

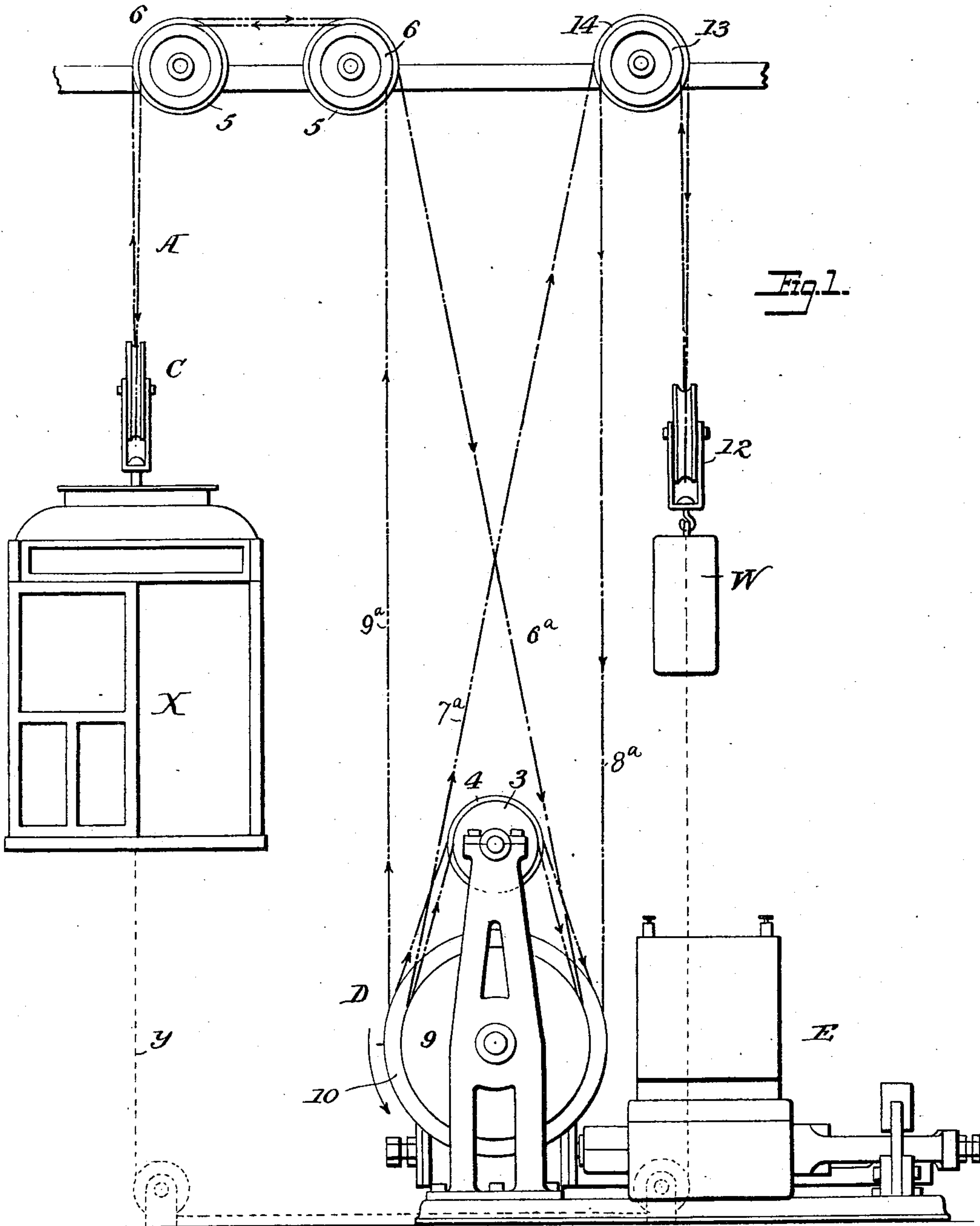
(No Model.)

2 Sheets—Sheet 1.

I. H. VENN.
ELEVATOR APPARATUS.

No. 564,321.

Patented July 21, 1896.



Witnesses
John G. Hinkel
A. N. Robson

Inventor
Isaac H. Venn
By *Arthur Freeman*
Attorneys

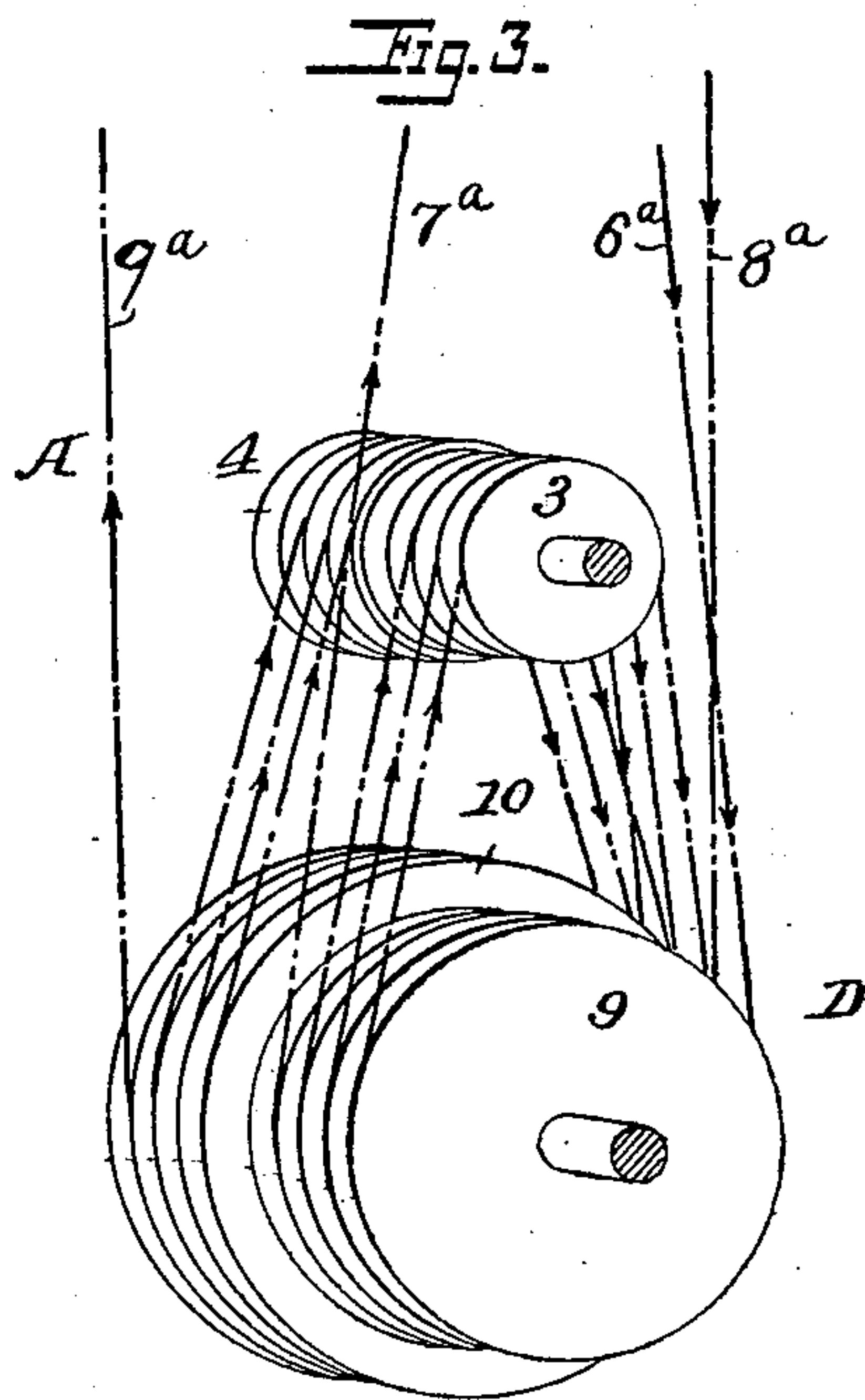
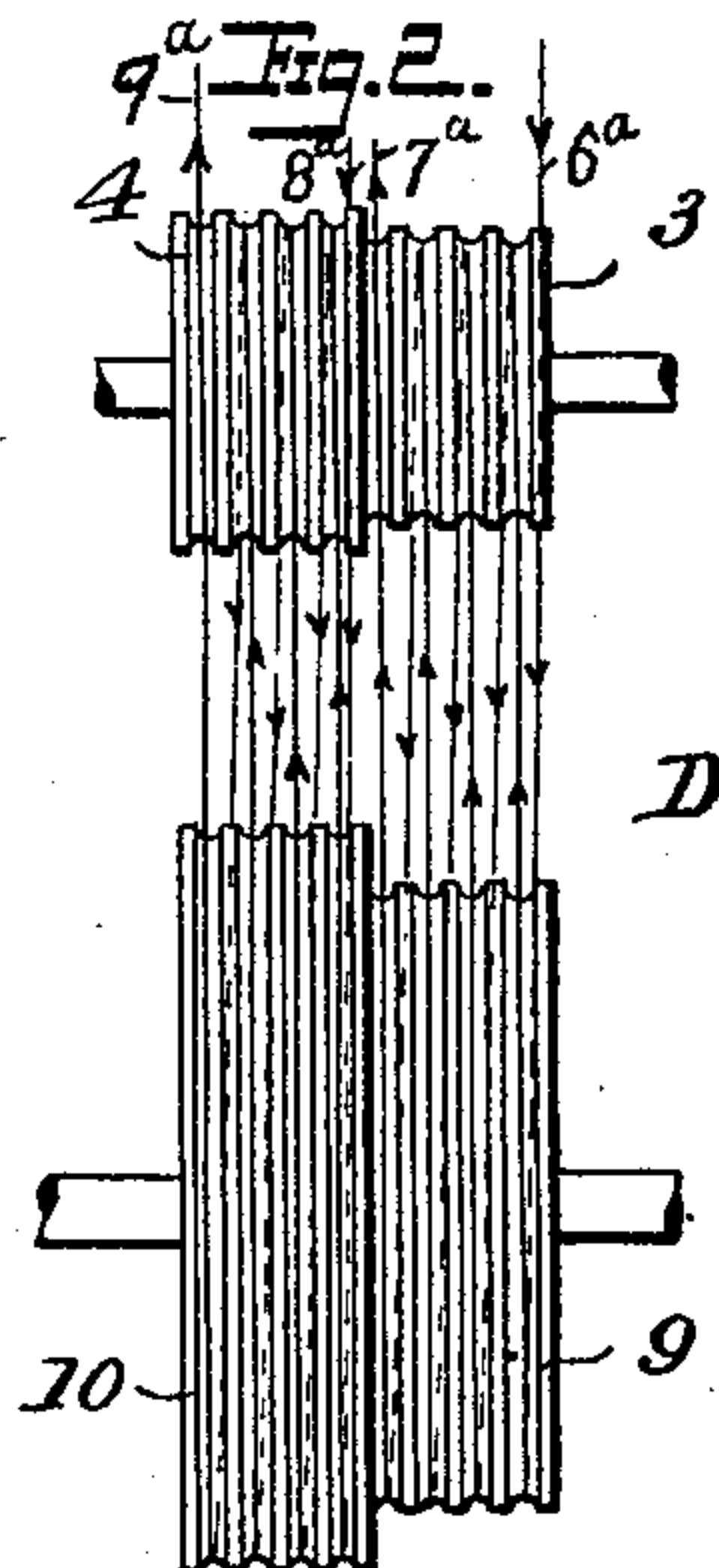
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UNITED STATES PATENT OFFICE.

ISAAC H. VENN, OF YONKERS, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE NATIONAL COMPANY, OF CHICAGO, ILLINOIS.

ELEVATOR APPARATUS.

SPECIFICATION forming part of Letters Patent No. 564,321, dated July 21, 1896.

Application filed July 6, 1893. Serial No. 479,708. (No model.)

To all whom it may concern:

Be it known that I, ISAAC H. VENN, 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 Elevator Apparatus, of which the following is a specification.

My invention relates to that class of elevator apparatus in which the cage is raised and lowered by means of an endless cable, one section of which is paid out, while the other is drawn upon at a greater speed, or vice versa, through the action of a differential drum; and my invention consists in constructing the parts of the apparatus and combining and arranging them so as to secure a proper adhesion of the endless cable to the drum, and so as to generally improve the construction and operation of the apparatus.

In the accompanying drawings, Figure 1 illustrates in side elevation sufficient of an elevator apparatus to show my improvement. Fig. 2 is an edge view of the winding-drum and auxiliary drums or pulleys. Fig. 3 is a perspective view of the winding-drum and counter drums or pulleys with the cable thereon.

The cage or platform X is of any usual or suitable construction, being arranged within the well and guided in the ordinary manner; but the suspensory cable A, instead of being connected directly with the cage, as usual, passes around a sheave or pulley C, which is connected with the cage, the said cable being an endless cable passing around said sheave C, also over two pairs of guide-pulleys 5 6 to the winding-drum, and also over guide-pulleys 13 14 to a pulley 12, to which is connected a weight W.

The weight W is not a counterweight, as it does not in any way counterbalance the weight of the cage, this not being necessary in the apparatus which I have devised, but it is for the purpose of taking up the cable, which in the course of operation is fed to the weighted side of the pulleys 13 14. Instead of having the weight, however, the pulley 12 may be connected by a cable y, as shown in dotted lines, to the bottom of the cage, the said cable y being properly guided.

The winding-drum D is a differential drum

having two sections 9 10, the latter of greater diameter than the former, and each section having one, two, or more grooves, the grooves in the sections 9 corresponding with grooves in a counter drum or pulley 3, while those in the section 10 correspond with grooves in a counter drum or pulley 4, the two pulleys 3 4 being upon the same axis, and the cable being wound first around the pulleys 3 9 and then around the pulleys 10 4, passing to and from the pulley or sheave C. The cable passes from the winding-drum over the pulleys 14 and 13 and to the pulley 12, as shown, one branch passing from the larger section of the winding-drum and the other from the smaller section.

As the result of the construction set forth the revolution of the winding-drum will cause one section of the cable to be delivered from the larger section 10 of the drum toward the cage, while the other section of the cable will be wound upon the smaller section 9 of the drum, the result being that as the winding-drum revolves there will be a constant feeding of the cable toward the cage, and the latter will be lowered. When the winding-drum is turned in the direction of the arrow, one section of the cable will be wound onto the larger section 10 of the drum, and the other section will be delivered from the smaller section 9 of the drum, and as a result the cage will be raised, the actual lifting or lowering movement in either case corresponding to the difference between the amount of cable wound upon one section of the drum and delivered from the other.

As the cable is wound onto the drum from the sections extending to the cage it is delivered from the sections extending to the pulley 12, and vice versa, so that the pulley descends as the cage rises, or the pulley rises as the cage descends, and this is the same whether the pulley be connected with the weight or with the cage, as shown in dotted lines.

It will be evident that so long as there is a perfect adhesion between the cable and the winding-drum the cage will be supported without any counterweight, as the weight of the cage comes upon both sections of the cable 8 extending to the winding-drum, and

one section extends to one side of the drum and the other section to the other, and there is, therefore, comparatively no tendency to revolve the drum, and the cage is locked or
5 suspended in position.

I make use of the winding-drum having a series of grooves in each section, and of the auxiliary drums 3 4, with corresponding grooves, so as to secure the necessary adhe-
10 sion of the cable to the drum, thereby preventing any slip, which, if it occurred, would render necessary the employment of a counterweight to counterbalance the cage. Although I have shown a winding-drum in which
15 there are three grooves in each section, it will be evident that there may be two, three, or more, the auxiliary drums or pulleys 3 4 having each a corresponding number of grooves. Also, although I have shown a
20 single cable, it will be evident that the same result may be attained by the use of two, three, or more cables, each one guided in the same manner as the cable 8, so as to secure the advantages which usually result from the
25 employment of more than a single cable, the pulleys C and 12 having grooves corresponding to the number of endless cables employed.

To enable it to be clearly understood in what manner the cable is passed around the
30 several sheaves and the differential drum and counter-drum, I have indicated arrow-darts throughout the length of such cable. Starting with the cable immediately as it leaves the sheave-pulley C, it will be seen that the
35 left-hand portion thereof is passed upwardly and over the guide-pulleys 5 5, thence downwardly, as indicated at 6^a, and around the under side of the outermost groove in section 9 of the drum D from the right. It is then
40 passed upwardly and over the corresponding groove in section 3 of the counter-drum, thence down and under the second groove in drum D, up again and over the second groove in 3, down again and under the third groove
45 in D from the right, then over the corresponding groove of the counter-drum, from whence the said cable is led around the under side of D again and carried upwardly, as at 7^a, and over the pulley 14, to and under the weight-

pulley 12. Leading upwardly again from this 50 latter pulley, the said cable passes in the reverse direction over the top pulley 14, then, as at 8^a, down around the under side of the first adjacent groove of section 10 of drum D, from the right; thence upwardly and over the 55 top of the corresponding groove in section 4 of the counter-drum, thence passing down and under the next groove in 10 and over the corresponding groove in 4, and so on, until finally the cable leaves the last groove in the 60 larger section of drum D, from the under side at the left, as at 9^a, passing up and over guide-pulleys 6 6, down and back again in a continuous manner, where it intersects with the starting-point. 65

Inasmuch as the cable must have a rapid movement in proportion to the speed of travel of the cage, it is practicable in this apparatus to make use of a motor having a rapidly-revolving shaft connected directly with the 70 shaft 16 of the drum D, as, for instance, an electromotor. I do not, however, claim this, as it constitutes the subject of a separate application.

Without limiting myself to the precise construction and arrangement of parts shown, I claim as my invention— 75

The combination of an elevator-cage, a winding-drum D having grooved sections of different diameters, a shaft for the drum 80 turning in stationary bearings, and a motor connected to drive the shaft, a pulley C on the cage, a weight provided with a pulley 12, an endless cable and independent grooved auxiliary drums 4, 3 of different diameters, the cable 85 extending from one section of the winding-drum around one of the auxiliary drums back to the other section of the winding-drum and around the remaining auxiliary drum and around the pulleys C, 12, substantially as set 90 forth.

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

ISAAC H. VENN.

Witnesses:

JAMES S. FITCH,
O. B. WARING.