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2,831,183

VISUAL IMPACT INDICATOR

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FIG. 1

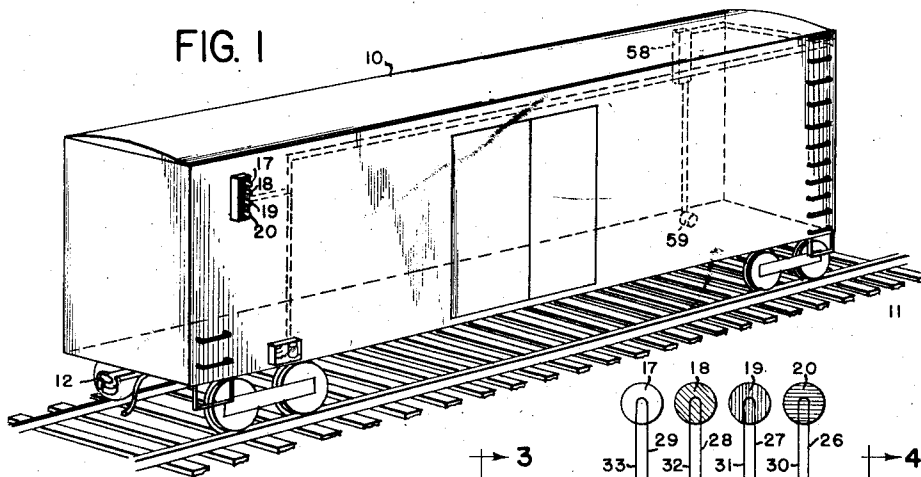


FIG. 2

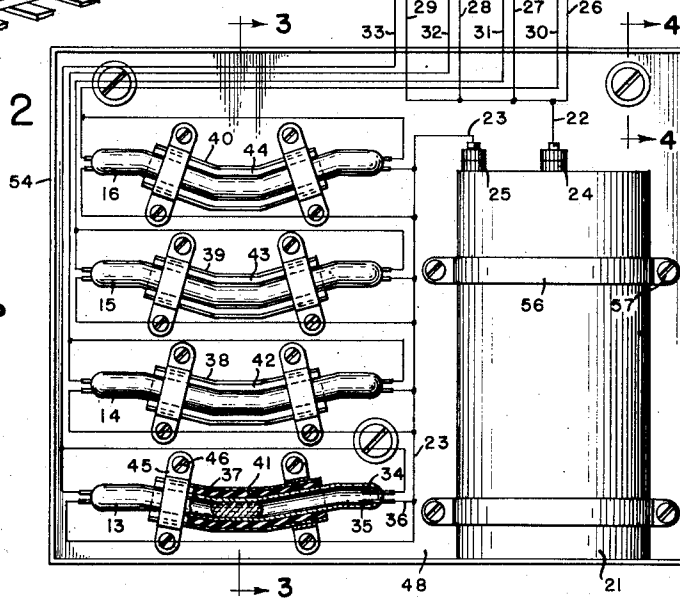


FIG. 3

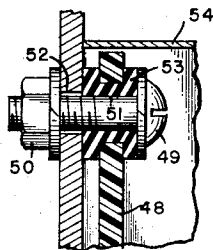
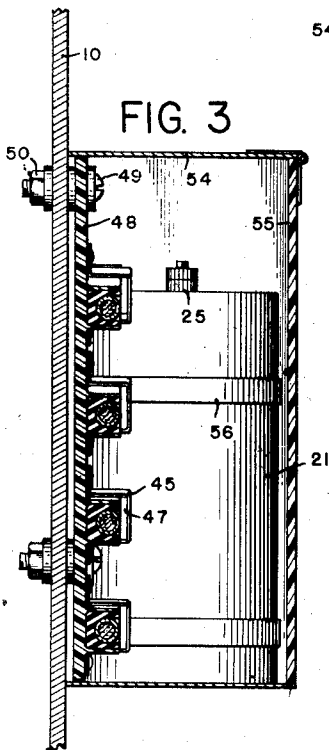


FIG. 4

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## VISUAL IMPACT INDICATOR

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3 Claims. (Cl. 340—262)

This invention relates to devices for giving an indication of what is happening upon the transition of a particular event or series of events in order to provide not only an indication of what is transpiring but in order likewise that such indication may be used as a guide for future action.

The invention relates more particularly to a visual impact indicator for revealing change in positive or negative velocity or the force of impact of objects at least one of which is concerned with motion, such for example an indicator perceptible to the senses for revealing the impact of railway rolling stock or the like.

It has been necessary for trainmen to have great knowledge and to acquire great experience and skill in the performance of their duties in operating railway rolling stock including coupling, uncoupling and moving of the cars during transfer of the same and starting and stopping, particularly on grades. Sometimes notwithstanding knowledge, experience and skill, impact between cars has resulted in damage to the rolling stock and to the cargo and it has been necessary to give consideration to methods of operating without damage but progress in this line has not been as great as has been desired.

It is an object of the invention to provide simple inexpensive and effective means for indicating the amount of force or impact in order to assist trainmen in determining the desirability of reduced or increased speed of contact or change in manner of operation.

Another object of the invention is to provide means from which the knowledge, skill and degree of carefulness of the workmen can be determined as well as a system capable of being readily installed in a desired location and easily repaired and involving minimum maintenance.

Other objects of the invention will be apparent from the following description taken in conjunction with the accompanying drawing:

Fig. 1 is a perspective of a section of railway track and a railway car having the invention applied thereto;

Fig. 2, a diagrammatic view of the signalling system.

Fig. 3, a section on line 3—3 and;

Fig. 4, a large fragmentary detail on line 4—4 of Fig. 2.

Briefly stated, the invention is a system by which positive and negative acceleration can be indicated and force of impact of a railway car or other vehicle may be observed, the system being applied to and carried by the particular car. The system involves a series of mercury switches in an electric circuit with signals perceptible to the human senses such as lights, which may be distinctive in color, the circuit including also a source of power as for example a battery and the mercury switches differing in angularity so that a series of them will be operated successively in proportion to the force of the impact to cause energy to flow from the battery to the signals, four of such switches being shown, one each for energizing the light signals. Thus when the invention is applied to a piece of rolling stock and such rolling stock is brought

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to a stop suddenly, one to four of the lights will be energized in accordance with the speed and suddenness of the stop or the impact.

With continued reference to the drawing, there is illustrated a railway car 10 on a track 11. The car 10 is adapted to be connected to other cars by a coupler 12 and if the coupling is skillfully and properly done no damage will result. It is desirable at times to determine the impact between the coupler 12 and the complementary coupler in order to determine the efficiency of the workmen such as the engineer who is responsible for and controls the movement of the car.

While the invention is described as applicable to a car 10, its use is not limited thereto but can be applied to other load carriers, land, marine and air.

The invention comprises mercury switches such as four or more, 13, 14, 15 and 16, each having a pair of contacts at each end. Such mercury switches serving to control the energizing of a series of lights, 17, 18, 19 and 20 which may be white, green, red and blue, or other colors, or instead other types of signals such as audible signals of varying character may be employed and which are adapted to be energized from a battery or source of power 21 through an electric circuit comprising conductors 22 and 23 attached to binding posts 24 and 25, the lead for such battery being post 24 and the ground being post 25.

From the post 24 of the battery 21 electricity is adapted to flow through conductor 22, lines 26, 27, 28 and 29 to the signals 17, 18, 19 and 20 and through conductors 30, 31, 32 and 33 to one of the two spaced contacts at the ends of the respective mercury switches. When the impact has caused the mercury to bridge the contacts as for example, contact 34 of the lower mercury switch cooperative contact 35 electricity will flow through conductor 36 and conductor 23 to the battery 21 to complete the circuit and actuate the respective signal. In other words when change in positive or negative acceleration or upon impact caused by movement in one direction, the contacts 34 and 35 will be bridged at one end of the mercury switch 13 and when the impact is caused by movement in the opposite direction it will cause bridging in the opposite end of the mercury switch 13. In either case the respective signal namely light 17 will be energized.

The mercury switches are mounted in supporting members 37, 38, 39 and 40, which may be of any desired material such as molded plastic or the like and provided with resilient shock absorbing material 41, 42, 43 and 44 in order to cushion the shock of the mercury switch. The members 37, 38, 39 and 40 form a cradle or trough in which the mercury switches are cushioned. The switches are secured in place in cradles or troughs by means of saddles 45 secured in place by screws or other fasteners 46. A pad or cushion 47 is disposed beneath such saddle bracket 45 and the underlying members. The fasteners 46 engage a base 48 and this base is adapted to be attached to the car 10 by means of a series of bolts 49 and nuts 50, the base 48 having an opening 51 and the car 10 having an opening 52 through which the bolt 49 extends. A rubber spool or grommet 53 of resilient material assists in absorbing the shock.

A housing 54 with a hinged cover 55 is provided, the housing being attached to the car 10 in any desired manner. However, the cover 55 is preferably of plastic or other material which is transparent. The battery 21 may be held in place by means of straps 56 or secured by screws or other fasteners 57, thus providing a compact assembly.

The signals 17, 18, 19 and 20 may be disposed if in a manner to be viewed from one side and if desired a second group or bank of signals 58 may be mounted so it can

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be viewed from an opposite direction, and likewise an inspection box 59 for testing the equipment.

It will be apparent from the foregoing that by the present invention there is provided a visible impact indicator by which a signal would be given in accordance with the force of the impact which may be readily observed. That due to the angularity at which the extremities of the mercury switches are disposed, each progressively steeper than the other, the signal means will be operated in accordance with the force of the impact and only fully operated when the impact is sufficient to produce such result.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is illustrated in the drawing and described in the specification, but only as indicated in the accompanying claims.

What is claimed is:

1. An acceleration indicator comprising an electrically operated signal, a mercury switch including a closed tube having electrodes in both ends thereof, said tube having a central portion and upwardly diverging intermediate portions and substantially horizontal end portions, a globule of mercury in said tube adapted to pass from the central portion through the inclined intermediate portions to the end portions, said tube being normally positioned with the end portions at the same horizontal elevation whereby acceleration of said tube in either direction will cause the globule of mercury to move in the opposite direction due to inertia forces, said inclined intermediate portions having an inclination such that a predetermined acceleration will cause the globule of mercury to engage the electrodes, said mercury being adapted to remain in said horizontal portion even though the inertia forces are appreciably reduced whereby a circuit may be closed upon an initial acceleration of relatively high value and remain closed during any subsequent acceleration of lesser value and upon stoppage of acceleration the circuit will be broken, a source of electric current, and means to con-

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nect said source of electric current to the electrodes of said mercury switch and said electrically operated signal whereby an observable signal is produced upon the exposure of said switch to a predetermined acceleration.

2. The invention according to claim 1 in which a plurality of indicators are provided with the switch of each indicator having a different inclination in the intermediate portion.

3. An acceleration indicator comprising an electrically operated signal, a mercury switch including a closed tube having a horizontally disposed portion at one end thereof, a portion of said tube being disposed at a lower elevation than said horizontally disposed portion, and a connecting communicating portion between said lower portion and said horizontally disposed portion, a globule of mercury in said tube, electrical contacts in said horizontally disposed portion, said switch having means to mount said tube with the tube extending in the direction of acceleration forces whereby acceleration forces of a predetermined value and of sufficient duration will cause the globule of mercury to move from said lower portion to said horizontally disposed portion, said globule of mercury remaining in said horizontally disposed portion for the duration of relatively small subsequent acceleration forces, a source of electric current, and means to connect said source of electric current to the contacts of said mercury switch and said electrically operated signal whereby an observable signal is produced upon the exposure of said switch to a predetermined acceleration.

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