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PATENTED NOV. 17, 1903.

W. DALTON & F. J. COLE.
ELECTRIC LOCOMOTIVE.

APPLICATION FILED JULY 20, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

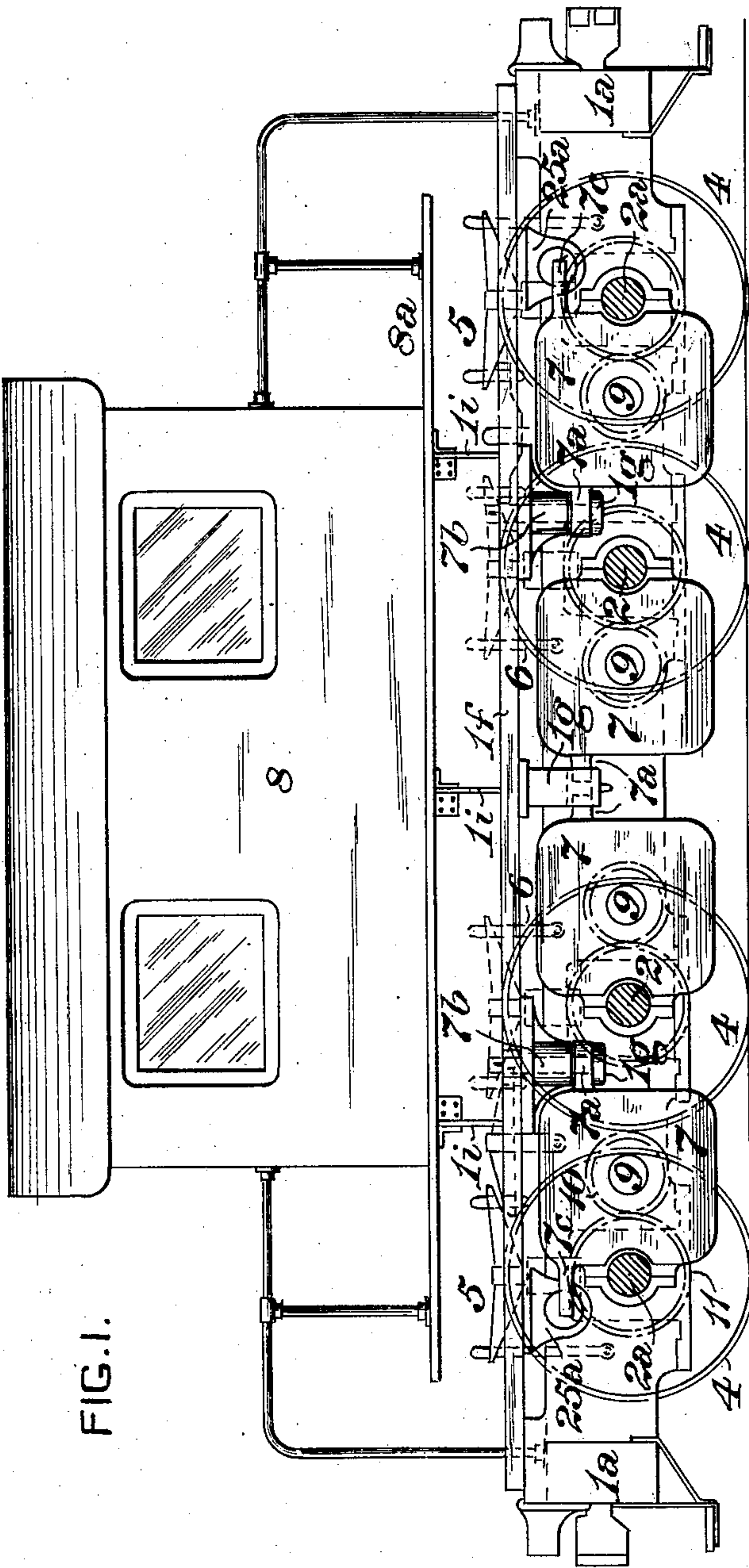


FIG. 1.

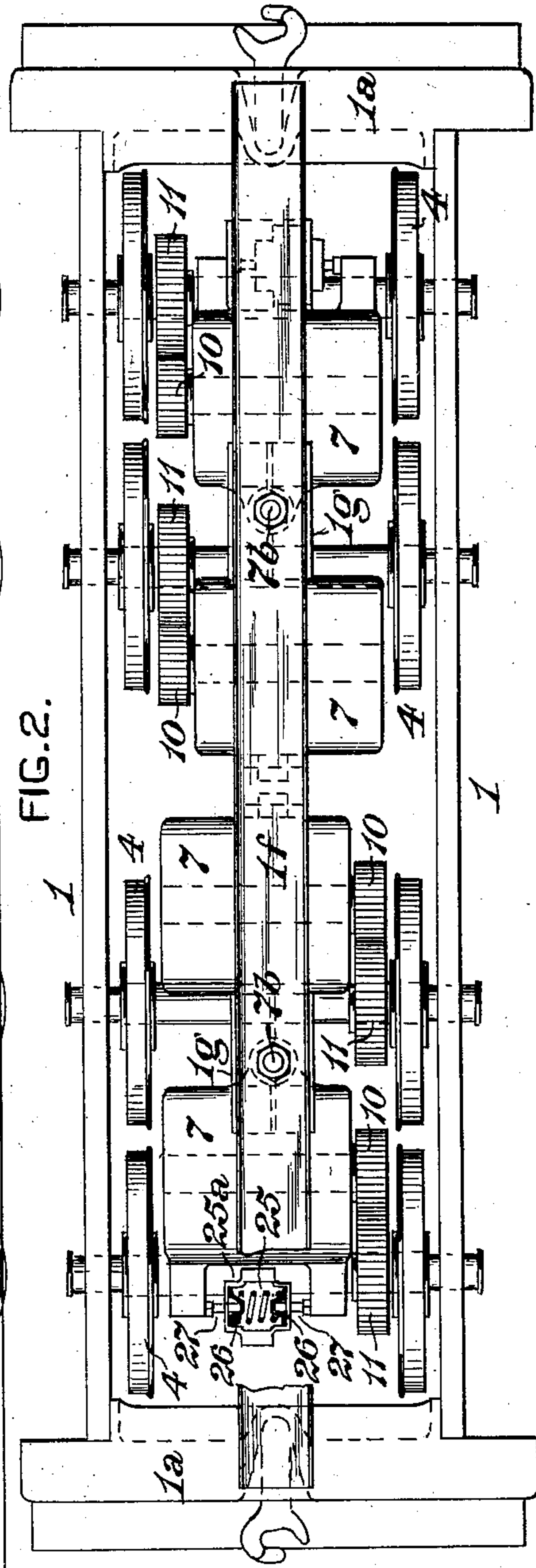


FIG. 2.

WITNESSES

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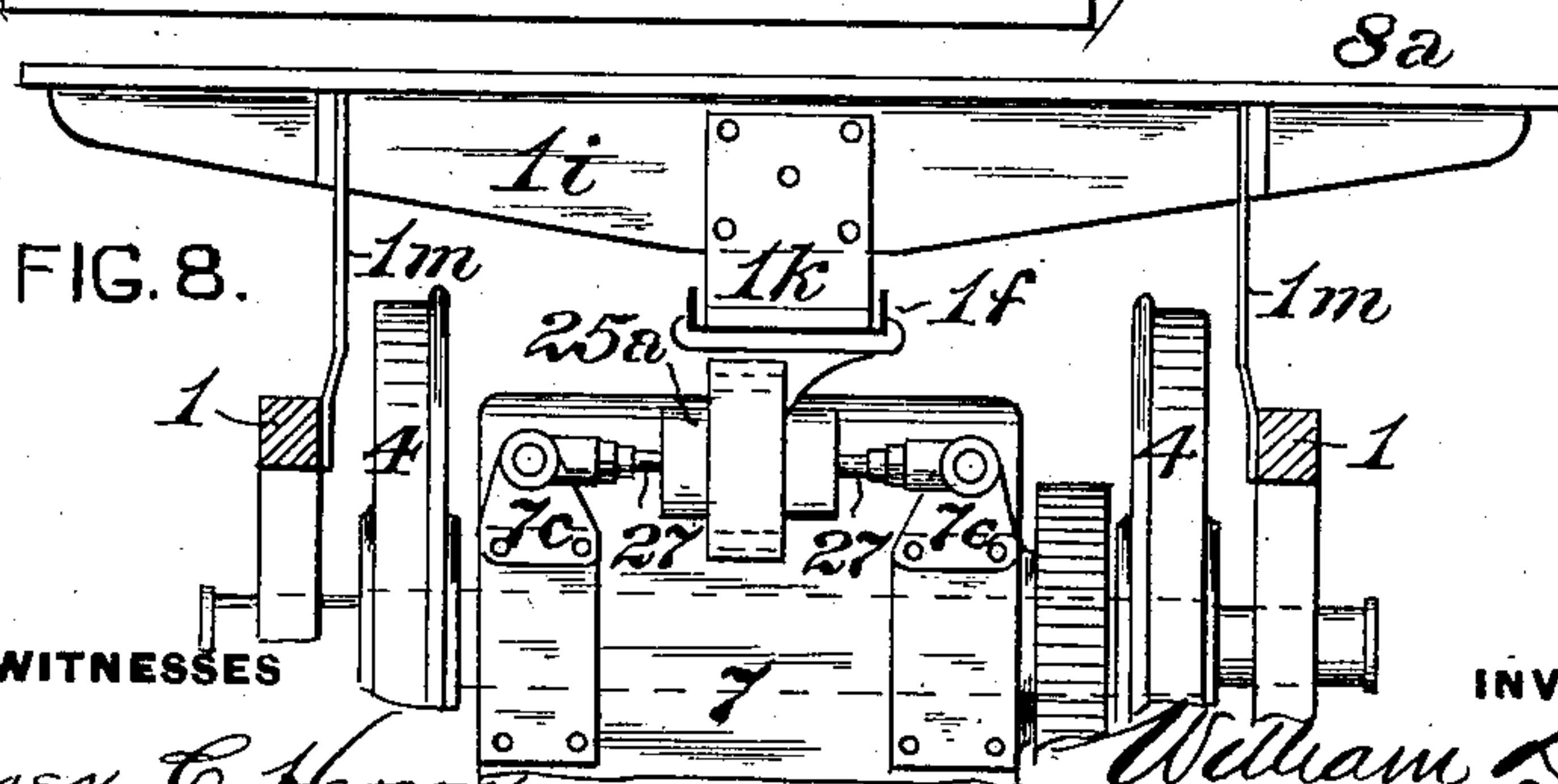
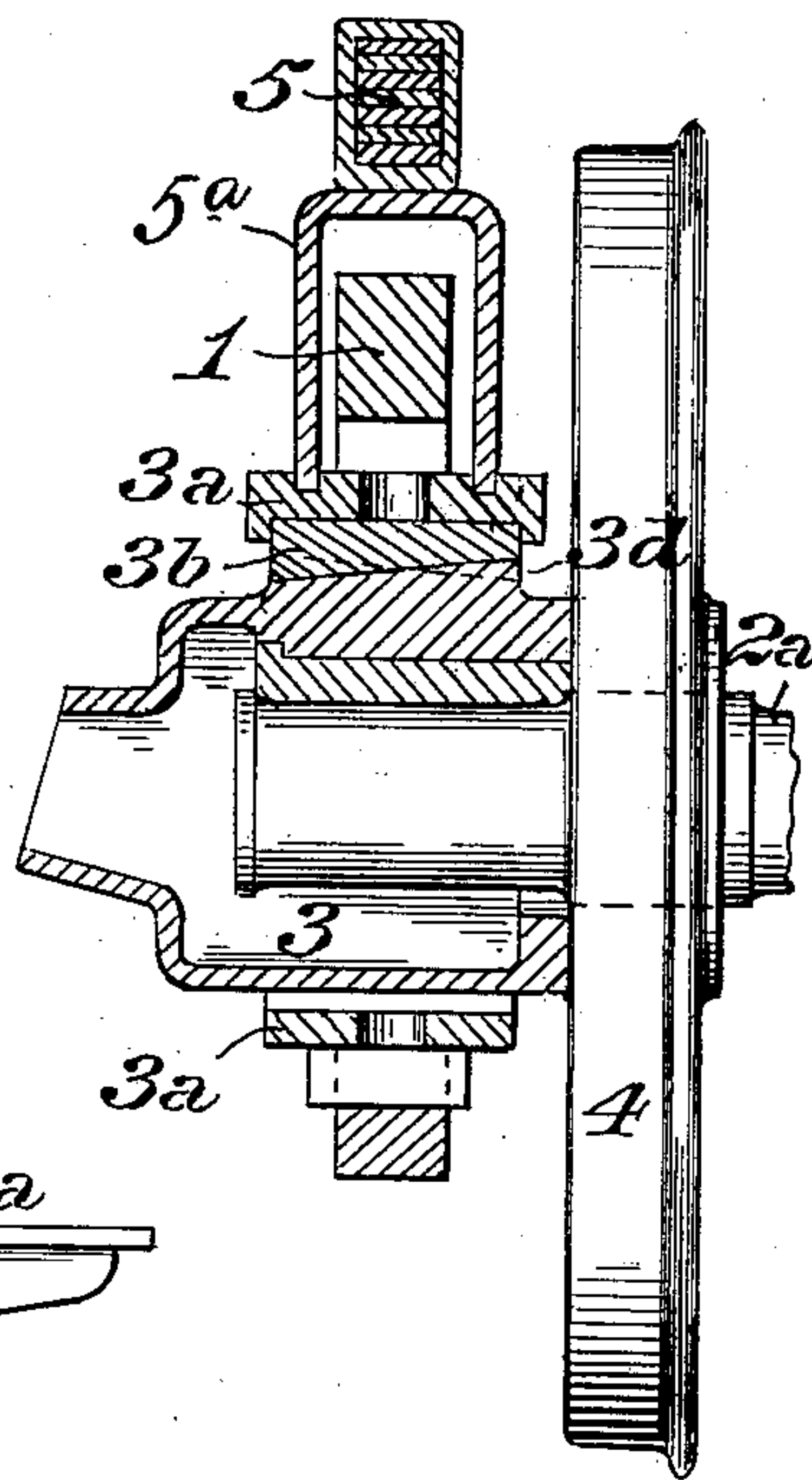
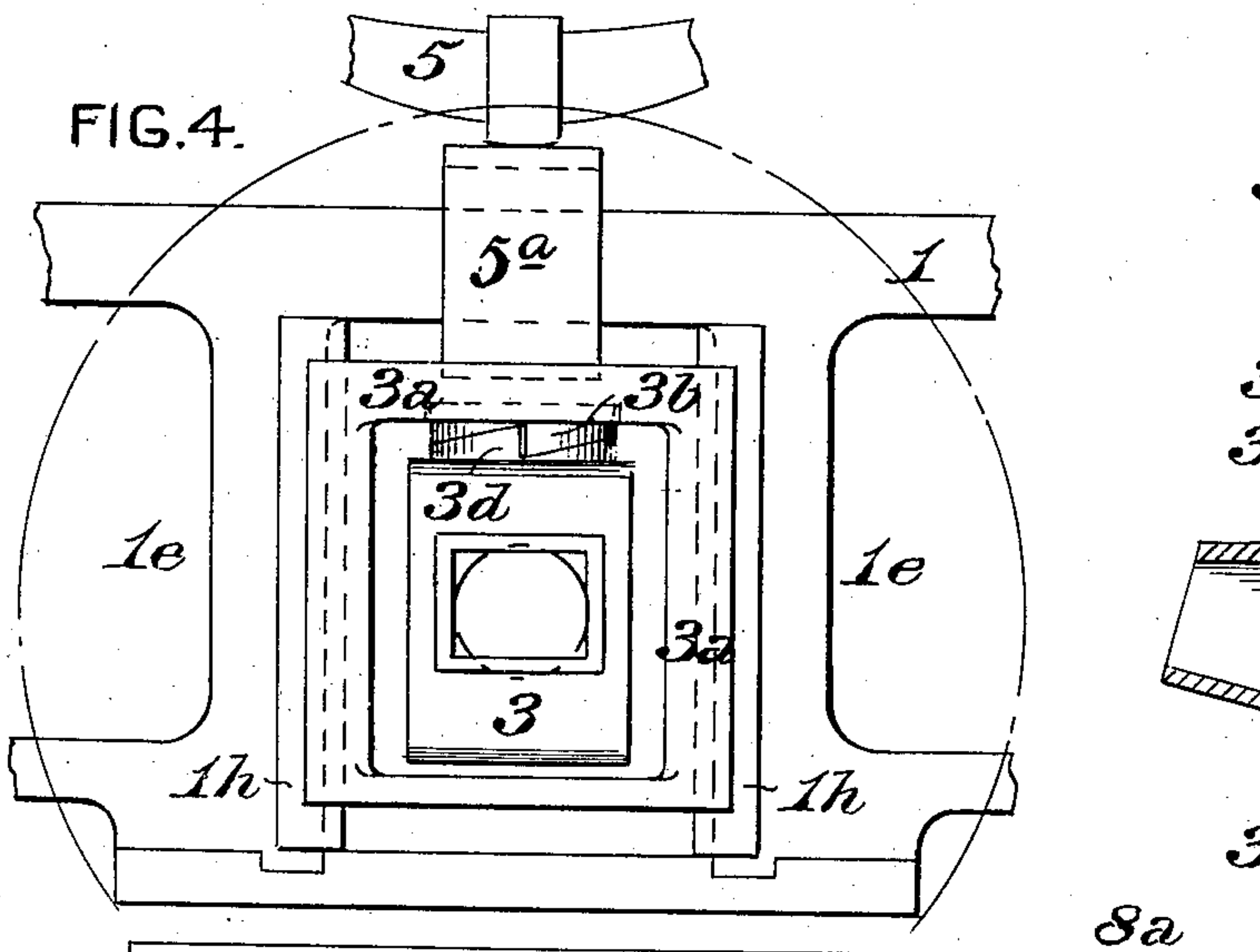
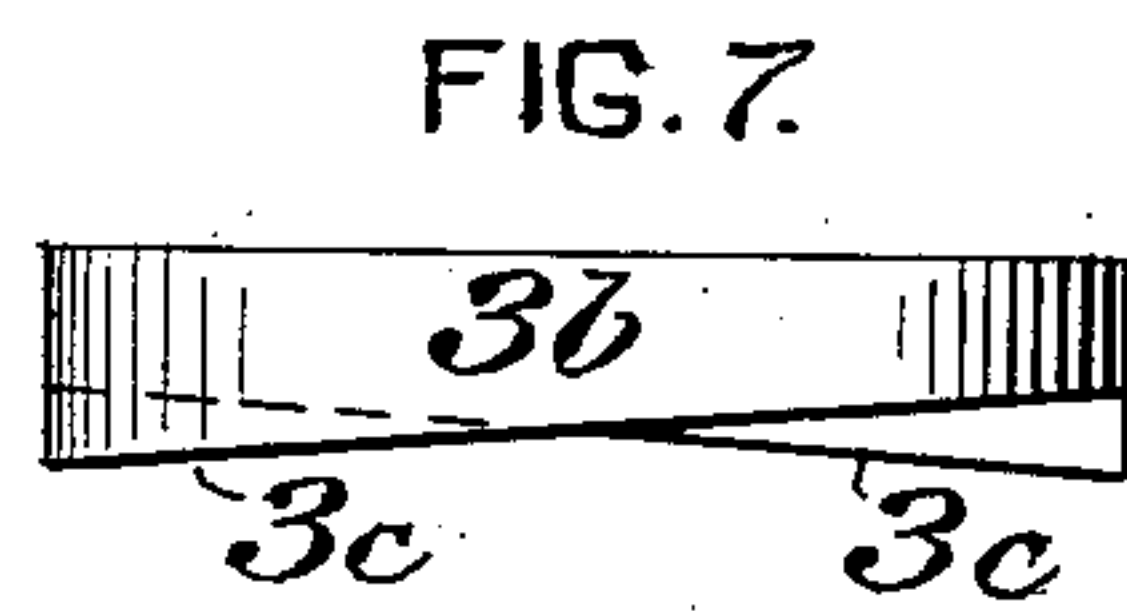
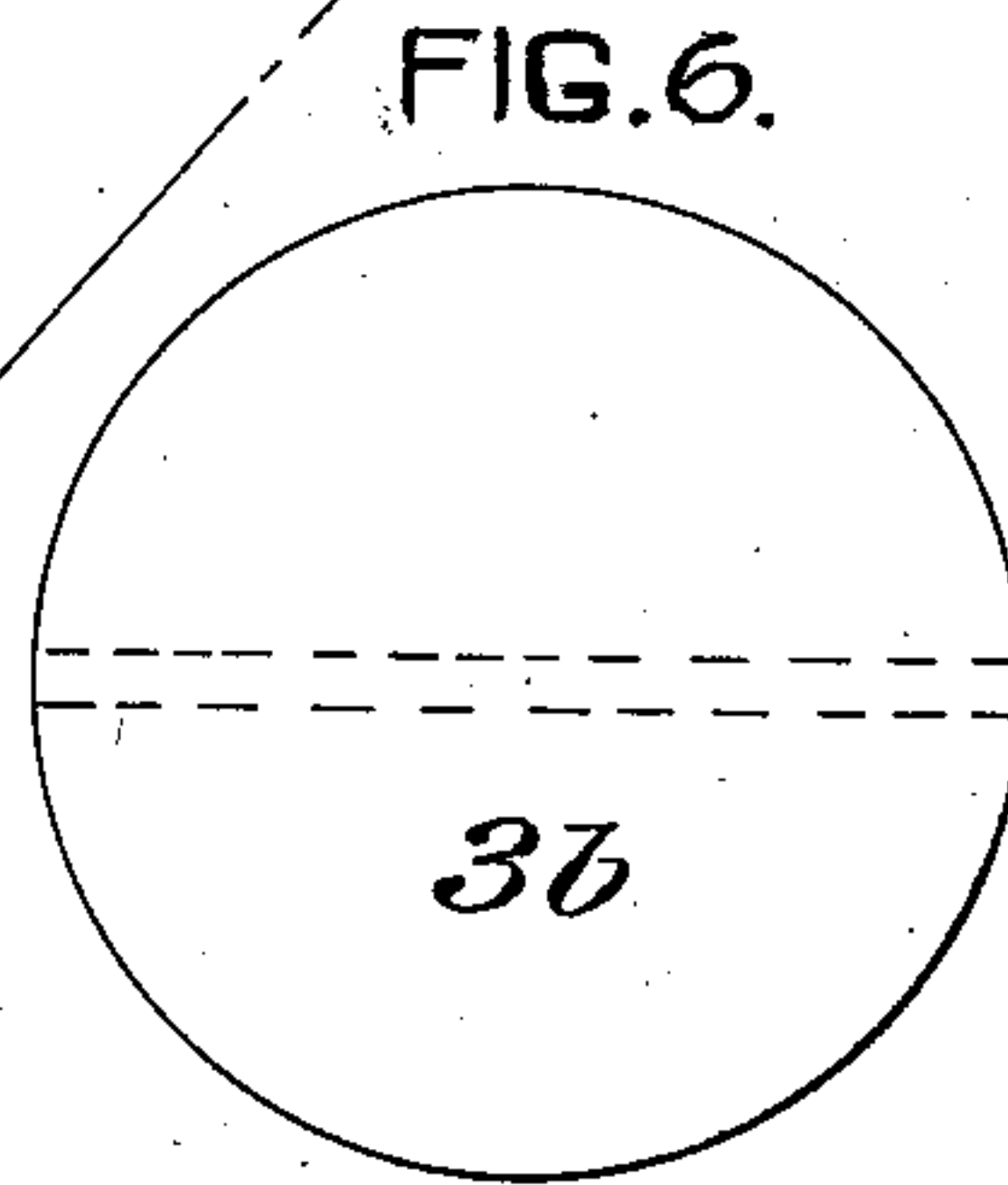
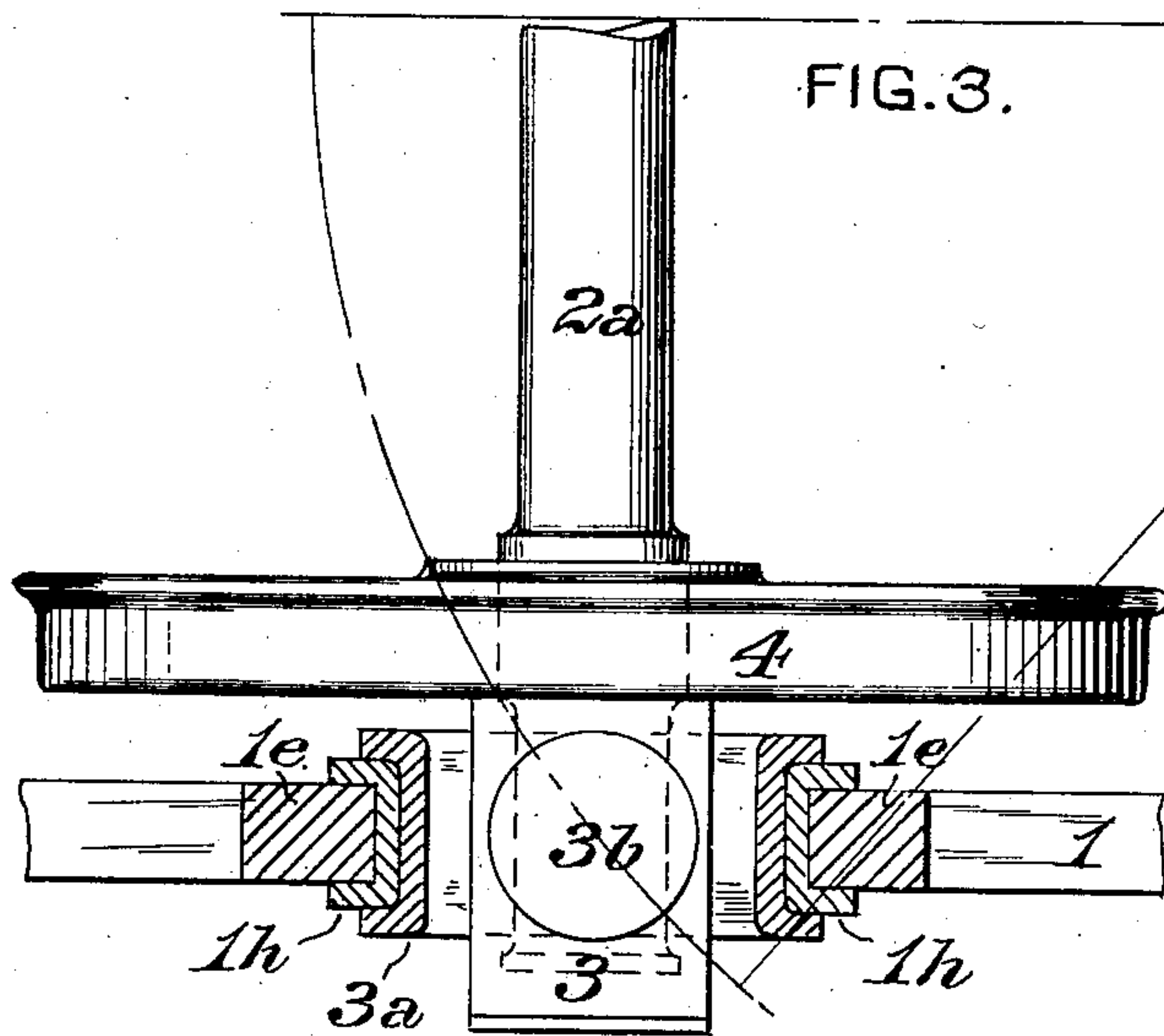
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2 SHEETS—SHEET 2.



WITNESSES

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UNITED STATES PATENT OFFICE.

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A CORPORATION OF NEW YORK.

ELECTRIC LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 744,303, dated November 17, 1903.

Application filed July 20, 1903. Serial No. 166,268. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM DALTON and FRANCIS J. COLE, both of Schenectady, in the county of Schenectady and State of New York, have jointly invented a certain new and useful Improvement in Electric Locomotives, of which improvement the following is a specification.

Our invention relates to electric locomotives of the type in which an electric motor is supported at one end upon a driving-axle, to which its power is transmitted through gearing, and is supported at the other end upon the frame of the locomotive.

The object of our invention is to provide means whereby an electric locomotive of the type referred to will be adapted to pass through curves of comparatively short radius without liability to derailment and without necessitating the application of a special or independent guiding-truck for the purpose.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a view, partly in elevation and partly in vertical longitudinal central section, of an electric locomotive, illustrating an application of our invention, the gearing being indicated by broken circles; Fig. 2, a plan or top view with the cab and spring-rigging removed; Fig. 3, a horizontal section, on an enlarged scale, through one of the pedestals of an end driving-axle with the journal-box and bearing-plate shown in plan view; Fig. 4, a front view in elevation of the same; Fig. 5, a vertical central section through the same; Fig. 6, a plan view, on a further enlarged scale, of a bearing-plate; Fig. 7, a side view of the same; and Fig. 8, a partial transverse section through the locomotive, showing the connections of the cab and frame.

Our invention is herein exemplified as applied in an electric locomotive, the main supporting-frame of which comprises two continuous side frame members 1, in or on which are formed or fixed jaws or pedestals 1^a for the reception of the journal-boxes 3 of a plurality of driving-axes 2 2^a, in this instance four in number, upon which the driving-

wheels 4 are secured, and a longitudinal center sill 1^f, which may be, as shown, in the form of a channel-beam, together with transverse buffer-beams 1^a, to which the side frame members and center sill are connected at their ends. The frame is supported upon the driving-axes through the intermediation of springs 5, which rest upon saddles on the journal-boxes 3 and are connected to the frame by spring-hangers 6, as in ordinary steam-locomotive practice. The detailed construction of the spring arrangement does not form part of our present invention, and the same is not, therefore, herein at length set forth.

Power for the rotation of the driving-axes is applied thereto from electric motors 7 of any suitable and preferred construction, the motors being located between the side frame members and the frame of each motor being journaled and supported at one end upon the driving-axle which it rotates and at the other upon the frame. Each of the motor-shafts 9 has fixed upon it a spur-pinion 10, the teeth of which engage those of a corresponding gear 11 on the axle which is driven by the motor. The ends of the motor-frames which are farther from their respective driving-axes are provided with noses or bearing-pieces 7^a, which are supported on brackets or hangers 1^s, secured to the center sill 1^f of the locomotive-frame.

It is well recognized in railroad practice that in locomotives having a comparatively long rigid wheel-base there is a tendency of the flanges of the leading driving-wheels to mount the rails in passing curves of short radius and to thereby cause derailment, and independent leading-trucks of either two or four wheels are generally employed in practice to guide the locomotive around curves. In the ordinary radial truck the bearings are inside the wheels and the movements of the truck are controlled by radius-bars running from the transverse plane of the journal-boxes back to a fixed center pin. When the journals are outside of the wheels, it becomes necessary either to use radius-bars of complicated structure reaching around the wheels

or radial boxes. In order to obviate the necessity for using independent leading and trailing trucks, as well as to avoid the complications which occur in radial boxes of comparatively short radius and avoid increase of wheel-base by the use of bars running from center to outside journal-boxes, we provide means whereby the frames of the motors of the end axles of the locomotive are supported on and connected to the locomotive-frame in such manner as to permit of radial movement of said axles in passing curves, thereby not only obtaining the useful effect of a special radial truck, but also avoiding the use of radius-bars. To this end the frames of the motors 7 of the end driving-axles 2^a of the locomotive are provided on their sides farther from said axles with noses or bearing-pieces 7^a, which are supported on brackets or hangers 1^s, secured to the center sill 1^f of the frame, and are coupled thereto by vertical center pins 7^b, the axle-boxes 3 being thereby connected to the frame with the capacity of movement in a horizontal plane in arcs, the radius of which is equal to the distance from the axis of the bearing of the frame upon the journal-box to the axis of the center pin. The end driving-axles 2^a are therefore adapted to move laterally in the same manner as if fitted in radial boxes or if mounted in a truck provided with radius-bars, while the use of either of these special constructions is rendered unnecessary, as their function is performed by the motor-frames, which are at the same time as effectively supported as in the constructions heretofore employed. The center pins 7^b are made loose enough to admit of the vertical movement of the frame relatively to the axles, but are fitted up sufficiently closely to maintain the axles in their proper positions in a horizontal plane.

The journal-boxes 3 of the end driving-axles 2^a are without side bearings, and each of them is free to move in a horizontal plane in the open space within a square guide-frame 3^a, which is fitted between and bears laterally on the shoes 1^h of the pedestal-jaws 1^e. The spring-saddles 5^a rest upon the tops of the frames 3^a, which are fitted to move vertically on the shoes 1^h in the manner of an ordinary journal-box, and through their long vertical bearing-surfaces serve to obviate the tendency of the tipping of the boxes around the base of the spring-band, which would otherwise be exerted when the journal is swung out of the center line of the spring. In order to return the end driving-axles to their normal positions at right angles to the frame members, transverse centering-springs 25 are fitted in boxes or cases 25^a, which are secured to the center sill 1^f above and adjacent to the sides of the motor-frames which adjoin the end axles. The springs 25 abut at their ends against followers 26, which in turn abut against the ends of the cases 25^a. Thrust-rods 27, which are coupled to lugs 7^c, fixed on the motor-frames, abut against the followers

26, with the result that the movement of the motor-frames in either direction in the swinging of the end driving-axles in traversing curves is resisted by said springs, which will be compressed thereby and will return the frames and axles to normal central position when the locomotive passes from a curved to a straight portion of the track.

The guide-frames 3^a, and through them the main frame members, are supported on the journal-boxes 3 through the intermediation of cylindrical bearing-plates 3^b, which are fitted and free to rotate about their axes in correspondingly-bored sockets in the top bars of the frames 3^a and are provided with double wedges or inclined faces 3^c on their lower sides, which abut against similar wedge projections 3^d on the top of the journal-box 3. The double wedge bearing on the frames on the journal-boxes acts in unison with the centering-spring before described to return the boxes to their normal central position after their movement therefrom in either direction incident to that of the axles in traversing curves.

The frame of the locomotive is transversely braced and stiffened, and the cab 8 supported in proper relation thereto by cross-ties 1ⁱ, which project vertically above and are secured by plates 1^k to the center sill 1^f of the frame, and may also be connected by plates or bars 1^m to the side frame members 1. The floor 8^a of the cab is secured to the cross-ties in any suitable manner, the upward extension of the cross-ties above the center still enabling the floor to be located at the proper level desired.

It will be seen that the means afforded by our invention for enabling an electric locomotive to readily and safely pass around curves are conveniently applicable in the type to which the invention relates and provide the substantial equivalent of a guiding-truck and attain its advantages without involving the additional expense and complication of a special structure independent of the driving-wheels.

We claim as our invention and desire to secure by Letters Patent—

1. In an electric locomotive, the combination of a main supporting-frame, a driving-axle journaled in bearings which are movable horizontally in said supporting-frame, and an electric-motor frame by which the driving-axle is pivotally coupled to the supporting-frame.

2. In an electric locomotive, the combination of a main supporting-frame, a driving-axle journaled in bearings which are movable horizontally in said supporting-frame, an electric-motor frame which is journaled at one end on the driving-axle, and a center pin coupling the motor-frame, at its opposite end, to the main supporting-frame.

3. In an electric locomotive, the combination of a main supporting-frame, a driving-axle journaled in bearings which are movable

horizontally in said supporting-frame, an electric-motor frame by which the driving-axle is pivotally coupled to the supporting-frame, and means for returning the motor-frame and driving-axle to normal central position after displacement therefrom.

4. In an electric locomotive, the combination of a main supporting-frame, a driving-axle journaled in bearings which are movable horizontally in said supporting-frame, an electric motor having a frame by which the driving-axle is pivotally coupled to the supporting-frame, and gearing through which the driving-axle is rotated by the electric motor.

5. In an electric locomotive, the combination of a main supporting-frame, an intermediate driving-axle journaled in rigid bearings therein, an electric motor by which said intermediate driving-axle is rotated, end driving-axes, each journaled in bearings which are movable horizontally in the main supporting-frame, electric motors each having a frame by which one of the end driving-axes is pivotally coupled to the main supporting-frame, and gearing through which each end driving-axle is rotated by the adjacent electric motor.

6. In an electric locomotive, the combination of a main supporting-frame, a driving-axle journaled in bearings which are movable horizontally in said supporting-frame, an electric-motor frame which is journaled at one end on the driving-axle, a nose or bearing piece fixed on the opposite end of the motor-frame, a bracket or hanger fixed to the main supporting-frame and supporting said nose, and a center pin pivotally connecting said nose and bracket.

7. In an electric locomotive, the combination of a main supporting-frame, a driving-axle journaled in bearings which are movable horizontally in said supporting-frame, an electric-motor frame by which the driving-axle is pivotally coupled to the supporting-frame, a box or casing fixed to the supporting-frame, a centering-spring in said casing, transversely-movable followers interposed between said spring and the ends of the casing, and thrust-

rods connected to the motor-frame and abutting on said followers.

8. In an electric locomotive, the combination of two main supporting-frame members, guide-frames fitted to traverse vertically in pedestals on said side frame members, journal-boxes supporting said guide-frames and having the capacity of movement in a horizontal plane within them, a driving-axle on which the journal-boxes are mounted, and an electric-motor frame by which the driving-axle is pivotally coupled to the supporting-frame.

9. In an electric locomotive, the combination of two main supporting-frame members, guide-frames fitted to traverse vertically in pedestals on said side frame members, journal-boxes having the capacity of movement in a horizontal plane within the guide-frames, bearing-plates interposed between the guide-frames and journal-boxes and having inclined or wedge faces abutting against corresponding faces on the journal-boxes, a driving-axle on which the journal-boxes are mounted, and an electric-motor frame by which the driving-axle is pivotally coupled to the supporting-frame.

10. In an electric locomotive, the combination of a side frame-supporting member, an open guide-frame having vertical sides fitted to traverse in pedestal-jaws on the supporting-frame member, a cylindrical bearing-plate fitted to move about its axis in a recess in the top bar of the guide-frame and having inclined or wedge faces on its lower side, and a journal-box having corresponding faces on its top abutting against those of the bearing-plate.

11. In an electric locomotive, the combination of a main supporting-frame comprising two side frame members, a center sill, and end buffer-beams, cross-ties connected to, and projecting above the center sill, and a floor and cab supported on said cross-ties.

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Witnesses:

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