April 30, 1940. B. B. WHITE 2,199,122

SHOCK OPERATED IGNITION SWITCH

Filed July 26, 1938

Fig. 1.

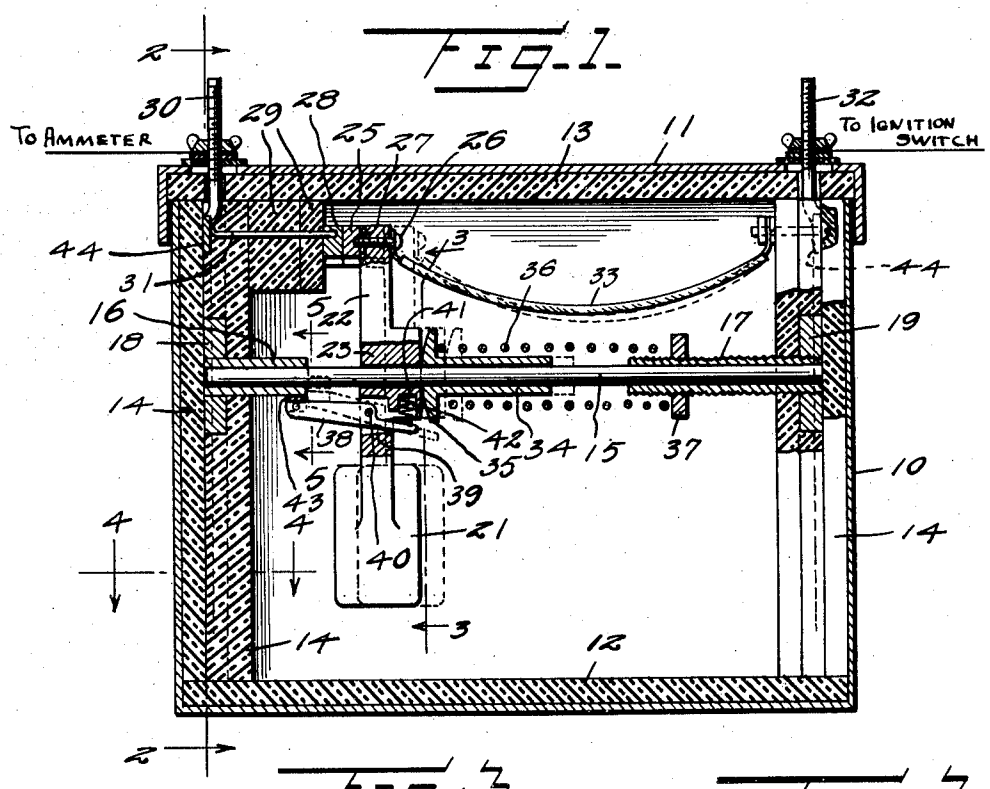


Fig. 3.

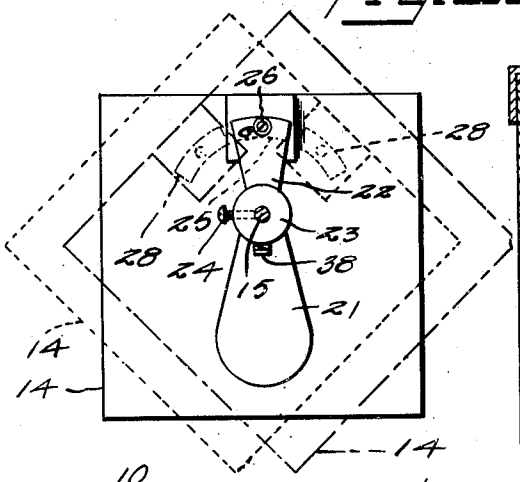


Fig. 2.

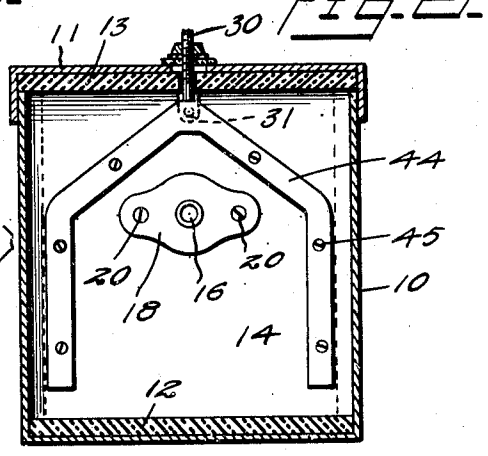


Fig. 4.

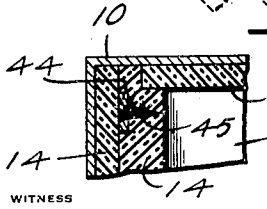
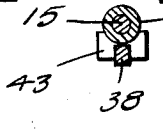


Fig. 5.



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SHOCK OPERATED IGNITION SWITCH

Bert B. White, Waterloo, Iowa

Application July 26, 1938, Serial No. 221,368

1 Claim. (Cl. 200—52)

This invention relates to a shock operating ignition switch and has for an object to provide a pendulum controlled switch which will automatically disconnect the ignition brushes from the electrical power source in the event the motor vehicle is involved in a major accident such as a head on collision, or an upset to the right or to the left, and prevent the vehicle catching fire.

A further object is to provide a device of this character which will be formed of a few strong simple and durable parts, which will be inexpensive to manufacture, and which will not easily get out of order.

With the above and other objects in view the invention consists of certain novel details of construction and combinations of parts hereinafter fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claim without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawing forming part of this specification,

Figure 1 is a longitudinal sectional view of a pendulum controlled ignition switch constructed in accordance with the invention.

Figure 2 is a cross sectional view taken on the line 2—2 of Figure 1 and showing one of the bearing boxes for the pendulum shaft and one of the binding posts.

Figure 3 is a detail cross sectional view taken on the line 3—3 of Figure 1 and showing diagrammatically the device tilted to the right or to the left to automatically open the ignition switch.

Figure 4 is a detail cross sectional view taken on the line 4—4 of Figure 1.

Figure 5 is a detail cross sectional view taken on the line 5—5 of Figure 1.

Referring now to the drawing in which like characters of reference designate similar parts in the various views, 10 designates a casing having a flanged cover 11. The casing is provided on the bottom with lining 12 of insulating material and the cover 11 is provided on the underneath face with a lining 13 of insulating material. The opposite end walls of the casing are each provided with a plurality of plates of insulating material designated in general by the numeral 14.

A shaft 15 is mounted for endwise and rotary movement in bearing sleeves 16 and 17 carried by respective plates 18 and 19 which are countersunk in the insulating plates 14 of the end wall and secured in place by screws 20, one of these plates being shown in elevation in Figure 2.

A pendulum 21 is provided with a stem 22 having a hub 23 to loosely receive the shaft 15. A set screw 24 is passed through the hub into contact with the shaft, as best shown in Figure 3, to secure the pendulum to the shaft. The pendulum normally occupies a vertical position and remains in this position when the casing is tipped sidewise in the event of the motor vehicle turning over on its side, or is driven rearwardly by the shock of a collision.

An arcuate contact plate 25 is secured to the upper end of the stem of the pendulum through the medium of a screw 26 and a strip 27 of insulating material is interposed between the contact and the stem. The contact plate normally engages an arcuate contact plate 28 which is mounted on insulating spacer blocks 29 carried by one end wall of the casing.

The contact plate 28 is electrically connected to a binding post 30 carried by one end wall through the medium of a conductor wire 31 passed through the insulating blocks 29. A binding post 32 is secured to the other end wall of the box and is connected to the contact plate 25 on the upper end of the pendulum through the medium of a flexible conductor wire 33. One of the binding posts may be electrically connected to the ignition switch and the other binding post may be electrically connected to the ammeter so that the ignition switch is normally closed at the contacts 25 and 28. In the event of the motor vehicle being tilted sidewise, and tilting the casing 10 in the same direction, as shown diagrammatically in Figure 3, the contact 28 on the end wall of the casing will be moved off of the contact 25 since the pendulum maintains this contact stationary, and the ignition circuit will be broken to prevent fire.

While the shaft 15 may turn axially to maintain the contact 28 stationary in the event the vehicle accidentally turns over to the right or to the left as just explained, the shaft 15 also has endwise movement to permit the pendulum moving forward when the casing is driven rearwardly by the shock of a head on collision to open the ignition circuit, as will now be described.

A sleeve 34 is loosely mounted on the shaft 15 and is equipped with a disc head 35 which is normally held in contact with the hub 23 of the pendulum through the medium of a helical spring 36 mounted on the sleeve and engaged between the head 25 and a nut 37 which is threadedly engaged with the bearing sleeve 17, as best shown in Figure 1. The spring normally maintains good electrical connection between the contacts 25 and 27. Impact causes the pendulum 21 and

shaft 15 to slide forwardly to compress the spring and disengage the contacts 25 and 28 so that the ignition circuit is opened. The ignition circuit is maintained open through the medium of a catch 38 which will now be described.

As best shown in Figure 1 the catch 38 is in the form of a lever which is pivotally mounted in an opening 39 formed in the pendulum stem, through the medium of a pivot pin 40. One end of the lever is spring pressed outwardly through the medium of a helical spring 41 which is mounted in a socket 42 in the hub of the pendulum. The opposite end of the catch 38 is provided with a pivoted yoke 43, best shown in Figure 5, which straddles the lower side of the bearing sleeve 16 when the parts are in position to hold the ignition circuit closed. Upon impact, when the shaft 15 and pendulum 21 move forwardly the catch 38 is carried forwardly as a unit therewith and the spring 41 moves the yoke 43 upwardly into engagement with the end of the bearing sleeve 16 and against the shaft 15. In this position the front end of the bearing sleeve forms a stop which holds the pendulum in circuit breaking position against the tension of its controlling spring.

As best shown in Figure 2 each binding post is mounted on a metal brace 44 of substantially inverted U-shaped contour. The brace is countersunk between contiguous insulating plates 14 of the end walls to strengthen the end walls to resist crushing strains. The brace is secured in position through the medium of screws 45, best shown in Figure 4.

In operation should the vehicle be tipped laterally to or beyond a 45 degree angle the casing will move with relation to the pendulum, carrying the contact 28 on the casing out of engagement with the contact 25 on the pendulum to break the ignition circuit. In the event a head-on collision occurs the pendulum 21 and shaft 15 slide forwardly with the result that the pivoted yoke 43 of the catch is moved into contact with the front end of the bearing sleeve 16 with which the catch is associated. When the catch is in this position the pendulum is held in the position into which it was moved by the impact, and in this position of the pendulum the contact 27 carried thereby is out of engagement with the contact 28 carried by the casing and the ignition circuit is broken.

From the above description it is thought that the construction and operation of the invention will be fully understood without further explanation.

What is claimed is:

A shock operated ignition switch comprising a casing, a shaft mounted for rotary and endwise sliding movement in the casing, a pendulum having an upstanding stem provided between its ends with a hub fixed to the shaft, a fixed switch contact on the casing adjacent to the upper end of the stem, a switch contact carried by the upper end of the stem, a spring sleeved on the shaft and engaging the hub to normally hold the pendulum contact in engagement with the fixed contact, said pendulum remaining constantly upright, lateral swinging movement of the casing beyond a predetermined angular distance withdrawing the fixed contact laterally from the pendulum contact, endwise movement of the shaft against the tension of the spring due to impact directed longitudinally of the casing and the shaft withdrawing the pendulum contact in a rectilinear direction from the fixed contact, a sleeve carried by the casing and receiving the shaft, and a pivoted spring pressed catch carried by the pendulum stem and normally bearing with its free end against said sleeve to hold the catch in released position, said catch advancing beyond the sleeve and engaging the end of the sleeve to lock the pendulum contact spaced from the fixed contact after movement of the shaft due to impact directed longitudinally of the casing and shaft has withdrawn the pendulum contact from the fixed contact.

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