AN AUTOMATIC ELECTRIC FOG-SIGNALING APPARATUS FOR RAILROADS.

BY THE ENGLISH CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

Interesting experiments have been carried out upon the Belgian State Railroads with a new system of signaling in fogs, a system which is the invention of Mr. W. de Ruyter van Steveninck, a late officer of the Holland navy, now resident in Brussels. The important feature of this device is that it is absolutely automatic in its operation, the detonators being electrically fired by the train itself, and in such a manner that a powerful acoustic signal is given beside the track. The signal is entirely independent of the operator, though operative in conjunction with a visual signal, and always gives an adverse signal should there be any breakdown in any part of the apparatus.

The detonator signal is retained, because it affords the most striking and certain means of warning the crew of a passing train, and cannot by any possibility be misunderstood. An accident would therefore be directly attributable to willful negligence on the part of the engineer.

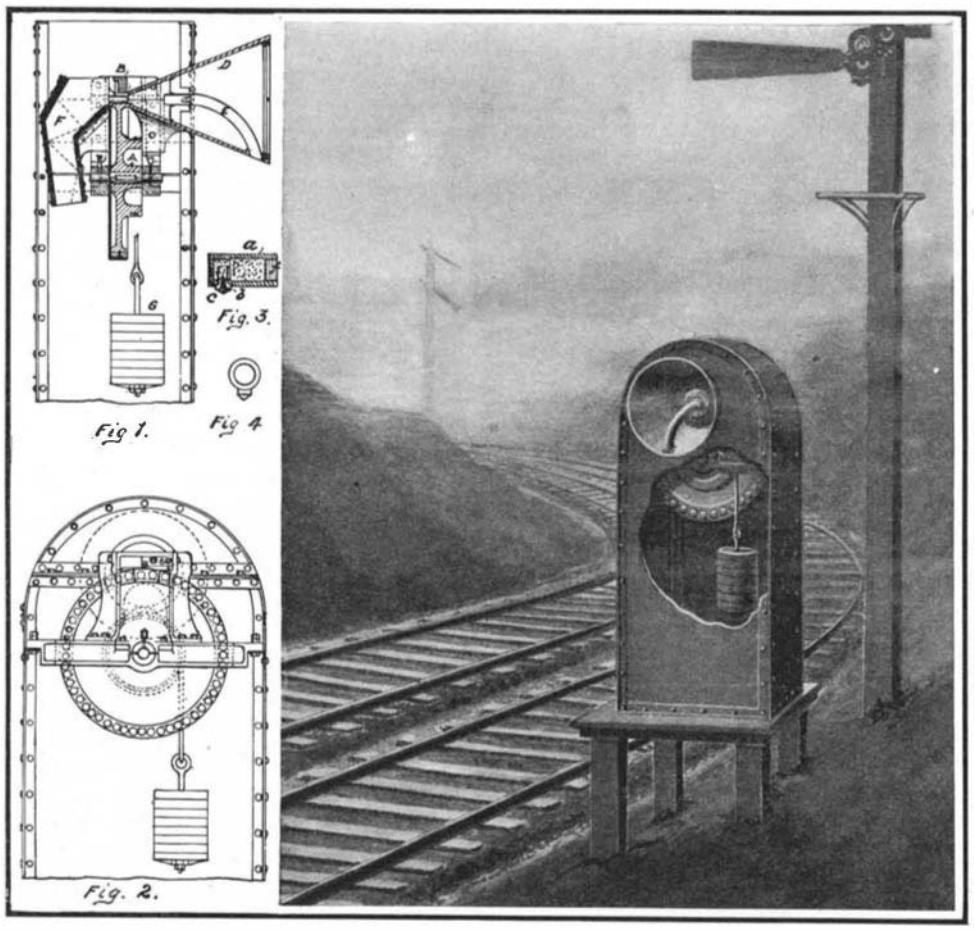
The apparatus comprises a small waterproof pillar box mounted beside the track, fitted with a trumpet facing the direction of the approaching train, this trumpet being placed on a level with the engineer in the cab of the locomotive. In this box is mounted a large wheel, provided with a peripheral magazine capable of holding fifty cartridges in grooved sockets. The forward action of this wheel is controlled by a pulley and counterweight, which is wound up like the weights of a clock, and which will make one revolution of the wheel clockwise. This wheel thrusts forward one cartridge at a time, the cartridge being brought to rest in a small space in the neck of the trumpet by a spring buffer.

The detonator (Figs. 3 and 4) comprises a cartridge case *a*, to the outside of which is screwed a small metal cap *b*. In this cap is inserted a screw *c*, insulated from the cap itself by a small tube of ebonite, which tube also carries a short length of platinum wire, one end of which is soldered to the point of the screw and the other to the cap *b*, which is filled with guncotton. The cartridge itself is loaded with common black powder, and is closed at its outer end by a wad *f*. The insulated screw in the cap is connected with one terminal of the battery, and the cartridge cap itself with the other terminal, the circuit being broken at the rail. The approaching train as it passes the apparatus closes the circuit, either by means of rail contacts or a treadle placed in the track; and immediately the circuit is established, the platinum wire in the cartridge cap becomes incandescent and fires the guncotton, which in turn detonates the cartridge. The sound of the explosion is deflected through the trumpet, as well as the gases of ignition, while the wad of the cartridge is blown to the ground through the curved tube *F* (Fig. 1). Under the force of the recoil the cartridge case itself is ejected from its socket in the magazine wheel, and falls into a box (Fig. 1), whence it can be easily recovered. Immediately after the explosion the magazine wheel, under the influence of the counterbalance weight, commences to revolve, bringing the next cartridge into the firing position in the neck of the trumpet, the extent of its travel being arrested by the buffer already mentioned, which insures its coming into the correct firing position. This brings the apparatus into firing position again. The empty cases can be collected, and may be recharged, which serves to reduce the working cost of the system. The rail contact can be placed either alongside the detonating apparatus or some distance in advance thereof, according to the prevailing conditions. Although the circuit is established and the detonation is produced as the front wheel of the engine passes over the contact, and the apparatus immediately resets itself, subsequent firing by each successive vehicle of the train is avoided by means of a relay, which cuts out the whole circuit until the last wheel of the train has passed completely by. The relay then opens instantly, and sets everything in readiness for the next train. In this way useless expenditure of the cartridges is avoided, only one being fired for each train.

Should the line be clear, the apparatus is cut out of action, and no signal is given. A detonator is fired only when the signal arm is at danger, or when the signaling arrangement breaks down.

It is obvious that the apparatus may be set at some distance from the signaling operator's cabin, the occupant of which, through not hearing the explosion, may not know whether the signal is fired or not. This event is ingeniously guarded against by means of an alarm to the operator's cabin, which gives indication that the explosion warning has been communicated to the engineer of the train. Directly the detonator is fired, a contact is closed and a circuit established with an electric alarm bell placed in the signal cabin. This bell continues ringing until the operator acknowledges the intimation by breaking the bell circuit by the movement of a switch. Similarly, intimation of the cartridge exhaustion of the magazine wheel is conveyed to the signal operator. When the magazine has been so depleted that only five cartridges are left in the wheel, this alarm bell in the signal cabin commences ringing, and cannot be arrested until the apparatus is recharged. Should the operator ignore this warning, and the last cartridge be fired, the whole of the signaling arrangements are interrupted by locking the apparatus automatically, and their normal working cannot be restored and trains pass by until the apparatus is recharged with cartridges, unless the train engineer willfully ignores the stop signal.

The Belgian experiments, which were of a searching nature, conclusively established the efficiency and reliability of this ingenious system.



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RAT DESTRUCTION BY ELECTRIC CURRENT.

Besides being harmful parasites, liable to work considerable damage wherever they take up their abode, rats are known to be the dangerous agents of propagation of infectious diseases, especially bubonic plague. Invading freely any vessel lying at anchor in harbors where that terrible scourge exists, they will carry contagion with them to any port touched by the ship, and accordingly present a most dreadful danger which it is hard to fight.

Many methods have, it is true, been suggested during the last few years for the destruction of rats, but none of these has proved free from serious drawbacks. "Smoking" by means of sulphurous acid gas is, for instance, liable to harm the cargo, while evicting the rats with illuminating gas is not free from some danger to the crew. As it is, none of these methods lends itself to general use at any place infested by the fearful rodent.

A Viennese engineer, Herr von Florentin, Baron of Biederheim, has recently performed, in the presence of representatives of several administrative bodies, the Imperial Navy Office, etc., at the Charlottenburg Municipal Electricity Works, some interesting tests on an extremely original device, by which the rats (or any other vermin) are literally electrocuted.

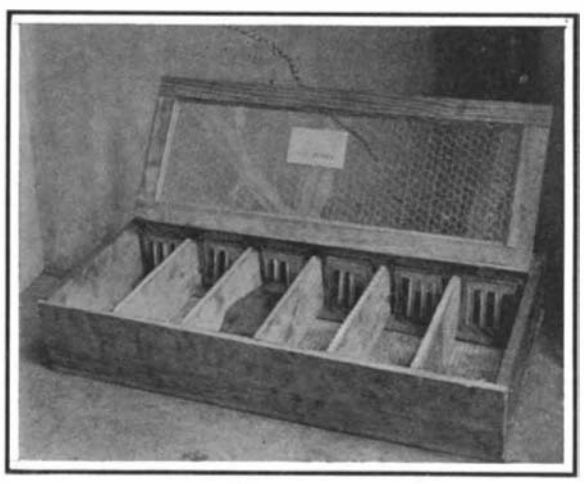
This patented apparatus takes advantage very ingeniously of all peculiarities of the rodent. Attracted by curiosity toward an electric lamp or by gluttony toward an appetizing morsel, the animal itself closes the current bound to kill it in a maximum of 50 to 60 seconds. Access to the apparatus is always free, even after this has been filled with several electrocuted animals, and, as shown by experiment, no rat caught by the electric trap succeeds in escaping its fate.

One of the most interesting features of this scheme is that continuous, alternating, or three-phase currents of low tension, e. g., 110 to 120 volts, are quite sufficient to electrocute the animals. Such currents are available at present nearly everywhere, and especially on board ship. Should no electric installation be available, it would be sufficient to provide a small accumulator battery, which in spite of its lower tension would produce quite similar effects.

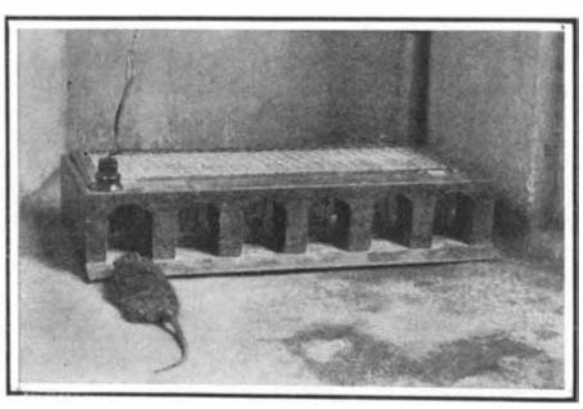
The apparatus can be so arranged that the electrocuted animal itself signals its execution to any desired place, advising the watchman by an electric bell, or the lighting of a red incandescent lamp, that there are some killed animals to be removed. The low tension of the current excludes any danger to men, and prevents any accidental electrocution of domestic animals.

The photograph reproduced in Fig. 1 shows the moment the rat prepares itself to enter one of the pigeonholes of the apparatus. Fig. 2 represents the electric trap open, with an electrocuted rat.

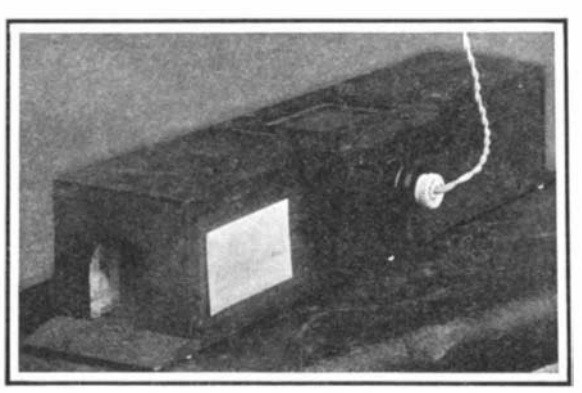
This invention is exploited by a company in Charlottenburg.



Top view of trap with lid raised, showing electrocuted rat.



Entrance side of trap with rat about to enter.



Smaller form of trap with single entrance.

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H. R. Weersma has attempted a new determination of the solar apex, or the point toward which the sun and planets are moving. He finds, for the apex, the co-ordinates: right ascension 267.7 deg., declination +31.41 deg. The point thus defined is in the constellation Hercules, near the star Nu Herculis.