is automatically unlocked.

The bottom A' of the car A is pivoted at A² and this pivoted bottom is normally supported by two latches A³ pivoted thereto and resting on two latches A³—A⁴ on a bar A⁵ that is made with two notches A⁹ and A¹⁰. The bar A⁵ is mounted on slides on the car A and carries the cam A⁸, said rod being normally held with cam A⁸ projected so as to engage with the rolls G by a spring A⁶. When during the travel of the car the cam A⁸ strikes the roll G at the selected stopping point the bar A⁵ is slid in the direction indicated by the arrow in Fig. 4 far enough to bring the notches A⁹ and A¹⁰ opposite the latches A³ and A⁴. The latter being then unsupported the bottom A' tilts and the contents of the car is discharged onto a trough or the like S at the selected stopping point. The cam A⁸ as shown in Fig. 4 is made with two inclines one extending up and the other down from a pocket which separates the two inclines so that during the travel of the car in either direction the incline which engages the roll G first acts to the shift bar A⁵ so as to free the bottom A' and then when the roll G enters the pocket between the two inclines said roll is carried with the car and its movement acts as described to stop the motor C.

The slot H¹¹ into which the pin H¹⁰ projects is elongated as shown in Fig. 9 to permit the starting and stopping movements of the slides K³ referred to.

From the above description it will be seen that the rolls G are interconnected and positioned so that they not only move together but no two of them are in the path of the cam A⁸ at once; that all of the slides K³ are connected so as to move together and so that when the cam A⁸ engages one of the rolls G to raise or lower any one of said slides the motor C will be stopped; that all of the slides H⁹ are connected so as to move together and their notches H⁸ are so positioned as to successively free their latches H⁷, and that the bell cranks F are all connected so as to work together and shift their links F⁴ and F⁷ correspondingly.

Fig. 9 of the drawings shows the selecting, stopping and door-controlling and controlled mechanisms of the first three floors of the building illustrated in Fig. 1. In said Fig. 9, however, the parts are shown in the positions they occupy after the operator at the 1st, 2d, or 4th floor has adjusted the

mechanism to stop the car A at the third floor. If the car be at the fourth floor the operator at that point after shifting the handle F into position opposite "3" on the index, as shown at floor 1 of Fig. 9, next throws bell crank H down and motor C is started in a direction to lower car A. The car A then descends until the cam A⁸ engages the roll G at the third floor whereupon the car is stopped and emptied automatically. If the car A is at the first or second floor, then the operator at either of those points throws the bell crank H up and the car A is lifted by the motor C until the cam A⁸ engages the roll G with the results described. As will be clear from Fig. 9, the car can not be started in either direction unless all of the doors are closed and when the bell crank F is adjusted to select any one of the floors as the stopping point for the car the door at that floor is automatically unlocked by the notch H⁸ being brought opposite or into the path of the hook of latch H⁷ and at the same time all of the other notches H⁸ are carried out of the path of their coöperating latches H⁷.

Having thus described the nature of my invention, and set forth a construction embodying the same, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In an elevator, a car, means for raising and lowering said car, a controller for said raising and lowering means, a plurality of mechanisms for operating said controller, a plurality of adjustable members adapted to be moved by the car to actuate respectively said controller-operating mechanisms, means common to all of said adjustable members for simultaneously moving the same, and selective mechanism operating through said means common to the adjustable members to position any one of such members to be engaged by the car to actuate its controller-operating mechanism.

2. In an elevator, a car, means for raising and lowering said car, a controller for said raising and lowering means, a plurality of mechanisms for operating said controller, a plurality of adjustable members adapted to be moved by the car to actuate respectively said controller-operating mechanisms, a plurality of door-locking mechanisms respectively actuated by said adjustable members, means common to all of said adjustable members for simultaneously moving the same, and selective mechanism operating through said means common to the adjustable members to position any one of such members to be engaged by the car to actuate its controller-operating mechanism and to actuate its door-locking mechanism.

3. In an elevator, a car, means for raising and lowering said car, a controller for said raising and lowering means, a plurality of

mechanisms for operating said controller, a plurality of door-controlled mechanisms respectively holding said controller-operating mechanisms against movement when their
 5 doors are open and releasing the same when the doors are closed, a plurality of adjustable members adapted to be moved by the car to actuate respectively said controller-operating mechanisms, means common to
 10 all of said adjustable members for simultaneously moving the same, and selective mechanisms operating through said means common to the adjustable members to position any one of such means to be engaged
 15 by the car to actuate its controller-operating mechanism.

4. In an elevator, a car, means for raising and lowering said car, a controller for said raising and lowering means, a plurality of
 20 vertical slides connected with said controller, means connected with said slides to vertically move the same to actuate the controller, slides adjustable transversely on said vertical slides, members differently located
 25 on said transversely adjustable slides adapted to be engaged by the car to actuate the vertical slides, a rod connecting said transversely adjustable slides, and selective means operating through said rod to simulta-
 30 neously move all of said transversely adjustable slides to position one or another of said members to be engaged by the car.

5. In an elevator, a car, means for raising and lowering said car, a controller for said
 35 raising and lowering means, a plurality of vertical slides connected with said controller, means connected with each slide to vertically move the same to actuate the controller, slides adjustable transversely on said
 40 vertical slides, members differently located

on said transversely adjustable slides adapted to be engaged by the car to actuate the vertical slides, a plurality of door-locking mechanisms respectively actuated by said
 45 transversely adjustable slides, a rod connecting said transversely adjustable slides, and selective mechanism operating through said rod to simultaneously move all of said transversely adjustable slides to position
 50 one or another of said members to be engaged by the car and to simultaneously operate all of said locking mechanisms.

6. In an elevator, a car, means for raising and lowering said car, a controller for said raising and lowering means, a plurality of
 55 mechanisms for operating said controller, latches for said controller-operating mechanisms, door-actuated means for operating each latch to hold its respective controller-operating mechanism when the door is
 60 opened and to free the same when the door is closed, a plurality of adjustable members adapted to be moved by the car to actuate respectively said controller-operating mechanisms, means common to all of said ad-
 65 justable members for simultaneously moving the same, and selective mechanism operating through said means common to the adjustable members to position any one of such members to be engaged by the car to actu-
 70 ate its controller-operating mechanism.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, this seventh day of July A. D. 1905.

JAMES T. COWLEY.

Witnesses:

W. A. MARCY,
 G. F. MAGNITZKY.