The purpose of this invention is to provide improved apparatus for protection against fire in buildings particularly adapted to be installed in buildings which are to be or are already equipped with fire extinguishing systems of the “dry pipe” type for cooperating with said dry pipe systems for obviating certain defects in and objections to the latter, and extending the protection against water damage as well as against fire damage.

It consists in the elements and features of construction shown and described as indicated in the claims.

In the drawings:

Figure 1 is a diagrammatic view showing the parts constituting and embodying the present invention installed in conjunction with a dry pipe system, the latter being diagrammatically shown extending into more or less remotely separated parts of the building for indicating the different and independent cooperation of the present invention with such remotely separated parts.

Figure 2 is an elevation of a structure comprising essential parts of the invention hereinafter called the pressure release control, the same being constructed for installation as a structural unit in connection with concurrently or previously installed dry pipe units for the purpose indicated.

Figure 3 is a longitudinal vertical section of the same axial with respect to the temperature-responsive element.

Figure 4 is a partly dissected end elevation of the same.

Figure 5 is a detail section at the line 5—5 on Figure 2.

Figure 6 is a detail section at the line 6—6 on Figure 2 looking up.

Figure 7 is a section at the line 7—7 on Figure 3.

Figure 8 is a section at the line 8—8 on Figure 4.

Figure 9 is a sectional view on an enlarged scale of a valve control device seen in edge elevation at 98 on Figure 1 operated by the vented pressure for controlling the access of water to a special water discharge pipe system having normally closed water discharge heads in a specially hazardous area.

Figure 10 is a sectional view of an exhauster release device seen in edge elevation at d on Figure 1.

Figures 11, 12, 13 and 14 are diagrammatic views of the general character of elevations of different forms of arrangement and installation of the pressure release unit which characterizes the invention, all of which it may be understood may be embodied in the fire extinguishing system which is shown diagrammatically in perspective in Figure 1.

Figure 15 is a view similar to Figure 6, showing a slight modification of the connection for displacing the fragile strut to release the release valve.

Referring to the drawings in detail: A main valve of a dry pipe fire extinguishing system is shown at A having the main water supply pipe B, furnished with a customary shut-off valve A' antecedent to the dry pipe main valve, A. C is the main discharge pipe line from the dry pipe main valve which may be understood as having the customary connections indicated at c, Figure 1 for producing air pressure in the system for holding the water controlling valve member of the dry pipe main valve normally seated, subject to being opened by the water supply pressure upon the release of the air pressure by the opening of a sprinkler head or otherwise. At D there is indicated a familiar form of apparatus commonly known as the “exhauster” type constructed for releasing to the atmosphere the pressure from the air pressure region of the system until this pressure is reduced to the normal tripping point of the dry pipe main valve, thus hastening the opening of the main valve by quickly reducing the pressure which holds it seated.

The details of this exhauster device require no description for understanding the present invention, and accordingly these details are not shown in the drawings, except so far as necessary to indicate the connection therewith of the parts constituting the invention as hereinafter described.

For the purpose of the present invention the construction embodying it comprises means susceptible of operation by rise of temperature in the region to be protected, to
a degree less than that of actual fire if the rate of rise is such as to indicate that it is due to fire and not caused by normal conditions involving no fire hazard. The device operating in this manner is associated with a system of discharge pipe lines of the dry pipe system having normally closed water discharge heads, in a manner for releasing the air pressure of the entire system independently of any release which would result from the opening of a sprinkler head,—as by the fusion of the sealing means by actual fire heat in the vicinity of such head, and in a manner and by means avoiding the discharge of the released air at any point in the protected area, where it so released it would tend to increase the fire hazard by fanning the fire and/or dispersing combustible material, such as dust, paper fragments, or the like, or liable in burning to facilitate the spread of fire by being thus dispersed.

The pressure release is effected in such manner also as to prevent escaping air from cooling adjacent sprinklers and prevent them from fusing promptly, and also to prevent escaping air from blowing the heat into other remote areas where it might cause the fusion of sprinkler heads situated where their operation will be of no assistance in quenching fire.

An important feature of the invention consists in the arrangement of the vent line,—the pipe system into which the air pressure is released,—for maintaining control of the release pressure and utilizing it for operating alarms or fire protective devices of any sort suitable to the character of the building or its contents.

Another feature of the invention consists in the construction and arrangement of the pressure venting means in such manner as to avoid water damage by the water following the air in the vent line, this being effected by extending the vent line for restricted discharge outside the building or to the drainage or sewer system of the building, or to any point immune to water damage, the restriction of the discharge being such as to avoid reduction of the pressure to a degree which would prevent effective discharge for dispersion of the water at the sprinkler heads which may be open. This expedient also ensures that in case of operation as described by fire threatening or fire indicating conditions which are not followed by actual fire, the admission of water to the discharge lines in which eventually no discharge heads are opened, does not result in damage to the system or operate to defeat the proper operation if fire should occur later, by reason of the water becoming frozen in the pipes to which it is thus admitted by the release of the air pressure, the flow capacity of the restricted discharge being sufficient to keep the water moving through the pipe line.

The fundamental element in the present invention is embodied in what is above referred to as the pressure release control unit, seen in elevation in Figure 2 and which will now be described.

This unit comprises a pipe member, 55, adapted to be connected with any pipe line of a water discharge system having normally closed water discharge heads, and a thermostatic or temperature-responsive device indicated in entirety at 50, and means operated by it when responding according to its character to relatively rapid change of temperature, for actuating the pressure release valve device indicated in entirety at 40, hereinafter more particularly described.

The detail construction of this temperature-responsive device, 30, is shown described and claimed in my co-pending application Serial No. 464,946 filed June 30, 1930. It consists of two metal bars or rods, 31 and 32, of the same metal or metals having substantially the same thermal co-efficient but of widely different cross section, the bar, 31, being the greater and the bar, 32, being the lesser, the two bars being mounted side by side for like exposure to the local temperature. Both bars are made fast to each other at one end by a tie plate, 33, and carried slidably by a hanger, 33', rigid with a substantially tubular housing, 34, which at the end remote from the hanger and tie plate is terminated by a bracket member, 35, formed with a web, 36, which constitutes a head plate at that end of the housing. The greater bar, 31, is made fast to this web, so that elongation of this greater bar causes both bars rigidly secured together as described at the other end, to be slid through the hanger, 33', while the lesser bar, 32, which extends loosely through the web, 36, and is not bound thereto, slides in said web.

This bracket terminal, 35, of the housing, as shown, supports, a valved structure shown in dissected view in Figure 4 and indicated as to its entirety by reference letter M, and of which the release valve fitting, 40, above mentioned is the valved element, having the release valve, 65, hereinafter more particularly described.

Beyond the point at which the structure M is carried by the bracket, 35, the latter is extended for affording pivotal support, as seen at 36", for a weighted lever, 37, which extends upwardly from its pivot with the weight, 38, overhanging from the pivot, and said weighted lever is held normally at the position indicated against gravity by a latch member, 39, pivoted at one end on the web, 36, of the bracket, 35, and having at the other end a catch nose, 45, which engages a catch, 46, carried by the lever, 37. At suitable place or places in the length of the rods, 31 and 32, the housing, 34, is furnished with suitable guide bearing for both rods, as indicated by
one such bearing seen at 47, to prevent the rods or either of them from sagging by their own weight as they might be liable to do when heated.

The housing, 34, is open at the lower side, as seen at 49, for admitting to the housing cavity and into contact with the rods, 31 and 32, any heated air or gases of combustion due to or indicating fire in the vicinity.

The operation of this structure in its response to temperature change is that upon slow change of temperature of the two rods, 31 and 32, acquire the temperature change throughout their cross section at substantially the same rate, and being of the same metal or of metal having approximately the same thermal co-efficient, they are lengthened or shortened equally in any change of temperature that occurs very slowly. But in case the temperature change due to fire in the apartment causes hot air or gases of combustion to occupy the cavity of the housing, 34, and cause more rapid change of temperature of the rods, the more slender rod becomes heated through so as to expand longitudinally before the larger rod is heated through a sufficient fraction of its diameter to cause it to experience any appreciable elongation.

The latch member, 39, has near its pivot a depending lug, 30, which carries a screw, 51, for entering the end of the lesser rod, 32, which protrudes through the web, 36, of the bracket, 35, and the latch member carries intermediate its ends a spring-pressed plug, 52, protruding upwardly against the top web of a bracket, 33, the spring, 52a, reacting downwardly on the latch and operating to hold the lug against the end of the rod, 43. With this construction it may be understood that when the rod, 32, is thrust in through the web, 36, which is held by its securement to the heavier rod, 31, unmoved in the housing, the encounter of the end of the rod, 32, with the end of said screw, 51, and thereby with the lug, 50, which is in effect a lever arm of the latch member, 39, such encounter causes the catch nose, 45, to be disengaged from the catch, 46, thus releasing the weight of the latch, 37, and permitting the weight, 38, to fall.

In order that there may be no failure in the operation for fire protection in case of any cause in any instance the above described thermostatic device should fail to be operated by the different in rate of expansion of the larger and lesser rods, as described, the unit shown in Figure 2 and above described, is furnished with a second temperature-responsive device which is clearly seen in Figure 2 and Figure 3. In Figure 4 and 5, in which there is shown a lever, 36a, fulcrumed at 36b, on the member, 34a, of the housing, 34, and having one arm extending through an aperture, 37a, into the housing, the other arm, 36a, being connected outside the housing by a fusible link, 36c, with a lug, 36d, which projects rigidly from the housing and a spring, 36e, housed in the boss, 36f, on the housing reacting on a thrust pin, 36g, mounted in the boss, holds the thrust pin against the arm, 36h, of the lever ready to depress said arm when the fusing of the fusible link releases said lever arm. Within the housing the lever, 36j, extends, as seen at 36k, immediately below the latch, 39, so that upon the fusing of the link, 36l, releasing the lever, the latch will be operated for disengagement of its catch nose, 45, from the catch, 46, in the same manner as when the latch is operated by the elongation of the rod, 42, in the normal operation of the first described temperature-responsive device.

The temperature-responsive device is associated in the pressure release unit with the pressure release valve which will now be described.

This construction is seen in Figures 3, 4, 5, 6 and 8, in which a two-membered fitting, 55, 56, is shown arranged for inflow and outflow pipe connection of the member, 55, at opposite sides thereof, as seen at 55a, 55b, respectively, with a discharge line of the dry pipe system, and the pressure vent line, 70, seen in Figure 1, the first mentioned connection being shown in Figure 1 as made by means of a pipe section, 60, bridging and connecting two parallel discharge lines and having a branch, 61, intermediate its connection with the two discharge lines leading to the connection at 55a.

The fitting member, 55, has a web, 55a, interposed between its outflow and inflow connections, 55b and 55c, at which respectively it is connected with the dry pipe system discharge line and the pressure vent line; and said fitting member has extending laterally with respect to the inflow and outflow connection and transversely of said web, 55a, and integral with the latter, a web, 55b, laterally bounding both the cavities of said fitting member, which cavities are partitioned from each other by the web, 55a. Said web, 55c, has an outer flat face mated with a corresponding face of the member, 56, so that when the two members, 55 and 56 are bound together, as indicated by the bolts, 57, 59, said web, 55c, constitutes the closure at that side of the cavity of the fitting, 56, and partitions said cavity from both cavities of the member, 55, which are partitioned from each other by the web, 55a.

The web, 55c, has a central threaded aperture which opens in the cavity of the member, 55, at the side of the partitioning web, 55a, toward the connection, 55b; and in this threaded aperture there is mounted a valve seat member, 59, having a valve seat at 62 encompassing a flow port, 65a. In the arc of a circle about this flow port at the side of the partitioning web, 55c, away from the inflow connection, 55b, the web, 55c, has flow apert-
tures, 55', constituting communication of the cavity of the member, 56, with the outflow connection, 55', of the member, 55. The valve seat member, 50, comprises a spider, 58, unitary with it striding the valve seat and arranged for holding the valve shown at 65 seated by means of a frangible strut, 68, interposed between the valve and a screw, 60, set through the head of the spider and adjustable by a screw driver for clamping the valve securely seated, as indicated in dotted line in Figure 4.

The member, 56, has a hollow internally threaded boss, 56', projecting laterally with respect to the fitting cavity and parallel to the inflow and outflow connections of the fitting member, 55, and said fitting, 56, has a web 58' at the side at which said boss is located, which forms the bottom of the cavity of the hollow boss and is apertured coaxially with said cavity, as seen at 58'. In the cavity of this boss clamped between the bottom web and the annular edge of a cup flanged washer, 71, there is mounted by said clamping a flexible and resilient diaphragm, 71', which may be understood to be shown in the drawings as made of rubber, said diaphragm having positively secured at its center a stem element, 73, 74, of which the end portion, 75, at the inner side of the diaphragm protrudes through and obtains guidance in the aperture, 56', in the bottom web of the boss cavity. The stem portion, 74, at the other side of the diaphragm obtains guidance in and protrudes from a central aperture in a plug, 73, which is screwed into the boss cavity clamping the cup-flanged washer against the diaphragm for clamping the latter securely at its margin. The stem, 73, at its inner end is deflected to form an acute angle terminal, as seen at 75, and the stem is of suitable length inwardly of the diaphragm, so that the acute angle end of the stem bears against the side of the frangible strut, 68, and preferably is somewhat stressed thereagainst by the resilient reaction of the diaphragm at the normal position of the parts assembled and held in place by screwing in the plug as described to securely clamp the margin of the diaphragm.

In Figure 15 there is shown a slight modification of the construction of the member, 6, in respect to the strut-breaking means. In this modified construction the diaphragm, 71', of the form illustrated in Figure 6 is omitted, and for preventing leakage after the operation of the device for breaking the strut and permitting the release valve, 55, to open, the stem, 73, 74, is furnished with a flange, 71', which forms a shoulder seating fluid-tight against a seat shown at 71', encompassing the guide bearing, 71', of the stem portion, 74, in the plug, 73', which takes the place of the plug, 73, of the form shown in Figure 6. This modified construction (Figure 15) is used in dry kilns and other installations where the extreme heat might tend to deteriorate the rubber diaphragm shown in Figure 6.

The two-membered fitting, 55, 56, with the valve seat, valve and operating parts assembled therein, as described, is mounted as a unit on the rear side of the branch terminal of the tubular housing of the temperature-responsive device described, the parts being dimensioned transversely of the tubular housing so that when said fitting is thus mounted, the axis of the boss, 56, of the fitting member, 56, from which at the axis the stem, 74, of the diaphragm, 71, protrudes, is in the vertical plane of swing of a boss, 38, with which the weight, 38, is furnished for the purpose of coiling with said protruding stem, 74, and thrusting the same inwardly to flex the diaphragm, 71, and thrust the opposite end, 73, of the diaphragm stem against the frangible strut, 68, breaking and displacing the latter and releasing the valve, which will be dislodged from its seat by the pressure in the system discharge line, releasing that pressure for venting through the vent line, 70.

Upon considering the construction of the release or vent valve for being held seated by the frangible strut, as described, and the provision for releasing the valve by displacing the strut by the means described, it will be understood that the dislodged valve cannot be re-seated without obtaining access to the interior of the fitting member, 56; and this can be done only by withdrawing the bolts, 57, which secure said fitting member to the member, 55, and removing the member, 56, and recovering the valve, which, if found in good condition, may be replaced on the seat and clamped thereon by a duplicate of the broken strut interposed between the valve and the adjustable clamping screw as described.

The construction described necessitating recovery and examination of the valve and re-seating and clamping it on its seat, is adopted in preference to any construction which would permit the re-seating of the valve by externally operable means without dis-assembling the fitting and inspecting the valve as to its condition and the condition of the valve seat, in order to ensure that in every instance of the operation of the apparatus in accordance with its purpose of releasing the system pressure, and causing the system to be occupied by water up to the discharge heads, the re-setting of the system shall not be effected without having the release valve unquestionably in condition for perfectly sealing the port which it controls. And in actual practice it is intended that the custodian of the protected building will keep himself supplied with duplicate assemblages, consisting of the valve seat member, 59, with valve mounted and clamped on the seat by a
strut, these assemblages being prepared, assembled and tested by experts at the factory and ready to be substituted in entirety for the corresponding assemblages in which the strut has been broken in the operation of the device, and of which the valve seat member and the valve if recovered, may be returned to the factory for exchange.

To complete the pressure release unit suitably for the purpose for which it is designed as stated, viz., for installation in conjunction with already installed and operating dry pipe fire extinguishing systems, an initial section, 30, of the pressure vent line, of about the length of the housing of the rate of rise thermostat, is rigidly connected to the latter by the outflow connection, 55b, of the fitting member, 55; and for rigidly connecting the opposite ends of said housing and said pipe section there is provided a bracket arm, 90, clamped at one end to the pipe section, as seen at 91, and having at the other end an eye, 92, for receiving a terminal pintle, 34t, with which the end of the housing, 94, is provided. And for facilitating the installation of the unit in the building to be served by it, brackets, 93, 96, each provided with a flat base, as seen at 94, and a hollow boss, 95, at a part of the length of the base, is formed for seating the pipe section, 80, and apertured for admitting a staple, 96, to clamp the pipe section on said seat by nuts, 96t, applied to the staple ends within the cavity 95t of the hollow boss.

But it may be understood that this unit may be installed supported on the discharge pipe lines of the system, one of which is shown at C in Figure 1, the vent line and all branches thereof being supported in the same manner as system discharge lines, viz., by ordinary pipe hangers, as indicated at 77.

For the primary purpose stated of releasing the system pressure independently of the opening and in advance of the opening of sprinkler heads by actual fire, the pressure release unit may be connected, as already described, at any point in the air pressure region of the system, as to any discharge line having normally closed sprinkler heads, as illustrated in Figure 1.

But when it is not designed to use the vented pressure for any other fire protective purpose, it may be found more convenient to make the connection with the air pressure region at an earlier point in the system, as for example, leading from the main discharge pipe at so short distance from the main valve that the air pressure will be fully vented before the water following the air in the main discharge pipe by arriving at the point at which the vent connection is made, can operate for trapping the vented air.

In Figure 11 there is shown an installation of the pressure release unit in a pipe led off from the main discharge pipe of the dry pipe main valve at a short distance above the main valve. In this installation the vent pipe is shown leading for final discharge in the funnel X commonly provided connected with a sewer or other drain system for draining the fire extinguishing system after it has been in operation for extinguishing fire.

In Figure 12 there is shown a pressure release unit connected with the main discharge pipe as shown in Figure 13, and having the vent pipe leading for discharge outside the building.

It will be understood that at any ultimate discharge of the vent line or its branches, the discharge is restricted so as not to reduce the pressure for discharge of water from any sprinkler heads which may be opened by actual fire below that necessary for proper dispersive water discharge. And the same precautionary restriction will still permit at the ultimate discharges of the vent line and branches, sufficiently free flow to avoid danger of the system pipes being burst or blocked by the freezing of the water held stationary in them in instances in which no fire follows the venting of the pressure and no discharge heads are opened. This detail of the construction consisting in restricted final discharge of the vent pipe lines may be understood to be indicated by the restricted discharge ports, 81 and 82, at the ends of the vent lines, as seen in Figures 11 and 12.

In Figure 13 there is shown a pressure release unit installed by connection of the vent line with the main discharge pipe, as shown in Figures 11 and 12, and having the vent pipe led to a float chamber, 105, which has at the upper side connection for air discharge controlled by a valve, 106, which is normally held open by the weight of the float whose carrying arm is operatively connected with the valve for closing with the latter when the water following the vented air pressure fills the chamber and lifts the float.

In this construction the vent or exhaust connection may be led to any suitable point for discharge outside the protected area; and immediately an alarm or any fire protective device which may be operated by the pressure vented before the water, following, shuts the valve. And for avoiding liability of bursting or blockading the pipes by water freezing in them when venting has been caused and no fire has followed, the float chamber may have a drain cock, 107, which will be left open in winter time, and which affords the necessary restricted discharge, as indicated at 82 and 83 in Figures 11 and 12.

In Figure 14 a pressure release unit is installed similar to that shown in Figures 11, 12 and 13 except that the vent outlet is through the nozzle of a water motor alarm indicated at 122t, the connection being made to the regular alarm line of the dry valve indicated at 121t, leading from the interme-
diately chamber of the dry valve to the alarm devices. In this construction the release of pressure causes the dry valve to open by equalizing the pressure on both sides of the dry valve clapper, and also causes the alarm to ring by reason of the pressure escaping through the restricted nozzle of the water motor by which the alarm is operated as heretofore described. This method is used for tripping the dry valve instead of that shown in Figure 10 on installations where the exhauster is not used.

In addition to the function of venting the air pressure so as to admit the water up to the sprinkler heads before they are opened, and conducting the vented air for discharge where it will not increase the fire hazard, the pressure release unit may be utilized for other functions.

In the class of supplemental fire protective devices which may be operated by the released system pressure, are such devices as shown in Figure 13, consisting of means for releasing automatically closing fire doors.

In this figure a branch, 83, of the vent line is shown leading to a fitting, 84, which comprises a flexible diaphragm 85, exposed at one side to the pressure admitted through the pipe branch, 83, and connected for operating a latch, 86, to disengage said latch from the fire door indicated at 87 to release the latter for automatically closing to cut off the fire from the apartment to which the door through which it closes leads.

When a building mainly equipped with a dry pipe system has any portions or apartments constituting an extra hazardous area equipped with a water discharge line having either open heads or normally closed heads adapted to be opened by fire heat, the pipe line leading to said heads being connected to the main water supply pipe antecedent to the dry pipe main valve, with an independent valve controlling the admission of water from the water supply line, the vented pressure of the dry pipe system may be utilized for opening such independent water control valve for admitting the water to be discharged at the already open heads, or at the normally closed heads instantly upon their being opened by fire heat. Construction for this purpose is shown in Figure 1 in which a branch, 70, of the vent line leads to a chamber, 98, having a diaphragm, 99, constituting one wall of the chamber, said diaphragm having a stem, 99, connected in any suitable manner for operating the independent water controlling valve, 88, controlling water access to the water discharge line, 97.

In this diagrammatic representation, 97 indicates a branch line having normally closed heads, 97b, and 97c indicates a branch line having open heads, 97a. The open head line is closed at the end as seen at 97c; but the closed head line leads for restricted ultimate discharge outside the building, as seen at 97c, as in Figures 12 and 13, for the reasons stated in connection with those figures.

As shown in Figure 1, said valve, arranged to be opened by the water pressure, has a lever arm, 88, engaged with a trip latch, 89, for holding the valve at closed position, and the diaphragm stem is arranged to operate the latch for releasing the lever, as may be understood from the drawings without further description.

In Figure 1 the vent line is also shown extended into an upper floor of the building into what may also be called an extra hazardous area, as for example, an apartment for storage of inflammable material, and into which, therefore, the discharge line of the dry pipe system is extended with normally closed sprinkler heads which in the absence of special means to the contrary would be reached by the water only after considerable delay by reason of the distance from the main valve. In such cases the vent line is branched directly from the pressure release unit, 30, as seen at 100, the branch, 101, leading to a subsidiary pressure release valve, 102, associated with the sprinkler head line in the hazardous area for venting that line almost instantly upon the venting of the antecedent line on the lower floor.

The construction of this secondary release valve being identical with that of the primary release valve of the pressure release unit, the thrust of the stem of the diaphragm, 110, due to the vent pressure communicated through the vent line branch, 101, operates to break and displace the frangible strut, 103, of the secondary release valve in the same manner as the falling weight operates for that purpose in the case of the primary pressure release valve of the pressure release unit. Or, it is obvious that the diaphragm stem may be arranged to release a weight arranged to operate in identical manner with the construction shown in connection with the vent valve of the primary pressure release unit.

Another utilization of the release pressure kept under control in the event line is illustrated in Figure 10, wherein a branch, 70a, of the vent line is shown connected for operating by the pressure in said vent line a diaphragm, 104, mounted in a housing, d, and having a stem, 104a, extending into the exhauster casing for operating a trip latch, 104b, to release the weighted lever, 104c, of the exhauster mechanism of my Patent No. 1,805,858 dated May 19, 1931.

At 120 in Figure 1 there may be seen indicated a customary form of alarm device—an electric bell—operated by connection with the intercept chamber of the dry pipe main valve, as indicated diagrammatically at 120a, in accordance with the familiar construction, this connection extending in a pipe line, 121, to a motor operated alarm gong of...
which the motor is shown in exterior outline at 129 with a shaft, 123, extending through the building wall to an outside alarm gong indicated at 124. This alarm apparatus, which in itself is not a part of the present invention, being in common use, is shown for the purpose of showing the connection with it of the pressure vent system which characterizes the present invention, and which is connected with these familiar alarm devices for operating them independently of their operating connection with the exhaust. This connection of the vent system with the alarms is shown at 125 where a branch, 70°, is connected to the pipe, 121, at a T, 126, the vent pressure operating back in the pipe portion, 127, to the electric bell alarm, 120, and in the other direction through the pipe, 121, to the gong-operating device, 124. And in order that in the event that the dry-valve should be operated normally concurrently with the pressure release device and vent system, the pressure arriving at the T, 126, from the dry valve may not operate in opposition to the pressure communicated through the vent line, 70, to a branch, 70°, there is interposed in said branch, 70°, a check valve, 130, opening for flow toward the T, 126, and sealing against reverse flow.

It may be understood that the pipe, 131, shown leading from the gong-operating device is for the purpose of draining from the latter water which may follow the vented air pressure as in the other vent line connections, such as shown at 81 and 82, and the discharge into the drain funnel, X; and the pipe element seen at 132 serves similarly for draining from the connection which operates the electric alarm, 120, the small amount of water which may reach that device.

I claim:

1. In combination with a dry pipe fire extinguishing system having a discharge line equipped with normally closed sprinkler heads with associated temperature-responsive means for causing said heads to be opened under predetermined temperature conditions, an auxiliary device comprising a thermostatic device having a movable element and adapted to respond to conditions involving fire hazard by movement of said element in advance of the response of the normally closed heads; means arranged for inflow connection with the air pressure region of the system and for outflow connection with a vent conduit; and a normally closed pressure release valve controlling flow there-through from the inflow to the outflow connection thereof, and means caused to operate for opening said valve to release the pressure by the temperature-responsive movement of the movable element of the thermostatic device; a subsidiary pressure release device associated with a selected section of the water delivery line of the dry pipe system, for releasing the air pressure in said section, the vent conduit from the primary pressure release device having a branch leading to said subsidiary release device, the latter being constructed for operation by the pressure communicated through said branch.

2. In a dry pipe fire extinguishing system of the type having normally closed water discharge heads with associated temperature-responsive means for causing said heads to be opened under predetermined temperature conditions in the apartment protected, and a main water-controlling valve and discharge pipe line therefrom to the discharge heads comprising an air pressure region antecedent to the discharge heads; a vent conduit arranged for communication with the air pressure region, and thermostatically controlled means for controlling communication of the air pressure region with said vent conduit constructed and arranged for responding to temperature conditions involving fire hazard in advance of the response of the temperature responsive means of the closed heads, said vent conduit being equipped with water discharge heads with associated temperature-responsive means for causing them to be opened under predetermined temperature conditions, said vent conduit being extended beyond said discharge heads and restrictedly opened for discharge outside the protected area, whereby in the event that after communication of the vent conduit with the air pressure region has been opened, the discharge heads of said vent conduit are not opened for water discharge, the movement of water through said vent conduit to the restricted discharge may be maintained for avoiding liability of water becoming frozen in said vent conduit line.

3. In combination with a fire protective system of the type having a main water supply controlling valve and a discharge line therefrom, the controlling valve being arranged to be normally held seated by fluid pressure in a pressure region of the discharge line, and having a water delivery pipe of the discharge line equipped with normally closed water discharge heads; a vent conduit connected with the fluid pressure region of the discharge line for venting the pressure to permit the main valve to be opened by the water supply pressure; a valve device controlling said vent conduit, and a temperature-responsive device located in the apartment to be protected operatively associated with said vent valve for causing the same to be opened upon predetermined temperature conditions affecting said temperature-responsive device; a second water delivery pipe line connected with the discharge line and equipped with normally closed water discharge heads; valve means controlling access of water from the discharge line to said second delivery pipe line; valve-operating means arranged to be operated by fluid pressure for opening said.
valve, and fluid pressure flow connection
from the vent conduit to said valve-operating
means, said water delivery pipe line being
extended beyond the normally closed dis-
charge heads and arranged for restricted dis-
charge at a locality immune to water damage.

4. In combination with a fire protective
system of the type having a main water sup-
ply controlling valve and a discharge line
therefrom, the controlling valve being ar-
ranged to be normally held seated by fluid
pressure in a pressure region of the discharge
line, and having a water delivery pipe system
comprising normally closed water discharge
heads; a vent conduit connected with the
fluid pressure region of the discharge line for
venting the pressure to permit the main valve
to be opened by the water supply pressure; a
valve device controlling said vent conduit,
and a temperature-responsive device located
in the apartment to be protected operatively
associated with said vent valve for causing the
same to be opened upon predetermined tem-
perature conditions affecting said tempera-
ture-responsive device; a supplemental water
supply line connected for deriving water sup-
ply independently of control by the main
water supply controlling valve; a controlling
valve in said supplemental water supply line
arranged to be opened by the supply pres-
sure; means for locking said valve at closed
position; operating means arranged to be
operated by fluid pressure for releasing said
valve-locking means, and fluid pressure flow
connection from the vent conduit to said
valve-operating means, said water delivery
pipe line being extended beyond the normally
closed discharge heads and arranged for re-
stricted discharge at a locality immune to
water damage.

In testimony whereof I have hereunto set
my hand at Hastings, Michigan, this 13th day
of June, 1931.

EMIL TYDEN.