

(No Model.)

2 Sheets—Sheet 1.

S. L. TERRY.

PRESSURE RECORDER FOR FLUID PRESSURE BRAKES.

No. 568,963.

Patented Oct. 6, 1896.

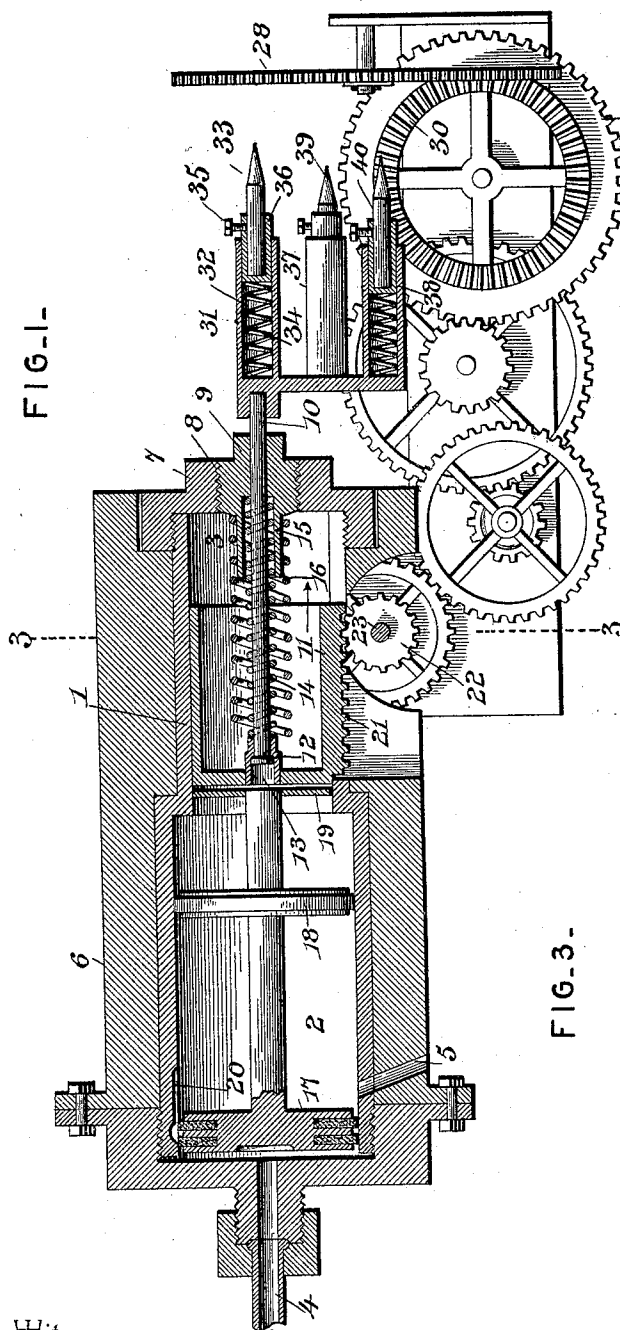


Fig. 1-

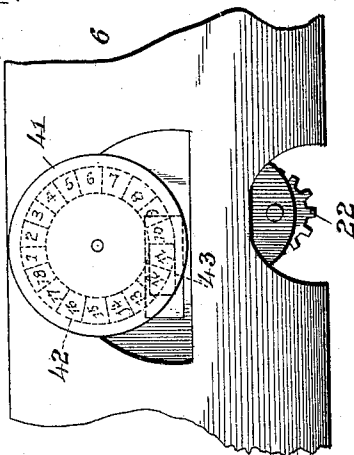


FIG. 4.

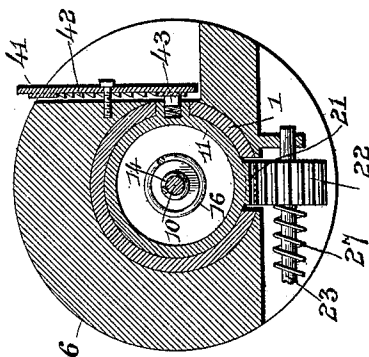


FIG. 3.

Inventor

Samuel L. Terry

By *his* Attorneys,

Chas. Snow & Co.

Witnesses

Jas. K. McCathran
D. D. May

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.)

2 Sheets—Sheet 2.

S. L. TERRY.

PRESSURE RECORDER FOR FLUID PRESSURE BRAKES.

No. 568,963.

Patented Oct. 6, 1896.

FIG. 2.

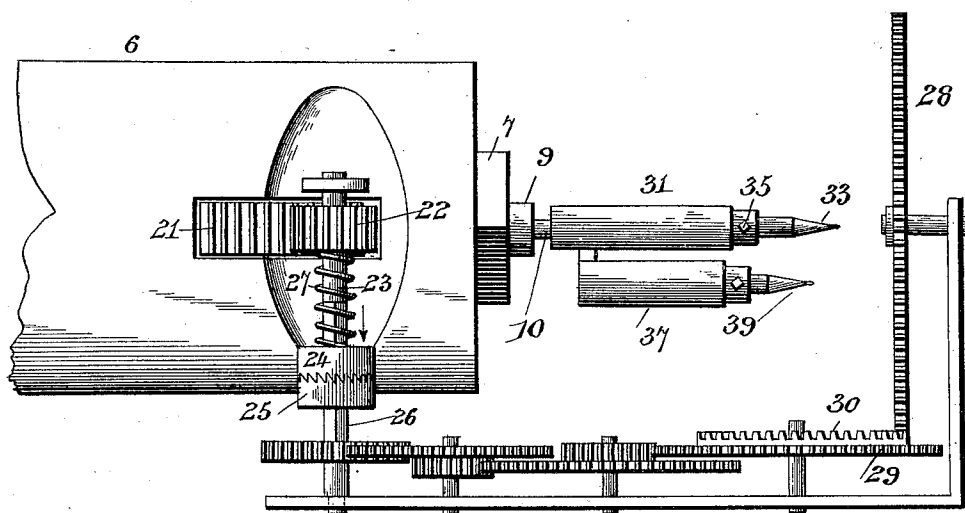
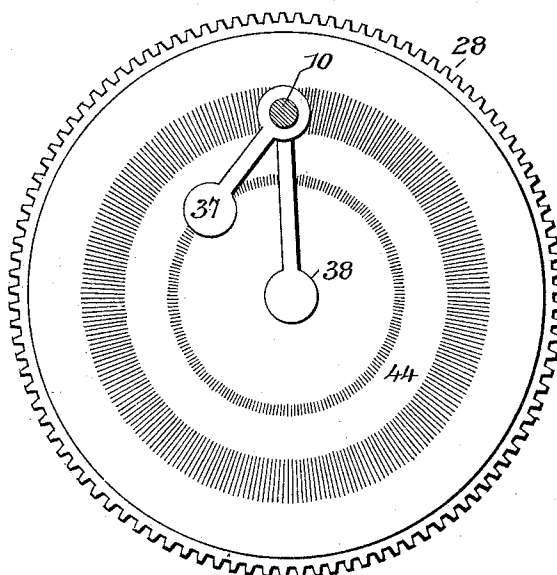


FIG. 5.



Inventor

Samuel L. Terry

Witnesses

Jas. H. McLaughlin
J. E. K. K.

By His Attorneys.

C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

SAMUEL L. TERRY, OF PHILLIPSBURG, KANSAS, ASSIGNOR OF ONE-HALF TO
WILLIAM STRETTON, OF SAME PLACE.

PRESSURE-RECORDER FOR FLUID-PRESSURE BRAKES.

SPECIFICATION forming part of Letters Patent No. 568,963, dated October 6, 1896.

Application filed June 24, 1895. Serial No. 553,906. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL L. TERRY, a citizen of the United States, residing at Phillipsburg, in the county of Phillips and State of Kansas, have invented a new and useful Pressure-Recorder for Fluid-Pressure Brakes, of which the following is a specification.

My invention relates to a recording device for air-brake mechanism, and the object in view is to provide means for recording the number of applications made by the engineer or others of the air-brake, together with the extent of pressure at each application.

There are times when too many applications of the air-brake reduces the pressure in the train-pipe to such an extent that when it is desired to make a final stop there is an insufficiency of air to properly accomplish this purpose, and when such an emergency arises upon a grade accidents are liable to occur. The device embodying my invention makes a record of the number of applications and the extent of each application, whereby the officials of the railroad are enabled to ascertain whether accidents occurring in this manner are due to inattention or inefficiency, or to a failure upon the part of the brake mechanism to properly perform its functions. The record of the amount of pressure would also advise the officials of a too severe application of the brakes, whereby the wheels are caused to slide or "skate."

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a longitudinal section of a recording device constructed in accordance with my invention. Fig. 2 is a bottom plan view of the same. Fig. 3 is a transverse section on the line 3 3 of Fig. 1. Fig. 4 is a partial side view. Fig. 5 is a face view of the dial with the positions of the markers indicated thereon.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates a casing bored to form a cylinder 2 of large diameter and a communicating

cylinder 3 of smaller diameter, an inlet-pipe 4 being in communication with the end of the large cylinder and an exhaust 5 being in communication with said cylinder at an interval from the head adjacent to the inlet-pipe. The cylinder is inclosed within a jacket 6, of cast-iron or its equivalent, and the outer end of the small cylinder is fitted with a removable cap 7. Threaded in a central opening 8 in said cap is an adjustable plug 9, through which passes a stem 10, connected to a slide or plunger 11, arranged in the small cylinder. The inner end of the stem 10 is shouldered or headed, as shown at 12, to fit in a counter-bored socket 13 at the inner end of the slide or plunger, and a return-spring 14 is coiled upon the stem between the extremity of said socket and the inner side of the plug 9. The plug 9 is provided upon its inner side with a tubular extension 15, which incloses the contiguous end of the coiled spring 14, and coiled around this extension is an auxiliary spring 16, which terminates at an interval from the slide or plunger, whereby when the slide or plunger is moved in the direction indicated by the arrow in Fig. 1 it comes in contact with the end of the auxiliary spring 16 after it has moved through a portion of its path.

Arranged in the main cylinder is a piston having parallel spaced heads 17 and 18 and a disk 19, which operates in the communicating small cylinder, whereby when the piston is actuated by the application of pressure motion is communicated to the slide or plunger by means of the disk 19. The wall of the main cylinder is channeled, as shown at 20, to allow pressure admitted at the outer side of the head 17 to pass to the space between the heads and thereby affect both heads of the piston. This increases the area of the piston, and hence the efficiency of the pressure. The springs which are arranged in the small cylinder are designed to repress the slide or plunger and the piston to expose the exhaust-port when the pressure is relieved.

21 represents a rack carried by the slide or plunger and engaging a pinion 22, arranged upon a transverse shaft 23. Fitted to slide upon a squared portion of this shaft is the movable member 24 of a clutch, adapted to

engage a fixed member 25, which is arranged upon a rotary shaft extension 26. A spring 27 is employed to hold the clutch-faces of the members 24 and 25 in operative relation, whereby motion is communicated from the shaft 23 to the shaft extension 26 when the pinion 22 is rotated by the movement of the slide or plunger in the direction indicated by the arrow in Fig. 2. When the pinion is turned in the opposite direction, the member 24 slips idly upon the member 25 and allows the shaft extension 26 to remain at rest. Arranged in a plane perpendicular to the direction of movement of the stem 10 is a recording-medium dial 28, to which motion is communicated from the shaft 26 by suitable gearing which is so constructed and arranged as to reduce the motion, the terminal gear 29 being provided with crown gear-teeth 30 to mesh with the peripheral teeth of a dial 28.

Secured to the exposed extremity of the stem 10 is a head 31, provided with a socket 32, in which is fitted a marker 33, which may consist of a pencil, as indicated in the drawings. Arranged in the socket in rear of said pencil is a cushion-spring 34, and the pencil is preferably secured by means of a set-screw 35 in a sleeve 36, which is arranged to slide axially in the socket. Arranged upon the head 31 are auxiliary sockets 37 and 38, constructed substantially as above described and fitted with markers 39 and 40, the tips or points of which are arranged at different intervals from the plane of the dial 28. Hence when the stem 10 is advanced by the forward movement of the piston in the main cylinder the marker 33 first comes in contact with the surface of the dial, and as the dial receives a rotary movement through the gearing above described it is obvious that a mark would be made upon the surface of the dial to indicate that an application of pressure has been made. If the pressure applied is small, the marker 33 is the only one which will come in contact with the dial, but if greater pressure is applied the marker 40 will be brought into contact with the face of the dial, and subsequently any increased pressure will cause the marker 39 to come in contact with the dial. The cushion-springs with which the markers are provided allow the advance of the head to bring the markers successively into contact with the dial without injury to or straining of the parts. Thus three different degrees of pressure may be indicated upon the dial by means of the markers, and by using a greater number of markers still further differences may be recorded.

After the removal of the pressure and the withdrawal of the markers from the dial the parts are returned to their normal positions, as indicated in Fig. 1, the backward movement of the slide or plunger 11 being effected without turning the dial by reason of the clutch mechanism above described. When, however, a subsequent application of pressure is made, the slide or plunger moves forward

a limited distance, controlled by the length of the socket 13, and hence operates the gearing and turns the dial before the stem 10 receives motion, and therefore an interval is formed between the preceding and the succeeding mark or marks upon the dial to distinguish the times of application of pressure.

In connection with the above mechanism I employ a disk 41, arranged at the side of the small cylinder and provided upon its inner surface with ratchet-teeth 42 for engagement by a spring-actuated pawl 43 on the slide or plunger 11. This disk is graduated from "1" to "18" and is adapted to receive a forward impulse in the direction of the graduations by means of the slide or plunger. The function of this disk is as follows:

It indicates the maximum pressure applied to the brake mechanism when the latter is operated under an emergency. Under these circumstances an unusually heavy pressure is necessary, and such pressure is indicated on the dial in pounds. It will be seen that this part of the mechanism operates independently of that above described. The dial is not moved under ordinary applications of pressure; but when the pressure exceeds a certain limit the pawl 43 engages the rack and turns the dial. Hence when an excessive pressure is applied to the brakes in an emergency the dial is advanced and remains in a position to show the extent of that pressure when consulted by the authorities of the road.

If a subsequent "emergency" application is made, the pawl 43 will again engage the rack and further advance the disk 41, thus showing the sum of the number of pounds expended during the two applications over and above that necessary for applying the brakes; but one such application is ordinarily the limit in a single "run," and if more are made the recording device, hereinbefore described, will indicate the number. In Figs. 3 and 4 the pawl 43 is shown in operative relation with the rack of the disk for the purpose of illustration, but it will be understood that in practice it is only brought into such operative relation when the pressure in the apparatus exceeds the amount necessary for applying the brakes.

The connection with the air-brake mechanism is accomplished by means of the inlet-pipe 4, which is preferably connected to the train-pipe of the system, whereby the piston which operates in the main cylinder receives the direct pressure of the air or other fluid upon each application of the brakes, and whereby the movement of the piston is proportionate to the amount of pressure applied.

The dial 28 is provided for each trip with a face or disk 44, of paper or equivalent material, the surface of which is provided with concentric series of short division-marks designed to indicate the extent of rotation of the dial during the application of pressure.

Various changes in the form, proportion, and the minor details of construction may be

resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described my invention, what I claim is—

1. A device for recording the number of applications of pressure in a fluid-pressure brake mechanism, the same having a piston exposed to train-pipe pressure, a slide or plunger adapted to be moved in one direction by the piston and having a return-spring, a recording medium, connections between the recording medium and the slide or plunger, including a clutch mechanism, whereby forward motion only is communicated to the recording medium, and a marker operatively connected with the slide or plunger and adapted to be moved into contact with the surface of the recording medium, substantially as specified.

2. A device for recording the number of applications of pressure in a fluid-pressure brake mechanism, the same having a piston exposed to train-pipe pressure, a movable recording medium, a marker, connections between the piston and said marker and recording medium whereby the recording medium receives a limited movement before the marker is affected, and means for returning the marker and piston to their initial positions, substantially as specified.

3. A device for recording the number of applications of pressure in a fluid-pressure brake mechanism, the same having a piston exposed to train-pipe pressure, a movable recording medium, means for operating the recording medium, and a plurality of markers operatively connected to the piston and adapted to be advanced toward the plane of and brought successively in contact with the surface of the recording medium to indicate pressures of different tension, substantially as specified.

4. A device for recording the number of applications of pressure in a fluid-pressure brake mechanism, the same having a piston exposed to train-pipe pressure, a slide or plunger arranged in the path of the piston and carrying a rack, a pinion meshing with said rack, a rotary dial, gearing connecting the dial with said pinion, interposed clutch mechanism to communicate forward and prevent backward rotation of the dial, a marker adapted to come in contact with the surface of the dial, and connections between the marker and the slide or plunger, substantially as specified.

5. A device for recording the number of applications of pressure in a fluid-pressure brake mechanism, the same having a piston exposed to train-pipe pressure, a slide or plunger arranged in the path of the piston, a dial, connections between the slide or plunger and the dial, whereby motion in a uniform direction is imparted to the dial, a stem loosely connected to the slide or plunger whereby the slide or plunger is capable of a

limited motion independently of the stem, a return-spring for the slide or plunger, and a marker carried by the stem and adapted to be brought thereby into contact with the surface of the dial, substantially as specified.

6. A device for recording the number of applications of pressure in a fluid-pressure brake mechanism, the same having a piston exposed to train-pipe pressure, a slide or plunger arranged in the path of the piston, a stem loosely connected to the slide or plunger, whereby the latter is capable of a limited movement independently of the stem, a return-spring for the slide or plunger, an auxiliary spring adapted to be engaged by the slide or plunger at an intermediate point of its path, a marker carried by the stem, a rotary dial arranged in the path of the marker, and connections between the slide or plunger and the dial, substantially as specified.

7. A device for recording the number of applications of pressure in a fluid-pressure brake mechanism, the same having a piston exposed to train-pipe pressure, a slide or plunger arranged in the path of the piston, a stem loosely connected to the slide or plunger whereby the latter is capable of a limited movement independently of the stem, a return-spring for the slide or plunger, an auxiliary spring adapted to be engaged by the slide or plunger at an intermediate point of its movement, means for adjusting said springs, a marker carried by the stem, a rotary dial arranged in the path of the marker, and means for communicating motion from the slide or plunger to the dial, substantially as specified.

8. A device for recording the number of applications of pressure in a fluid-pressure brake mechanism, the same having a piston exposed to train-pipe pressure, a plunger arranged in the path of the piston, a stem connected to the plunger, a return-spring for the slide or plunger, a rotary dial, connections between the slide or plunger and the dial, a head carried by the stem, and a plurality of spring-pressed markers carried by the head with their tips or points at different intervals from the plane of the dial and adapted to be successively brought into contact with the surface thereof, substantially as specified.

9. A device for recording the number of applications of pressure in a fluid-pressure brake mechanism, the same having a piston exposed to train-pipe pressure, a slide or plunger arranged in the path of the piston, a stem connected to the slide or plunger, main and auxiliary springs for returning the slide or plunger, the latter being engaged by the slide or plunger at an intermediate point of its movement, a rotary dial, connections between the slide or plunger and the dial, a head fixed to the stem, sockets arranged upon the head, markers fitted to slide in the sockets and adapted to be brought successively in contact with the surface of the dial, and cushion-springs for holding the tips or points

of the markers at different distances from the plane of the dial and allowing the repression thereof when brought into contact with the dial, substantially as specified.

5 10. A device for recording the number of applications of pressure in a fluid-pressure brake mechanism, the same having communicating main and auxiliary cylinders, the main cylinder having inlet and exhaust ports, a piston arranged in the main cylinder and provided with a disk operating in the auxiliary cylinder; a slide or plunger arranged in the auxiliary cylinder, a stem having a headed or shouldered extremity fitting in a socket in the
10 slide or plunger, whereby the slide or plunger is capable of limited movement independently of the stem, main and auxiliary springs for returning the slide or plunger, the auxiliary spring terminating short of the plane of the plunger and adapted to be engaged thereby at an intermediate point of its stroke, a dial, connections between the slide or plunger and the dial whereby rotary motion is imparted to the latter at each forward movement of the
15 former, and a plurality of repressible markers adapted to be brought into contact with the surface of the dial and having their points normally arranged at different intervals from the surface thereof, substantially as specified.

30 11. A device for recording the number of applications of pressure in a fluid-pressure brake mechanism, including a movable recording medium, a marker mounted for movement toward and from the plane of the recording medium, means controlled by and permanently exposed to fluid-pressure in the brake mechanism for moving the marker toward the recording medium, and means controlled by fluid-pressure for operating the recording medium, substantially as specified.

45 12. A device for recording the number of applications of pressure in a fluid-pressure brake mechanism, including a movable recording medium, a cushioned marker mounted for movement toward and from the plane of the recording medium and yieldingly held

out of contact therewith, means controlled by train-pipe pressure for moving the marker toward the recording medium, and means controlled by train-pipe pressure for imparting advance movement to the recording medium, substantially as specified. 50

13. In a fluid-pressure brake system, the combination with a moving part exposed to fluid-pressure, of a pressure-recording device, and connections between the moving part and the recording device, whereby the former is adapted to move a limited distance without imparting motion to the latter, substantially as specified. 60

14. In a fluid-pressure brake system, the combination with a moving part permanently exposed to fluid-pressure and yieldingly held in its repressed position, of a movable pressure-recording device, and means connected with said recording device and arranged in the path of the moving part, whereby movement of the moving part due to a fluid-pressure sufficient for operating the brake mechanism under ordinary circumstances is allowed without affecting the recording device, substantially as specified. 65 70

15. Means for recording the maximum application of pressure in a fluid-pressure brake mechanism, the same including a movable recording device capable of movement in one direction only, a moving part or member exposed to fluid-pressure in the brake mechanism, and means connected to the recording device and arranged in the path of said moving part whereby motion is communicated by said moving part or member to the recording device when the fluid-pressure in the brake mechanism exceeds a predetermined limit, substantially as specified. 75 80 85

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

SAMUEL L. TERRY.

Witnesses:

JOHN G. GEBHART,
JNO. T. ROYCE.