

No. 713,705.

Patented Nov. 18, 1902.

R. C. SMITH.

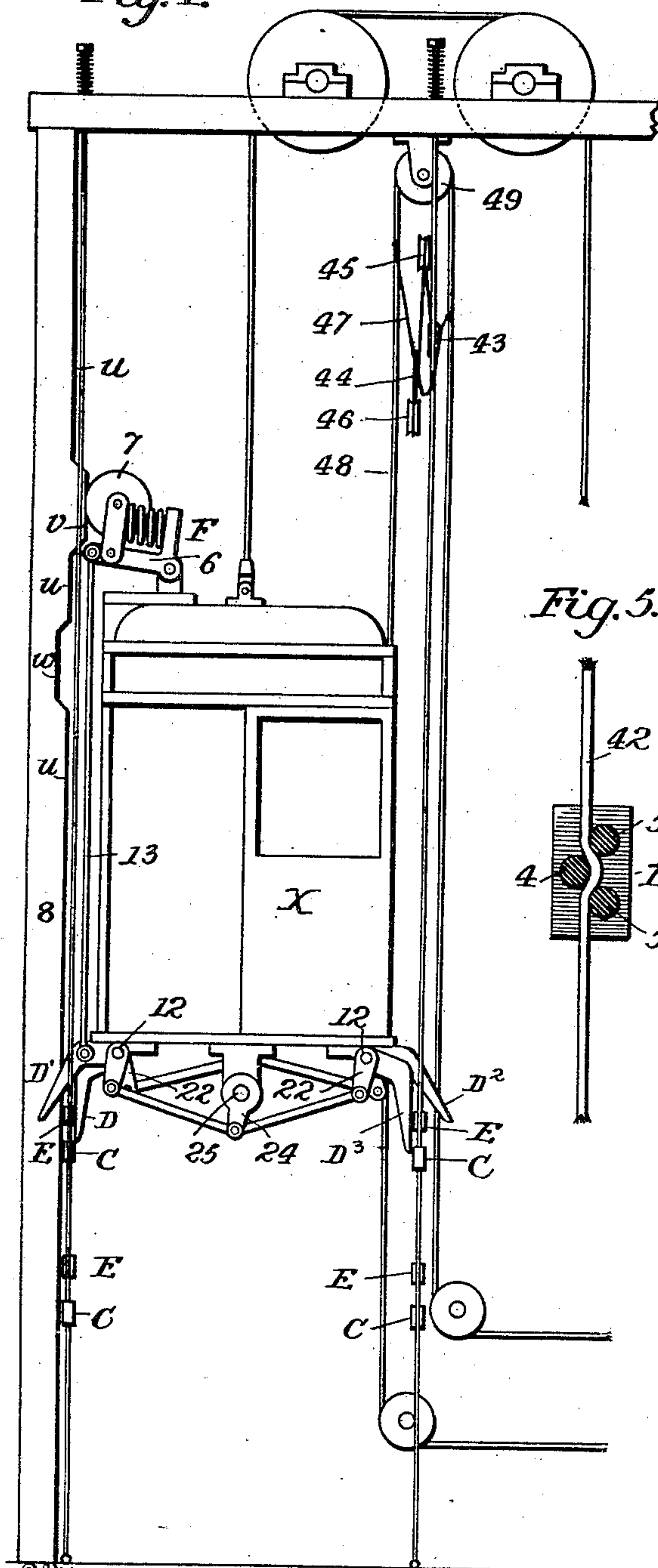
SAFETY DEVICE FOR ELEVATORS.

(Application filed May 5, 1902.)

(No Model.)

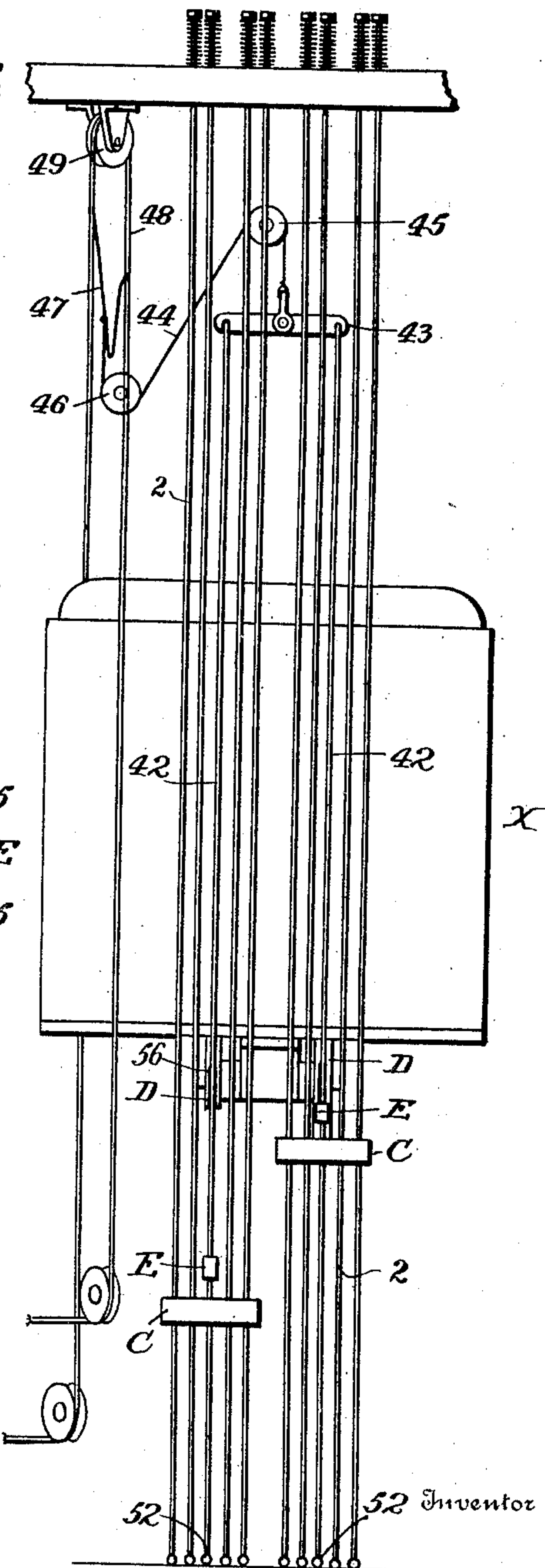
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Fig. 1.



Witnesses  
*Am. Gallman*  
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Fig. 2.



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Fig. 3.

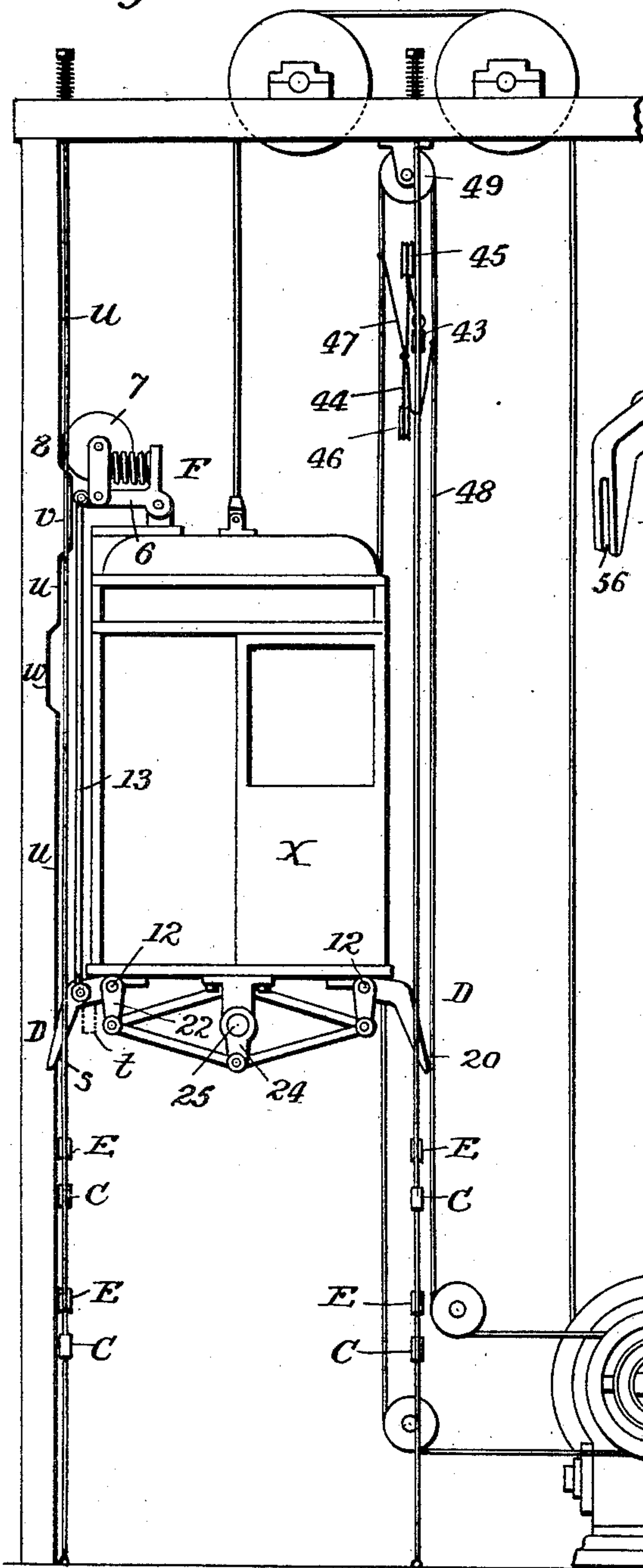


Fig. 4.

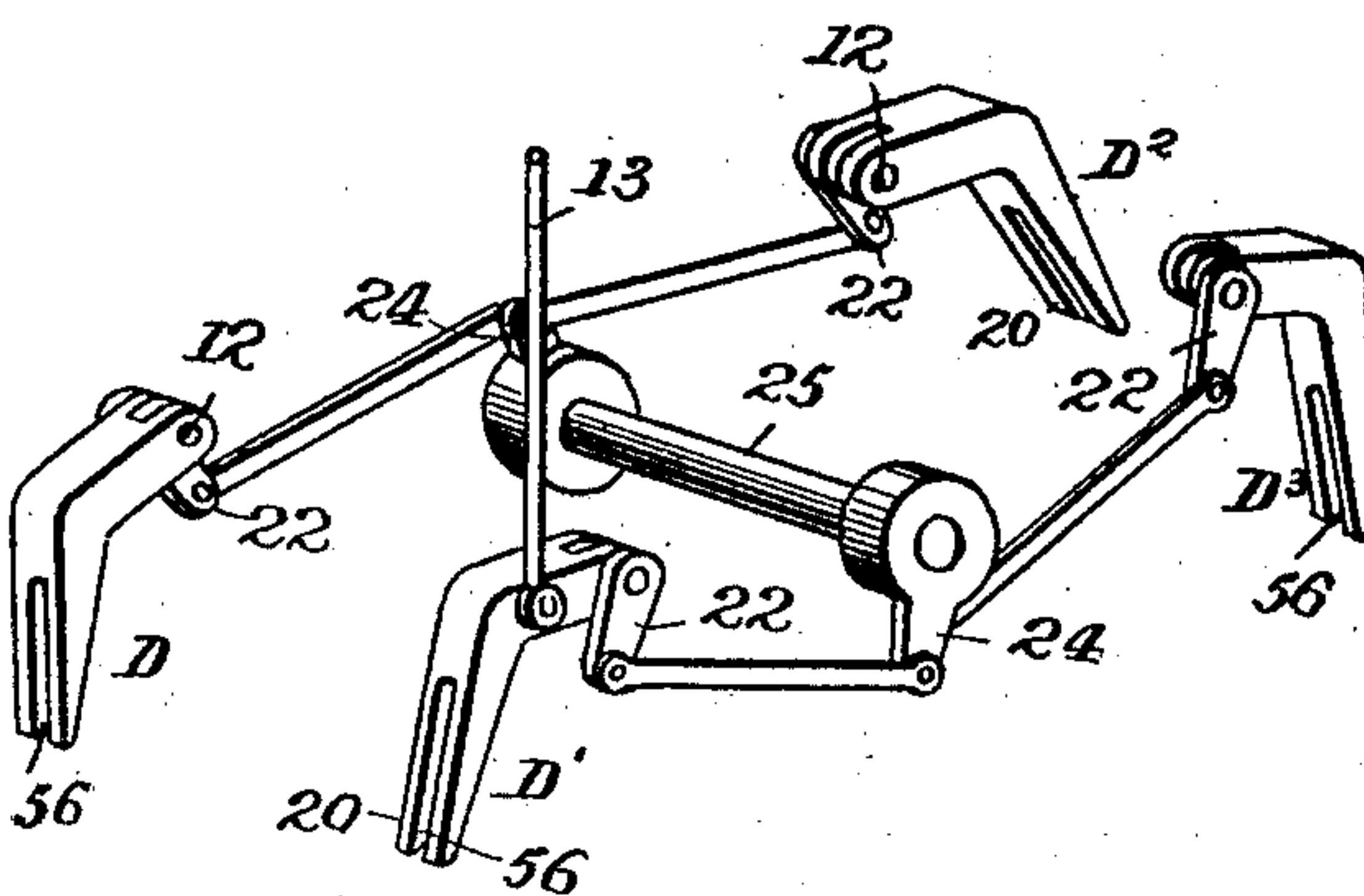
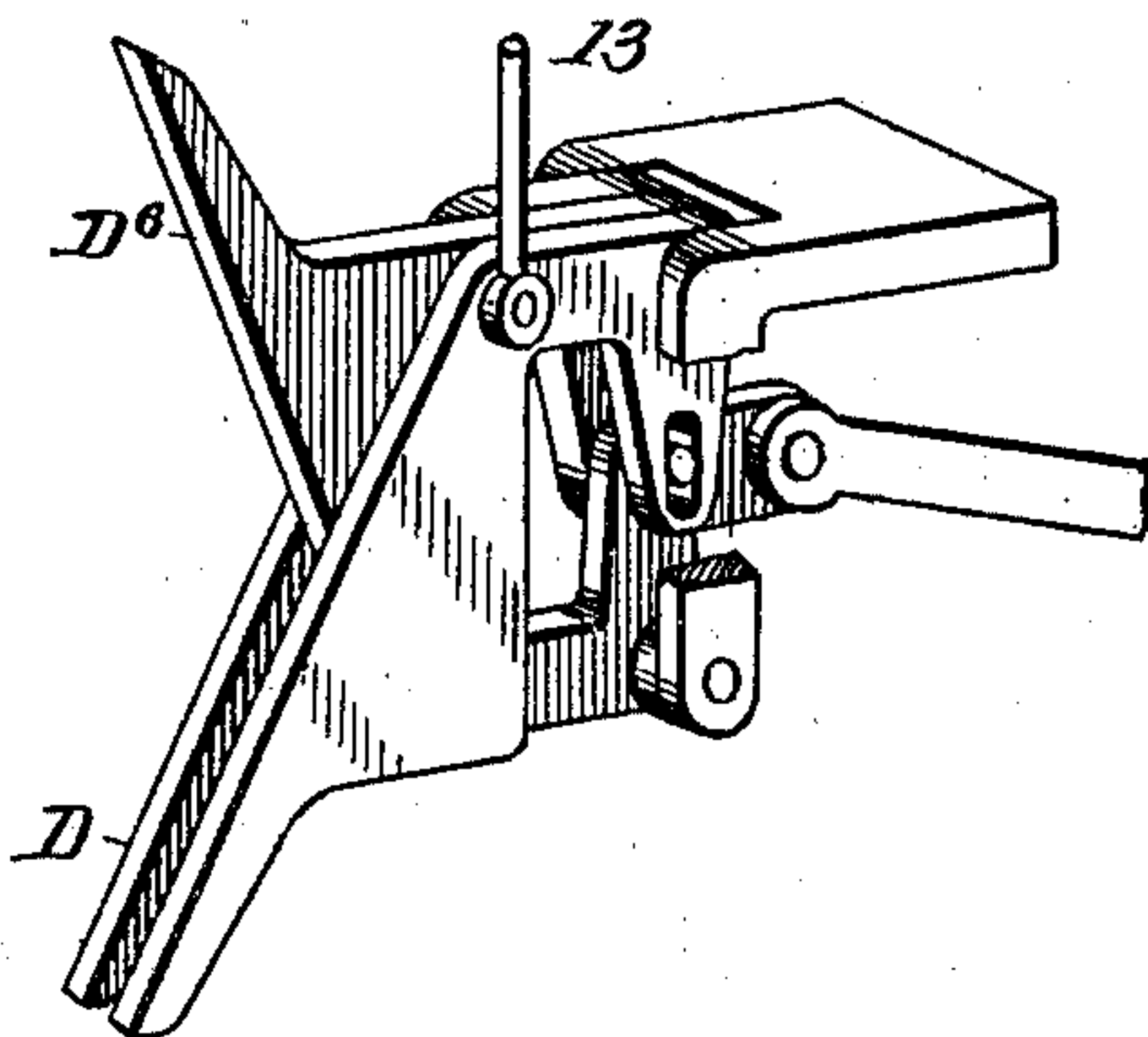


Fig. 6.



Witnesses

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# UNITED STATES PATENT OFFICE.

RUDOLPH C. SMITH, OF YONKERS, NEW YORK, ASSIGNOR TO OTIS ELEVATOR COMPANY, OF EAST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## SAFETY DEVICE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 713,705, dated November 18, 1902.

Application filed May 5, 1902. Serial No. 106,035. (No model.)

*To all whom it may concern:*

Be it known that I, RUDOLPH C. SMITH, a citizen of the United States, residing at Yonkers, in the county of Westchester and State of New York, 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 has for its object to arrest the elevator-engine in case of excessive speed of movement of the car; and my invention consists of one or more blocks or equivalent devices in the well connected with the stopping and starting device and a dog or dogs on the car and controlling means whereby a dog may be caused to make contact with and shift a block in case the car moves at undue speed, as fully set forth hereinafter and as illustrated in the accompanying drawings, in which—

Figure 1 represents in elevation sufficient of an elevator apparatus to illustrate my invention. Fig. 2 is a side view of the parts; Fig. 3, an elevation showing the parts in a different position. Fig. 4 is a perspective view showing the connection of four dogs. Fig. 5 is a view showing one of the blocks; Fig. 6, a perspective view showing the form of dogs for operating in both directions.

The cage X is operated from the engine A in any suitable manner, the said engine being provided with a suitable stopping and starting device—as, for instance, a valve or electric switch or belt-shifter—which is operated by the control means from within the car, the control means shown being an endless cable 48, passing around a suspension-pulley 49 at the top of the well and around a pulley 50, connected with the stopping and starting device of the engine. Normally the hand-rope 48 is stationary, one section passing through the car, and its movement up or down by the operator will shift the stopping and starting device to control the movements of the car.

In order that the controlling device, whether in the form of a hand-rope or other well-known construction, may be shifted in case the car acquires an excessive speed, so as to arrest the operation of the motor, I arrange within the well one or more blocks E in position to

make contact with a dog carried by the car, and I connect said block or blocks with the control device in such manner that as a block is carried with the car in case of excessive speed of the latter the control device will be shifted and the movement of the engine arrested, and these features while capable of use alone are preferably combined with means for automatically retarding the speed of the car in case it should become excessive, so that in such case the engine is also brought to rest. While these parts may be constructed in different ways, I prefer to mount the blocks E upon rods or cables 42, connected with the control device, and where there is a plurality of dogs upon the car I use a corresponding number of wires or rods 42. Thus, as shown, there are two dogs D upon the car at each side and two suspended cables 42, connected to opposite ends of a lever 43, suspended from a cable 44, passing around guide-pulleys 45 and 46 and connected to the center of a flexible connection, as a chain or cable 47, the ends of which are attached to the two sections of the shifting-rope 48.

If the blocks E were attached fixedly to the cables 42, some part of the connections would be broken in case the travel of the car after contact with a block exceeded the possible length of movement of the connections, and I therefore so support each block upon the cable or rod that it will slide thereon under a force which is less than the breaking strain of the connections. Thus each block may be provided with pins 45, so arranged that the rod or cable 42 will be bent in passing between the pins, thus preventing the block from sliding without the application of a considerable force, but permitting it to slide before there is any breaking strain upon the parts. Each cable 42 is connected to an eyebolt 52 at the lower end, so that when contact is made with a block upon either cable to depress one end of the lever 43 the other wires will resist the upward movement of the other end of the lever, which will have its fulcrum at the point of connection with the cable.

It is of course requisite that when the cage travels at its normal speed there shall be no contact between the dog and a block, and I



therefore provide controlling means whereby each dog is brought into engaging position only in case the car exceeds its normal speed. Thus the dog may be an L-shaped lever pivoted below the car at the point 12 and connected by a rod 13 or otherwise with a controller F, which, as shown, is a lever 6, carrying a roller 7, which makes contact with certain bearings in the well, so that when the car travels at normal speed the dog as it approaches a block will be carried inward past the same and then outward into contact position to make contact, if necessary, with the succeeding block when more than one block is used, while if the car travels at an excessive speed the controller will not be shifted and the dog will make contact with the next block toward which it is carried. The means for thus operating the controller is preferably a track 8, having depressions *w* or breaks at such intervals that when the roller 7 at normal speed passes into the same the dog D, connected with the controller, will be carried away from the block E as it approaches and passes the same and will thereafter be shifted into engaging position by the contact of the roller 7 with a projection *v*. The break or depression *w* is of such length that if the car travels at an excessive speed the roller 7 will not have time to enter the depression, and the dog, which is normally in position to make contact with the block, will be brought against the same and cause the engine to be arrested.

If there was but one dog or but one dog on each side of the car, the track 8 need have only depressions or breaks *w*; but in the construction shown there are two dogs at each side having arms 22, with rods connecting them to oppositely-arranged arms 24 on the rock-shaft 25, so that when the arms 24 are in a vertical position all of the dogs will be in a position to engage blocks E, there being a block E or line of blocks E to each dog, and the blocks upon the different lines are arranged alternately, (see Fig. 2,) so that if the dog D, Figs. 1 and 4, is out of position to engage a block as it passes the same the dog D' will yet be in position to engage the next block, but when shifted so as not to engage the same the dog D will be brought into position to engage the block which it is approaching, the connected dogs on the opposite side acting in like manner. It is therefore necessary that the track 8 on which the wheel 7 travels shall have a main bearing *u* in such position that when the wheel is on this portion the arms 24 shall be vertical and all the dogs in engaging position with the blocks. When the roller 7 enters a break or depression *w*, it will therefore carry the dogs D' D<sup>2</sup> out of engaging position, carrying the dogs D D<sup>3</sup> farther outward in their engaging position. When the roller 7 is on the succeeding main portion of the track at *u*, the parts will again be brought to the position shown in Fig. 3, and when the roller makes contact with the projection *v*, Fig. 1, the dogs D' D<sup>2</sup>

will be carried farther outward in engaging position and the dogs D D<sup>3</sup> will be carried out of engaging position. By this means the dogs at both sides will be always in engaging position when the roller 7 is on the main part of the track and will be successively operated during normal movements of the car, so as to swing from contact with the blocks as they approach the same, but will be caused to engage the same if the car moves so rapidly that the roller 7 cannot enter the depression *w*.

There may be two sets of dogs D D<sup>6</sup>, as shown in Fig. 6, the dogs D<sup>6</sup> arranged to engage the blocks when the car is traveling upward at an undue speed, which might result in those cases where the cars are overbalanced. In this case both dogs D D<sup>6</sup> can be moved outward and inward under like conditions.

While the above-described devices may be used in connection with any of the ordinary safety devices for arresting the movements of the car, they are effective in connection with that class of safety devices in which the movement of the car is gradually retarded by means of retarders, consisting of blocks C, supported to slide with a determined resistance upon supporting wires or rods 2, this resistance being such that while the retarders when connected temporarily with the car will first be carried by the car they will gradually resist and overcome its motion. The construction of dogs shown is that which will operate effectually in this connection, each retarder C being arranged a short distance below one of the blocks E, so that the latter will move and cause the arrest of the engine before the dogs are brought into action upon the retarder. As it is desirable that the inner edges *s* of the fingers 20 of the dog shall meet the outer edges of the retarders to deflect them inward, so that they will be brought finally to the position shown at dotted lines *t*, Fig. 3, I prefer to form slots 56 in the ends or fingers 20 of the dogs to receive the cables 42, which will thus be pressed outward and away from the rods supporting the blocks E, permitting the latter to slide up inside the fingers 20, as required.

It will be understood that while I have described a plurality of dogs and a plurality of blocks E, I may use only a single dog and single block and that the dogs may be operated by any suitable devices to be brought into proper position to engage the sliding blocks and that the latter may be connected in any suitable way to operate the stopping and starting device.

I do not here claim any of the features shown herein and claimed in my applications Serial Nos. 106,036 and 106,472.

Without limiting myself to the precise construction and arrangement shown, I claim—

1. The combination with the car and stopping and starting device of an elevator, of a block arranged in proximity to the path of the car and connected to operate the stopping and



starting device, but capable of movement independent thereof, a dog upon the car, and means for moving it into and out of position to contact with the said block, substantially  
5 as set forth.

2. The combination with the car and stopping and starting device of an elevator, of a block arranged in proximity to the path of the car and connected to operate the stopping and  
10 starting device, a dog upon the car, and means for moving it automatically into and out of position to contact with the said block, substantially as set forth.

3. The combination with the car and stopping and starting device of an elevator, of a block arranged in proximity to the path of the car and connected to operate the stopping and  
15 starting device, a dog upon the car, and means for moving it to withdraw it from position to contact with the block when the car is moving at normal speed and for retaining it in  
20 engaging position when the normal speed is exceeded, substantially as set forth.

4. The combination with an elevator-car, its stopping and starting device, a retarding means in the well, a dog on the car, means  
25 for shifting the dog according to the speed of the car, and a block connected to shift the stopping and starting device, said block arranged to be actuated by the said dog when  
30 the speed of the car is excessive, substantially as set forth.

5. The combination with an elevator-car and with the engine stopping and starting device, of a plurality of blocks within the well  
35 connected to actuate the stopping and starting device, a plurality of dogs carried by the car, means for shifting each dog to prevent contact with the blocks during normal speed  
40 movements of the car, and means for maintaining the dogs in contacting position when the speed of the car becomes excessive, substantially as set forth.

6. The combination of the car, stopping and

starting devices and sliding retarder, blocks 45 connected with the stopping and starting devices, dogs carried by the car, and means for shifting the dogs according to the speed of the car to actuate both the blocks and retarders,  
50 substantially as described.

7. The combination with the car, retarders, blocks and cables supporting the same, of dogs having slots to receive the cables and means for operating the dogs, substantially  
55 as set forth.

8. The combination with the stopping and starting device, of a lever connected with the stopping and starting device, wires extending downward from the lever, blocks sliding with  
60 a predetermined resistance on the cables, dogs on the car, and means for shifting the dogs into and out of position to engage the blocks, substantially as set forth.

9. The combination with a car and stopping and starting devices, of a wire or cable within 65 the well, a block sliding with a predetermined resistance on the cable, with means for resisting the sliding movement, connections between the block and stopping and starting devices, a dog on the car, and means for shifting  
70 the dog into and out of engaging position with the block according to the speed of the car, substantially as set forth.

10. The combination with the stopping and starting device of an elevator-car, of a rod, a 75 retarder thereon, connections between the retarder and the stopping and starting devices and a movable dog carried by the car and means whereby said dog is carried to engage the retarder when the speed of the car is excessive, substantially as described. 80

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

RUDOLPH C. SMITH.

Witnesses:

E. W. MARSHALL,  
W. H. BRADY.