

Oct. 29, 1968

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3,407,879

FIRE EXTINGUISHING SYSTEM

Filed June 17, 1966

3 Sheets-Sheet 1

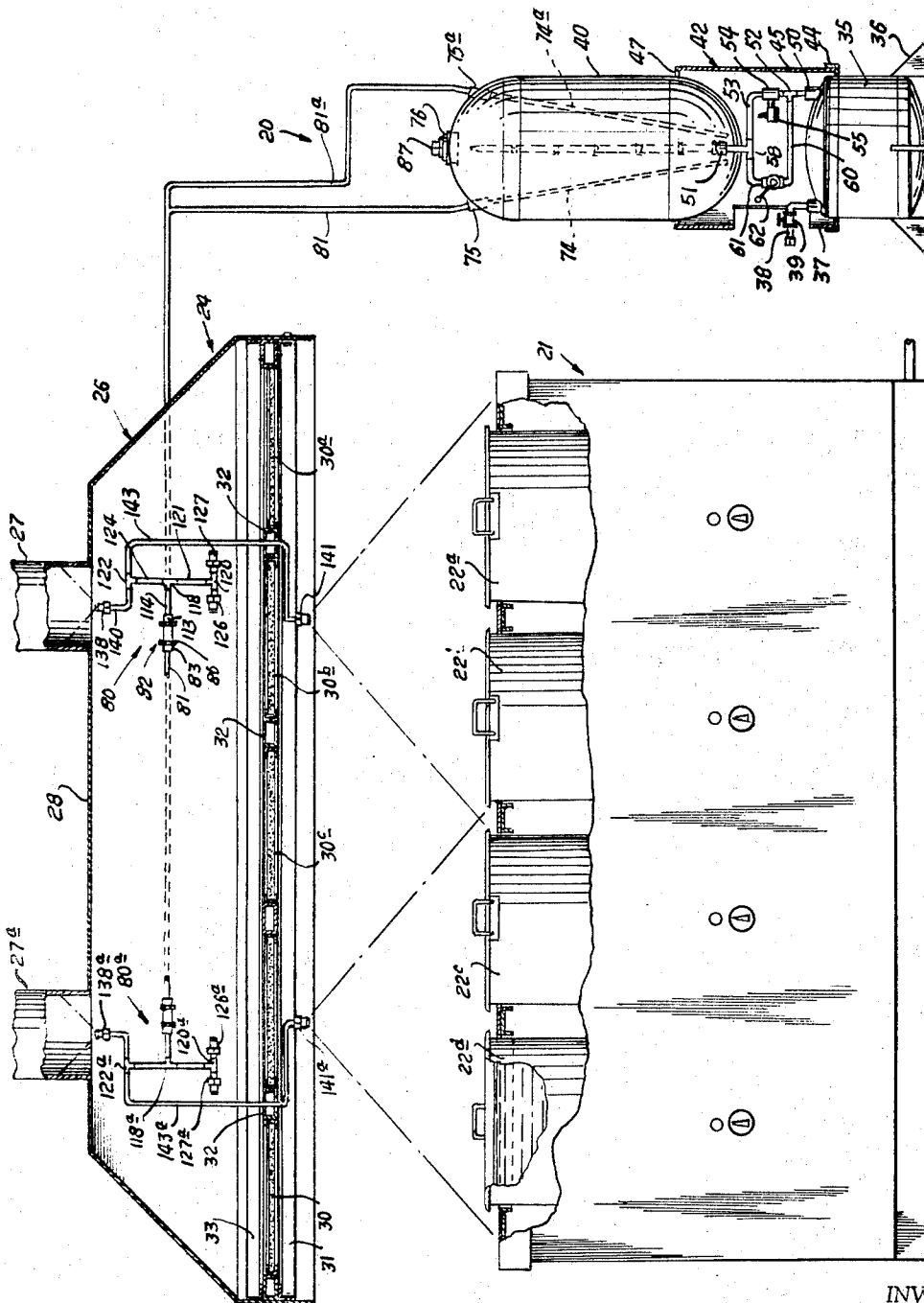


Fig. 1

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3 Sheets-Sheet 2

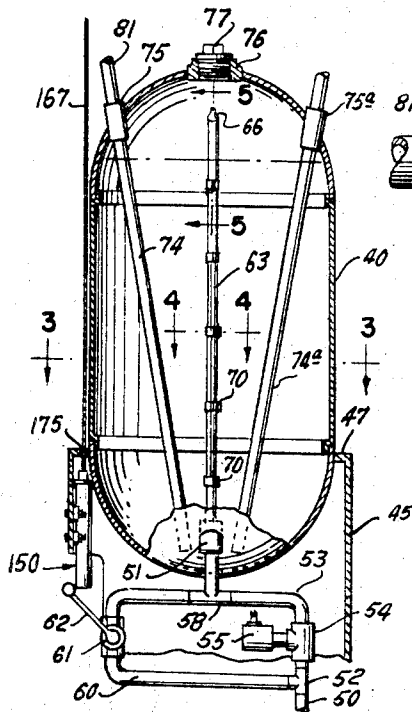
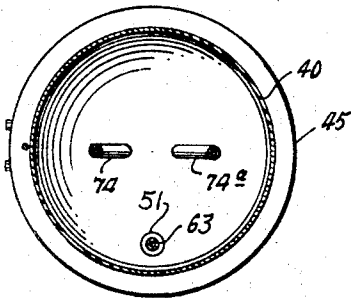
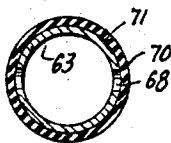
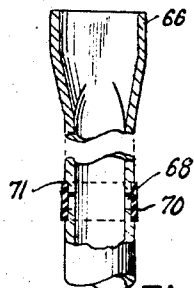
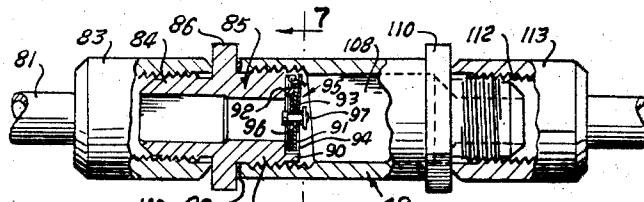
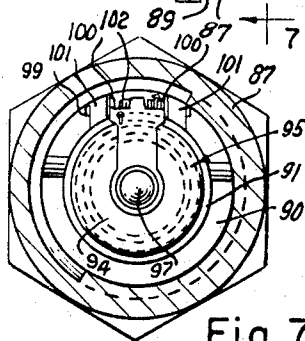
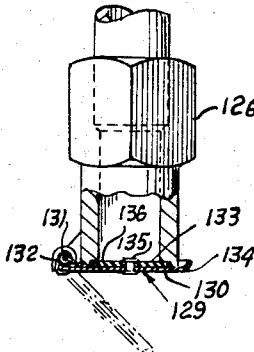
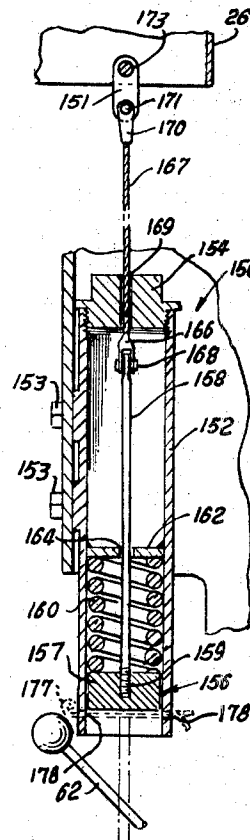


Fig. 9

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FIRE EXTINGUISHING SYSTEM

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3 Sheets-Sheet 3

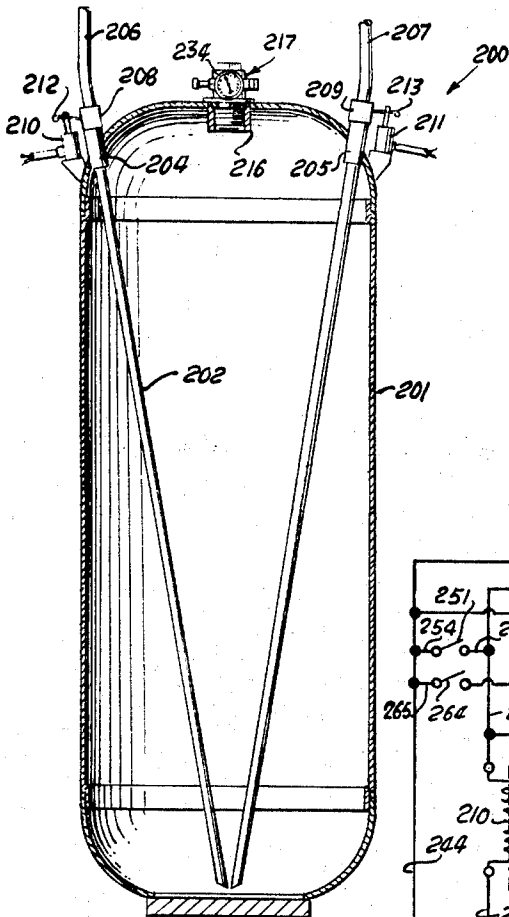


Fig. 10

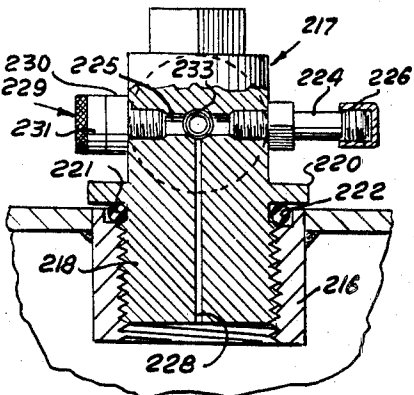


Fig. 11

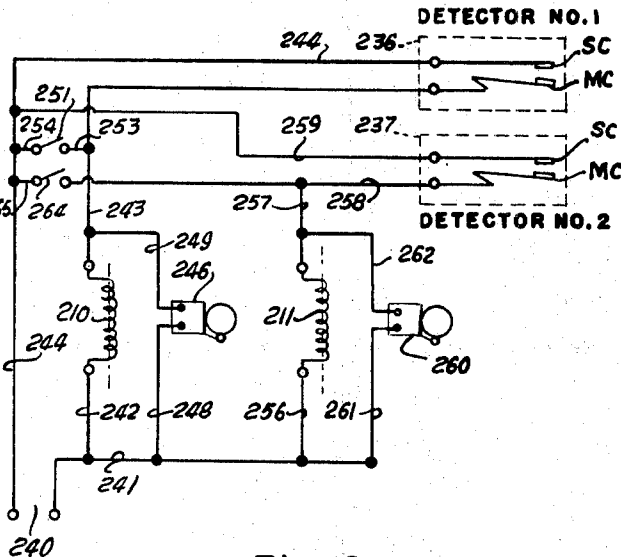


Fig. 12

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FIRE EXTINGUISHING SYSTEM
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ABSTRACT OF THE DISCLOSURE

A fire extinguishing apparatus having a chemical storage tank provided with a plurality of ejection tubes which extend convergently upwardly from adjacent the bottom end of the container through which the chemical may be forced for movement through the tubes to locations of use by means of inert gas introduced into the top end of the tank.

This invention relates to a protective apparatus and more particularly to a fire extinguishing apparatus.

An object of this invention is to provide a new and improved fire extinguishing apparatus having a tank in which a fire extinguishing chemical in powder form may be stored provided with a plurality of ejection tubes through which the chemical may be ejected from the tank by fluid pressure.

Another object is to provide a fire extinguishing apparatus having spaced discharge means at locations remote from the tank and connected to the ejection tubes by conduit means.

Still another object is to provide a fire extinguishing apparatus wherein the discharge apparatus is provided with valve means upstream of the discharge means for preventing flow of fluid into the conduit means to prevent the entry of moisture into the conduit means and thence to the chemical to prevent deterioration or caking of the chemical.

Still another object is to provide a fire extinguishing apparatus wherein the valve means also serves to impart turbulence to the chemical flowing therethrough in order that any agglomerations or lumps of the chemical be comminuted into fine powder particles to obtain optimum dispersion of the chemical upon its discharge.

A further object is to provide apparatus wherein the discharge means includes a yoke provided with a plurality of discharge heads oriented to discharge the chemical in different directions.

A still further object is to provide a fire extinguishing apparatus for extinguishing fires in a cooking apparatus and in an exhaust hood disposed over the cooking apparatus.

A still further object is to provide a fire extinguishing apparatus wherein the hood has a plurality of exhaust stacks and filter pads through which air is drawn into the hood wherein the apparatus includes a plurality of yokes each having a plurality of discharge heads for discharging the chemical into the exhaust stacks of the hood and onto the filter pads and internal surfaces of the hood.

Another object is to provide a fire extinguishing apparatus wherein the yokes have discharge heads adapted to discharge the chemical onto the cooking apparatus.

Still another object is to provide a chemical storage tank having a plurality of ejection tubes into whose open bottom ends located adjacent the bottom of the tank the chemical may be forced for movement through the tubes to locations of use by means of inert gas pressure introduced into the top end of the tank.

Additional objects and advantages of the invention will be readily apparent from the reading of the following description of a device constructed in accordance with the

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invention, and reference to the accompanying drawings thereof, wherein:

FIGURE 1 is a schematic view, with some parts broken away, of a fire extinguishing apparatus embodying the invention shown installed to extinguish fires in a cooking apparatus and in an exhaust hood disposed over the cooking apparatus;

FIGURE 2 is a vertical, partly sectional view, of the chemical tank of the apparatus;

FIGURE 3 is a sectional view taken on line 3-3 of FIGURE 2;

FIGURE 4 is a sectional view taken on line 4-4 of FIGURE 2;

FIGURE 5 is a sectional view taken on line 5-5 of FIGURE 2;

FIGURE 6 is an enlarged partly sectional view of a check valve of the apparatus;

FIGURE 7 is an enlarged sectional view taken on line 7-7 of FIGURE 6;

FIGURE 8 is a fragmentary partly sectional view of one of the discharge heads of the apparatus illustrated in FIGURE 1;

FIGURE 9 is a fragmentary vertical sectional view of an actuator assembly for opening a valve of the apparatus;

FIGURE 10 is a vertical sectional view of a modified form of the chemical tank;

FIGURE 11 is a fragmentary partly sectional view of the header which closes the inlet of the tank; and,

FIGURE 12 is a circuit diagram of an electric circuit for controlling the operation of the valves of the tank illustrated in FIGURE 10.

Referring now particularly to FIGURES 1 through 8 of the drawings, the fire extinguisher apparatus 20 is shown installed to extinguish fires in a cooking apparatus 21 which includes kettles 22 and a gas or electric heating means, not shown, for heating the cooking liquids in the kettles and fires in an exhaust system 24 which is mounted over the cooking apparatus. The exhaust system includes a downwardly opening hood 26 disposed over the cooking apparatus and a pair of exhaust pipes or stacks 27 and 27a which open through the top wall 28 of the hood. Suitable suction fans or blowers, not shown, associated with the stacks move air upwardly from the hood and through the stacks. The hood has a plurality of horizontal filters 30 mounted therein through which the air from above the cooking apparatus is moved into the hood. Opposite end portions of the filters rest on the horizontal flange of an angle member 31 secured to the walls of the hood and extending about its sides. The filter pads are disposed between spaced brace members 32 which also extend across the hood and are rigidly secured at their opposite ends to the walls of the hood in any suitable manner as by welding. The brace members may rest also on the support angle member 31. A top retainer angle member 33 may also be secured to the hood above the brace members. The filter pads are provided to minimize the flow of cooking liquids in vapor or droplet form into the stacks and are of such dimensions that they may be removed from between the brace members and the angle members for periodical cleaning or replacement when deposits of cooking liquids accumulate thereon. The cooking oils are combustible and it is desirable therefore that the fire extinguishing system be so constructed that it will direct the spray of the fire extinguishing substance not only onto the top surfaces of the cooking apparatus to extinguish any fire of the cooking liquids in the kettles 21 but also onto the filter pads and the internal surfaces of the hood and into the exhaust stacks to extinguish any fire of the deposits of the cooking liquids on the filter pads and the internal surfaces of the hood and the stacks. The fire extinguishing system includes a closed tank 35 supported on the base 36, in which an inert gas, such as

nitrogen, may be stored under a relatively high pressure. The tank is fillable with the inert gas through an inlet 37 to which a filler pipe 38 is connected. The filler pipe has a manually operable valve 39 connected therein.

The inert gas is employed to expel a fire extinguishing chemical stored in powder form in a chemical tank 40 supported above the gas tank by a suitable support assembly 42. The support assembly may include a support ring 44 rigidly secured to the chemical tank and a cylinder 45. The lower edge of the cylinder rests on the support ring. The chemical tank may be rigidly secured to the top inner flange 47 of the support cylinder in any suitable manner, as by welding and the like. The outlet 50 of the gas tank is connected to the inlet 51 of the chemical tank by means of a T-fitting or coupling 52, a conduit 53 having a valve 54 connected therein which is operable by a solenoid 55, and a T-fitting or coupling 58. The outlet 50 is also connected to the inlet 51 of the chemical tank through the T-fitting 52, a conduit 60 in which a valve 61 is connected and which is operable by a lever or handle 62 and the T-fitting 58. It will be apparent that the gas under pressure from the tank may flow to the inlet of the gas tank when the solenoid 55 is energized and opens the valve 50 or when the operator handle 62 of the valve 61 is moved downwardly and pivoted in a counterclockwise direction, as seen in FIGURE 1, and opens the valve 61.

The inlet 51 of the chemical tank is secured as by welding to the tank adjacent its bottom and has a gas injection tube 63 secured to its upper end which extends vertically through the tank substantially the full length thereof. The gas injection tube is flattened at its upper end portion 66 to reduce its effective orifice at its upper end and is provided with a plurality of longitudinally spaced apertures or ports 68 which are closed by resilient annular rings 70 disposed in external annular recesses 71 of the tube to which the ports open. When the gas under pressure is introduced to the inlet of the chemical tank and thus to the lower end of the gas injection tube, due to the restriction of the orifice of the tube at its upper end portion a back pressure is created in the tube so that while most of the gas will flow upwardly through the top end into the chemical tank above the top level of the powdered fire extinguishing chemical, some of the gas will flow outwardly through the ports 68, the resilient rings expanding slightly to permit such flow. The chemical is thus agitated and stirred throughout substantially its full mass whenever the inert gas is introduced into the chemical tank under pressure to facilitate its ejection into the bottom open ends of a pair of ejection ducts or tubes 74 and 74a. The lower ends of the ejection tubes are disposed adjacent the bottom of the tank and are rigidly secured at their top ends, as by welding or the like, to tubular outlets 75 and 75a, respectively, of the tank. The tank has an inlet 76 at its top end through which the fire extinguishing chemical may be introduced into the tank. The inlet is closable by suitable plugs 77.

The tank outlet 75 is connected to a yoke assembly 80 positioned in the hood by a pipe 81 whose lower end is rigidly secured to the outlet and which extends into the hood above the filter pads through a suitable aperture thereof. The yoke assembly includes a check valve 82 connected to the end of the conduit 81 by a coupling 83 threaded on the reduced end portion 84 of the male housing section 85 of the valve. The male housing section has an external upwardly extending flange 86, which may be hexagonal in form to provide a plurality of pairs of parallel flat outside surfaces which are engageable by a wrench or other suitable tool, and a body portion 87 which is threaded in the female housing section 88. A suitable annular gasket 89 is disposed between the flange 86 and the adjacent end section of the female housing section to seal therebetween.

The inner reduced end portion 90 of the male housing section has an internal annular seat surface 91 which is engageable by the annular flange 92 of a resilient seal member 93 secured to a dish-shaped member 94 of a

closure 95 by a retainer disc 96 and a rivet 97. The closure member is pivotally mounted on the male housing member by an arm 98 also secured to the disc member by the rivet 97. The arm is pivotally secured to the male housing member by a pin 99 which extends through the spaced end flanges 100 of the arm and the parallel lugs 101 of the male housing section. The closure member is biased toward its closed position by a spring 102 disposed about the pin, one end of the spring extending into a suitable recess of the male housing member and its other end extending through a suitable aperture in the arm and engaging its outer surface.

The two housing sections define a mixing chamber 108 downstream of the closure member which is of greater diameter than the passage of the male housing section. The female housing section also is provided with an external hexagonal flange 110 which provides flat parallel surfaces which are engageable by a tool, such as a wrench. The reduced end portion 112 of the female housing section is connectable by a coupling 113 to a horizontal conduit 114 of the yoke.

The check valve 82 prevents reverse flow of fluids and moisture into the pipe 81 and through the pipe into the chemical tank. Turbulence is induced in the powdered dry chemical during its passage through the valve since the passage of the male housing section is of smaller diameter than the passages of the pipes 81 and 114 and the mixing chamber is of much greater diameter than these passages. Such turbulence causes comminution of any conglomerations or lumps of the dry chemical powder moving through the valve into fine small particles.

The downstream end of the pipe 114 is connected to the inlet of a middle T-coupling 118 whose bottom outlet is connected to a bottom T-coupling 120 by a pipe 121. The top outlet of the middle T-coupling is connected to a top T-coupling 122 by an upper pipe 124.

A pair of discharge heads 126 and 127 are connected to the opposite outlets of the bottom T-coupling through which the dry chemical is discharged in opposite directions into the hood above the filter pads. Each of the discharge heads may have a closure 130 for its outlet which is pivotally mounted on a pin 131 secured to the head. The closure is biased with a relatively small force, e.g., two to four ounces toward its closed position by a spring 132 disposed about the pin. The closure may include a resilient gasket or seal member 133 rigidly secured to a disc 134 by a rivet 135. The seal member is adapted to engage the annular seat surface 136 of the discharge head.

The discharge heads 126 and 127 are located at one end of the hood to discharge the chemical in opposite directions above the pads 30a and 30b.

The top T-coupling 122 of the yoke 80 similarly has a discharge head 138 connected to one of its outlets by a pipe 140, the discharge head 138 being disposed to discharge the chemical into the exhaust stack 27. The other outlet end of the top T-coupling 122 is connected to a discharge head 141, disposed below the pad 30b and located to discharge the fire extinguishing mixture over two of the kettles 22a and 22b, by a pipe 143 which may extend downwardly through one of the brace members 32.

A second yoke 80a, located in the hood and connected to the other outlet 75a of the chemical tank by the pipe 81a, is substantially identical in structure to the yoke 80 and, accordingly, its components have been provided with the same reference numeral, to which the subscript *a* has been added, as the corresponding elements of the yoke 80. The two yokes are spaced from each other at opposite ends of the hood so that all internal surfaces of the hood and the filter pads will be subjected to the chemical discharged through the nozzles 26, 27, 26a and 27a connected to the bottom T-couplings 120 and 120a of the two yokes 80 and 80a. The discharge head 138a of the yoke 80a is disposed to discharge the chemical upwardly into the exhaust stack 27a and its discharge head 141a is

located above the portion of the cooking apparatus 21a to discharge chemical over areas of the cooking apparatus which are not covered by the spray from the discharge head 141. For example, the chemical discharged through the head 141a will cover the tops of the kettles 22c and 22d if the chemical discharged through the head 141 covers only the kettles 22a and 22b.

It will be apparent of course that the chemical will be ejected from the chemical tank 40 through the ejection tubes 74 and 74a to the yokes 80 and 80a by the inert gas 35 under high pressure in the tank 35 whenever either the solenoid valve 54 or the valve 61 is opened, the closures of the discharge heads being easily moved to their open positions by the force exerted thereon as the pressure in the yokes is raised.

Energization of solenoid 55 which opens the valve 54 is controlled by any suitable electric circuit which may include a temperature sensitive element which causes such circuit to connect the solenoid across a source of electric current when the temperature in the vicinity of the hood or of the cooking apparatus exceeds a predetermined value, as when a fire occurs either within the hood, the exhaust stacks, or the cooking apparatus 21.

The valve 61 may also be opened upon the occurrence of the fire within the hood or the cooking apparatus by an actuator assembly 150 illustrated in FIGURES 2 and 9 which includes a fusible link or element 151 which melts or fails upon the occurrence of a high temperature adjacent the cooking apparatus and the hood. The actuator assembly may include a tubular housing 152 rigidly secured to the cylinder 45 above and in alignment with the handle 62 of the valve 61 by bolts 153 which extend through suitable apertures in the cylinder into threaded bores of the housing. The upper end of the housing may have a cap 154 threaded therein.

A piston 156 located in the housing includes a piston head 157 and a rod 158 threaded in an upwardly opening bore 159 of the piston head. The piston is biased downwardly by a spring 160 disposed about the piston rod whose lower end portion engages the top surface of the piston head and whose upper end portion engages a spring retainer ring 162 rigidly secured in the housing in any suitable manner, as by welding. The flattened top end portion of the piston rod extends between the dependent spaced arms of a connector member 166 rigidly secured to the lower end of a flexible line or cable 167 and is secured to the connector member by a pin 168 which extends through aligned apertures thereof.

The cable extends outwardly of the housing through the passage 169 of the cap 154 and is secured to the fusible link 151 by a connector member 170 which may be identical to the connector member 166, the link 151 extending downwardly between the arms of the connector member and being secured thereto by a pin 171. The upper end of the link may be rigidly secured, as by a screw 173 to a suitable structure, such as the hood 26. It will be apparent of course, that the cable may extend over suitable rotatable pulleys or sheaves as required if the chemical tank is located to one side of the hood. The cable extends from the cylinder 45 through a suitable aperture 175 in the flange 47 of the cylinder.

In use, the spring is in its compressed condition holding the cable in tension and exerting a downward force on the fusible link and the piston head is above the handle 62 of the valve 61 which is now in its upper position as illustrated in full lines in FIGURE 9. Upon the occurrence of a fire adjacent the structure which is to be protected by the fire extinguishing apparatus, the fusible link 151 will fail or melt and the spring will then forcibly propel the piston downwardly and cause it to strike the handle 62 of the valve 61 and move it downwardly to open the valve as shown in broken lines in FIGURE 9.

If it is desired to deactivate the actuator assembly 150, a cotter key 177 may be inserted through the aligned apertures 178 of the housing below the piston 157 to hold the piston against downward movement.

In use, the chemical tank is filled through the inlet 76 to a level below the top of the gas injection tube 63 with a suitable fire extinguishing chemical in powder form, such as sodium bicarbonate. Certain additives may be mixed with the sodium bicarbonate to inhibit compaction of the sodium bicarbonate in the tank and also agglomeration of the powder particles into lumps to improve the flow characteristics of the chemical. The gas tank 35 is filled with an inert gas, such as nitrogen, through the filler pipe 38 to a predetermined pressure, for example a pressure of 160 to 220 lbs. per square inch. The valves 54 and 61 are of course closed.

The check valves 82 and 82a now prevent flow of moisture into the conduits 81 and 81a which could otherwise occur during cleaning of the hood since steam or hot water is employed during such cleaning to remove deposits of the cooking liquids from the walls of the tank and the closures of the discharge heads are easily opened by relatively small force. For example a jet or stream of steam or a lot of water impinging on the closure members may easily move them to open positions thus permitting entry of the steam or hot water into the yokes. Such closure members are sometimes inadvertently broken and not replaced. In addition if the gasket members 133 fail, or the closure members are otherwise defective or broken, air is drawn into the conduits 81 during periods of non-use of the cooking apparatus since the temperature within the hood then drops and the reduced pressure within the conduits as the temperature falls tends to cause air to flow inwardly therein. Any moisture present in such air then tends to condense in the cooler portions of the conduits adjacent the chemical tank 40. If such moisture flows downwardly through the ejection tubes into the tank, it causes the chemical to deteriorate or to form lumps which will then prevent proper ejection thereof.

If a fire occurs either in the vicinity of the cooking apparatus, as when the cooking liquids in the kettles catch on fire or when the deposits of the cooking liquids on the filter pads, or on the internal surfaces of the hood or stacks catch on fire, the control circuit which controls the energization of the solenoid 55 of the valve 54 connects the solenoid across a source of electric current and the valve 54 is opened. Alternatively, the valve 61 may be opened manually when the fire is detected or, if it is provided with the actuator 150, the fusible link 151 will fail when such fire occurs and the actuator assembly will open the valve 61.

Opening of either the valves 54 or 61 causes the pressure in the top of the chemical tank above the fire extinguisher chemical to be raised suddenly and the powdered fire extinguisher chemical is forced downwardly in the tank and upwardly through the ejection tubes 74 and 74a and to the yokes 80 and 80a through the pipes 81 and 81a.

Simultaneously, the back pressure created in the gas injection tube 63 due to the restriction of its orifice as its top end causes a certain amount of its gas to flow outwardly into the tube through the ports 68, the resilient rings or bands being moved outwardly to permit such flow. The gas flowing outwardly through the ports 68 agitates and stirs the mass of chemical in the tank to facilitate its flow through the bottom ends of the ejection tubes.

The fire extinguishing chemical is thus moved from the tank to the yokes and discharged in fine powder form onto the kettles of the cooling apparatus and also into the hood and the stacks. The inert gas will be discharged through the discharge heads after the chemical has been discharged and will of course also tend to extinguish any fire which may still be present. It will be seen that the use of two separate ejection tubes permit the chemical to be supplied from the tank to two separate groups of discharge heads such as those provided by the yokes 80 and 80a so that the chemical from a single tank may

be dispersed or sprayed over large areas of apparatus which is to be protected.

Referring now particularly to FIGURES 10, 11 and 12 of the drawings, the fire extinguishing apparatus 200 includes a tank 201 in which both the powdered fire extinguishing chemical and a supply of gas under pressure is contained. The chemical is ejected from the tube through either one or the other of the ejection tubes 202 and 203 whose lower open ends are disposed adjacent the bottom of the tank. The tubes are connected to the outlets 204 and 205 rigidly secured to the tank, as by welding. Flow of the chemical from the tank to the pipes 206 and 207 which extend to the locations to be protected and to suitable chemical discharge means, such as the yokes 80, at such locations is controlled by valves 208 and 209 which are opened when the solenoids 210 and 211, respectively, are energized. The armatures of the solenoids are connected to the operating handles 212 and 213 of the valves and move the operator handles downwardly to open the valves when the solenoids are connected across a source of electric current.

The inlet 216 of the tank is closable by a header 217 whose lower portion 218 is threaded in the inlet. The external annular flange 220 of the header is engageable with a seal ring 221 disposed in an annular recess 222 of the inlet. The seal ring seals between the header and the inlet.

Gas under pressure is introduceable into the upper end of the tank above the chemical through a filler pipe 224 threaded, in one end of a transverse passage 225 of the header. The filler pipe may have a suitable check valve therein which prevents outward flow of gas through the filler pipe and its outer end may be also closed by a cap 226 threaded thereon. A vertical passage 228 of the header provides communication between the transverse passage and the lower end of the header.

A bleeder valve 229 has a stationary member 230 threaded in the other end of the transverse passage and a valve member 231 rotatably secured to the stationary member 232. Rotation of the valve member opens the bleeder valve to permit slow escape of the gas from the tank to the exterior. The header also has a suitable passage which opens to the transverse passage in which is threaded the inlet end 233 of a pressure gauge 234.

It will be apparent that the tank is charged by first removing the header and introducing the powdered chemical into the tank through the tank inlet 216 until a proper amount, which does not completely fill the tank, has been placed in the tank. The header is then threaded into the tank inlet 216. An inert gas, such as nitrogen, is then introduced from a suitable source under pressure through the filler pipe 224 until a proper pressure is obtained within the tank, for example between 160 and 220 pounds per square inch. The protective cap 226 may then be secured to the filler pipe.

The pipes 210 and 211 may extend to widely separated locations, for example to two different hoods over two different cooking apparatuses and the solenoids which control the operation of their valves are controlled by separate fire detectors 236 and 237. The detectors may be of any suitable type, for example each may have a movable contact MC which if the temperature of the location of the detector exceeds a predetermined value moves to engage the stationary contact SC thereof. The solenoid 210 is connectable across an input circuit or source of electric current 240 through the conductors 241, 242 and 243, the detector 236, and the conductor 244. An alarm buzzer 246 is connected across the solenoid 210 by the conductors 242, 241, 248, 249 and 243, so that not only will the solenoid 211 be energized to open the valve 204, and an audible alarm will also be given when the detector 236 closes. The solenoid 210 may also be connected across the input circuit by a manually operable switch 251 which when closed connects the solenoid across the input circuit through the conductors 241, 242, 243, 253, 254 and 244.

Similarly, the solenoid 211 is connectable across the input circuit through the conductors 241, 256, 257, and 258, the detector 237 and the conductors 259 and 244. A buzzer 260 is connected across the solenoid 211 by the conductors 241, 261, 262 and 257. The solenoid 211 may also be connected across the input circuit by a switch 264 and the conductors 241, 256, 257, 258, 265 and 244.

It will be apparent that one of the pipes 206 may extend into a hood and have connected to its end in the hood a yoke, such as the yoke 80, or other means for discharging the chemical into the hood and into the stack thereof, and that the pipe 207 may similarly extend to another hood and be provided with a similar yoke. The detectors would of course be placed in or adjacent the hoods so that if the fire occurred in the hood to which the pipe 206 extends, the detector 236 could close and the gas under pressure in the tank 201 would force the dry chemical through the ejection tube 202 and the pipe 206 for discharge into such hood and, conversely, if the fire occurred at the location of the hood to which the pipe 207 extends, the detector 237 would close and the chemical from the tank would be moved through the ejection tube 203 and the pipe 207 to such other hood. Alternatively, the pipe 206 and 207 could extend into a single hood, such as the hood 26, and have the yokes 80 and 80a connected thereto in the same manner as illustrated in FIGURE 1. In this case, only a single detector would be employed which would energize both solenoids on the occurrence of a fire at the location of the hood.

The discharge of the chemical through either the pipe 207 or the pipe 206 can of course also be caused by manually closing either the switch 251 or the switch 264.

It will now be seen that a new and improved fire extinguishing apparatus has been illustrated and described which includes a tank for holding a charge of fire extinguishing chemical and having a plurality of ejection tubes extending therethrough through which the chemical may be ejected from the tank and be conveyed through suitable pipes or conduit means connected to such ejection tube to suitable discharge means.

It will further be seen that the apparatus is provided with check valves at the location of discharge means to prevent flow of moisture into such conduit means.

It will further be seen that such check valves not only serve to prevent the reverse flow of fluid into the pipes but also serve as a means for comminuting or breaking up agglomerations of the chemical as it passes there-through into fine powder particles.

It will further be seen that the chemical may be ejected simultaneously through two or more of the ejection tubes in a tank or selectively through one or the other thereof depending on the desired installation.

It will further be seen that the chemical may be moved either by gas stored under pressure in a tank separate from the chemical or stored in the same tank as the chemical.

It will further be seen that by the use of a plurality of ejection tubes in the chemical tank the contents of a tank may be transported to different spaced locations and discharged over large areas.

It will further be seen that a new and improved tank for a fire extinguishing chemical has been illustrated and described which has a pair of ejection tubes which extend convergently downwardly to locations adjacent the bottom of the tank through which the chemical may be ejected from the tank and to a location of use through conduit means secured to the upper ends in communication with the upper end of the ejection tubes.

It will further be seen that the tank may also include a gas injection tube which extends substantially the length of the tank through which gas under high pressure may be injected into the top end of the tank.

It will further be seen that the gas injection tube may have a plurality of vertically spaced ports through which the gas may escape into the tank at locations spaced be-

low the top end of the tank for agitating the chemical at the time it is being ejected from the tank.

The foregoing description of the invention is explanatory only, and changes in the details of the construction illustrated may be made by those skilled in the art, within the scope of the appended claims, without departing from the spirit of the invention.

What is claimed and desired to be secured by Letters Patent is:

1. A fire extinguishing apparatus including a tank for holding a fire extinguishing agent having a plurality of ejection tubes extending therethrough and opening to the tank adjacent the bottom thereof and an inlet means; a plurality of discharge means remote from said tank for dispersing a fire extinguishing agent from said tank over structures to be protected from fire; separate conduit means extending from each of said ejection tubes to separate ones of said discharge means whereby a fire extinguishing agent in the tank may be ejected through said ejection tubes and said conduit means to said discharge means by fluid pressure introducible into the tank through said inlet means above the fire extinguishing agent; and separate valve means connected in said first and second conduit means immediately upstream of each of said discharge means for permitting fluid flow through said conduit means to said discharge means and preventing fluid flow from said discharge means into said conduit means.

2. The apparatus of claim 1, wherein the fire extinguishing agent in said tank is in powder form and each of said valve means provides a passage having an upstream portion of restricted orifice and a downstream portion of enlarged orifice for inducing turbulence in the fire extinguishing agent as it flows therethrough to cause comminution of agglomerations of the agent into fine powder particles prior to their discharge by the discharge means.

3. For use in a fire extinguishing apparatus: a tank for storing a fire extinguishing chemical; inlet means for introducing an inert gas under pressure to said tank above the chemical contained in the tank; and a plurality of ejection tubes through which the chemical may be ejected from the tank to separate locations of use, said ejection tubes opening to the tank adjacent the bottom of the tank, said ejection tubes extending convergently downwardly from spaced locations at the top portion of the tank, said inlet means including a gas injection tube extending upwardly through said tank and opening to the interior of the tank adjacent its top.

4. The device of claim 3, wherein said gas injection tube has a reduced orifice adjacent its top end and a plurality of longitudinally spaced lateral ports, and closure means yieldably closing said lateral ports.

5. The device of claim 4, and a tank of inert gas under pressure, conduit means connecting said gas ejection tube to said tank of inert gas, and valve means operatively associated with said conduit means for controlling flow of gas through said conduit means.

6. The device of claim 5 and fire detector means operatively associated with said valve means for opening said valve means upon the occurrence of a fire.

7. The device of claim 5, wherein said tank for storing a chemical is mounted above said tank of inert gas.

8. A fire extinguishing apparatus including: a first tank for storing a fire extinguishing chemical in powder form; first and second ejection tubes extending downwardly through said first tank and opening to the tank adjacent the bottom thereof; a plurality of discharge means located remote from said tank; first and second conduit means connected to upper ends of and extending from said first and second ejection tubes; respectively, to separate ones of said discharge means; a second tank of inert gas under pressure; third conduit means connecting said tanks for permitting flow of gas from said second tank to said first tank to cause ejection of a fire extinguishing chemical from said first tank through said ejection tubes, said first and second conduit means and said discharge means; and valve means operatively associated with said third conduit means for controlling flow of gas through said third conduit means from said second tank to said first tank.

9. The fire extinguishing apparatus of claim 8, wherein said first tank is mounted above said second tank.

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