May 9, 1933. W. GRAAFF 1,908,141

APPARATUS FOR GENERATING FIRE FOAM

Filed June 2, 1928

Fig. 1.

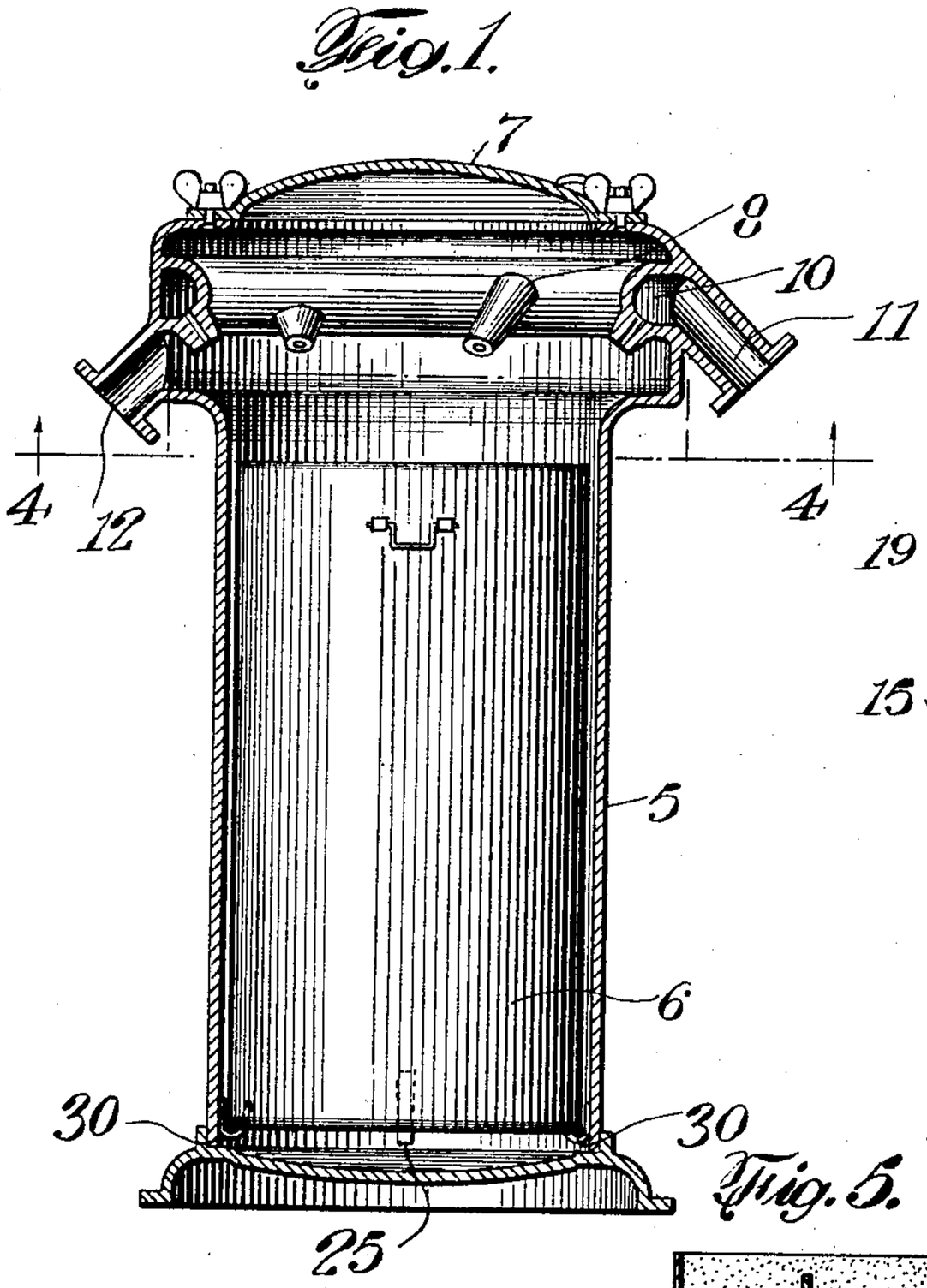


Fig. 2.

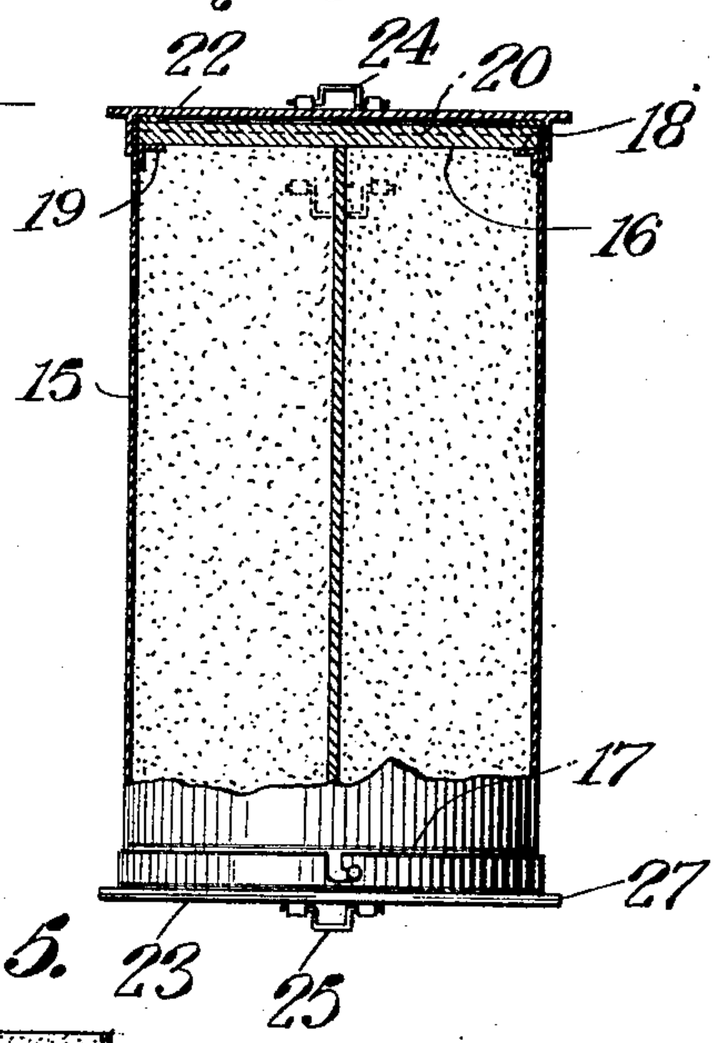


Fig. 5.

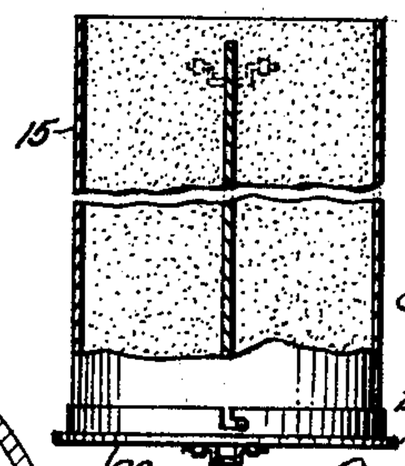


Fig. 4.

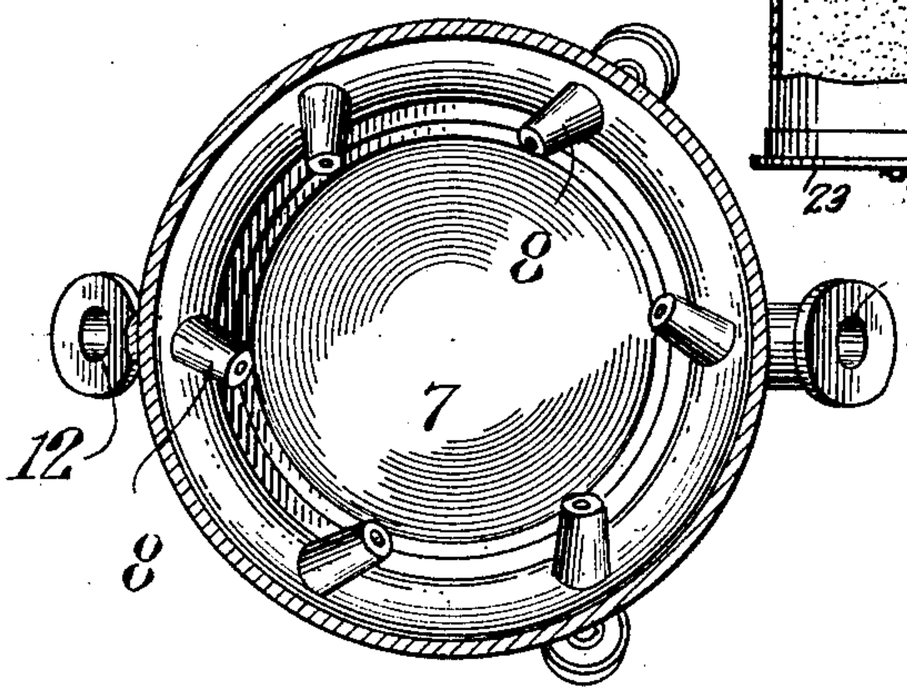
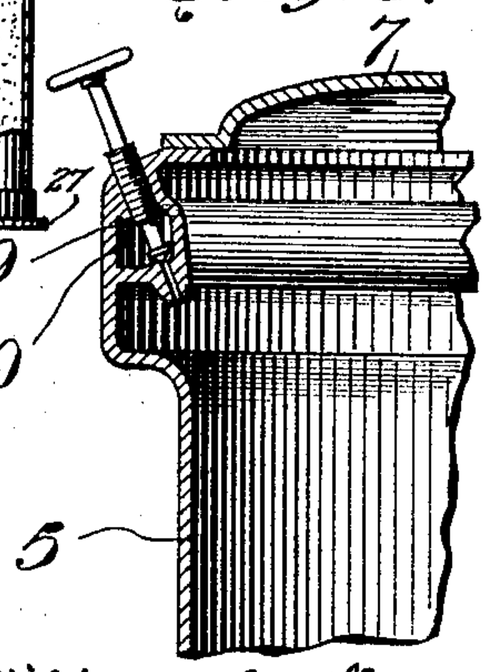


Fig. 3.



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ATTORNEYS.

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UNITED STATES PATENT OFFICE

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APPARATUS FOR GENERATING FIRE FOAM

Application filed June 2, 1928, Serial No. 282,341, and in Germany June 3, 1927.

The present invention relates to fire fighting apparatus and has for an object to provide an improved foam generator.

The invention provides a generator of the type adapted to be connected with a water supply for charging a stream of water flowing through the generator with chemicals to form foam. The invention provides, in its preferred embodiment, an apparatus adapted to be repeatedly recharged with chemicals carried in cartridges which can be readily transported and easily inserted in the generator.

The nature and objects of the invention will be better understood from a description of a specific embodiment for the purpose of which description reference should be had to the accompanying drawing forming a part hereof and in which—

Figure 1 is a central sectional view of a fire foam generator embodying the invention,

Figure 2 is a detail view of the cartridge separate from the generator and showing the protective covers applied to the ends thereof,

Figure 3 is a sectional view showing the construction of one of the valve nozzles,

Figure 4 is a sectional view taken on the line IV—IV of Fig. 1, and

Figure 5 is a view similar to Figure 2 illustrating a modified cartridge construction.

The generator shown for the purpose of illustrating the principles of the invention comprises a casing 5 having a cylindrical chamber for receiving a cartridge 6 of foam forming chemicals. A removable cover 7 provides for the insertion of the cartridge through the top. Nozzles 8, 9 around the periphery of the casing near the top thereof are arranged to direct streams of water downwardly and inwardly into the cartridge chamber to form foam. These nozzles are directed diagonally, as shown in Fig. 4, to provide a swirling action of the water, the better to mix with the chemicals of the cartridge.

The diameter of the upper portion of the casing is such as to provide suitable space for the annular chamber 10 which receives water from the inlet 11 and from which chamber the nozzles 8 and 9 lead. Some of the nozzles are preferably provided with valves in order that the amount of water may be varied to control the quantity and character of the foam. A suitable hose may be connected to the foam outlet 12.

The cartridge in its preferred form consists of a cylinder 15 filled with foam forming chemicals and having frangible discs 16 and 17 closing the ends thereof. These discs are shown as secured to the cylinder 15 by brackets 18, 19 and may consist of a suitable material soluble in water and may be reinforced by a suitable wire mesh 20. For purpose of transportation the cartridge is provided with caps 22, 23 having handles 24, 25 for convenient handling. These covers may, if desired, be connected to the cylindrical shell 15 as by bayonet joints to permit easy removal for use of the cartridge. Each cover is formed with a flange, as indicated at 27, extending substantially beyond the side wall of the cartridge, the diameter of the flanged cover being sufficiently greater than the inner diameter of the cartridge chamber, or, if desired, sufficiently larger than the diameter of the opening in the top of the container to prevent inserting the cartridge without removing the covers.

The discs 16 and 17 which close the ends of the cartridge are preferably both frangible and soluble in water and it is desirable that both discs should be broken when inserted in the generator. Ordinarily the upper disc may be broken by hand after it is inserted in the generator. If it is not broken it will nevertheless dissolve quickly as the water enters. In the structure illustrated provision is made for automatically breaking the bottom disc when the cartridge is inserted. As shown, hook members 30 having sharp knife edges are arranged around the bottom of the cartridge chamber to break the frangible bottom disc and to support the cartridge. The cartridge is enough smaller than the chamber in which it fits to permit such form as is formed at the bottom of the cartridge to

flow up between the walls of the cartridge and casing.

If desired, for convenience in handling, suitable handles 29 may be provided on the side of the cartridge but if such handles are provided they are preferably positioned somewhat down from the top of the cartridge in order that in placing the cartridge in the generator, it will be necessary to let loose of it and let it fall instead of letting it down easily to the bottom of the container. By this expedient the breaking of the bottom disc of the cartridge by the hook members may be insured.

The cartridge may be charged with a uniform mixture of foam forming materials or, if desired, a central partition 35 preferably soluble in water may divide the cartridge into two compartments for acid and alkali materials respectively.

The foregoing description of a particular embodiment is illustrative merely and is not intended as defining the limits of the invention.

So f. i. the frangible discs 16 and 17 of the cartridge may be omitted and only one cover may be given to the cartridge in case of introducing the water into it from the top of the apparatus. In case of introducing the water into the bottom part of the apparatus, the cartridge, however, should be provided with two frangible discs and two covers as described.

In the operation of the foam generator illustrated in the drawing, the closure member 7 is first removed from the casing 5 by turning of the wing nuts which serve to clamp the closure to the casing. The cartridge, of the type shown in Figure 2, may then be inserted through the opening at the top of the casing after the covers 22 and 23 have been removed from the cartridge. The handles 29 on the side of the cartridge may be employed to assist in the introduction of the same into the casing. It will be necessary, however, to release these handles and permit the cartridge to drop before it is fully inserted. As the cartridge drops to its position at the bottom of the casing, the hook members 30 will engage the frangible disc 17 at the bottom of the cartridge to break the same. The upper frangible disc 16, if one is provided, may be broken by hand or it may be left until water entering the casing dissolves this disc. The inlet 11 should be connected to any suitable source of water under pressure. Water introduced through the inlet 11 will fill the annular chamber 10 and will be discharged through the nozzles 8 downwardly and in a tangential direction against the top of the cartridge. If the disc 16 has previously been broken, the water will immediately come in contact with the chemicals within the cartridge and due to the tangential introduction of the water, will produce a rapid whirling movement within the casing. If the disc 16 has not been previously broken, it will first be dissolved and the whirling movement will be subsequently set up. Foam will then be rapidly generated and will be discharged from the casing through the outlet 12, which may be connected to any suitable pipe or hose system for distribution of the foam. By proper adjustment of the valves 9 in the nozzles, the generation of foam will be readily controlled.

I claim:

1. A fire foam generator comprising in combination a casing having a cylindrical chamber and above said chamber a foam outlet and a plurality of water nozzles for directing streams of water downwardly into said chamber, valves controlling said nozzles; said chamber being arranged to receive a chemical cartridge comprising a cylindrical casing containing a charge of foam forming chemicals.

2. Apparatus for generating fire foam comprising a casing providing a cylindrical chamber open at the top; a chemical cartridge adapted to be inserted, in said chamber, comprising a cylinder, a frangible disc closing the lower end of said cylinder; a plurality of nozzles for directing streams of water downwardly into the cartridge chamber arranged around the periphery of said casing above said chamber; means within said casing for breaking the disc upon insertion of the cartridge, and a removable cover for said casing through which said cartridge may be inserted.

3. A fire foam generator comprising in combination a casing having a cylindrical chamber and above said chamber a foam outlet and a plurality of water nozzles for directing streams of water downwardly into said chamber; valves controlling said nozzles; a chemical cartridge adapted to be inserted in said chamber comprising a cylindrical casing containing a charge of foam forming chemicals with soluble, frangible discs closing the opposite ends of said cartridge, and means within said casing for breaking one of said discs upon insertion of said cartridge, the other of said discs being destroyed upon the introduction of water.

4. A cartridge for use in a foam generator comprising a cylindrical casing filled with foam generating material, soluble, frangible discs, closing the opposite ends of said casing and a cover member enclosing each frangible disc and of substantially larger diameter than said casing.

5. A cartridge for use in a foam generator comprising a cylindrical casing subdivided by a partition of material soluble in water into compartments for acid and alkali materials respectively, soluble, frangible discs closing the opposite ends of said casing and

a cover member enclosing each frangible disc and of substantially larger diameter than said casing.

6. A fire foam generator which comprises a casing having a cylindrical chamber adapted to receive a cartridge of foam forming chemicals having a slight clearance with the wall of said chamber, a plurality of nozzles arranged above said chamber around the periphery thereof and adapted to direct jets of water into the top of said chamber, said nozzles having their innermost tips arranged in a circle of at least as great a diameter as said chamber and concentric therewith, means for conveying water to said nozzles including an annular chamber adjacent the top of said casing, said annular chamber having at least as great an internal diameter as said cylindrical chamber, the arrangement being such that said cartridge may be inserted through the top of said cylindrical chamber without removal of said nozzles and annular chamber and foam outlet means communicating with said cylindrical casing.

7. A fire foam generator which comprises a casing having a cylindrical chamber adapted to receive a cartridge of foam forming chemicals having a slight clearance with the wall of said chamber, a plurality of nozzles arranged above said chamber around the periphery thereof and adapted to direct jets of water into the top of said chamber downwardly and at an angle to the axis of the chamber, means for conveying water to said nozzles including an annular chamber adjacent the top of said casing, the innermost ends of said nozzles being arranged in a circle of at least as great a diameter as the internal diameter of said cylindrical chamber to permit introduction of said cartridge into said chamber through said circle and foam outlet means communicating with said cylindrical casing.

8. A fire foam generator which comprises a casing having a cylindrical chamber adapted to receive a cartridge of foam forming chemicals having a slight clearance with the wall of said chamber, a plurality of nozzles arranged in a circle above said chamber around the periphery thereof and adapted to direct jets of water into the top of said chamber, means for conveying water to said nozzles including an annular chamber adjacent the top of said casing, said casing having an opening at its top through which said cartridge may be passed, a closure for said opening, the diameter of said opening and the internal diameter of said annular chamber being at least as great as the internal diameter of said cylindrical chamber, the innermost portions of said nozzles being arranged to permit passage of said cartridge through the circle defined thereby and foam outlet means communicating with said cylindrical casing.

9. A cartridge for use in a foam generator which comprises a cylindrical casing subdivided by a displaceable partition into compartments for acid and alkali materials, respectively, and a destructible disc for closing one end of said casing.

In testimony whereof, I have signed my name to this specification this 21st day of May 1928.

WILHELM GRAAFF.