(No Model.) 2 Sheets—Sheet 1.

J. W. LATTIG.

TORPEDO MACHINE OR APPARATUS FOR RAILWAY SIGNALING.

No. 522,473. Patented July 3, 1894.

Fig. 1.

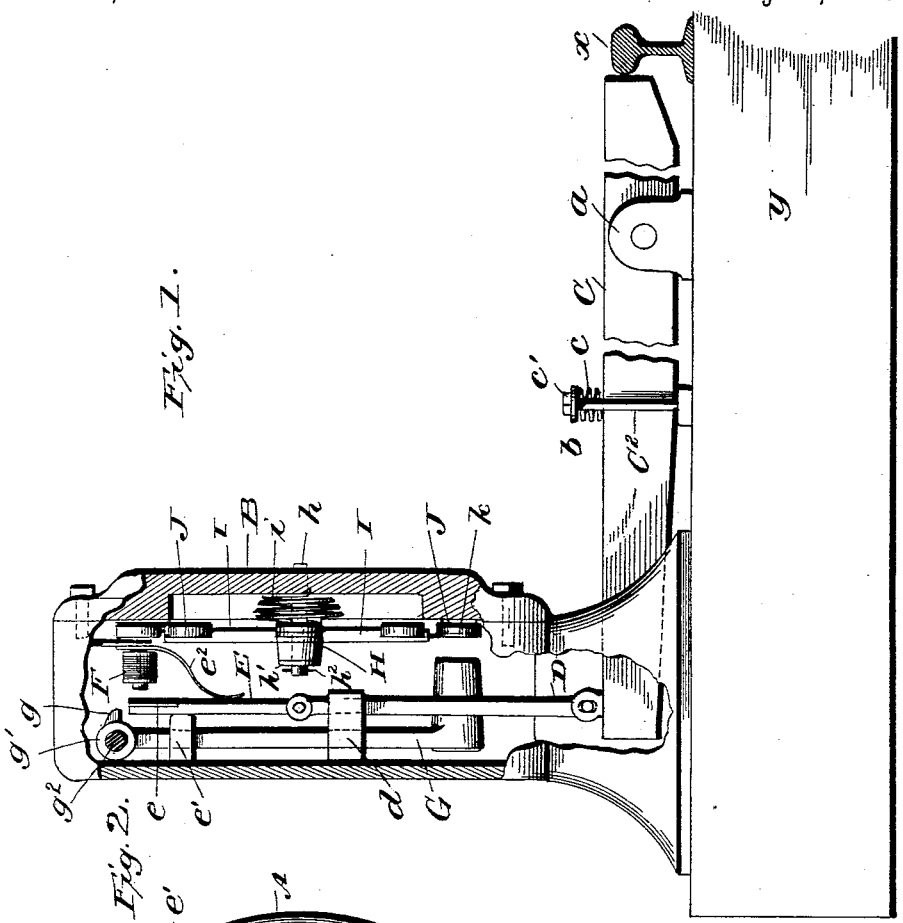
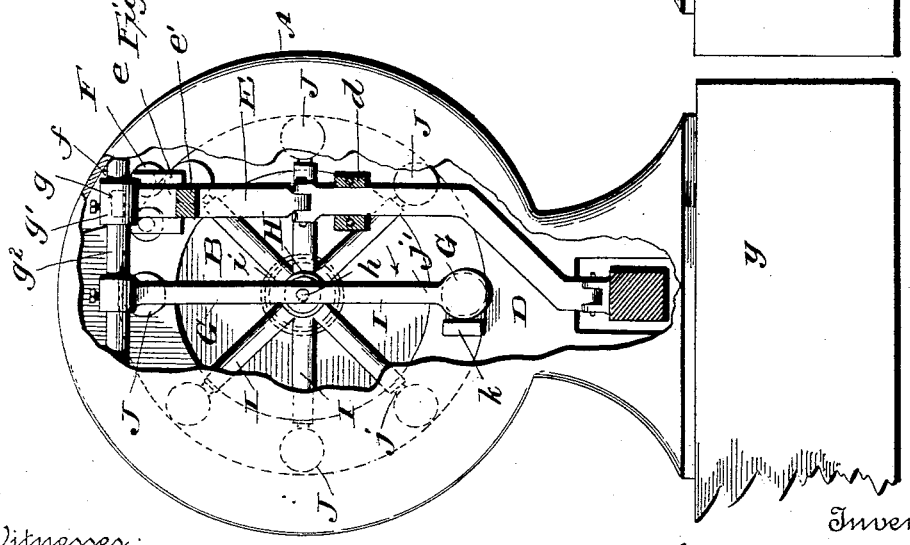


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

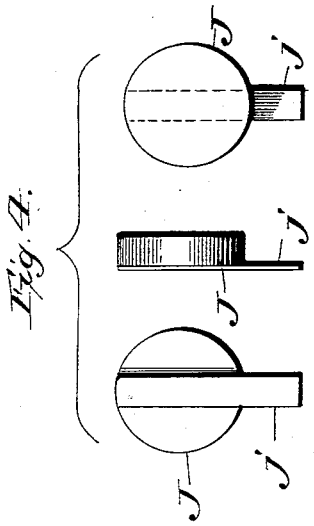


Fig. 5.

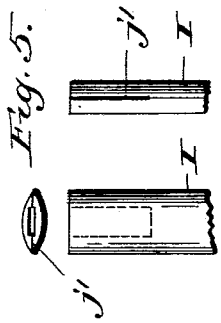


Fig. 6.

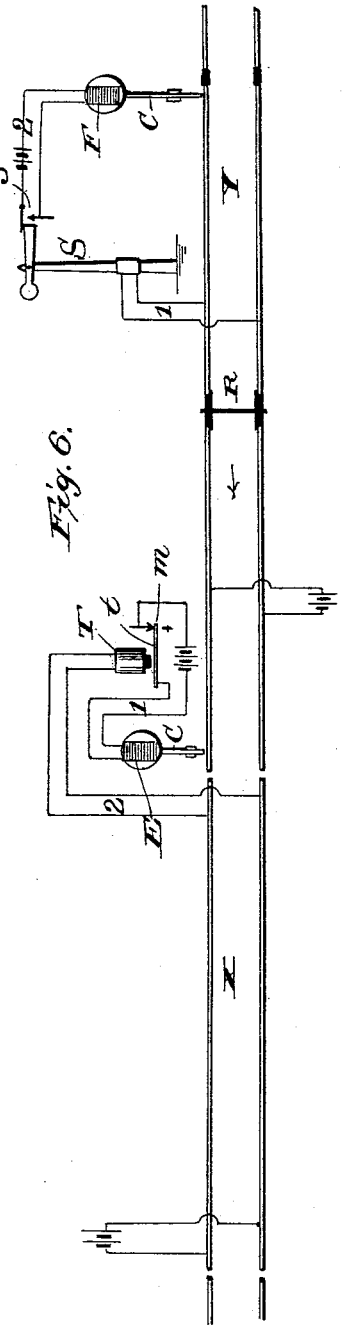
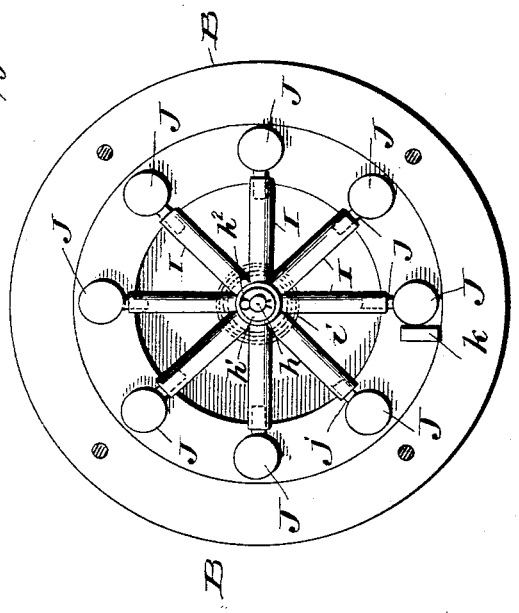


Fig. 3.



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UNITED STATES PATENT OFFICE.

JACOB W. LATTIG, OF EASTON, PENNSYLVANIA.

TORPEDO MACHINE OR APPARATUS FOR RAILWAY SIGNALING.

SPECIFICATION forming part of Letters Patent No. 522,473, dated July 3, 1894.

Application filed February 15, 1894. Serial No. 500,202. (No model.)

To all whom it may concern:

Be it known that I, JACOB W. LATTIG, of Easton, in the State of Pennsylvania, have invented a new and Improved Torpedo Machine or Apparatus for Railway Signaling and Like Uses, of which the following is a specification.

My invention relates to mechanism or apparatus whereby under certain predetermined conditions a torpedo is exploded by a passing railway train, which actuates by the wheels of the car or cars a striking mechanism for exploding the torpedo. Mechanism of this general kind is well known and has been in practical use to a considerable extent. In the received forms of this apparatus the mechanism sets itself automatically and as one torpedo is exploded another is supplied automatically to be exploded in turn under similar conditions.

The machine which I have devised is electrically controlled, the hammer or striking part by which the torpedo is exploded being controlled by an electro-magnet, through the intermediary of which the hammer will be called into play or not, by the action of the passing train, according as the magnet is de-energized or energized. In other words, in the motion transmitting mechanism by which the hammer is actuated there is a break which is closed or not according as the magnet is inactive or active. This feature so far as I am aware is entirely new with me. I know of no railway torpedo apparatus in which an electro-magnet has been used for a similar purpose.

An apparatus of this kind is well adapted for use in connection with automatic block systems in which the railway track is divided into insulated sections, each forming part of a circuit—usually termed the track circuit—completed through the rails of the section. The manner in which it can thus be used will be hereinafter pointed out.

Other features of my invention reside in details of construction and arrangement of the various parts of the apparatus which can best be explained in connection with the accompanying drawings to which I shall now refer for a more complete understanding of the several features of the invention.

Figure 1 is a side elevation of the apparatus in connection with a track rail—a portion of the inclosing case or shell of the apparatus being broken away to expose the working parts within. Fig. 2 is a rear elevation of the same with the case partly broken away. Fig. 3 is an elevation of the lid or cover looking at its inside face. Fig. 4 shows in front, rear and side elevation one of the torpedoes. Fig. 5 shows a plan, edge elevation and end elevation of the outer portion of one of the torpedo-carrying radial arms or bars. Fig. 6 is a diagram representing two ways in which my apparatus can be used in connection with a track circuit for automatic signaling.

In Fig. 1, x is the track rail adjoining which, that part of the hammer or striker actuating mechanism to be operated by a passing train is located; and y is the sleeper or tie on which the rail rests and the torpedo machine is secured.

A is the case or shell of the machine, and B (Figs. 1 and 3) is the lid or cover for the front of the same.

The track lever C, which is the part to be struck by the passing train, is pivoted in the fulcrum casting a with its shorter end or arm in proximity to and normally standing slightly above the level of the rail as usual in this class of apparatus; the height at which this end stands above the rail can be adjusted to suit by altering the height of the back stop b on which the long arm of the lever rests at its rear end—which stop is preferably elastic to prevent shock. The long arm of the lever is held down with yielding pressure, by a spring c, pressed upon the lever by a nut and bolt c', c^2—the latter at its lower end being bedded in a suitable casting secured to the sleeper beneath the lever.

To the rear end of the track lever C is pinned the upright rod D, which at its upper end is held in and passed through a vertical stationary guide d, secured to the case of the machine. At the point where the rod is pinned to the lever it has a slightly slotted hole for the pin, which will permit sufficient play between the parts to prevent the upper end of the rod jamming in its guide when moved up and down therein.

To the upper end of the rod D is pinned the arm E, so as to be capable of vibration to and

from an electro-magnet F attached to a stationary hanger or support f in the case. This arm E carries the armature e and is in effect the armature lever of the magnet. It is provided with a back stop e' and a spring e^2, which presses it against the back stop when not drawn forward by the superior attractive force of the magnet.

The upper end of the arm E is below a toe or projection g, attached to or forming part of a collar g', rigidly secured by a set screw or otherwise to a rock shaft g^2 journaled in the case A. Upon the same shaft (see Fig. 2) is also rigidly secured the shank of a hammer or striker G, which normally hangs by gravity in the position shown in Figs. 1 and 2.

The arrangement shown in the drawings is such that when the arm E is against its back stop (in which position it is represented in Fig. 1) its upper end will be directly under and in the path of the toe or projection g. Consequently, if the arm while in this position be lifted by the lever C, it will strike the toe and thus will cause a sudden partial revolution of the rock shaft g' with the effect of swinging the hammer sharply forward so as to strike with force any thing in its path. But when, on the other hand the arm E is drawn forward by the attractive force of the magnet, its upper end will be carried out of the path of the toe or projection g, in which event its upper end in rising will clear and have no contact with the toe, and thus the hammer will remain at rest. The armature lever E is thus in effect a portion of the hammer actuating mechanism, and the break in that mechanism which is controlled by the electro-magnet F, is between that arm E and the toe or projection g.

Various arrangements for presenting successive torpedoes to the action of the hammer can be employed. That shown in the drawings is carried by the lid or cover B, and consists of a frame composed of a hub H and radial arms I attached thereto; in this instance there are eight of such arms, but their number may vary. The hub is mounted and capable of revolving upon a stud or axle h fixed to and projecting from the inner face of the cover. It is held in place on said axle by a spring washer h', a pin h^2, or by other suitable means which will suggest themselves to the skilled mechanic; and it is revolved, whenever free to do so, by a spiral spring i, which is wound up or under tension and has one of its ends secured to the hub and its other end to the cover.

The torpedoes are held in the extremities of the radial arms in any suitably way—being so positioned that as the frame revolves each torpedo in succession will be brought opposite to and in the path of movement of the hammer so that it may be exploded by a forward movement of the hammer—the solid part of the lid in rear of the struck torpedo acting at this time as the anvil. In the present instance the torpedoes J are held in place, by means of shanks or strips j with which they are provided, which are inserted and held in sockets formed for them in the outer split ends j' of the radial arms I, which latter are made of spring steel, so that they will not bend or break when used. The rotatable torpedo carrying frame is prevented from revolving by a stop k (Fig. 3) in the lid against which one of the torpedoes will bring up in position to be struck by the hammer. When this torpedo is exploded the frame will be free to revolve until the next succeeding torpedo brings up against the stop. The shanks j will be made of thin cast iron or other comparatively brittle and fragile material, so that when any torpedo is exploded its shank will be thoroughly destroyed, thus preventing the possibility of its catching on the stop k, and of in this way checking the revolution of the torpedo carrying frame.

In the arrangement of parts shown in Figs. 1, 2 and 3, the magnet is supposed to be normally active when the apparatus is in use, and the hammer will be actuated only when the magnet is inactive. Of course if the magnet were so arranged in circuit as to be normally inactive, then by an obvious change of parts the operating mechanism could be made to actuate the hammer only when the magnet became active.

In Fig. 6 I have represented a track composed of two insulated sections each provided with my invention. In the arrangement shown in section X the apparatus is applied to that section without any accompanying visible signal. In this case the electro-magnet E of the torpedo machine is included in a normally closed circuit 1 completed through contacts m, controlled by the armature lever t of the track relay T—the latter being included in a normally closed track circuit 2 completed through the rails of the section. So long as the track relay is closed, the circuit of the torpedo magnet F is closed also, and the machine will be out of action. As soon however, as a train enters section X the track circuit 2 will be completed through the path of shorter resistance afforded by the wheels and axles of the train, the track relay consequently will be cut out and de-energized, thus breaking the circuit 2 at m, and rendering the magnet F also inactive, with the result of closing the break in the hammer actuating mechanism. Thus so long as a train is on the section any following train on striking the bar lever E will at once explode a torpedo; and the same will be true if there be any break in the section rails or any misplaced switch in the section.

In the arrangement shown in connection with section Y, the torpedo apparatus is likewise controlled from a track circuit, not immediately however, as in the other instance, but mediately and through the agency of a visible signal S, so arranged as to operate a circuit making and breaking switch in the circuit 2 of the torpedo magnet F.

The signal itself is normally at safety by operating mechanism controlled by electrical appliances in a normally closed track circuit 1 in a well known way—as shown for example in my Letters Patent No. 499,125, of June 6, 1893. The torpedo magnet circuit 2 is normally closed also. When however, a train typified at R is on the section, the signal (as represented in the drawings) goes automatically to danger, and in so doing it operates the switch (typified at *s*) to break the torpedo magnet circuit 2.

These examples will serve to indicate the manner in which my invention can be applied to existing systems of block signaling.

In the last described arrangement it will be noted that it is quite impossible for the torpedo machine to block the signal or to interfere with it in any manner whatever no matter how delicate the signal may be, since the latter simply operates a switch or circuit changer by means of which the machine is controlled. This feature is of course material, as any attachment to a signal which is in the slightest degree liable to block that signal at safety when it ought to go to danger is worse than useless.

As regards the machine itself the torpedoes are cased securely in the machine free from molestation, and they are at such height above ground as to be kept from wet and dampness. The bottom of the case of the machine will of course have suitable openings in it to furnish abundant clearance for the exploded shells to fall without clogging the machine, as well as to permit the noise of explosion to be more distinctly heard.

I also remark that in lieu of the springs used to influence the armature lever, and the rotatable torpedo carrying frame, I may employ other suitable instrumentalities such as weights, &c., or may in some instances depend on gravity.

Having described my improvements and the best way now known to me of carrying the same into effect I state in conclusion that I do not restrict myself to the particular mechanical details hereinbefore set forth in illustration of my invention, since manifestly the same can be widely varied by the skilled mechanic; but

What I claim herein as new, and desire to secure by Letters Patent, is—

1. In a torpedo signal apparatus, the combination with the hammer or striker, of actuating mechanism therefor having in it a break which when open permits that part of the mechanism on one side of the break opposite from the hammer to move without influencing the hammer, and an electro-magnet and armature therefor operating to open or close said break according as the magnet is active or inactive, substantially as and for the purposes hereinbefore set forth.

2. In a torpedo signal apparatus the combination with the track lever and the hammer, of intermediate motion transmitting mechanism comprising a vibratory arm adapted to engage a toe or projection and capable of movement into and out of the path of that projection, and an electro-magnet and armature whereby the vibratory movement of said arm is controlled, substantially as and for the purposes hereinbefore set forth.

3. In combination, the pivoted track lever, the upright rod pinned to said lever, the vibratory armature lever carried by the upright rod, the toe or projection against which said vibratory arm acts, the rock shaft on which said toe is mounted, a hammer mounted upon the same shaft; and an electro-magnet whereby said armature lever may be influenced, the combination being and acting substantially as hereinbefore set forth.

4. The combination with the normally closed track circuit and track relay included therein, of a torpedo apparatus having a break in its exploding mechanism and an electro magnet whereby said break is opened or closed according as the magnet is active or inactive, and a normally closed circuit including said electro-magnet and completed through contacts controlled by the track relay, substantially as set forth.

5. In combination with the hammer actuating mechanism, and the electro-magnet controlling a break in said mechanism, a visible signal and an electric circuit including said electro-magnet and completed through contacts controlled by the visible signal, substantially as and for the purposes hereinbefore set forth.

In testimony whereof I have hereunto set my hand, before two subscribing witnesses, this 13th day of February, 1894.

JACOB W. LATTIG.

Witnesses:
EDWARD J. MALLOY,
JOSEPH F. CASKEY