J. A. STEINMETZ.

PROTECTING FROM POISONOUS GAS IN WARFARE.

APPLICATION FILED SEPT. 4, 1915.

1,225,521.

Patented May 8, 1917.

2 SHEETS—SHEET 1.

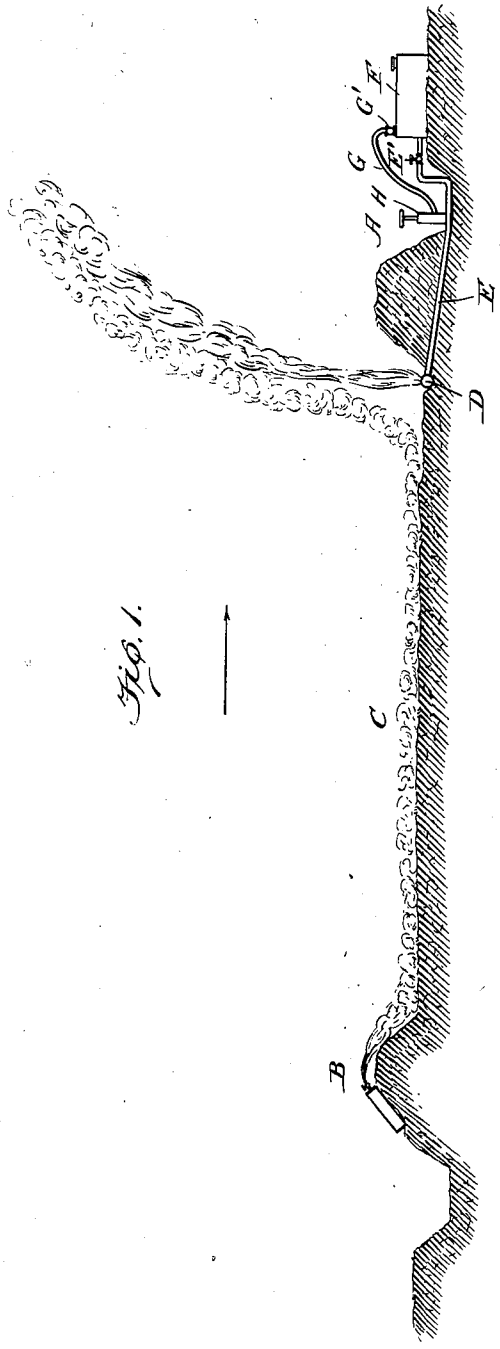

Fig. 1.

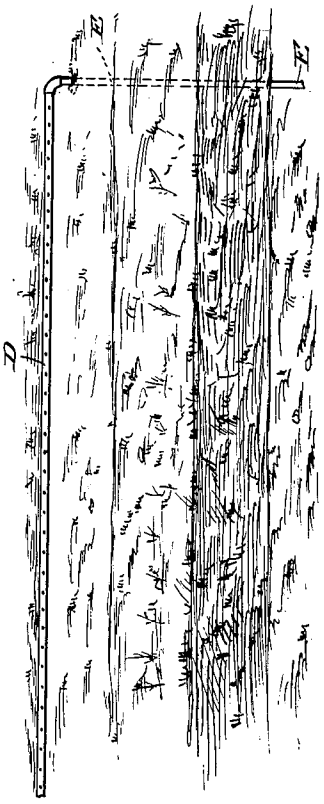

Fig. 2.

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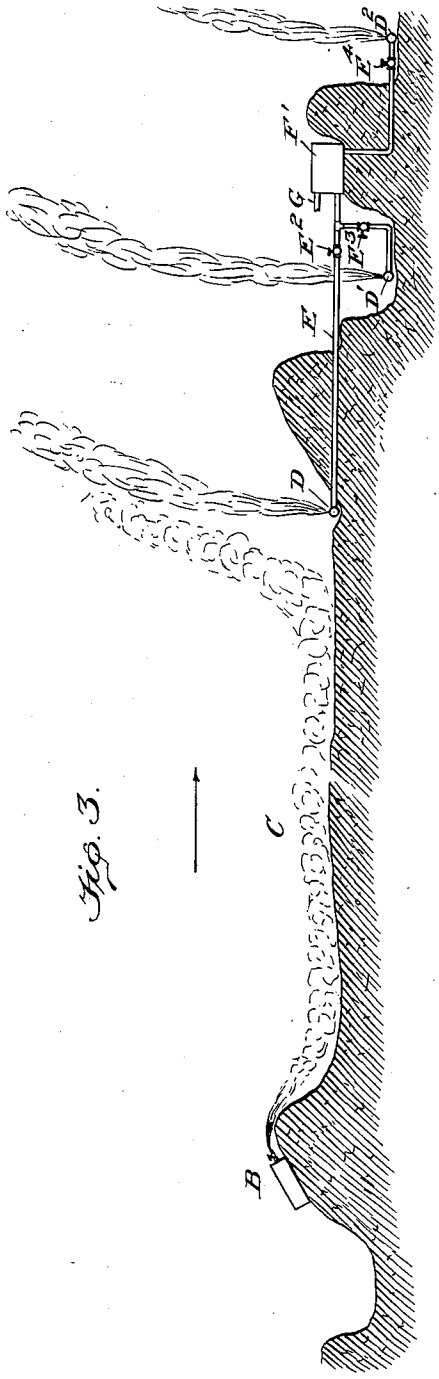

Fig. 3.

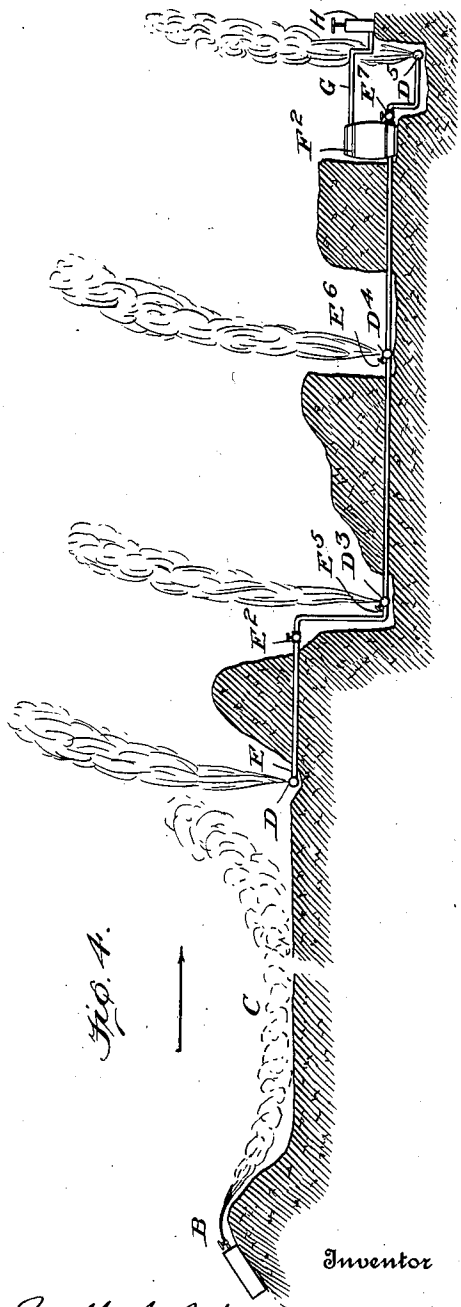

Fig. 4.

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PROTECTING FROM POISONOUS GAS IN WARFARE.

1,225,521. Specification of Letters Patent. Patented May 8, 1917.

Application filed September 4, 1915. Serial No. 49,133.

To all whom it may concern:

Be it known that I, JOSEPH A. STEINMETZ, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Protecting from Poisonous Gas in Warfare, of which the following is a specification, reference being had therein to the accompanying drawing.

It is now common to take advantage of a favorable wind to send into the trenches of an opposing army heavy life-destroying gases, and no satisfactory defense against such attacks is in use, so far as I am advised. The object of this invention is to provide fairly satisfactory protection against such use of deleterious gas.

Since the gas used must be heavy enough to be carried along the ground for some distance and to fill the attacked trenches before it rises or becomes so diffused or diluted as to be harmless, and since such moving heavy gas is readily deflected by transverse currents of other gaseous fluid, it is quite possible to deflect it upwardly so that the breeze which advances it will carry it onward far above the works against which it is directed; and should it again fall it will be after such diffusion and dilution as to deprive it of its dangerous character.

In the accompanying drawings which are diagrammatic,

Figure 1 is a sectional view of opposing earthworks and illustrates the suggested attack and defense.

Fig. 2 is a plan view of a portion of the same works.

Fig. 3 is a view like Fig. 1, showing similar defensive devices used with two parallel trenches.

Fig. 4 is a like view showing the arrangement which may be adopted when there is a succession of three or more trenches.

In these views, A, A′, A^2 represent earthworks to be defended and B hostile works from which poisonous heavy gases may be carried across an intervening field C by air moving in the direction of the arrow of Fig. 1. As shown in the latter figure, a conduit or pipe D, perforated at short intervals, extends in front of and parallel to the earthworks A, and this conduit is supplied with gasolene or other combustible fluid by a pipe E from a tank or reservoir F in or near the trench and if desired below the surface of the earth. The pipe E is provided with a valve E′, and the reservoir, when it is a closed container and especially when it is below the level of the conduit D, is connected by a pipe G, having a check valve G′, with a pump H by which pressure may be created in the reservoir so that on the opening of the valve E′ the combustible fluid will be very quickly distributed along the conduit D.

Whenever poisonous gas is to be deflected, the conduit D is thus supplied and the fluid discharged is ignited by throwing burning material into the vicinity of the pipe or by any other suitable means. There is thus created instantly a rapidly rising curtain of heated air and products of combustion, and this rises far above the earthworks and is bent rearwardly by the same breeze which brings the noxious gases from the hostile trenches at B. The latter gases on reaching this curtain are deflected by it and carried upward and rearward without affecting the occupants of the trench and indeed without power to harm if they finally fall, since they are lost in great body of the surrounding atmosphere.

The pipe D of Figs. 1 and 2 being somewhat exposed may be injured by gun fire, and with the enemy in force in front repairs would be very difficult by night or day. For such reasons the single trench is not desirable where more can be provided, and in fact parallel trenches are usually provided for other reasons. When such trenches have been formed each is provided with a fuel pipe D′, D^2, etc., which is protected from direct hostile fire, and by proper manipulation of valves E^2, E^3, etc., any of the pipes, or part or all of them may be used simultaneously or in succession. If two or more be used at the same time, each creates a moving curtain and supplements the action of the others making assurance of protection doubly sure. The occupants of the trenches may if they desire ignite the fuel in one trench and temporarily retire to the next in rear, for naturally the gas liberated by the enemy effectually prevents immediate advance by their own men. It is to be noted that this defense may be instantly interposed as often as the enemy makes it necessary and may be as quickly discontinued when the danger is past, so that little fuel is wasted. It is further worthy of mention that the apparatus required is very simple,

and that modern armies are constantly supplied with large quantities of combustible material suitable for the use set forth, and that the method although shown as used with simple trenches is equally applicable wherever poisonous gas is similarly employed.

What I claim is:

1. The method of protecting against poisonous gas advancing toward an area to be protected which consists in burning along a line slightly in front of the boundary of the area to be protected, highly combustible fuel, thus forming a protecting wall of heated rising gas which deflects the poisonous gas to a safe height above such area.

2. The method of defending against poisonous gas advancing toward an area to be protected which consists in delivering along a line slightly in front of the margin of such area highly combustible fluid fuel under pressure and igniting the fuel so delivered, thereby forming a wall of rapidly rising heated gases to deflect to a safe height the advancing poisonous gas.

3. The method of defending against poisonous gas used in warfare which consists in delivering a supply of fluid fuel under controlled pressure along a line slightly in front of the area to be protected and igniting the fuel so delivered, thereby forming a controllable wall of heated rising gases to deflect advancing poisonous gas to a safe height above said area.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH A. STEINMETZ.

Witnesses:
OMA F. STEINMETZ,
T. LEWIS THOMAS.