April 18, 1944. W. B. WAIT 2,346,883

TRAIN CONTROL FORESTALLING RECORDER

Filed Feb. 23, 1942 2 Sheets-Sheet 1

Fig. 1.

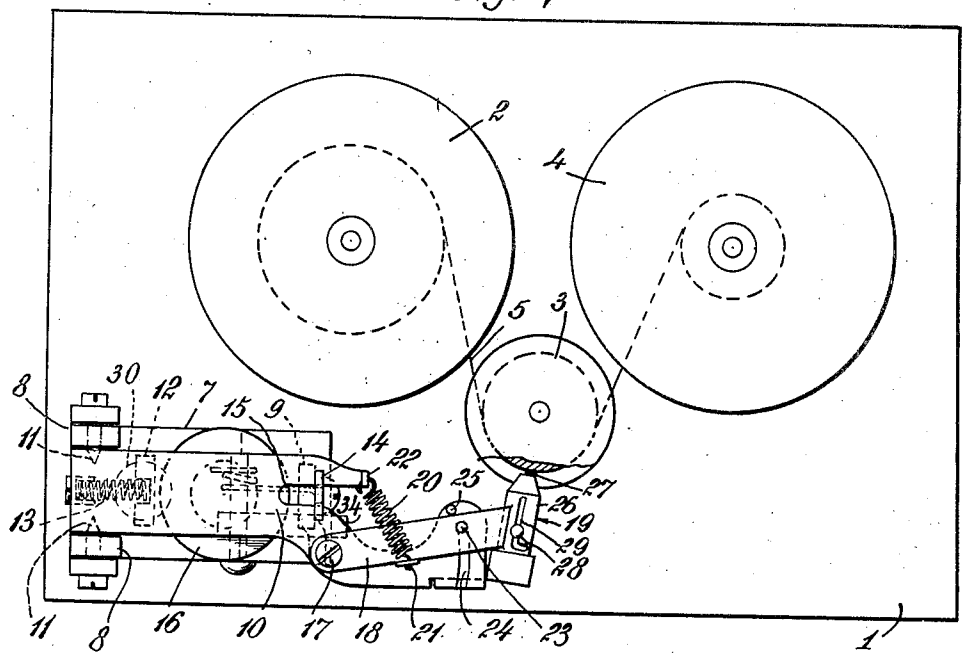
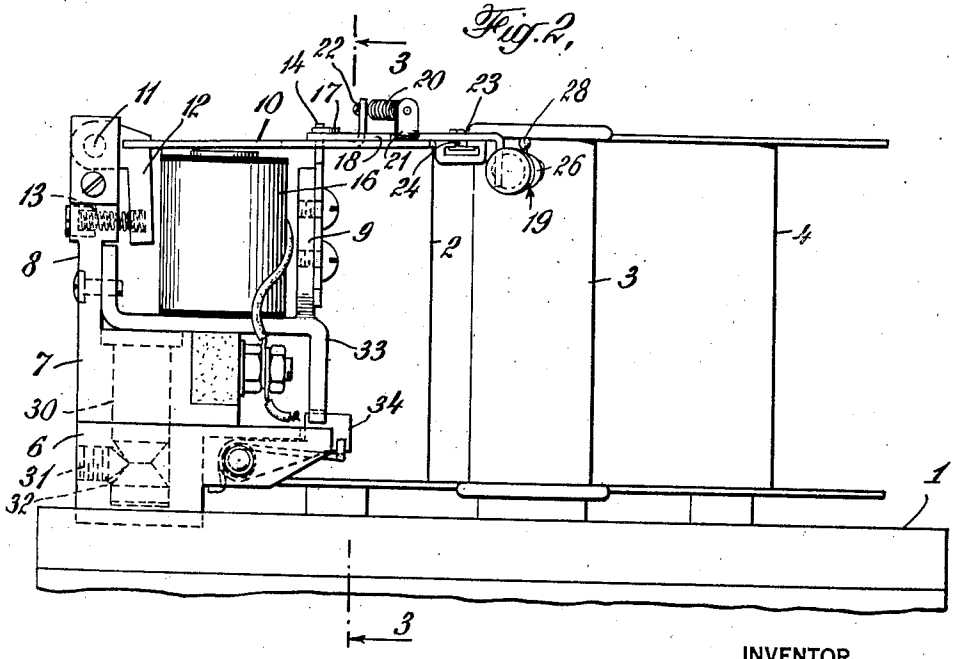


Fig. 2.



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Fig. 4,

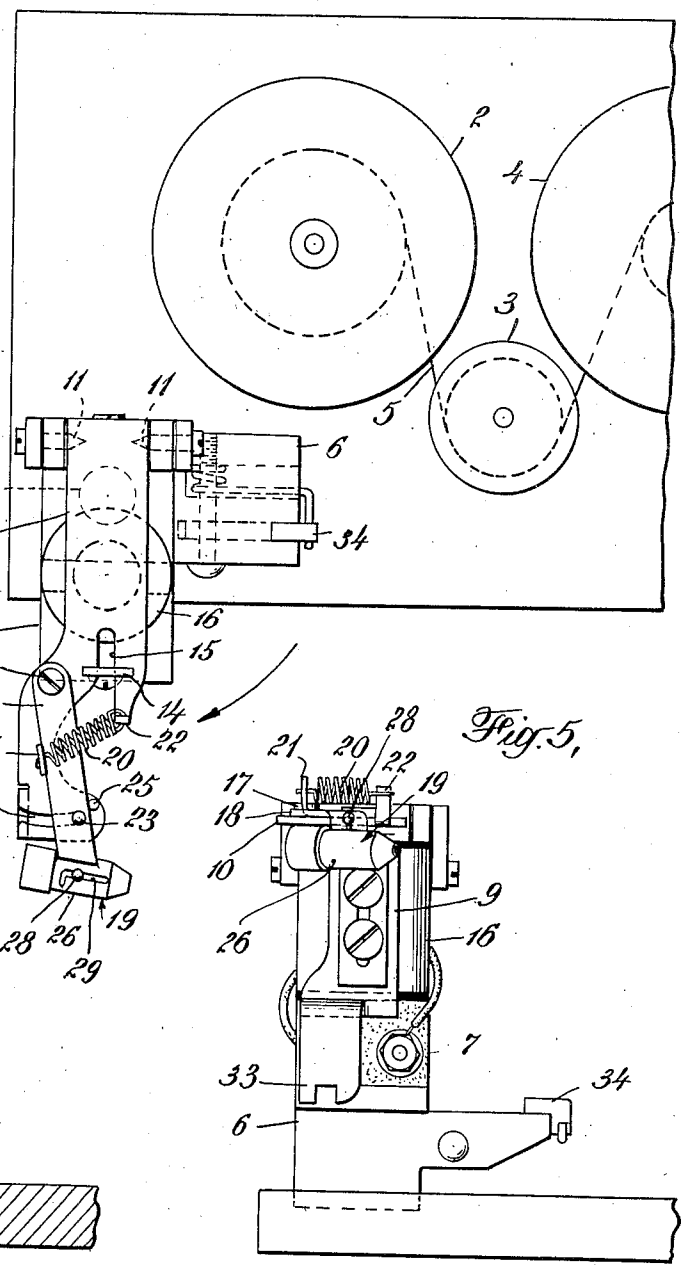


Fig. 3,

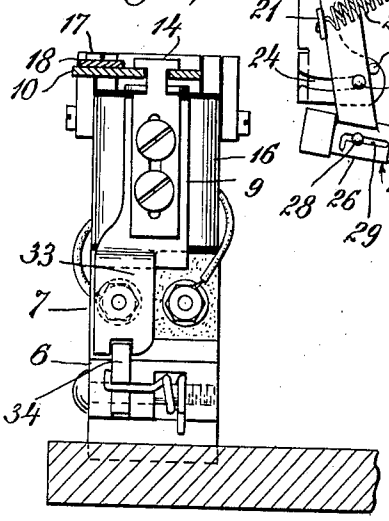


Fig. 5,

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UNITED STATES PATENT OFFICE

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TRAIN CONTROL FORESTALLING RECORDER

William Bell Wait, New York, N. Y.

Application February 23, 1942, Serial No. 431,925

1 Claim. (Cl. 234—72)

This invention relates to automatic train control forestalling recorders and has to do particularly with means for mounting the recording pencil so that it may be conveniently moved from operating position to permit renewal of the tape and the pencil lead without injury to the actuating mechanism.

Automatic train control systems generally in use in this country comprise means for automatically actuating the air-brake valve and applying the brakes of a train entering a block in which the wayside signal is other than clear. If the signal is yellow, indicating the need for caution only, and the track is visible to the engineer for a substantial distance ahead, it is neither necessary nor desirable that the train be brought to a full stop; best practice dictates that the engineer reduce speed to a prescribed maximum and proceed with caution. To enable him to do this, despite the automatic control, the locomotive is provided with a forestalling mechanism by means of which the engineer can manually forestall the automatic application of the brakes and "run the yellow." In fine the engineer has, and as a practical matter must have, means within his control for rendering the automatic safety system ineffective. This, of course, is dangerous if the engineer is careless or not alert. Means have, therefore, been proposed for limiting his use of the forestalling mechanism, such, for example, as means for automatically making forestalling impossible at engine speeds above a given maximum, or for automatically opening the forestalling circuits above a given speed. Such means are shown and described in my Patent No. 2,216,713, October 1, 1940.

Another effective method of ensuring care on the part of the engineer is to keep a graphic record on the speed record tape of each forestalling operation. An inspector can determine from such a record just when and where the engineer forestalled and the speeds at which it was done, and the knowledge that such a record is being made tends in train control territory to bring about a more punctilious observance of safety rules than might otherwise be expected. Such a forestalling record can be made in trains equipped with means for automatically limiting the speeds at which forestalling is possible, as shown in my patent, or in trains having no such limiting means.

The forestalling record is made on the speed tape by the following mechanism: An armature carrying a pencil is pivotally mounted adjacent the tape and rocked by means of an electromagnetic coil momentarily energized when the forestalling mechanism is actuated. The pencil makes contact with the tape at all times, normally drawing a straight line parallel with the edge of the tape. When the forestalling lever is moved, the electromagnet is energized, the armature is pulled down and the pencil makes a short line on the tape at right angles to its normal path. The electromagnet being immediately deenergized, a spring returns the armature to its original position. The pencil is fixed to the end of a short arm pivotally mounted on the armature and urged toward the tape by means of a spring. In order to replace the pencil or its lead or to get the pencil out of the way while an old tape is being removed and a new one installed, it has been customary to swing the pencil arm back past its dead center with respect to the spring. Now the armature is nicely and delicately pivoted; hence when pressure is applied to swing the pencil arm about its pivot beyond its dead center, the armature may be put under a severe strain (and usually is if the operation is performed by an engineer unaccustomed to manipulating delicate instruments) and may be seriously damaged. It is the object of the present invention so to mount the pencil that it may be swung into inoperative position readily and without putting any strain on the armature and its pivots.

I have attained this object by mounting the armature, the armature pivots and the electromagnet on a supporting block which is swivelled upon the instrument housing adjacent the tape spools. A latch holds the block in operative position with the pencil in contact with the tape. When it becomes necessary to change tapes or pencils or to provide the pencil with a new lead, the latch is released and the block, carrying the armature and the pencil arm, the armature pivots and the electromagnet, is swung upon the swivel pin and out of the way without swinging the pencil arm on the armature and without putting any strain on the armature or its pivot bearings.

In the accompanying drawings I have illustrated a preferred embodiment of my invention. In these drawings Figure 1 is a plan view of the instrument housing showing the tape rolls and the forestalling recorder of the present invention in operative position; Figure 2 is a front elevation of the parts shown in Figure 1; Figure 3 is a section taken along line 3—3 of Figure 2; Figure 4 is a plan view similar to Figure 1 showing the armature support swung into inoperative position away

from the tape rolls and Figure 5 is a front elevation of the armature and its support shown in the inoperative position of Figure 4.

In these drawings 1 represents the usual instrument housing containing the speedometer mechanism. On the top of this housing are mounted the usual tape rolls; a supply roll 2, the registration roll 3, and the take-up roll 4. The tape 5 is fed from the supply roll 2 over the registration roll 3 and onto the take-up roll 4.

Mounted on the top of the housing 1 and in front of the supply roll 2 is a fixed block 6, which supports a block 7 provided with two standards 8 and 9. A relatively rigid armature 10 is pivotally mounted on jeweled pivots 11 carried by the standard 8, and provided with a depending arm 12. Between the arm 12 and the standard 8 is interposed a compression spring 13 urging the arm 12 to the right and tending to swing the armature upward about the pivots 11. The amplitude of movement of the armature is limited by a T-shaped stop 14 mounted on the standard 9, the shank of which lies within a slot 15 in the armature. Carried by the support 7 between the standards 8 and 9, is an electromagnet 16 which is energized when the engineer forestalls and swings the armature 10 downward about its pivots 11 against the thrust of the spring 13. When the armature is de-energized, the spring 13 swings the armature 10 upward and into contact with the stop 14.

Pivotally mounted on the armature at 17 is an arm 18 carrying at its outer end a pencil 19 urged toward the tape on the registration roll by means of a tension spring 20, connected at 21 to the arm 18 and anchored at 22 to the armature. A headed rivet 23, depending from the arm 18 slides within an arcuate slot 24 in the armature and limits movement of the arm 18 to a plane parallel to the armature. A stop 25 on the armature limits the inward movement of the arm 18.

The pencil 19 illustrated comprises a cylindrical casing 26 containing a barrel for the lead 27. The lead is urged outwardly by means of a spring-pressed plunger, not shown. The plunger is provided with a trigger 28 extending through a bayonet slot 29. Any other suitable type of pencil could be employed.

The block 7 is provided with a swivel pin 30 journaled within the fixed block 6 so that the former can be swivelled upon the latter. The two blocks are held against relative vertical movement by means of a screw 31 in the block 6 terminating in a conical end which lies within a V-shaped groove 32 in the pin 30. Depending from the standard 9 is a latch 33 cooperating with a spring-pressed dog 34 on the block 6 to hold the block 7 so that the pencil makes contact with the tape, as shown in Figure 1. This is the normal operating position.

In order to insert a new lead in the pencil, it is necessary to retract the plunger by moving the trigger 28 down the slot 29 and turning it to one side to hold the lead spring under compression. The lead is thereupon inserted into the lead barrel. In order to perform this operation it has heretofore been necessary to swing the arm 18 clockwise about the pivot 17 until the point 21 moves beyond a line passing through the pivot 17 and the point 22. The same thing has been necessary when an old tape was to be removed and a new one installed. This usually involved a severe strain on the pivots 11 and frequently resulted in injuring the instrument. According to the present invention it is not necessary to swing the arm 18 with reference to the armature either to replace a lead or a tape. It is necessary only to depress the dog 34 and swivel the block 7 to the position shown in Figures 4 and 5. When the pencil is in the position shown in these figures, it is easy to insert a new lead in its barrel and easy to remove the old tape and install a new one.

I claim:

Apparatus for recording the operation of the forestalling mechanism of an automatic train control system comprising a record-receiving surface adapted to support a record-receiving member, an electromagnet, a relatively rigid armature member extending beyond at least one side of the electromagnet, a stylus mounted on the extension of the armature member and normally in contact with the record-receiving member, a support for the electromagnet and armature member, means for pivotally mounting the armature member on the support on an axis in a plane perpendicular to the surface of the record-receiving member, and a swiveled mounting for the support to enable the support and the electromagnet and armature carried thereby to be swung as a unit to move the stylus from contact with the record-receiving member, and means for latching the support in a position in which the stylus is in contact with the record-receiving member, the stylus being spring-mounted on the armature to cause it to have a pressure contact with the record-receiving member when the support is in its said latched position.

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