No. 706,201. Patented Aug. 5, 1902.

W. F. RICHARDS.

LUBRICATOR.

(Application filed Jan. 19, 1900.)

(No Model.) 2 Sheets—Sheet 1.

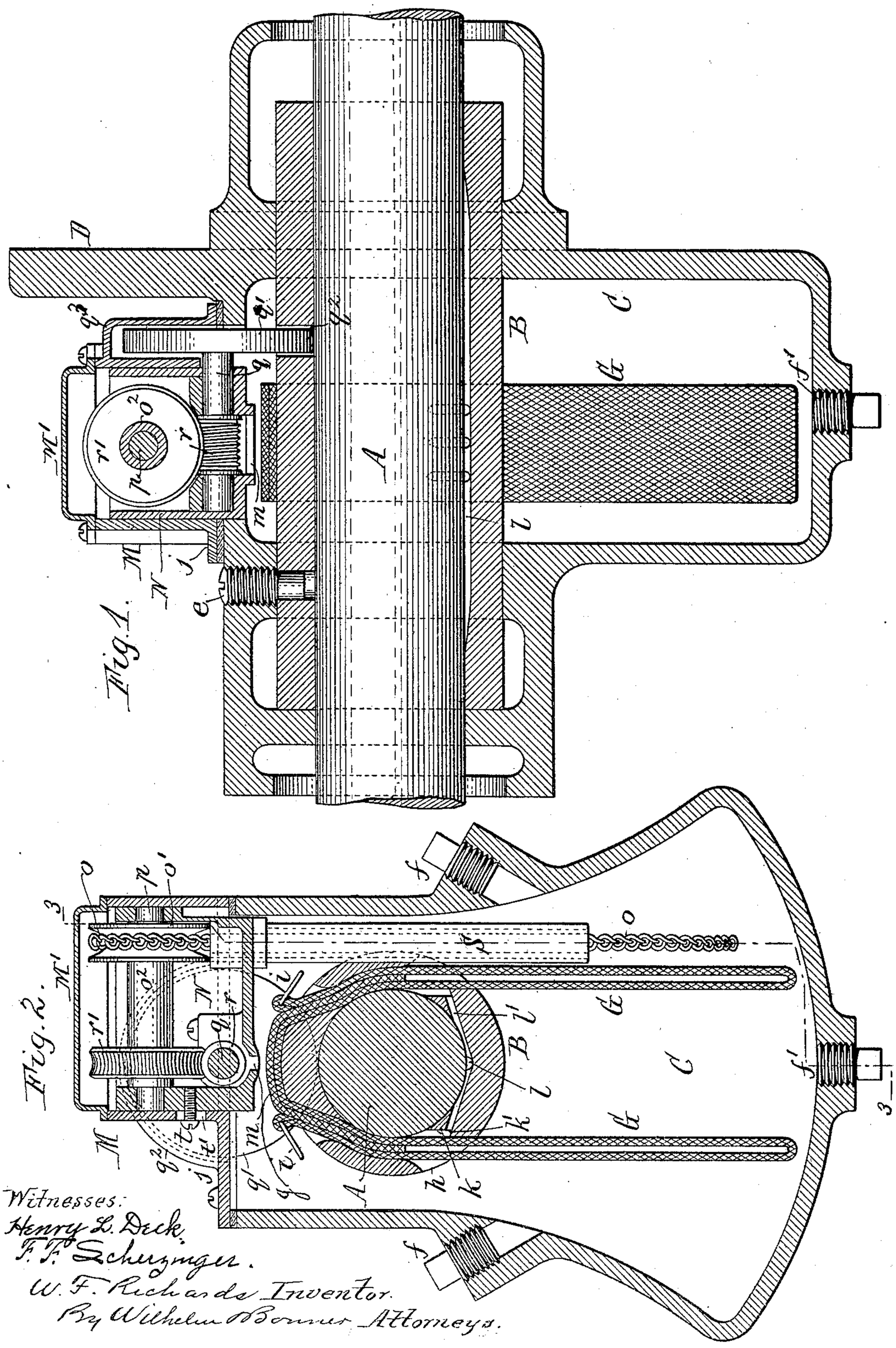

Fig. 1.

Fig. 2.

Witnesses:
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F. F. Schreyer.

W. F. Richards Inventor.
By Wilhelm & Bonner Attorneys.

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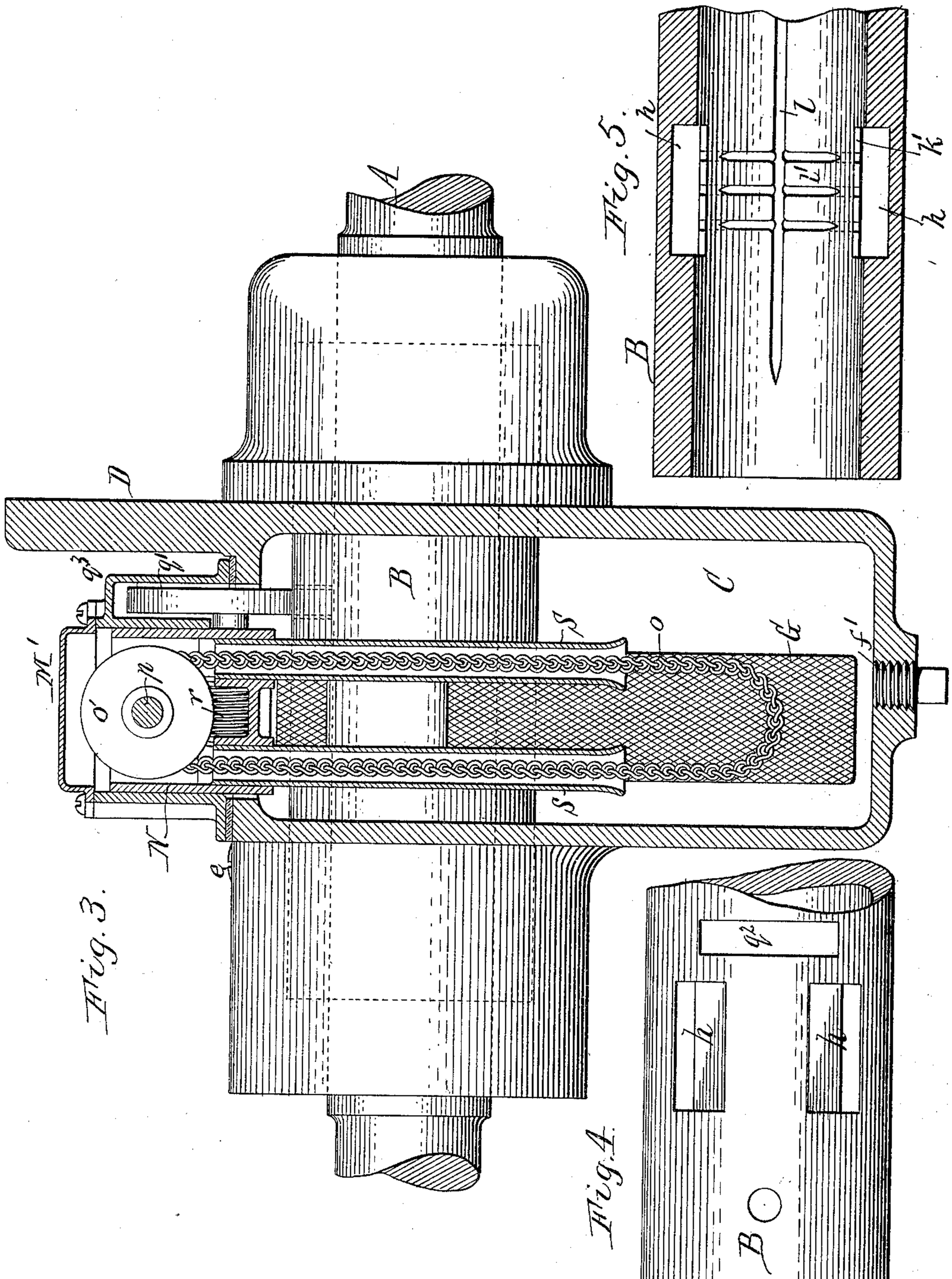

Fig. 3.

Fig. 5.

Fig. 4.

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UNITED STATES PATENT OFFICE.

WILLARD F. RICHARDS, OF BUFFALO, NEW YORK, ASSIGNOR TO CHARLES M. GOULD, OF NEW YORK, N. Y.

LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 706,201, dated August 5, 1902.

Application filed January 19, 1900. Serial No. 2,019. (No model.)

To all whom it may concern:

Be it known that I, WILLARD F. RICHARDS, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Lubricators, of which the following is a specification.

This invention relates to shaft-bearings which are lubricated by means of a wick immersed in an oil-reservoir arranged underneath the bearing.

The object of my invention is to improve the construction of the bearing and its lubricating device with a view of insuring a constant and uniform lubrication of the same, avoiding waste of oil, and facilitating the removal of the wick for cleaning and renewing the same.

In the accompanying drawings, consisting of two sheets, Figure 1 is a longitudinal sectional elevation of the bearing of a dynamo or electric machine embodying my invention. Fig. 2 is a transverse vertical section of the bearing, taken centrally through the same. Fig. 3 is a longitudinal section in line 3 3, Fig. 2. Fig. 4 is a fragmentary top plan view of the bearing-sleeve. Fig. 5 is a fragmentary horizontal section thereof.

Like letters of reference refer to like parts in the several figures.

A is a shaft—such, for instance, as the armature-shaft of a dynamo—and B is my improved bearing, in which the adjacent portion of the shaft is journaled. This bearing consists of a tube or sleeve which is seated in openings formed in the front and rear walls of an oil well or reservoir C. When the bearing is applied to a dynamo, this reservoir is secured to one of the heads of the dynamo-casing by bolts (not shown) which pass through said head and through a flange D, formed on the reservoir. The bearing-sleeve is held against turning by a set-screw *e* or any other suitable fastening. The oil-reservoir is provided at its sides with plugged filling-openings *f* and in its bottom with a plugged drain-opening *f'*. G G are wicks or capillary feeders which supply the oil to the shaft and bearing-sleeve B. These wicks are preferably flat, and each of the same consists of two depending branches which dip into the oil in the reservoir C and rest with their upper portions against opposite sides of the armature-shaft. The bearing-sleeve B is provided on opposite sides of the shaft with openings *h*, through which the branches of the wick pass and which intersect the bore of the sleeve, so as to allow the saturated wick to lie against the shaft, as shown in Fig. 2. The openings of the bearing-sleeve extend from top to bottom thereof, so that the wick branches can be passed downwardly through the openings into the reservoir. The exposed upper portion of the wick which connects its branches passes over the solid portion of the bearing-sleeve between its wick-openings, so that the wick is suspended from the sleeve. The wick preferably consists of a double thickness, as shown, to increase its absorbing-surface, and the portion of the wick on the upper surface of the bearing B may be thickened by an extra layer or piece of wicking *g*, if desired.

i represents a pair of rings or loops attached to the upper portions of the wick branches for withdrawing the same from the openings of the bearing-sleeve when it becomes necessary to clean or renew the wick. The reservoir C is provided in its top with an opening for introducing and renewing the wick, which opening is closed by a removable cap or cover *j*, as shown in Figs. 1 and 2.

Each of the openings *h* of the bearing-sleeve is provided in its lower inner wall with a longitudinal groove or recess *k*, which opens into the bore of the sleeve and forms a ledge or shelf *k'*, which is inclined inwardly, as shown in Fig. 2. This shelf is adapted to receive any surplus oil flowing down the wick from the top of the shaft. *l* is a longitudinal groove or channel formed in the bottom of the bearing-sleeve and extending nearly from end to end thereof, and *l'* represents transverse channels which lead from the foot of the inclined shelves *k'* to said longitudinal groove and through which such surplus oil flows to the lower portion of the bearing-sleeve, thereby supplying the surplus oil to the bottom of the shaft. By this construction the oil is fed directly to the shaft by the wicks, and the wicks intercept and hold in suspension any grit in the oil, preventing it from reaching the shaft and the bearing-sleeve. The por-

tions of the wicks lying against the shaft also act as wipers, which keep the shaft and bearing-sleeve free from grit.

In order to insure a constant supply of oil to the shaft-bearing under all conditions, I prefer to combine with the wicks G an auxiliary feed device which is constructed as follows: M is a rectangular casing which surmounts the cap *j* and which is preferably formed integral therewith. This casing is bottomless and opens into the top of the oil-reservoir C, and the upper end of the casing is closed by a removable cap M'. N is an auxiliary oil-reservoir arranged within the casing M and adapted to receive a supply of oil from the reservoir C. This auxiliary reservoir is provided in its bottom with a discharge-opening *m*, arranged directly over the bearing-sleeve B, so that the oil flows upon the portion of the wicks G extending over said sleeve. *o* is an endless feed chain or cord which hangs loosely from an upright pulley *o'*, journaled in the auxiliary reservoir N, and dips into the oil in the main reservoir C, so that the rotation of said pulley causes the endless feed-chain to roll around the same and elevate a portion of the oil in the main reservoir into the auxiliary reservoir. The pulley *o'* is secured to a hollow shaft o^2, which turns upon a transverse pin *p*, secured in openings formed in the side walls of the auxiliary oil-reservoir. *q* is a main actuating-shaft which is journaled lengthwise in the lower portion of the auxiliary oil-chamber and which is driven from the lubricated shaft A by a friction-wheel *q'*, secured to the actuating-shaft and running in contact with the lubricated shaft. The bearing-sleeve B is provided in its top with a transverse slot q^2, through which the lower portion of the friction-wheel *q'* extends. Motion is transmitted from the actuating-shaft *q* to the pulley-shaft o^2 by a worm *r*, formed in or secured to the main shaft and meshing with a worm-wheel *r'*, secured to the pulley-shaft, or by any other suitable mechanism. The upper portion of the friction-wheel *q'* is inclosed by a housing q^3, formed on the casing M. The auxiliary oil-reservoir N is vertically movable in the casing M and free to slide therein, so that the friction-wheel *q'* is at all times held in contact with the lubricated shaft by the weight of said reservoir and the various parts mounted on the same. S represents guide-tubes for the depending portions of the feed-chain *o*, which pass through the bottom of the auxiliary oil-reservoir and extend downwardly nearly to the lower extremity of said chain. When the shaft A is in motion, the actuating-pulley *o'* of the feed-chain *o* is turned through the medium of the friction-wheel *q'* and the worm-gearing *r r'*. As the chain rolls over this pulley a portion of the oil picked up by the ascending side of the chain is elevated into the auxiliary reservoir N, and upon reaching the upper side of the pulley *o'* the oil is thrown from the chain into said reservoir by centrifugal force. From this reservoir the oil flows through the discharge-opening *m* upon the wicks G. The motion of the actuating-pulley *o'* as compared to that of the shaft A is a relatively slow one; but the shaft A is driven at such a high speed that if the chain ran directly thereon the shaft-bearings would be flooded by the oil elevated by the chain, whereas by the employment of the speed-reducing gearing between the shaft and the pulley *o'* the latter operates the chain just fast enough to deliver a drop or two of oil at a time, as above explained, to the auxiliary reservoir, and this amount is sufficient for the desired purpose. By the employment of this auxiliary feed device the portions of the wicks in contact with the lubricated shaft are kept supplied with oil, even if the capillary action of the wicks should become impaired by the thickening of the oil or the clogging of the wicks.

When it is desired to cleanse the wicks or renew the same, the cover *j* is removed and the wicks are withdrawn from the openings of the bearing-sleeve B by means of the rings *i*, and after cleaning the wicks they can be conveniently replaced or new ones can be substituted therefor when they become unserviceable.

t is a horizontal pin or screw secured to the front wall of the vertically-movable oil-reservoir N and projecting into a vertical slot *t'*, formed in the adjacent wall of the casing M. This screw, while permitting the auxiliary reservoir to slide in the casing M, acts as a stop, which prevents said reservoir and the parts carried by it from falling out of the casing M when the cover *j* is removed from the main oil-reservoir for inserting or removing the wicks.

I claim as my invention—

1. The combination with an oil-reservoir, of a horizontal bearing-sleeve arranged in the upper portion of said reservoir and provided in its side wall with an aperture which intersects the bore of the sleeve, and a stationary wick supported on said sleeve and immersed in the oil in said reservoir and having its upper portion arranged in said aperture so as to lie against the shaft journaled in said bearing-sleeve, substantially as set forth.

2. The combination with a journal, and an oil-reservoir, of a horizontal bearing-sleeve arranged in the upper portion of said reservoir and provided with an upper side over the journal and provided in its side walls with openings which open into the bore of the sleeve, and a wick supported upon the upper side of said sleeve and having depending branches which pass downwardly through said openings and are immersed in the oil in said reservoir, substantially as set forth.

3. The combination with an oil-reservoir, of a bearing-sleeve provided on opposite sides thereof with openings which intersect its bore, and a wick having depending branches which pass through said openings and are immersed

in the oil of said reservoir, and which are provided at their exposed, upper ends with rings or handles for withdrawing the wick from the openings of the sleeve, substantially as set forth.

4. The combination with an oil-reservoir, of a bearing-sleeve provided in its side wall with a wick-opening which intersects its bore, and a transverse channel which leads from the inner lower edge of said opening to the bottom of the sleeve-bore, and a wick supported by said sleeve and arranged in said opening and immersed in the oil in said reservoir, substantially as set forth.

5. The combination with an oil-reservoir, of a bearing-sleeve provided in its side with an opening which intersects its bore, a shelf or ledge arranged at the lower, inner wall of said opening, a longitudinal channel arranged in the bottom of the sleeve-bore, and a transverse channel or channels leading from said ledge to said longitudinal channel, and a wick arranged in said opening and immersed in the oil in said reservoir, substantially as set forth.

6. A bearing-sleeve provided in its side with a wick-opening which intersects its bore, and having a recess in its lower, inner wall which forms a ledge or shelf adapted to receive any surplus oil flowing down the wick, a longitudinal channel arranged in the bottom of the sleeve-bore and a transverse channel or channels leading from said ledge to said longitudinal channel, substantially as set forth.

7. The combination with a shaft to be lubricated, of a main oil-reservoir arranged below said shaft, an auxiliary reservoir arranged above said shaft and provided with a discharge-opening, a pulley arranged in said auxiliary reservoir, a depending flexible feed member running loosely over said pulley and dipping into the oil in said main reservoir, and means for turning said pulley, substantially as set forth.

8. The combination with a shaft to be lubricated, of a main oil-reservoir arranged below said shaft, an auxiliary reservoir arranged above said shaft and provided with a discharge-opening, a pulley arranged in said auxiliary reservoir, a depending flexible feed member running loosely over said pulley and dipping into the oil in said main reservoir, and intermediate gearing whereby said pulley is rotated from said shaft, substantially as set forth.

9. The combination with a shaft to be lubricated, of a main oil-reservoir arranged below said shaft, an auxiliary reservoir arranged above said shaft and provided with a discharge-opening, a pulley arranged in said auxiliary reservoir, a depending flexible feed member running loosely over said pulley and dipping into the oil in said main reservoir, a worm-wheel mounted on the shaft of said pulley, and an actuating-shaft having a friction-wheel which runs in contact with the lubricated shaft and a worm which meshes with said worm-wheel, substantially as set forth.

10. The combination with a shaft to be lubricated and a main reservoir arranged below the same, of a bottomless casing arranged above said shaft, a vertically-movable auxiliary oil-reservoir capable of sliding freely in said casing and provided in its bottom with a discharge-opening, a pulley mounted on a horizontal shaft journaled in said auxiliary reservoir, an endless flexible feed member depending from said pulley and dipping into said main reservoir, and an actuating-shaft journaled in said auxiliary reservoir and having a friction-wheel which runs in contact with the shaft to be lubricated, and a worm which meshes with a worm-wheel mounted on the shaft of said pulley, substantially as set forth.

11. The combination with a shaft to be lubricated, of a main oil-reservoir arranged underneath the shaft, an auxiliary oil-reservoir arranged above the shaft and provided in its bottom with a discharge-opening, a wick depending from the shaft into said lower reservoir and exposed at the upper side of the shaft, a pulley journaled in the auxiliary reservoir, an endless flexible feed member suspended from said pulley and dipping into the oil in the lower reservoir, and intermediate gearing whereby said pulley is turned from the lubricated shaft, substantially as set forth.

12. The combination with a shaft, of a main oil-reservoir arranged below the shaft, an auxiliary reservoir arranged above the main reservoir and provided with a discharge-opening, a pulley arranged in said auxiliary reservoir, a flexible feed member running over said pulley and dipping into the oil in said main reservoir, means for driving said pulley, and a wick located between said discharge-opening and the shaft for catching any grit or sediment in the oil, substantially as set forth.

Witness my hand this 23d day of December, 1899.

WILLARD F. RICHARDS.

Witnesses:

JNO. J. BONNER,

THEO. L. POPP.