W. H. WATSON.

AUTOMATIC BLOCK SYSTEM.

APPLICATION FILED MAR. 24, 1908.

1,068,614.

Patented July 29, 1913.

Fig. 2

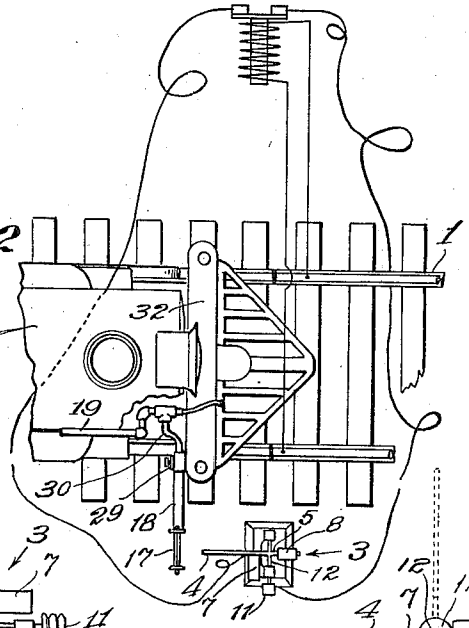


Fig. 3.

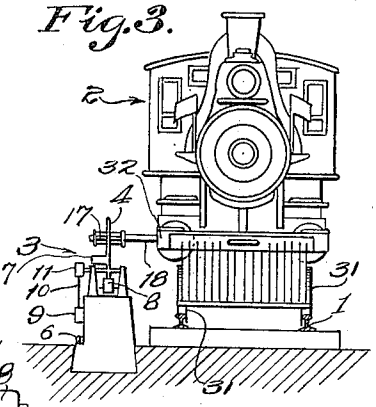


Fig. 6.

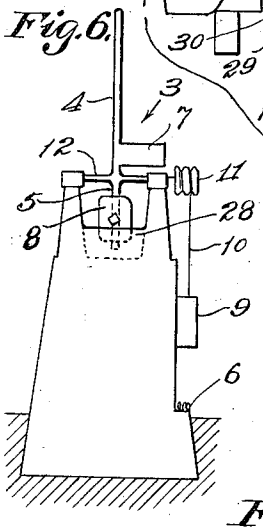


Fig. 7.

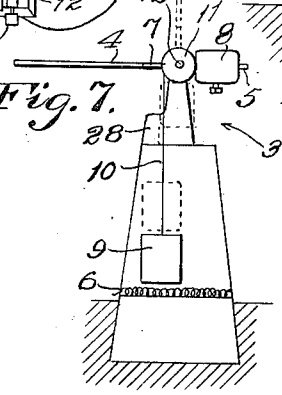


Fig. 4.

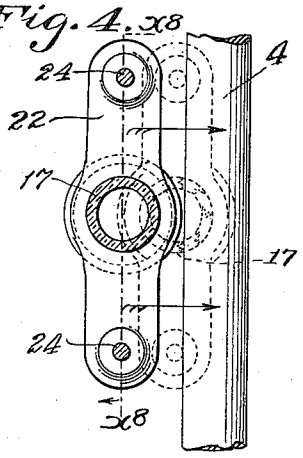


Fig. 1.

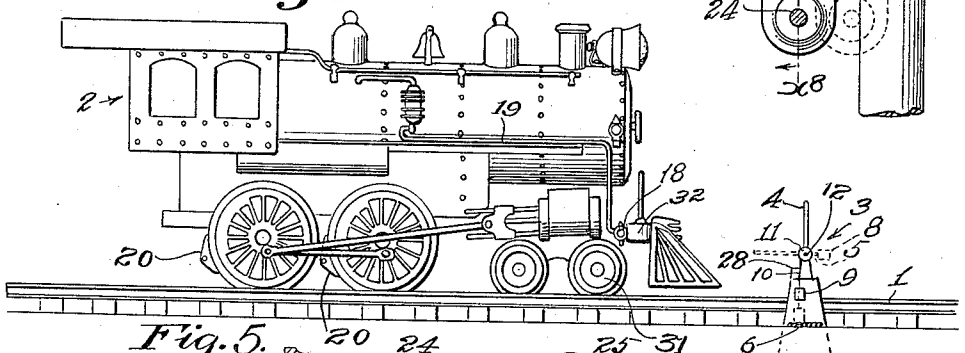
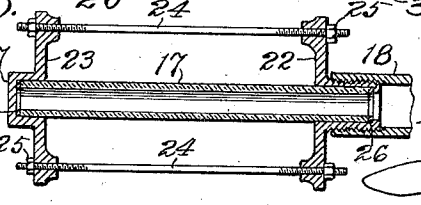


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM H. WATSON, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-FOURTH TO ZEPHYR H. HUTCHINS AND ONE-FOURTH TO JOHN T. BUTLER, BOTH OF LOS ANGELES, CALIFORNIA.

AUTOMATIC BLOCK SYSTEM.

1,068,614. Specification of Letters Patent. Patented July 29, 1913.

Application filed March 24, 1908. Serial No. 423,023.

To all whom it may concern:

Be it known that I, WILLIAM H. WATSON, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Automatic Block System, of which the following is a specification.

This invention relates to automatic means for preventing collisions and other accidents from occurring to cars, locomotives or trains, on steam, electric, or other railways.

An object of the invention is to provide cheap and simple means certain in operation, whereby the car, locomotive, or train on a railway may be automatically and positively stopped at the beginning of any block for which the danger-signal is given, thus to positively guard against accidents which might occur through inattention of, or by the slumber or death of the engineer.

The invention is designed to employ the usual block signal mechanism with the exception that the semaphores are located near the track and are arranged in position to be engaged by a part projecting from one side of the locomotive, car or train, and to thereby set into operation the means provided for bringing the locomotive, car or train to a standstill.

I do not propose to limit the invention to any specific construction of signaling apparatus or brake mechanism, for the reason that any well-known system of air or magnetic brakes may be employed for stopping the car, locomotive or train, and any well-known brake signaling system may be employed for actuating the means for setting the braking mechanism into operation. For this reason the drawings hereto appended need not show in detail any of the working parts excepting those new parts by which my invention is made practicable.

The invention is equally applicable to single and multiple track railways, and the semaphores are arranged alternately on opposite sides of the railway, and the means carried by the train for automatically setting the braking mechanism into operation will be carried by one side only of the locomotive, car or train.

The distances apart at which the semaphores are set, and the dimensions, proportions and materials employed may be varied without departing from the principle of this invention.

In carrying out this invention it is necessary that the vehicle to be stopped shall be provided with automatic brakes constantly ready to be set into operation to stop the vehicle, and with an element carried by the train and capable of having its position or state changed by contact with an object stationed upon a right-of-way, and brought into position to intercept such element.

The element for putting the braking apparatus into operation may be of various kinds, and the stationed means for effecting the change of position or state of the same may be varied within the judgment of the constructor without departing from the broad spirit of this invention; but my invention includes not only the generic means of effecting the result, but also the specific means hereinafter set forth and illustrated in the accompanying drawings in which a frangible tube, preferably made of glass and held by slender rods, is carried by a vehicle, and an electrically-operated semaphore is arranged at the side of the track and is adapted to stand in the way of such frangible tube to cause a fracture of the same and a bending of the rods whenever the semaphore is in danger-indicating position, and the vehicle moves beyond the semaphore.

Semaphores of various constructions may be used, and in the accompanying drawings I shall illustrate the form I at present deem most desirable. For convenience, the invention will be illustrated as applied to a locomotive.

The semaphore or signal may be operated by an electric motor, or by an electro-magnetic contrivance or solenoid, or by any contrivance adapted for the purpose. Any form of obstruction against which the frangible tube may strike and by which it may be broken, will serve the purpose of stopping the train. I shall illustrate the invention as applied with a gravity-operated signal held in position by a solenoid.

The accompanying drawings illustrate the invention.

Fig. 1 is a side elevation of a locomotive on a track and approaching a semaphore that is up ready to intercept the frangible tube. Dotted lines indicate a position to which said semaphore may be brought to allow the locomotive to pass cautiously onto the block in case the engineer discovers the

signal in time to stop his train without the use of the automatic. Said dotted position is the safety position in which the signal normally stands while the track is clear. Fig. 2 is an enlarged fragmental plan of the engine and track at the left of Fig. 1. Fig. 3 is an elevation looking to the left from the front of the engine in Fig. 2. Fig. 4 is an enlarged, fragmental, sectional plan showing in solid lines the frangible member at the moment before contact with the danger-signal. Dotted lines indicate the action upon a further advance of the locomotive, and show the possible state of the frangible tube for setting in motion the brake-mechanism. Fig. 5 is a vertical axial section on line w^8, Fig. 4, looking to the left. Fig. 6 is an elevation on an enlarged scale of the signal in danger position viewed from the side toward which the engine approaches. Fig. 7 is an elevation from the right of Fig. 6. The signal is shown in safety position in solid lines, and in danger position in dotted lines.

1 designates the usual railway track, the rails of which are bonded in the usual way, not shown, for operation of an electromagnetic semaphore.

2 designates a locomotive on the track. 3 designates a semaphore or signal on one side of said track.

4 and 5 designate semaphore arms constructed to normally stand in danger position and operable from such position to safety position in the usual manner by electrically-controlled mechanism, as a solenoid 6 that normally holds the semaphore arms 4, 5, in safety position.

The semaphore arms may each be provided with a target, as 7 and 8. The target 8 may be a weight of sufficient gravity to hold the arm 4 erect except when the solenoid 6 is active to draw down the weight 9 that is connected by a cord 10 fastened to and wound on a drum 11 that is fixed to the shaft 12 that carries the semaphore arms.

17 designates means in the form of a frangible tube connected with a pipe 18 that in turn is connected with a train-line 19 of the air-brakes 20. Thus the tube is connected to set in operation the brake system of the train when the tube is broken. Said tube 17 is arranged to be readily detachable from and attachable to the pipe 18, and whenever the tube strikes a danger signal the tube breaks, the train line is thus opened and the brakes at once applied. When the train has come to a standstill the engineer may readily replace the broken tube with a new one, and his train will again be in commission to proceed carefully over the track which has been blocked. The danger-signal may then be held down while the engine is allowed to cross over and be piloted over the track to determine what the obstruction is.

It is to be understood that the station train order signals will also be constructed in accordance with this invention so that unless the station agent is attentive to manually lower the signal the train cannot proceed. In order to guard against breakage from vibration of the locomotive, the frangible tube may be held between two shouldred heads 22, 23 which are slipped over the ends of the tube and are connected by slender upper and lower truss rods 24 that are passed through the heads on either side of and parallel with the tube 17 and that are threaded on their ends for nuts 25 so that the tube may be firmly secured between the heads against excessive vibration. At the connections between the heads 22, 23 and the open ends of the tube 17 are provided gaskets 26 in the usual manner of securing water glasses to boilers, excepting that one end of the tube is capped in any suitable manner and in the instance shown consists of a cap 27 which is integral with the shouldered head 23. The head 22 is screwed or otherwise fastened to the open end of the pipe 18 of the train line in such position that the tube 17 and rod 24 will contact with the raised arm 4 of the semaphore at which contact the tube will be broken and the truss rods will be readily bent aside.

The utility of the rods 24 is evident, since the tube is reinforced vertically against excessive vibration tending to break it, but said rods being of small cross section relative to the semaphore arm 4 may be readily bent aside by the semaphore arm.

In the form shown, 28 is a stop against which one arm of the semaphore will come to rest when the semaphore is in danger position. The semaphore-arm 4 is adapted to move downward from danger position toward the direction from which the vehicle to be signaled will approach, and the stop 28 is arranged to prevent the bar from being moved downward in the opposite direction, so that when the means for setting the brakes into operation engages said arm the same will be so acted upon as to set the brakes into operation regardless of the speed at which the vehicle may be moving. The purpose of this is to prevent the vehicle from creeping past a danger signal.

In order to throw the automatic stopping device out of commission, the air line pipe 18 may be mounted on a pivot 29 and connected by flexible connection 30 with the air-brake train-line 19, so that when the engine is taken off the train at the terminal, the pipe 18 may be swung up and over the track so as to no longer project from the locomotive. It is desirable to mount the pipe 18 just behind the pilot-beam 32 so

that the device for setting the brakes into operation will pass the signal in safety position before the front truck wheels 31 enter the block, because as soon as the vehicle wheels enter the block a short circuit is effected and the signal is set to danger position.

The wiring by which the semaphores will be appropriately operated is only shown in part, as the same may be variously installed within the judgment of electrical engineers without departing from the spirit of my invention.

Ordinarily the engineer will be able to note the danger signal so that the destructible devices 17 and 24 which are designed to set the brakes will not be brought into contact with the arm. When such contact occurs and the glass is broken the engineer will, before starting his engine, remove the nuts 25 and rods 24 and will restore the glass tube 17 and the rods 24 with new.

By locating the arm or pipe 18 as shown, projecting from the side of the locomotive in front of the cab, it is always in view of the engineer, who is thereby able to note when it is in and out of commission; and the pipe 18 is preferably located near the pilot 32 so that it is readily reached for the purpose of restoration.

By locating the semaphore arm 4 beside the track and at the level of the pilot it is out of the way of laborers working on or repairing the track and is in plain view of the engineer.

I claim:—

1. In an automatic block signaling system the combination with a locomotive having air brake appliances of an extensible and withdrawable arm at the level of the pilot provided at its end with a frangible tube and slender rods to hold said tube, means communicating with said tube to set in operation the brake system of a train when the tube is broken, and a semaphore provided with an arm adapted to extend in signaling position beside the track at about the level of the pilot thereby to be engaged by said tube substantially as and for the purpose set forth.

2. In an automatic block signal system, a brake system having a train line, a frangible tubs, two heads to hold said tube, slender rods connecting the heads; one of said heads being a cap and the other head being open and connected with the train line of the brake system.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 4th day of March, 1908.

WM. H. WATSON.

In presence of—
JAMES R. TOWNSEND,
Z. H. HUTCHINS.