No. 838,780. PATENTED DEC. 18, 1906.

G. P. FINNIGAN.

RAILWAY SIGNAL.

APPLICATION FILED AUG. 19, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

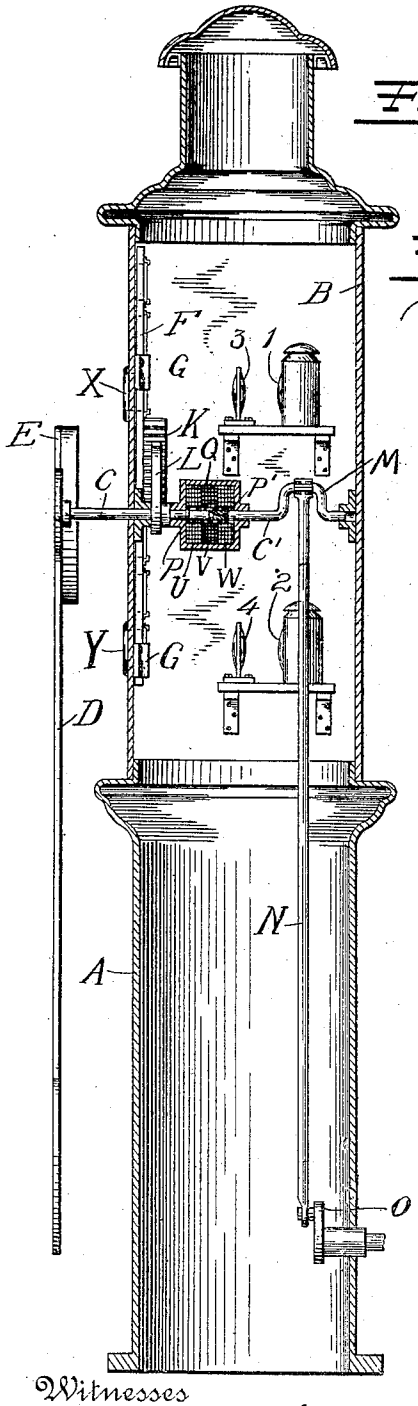


Fig. 3.

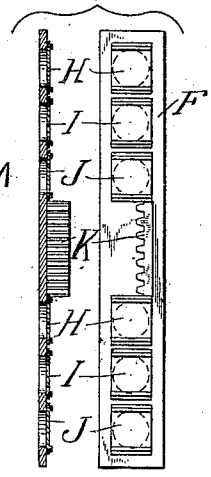
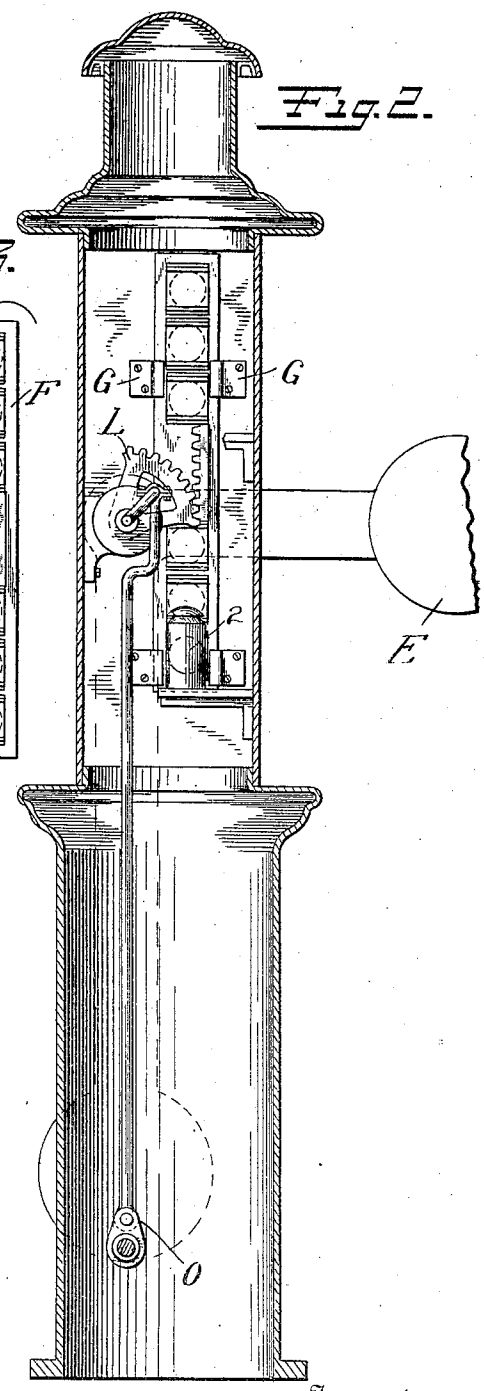


Fig. 2.



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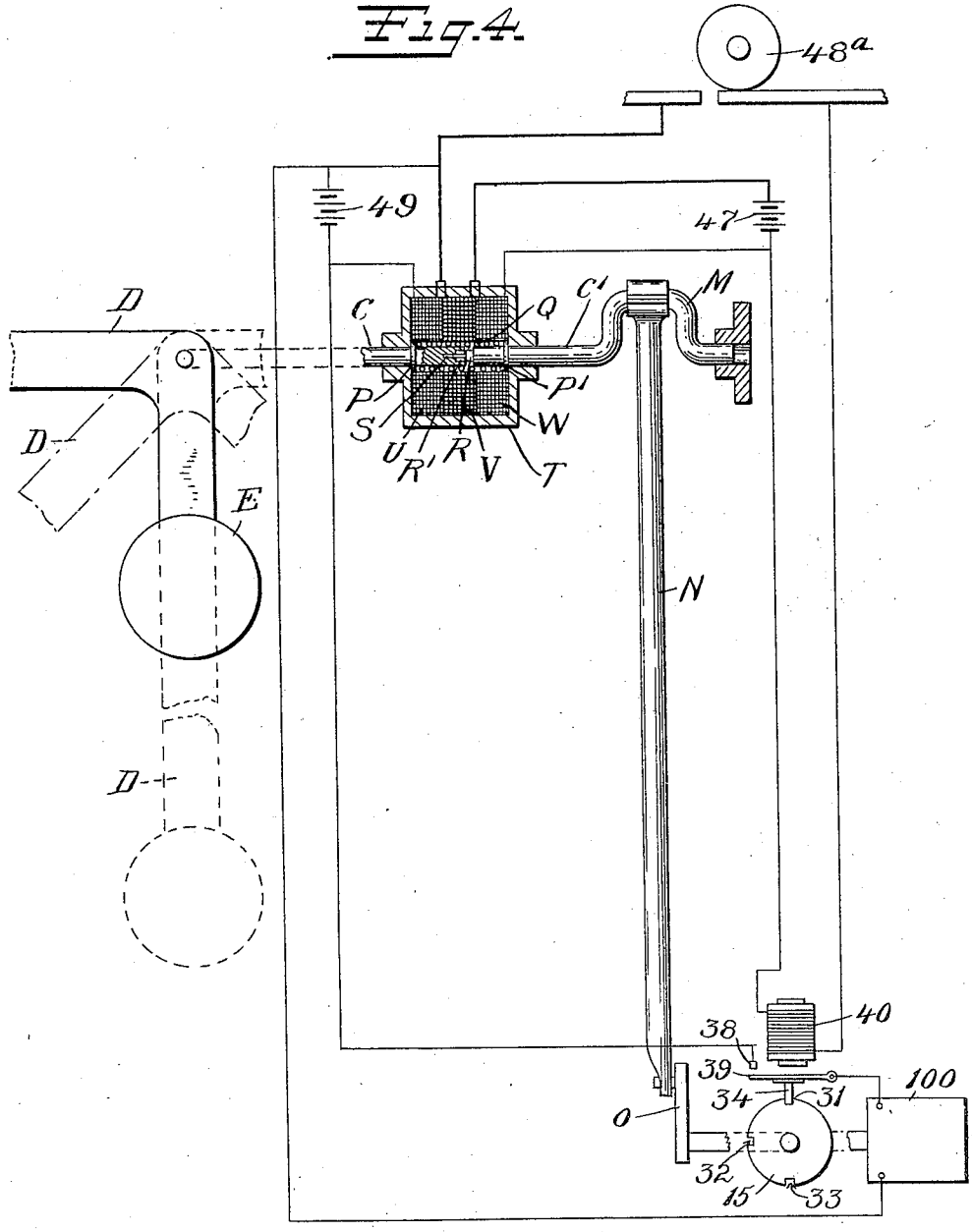
2 SHEETS—SHEET 2.

Fig. 4.



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RAILWAY-SIGNAL.

No. 838,780. Specification of Letters Patent. Patented Dec. 18, 1906.

Application filed August 19, 1905. Serial No. 274,891.

To all whom it may concern:

Be it known that I, GEORGE P. FINNIGAN, a citizen of the United States, residing at Greene, Chenango county, New York, have invented certain new and useful Improvements in Railway-Signals, of which the following is a full, clear, and exact description.

This invention relates to railway-signals.

One object of the invention is to produce a signal which in the day-time shall display a semaphore-arm in two or more positions and at night shall display different-colored lights, the different colors corresponding to different positions of the signal-arm.

As described below and shown in the accompanying drawings, the arm has three positions, "danger," "caution," and "clear," and at night displays a red light when the arm is in danger position, a green light when it is in caution position, and a white light when it is in clear position. The apparatus when operated by an electric motor or depending upon electric circuits is so arranged that if for any reason any source or sources of electricity give out the arm will at once automatically take the danger position.

Another object of the invention is to provide a new and improved signal which shall have the capability of automatically coming to zero in case the actuating power gives out.

The following is a description of an embodiment of my invention, reference being had to the accompanying drawings, in which—

Figure 1 represents a vertical section of a signal embodying my invention. Fig. 2 represents a vertical section of the same on a plane at right angles to that of Fig. 1. Fig. 3 represents a sectional view and an elevation view of a slide carrying glasses of different colors for making the different-colored lights. Fig. 4 is a detail view of an electric clutch mechanism and circuits whereby the semaphore-arm is automatically detached from its normal operating mechanism in case the current fails.

Referring more particularly to the drawings, A represents a signal-post, having the housing B, in which is mounted the shaft C, carrying the semaphore-arm D. The semaphore-arm D is provided with a member E, connected to the main portion D and lying at right angles thereto. The portion E is of greater weight than the main portion D, so that when the semaphore-arm is detached from its operating mechanism the main portion is brought up into a horizontal position corresponding to the danger position. Within the housing B is the slide F, held by guides G, so as to be capable of a vertical movement. This slide F carries the glasses H I J, the glasses H being red, the glasses I green, and the glasses J uncolored. The slide F carries a rack K, with which engages a segment L, rigidly fastened to the shaft C of the semaphore-arm. This shaft C has an extension C′, which is formed with a crank-arm M, with which a link N is connected, the lower end of the link being connected to a crank-arm O, which is actuated by the operating mechanism.

The semaphore is actuated by a motor (shown diagrammatically at 100, Fig. 4) energized by current from the battery 49, controlled by the magnet 40, energized by the battery 47, whose circuit is adapted to be closed by the wheel 48ª. When the magnet 40 is energized, the pin 34 is raised and an electric contact is established at the points 38 and 39, thereby closing the motor-circuit through the battery 49. A wheel 15, mounted on the motor-shaft and provided with recesses 31, 32, and 33, keeps the contacts 38 39 in engagement until the pin 34 falls into the next succeeding recess, whereupon the motor-circuit is broken and the motor stops. The recess into which the pin 34 falls determines the stopping-point of the motor and the position of the semaphore-arm D.

The part C′ of the semaphore-shaft is capable of slight longitudinal movement. The two parts C C′ are provided with collars P P′, between which is located a spring Q. This spring Q normally tends to keep the opposing ends of the parts C C′ apart. These opposing ends are provided one with a lug R and the other with a recess R′, corresponding thereto. This lug and recess are of irregular shape, so that when the lug is within the recess the two parts C C′ are clamped together. This part C is provided with a pin, which enters the hole S, so as to properly center one part relatively to the other when the clutch-faces are not in engagement. About the break between the parts C C′ is provided a magnetic casing T, which contains in the present instance three coils U, V, and W. Of these coils U is connected directly around the battery 49, and W is connected directly around the battery 47. The coil V is in series with the battery 47 and the magnet 40, as shown in Fig. 4. These coils are so wound that the currents through them produce cu-

mulative magnetomotive forces, or, in other words, coact in producing magnetic flux. The spring Q is sufficient to separate the clutch-faces when one of the batteries 47 49 gives out. From this it results that when the batteries 47 and 49 are in proper condition the two parts of the shaft C C′ are held together against the action of the spring Q, and thus clamp one relatively to the other. Whenever either of the batteries 47 or 49 weakens, so as not to be in proper condition for controlling the semaphore-arm, the spring Q will overcome the magnetic attraction due to the coils U and W, thus detaching the part C of the shaft of the semaphore from its controlling mechanism and permitting the semaphore to swing to danger position under the influence of the weight E, as shown in full lines in Fig. 4. In order to prevent the clutch being disengaged if for any reason the battery 47 should be short-circuited, I place the coil V in series with the battery 47 and the magnet 40 energized thereby, so that the current from the short-circuited battery will pass through the coil V, and thus hold the parts C C′ together even when the current through the coil W fails by reason of such short circuit. When this is the case, it is only necessary to see to it that in normal operation the battery 47 is short-circuited only in such a way as to cause its short-circuit current to flow through the coil V. Of course if it should be abnormally short-circuited, so as not to cause the current to flow through the coil V, the system would need attention and it would be desirable to have the semaphore-arm rise to danger position, which result would be accomplished.

The housing is provided with windows X and Y, through which the light from the lanterns 1 and 2 is thrown. Supplemental lenses 3 4 may be placed between the lanterns and these windows, so as to direct the light as desired.

From the foregoing description it will be seen that as the semaphore-arm rises to caution position the slide F will be moved downwardly until the green glasses are in front of the windows X Y. When the semaphore-arm rises to danger position, the red glasses will be in front of those windows. If for any reason the electric currents upon which the operation depends cease to flow, the signal at once automatically rises to danger position and the red light is displayed. In the device illustrated in Fig. 4 three coils are shown. In some instances two only or even one alone might be used, and in some instances more might be desirable.

The apparatus admits of various modifications without departing from my invention. I prefer to use the form of clutch device shown in Fig. 4, in which the spring normally tends to keep the members C C′ apart and in which the magnetic action of the coils U and W is cumulative, although this cumulative action as distinguished from a differential action is not essential to the broad invention. It is to be noted that when the part C is released from the part C′ by reason of the failure of the controlling source of current not only is the semaphore-arm automatically moved into danger position, but that the slide F is also moved so as to display the red light through the windows. There being two windows X and Y, with two separate lanterns, the danger of having the lights extinguished at night is reduced to a minimum.

By "batteries" in the foregoing description is meant any suitable source of current, such as a series of battery-cells, dynamos, or the like. Gravity-cells are preferred, since they require a high-resistance circuit to be maintained in order that efficient results may be attained, and when used in the relations described are found to be very satisfactory.

What is claimed is—

1. In a railway-signal, a semaphore-arm, weighted so as to automatically come to "danger" position when released, a divided shaft carrying said semaphore-arm, operating mechanism therefor, an electromagnetic clutch carried by the parts of said shaft, a battery energizing said electromagnetic clutch, and a coil energizing said clutch and permanently connected across the terminals of said battery.

2. In a railway-signal, a semaphore-arm weighted so as to automatically come to "danger" position, when released, a divided shaft carrying said semaphore-arm operating mechanism therefor, a magnetic clutch carried by the parts of said shaft, a battery energizing said electromagnetic clutch, the energizing-windings of said clutch being part in shunt with said battery and part in series to said battery.

3. In a railway-signal, a semaphore-arm weighted so as to automatically come to "danger" position when released, a divided shaft carrying said semaphore-arm operating mechanism therefor, a magnetic clutch carried by the parts of said shaft, a battery energizing said electromagnetic clutch, said clutch having a plurality of energizing-windings in shunt to a plurality of batteries.

4. In a railway-signal, a semaphore-arm weighted so as to automatically come to "danger" position when released, a divided shaft carrying said semaphore-arm operating mechanism therefor, a magnetic clutch carried by the parts of said divided shaft, a plurality of batteries energizing said electromagnetic clutch, said clutch having a plurality of energizing-windings, part in shunt to a plurality of said batteries, and part in series with one of said batteries.

5. In a railway-signal, the combination of a semaphore-arm, a shaft therefor, a housing

through which such shaft passes, a slide within said housing containing colored glasses adapted to pass before a window in said housing, and a lamp placed opposite said window, and means connected with said shaft for causing said slide to move longitudinally in front of said window.

6. In a railway-signal, the combination of a semaphore-arm, a shaft therefor, a housing through which such shaft passes, a slide within said housing containing colored glasses adapted to pass before a plurality of windows in said housing, and a plurality of lamps placed opposite said windows, and means connected with said shaft for causing said slide to move longitudinally in front of said windows.

7. In a railway-signal, the combination of a semaphore-arm, a shaft therefor, a housing through which such shaft passes, a slide within said housing containing colored glasses adapted to pass before a window in said housing, and a lamp placed opposite said window, and means connected with said shaft for causing said slide to move longitudinally in front of said window, a weight normally tending to move said arm to "danger" position and to display a red light, an electromagnetic clutch connecting said signal with its operating mechanism, said clutch having energizing-windings, a source of current, a circuit therefor, and shunt connections for said windings around said source.

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Witnesses:
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