Aug. 17, 1937. R. M. URQUHART 2,090,602

ART OF HANDLING AND UTILIZING FOAM FORMING CHEMICALS

Filed April 8, 1929

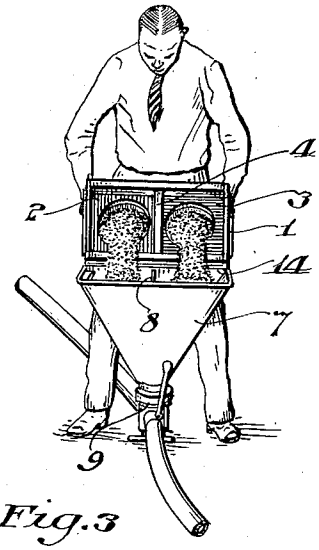


Fig. 1.

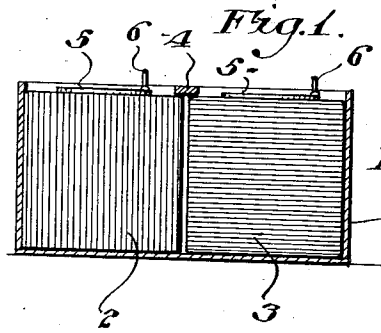


Fig. 3

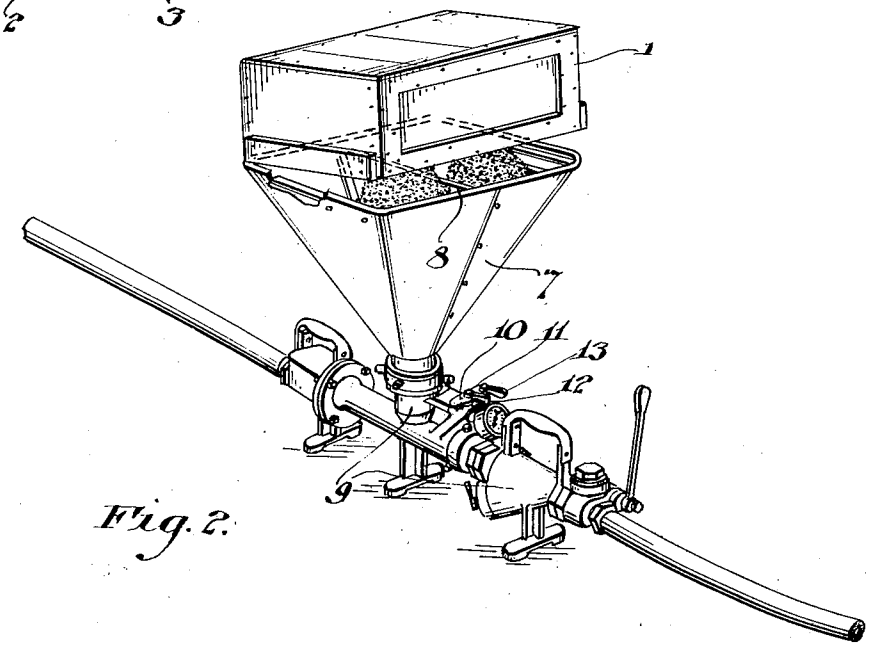


Fig. 2.

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ART OF HANDLING AND UTILIZING FOAM FORMING CHEMICALS

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12 Claims. (Cl. 169—15)

My invention is an improved method of and apparatus for combining with a solvent chemicals which react with the solvent and with one another to produce a stable foam suitable for extinguishing fires, and particularly fires resulting from the combustion of volatile fluid.

Such chemicals consist preferably of an acid and a base reacting to form a gas tending to form bubbles; the walls of such bubbles being preferably toughened or rendered more viscous by the presence in, or addition to, the solvent of a stabilizer such as licorice extract, legume extract, or the like in either powdered or liquid form.

For the efficient utilization of such chemicals and stabilizer, it is desirable that they be simultaneously introduced into a flowing stream at substantially the same locus, but when admixture thereof takes place prior to the introduction thereof into the solvent, a deleterious reaction takes place among the dry chemicals due to vibration, atmospheric moisture, water of crystallization, heat, and other causes, and such reactions either diminish or completely destroy the foam forming capacity of the chemicals when introduced into the solvent.

My improvement not only entirely overcomes any difficulties resulting from deterioration of mixed chemicals, but likewise overcomes the wastage of chemicals resulting from their introduction into a flowing solvent separately from individual packages. Such separate introduction from individual packages results in the introduction into the flowing stream of unbalanced ratios of the respective chemicals so that the foam forming capacity of the chemicals is not fully utilized, and the foam formed lacks the desired consistency and quality. Moreover separate feeding from individual packages necessitates the attention of two operatives, and tends to cause confusion and uncertainty in the operation of foam generating apparatus during the excitement of a conflagration.

In accordance with my invention, separately inert reacting chemicals suitable for the production of foam, and one thereof preferably having combined therewith a foam stabilizer, are packed in a receptacle containing a plurality of compartments or in twin containers coupled together so as to permit simultaneous handling of the package and ejection of the chemicals therefrom in separated streams maintained in spaced relation during their introduction into a solvent therefor and preferably into the divided hopper of a generator having an ejector or ejectors at the bottom thereof for absorbing chemicals into a flowing stream or streams of water passing through the ejector or ejectors. Preferably the hopper is provided with means for converting each of the separate powders introduced therein into a semi-liquid "slurry" or concentrated aqueous dispersion whereby the introduction into the main flowing stream is facilitated and the proportioning of the ingredients further controlled.

In the preferred embodiment of my invention, the separate chemicals are packed in water-proof containers coupled together by a package adapted to fit over the top of a generator provided with supports for engaging the package upon inversion thereof upon the generator.

The characteristic features of my improvements will more fully appear from the following description and the accompanying drawing in illustration thereof.

In the drawing, Fig. 1 is a perspective view illustrating the practice of my method in pouring separate powders into a twin generator; Fig. 2 shows the generator with a twin package of foam forming chemicals inverted thereon; and Fig. 3 is a longitudinal sectional view illustrating a preferred form of the twin package.

As illustrated in the drawing, a receptacle 1 contains a plurality of compartments having therein containers 2 and 3 preferably retained in place by a cleat 4. The container 2 is filled with an acid chemical, such as aluminum sulphate, and the container 3 is filled with a basic chemical, such as bicarbonate of soda. A foam stabilizer, such as powdered licorice extract or legume extract may be mixed with one of the chemicals, preferably the basic chemical, so as to render more tenacious the foam resulting from the reaction of the basic and acid chemicals in a solvent therefor.

Each container 2 and 3 is provided with an air-tight closure 5 which may be readily detached by a pull upon the handle 6.

Foam forming chemicals so packaged and stored retain their foam forming qualities and free flowing characteristics indefinitely, and such packaging is particularly applicable to the concurrent introduction of the chemicals into a flowing stream passing through a generator consisting of a hopper 7 divided into separate compartments by a partition 8 and having at the bottom thereof one or more ejectors 9. The ejector creates a suction at the bottom of the hopper which draws the separate chemicals fed to the hopper compartments into the ejector jet in desired proportions for forming foam. The proportioning of the chemicals relatively to one another and

to the volume of water passing through the jet may be further controlled by introducing water into the respective hopper chambers through the by-passes 10 and 11 controlled by cocks 12 and 13. By varying the water introduced into the respective chambers of the hopper the rapidity of the feed of the respective chemicals into the main stream may be regulated and the consistency of the foam controlled.

In the practice of my invention, the operative at the generator opens both containers of a package and tilts the package over the hopper so that both chemicals flow into the hopper at a substantially uniform rate, and the package is preferably inverted on the hopper and rests upon the bearings 14 along the edges thereof until emptied. The packages may be emptied upon the hopper in rapid sequence as required to maintain a constant uniform supply of chemicals in the respective hopper compartments thereby insuring a continuous supply of uniform foam.

By my improvements, there is entirely eliminated the danger of deterioration of chemicals in storage or handling which commonly results where foaming chemicals are mixed in intimate contact in a single powder, and eliminates the necessity for any inert filler required with mixed chemicals to check the rapid deterioration thereof. Consequently I am enabled to provide at all times a supply of chemicals which are completely foam producing and which may be fed as a unit to form, as required for use, separate, concentrated liquid suspensions of separate reacting chemicals which are simultaneously introduced into a flowing stream to form foam. Furthermore in the event an opened package of my chemicals should be inadvertently wet by rain or a misdirected hose stream the effectiveness of such chemicals is not dissipated and they can be utilized by being separately fed simultaneously into the respective compartments of the generator.

Having described my invention, I claim:

1. The method of storing and handling foam forming chemicals which consists in supporting separately inert chemicals as separate bodies of chemicals, one of which contains a stabilizer, inverting said bodies of chemicals and discharging said chemicals in separate substantially parallel streams supplying substantially constant quantities relatively to one another.

2. The method of forming foam which consists in simultaneously pouring through air at atmospheric pressure spaced streams of separately inert foam forming chemicals into a solvent therefor in substantially constant quantities relatively to one another.

3. The method of forming foam which consists in concurrently pouring in substantially constant quantities relatively to one another separately inert chemicals from separate bodies thereof through air at atmospheric pressure into a flowing solvent in which said chemicals react together.

4. The method of storing and handling foam forming chemicals which consists in confining separately inert chemicals as separate bodies of chemicals and discharging said chemicals in separate substantially parallel unconfined and concurrently flowing streams of smaller cross section than said bodies, said streams supplying substantially constant quantities relatively to one another of said chemicals.

5. The method of forming foam which consists in simultaneously pouring into separate zones having sub-atmospheric pressures spaced unconfined streams of concurrently flowing separately inert foam forming chemicals, combining the respective streams of chemicals in substantially constant quantities relatively to one another with liquids passing through such zones, and separately feeding the respective mixtures of chemicals and liquids into a flowing stream.

6. The method of forming foam which consists in supporting separately inert foam forming chemicals as separate bodies of chemicals, simultaneously discharging unconfined concurrently flowing streams of said chemicals from said bodies of chemicals and in substantially constant quantities relatively to one another into zones of sub-atmospheric pressures, and combining said chemicals with a flowing solvent communicating with said zones.

7. Apparatus of the character described comprising a hopper having therein a partition forming a plurality of compartments, a receptacle containing a plurality of compartments complementary to the compartments of said hopper, said receptacle compartments containing foam forming chemicals, and said hopper being provided with bearings within its edges for supporting said receptacle in position for discharging the contents of said receptacle into the compartments of said hopper.

8. An article of manufacture comprising a unitary package having separate sealed compartments containing respectively an acid and an alkali, one of said compartments having therein a foam stabilizer, the contents of said compartments when combined with water reacting with one another to form foam, said compartments having normally sealed ports so arranged that, when opened, substantially parallel streams of acid and alkali are discharged therefrom upon the inversion of said package.

9. An article of manufacture comprising a plurality of relatively fixed containers charged respectively with an acid and an alkali, one of said containers having therein a foam stabilizer, said containers being normally air tight and having ports sealed with readily detachable closures, said ports being disposed to discharge the contents of said containers in adjacent spaced substantially parallel streams.

10. An article of manufacture comprising a package having compartments housing a plurality of containers containing respectively an acid and an alkali in powdered form, said acid and alkali being adapted to react with one another in water containing a stabilizer to form foam, said containers having normally sealed ports for discharging said acid and alkali in substantially parallel streams, and a cleat disposed between said ports and securing said containers in said compartments, said cleat spacing the streams discharged from said containers.

11. The method of forming foam which consists in constricting and expanding flowing water to create separate zones of suction and pouring through air at atmospheric pressure into said zones parallel streams of acid powder in substantially constant quantities relatively to one another and alkali powder, which streams are drawn into said water by suction, one of said powders containing a powdered stabilizer, said powders reacting with said liquid stream to form foam.

12. Apparatus for forming foam which consists of a plurality of adjacent containers charged respectively with an acid and an alkali, one of

said containers having therein a foam stabilizer, said containers being normally air tight and having ports sealed with readily opening closures, said ports being disposed to discharge the contents of said containers in adjacent spaced substantially parallel streams supplying substantially constant quantities relatively to one another, and ejector mechanism forming zones of subatmospheric pressure beneath said ports and into which said streams are drawn for admixture with solvent therefor flowing through said ejector mechanism.

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