AUTOMATIC SIGNALING AND CHECKING APPARATUS FOR RAILWAY-SIGNALS.


To all whom it may concern:

Be it known that I, Iwan von Korotkiewitsch, a subject of the Emperor of Russia, residing in Warsaw, Russian Empire, have invented new and useful Improvements in and Relating to Automatic Signaling and Checking Apparatus for Railway-Signals, of which the following is a specification.

The present invention relates to an automatic signaling and checking apparatus for railway signals the object of which on the one hand is to warn the locomotive driver and the officials on the train by means of a detonator signal, which can be heard for a considerable distance of the danger of entering a station when the signal is at danger, and on the other hand, to indicate exactly how many vehicle axles pass a signal at danger so that it is possible to answer with certainty the question as to whether the signal was set at danger before the passage of the train or only later during or after its passage, which is a question that frequently has to be settled in order to determine the blame attaching to the various railway officials when an accident occurs.

The automatic signaling and checking apparatus broadly is provided with a yielding reservoir arranged beneath the track and an apparatus connected therewith by means of a pipe for receiving pressure and transmitting this pressure for the purpose of signaling and recording.

My invention consists of structural features and relative arrangements of parts which will be hereinafter more fully described and particularly pointed out in the appended claims.

In the drawings: Figure 1 is a side elevation of the pedal device, Fig. 2 is a section on line a—a of Fig. 1, Fig. 3 is a section on line b—b of Fig. 1, Fig. 1 is a diagrammatic view of the operation or give of the rails, Fig. 2, is a sectional view of the semaphore operating means, Fig. 3, is a side view of Fig. 2 with one side of inclining casing removed, Fig. 4, is an enlarged elevational view of a section of Fig. 2, and Fig. 5, is an enlarged detail view. Fig. 6 is a perspective view showing the different parts of my invention in their assembled or working position.

Referring to Figs. 1, 1* and 1*, the yielding reservoir, the action of which depends upon the “give” of the rail during the passage of the train, consists of a flat thin walled receptacle 3, fixed on a beam 2. It is fixed directly to the rail by means of bolts and indirectly by means of rod connections 1, in such a manner that owing to the pressure exerted by the undulatory “give” of the rail the reservoir 3, is compressed from above and from below, and its internal volume considerably reduced. In order to attain this object in a different and probably better manner the connections may be arranged at such intervals as correspond approximately to the usual minimum interval between adjacent vehicle axles, (see Fig. 1*). By means of a pipe 5, the reservoir 3, communicates with the rest of the signal mechanism fixed to a semaphore, and is filled with any suitable non-freezing liquid serving as a pressure-transmitting medium, (see Figs. 2, 3 and 4). At its upper end the connecting pipe 5, opens into a reservoir 8, which is provided with a liquid gage pipe 9, inserted through an outer opening 10, by means of which the entire signaling apparatus can be filled. The reservoir 8 consists of two vertical cylindrical chambers 8* and 8†, of different dimensions, which are arranged in proximity to each other and communicate through an opening and of a third and lower chamber 8‡, located between the mouth of the said pipe and the lower openings of the two vertical chambers 8* and 8†.

In this lower chamber 8‡ immediately beneath the opening of the upper vertical chamber 8*, a cut off valve 8§, is suspended from rod 8¶, to the semaphore board 18, by means of a chain 19, and a compensation spring 20, in such a manner that when the signal is at danger, that is to say, when it occupies the horizontal position, the valve 8§, shuts off the upper chamber 8* and leaves only the communication between the lower chamber 8‡, and smaller vertical chamber 8§, free. When the signal is “off” on the other hand, that is to say when it occupies a position 45° from the horizontal, a free passage
is provided between the lower chamber 8
10, and two vertical chambers 8 and 8.

A tight fitting piston 11, is arranged in the smaller vertical cylindrical chamber 8,
15 which is open at both ends, said chamber together with the rest of the detonating and checking mechanism is arranged in an appropriate casing 6. The piston 11 when it is in its lowest position as shown in Fig. 2, closes the aperture connecting chambers 8 and 8, that is to say, cuts off communication between the two vertical chambers 8 and 8, while in a raised position it opens this aperture, and communication between said chambers.

The end of a lever 12, is connected with a shaft 12 which rests above the cylindrical chamber 8, provided with the aforesaid piston 11, and this lever connects the yielding reservoir 3, with the signaling and checking apparatus proper.

The shaft 12, mounted in a suitable frame 7, fixed to the cylinder casing 7, carries the lever 12, already referred to together with a pawl 12, and a cam 12; said lever and cam being arranged in such a manner, that when the lever 12 rests on the head of the piston 11, the pawl 12 is adapted to hold the weight 13, by the projecting collar 13, in its raised position, and when the lever 12 is raised, and the shaft 12 rotated, the pawl 12, releases the weight 13, to slide down the rod 14, striking against small rod or rods 15, and producing the detonation by exploding suitably arranged cartridges 16.

The cam 12, becomes operative simultaneously with the pawl 12, and when the shaft 12, is rotated, it is adapted to lift the lever 21, by means of the cam engaging with a roller with which the lever is provided, the latter being rotatable about a suitably arranged shaft 21 supported in a bracket; by this means the pawl 22, connected with lever 21, and held from above by a spiral spring 24, rotates a ratchet wheel 23, to the extent of one tooth. The position of the ratchet 23 is firmly held by means of any suitable means as a pawl.

It will of course be understood that this signaling and checking apparatus is operative only when the signal is at danger that is to say when the semaphore arm occupies the horizontal position.

The operation of the device is as follows: The reservoir 3 is compressed on both sides by the indolatory “give” of the rails, and its liquid contents ascends through the pipe to the chamber 8, where when the valve 84 is lifted it finds access to the chamber 8a cut off, and hence the piston 11, being raised, the lever 12, which is thereby lifted, rotates the shaft 12 and causes the weight to be released and fall, and by striking against the cartridges this weight produces the detonation signal. Simultaneously, owing to the lifting of the cam 12, in the manner described, the ratchet wheel 23 is rotated to the extent of one tooth. This is repeated each time a vehicle axle passes over the reservoir 3, so that it is possible to determine exactly how many axles of a given train have passed a signal at danger, thereby affording direct and indisputable evidence as to the responsibility of the various officials in case of accident.

Another device is also connected with the detonating mechanism: Upon the weight 13, an arm 17, is suspended and when the weight slides down it protrudes from the casing 6, and owing to the fact that it is appropriately hinged at 17a, and loaded at 17b, it assumes the horizontal position, as shown in Fig. 4. This projecting arm is a visible sign that the signaling mechanism has acted and that it must again be set for proper operation.

The signaling apparatus is filled to about half the height of the gage pipe 9, for the reason that with such a large excess of liquid there is no danger of any evaporation of liquid due to variation of temperature and thereby destroying the proper operation of the apparatus.

What I claim as new and desire to secure by Letters Patent is:

1. A combined signaling and checking apparatus comprising a railroad track, a yielding reservoir connected with said track and whose volume is decreased by the motion from the track of the railroad, a signal, a checking device, means for connecting and disconnecting said reservoir from the checking device consisting of a receptacle having two vertical and intercommunicating chambers and a lower chamber communicating with said vertical chambers, a valve for closing the communication between the lower chamber and one of said vertical chambers and connected with the signal, a movable piston in the other vertical chamber adapted to close the communication between the two vertical chambers and transmit its motion to the checking apparatus.

2. A combined signaling and checking apparatus comprising a railroad track, a hollow yielding reservoir connected with and receiving motion from the track, a signal, a checking device, means for operating said checking device consisting of a receptacle provided with a pipe connecting with the yielding reservoir, said receptacle consisting of two vertical and intercommunicating chambers, and a lower chamber communicating with the vertical chambers, a valve for closing the communication between the lower chamber and one of said vertical chambers, and connected with the signal, a movable piston in the
other vertical chamber adapted to close the communication between the two vertical chambers and transmit its motion to the checking device, whereby when the signal is off, the valve permits the fluid forced from the reservoir to pass freely into all the chambers of the receptacle, while when the signal is at danger the inlet to one of the vertical chambers is closed and the liquid is caused to lift the piston, and operate the checking device.

Iwan von Korotkiewitsch.

Witnesses:

Viktorin von Louin,
Hirsch von Rabtnouris.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D.C."