P. I. CHANDEYSSON.

ELECTRIC SIGNAL.

APPLICATION FILED JAN. 25, 1908.

922,391.

Patented May 18, 1909.

2 SHEETS—SHEET 1.

Fig. 2

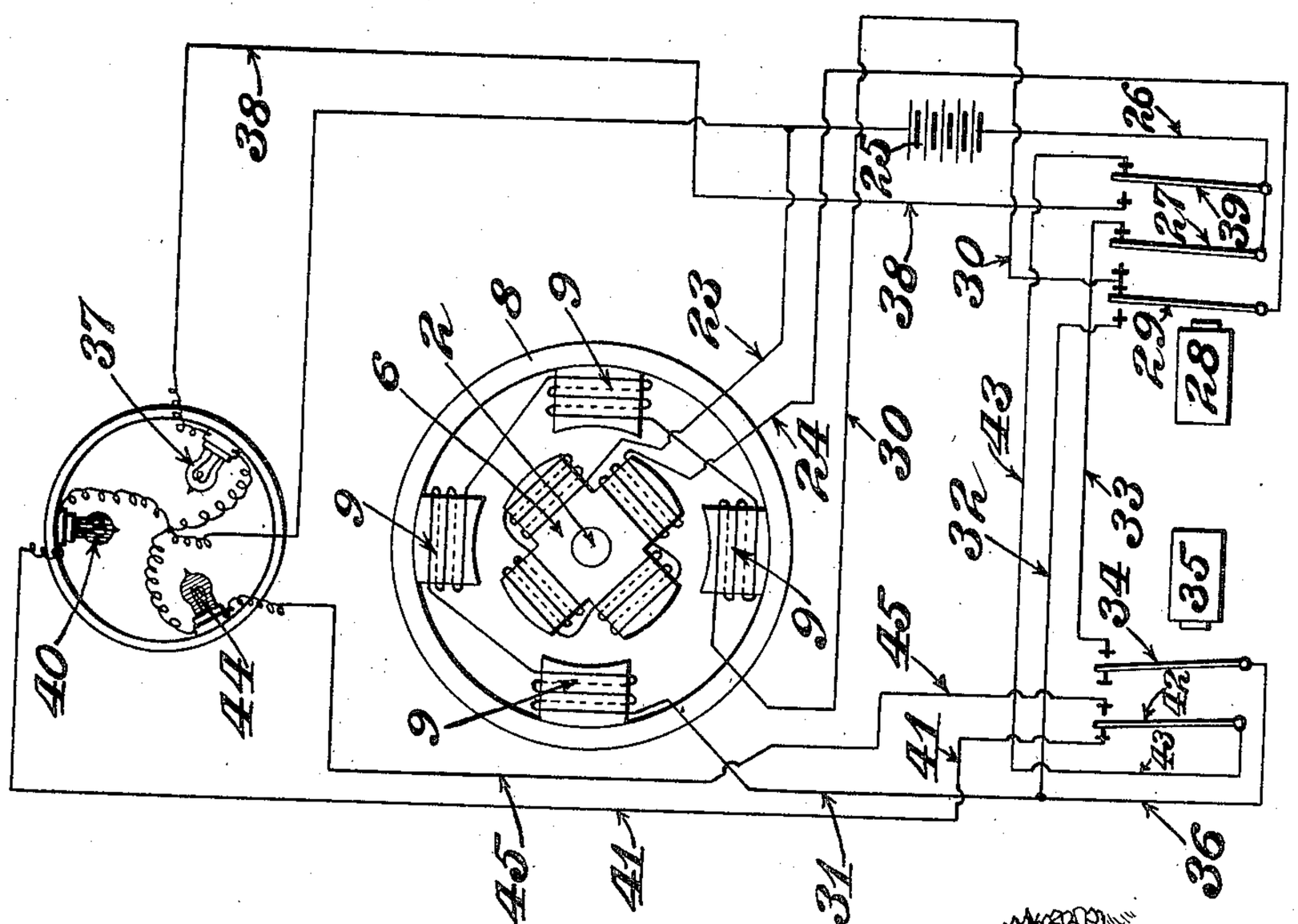
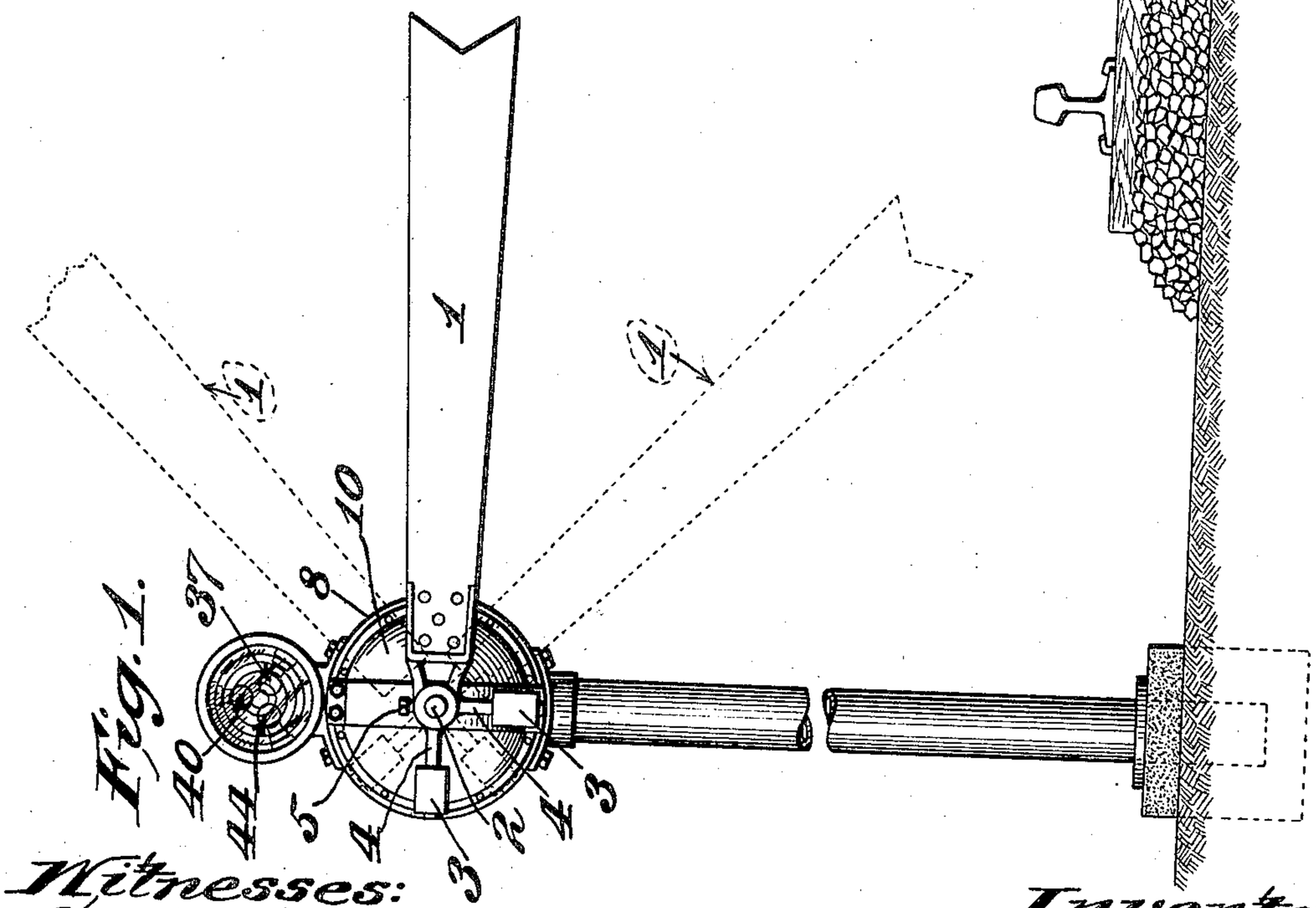


Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 3.

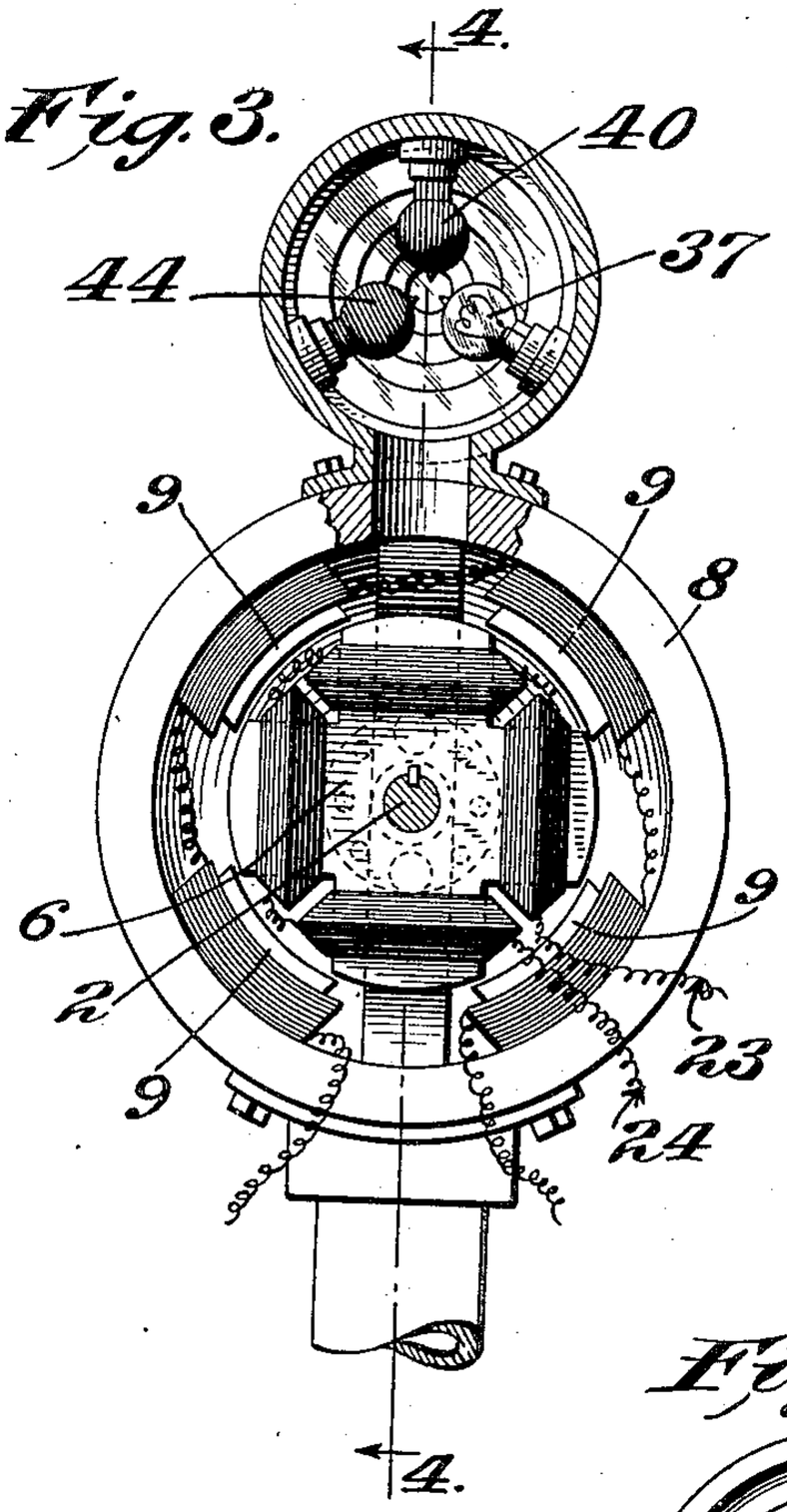


Fig. 4.

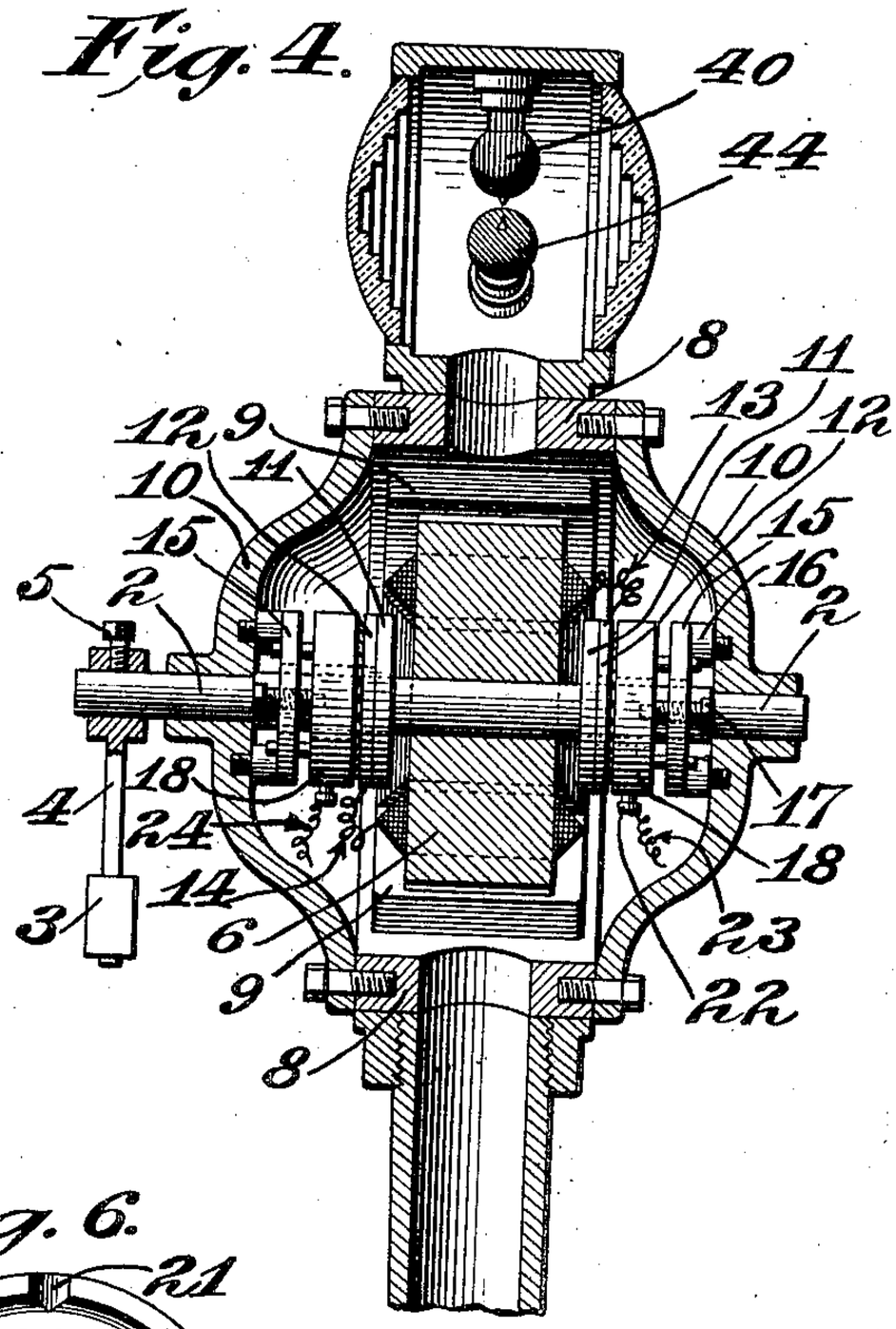


Fig. 6.

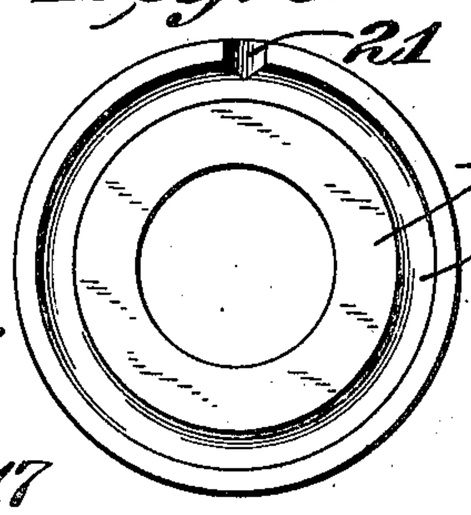


Fig. 5.

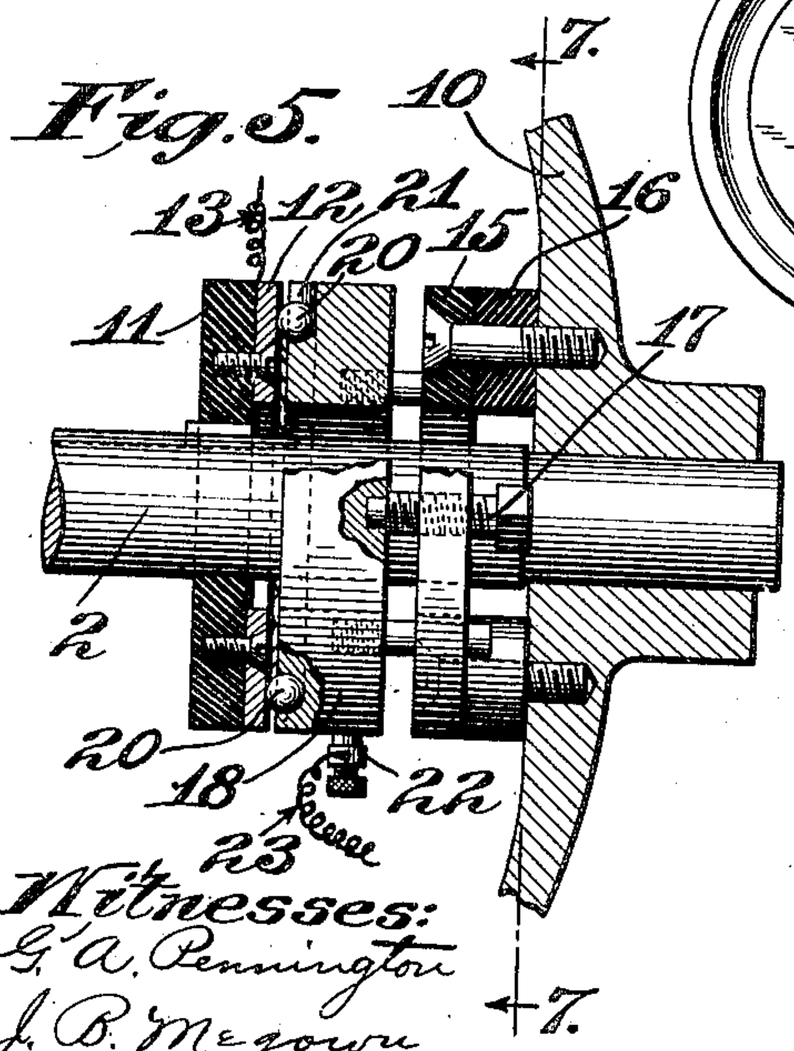
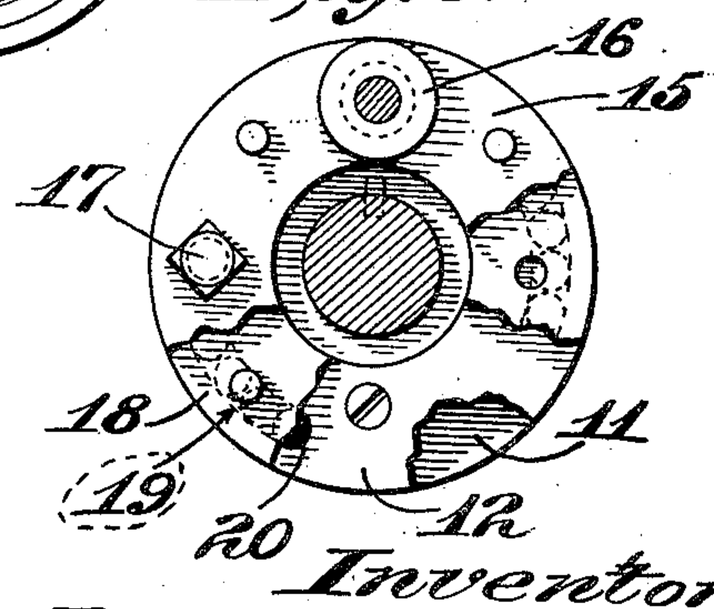


Fig. 7.



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UNITED STATES PATENT OFFICE.

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ELECTRIC SIGNAL.

No. 922,391. Specification of Letters Patent. Patented May 18, 1909.

Application filed January 25, 1908. Serial No. 412,589.

To all whom it may concern:

Be it known that I, PIERRE I. CHANDEYSSON, a citizen of the United States, and a resident of the city of St. Louis and State of Missouri, have invented a new and useful Improvement in Electric Signals, of which the following is a specification.

My invention relates to electrically actuated signals and has for its principal objects to simplify the construction and arrangements of the circuits and mechanical elements, to insure certainty of the proper indication, and to secure other advantages hereinafter appearing.

My invention consists in the arrangements and combination of parts hereinafter described and claimed.

In the accompanying drawing, which forms part of this specification, and wherein like symbols refer to like parts wherever they occur, Figure 1 is an elevation of a semaphore and signal embodying my invention; Fig. 2 is a diagrammatic view of an electrical system conforming to my invention; Fig. 3 is a vertical view of the semaphore operating mechanism with one of the cover plates of the casing removed and with the signal shown in section; Fig. 4 is a vertical section of the signal and the semaphore operating mechanism on the line 4—4 of Fig. 3; Fig. 5 is an enlarged detail view of the electrical connection of the armature circuit; Fig. 6 is a side view of the grooved plate constituting a portion of the electrical contact; and, Fig. 7 is a vertical section on the plane 7—7 of Fig. 5, portions of the several disks being broken away.

The semaphore blade 1 is mounted upon a shaft or axle 2 and is adapted to rest in three indicating positions, namely, a horizontal position, a high-angle position and a low-angle position. Preferably, the horizontal position indicates danger. The semaphore blade is normally maintained in the horizontal position by counterweights 3 mounted on short arms 4 secured to the shaft or axle thereof. One of said arms is secured by means of a set screw 5, whereby the angular position of said arm and its counterweight may be varied at pleasure. Preferably, one of the counterweights is permanently arranged diametrically opposite the semaphore blade, and the adjustably mounted counterweight is arranged at approximately right angles to said blade. The fixed counterweight approximately counterbalances the semaphore blade in its horizontal position, and the adjustable counterweight normally holds the semaphore blade in such position. By this arrangement, the force required to shift and hold the semaphore blade in its high angle position and in its low angle position, respectively, is less than would be required if there were only one counterweight.

The shaft of the semaphore has an electrical armature 6 fixed thereto. This armature has four poles similarly wound in series with a battery 25 in a normally open circuit. Surrounding the armature is a cylindrical shell 8 which constitutes the base or support for four electro-magnets 9 arranged to constitute a field to coöperate with the armature. The field magnets have similar windings arranged in series with each other in a normally open circuit. In the normal horizontal position of the semaphore blade, the respective armature poles are midway between the poles of the field magnets.

Each end of the shell is provided with a cap plate 10 adapted to be bolted or otherwise secured thereto and having a central opening constituting a journal or bearing for the semaphore shaft. Fixed to the shaft near each end thereof is a disk 11 of insulating material upon which is mounted a metal ring or contact plate 12 to which the windings of the armature are electrically connected by wires 13, 14. Fixed upon each of the cap plates of the casing is a ring 15 of insulating material, said rings being secured by means of screws which pass through insulating washers 16. Extending transversely through each of the rings is a series of adjusting screws 17 whose ends bear in sockets provided therefor in a metal ring 18 which is mounted thereon. This metal ring surrounds but is spaced from the armature shaft and has an annular groove 19 in its inner face. This groove constitutes a raceway for a series of antifriction balls 20, which bear against the contact plate 12 fixed to the insulating plate that is mounted to turn with the armature shaft. A groove 21 extending upwardly from the annular groove to the periphery of the metal ring at the uppermost portion thereof furnishes a convenient means of inserting the balls into the raceway. The pressure on the balls is regulated by properly adjusting the adjusting screws 17. The metal rings 18 are provided with binding posts 22

to which are connected the wires or terminals 23, 24 of the armature circuits.

One end of the semaphore armature coil is connected by the wire 23 to battery 25 which battery is connected by the wire 26 to one armature 27 of an electro-magnet 28. The other end of the semaphore armature coil is connected by the wire 24 to a second armature 29 of said electromagnet 28. The back stop of said second armature is connected by the wire 30 to one end of the semaphore field windings, and the other end of said semaphore field windings is connected by the wire 31 and the wire 32 to the forestop of said second armature 29. The forestop of the first mentioned armature 27 and the back stop of the second armature 29 are electrically connected and both communicate with the wire 30 which is connected to the field winding as above mentioned. When the electro-magnet 28 is energized, a circuit is completed through both the semaphore armature and the field magnet as follows: Starting from the battery 25, the circuit follows the wire 23, the semaphore armature, the wire 24, the armature 29 and its forestop to the wire 32, the wire 31, the semaphore field windings, the wire 30 to the forestop of the armature 27 and thence through said armature 27 and the wire 26 back to the battery 25. When the electro magnet 28 is energized, therefore, the circuit is completed through both the field and the armature of the semaphore operating mechanism, with the result that the poles of the armature are brought opposite the poles of the field magnet, the direction of rotation of the armature shaft depending upon the direction of the current. In order to provide for reversing the polarity of the current through the semaphore field, the backstop of the armature 27 is connected by a wire 33 to the fore stop of the armature 34 of a second electro-magnet 35, and this last mentioned armature is connected by the wire 36 to the wire 31, which is permanently connected to one end of the windings of the field magnet. The other end of the windings of such field magnet is connected as above stated to the backstop of the armature 29 of the first mentioned electro-magnet 28. By this arrangement, when the second electro-magnet 35 is energized and the first remains deënergized, a circuit is completed as follows: beginning at the battery 25, thence by the wire 23 to and through the semaphore armature and the wire 24 to the armature 29 of the electro-magnet 28; thence through the back of said armature 29 and the wire 30 to and through the field windings of the semaphore, and thence by wires 31 and 36 to the armature 34 of the electro-magnet 35 and thence through the forestop of said armature 34 and the wire 33 to the backstop of the armature 27 and thence through the armature 27 and the wire 26 back to the battery 25. This circuit is completed through both the armature and the field magnets of the semaphore, as in the case of the circuit completed by the energizing of the first magnet. In the present case, however, the current through the field magnets is in a direction the reverse of the current of the first mentioned circuit, and consequently, the armature and its shaft are moved in a reverse direction.

It is considered unnecessary for present purposes to describe the method of bringing the two circuit controlling electro-magnets into operation. Preferably, these electro-magnets are elements of a block signal system of the kind more fully described in application No. 293,145 for Letters Patent therefor, filed by me on December 23, 1905. According to such system, the normal position of the semaphore is the "danger" position, the local circuit of the semaphore actuating mechanism being open. When the engine arrives at a predetermined section of the track, it causes one of the controlling magnets to be energized thereby completing the circuit of the semaphore operating mechanism through the armature of said magnet, with the result that the armature is shifted to its "cautionary" position. When the train reaches the next block, the other controlling magnet comes into operation to reverse the current through the field magnet, with the result that the semaphore is shifted back past "danger" position to the "clear" position.

In addition to the semaphore, my device is equipped with three colored lights which correspond respectively to the three positions of the semaphore. For this purpose, a lantern is mounted on the top of the casing of the semaphore motor. This lantern preferably comprises a horizontally mounted cylinder whose ends are closed with ordinary signal lenses and inside of said cylinder are the three incandescent electric lamps colored, respectively, red, white and green. The filaments of all of these lamps are electrically connected to the wire 23 which is connected to the battery 25. The white lamp 37 is electrically connected through the wire 38 to the forestop of an armature 39 of the electric magnet 28, said armature 39 being electrically connected to the wire 26 which in turn is connected to the battery 25. The red lamp 40 is connected by the wire 41 to the backstop of an armature 42 of the electro-magnet 35 and said armature 42 is connected by the wire 43 to the backstop of said armature 39 of the electro-magnet 28, which armature 39, as above stated, is connected by the wire 26 to the battery 25. The green lamp 44 is connected by the wire 45 to the forestop of said armature 42 of the electro-magnet 35 which armature in turn is indirectly connected to the battery 25 as just described. By

this arrangement, the circuit is completed through one or another of the three lamps but through only one at a time.

Obviously, the location of the battery in the circuit and the location of the circuit changer are of minor importance, as it amounts to the same thing whether the current is reversed through the semaphore armature or the field magnet. I do not wish, therefore, to restrict myself to the details of construction or of the arrangements of parts above described.

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

1. An electric motor comprising a four-pole armature and a four-pole field, and a semaphore blade on the shaft of said armature, said shaft being counterweighted to normally hold said semaphore in horizontal position with armature poles midway between the field poles.

2. An electric signal apparatus comprising an electric motor having a four-pole armature and a four-pole field, and means tending to hold said armature poles midway between the field poles, and a normally open electric circuit containing the windings of said armature and said field, and means for changing the relative polarity of the two sets of poles and three differently colored electric lights, one of said lights being in a normally closed circuit and the other two being in multiple arcs of a normally open circuit adapted to be closed by said pole-changing means.

3. An electric signal apparatus comprising an electric motor having a multipolar armature and a multipolar field and means tending to hold said armature poles midway between the field poles and a semaphore on the armature shaft, and a normally open electric circuit containing the windings of said armature and said field and means for changing the relative polarity of the two sets of poles and three differently colored lamps corresponding respectively to the normal and the two actuated positions of the armature shaft.

4. An electric signal apparatus comprising an electric motor having a four-pole armature and a four-pole field, a counterweighted semaphore on said armature tending to hold said armature poles in a horizontal position midway between the field poles and a normally open circuit containing in series the windings of said armature and of said field, and means for changing the polarity of one of said poles with respect to the other.

5. An electric signal motor comprising a multipolar armature and a multipolar field, a semaphore blade on the shaft of said armature, counterweighted to normally rest in horizontal position and hold said armature poles midway between the field poles.

6. An inclosed electric signal motor comprising a protective shell, a horizontal armature shaft journaled in the ends of said shell, a multipolar armature on said shaft and a multipolar field inside of said shell and surrounding said armature and a semaphore on said armature counterweighted to normally rest in horizontal position.

7. An electric signal motor comprising an armature, an armature shaft, an insulated contact disk on said shaft connected to the armature winding, and an insulated contact disk on the framework connected to the circuit wire, the adjacent surfaces of said disks having annular grooves therein constituting a raceway and antifriction balls in said raceway.

Signed at St. Louis, Mo., December 27, 1907.

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