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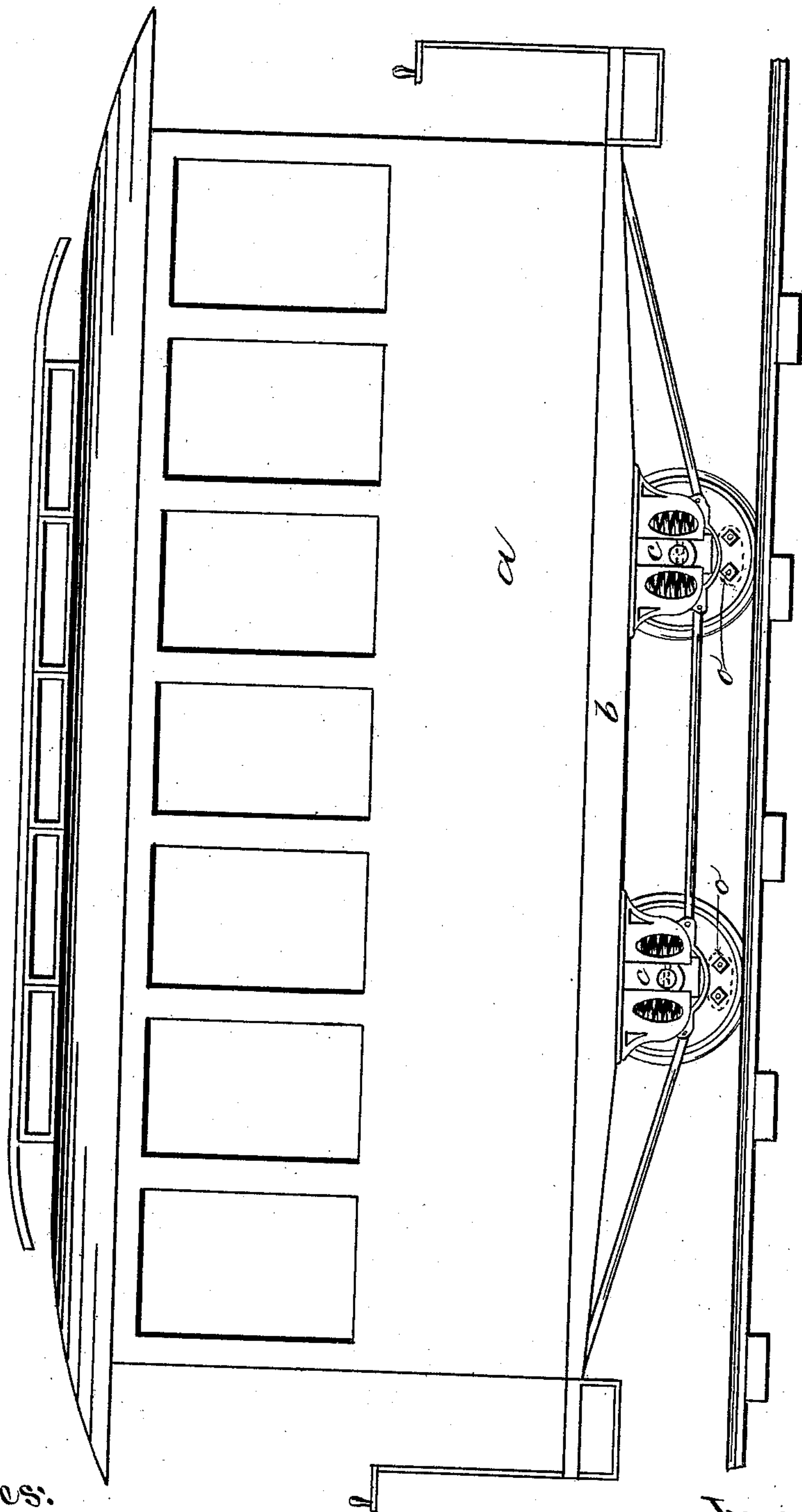
7 Sheets—Sheet 1.

E. WAGEMANN.
ELECTRIC CAR.

No. 432,501.

Patented July 15, 1890.

Fig. 1.



Witnesses:

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Willie L. Dope

Inventor:

Edmund Wagemann
By his Attorney
Edward P. Thompson

(No Model.)

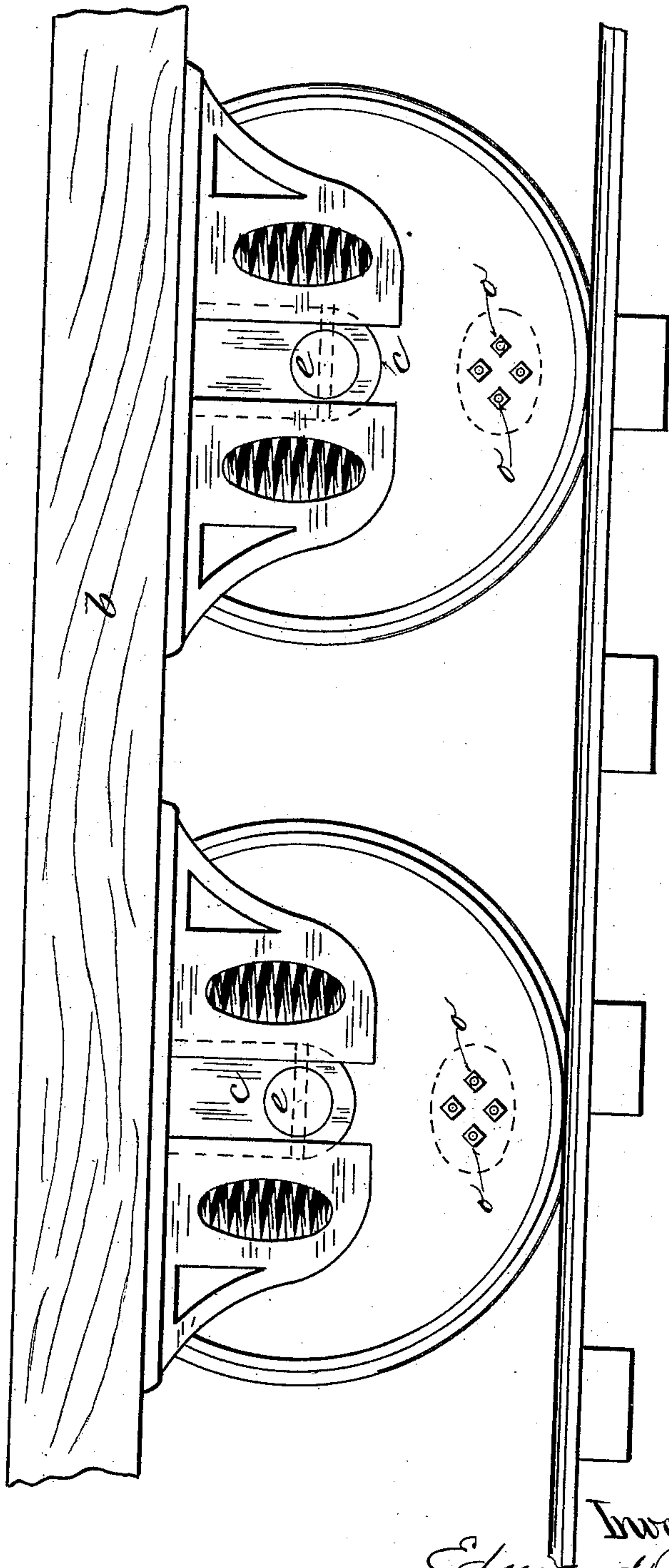
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Patented July 15, 1890.

Fig. 2



Witnesses:

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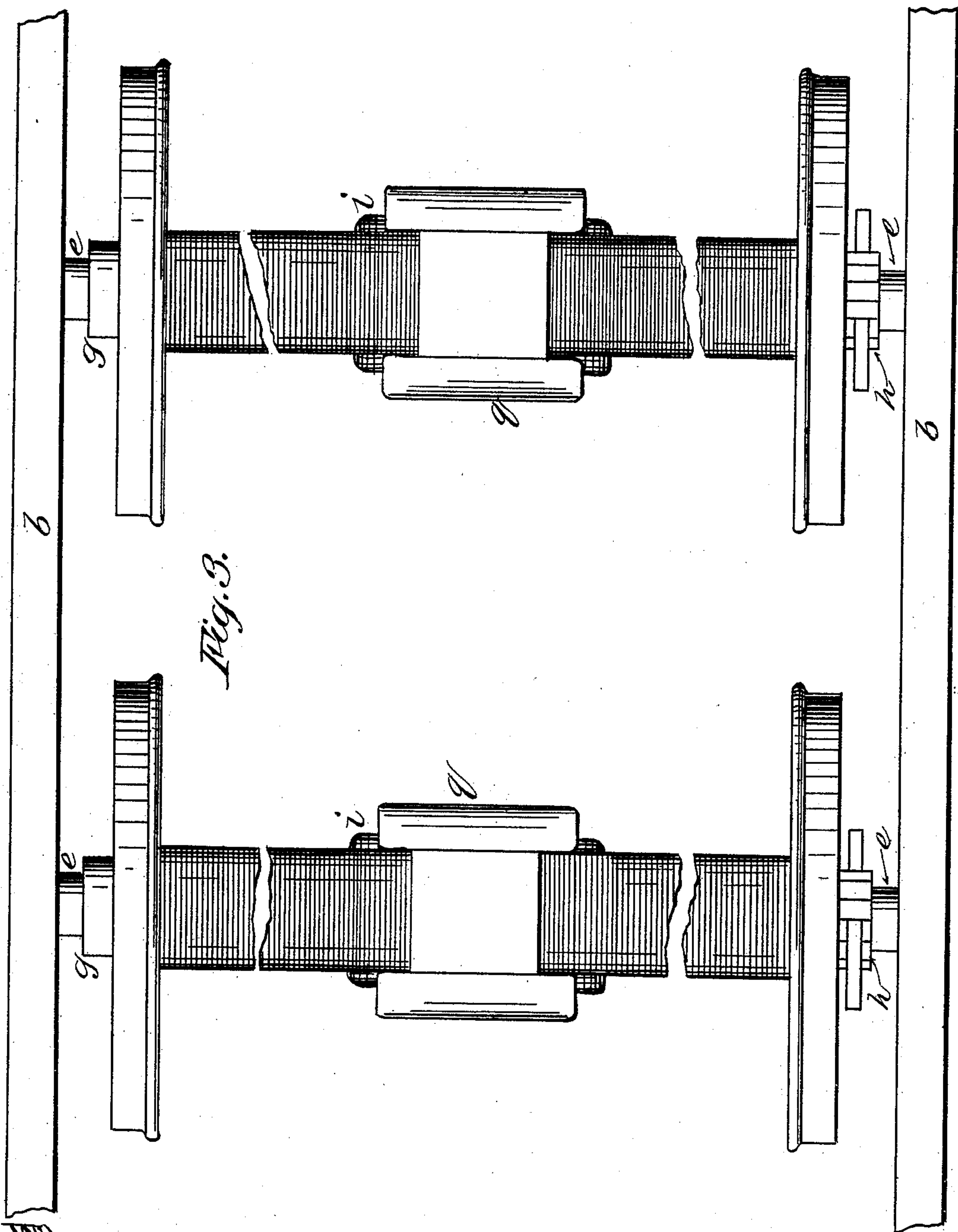
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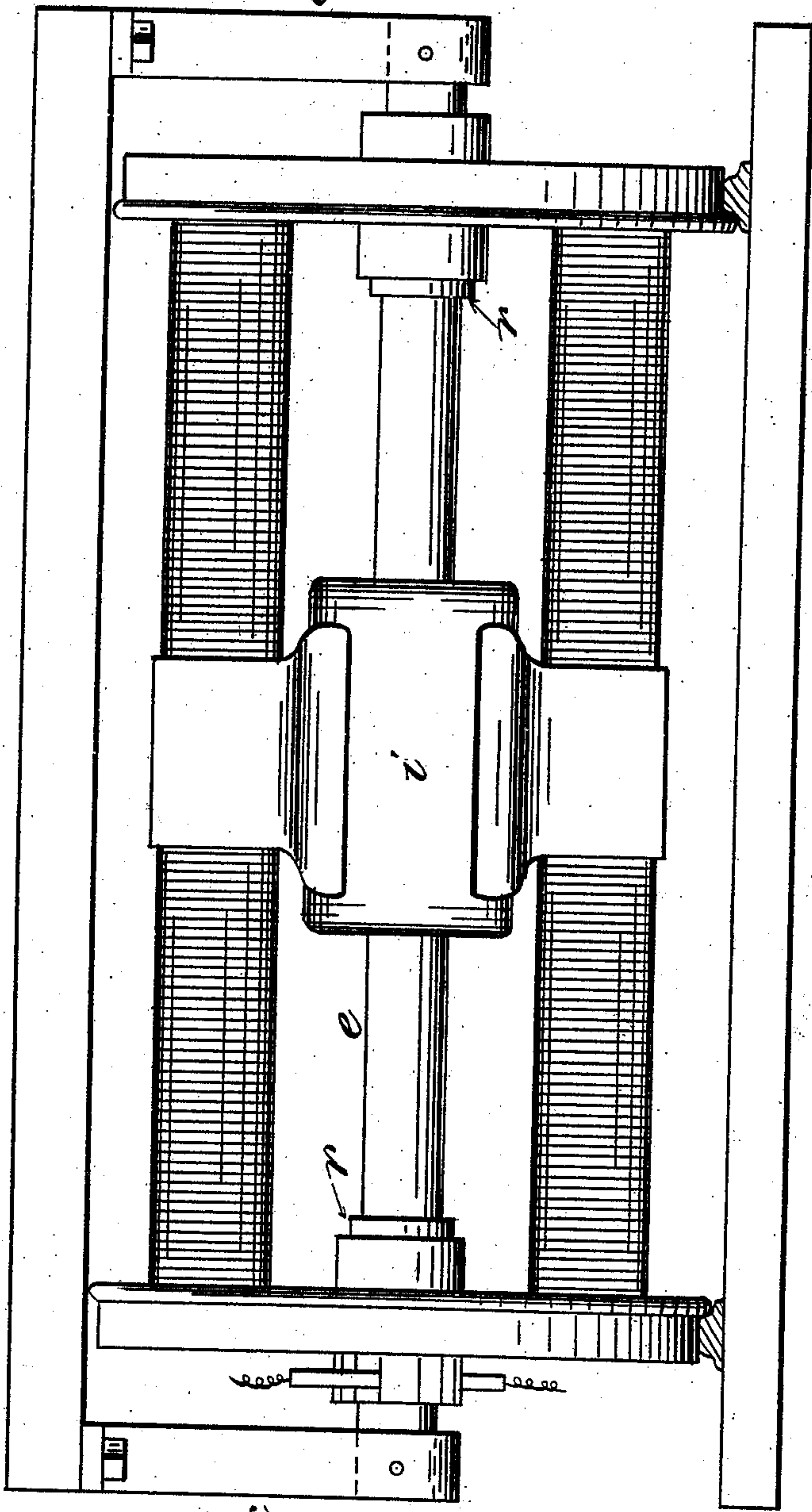
E. WAGEMANN.
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Patented July 15, 1890.

Fig. 4.



Witnesses:

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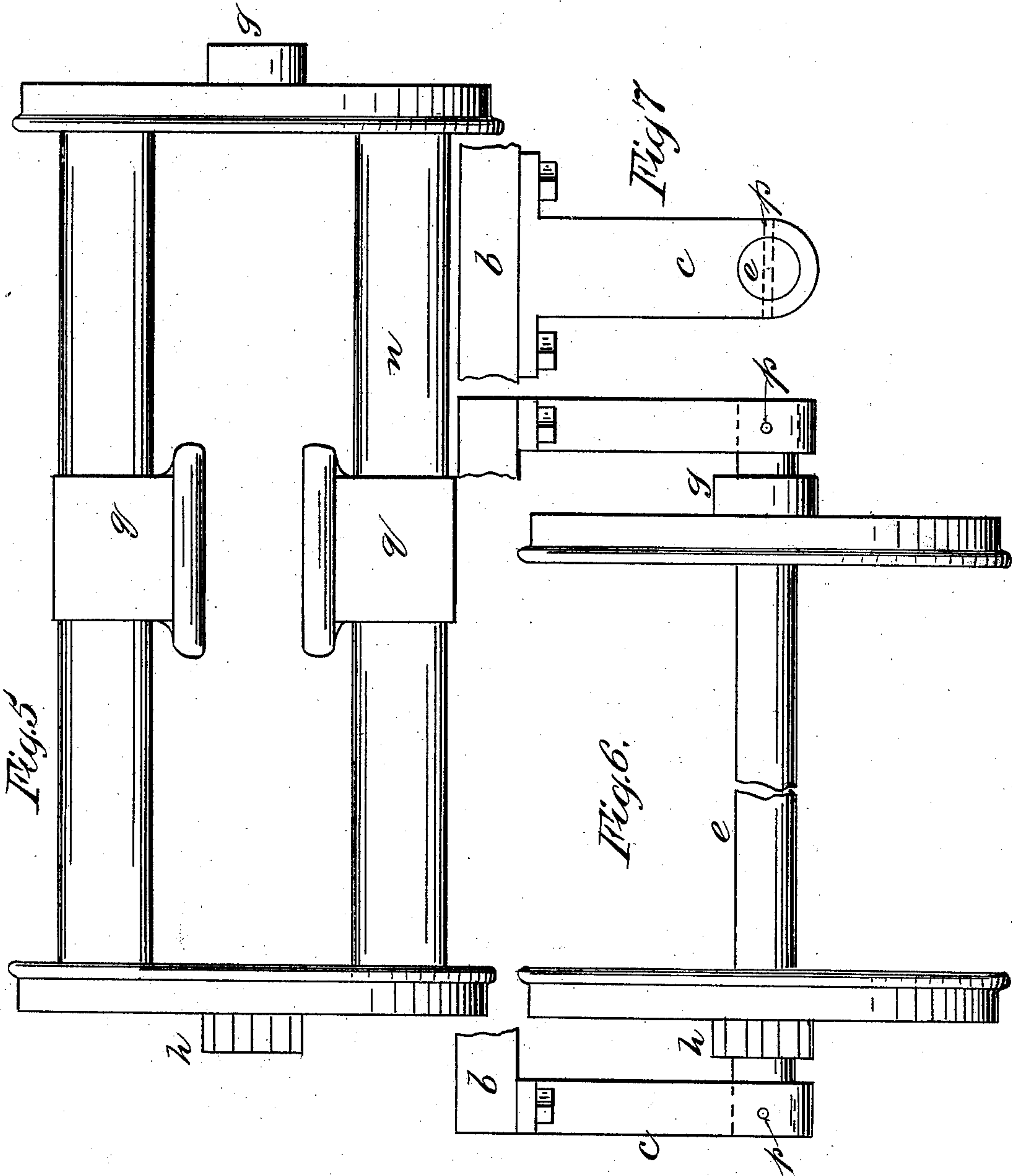
(No Model.)

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No. 432,501.

Patented July 15, 1890.



Witnesses:

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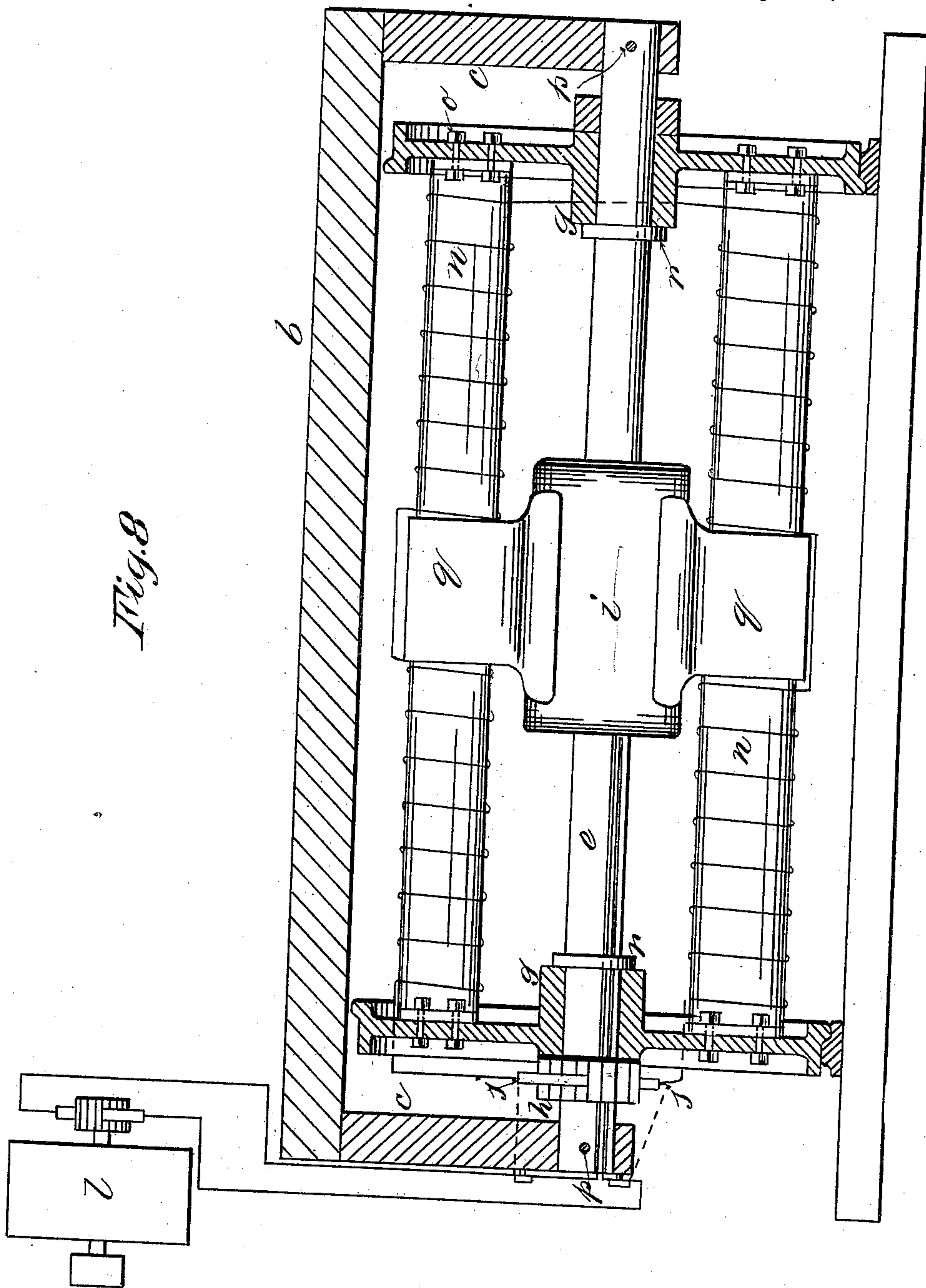
(No Model.)

E. WAGEMANN.
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No. 432,501.

Patented July 15, 1890.



Witnesses:

D. W. Gardner
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(No Model.)

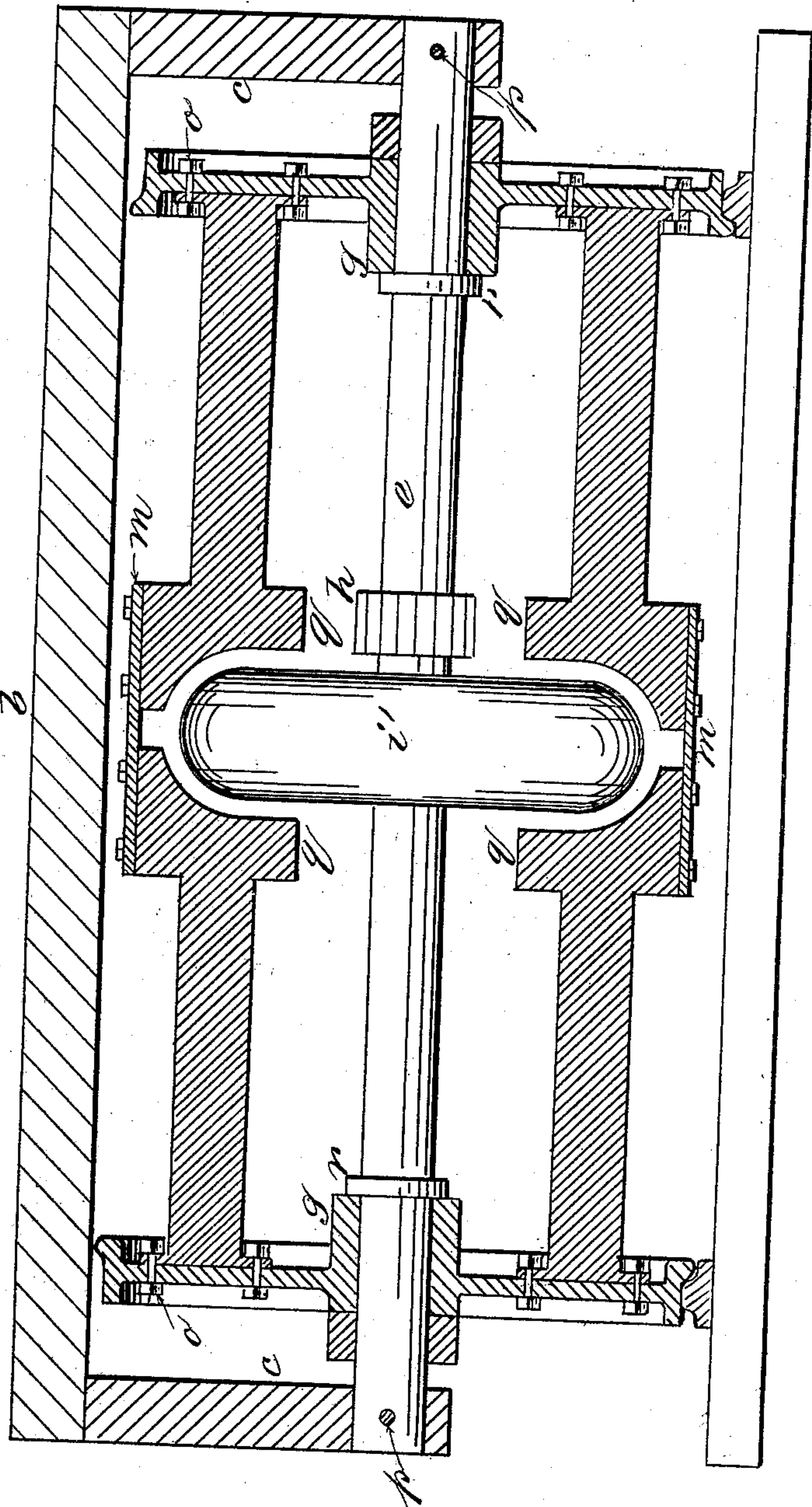
E. WAGEMANN.
ELECTRIC CAR.

7 Sheets—Sheet 7.

No. 432,501.

Patented July 15, 1890.

Fig. 9.



Witnesses:
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UNITED STATES PATENT OFFICE.

EDMUND WAGEMANN, OF LITTLE ROCK, ARKANSAS, ASSIGNOR OF SIX-SEVENTHS TO JOHN D. ADAMS, DEAN ADAMS, OSCAR DAVIS, JOHN W. DAVIS, HORACE G. ALLIS, AND JOHN B. JONES, ALL OF SAME PLACE.

ELECTRIC CAR.

SPECIFICATION forming part of Letters Patent No. 432,501, dated July 15, 1890.

Application filed October 17, 1889. Serial No. 327,383. (No model.)

To all whom it may concern:

Be it known that I, EDMUND WAGEMANN, a subject of the German Emperor, and a resident of Little Rock, county of Pulaski, and State of Arkansas, have invented certain new and useful Improvements in Electric Cars, (Case 14,) of which the following is a specification.

The invention relates to a type of electric-motor car in which the wheels of the car form the yoke of the field-magnets.

The object of the invention is to obtain minimum of weight of the combined truck and motor.

The invention in all its details is represented in Figures 1, 2, 3, 4, 5, 6, 7, 8, and 9. Fig. 1 is a side elevation of the complete device, showing the car-body as well. Fig. 2 is a side elevation of the truck combined with the motor, the figure being drawn to a larger scale than that of Fig. 1. Fig. 3 is a plan view of Fig. 2, some portion thereof being broken out in order to make room on the sheet. Fig. 4 is an elevation of Fig. 2, looking in the direction of the track, which is shown in cross-section. Fig. 5 is a similar view to Fig. 4 of the field-magnet core and yokes. Fig. 6 is a view parallel with the planes of the wheels of the axle and wheels mounted thereon, showing how they may be brought to a common and accurate center before the cores are fastened to them. The figure also shows the axle fixed to the bearings. Part of the axle is broken away, as occupying valuable space otherwise. Fig. 7 is a side elevation of the bearing supporting the axle. Fig. 8 is a cross-section of the combined truck and motor, the cylindrical portions of the same being not sectioned. The section is taken in a plane coinciding with the axle's axis and perpendicular to the track. In this figure the circuits are represented. Fig. 9 shows in a similar section a modification showing the preferred construction when a cylindrical ring-armature is employed.

The device consists of the combination of a car-body *a*, supported on a truck represented in part by the letter *b*, bearings or supports *c*, to which the axles *e* of the wheels *f* are fixed in a stationary manner. The car-wheels

have central holes in the hubs *g*, through which the axles pass loosely. Upon one hub of each pair of wheels is a commutator *h*. The coils of the armature *i* are electrically connected to the commutator in the usual manner, while the brushes *j* bearing on the commutator connect electrically with both the field-magnets and the generator *l*.

In Fig. 9 the armature is a cylindrical ring-armature *i'*, while in the other figures it is a Siemens or cylindrical armature *i*. In Fig. 9 the pole-pieces are connected together by non-magnetic material *m*. In all cases the cores *n* of the field-magnets are secured, as by bolts *o*, to the wheels, respectively, on opposite sides of the axle.

The axles may be fastened to the bearings *c* by pins *p*.

The wheels in each case form the yoke of the field-magnet, being made of suitable iron for the purpose. Pole-pieces *q* are provided for the said magnets, and are located within inductive proximity to the armature.

Collars *r* are fixed to the axles to prevent the wheels from lateral motion.

When the current is turned on from the electric generator *l*, the field-magnets and wheels rotate and propel according to well-known principles of electric induction between the armatures and the pole-pieces.

I claim as my invention—

1. In an electric car, the combination of stationary axles, rotary wheels mounted thereon, an armature of an electric motor fixed upon the axles, and field-magnets of the motor connecting the wheels and provided with pole-pieces which are within inductive proximity to the said armature.

2. In an electric car, the combination of field-magnet cores, car-wheel axles, and car-wheels connecting the ends of the cores, the said wheels being of magnetic material and the axes of the cores being parallel to the car-wheel axles.

3. The combination of two car-wheels, the same being of iron, car-wheel axles, and field-magnet cores joined to the said wheels on opposite sides of the wheels' centers and parallel to the car-wheel axles.

4. In an electric car, the combination of car-axles, bearings or supports in which the axles are fixed, wheels loose upon said axles, field-magnets connecting said wheels in pairs,
5 armatures mounted upon said axles, commutators on said wheels' hubs and in circuit with said armatures and field-magnets and with a suitable electric generator.

5. In an electric car, the combination of
10 two car-wheels, field-magnets joining the same,

and an armature within inductive relation to the poles of said field-magnets.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 22d day of August, 1889.

EDMUND WAGEMANN.

Witnesses:

E. G. DUVALL, Jr.,

NELLIE L. POPE.