No. 755,361. PATENTED MAR. 22, 1904.

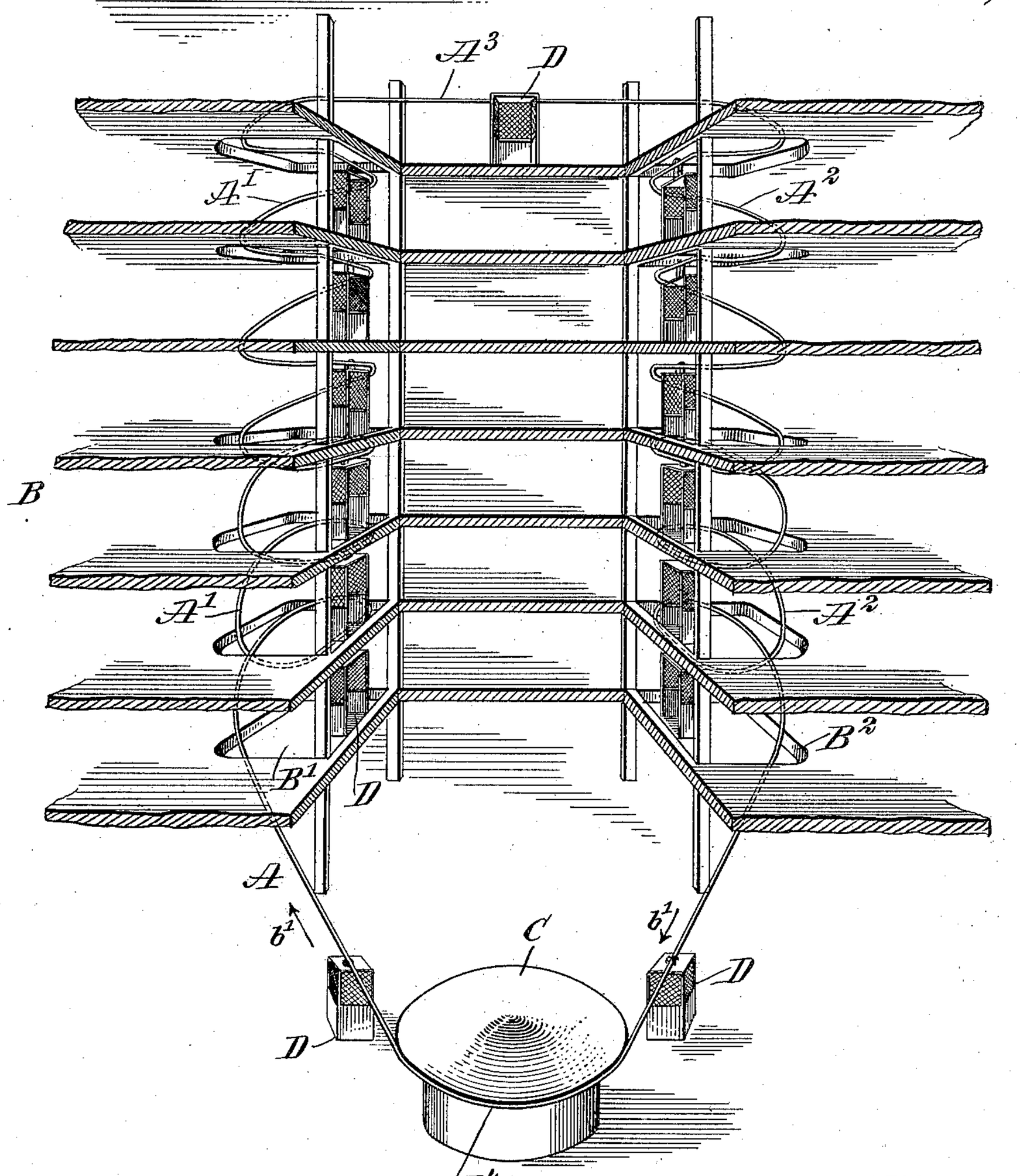
D. E. CONDON.

ELEVATOR.

APPLICATION FILED SEPT. 15, 1903.

NO MODEL. 5 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

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NO MODEL. 5 SHEETS—SHEET 2.

Fig. 2.

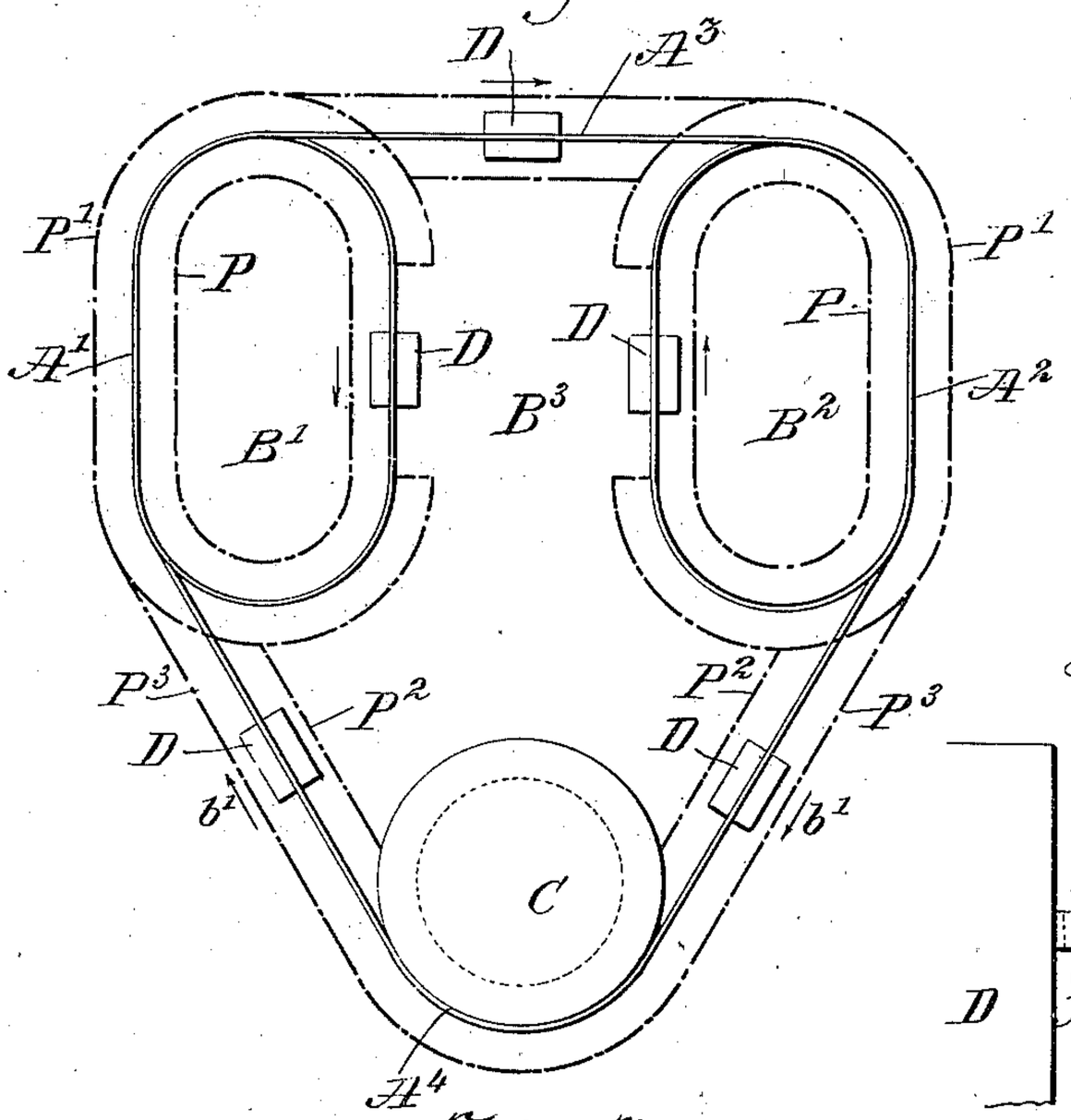
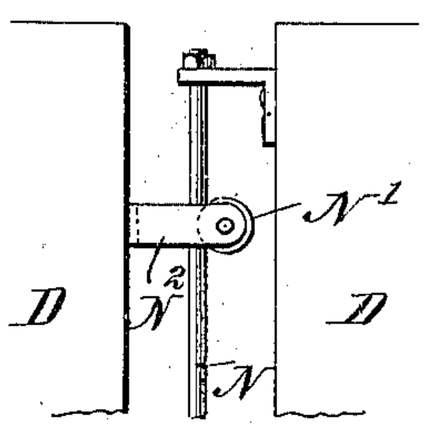
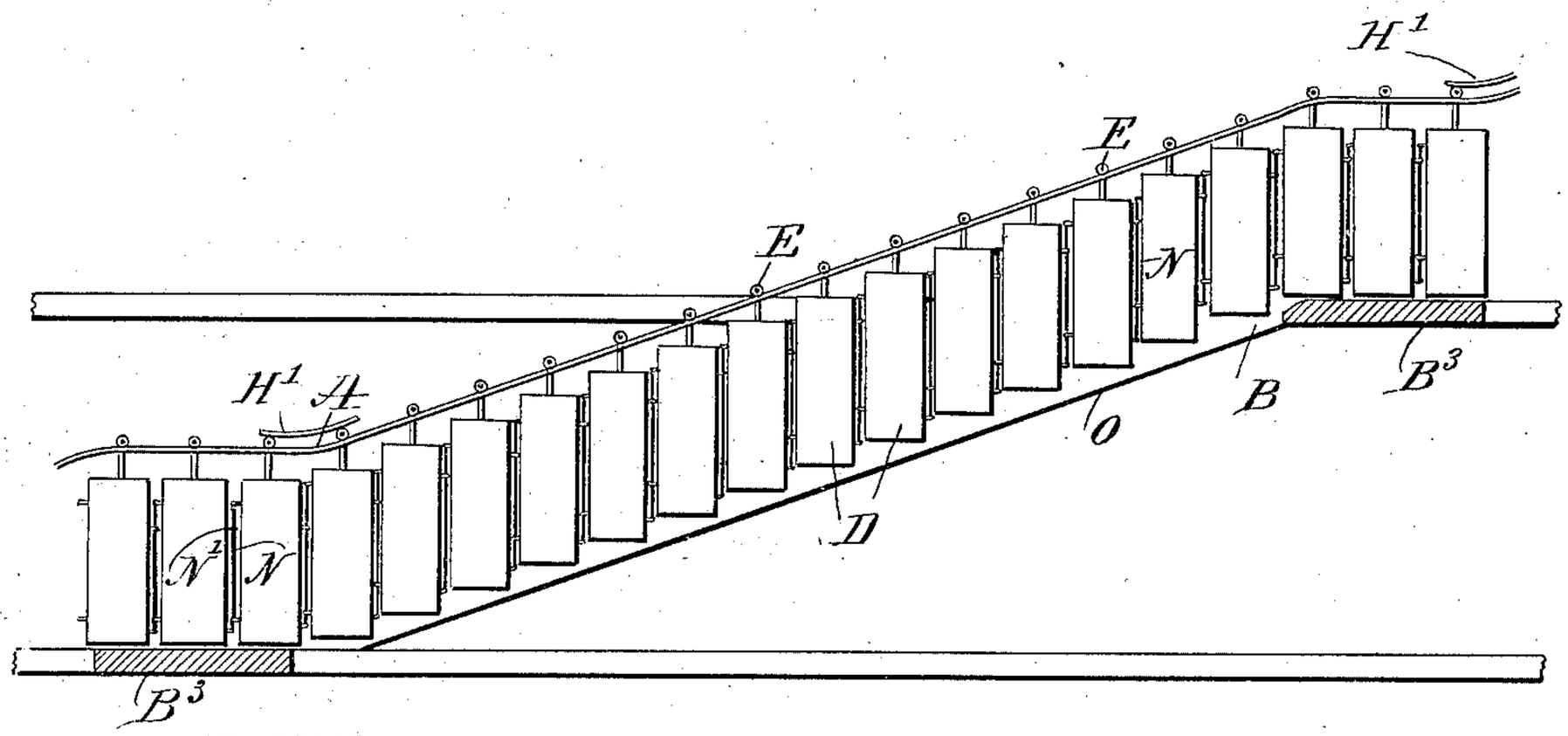


Fig. 3.

Fig. 4.





WITNESSES:

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NO MODEL. 5 SHEETS—SHEET 3.

Fig. 5.

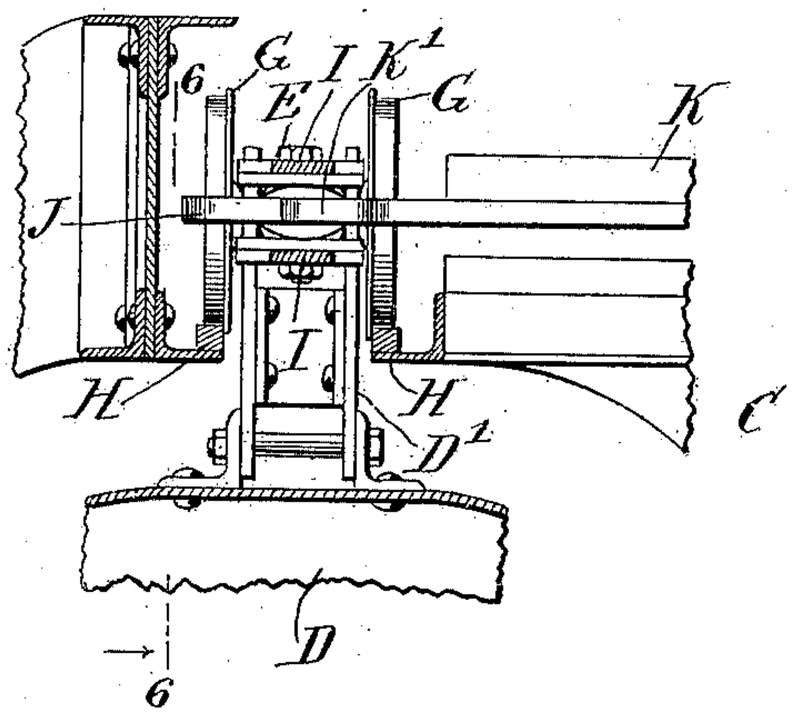


Fig. 8.

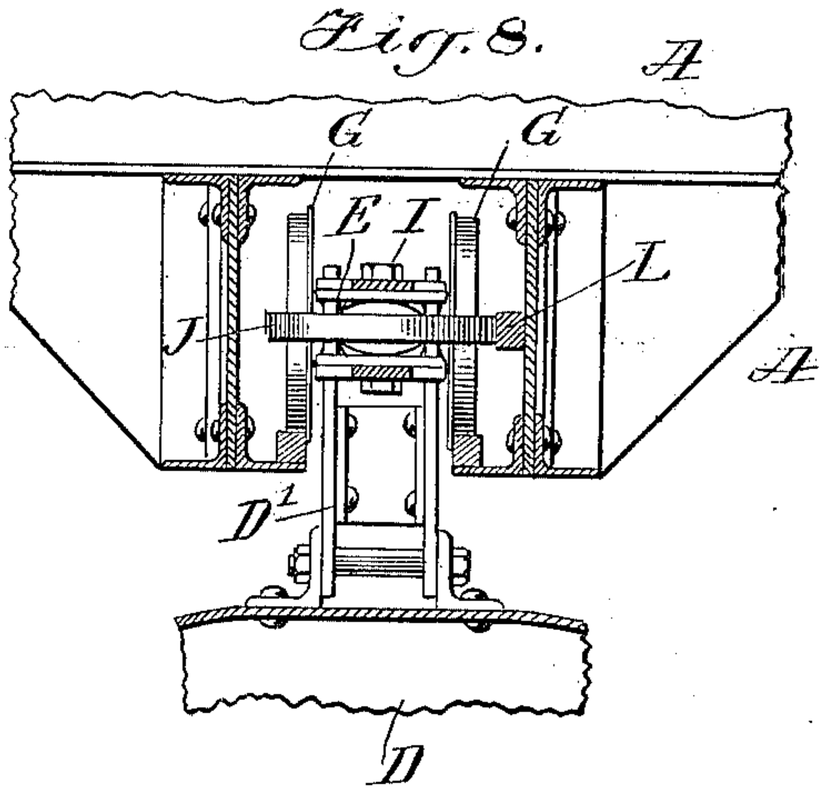


Fig. 6.

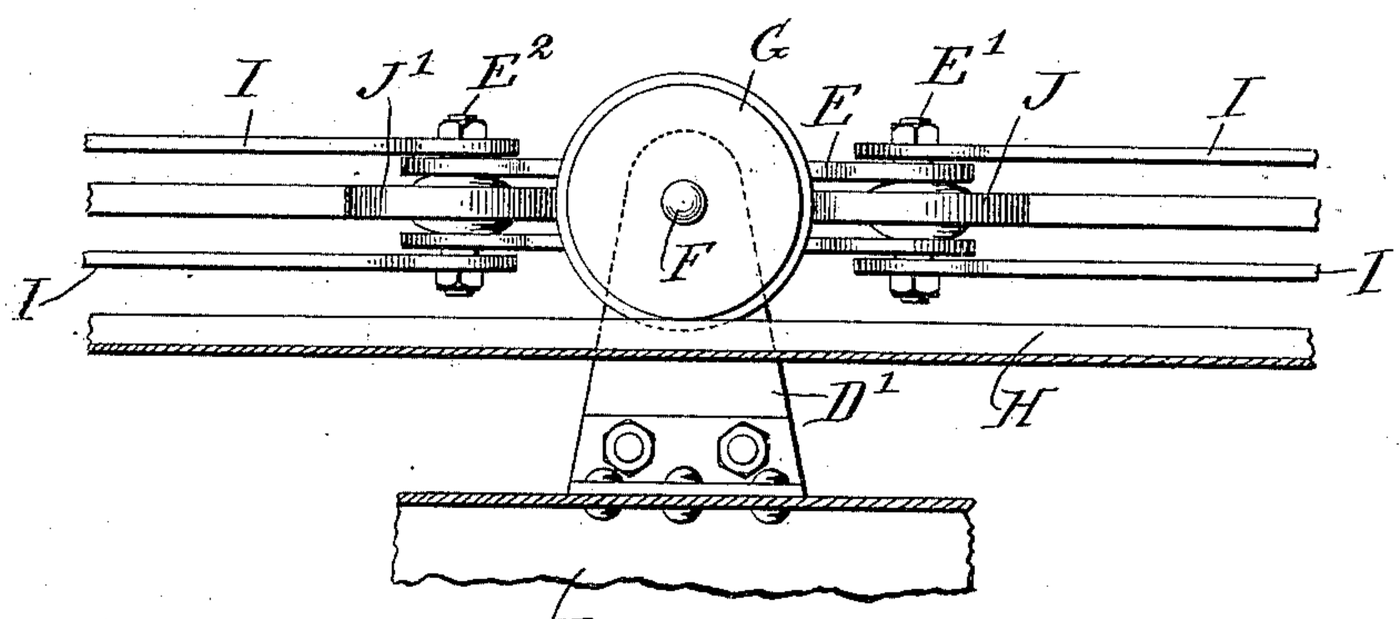
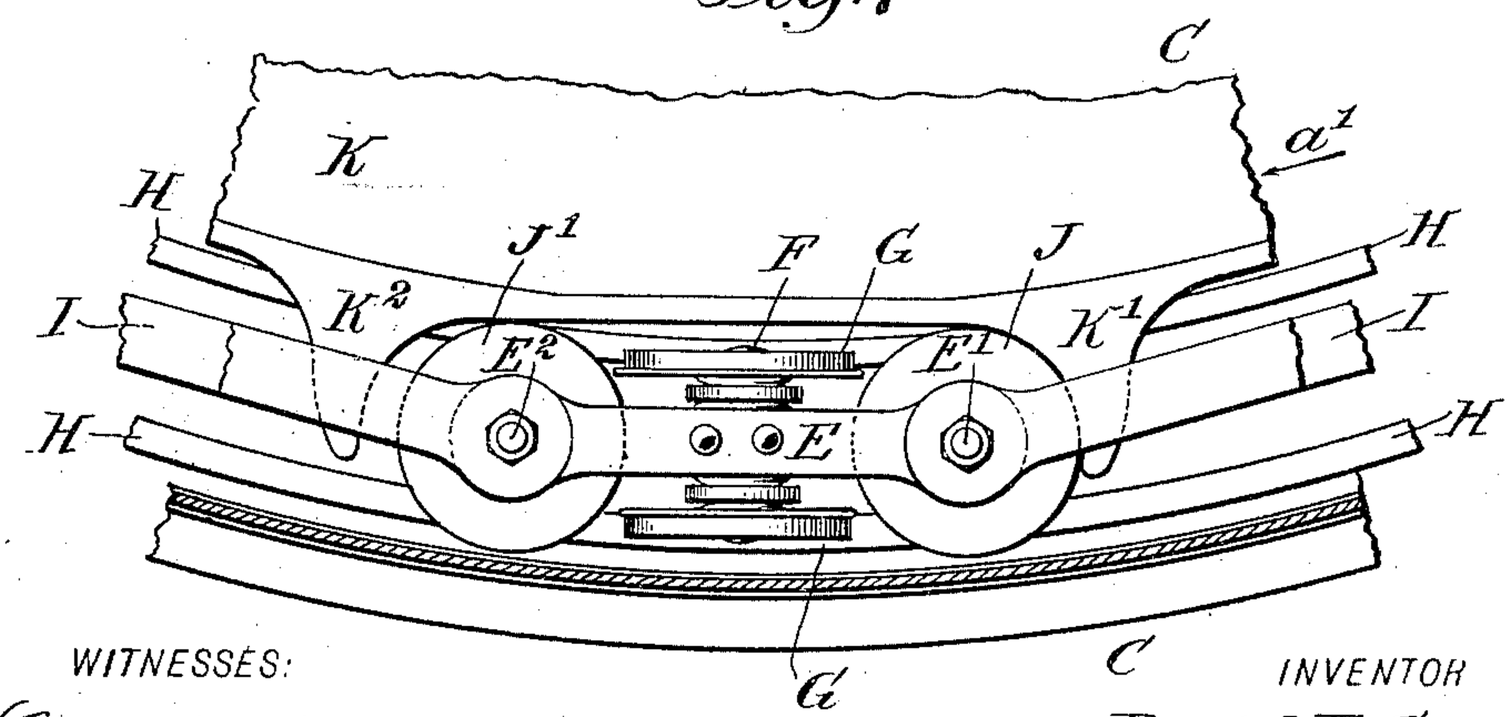


Fig. 7.



WITNESSES:

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APPLICATION FILED SEPT. 15, 1903.

NO MODEL. 5 SHEETS—SHEET 4.

Fig. 9.

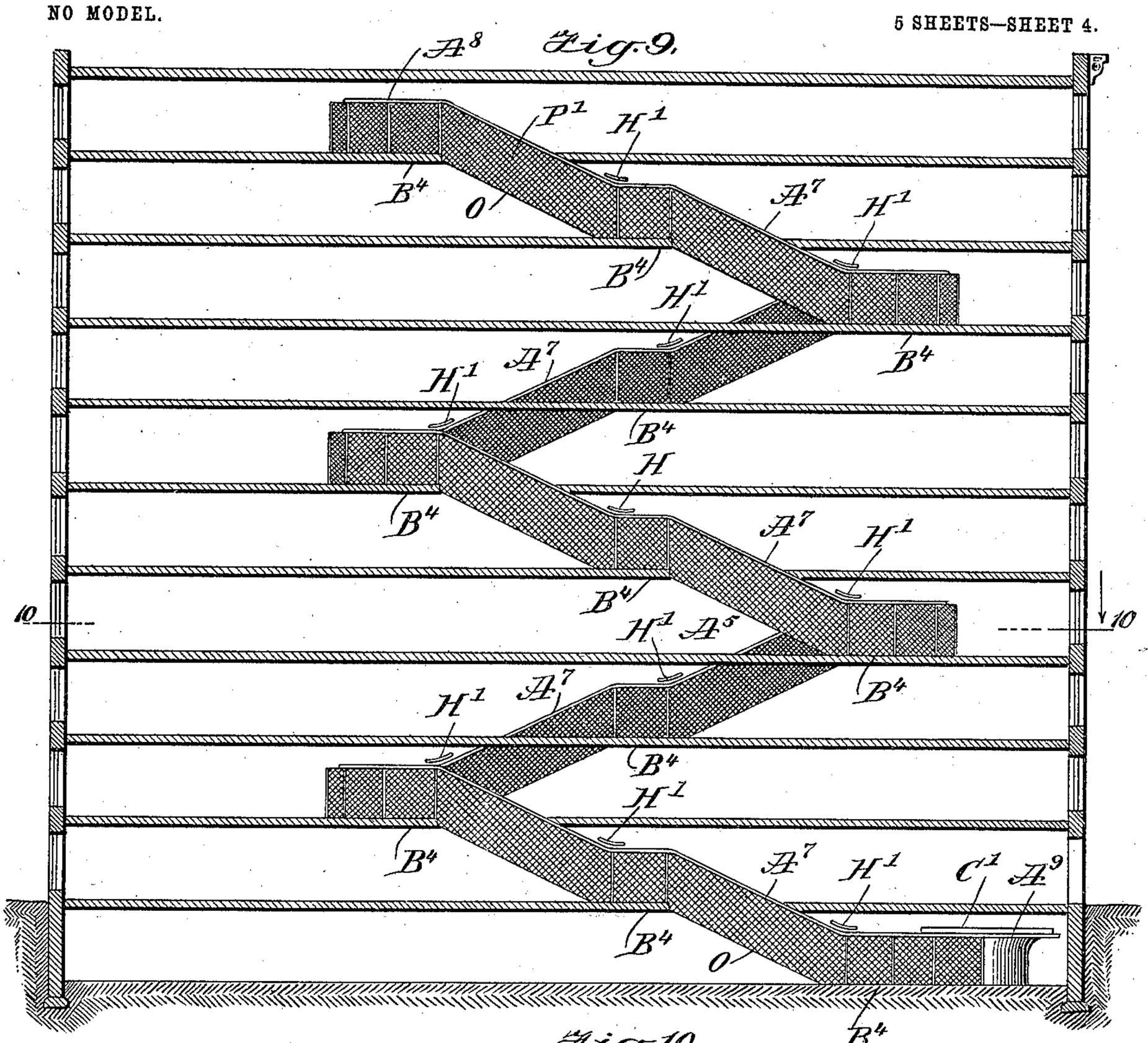
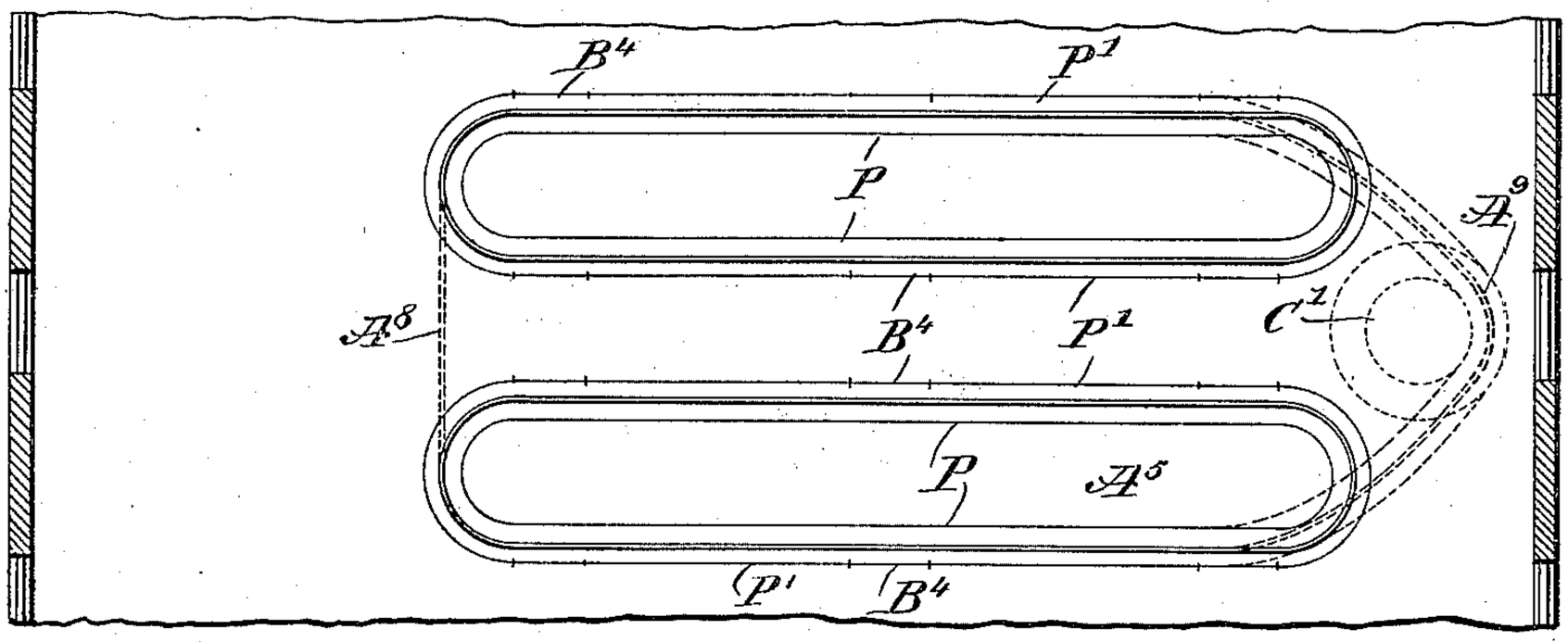


Fig. 10.



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ELEVATOR.

APPLICATION FILED SEPT. 15, 1903.

NO MODEL. 5 SHEETS—SHEET 5.

Fig. 11.

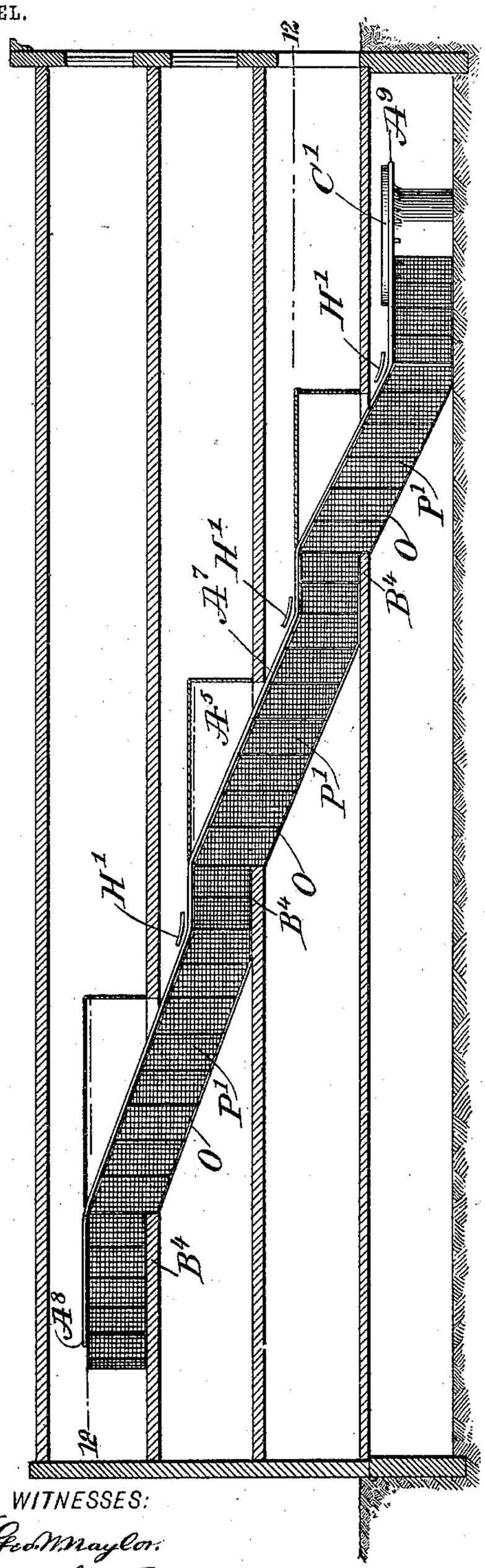
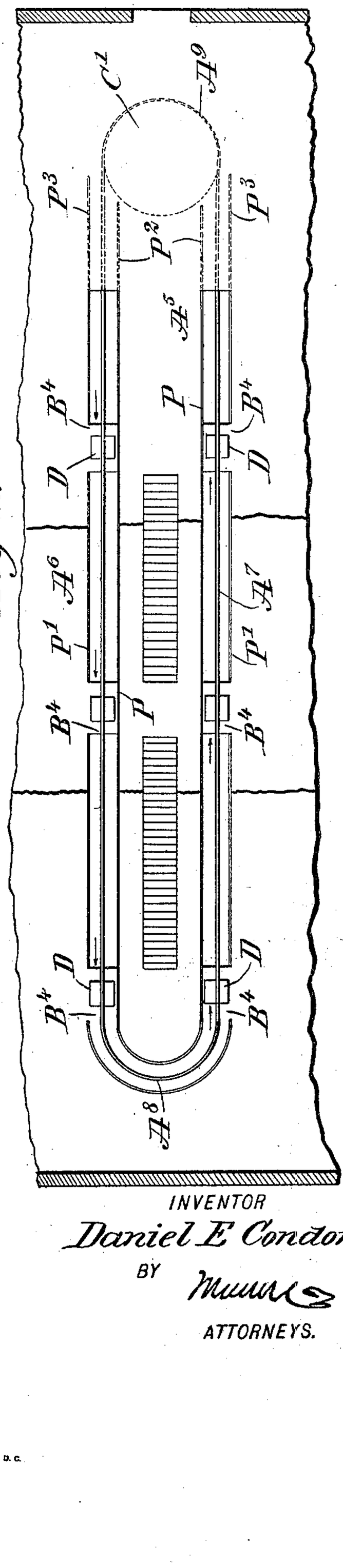


Fig. 12.



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No. 755,361. Patented March 22, 1904.

UNITED STATES PATENT OFFICE.

DANIEL E. CONDON, OF SAN FRANCISCO, CALIFORNIA.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 755,361, dated March 22, 1904.

Application filed September 15, 1903. Serial No. 173,271. (No model.)

To all whom it may concern:

Be it known that I, DANIEL E. CONDON, a citizen of the United States, and a resident of San Francisco, in the county of San Francisco and State of California, have invented a new and Improved Elevator, of which the following is a full, clear, and exact description.

The invention relates to spiral elevators such as shown and described in the Letters Patent of the United States No. 719,751, granted to me February 3, 1903.

The object of the present invention is to provide a new and improved elevator designed for use in all classes of modern business and industrial buildings in which large crowds of people (and freight, &c.) have to be carried to, from, and between the various floors in the safest, most expeditious, and systematic manner possible, the elevator being arranged for continuous travel of the cars from one floor to another in the building, at the same time enabling the passengers to readily leave or enter the cars at any floor of the building.

The invention consists of novel features and parts and combinations of the same, as will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a diagrammatic view of the improvement as applied to a high building, the latter being shown in section. Fig. 2 is a diagrammatic plan view of the same. Fig. 3 is a diagrammatic side elevation of the improvement, showing more particularly the arrangement between two floors of the building and a string of connected cars. Fig. 4 is a side elevation of the connection between adjacent cars shown in Fig. 3. Fig. 5 is a cross-section of the improvement at the power-station, showing the propelling mechanism for the train of cars. Fig. 6 is a sectional side elevation of the same on the line 6 6 of Fig. 5. Fig. 7 is a plan view of the same, part of the station being shown in section. Fig. 8 is a cross-section of the track in the building and one of the cars having its truck mounted to travel on the said track. Fig. 9 is a sectional side elevation of a building provided with an endless elevator having straight flights up and down. Fig. 10 is a sectional plan view of the same on the line 10 10 of Fig. 9. Fig. 11 is a sectional side elevation of a building provided with an endless elevator of modified form, and Fig. 12 is a sectional plan view of the same on the line 12 12 of Fig. 11.

The elevator shown in Figs. 1 to 8, inclusive, is provided with an overhead endless track A, having a spiral up-run A′ and a spiral down-run A^2, the runs extending in spaced elevator-shafts B′ and B^2, arranged in a building B, and the said shafts extend through all the floors of the building, as plainly indicated in Fig. 1. The shafts B′ and B^2 open at each floor onto a landing B^3, which may be common to both shafts, as indicated in Fig. 2, and the track portions along the landings at each floor are horizontally disposed, as indicated in Fig. 3. The upper ends of the runs A′ and A^2 are connected with each other at the top floor or attic of the building by the track-section A^3, and the lower ends of the said runs terminate in a loop A^4, extending around a power-station C, which may be located in the basement of the building or outside of the same, if desired. On the track A is mounted to travel an endless train of cars D, each having a truck E, carrying a transverse axle F for the truck-wheels G, mounted to travel on endless rails H, forming part of the track A, and in the ends of each truck E are arranged vertically-disposed pivot-pins E′ and E^2, connected by links I with the corresponding pins of the trucks of adjacent cars, so that the several trucks of the whole series are connected with each other to form an endless train of cars D, each of which has a hanger D′ attached to its top and hung on the axle F of the corresponding car-truck E. On the pins E′ and E^2 are mounted to turn friction-rollers J and J′, adapted to be peripherally engaged by the sprockets or arms K′ and K^2 of a sprocket-wheel K, located in the power-station C and continually rotated by a suitable driving-gear from a motor located in the power-station. This part of the improvement may be the same as described in

the patent above referred to, so that further detailed description of the same is not deemed necessary, it being, however, understood that when the sprocket-wheel K is rotated in the direction of the arrow a' then the sprockets K′ engage the rollers J to impart a traveling motion to the endless train of cars in the direction of the arrows b', as indicated in Figs. 1 and 2; but when the sprocket-wheel K is rotated in the reverse direction of the arrow a' then the other sprockets K^2 move in peripheral contact with the rollers J′, so as to impart a traveling motion to the endless train of cars in the inverse direction of the arrows b'. As shown by the arrows a' and b', the endless train of cars travels up in the shaft B′ and down in the shaft B^2; but this may be reversed on reversing the rotation of the sprocket-wheel K, as above described. Now when the cars D arrive at a landing B^3 they travel with their bottoms directly over the landings (see Fig. 3) to allow the passengers to readily step in or out of the cars—that is, the passengers desiring to go from one floor to another one above make use of the cars traveling up and through the shaft B′ on the run A′ and passengers desiring to go from a higher floor to a lower floor make use of the cars traveling through the shaft B^2 on the run A^2. In order to support the trucks and cars laterally and guide them along the spiral curvatures during the time they travel on the up and down runs of the tracks, the said runs are provided with a guide-rail L, (see Fig. 8,) on which travel the horizontally-disposed friction-rollers J. If desired, the cars D may be arranged very close together, as illustrated in Figs. 3 and 4, and in this case the opposite sides of adjacent cars are connected with each other by a flexible connection which allows the adjacent cars to assume different levels, especially when traveling from one landing to another. The connection referred to preferably consists of a vertically-disposed rod or bar N, supported on the side of one car and engaged by a plurality of friction-rollers N′, journaled in bearings N^2, attached to the opposite side of the adjacent car, as will be readily understood by reference to Fig. 4, the friction-rollers N′, however, engaging the rod or bar N on the side adjacent to the car supporting the rod. In order to guide the truck-wheels G when a car passes from an inclined track portion or flight to a horizontal floor-landing, and vice versa, overhead guard-rails H′ are provided, each consisting of a short curved rail-piece secured on the upper flanges of the track-girders for the wheels G to be held down when passing from the inclined track to a landing, or vice versa. Below the cars and from one landing B^3 to the next higher landing extends a fixed support or floor O (see Fig. 3) out of contact with the bottoms of the cars, but serving to prevent a car which may become detached from the track from dropping in the corresponding shaft and also to prevent a person from dropping down the shaft. The support O may be a light iron structure in the form of a grille or other open work, but sufficiently strong for the purpose. Each of the shafts B′ and B^2 is provided with railings P and P′, forming a passage-way for the cars, so as to prevent people from falling out of the cars, it being, however, understood that the outside railings P′ are open at the landings B^3 for the passengers to readily step in and out of the cars, as will be understood by reference to Fig. 2. Similar railings P^2 and P^3 extend on opposite sides of the cars from the shafts to the power-station, as indicated in the said Fig. 2.

In the arrangement shown in Figs. 9, 10, 11, and 12 the continuous overhead track A^5 has its up-run A^6 and its down-run A^7 extending in straight flights from one floor to the other, and on each floor is a horizontal portion at the landing B^4 of each floor for the ingress and egress of the passengers to and from the cars D, traveling in endless-train fashion on the said track A^5. The upper ends of the runs A^6 A^7 are connected with each other by the track-section A^8, and the lower ends of the said runs terminate in the loop A^9 around the power-station C′, shown located in the basement of the building. The detail construction of the elevators shown in Figs. 9, 10, 11, and 12 is the same as above described in reference to Figs. 2 to 8, inclusive, and the difference in the arrangement between the elevators shown in Figs. 9 and 10 and Figs. 11 and 12 consists merely in the fact that the runs of the elevator shown in Figs. 11 and 12 extend in one direction only, while the runs of the elevator illustrated in Figs. 9 and 10 extend in a zigzag line, as will be readily understood by reference to Fig. 9.

It is understood that the endless train (as per Figs. 3 and 4) is run sufficiently slow, but continuously—say from sixty to ninety feet per minute—to allow the passengers to readily step into and out of the cars at the landings; but by having the safety-railings described it is evident that passengers are not liable to become injured during their travel from one landing to the other, and in case a car should fall it can only drop to the support O immediately below, so that absolute provision is made for the safety of the passengers both in going up in the building or down in the same.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. An elevator for a building comprising a fixed continuous track having an up-run and a down-run, landings at each floor for both the up-run and down-run, each of the runs having a horizontal portion at each landing, a loop connecting the lower ends of the runs with each other, a plurality of connected trucks mounted to travel on the said track, cars suspended from the said trucks, the trucks and

cars forming an endless train and the cars being arranged to carry loads on both the up and down runs, and means for imparting a continuous traveling motion to the said train, as set forth.

2. An elevator provided with spaced elevator-shafts and floor-landings, and an endless track having an up-run in one shaft and a down-run in the other shaft, the upper ends of the runs being connected with each other and the lower ends terminating in a loop, the endless track being disposed horizontally at each floor-landing, on both the up and down runs, as set forth.

3. An elevator provided with spaced elevator-shafts and floor-landings, and an endless track having an up-run in one shaft and a down-run in the other shaft, the upper ends of the runs being connected with each other and the lower ends terminating in a loop, the endless track being disposed horizontally at each landing on both the up and down runs and the floor-landings being disposed horizontally and projecting across the shafts underneath the floors of the cars, as set forth.

4. An elevator provided with an endless track having an up-run and down-run, each run having a series of inclined, and straight horizontal portions alternating with each other and connecting a plurality of stories in a building on both the up and down runs, the horizontal portions being arranged at each floor-landing and the inclined portions extending between the floor-landings and an endless train of suspended cars mounted to travel on the said track.

5. An elevator provided with spaced elevator-shafts and floor-landings, an endless track having an up-run in one shaft and a down-run in the other shaft, the floor-landings on both the up and down runs projecting into the shaft, the upper ends of the runs being connected with each other and the lower ends terminating in a loop, an endless train of suspended cars mounted to travel on the said track, and a fixed support or floor below the cars, and parallel to the car-path the said support extending from the said projecting portion of one floor-landing to the projecting portion of the next floor-landing, and following the curvature and inclination of the track and the train, as set forth.

6. An elevator comprising a fixed continuous track, an endless train of trucks mounted to travel along the said track, cars suspended from the said trucks and a revolving power-wheel having arms engaging rollers on the trucks, to impart a traveling motion to the train, as set forth.

7. An elevator having a fixed continuous track having an up and down run, an endless train of trucks mounted to travel on the said track, cars suspended from the said trucks and a power sprocket-wheel mounted to turn and adapted to engage with its sprockets or arms, rollers on the trucks of the said cars, as set forth.

8. An elevator having a fixed continuous track, an endless train of cars mounted to travel on the said track, each car carrying a pair of spaced friction-rollers, and a power sprocket-wheel having pairs of sprockets, one of the sprockets of each pair being adapted to engage one of the rollers on a car for driving in one direction and the other sprocket being adapted to engage the other roller of a car for driving in the reverse direction, as set forth.

9. An elevator having a fixed continuous track, an endless train of cars mounted to travel on the said track, each car carrying a pair of spaced friction-rollers, and a power sprocket-wheel having pairs of sprockets, one of the sprockets of each pair being adapted to engage one of the rollers on a car for driving in one direction, and the other sprocket being adapted to engage the other roller of a car for driving in the reverse direction, the sprockets being spaced farther apart than the rollers, as set forth.

10. An elevator comprising a fixed continuous track having an up-run, a down-run, a loop connecting the lower ends of the runs with each other, a guide-rail on the up and down runs of the track and terminating at the ends of the said loop, an endless train of trucks mounted to travel on the said track, cars suspended from the said trucks, friction-rollers carried by the trucks and mounted to travel on the said guide-rail, and a power sprocket-wheel at the said loop, having sprockets for engaging the said rollers, as set forth.

11. An elevator provided with an endless track having alternating inclined and horizontal portions, trucks mounted to travel on the said track, cars suspended from the trucks, and curved guide-rails for guiding the truck-wheels at the junctions of the inclined and horizontal portions, as set forth.

12. An elevator provided with a continuous track having alternating inclined and horizontal portions, a horizontal loop connecting the lower ends of the track with each other, trucks mounted to travel on the said track, cars suspended from the trucks and a hinge connection between opposite sides of adjacent cars, as set forth.

13. An elevator provided with a continuous track, cars mounted to travel on the said track, and a hinge connection between opposite sides of adjacent cars, the hinge connection consisting of a fixed vertical rod on one side of a car and friction-rollers journaled on the opposite side of the adjacent car and engaging the said rod, as set forth.

14. An elevator provided with an endless train of cars mounted to travel up and down in a building and fixed floor-landings in the building having projecting portions extending into the passage-way for the cars and on which the cars travel as set forth.

15. An elevator provided with an elevator-shaft having floor-landings, provided with projecting portions extending into the shaft, and cars mounted to travel in the said shaft and above the projecting portions of the landings, as set forth.

16. An elevator provided with elevator-shafts forming passage-ways, each floor of the building in which the elevator is located forming landings having portions projecting into the passage-ways, and cars traveling in the said passage-ways and over the said projecting portions of the floors, as set forth.

17. An elevator provided with an elevator-shaft forming a passage-way, the floors of the building in which the elevator is located forming landings projecting into the passage-way, supports extending from one projecting portion of the floor-landing to another, and cars traveling in the passage-way immediately above the said supports and over the said projecting portions of the floors, as set forth.

18. An elevator provided with an elevator-shaft, a train of cars mounted to travel spirally in the said shaft, and railings in the shaft, on opposite sides of the cars, to form a passage-way for the cars, the said railings forming a complete inclosure for the track and moving parts of the elevator, as set forth.

19. An elevator provided with an elevator-shaft extending through a plurality of stories in a building, a train of suspended cars mounted to travel spirally in the said shaft, and railings in the shaft, on opposite sides of the cars, to form a passage-way for the cars, the outer railing having openings at the landing of each floor of the building in which the elevator is located, as set forth.

20. An elevator provided with a continuous track, trucks mounted to travel on said track, cars suspended from the said truck, and a hinge connection between adjacent cars comprising a fixed vertical rod on one car and a friction-roller carried by the other car and engaging the said rod on the side adjacent to the car supporting the rod, as set forth.

21. An elevator having a fixed continuous track, a train of cars having trucks mounted to travel on the said track, vertically-disposed pivot-pins in the ends of each truck, connected by links with the corresponding pins of the trucks of the adjacent cars, friction-rollers mounted to turn on the said vertically-disposed pins, a guide-rail on which the friction-rollers travel, and a power sprocket-wheel having pairs of sprockets, one of the sprockets of each pair being adapted to engage one of the said friction-rollers of a car for driving in one direction and the other sprocket being adapted to engage the other roller of a car for driving in a reverse direction, as set forth.

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

DANIEL E. CONDON.

Witnesses:
W. A. KOLMAR,
A. S. HILL.