

(No Model.)

H. C. SPAULDING.

TIME RECORDING DEVICE FOR DYNAMO ELECTRIC MACHINES.

No. 414,339.

Patented Nov. 5, 1889.

Fig. 1.

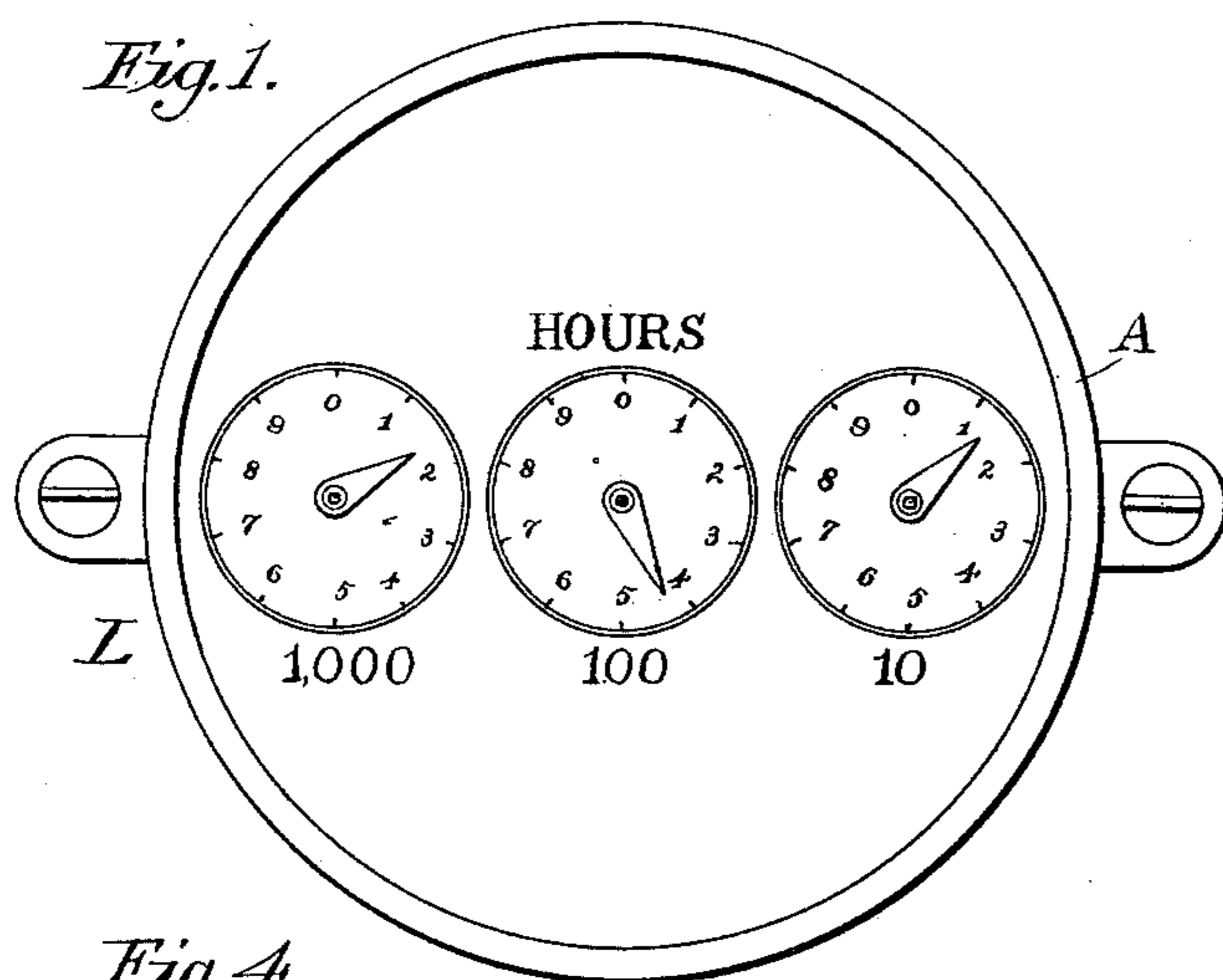


Fig. 1A.

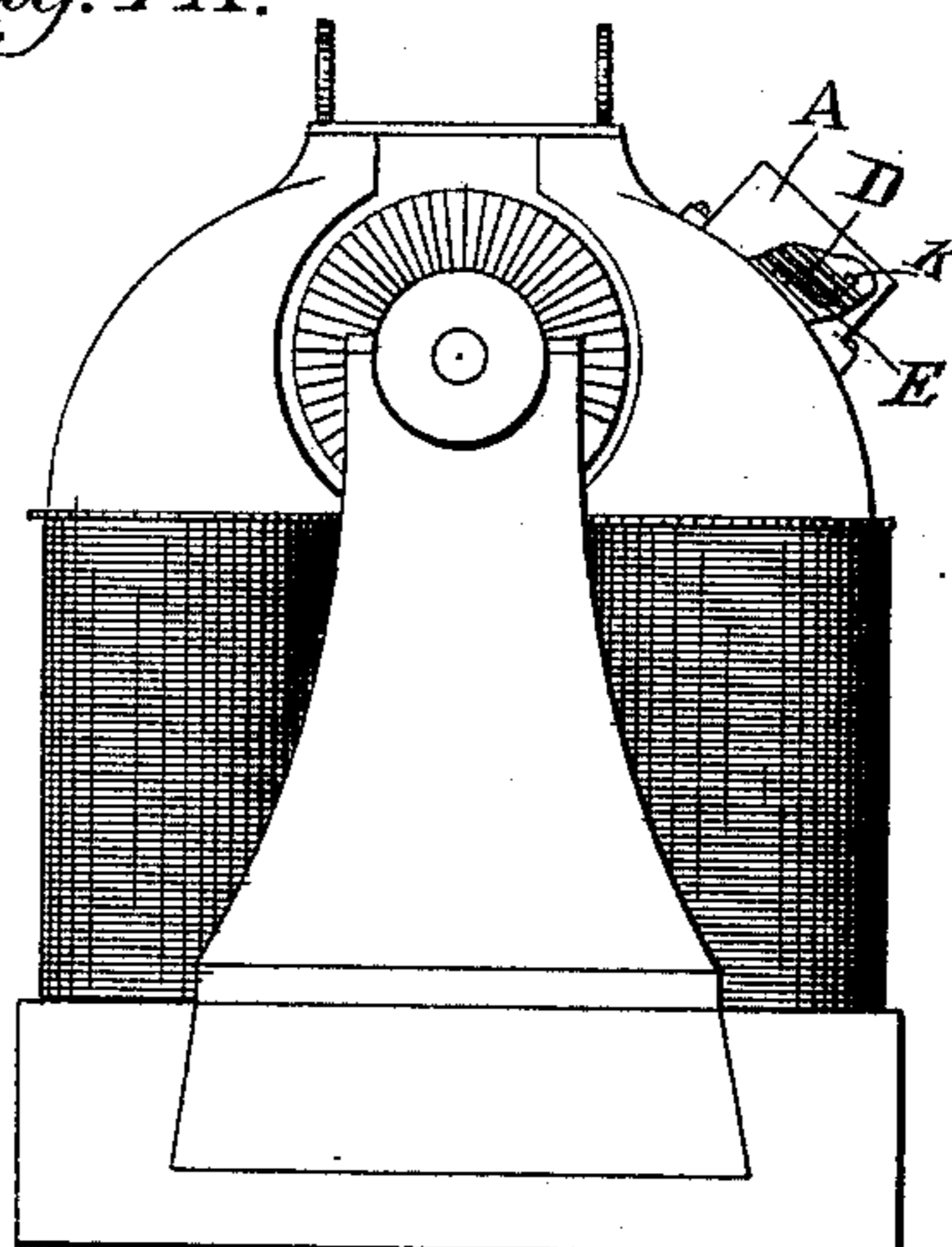


Fig. 4.

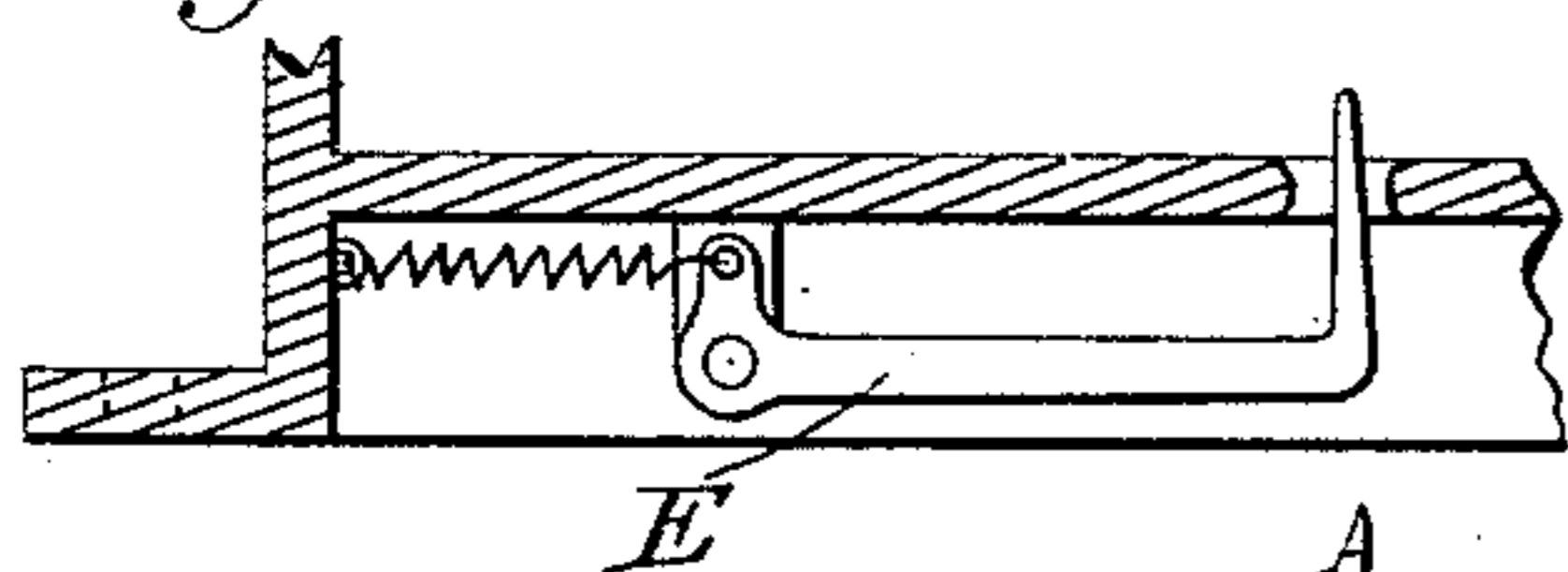


Fig. 5.

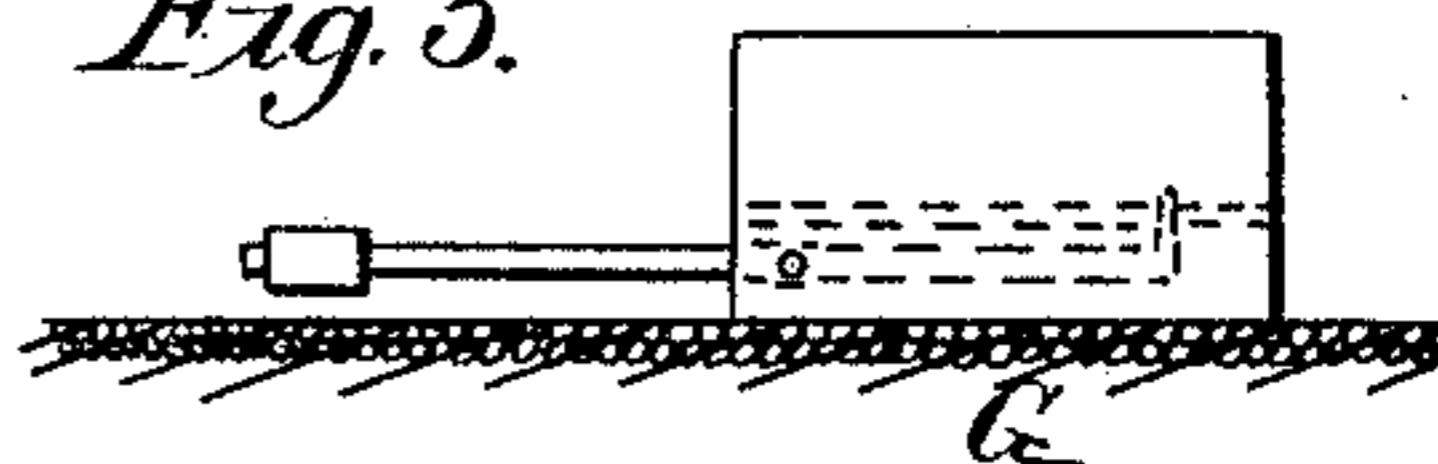


Fig. 2.

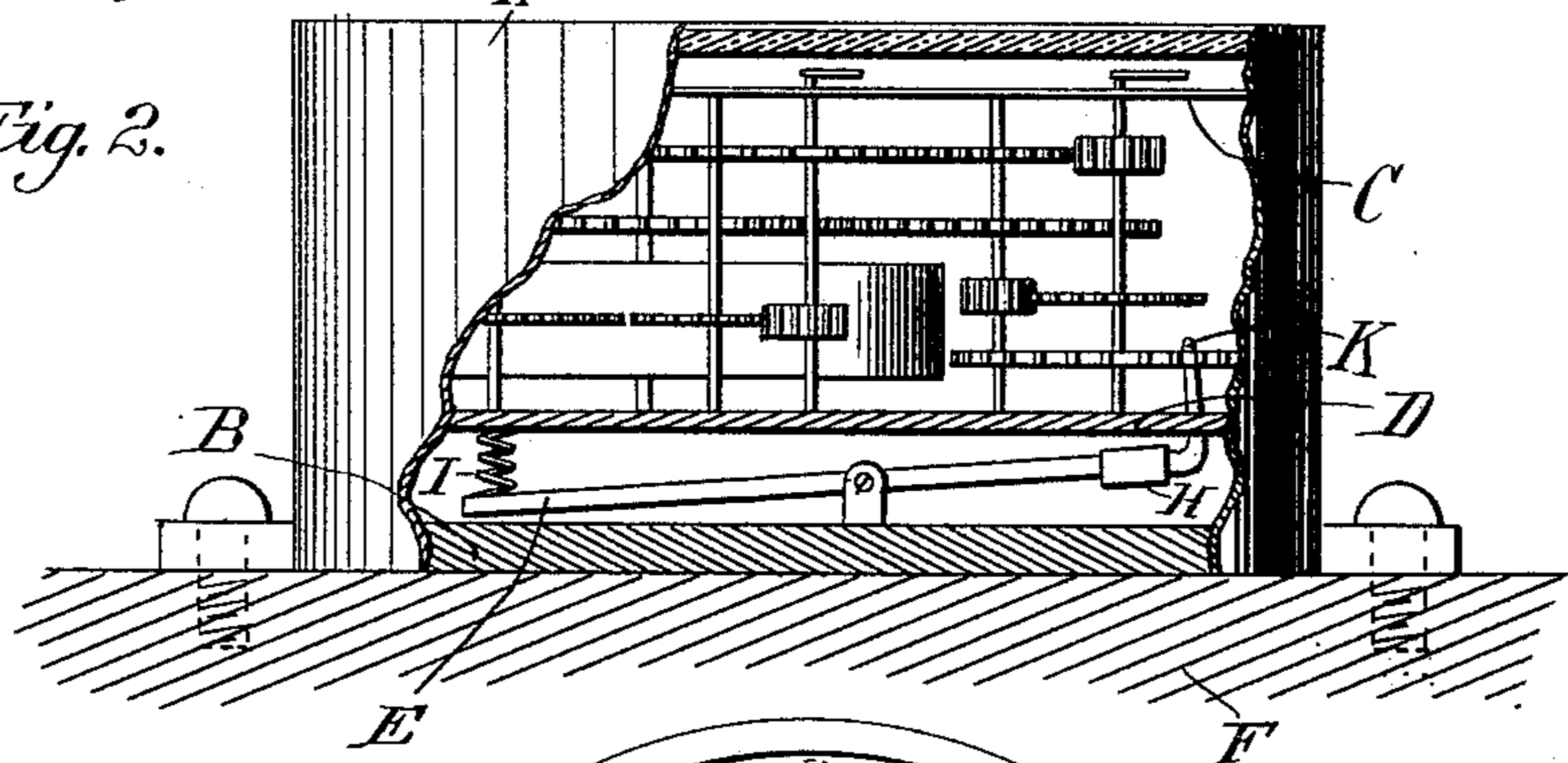
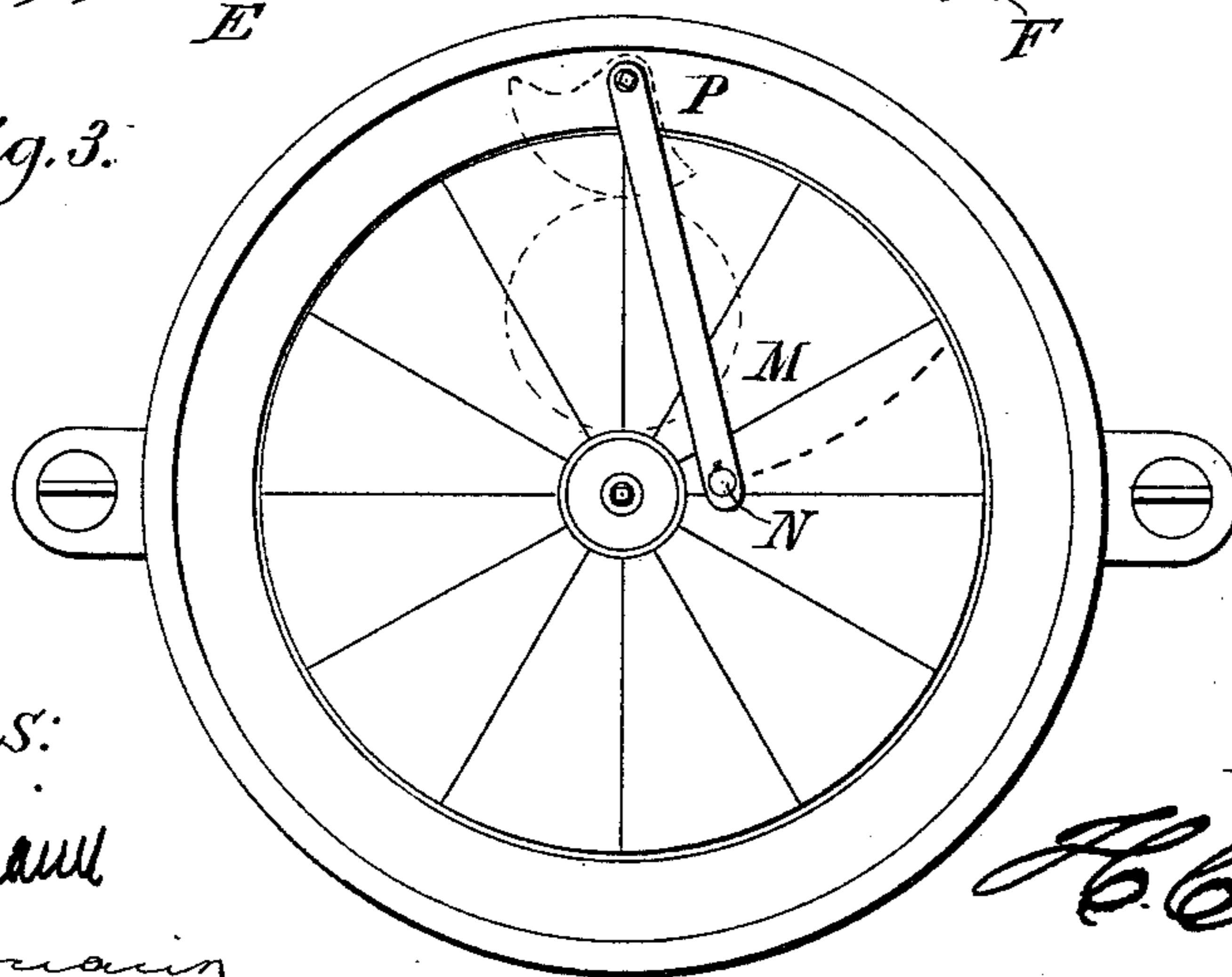


Fig. 3.



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TIME-RECORDING DEVICE FOR DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 414,339, dated November 5, 1889.

Application filed April 8, 1889. Serial No. 306,483. (No model.)

To all whom it may concern:

Be it known that I, HOLLON C. SPAULDING, a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Time Indicating or Recording Device for Dynamo-Electric or Electro-Dynamic Machines, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.
My invention is an improvement in apparatus for automatically indicating or recording the aggregate time during which a dynamo-electric or electro-dynamic machine is used, and is applicable alike to any machine using electro-magnets that change their state of magnetization when the machine is operated either by an increase or a decrease of its intensity.

The object of my invention is to construct a simple, effective, reliable, and inexpensive time indicator or recorder which may be applied directly by screws, bolts, or other simple mechanical means or by its own gravity to any machine having electro-magnets that are magnetized when the machine is in use, and practically demagnetized when the machine is not in use, or vice versa, as in the case of machines used on closed circuits, like telegraph-lines.

My object is further to accomplish this without in any way interrupting or disturbing any of the electrical circuits and to effect improvements in minor details.

I attain these objects by the device illustrated in the accompanying drawings, wherein—

Figure 1 is a front elevation of one form of my device, showing the dial and indicator-hands. Fig. 1^a shows the relation of the apparatus to a dynamo-electric machine as properly applied and in operation. Fig. 2 is a plan of the same, partly in section and part broken away. Fig. 3 shows a modification wherein a record is kept of the time. Figs. 4 and 5 show modified forms of some parts in detail and hereinafter more fully referred to.

In these figures, A is the inclosing-case of any suitable material, but preferably non-magnetic, having lugs L for attachment to the machine. This attachment may, how-

ever, be performed in any other suitable way, as above referred to.

In Fig. 2, F represents the field-magnet of a magneto-electric device.

In case of certain forms of machine it may be preferable to attach the indicator to the wire wrapping, as shown in Fig. 5 at G. The case A is fastened in a position where the magnetic variation between the minimum and the lowest practical intensity is sufficient to insure the operation of parts, though it should in no way be allowed to effect the magnetic distribution. The front of the case A may be closed with a glass plate, as in Fig. 2, and behind this is placed the plate C, which serves the double purpose of dial and of bearings for one end of the various arbors or the clock-work. The other ends of the said arbors bear in the back plate D, placed at a distance suitable for the purpose and to admit of the necessary works. Behind this plate lies the detent-lever E, provided with the detent proper K, projecting through a hole in the plate D, and provided, if non-magnetic, with a suitable armature-piece H. If, however, it be desired, the lever E may itself be of magnetic material and serve the function of the armature, as shown in Fig. 4. This lever is pivoted to suitable lugs on the plate D, which is preferably non-magnetic; or an additional plate, preferably of soft iron, may be placed at the back of the case A and serve the double purpose of bearing-lugs for the pivot of aforesaid lever and of closing the case A at the back against the entrance of dust and other foreign matter. This is shown in Fig. 2. It may also be found preferable to supply this back plate, even though the pivot for lever E be attached to the plate D.

Suitable retracting devices are provided to act against the magnetic attraction, as shown at I; but the details of these are immaterial, as any of the well-known forms may be applied.

In Figs. 2 and 4 the magnetic attraction tends to withdraw the detent, while in Fig. 5 it tends to make it act. The action of the retracting device is of course opposed in both cases to the magnet. Fig. 5 also shows the armature H attached to the lever E at some distance outside the box A, the said lever E

extending through a suitable hole or slot in the case. This arrangement permits the box to be placed at some distance from the magnetic field, and may be found advantageous both for the action of the clock-work and for the machine itself, as by preventing irregularity in action due to retarding Foucault currents and by preventing disturbance of the magnetic distribution.

The details of the clock-work, being immaterial and not a part of my invention, may be left to the choice of any one skilled in the art, it being of course understood that the works must be self-starting.

When a permanent record is desired, the form of the dial and indicator is modified, as shown in Fig. 3, wherein the hands of the indicator are replaced by a disk of paper, which is carried in any suitable manner by the central arbor. The clock-work is somewhat modified, as only two movements are required—one the slow rotation of the paper disk and the other a still slower movement of a marking-point to or from the center of the paper disk. The latter result is accomplished by suitable reducing-gearing giving the desired rotation to the arbor P. To this arbor there is attached the pencil-lever M, bearing the pencil N. The spur-gearing on the arbor P may with advantage be but a sector of a complete gear, and in this case, when the pencil-point has traveled to the extreme edge of the paper disk, the sector will be thrown out, and then, a new paper disk having been substituted for the one already used, the arm M may be rotated by hand until it reaches its other limit, at which point the opposite end of the sector will once more gear with the train and a new record be begun. This result may be obtained by the more simple but less certain method of having the arm M movable on its pivot. It may then be adjusted at pleasure.

The *modus operandi* of my device differs, as heretofore shown, from the usual stop-motion meter or indicator merely in being in direct combination with the field-magnets of the machine indicated, instead of having its own supplemental electro-magnet. It is therefore unnecessary to explain more at length the operation than as heretofore set forth in this specification.

The various well-known substitute parts may be introduced without in any way affecting this invention, and will readily suggest themselves whenever desirable to any electrical engineer—as, for example, the paper drum-card for the disk-card shown in Fig. 3. These, however, being not invention, but mere substitution, it is thought useless to detail them.

Having now fully described my invention and how the same may be made and used, I claim and desire to secure by Letters Patent—

1. The combination, with a dynamo-electric or electro-dynamic machine, of a time-indicating device and a detent therefor controlled by the field of force of said machine, as and for the purposes set forth.

2. The combination, with the field-magnets of a dynamo-electric or electro-dynamic machine, of a time-recording device, a detent therefor controlled by the attraction of the said field-magnets, and a retracting device acting in opposition to the said attraction, as and for the purposes set forth.

3. The combination, with a machine having electro-magnets that change their state of magnetization when the machinery is started or stopped, of a time indicating or recording mechanism, a detent therefor, and an iron armature attached to or forming part of the said detent and controlled by the attraction of said electro-magnets, all substantially as described, and for the purposes set forth.

4. In combination with a machine having electro-magnets that are energized when the machine is in use and practically de-energized when the machine is at rest, a time indicating or recording mechanism, a detent therefor provided with a magnetic armature and attracted from interference with the said mechanism by the said electro-magnets, and a retracting device acting against the said electro-magnets, all substantially as described, and for the purposes set forth.

5. A time-indicator for the purposes set forth, consisting of a non-magnetic case having lugs for attachment, indicating mechanism within the said case, a non-magnetic back plate, lugs forming bearings, a detent-lever pivoted to said bearings, and a magnetic supplemental back plate, substantially as described.

6. A time indicating and recording device for ascertaining the aggregate time during which an electro-dynamic or dynamo-electric machine has been in use, consisting of a case A, clock-work contained therein, a non-magnetic back plate D, the detent K, detent-lever E, bearings therefor, the retracting device I, and the soft-iron supplemental back plate B, all substantially as hereinbefore set forth.

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Witnesses:

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