

W. ARTHUR.  
 REGISTERING DEVICE FOR ELECTRIC TRAIN CREWS.  
 APPLICATION FILED MAR. 19, 1918. RENEWED MAR. 13, 1919.

1,319,451.

Patented Oct. 21, 1919.

2 SHEETS—SHEET 1.

*Fig. 1.*

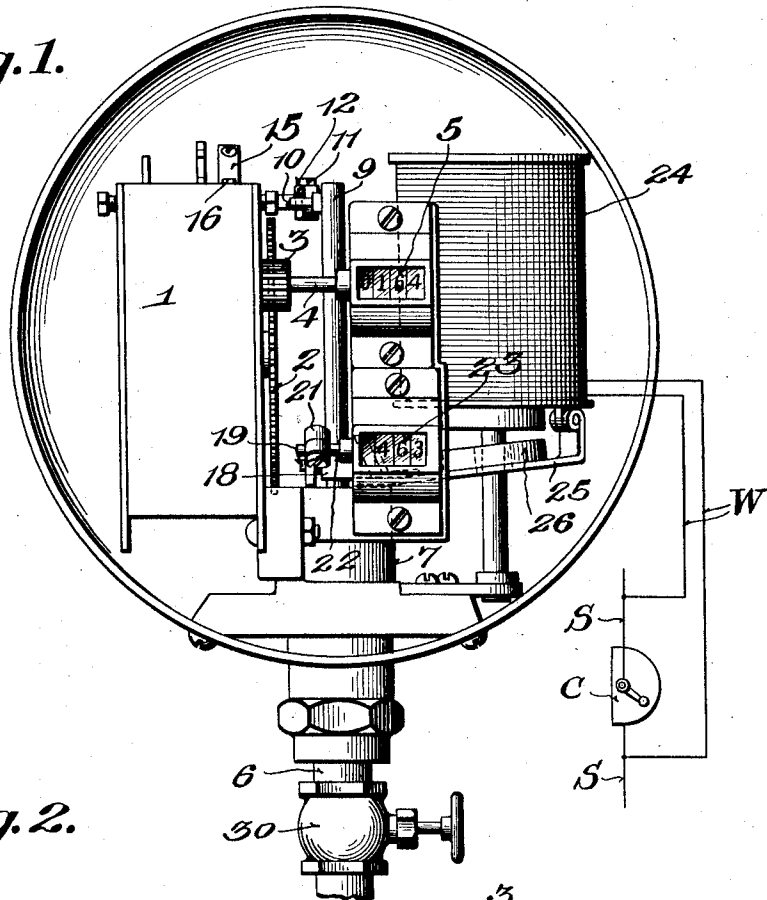
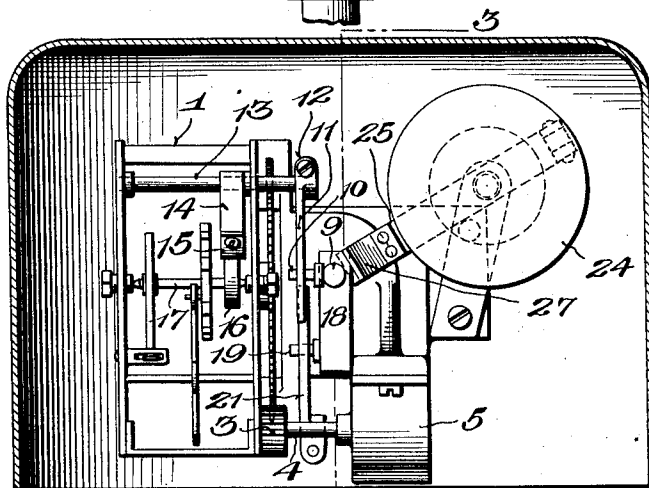


*Fig. 2.*



Inventor

Witness

*Chas. L. Griesbauer.*

*William Arthur,*  
*Attorney*

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2 SHEETS—SHEET 2.

*Fig. 3.*

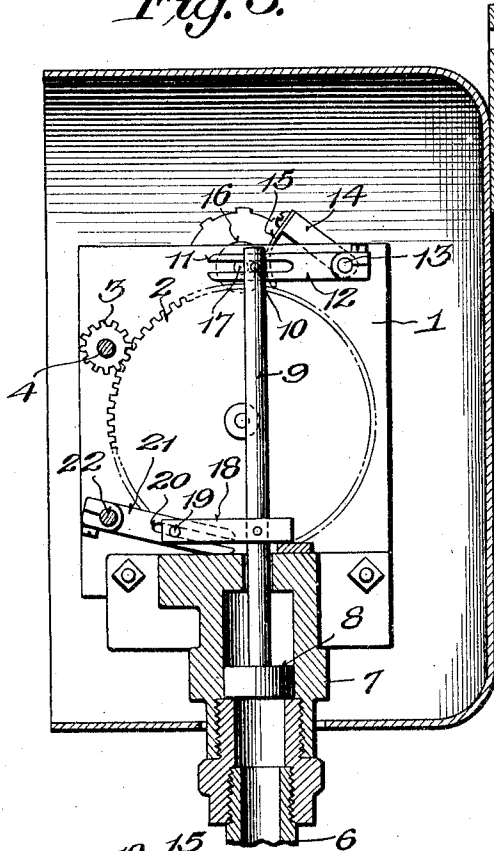


*Fig. 4.*

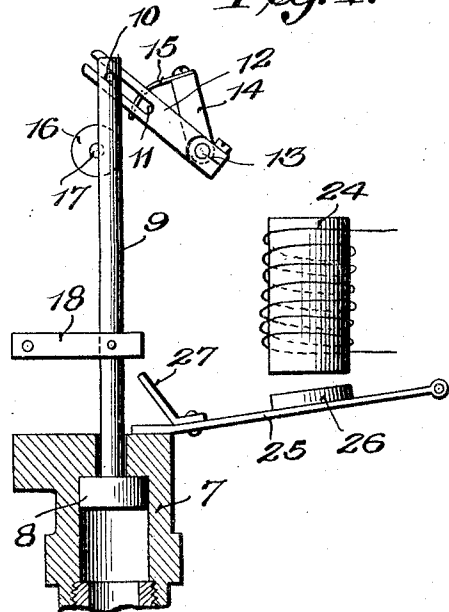


*Fig. 5.*

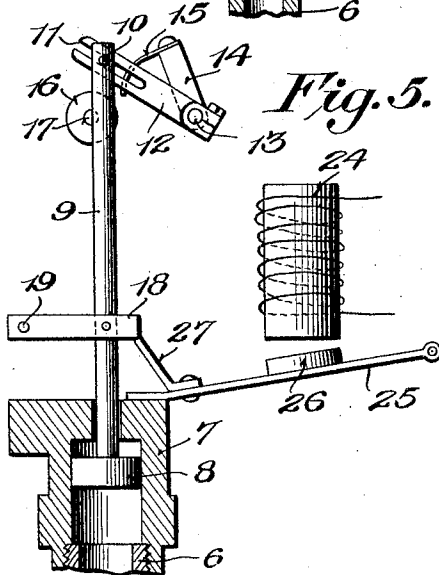
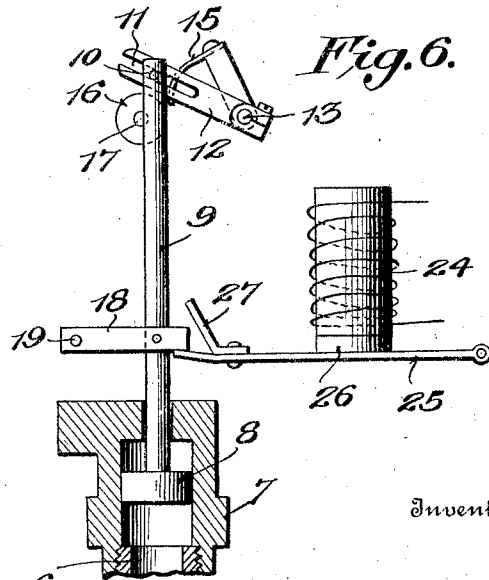


*Fig. 6.*



Inventor

William Arthur;

By *W. H. Mess.* Attorney

# UNITED STATES PATENT OFFICE.

WILLIAM ARTHUR, OF NEW HAVEN, CONNECTICUT.

REGISTERING DEVICE FOR ELECTRIC-TRAIN CREWS.

1,319,451.

Specification of Letters Patent.

Patented Oct. 21, 1919.

Application filed March 19, 1918, Serial No. 223,336. Renewed March 13, 1919. Serial No. 282,490.

*To all whom it may concern:*

Be it known that I, WILLIAM ARTHUR, a subject of the King of England, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Registering Devices for Electric-Train Crews, of which the following is a specification.

This invention relates to certain new and useful improvements in registering device for electric train crews, and pertains more particularly to registering devices employed for the purpose of ascertaining the efficiency of not only the motorman, but the conductor as well.

It has been heretofore proposed to ascertain the efficiency of the motorman by registering the time of power on, time of braking, coasting, and number of times of brake operations, but these factors do not in any way enable the efficiency of the conductor to be ascertained.

The motorman must complete his run in a certain prescribed time, but if the conductor wastes time by taking too long in opening and closing the door, or in not promptly giving the ahead signal when the passengers have been either let off or taken on, then the motorman must speed his car up in order to complete the run in the scheduled time. This deprives the motorman of the opportunity of coasting and also requires a longer time of brake application, with the result that more current is employed, and the equipment is subjected to greater wear and tear. The increased consumption of power necessarily requires a corresponding increase in coal consumption.

The present invention therefore briefly proposes to provide a register which indicates the efficiency of both the motorman and the conductor, or in other words of the crew as distinguished from prior devices which chiefly propose to indicate the efficiency of the motorman alone.

Further and other objects will be later herein set forth and manifested in the course of the following specification.

In the drawings:

Figure 1, is a side elevation of the invention; showing the same in a case with its front removed;

Fig. 2, is a top plan view, the case being shown in section;

Fig. 3, is a section on line 3—3 of Fig. 2; and

Figs. 4, 5 and 6, are fragmentary side elevations, partly in section, showing the parts during their various stages of operation.

In proceeding in accordance with the invention, a suitable clock mechanism 1, is employed, the master gear 2 of which operates a pinion 3 mounted on a shaft 4, the latter being in suitable operative connection with a register 5 which will be referred to as the combined register in the following, since it registers the sum of the braking period, the power-on period and the stop period.

A pipe 6 leads from the air brake line and has a cylinder 7 connected thereto within which latter is a plunger 8 having a rod 9 connected thereto. Rod 9 has a pin 10 at its upper end which engages in the slot 11 of an arm 12, the latter mounted on a suitable shaft 13. A second arm 14 is also secured to the shaft 13 and carries a light curved leaf spring braking and starting member 15, which latter engages a brake wheel 16 mounted on the balance wheel arbor 17 of the clock works.

The plunger rod 9 also has an arm 18 rigidly secured thereto, the arm carrying a pin 19 at its outer end, which pin extends through a slot 20 formed in an arm 21 mounted on the shaft 22, of a register 23, the latter indicating the number of times the brake is operated, by registering each time the brake is operated.

An electromagnet 24 is suitably connected, as indicated at W, in the circuit S, of the usual motor controller C, so that whenever the motor controller is operated to close the circuit the magnet will be energized. A hinged arm 25 carries an armature 26 which latter is attracted upon energization of the magnet, the free end of the arm being disposed so as to be capable of engaging beneath the arm 18 of the plunger rod 9, as shown in Fig. 6. A finger 27 is rigidly secured to the arm 25 and extends upwardly therefrom.

The clock is normally wound but is inactive during coasting, the parts in this position being indicated in Fig. 3, in which the spring brake 15 engages the brake wheel 16 of the clock works and holds the clock quiescent, the plunger being also in its lowermost position. When the brakes are ap-

plied, air entering the cylinder 7 will move the plunger to its uppermost position as depicted in Fig. 4, thereby raising arm 18, and the latter through the pin 19, slot 20 and arm 21 will rotate the shaft 22 of the brake register 23, and register a time of brake applied, on said register.

This upward movement of the plunger causes the spring 15 to move upwardly to the position of Fig. 4, wiping the wheel 16 in its upward movement so as to start the clock. The clock throughout its operation causes the combined register 5 to be actuated so as to register the braking period. When the brakes are released, the plunger drops but is caught by the finger 27, and prevented from completing its down movement, being held in the position shown in Fig. 5, so that the register 5 will continue its movement and register the entire time during which the car stops or remains at a standstill.

When the motor is started, the brakes being off, and the parts in the position of Fig. 3, the magnet 24 is energized, attracting the armature 26, and moving the parts to the position of Fig. 6, in which position the spring 15 is still prevented from wiping the wheel 16 and stopping the clock, so that as long as the current remains on the register 5 will continue in operation. This upward movement of the rod 9 is however not sufficient to operate the brake register 23 so that the latter is consequently not affected.

When the current is shut off with the parts in the position of Fig. 6, the arm 25 will be released, due to the deenergization of the magnet 24, and the plunger then completes its down movement, bringing the parts to the position of Fig. 3.

It will thus be apparent from the foregoing that whenever the brakes are applied the brake register 23 will be operated once to indicate that the brakes have been operated once. As long as the brakes are kept applied the upper or combined register 5 will be kept in operation because the plunger is kept in its uppermost position of Fig. 3, and will thus register the duration of the braking period, and as long as the car remains at a stop the period of stopping will be also registered on the register 5, because, upon release of the brakes the plunger is prevented from completing its down movement to stop the clock, due to the parts being then in the position of Fig. 5, the current being off. When the current is on the upper register 5, will also register the length of time, since the plunger will be held in the position of Fig. 6, in which the clock is permitted to remain active. However, as soon as the current is shut off and the brakes are released, then the parts will occupy the position of Fig. 3, in which the clock is inactive, and the combined or upper register 5, is likewise inactive.

The finger 27 is preferably secured to the arm 25 so as to be readily removable therefrom, so that if desired, the apparatus will register power-on and braking to the exclusion of stopping. To enable power on only to be registered, a valve 30 is placed in pipe 6, so as to allow the air to be cut off from the cylinder and to enable the braking period alone to be determined it is merely necessary to remove the armature carrying arm 25.

What is claimed is:—

1. A registering mechanism for determining the efficiency of the crews of trolley cars and the like, including a register for indicating each time the brake is operated, means for operating said register from the brake controller, a combined register for indicating the sum of the duration of power on periods, stopping periods, and braking periods, and means for operating the combined register by the motor controller.

2. A registering mechanism for determining the efficiency of the crews of trolley cars and the like, including a register for indicating each time the brake is operated, means for operating said register by the brake controller, a combined register for indicating the sum of the duration of braking periods, power on periods and stopping periods, means for operating the combined register upon each application of the brakes to register braking period and stopping period, and means controlled by the motor controller for independently operating said first means whenever power is put on, and for stopping the combined register when the power is off, and the brakes are off.

3. A registering mechanism for determining the efficiency of electric train crews, including a register indicating each time the brake is operated, a combined register for indicating the sum of the period of braking, power on period, and stopping period, means actuated by the brake controller for actuating the brake register and for also operating the combined register, means controlled by the motor controller for actuating said first named means when the power is on and the brakes are off and thereby operating the combined register to the exclusion of the brake register, and means whereby said first named means will cause stoppage of the combined register when the current is shut off.

4. A registering mechanism for determining the efficiency of electric train crews, including a register indicating each time the brake is operated, a combined register for indicating the sum of the braking, power on and stopping periods, a clock mechanism for operating the combined register, means controlled by the brake controller for actuating the brake register each time the brakes are applied and for also starting the clock mech-

anism to thereby operate the combined register, and means controlled by the motor controller for actuating said first named means to cause starting of the clock to the exclusion of operation of the brake register whenever the power is on and the brakes are off and for releasing the first named means to cause stoppage of the clock mechanism when the power is shut off.

5. A registering mechanism for determining the efficiency of electric train crews, including a register for indicating each time the brake is operated, a reciprocating element for actuating said register controlled by the brake, a combined register for indicating the sum of the power on, stopping, and braking periods, means operated by said element for actuating the combined register when the brakes are applied, means controlled by the motor controller for also actuating said element to operate the combined register whenever the power is on and the brakes are off, and means whereby when the power is shut off and the brakes are off said element will cause stoppage of the combined register.

6. A registering mechanism for determining the efficiency of electric train crews, including a register for indicating each time the brake is operated, a reciprocating element controlled by the brake controller for actuating said register, a combined register for indicating the sum of the power on, stopping, and braking periods, a clock mechanism for actuating said combined register, means operated by said element for starting the clock mechanism whenever the brake is applied, means controlled by the motor controller for actuating said element to start the clock mechanism whenever power is applied and the brakes are off, and means whereby said element causes stoppage of the clock mechanism when the power is off and the brakes are off.

7. A registering mechanism for determining the efficiency of electric train crews, including a register for indicating each time the brake is operated, a reciprocating element controlled by the brake controller for actuating said register, a combined register for indicating the sum of the power on, stopping, and braking periods, a clock mechanism for actuating said combined register, means operated by said element for starting the clock mechanism whenever the brake is applied, energizable means controlled by the motor controller for actuating said element whenever power is on and the brakes are off to operate the combined register, and means whereby said elements will cause stoppage of the clock mechanism when the power is off.

8. A registering mechanism for determining the efficiency of electric train crews, including a register for indicating each time

the brake is operated, a reciprocating element controlled by the brake controller for actuating said register, a combined register for indicating power on, stopping, and braking periods, a clock mechanism for actuating said combined register, means operated by said element for starting the clock mechanism whenever the brake is applied, an electro-magnet, a pivoted armature carrying arm for the magnet, a projection on said element engageable with said arm in one position to hold the element against complete down movement, means on the arm to engage said projection to hold the element against down movement when the brake is operated and the power is off, and means for controlling the electro-magnet by the motor controller.

9. In a registering mechanism, a brake register, a combined register for registering the sum of the power on, braking and stopping periods, means controlled by the brake controller for operating the brake register to register times of brake operation and the combined register to register period of braking and means controlled by the motor controller for causing the combined register to register stopping and power on periods.

10. In a registering mechanism, a brake register, a combined register for registering the sum of the power on, braking, and stopping periods, means controlled by the brake controller for operating the brake register to register times of brake operation and the combined register to register period of braking, means controlled by the motor controller for causing the combined register to register stopping and power on periods, means for enabling registration on the combined register of power on and braking periods to the exclusion of stopping, means for enabling the braking period alone to be registered on the main register, and means for enabling power on only to be registered on the main register.

11. In a registering mechanism, a combined register inactive during coasting for indicating the sum of the power on, braking, and stopping periods, means controlled by the motor controller for rendering said register active when the power is on, means controlled by the brake controller for rendering said register active during the braking periods, and means whereby said register is rendered active during the stopping periods.

12. In combination with a brake register and a combined register for registering power on and braking periods, means common to each register for operating same, means controlled by the brake controller for actuating said common means and thereby operate both registers upon each brake application, and means controlled by the motor controller for operating said com-

mon means to actuate the combined register to the exclusion of the brake register when the power is on.

13. In combination with a brake register, 5  
and a normally inactive combined register for indicating power on and braking periods, means controlled by the brake controller for operating the brake register and rendering the combined register active 10  
whenever the brakes are applied, and means controlled by the motor controller for rendering the combined register active to the exclusion of the brake register whenever power is applied.
14. In combination with a brake register, 15  
and a normally inactive combined register for indicating power on and braking periods, means to operate both registers

when the brakes are applied, and means to operate the combined register only when the 20  
power is applied.

15. A registering mechanism including a combined register for indicating the sum of power on, stop and braking periods and means for operating the combined register 25  
controller by the brake controller and the motor controller.

16. A combined register for indicating the sum of the duration of power on time, braking time or stop time either separately 30  
or jointly and means for operating said register controller by the brake controller or motor controller either separately or jointly.

In testimony whereof I affix my signature.

WILLIAM ARTHUR.

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