

No. 859,019.

PATENTED JULY 2, 1907.

F. S. SMITH.
ELECTRIC TRANSPORTATION SYSTEM.

APPLICATION FILED MAR. 11, 1907.

3 SHEETS—SHEET 1.

Fig. 1.

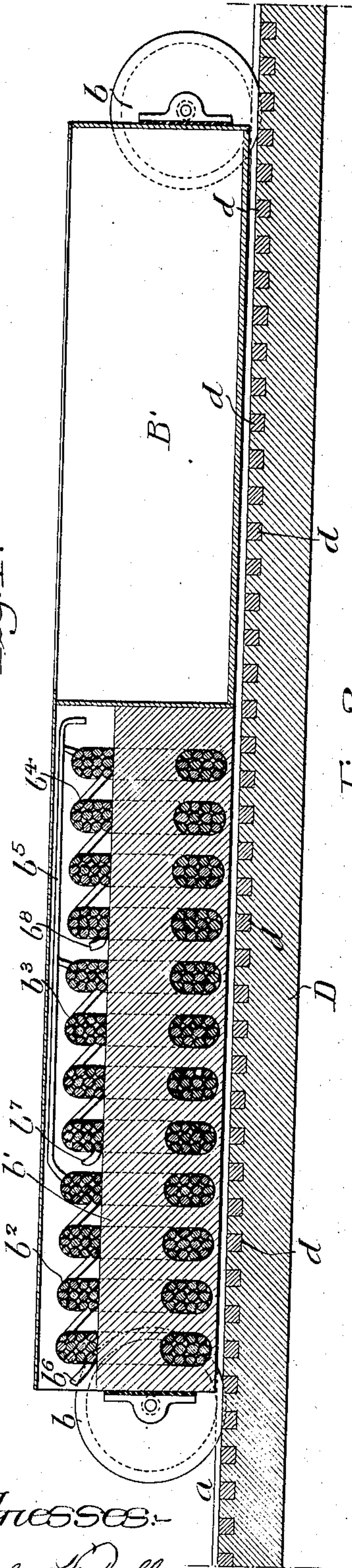


Fig. 2.

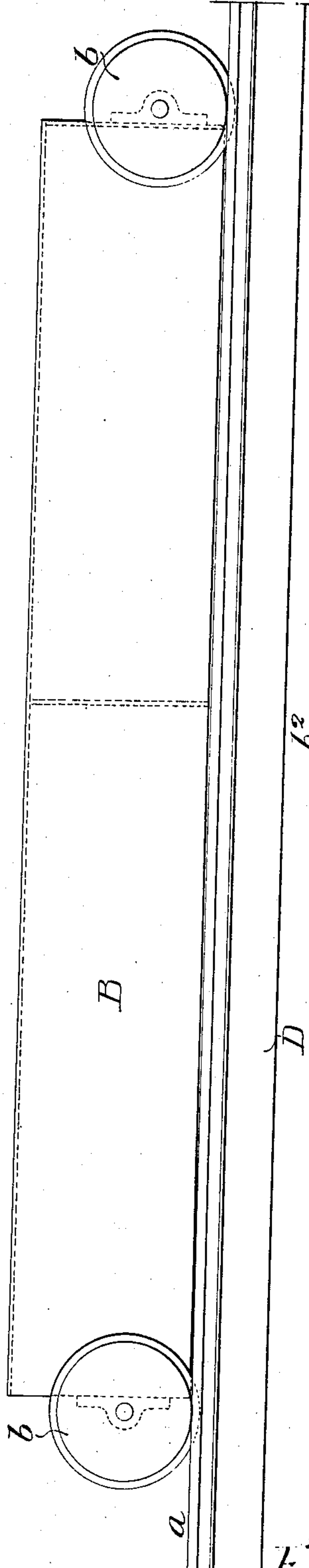
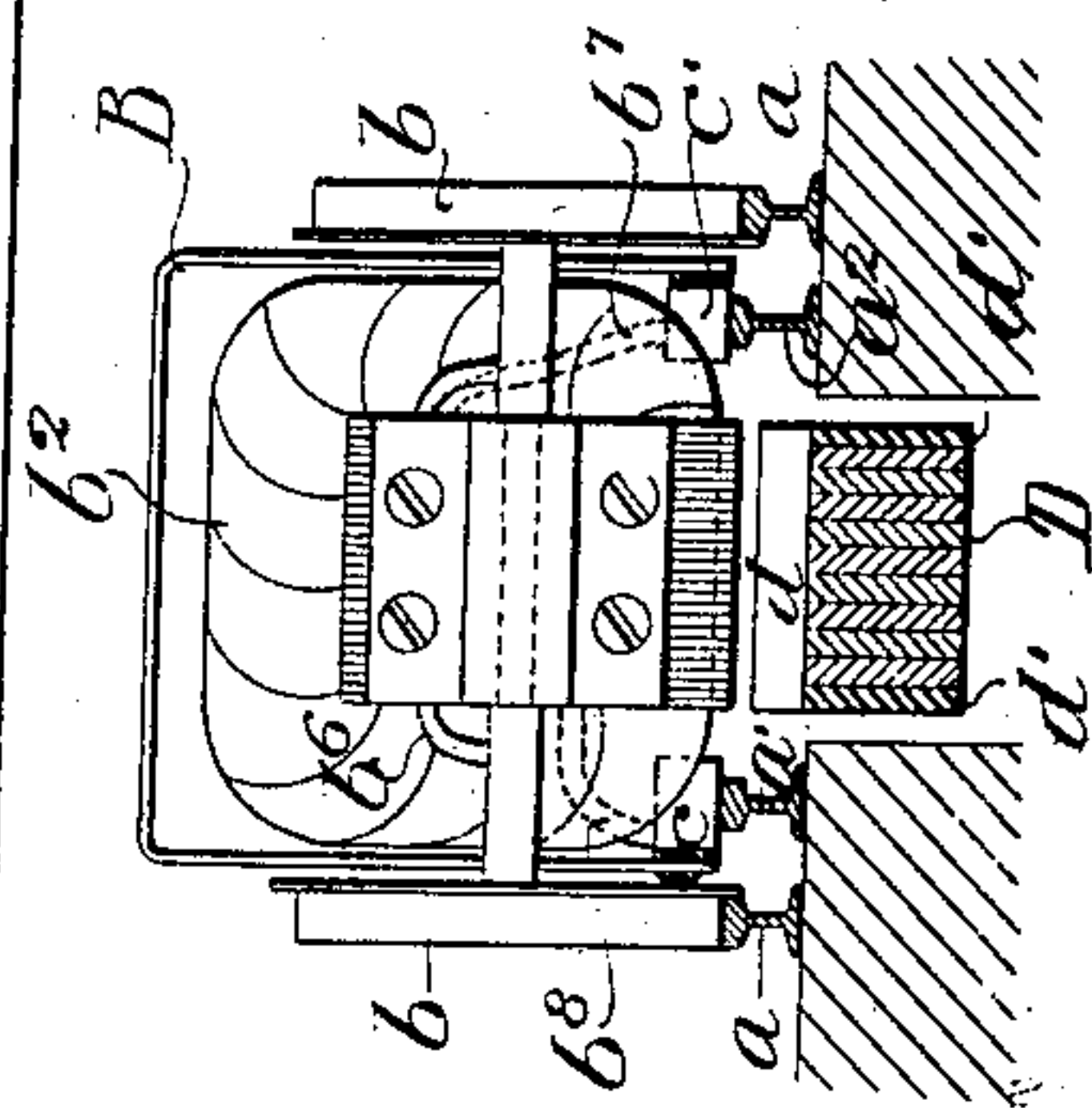


Fig. 3.



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3 SHEETS—SHEET 2.

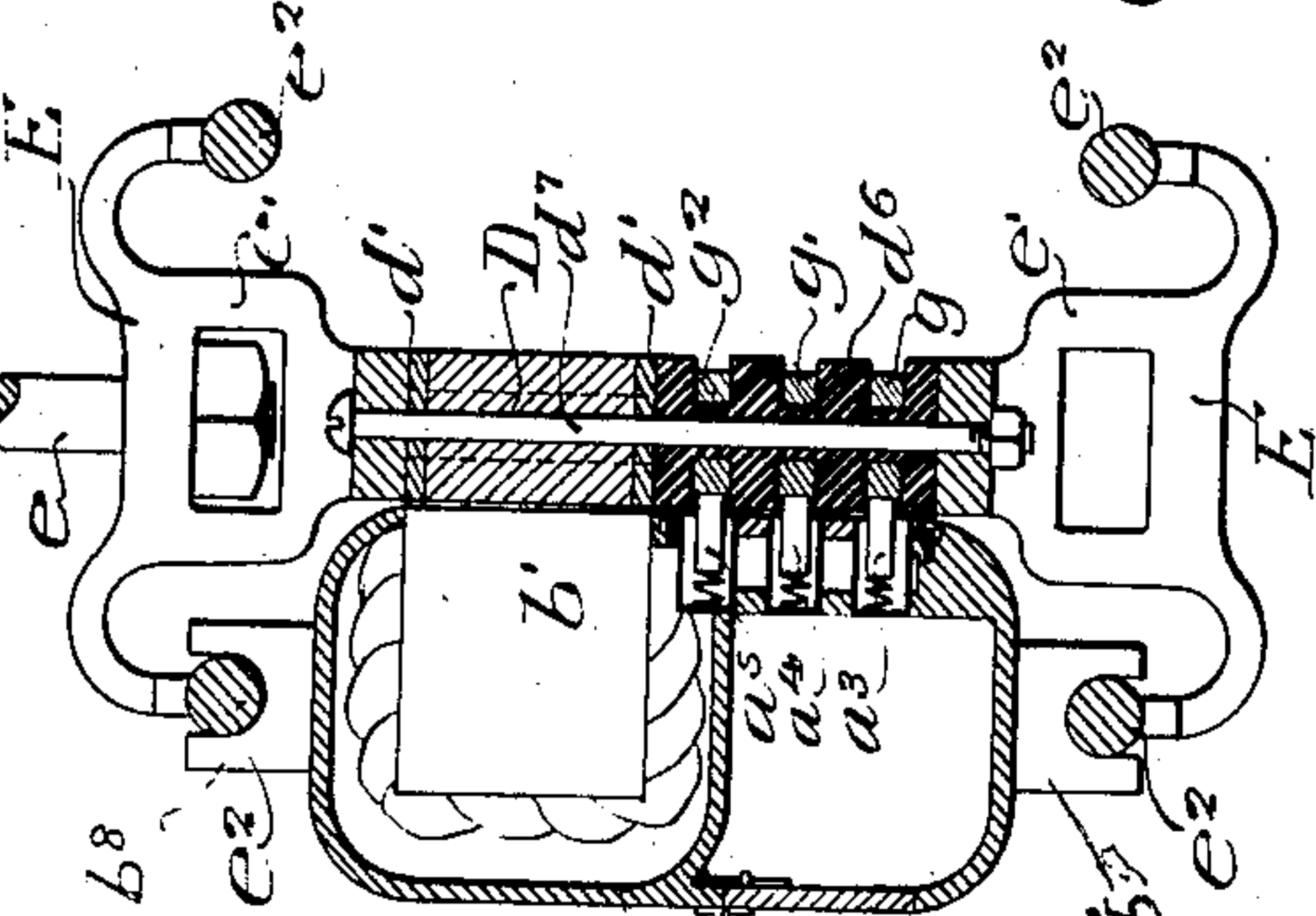
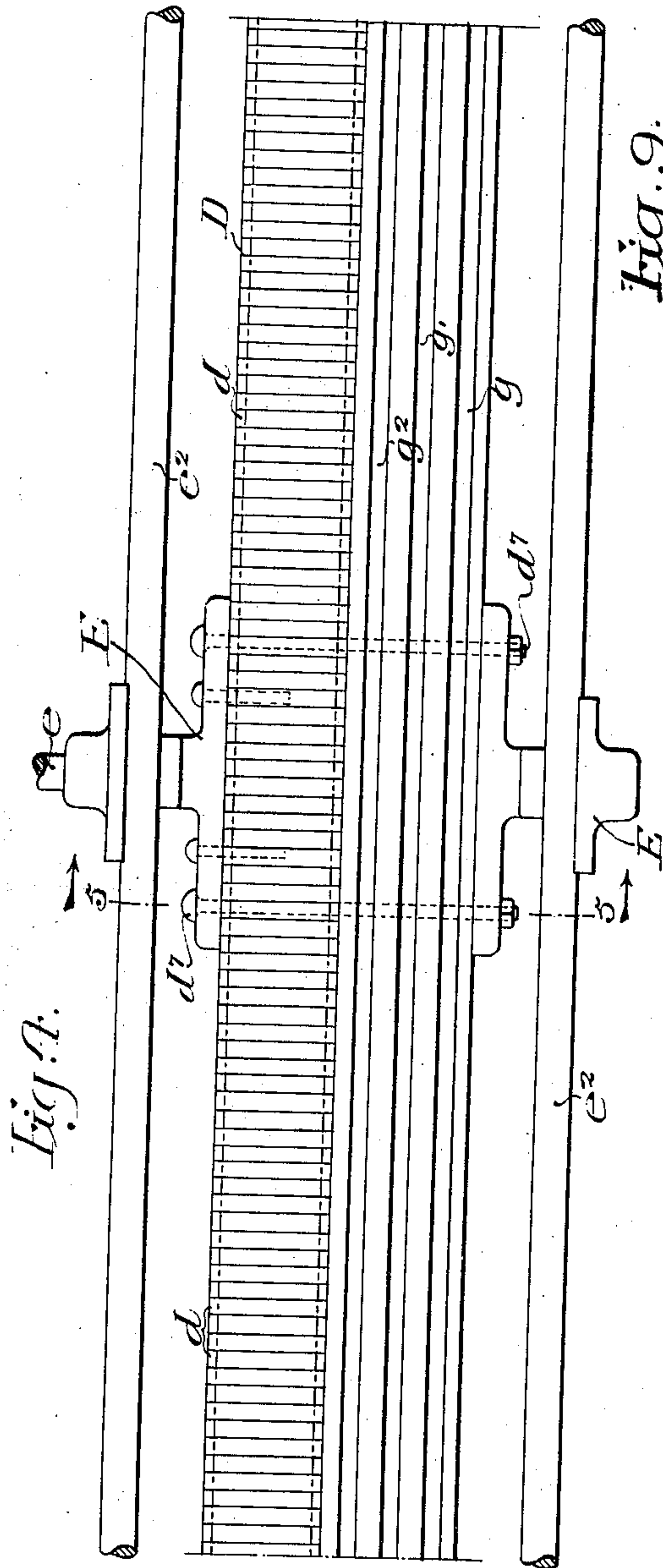


Fig. 5.

Fig. 9.

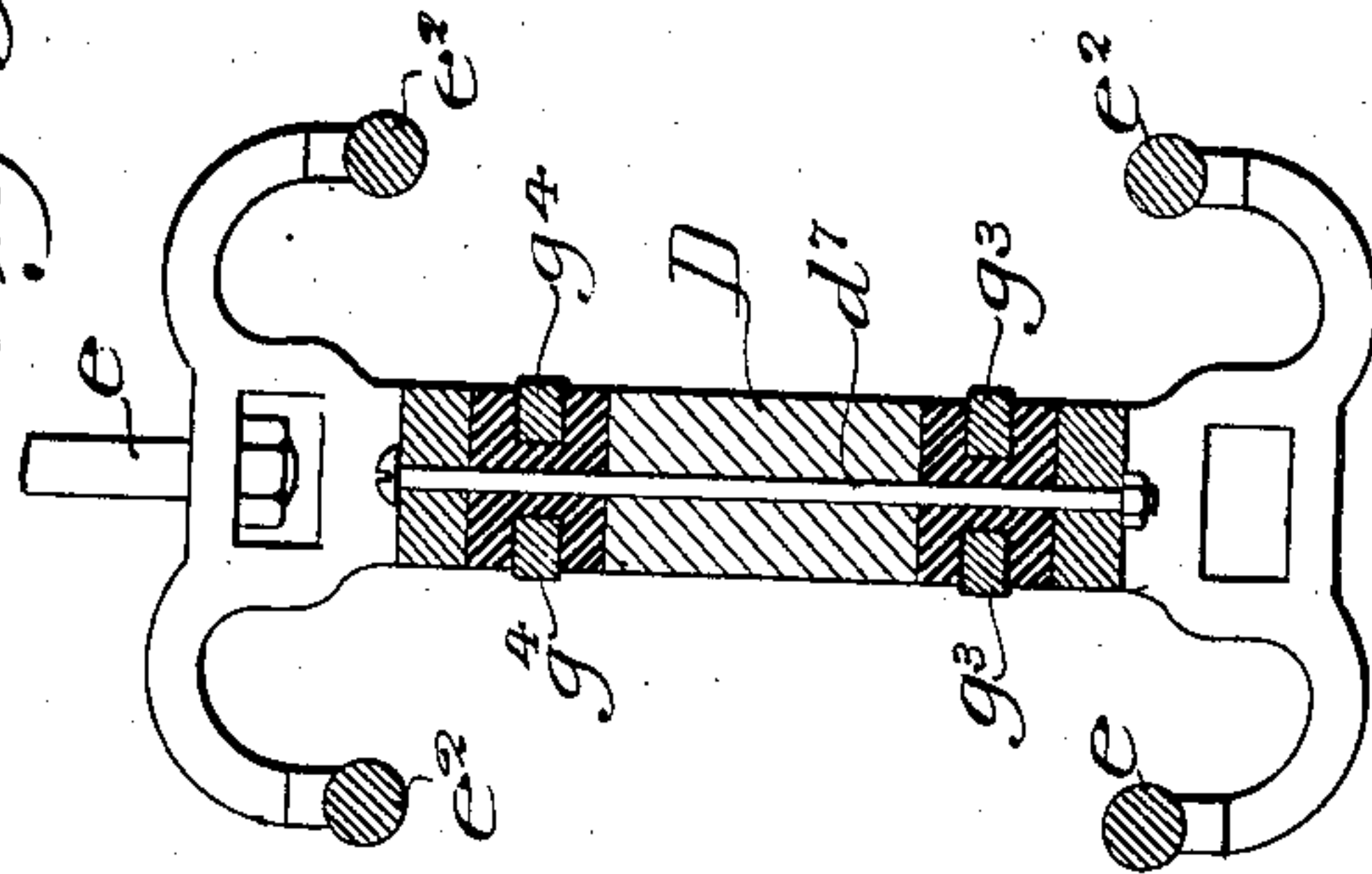
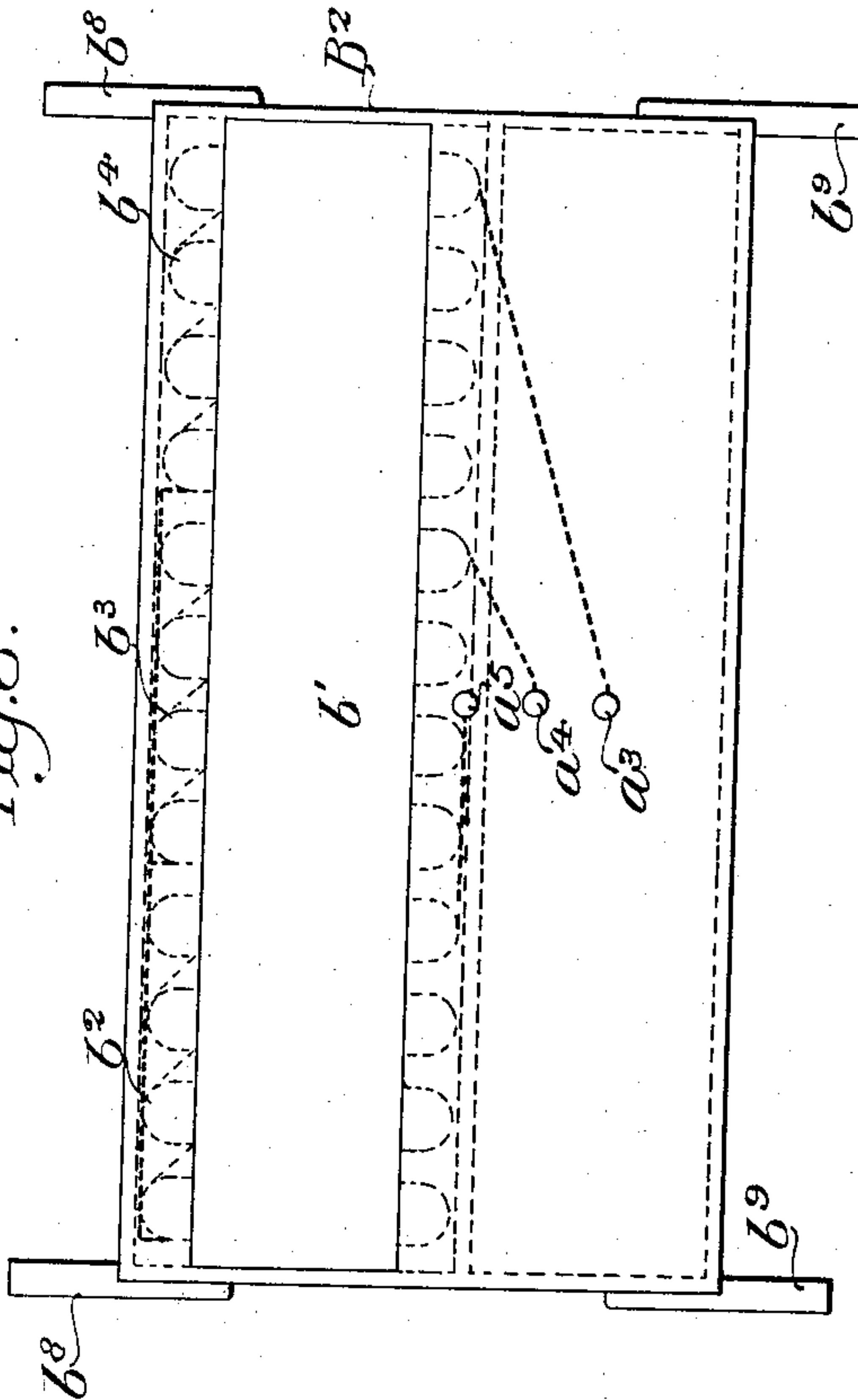


Fig. 6.



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3 SHEETS—SHEET 3.

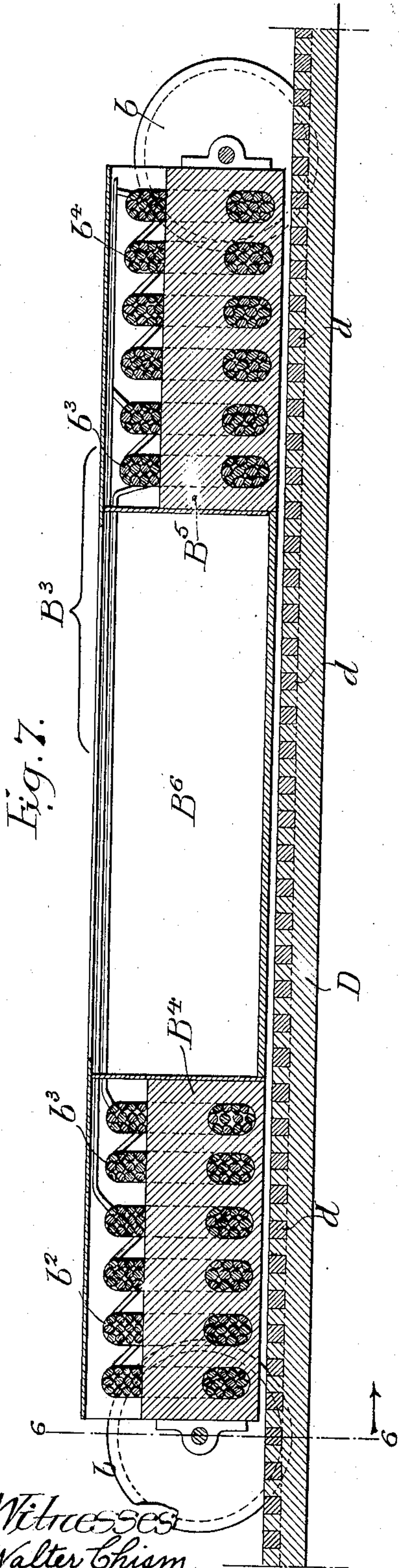
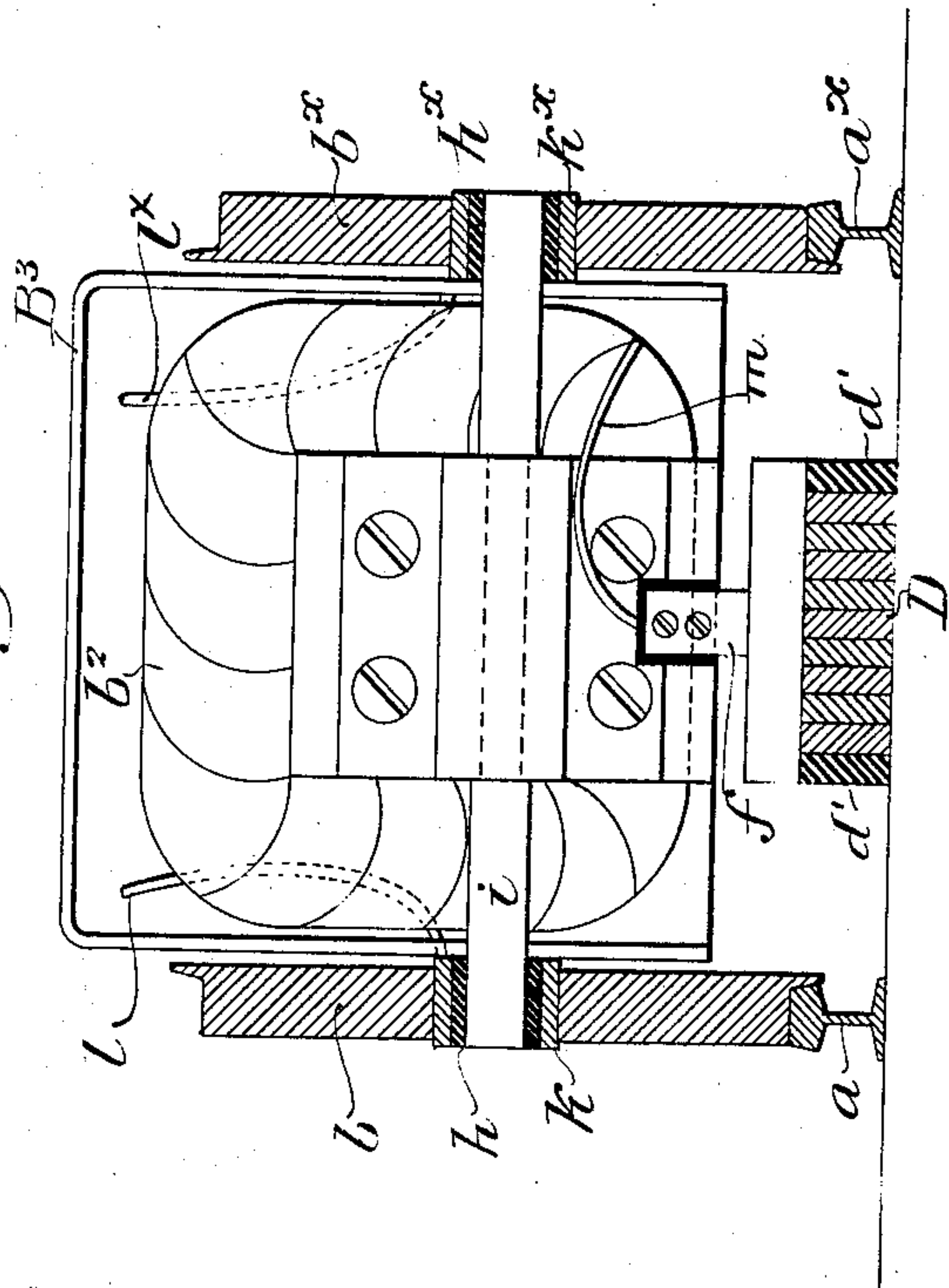


Fig. 7.

Fig. 8.



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UNITED STATES PATENT OFFICE.

FRANKLIN S. SMITH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO ELECTRIC CARRIER COMPANY, OF CAMDEN, NEW JERSEY, A CORPORATION OF NEW JERSEY.

ELECTRIC TRANSPORTATION SYSTEM.

No. 859,019.

Specification of Letters Patent.

Patented July 2, 1907.

Application filed March 11, 1907. Serial No. 361,780.

To all whom it may concern:

Be it known that I, FRANKLIN S. SMITH, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Electric Transportation Systems, of which the following is a specification.

My invention has relation to and comprehends certain improvements in that class of railway or transportation systems in which both the movable members or cars and the fixed members embody electrical mechanism or devices adapted to co-operate to occasion movement of the cars.

One object of the invention is to provide a transportation system of the above class which shall not only be economical of current but less expensive to construct and maintain than other systems of the same general character.

A further object of the invention is to provide in such a transportation system a movable member or members which shall be free from rotary driving mechanism and simple and inexpensive of construction.

A system embodying the foregoing and other advantages is hereinafter described and typified in the accompanying drawing, in which:—

Figure 1, is a vertical longitudinal section of a portion of a transportation system especially applicable to mail or parcel carrying, embodying my invention, and illustrating in detail one of the movable members or carriers; Fig. 2, is a side elevation of the parts represented in Fig. 1; Fig. 3, is an end elevation partly in transverse vertical section, of the transportation system illustrated in Figs. 1 and 2, sight being taken from the left hand ends of said figures; Fig. 4, is a side elevation of a portion of a transportation system especially applicable to store service, and embodying my invention; Fig. 5, is a transverse vertical section of the devices represented in Fig. 4, on the line 5—5 of said figure, particularly illustrating one of the carriers in position; Fig. 6, is a side elevation of one of said carriers; Fig. 7, is a longitudinal vertical section of a portion of a modified form of a transportation system embodying my invention and especially applicable to mail or package carrying; Fig. 8, is an end elevation, sectional on the line 6—6, of Fig. 7, of the transportation system illustrated in said Fig. 7, and Fig. 9, is a transverse vertical section of a modified form of the fixed member and its associated tracks with their supporting means, which may be used instead of that form illustrated in Figs. 4 and 5.

In an application for patent filed by me November 21, 1906, Serial No. 344,507, I have described and claimed an electrically actuated transportation system in which windings adapted to be energized by an alternating current of electricity are applied to a suitable core, constituting the fixed member, and paralleling the track or road bed of the system.

In this system the movable member or carrier embodies a core provided with electrical conductors adapted to be inductively supplied with current by the fixed member. The carrier moreover controls or localizes the flow of current to the windings of the fixed member, which in some applications may be objectionable.

To overcome any possible objection and simplify the system, I provide the tracks *a*, represented in Figs. 1, 2 and 3, for the reception of wheels *b* supporting the movable member or carrier B. In any desired position and parallel with these tracks, I mount an iron core D, which may or may not be laminated, providing it with windings consisting of transverse bars *d* of copper, or other suitable material, connected at their ends with longitudinally extending plates *d'*, also of copper or other suitable material. These bars and plates constitute windings similar to those known as "squirrel cage" windings of an induction motor, and may, as is obvious, be replaced by other types of efficient windings.

The movable member or carrier B, in the construction under consideration, conveniently consists of a casing or container, having within it an iron core *b'* provided with windings adapted in the present instance to be supplied with three-phase alternating current.

All of the corresponding free ends of each set of the windings *b*², *b*³ and *b*⁴ are connected by a common conductor *b*⁵, while the other free end *b*⁶ of the windings *b*² is connected to a brush or contact shoe *c* mounted upon but insulated from the body or frame of the carrier B in any desired manner. Similarly another free end *b*⁷ of the winding *b*³ is connected to a second brush or shoe *c'*, of said carrier, while the third free end *b*⁸ of the winding *b*⁴ is connected in any desired manner to said carrier so as also to be electrically connected to the wheels *b*. Conducting rails *a'* and *a*² are so placed as to be respectively engaged by the shoes *c* and *c'*, while in addition I also provide conducting rails *a* which also serve as track rails. These three sets of conducting rails are connected in a manner well understood, to any suitable source of three phase alternating current.

B' is a compartment of the carrier adapted to contain the articles to be transported, and the entire carrier structure may be of such form, dimensions, proportions and organization as may be desired.

With the three phase alternating current supplied to the three sets of rails *a*, *a'* and *a*², as described, the consequent energization of the windings *b*², *b*³ and *b*⁴ will cause the carrier B to travel in a direction determined by the respective terminal connections of said windings, under the laws governing the operation of induction motors.

It will be obvious that in place of the three phase windings described, I may substitute windings adapted to be supplied with other forms of alternating current.

In the application of my invention to a transportation system in which it is desired that the carriers should operate in both directions,—such, for instance, as a store service system,—I conveniently resort to the embodiment represented in Figs. 4, 5 and 6, in which E is a framework preferably depending from suspension rods *e*. This framework embodies an elongated iron core D which may or may not be laminated, and provided upon a pair of its opposite faces with transverse copper bars *d* short circuited or connected at their respective ends by copper plates *d'*, as already described with reference to the embodiment represented in the first three figures of the drawings. Above and below the core D are bracket structures *e'*, each of which supports a pair of substantially parallel guide rods or rails *e*², respectively in alinement by pairs, the one above the other.

*d*⁰ is a structure also mounted upon the frame, and, in the present embodiment, forming part thereof, which parallels the core and is provided on its vertical side faces with three exposed electrical conductors *g*, *g'* and *g*².

The brackets *e'*; the core D and the structure *d*² are conveniently united by vertical extending bolts *d*⁷.

B² is a carrier preferably embodying an upper and a lower compartment, of which the upper contains the carrier core *b'* and the windings *b*², *b*³ and *b*⁴ arranged in a manner similar to those already described in connection with the embodiment illustrated in the first three figures of the drawings. The free ends of the windings *b*², *b*³ and *b*⁴ are however, electrically connected to spring pressed brushes *a*³, *a*⁴ and *a*⁵, designed to respectively make contact with the conductors *g*, *g'* and *g*², which are connected with a source of alternating current.

The carrier B² is provided at each end with an upper guide arm *b*⁸, and a lower guide arm *b*⁹, each of which is so recessed as to engage one of the guide rods *e*², which serve as rails. The lower compartment of the carrier serves to receive articles to be transported and preferably has a door *b*¹⁰.

In the operation of this embodiment of my invention it is to be understood that the terminal connections of the windings *b*², *b*³ and *b*⁴ are to be the same on both sides.

In the application of my invention represented in Figs. 7 and 8, a form especially applicable to mail or parcel carrying, the iron core D, which may or may not be laminated, and which constitutes the fixed element, is, as in the embodiment represented in Figs. 1, 2 and 3, located between and parallel with the carrying rails *a* and *a*[×]. In this embodiment the rails *a* and *a*[×] and the core D, in addition to serving respectively as carrying rails and a fixed element for the induced current, possess the additional function of constituting the three conductors of a three phase current. In this embodiment, however, I dispense with the shoes *c*, *c'*, represented in Fig. 3, and substitute a brush *f* attached to but insulated from the core of the moving element or carrier, and adapted to make contact with the fixed element. The rails *a* *a*[×] in this embodiment are also conductors of different phases, and the carrying wheels *b*, *b*[×] are insulated from each other by insulating collars *h*, *h*[×] on their common axle *i*.

k, *k*[×] are conducting collars applied to the axle *i*, and respectively connected by conducting wires *l*, *l*[×] with two of the respective phase windings.

m is a third conducting wire connecting the brush *f* with the third phase winding.

In this embodiment, moreover, the moving element or carrier B³ is provided with a divided core B⁴, B⁵, so as to provide a central carrying compartment or container B⁶ for the reception of the articles to be transported. The divided core as to its three phase windings is connected by the conducting wires *l*, *l*[×] and *m*, in the manner illustrated in Figs. 7 and 8; the second phase winding being divided into two parts respectively disposed upon opposite ends of the container. As a result of this special embodiment, the pole pitch is the entire length of the carrier, with the result that a higher speed is attained than would otherwise be possible.

Having thus described my invention in certain of its typical embodiments, it is to be understood that without departure from the principles that underlie it, various modifications in the windings of the movable and the fixed elements may be adopted. For example, in Fig. 9, I have illustrated a special form of fixed member and track structure as designed for use in store service, the core D being placed between two of the current supply conductors *g*³ while the rails or tracks *e*² are connected to serve as the means whereby the third phase winding is furnished with current.

Claims:—

1. An electric transportation system consisting of a fixed member, rails adjacent to and parallel with said fixed member, with a movable member adapted to operate upon said rails, said member embodying a winding divided into two sections having a container between them and adapted to be connected with a source of alternating current supply, substantially as described.
2. An electric transportation system consisting of a fixed member provided with a winding short-circuited upon itself, rails adjacent to and parallel with said fixed member, and a movable member adapted to operate upon said rails, substantially as described.
3. An electric transportation system consisting of a fixed member provided with a winding short-circuited upon itself, rails adjacent to and parallel with said fixed member, and a movable member adapted to operate upon said rails and embodying windings adapted to inductively energize said fixed member, substantially as described.
4. An electric transportation system consisting of a fixed member, a track arranged to serve as a conductor adjacent to and parallel with said fixed member, conductors also adjacent to and parallel with said fixed member and said track, a movable member embodying a winding, and means for electrically connecting said winding and said conductors to occasion the travel of said movable member along said track, substantially as described.
5. An electric transportation system consisting of a fixed member, tracks adjacent to and parallel with two of its opposite faces, and movable members adapted to be connected with a source of alternating current supply to occasion their movement in opposite directions upon said tracks, substantially as described.
6. An electric transportation system consisting of a fixed member comprising a core of magnetic material, transverse conductors upon two opposite faces of said core, means for short-circuiting said conductors, tracks adjacent to and parallel with said fixed member upon opposite sides thereof, and movable members adapted to operate in opposite directions upon said tracks, substantially as described.

7. An electric transportation system consisting of a fixed member provided with a winding upon two of its opposite faces and short-circuited upon itself, conductors adjacent to and parallel with said fixed member, guide rails adjacent to and parallel with each of the wound faces of said fixed member, a movable member embodying a winding, and means for connecting said winding with said conductors to occasion the movement of the movable member along either wound face of said fixed member, substantially as described.

8. An electric transportation system consisting of a fixed member, tracks, and a movable member for operating on said tracks, there being windings on the movable member arranged in a plurality of sections placed apart from each other and connected to a source of current, said windings being designed to co-operate with the fixed member to cause movement of said movable member, substantially as described.

9. An electric transportation system consisting of a fixed member, tracks, and a movable member for operating

ing on said tracks, there being a plurality of windings on the movable member provided with means for supplying alternating current of different phases to said windings respectively, one of the windings being separated into sections relatively distant from each other, substantially as described.

10. An electric transportation system consisting of a fixed member, tracks, and a movable member for operating on said tracks, there being a winding on the movable member connected to a source of alternating current, said winding being placed to coact with the fixed member to cause movement of the other member and being formed in sections relatively distant from each other, substantially as described.

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

FRANKLIN S. SMITH.

Witnesses:

WILLIAM E. BRADLEY,
JOS. H. KLEIN.