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UNDERGROUND FUEL STORAGE SYSTEM

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FIGURE 1.

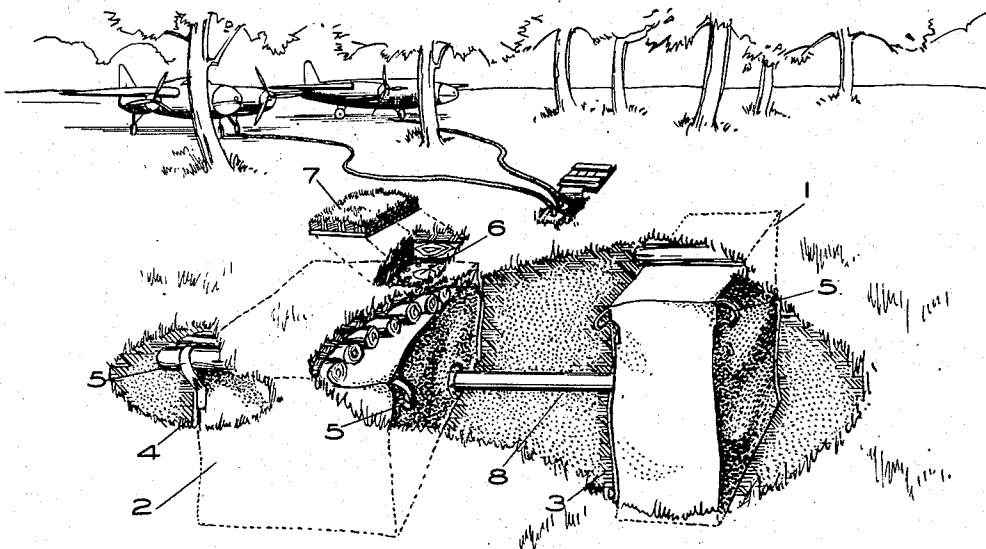
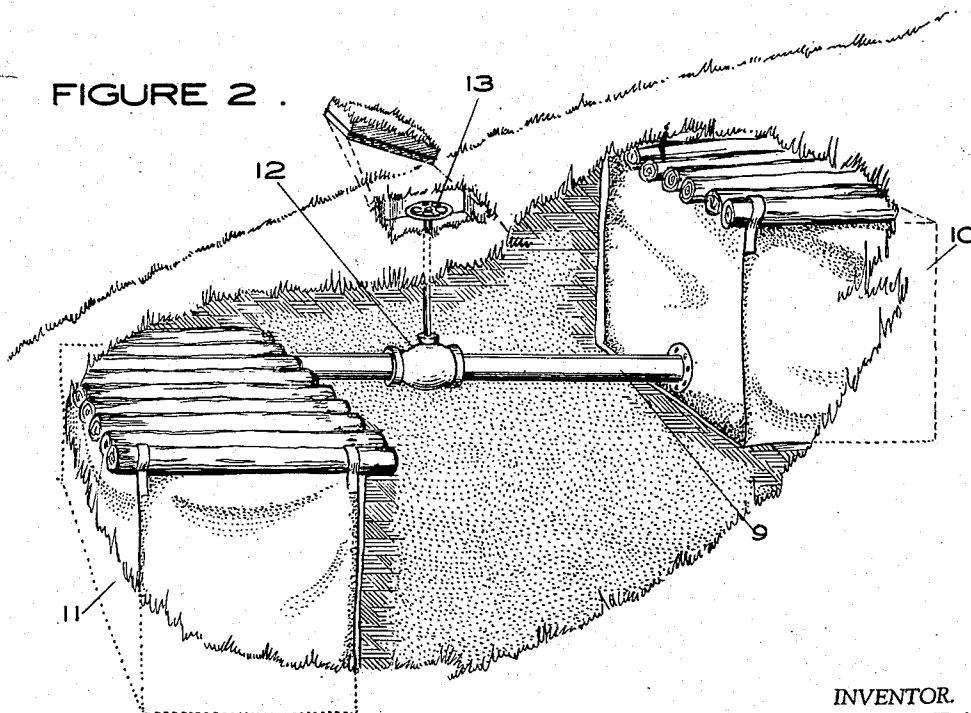


FIGURE 2.



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UNDERGROUND FUEL STORAGE SYSTEM

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1 Claim. (Cl. 220—18)

This invention relates to an underground storage system for liquid fuel.

Fuel storage by this system is accomplished by means of flexible, liquid proof containers supported in excavated cavities in the ground and covered over by earth or sod which affords a dual protection, namely, protection from observation and from fire hazard. Due to the fact that the flexible fuel containers can be collapsed, the equivalent of many gallons capacity can be readily transported on a single truck with the necessary connections and fittings.

Such a system is readily adaptable for military use in establishing land bases or supply depots for temporary airports, and the like. The ease with which such a system may be installed at a depot and camouflaged will be readily apparent from the following description.

In such a system it is merely necessary to transport the bare essentials such as the collapsible fuel containers and fittings, as the walls of the excavation support the container, and the roof structure can usually be obtained by felling a sufficient number of small trees. Supporting poles and planks for covering the cavity, may be transported if necessary.

Further and other objects will become apparent from the description of the accompanying drawing which forms a part of this disclosure and in which like numerals refer to like parts.

In the drawing:

Figure 1 shows the underground storage system for fuel.

Figure 2 shows a safety feature of such an underground storage system.

Figure 1 discloses flexible fuel storage containers 1 and 2, placed in cavities in the ground 3 and 4. These cavities are carefully excavated in solid ground so that the dimensions of the cavities conform, as near as possible, to the outside dimensions of the containers. While the walls of the excavated cavity are usually sufficient support, plywood or any similar backing material or lining may be used in the cavity. Straps 5 are shown at the upper corners of the flexible container and are intended to be secured to a supporting structure over the top of the cavity which may be of small logs or any other suitable members that span the cavity and afford the necessary support. Similar straps may be placed on the lower corners so that the lower corners may be staked down to prevent water in the cavity from floating the cell. The whole cavity may then be covered over by logs as shown in the drawing to afford protection and support

for an earth or a sod covering. Access is provided to fitting 6 by a removable cover such as 7 whereby the fuel lines may be attached and the fuel pumped from the storage cells. The storage cells may be interconnected underground by pipes 8.

It is important that the ground be selected and the cavity carefully excavated so that the walls of the cavity will be self-supporting and will support the load of the fuel in the container.

Figure 2 shows an arrangement of tanks which may be employed to salvage gasoline from a burning tank. The location must be chosen with such slope so that cavities may be excavated for tanks, in such a position that pipe 9 connecting the two tanks will permit fuel to flow from the bottom of the upper tank into the lower tank. The cavities may be merely excavated to different depths to accomplish the desired result. The two excavations for the cells must be placed far enough apart so that there is no danger of a fire in the upper tank igniting fuel in the lower tank. The upper tank 10 is the normal fuel storage tank, the lower tank 11 is the emergency or salvage tank. In case of a fire or excessive leakage due to damage of tank 10, valve 12 may be opened by hand wheel 13 and the fluid permitted to flow by gravity from tank 10 to tank 11. By this means, even though tank 10 is burning, almost all of the fuel can be drawn off through pipe 9 and the combustion will not be transmitted to tank 11.

The cell used in carrying out this invention may be of any materials or construction which will render the cell sufficiently flexible and rugged so that it may be collapsed and stored in a relatively small space, and withstand handling and transportation from one location to another. The materials of the cell which come in contact with the liquid must, of course, be inert to any chemical reaction with the liquid.

An example of a specific cell of the above specifications would be one comprising a layer or layers of fabric, impregnated with a liquid-proof plastic material. Where more than one layer of fabric is used, the impregnating plastic material would also act to bond the layers of fabric into a single flexible wall structure. The plastic materials must be such as will render the wall structure flexible and resistant to the chemical action of the liquid.

Suitable materials may be of the Perbunan or Thiokol R D type composed of co-polymers of acrylonitrile and butadiene, or hydrolysis products of co-polymers such as Resisto-flex which is

made up of polyvinyl alcohol and polyvinyl acetate. Condensation polymers, such as the Thiokols, which may be either of the ethylene dichloride or dichloroethyl ether type condensed with sodium polysulfide; or nylon which is a condensation product of adipic acid and hexamethylene diamine, may also be used.

In the event that the impregnating material used is not resistant to the action of the fluid carried in the cell, the above materials may be used as a lining for the cell.

It is to be understood that certain changes, alterations, modifications and substitutions can be made without departing from the spirit and scope of the appended claims.

I claim as my invention:

In an underground fuel storage system, comprising an excavation of predetermined dimensions, a flexible, rubber-like fuel containing cell having top, bottom and side walls forming an integral closed structure adapted to be placed in said excavation, the dimensions of said excavation being substantially equal to the external dimensions of said cell when empty, rigid means extending over said excavation adjacent the top thereof and supported by the ground substantially at ground level, and strap means secured to said rigid means to support said cell to prevent the collapse of said cell when empty.

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