AUTOMATIC SIGNAL AND BARRIER DEVICE FOR RAILROAD CROSSINGS

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1 Claim. (Cl. 39—42)

This invention relates to the art of signaling devices and particularly concerns an arrangement of apparatus for automatically signaling the approach of a train to a vehicular railroad crossing and for automatically lowering suitable barriers to vehicles at the crossing. The invention further concerns a novel barrier device for a vehicular railroad crossing.

It is a principal object of the invention to provide automatic means actuated by a train near and in a vehicular track crossing to signal the approach and presence of the train and to operate a vehicular barrier.

It is another object of the invention to provide a unique arrangement of signals and barriers at a railroad track crossing for vehicles.

It is another object of the invention to provide a flexible barrier for a railroad track crossing.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claim in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a plan view of a portion of double track railroad including a vehicular crossing, wherein signaling apparatus embodying the invention is installed.

Fig. 2 is a perspective view of a barrier device employed at the vehicular crossing, on an enlarged scale.

Fig. 3 is a sectional view taken on lines 3—3 of Fig. 2.

Fig. 4 is a plan view of a vehicle crossing a track with the yielding barrier member in guard position.

Fig. 5 is an elevational view of the crossing with the barriers in guard position with a vehicle under one barrier member.

Fig. 6 is a circuit diagram of an arrangement for energizing an electrical device.

In Fig. 1 is shown a portion of a railroad having two tracks T. Each pair of tracks has five sections. The two outer sections 10 are the conventional tracks mounted on ties 11. These sections extend for an indefinite distance from the vehicular crossing C. A pair of intermediate sections 12 are located a definite distance from the crossing starting at a point at which it is desired to actuate the alarm apparatus that a train is approaching the crossing. These sections 12 are limited in length to the distance of train travel considered safe before the barriers B are operated. The central section 14 of the trackage is sufficiently long so that the barriers B can be operated before the train reaches the crossing. This section of trackage extends through and beyond the crossing. At the crossing are platforms 16 disposed between the blocks 17 of buildings, houses, etc., indicated by dotted lines.

The several sections of tracks are mounted on electrically non-conductive ties 11. The ends of the several sections of track are spaced a short distance D apart, and the tracks in each section are insulated electrically from each other. It is intended that electrical contact between the tracks in each section be made through the train when it is disposed in that section. The wheels 19 and axle 20 represent such an electrically conductive train portion which electrically connects the two tracks of the section of trackage entered upon by the train approaching the crossing.

At each end of the crossing is a pole-type barrier B to be described in detail below. Near the crossing is a siren 21 and a traffic light 22. Near the end of the street S beyond the crossing is another siren or a bell 23 and another traffic light 24.

A battery 25 or other source of electrical power is provided to activate the alarm and barrier apparatus. Lamp 24 preferably provides an amber warning light and bell 23 provides an audible warning signal that a train is approaching. The lamp 24 and bell 23 are connected in parallel with each other and in series with the tracks in sections 12 as shown by wires 29 in Fig. 1. Wire 30 is connected to power source 25. Wires 28 provide the return circuit from the tracks of section 12 to the power source.

The tracks in the central section 14 are connected to wires 31 and 32. Wires 31 are connected to the parallel arrangement of a motor 33 shown in Fig. 3 and used in the barrier B, siren 21, and lamp 22. Lamp 22 preferably provides a red light and the siren is quite loud and indicates that a train is in the central section 14 of trackage. Wires 23 are connected from the power source to the motors of the barriers B, the several lamps 22 and sirens 21. Only the electrical connections at one side of the crossing are shown since the connections to the lamps 22, 24, audible signal devices 21, 23, and barriers B at the opposite side of the crossing are connected in parallel with the corresponding numbered members on the first described side of the crossing.

In Fig. 1, wheels 19 with axle 20 are shown completing the early warning circuit of the central track section 12, so that lamps 24 are lit and bells 23 are sounding. In addition, in Fig. 1 another set of wheels 29' and axle 20' are shown in central section 14 on the other track to indicate that a train is in this section, so that the electrical circuit is also completed through lamps 22', sirens 21', and the actuating motor 33 of the barrier members B. Thus the barrier poles P are shown in closed or guarding position at the crossing.

In Figs. 2 and 3 is shown the barrier B including a flexible pole P. This pole is preferably made of a white or brightly colored plastic material such as polyethylene, nylon, Fiberglas, or the like. It is required that it be quite tough but resilient to bend through an angle of about ninety degrees in all directions without breaking. The pole may have red or other brightly colored strips 35. The pole is widest at its base and tapers to a narrow tip. The several tips of the adjacent aligned poles in guard position are spaced a short distance apart as shown in Fig. 1. Each barrier assembly consists of a pair of barrier poles P each mounted in its own housing 36. The housing 36 is a closed hollow casing which has a wide slot 37 in part of its front side 38 and top 39. The pole pivots on a shaft 40 journaled in the sides 41 of the housing. At the base and tip of the pole 16 is shown 42 formed with gear teeth. These teeth mesh with teeth of the spur gear 43. Gear 43 is mounted on shaft 44 journaled in the sides of the housing 36. Juxtaposed to gear 43 is a pulley 45. The pulley is frictionally mounted on shaft 44.

An endless belt 46 is engaged on pulley 45 and another pulley 47 mounted on the shaft of the motor. Power is
supplied to the motor via wires 31 and 32. A spring 50 is attached to lever 51 which is securely attached to the base of the pole P. When the motor is energized and rotating the pole is lowered to a horizontal position and is stopped and supported by the lower edge of slot 37 on the front wall 38. The motor continues to rotate as long as power is supplied thereto but slippage occurs of the pulley 45 in a friction clutch-like arrangement so that the pole remains extended horizontally in the guard position. When the motor ceases rotation as the power is cut off the spring 50 returns the pole to the vertical elevated position.

In Fig. 4 is shown a vehicle V such as an automobile crossing the track T between platforms 16. Poles P have descended into horizontal guard position before the automobile left the platforms. The flexibility of the poles permits them to bend so that the vehicle can continue through them as shown. The poles yield and separate and do not damage the vehicle, nor are the poles damaged in separating. As soon as the car has left the crossing the poles spring back to their normal guard positions.

In Fig. 5 is shown the pole action when a vehicle V is present in the crossing and one pole P of the barrier descends on the vehicle. Because of the friction clutch arrangement of the pole actuating means, the pole will be held in the elevated position shown in Fig. 5 and will at once descend when the vehicle leaves the crossing clear of the pole barrier. The pole is of course also flexible in a vertical plane as shown by the dotted line configuration P' in Fig. 2 where the pole is bent in an arc. Arrow 55 indicates the horizontal plane flexibility of the pole in Fig. 1, and arrow 56 indicates the vertical plane flexibility. Since the pole is flexible in all directions in a vertical plane regardless of the angle of contact of the pole with a vehicle leaving the crossing belatedly, no damage will be done to the pole barrier or to the vehicle.

The apparatus thus described includes the early warning visible and audible signals when a train is in the remote sections 12 about a mile or so from the crossing. The apparatus further includes the automatically operated barriers, and visible and audible signals when the train is in the central danger section of trackage 14 near or at the crossing C. The barriers B remain closed as long as the train is in the central section 14, and the warning signals continue as long as a train is in one of the remote sections 12. When the train is wholly within a remote portion 10 of the trackage then all signals are automatically deactivated and the barriers are automatically lifted. The barriers B are of course lifted when the train has left the central danger section 14 wholly and enters a section 12. A particular feature of the barriers to be noted is that they fully guard and block the crossing when lowered yet they will permit a vehicle to make an emergency passage over the tracks if necessary when the train is not actually in the crossing.

If it is found undesirable that a high voltage be applied to the tracks T by power source 25, then power source 25 may be a low voltage source having a potential just sufficient to energize a relay. This relay, as shown in Fig. 6, may have a coil 27, core 26, an armature carrying movable contact 15, and a stationary contact 15'. Each of the signals 21, 22, 23, 24, as well as motor 33, will be connected across the contacts 15, 15' as represented by the electrical device E in Fig. 6. Another high powered electrical energy source 18 is in series with contacts 15, 15' and the electrical device E. Wires 31 and 32 serve to conduct a current to energize the relay coil 27 whereupon the contacts 15, 15' close and the device E is energized.

It is to be understood that the bells and the barrier poles may be activated by any suitable mercury or quick silver switch placed at any desired distance from the crossing.

While I have illustrated and described the preferred embodiment of my invention, it is to be understood that I do not limit myself to the precise construction herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claim.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

A gate element for a railroad crossing comprising a hollow block-shaped housing having a communicating slot in its front and top walls, a shaft journalled in the side walls of the housing and extending across said slot, a flexible tapered pole having its large end pivotally connected to the shaft in said slot and movable therein and having its other end extending outwardly of the housing and flexible laterally, a metal insert on the large end of the pole in the slot forming an extension thereof, another shaft journalled in the side walls of the housing and extending across said slot parallel to the first-named shaft, a gear on said second-named shaft disposed in the slot, a pulley on the same shaft adjacent said gear, gear teeth on the metal insert on the pole in mesh with the teeth on the gear, a motor mounted in the housing, means of connection between the motor and the pulley for rotating the shaft mounting the gear whereby the pole may be raised, and a spring in the housing having one end connected to the large end of the pole and its other end anchored to the housing for lowering said pole when the motor is turned off.

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