May 3, 1938. R. ERICH 2,115,948

INERTIA SWITCH

Filed Feb. 5, 1936

Fig. 1

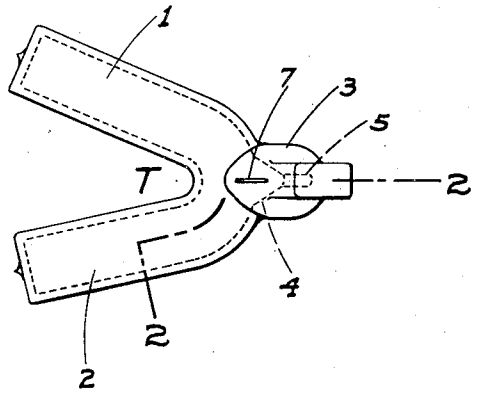
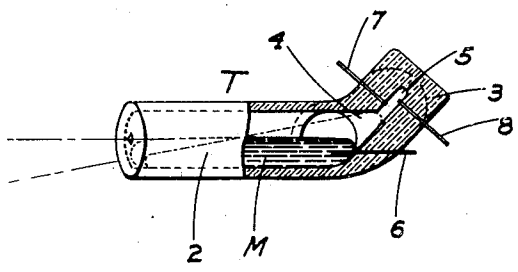


Fig. 2



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UNITED STATES PATENT OFFICE

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INERTIA SWITCH

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Application February 5, 1936, Serial No. 62,483

1 Claim. (Cl. 200—52)

This invention relates to improvements in switches and is directed primarily to a signalling switch for motor vehicles, this application being a continuation in part of my application Serial No. 721,146, filed April 18, 1934.

The principal object of the invention is to produce an inertia switch to be interposed in the stop light circuit of a motor vehicle through the medium of which switch there will be given automatic signals indicative of the true velocity changes of the vehicle, i. e. a slowing of the speed of the vehicle occasioned by the operator removing his foot from the accelerator pedal will be indicated by an intermittent blinking of the stop light, or a separate slow down light, and a full stop of the vehicle will be indicated by a full illumination of the stop light. Rear end collisions can be thus materially reduced since the driver of a following vehicle will be warned by the blinking of the stop light ahead that a slowing up and a possible stop of the vehicle is imminent.

These objects I accomplish by the use of a simple mercury inertia switch so arranged and constructed and in which the mercury has such a definite action relative to the physical construction of the switch as to provide the action indicated in the foregoing paragraph and at the same time to permit of the vehicle being inclined at a relatively high critical angle without bringing the switch into play.

In the drawing similar characters of reference indicate corresponding parts in the several views.

Fig. 1 is a plan view of my improved inertia switch.

Fig. 2 is a sectional view of the same, taken on a line 2—2 of Fig. 1.

Referring now more particularly to the characters of reference on the drawing the letter T indicates generally a mercury tube in substantially the shape of a Y, the legs 1 and 2 of which are adapted to be mounted on the vehicle in horizontal position. The neck 3 of the Y at the apex of the legs 1 and 2 rises at an angle of approximately forty-five degrees to the horizon.

Each of the tube legs 1 and 2 are preferably of full cylinder form which merge into a single smaller cone shaped bore 4 at the lower end of the neck 3, the bore 4 communicating at its apex with a relatively small closed bore 5 in the upper end of such neck 3. The axis of the cone shaped bore intersects the axis or horizontal center line of the tube T in the plane of the base of such cone shaped bore.

One electrode 6 in the electrical circuit leading to the slow down and/or stop light projects into tube T preferably at the junction of the legs 1 and 2 while a pair of electrodes 7 and 8 are mounted in vertically spaced relation in the neck 3 and project into the bore 5.

In practice mercury M is filled into the tube T to such an amount that when the tube is quiescent such mercury fills substantially one-half of each leg 1 and 2 shown by full lines in the drawing and covering the electrode 6 and when at rest the inner or electrical circuit completing surface thereof is approximately within the plane of the base of the cone shaped bore 4. When the vehicle is on a grade the capillary repulsion presented by the smaller cone shaped bore 4, which repulsion increases as the mercury enters this cone shaped bore, causes the flow of the mercury to the electrode 7 to be retarded and hence closing of the circuit due to the tilting of the tube is delayed and therefore there results a greater crictical angle at which the contact between electrodes 6 and 7 will be made under normal running conditions and which delay in practice has been demonstrated to be sufficient for all normal vehicle operation.

Although the cone shaped orifice 4 dampens ordinary road shocks by capillary repulsion, nevertheless upon deceleration of the vehicle, the inertia force plus the momentum of the mass of the mercury made possible because the legs 1 and 2 are only substantially one-half filled causes the mercury to overcome such repulsion and so splash back and forth with a wave-like motion. This motion intermittently makes and breaks contact between the electrodes 7 and 6. This causes a blinking of the light in the stop light or in a slow down light, if such a separate slow down light is introduced into the circuit. This eliminates that interval of time required by mind reaction in the process of applying the brakes.

Then when a complete stop is made by applying the brakes the powerful slap of the mercury converging from the two horizontal columns in the legs 1 and 2 of the tube T into the cone 4 and orifice 5 will drive the mercury clear up to and past the point 7 and to the point 8 if a separate stop light is in the circuit and will give a full constant stop light, since the deceleration is then great enough to sustain a definite head of liquid.

The initial blinking of the light upon deceleration warns a following motorist that a definite change of speed of the leading vehicle is intended even before the operator of the leading vehicle

spends the time necessary mentally in manipulating the change. If, for example, a vehicle is moving at the rate of only thirty miles an hour and the operator suddenly removes his foot from the accelerator and it requires one second for him to apply the brakes, he will have travelled approximately forty-four feet before a slow down occurs—with the possibility of a very sudden slow down. Thus, the motorist following would be warned by the blinking light, occasioned by the deceleration, that a slow down was about to occur and would be able to allow himself an additional forty-four feet in which to be ready to make a sudden stop. This situation multiplies itself to each succeeding vehicle if all are equipped with the automatic switch and thus the danger of a disastrous "pile up" can be avoided.

From the foregoing description it will be apparent that with the tube T mounted in the stop light circuit of a vehicle, it will effectively function to automatically indicate true velocity changes of the vehicle and thus accomplish the objects of the invention as herein set forth.

I claim:

An inertia switch for the purpose specified comprising a tube adapted to normally be in a horizontal position and terminating in a neck, the neck being set at an upward angle to the normal horizontal position of the tube and being provided with a cone shaped bore having its wide end communicating with the bore of the tube and its apex in communication with a relatively small bore provided in the outer end of the neck, the tube being normally substantially one-half filled with mercury, an electrode in the tube normally projecting into contact with the mercury and another electrode located in the neck and extending into said small bore.

REUBEN ERICH.