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Description

This invention relates to safety curtain means such for example as smoke or fire curtains as might be used for partitioning areas in the event of fire to contain the fire or smoke from it.

Such curtains are normally held in a stowed condition, as by being wound up on a roller in the manner of window blinds, and deployed when necessary to an operative condition. The deployment might be under a bias, as for example a gravitational bias, with the bottom of a roller-mounted curtain being weighted. Such curtains are in known construction held in the stowed condition, for automatic release in the event of fire or smoke being detected, by an electrical arrangement, for example, electromagnetic clutch. This has the disadvantage that if electrical power to a building or area containing the curtain means is interrupted for any reason, the curtain means will deploy unless special measures are taken to maintain an emergency power supply to the electrical arrangement. Such special measures might comprise a local battery backup kept recharged from the mains supply. This is complicated and expensive and in any event requires an electric power supply to the arrangement and battery charge means to be permanently connected, even when the building or area is unsupervised, which gives rise to its own hazards.

US-A-3 687 185 discloses a safety curtain means deployable between a stowed condition and an operative condition and biased to deploy to the operative condition but held in the deployed condition by a latching mechanism which is held on by the pressure of CO₂ or other extinguishing gas so as to be released on release of that gas to extinguish a fire.

The invention provides safety curtain means which need not depend upon electric power for operation and which are thus less complicated, less expensive and less hazardous. The safety curtain means of the present invention make use of fluid pressure as in the US-A-3 687 185 arrangement, but do not depend upon the presence of a CO₂ or like extinguishing system and make further use of the fluid pressure.

The invention comprises safety curtain means deployable between stowed condition and operative condition and biased to deploy to operative condition, comprising fluid pressure operated, stowed condition holding means adapted to hold said curtain means in stowed condition and to release said curtain means on release of fluid pressure to be deployed to said operative condition under the bias, characterised by fluid pressure operated motor means adapted to deploy said curtain means to stowed condition.

Said stowed condition holding means may

comprise fluid pressure lock means in which a lock member biased to a release position is held in an operative position by fluid pressure. Such fluid pressure lock means may be resiliently biased to said release position.

Said lock means may comprise ratchet and pawl means or plate-type clutch or brake means, or a dog clutch or a pin engageable in a recess.

Said stowed condition holding means may comprise fluid motor means which may be operative to deploy safety curtain means to the stowed condition. Such motor means may also be operative to deploy the safety curtain means to the operative condition.

The fluid pressure operated means may be pneumatic.

One advantage of the use of pneumatic means is that safety curtain means are primarily used in conjunction with roof ventilators and these are in any event operated pneumatically, so that there is already a supply of pressure air. This may already be sufficient to cope with both roof ventilators and safety curtains, but it is in any event a simple matter to substitute a higher capacity air supply unit.

Said motor means may be rotary or linear, the latter for example comprising a piston-in-cylinder arrangement, which may be connected to the safety curtain means by a pulley arrangement. The piston-in-cylinder arrangement may be disposed vertically to one side of the safety curtain means or horizontally along the upper edge thereof.

The safety curtain means may comprise rate control means operative to control the rate of deployment of the safety curtain means to its operative position, such, for example, as a restriction controlling rate of pressure fluid release.

The said curtain means may be biased gravitationally to deploy to operative condition.

The safety curtain means may comprise heat-actuated fluid pressure release means, such, for example, as a bimetal strip or bellows-type valve arrangement or a fusible arrangement. One or more heat-actuated fluid pressure release means may be arranged in a fluid pressure supply line for said stowed condition holding means, which line is arranged to pass through a region in which a fire should trigger the deployment of the safety curtain means to its operative position.

Such heat-actuated fluid pressure release means may also be normally maintained closed by being maintained at elevated temperature by an electric current but opened to release fluid pressure holding the safety curtain means in its stowed condition on loss of current permitting the release means to cool to ambient. It may be arranged that the release means is maintained closed only within a restricted temperature band so that it releases

pressure in the event it cools through loss of heating current or reaches an excessive temperature because of a local fire. Such heat-actuated fluid release means may be useful in connection with the operation of other fire safety measures such as roof ventilators and sprinkler systems and may comprise an invention independent of safety curtain means.

The curtain means may be stowed on a roller.

The invention also comprises safety curtain means deployable between stowed condition and operative condition, having control means adapted automatically from time to time to deploy said curtain means as a routine check on and/or exercise of their operation.

If the safety curtain means are not called into operation, parts may seize or have their movement restricted by foreign bodies. Since safety curtains usually protect spaces which have periods (eg nighttime) when they are regularly not in use, it is possible to arrange, for example, a clock timer to deploy the curtain on a regular basis during such dead time. With a pneumatic operating system this can be combined with regular lubrication by introducing a lubricant mist.

Embodiments of safety curtain means according to the invention will now be described with reference to the accompanying drawings, in which :-

- Figure 1 is a side view with a diagrammatic illustration of a control arrangement;
- Figure 2 is a side view of a detail of one embodiment;
- Figure 3 is a front view of a detail of another embodiment;
- Figure 4 is a front view of a detail of a further embodiment;
- Figure 5 is a side view of a further embodiment;
- Figure 6 is a front elevation of another embodiment;
- Figure 7 is a front elevation of another embodiment;
- Figure 8 is a sectional elevation of a heat controlled pressure release valve; and
- Figure 9 is a plan view of a possible operating system.

The drawings illustrate safety curtain means 11 deployable between stowed condition (full line) and operative condition (broken line) and biased to deploy to operative condition and fluid pressure operated, stowed condition holding means 12 adapted to hold said curtain means 11 in stowed condition and to release said curtain means 11 on release of fluid pressure to be deployed to said operative condition under the bias.

Figures 2 and 3 illustrate stowed condition

holding means 12 comprising fluid pressure lock means in which a lock member 13 biased to a release position is held in an operative position by fluid pressure. Said lock member 13 is in each case resiliently biased to said release position by spring means 14.

The lock means illustrated in Figure 2 comprise ratchet 15 and pawl 16 means, the lock means also comprising a fluid pressure actuator 17 having a piston 18 biased by pressure spring 14, the pawl 16 being on the piston 18 rod.

The lock means illustrated in Figure 3 comprise fluid pressure actuated plate-type clutch or brake means 19 having caliper-type outer plates or pads 21 and an inner plate 22 gripped between the plates or pads 21 when fluid pressure is on piston-in-cylinder actuators 23.

Figure 4 illustrates lock means comprising a fluid pressure motor 31 which drives a gear box 32 and has pressure fluid connections 33 and manually operated valve means 34 to connect either one of said connections 33 to the pressure fluid supply and the other to exhaust or return whereby to drive the motor in either direction, and to disconnect both connections 33 from both exhaust or return and supply so as to hold the motor 31 against rotation, whereby it acts as a lock. The output shaft 35 from the gearbox 32 connects with a roller 36, as indeed do the ratchet 15 of Figure 2 and the inner plate 22 of the clutch or brake means 19 of Figure 3, on which the curtain means 11 are wound up.

The curtain means 11 are biased gravitationally to deploy to operative i.e. in this case, dropped position, from the stowed position in which the curtain means are wound up on the roller 36 which is situated in an enclosure 37 at or near roof level. The roller 36 is mounted on free running bearings (not shown) so as to offer no resistance, or substantially no resistance to motion under the influence of a weight 38 attached to the free end 39 of the curtain 11.

In addition to the valve means 34 of Figure 4, further valve means 39 are provided which are operable to release both connections 33 to atmosphere so as to release any holding force on the roller 36 and allow the curtain 11 to deploy when necessary. The release may be implemented by manually operating the valve means 39 or by connecting the valve means 39 for actuation by smoke or fire detector means 41 which may trigger an energising current to an electric valve actuator 42.

Figure 1 shows a rudimentary schematic operating arrangement in which a pressure fluid supply is maintained to said safety curtain means 11 from a compressor 43 or plenum or other supply of e.g. compressed air.

Figure 5 illustrates a different arrangement in

which the safety curtain 11 is not rolled up but rather is a bottom-weighted curtain of the pleated or folding type. In substitution for the motor 31 acting on the roller 36, it could act instead on wires or cords 51 which pass through each pleat or fold and which when pulled serve to haul up the entire curtain, pleat on pleat.

Clearly, also, so-called festoon-type curtains could be used.

Figures 6 and 7 illustrate a linear pneumatic motor arrangement comprising a piston-in-cylinder arrangement 61 connected to the safety curtain 11 by a pulley arrangement 62. In each case, the piston rod 61A is extended when the curtain 11 is lowered, as illustrated, and to raise the curtain, pressure is applied above the piston at a pressure air inlet 63 to drive the piston into the cylinder 61B.

The pulley arrangement 62 comprises a pulley 64 on the end of the piston rod 61A, fixed pulleys 65,66 and a winding drum 67 to which one end of a wire 68 is fixed, the other end being fixed near the pulley 65.

In Figure 6 the piston-in-cylinder arrangement 61 is located in vertical orientation to one side of the curtain 11, which runs in tracks 69. In Figure 7, the arrangement 61 is located horizontally, above the curtain 11.

When pressure on the piston is released, the air therein escapes allowing the piston to extend out of the cylinder 61B and the curtain 11 drops under the weight 38.

The rate of fall of the curtain 11 when pressure is released can be controlled by a pre-settable restriction 71 in the supply conduit 72 to the cylinder 61B. Such restriction 71 will be preset to control the rate of fall to a safe value such that it will not cause injury should it happen to fall when somebody is standing beneath it. The restriction 71 can be a one-way restriction, i.e. allowing air to be released at a low, safe rate, yet allowing pressure air readily to the piston-in-cylinder arrangement to raise the curtain 11.

Figure 8 illustrates a heat-actuated fluid pressure release means comprising a thermostatic valve 81 in which a piston 80 on spindle 82 in a threaded collar 83 is attached to an adjusting knob 84 so as to be adjustable for height inside a sleeve 85 having a valve aperture 86. The sleeve 86 telescopes on an inlet spigot 87 and moves up and down thereover attached to a bimetal strip 88. The strip 88 bends (dashed lines) according to its temperature to raise and lower the aperture 86 in relation to the piston 80 to open or close the valve. Such a valve 81 is mounted on a T-piece 89a in the supply line 89 from the pressure source to a fluid pressure operated stowed condition holding means, such as the rotary motor 31 of Figure 4 or the piston-in-cylinder arrangements 61 of Figures 6

and 7. The valve 81 opens to release fluid e.g. air pressure from the line 89 in the event of excessive temperature as from a local fire.

Such valves 81 may be distributed along a line 89 from an air supply 91 to the curtain 11 as shown in Figure 9 as local fire detectors.

One at least of such valves may also incorporate another safety feature, namely being held at above ambient temperature by an electric heating element 92 which may be fitted with a thermostatic cutoff 93. A fail-safe negative signal, i.e. cutting-off of power to the valve 81 allows the temperature to drop so that the valve member 85 moves to expose the aperture 86 oppositely to the direction it moves in, to do, however, the same thing, namely expose the aperture 86, in the event of overheating as by a fire.

Another safety feature is illustrated in Figure 9. A clock timer 94 actuates valve means 95,96 to seal off a plenum 97 maintained under pressure by a motor driven pump 98 and release pressure from the line 89 to allow the curtain 11 to drop on a periodic basis as a check to see if everything is working as it should. After a suitable time, the valving is reversed to seal off the escape of pressure air by valve 95 and open valve 96 to re-pressure the system thereby raising the curtain. That the curtain falls as it should can be checked manually by e.g. observing the same or, if the test is arranged for a period when there is nobody about, some automatic sensing arrangement may be used. As illustrated, a limit switch 98 actuated when the curtain reaches the bottom of its descent operates to change an indicator 99 from red (initiated by the timer at the start of the test) back to green, to indicate that the test has been carried out successfully. The same limit switch can also be used to reverse the valves 95,96 instead of the timer, so that in the event the curtain 11 does not reach the limit switch at least it remains at the level to which it descended, as a fail safe measure and also to indicate to maintenance staff the extent of the shortfall. Figure 9 also illustrates a lubricating arrangement in which a valve 101 is actuated also by the timer 94 to introduce a lubricant mist into the air line 89 when pressure air is restored thereto after a test. The lubricant is kept in a bottle 102 which is pressurised from the air line 89. The lubricant mist is carried around the system to lubricate valves, motor, clutch or whatever moving parts require it.

Instead of the bimetal strip-type valves 81, or some of them, valves having a fusible element can be used in the line 89 of Figure 9 as local fire detectors. Bellows-type valves can also be used wherever the bimetal strip-type valves are used.

Claims

1. Safety curtain means (11) deployable between stowed condition and operative condition and biased to deploy to operative condition, comprising fluid pressure operated, stowed condition holding means (12) adapted to hold said curtain means (11) in stowed condition and to release said curtain means (11) on release of fluid pressure to be deployed to said operative condition under the bias, characterised by fluid pressure operated motor means (31;61) adapted to deploy said curtain means (11) to stowed condition. 5
2. Safety curtain means according to claim 1, in which said stowed condition holding means comprise fluid pressure lock means (12) in which a lock member (13) biased to a release position is held in an operative position by fluid pressure. 10
3. Safety curtain means according to claim 2, in which said fluid pressure lock means (12) are resiliently biased to said release position. 15
4. Safety curtain means according to claim 2 or claim 3, in which said lock means (12) comprise ratchet (15) and pawl (16) means. 20
5. Safety curtain means according to claim 2 or claim 3, in which said lock means (12) comprise plate-type clutch or brake means (19). 25
6. Safety curtain means according to any one of claims 1 to 5, in which said stowed condition holding means (12) comprise said fluid motor means (31;61). 30
7. Safety curtain means according to claim 6, in which said fluid motor means (31) are drivable in either direction so as to be operative to deploy said safety curtain means (11) to the stowed condition and to the operative condition. 35
8. Safety curtain means according to claim 6, in which said fluid motor means (31;61) are arranged to drive said safety curtain means (11) to the stowed condition, but to run freely to allow said curtain means (11) to deploy to the operative condition under the bias. 40
9. Safety curtain means according to any one of claims 1 to 8, in which said fluid pressure operated means are pneumatic (12;31;61). 45
10. Safety curtain means according to any one of claims 1 to 9, in which said motor means (31) are rotary. 50
11. Safety curtain means according to any one of claims 1 to 9, in which said motor means (61) are linear. 55
12. Safety curtain means according to claim 11, in which the said motor means (61) comprise a piston-in-cylinder arrangement (61A,61B).
13. Safety curtain means according to claim 12, in which the piston-in-cylinder arrangement (61) is connected to said safety curtain means by a pulley arrangement (62).
14. Safety curtain means according to claim 12 or claim 13, in which the piston-in-cylinder arrangement (61) is disposed vertically to one side of the safety curtain means (11).
15. Safety curtain means according to claim 12 or claim 13, in which the piston-in-cylinder arrangement (61) is disposed horizontally along the upper edge of the safety curtain means (11).
16. Safety curtain means according to any one of claims 1 to 15, comprising rate control means (71) operative to control the rate of deployment of said safety curtain means (11) to its operative position.
17. Safety curtain means according to claim 16, in which said rate control means (71) comprise a restriction controlling rate of pressure fluid release.
18. Safety curtain means according to any one of claims 1 to 17, in which said curtain means (11) are biased gravitationally to deploy to operative condition.
19. Safety curtain means according to any one of claims 1 to 18, comprising heat-actuated fluid pressure release means (81).
20. Safety curtain means according to claim 18, in which said heat-actuated fluid pressure release means (81) comprise a bimetal strip (88) valve arrangement.
21. Safety curtain means according to claim 19 or claim 20, comprising one or more heat-actuated fluid pressure release means (81) arranged in a fluid pressure supply line (89) for said stowed condition holding means (12), which line is arranged to pass through a region in which a fire should trigger the deployment

of the safety curtain means (11) to its operative condition.

22. Safety curtain means according to any one of claims 19 to 21, in which said heat-actuated fluid (92) pressure release means (81) are of the type which have a heater (92) heated by an electric current and are maintained closed only within a restricted temperature band so as to release pressure in the event of cooling through loss of heating current or of reaching an excessive temperature because of a local fire.

23. Safety curtain means according to any one of claims 1 to 22, in which said curtain means (11) are stowed on a roller (36).

24. Safety curtain means (11) deployable between stowed condition and operative condition, having control means (94,95,96,97,98) adapted automatically from time to time to deploy said curtain means (11) as a routine check on and/or exercise of their operation.

25. Safety curtain means according to claim 24, comprising a lubricating arrangement (101,102) which lubricates the safety curtain means (11) automatically during such automatic deployment.

26. Safety curtain means according to any one of claims 1 to 25, operated pneumatically, in which a lubricant mist is introduced into the pressure gas, by a valve (101) and lubricant bottle (102) arrangement.

Revendications

1. Rideau de sécurité (11) qui peut être déployé entre un état de rangement et un état de travail et qui est rappelé afin qu'il se déploie vers l'état de travail, comprenant un dispositif (12) de maintien à l'état de rangement, commandé par un fluide sous pression et destiné à maintenir le rideau (11) à l'état de rangement et à libérer le rideau (11) lors de la disparition de la pression du fluide afin qu'il soit déployé vers l'état de travail sous l'action de la force de rappel, caractérisé par un moteur (31 ; 61) commandé par un fluide sous pression et destiné à déployer le rideau (11) vers l'état de rangement.

2. Rideau de sécurité selon la revendication 1, dans lequel le dispositif de maintien à l'état de rangement comprend un dispositif de verrouillage (12) par la pression d'un fluide dans le-

quel un organe de verrouillage (13) rappelé en position de libération est maintenu en position de travail par un fluide sous pression.

3. Rideau de sécurité selon la revendication 2, dans lequel le dispositif (12) de verrouillage agissant sous la pression d'un fluide est rappelé élastiquement vers sa position de libération.

4. Rideau de sécurité selon la revendication 2 ou 3, dans lequel le dispositif de verrouillage (12) comprend un dispositif à roue à rochet (15) et à cliquet (16).

5. Rideau de sécurité selon la revendication 2 ou 3, dans lequel le dispositif de verrouillage (12) comprend un dispositif de freinage ou d'embrayage du type à plateaux (19).

6. Rideau de sécurité selon l'une quelconque des revendications 1 à 5, dans lequel le dispositif (12) de maintien à l'état de rangement comprend un moteur (31 ; 61) commandé par un fluide.

7. Rideau de sécurité selon la revendication 6, dans lequel le moteur commandé par un fluide (31) peut être commandé dans un sens ou dans l'autre afin qu'il assure le déploiement du rideau de sécurité (11) vers l'état de rangement ou vers l'état de travail.

8. Rideau de sécurité selon la revendication 6, dans lequel le moteur (31 ; 61) commandé par un fluide est destiné à entraîner le rideau de sécurité (11) vers l'état de rangement, mais à rester libre afin qu'il permette le déploiement du rideau (11) vers l'état de travail sous l'action de la force de rappel.

9. Rideau de sécurité selon l'une quelconque des revendications 1 à 8, dans lequel le dispositif commandé par un fluide sous pression est de type pneumatique (12 ; 31 ; 61).

10. Rideau de sécurité selon l'une quelconque des revendications 1 à 9, dans lequel le dispositif moteur (31) est de type rotatif.

11. Rideau de sécurité selon l'une quelconque des revendications 1 à 9, dans lequel le dispositif moteur (61) est linéaire.

12. Rideau de sécurité selon la revendication 11, dans lequel le dispositif moteur (61) comprend un ensemble à piston placé dans un cylindre (61A, 61B).

13. Rideau de sécurité selon la revendication 12, dans lequel l'ensemble (61) à piston placé dans un cylindre est raccordé au rideau de sécurité par un ensemble à poulies (62). 5
14. Rideau de sécurité selon la revendication 12 ou 13, dans lequel l'ensemble (61) à piston placé dans un cylindre est disposé verticalement d'un côté du rideau de sécurité (11). 10
15. Rideau de sécurité selon la revendication 12 ou 13, dans lequel l'ensemble à piston placé dans un cylindre (61) est disposé horizontalement le long du bord supérieur du rideau de sécurité (11). 15
16. Rideau de sécurité selon l'une quelconque des revendications 1 à 15, comprenant un dispositif (71) de réglage de vitesse destiné à régler la vitesse de déploiement du rideau de sécurité (11) vers sa position de travail. 20
17. Rideau de sécurité selon la revendication 16, dans lequel le dispositif (71) de réglage de vitesse comprend un rétrécissement qui limite le débit d'évacuation de fluide sous pression. 25
18. Rideau de sécurité selon l'une quelconque des revendications 1 à 17, dans lequel le rideau (11) est rappelé par la force de pesanteur afin qu'il se déploie vers l'état de travail. 30
19. Rideau de sécurité selon l'une quelconque des revendications 1 à 18, comprenant un dispositif (81) de libération de fluide sous pression commandé par la chaleur. 35
20. Rideau de sécurité selon la revendication 19, dans lequel le dispositif de libération (81) du fluide sous pression commandé par la chaleur comprend un ensemble à soupape à bande bimétallique (88). 40
21. Rideau de sécurité selon la revendication 19 ou 20, comprenant un ou plusieurs dispositifs (81) de libération du fluide sous pression commandés par la chaleur, disposés dans une canalisation (89) d'alimentation en fluide sous pression du dispositif (12) de maintien à l'état de rangement, cette canalisation étant destinée à passer dans une région dans laquelle un incendie peut déclencher le déploiement du rideau de sécurité (11) vers son état de travail. 45
22. Rideau de sécurité selon l'une quelconque des revendications 19 à 21, dans lequel le dispositif (81) de libération de fluide sous pression (92) commandé par un fluide est d'un type qui comporte un organe de chauffage (92) qui est chauffé par un courant électrique et qui est maintenu uniquement dans une plage limitée de température de manière que la pression soit libérée en cas de refroidissement du fait de la suppression d'un courant de chauffage ou lorsqu'une température excessive est atteinte à cause d'un incendie local. 50
23. Rideau de sécurité selon l'une quelconque des revendications 1 à 22, dans lequel le rideau (11) est rangé sur un rouleau (36). 55
24. Rideau de sécurité (11) qui peut être déployé entre un état de rangement et un état de travail, et comprenant un dispositif de commande (94, 95, 96, 97, 98) destiné à déployer automatiquement le rideau (11) de temps en temps pour une vérification de routine du fonctionnement et/ou pendant des exercices relatifs à son fonctionnement.
25. Rideau de sécurité selon la revendication 24, comprenant un ensemble de lubrification (101, 102) qui lubrifie le rideau de sécurité (11) automatiquement pendant le déploiement automatique.
26. Rideau de sécurité selon l'une quelconque des revendications 1 à 25, commandé pneumatiquement, dans lequel un brouillard d'un lubrifiant est introduit dans le gaz de mise sous pression, par un ensemble à soupape (101) et à bouteille (102) d'un lubrifiant.

Patentansprüche

1. Feuerfeste Vorhangeinrichtung (11), die zwischen einem verstaute Zustand und einem Betriebszustand betätigbar und vorgespannt ist, sich in den Betriebszustand zu entfalten, mit einer durch ein Druckfluid betätigbaren Haltevorrichtung (12) zum Halten der Vorhangevorrichtung (11) im verstaute Zustand und zum Freigeben der Vorhangeinrichtung (11) bei Freigabe des Druckfluids, um unter Vorspannung in den Betriebszustand entfaltet zu werden,
gekennzeichnet durch
eine durch Druckfluid betätigbare Motoreinrichtung (31;61), die die Vorhangeinrichtung (11) in den verstaute Zustand bringt.
2. Feuerfeste Vorhangeinrichtung nach Anspruch 1, bei der die Haltevorrichtung für den verstaute Zustand eine Druckfluid-Verriegelungsvorrichtung (12) aufweist, bei der ein in die Freigabestelle vorgespanntes Verriegelungsele-

ment (13) durch ein Druckfluid in der Betriebsstellung gehalten wird.

3. Feuerfeste Vorhangeinrichtung nach Anspruch 2, bei der die Druckfluid-Verriegelungsvorrichtung (12) elastisch in die Freigabestellung vorgespannt ist. 5
4. Feuerfeste Vorhangeinrichtung nach Anspruch 2 oder 3, bei der die Verriegelungsvorrichtung (12) eine Sperrklinkenvorrichtung (15,16) umfaßt. 10
5. Feuerfeste Vorhangeinrichtung nach Anspruch 2 oder 3, bei der die Verriegelungsvorrichtung (12) eine Scheibenkupplungs- oder Bremsvorrichtung (19) umfaßt. 15
6. Feuerfeste Vorhangeinrichtung nach einem der Ansprüche 1 bis 5, bei der die Haltevorrichtung (12) für den verstaute Zustand die Druckfluid-Motorvorrichtung umfaßt. 20
7. Feuerfeste Vorhangeinrichtung nach Anspruch 6, dadurch gekennzeichnet, daß die Druckfluid-Motorvorrichtung (31) in beide Richtungen antreibbar ist, derart, daß die feuerfeste Vorhangeinrichtung (11) in den verstaute Zustand und in den Betriebszustand bringbar ist. 25
8. Feuerfeste Vorhangeinrichtung nach Anspruch 6, dadurch gekennzeichnet, daß die Fluid-Motorvorrichtung (31;61) die feuerfeste Vorhangeinrichtung (11) in den verstaute Zustand steuert aber sonst frei läuft, um zuzulassen, daß die feuerfeste Vorhangeinrichtung (11) unter Vorspannung in den Betriebszustand gebracht wird. 30
9. Feuerfeste Vorhangeinrichtung nach einem der Ansprüche 1 bis 8, bei der die durch Druckfluid betätigbaren Mittel (12;31;61) pneumatisch ausgebildet sind. 35
10. Feuerfeste Vorhangeinrichtung nach einem der Ansprüche 1 bis 9, bei der die Motorvorrichtung (31) drehbar ist. 40
11. Feuerfeste Vorhangeinrichtung nach einem der Ansprüche 1 bis 9, bei der die Motorvorrichtung (61) linear ausgebildet ist. 45
12. Feuerfeste Vorhangeinrichtung nach Anspruch 11, bei der die Motorvorrichtung (61) eine Kolben-Zylinderanordnung (61A,61B) aufweist. 50
13. Feuerfeste Vorhangeinrichtung nach Anspruch 12, bei der die Kolben-Zylinderanordnung (61)

mit der feuerfesten Vorhangeinrichtung über eine Seilzuganordnung (62) verbunden ist.

14. Feuerfeste Vorhangeinrichtung nach Anspruch 12 oder 13, bei der die Kolben-Zylinderanordnung (61) senkrecht an einer Seite der Vorhangeinrichtung (11) angeordnet ist.
15. Feuerfeste Vorhangeinrichtung nach Anspruch 12 oder 13, bei der die Kolben-Zylinderanordnung (61) horizontal längs der oberen Kante der Vorhangeinrichtung (11) angeordnet ist.
16. Feuerfeste Vorhangeinrichtung nach einem der Ansprüche 1 bis 15, die eine Geschwindigkeits-Steuereinrichtung (71) umfaßt, die die Entfaltungsgeschwindigkeit der Vorhangeinrichtung (11) in ihren Betriebszustand steuert.
17. Feuerfeste Vorhangeinrichtung nach Anspruch 16, bei der die Geschwindigkeits-Steuereinrichtung (71) eine Begrenzung zur Steuerung der Geschwindigkeit der Druckfluid-Freigabe aufweist.
18. Feuerfeste Vorhangeinrichtung nach einem der Ansprüche 1 bis 17, bei der die Vorhangeinrichtung (11) zum Entfalten in den Betriebszustand durch Schwerkraft vorgespannt ist.
19. Feuerfeste Vorhangeinrichtung nach einem der Ansprüche 1 bis 18 mit einer Druckfluid-Freigabevorrichtung (81), die durch Wärme betätigt wird.
20. Feuerfeste Vorhangeinrichtung nach Anspruch 19, bei der die durch Wärme betätigbare Druckfluid-Freigabevorrichtung (81) eine Bimetallstreifen-Ventilanordnung (88) umfaßt.
21. Feuerfeste Vorhangeinrichtung nach Anspruch 19 oder 20 mit einer oder mehreren durch Wärme betätigbaren Druckfluid-Freigabevorrichtungen (81) in einer Druckfluid-Versorgungsleitung (89) zu der Haltevorrichtung (12) zum Halten im verstaute Zustand, wobei die Leitung derart angeordnet ist, daß sie durch den Bereich hindurchgeht, in dem das Feuer das Entfalten der Vorhangeinrichtung (11) in ihren Betriebszustand auslösen soll.
22. Feuerfeste Vorhangeinrichtung nach einem der Ansprüche 19 bis 21, bei der die durch Wärme betätigbare Druckfluid-Freigabevorrichtung (81) ein durch elektrischen Strom geheiztes Heizelement (92) aufweist und nur in einem begrenzten Temperaturbereich geschlossen

gehalten wird, so daß im Falle des Abkühlens durch Verlust des Heizstroms oder des Erreichens einer erhöhten Temperatur wegen eines lokalen Feuers Druck freigelassen wird.

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- 23.** Feuerfeste Vorhangeinrichtung nach einem der Ansprüche 1 bis 22, bei der die Vorhangeinrichtung (11) auf einer Rolle (36) verstaut ist.
- 24.** Feuerfeste Vorhangeinrichtung (11), die zwischen einem verstauten Zustand und einem Betriebszustand entfaltbar ist, mit einer Steuervorrichtung (94,95,96,97,98) zum automatischen Entfalten der Vorhangeinrichtung (11) von Zeit zu Zeit als Routineüberprüfung und/oder Übung ihres Betriebes. 10
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- 25.** Feuerfeste Vorhangeinrichtung nach Anspruch 14 mit einer Schmieranordnung (101,102), die die feuerfeste Vorhangeinrichtung (11) automatisch während eines derartigen automatischen Entfaltens schmiert. 20
- 26.** Feuerfeste Vorhangeinrichtung nach einem der Ansprüche 1 bis 25, bei der bei einem pneumatischen Betrieb ein Schmiernebel durch eine Ventil- und Schmierflaschenanordnung (101,102) eingeführt wird. 25

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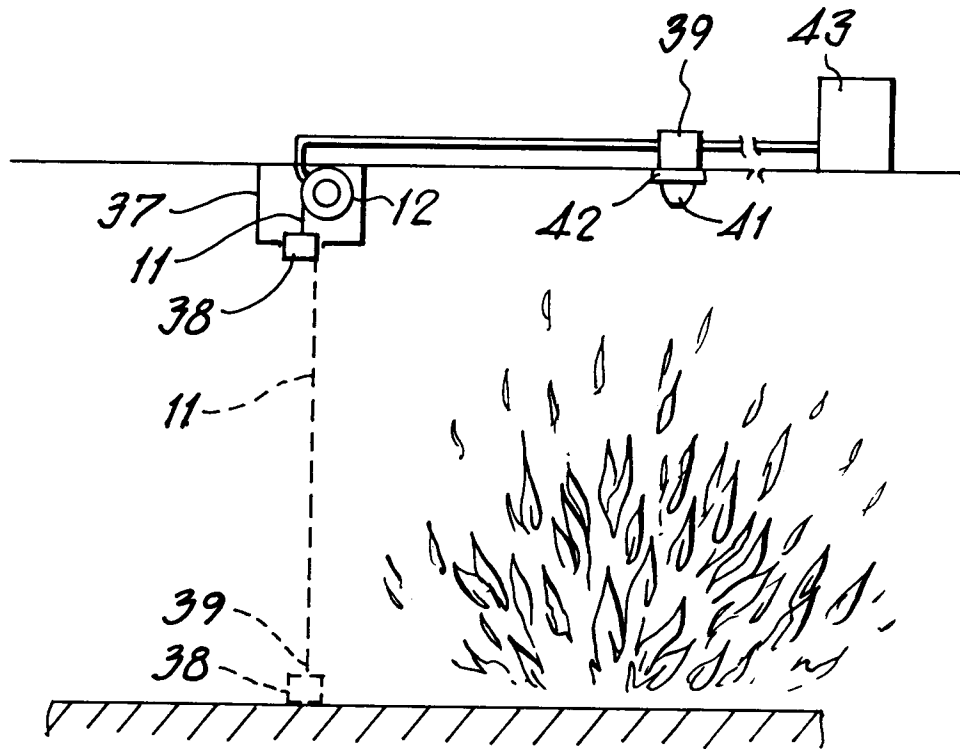


FIG. 1

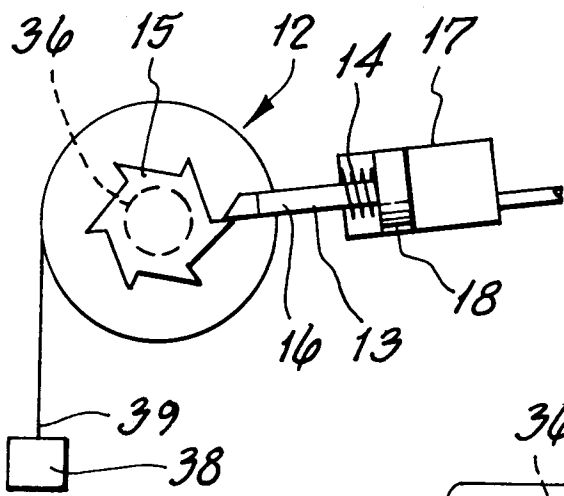


FIG. 2

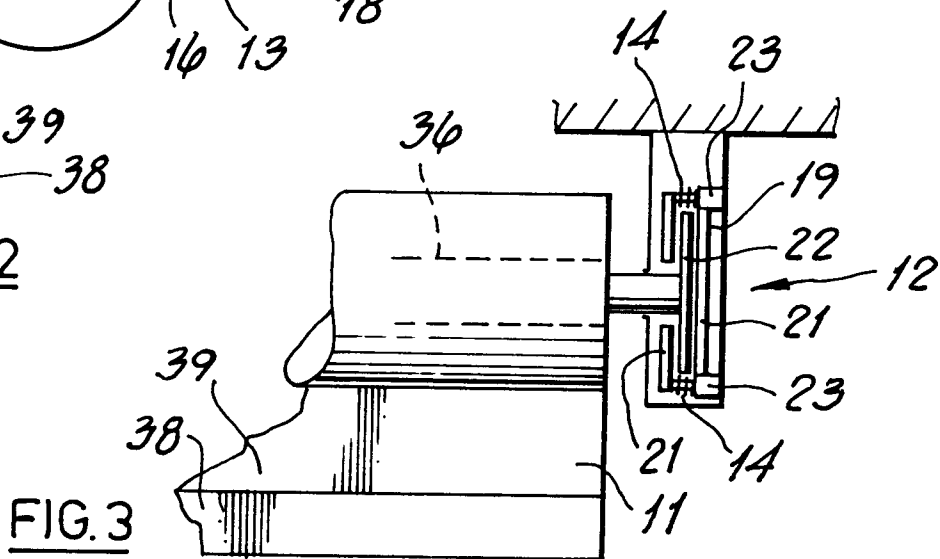
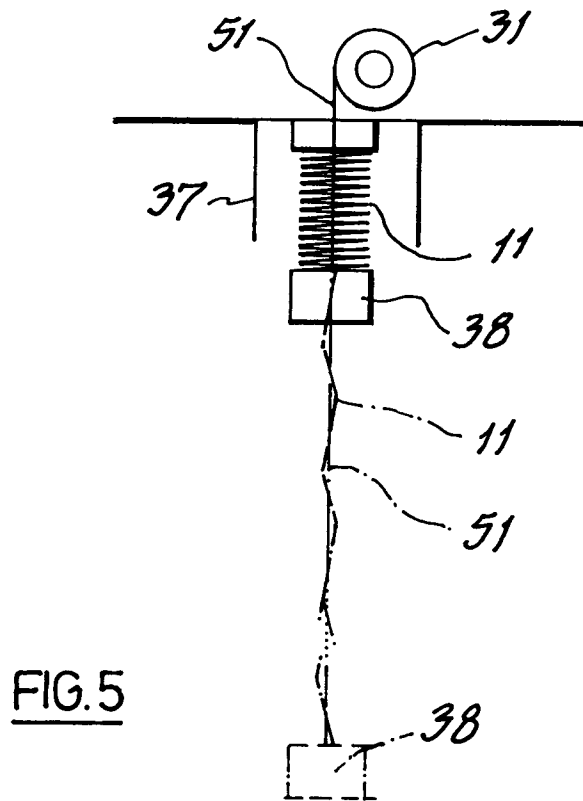
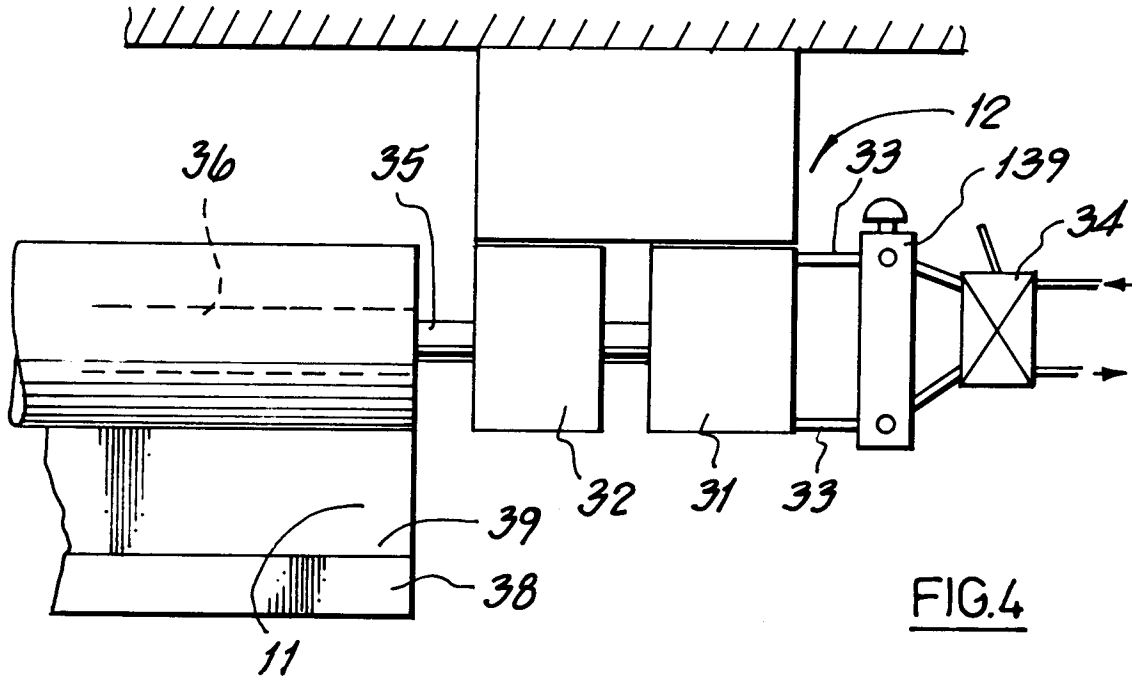


FIG. 3



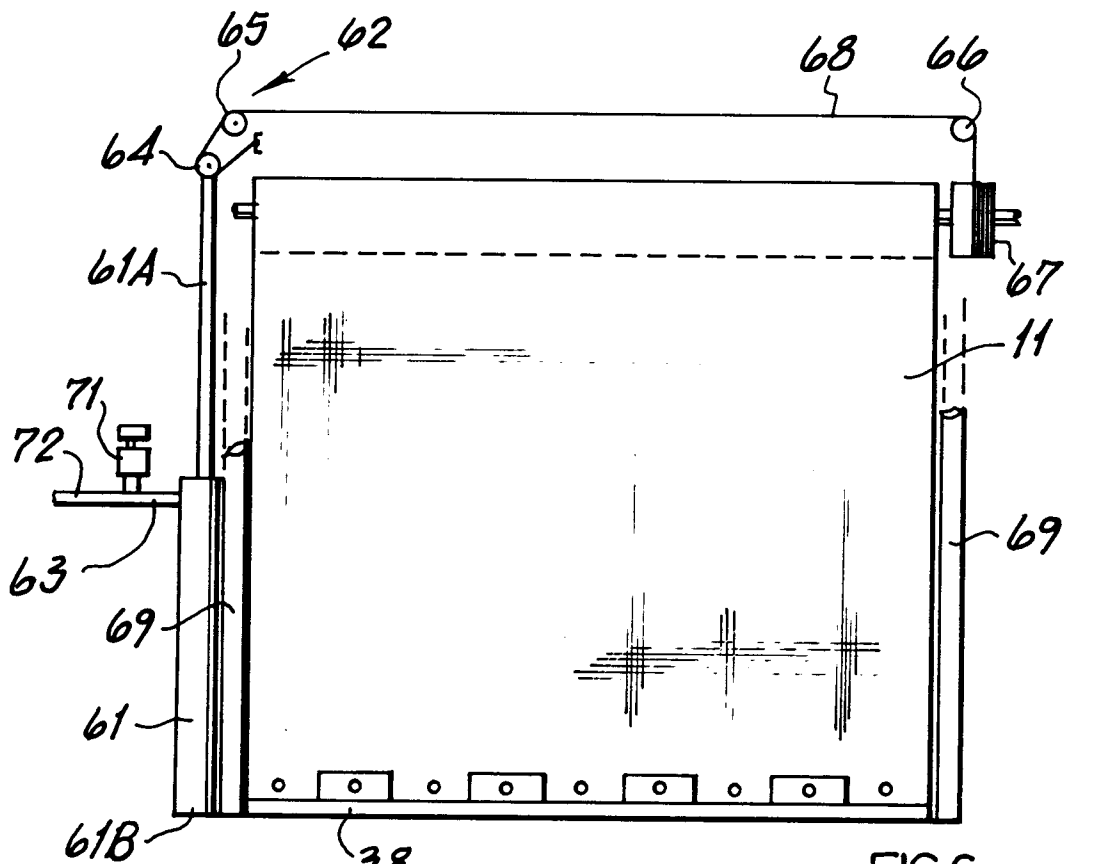


FIG. 6

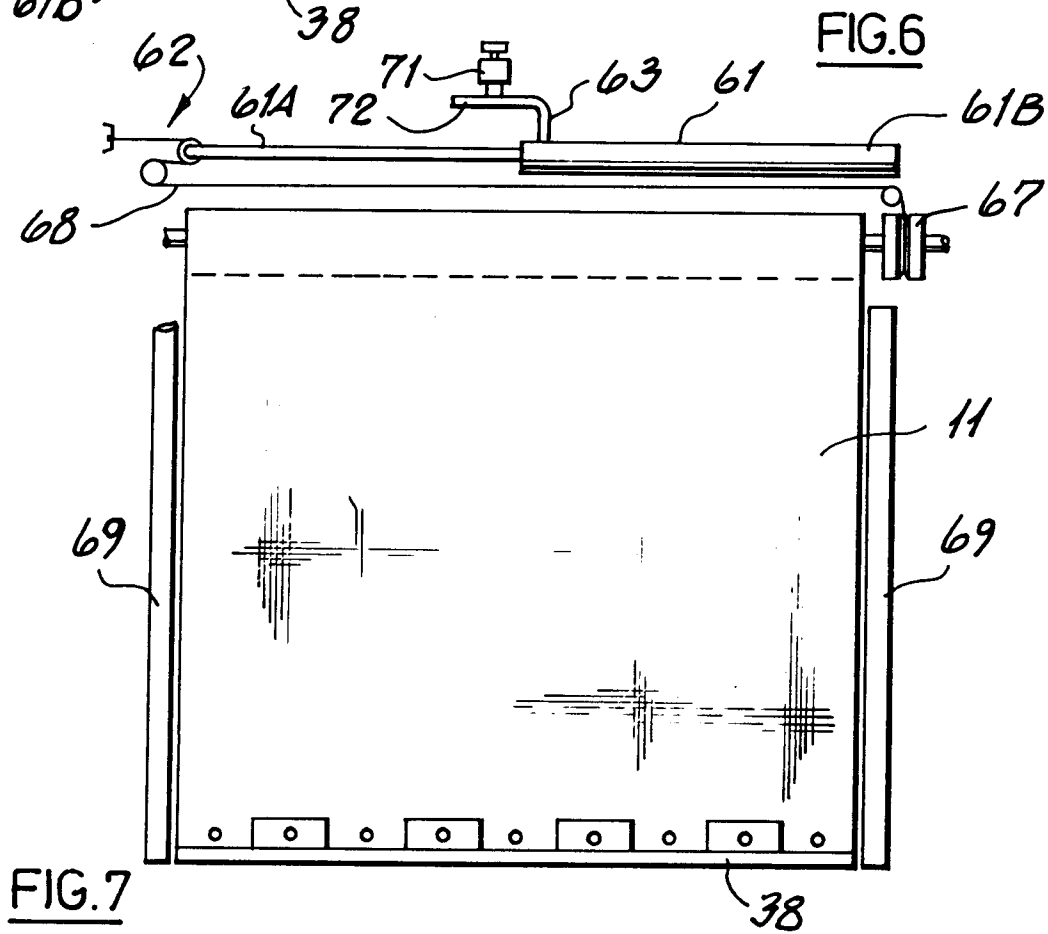


FIG. 7

FIG. 8

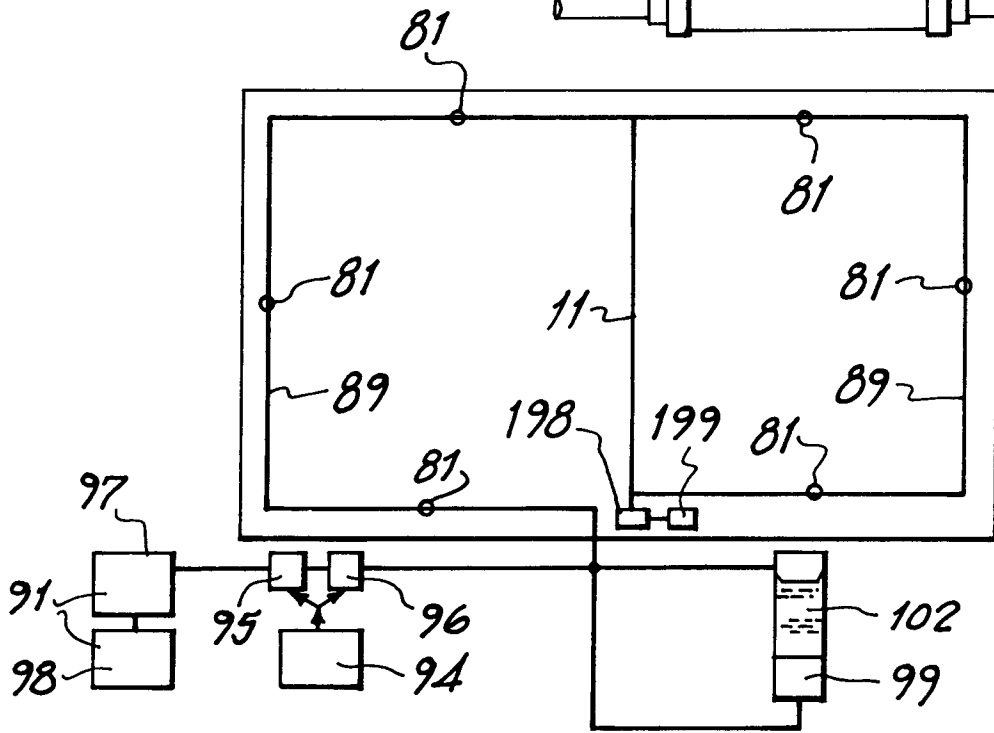
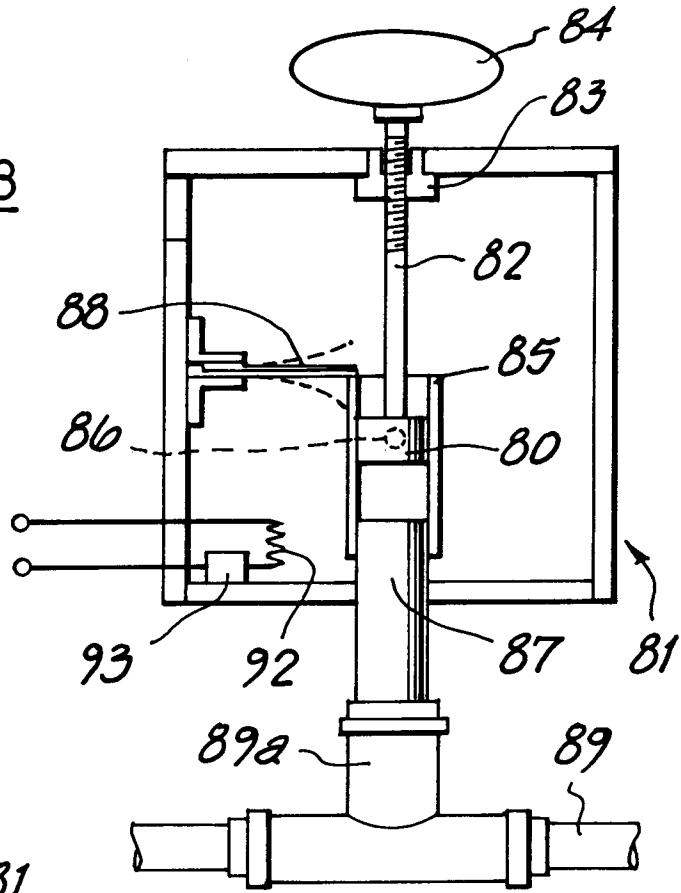


FIG. 9