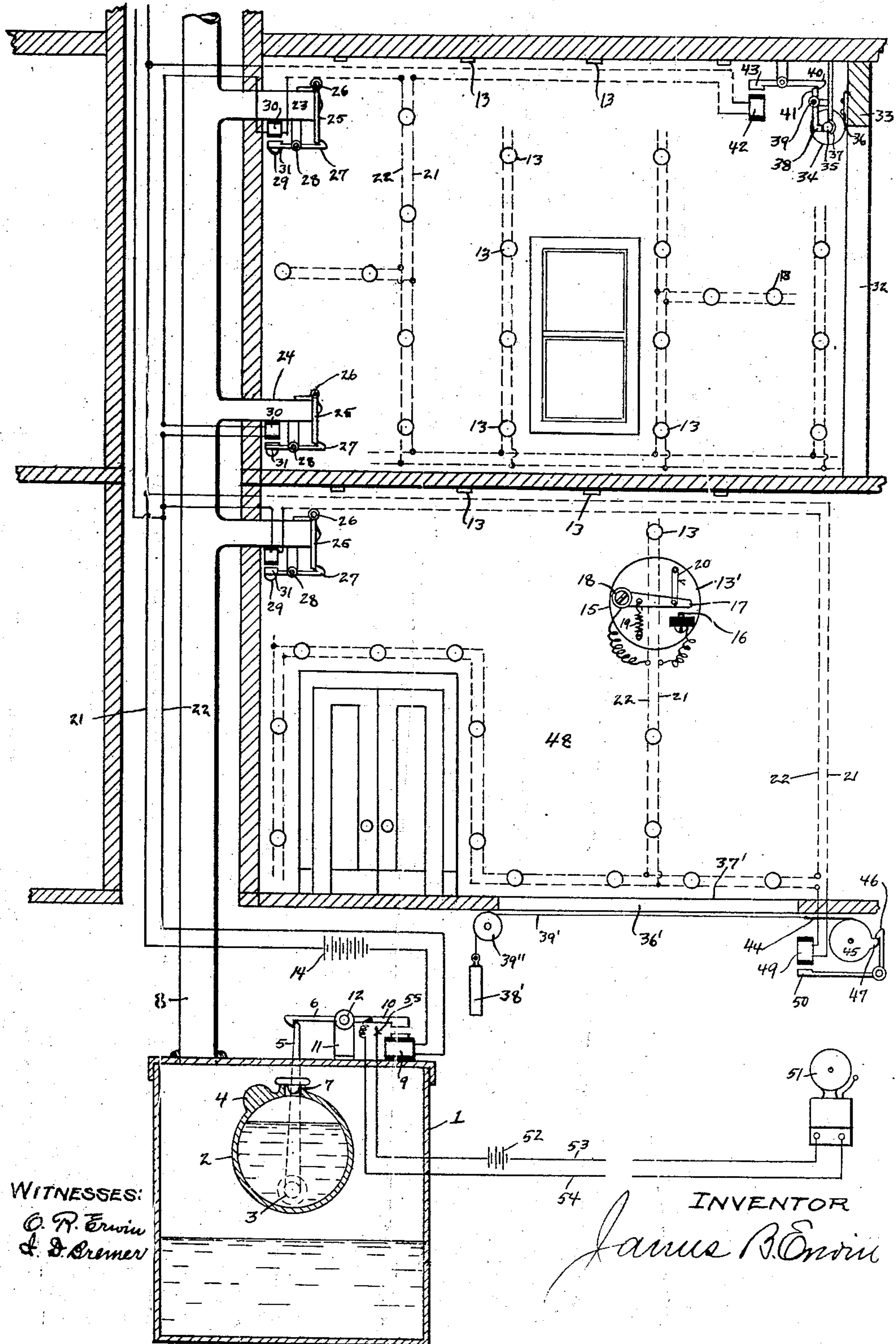


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 AUTOMATIC FIRE EXTINGUISHING SYSTEM.  
 APPLICATION FILED JUNE 12, 1908.

912,370.

Patented Feb. 16, 1909.



WITNESSES:  
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## AUTOMATIC FIRE-EXTINGUISHING SYSTEM.

No. 912,370.

Specification of Letters Patent.

Patented Feb. 16, 1909.

Application filed June 12, 1908. Serial No. 438,015.

*To all whom it may concern:*

Be it known that I, JAMES B. ERWIN, a citizen of the United States, residing at the city of Milwaukee, county of Milwaukee, and State of Wisconsin, have invented new and useful Improvements in Automatic Fire-Extinguishing Systems, of which the following is a specification.

The object of my invention is among other things to provide a fire extinguishing system for extinguishing fires by gas, by which, if a fire occurs in any one of several compartments of a building, the initial action of a heat controlled device located in such compartment will be automatically communicated to a supply of liquid or liquid and dry gas-producing substances located at a distance therefrom, such substances will become chemically united, a fire extinguishing gas will be liberated, the gas separated from the liquid, and conducted to that compartment only where the fire occurs, the passage ways leading to such compartments will be closed and an alarm signal will be given.

My invention pertains more especially,—First, to the heat controlled means for producing the initial action by which a plurality of liquid or liquid and dry gas-producing substances become chemically united, the fire-extinguishing gas is generated, separated from the liquid, and led to any one of several compartments of a building where the primary heat controlled devices are located. Second,—to the electrically controlled means by which the initial action of the primary heat controlled device is transmitted to the receptacle containing the gas-producing substances, whereby such substances become chemically united. Third,—to the mechanical means by which a plurality of gas-producing ingredients are automatically commingled together and also to the primary heat controlled means located at a distance by which the initial action of such mechanical means is produced. Fourth,—to the means for controlling the course of the fire extinguishing gas, when liberated, from its containing receptacle past any number of compartments where not required and automatically admitting it to that compartment only where required. Fifth,—to the means for automatically closing a passage way between two or more compartments of a building, whereby the fire-extinguishing gas will be confined to the

room only where required. Sixth,—to the general combination and arrangement of the several cooperating parts of the system, whereby when a fire occurs in any one of several compartments of a building, the fire-extinguishing gas producing substances will become chemically united, the resultant gas liberated will be led to that compartment only where the fire occurs; the openings or passage ways to such compartment will be closed and an alarm signal will be given.

The construction of my fire-extinguishing system is further explained by reference to the accompanying drawing which represents a vertical section of several compartments of a building in connection with the preferred form of my fire-extinguishing system, part in section.

Like parts are identified by the same reference characters.

While my fire-extinguishing system contemplates the production of a fire-extinguishing gas either by the chemical union of liquid substances or by the union of both liquid and dry substances from which a fire-extinguishing gas is liberated and while fires may be successfully extinguished with gas produced from the union of either of said substances, for convenience of description, I herein refer to that system by which the liquid substances are used as the preferred method.

By the preferred method a quantity of gas generating liquid is stored in the tank 1, and another liquid is stored in the invertible tank 2. The tank 2 is preferably supported below its center of gravity from the inclosing tank 1 at its respective sides on the trunnions 3, whereby the minimum power is required to invert it.

4 is a weight which is connected with the tank 2 at one side of the vertical center, whereby when said tank is released from its retaining mechanism, it will be inverted by the gravity of said weight and its contents discharged into the inclosing tank below.

In practice I preferably store the smaller quantity of liquid required in the invertible tank 2, and the larger quantity in the inclosing tank 1.

The tank 2 is retained in its normal upright position shown in Fig. 1 by the arm 5 which is preferably connected with the protruding end of one of the trunnions 3 upon



the outside of the inclosing tank 1, and is adapted to be engaged at its upper end by the retaining catch 6. It will be understood that when the catch 6 is disengaged from the arm 5 said tank 2 will be revolved a one-half revolution on its supporting trunnions when the contents of the receptacle will be discharged through the mouth 7 of the receptacle as stated into the inclosing receptacle below, when by the chemical union of the two substances thus commingled together, a fire extinguishing gas will be liberated and will pass out of the tank 1 through the duct 8 to the place or places of discharge as hereinafter described. As a preferred means of disengaging the catch 6 from the arm 5, an electro-magnet 9 is employed which is located beneath the arm 10, which arm 10 is formed integrally with said catch 6 and the same is pivotally supported from the standard 11 upon the pin 12, whereby when such electro-magnet 9 is energized, the arm 10 will be drawn down in contact therewith, the catch 6 will be raised and disengaged from the tank retaining arm 5 when said tank will be inverted and its contents discharged. As one means of automatically releasing the catch 6, I preferably provide the several compartments of the building with a plurality of electric circuit closers 13, which are preferably located along the ceiling and around the most exposed parts of the room, whereby when the heat in such room exceeds a predetermined temperature said circuit closers will be caused to act when an electric circuit will be formed through said circuit closers between the battery 14 or other source of electrical energy and said electro-magnet 9, whereby the arm 10 will as stated, be drawn into contact with the electro-magnet, the catch 6 disengaged from the arm 5, the tank 2 inverted and its contents discharged into the liquid below.

13' represents an enlarged view of one of the several circuit closers 13, all of which in practice may be substantially the same size, each of such circuit closers comprising a base plate 15, an electric terminal 16, a switch arm 17, which is pivotally supported from the base plate upon the screw 18, arm actuating spring 19 and a fusible link 20. The terminal 16 is connected with the battery by the wire 21 and the switch arm 17 is connected with the battery through the wire 22. Thus it will be understood that when the link 20 becomes fused the electric circuit will become closed by such switch arm between the wires 21 and 22 and the battery 14, whereby the several electro-magnets connected with said wires 21 and 22 will be simultaneously energized and the several cooperating parts of the system be automatically actuated.

To provide for leading the fire-extinguishing gas to that compartment only of a build-

ing where the fire occurs and to prevent it from entering any of the other compartments, the outlet ends of the several branch ducts 23 and 24 leading to such compartments are provided with valves 25 which are pivotally connected with the outlet ends of said ducts by the pins 26 and are normally locked in their closed position by the retaining catch 27. The catch 27 is pivotally supported near the discharge end of said duct upon the pin 28 and is normally retained in its locked position by the weight 29, an actuating spring or in any other convenient manner.

30 is an electro-magnet which is located in close proximity to the arm 31, which arm 31 is formed integrally with the catch 27 and is supported by the same pivot 28. The electro-magnet 30 is connected with one of the electric circuit wires 22 whereby when the electric circuit is closed (as hereinbefore described by a rise of temperature in any one of the compartments where a fire occurs) between the battery and the several electro-magnets of the system, the valve retaining catch 27 will be simultaneously disengaged from the valve 25 as the gas is generated in its retaining tank, whereby that valve only which is located where the fire occurs will be released the instant the fire extinguishing gas is liberated and the gas thus liberated will be led to that compartment only where the fire occurs.

In view of the fact that the fire extinguishing gas employed is heavier than the atmosphere, I preferably provide ducts of different sizes in each compartment, the larger one 23 being located near the ceiling and the smaller one 24 near the floor, whereby the greater portion of the gas will be led to the upper part of the room when it gradually descends and extinguishes the fire with which it comes in contact near the upper part of the room, while the smaller quantity of gas which is led through the lower duct will extinguish such fires, if any, as may occur in the lower part of the room. The duct 24 is provided with a valve and automatic valve actuating mechanism of substantially the same construction as that connected with the larger duct 23 and such parts are referred to by the same reference numerals.

32 represents an opening through the partition 33, which is adapted to be closed by a curtain or flexible partition 34, one end of which is wound upon the roller 35, while its opposite end is fastened to the partition 33 by a plurality of fastening barbs or screws 36. The curtain roller 35 is normally supported in place by the bracket 37 against which it is retained by the lever 38. The lever 38 is pivotally supported from the bracket 37 upon a pin 39 and the lower arm is retained against said roller 35 by the retaining catch 40, which engages the upper or opposite arm



41, whereby the lower arm 38 is retained in contact with said roller. 42 is an electro-magnet in connection with said electric circuit, whereby as said electric circuit is closed, the arm 43 is drawn down in contact with said electro-magnet 42, whereby the catch 40 is disengaged from the lever when said curtain supporting roller is released and permitted to drop of its own gravity, when it will unroll and close the passage way 32 through said partition.

44 represents a flexible curtain which is supported on a roller 45 and the same is adapted to be drawn horizontally across the opening 36' through the floor 37' by the weight 38' acting through the flexible connection 39' operating over the pulley 39'', as soon as said roller is released. The roller 45 is prevented from unwinding by the catch 46 which engages the stop 47 of said roller. When a fire occurs in the compartment 48, the electric circuit connecting the battery 14 with the several circuit closers 13 in such compartment will simultaneously energize the electro-magnet 49, whereby the arm 50 which forms an integral part of the catch 46 will be drawn up in contact with the electro-magnet 49 whereby the catch 46 will be disengaged from the roller and the partition 44 will be drawn across the passage way 36' by the action of the weight 38', as stated.

51 represents a signal alarm of ordinary construction which is connected with the battery 52 through the circuit wires 53 and 54 and arm 10, when said arm 10 is brought in contact with the electro-magnet 9. The wire 54 is permanently connected with the arm 10 and said arm 10 is brought in connection with the other circuit wire through the terminal 55, which is so located as to contact with said arm 10 as said arm 10 is brought in contact with the electro-magnet 9.

When my fire-extinguishing system is used in a large single compartment, such compartment may be provided with a plurality of inlet gas ducts and each duct provided with a heat or electrically controlled valve which is adapted to receive its initial action from a rise of temperature in or near that part of the room where such valve is located whereby when a fire occurs, the gas will be first led through the valve nearest to such fire where its need is most urgent. In case the fire should spread towards the other inlet valves, they will in like manner be opened and the gas led to such other part of the room where needed while it will of course be gradually diffused in all parts of the room regardless of the location of such valve. To further concentrate the gas where most needed in a single compartment, such compartment may be provided with one or more fire-proof curtains or partitions by which such compartments may be automatically subdivided, in which event each

subdivision of the compartment is provided with a separate branch gas duct and gas controlling valve, whereby the gas admitted will be confined to that subdivision only of the room where the fire occurs. It will be understood that the gas controlling valves in each subdivision are provided with similar heat controlled means to those heretofore described by which they are automatically released when a fire occurs in such particular part of the room.

While the system illustrated and thus far described is shown as supplied from a reservoir located in the basement of a building, it is obvious that if desired said gas generating and distributing mechanism may be connected with the water supply reservoirs of the ordinary sprinkling system located upon the roof of a building when the water supply ducts of a sprinkling system may in that event be employed for distributing the gas generated by my system in such reservoir. It will also be obvious that while the system is shown and described as used in connection with a building, it is with slight modifications equally adapted to be used for protecting marine vessels. While I have shown and described the tanks 1 and 2 as adapted to be both supplied with a liquid, one of said tanks may, if desired, be provided with dry, and the other with liquid ingredients which when commingled together will become chemically united and a fire-extinguishing gas liberated.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is,

1. In a system of devices for extinguishing fires with gas, the combination of a receptacle for storing liquid fire extinguishing gas producing substances, separated from each other, automatic mechanical means for commingling such substances together, a gas duct communicating from the gas space above the liquid level in such receptacle in to the compartment to be protected from fire, an electrically controlled valve for closing the discharge end of said duct, a plurality of heat controlled electric circuit closers, located in those parts of the room most exposed to fire at a distance from said valve, a source of electrical energy, an electric circuit including said source, circuit closers, valve releasing mechanism, and the said mechanical means by which the gas producing substances are commingled together whereby when said electric circuit is closed by any one of said circuit closers, said valve will be released, the gas producing substances will be commingled together, and the gas generated will be led to, and disseminated through all parts of the room where said circuit closers are located.

2. In a system of devices for extinguishing fires with gas, the combination of a re-



ceptacle for storing liquid fire extinguishing gas producing substances separate from each other, mechanical means for commingling such substances together, gas ducts communicating from said receptacle above the liquid therein to the compartment or compartments to be protected from fire, gas actuated valves for closing the discharge ends of said ducts, said valves being adapted to be opened by the pressure of gas, valve retaining mechanism adapted to normally hold said valves in their closed position, electrically controlled means for disengaging said valve retaining mechanism from said valves and simultaneously releasing the mechanical means by which said gas producing substances are commingled together, heat controlled means located at a distance from and adapted to produce the initial action of said electrically controlled means.

3. In a system of devices for extinguishing fires with gas, the combination of a receptacle for storing liquid fire extinguishing gas producing substances separate from each other, mechanical means for commingling such substances together, gas ducts communicating from said receptacle above the liquid therein to the compartment or compartments to be protected from fire, gas actuated valves for closing the discharge ends of said ducts adapted to be opened by the pressure of gas, valve retaining mechanism adapted to normally hold said valves in their closed position, electrically controlled means for disengaging said valve retaining mechanism from said valves and simultaneously releasing the mechanical means by which said gas producing substances are commingled together, a plurality of heat controlled circuit closers respectively located at a distance from said inlet gas controlling valve in the most exposed parts of said compartment or compartments for producing the initial action of said electrically controlled means and an electric conductor communicating between said circuit closers, valve actuating means, and the mechanical means by which

said gas producing substances are commingled together.

4. In a system of devices for extinguishing fires with gas, the combination of a receptacle for storing liquid fire extinguishing gas producing substances, a smaller receptacle revolvably supported in said first named receptacle, gravity actuated means for revolving said smaller receptacle upon its supporting bearings within its inclosing receptacle, a catch for retaining said revolvable receptacle in its upright position, gas ducts communicating from said first named receptacle above the liquid therein to the compartment to be protected from fire, valves for closing the discharge ends of said ducts, electrically controlled means located at a distance from said valve, for disengaging said receptacle retaining catch and releasing said valves and heat controlled means for producing the initial action of said electrically controlled means.

5. The combination of a gas generating tank, a plurality of separated liquid fire extinguishing gas producing substances located in said tank, automatic mechanical means for commingling said gas producing substances together in said tank, ducts communicating from said tank above the liquid level therein to the room or rooms to be protected from fire, valves adapted to close the discharge ends of said ducts, means for normally retaining said valves in their closed position, movable partitions for closing the openings between the different compartments of a building, heat controlled means for simultaneously producing the initial action for releasing said gas controlling valves closing the openings between the different compartments and for commingling said gas producing substances together.

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

JAMES B. ERWIN.

Witnesses:

I. D. BREMER,  
O. R. ERWIN.