(No Model.)

J. B. STEWART.

RAILWAY SIGNAL.

No. 543,322. Patented July 23, 1895.

Fig. 1.

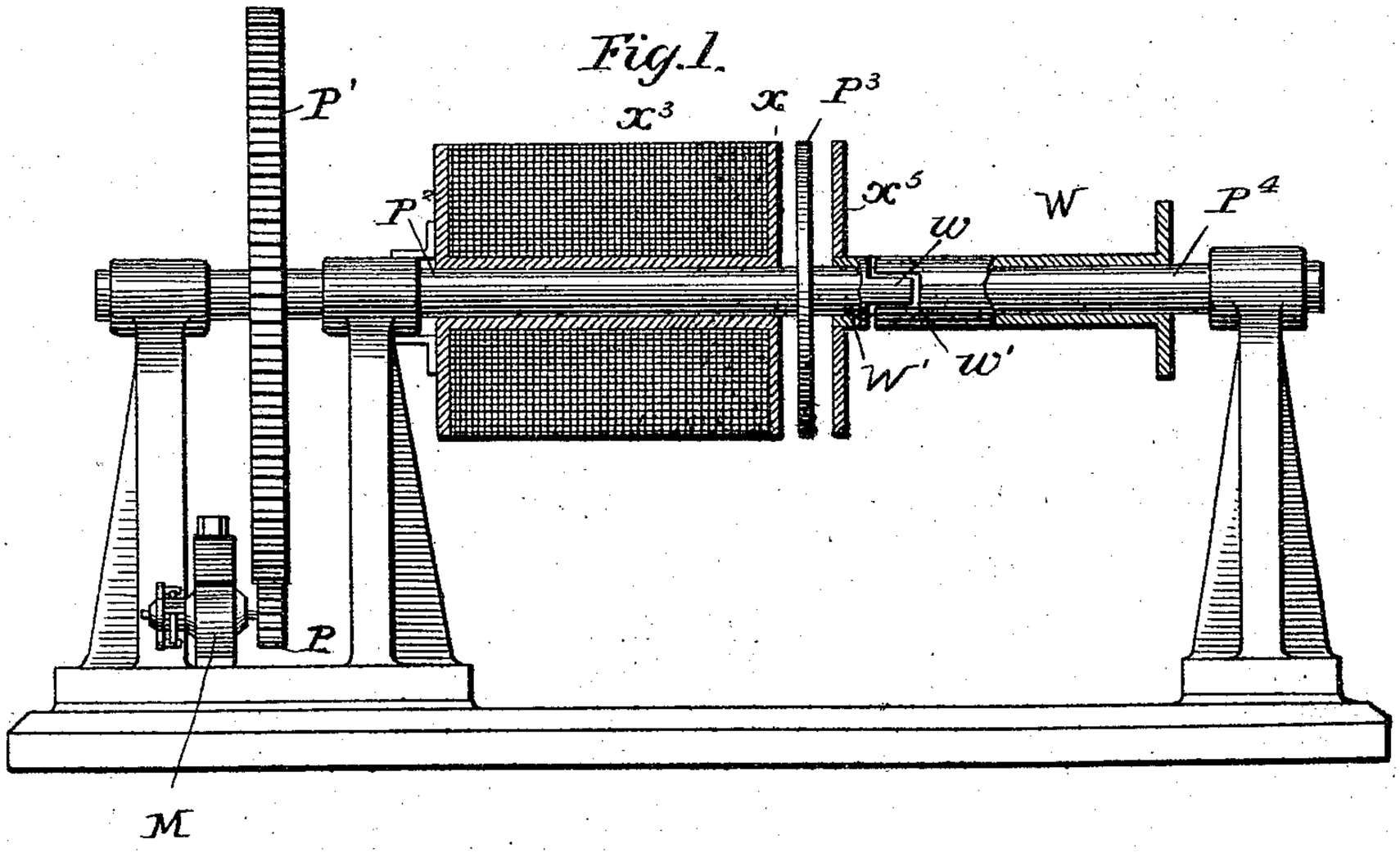


Fig. 2.

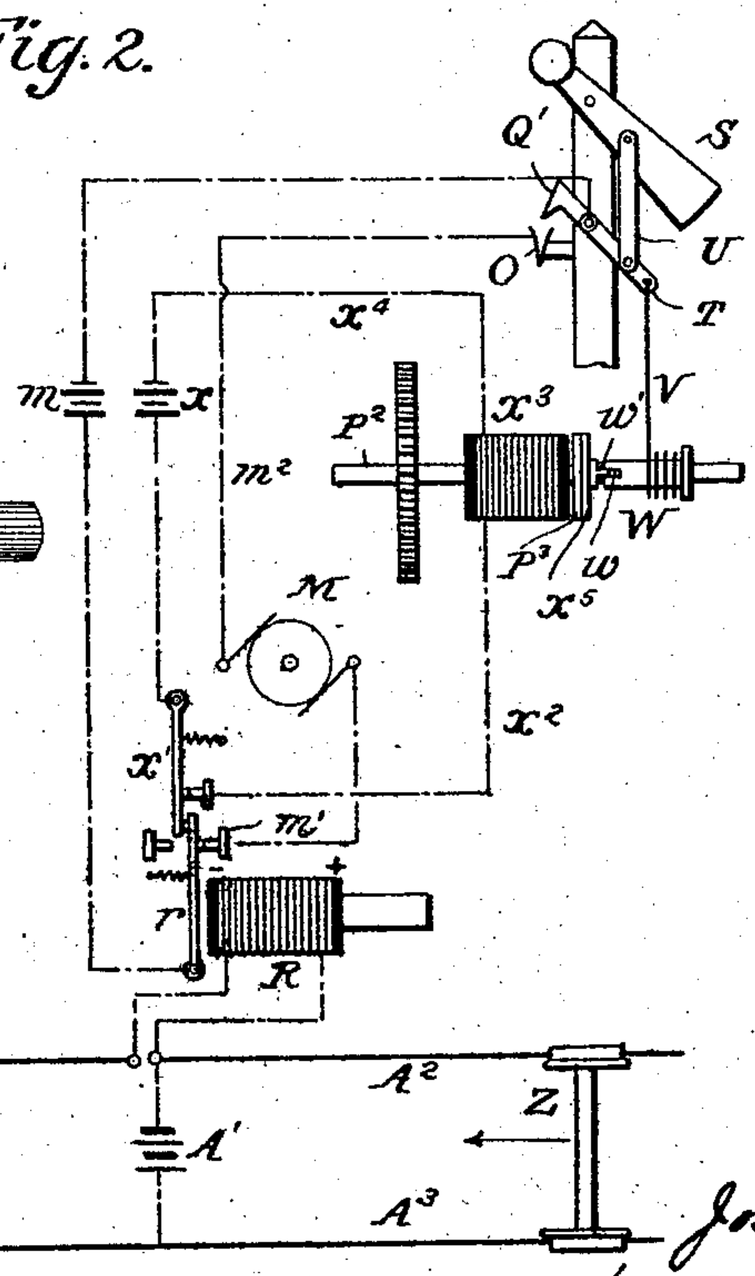
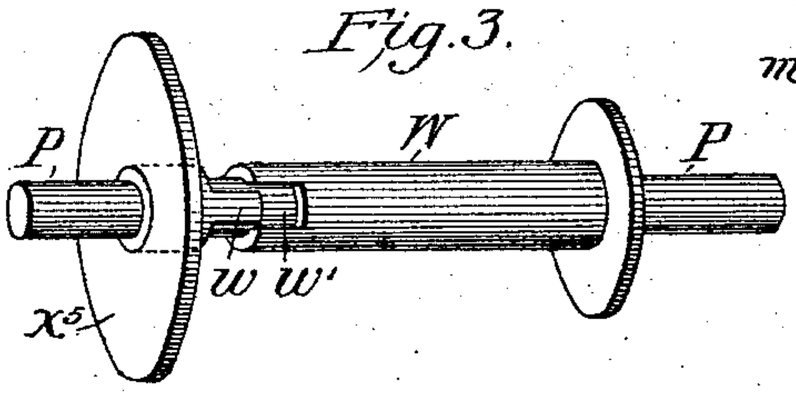


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOSEPH B. STEWART, OF HAVERSTRAW, NEW YORK.

RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 543,322, dated July 23, 1895.

Application filed August 24, 1894. Serial No. 521,233. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH B. STEWART, a citizen of the United States, residing at Haverstraw, Rockland county, State of New York, have invented certain new and useful Improvements in Railway-Signals, of which the following is a specification.

My invention relates to electromagnetic clutches, and while my invention may be used for many and various purposes it is more particularly designed for use in connection with electric automatic block-signaling systems—such, for instance, as is shown and described in my application, Serial No. 502,898; and the object of my invention is to provide a simple and effective clutch, which will act positively under all conditions, and which shall be simple in construction and mode of operation, and not liable to get out of order, and to these ends my invention consists in the various features of construction and arrangement substantially as hereinafter set forth.

In the accompanying drawings I have illustrated an embodiment of my invention and shown its application and use in a manner sufficient to enable others to understand the same, in which—

Figure 1 is a side view, partly in section, showing the clutch. Fig. 2 is a diagrammatic view showing one way of using the clutch in connection with electric automatic block-signal systems; and Fig. 3 is a detail perspective showing the shaft, the loose collar, and drum mounted thereon.

In said block-signal system it is desirable to have the signal automatically set to "danger" when not positively moved to the "safety" position, and for purposes of economy and otherwise it is preferable to have such signals operated on an open-circuit system, as fully set forth in my former application. When, however, it becomes necessary to set the signal to "safety," means should be provided whereby the signal can be positively operated and held in that position as long as necessary, and which may be released to allow the signal to go to "danger," and which, in case of any accident or failure to operate, will allow the signal to remain at "danger," and without describing all the details of such a system I will now proceed to describe my improved clutch and then briefly show one mode of operating it.

On a suitable shaft P^2 is mounted a gear-wheel P', which in the present instance meshes with a pinion P, connected to an electromagnetic motor M, arranged so that when the motor is energized the shaft will be rotated. This shaft P^2 is made of iron or other magnetic material, and its end is preferably extended, as at P^3, to form an extended pole-piece in the manner hereinafter set forth. Connected to this magnetic portion of the shaft is another portion P^4, which is of brass or other non-magnetic material, and is united to the magnetic portion P^2 in any suitable way, as by screwing the two parts together, so that the parts P^2 and P^4 constitute practically a single shaft supported in suitable bearings.

By making the shaft in two portions, one of magnetic material and the other of non-magnetic, as above described, the magnetic force is expended or exerted at the end of the magnetic portion of the shaft, and does not have any retarding influence on the movement of the drum hereinafter described, as it would have if the whole shaft were made of one piece of magnetic material, and when the magnetic portion of the shaft is extended to form an extended pole-piece, as shown, this advantage is intensified and greater frictional surface-contact is provided for the drum.

A coil or helix x^3, which is wound upon a spool or bobbin X, which may be of brass or other non-magnetic material, is mounted on the magnetic portion P^2 of the shaft, so that the shaft is permitted to rotate independently of the bobbin and its helix, which bobbin may be connected to the frame in any suitable way. Also mounted on the non-magnetic portion of the shaft is a winding-drum W, which is also preferably made of non-magnetic material, and which rotates freely on the shaft. One end of this drum is preferably made of or provided with some magnetic material to form an armature for the core or pole P^3, and I have shown an extension x^5 of iron or similar material connected to a collar or segregated portion W′ of the drum W, so that it can slide freely on the shaft; but in order that it may rotate with the drum I provide some sort of means—such,

for instance, as the lugs *w* on the collar or segregated portion and the notches *w'* in the drum—whereby the collar or segregated portion and magnetic end piece can have a lateral motion on the shaft and at the same time rotate with the drum.

Referring to Fig. 2, S represents the signal or semaphore, which is connected by a link U to a pivoted arm T, and this is connected by a cord or chain V with the drum W, and it will be seen that when the cord or chain is wound upon the drum the signal will be brought to the position of "safety" indicated in the drawings; but when the clutch is free and the drum can freely rotate on the shaft the weighted signal will unwind the chain or cord and allow the signal to automatically assume the position of "danger."

In the arrangement shown the motor M is operated from a source of electric energy *m*, which source is connected with the motor by the conductors m' m^2. The clutch is also operated from a separate source of electric energy, as *x*, the coils or helix being included in the circuit x' x^2 x^4. Both of these circuits are shown as controlled by a relay R. The armature *r* opens or closes the circuits of the motor and clutch simultaneously, the said relay being operated or controlled by a train Z on the track A^2 A^3, through the medium of a battery A and suitable connections, in a manner which need not be specifically set forth. The motor-circuit is also provided with a brake O, controlled by a contact O' on the lever T.

In the arrangement shown it will be seen that when through the operation of the relay R the circuits of the motor M and of the helix x^3 are closed, the motor operates to rotate the shaft P^2, and the helix or coil x^3 being energized at the same time magnetizes the shaft by induction, so that its pole-piece P^3 attracts the extension x^5 of the drum and holds the two in close contact, so that they rotate together with the shaft P^2, and this, through the medium of the connections *w* *w'*, causes the drum W to be rotated and wind up the cord or chain, drawing the signal to the safety position and holding it there as long as the circuit of the coil is closed. As soon, however, as the circuit is broken, the pole-piece P^3 is demagnetized and the drum released and the signal is allowed to go to "danger" position, where it remains until again positively operated by energizing the coils and magnetizing the core and pole-piece and operating the clutch, as before. It will be seen by this arrangement that it is not necessary for the cogs of the pinions and gear to run in reverse directions, as the armature of the motor may rotate in one direction only.

What I claim is—

1. An electro-magnetic clutch, comprising a shaft, a portion of which is of magnetic material and forms the core of the magnet of the clutch, a coil or helix mounted thereon, and a winding drum also loosely mounted on said shaft, a portion of which drum is of magnetic material, substantially as described.

2. An electro-magnetic clutch, comprising a shaft, a portion of which is of magnetic material and forms the core of the magnet of the clutch, a coil or helix mounted thereon, the shaft being extended to form an extended pole-piece, and a drum, also mounted on said shaft a portion of which is of magnetic material and operates as an armature for the pole-piece, substantially as described.

3. An electro-magnetic clutch, comprising a shaft, a part of which is of magnetic material and part of non-magnetic material, a coil loosely mounted on the magnetic portion of the shaft which portion forms the core of the magnet of the clutch, and a winding drum loosely mounted on the non-magnetic portion of the shaft, the drum being provided with magnetic material to form an armature, substantially as described.

4. In an electro-magnetic clutch, the combination with the shaft composed of magnetic material and non-magnetic material, of a coil or helix loosely mounted on the magnetic portion of the shaft which portion forms the core of the magnet of the clutch, an extended pole-piece for said magnetic portion of the shaft, a winding drum loosely mounted on the non-magnetic portion of the shaft, a section or collar having magnetic material forming an armature, and means for connecting the section and drum so that they will rotate together, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH B. STEWART.

Witnesses:

A. KETCHUM,

J. P. CRANEY.