J. F. McELROY.

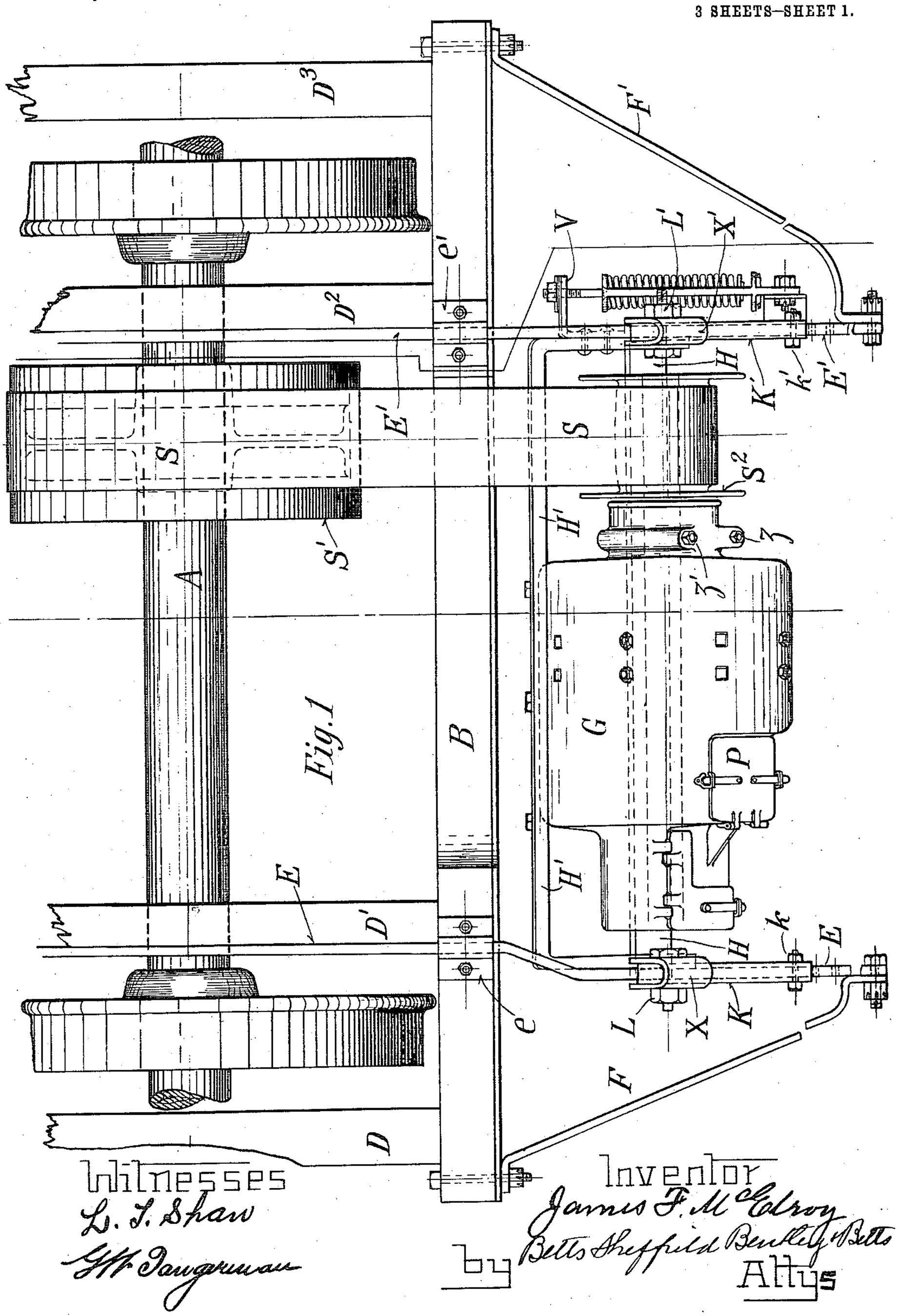
DYNAMO MOUNTING.

APPLICATION FILED FEB. 21, 1908.

983,158.

Patented Jan. 31, 1911.

3 SHEETS—SHEET 1.



Witnesses

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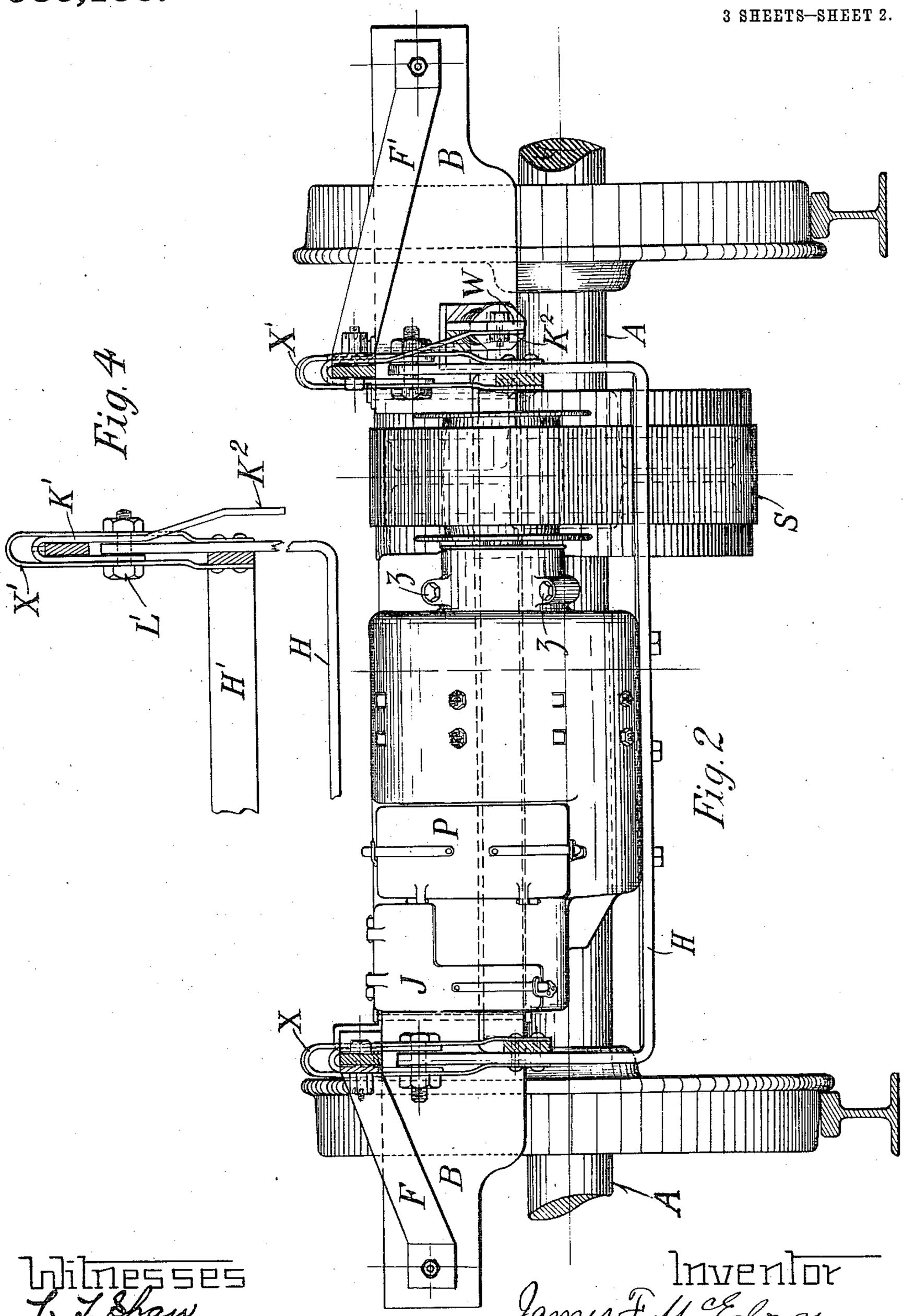

Fig. 4

Fig. 2

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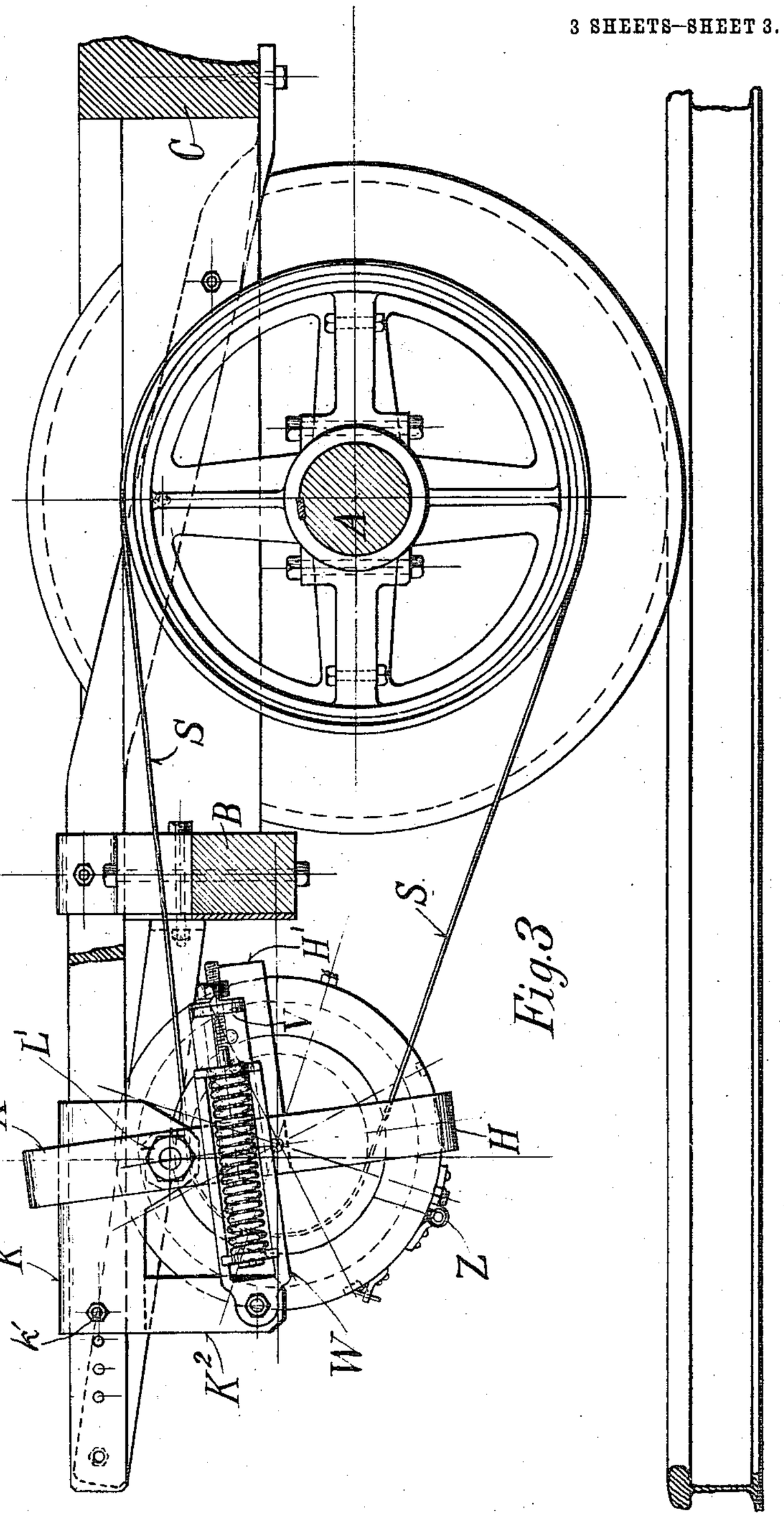

Fig.3

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UNITED STATES PATENT OFFICE.

JAMES F. McELROY, OF ALBANY, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE UNITED STATES LIGHT & HEATING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF MAINE.

DYNAMO-MOUNTING.

983,158. Specification of Letters Patent. Patented Jan. 31, 1911.

Application filed February 21, 1908. Serial No. 417,003.

To all whom it may concern:

Be it known that I, JAMES F. MCELROY, a citizen of the United States, residing in the city of Albany, county of Albany, State of New York, have invented certain new and useful Improvements in Dynamo-Mounting, of which the following specification and accompanying drawings represent that form which I now regard as the best of the various forms in which the terms and substance of the invention may be embodied.

In the drawings, Figure 1 is a plan view of my invention; Fig. 2 an end view therof; Fig. 3 a side view thereof; Fig. 4 shows the detail.

My invention relates to the mounting of dynamos upon railway vehicles, and particularly to such mounting of the dynamo that it may be driven from one of the car-axles by means of a belt.

In particular, I so mount the dynamo that it may be adjusted bodily to and from the car-axle, and, moreover, provide for it a self-adjusting tension device, by means of which the tension on the belt is maintained substantially uniform in spite of variations in the length of the belt by stretching or other causes. I also mount the dynamo upon a pivotal support, the axis of rotation of the dynamo being within the body of the dynamo itself, whereby the aforesaid tension device may take up slack in the belt and at the same time the tendency of the dynamo to swing upon its supports under sudden shocks is practically eliminated. I also split the dynamo casing at the top and bottom and hinge one half thereof so that it may open outwardly on the side of the machine from the car-axle. In this same half of the dynamo casing I also provide a door hinging on nearly a vertical line, so that it may be opened outwardly and nearly in a horizontal direction, to permit ready access to the interior of the casing.

The foregoing features, together with others to be hereinafter described, will form the subject-matter of the claims hereinafter stated.

Turning to the drawings, A represents the axle of the car-wheel, journaled in the ordinary manner in a truck, the transverse beams of which are indicated at B and C, and the longitudinal beams of which are indicated at D, D′, D², D³ (see Fig. 1). Upon the end beam B and projecting rearwardly therefrom are two bracket arms E and E′. At their inner extremities these brackets are bolted to the under side of the beam C (see Fig. 3). From this point they pass upward toward the rear and rest upon the top side of the beam B, to which they are secured by clamps *e* and *e′*. The rear or outer ends of these brackets are provided with brace bars F and F′, which extend from the extremities of the brackets in an outward direction, as appears in Fig. 1, and at the same time in a downward direction, as appears in Fig. 2, to the beam B, to which they are bolted.

Between the two bracket arms E and E′ the dynamo G is supported at a point outside of the truck beam B in the following manner. To the under side of the dynamo, and parallel to the dynamo shaft, is bolted a bar H, the ends of which are bent upward (see Fig. 2) to a point slightly above the axis of the dynamo. A similar bar H′ is bolted on the inside of the dynamo adjacent to the beam B, the ends of this bar being turned inwardly, as appears in Fig. 1, and bolted to the bar H. The two extremities of the bar H are bolted to sliding loops K and K′, which embrace and slide upon the respective bracket bars E and E′. These loops are adjusted in position along the bracket bars, and are secured thereto at a desired point by means of bolts *k* and *k′*, which pass through the two sides of the loop and through a hole in the bracket bar embraced by the loop. By this means the dynamo, which is pivotally suspended from these loops, is given an approximate adjustment with respect to the car-axle. The connection between the aforesaid loops and the respective extremities of the hanger bar H is secured by means of the bolts L and L′, the axis of these bolts being the axis of the bodily rotation of the dynamo. It should be observed at this point that this axis of rotation is within the body of the dynamo and is as close to the center of gravity thereof as is consistent with the tensioning of the belt by the means to be hereinafter described. The purpose of this is to reduce the tendency of the machine to swing to and fro under the impulse given by the sudden starting of the cars in one direction or the other

and the bumping against other cars, and similar causes. Of course, if the dynamo were suspended exactly at the center of gravity, such shocks would have no effect toward causing the dynamo to rotate on its supports—in other words, its suspension would be neutral with respect to shocks of that kind. It is my object to approximate as closely as possible to this neutral support by mounting the pivots upon which the dynamo hangs as nearly to the center as may be permissible under the circumstances.

The dynamo being pivotally mounted, as above described, a belt S is provided, which connects the drive pulley S′ on the car-axle A with the smaller pulley S^2 on the shaft of the dynamo. On the sliding loop K′ nearest to the belt S and at the end of the loop farthest from the car I place a downward projection K^2 (see Fig. 3). To the lower extremity of the projection K^2 I pivot one end of the spring guide W, the other end of which is attached to a bracket V bolted to the bar H′, which in turn is bolted to the casing of the dynamo.. The spring guide W is made with two telescoping portions with a spring between them which obviously tends to draw the dynamo in a direction away from the truck and toward the aforesaid projection K^2. The tension of the spring, therefore, tends to rotate the dynamo bodily around a center coincident with the axis of the supporting bolts L′ and to thereby put the belt S under tension.

Referring particularly to Fig. 3, it will be manifest on inspection that as the belt becomes slack the tension of the spring will tend to diminish, but at the same time the horizontal axis of the spring will drop as the dynamo rotates around the bolt L′. Therefore, although the tension of the spring would be somewhat decreased, yet it will act on a longer lever arm with respect to the bolt L′ as a fulcrum. Conversely, if the belt is tighter and shorter the horizontal axis of the spring will rise nearer to the bolt L′ and thereby, although its tension is increased, it will act upon a shorter lever arm with respect to the axis of the bolt of the fulcrum. By this arrangement the spring will always exert substantially the same tension upon the belt regardless of the length of the belt and the distance between the centers of the two pulleys.

It will be manifest that the result of my construction as thus far described is to relieve the belt from all unequal strains. For example, the above described hanging of the dynamo upon the axis of the rotation lying within the body of the dynamo relieves the belt from the sudden and excessive strains which would result if the dynamo were pivoted at a point either above or below it. In such case a shock tending to swing the dynamo away from the truck would produce a sudden and abnormal strain on the belt, whereas a shock tending to swing the dynamo toward the truck would first slacken up the belt but the rebound to the action of the spring would produce a heavy blow on the belt, tending to snap it in two. Moreover, by means of the self-adjusting tension device above described, the belt is kept equally taut, in spite of any stretching, so that it need not be given an undue degree of tension when it is first applied, in order to prevent it from slipping after it has become slightly stretched. I am also enabled by the adjusting of the aforesaid sliding loops along the bracket arms to insure that the shaft of the dynamo will be parallel with the car-axle at all times, there being the same number of adjusting holes in each of the brackets, these holes being located in respective brackets at equal distances from the car-axle. By this means I avoid the necessity of tightening the belt by minute gradations in the bodily position of the dynamo itself with respect to the car-axle. I give the sliding loops a fixed and definite advance along the brackets, either toward or from the car truck, by definite and comparatively long steps and then secure them positively in position, the tension being then taken care of in the way I have described by means of the self-adjusting spring. This not only enables the belt to run true by maintaining the dynamo shaft parallel to the car-axle, but also avoids the necessity for cutting off a section of the belt and relacing it to shorten it after it becomes stretched to a considerable degree. It is only necessary in my construction to set the sliding loops back to the next hole and secure them in place, the tension device aforesaid taking care of the smaller degrees of adjustment. The tension of the belt is also not dependent on screwing the dynamo bodily back and forth as in some adjusting arrangements.

Over each one of the sliding loops K and K′ I provide a guard loop X X′ (see particularly Fig. 4), the two ends of which are bolted to the inturned-end portion of the bar H′. By this means the loss of one or both of the main hanger-bolts L and L′ will not cause the dynamo to drop out on the track and derail the train. At the same time the braces F and F′ will prevent the sliding loops escaping from the ends of the bracket bars E and E′. These guard loops may be said to span the main hanger bolts in that they form a supplementary connection around those bolts between the dynamo on the one hand and the bracket bars on the other.

The casing of the dynamo is split into two parts on an approximately vertical line, the two parts being hinged together near the bottom at the point Z (see Fig. 3) and

brought together at the top, being held together by the bolts *z*, Figs. 1 and 2. By this means the rear half of the dynamo casing may be swung outwardly and the armature removed by slacking up the belt and lifting it from the pulley S^2. Moreover, in the said removable half of the armature casing is a door P lying in a slightly inclined plane and hinged so as to open outwardly to permit of the easy inspection of the interior of the dynamo. A similar door J, hinged at the top of the machine on a horizontal axis, is provided at the left of the door B and serves to give access to the mechanism which reverses the dynamo connections on the reversal of the direction of rotation.

My invention is primarily designed for an electric-lighting dynamo driven by a car-axle, but may also be employed in the event of the dynamo serving as a motor to drive the axle while my mode of tensioning the belt may be employed in any situation wherein a dynamo whether acting as a generator or as a motor is belted to an axle, which term is in this respect inclusive of a shaft of any appropriate kind.

What I claim as new and desire to secure by Letters Patent is:

1. The combination with an axle, of a dynamo belted thereto, means for adjusting the dynamo to and from the axle by definite steps and supplementary means for automatically maintaining a substantially constant spring tension on the belt.

2. The combination with an axle, of a dynamo belted thereto, a supporting bracket, means for adjusting the dynamo at definite points along the bracket, a rotatable mounting for the dynamo, and means for adjusting the tension of the belt by movement of the dynamo around its axis of rotation.

3. The combination with an axle, of a dynamo belted thereto, a support for the dynamo movable to and from the axle by equal definite steps at both ends, means for mounting the dynamo rotatably in said support, and a spring tending to rotate the dynamo upon its support for maintaining the tension of the belt.

4. The combination with an axle of a dynamo belted thereto, a support for the dynamo adjustable to and from the axle, means for securing the said support at definite points, and a spring tending to rotate the dynamo with respect to the said support for imposing tension on the belt.

5. The combination with an axle, of a dynamo belted thereto, an adjustable support for the dynamo upon which the dynamo is rotatably mounted, and a self-adjusting spring for imposing a substantially constant tension on the belt.

6. The combination with an axle, of a dynamo belted thereto, an adjustable support for the dynamo upon which it is rotatably mounted, and a spring attached at one end to the said adjustable support and at the other end to the dynamo in a line eccentric to the axis of rotation of the dynamo.

7. The combination with an axle, of a dynamo belted thereto, a support for the dynamo upon which it is rotatably mounted, and a spring tending to rotate the dynamo on its support and acting along a line eccentric with respect to the axis of the rotation of the dynamo but changeable in position with respect to such axis, whereby the leverage of the spring varies substantially inversely as its tension.

8. The combination with an axle, of a dynamo belted thereto, a support for the dynamo upon which it is rotatably mounted, a spring tending to rotate the dynamo around its axis of rotation in a direction away from the axle, and a pivotal mounting for the spring whereby the line of action of the spring varies as the dynamo is rotated on its axis to increase its leverage as the dynamo recedes from the axle.

9. The combination with an axle, of a dynamo belted thereto, a support for the dynamo upon which it is rotatably mounted, a spring tending to rotate the dynamo on its axis, and connections for the spring permitting it to act upon the dynamo on a changing leverage increasing as the belt slackens as the dynamo is drawn farther from the axle.

10. The combination with an axle, of a dynamo belted thereto, a support for the dynamo upon which it is rotatably mounted, the axis of rotation of the dynamo on its support being within the body of the dynamo and approximately at its center of gravity, and means for imposing tension on the belt by pressure tending to rotate the dynamo upon its support.

11. The combination with an axle, of a dynamo belted thereto and located at one side of the axle, an adjustable support upon which the dynamo swings upon an axis lying within the body of the dynamo approximating in position to the center of gravity thereof, and means for tensioning the belt by pressure tending to swing the dynamo upon its supporting axis.

12. The combination with an axle, of a dynamo belted thereto, a support for the dynamo at one side of the axle upon which the dynamo swings and which is adjustable by definite steps to and from the axle, and a tension spring anchored at one end to the said support and connected to the dynamo at the other end and tending to tension the belt by pressure acting eccentrically to and at varying distances from the axis of suspension of the dynamo.

13. The combination with an axle, of a dynamo belted thereto, horizontal support-

ing brackets for the dynamo, supports adjustable along said brackets and upon which the dynamo is rotatably mounted, and a self-adjusting spring connected at one end to one of the said supports and at the other end to the dynamo and acting to tension the belt by rotating the dynamo upon its supporting axis.

14. The combination with a car axle, of a dynamo mechanically connected thereto at one side of the axle and having its casing split at top and bottom, so as to open outwardly on that side of the dynamo away from said axle.

15. The combination with a car truck of overhanging brackets projecting outside the truck axle and a dynamo mounted on said brackets and having its casing split at top and bottom in a line through the journal axis so as to open outwardly on the side away from the truck.

16. The combination with a car axle, of a dynamo having a driving connection therewith, a support on which the dynamo is rotatably mounted and a guard spanning the point by which the dynamo is upheld.

17. In combination, a car truck, a generator, connecting means for securing said generator to said truck, and supplementary means associated with said elements, normally inoperative but adapted to coöperate with said truck upon failure of said connecting means.

18. The combination with a car truck, of a generator mounted thereon, driving means for said generator associated with said elements, and means for maintaining substantially uniform tension of said driving means upon changes in the relative proportions thereof.

In witness whereof I have hereunto set my hand, before two subscribing witnesses, this 18th day of February, 1908.

JAMES F. McELROY

Witnesses:
BEULAH CARLE,
ERNEST D. JANSEN.