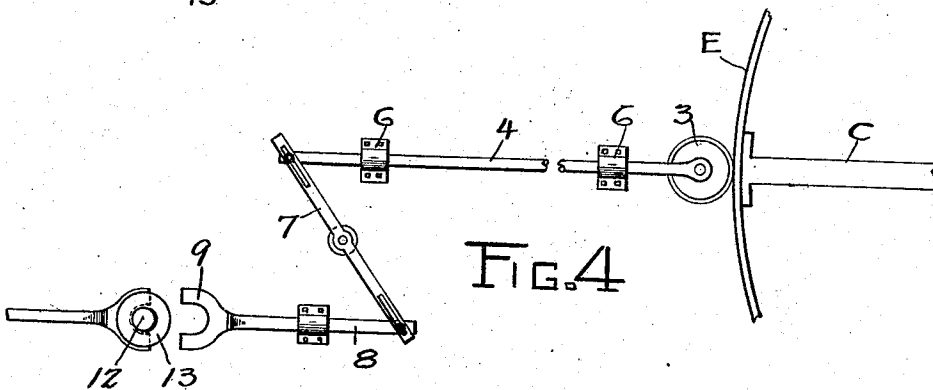
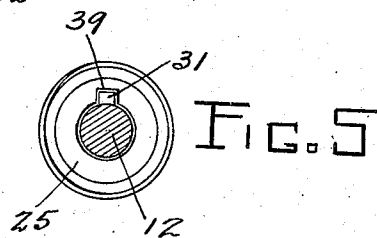


942,189.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC TRAIN-STOP.

942,189.

Specification of Letters Patent.

Patented Dec. 7, 1909.

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To all whom it may concern:

Be it known that I, WILLIAM J. SOSEENE, a subject of the Czar of Russia, and a resident of Emeryville, in the county of Alameda and State of California, have invented a new and useful Improvement in Automatic Train-Stops, of which the following is a specification.

The invention relates to improvements in means for so controlling the operation of the air brakes of a moving train that the brakes will be automatically applied and the further progress of the train will be arrested before the train comes within unsafe proximity to the train ahead using the same track.

Brake operating means of the character to which this invention belongs include novel devices controlling the air-brake system of a train, and means external to the train for throwing the devices on the train into operation, with the result that when a train enters upon or approaches a block or section of road already occupied by a train, the progress of the entering train is arrested.

The object of the invention is to prevent a train from passing out of one block or section of road and entering on another when the block ahead is already occupied by a train.

Another object of the invention is to automatically apply the air brakes on the train as it enters upon the block already in use, such application of the air being gradual, so that the train will not be brought to an abrupt stop.

The condition of the block or section of road is indicated by a semaphore vane on the signal tower at the beginning of the block. The mechanism, employed in this invention, acts in conjunction with the semaphore and automatically applies the brakes, independent of the engineer, as the train passes a semaphore which is set to indicate that the block ahead is already occupied by a train.

The invention consists of novel means attached to the semaphore tower and arranged to put in operation the mechanism on the train adapted to cut off the flow of steam to the cylinders of the locomotive and to gradually apply the air brakes. The device on the semaphore tower engages with the mechanism on the train only when the semaphore is set to indicate a full block ahead and is

not operative when the block, being entered upon, is clear.

With these and other objects in view, as will more fully appear hereinafter, the invention consists in certain novel features of construction and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings and particularly pointed out in the appended claims, it being understood that various changes in the form, proportion, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a front view of a locomotive and a semaphore tower equipped with the apparatus of my invention, the semaphore being set to indicate that a train is in the block ahead. Fig. 2 is a plan or top view of the semaphore tower and part of the locomotive, showing the means on the tower for throwing the brake operating mechanism into operation. Fig. 3 is an elevation, partly diagrammatic, of the brake operating means located on the train; the dotted lines indicating the position of the parts during operation. Fig. 4 is a detail plan showing means for throwing the brake operating mechanism into operation. Fig. 5 is a detail view of the vertical shaft showing means for loosely attaching the worm gear thereto.

The sections, into which a line of road is divided for the purpose of this invention, are the usual blocks employed in various signaling systems, in use at the present time and no change therein is necessary for the application of this invention. The semaphore tower A is of standard construction, having a vane B which, in a horizontal position, indicates a full block and, when depressed, indicates a clear track. An arm C pivoted to the semaphore tower at the proper height is connected to the semaphore vane by the rod 2, so that the arm C moves in conjunction with the vane B, lying in a horizontal position when the vane is in that position. The arm C is counterbalanced so that little power is required to move it, and the power at present employed to move the semaphore vane B is also sufficient for moving this arm C.

A curved plate or tripper E on the outer end of the arm C is engaged by a wheel 3 of the mechanism on the train, and the rod

4 bearing the wheel 3 is forced inward as the wheel rides over the curved surface. The tripper plate E is formed with flaring ends and is provided with guard strips 5, along the edges, to constrain the wheel 3 to the proper path. The distance that the rods 4 on the train can project is determined by the clearance used in general practice in railway construction; hence the arm C must be made of such length that the wheels 3 will contact with the plate E and displace the rod 4 the proper amount. In the present construction, the rods 4 are shown placed above the cab of the locomotive, but it is evident that they could be arranged within the cab, or in any other part of the train which would be more convenient.

The rod 4 bearing the wheel 3 is slidably mounted in the bearings 6 and moves inward as the wheel runs up on to the high part of the plate E. A lever 7, pivoted at the center, joins the ends of the rods 4 and 8, and causes an outward motion of the rod 8 for a corresponding inward movement of the rod 4. The end of the rod 8 is formed in a U-shaped member 9, which acts as a latch to hold the vertical shaft 12 suspended. A collar 13 on the shaft rests on the U-shaped members 9, and when either of these are withdrawn, the shaft drops, thereby bringing the bevel friction gear 14 on the lower end thereof into contact with a similar gear 15 on one of the axles of the train which causes the shaft 12 to rotate. The latch members 9 are formed of the proper thickness to allow the gears 14—15 to come in contact when either of them are withdrawn.

A steam valve 16, located in the steam pipe between the boiler and the cylinders and normally open, is adapted to be immediately closed by the revolving shaft 12. A lever 17 on the valve 16 is connected to a pulley 18 on the shaft 12 by the cord 20, which winds up on the pulley as the shaft revolves. The end of the cord 20, formed in a noose and placed over the end of the lever 17, will slip therefrom when the valve 16 is closed.

The parts of the brake controlling appliance, which are carried on each train, comprise a valve controlled outlet pipe or passage through which communication between the train-pipe of the air brake system on the train and the atmosphere is established or is cut off, according as the valve is opened or closed. This valve, being independent of the engineer's valve, through which the brakes are controlled by the engineer in the usual stopping of the train under normal conditions, is located between the source of compressed air supply on the engine and the connection of the train pipe therewith and is placed in such position that it does not interfere with the usual handling and controlling of the train brakes on the part of

the engineer through the regular hand operated valve which is provided in the engine cab. By relieving at the proper moment, or reducing the pressure in the train pipe connection, the valve 22, on being operated sets the brakes throughout the train. But instead of being operated by hand, the same as the engineer's valve, the valve 22 is operated through the medium of the rod 23, connected to the segmental gear 24 which is actuated by the worm 25. The worm gear 25 is loosely fitted to the shaft 12, so that the latter can be displaced vertically without moving the worm, which is held in position in mesh with the segmental gear 24 by the bearings 26—27. A key 31 on the shaft is loosely fitted to a key-way 39 in the worm, thus causing the worm to rotate with the shaft. By fitting the worm loosely to the shaft and holding it in position by the bearings 26—27, it is prevented from riding up on the segmental gear 24, which would have the effect of raising the shaft 12 and separating the gears 14—15.

The segmental gear 24 is preferably made semicircular in form and in the normal position engages the worm 25 at its center, so that it can turn a quarter revolution regardless of the direction in which the train is traveling.

The valve 22 is adapted to be operated by the movement of the lever 28 to either side of the normal position. A radial slot 29 in the segmental gear is provided so that the rod 23 can be attached thereto at any point and so cause various displacements of the lever 28 for a quarter turn of the segment 24, according to various conditions of operation. The outer end 35 of the rod 23 is forked, forming two fingers which engage the spindle 30 of the fly-ball governor 32. The governor is arranged to be driven from the shaft 12 through the belt 33. As the governor revolves the balls are displaced, raising the spindle 30 and the outer end of the rod 23.

The lever 28 on the air valve is slotted to receive the pin 34 in the rod 23 and, as the rod 23 is raised, the pin slides in the slot, thus increasing the acting lever arm of the lever 28, and thereby causing a smaller displacement thereof for a given movement of the segment 24. These means are therefore arranged to open the air valve slowly and so cause the brakes to be applied gradually. The air valve is slightly opened when the segment has made a quarter turn and the outer end of the rod 23 is in the raised position. As the speed of the train is reduced, the governor balls come closer together, thereby lowering the rod 23 and further opening the air valve which causes the brakes to be set more firmly.

For the purpose of resetting the segmental gear 24 after the mechanism has operated,

the shaft 36 is fitted in the slot 37 of the bearing 38. The shaft may be unclamped from the bearing and slipped back in the slot 37, until the segment 24 is out of mesh with the worm 25. After the segment has been rotated to the proper position, it is placed in mesh with the worm and the shaft 36 is clamped in position.

The operation of the mechanism is as follows: The wheel 3 on the rod 4 comes in contact with the tripper plate E, thus causing the U-shaped latch 9 to be withdrawn from under the collar 13 and thereby allowing the shaft 12 to drop and bring the gears 14—15 into contact. Simultaneously, the steam is shut off, the governor raises the outer end of the rod 23 and the segmental gear turns slowly through a quarter revolution, thus opening the air valve slightly, which applies the brakes. As the speed of the train is reduced, the balls of the governor, revolving in a path of less diameter, lower the end of the rod 23 and open the valve wider, thereby applying the brakes more heavily. It is evident that other means could be employed for withdrawing the latch and allowing the gears 14—15 to come in contact, and I do not restrict myself to the exact method shown for accomplishing this result.

I claim,

1. In an automatic train stop the combination with a trip on the roadway of mechanism connected with the running gear to shut off the supply of steam to the cylinders; means for setting the mechanism out of contact with the running gear and releasing means therefor operated by the trip.

2. In an automatic train stop the combination with a trip on the roadway and an air brake system on the train of mechanism actuated by the movement of the train adapted to be put into operation by the trip to gradually apply the brakes on the train.

3. In an automatic train stop the combination with a trip on the roadway and an air brake system on the train, of mechanism operative by the movement of the train and arranged to be thrown into operation by the trip to gradually open the valve in the air pipe and cut off the supply of steam to the cylinders.

4. In an automatic train stop the combination with a trip on the roadway and an air brake system on the train of mechanism released by the trip and adapted to be op-

erated by the motion of the train to apply the brakes and a governor in said mechanism arranged to regulate the rate at which the brakes are applied.

5. In an automatic train stop the combination with a trip on the roadway and an air brake system on the train of means on the train thrown into operation by the trip to slightly open the air valve, and to vary the opening thereof inversely with the speed of the train.

6. In an automatic train stop the combination with a trip on the roadway and an air brake system on the train, of mechanism arranged to be thrown into operation by the trip to cut off the supply of steam to the cylinders, to slightly open the air brake valve and to increase the opening as the speed of the train is reduced.

7. In an automatic train stop, the combination with an air brake system on the train of a valve in the air pipe, a lever on said valve, an arm engaging the lever and arranged to slide thereon, one end of the arm being connected to a fly-ball governor to impart a vertical displacement thereto, the other end being connected to a segmental gear to impart a horizontal motion thereto, the gear and governor being operated from the axle of the train, and means external to the train for throwing said mechanism into operation.

8. In an automatic train stop an air valve connected with the train pipe, an arm to operate the valve, means to move the arm a limited distance to slightly open the valve and apply the brakes, means to gradually open the valve farther as the speed of the train decreases, and means external to the train for throwing said apparatus into operation.

9. An automatic train-stop comprising a shaft arranged to be rotated by an axle on the train, a worm gear on said shaft, a segmental gear in mesh therewith, means connecting the segmental gear with the valve controlling the air brake system; a fly-ball governor connected with such means to vary the opening of the valve inversely as the speed of the train and means external to the train for throwing the mechanism into operation.

WILLIAM J. SOSEENE.

Witnesses:

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H. G. PROST.