United States Patent

Utesch, Jr.

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[54] FIRE CONTROL APPARATUS

[72] Inventor: **George A. Utesch, Jr.**, Chicago, Ill.

[73] Assignee: **General Fire Extinguishers Corporation**

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[52] **U.S. Cl.** **169/2**, 169/5, 169/19

[51] **Int. Cl.** **A62c 3/00**

[58] **Field of Search** 169/1, 2, 5, 9, 11, 19, 20, 169/26; 137/68, 71

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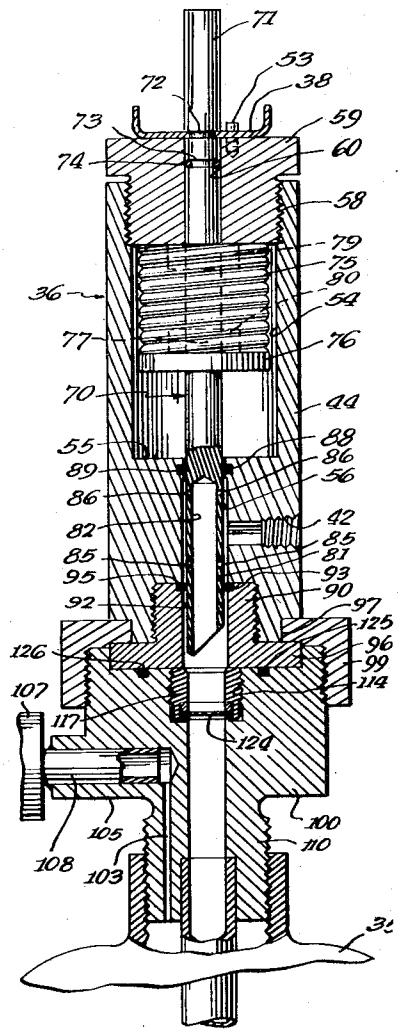
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Primary Examiner—M. Henson Wood, Jr.
Assistant Examiner—Edwin D. Grant
Attorney—Hofgren, Wegner, Allen, Stellman & McCord

[57] **ABSTRACT**

A fire control apparatus is provided particularly for use in areas where food is prepared using fats or greases. The apparatus automatically activates upon the presence of flame or excessive heat in a control zone whereupon high-volume extinguishant is flooded rapidly over the zone to extinguish the flame and rapidly reduce the heat. After a predetermined time interval or after a predetermined volume of extinguishant has been discharged, the rate of flow of extinguishant from the same source will be automatically reduced a substantial amount and will continue to be discharged over the zone for a relatively long period of time to prevent new flames from developing and to further reduce the amount of heat in the zone to below the flame autoignition point.

11 Claims, 9 Drawing Figures



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SHEET 1 OF 3

Fig. 1

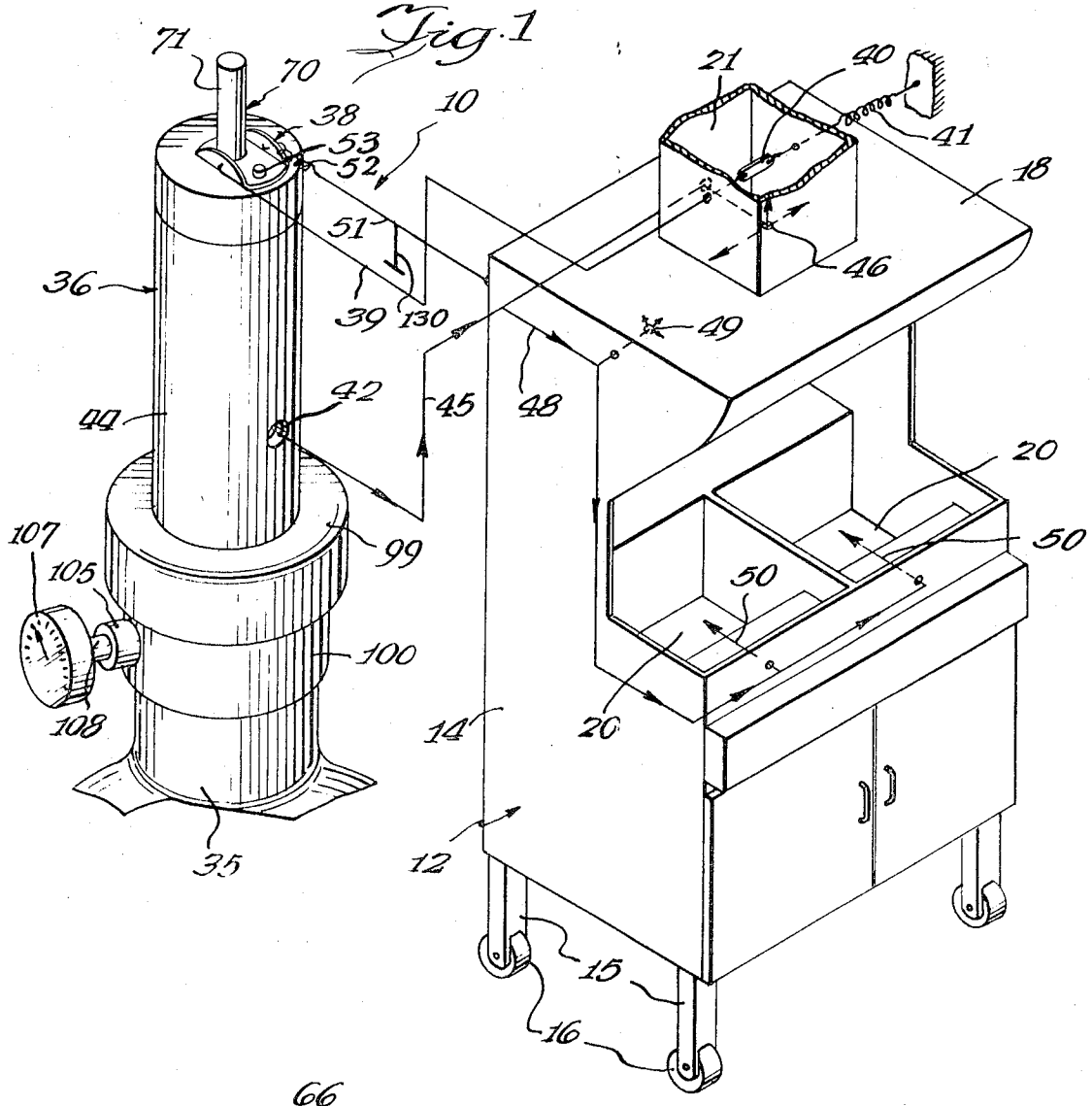


Fig. 2

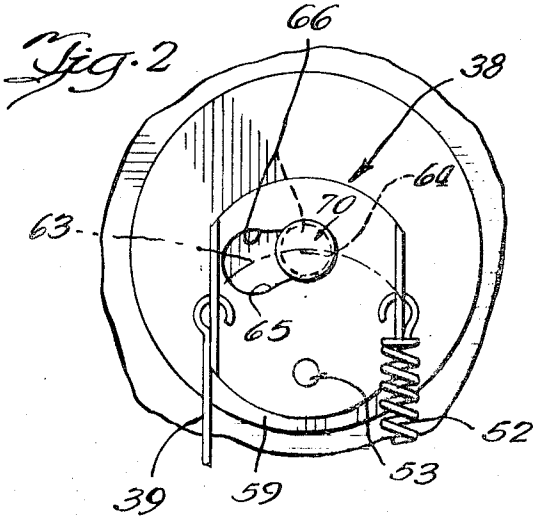
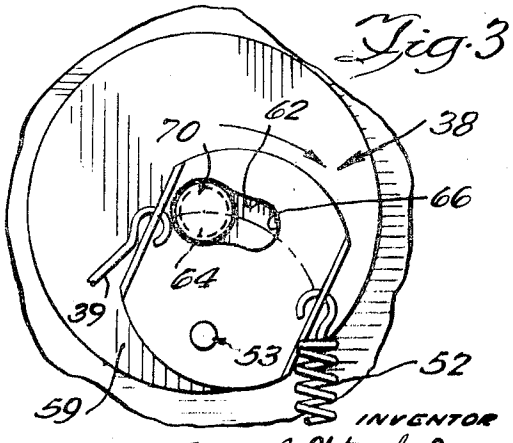


Fig. 3



INVENTOR
George A. Utesch, Jr.

BY Hofgren, Wagner, Green, Lallman & McCord
ATTORNEYS

Fig. 4

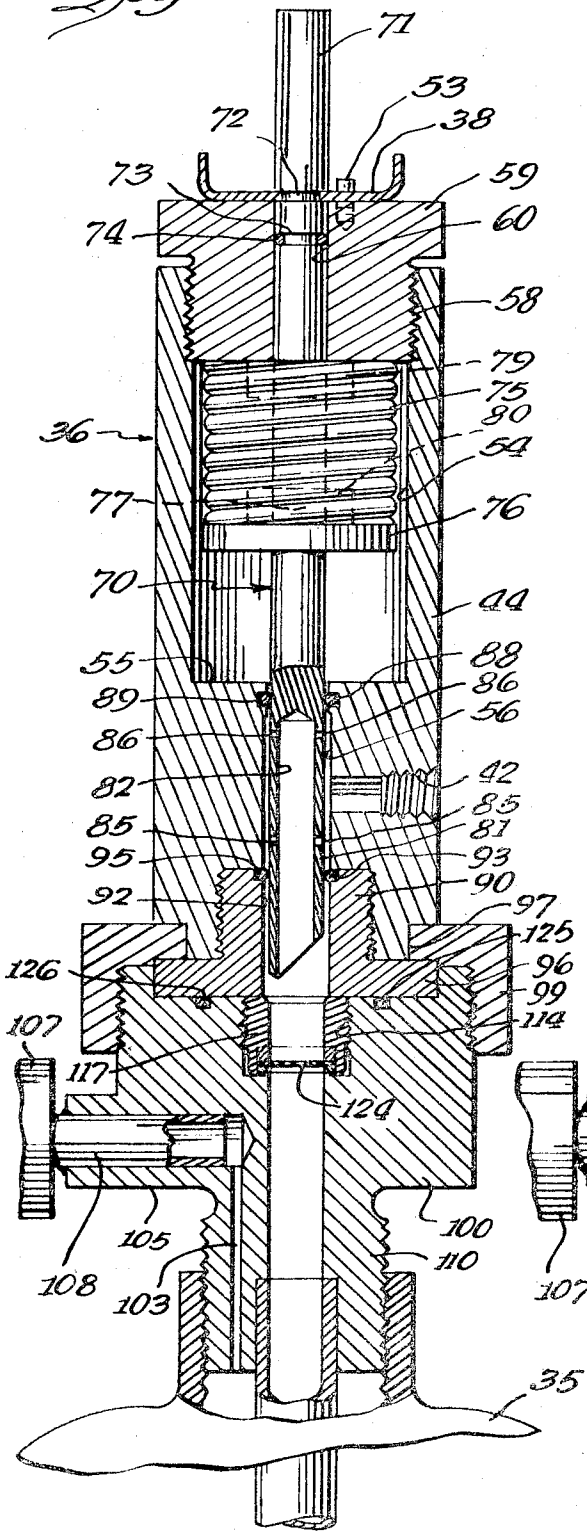
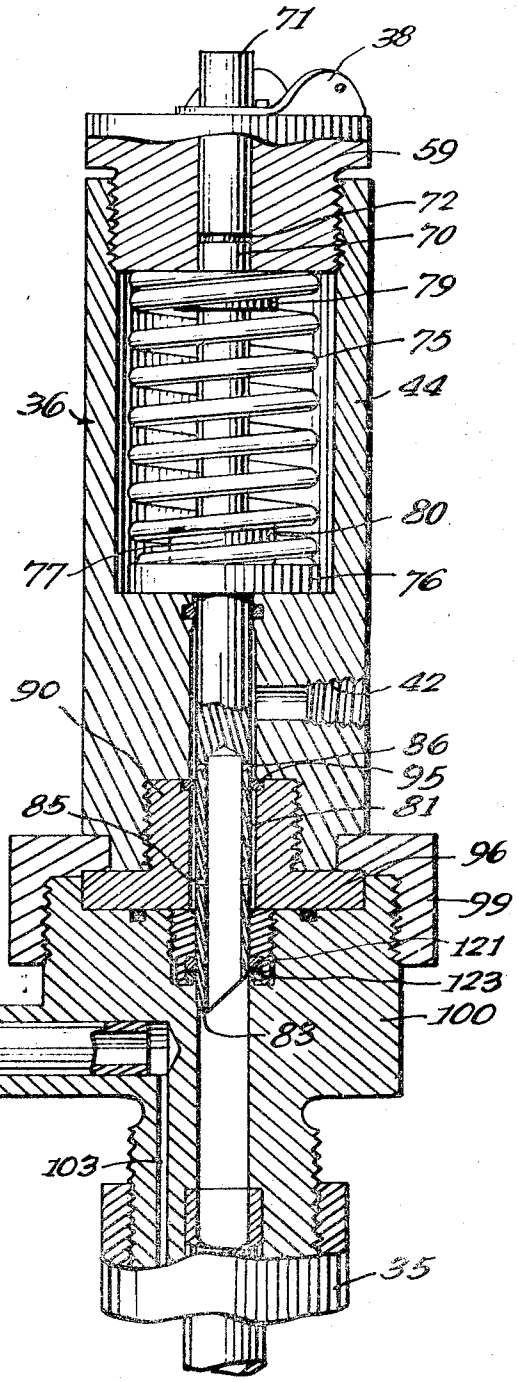

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Fig. 5


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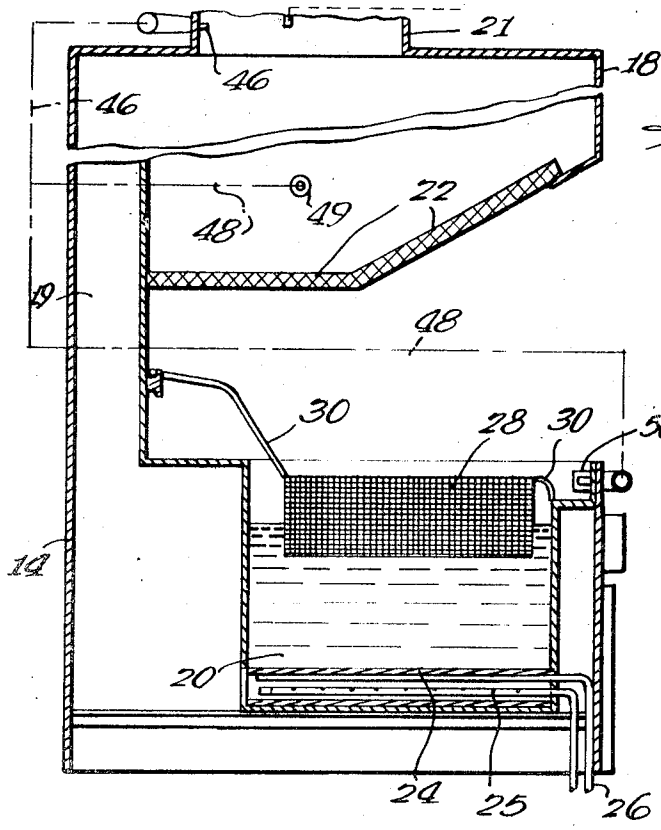


Fig. 6

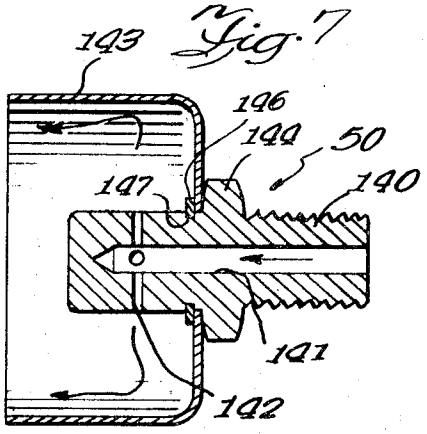


Fig. 7

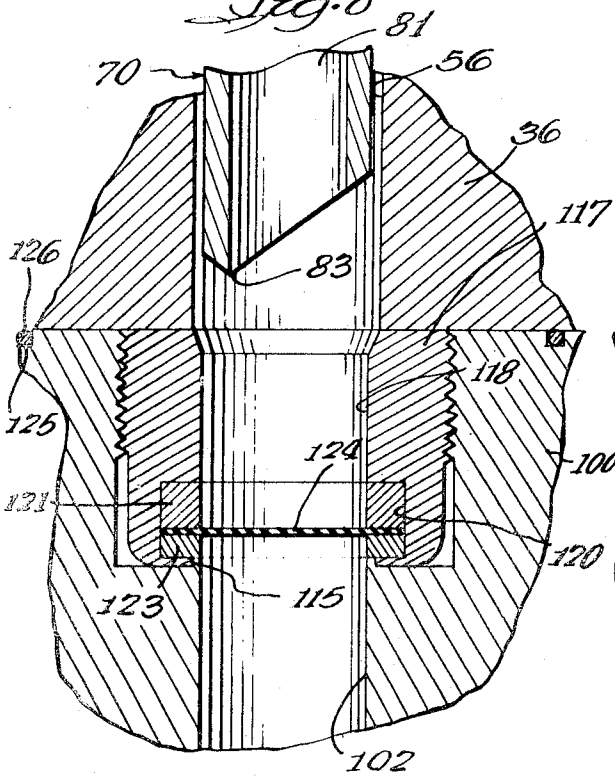


Fig. 8

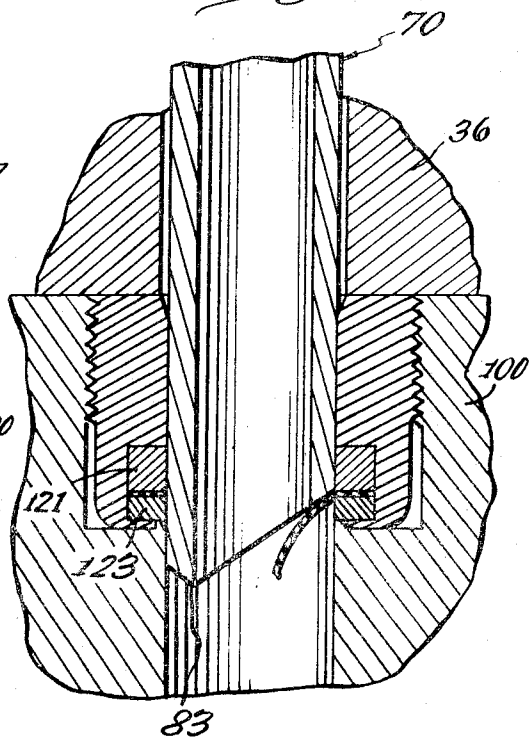


Fig. 9

FIRE CONTROL APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to fire control apparatus and more particularly to a valve and nozzle for use in the control of fires in areas where food is prepared by the use of fats or grease.

2. Description of the Prior Art

In fire control, one of the hardest fires to put out and to keep out is a fire that develops in and around areas where considerable amounts of fat or grease are used in food preparation. This is particularly true in the equipment known as "deep fryers" where potatoes, fish and other foodstuffs are immersed in a vat of fat or grease which is generally maintained at temperatures around 300° to 400° F.

Temperature controls are provided so that if the temperature of the material in the vat exceeds a predetermined amount, the heat source for the vat is shut off. Occasionally, the controls fail and the temperature continues to rise until the autoignition point is reached.

Another source of fire around a cooking area is created by the accumulation of grease and fat in the hood or exhaust duct area above the appliance where, when sufficient grease or fat has accumulated and the temperature rises above the autoignition point, a fire can develop from burning the fats or greases.

It has generally not been too difficult to put out the flame of either a vat fire or a hood and exhaust duct fire, but it has been difficult to keep the fire out because the flame will raise the temperature to around 800° F. so that, even though the flame is momentarily extinguished, the grease will immediately reignite as long as the temperature is above the autoignition point.

In current use there are two systems operating on different principles for controlling the reignition of the flames. The first is to blanket the grease and fat area with powder to smother the flame and prevent reignition. The second approach is to cool the grease and fat of the surrounding area by an agent that has a cooling effect.

Of the two alternative systems on the market today, the first system, wherein powder is mixed with a propellant such as CO_2 and is spread as a blanket over the affected area, has the principal disadvantage that the equipment has to be carefully watched until it cools down below the autoignition point and then has to be completely cleaned before it can be reused. This means discarding large amounts of usable fats and/or grease and the like.

The second currently used system employs two cylinders of carbon dioxide (CO_2) separately piped to the cooking area, wherein the first cylinder applies the CO_2 at a fast rate to extinguish the flame and then the second cylinder is activated to propel CO_2 at a slow rate over the grease to cool the grease below the autoignition point. Carbon dioxide by its nature requires large volumes of material in order to effectively control the more common fires in deep-fry units and the like.

SUMMARY OF THE INVENTION

In my invention, I provide an apparatus whereby—using a single container of extinguishant and a specially designed valve arrangement—I am able to control the flame and cool the area effectively, i.e., a member appropriately located in the apparatus detects the presence of excessive heat or of a flame and automatically operates the valve for releasing large volumes of extinguishant into at least one of several areas for readily extinguishing any flame that may be present. The valve is designed to then automatically reduce the rate of flow of extinguishant from the supply cylinder or container and to continue to flow at a reduced volume over the affected area for a considerable period of time, thereby cooling the area well below the autoignition point. At least one form of extinguishant contemplated to be used is nontoxic and, therefore, will not contaminate the area. It is possible therefore to return the equipment to service without discarding the fats or greases being used.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a deep-fry piece of equipment with a schematic showing the location of the improved fire control apparatus thereon;

FIGS. 2 and 3 are top plan views of two positions of a cam release mechanism of the invention;

FIg. 4 is a cross-sectional view taken along a plane passing vertically through the valve, showing the valve in cocked position;

FIG. 5 is a cross-sectional view similar to FIG. 4 showing the valve in the initial operating position;

FIG. 6 is a cross-sectional schematic view taken along a vertical plane of FIG. 1 showing the relationship of various elements of the fire control apparatus;

FIG. 7 is an enlarged cross-sectional view of one of the improved fire control nozzle arrangements;

FIG. 8 is an enlarged cross-sectional view showing the puncturing member of the valve in the cocked position, and

FIG. 9 is an enlarged cross-sectional view similar to FIG. 8, only showing the valve puncturing member in puncturing position.

Referring now to the drawings, there is shown in FIGS. 1 and 6 a fire control apparatus 10 of the instant invention as applied to a piece of commercial deep-fry equipment 12 of the type in common use in restaurants offering fried foods, such as French-fried potatoes, fried shrimp, fried fish and the like. It is intended that the fire control apparatus, method or system could be applied to other pieces of equipment where an initial high-volume, short-duration blast of extinguishant is required followed immediately by a lower volume but considerably longer duration flow of extinguishant, first to extinguish the flame and then to lower the temperature of burnable materials and the surrounding equipment.

The illustrated deep-fry equipment 12 is composed of a stainless steel or porcelain body 14 having legs 15 and casters 16 upon which the equipment can be moved if desired. Doors 17 are provided on the front of the body 14 for storage of cooking implements (not shown). A vent portion 19 extends upwardly from the rear of the body 14 and has a hood 18 projecting forwardly in overhanging but vertically spaced relationship to a pair of open vats 20 formed in the body 14. A stack or exhaust duct 21 communicates with the inside of the hood 18 and is connected to an exhaust system for the restaurant. The hood 18 is provided with removable screens or filters 22 which are intended to filter the fumes and vapors and to collect droplets of fat or grease that are carried upward from the hot fat or grease in the vats 20 as is well known in the food preparation art.

As best shown in FIG. 6, the vats 20 have ducts 24 passing through the lower portion thereof in which an appropriate heat source 25 is positioned to supply heat to the vats 20 for maintaining the fat or grease in the vat at a predetermined cooking temperature. In the illustrated form, the heat source 25 is a flame fed by a gas source through pipes 26 with the exhaust gases and products of combustion going through the ducts 24, vent portion 19 into the hood 18 and up the stack 21. The source of heat could be an electric unit or any other compatible system. An appropriate set of controls and thermostats are provided in the vat 20 and in the piping 26 whereby the desired temperature of the fat or grease can be set and automatically maintained. In normal use of the equipment, the vat 20 is filled to the correct level with fat or grease and by mans of the heat source 25 it is heated to the desired temperature. The potatoes or other food to be deep fried are placed in a basket 28 which is suspended in the hot fat or grease by means of appropriate suspension means 30. The vapors and odors from the cooking are drawn up through the filter 22 and on up the stack, by action of an exhaust fan.

Occasionally, due to a faulty heat control or thermostat or due to improper or poor maintenance of the equipment or due to inexperienced operating personnel, the cooking temperatures become elevated to a point that flames will autoignite either from the vat, in the hood or in the stack. The flame will

immediately raise the temperature of the fat or grease in the vat, hood and stack to a point that even though the flame is momentarily extinguished, it will immediately reautoignite into flame again. Therefore, to effectively bring the fire under control not only must the flame be extinguished but also the surrounding area must be cooled to below the autoignition point of the fats or greases. The invention is directed to a novel valve and nozzle in a fire control apparatus whereby the flame is extinguished and the temperature of the affected area is reduced to prevent reatuoignition of the flame.

As shown schematically in FIGS. 1 and 6, the fire control apparatus is comprised of a cylinder 35 containing an appropriate extinguishant under pressure. The cylinder 35 is held in a bracket on the sides or back of the body 14 or can be nested in a frame on the top of the hood 18. The exact location is primarily a matter of servicing convenience. The only requirement is that it be fixed relative to the stack or exhaust duct 21. The fire extinguisher head assembly 36 is removably connected to the cylinder 35, as will be described hereinafter, and has a release cam 38 pivotally mounted thereon which is connected by a cable 39 to a fusible link 40 resiliently positioned in the stack or exhaust duct 21 by a spring 41. Flame or excessive heat in the stack or exhaust duct 21 will melt the link 40 releasing the cable 39 and release cam 38 to actuate the fire extinguisher and head assembly 36 as will be described in detail hereinafter.

The head assembly 36 has an outlet 42 in the wall of the discharge valve body 44 through which outlet 42 extinguishant will flow. Appropriate piping 45 connects outlet 42 with a nozzle 46 in the stack or exhaust duct 21. The piping 45 has a branch 48 which connects in one portion through body 14 to a nozzle 49 in the hood 18 above filters 22 therein and in another portion to a pair of nozzles 50 projecting into the area above the fat or grease in the vats 20. A cable 51 is connected to a spring 52 which in turn is connected to the release cam 38 for pivoting the cam 38 in a clockwise direction about a pivot 53. The spring 52 is not as strong as spring 41 so that spring 41 overcomes the loading of spring 52. The cable 51 and spring 52 are used to release the cam 38 when the frangible link 40 disintegrates due to a fire in the equipment.

The head assembly 36 as shown in FIGS. 4 and 5 has the discharge valve body 44 bored or recessed at 54, which bore extends from one end thereof throughout a major portion of the length of the body and terminates in a shoulder 55 through which shoulder an aperture 56 extends axially the remaining length of the body. The mouth of the recess 54 is internally threaded at 58 into which is screwed a valve cap 59 which is apertured at 60 in axial alignment with aperture 56 in the body 44. The pivot pin 53 for the release cam 38 is seated in the external end face of the cap 59 about which pin the release cam 38 pivots. The cam 38 has an arcuately shaped keyhole slot 62 therethrough (FIGS. 2, 3) with the centers 63, 64 respectively, of the large diameter end portion 65 and the small diameter end portion 66 lying on the same circle, which circle is centered at the center of the pivot pin 53. The circle through the centers 63, 64 of the keyhole slot 62 also passes through the center of the aperture 60 in the valve cap 59.

An elongate valve stem 70 is slidably mounted in the aligned apertures 60 and 56 in the cap 59 and valve body 44, respectively, with one end portion 71 extending upwardly beyond the cap 59 and in which portion 71 is formed a pair of axially spaced annular grooves or recesses 72, 73. An O-ring 74 is seated in recess 73 for sealing the stem 70 with the cap 59. Within the valve body 44 and surrounding the valve stem 70 is a compression spring 75 which is retained between the valve cap 59 and a valve retaining collar 76 by means of a collar drive pin 77 passing through the collar 76 and the valve stem 70. The cap 59 has a spring centering member 79 fixed on the inner surface thereof such that the spring 75 will be centered with respect to the valve stem 70 by the combined action of said member 79 and the stepped down shelf 80 on the retaining collar 76.

The lower end portion 81 of the valve stem 70 is hollowed or tapped as at 82 with the end severed at an angle and dressed to form a puncturing point 83. At appropriate locations along the length of said end portion 81 is formed at least two pairs of axially spaced-apart outlet openings 85, 86. Each pair of openings will preferably consist of one opening in one side and another opening diametrically opposite thereto but variations therefrom have been found to work successfully. In the wall of the opening 56 of the valve body 44 is an annular recess 88 in which is seated an O-ring 89 which is adapted to provide a seal between the valve stem 70 and the valve body 44. The recess 88 and O-ring 89 are located between the outlet 42 of the valve body 44 and the recess 54 in which the spring 75 is located to prevent extinguishant from leaking into said cavity 54 and to prevent loss of pressure in the system.

The valve stem 70 with the spring 75 trapped between the valve cap 59 and the retaining collar 76 is assembled with the valve body 44 by threading the end portion 81 with the puncture point 83 through the opening 56 so that the threaded cap 59 can be drawn down tight in the valve body. An orifice shut off bushing 90 has an aperture 92 through the center thereof which aperture has a recess forming a shoulder 93 at the inner end thereof on which shoulder 93 an O-ring or gasket 95 is nested. The bushing 90 is inserted in the threaded lower end of the valve body 44 with the puncture point 83 on the lower end portion 81 of the valve stem passing into the aperture 92. The O-ring or gasket 95 sealingly engages the outer surface of the valve stem 70 as the bushing is threaded into nested relation in the valve body. With the bushing 90 drawn up tight the gasket 95 will form a pressure seal between the valve body and the valve stem.

Trapped between a flange 96 on the bushing 90 and the walls of a recess 97 formed in the one edge of valve body 44 is the discharge valve retaining collar 99. The fit between the collar 99 and the valve body 44 will permit the collar to turn relative to the valve body. The collar 99 has an opening through its center for accommodating passage of the valve body 44 and it internally threaded in its cylindrical portion for attachment to the refillable cylinder or tank 35 of extinguishant.

Carried on the cylinder or tank 35 is a storage cylinder valve head 100 which is axially bored at 102. A bore 103 is disposed parallel to the axial bore 102 and intersects with a bore 104 in a threaded hub 105 projecting from the sidewall of said head 100. A standard pressure gauge 107 with a threaded stub 108 is threaded into the bore of hub 105 so that when the threaded nipple 110 on the valve head 100 is screwed into the cylinder or tank 35, the pressure in the cylinder will be recorded on the gauge 107. The valve head 100 has a syphon tube 112 connected in the nipple 110 and projects down into the interior of the cylinder or tank 35 in the usual manner for the most efficient method of discharging the extinguishant from the cylinder.

An oversized bore 114 is concentrically formed with respect to the bore 102 in the valve head 100. The bore 114 is threaded and has a valve seat 115 formed in the base of the bore around the edge of the bore 102. A rupture disc housing 117 has an opening 118 through the center thereof and is threaded on its outer surface. The one end portion of the opening 118 in the housing 117 is enlarged as at 120 for receiving a pair of washers 121, 123 between which is sandwiched a rupture disc 124. With the washers and disc 124 seated therein, the housing 117 is threaded into the bore 114 in the valve head 100 so that the washer 123 seats on the valve seat 115 for pressure sealing the rupture disc housing 117 to the valve head 100.

In the system, the cylinder or tank 35 is to be filled and sealed with the just described valve head 100 and rupture disk 124. The top wall of the valve head 100 has a circular recess 125 formed therein in which an O-ring or gasket 126 is nested which serves as a seal between the valve head 100 and the head assembly 36 when the two are assembled.

With a fire control system installed on a deep fry piece of equipment, the valve head assembly **36** is held firmly in a housing or bracket either on the piece of equipment to be fire protected or close to it. The valve head assembly **36** which includes principally the valve body **44**, valve stem **70**, spring **75**, collar **76**, cap **59** and release cam **38** is cocked or loaded by manually or mechanically pulling the valve stem **70** upward out of the cap **59** until the recess **72** is aligned with the release cam **38** whereupon the release cam **38** is pivoted until the edges of the small diameter end portion **66** of the keyhole slot **62** nest in the recess **72**. Release of the valve stem **70** will permit the coiled spring **75** to urge the top wall of the recess **72** against the release cam **38** to hold the valve system in the cocked position. The cable **39** extends from the release cam **38** through one wall of the stack or exhaust duct **21** and is connected to one side of the frangible link **40**. The other side of the frangible link **40** is connected through the wall of the stack **21** to a spring **41** which is anchored to a fixed member. The cable **39** is resiliently connected to the release cam **38**. The cam release spring **52** is connected at one end to a fixed point through the cable **51** and is stretched and connected at its other end to the release cam **38**. The cable **39**, frangible link **40** and spring **41** are loaded sufficiently to hold the release cam **38** against the tension of spring **52**, with the wall **66** of the slot in the cam **38** nesting in the recess **72** in the valve stem **70** as shown in FIG. **2** which is the cocked position of the mechanism shown in FIG. **4**. The spring **52** is loaded and attempts to pull the release cam **38** in a clockwise direction to the position of FIG. **3** against the higher loading of spring **41** in cable **39**. A hand release **130** is connected to the cable **51** and hangs in a position where it can be quickly grabbed and pulled to overcome the tension of the spring **41** to pivot the release cam **38**, thereby releasing the valve stem **70** and actuating the system.

The valve head assembly **36** is connected to a charged cylinder **35** by threading the collar **99** of the assembly **36** onto the storage cylinder valve head **100**. The gasket **126** is compressed between the head assembly **36** and the storage valve head **100** to effect a pressure seal therebetween.

It will be noted that the puncture point of the valve stem **70** is spaced from the rupture disc **124** as shown in FIG. **5**.

The piping **45** from the outlet **42** of the valve head assembly **36** connects through piping **48** to the nozzles **46**, **49** and **50**. As illustrated in FIG. **7**, the nozzle **50**—which can be the same as nozzles **46** and **49**—is of a novel design and includes a nipple **140** which is blind bored as at **141** with branch bores **142** radiating at right angles outwardly therefrom. A deflector hood or cup **143** is trapped between the enlarged integral nut **144** and a snapring **146** seated in a groove **147** in said nipple **140**. The deflector hood **143** has cylindrical sidewall **149** spaced outwardly and in overlapping relationship with respect to the bores **142**. The extinguishant from the cylinder is propelled from the bores **142**, strikes the wall **149** of the hood **143** and is deflected horizontally in a scrambled random pattern as a blanket onto the fat or grease in the vat **20**. It is important to get the extinguishant out of the nozzle fast but not so fast as to create excessive turbulence which can spread the flame to other surrounding areas. The hood **143** lays the extinguishant down as a blanket over the fire to extinguish the flame and cool the area. When the nozzle **50** is used in the hood or stack, the extinguishant flows over and around the inside of the hood **18** and screen **22** and into the stack or exhaust port **21**. The nozzle **50** causes the extinguishant to engulf the affected areas so as to extinguish the flames and cool the equipment. The nozzle **50** is shown located on the front of the vat nearest the station occupied by an attendant so that the blast of extinguishant takes the flame away from the station as it extinguishes the flames and cools the equipment.

In operation, when a flame autoignites from the deep fry equipment, it will immediately ignite any grease condensed in the hood or stack, rapidly raising the temperature of all affected areas. The frangible link **40** in the stack will disintegrate, releasing the cable **39** whereupon the spring **52** pivots the release cam **38** disengaging the small end **66** of the keyhole slot **62** from the recess **72** in the valve stem. The compressed spring **75** will drive the valve stem **70** through the enlarged end **65** of the keyhole slot **62** and puncture the rupture disc **124** with the piercing point **83**. The pressure of the extinguishant in the cylinder or tank **35** will force the extinguishant up the bore **102**, into the end of the hollow portion **81** of the valve stem **70** and drive the valve stem back up through the valve body **44** to recompress the spring **75**. The extinguishant will rapidly flow through both pairs of openings **85**, **86** and out the orifice **42** through the piping **45** to the nozzles **46**, **49** and **50**. After a short period of time of high-volume flow of extinguishant, the pressure in the cylinder or tank **35** will drop a sufficient amount that the pressure of the spring **75** will overcome the pressure in the tank and the valve stem **70** will be forced down by the spring **75** until the ports or openings **85** pass below the O-ring or gasket **95** which will shut off the flow of extinguishant from said ports **85**. The result of shutting off ports **85** will be to cut in half the flow rate of extinguishant which when coupled with the reduction in pressure in the cylinder **35** will reduce the flow of extinguishant from the orifice **42** to about one-half of the original flow rate. At the reduced rate of discharge the extinguishant will continue to flow for a considerable period of time until the cylinder **35** is exhausted.

The purpose of the high volume, short duration—low-volume, long-duration sequence of discharge of extinguishant is to make it possible to properly control fires of the type described hereinbefore. That is, the initial high volume blast of extinguishant flooding the vat, the hood area and the stack quickly puts out the flame. However, if at that point the extinguishant ceased flowing, the flame would reignite since the temperatures of the fat, grease and surrounding surfaces are usually well above the autoignition point. By automatically changing the flow rate to a substantially reduced amount and continuing at that reduced rate, the extinguishant acts as a coolant and lowers the temperature of the fat, grease and surrounding area so that after the passage of a predetermined period of lower volume discharge the possibility of further autoignition is eliminated.

The deep fry equipment can be cleaned up, a new frangible link **40** installed, the valve head assembly **36** recocked and a new cylinder **35** assembled thereto ready for an immediate return of the equipment to service.

A specific operative system that has been successfully used will now be described. That is, a fire control system for protection of a specific piece of deep-frying cooking equipment utilized a cylinder **35** holding approximately 20 pounds of Freon 1301 (a commercially available extinguishant) pressurized with nitrogen. The pairs of ports **85** and **86** in the valve stem **70** were designed to emit a part of the Freon 1301 in an initial blast. This initial blast was a high-volume, short-duration blast of extinguishant sufficient to extinguish the flames of a fire. The valve automatically cuts one pair of ports **85** out of the system and continues to discharge the extinguishant at a substantially reduced rate whereby the remaining Freon 1301 is discharged over an extended period of time until the cylinder is exhausted. This slower but continuous flow of extinguishant cools the equipment to below the autoignition point.

Typical deep fry equipment cooks at between 300° F. and 400° F. Failure of a control will permit the temperature to go up until at around 640° F. the fat or grease can autoignite into flame. The flames generate temperatures of around 800° F. such that when the initial blast of extinguishant floods the area, the flame is extinguished, but the surrounding temperatures can still be well above the autoignition temperature. The reduced flow rate over the longer period of time cools the surrounding area to a safe temperature well below the autoignition temperature.

The manner that Freon 1301 operates to extinguish a flame and to cool burning material is within the skill of a person in the art and will not be repeated here. Any other extinguishant having similar physical characteristics such as density, cooling capacity, heat absorption and the like is usable in the system.

By effectively controlling the fire before the temperatures reach or exceed 900° F., no decomposition takes place and since the Freon 1301 is nontoxic, it will not taint the cooking equipment. Accordingly, after a fire the equipment can be returned to service without extensive cleaning and reconditioning being required.

I claim:

1. A fire control apparatus for use in controlling a grease fire in cooking equipment having a heated open vat containing melted grease, comprising a pressurized tank of extinguishant, valve means carried by said tank for controlling the flow of extinguishant from said tank, means directing said flow of extinguishant from said valve means toward said vat, said valve means having a spring-loaded means having one end portion adapted to release the pressurized extinguishant from said tank, axially spaced ports associated with said one end portion of the spring-loaded means, means for releasing said spring-loaded means whereby said pressurized extinguishant is released, said pressurized extinguishant initially opening all of said ports associated with said spring-loaded means for maximum discharge of extinguishant and gradual decay of the pressure in said tank permitting said spring-loaded means to close some of said ports thereby reducing the rate of discharge of extinguishant.

2. In fire control apparatus as claimed in claim 1 wherein said spring-loaded means comprises a valve stem and wherein said one end portion thereof is hollow and has a puncture point for piercing a rupturable disc carried by said pressurized tank.

3. In fire control apparatus as claimed in claim 2 wherein said ports associated with said spring-loaded means comprise axially spaced openings communicating between said hollow portion of said valve stem and an outlet from said valve means.

4. In fire control apparatus as claimed in claim 3 wherein gasket means operate to seal the valve means to said valve stem so that movement of the valve stem from one position to another closes at least one of said ports in said valve stem.

5. In fire control apparatus as claimed in claim 1 wherein the other end portion of said valve stem extends beyond the valve means and is releasably engaged by said releasing means, and wherein said releasing means comprises a release cam engaging said valve stem whereupon movement of said release cam permits said valve stem to move to a position to release said extinguishant.

6. In fire control apparatus as claimed in claim 5 wherein said one end portion of the valve stem has a puncture point adapted to rupture a seal into the pressurized extinguishant.

7. A fire control apparatus for use in controlling a grease fire in cooking equipment having a heated open vat containing melted grease, comprising a pressurized tank of extinguishant, valve means carried by said tank for controlling the flow of extinguishant from said tank, means directing said flow of extinguishant from said valve means toward said vat, said valve means having a spring-loaded stem means operatively connected with respect to the vat such that a flame in the vicinity of the vat will release said stem means, said stem means having one end portion adapted to release the pressurized extinguishant upon movement of said stem means by said spring, said one end portion being hollow and having axially spaced ports communicating between the hollow inside of said stem means and an outlet port in said valve means whereby initial release of said pressurized extinguishant opens all of said ports in said stem means for maximum discharge of extinguishant toward the vat, gradual decay of the pressure in said tank permits said stem means to close at least one of said ports thereby reducing the rate of discharge of extinguishant towards said vat.

8. The fire control apparatus as claimed in claim 7, wherein said one end portion has a puncture point for penetrating a seal in said tank for releasing said extinguishant.

9. In a fire control apparatus as claimed in claim 7 wherein said means for directing said flow of extinguishant into said control zone comprises a nozzle with a central blind bore and radially projecting bores communicating therewith, means surrounding said nozzle in overlapping relationship with said radial bores for deflecting extinguishant issuing from said radial bores in a random fashion toward and over the surface of said control zone.

10. In an apparatus as claimed in claim 9, wherein said nozzle and overlapping means are horizontally directed for laying down a blanket of extinguishant over said control zone.

11. A fire control apparatus for use in controlling fire in a heated open vat containing melted grease, a hood overhanging said vat in vertically spaced relationship, a stack communicating with said hood for removing exhaust fumes and the like from said vat, and fire control means for controlling a fire in said vat comprising a pressurized cylinder of fire extinguishant, a rupturable disc sealing said extinguishant in said cylinder, means directing discharge from said cylinder over said vat into said hood and up said stack, a valve means controlling the flow of fluid from said cylinder into said discharge directing means, said valve means comprising a valve body, a valve stem slidably mounted in said valve body, spring means in said valve body urging said valve stem in an extended position toward said rupturable disc on said cylinder, said valve stem being hollow throughout a portion thereof, a puncturing point on said stem with an opening therethrough communicating with said hollow portion, axially spaced ports through the sides of said stem communicating with said hollow portion of the stem, a seal carried by said valve body and slidably engaging the outside of said stem, cocking means engaging said stem for holding said spring compressed and for holding said puncturing point spaced away from said rupturing disc, and means in said vat, hood or stack for releasing said cocking means upon detection of a fire therein, whereby upon release of said cocking means said spring will drive said point through said rupturable disc whereupon pressure in the hollow stem will recompress the spring and a large volume of extinguishant will be discharged through said ports and into said discharge directing means, upon release of sufficient pressure said stem will slowly move downward until at least one of said ports is closed thereby reducing the discharge proportionally.

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