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PERCUSSION FUSE

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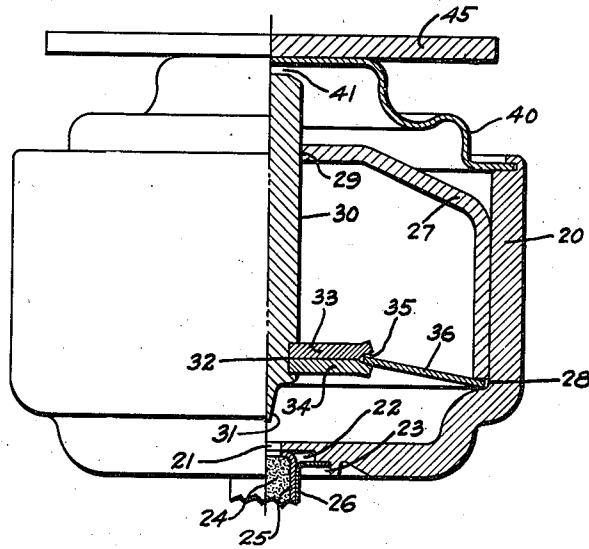


Fig. 1.

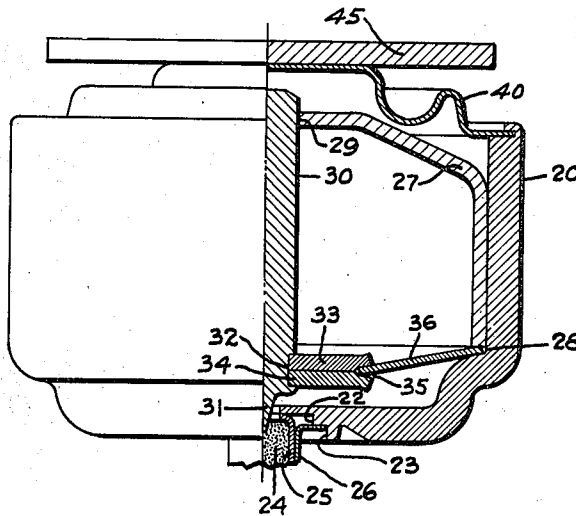


Fig. 2.

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## PERCUSSION FUSE

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7 Claims. (Cl. 102—8)

This invention relates to improvements in percussion fuses and particularly percussion fuses used in connection with mines buried in the ground.

It is among the objects of the present invention to provide a percussion fuse for a mine which is of simple and sturdy construction and in which the movable firing pin is sealed against the dirt and ground in which the fuse and mine are buried.

A further object of the present invention is to provide a percussion fuse for a land mine which will safely support a predetermined load and will not be rendered effective to explode the mine unless the said predetermined safe load is exceeded under which circumstances the fuse is collapsed and fired and the mine exploded.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing wherein a preferred embodiment of the present invention is clearly shown.

In the drawing:

Fig. 1 is a side view, half in section and half in side elevation showing the percussion fuse in normal condition.

Fig. 2 is a view similar to Fig. 1 showing the fuse cover collapsed and the firing pin shifted to firing position.

Referring to the drawing the numeral 20 designates the cup-shaped housing having a central opening 21 in its bottom wall and two counter-bored portions 22 and 23. Any suitable primer charge 24 may be contained within the tubular member 25 carried by a member 26 secured in the counterbore 23 of the housing. A guide member 27 in the form of a cup, is inserted into the housing 20 so that its peripheral edge cooperates with a curve in the housing to provide an annular groove 28. A central opening 29 in the guide member slidably supports the firing pin 30 which is pointed at one end as at 31. Firing pin 30 has an annular flange member 32 which may be either integral therewith or may, as shown, comprise two discs 33 and 34 secured to said firing pin the peripheral edges of said discs being bent outwardly, away from each other to provide an annular groove 35.

A snap action mechanism comprising a dished resilient washer 36 is interposed between the firing pin and housing the inner peripheral edge of said washer fitting into the annular groove 35 of the firing pin flange 32 while the outer peripheral edge of the washer 36 fits into the annular groove 28. This washer 36 is normally so

conditioned that it will hold the firing pin in a position in which its pointed end is aligned with but spaced from the primer charge 24. However, as the firing pin is moved toward said primer charge the inner peripheral edge of the resilient washer, fitting into the annular groove 35 of the firing pin flange will be shifted into the plane of the outer peripheral edge of said washer which edge rests in the annular groove 28 and when said inner edge passes beneath said outer edge the flexible washer will assume its other extreme position as indicated in Fig. 2 thereby moving the point 31 of the firing pin 30 into exploding contact with the primer charge 24 as shown in Fig. 2. The washer 35 is so designed and constructed that a predetermined force is necessary to be exerted against the end of the firing pin to move said firing pin to actuate the resilient washer from its one extreme position into the neutral position at which it is conditioned quickly to flex into its other extreme position. Therefore it may be said that the resilient washer 36 offers a predetermined opposing effort against movement of the firing pin 30 from its normal position as shown in Fig. 1 toward its firing position as shown in Fig. 2.

The housing 20 is provided with a cover 40 secured thereto in any suitable manner so as to seal the housing against dust and dirt. The drawing shows the cover secured to the housing by spinning an edge portion of the housing over the peripheral edge of the cover. This cover 40 is so shaped that a clearance 41 is provided between the firing pin 30 in its normal position and the adjacent inner surface of the cover. Cover 40 is corrugated to give a greater strength against collapse by the application of a load upon the cover. A cover made of metal of a predetermined thickness and corrugated as shown in Fig. 1 will safely support a load of approximately 350 pounds before it will be collapsed as shown in Fig. 2. Cover 40 has a platform 45 secured thereto said platform lying in a plane substantially at right angles to the axis of the firing pin 30.

The percussion fuse of the present invention is used to fire a mine buried in the ground. When properly placed, the platform 45 of the fuse is just beneath the surface being covered and hidden by the ground. It is intended that the mine fuse of the present invention permit loads of a certain weight to pass safely over the fuse while a heavier load of a predetermined value or over collapse the fuse as the load is applied to the fuse platform 45 and cause it

to explode the mine. For instance if, as has been previously mentioned the cover 40 is designed and constructed safely to carry a load of 350 pounds any load in excess of which will crush and cause collapse of said cover and if, for instance the snap action, resilient washer 36 provides for a resistance to firing pin movement out of normal position of approximately 200 pounds, then it may be seen that a load of approximately 550 pounds must be applied on the fuse before the firing pin can be moved to bring the snap action device into operation quickly to move the firing pin into firing engagement with the primer charge 24 and thus explode the mine. In view of these resistances to movements of the platform 45 and firing pin 30 toward the primer charge the present percussion fuse can be operated only by the application of a predetermined load and therefore can be safely traversed by lesser loads. It will, of course, be understood that the design and construction of the fuse cover and resilient spring collar or washer may be altered to accommodate the fuse to any desirable crushing and firing load.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A percussion fuse comprising in combination, a housing; a primer charge supported by said housing; a guide member fitting into said housing; a firing pin slidably supported by said guide member so as to be in direct alignment with the primer charge; a snap action mechanism interposed between the firing pin and housing said mechanism comprising a resilient disk normally dished to hold the firing pin spaced from the primer charge, but adapted to be flexed to reverse its dished shape thereby quickly to shift the firing pin into striking engagement with the primer charge; and a cover attached to the housing, spaced from the firing pin, said cover being corrugated to support a predetermined load which, if exceeded, collapses the cover directly upon the said pin and moves it to flex the snap action mechanism.

2. A percussion fuse comprising in combination, a housing; a primer charge supported by said housing; a guide member fitting into said housing; a firing pin slidably supported by said guide member so as to be in direct alignment with the primer charge; an over-center, snap action mechanism connected between the firing pin and housing and normally exerting a predetermined force holding said firing pin in normally spaced relation with the primer charge but adapted to be moved over center by movement of the pin toward the primer charge whereby said mechanism will quickly move the pin into engagement with the primer charge; and a cover secured to the housing so as to be spaced from the adjacent end of the firing pin; said cover having corrugations adapted to stiffen it for supporting a predetermined load which, if exceeded, causes collapse and engagement of the cover with the firing pin and moves said firing pin against the opposing effect of the snap action mechanism.

3. A percussion fuse comprising in combination, a housing; a primer charge attached to the housing; a guide member in said housing, cooperating therewith to provide an annular groove; a

firing pin slidably supported by the guide and having a flange provided with an annular groove in its peripheral surface; a flexible, dished washer supported between the grooved flange of the firing pin and the groove provided by the guide and housing; and a corrugated cover for the housing, spaced from the firing pin and adapted to collapse at a predetermined applied load and engage and move the firing pin toward the primer charge.

4. A percussion fuse comprising in combination, a cup-shaped housing; a primer charge on said housing; a guide member in said housing, cooperating therewith to provide an annular groove; a firing pin slidably supported by the guide member and having a pointed end and adjacent thereto a disc-like flange grooved in its outer periphery; a resilient, normally upwardly dished washer having its interior edge supported in the firing pin flange groove and its exterior edge in the groove formed between the guide member and housing, said washer normally holding the pointed end of the firing pin spaced from the primer charge but adapted by initial movement of said firing pin to be flexed and at a predetermined point in its movement quickly to move the firing pin into firing contact with the primer charge; and a cover secured to the housing and spaced from the end of the firing pin opposite its pointed end, said cover being shaped to support a predetermined load thereon which load, if exceeded, collapses the cover to engage and move the firing pin toward the primer charge.

5. A percussion fuse comprising in combination, a housing; a primer charge in said housing; an apertured member in the housing providing a guideway; a firing pin slidable in said guideway and aligned with the primer charge; a dished, spring washer normally supporting the firing pin spaced from the primer charge; and a cover for the housing, collapsible at a predetermined load thereon for engaging and moving the firing pin to flex the spring washer whereby said spring washer is conditioned quickly to shift the firing pin into contact with the primer charge.

6. A percussion fuse comprising in combination, a housing; a primer charge in said housing, a guide member in the housing; a firing pin slidably carried by said guide member; a bowed spring washer normally supporting the firing pin in spaced relation to the primer charge; and a cover for said housing, collapsible at a predetermined load to engage and move the firing pin toward the primer charge whereby the bow of the spring washer is reversed and thereby the firing pin is quickly urged to strike the primer charge with a snap action.

7. A percussion fuse comprising in combination, a housing; a primer charge supported by said housing; a guide member in the housing; a firing pin slidably carried by the guide member so as to align with the primer charge; a spring washer normally convexly bowed and supporting the firing pin in spaced relation to the primer charge; and a cover for the housing, collapsible at a predetermined applied load for moving the firing pin to flex the spring washer from its normal convex toward its operated concave bowed position whereby said washer, after being moved to its center or substantially flat position, quickly shifts the firing pin to strike the primer charge with a snap action.

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