May 30, 1950 N. T. COLBY 2,509,213

GROUND MINE

Filed April 19, 1944

Fig. 1.

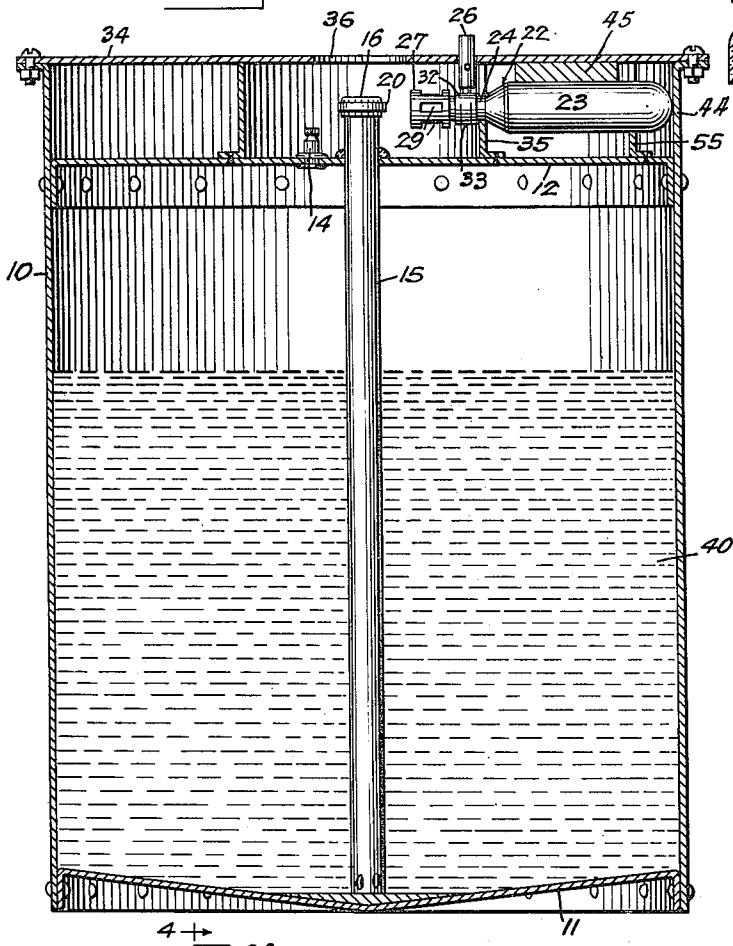


Fig. 8.

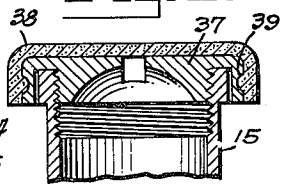


Fig. 5.

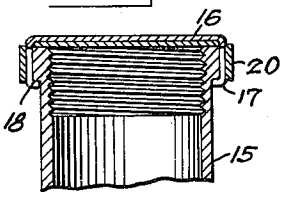


Fig. 6.

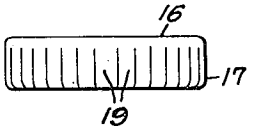


Fig. 7.

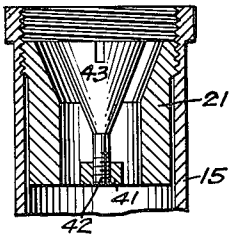


Fig. 9.

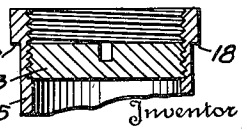


Fig. 2.

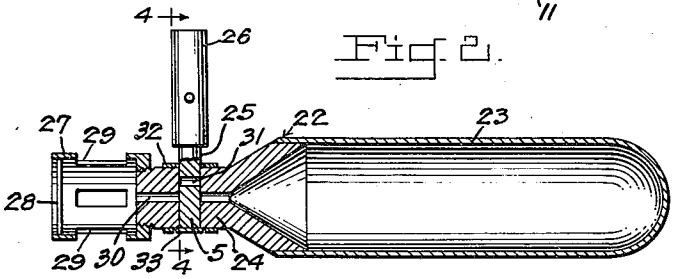


Fig. 3.

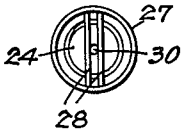
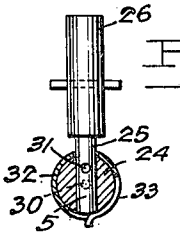


Fig. 4.



Inventor

Noel T. Colby

By C. E. Herrstrom & A. E. Thibodeau

Attorneys

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GROUND MINE

Noel T. Colby, Burney, Calif.

Application April 19, 1944, Serial No. 531,774

4 Claims. (Cl. 102—90)

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

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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.

The invention relates to land mines and particularly to incendiary mines, and has for an object to present a novel structure means and method for effecting the functioning of such a mine.

Another purpose is to present a novel means for utilizing hydrocarbon liquid as an incendiary material.

It is a further object to offer a novel system for effecting the discharge of flaming liquid.

Additional object advantages and features of invention reside in the construction arrangement and combination of parts involved in the embodiment of the invention, as may be understood from the following description and accompanying drawings wherein:

Figure 1 is a vertical section of an embodiment of the invention;

Figure 2 is a detail of the igniter;

Figure 3 is an end view of the igniter nozzle;

Figure 4 is a cross section of the igniter on the line 4—4 of Figure 2;

Figure 5 is a detail of the incendiary jet cap;

Figure 6 is an elevation thereof detached;

Figure 7 is a detail section of a modification of the jet;

Figure 8 is a similar view of a further modification;

Figure 9 is a similar view, showing the closure of the pipe 15 for shipment.

Referring to the drawings, there is illustrated a liquid reservoir or main tank 10 adapted to hold a liquid 40 such as gasoline, under pressure, and consisting of a vertical cylindrical tank of conventional structure having a basin bottom 11 and sealed head 12 in which there is a hermetic filling fitting 13 (Fig. 9) for introducing the liquid, and an air valve 14 corresponding to those used in automobile tires, through which air may be pumped conventionally and retained.

Centrally of the reservoir a discharge pipe 15 is extended from near the bottom through the head 12 to a selected point of discharge in this instance immediately over the head 12, and there fitted with a thermally released cap 16. In one instance the cap is a sheet metal disc set across the simple end of the pipe, with edge portions 17 turned downward around the pipe and crimped under a shoulder 18, formed on the pipe. The downturned edge portions of the cap are slotted so as to form weakened fingers 19, as in Fig. 6,

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and a lead band 20 is fitted around these fingers to hold them in engaged position. The band may be alloyed, as, with antimony, cadmium, or other metal to lower its melting point, if desired. If desired, a fan jet or cone jet nozzle device 21 may be incorporated in the end of the pipe as in Fig. 7, which may be covered by the cap.

An igniter 22 is mounted at the top of the tank consisting of a small bottle cylinder 23 adapted to hold an inflammable gas under high pressure and having a discharge neck 24 presented toward the cap 16 and in which there is fitted a depressible valve 25 slidable through the neck 24 of the bottle and having an external operating head or stem 26 disposed in a position to be depressed by personnel or mobile materiel to release the content of the cylinder through the neck 24.

On the end of the neck there is mounted a nozzle and igniter 27, across or in the mouth of which there is mounted a pair of igniter wires, or other automatic catalytic gas-igniting device 28, responsive to flow of vented gas from the bottle to ignite the same. The nozzle is formed with lateral air inlet ports 29 so that a combustible mixture is formed when the valve 25 is opened.

Other igniting means may be employed as found expedient.

The neck 24 of the igniter is a thick cylindrical member axially bored to form a passage 30 for released gas and across this neck a vertical diametrical bore is formed in which a simple sliding plug 5 constituting the valve is slidable, having a port 31 therethrough which, at initial closed position of the valve is spaced above the passage 30. The lower extremity of the valve at this time is flush with the lower side of the neck and the head 26 has a thickened part around the plug spaced above the neck the same distance that the port 31 is located above the passage 30.

A sleeve 32 is engaged around the neck 24, through which the plug extends at the upper side. A spring tongue 33 is formed on this sleeve, the extremity of which presses upwardly against the neck at the lower end of the plug to support the latter yieldingly in closed position. The length of the spring finger is such that upon depression of the valve its extremity passes the extremity of the spring and is retained in open position by the spring bearing against the side of the valve.

The pipe may be extended to a distance from the reservoir 10, and the igniter mounted near the extremity of the pipe 15 with the cap closure described. In the present instance the igniter is mounted on saddle brackets 35—55 secured to the head 12 of the tank, and a protective cover plate

34 carried at the upper extended wall of the tank spaced above the capped end of the pipe and the igniter. The inner bracket 35 for the igniter may consist of an annular wall concentric with the pipe 15 and spaced therefrom, supporting the central portion of the cover plate 34. The latter has a central opening 36 concentric with the pipe 15 and of sufficient size to permit the jet of liquid from the pipe to be ejected therethrough. The head 26 of the igniter valve extends through the plate 34 slidably. The valve 14 is located close beside the pipe 15.

The igniter 22 is placed in a position radial to the pipe 15 and alined with the cap 16 so that when operated a flame will be directed against the cap to melt the lead band 20.

In the present instance the upper end of the pipe 15 is interiorly threaded, and it serves as a filling neck, the fitting 13 being a simple threaded plug screwed to a suitable seat in the mouth of the pipe. This will permit introduction of an inflammable liquid 40 thereinto before shipment to the field, leaving a suitable space thereover, but not necessarily having the content under pressure, and either at a base or elsewhere, before or after placement for action, usual air pump connections are applied to the valve 14, and air introduced to a pressure of forty pounds per square inch or more, or less, according to the effect desired, after the cap 16 and band 20 are applied.

The nozzle 21 of Fig. 7 consists of a bushing body threaded at its outer part to screw into the interior threads of the pipe 15 in the same position as the plug 13 in Fig. 9, and leaving room outward thereof to permit the plug 13 to be also screwed therein if desired. The bushing has a conical interior seat at its outer end and a cross bar 41 at its inner part through which is screwed a threaded stem 42 of a conical nozzle baffle 43 slotted across its outer end to receive a screw driver by which it may be adjusted by rotation to vary the clearance between the baffle and the seat on the bushing.

The outer bracket 55 for the bottle consists of a simple vertical plate, the upper edge of which lies close to the cover plate 34, and it is formed with a wide vertical slot or saddle notch opening on its upper edge, of a width to receive the body portion of the cylinder 23, to rest on the lower end edge of the slot. The bracket 35 is also slotted vertically from its upper edge, this slot being of a width to fit closely to the neck 24 between the body of the cylinder 23 and the sleeve 32. This will hold the igniter 22 against longitudinal displacement from its proper operative position. The plate 34 is shown bolted to a flange on the upper end of the cylindrical wall of the reservoir and at any time before operation the igniter 22 may be set in place for operation, or may be removed. If desired the plate 34 may be welded in place after placement of the igniter 34.

The cylinder butt of the bottle cylinder 23 is shown as close against the wall 44 of the tank 10, and the cylinder may be fitted or wedged between this wall and the bracket 35, although this is not essential. A block 45 which may be of wood is set between the plate 34 and the cylinder, holding it against upward displacement in the brackets.

This construction permits the shipment of the igniters separately from the reservoir element, and assembly at a field or other base, adding to the safety of the device. However, the mine and igniter 22 may be placed in a safe condition for handling by placing the cylinder 23 in the brackets 35—55, with the valve turned to a horizontal position where the curved form of the bracket 35 will prevent outward movement of the valve, and also protect it, the plate 34 also serving as protection of the valve.

In Fig. 8 a modification of the cap mounting is shown, in which the pipe 15 has a metal, slotted nozzle cap 37 screwed thereon and covered with a combustible or explosive plastic 38, as a hermetic seal, the cap 37 having a circumscribing groove 39 into which the plastic fits. The plastic may be nitro cellulose, pyroxylin or a plastic explosive such as TNT or a double base so-called powder adapted to provide a securing collar or band of sufficient substantiality.

With the unitary device illustrated, the tank and mounted parts are buried or otherwise concealed at the point where it is desired that it shall operate, with the plate 34 at or immediately under the surface of a roadway or path in most cases, but with the cap 16 uncovered.

On depression of the valve head 26 a jet of gas is released through the nozzle 27, which, drawing in, and mixing with, air from the lateral openings of the nozzle, passes as a combustible mixture across the igniter wires or the like at 28, becoming ignited thereby. A very hot flame is thereafter projected against the cap and lead collar or other destructible holding means at the cap. The lead is soon melted, and the pressure of the confined liquid from the tank 10 against the cap 16 blows the latter away, the liquid from the tank being then ejected by the expanding air thereover in the tank. This liquid immediately becomes ignited, producing a dangerous widespread flame.

In the event that a combustible collar is used to seal the cap, and especially if an explosive material is so used, release of the material 38 will occur in substantially the same way, but freeing of the liquid 40 will be quicker.

I have disclosed my invention in the best form known to me, but it will be understood that this is purely exemplary and that changes in construction and arrangement, substitution of materials and equivalents mechanical or otherwise may be made without departing from the spirit of the invention, as set forth in the appended claims wherein I claim:

1. A mine device of the character described, comprising a first reservoir of combustible fluid under pressure, a duct therefrom having a discharge end arranged to be located at ground level, a thermally destructible seal for said end, a second reservoir mounted on said first reservoir having inflammable gas under pressure and having a discharge nozzle constructed and arranged to project said gas toward said seal, an external pressure operated valve to control discharge of gas from said second reservoir to the nozzle, and automatic means to ignite gas emitted from said nozzle.

2. A mine device of the character described comprising a hermetic receptacle, a duct therefrom having an outer discharge end, an inflammable fluid and a gas under high pressure in said receptacle, means sealing said discharge end of the duct yieldable to said pressure only at a predetermined high temperature, and separate means mounted on said receptacle and operable by casual pressure of passing bodies to project a jet of inflammable gas on said sealing means, means for automatically igniting said jet to subject said sealing means to said high temperature

and to subsequently ignite inflammable fluid consequently emitted from the duct.

3. A mine device of the character described comprising a hermetic receptacle, a duct therefrom having an outer discharge end, an inflammable fluid in the receptacle including a gas under high pressure, means sealing said end of duct yieldable to said pressure at a predetermined temperature, and separate means operable by casual pressure of passing bodies to project a flame on said sealing means and against inflammable fluid consequently emitted from the duct, a top plate having an aperture through which said duct extends, a terminal outlet for said duct in close proximity to said plate, said means to project a flame including a bottle support on the plate adjacent said end of the duct, a bottle device fixed on the support containing inflammable fluid under pressure and having a nozzle extended and constructed to project fluid toward said pipe end, a valve in the nozzle having a depressible operating member exposed outwardly for casual operation, and means to automatically ignite inflammable fluid emitted from said nozzle.

4. A mine device of the character described, comprising a first reservoir of combustible fluid under pressure, a duct therefrom having a discharge end arranged to be located at ground level, a thermally destructible seal for said end, a second reservoir having inflammable gas under pressure and having a discharge nozzle constructed and arranged to project said gas toward said seal, an external pressure operated valve to control discharge of gas from said second reservoir to the nozzle, and automatic means to ignite gas emitted from said nozzle, said first reservoir including a top plate, said duct extending therethrough and stopping closely thereover,

said means to project gas including a bottle support on the plate adjacent said end of the duct, said second reservoir comprising a bottle device fixed on the support and having said nozzle constructed and arranged to discharge in line with said pipe end, said valve in the nozzle having a depressible operating member exposed outwardly for casual operation to open the valve and means to automatically ignite inflammable fluid emitted from said nozzle, said bottle support comprising a saddlelike seat for the bottle fixed on said top plate, said receptacle having a cover plate secured on the receptacle above said bottle, said plate having an opening over said pipe end, and having said operating member extended movably therethrough for operation, and a part on the cover plate engaged with said bottle to hold the latter to said seat releasable with removal of the cover plate.

NOEL T. COLBY.

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