No. 719,751. PATENTED FEB. 3, 1903.

D. E. CONDON.

SPIRAL ELEVATOR.

APPLICATION FILED JULY 19, 1902.

NO MODEL. 7 SHEETS—SHEET 1.

Fig. 10.

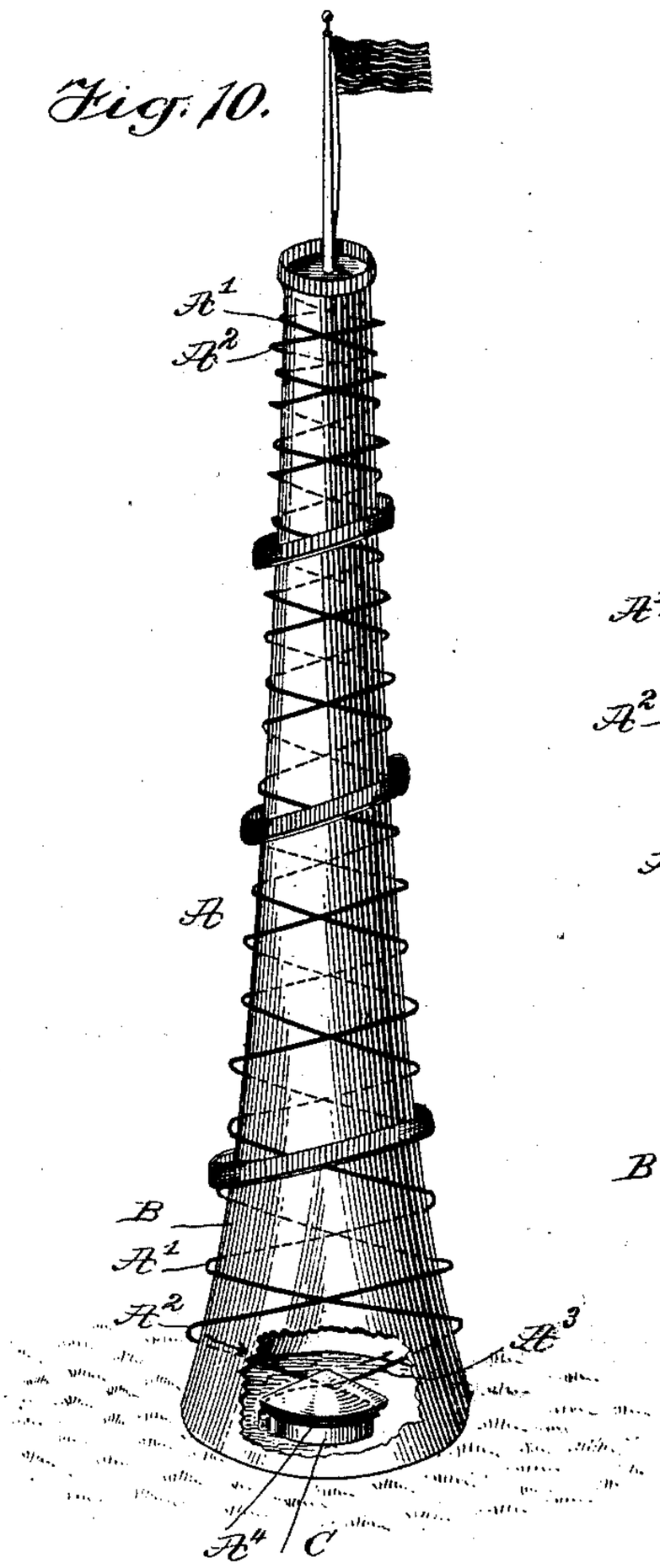
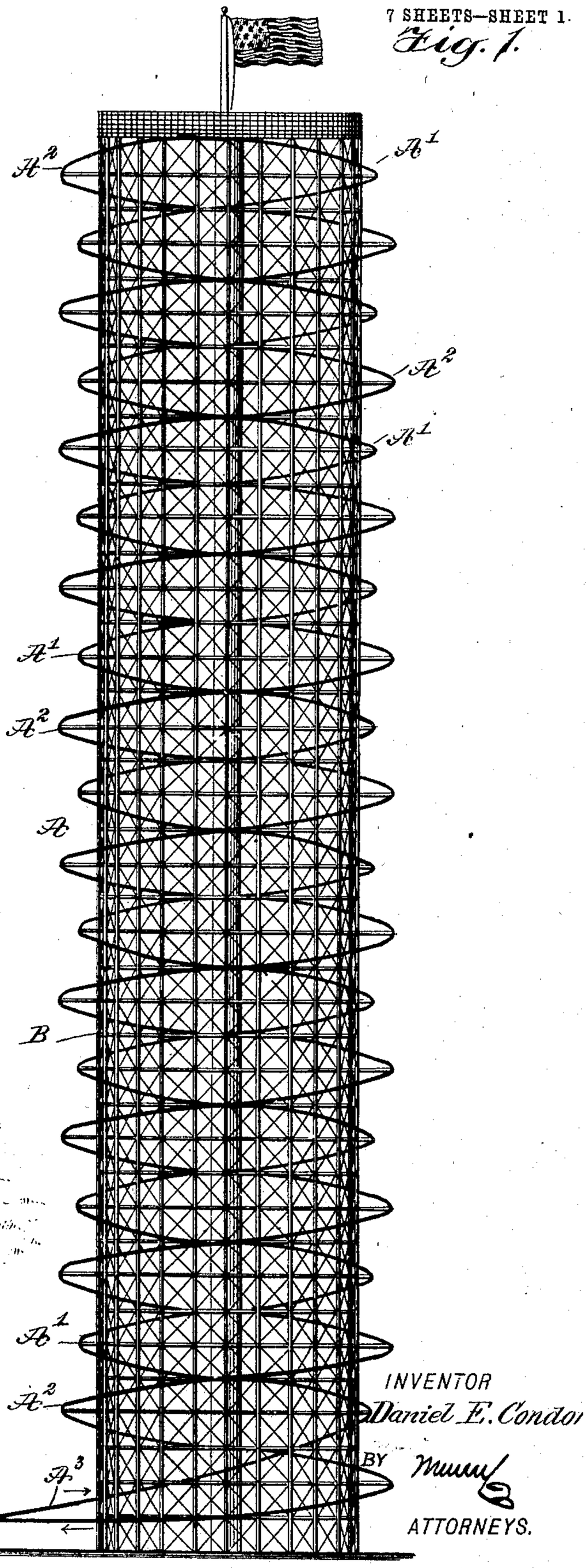


Fig. 1.



WITNESSES:

Geo. H. Mayler.

Rud. J. Hoschek

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ATTORNEYS.

No. 719,751. PATENTED FEB. 3, 1903.

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NO MODEL. 7 SHEETS—SHEET 2.

Fig. 2.

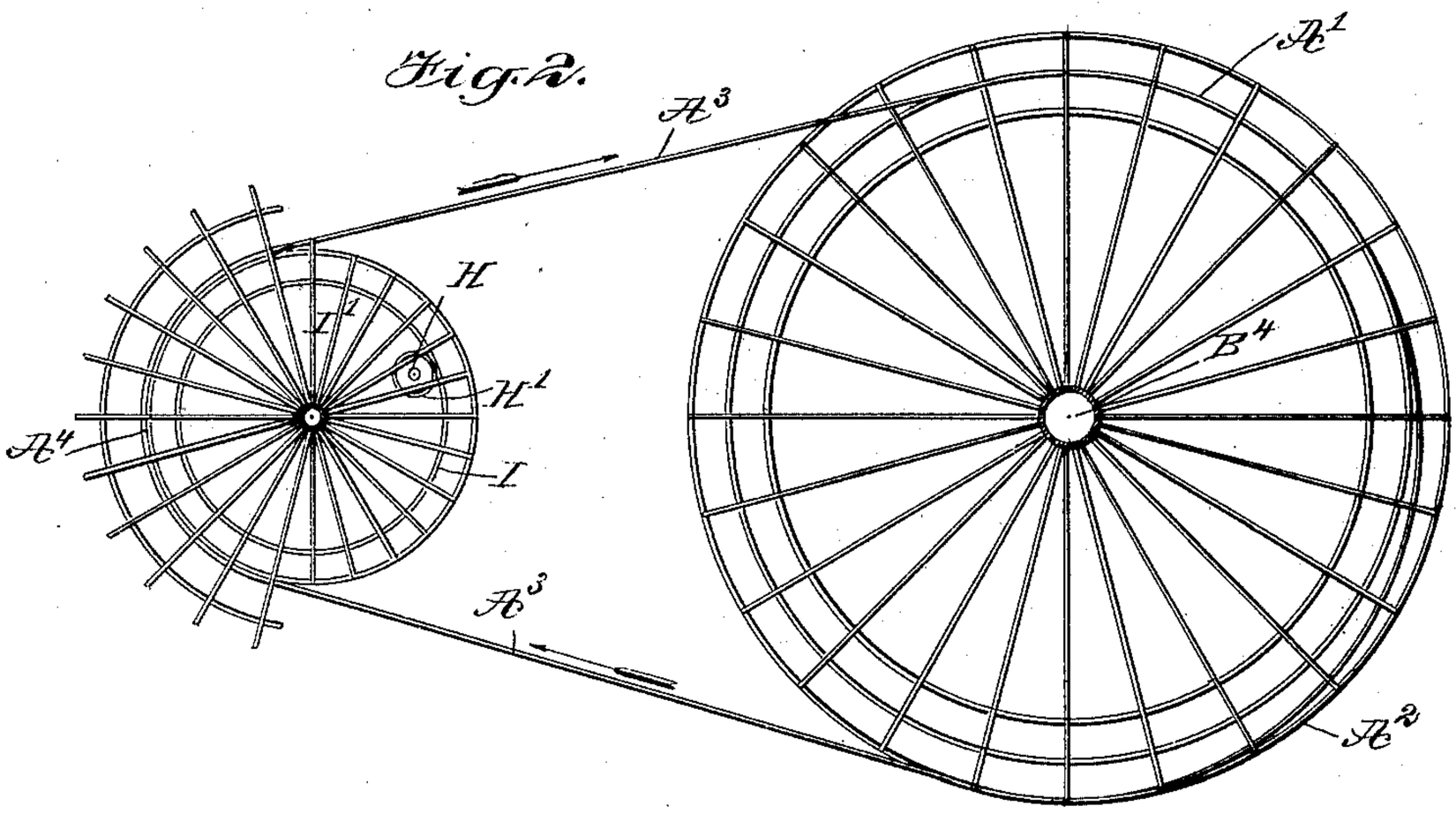
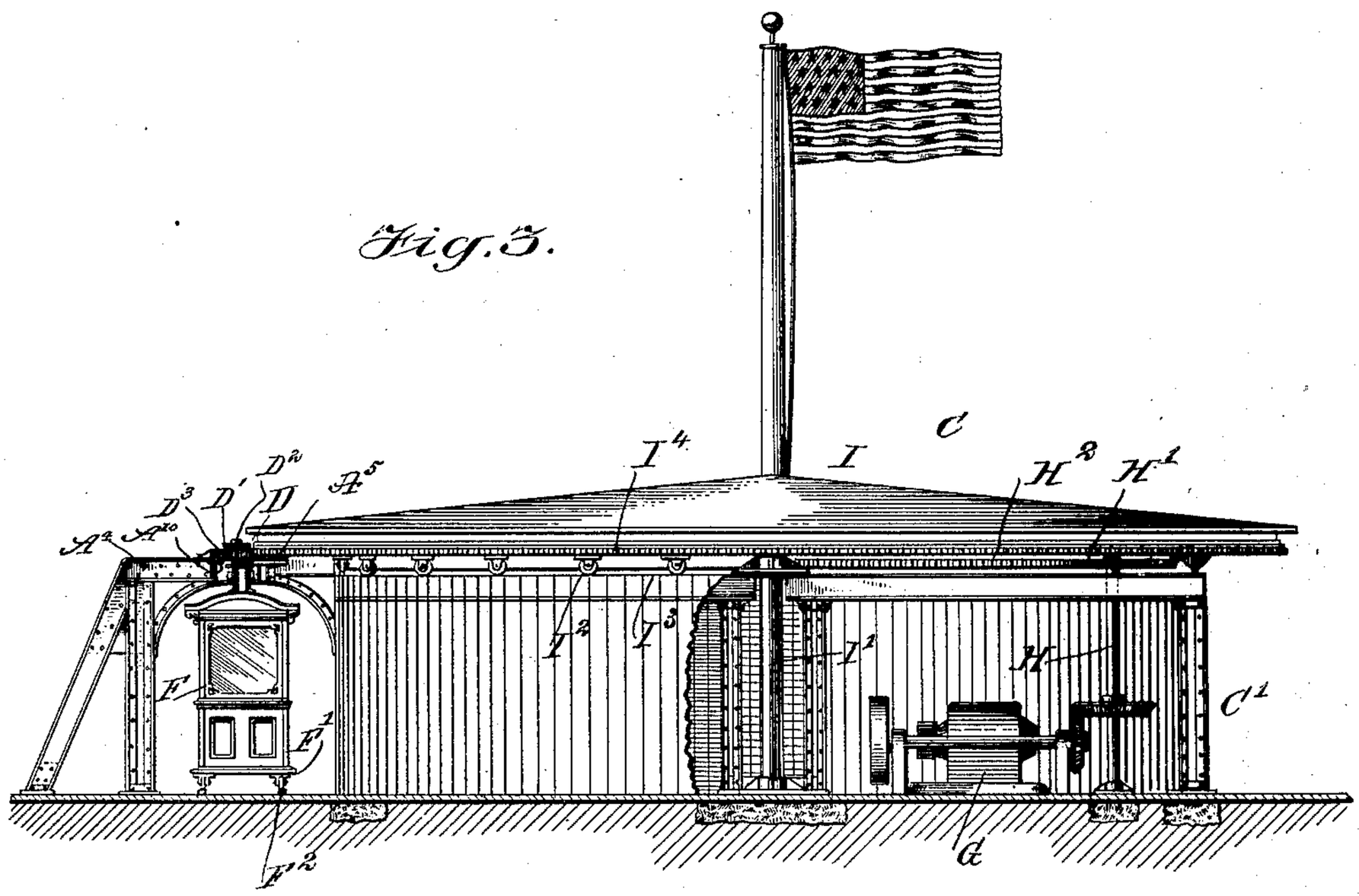


Fig. 3.



WITNESSES:

Geo. H. Graves.

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NO MODEL. 7 SHEETS—SHEET 3.

Fig. 4.

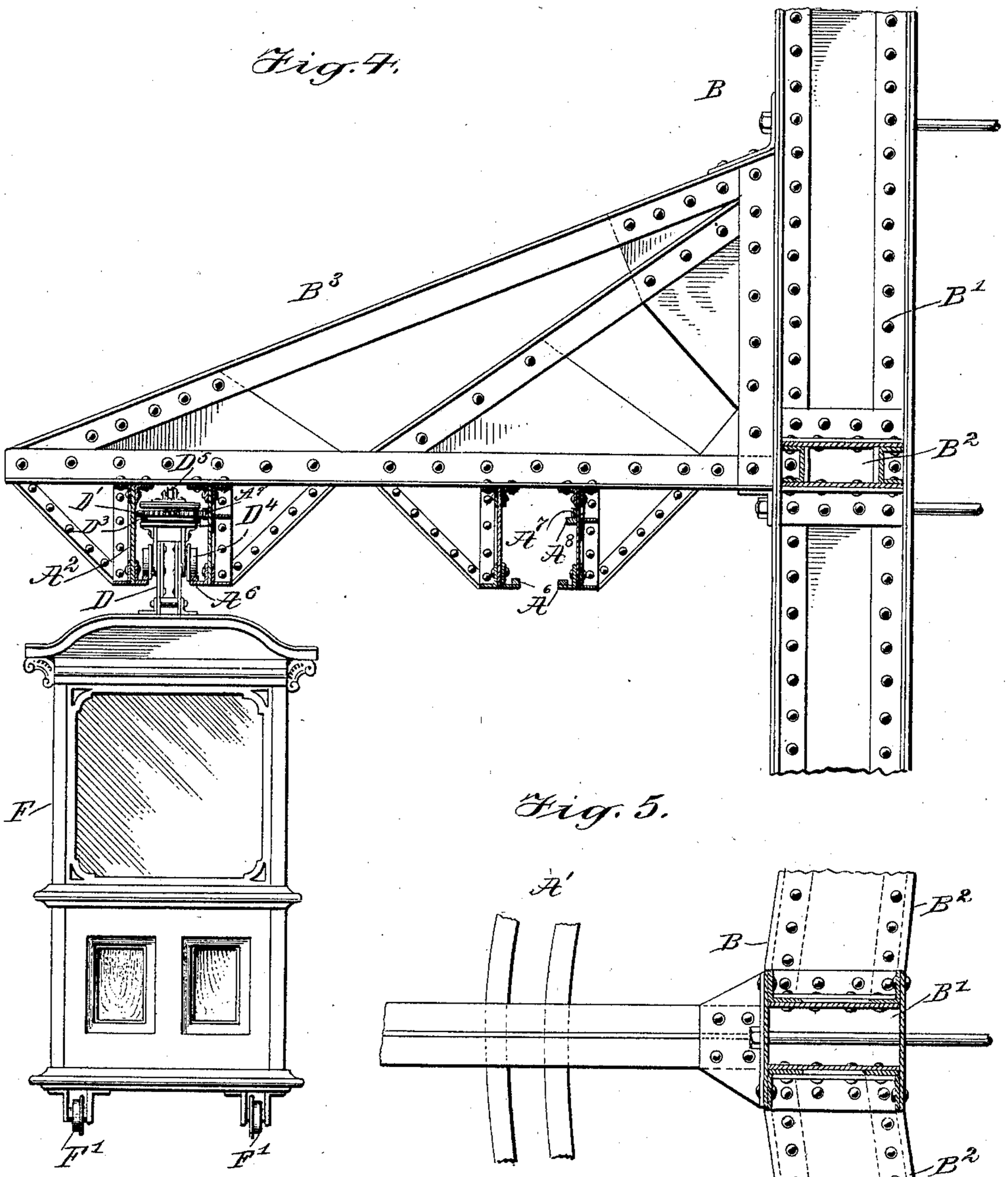

Fig. 5.

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NO MODEL. 7 SHEETS—SHEET 4.

Fig. 6.

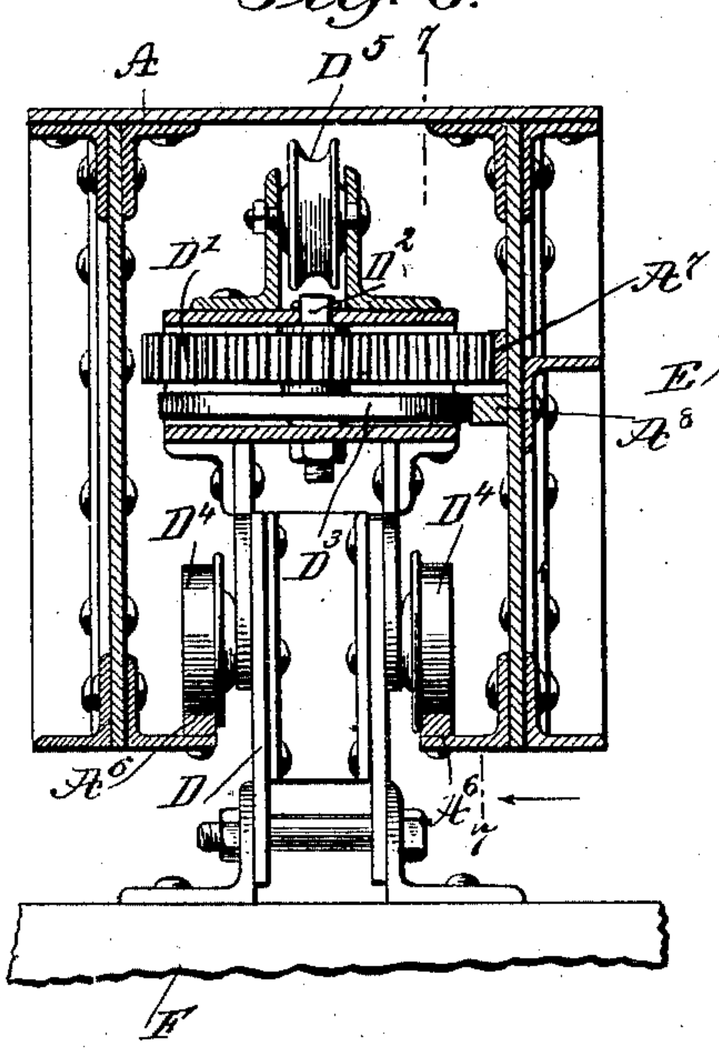


Fig. 7.

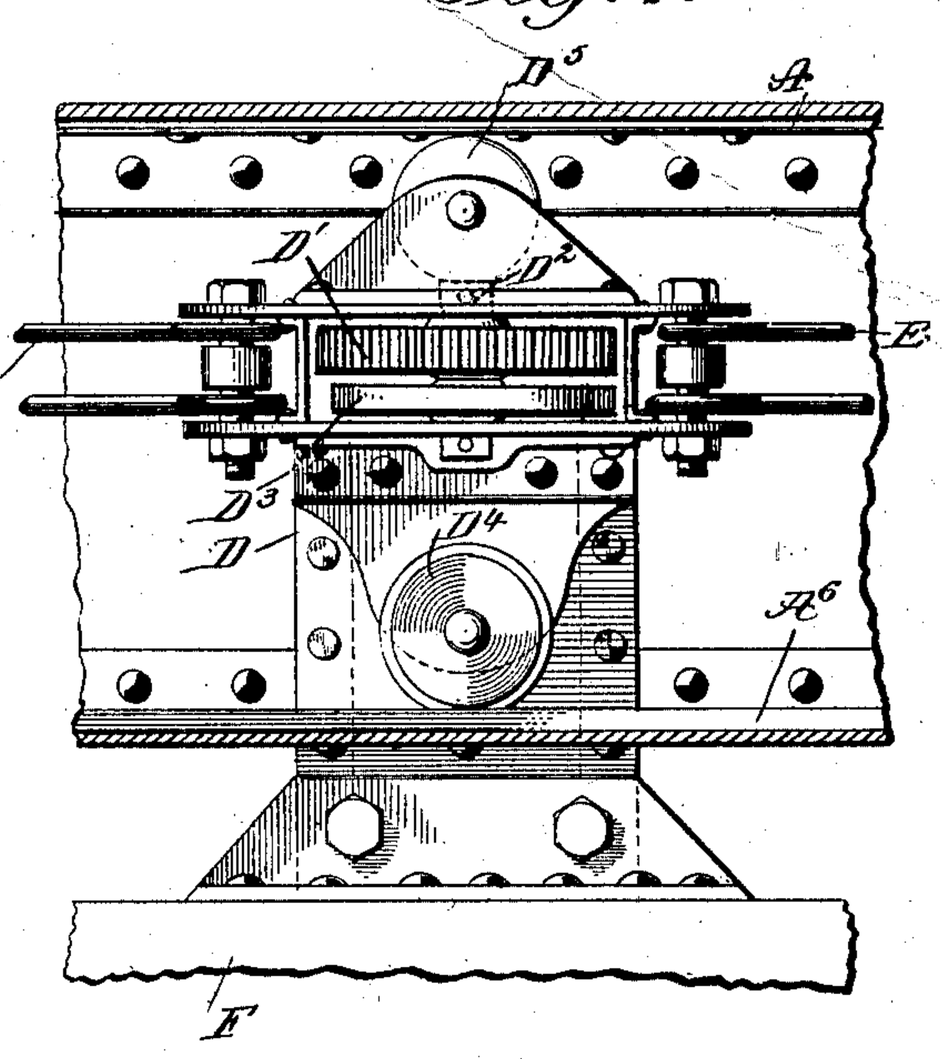


Fig. 11.

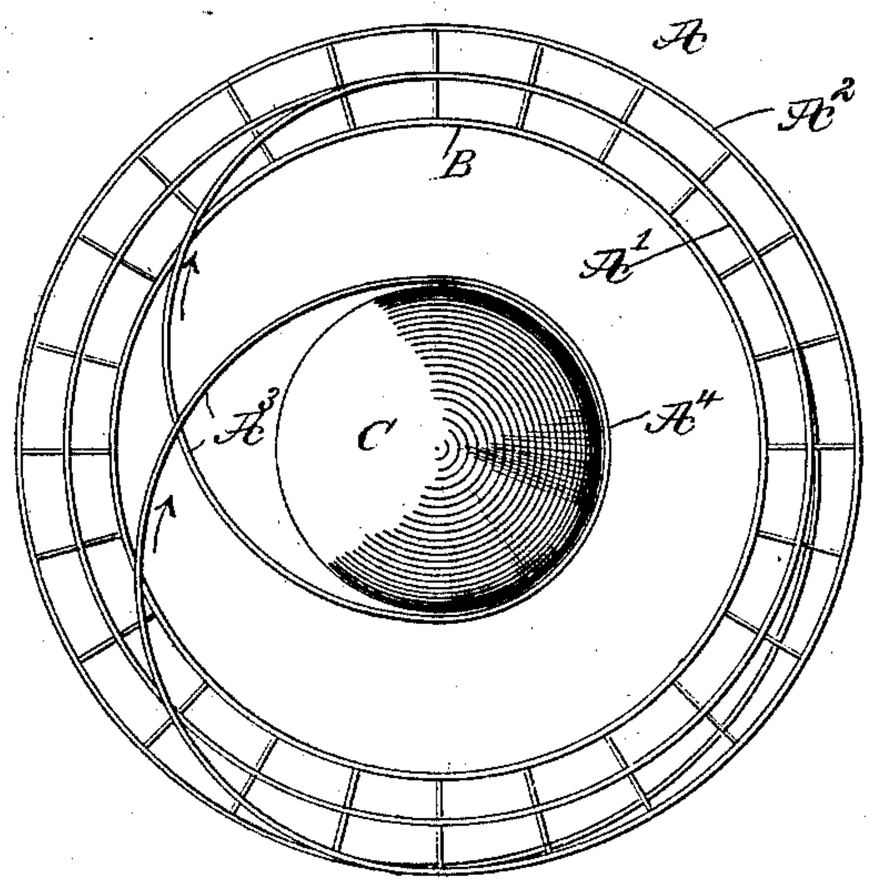
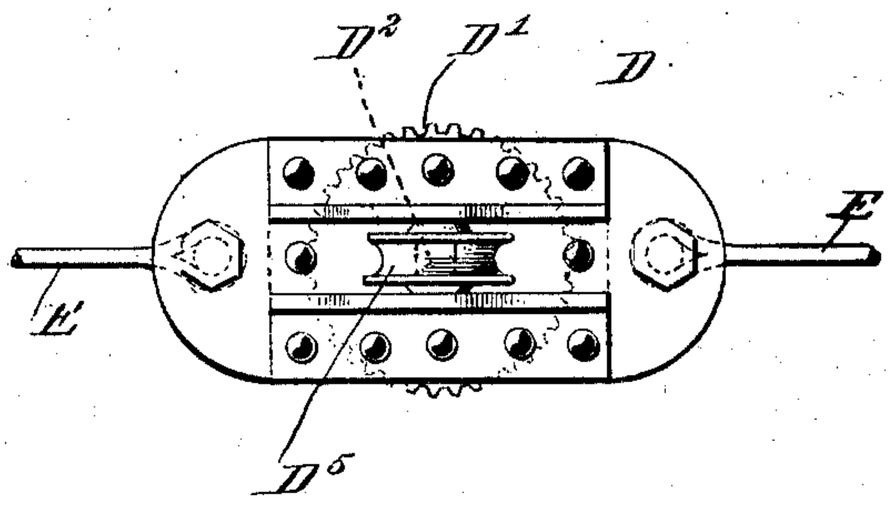


Fig. 8.



WITNESSES:

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APPLICATION FILED JULY 19, 1902.

NO MODEL. 7 SHEETS—SHEET 5.

Fig. 9.

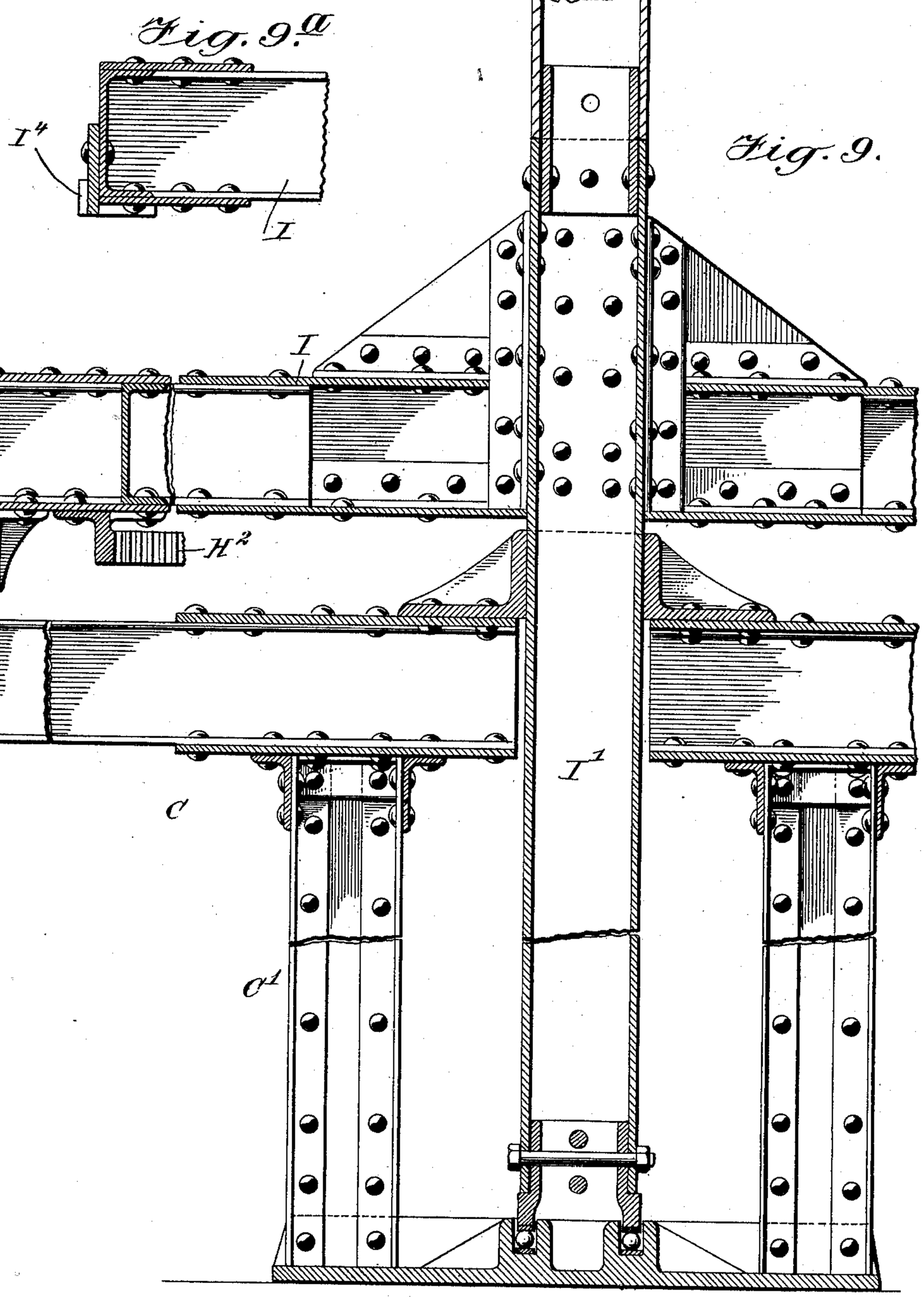

Fig. 9ª.

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APPLICATION FILED JULY 19, 1902.

NO MODEL. 7 SHEETS—SHEET 6.

Fig. 12.

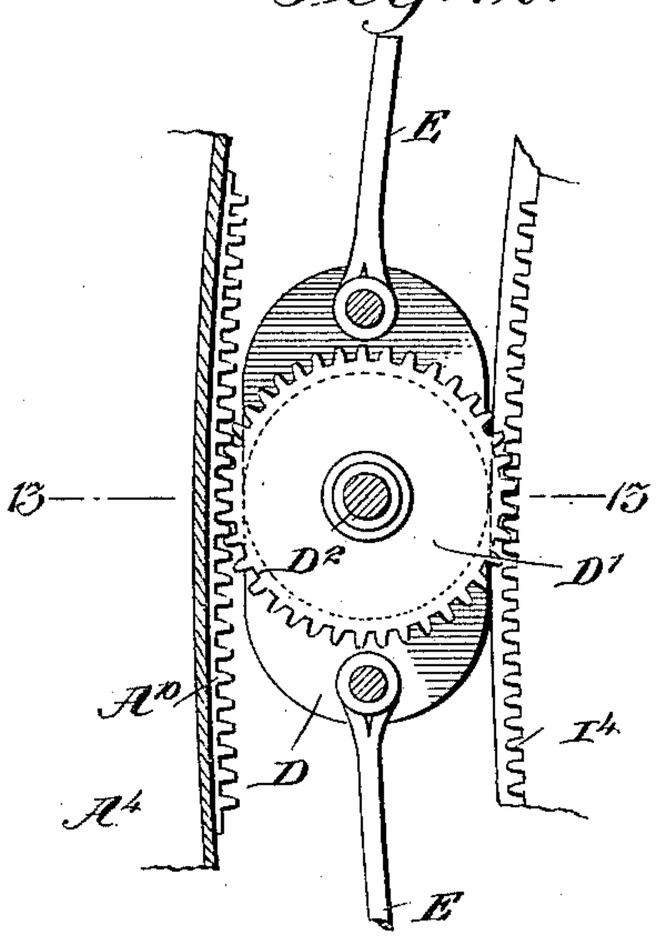


Fig. 14.

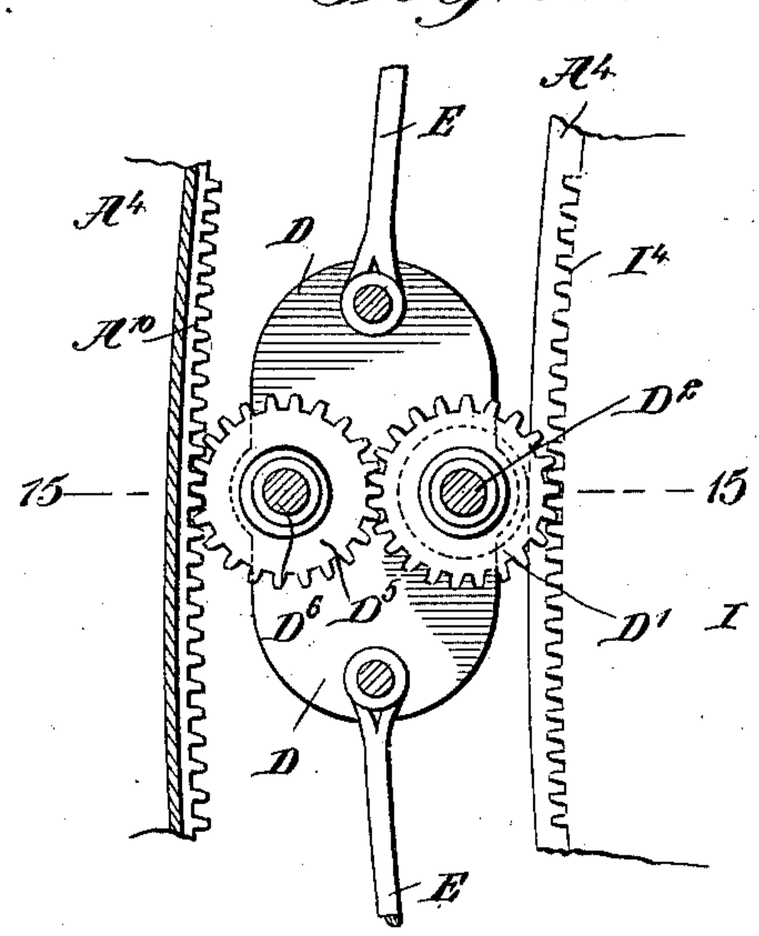


Fig. 13.

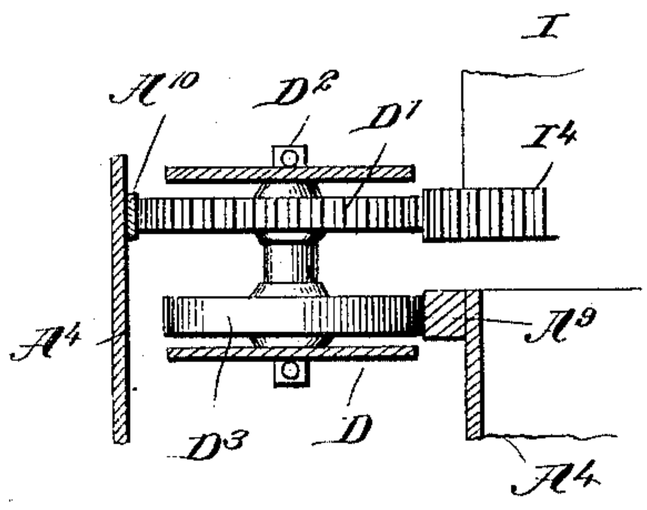
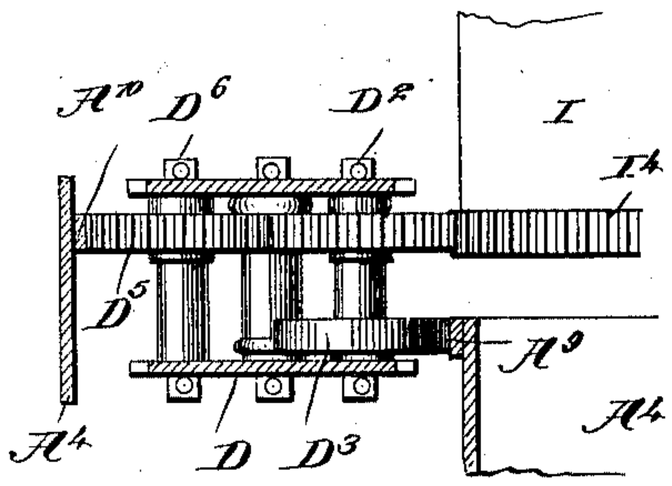


Fig. 15.



WITNESSES:

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No. 719,751. PATENTED FEB. 3, 1903.

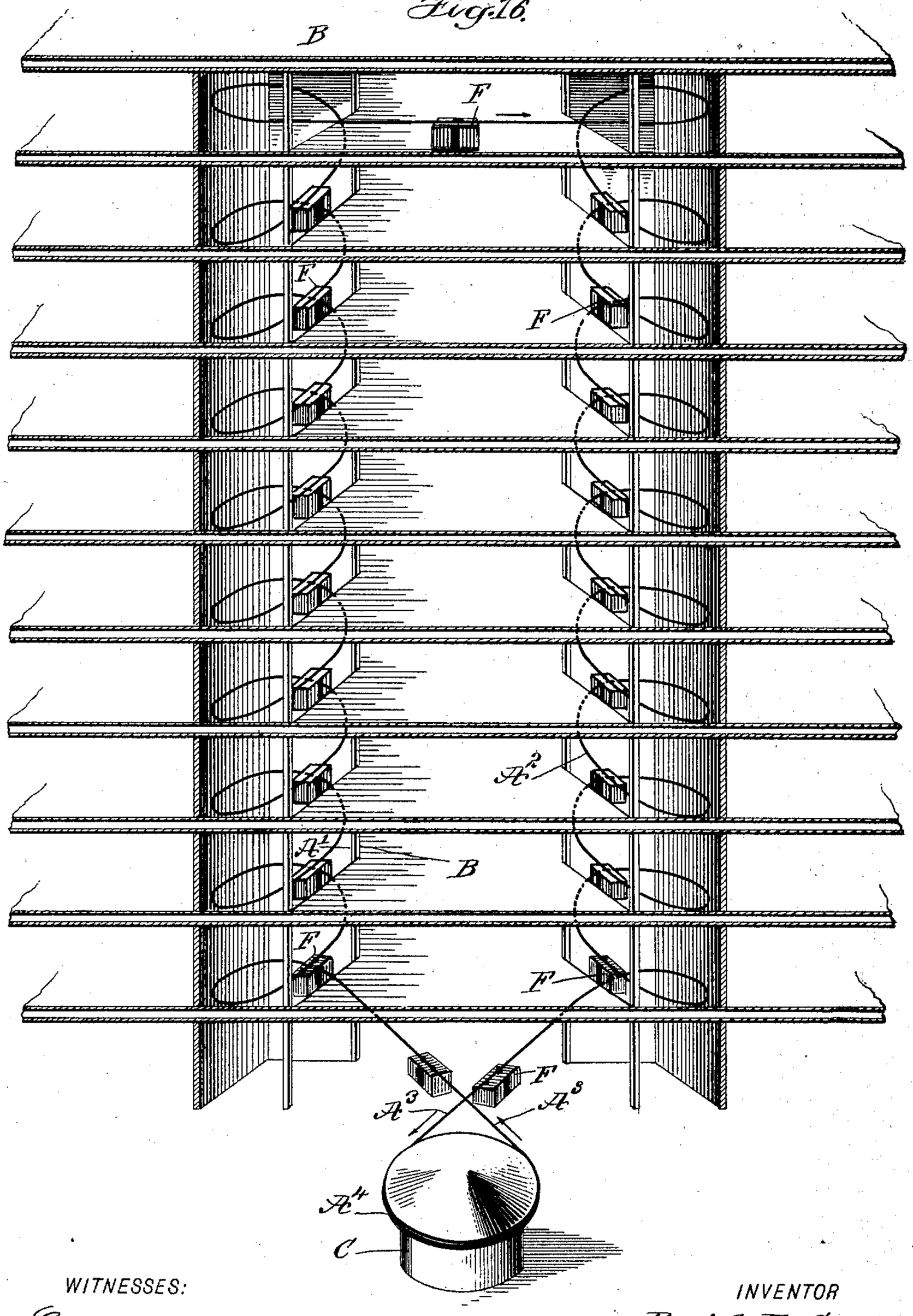
D. E. CONDON.

SPIRAL ELEVATOR.

APPLICATION FILED JULY 19, 1902.

NO MODEL. 7 SHEETS—SHEET 7.

Fig. 16.



WITNESSES:

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Geo. J. Hoover

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BY

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ATTORNEYS.

UNITED STATES PATENT OFFICE.

DANIEL E. CONDON, OF SAN FRANCISCO, CALIFORNIA.

SPIRAL ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 719,751, dated February 3, 1903.

Application filed July 19, 1902. Serial No. 116,267. (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 Spiral Elevator, of which the following is a full, clear, and exact description.

The invention relates to traction devices; and its object is to provide a new and improved spiral elevator for use in observation-towers, rotundas of high buildings, and the like designed for pleasure-trips, for business, industrial, and other purposes, and arranged to insure perfect safety to the passengers making use of the elevator.

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 side elevation of the improvement as applied to an observation-tower. Fig. 2 is an enlarged diagrammatic plan view of the same. Fig. 3 is an enlarged side elevation of the power-house or central station, parts being shown in section. Fig. 4 is an enlarged sectional side elevation of the framework, showing the up and down runs of the overhead spiral track at a crossing in cross-section and a car in elevation. Fig. 5 is a sectional plan view of part of the framework and one of the runs. Fig. 6 is an enlarged cross-section of the track, one of the trucks, and a portion of the car suspended thereon. Fig. 7 is a sectional side elevation of the same on the line 7 7 of Fig. 6. Fig. 8 is a plan view of one of the trucks. Fig. 9 is an enlarged sectional side elevation of part of the power-house and the power-wheel. Fig. 9^a is an enlarged sectional side elevation of the driving-wheel. Fig. 10 is a perspective view of a modified form of the improvement, parts being broken out. Fig. 11 is an enlarged diagrammatic plan of the same. Fig. 12 is an enlarged plan view of the propelling mechanism at the station, parts being in section. Fig. 13 is a sectional side elevation of the same on the line 13 13 of Fig. 12. Fig 14 is a sectional plan view of a modified form of the propelling mechanism. Fig. 15 is a sectional side elevation of the same on the line 15 15 of Fig. 14. Fig. 16 is a diagrammatic view of a modified form of the improvement as applied to a building, the latter being shown in section.

The improved spiral elevator, as shown in Figs. 1 and 10, is provided with an overhead endless track A, having concentric spiral up and down runs A′ and A^2, mounted on a framework B of any approved construction, the upper ends of the said runs A′ A^2 being connected with each other and the lower ends of the said runs terminating in a loop A^3, having a horizontally-disposed segmental portion A^4, extending around a power-house or central station C, located either a short distance from the framework B, as shown in Figs. 1 and 2, or arranged within the base of the framework, as illustrated in Figs. 10 and 11. The framework B may be of cylindrical, conical, or other suitable shape and in the form of an observation-tower or arranged in the rotunda of a building, and, in the case of an observation-tower, preferably with a suitable platform on the top to permit persons to view the surrounding country or scenery from the said platform.

On the endless track A are mounted to travel trucks D, spaced suitable distances apart and connected with each other by links E in the form of chains, coupling-rods, or the like, and from all or only from sundry of the said trucks D are suspended cars F for the reception of the attendant and passengers. Now by having the trucks connected with each other it is evident that an endless train is produced, which travels on the endless overhead track A, and the said train is set in motion at the power-house or central station C in the manner presently to be described in detail.

In the power-house C is mounted a motor G of any approved construction, geared with a vertically-disposed shaft H, journaled in suitable bearings held on the framework C′ of the power-house, and on the upper end of the said shaft H is secured a gear-wheel H′, in mesh with an internal gear-wheel or annular rack H^2, secured to a power-wheel I, hav-

ing its shaft I′ journaled in suitable bearings arranged on the framework C′ of the power-house, as illustrated in Figs. 3 and 9. The power-wheel I is provided with track-wheels I^2, traveling on an annular track I^3, supported on the framework C′ of the power-house, and the said power-wheel I is provided with a spur-wheel I^4, adapted to mesh with a pinion D′, mounted to rotate loosely on a shaft D^2, held vertically on the truck D, the said pinion D′ being adapted to move into mesh with a segmental internal gear-wheel A^{10}, secured on the horizontal portion A^4 of the endless track, so that when a pinion D′ of a truck moves in mesh with the revolving gear-wheel I^4 then the rotation of the latter causes the pinion D′ to rotate, and as the latter is in mesh with the fixed segmental gear-wheel A^{10} it is evident that the truck D, carrying the said pinion D′, is pushed along in the horizontal portion A^4 of the endless track and in the same direction as that in which the driving-wheel is rotating. Thus a positive traveling motion is given to each of the trucks D on reaching the horizontal loop portion A^4 of the endless overhead track, and as at least two and usually more such trucks are at the same time traveling in the said horizontal portion it is evident that a continuous traveling motion is imparted to the entire train, so that one set of cars travels up the run A′ while another set of cars travels down the run A^2.

The trucks D may be made of single or multiple axle construction, and the wheels D^4 of the said trucks are mounted to travel on track-rails A^6, supported on bottom flanges of the girders forming the endless track, (see Figs. 6 and 7,) and in order to prevent sidewise swaying of the trucks and the cars I provide a rail A^8 on the web of the inner girder, on which travels a pulley D^3, rotating loosely on the axle D^2, previously referred to. The pulley D^3 also engages and travels on a segmental rail A^9 on the horizontal portion A^4 of the endless track (see Fig. 13) at the time a truck reaches this portion of the track. If desired, the pinion D′ of each truck may be in mesh on the up and down runs of the track, with racks A^7 secured to the webs of the inner girders, directly above the rail A^8, as illustrated in said Figs. 6 and 7.

The propelling mechanism for the trucks on the station may be varied. For instance, as shown in Figs. 14 and 15, the pinion D′, driven by the gear-wheel I^4, is in mesh with a like pinion D^5, having its shaft D^6 journaled on the truck D, the said pinion D^5 being also in mesh with a fixed segmental gear-wheel A^{10}, forming part of the horizontal portion of the track. In this case the truck D is caused to travel in the opposite direction to that of the driving gear-wheel I^4.

Each car F is preferably provided on its bottom with track-wheels F′, adapted to travel on segmental rails F^2, arranged around the power-house below the horizontal portion A^4 of the endless track, so that while the truck of a car is positively driven from the power-wheel I^4 the weight of the car is sustained by the wheels F′, traveling on the track-rails F^2. The top of each truck is preferably provided with a grooved pulley D^5, adapted to engage short lengths of track-rails placed at the change of grade occurring at the connection between the lower ends of the runs A′ A^2 and the horizontal portion A^4 of the loop A^3 and all other places where necessary.

The spiral up and down runs A′ and A^2 may be of the same or different pitch, preferably, however, of the same pitch, as shown in the drawings. Now by reference to Figs. 1 and 10 it will be seen that the runs pass each other at every convolution on opposite sides of the framework between the base and top thereof. Passengers in one car thus pass close to the passengers in another car running in an opposite direction, so that the up and down journey in a car will be greatly enjoyed by the passengers. On a car reaching the top the passengers may alight on the framework-platform to view the surrounding country or scenery from the top of the tower, and the passengers can take the same or another car for the down journey. On a tower having spiral runs of ordinary grade—say ten per cent. to twenty per cent.—long cars with two or more axle-trucks may be employed; but on a tower having a track of a very steep grade—over twenty per cent.—I prefer to use short cars with single axle-trucks for the cars to hang perpendicular during the entire journey.

The links E are provided with turnbuckles or like devices to allow proper adjustment of the train.

The framework B consists, preferably, of posts B′, arranged in a circle and strongly connected with each other by suitable braces B^2, &c., and from each post B′ extend outwardly in a radial direction the brackets B^3 for supporting the spiral runs A′ A^2 of the endless track A. The posts B′ are braced from a central post B^4. (See Fig. 2.) The girders of the endless track A are suitably braced from the brackets and are reinforced longitudinally and braced transversely to give the desired strength to the track. The portions of the loop A^3 extending from the ends of the segmental portion A^4 to the lower ends of the runs A′ A^2 are supported on suitable pillars; but as such construction and other details of the track A, framework B, and power-house C vary according to the size and shape of the elevator and its intended use it is not deemed necessary to enter into a minute description of such details.

The framework B may be provided with suitable stairways, platforms, rooms, &c., in addition to the spiral runs of the track.

The power-house or central station C is provided with suitable platforms, preferably two

in number, one for the passengers to reach the cars and the other for the passengers leaving the cars.

It is understood that the endless train is set intermittently in motion, and in practice a number of cars stop simultaneously on each station and the top platform of the tower for passengers to embark and disembark, and as soon as this is done the train is set in motion from the driving machinery

Each car is provided with suitable brake devices under the control of the attendant, so that in case of derangement of the actuating machinery or the train the cars can be stopped at any point of the track or slowly run down to the starting-point at the station.

It is understood that the power required to propel the endless train is approximately not greater than that required to haul a corresponding train on a level track, as the weight of the cars on the down-run A^2 practically balances that of the cars traveling on the up-run A'.

As shown in Fig. 16, the device is arranged as an elevator for a high building B, and in this case the spiral up and down runs A' A^2 of the endless track A are not connective, but are spread apart. The upper ends of the runs are connected with each other at the top floor of the building and the lower ends terminate in a loop A^3, having its horizontal portion A^4 extending around the power-house C, located in the basement of the building. An endless train formed of cars F, trucks, and links is intermittently set in motion from the power-house C, and the arrangement is preferably such that when the train stops two cars are at each floor—that is, one at the up-run and one at the down-run, as indicated in the Fig. 18. By the arrangement described passengers can be quickly taken up or down in the building without undue loss of time, as one set of cars is always going up while at the same time another set of cars is going down.

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

1. An elevator comprising a fixed continuous track having a spiral up-run and a like down-run, a loop connecting the lower ends of the runs with each other, a plurality of connected cars forming an endless train, mounted to travel on the said track, and means for imparting a traveling motion to the train, as set forth.

2. An elevator comprising a framework, an overhead track having spiral up and down runs supported by the said framework and connected with each other at the upper ends, the lower ends being connected by a loop, connected cars forming an endless train, adapted to travel on the overhead track, a power-house supporting the said loop, and means in the power-house for imparting a traveling motion to the said train, as set forth.

3. An elevator comprising a framework, an overhead track having spiral up and down runs supported on the framework and connected with each other at the top, the lower ends being connected by a loop, cars having overhead trucks mounted to travel on the said overhead track, means for connecting the cars at intervals, to form an endless train, a power-house carrying the said loop, and revolving means in the power-house for imparting a traveling motion to the cars in succession, as set forth.

4. An elevator comprising a framework, an overhead track having spiral up and down runs supported on the framework and connected with each other at the top, the lower ends being connected by a loop, cars having overhead trucks mounted to travel on the said overhead track, means for connecting the cars at intervals, to form an endless train, a power-house at one side of the said framework, carrying the said loop, and revolving means in the power-house for imparting a traveling motion to the cars in succession, as set forth.

5. An elevator comprising a framework, an endless overhead track having spiral up and down runs supported on the said frame, the upper ends of the runs being connected with each other and the lower ends terminating in a loop having a segmental portion, cars having overhead trucks mounted to travel on the said track, means for connecting the cars with each other to form an endless train, and means at a central station for imparting a traveling motion successively to the car-trucks on the latter reaching the central station, as set forth.

6. An elevator comprising a framework, an endless overhead track having spiral up and down runs supported on the said frame, the upper ends of the runs being connected with each other and the lower ends terminating in a loop having a segmental portion, cars having overhead trucks mounted to travel on the said track, means for connecting the cars with each other to form an endless train, and means at a central station for imparting a traveling motion successively to the car-trucks on the latter reaching the central station, the said means comprising a revoluble gear-wheel adapted to be engaged by pinions on the car-trucks, as set forth.

7. An elevator comprising a framework, an endless overhead track having spiral up and down runs supported on the said frame, the upper ends of the runs being connected with each other and the lower ends terminating in a loop having a segmental portion, cars having overhead trucks mounted to travel on the said track, means for connecting the cars with each other to form an endless train, and means at a central station for imparting a traveling motion successively to the car-trucks on the latter reaching the central station, the said means comprising a pinion journaled on each truck, a revoluble gear-wheel on the central station, adapted to be engaged by the said

pinions, and a fixed segmental gear-wheel on the said station, adapted to be engaged by the said pinion, as set forth.

8. An elevator provided with a tower, and an endless track having concentric spiral up and down runs supported on the said tower, the upper ends of the runs being connected with each other and the lower runs terminating in a loop, as set forth.

9. An elevator provided with a tower, and an endless track having concentric spiral up and down runs supported on the said tower, the upper ends of the runs being connected with each other and the lower runs terminating in a loop having a segmental portion, as set forth.

10. An elevator provided with a tower, and an endless track having concentric spiral up and down runs supported on the said tower, the upper ends of the runs being connected with each other and the lower runs terminating in a loop extending to one side of the tower, as set forth.

11. An elevator having a power-station provided with a segmental track, a driven, horizontally-disposed power gear-wheel mounted in the power-station, a truck mounted to travel on the said track, a pinion in mesh with the said driven gear-wheel and journaled on the truck, and a fixed segmental gear-wheel or rack adapted to be engaged by the said pinion at the time the latter meshes with the said power gear-wheel, 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:

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S. H. BROOKS.