(No Model.) 3 Sheets—Sheet 1.

M. WADDELL.

DYNAMO AND MOTOR.

No. 514,047. Patented Feb. 6, 1894.

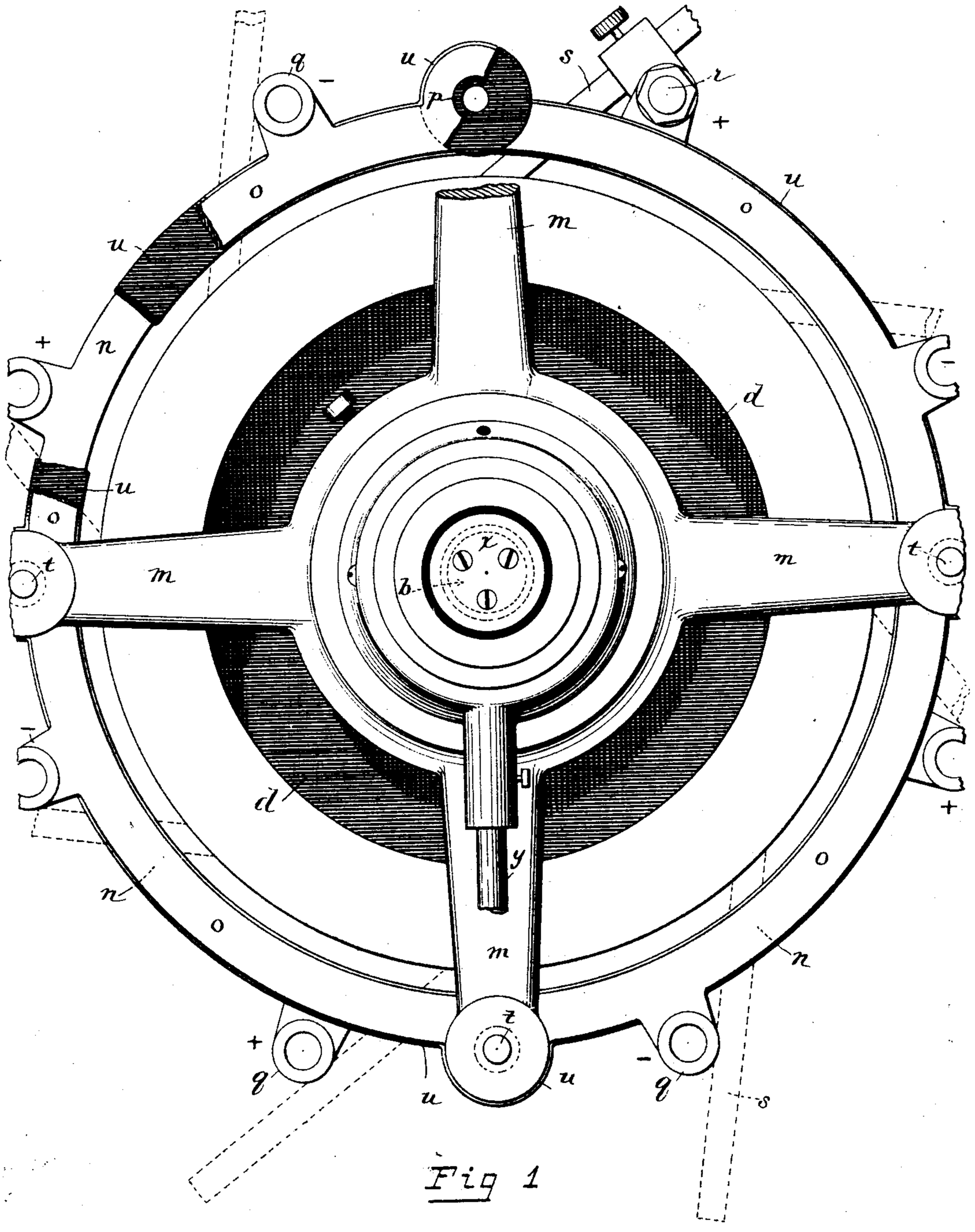

Fig 1

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Fig 2

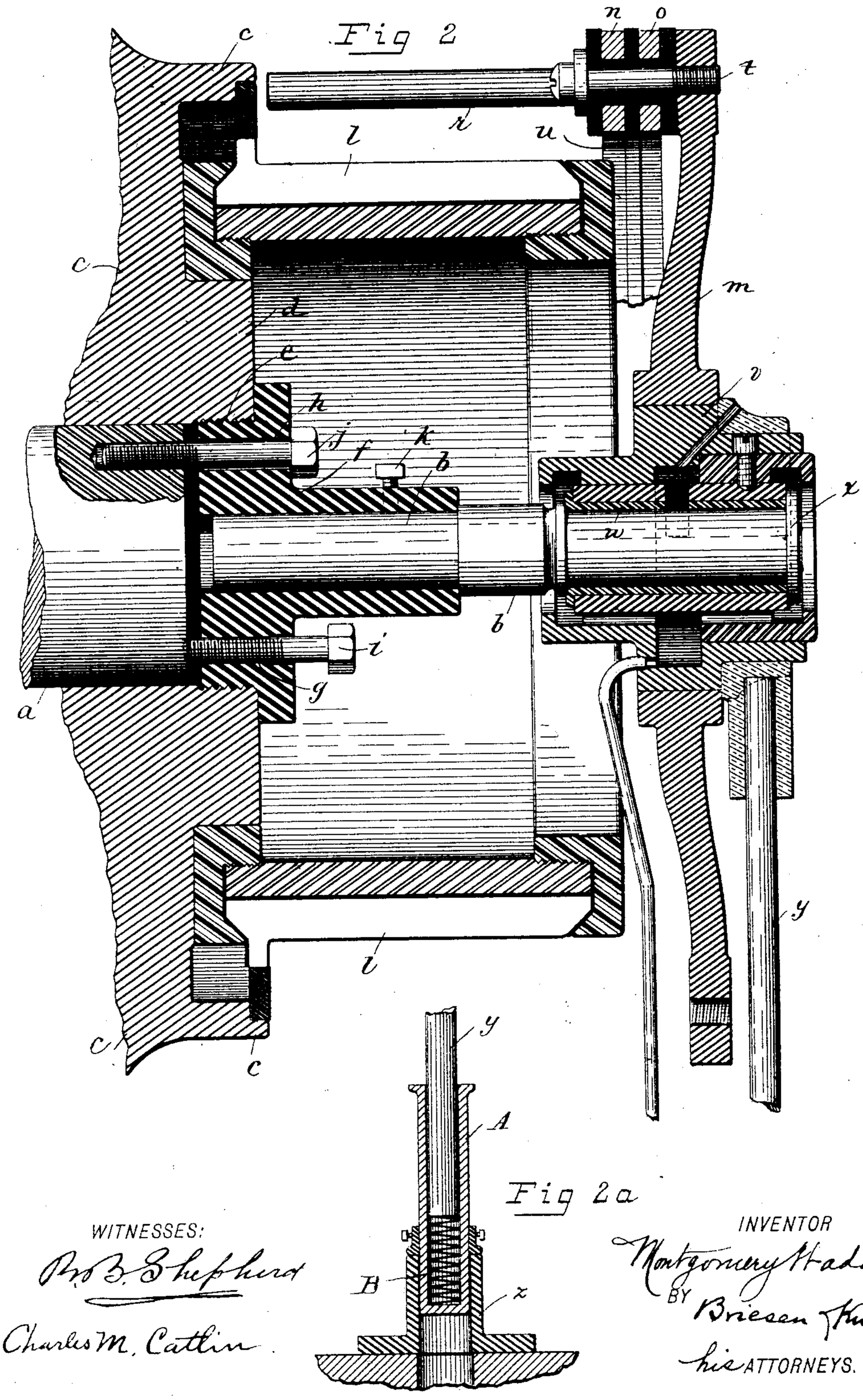

Fig 2a

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(No Model.)

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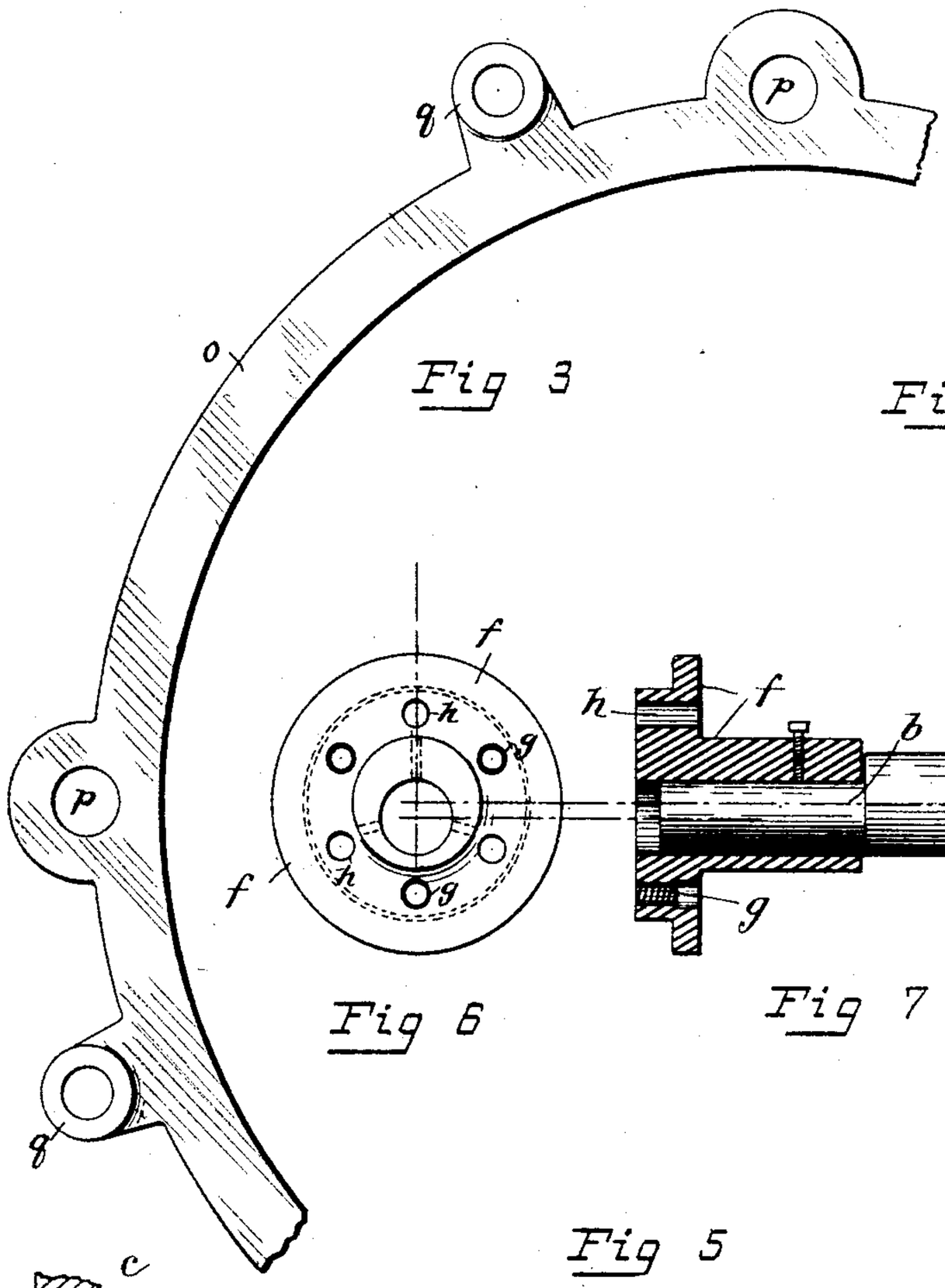


Fig 3

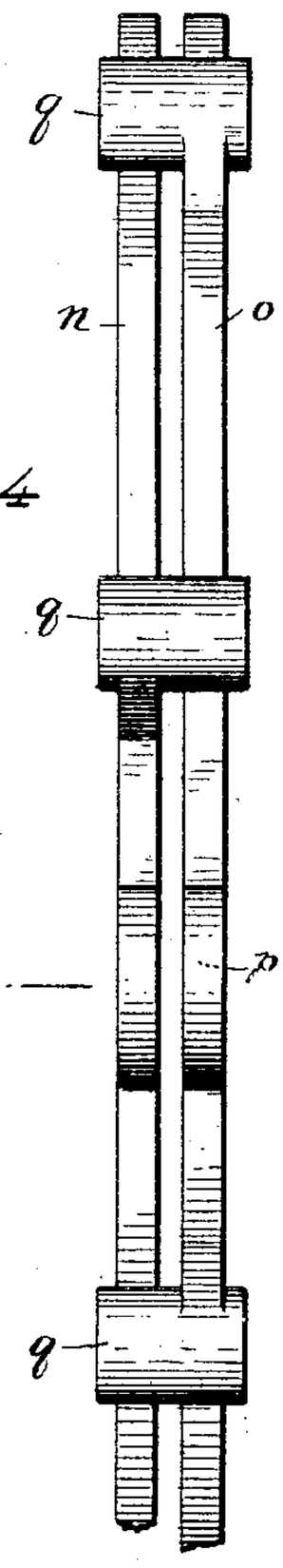


Fig 4

Fig 6

Fig 7

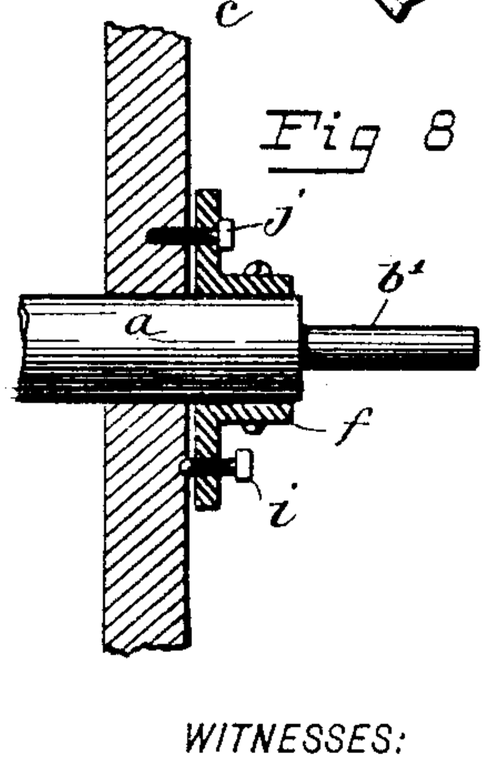
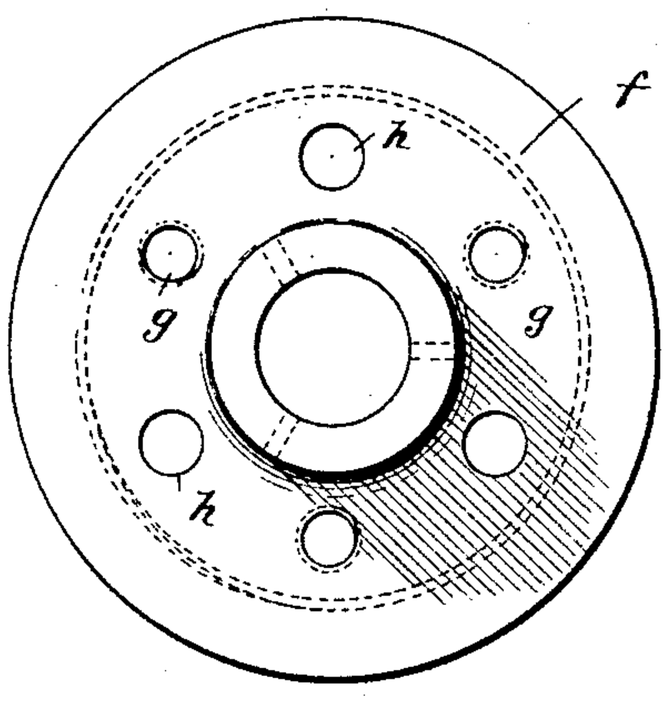


Fig 8

Fig 5



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UNITED STATES PATENT OFFICE.

MONTGOMERY WADDELL, OF BRIDGEPORT, CONNECTICUT.

DYNAMO AND MOTOR.

SPECIFICATION forming part of Letters Patent No. 514,047, dated February 6, 1894.

Application filed March 13, 1893. Serial No. 465,721. (No model.)

To all whom it may concern:

Be it known that I, MONTGOMERY WADDELL, a subject of the Queen of Great Britain, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented new and useful Improvements in Dynamos and Motors, of which the following is a specification.

This invention relates to dynamos and motors.

The main objects of the invention are to provide an improved brush carriage, and improved means for supporting the same.

A further object is to provide for adjusting the armature supporting spider, so as to bring the armature supported thereby into exactly the position desired with respect to the field magnet poles.

The invention consists in the several features and combinations hereinafter more fully described and set forth in the claims.

In the drawings Figure 1 is a face view of the improved commutator carriage, with parts broken away. Fig. 2 is a vertical central section thereof, and Fig. 2ª is a part of the same. Fig. 3 is a face view of a fragment of one of the rings used in the brush carriage. Fig. 4 is an edge view of two fragments of such rings in the relative position which they occupy when in place in the machine. Fig. 5 is a face view of a bearing to be described. Figs. 6 and 7 illustrate a means for adjustment of the carriage supporting spindle, and Fig. 8 illustrates a means for adjusting the armature.

The commutator brush carrier or carriage to be described has been designed more particularly for "direct-driven" multi-polar dynamos, although the invention is not confined to this class of machines. This brush carriage is adapted to be mounted on an extension of the armature shaft, on the commutator side of the armature, in machines which have no shaft bearing on said side of the armature. Heretofore brush carriages have been supported on this side of the armature, but on a shaft bearing or standard rising from the floor or base on which the machine was supported, and these old constructions have been such that the vibrations produced by operation of the machine have caused an irregular or scraping movement of the brushes on the commutator segments, which has badly worn the latter and which has interfered with the perfect operation of the brushes. I obviate the difficulty mentioned, and other difficulties, by extending the armature shaft on the commutator side of the armature, and by mounting the brush carrier on such extension. Preferably the extension of the main armature shaft *a* consists of a comparatively small shaft or spindle *b*, suitably secured in place in line with the center of the armature shaft as shown in Fig. 2, but it should be understood that it is not essential that this extension should be composed of a spindle or section separate from the main shaft.

c indicates the armature supporting spider or part, only a portion of the spider, and none of the armature being shown. It will be understood that the spider is keyed to the armature shaft in the usual manner to prevent its turning thereon. At the center of the hub of this spider is or may be an extension *d*, with an interior screw thread *e*, and which extends forward from the end of the armature shaft. *f* is a flanged hub adapted to screw into said screw threaded extension, as shown in Fig. 2. The flange of hub *f* is provided with several, preferably six, screw or bolt holes, *g*, *h*, at regular intervals, and alternating, as shown in Fig. 5. The holes *g* are screw-threaded, but the holes *h* are preferably not. Bolts *i* are screwed into the holes *g*, so that they project any desired distance, and are adapted to bear against the end of the armature shaft. Through holes *h* are passed bolts *j*, which screw into holes in the end of the shaft *a*. By inserting the screws or bolts *i* a greater or less distance through their supporting flange, before the screws or bolts *j* are screwed in, the position of the spider (and armature carried thereby) can be delicately adjusted longitudinally on the shaft. The screws *i*, when in place, will prevent movement of the spider toward the left, in the construction shown, and screws *j* will prevent movement toward the right. The extension or spindle *b* is fixed in the hub *f* and by suitable means, such as set screw *k*. The commutator cylinder (which is shown supported by the spider *c*, which is in fact a part of the armature) is made up of segments *l*, secured

together and insulated, in the usual or in any suitable manner.

On the outer end of spindle *b* is mounted a comparatively small spider *m*, having any suitable number of arms adapted directly or indirectly to support commutator brushes or brush supporting devices. Preferably, when the carriage is for use on multi-polar machines, the brushes, of which there may be as many as there are field magnet poles, are not carried directly by these arms, but are carried on suitably insulated conducting rings as indicated in the drawings, where *n*, *o*, are two duplicate rings, each having bolt holes *p*, and hollow or bored enlargements *q*, which preferably extend farther on one side of the body of the ring than on the other, as shown in Fig. 4. These two duplicate rings are, when assembled in the machine, turned so as to face in opposite directions, with the parts *q* on one ring alternating with those on the other ring. See Figs. 1 and 4. One ring connects and carries all of the + brushes, and one all of the — brushes.

In each or in several of the enlargements *q* are secured pins or rods *r*, on each of which is a brush holder and carbon, copper or other commutator brush *s*, as shown most clearly in Fig. 1.

Through the holes *p* and into corresponding holes in the spider arms are passed bolts *t*, insulated from the rings, as shown. Between rings *n*, *o* is an insulating ring or layer *u*. One terminal of the line, not shown, will be connected to one of the rings *n*, *o*, which will be the terminal of the machine, and the other terminal of the line will or may be connected to the other of said rings, which will be the terminal of the machine; but evidently, connection of the wires will depend to some extent on the character of the winding of the machine. The arrangement of the rings described gives a compact, strong and convenient construction.

Instead of mounting the spider *m* directly on the spindle *b*, it is preferred to provide a special bearing box *v* with suitable oil passages, and with a central bushing *w*, which is carefully fitted to the end of spindle *b*, being held from movement in one direction by a shoulder on the spindle, and in the opposite direction by a plate *x*, removably secured on the end of the spindle, or by other suitable means.

To prevent the brush carriage from rotating with the armature, and with spindle *b*, I provide a stiff rod *y*, the upper end of which is secured to the carriage in any suitable manner, and the lower end of which is secured to the floor, for example, by screwing to the floor a socket *z* into which extends a sleeve A, which fits onto the end of rod *y*. Between the bottom of the rod and said sleeve is, or may be, a spiral spring B, which serves to partially support the weight of the brush carriage, to relieve the strain on extension *b*, but which is sufficiently yielding to avoid transmitting the troublesome vibrations of the floor or foundation to the carriage and brushes, and which therefore does not correspond to an ordinary shaft bearing. The function of rod *y*, as above indicated, is mainly to prevent rotary movement of the brush carriage, and its use in connection with the spring is secondary. The spring may be omitted, in which case the weight of the carriage would be carried entirely by the spindle *b*.

Other means than those described to prevent rotation of the carriage may sometimes be used. It may happen by reason of defects in casting, or working some of the parts described, that the axis of part *b* will not be exactly coincident with the axis of the armature shaft. This would, obviously, produce an irregular movement and contact of the brushes on the commutator cylinder. To provide against this it is proposed, in some cases, to make the opening in hub *f* slightly eccentric, as shown, exagerated, in Fig. 6. The outer end of spindle *b* which carries the spider *m* is also slightly eccentric to the opposite end, as indicated in Fig. 7. By turning spindle *b* its outer end can be brought into exact alignment with the axis of the shaft, thereby insuring satisfactory working of the bearing, and steadiness of the carriage and brushes.

In large machines the bore of the part *f* (see Fig. 8) may be large enough to receive the shaft *a*, *f* being rigidly secured to the shaft, and the screws *i*, *j* may respectively bear against and enter the spider or body *c*. By adjusting the screws the position of body *c*, and of the armature thereon can be controlled as already indicated.

What I claim is—

1. The combination with an armature shaft, of an extension thereof on the commutator side of the armature, the end of the extension forming a bearing, a device adapted to support commutator brushes on said bearing, and means preventing rotation of said device, substantially as described.

2. The combination with an armature shaft, of an extension thereof on the commutator side of the armature, the end of the extension forming a bearing, a device adapted to support commutator brushes on said bearing, said extension consisting of a separate section or spindle *b*, secured to and in line with the main shaft, and means preventing rotation of said device, substantially as described.

3. The combination with an armature shaft, of an extension thereof on the commutator side of the armature, the end of the extension forming a bearing, a device adapted to support commutator brushes on said bearing, said extension consisting of a separate section or spindle *b*, secured to and in line with the main shaft, and means for adjustment of said

section or spindle to bring its axis into exact alignment with the axis of the main shaft, when necessary, substantially as described.

4. The combination of an armature shaft having no supporting bearing on the side of the armature which carries the commutator cylinder, and extension of said shaft, and a brush carrier on such extension, substantially as described.

5. The combination of an armature shaft having no supporting bearing on the side of the armature which carries the commutator cylinder, an extension of said shaft, a brush carrier, and a rod *y* secured to the carrier and to a fixed support, such as the floor, to prevent rotation of the carrier, substantially as described.

6. The combination of an armature shaft having no bearing on the side of the armature which carries the commutator cylinder, an extension of said shaft, and a brush carrier on such extension, a rod *y* secured to the carrier and to a fixed support, such as the floor, to prevent rotation of the carrier, and a spring tending to counteract the weight of the carrier on said extension of the shaft, substantially as described.

7. The combination of two conducting rings insulated from each other, commutator brushes carried respectively by said rings, and a spider for supporting the rings, substantially as described.

8. The combination in a brush carrier, of duplicate rings, having bored enlargements *q* forming supports for rods *r*, and the commutator brushes, said rings facing in opposite directions, side by side, but insulated from each other, and the enlargements *q* on the two rings alternating, substantially as described.

9. The combination of a shaft, an armature supporting body thereon, a body *f* secured to one of said parts (namely, the shaft and the armature) and screws *i*, *j*, in said body *f*, a part of the screws bearing against and a part of the screws screwing into the other part, whereby by adjusting said screws the position of the armature on the shaft can be adjusted, substantially as described.

10. The combination of a shaft *a*, a part *c* thereon, a hub or part *f* secured to the part *c*, and having bolt holes at intervals, bolts in some of said holes and bearing against the end of the shaft, and bolts in other of said holes, and entering holes in the end of the shaft *a*, whereby the part *c* is held from axial movement in either direction on the shaft, and whereby said part *c* can be adjusted, substantially as described.

11. The combination in a brush carrier of duplicate rings, having bored enlargements *q*, extending farther on one side of the body of the ring than the other, forming supports for rods *r*, and the commutator brushes, said rings facing in opposite directions, side by side, but insulated from each other, and the enlargements *q* on the two rings alternating, substantially as described.

MONTGOMERY WADDELL.

Witnesses:

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JAS. L. SUYDAM.