April 30, 1946. S. L. METCALFE 2,399,242

LAND MINE

Filed Oct. 15, 1942

Fig. 1

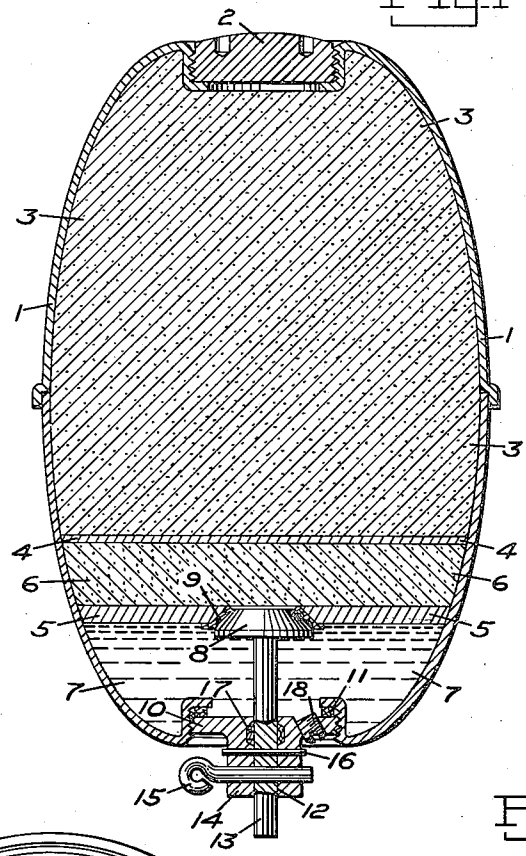


Fig. 2

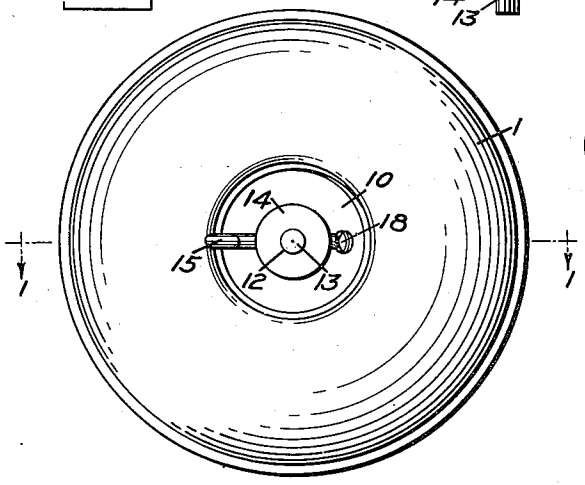
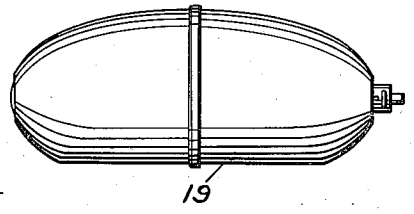


Fig. 3



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LAND MINE

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Application October 15, 1942, Serial No. 462,190

1 Claim. (Cl. 102—8)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to a land mine, and in particular, one that is adapted to damage the tread of a tank or the wheel of a truck or airplane, the size and weight to be as small as consistent with such tactical uses. Such a mine would be filled with explosives stable enough to withstand dropping from a great height yet sensitive enough to detonate upon pressure from the tread of a light tank.

Briefly, these and other objects are attained by employment of a mine divided into three compartments, one containing a stable explosive and the other two compartments containing substances in a liquid or gaseous form which upon being mixed form an explosive of sufficient sensitiveness to explode upon light pressure and with sufficient power to set off the main explosive.

The specific nature of the invention as well as other objects and advantages thereof will clearly appear from a description of a preferred embodiment as shown in the accompanying drawing in which:

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

Fig. 2 is an end view of the mine, and

Fig. 3 is a side view of a modified mine.

Referring to the drawing by characters of reference there is shown a mine with a main outer casing 1, made in two sections, and having a filler cap 2 for the opening through which a main explosive 3, such as TNT is charged into a chamber defined by a partition 4. A further partition 5 of more solid construction than partition 4 further divides the mine into a chamber for reception of sensitizing components which in the preferred example shown comprises carbide 6 in one compartment and water 7 in the other.

A stopper mechanism is preferably employed to normally separate the sensitizing components and permit mixing thereof at the proper time. Thus, a stopper seat is provided in the wall 5 to receive a stopper 8. The stopper seat will preferably be supplied with a gasket 9 to provide a water-tight seal. A stopper assembly plug 10 is threadedly received in the casing 1 against a gasket 11 and has a central bore 12 to receive the stopper stem 13. A boss 14 is provided on the plug 10 and both the boss 14 and the stopper stem 13 are drilled to receive a pull pin 15 and a shear pin 16. The valve 8 is thus seated tightly against its gasket 9 by continued turning of the plug 10, the pull pin 15 imparting the turning movement to the stopper stem. Packing 17 is provided between the plug and stopper stem and a filling plug 18 is provided in the plug.

Operation.—Prior to dropping the bomb the pull pin 15 is removed and this leaves the stopper supported against its gasket pressure only by the shear pin 16. Upon impact with the ground the bomb tends to be deformed with a consequent lessening of volume and the stopper 8 is forced away from its seat, shearing the shear pin 16 either wholly or in part. In either case the water seal is broken and the water seeps into the carbide and generates acetylene gas. This forces the stopper stem outward until the underside of the stopper seats against the plug 10, and thereafter pressure builds up in the now combined chambers 6 and 7. Acetylene itself is not explosive under ordinary conditions, but becomes so when subjected to high pressure, breaking up into carbon and hydrogen with the evolution of heat, and this heat speeds up the further decomposition, and no auxiliary oxygen supply is necessary for the explosion since mixtures of acetylene and air are explosive throughout a wide range of percentage composition and mixtures with as low as 3% of air by volume will explode at about 500°. Thus the residual air in the interstices of the carbide will suffice. The pressure required is furnished by the confinement of the gas being generated together with the heavy tank or other vehicle which, in passing over, deforms the mine and thus creates further pressure. The violence of the acetylene explosion is sufficient to detonate the main charge. The amount of acetylene and volume of the chambers will be so adjusted that spontaneous detonation of the gas under its own pressure will not take place.

The mine will preferably have a curved outer casing to better withstand the shock of impact when dropped. The mine may be truly spheroid as shown in Figs. 1 and 2, but any rounded contour will suffice. In particular, it may have a flattened portion 19 as shown in Fig. 3 to prevent rolling and thus improve the accuracy of placement as well as rendering it more tractable when engaged by a vehicle. It will be further noted that if impact occurs in a region behind the stopper, the pin will still be sheared though in a sense opposite to that which occurs when the stopper is forced outwardly of its seat. The resilience of the gasket under the stopper will then force it back sufficiently to permit entry of the water. The smallest seepage will suffice. In most cases of impact the inertia of the stopper alone will be

a large contributing factor to the shearing of the pin.

I claim:

A land mine comprising an outer casing deformable upon impact, a plurality of partitions dividing the mine into compartments, a high explosive in one compartment, carbide in another of said compartments, water in the compartment adjoining the carbide containing compartment, a plug in the water compartment and having a portion extending outside of the casing, an aperture in the partition between the water and carbide compartments, a movable stopper spaced from the plug and normally closing said aperture and having a guiding stem extending through the plug, said stopper being adapted to be forced from its seat upon the deformation of the casing to establish initial communication between the carbide and water compartments, and be further removed from its seat upon generation of pressure in the carbide compartment to establish full communication between said compartments.

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