F. C. BARGAR.

FIRE EXTINGUISHER.

APPLICATION FILED AUG. 11, 1919.

1,422,406. Patented July 11, 1922.

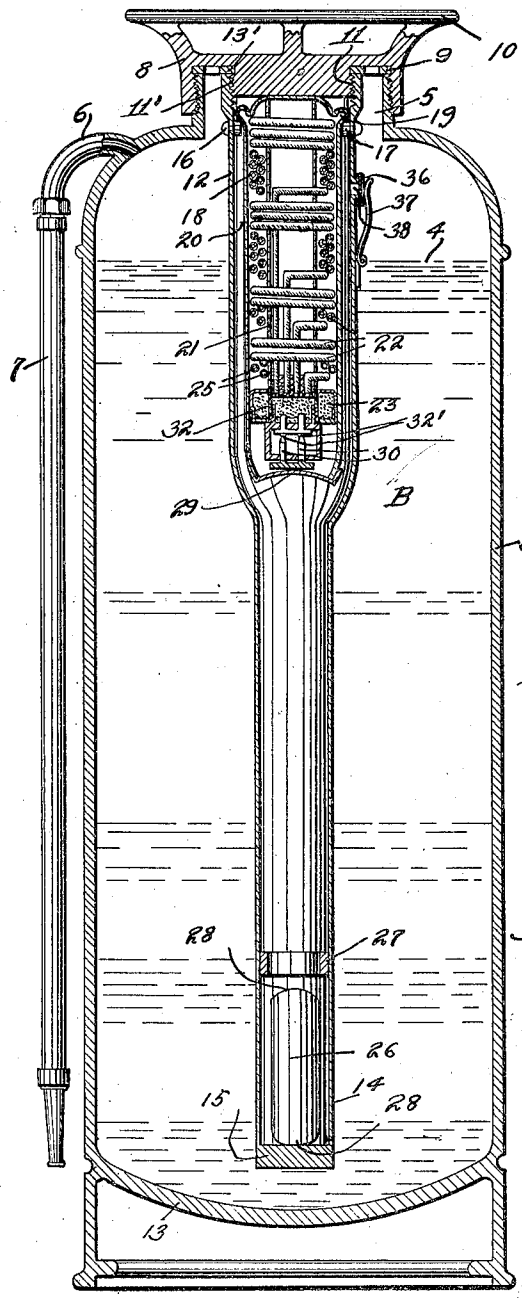


Fig 1.

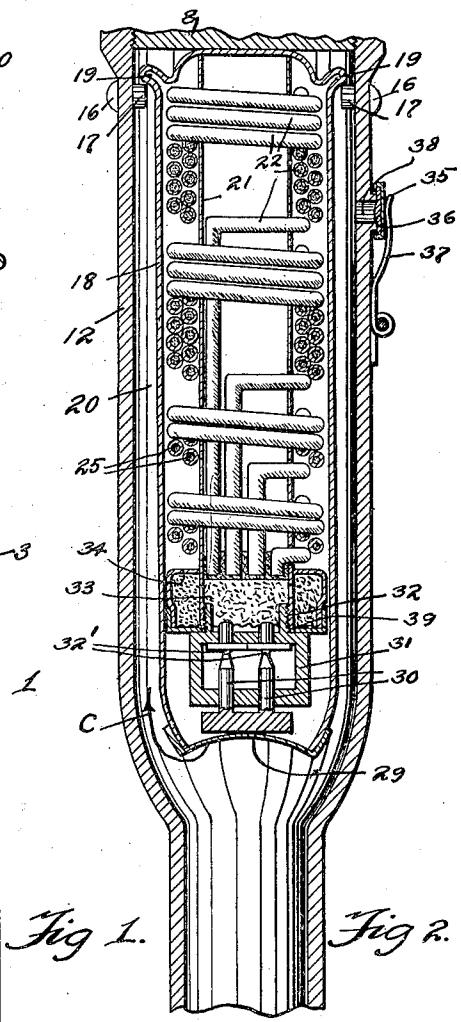


Fig 2.

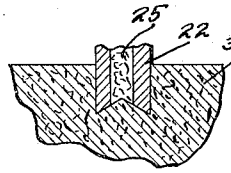


Fig 3.

Witness
A. Lundell

Inventor
Frederick C. Bargar

By C. C. Shepherd Attorney

UNITED STATES PATENT OFFICE.

FREDERICK C. BARGAR, OF COLUMBUS, OHIO, ASSIGNOR TO FOAMITE FIREFOAM COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

FIRE EXTINGUISHER.

1,422,406. Specification of Letters Patent. Patented July 11, 1922.

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To all whom it may concern:

Be it known that FREDERICK C. BARGAR, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, has invented certain new and useful Improvements in Fire Extinguishers, of which the following is a specification.

This invention relates specifically to fire extinguishers, and has for its primary object to provide improved and efficient means for effecting the expulsion of a chemical extinguishing agent from the body of an extinguisher in a prompt, reliable and effective manner.

More particularly stated, one of the important objects of the invention is to utilize for the expulsion of the chemical extinguishing agent the kinetic energy of a suitable gas which is formed at the moment its use is required from a material having potential energy, and which gas is introduced into direct contact with the extinguishing agent as soon as it is formed to thereby expel the latter from the casing; as contradistinguished from those extinguishers wherein expansive and fire extinguishing properties are developed by the admixture of certain chemical substances at the time the use of the extinguishing agent is required, as well as from those extinguishers wherein an expansive expelling agent is constantly engaged with the extinguishing agent and from those wherein the gaseous expelling agent is previously formed and retained in the gaseous condition separated from the extinguishing agent until its use to expel said agent is required, it of course being understood that the gas which is formed at the moment it is to be used, according to the present invention is not essentially an element of the fire extinguishing agent but is primarily intended merely to supply the pressure necessary to expel said agent from the casing.

The utilization of the kinetic energy of a gas which is generated and introduced into contact with the chemical extinguishing agent at the moment it is to be used to expel the latter avoids or prevents deterioration of the pressure creating medium by reason of a loss of pressure thereof due to leakage or other causes and at the same time makes it practical automatically to maintain a pressure of the gas upon the extinguishing agent at all times adequate to insure absolutely the discharge of all the extinguishing agent, without being required, in order to secure these practical and important advantages, to resort to complicated or expensive valved mechanisms to retain the gas and regulate its flow or to resort to a pumping operation to secure complete and uniform flow of the extinguishing agent.

In accordance with the foregoing objects, the invention consists, generically:

Firstly, in means whereby the chemical extinguishing agent is expelled from the casing by the kinetic energy of a suitable gas which is formed at the time its use to expel the extinguishing agent is required from a suitable material having potential energy, and which material is normally separated from the extinguishing agent and is of such nature that the gas may be so formed and so controlled that it acts directly upon the extinguishing agent with a pressure adequate to expel the latter, regardless of the gradually decreasing space within the casing occupied by the extinguishing agent and the correspondingly gradually increasing space within the casing occupied by the expansive expelling agent.

While I recognize the fact that gas formed from other materials than the one hereinafter particularly set forth may be employed, and therefore would have it understood that this invention, considered in its broadest aspects, is not confined to a means for the utilization of a gas derived from the particular source or class of material, nor in the particular way, hereinafter set forth, yet I consider that the utilization of the kinetic energy of a gas derived from a suitable inflammable material, is of such importance as to justify claims particularly based thereon, and especially but not exclusively when said inflammable material is of a solid nature having potential energy which is transformed into kinetic energy by the combustion of said material. Gunpow-

der belongs to the last named class of materials and is readily obtainable, it is inexpensive and answers all of the requirements of a most practicable material for the present purposes. Accordingly, I have exemplified the invention in a structure of novel and most practicable nature for the utilization of gunpowder or analogous inflammable materials transformable into a gaseous substance having suitable kinetic energy by the combustion of said material.

Accordingly, the invention further consists:

Secondly, in a fire extinguisher wherein said chemical extinguishing agent is expelled from the body of the extinguisher by means of an improved combustible structure, which latter is normally confined within a chamber substantially sealed from the agent containing chamber of the extinguisher, whereby upon the ignition of the combustible structure, through the provision of readily operable means, the gases released by the combustion of said structure will be brought to bear upon the extinguishing agent to forcibly eject the latter from the extinguisher body.

Thirdly, in a combustible structure of the aforesaid character and utility which consists primarily of a plurality of powder containing fuses, the latter being of relatively different lengths and capable of being simultaneously ignited in order that the gaseous pressure created by their combustion will be effectively prolonged to maintain the desired pressure for the necessary period of time upon the extinguishing agent to effect the complete expulsion of the latter from the extinguisher casing and at the same time to effect the maintenance of a substantially uniform pressure upon said agent so that the latter will be ejected in a stream of uniform power during substantially the entire period of its discharge.

A still further object is to provide a pressure generating structure of a combustible character which may be employed in connection with the standard invertible types of extinguishers, hitherto in common use, and to render the same more reliable and efficient, and my invention, therefore, consists;

Fourthly, in such a structure capable of being readily connected with an extinguisher of this type and of such form as to be fully operative irrespective of climatic conditions and, further, of such construction as to insure a full and complete discharge of the agent from the extinguisher after the discharging operation has been initiated.

A further object of my invention is to produce an extinguisher which will not freeze at low temperature, and in particular I have provided an apparatus which will not freeze at —40° F., this being the critical low temperature prescribed by the underwriters' laboratories.

Another important object is to employ as the gas producing agent a substance of the type generally employed as an explosive, because of the large volume of gas generated relative to the original volume of the substance; and a more particular object is to so compound and arrange such substance that it will not be converted into gas too rapidly so as to produce an explosion, but will generate the gas gradually to maintain continuous pressure throughout the relatively extended period during which the extinguisher is being emptied.

Other objects of the invention and subjects of claims will be in part obvious and in part pointed out hereinafter.

In the accompanying drawing, wherein has been illustrated one of the many different forms of the invention:

Figure 1 is a vertical sectional view taken through a fire extinguisher and illustrating the location of the combustible agent expelling structure therein.

Figure 2 is a similar view on an enlarged scale of the combustible pressure generating structure, and,

Figure 3 is a detailed sectional view of the fuse construction.

Similar characters of reference denote like and corresponding parts throughout the several views of the drawing.

The invention has been exemplified as employed in connection with a fire extinguisher 1 which in this instance is of the invertible type, and as it is possible to admirably develop the principles of the invention in an extinguisher of this character, the following description will be accordingly confined thereto but it will be obvious after a further perusal of the following description that the principles of the invention may be also equally adapted to many other types or forms of chemical fire extinguishers.

The extinguisher 1 consists of the usual body or casing 3 which is adapted to contain a suitable quantity of a liquid chemical extinguishing agent 4. The upper end of the casing is provided with the usual entrance opening 5 by means of which the agent 4 may be introduced into the interior of the body 3, and said casing is further provided at a point contiguous to the opening 5 with an outlet 6, to which the ordinary flexible nozzle carrying hose 7 is attached, through the use of which the stream projected from the extinguisher may be controlled and directed. The opening 5 is provided with the usual base closure 8, which is formed with internal threads in order that the same may be threadedly secured to the annular wall defining the opening 5, this construction enabling the closure to be securely and separably connected with the body 3. A gasket

9 is preferably interposed between the closure and the upper edge of the wall defining the opening 5 to prevent undue seepage or escape of the liquid agent 4.

The closure 8 is further formed with the usual integral resting or supporting ring 10, whereby when the casing is inverted, same may be supported in an upright position by positioning the ring upon a suitable base, said ring also serving to permit the extinguisher to be conveniently handled during transportation.

Referring now to the more essential features of the invention, the closure 8 is provided on its under face with a depending threaded projection 11, the latter being situated substantially in an axial position with respect to the casing 3, and threadedly secured as at 11′ to the projection 11 is a depending tubular casing 12, which is formed to extend centrally through the body 3 and substantially contiguous to its curved bottom wall 13. The upper edge of the casing is threaded into engagement with a gasket 13′ so as to force the latter against the closure 8 and in this manner to seal the interior of said casing from the agent containing chamber B of the casing, in order that said agent will be prevented from gaining access to the interior of the casing. The lower end 14 of the casing 12 is closed by means of a rigid plug 15 which also serves to exclude the agent from the interior of said casing. The reasons for sealing the interior of the casing against the ingress of the liquid will be more apparent as the description proceeds.

Formed in the upper end of the casing and passing transversely therethrough is a plurality of radially projecting rivets or offsets 16, which are provided with heads 17 disposed in concentric array within the casing. Adapted to be suspended and supported by the heads 17 is a shell 18, preferably formed from thin sheet metal. The upper portion of the shell 18 is suitably bent to provide an offset annular bead 19, which is adapted to rest or seat upon the heads 17 so that the shell 18 as a whole will be suspended within the casing 12 and spaced from the inner walls of the latter, as shown by the numeral 20. This shell contains the charge of gas generating material, preferably as follows: Located within the shell 18 is a tube 21, around which is wrapped a plurality of powder containing fuses 22, which have their adjacent ends passed through the central bore of the tube and conjointly terminated in a highly inflammable substance 23, and the evenly terminating ends of said fuses are preferably of conical formation, as is shown in Figure 3, in order that by embedding the same within the substance or compound 23, the ignition of the latter will be bound to be transmitted to the powder bores 25 of the several fuses, thus insuring their combustion upon the combustion of the substance 23.

In order to effect the ignition of the substance 23, in this form of the invention, use is made of a sliding weight 26. The latter is normally contained within the lower end of the casing 12 and rests upon the plug 15. However, by inverting the extinguisher, said weight will be gravitated downwardly toward the shell 18. The fall of the weight 26, however, is delayed until the extinguisher assumes a substantially inverted vertical position by the action of the ring 27, which latter possesses a bore of such diameter that the weight will be confined between the ring and the plug 15 until the extinguisher is in its approximately upright position. When thus located, said weight will be permitted to pass through the bore of the ring 27, in order that a sheer fall of the same may be provided. The ends of the weight may be rounded as at 28, if desired, to prevent the same from wedging within the ring. When the weight falls, the same strikes a soft metal diaphragm 29, which is of crown shape and is carried by the lower end of the shell 18, and the blow delivered by the weight is transmitted to the pair of simultaneously movable firing pins 30, which are mounted for reciprocation within a block 31 threadedly carried as at 32 by the lower end of the tube 21. The firing pins are normally located in contiguous relation with respect to the pair of firing caps 32′, which are inserted into openings formed in the block 31, and said caps 32′ discharge into a body of loose or free powder 33, which is contained within a soft metal receptacle 34, the latter being positioned upon the block 31 in concentric relation with respect to the lower end of the tube 21.

It will thus be manifest that the falling of the weight 26 will force the pins 30 into engagement with the caps 32′ so as to effect the explosion of the latter, and the discharge of said caps results in the combustion of the powder 33, which sets up a sufficient gas to effect an initial expulsion of the agent 4 from the body of the extinguisher. The gases released by the powder 33 burst the receptacle 34 and also the soft metal diaphragm 29, and find vent from the casing 12 by passing upwardly in the direction indicated by the arrow C within the annular space 20, and are released from the casing by forcibly opening a valve 35. This valve consists of a flat cork lined cap 36 which is held by means of a leaf spring 37 in obstructing relation with respect to the transverse port 38 formed in said casing. The gases passing upwardly through the space 20 thus engage the cap 36 and force the latter to uncover the port 38, and in this manner said gases are released from the

casing. It will be observed that when the extinguisher is inverted, the agent 4 will gravitate toward the closure 8 and into and around the outlet 6, thus when the gases are emitted from the port 38, the same will be forced to travel upwardly through the body of the agent into the space located between the top of the agent and the bottom wall 14, which of course is located at the top of the extinguisher when the latter is inverted. It has been found preferable to locate the port 38 upon the far side of the casing 12 as regards the outlet 6, in order that the gases which are initially released from said casing will be prevented from escaping by way of the outlet 6. However, this is a substantially negligible factor and even if the port 38 were disposed to face the outlet 6, the escape of gases would be relatively minute. It will thus be seen that the combustion of the powder 3 will effect the fracture of the diaphragm 29 and the opening of the valve structure 35 and that the gases will be directed upwardly through the body of the fluid into expelling engagement with the volumetric head thereof, in order that a positive force may be placed upon this head of fluid to forcibly eject the same through the hose 7.

Following the combustion of the powder 33, similar action is set up in the combustible substance 23 and thence to the several fuses 22, so that the escape of gases or the products of combustion, will be continuous after the initial combustion of the powder 33. And the fuses are of such length as to continually supply the interior of the casing 3 with sufficiently pent up gases to effect the entire expulsion of the agent 4 from the casing 3 after combustion has been initially started. This in itself is a desirable feature because a complete exhaustion of the agent is provided thus preventing the extinguisher from being partially used and left in an inoperative condition.

Under certain circumstances, it has been found advisable to form the fuses of different lengths, in order that sufficient pressure within the casing 3 may be established throughout the period of agent discharge. This is primarily accomplished by the fact that the fuses are not permitted to be simultaneously burnt out or extinguished, in order that the period of combustion of each fuse, by reason of their varying lengths, is successively different, so that the loss in pressure within the extinguisher by reason of the expanding gases, caused by the escaping fluid, will be compensated for by the burning action of the longer fuses, thus providing a liquid discharge stream of substantially uniform pressure and power throughout the discharging operation.

From the foregoing description taken in connection with the accompanying drawing, it will be seen that there is provided a fire extinguisher of considerable utility, and one capable of efficiently performing with a mimimum of manual attention its intended functions. An extinguisher constructed in accordance with the present disclosure will be capable of operating under all manner of climatic conditions and will be particularly useful in localities wherein low temperatures prevail as the element of freezing has been reduced to a minimum. After the expelling mechanism has been used, the same may be readily removed from the interior of the extinguisher and replaced by the mere insertion of a renewed shell 18 and its associated parts, this operation being capable of being easily and quickly performed. It will be noted that the upper end of the tube 21 substantially contacts with the projection 11, this permits said tube to be retained in a rigid manner when the extinguisher is inverted, in order that the weight 26 may deliver its blow upon an unyielding base and in this manner insure the explosion of the caps 32'. A plurality of the latter are provided simply to insure combustion of the powder 33, as it is obvious that by having a plurality of these caps, failure on part of one or the other thereof to explode will be counteracted by the remaining caps. Also, the receptacle 34 may be provided with a screen 39, which will serve to confine the burning powder within the space allotted by the receptacle and will prevent the same from flying around within the casing 12. It will thus be apparent that a structure has been provided for carrying out the objects of the invention, which is of an efficient and reliable nature and will be instantly responsive to meet the demands of emergencies.

A principal difficulty in the production of pressure generating apparatus through the combustion of gas producing substances in a confined space is the fact that the pressure to which the substance is subjected by the generation of gas materially increases the rapidity of combustion, so that with many types of combustible material, such as various forms of gunpowder and dynamite, ignition in a confined space produces an explosion, though ignition in the open would result merely in relatively slow burning. It will be apparent from the above description that I have employed a gas generating combustible material in a confined space, but have so arranged and constructed the apparatus and selected the material that while the pressure developed may increase the speed of burning, it will not produce an explosion.

It will also be evident that I have employed pressure generating apparatus capable of sustaining extremely low temperatures without freezing, and in particular unaffected by temperatures above —40° F. In

this respect my invention is distinguished from devices employing sulphuric acid in the pressure generating mechanism, since the pure acid freezes at —29° F., and when diluted the freezing point of the acid rises materially, fluctuating in accordance with the degree of dilution but being substantially above the freezing point of the pure acid except at degrees of dilution which would render it useless for the purpose indicated.

It will be understood that the mechanism herein described may be utilized for expelling from a container liquid of other nature than chemical fire extinguishing liquid, and while I have set forth this particular utility and application of the invention because the same is preferred yet I do not intend thereby to restrict the invention to this particular use, i. e., to its use as a part of a fire extinguisher, but reserve the right to employ it in all the uses to which the subject matter embodied in the several claims may be put.

What I claim is:

1. A gas pressure generating attachment for a fire extinguisher comprising a shell adapted to be connected with the extinguisher and provided interiorly with a material which has potential energy and is transformable gradually into a gaseous product capable of exerting kinetic energy adequate to expel the extinguishing agent from the extinguisher.

2. A gas pressure generating attachment for a fire extinguisher comprising a shell adapted to be connected with the extinguisher and provided with a combustible material which is transformable gradually when under combustion into a gaseous product to expel the extinguishing agent from the extinguisher.

3. A gas pressure generating attachment for a fire extinguisher comprising a shell adapted to be connected with the extinguisher, fuses in said shell and ignitable means having connection with said fuses.

4. A gas pressure generating attachment for a fire extinguisher comprising a shell adapted to be connected with the extinguisher, fuse elements positioned within said shell, a combustible substance in which the ends of the fuse elements are embedded and ignitable means to ignite the combustible substance.

5. A gas pressure generating attachment for a fire extinguisher, comprising a shell adapted to be connected with the extinguisher, slow-burning combustible pressure generating material therein, and a detonating organization for igniting said material.

6. A gas pressure generating attachment for a fire extinguisher, comprising a shell adapted to be connected with the extinguisher, slow-burning combustible pressure generating material therein, and a detonating organization for igniting said material, said detonating organization including a detonating powder and a firing pin to ignite said powder.

7. A gas pressure generating attachment for a fire extinguisher comprising a shell adapted to be inserted within the casing or body of the extinguisher and containing a combustible pressure generating material which is normally separated thereby from the extinguishing agent, said material when under combustion being transformable gradually into a gas whose energy ruptures the shell and thereby escapes therefrom and is adapted to expel the extinguishing agent from the extinguisher.

8. A gas pressure generating attachment for a fire extinguisher comprising a shell having a frangible portion and adapted to be connected with the casing or body of the extinguisher, combustible pressure generating material therein, and a detonating organization for igniting said material to thereby generate a gas which ruptures the frangible portion of the shell and is adapted to expel the extinguishing agent from the extinguisher.

9. A gas pressure generating attachment for a fire extinguisher comprising a shell having a frangible portion and adapted to be connected with the casing or body of the extinguisher, combustible pressure generating material therein, and a detonating organization for igniting said material to thereby generate a gas which ruptures the frangible portion of the shell and is adapted to expel the extinguishing agent from the extinguisher, said detonating organization including a firing pin and means ignited thereby.

10. A gas pressure generating attachment for a fire extinguisher comprising a shell having a frangible portion and adapted to be connected with the extinguisher, fuses therein, combustible substance in which the ends of the fuses are embedded and ignitable to ignite the combustible substance to thereby ignite the fuses.

11. A gas pressure generating attachment for a fire extinguisher comprising a shell having a frangible portion and adapted to be connected with the extinguisher, fuses therein having different burning periods, and ignitable means for igniting means for igniting the fuses.

12. A gas pressure generating attachment for a fire extinguisher comprising a shell having a frangible portion and adapted to be connected with the extinguisher, fuses therein having different burning periods, a combustible substance in which the ends of the fuses are embedded, and ignitable means to ignite the combustible substance to thereby ignite the fuses.

13. A gas pressure generating attachment

for a fire extinguisher, comprising a shell adapted to be connected with the extinguisher, said shell having an inner member, and fuses therein coiled about said inner member.

14. A gas pressure generating attachment for a fire extinguisher, comprising a shell having a frangible portion and adapted to be connected with the extinguisher, said shell having an inner member, and fuses therein coiled about said inner member, said fuses having different burning periods.

15. A gas pressure generating attachment for a fire extinguisher, comprising a shell having a frangible portion and adapted to be connected with the extinguisher, said shell having an inner member, fuses coiled about the inner member, a combustible substance in which the ends of the fuses are embedded, and an ignitable element to ignite said substance.

16. A gas pressure generating attachment for a fire extinguisher, comprising a shell having an inner frangible receptacle, and a slow-burning combustible gas generating material in said receptacle, adapted to rupture the receptacle and escape from the shell when under combustion.

17. A gas pressure generating attachment for a fire extinguisher, comprising a completely closed shell having an inner frangible receptacle, said shell also having a frangible section, and a slow-burning combustible gas generating material in said receptacle, adapted to rupture the receptacle and frangible section of the shell when under combustion.

18. A gas pressure generating attachment for a fire extinguisher, comprising a completely closed shell having an inner frangible receptacle, said shell also having a frangible section, a combustible gas generating material in said receptacle and fuse elements positioned in the shell and ignited by said material, said material being adapted to rupture the receptacle and frangible section of the shell when under combustion.

19. Apparatus for expelling the contents of a fire extinguisher through a predetermined outlet, comprising means for generating gas and means for introducing gas into the extinguisher in contact with the extinguishing means, said generating means including a plurality of gas generating elements each continuously operative through a predetermined period, and means for simultaneously rendering all of said elements operative.

20. A gas pressure generating attachment for a fire extinguisher comprising a shell having means at its upper end by which it may be detachably suspended within a fire extinguisher and completely encasing a charge of a combustible substance which under combustion is transformed gradually into a gaseous product capable of exerting energy to rupture the shell and expel the extinguishing agent from the extinguisher, the shell being also provided with an ignitable element for igniting said substance.

21. A gas pressure generating mechanism for a fire extinguisher comprising a casing adapted to be mounted in the body of a fire extinguisher, and a shell comprising a confined charge of a combustible gas generating material removably mounted in the casing, said casing sealing the charge against the extinguishing agent and having an outlet for the gas generated by the combustion of said charge.

22. A gas pressure generating mechanism for a fire extinguisher comprising a casing adapted to be mounted in the body of a fire extinguisher, a shell comprising a confined charge of a combustible gas generating material removably mounted in the casing, and an operating element in the casing for igniting said charge.

23. A gas pressure generating mechanism for a fire extinguisher comprising a casing adapted to be mounted in the body of a fire extinguisher, a shell comprising a confined charge of a combustible gas generating material removably mounted in the casing, said casing sealing the charge against the extinguishing agent and having an outlet for the gas generated by the combustion of said charge, and an operating element in the casing for igniting said charge.

24. A gas pressure generating mechanism for a fire extinguisher comprising a member having means for connecting it to the casing of the extinguisher, a shell mounted in said member and thereby connected with the extinguisher, said shell containing a combustible material which has potential energy and is transformable gradually into a gaseous product capable of exerting kinetic energy adequate to expel the extinguishing agent from the extinguisher, and means, comprising an element movable in said member, for igniting said material.

25. A gas pressure generating mechanism for a fire extinguisher comprising a member having means for connecting it to the casing of the extinguisher, a shell mounted in said member and thereby connected with the extinguisher, said shell containing a combustible material which has potential energy and is transformable into a gaseous product capable of exerting kinetic energy adequate to expel the extinguishing agent from the extinguisher, an ignitable means for said material, and an element gravitationally movable in said member when the mechanism is inverted, to ignite said means to thereby ignite the combustible substance.

26. A gas pressure generating mechanism for a fire extinguisher comprising a member having means for connecting it to the casing

of the extinguisher, a shell mounted in said member and thereby connected with the extinguisher, said shell containing a combustible material which has potential energy and is transformable into a gaseous product capable of exerting kinetic energy adequate to expel the extinguishing agent from the extinguisher, an ignitable firing element for said material, a firing pin for said element, and an element gravitationally movable in said member, when the mechanism is inverted, to operate on the firing pin.

27. A gas pressure generating mechanism for a fire extinguisher including combustible pressure generating means and means operable upon the inversion of the mechanism to ignite said combustible means, whereby pressure is generated to expel the fire extinguishing fluid from the extinguisher.

28. A gas pressure generating mechanism for a fire extinguisher, including combustible pressure generating means, an element containing the same, an igniting medium and means for automatically igniting said medium upon the inversion of the mechanism, said means comprising an operating element which is restrained against operation until the mechanism has been substantially inverted.

29. A gas pressure generating mechanism for a fire extinguisher, comprising a casing, a confined charge of a combustible gas generating medium in said casing, a weight also in said casing, means operated by impact of the weight to ignite said combustible medium, and means for automatically preventing such impact until the mechanism has been substantially inverted.

30. A gas pressure generating mechanism for a fire extinguisher, comprising a casing, a confined charge of a combustible gas generating medium removably mounted in said casing, means substantially forming a part of the charge and operable when subjected to the force of impact to cause the charge to be ignited, a weight gravitationally movable in the casing to produce such impact, and an element having an opening through which the weight must pass in its movement to the charge, said opening having dimensions corresponding to the cross sectional shape and size of the weight to thereby restrain movement of the weight to the charge until the mechanism has been substantially inverted.

31. A gas pressure generating mechanism for a fire extinguisher, comprising a casing adapted to be mounted in the body of the fire extinguisher, a shell having a confined charge of a combustible gas generating material removably mounted in the casing, said casing having an outlet for the gas generated by the combustion of said charge and sealing the charge against the extinguishing agent, and an operating element movable in the casing to cause said charge to be ignited.

32. A gas pressure generating mechanism for a fire extinguisher, comprising a casing adapted to be mounted in the body of the fire extinguisher, a shell having a confined charge of a combustible gas generating material removably mounted in the casing, said casing having an outlet for the gas generated by the combustion of said charge and sealing the charge against the extinguishing agent, a weight gravitationally movable in the casing to cause said charge to be ignited, and means for preventing such movement of the weight until the mechanism has been substantially inverted.

33. A gas pressure generating attachment for a fire extinguisher of that type which employs a chemical fire extinguishing agent and embodies a container from which said agent is expelled through a discharge outlet by the pressure of gas, said generating attachment comprising means containing a material having potential energy and transformable into a gaseous product capable of exerting kinetic energy adequate to expel the extinguishing agent from the container of the latter through said outlet but inadequate to rupture said container, and means for transforming said material automatically into a gaseous product at the time it is to be used to expel the chemical extinguishing agent from the container.

34. Apparatus for expelling the contents of a fire extinguisher through a predetermined outlet, comprising means for generating gas and means for introducing the gas into the extinguisher in contact with the extinguishing means, said generating means including a plurality of gas generating elements each continuously operative through a predetermined period, and means for simultaneously rendering all of said elements operative, the operative periods of the different elements being varied so that the pressure upon the extinguishing medium in the extinguisher will remain substantially constant during the expulsion of said medium.

35. A gas pressure generating mechanism for a fire extinguisher of that type which employs a chemical fire extinguishing agent and embodies a container from which said agent is expelled through a discharge outlet by the pressure of the gas, said generating mechanism comprising means containing a material having potential energy and which is combustible and transformable when under combustion into a gaseous product capable of exerting kinetic energy adequate to expel the extinguishing agent from the container of the latter through said outlet but inadequate to rupture said container, and means for firing said material automatically at the time it is to be

used to expel the extinguishing agent from the container.

36. A chemical fire extinguisher comprising a container for the chemical fire extinguishing agent, said container having an outlet, and mechanism for supplying a pressure of gas upon the agent in said container to expel said agent through the outlet, said mechanism comprising a means containing a material having potential energy and transformable in and of itself into a gaseous product capable of exerting kinetic energy and which means has its interior normally out of communication with the interior of the container and has communication therewith when the gaseous product has been formed, and means for setting the aforesaid means into gas producing activity at the time the gaseous product is to be used to expel the extinguishing agent from the container.

37. A chemical fire extinguisher comprising an invertible container for the chemical fire extinguishing agent, said container having an outlet, and mechanism for supplying a pressure of gas upon the agent in said container to expel said agent through the outlet, said mechanism comprising a means containing a material having potential energy and transformable in and of itself into a gaseous product capable of exerting kinetic energy and which means has its interior normally out of communication with the interior of the container and has communication therewith when the gaseous product has been formed, and means for setting the aforesaid means into gas producing activity upon inversion of the container.

38. A fire extinguisher comprising a casing capable of receiving a fluid extinguishing agent, an outlet structure for said casing, a combustible means, and mechanism automatically operable upon the inversion of said casing to ignite said means, whereby a pressure will be generated to expel said agent through the outlet structure.

39. A fire extinguisher comprising a casing capable of containing a chemical extinguishing agent, a charge of combustible material positioned within said casing and substantially sealed from the latter to exclude said agent, and mechanism operable upon the inversion of said extinguisher for igniting said combustible means and introducing the gases generated thereby into expelling relation with said agent.

40. A fire extinguisher comprising a casing adapted to contain a fluid extingushing agent, an outlet, and a removable inlet closure for said casing, a charge of combustible gas generating material removably disposed in said casing substantially in line with the inlet opening and substantially sealed against admixture with the extinguishing agent in the casing, and means for igniting said charge to thereby cause the generation of a gas to expel the agent from the casing through said outlet, the means for sealing the material against admixture with said agent including an element to permit the escape of the gas into expelling relation with said agent.

41. A fire extinguisher comprising a casing adapted to contain a fluid extinguishing agent, an outlet, and a removable inlet closure for said casing, a charge of combustible gas generating material removably disposed in said casing substantially in line with the inlet opening and substantially sealed against admixture with the extinguishing agent in the casing, and means for igniting said charge to thereby cause the generation of a gas to expel the agent from the casing through said outlet, the means for sealing the material against admixture with said agent including a frangible element to permit the escape of the gas into expelling relation with said agent.

42. A fire extinguisher comprising a casing having an outlet and a removable inlet closure, said casing being adapted to contain a fluid extinguishing agent, and an agent expelling structure having connection with said closure and including a renewable charge of combustible material which is sealed from the extinguishing agent, and when under combustion produces a gas which breaks the seal and expels the agent through said outlet.

43. A fire extinguisher comprising a casing adapted to contain a fluid extinguishing agent, an outlet and a removable inlet closure for said casing, an inner casing connected to the inlet closure and provided with means for the escape of gas therefrom, a charge of a combustible material removably mounted in said inner casing, said material when under combustion generating a gas to expel the agent from the first mentioned casing through said outlet, and means for igniting said material.

44. A fire extinguisher, comprising a casing adapted to contain a fluid extinguishing agent and provided with an outlet for said agent, an inner casing having means for the escape of gas therefrom, a charge of combustible material removably mounted in the inner casing, said material when under combustion generating a gas to expel the agent from the first mentioned casing from said outlet, and means for igniting said material to produce said gas, the inner casing having an outlet for the escape of the gas into expelling relation with the extinguishing fluid.

45. A fire extinguisher comprising a casing adapted to contain a fluid extinguishing agent and provided with an outlet for said agent and further provided with an opening having a closure, a shell adapted to

be inserted into the casing through the latter opening and removably held in the casing with one end impinging upon said closure, said shell having a charge of combustible material to produce when ignited a gas to expel the extinguishing agent from the casing, and means for igniting said material comprising a weight to impact upon the other end of the shell.

46. A fire extinguisher comprising a casing adapted to contain a fluid extinguishing agent and provided with an outlet for said agent and further provided with an opening having a closure, an inner casing having a gas outlet, a shell adapted to be inserted into the inner casing through the opening in the outer casing and removably held in position with one end impinging upon said closure, said shell having a charge of combustible material to produce when ignited a gas to expel the extinguishing agent from the first mentioned casing, and means for igniting said material comprising a weight to impact upon the other end of the shell, said weight being movable gravitationally in the inner casing.

47. In a fire extinguisher, the combination with a casing adapted to contain a chemical extinguishing agent, combustible elements capable when simultaneously ignited to burn over different effective periods, means for substantially simultaneously igniting said elements, and means for directing the gases generated by the combustion of said elements into expelling relation with said agent.

48. A fire extinguisher comprising a casing capable of containing an extinguishing agent, combustible bodies located within said casing, said bodies being of varying individual proportion whereby when the same are simultaneously ignited the gases released thereby will exercise a substantially uniform pressure upon said agent during the period of expulsion of the latter from said casing, and means for igniting said bodies.

49. A fire extinguisher comprising a casing adapted to contain a chemical extinguishing agent and provided with inlet and outlet structures, a receptacle carried by said inlet structure and normally sealed from the agent containing portions of said casing, a plurality of inflammable bodies located within the normally sealed portion of said receptacle, said bodies being proportioned to individually burn for different periods of time, and mechanism for effecting the ignition of said bodies.

50. In a fire extinguisher, the combination with a casing adapted to contain a chemical extinguishing agent, of means for expelling said agent from said casing, comprising a member removably located within said casing, a plurality of combustible fuse elements of different lengths disposed within said member, firing mechanism for substantially simultaneously igniting said elements and means for directing the gases generated by the combustion of said elements into expelling relation with said agent.

In testimony whereof I affix my signature.

FREDERICK C. BARGAR.