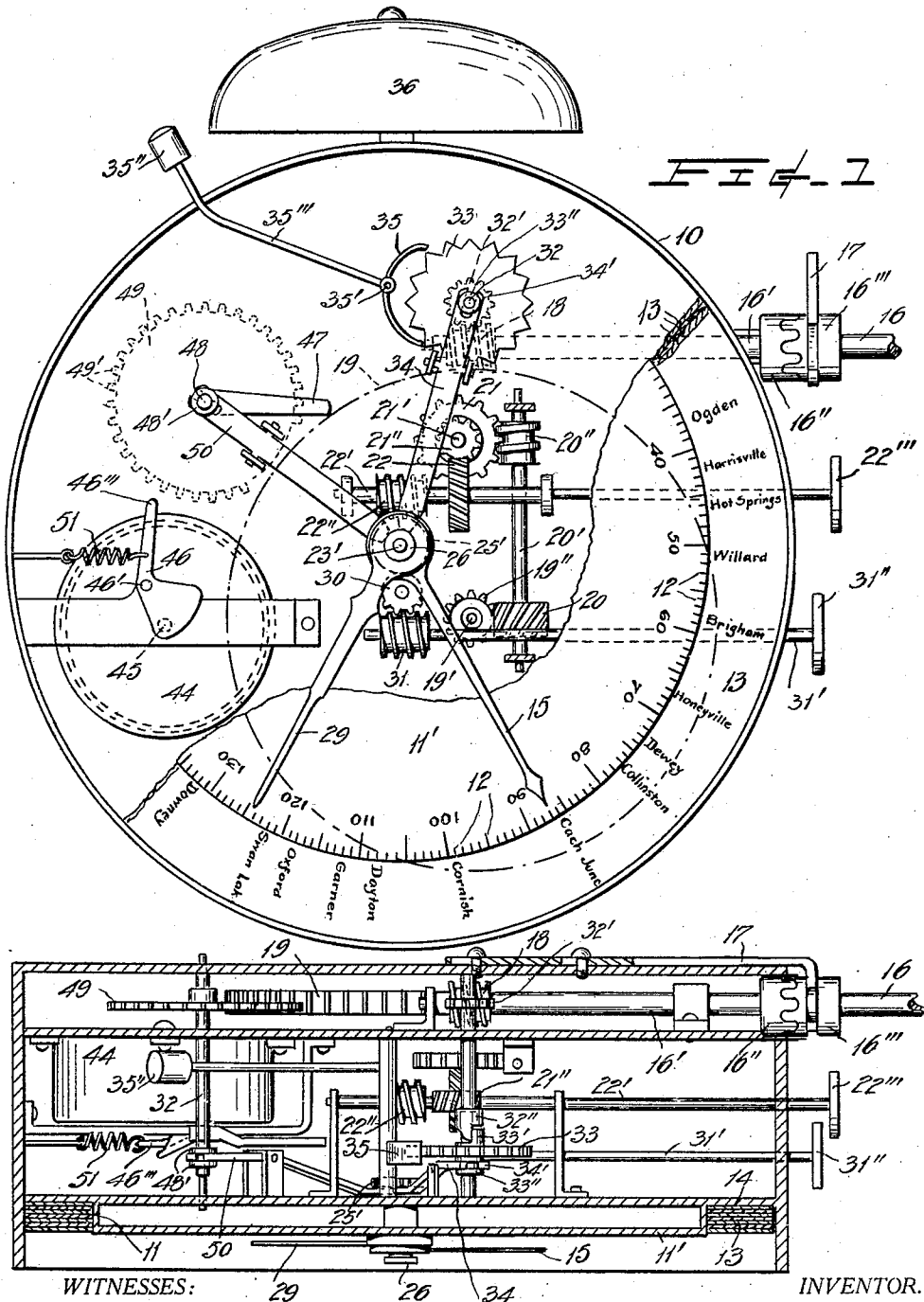


L. E. FUGATE.
 AUTOMATIC RAILWAY TRAIN CONTROLLER.
 APPLICATION FILED FEB. 17, 1908, RENEWED MAY 24, 1909.

933,042.

Patented Aug. 31, 1909.

2 SHEETS—SHEET 1.



WITNESSES:
 Horacy Barnes
 A. N. Shoemaker

INVENTOR.
 Lake E. Fugate
 BY
 Pierre Barnes
 ATTORNEY.

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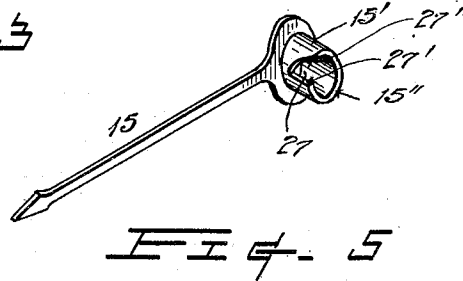
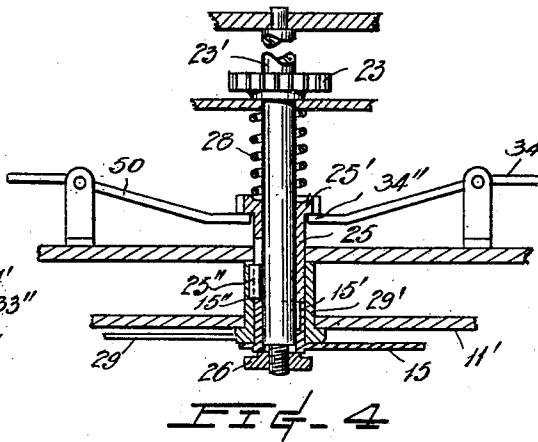
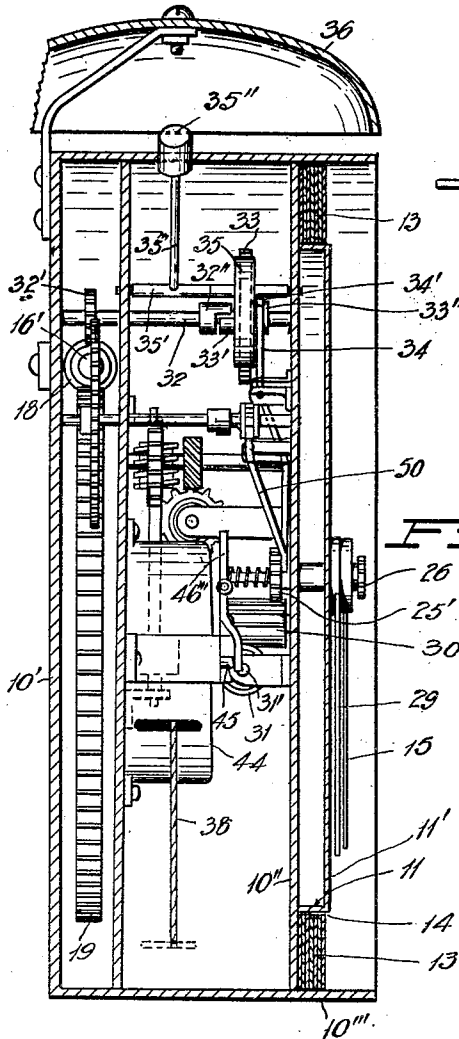


FIG. 6

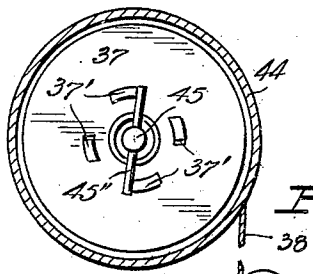
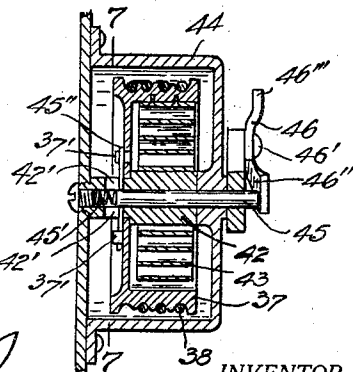
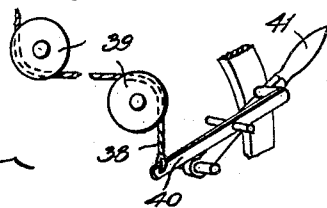


FIG. 7

WITNESSES:
Horace Barnes
A. H. Shoemaker



INVENTOR.
Lake E. Fugate
BY
Pierre Barnes
ATTORNEY.

UNITED STATES PATENT OFFICE.

LAKE E. FUGATE, OF OGDEN, UTAH.

AUTOMATIC RAILWAY-TRAIN CONTROLLER.

933,042.

Specification of Letters Patent.

Patented Aug. 31, 1909.

Application filed February 17, 1908, Serial No. 416,320. Renewed May 24, 1909. Serial No. 498,076.

To all whom it may concern:

Be it known that I, LAKE E. FUGATE, a citizen of the United States, residing at Ogden, in the county of Weber and State of Utah, have invented certain new and useful Improvements in Automatic Railway-Train Controllers, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in the railway-train register and alarm which was illustrated and described in United States Patent No. 708,632 granted to me September 9, 1902.

The object of my improvements is the provision, supplementary to the apparatus for registering the distances traveled and the sounding of the alarms, as described in the aforesaid patent, of means whereby the air brake system of a train may be influenced to cause the application of the brakes to stop the train in the event of the engineer failing to heed the alarm.

The invention consists in the novel construction and adaptation of devices to render the apparatus capable of performing the above noted object.

In the accompanying drawings, Figure 1 is a front elevation of apparatus embodying my invention with the front of the containing case partly broken away. Figs. 2 and 3, respectively, are horizontal and side views of the same with the casing in section. Fig. 4 is an enlarged detail partly in plan and partly in section of the arbors of the index hands. Fig. 5 is a perspective view of one of the index hands; Fig. 6 is a detail sectional view; and Fig. 7 is a section taken through 7—7 of Fig. 6.

The reference numeral 10 designates a casing which is desirably cylindrical in shape and is closed at its rear by a back wall 10' and has a front wall 10'' positioned at some distance to the rear of the front edge of the circumferential wall 10'''. Projecting forwardly from the wall 10'' is the flange 11 which supports a circular dial plate 11' having about its periphery, graduate marks indicative of miles or other measures of distance. These marks are designated by de-

nominating numbers, such as 12, commencing at zero, say at the top, and thence progressively about the circumference to any predetermined amount, as say, to two hundred miles and designated by proper denominating marks.

Annular shaped cards 13 are placed in the space 14 intermediate the flange 11 and the circular wall of the case. Upon these cards are marked the stations, switches or turn-outs situated upon the railway line and disposed in such angular relation as to correspond to their distances apart as designated by the appropriate of the aforesaid graduate marks upon the adjacent edge of said dial plate. An index hand 15 is employed to point off upon the dial and the outermost of the cards the indicative marks thereon and is driven from one of the axles of the locomotive by suitable mechanism. This said mechanism may be constructed and arranged in any suitable manner, but desirably as herein illustrated. A two part shaft 16 and 16' of which the part 16 is rotated continuously by said axle when the train or car thereof is in motion. The other part is arranged to be connected with or disconnected from the part 16 by coupling members 16'' and 16''' which are rotatively carried by the respective shaft parts and one of the members, 16'', is arranged to be slidable longitudinally of the shaft by a shifting bar 17 secured to the back of the casing. Shaft part 16' has mounted thereon a worm 18 which rotates a toothed wheel 19 upon an arbor 19' carrying a spiral gear 19'' which is in mesh with a similar gear 20 upon an arbor 20' provided with a worm wheel 20''. The latter engages a toothed wheel 21 upon an arbor 21' with a spiral gear 21'' in mesh with a spiral gear 22 upon an arbor 22' upon which is a worm wheel''. The last named wheel 22'' meshes with a toothed wheel 23 upon the arbor 23' which carries the aforesaid hand 15. The arbor 22' is desirably of a length to extend outside of the casing and is provided at its outer extremity with a finger-engaging wheel 22''' for setting the index-hand 15. Arbor 23' has loosely mounted thereon a sleeve 25 extending

through the casing wall 10'' and the dial-plate 11' and is reliably socketed in the boss 29' of another hand 29. Within the boss 29' is rotatably seated the boss 15' of the index-hand 15 and a gear wheel 25' is fixedly secured to or formed upon the inner end of the sleeve, 25.

The boss 15' is connected to the arbor 23' to rotate in unison therewith and is held in place by suitable means, such as a nut 26 screwed upon the threaded end of the arbor. This boss is likewise provided at its inner end with an angular notch 27 having a side 27' which is parallel with the axis of rotation and in the same radial plane with the hand; the other side 27'' of the notch being inclined thereto, as shown in Fig. 5. Interiorly of the boss 29' is a lug 25'' provided to restrain the boss and the connected sleeve from being thrust outwardly by bearing against the inner edge 15'' of the boss 15' until the notch 27 thereof is presented to afford outward movement to the lug and which is accomplished by a spring 28, see Fig. 4, acting against the sleeve.

When resetting the hand 29, the lug 25'' is engaged with the sloping side 27'' of the notch 27 which forces the sleeve inwardly and restores the spring to its compressed condition. The hand 29 is arranged to be in the same axial plane with said lug and its office is to indicate predeterminately the place designated upon the dial corresponding with the point where the alarm is to be actuated.

The setting of the hand 29 is effected from a gear wheel 30 arranged to drive the wheel 25', and being itself driven by a worm wheel 31. The arbor 31' for this worm is extended outside of the casing where it is provided with a finger wheel 31'' for manipulating the same. 32 is an arbor upon which is fixedly mounted a gear wheel 32' in mesh with the worm 18 and is rotated continuously therewith when the car is in motion.

The arbor 32 has a toothed wheel 33 mounted so as to be normally loose thereupon but is connected for rotation by the provision of a horned coupling part 33' upon the wheel being upon occasion engaged by a counter part 32'' fixed to the arbor, such engagement being effected by the outward movement of the sleeve 25 through the medium of a spring lever 34 having a forked end 34' which engages in a peripheral slot of the wheel boss 33'' while its other end 34'' is in contact with the web of the wheel 25'. An escapement 35 fulcrumed at 35' is influenced by the wheel 33, when in rotation, to cause a hammer 35'' upon an attached rod 35''' striking a succession of blows against a gong 36.

From the foregoing it is apparent that when the hand 15 overtakes and engages the

hand 29 the then engaged sleeve 25 in being pressed inwardly effects the sounding of an alarm to attract the attention of the engineer, and, should no attention be paid to such notice, the brake appliances of the train are operated by devices which will now be explained to automatically stop the progress of the train. These devices comprise a drum 37, for a line 38 passing about guide pulleys 39 disposed to lead the line to a lever 40, see Fig. 7, which is adapted to swerve the handle 41 controlling the engineer's air-valve which is employed for applying the brakes. Said drum 37 is mounted upon a non-rotary, axially bored mandrel 42 with a coil spring 43 therebetween connecting each and is wound up by pulling upon the line 38 from outside of the casing. The drum is inclosed by a housing 44 which, with a partition of the casing, supports said mandrel and within the latter is a rod 45 which is acted upon by a spring 45', see Fig. 6, to have a pin 45'' extending therethrough engage ratchet teeth 37' provided in the drum to lock the latter against the power of the spring 45' which tends to wind the line about the drum. The pin 45'' extends through slots 42' in said mandrel whereby it is free to be moved to disengage the ratchet teeth for releasing the drum when the rod is correspondingly moved in opposition to the spring 45'. Such movement of the rod 45 is attained through a cam-lever 46 fulcrumed at 46' and having its cam-face 46'' upon one of its arms which wipes against the end of the rod and thrusts it rearwardly when the other arm 46''' is encountered and swung in opposition to a spring 51 by an arm 47 upon a shaft 48 when the latter is sufficiently rotated. This movement of the shaft is effected by a wheel 49 having teeth 49' about a portion of the periphery and arranged to mesh with the wheel 19. This shaft is furthermore arranged for longitudinal movement to cause the wheel 49 being normally held out of engagement with the other, 19, and is restored thereto by shifting lever 50 having a forked end engaging the collars 48' of the shaft 48 being actuated through the movement of the sleeve 25 which influences the aforesaid lever 34.

The operation of the invention is as follows: The outermost of the annular cards 13 is first turned about its axis until the place of departure marked thereon corresponds with the index finger 15, or the card may be left undisturbed and the finger adjusted through the agency of the wheel 22''' to bring it into such register. The other hand 29 is then adjusted, through the wheel 31'', to point off the indicated place upon the card whereat the alarm is to be sounded,—as, for example, the place where the train is to be side tracked,—and in thus moving the

hand 29 the lug 25'' is brought into position whereat the sleeve 25 is released to permit of it moving outwardly when the notch 27 upon the boss of the other hand is presented as will occur when the hand 15 arrives in the same radial line with the hand 29, and corresponding with the arrival of the train itself at the designated place upon the track. The occurrence of such outward movement of the sleeve, through the action of the wheel 25' and the lever 34, effects the coupling of the escapement wheel with the rotating shaft 32 to sound the alarm through the actuating of the gong-hammer 35''. Concurrently the wheel 25' also acts through the lever 50 to slide the shaft 48 endwise and bring the teeth of the wheel 49 into mesh with the rotating wheel 19 and in such position that the arm 47 is caused to make almost an entire revolution before it encounters the arm 46''' of the lever 46. During this inoperativeness of the arm 47 the train has progressed a distance of, say three hundred yards, and during a lapse of time sufficient for the engineer to apply the brakes for stopping the train. Should he fail to do this, said arm will engage and swing the lever 46 which, in turn, will then press the rod 45 inwardly so as to disengage the pin 45'' from the ratchet teeth 37'' of the drum 37, thereby allowing the latter being turned by the spring 43 to wind up the line 38 and thus influence the lever 40 to swerve the handle 41 which actuates the valve to apply the train-brakes.

Having described my invention, what I claim, is—

1. The combination with devices for effecting the application of air-brakes upon a railway-train, of a spring-operated drum for actuating said devices, and means operated from a car-wheel axle for controlling the operation of said second named means.

2. The combination with a train of gears adapted to be actuated by a car-wheel axle, a dial plate, an annular card with stations marked thereon, and index hand operated by said gears for pointing off the progress of the car upon the dial, another hand to be set at a predetermined point upon said dial plate, an alarm-bell, and a hammer for the bell; of means controlled by said index hand whereby said hammer is vibrated to ring the bell at said predetermined point, controlling means for regulating the application of the car air-brakes, and a rotatable spring-operated drum controlled by the index hand to actuate said brake controlling means subsequent to the ringing of the bell.

3. The combination with an alarm-bell, and devices for effecting the application of air-brakes upon a railway-train, and means including lever controlled devices arranged to be operated by the travel of said train

for actuating said alarm bell and also for actuating the devices for applying the air-brakes.

4. The combination with the dial plate, a station card, an index hand, trains of gears arranged to be operated from the axle on a railway-train, an alarm-bell, adjustable means for causing the bell to be rung at a predetermined point, air-brakes upon the railway-train, and devices including a winding drum for effecting the application of said air-brakes subsequent to the ringing of the bell.

5. The combination with the dial plate, a station card, an index hand, trains of gears arranged to be operated from the axle of a railway-train, an alarm bell, adjustable means for causing the bell to be rung at a predetermined point, air-brakes upon the railway-train, devices for effecting the application of said air-brakes subsequent to the ringing of the bell, such devices including a line, a drum, and means actuated by said train of gears for winding the line about the drum.

6. In combination with an alarm, and means for effecting the application of the air brakes, a pair of pivoted levers, means controlled by one of said levers to sound said alarm, means controlled by the other lever to operate said means for applying the air brakes, and means controlled from the car axle for simultaneously moving the inner ends of said levers to operative position.

7. In combination with an alarm, and means for effecting application of the air brakes, a pair of pivoted levers, means connected with said levers whereby actuation of the latter to operative position will sound said alarm and operate said brake applying means, and spring operated means for moving said levers to operative position.

8. In combination with an alarm, and means to apply the air brakes, means for simultaneously sounding said alarm and operating said brake applying means including an arbor, an index hand having a boss rigidly connected to said arbor thereon, a spring pressed sleeve loosely mounted on said arbor, a second hand having a boss surrounding said sleeve and said boss of the index hand, said boss of the index hand having a notch therein, a lug on said boss of the second hand adapted in one position of said boss of the index hand to enter the notch therein, and means operated by the movement of said sleeve to actuate said means for sounding the alarm and operating the brake applying means.

9. In combination with means to apply the air brakes, means to actuate said means including a normally restrained device, a rotatable device having a projection, and means disposed in the path of said projec-

tion to be actuated thereby to release said restrained device.

10. In combination with means to apply the air brakes, means to actuate said means including a rotatable wheel actuated by the train movements, a rotatable device, means for predeterminately effecting operation of said rotatable device from said wheel, and means actuated by said rotatable device for operating said means for actuating the brake applying means.

11. In combination with the air valve of an air brake system, means for operating said valve to operate the brakes including a flexible cable connected to said air valve, a spring held drum normally locked and connected to said cable, and means operated by the train movements to release said drum and wind said cable to operate said air valve.

12. In combination with means to apply the air brakes, means to operate said means, a spring pressed sliding sleeve for actuating said last named means and means to permit said sleeve to slide under the influence of said spring including a rotating index hand.

13. In combination with alarm means and brake applying means, a pair of pivoted elements having connection at one end with said alarm and brake applying means, and means to simultaneously operate the opposite ends of said elements including a spring pressed normally retracted sliding element and a rotating element to release said element to permit the same to be influenced by said spring.

14. In combination with alarm means, means to actuate the same including a spring pressed part having a lug, and a rotatable index hand having a notched part to receive said lug in said notch when said index hand reaches predetermined position.

15. In a device of the type set forth, a dial plate having graduations, a series of superposed ring-like cards surrounding said dial and having stations, and the like marked thereon to cooperate with said dial, and hands arranged to rotate with respect to said dial and cards.

16. In combination with means to sound the alarm and means to apply the air brakes, normally restrained means to operate each of said means including a pair of rotatable hands and means whereby when said hands lie in the same radial line said normally restrained means will be released.

17. In combination with means to sound the alarm and means to apply the brakes, means to operate each of said means including a pair of elements having their inner ends adjacent, a spring pressed normally restrained part to engage each of said inner ends of said elements, and means operated by the train movements to predeterminately release said normally restrained part.

18. In combination with means to sound the alarm and means to apply the brakes, devices to simultaneously operate each of said means, and means to simultaneously operate said devices including a spring pressed part, and means actuated by the train movements to operate said spring pressed part.

19. In combination with an alarm and sounding means therefor, means to actuate said sounding means including a pivoted part, a normally restrained spring pressed part to operate said pivoted part, and means actuated by train movements to release said spring pressed part.

20. In combination with means to sound an alarm and means to apply the brakes, separate means to actuate each of said named means, normally restrained means to simultaneously actuate each of said separate means arranged at one end of the latter, and means to release said normally restrained means.

21. In combination with means for applying the brakes, a wheel rotated by the train movements, and means controlled by the rotation of said wheel to apply said brakes including a device which is normally immovable, and means for predeterminately effecting operation of said device from said wheel to apply the brakes.

22. In combination with means for applying the brakes, rotatable means operated by the train movements, means to actuate said brake applying means normally out of gear with said rotatable means, means for throwing said means to actuate the brake applying means into gear with said rotatable means, and means for actuating said last named means operated at a predetermined time from said rotatable means.

23. In combination with means for applying the brakes, rotatable means operated by the train movements, second means for automatically effecting operation of said brake applying means from said rotatable means, a normally restrained part released by the movements of said rotatable means, and means actuated by said normally restrained part for effecting operation of said second means from said rotatable means.

24. In combination with means for applying the brakes, rotatable means operated by the train movements, second means for operating said brake applying means, and means operated by said rotatable means for throwing said second means into gear with said rotatable means.

25. In combination with an alarm and means to sound the same, rotatable means operated by the train movements, a normally restrained part, means actuated by said rotatable means to predeterminately release said normally restrained part, and means actuated upon release of said normally re-

strained part to throw said sounding means into gear with said rotatable means.

26. In combination with an alarm and sounding means therefor, and means to apply the air brake, rotatable train operated means for actuating each of said means, a normally restrained part releasable by the movements of said rotatable means, and means simultaneously operated by the release of said normally restrained part to

throw said alarm sounding means and said brake applying means into gear with said rotatable train operated means.

In testimony whereof I affix my signature in presence of two witnesses.

LAKE E. FUGATE.

Witnesses:

C. S. GUNNELL,
MARIE DEN HARTOG.