

No. 780,073.

PATENTED JAN. 17, 1905.

C. A. TEAL.  
FIRE EXTINGUISHING APPARATUS.

APPLICATION FILED AUG. 18, 1903.

3 SHEETS—SHEET 1.

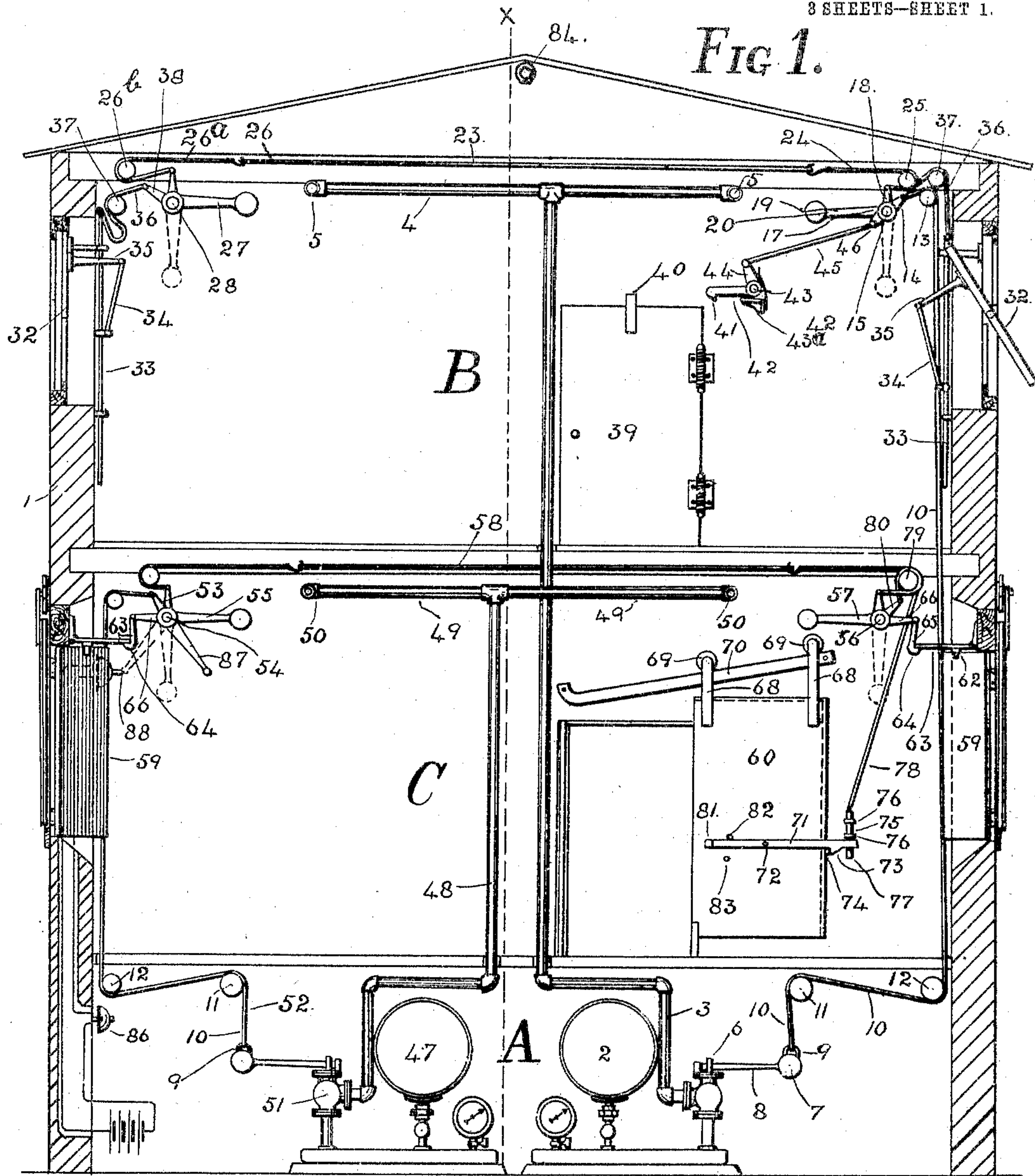


Fig. 4.

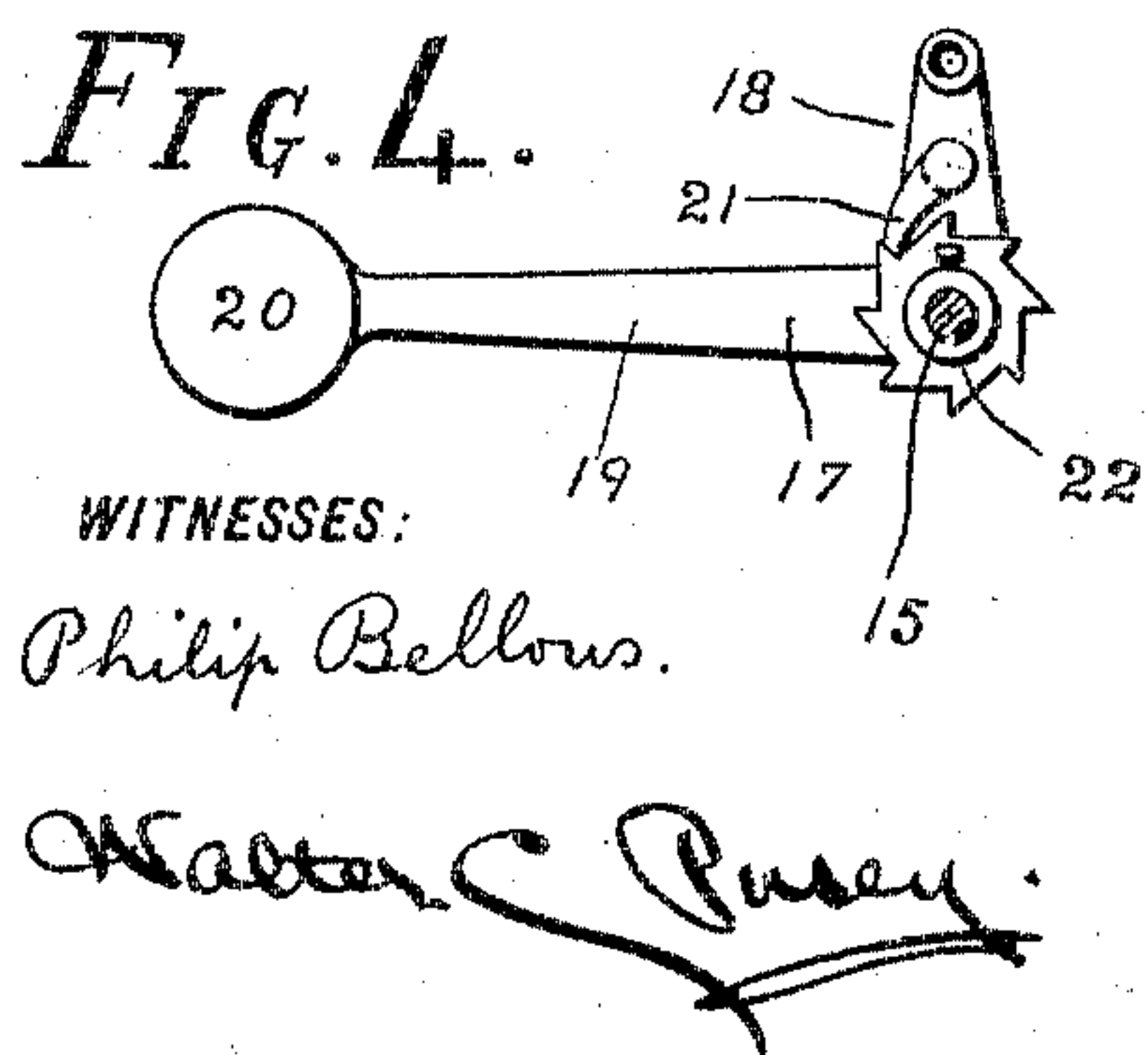
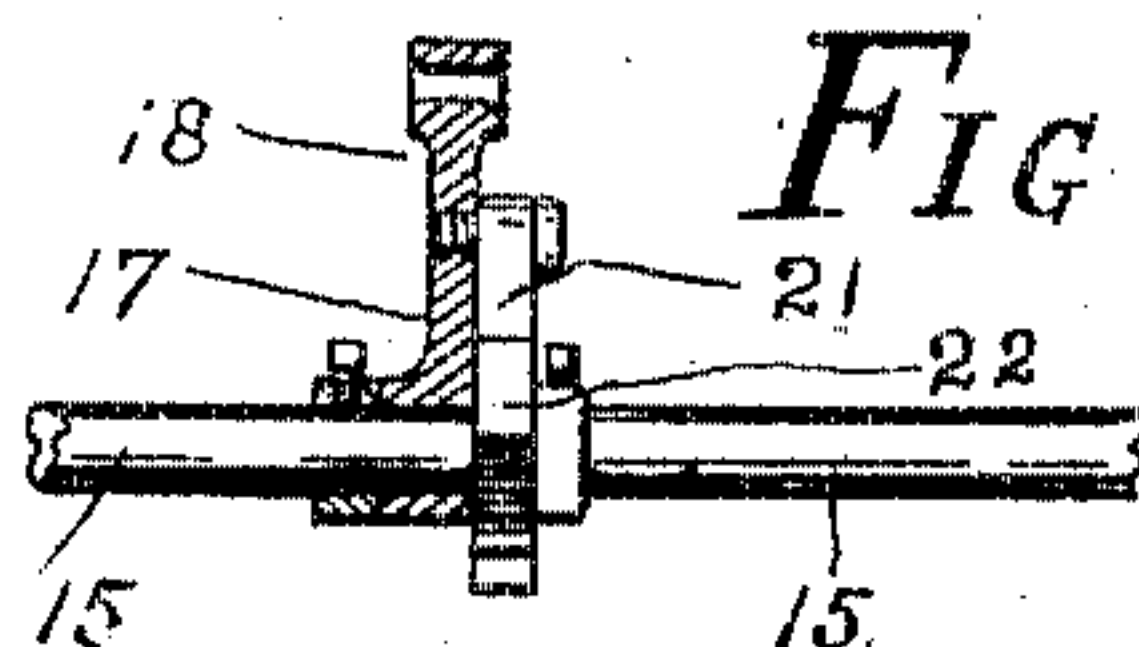


Fig 5.



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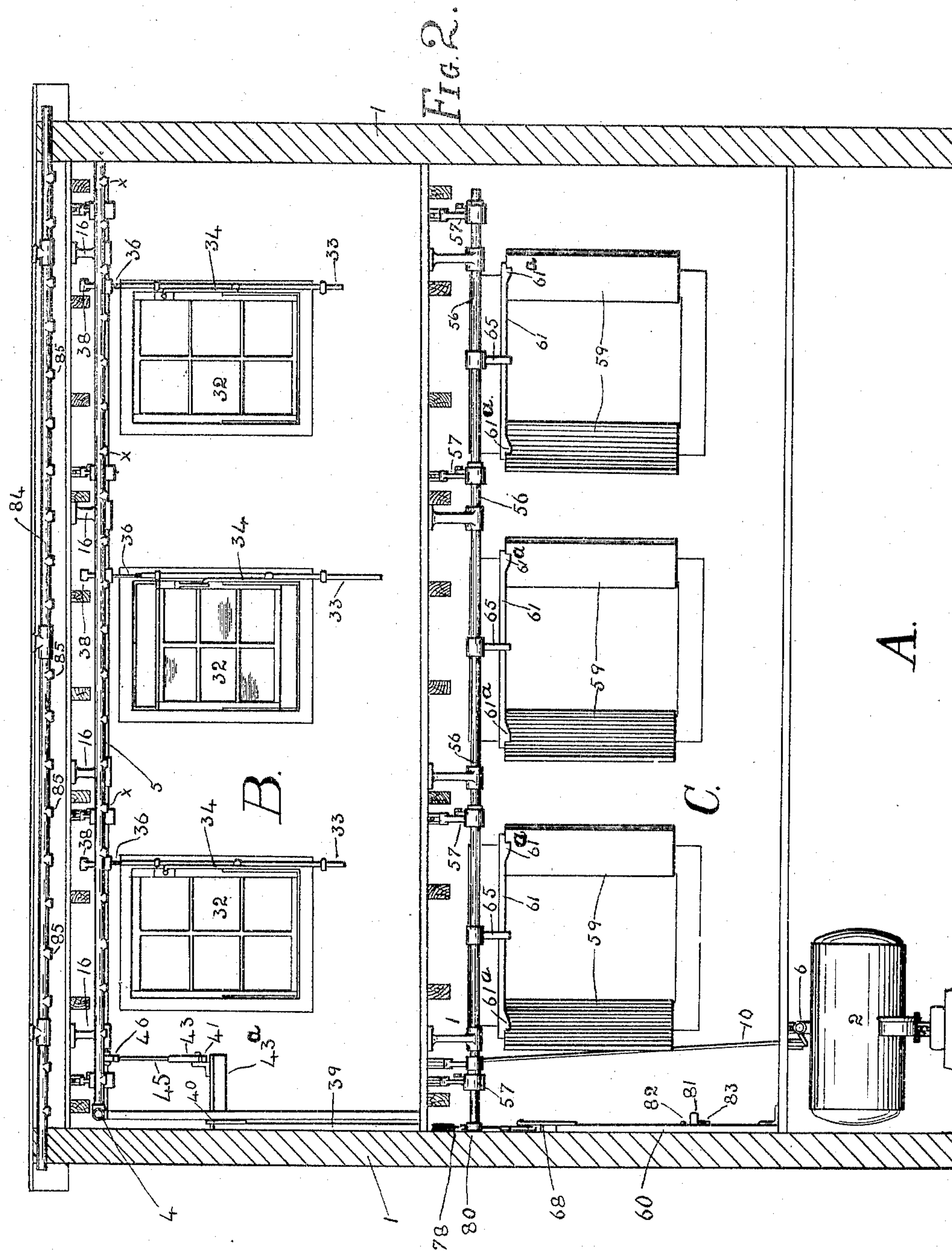
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3 SHEETS—SHEET 2.



WITNESSES:  
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Walter C. Pusey

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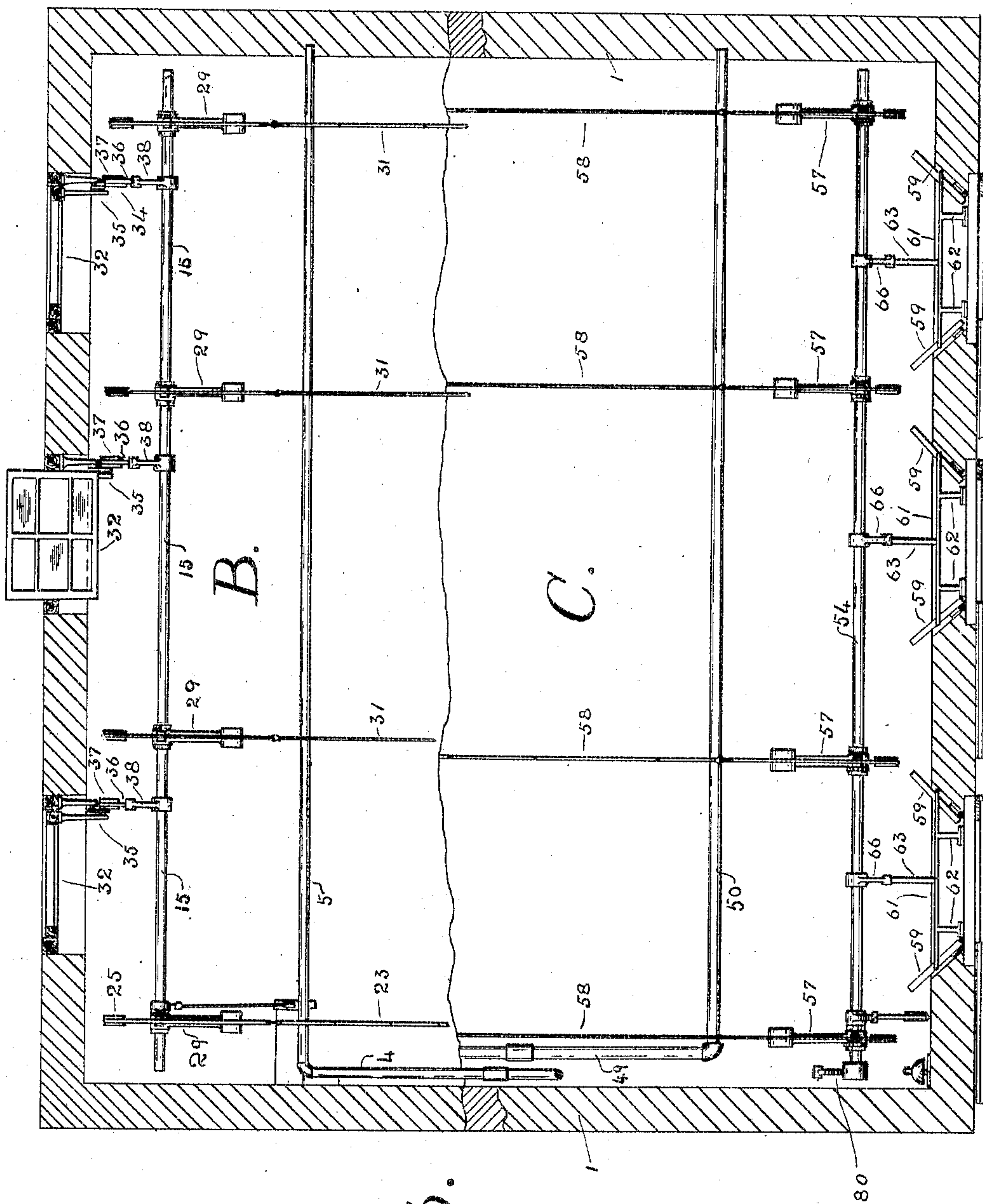


FIG 3.

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# UNITED STATES PATENT OFFICE.

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## FIRE-EXTINGUISHING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 780,073, dated January 17, 1905.

Application filed August 18, 1903. Serial No. 169,876.

*To all whom it may concern:*

Be it known that I, CHARLES A. TEAL, a citizen of the United States, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Fire-Extinguishing Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, of which—

Figure 1 is a sectional elevation of a building equipped with my invention. Fig. 2 is a sectional elevation on line *x x*, Fig. 1. Fig. 3 is a sectional plan view, the upper floor being broken away. Fig. 4 is a detail, enlarged, of one of the weighted levers in side elevation; Fig. 5, a sectional end elevation of the same.

This invention relates to apparatus for extinguishing fires in buildings by means of carbon dioxid which is liberated through mechanism that is adapted to be automatically put in operation by the separation of a fusible connection that is melted or softened by the heat of a fire occurring in the building.

The main object of the invention is to provide, in connection with such apparatus, means and mechanism whereby suitable doors or windows or the like of the building or a room thereof are caused to be automatically closed to prevent the escape of the carbon dioxid, which mechanism is set in operation through the burning or fusion of a suitable connection on the occurrence of a fire within the building or room.

The precise nature of the invention will clearly appear from the following specification, reference being had to the accompanying drawings.

Referring to the drawings, 1 denotes the building in which the apparatus is installed. On the lower floor A, or it may be termed a "basement" or "cellar," is a tank or receptacle 2, that is charged with carbon dioxid or other suitable fire-extinguishing gas under pressure, from which tank leads a pipe 3 to an upper story or room B of the building. This pipe communicates with a horizontal pipe 4, near the ceiling of the room, from the ends of which pipe extend pipes 5, having exit-orifices for the gas. Within pipe 3 is a valve 6, simi-

lar to a safety-valve, which is maintained normally closed by a weight 7 on the free end of an arm 8, that is pivoted on the valve-box and passes through a slot on the stem of the valve. Secured to said lever, in this instance to an eye 9 on the weight, is a chain or other non-flammable connection 10, that passes over a roller 11, under a roller 12, and over a roller 13 adjacent to the ceiling of the room B and is secured to an arm 14, projecting from a transverse horizontal shaft 15, which is journaled in brackets 16, Fig. 2, depending from the ceiling of the room. Mounted loosely upon said shaft is a bell-crank lever 17, having a short arm 18 and a long arm 19, carrying a weight 20 at its free end. The said short arm has pivoted to the side thereof a pawl 21, Figs. 4 and 5, that is adapted to engage the teeth of a ratchet-wheel 22, which is fixed upon the shaft 15, so that while the lever 17 may be turned upon the shaft in one direction it will rotate the shaft with it when turned in the opposite direction, as and for a purpose hereinafter explained. To the short arm 18 of said lever is secured one end of a fusible rod or connection 23, in this instance by an intervening chain or the like 24, that passes over a roller 25. The other end of the fusible rod may be fastened to the wall of the room; but in this case (for a purpose hereinafter described) it is connected by a chain 26<sup>a</sup>, passing around a roller 26<sup>b</sup>, to the short arm 26 of a bell-crank lever 27, which is a duplicate of lever 17, and is mounted on a shaft 28 similar to shaft 15 on the opposite side of the room and parallel with the latter. This lever 27 also has a pawl engaging a ratchet-wheel on the shaft, similar to the same parts in connection with lever 17. (Shown in Figs. 4 and 5.) At intervals along shafts 15 and 28 are other similar or supplemental bell-crank levers 29, with like pawls and ratchets, those levers, &c., on one shaft being opposite those on the other, and thereby forming pairs. Said other levers on shaft 28 are shown in Fig. 3 and those on shaft 15 in Fig. 2. Fusible rod connections 31 connect the short arms of the levers of the pairs in the same manner as that connecting the end levers 17 and 27. These several con-



nections, respectively, maintain opposite levers in the restrained potential position—that is to say, with their weighted long arms directed inwardly and horizontally, as shown.

5 At the side, or as in this instance at the opposite sides of the room B, are transversely-pivoted windows or sashes 32, each of which is adapted to be opened and closed by a device such as is frequently used for a like purpose in connection with transoms, the same  
10 consisting of a vertically-slidable rod 33, which is connected to the window by a lever connection comprising an arm 34, pivoted on said rod and pivotally connected with an arm 35, projecting from the window. One end of a chain  
15 36, Figs. 1 and 3, that passes over a roller 37, is secured to the upper end of the slidable rod 33 and its other end to an arm 38, Figs. 1 and 3, that is fixed upon the shaft 28. There are  
20 similar arms 38 on shaft 15, that are in like manner, respectively, connected with the slidable rods 33 for the windows on that side of the room.

39, Fig. 1, is a door with spring-hinges that  
25 tend to maintain the door in the closed position shown. When it (the door) is opened out, its upper edge, or in this instance a projection 40 thereon, is adapted to engage a hook or catch 41 on the free end of an arm 42 of a  
30 bell-crank lever 43, the other arm, 44, of which is connected by a chain 45 with an arm 46 on shaft 15, said bell-crank being pivoted to a bracket 43<sup>a</sup>, projecting from the wall of the room. The said catch locks the door in the  
35 open position against the stress of the spring-hinges.

Should a fire occur, the door and the windows being then in the open position and the bell-crank levers on shafts 15 and 28 and their  
40 connections being in the position shown in the drawings and any one of the fusible rods 23 or 31 become severed thereby, the said levers that had been held by the rod being thus released, their weighted arms descending cause  
45 the respective shafts 15 and 28 to rotate, whereupon the arm 14, drawing upon the chain 10, which is also attached to the valve-arm 8, raises the latter, and consequently the valve, and permits the flow of the carbon di-  
50 oxid, which finally escapes into the room through the openings in the pipes 5 and extinguishes the fire within the room. At the same time the arms 38 of the respective shafts 15 and 28 as they rotate draw upon the chains  
55 36, and so slide up the rods 33, and thus close the windows 32. Also the arm 46 on shaft 15, drawing back the chain 45, connecting said arm and the bell-crank 43, raises the hook-arm 42, thereby releasing the door 39, to be  
60 closed by its spring-hinges. It will be obvious that the rotation of the shafts 15 and 28 occurring when one or more of the fusible rods is severed does not affect the remaining rods and bell-crank levers, as the shafts  
65 merely turn in the latter. It will also be seen

that the said windows and door may be readily opened and closed by the hand without interfering with the devices for causing the same to close automatically when a fire occurs, as hereinbefore described.

70 The apparatus for extinguishing a fire occurring in a room C below room B is substantially identical with that for the latter room, and therefore does not require particular description, 47 being the gas-charged  
75 tank, similar to tank 2, from which leads a pipe 48 to a pipe 49 adjacent to the ceiling of the room and having branch pipes 50 with orifices for the escape of the gas. 51 is the  
80 valve in pipe 48, to the weighted arm of which valve is secured a chain 52, that is connected to an arm 53 on a shaft 54, upon which are mounted bell-crank levers 55, similar to the  
85 levers on shafts 15 and 28. A like shaft 56 on the other side of the room has like bell-crank levers 57, and the opposite levers are connected by fusible rods 58. I have shown, however, by way of illustration in connection  
90 with the apparatus in this room C, Fig. 1, windows or shutters 59 and also a door 60 of forms differing somewhat from the described windows and door in room B and suitable means for causing the automatic closure of  
95 said shutters and door through the rotation of the shafts 54 and 56, occurring when one or more of the fusible rods 58 become fused. Referring first to the said shutters, these are  
100 in the present instance at each side of the room, as shown. They are in pairs and pivoted to the window-frame, so as to open inwardly, and have spring-hinges tending to maintain them in the closed position. When  
105 opened out, as seen in Figs. 2 and 3 and at one side of Fig. 1, they are respectively held in that position by horizontal bars 61, that are secured to arms 62, whose inner ends are  
110 pivoted to the upper part of the window-casing. Projecting from each of said bars is an arm 63, Figs. 1 and 3, whose free end is adapted to be engaged by a hook 64 (clearly  
115 seen in Fig. 1) at the end of an arm 65, which is pivoted to and depends from a horizontally-extending arm 66, that is fixed to the shaft 56. Each of bars 61 is provided on the under  
120 side with lugs or projections 61<sup>a</sup>, that are adapted to engage the upper margin of the shutters when in the open position, as more clearly seen in Fig. 2. These lugs are also  
125 beveled inwardly, as seen in said figure, so that when the shutters are opened out they will by impinging against said beveled part push up the bars, which latter then fall back, and the lugs then lock the shutters in place. When, however, the shaft 56 is caused to rotate through the fusion of one of the rods 58,  
130 as described, the hooked arm 63 will obviously raise the said bars 61 and releasing the shutters the latter will be closed by their spring-hinges. The shutters may be readily closed by the hand by merely lifting up the



arm 63 sufficiently to cause the bar 61 to release the shutters, which then close automatically.

The door 60 above referred to is a sliding or rolling door, the same having at the top projecting pieces 68, at the free ends of which are rollers 69, that are supported on an inclined guideway or bar 70, whereby when the door is in the open position (that is, elevated) it will when released close by its gravity. It is held in the open position, as shown, by a latch-bar 71, that is pivoted at 72 to the side of the door, this bar having a lug 73 on its under side that when the door is opened engages over a projection or stud 74, that projects from the wall of the room. 75 is a pin that is adapted to slide vertically in eyes or staples 76, fixed to said wall, and has at its lower end a hook 77, that is adapted to engage the under side of the free outer end of the bar 71. A chain 78, passing over a roller 79, connects said pin with an arm 80, which projects from the shaft 56. When one of the fusible rods 58 is severed and the said shaft thus caused to rotate, the arm 80, drawing upon the chain, causes the pin 75 to lift the bar 71 and disengage lug 73 from stud 74, whereupon the door rolls down to the closing position. The door may be released by the hand when desired. To this end for convenience I extend the bar 71 forward beyond its pivot and provide a projecting handle 81 on its free end for operating the door and also the bar 71. A stop 82 limits the throw of the bar in one direction and a stop 83 in the opposite direction.

Various other constructions of windows, shutters, and doors adapted to be closed automatically by the release of the weighted bell-crank levers on rotatable shafts, occurring from the destruction of the fusible connections holding the levers restrained, may be used in lieu of those shown in the drawings. As will be understood, the purpose of having doors, shutters, or the like adapted to close automatically through the severance of one or more of the fusible connections is to prevent the escape from the room of the fire-extinguishing gas, yet which doors may be operated manually without impairing the integrity of the connections between them and the parts which cause or permit them to close automatically, as described.

It is necessary or desirable that the air within the room equipped with the apparatus shall be allowed to escape when the heavier fire-extinguishing gas is permitted to enter the room. To this end I provide at or near the top of room B a suitable exit-pipe 84, Figs. 1 and 2, leading outside the building and having orifices therein, also a similar pipe (not shown) in the upper part of room C.

In order to cause an alarm to sound when a fire occurs in the building, I provide an electric bell that is adapted to be caused to sound

immediately upon the fusion of one of the fusible rods, which bell may be located either in or adjacent to the building or at any desired point distant therefrom. I have shown such a bell placed within the room A of the building, the same being shown in Fig. 1 of the drawings and marked 86. This bell is in circuit which is normally opened, but is adapted to be closed when one of said fusible rods 58 is severed by an arm 87 on the shaft 56, which the rotation of the latter carries against the push-button 88, as indicated by the dotted outline of said arm, thereby closing the electric circuit and causes the bell to ring. There may be one of these alarm-bells for each room or a single bell adapted in like manner to be sounded by means of suitable connections when any of the fusible connections of any of the rooms of the building become severed by the heat of a fire occurring in such room.

I do not limit myself to the particular construction shown and hereinbefore described, as any one skilled in the art to which the improvement pertains may vary the same without departing from the essential principles of the invention.

I do not claim *per se* the combination of the rotatable shafts, the bell-crank levers mounted thereon, and the fusible connections secured to said levers, as the same are shown and described in United States Letters Patent No. 724,968, issued to me as assignor, &c., April 7, 1903, for a fire extinguishing apparatus; but

What I do claim as new, and desire to secure by Letters Patent, is—

1. In a fire-extinguishing apparatus, the combination with a tank for containing a fire-extinguishing agent, of a pipe leading from said tank into the interior of a room or building, a valve in said pipe adapted to normally close the latter, rotatable shafts arranged at opposite sides of the room or building, a series of weighted levers loosely mounted on said shafts, the levers of one shaft being arranged opposite to the levers of the other shaft and forming pairs, a fusible connection arranged between the levers of each pair to maintain the levers of the pair in restrained position, an arm fixed to one of said shafts, a connection between said arm and said valve to open the latter when the shaft is rotated, doors, shutters or the like at the sides of the room or building, means tending to maintain the same in closed position, releasable means for locking the same in open position, and connections between said locking means and the shafts for actuating the releasing means when the shafts are rotated to permit the doors, shutters or the like closing.

2. In a fire-extinguishing apparatus, the combination with a tank for containing a fire-extinguishing agent, of a pipe leading from said tank into the interior of a room or build-



ing, branch pipes connected to said pipe and  
having distributing-orifices for the exit of  
the extinguishing agent, a valve in said pipe  
adapted to normally close the latter, rotatable  
5 shafts arranged at opposite sides of the room  
or building, a series of weighted levers loosely  
mounted on said shafts and having lever-and-  
ratchet connections with said shafts, the le-  
vers of one shaft being arranged opposite to  
10 the levers of the other shaft and forming  
pairs, a fusible connection arranged between  
the levers of each pair to maintain the levers  
of the pair in restrained position, an arm  
fixed to one of said shafts, a connection be-  
15 tween said arm and said valve to open the lat-  
ter when the shaft is rotated, doors, shutters,

or the like at the sides of the room or build-  
ing, means tending to maintain the same in  
closed position, releasable means for locking  
the same in open position, and connections 20  
between said locking means and the shafts for  
actuating the releasing means when the shafts  
are rotated to permit the doors, shutters or  
the like closing.

In testimony whereof I have hereunto af- 25  
fixed my signature this 11th day of August,  
A. D. 1903.

CHARLES A. TEAL.

Witnesses:

WILLIAM E. CHAPMAN,  
WALTER C. PUSEY.