H. B. HELM.

SYSTEM FOR PROTECTION AGAINST FIRE.

APPLICATION FILED AUG. 11, 1908.

914,721.

Patented Mar. 9, 1909.

3 SHEETS—SHEET 1.

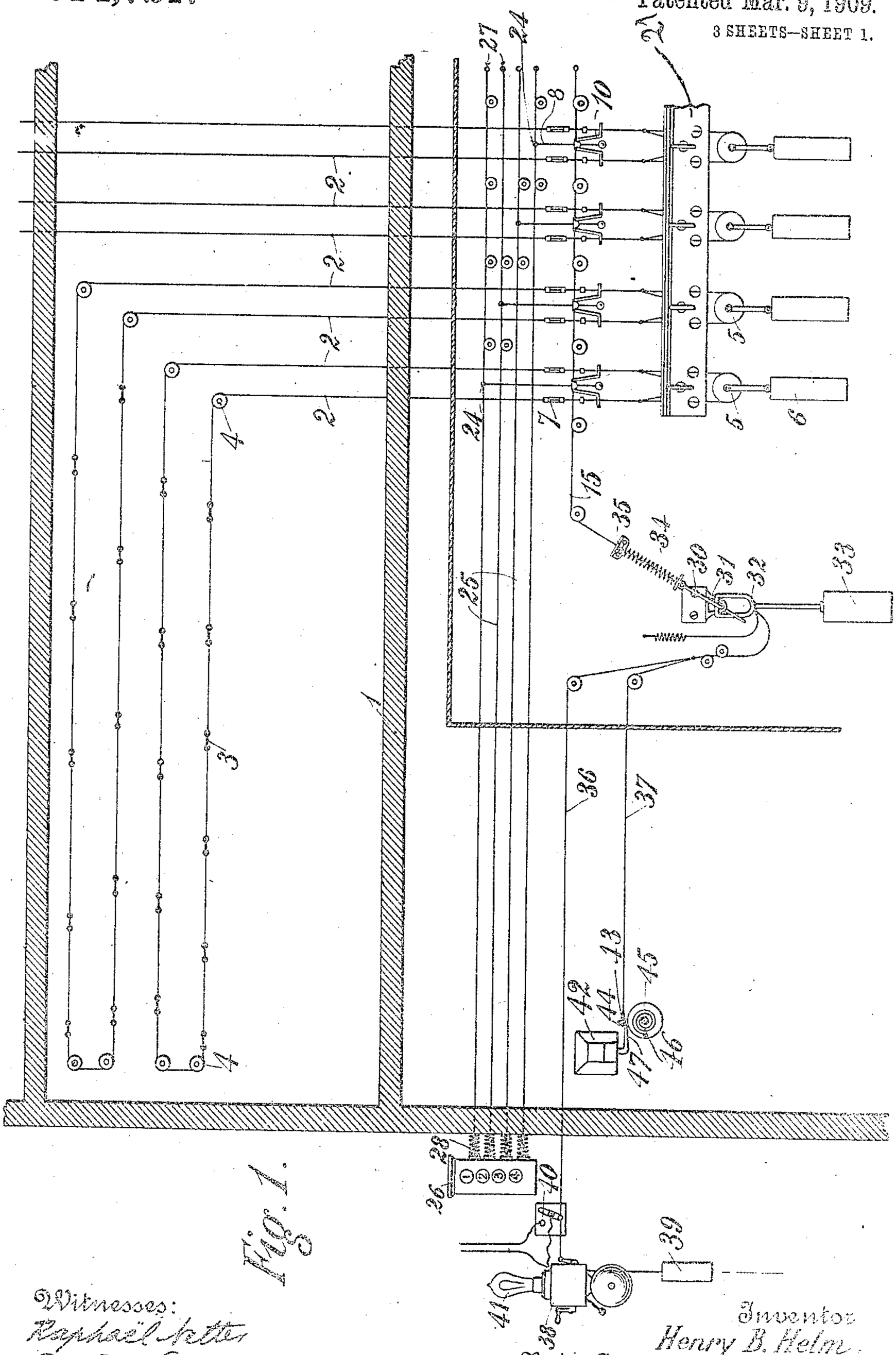

Fig. 1.

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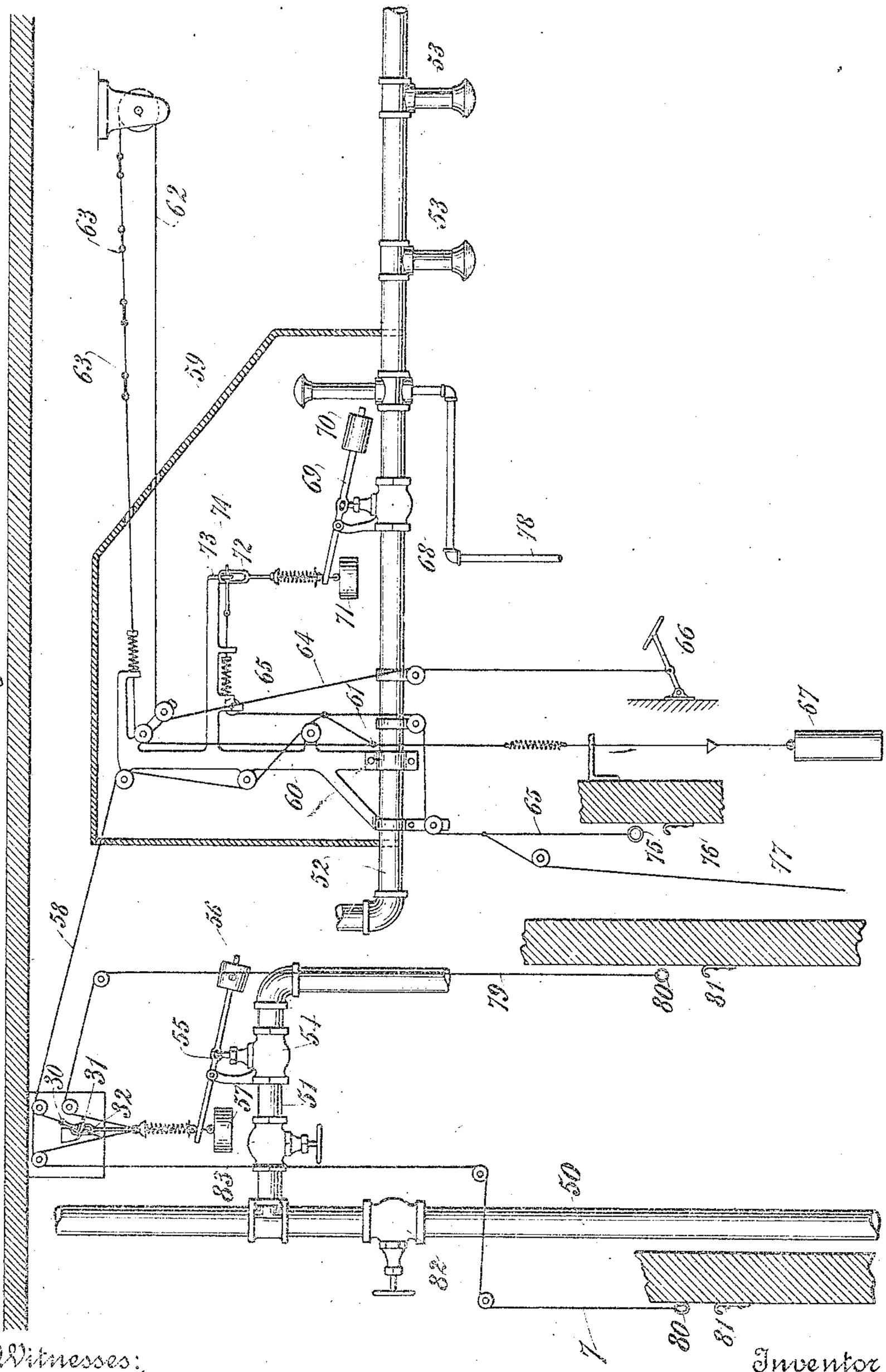
3 SHEETS—SHEET 2.

Fig. 2.



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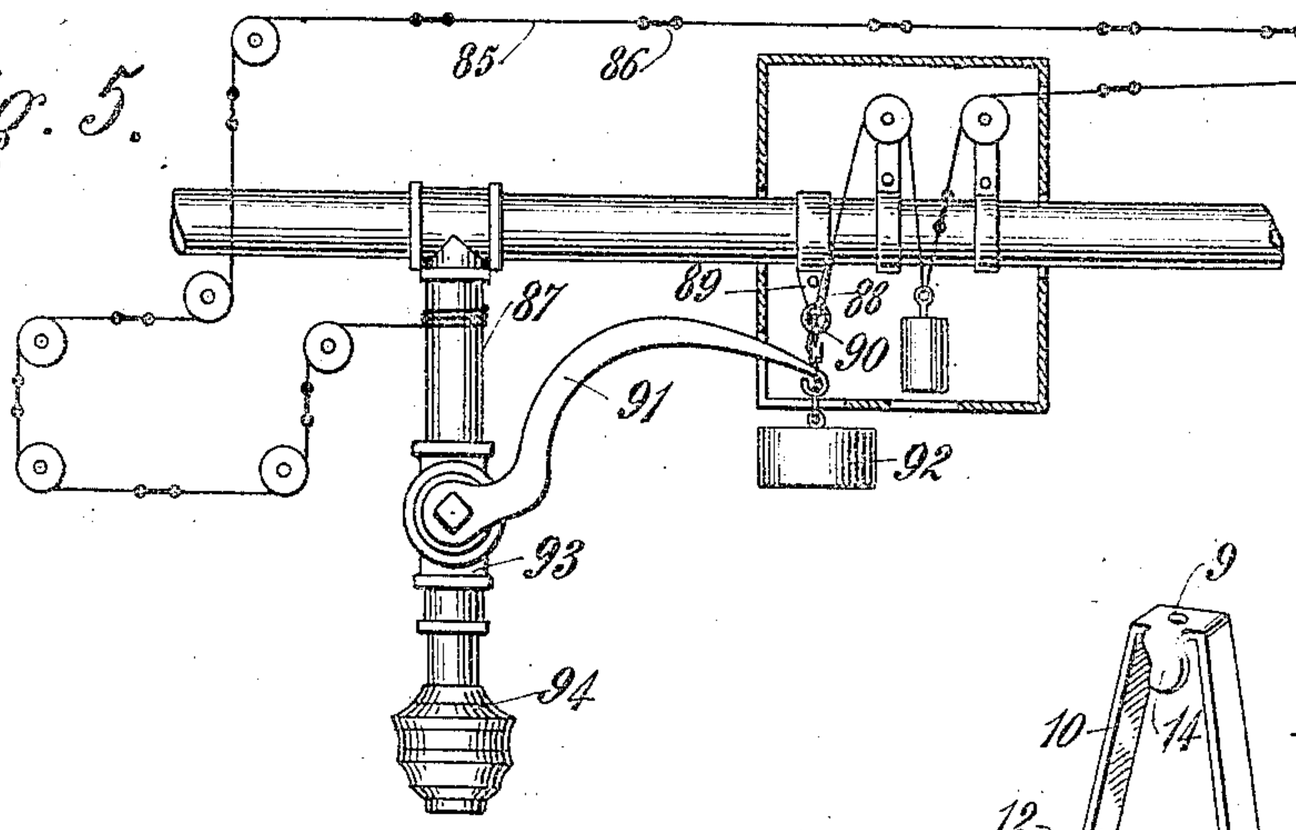
3 SHEETS—SHEET 3.

Fig. 5.



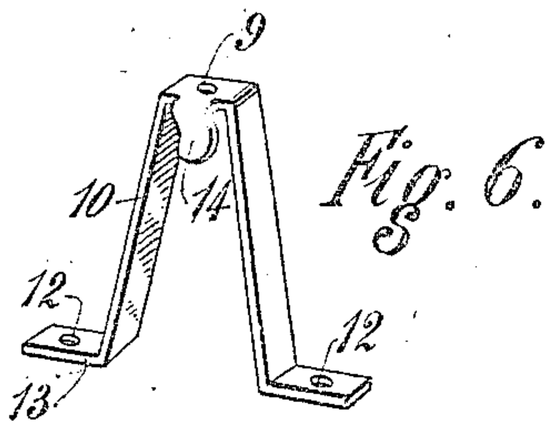


Fig. 6.

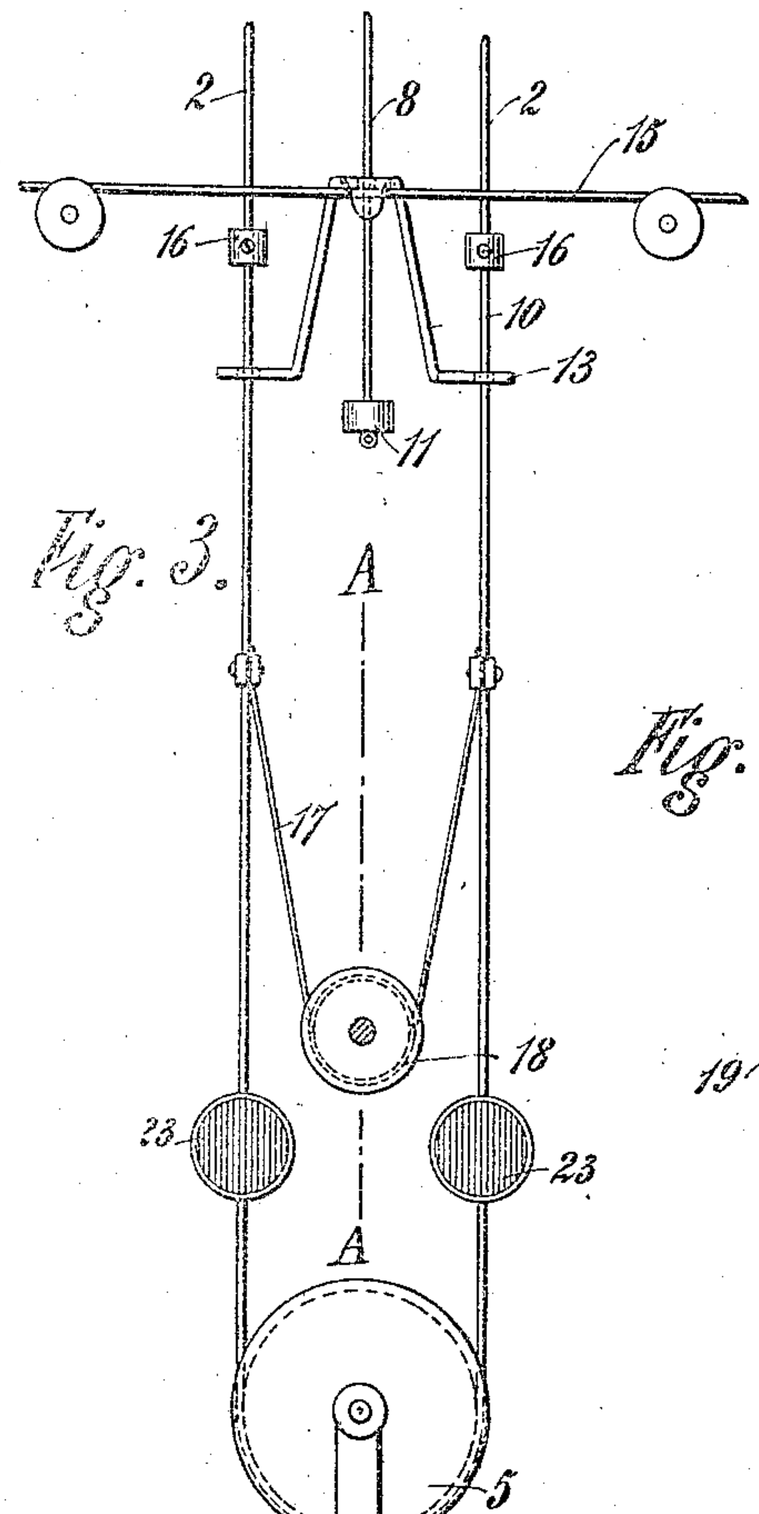


Fig. 3.

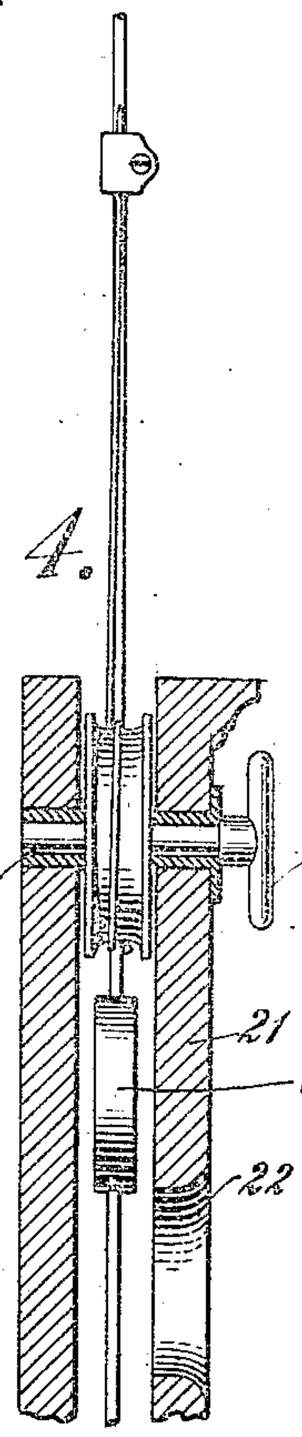


Fig. 4.

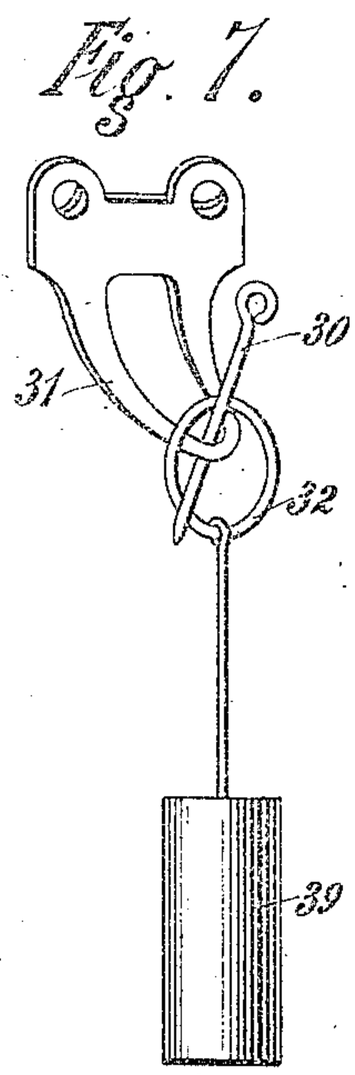


Fig. 7.

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UNITED STATES PATENT OFFICE.

HENRY B. HELM, OF NEW YORK, N. Y.

SYSTEM FOR PROTECTION AGAINST FIRE.

No. 914,721. Specification of Letters Patent. Patented March 9, 1909.

Application filed August 11, 1908. Serial No. 447,928.

To all whom it may concern:

Be it known that I, HENRY B. HELM, a citizen of the United States, residing in the city of New York, county and State of New York, have invented certain new and useful Improvements in Systems for Protection Against Fire, of which the following is a full, clear, and complete disclosure.

The object of my invention is to produce a system comprising a series of devices to be located throughout the floors and rooms of buildings, such devices being operated by heat or flame arising from combustion, or other abnormal increase in temperature, so that a water distributing or extinguishing system may be automatically put into operation or so that a fire alarm, indicator, or similar devices may be operated to give notice of the place and the existence of a fire.

My invention resides in a system that is preferably non-electrical, and, broadly stated, comprising a series of wires in which fusible links are placed, said wires being strung on pulleys or other suitable supports about the ceilings and other parts of the floors and rooms of a building or other structure. The wires in which the fusible links are placed are kept under tension, preferably by means of a weight, so that in the event of any of the links becoming separated, the weight will fall, thereby operating valves, alarms, or indicators, which are operatively connected with said wires, so as to either extinguish, or indicate the locality and existence of the fire.

My invention also resides in a system of arrangement of conduits or pipes with their controlling valves, in connection with a system of taut wires, by which the water supplied to the fire is confined to the place at which the fire exists, in sufficient quantities to immediately extinguish the fire, without doing damage to the other parts of the building or its contents.

A particular feature of this part of my invention resides in the means whereby the supply of water to the extinguishing apparatus is always under control of persons in other parts of the building from that in which the fire is burning.

Further features and advantages of my invention will be hereinafter described and claimed in the following specification, to which reference may be had for embodiments of my invention and forms which I at present deem preferable.

Referring to the accompanying drawings forming a part of said specification, Figure 1 is a diagrammatic view of one form of my invention applied to the operation of an indicator, an alarm bell, and similar devices; Fig. 2 is a diagrammatic view showing my invention as applied to a fire extinguishing system using water, and also shows an arrangement of valves whereby said extinguishing system is controlled; Fig. 3 is a view showing on a larger scale the parts indicated in Fig. 1, for communicating motion in the local wires or circuits to the indicator, alarm, or extinguishing devices; Fig. 4 is a vertical sectional view taken substantially on the line A—A Fig. 3; Fig. 5 is a view showing a modification of my invention as applied to another form of water extinguishing system; Fig. 6 is a detailed perspective of a device for connecting the local wires with the wires running to the indicating or alarm devices shown in Fig. 3; and Fig. 7 is a view in elevation showing the means for operating or causing the actuating weights to fall, so that the indicators, valves, alarms or similar devices may be positively put into action.

Referring to Fig. 1 of the drawings, the numeral 1 indicates the floors of the building; the numeral 2 indicates the local wires extending to the different floors of the building, and these wires include the fusible links 3, which are so located in the wires as to effectively cover the entire area or space in a particular room or part of a building. These fusible links 3 may consist of any well known form of such devices to be found upon the market, and are preferably so constructed as to be operated when the heat in the locality in which the particular link is situated rises above one hundred and sixty degrees Fahrenheit. It is obvious that the horizontal portion of these wires may be placed at any convenient point, such as upon the ceiling, walls, or other parts of rooms, where they will be protected from contact with foreign bodies, or from being otherwise disturbed. As shown in Fig. 1, the wires 2 are made endless, and are carried upon suitable pulleys or wheels 4, preferably provided with ball or other anti-friction bearings. The vertical portion of these wires 2, or the portion extending to that part of the building where the apparatus to be operated is located, passes above groove pulleys or wheels 5, from which are suspended weights 6 for

the purpose of keeping the wires taut, so that they will separate the parts of the fusible links when the temperature rises to a sufficient point. The wires 2 are preferably provided with suitable turnbuckles 7 or similar adjusting devices, to allow of adjustment in the length of the wires, so that any slack may be taken up or any shortening of the wires compensated for.

Referring now to Figs. 3 and 4, the numeral 8 indicates a wire or similar flexible connection adapted to coöperate with the wires or similar connections extending to the alarm, indicator or other device. The wire 8 passes through a hole 9 in a yoke or strap 10 (shown in detail in Fig. 6) and terminates in a stop or weight 11. The wires 2 pass through holes 12 in the horizontal ears 13 of the strap 10. The upper end of the strap 10 is provided with a hook 14 adapted to engage a horizontal cord or wire 15. The wires 2 are also provided with adjustable stops 16, which, when the apparatus is set and not in operation, are located at a point slightly above the ears 13, as indicated in Figs. 1 and 3. It will now be seen that should any one of the fusible links 3 in the wires 2 become separated by the heat, the weight 5 will cause the stops 16 to be carried down with the wires 2 until they come in contact with the ears 13, thereupon the strap 10 will be drawn downward, thereby causing the wire 15 to be pulled laterally, so that its effective length is shortened. This shortening of the wire 15 is utilized to operate certain devices hereinafter to be more fully pointed out.

In connection with the wires 2 I provide an arrangement for inspecting and testing the same, which may be utilized without disturbing the equilibrium of the system. For that purpose I connect a branch 17 with the wires 2, passing one or two turns of the same about a wheel or pulley 18. The wheel 18 is rigidly attached to a shaft 19, which carries at its outer end a bar or handle 20. The shaft 19 is mounted on suitable bearings in a casing 21, provided with holes 22 forming sight openings, and coöperating with these sight openings are colored disks or tablets 23 attached to the wires 2. By virtue of this arrangement, should either run or side of the wire 2 become elongated, or otherwise displaced, one of the disks or tablets 23 will appear behind the sight openings 22, thus indicating that there has been a change in the conditions existing in the wires 2. Now, when it is desired to know whether or not the pulleys may freely rotate on their bearings, and to know whether there is any obstruction to the free running of the wires 2, the handle 20 may be turned, thereby causing the whole length of the corresponding wire 2 to move in one direction, or the other along its entire length if no obstruction or hindrance should exist, and it should be noted that this can be done without in any way disturbing the equilibrium of the system.

Coming now to the connections between the local wires 2 and the means for operating the indicators or alarms, as shown in Fig. 1, it will be seen that the wires 8 extend upward and terminate in loops 24, which pull the wires 25, extending to the indicator or annunciator 26. This annunciator may be constructed in any well known way, so that should any of the cords 25 be pulled, a corresponding disk or number will show at the annunciator. The cords 25 are preferably fixed at one end as indicated at 27, and the other ends of the cords are provided with coiled springs 28, which tend to keep the wires 25 taut. It will now be seen that should any one of the wires 25 be pulled downward, as before described, the corresponding wire 15 will be pulled laterally, thereby shortening its effective length and so operating one of the indicators in the annunciator 26.

Where more power is required to operate the signaling or alarm device, I provide means as shown in Figs. 1 and 7. In this instance the wire 15, which passes beneath the hooks 14, is connected with a retractable part or pin 30 adapted to pass through a fixed inclined loop 31. A link or similar movable device 32 is adapted to pass over the end of the loop 31, and this link is retained in position by the pin 30 when the same is passed through the loop 31 outside of said link. A weight 33 is carried by the link 32 in any suitable manner. A spring 34 surrounds the wire 15 and abuts against a fixed stop 35 so as to keep the said wire under tension at all times. To the link 32 or connecting parts are attached a plurality of cords or wires 36 and 37, and these may pass to any corresponding number of signaling, alarm, or other devices to be operated by them during the action of the system. I have shown the wire 36 attached to a mechanically operated bell 38, which is preferably rung by means of a weight 39, which may be wound up and set so that when the wire 36 is pulled the weight will be released, thereby causing the bell to ring. I have also shown the wire 36 connected with a switch 40, which is adapted to close the circuit to an electric lamp 41, which, when lighted, will display a red light. The wire 37 is shown as passing to a local fire alarm box 42, and for this purpose the wire 37 is provided with a loop 43, which passes over a lug 44 carried by a rotatable drum 45. This drum 45 may be operated by a coiled spring 46, or by any other suitable means, so that when the loop 43 is pulled off the lug 44 said lug will move toward the left, as shown in the drawings, and allow the hook in alarm box (which has been pulled down by weight 33 falling and pulling wire 37) to go up to its original position and so send in the alarm.

In the above descriptions, and elsewhere, where wires have been mentioned, it is obvious that I do not intend to be limited to metallic wires alone, for any device may be used for communicating motion between the parts, whether they be flexible cords, chains, or similar well known devices for transmitting motion. However, I prefer in general to use phosphor bronze wire, which not only is very strong and sustains a comparatively large weight for a given cross section, but which is also less liable to be affected by corrosive gases, heat, moisture, and other unavoidable conditions. If necessary, where turns are very short, it will be understood that flexible metallic cord may be used in the place of solid wire.

In the operation of the part of my device last above described, it will now be seen that when any of the parts of a fusible link 3 are separated, the downward motion of the straps 10 will cause the effective length of the wires 15 to be shortened, thereby drawing the pin 30 out of the loop 31, so that the link 32 and its attached weight 33 may drop. The dropping of the weight 33 pulls upon the wires 36 and 37, thereby operating the mechanical alarm 39, the red light 41 and the fire alarm box 42.

The above description illustrates the embodiment of my improved system as applied to signaling and alarm devices, but the system is especially adapted to include apparatus for extinguishing fires.

Referring now to Fig. 2, the numeral 50 indicates a standpipe which passes each floor of the building in the usual manner, and is adapted to be supplied through water mains in the street or a reservoir on the roof of the building, or by pumps located at convenient points in the building, or elsewhere. The standpipe 50 has a main branch pipe on each floor, as indicated at 51, and the pipe 51 may be branched to have conduits, such as 52, located in different rooms or parts of the same floor. The local pipes 52 may be provided with the usual sprays or sprinklers, etc., but I preferably provide these pipes with rotary water jets 53, which throw a greater volume of water over a considerable range, and more effectively than a spray or sprinkler. When such a rotary jet is used, one water outlet may be provided for a space amounting to about 2500 square feet of floor area.

The means for controlling the flow of water through the pipes or conduits above mentioned may be described as follows: In the branch pipe 51 at a particular floor, I provide a valve 54. This valve 54 is preferably one now to be purchased in the open market, and which may be opened and closed by the vertical movement of a stem 55 connected with a lever 56, which may be operated either by hand or by an overbalancing weight, such as 57. These valves may be adjusted to be opened by a certain number of pounds weight for a given water pressure within the pipes. The end of the lever 56, which carries the weight 57, is connected with a link 32 coöperating with a loop 31 and a pin 30, similar to those previously described, the pin 30 being operated by a cord 58, which may be connected to the local fusible links in a manner like that already described in connection with the alarm and annunciator devices, or may be operated by the means described as follows:

To the local or branch pipes 52 may be fastened suitable boxes or casings 59, which are adapted to contain the actuating devices for the local water controlling valves. Upon the pipe 52 is fastened a suitable standard 60, having projections or arms at suitable positions to carry the requisite pulleys or wheels and other parts. The wire 58 is attached as at 61 to the local or primary wire 62, having fusible links 63, through the use of the branch wire 64, also connected to the pin operating wire 65. One end of the local or primary wire 62 is attached to a lever 66, which may be used to test the condition or free running of the wire 62, without disturbing the equilibrium of the system. The other end of the wire 62 carries the weight 67, which holds said wire under tension and causes the links to separate when the heat about such links has reached a sufficient temperature. The local pipe 52 is provided with a balanced valve 68 similar to the valve 54, and is operated by a lever 69 acted upon by the weights 70 and 71. One end of the lever 69 is connected with the link 72, adapted to engage the loop 73, and is retained in position thereon by means of the pin 74, which is attached to the pin operating cord 65. One end of the cord 65 terminates in a ring or loop 75 adapted to engage a hook 76. This ring and hook may be located at the floor below, so that the valves may be operated without passing to the floor on which the fire exists, and I may provide a branch wire 77, which may extend to the main floor, so that the valves may be operated from that point. The numeral 78 indicates a drip pipe, which may carry away any water that may leak through the valve 68. One or more wires 79, terminating in rings 80, adapted to engage hooks 81, may be connected with the lever 56 for operating the main valve 54, so that this valve may be controlled from the floor below, or from any other suitable point. It is obvious that the usual globe valves 82 and 83 may be inserted so as to entirely shut off the water supply both from the standpipe and from each floor, when desired.

The operation of my extinguishing system is as follows: Supposing the parts of one of the links 63 to be separated by the presence

of fire, the weight 67 will drop, pulling the wires 64 and 58, thereby disengaging the pin 30 from the loop 31. The falling of the weight 67 also pulls upon the cord 65, through the connecting cord 64, to disengage the pin 74 from the loop 73, allowing the link 72 to release the weight 71, so that the valve 68 is also opened. Both of these valves being opened, the water is then supplied to the distributers or rotary jet devices 53. It will also be seen that these valves may be operated by pulling down on the cord 65 and hooking the ring over the hook 76, and in a similar manner by pulling down on the cord 77, the end of which may be located in the basement. Should it be desired to shut off the water from the pipe 51, and, consequently, the pipe 52, one of the rings 80 may be placed over its corresponding hook 81, which will thereby raise the weight 57, allowing the valve 54 to be closed. This will obviate the flooding of the building after the fire at a particular point has been extinguished. I have at several points indicated springs to be used as buffers or for holding the wires under tension, but I do not believe it necessary to refer to these specifically, as their functions will be obvious.

In Fig. 5 I have shown my improved system as modified to operate a sprinkler or distributer controlled by an ordinary plug cock or swivel screw valve. In this instance the fusible link 86 is connected to a fixed point, such as the pipe 87, while the other end is connected to the pin 88 passing through the loop 89, and retains the ring 89 in position. This ring is connected with the end of a lever 91, which is operated by means of a weight 92 to open the valve 93 and admit water to the distributer 94.

Having thus described these forms of my invention, I do not wish to be understood as being limited to the exact details of form and arrangement of parts herein set forth, for various changes may be made therein by any one skilled in the art without departing from the spirit and scope of my invention.

What I claim and desire to protect by Letters Patent is:

1. In a fire protective system, a primary endless wire, fusible links therein, an anti-friction device carried by a loop in said wire, tension means connected with said anti-friction device, and apparatus connected with said wire and operated by said tension means.

2. In a fire protective system, a device for operating protective apparatus, comprising a fixed inclined support, a releasable device connected with the apparatus to be operated, and adapted to rest upon and slide longitudinally of said inclined support, and to sustain the weight of parts of said apparatus, and a retractable part adapted to engage and be held in position by said support and adapted to hold said releasable device in normal position thereon, the inclination of said support being such as to permit said releasable device to slide therefrom upon the withdrawal of said retractable part.

3. In a fire protective system, a primary wire, fusible links therein, means for keeping said wire under tension, a pin connected with said wire, a fixed inclined eye, a link adapted to rest on said loop and be retained thereon by said pin, and apparatus connected with said link and operated by the disengagement of said link with said eye the force of the actuating parts of said apparatus being sustained by said fixed eye.

4. In a fire protective system, a wire freely movable longitudinally, fusible links connected with said wire, means for manually moving said wire longitudinally for testing the same, branch wires connected with said movable wire and devices connected with said branch wires and adapted to be operated by an abnormal movement of said movable wire caused by the fusing of said links.

5. In a fire protective system, a primary looped wire, tension means for said wire, fusible links therein, stops carried by the sides of said loop, a part through which said loop passes and carrying a hook, a second wire, means for holding said second wire taut, said hook engaging said second wire and operated by said stops, and apparatus connected with said second wire and operated thereby.

6. In a testing device for a fire protective system, a primary endless wire, devices therein mechanically operated by the presence of heat, a pulley or drum about which said wire passes, and means for manually turning the latter to move said wire in the direction of its length.

7. In a fire protective system, a wire, devices therein mechanically operated by the presence of heat, indicating tablet fixed to said wire, and a stationary part with which said indicating tablet is adapted to register to indicate the position of the wire.

8. In a fire protective system, a primary endless wire, fusible links therein, an antifriction device carried by a loop in said wire, tension means connected with said antifriction device, a strap through which the sides of said loop pass, stops on said loop adapted to engage said strap, secondary wires engaging said straps and apparatus connected with said secondary wires and operated by said tension means.

9. In a fire protective system, local wires extending through the space to be protected, fusible links in said wires, means for keeping said wires under tension, but allowing longitudinal movement as a whole, branch wires connected with said local wires, devices adapted to be operated by said branch wires, fixed inclined supports, releasable devices

resting on said fixed supports, retractable parts adapted to engage said fixed supports and hold said removable devices in position thereon, said removable devices and retractable parts being interposed in said branch wires.

10. In a fire protective system, a local wire extending through the space to be protected, fusible links in said wire, means for keeping said wire under tension, and at the same time allowing longitudinal movement as a whole, a branch wire connected with said local wire, a fixed inclined support, a valve adapted to be operated by said branch wire, a releasable device resting on said fixed support, a retractable part adapted to engage said fixed support and hold said removable device in position thereon, said removable device and retractable part being interposed in said branch wire.

11. In a fire protective system, local wires extending through different floors of a building, fusible links in said wires, means for keeping said wires under tension, but allowing longitudinal movement as a whole, branch wires connected with said local wires, distributing pipes, balanced valves in said pipes, wires connected with said valves, means for keeping said valves in their closed positions, fixed inclined supports, removable devices resting on said fixed supports, retractable parts adapted to engage said fixed supports and hold said removable devices in position thereon, said removable devices and retractable parts being interposed in said branch wires and adapted to interrupt the continuity of said wires to operate said valves.

12. In a fire protective system, main and branch distributing pipes, main and local valves in said pipes, local or primary wires operatively connected with said local valves, fusible links in said wires, secondary wires connecting said primary wires with the main valves, means for operating said main valves, by a movement of said secondary wires, and means for resetting said main valves at points distant therefrom.

Signed this 30th day of July, 1908, at New York city, county and State of New York.

HENRY B. HELM.

Witnesses:
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