

June 6, 1933.

D. MAPES

1,912,458

SELECTIVE FIRE EXTINGUISHING SYSTEM

Filed Oct. 3, 1929

3 Sheets-Sheet 1

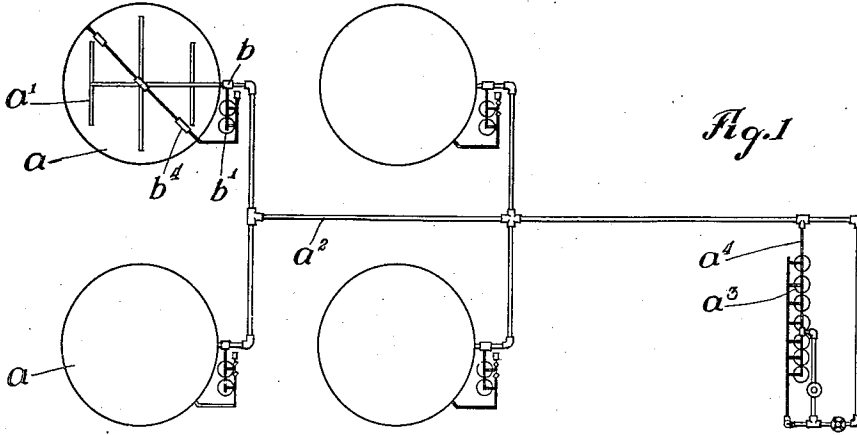


Fig. 1

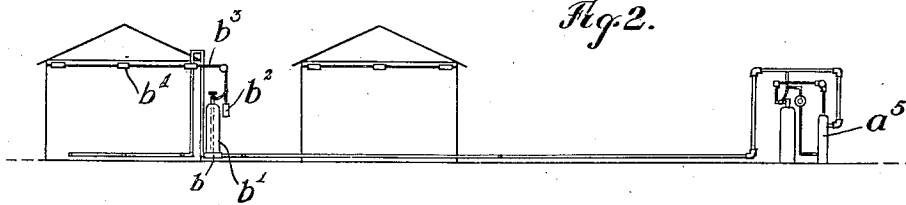


Fig. 2.

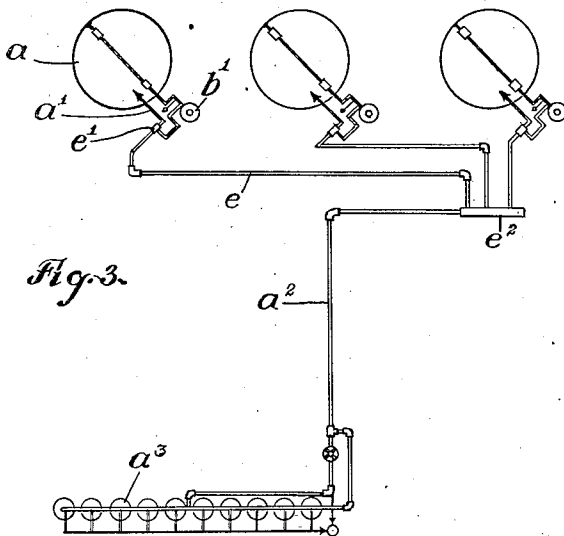


Fig. 3.

Inventor
Daniel Mapes

By his Attorneys
Kidding, Greeley, O'Shea & Campbell

June 6, 1933.

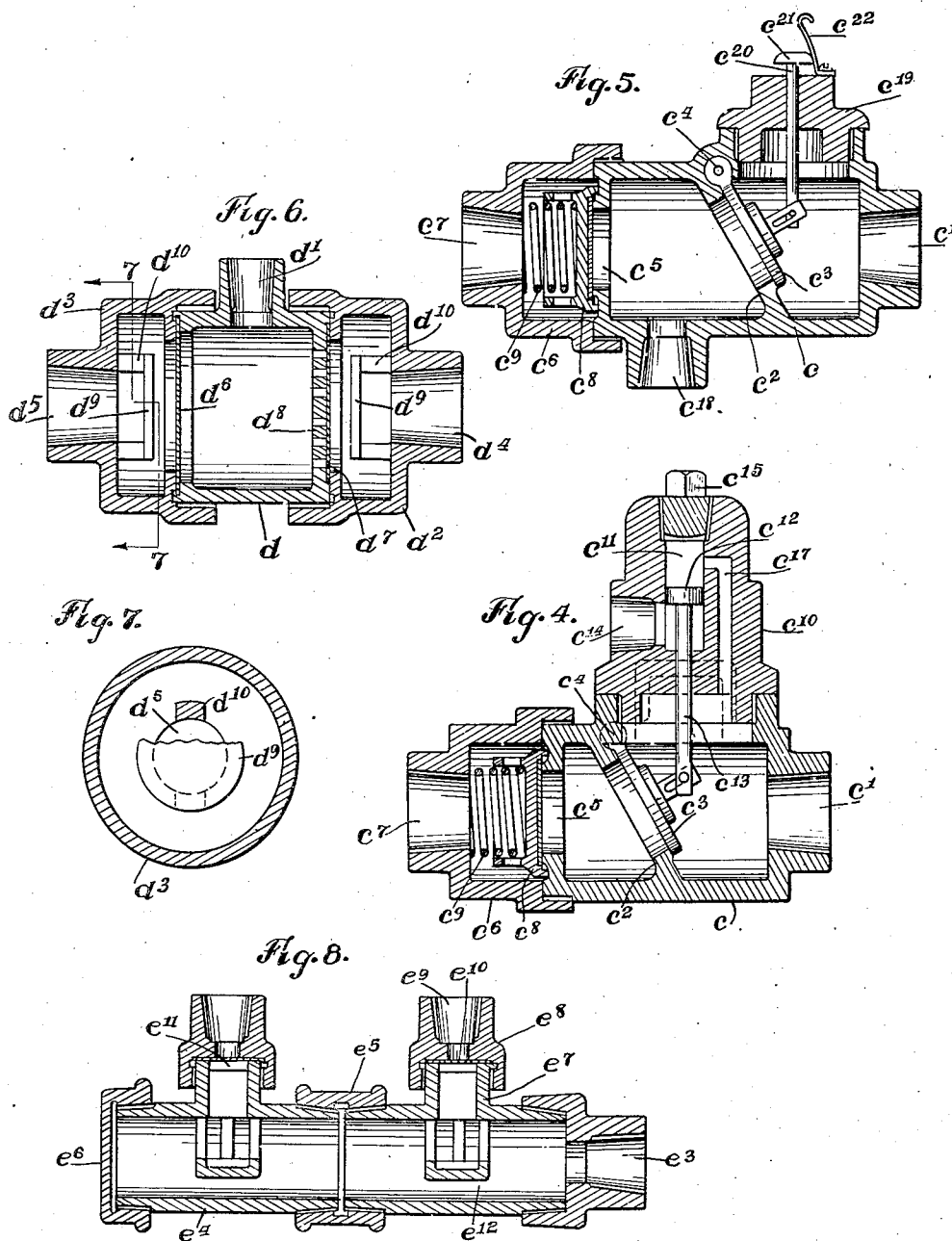
D. MAPES

1,912,458

SELECTIVE FIRE EXTINGUISHING SYSTEM

Filed Oct. 3, 1929

3 Sheets-Sheet 2



Inventor

Daniel Mapes

By his Attorneys
Redding, Peck, Gilman & Campbell

June 6, 1933.

D. MAPES

1,912,458

SELECTIVE FIRE EXTINGUISHING SYSTEM

Filed Oct. 3, 1929

3 Sheets-Sheet 3

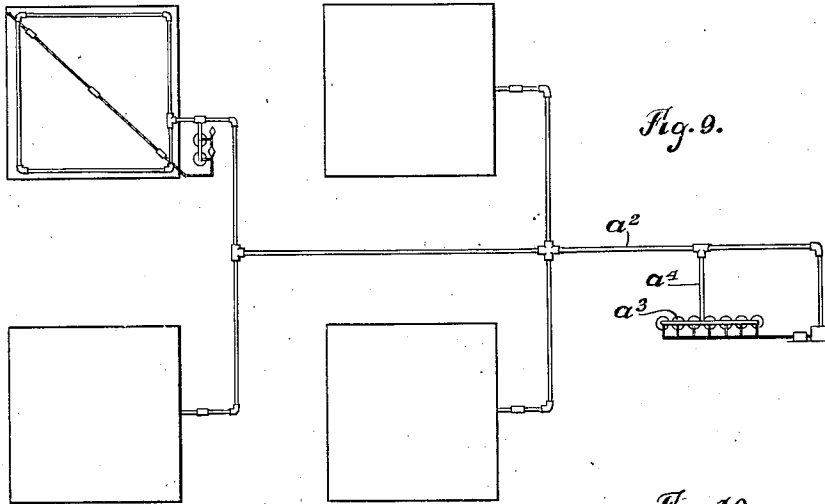


Fig. 9.

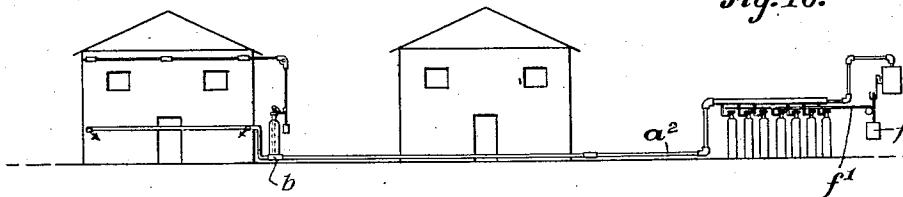


Fig. 10.

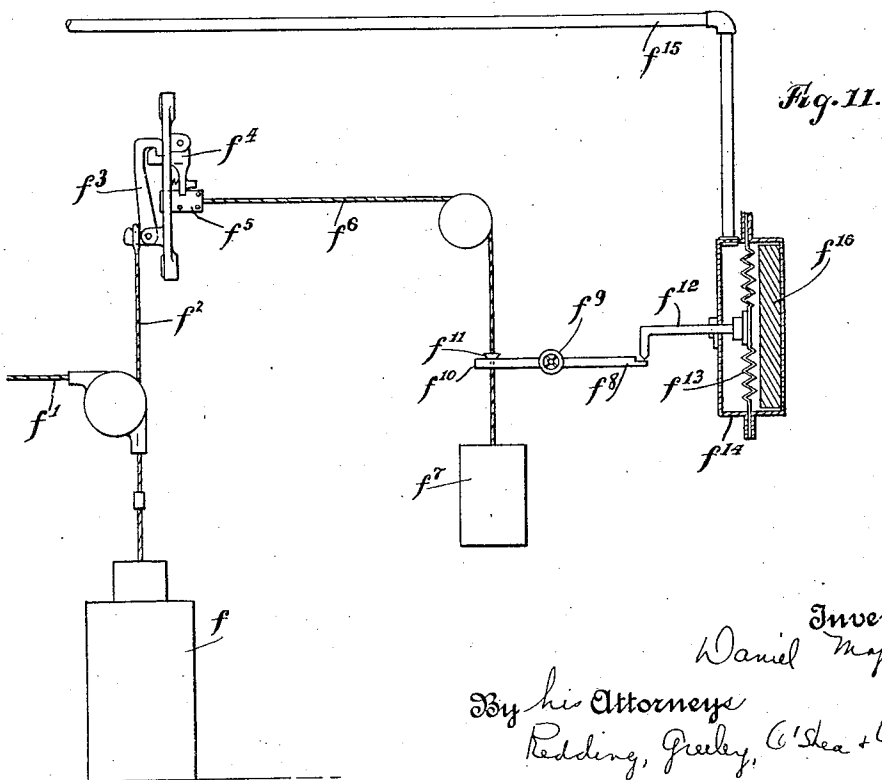


Fig. 11.

Inventor
Daniel Mapes

By his Attorneys
Redding, Greeley, O'Shea + Campbell

UNITED STATES PATENT OFFICE

DANIEL MAPES, OF MAMARONECK, NEW YORK, ASSIGNOR TO WALTER KIDDE & COMPANY, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

SELECTIVE FIRE EXTINGUISHING SYSTEM

Application filed October 3, 1929. Serial No. 396,985.

The present invention relates to fire extinguishing systems and embodies, more specifically, an improved fire extinguishing system which is adapted to supply a fire extinguishing medium from a common source to one or more of a plurality of spaces to be protected.

It frequently happens that the spaces to be protected against fire are quite large and hence require a considerable volume of fire extinguishing medium so that the expense of supplying sufficient fire extinguishing medium for all the spaces is very great. The need will therefore be seen for a system to automatically distribute the fire extinguishing medium from a common supply to any one of a plurality of spaces to be protected.

In certain instances, it is possible to obtain proper distribution of the fire extinguishing medium electrically but in other instances, as when electricity is not available, or when its use is dangerous by reason of proximity to gasoline tanks, etc., it is necessary to employ a completely mechanical fire extinguishing system.

An object of the invention, therefore, is to provide a fire extinguishing system which selectively serves a plurality of locations.

A further object of the invention is to provide a fire extinguishing system in which a common source of fire extinguishing medium is adapted to supply a plurality of locations, the number and identity of which are automatically selected.

A further object of the invention is to provide an improved form of selector valve by means of which the discharge of fire extinguishing medium into a space is prevented when there is no demand for such medium.

A further object of the invention is to provide an improved selector valve which is adapted to control the flow of fire extinguishing medium to a plurality of protected areas.

Further objects, not specifically enumerated above, will be apparent as the invention is described in greater detail in connection with the accompanying drawings, wherein:

Figure 1 is a plan view of a fire extinguishing system in which a plurality of independent locations are supplied from a common source of fire extinguishing medium and in

which the flow of the fire extinguishing medium to the individual locations is controlled by a selector valve constructed in accordance with the present invention.

Figure 2 is a view in side elevation, showing the system of Figure 1.

Figure 3 shows a fire extinguishing system in which the distribution of the fire extinguishing medium to a plurality of locations is controlled by a selector valve constructed in accordance with the present invention.

Figure 4 is a view in section, taken through the axis of a selector valve constructed in accordance with the present invention.

Figure 5 is a view in section, taken through the axis of a selector valve of a modified form.

Figure 6 is a view in section, taken through the axis of a selector valve of a still further modified form.

Figure 7 is a view in section, taken on line 7-7 of Figure 6, and looking in the direction of the arrows.

Figure 8 is a view in section, taken through the axis of a selector valve, such as used in the system of Figure 3.

Figure 9 is a plan view of a fire extinguishing system in which the discharge of the fire extinguishing medium is controlled in an improved manner.

Figure 10 is a view in elevation, showing the system of Figure 9.

Figure 11 is a detail view showing the means for controlling the discharge of the fire extinguishing medium in the system shown in Figures 9 and 10.

Referring to the above drawings, a designates each of a plurality of locations, herein shown as fuel tanks, to which a fire extinguishing medium is to be supplied in the event of fire.

Each location is provided with distribution piping a' supplied from a main pipe line a^2 . A bank of containers for a fire extinguishing medium is shown at a^3 and is connected to the main pipe line through an auxiliary pipe a^4 . The discharge of the fire extinguishing medium from these containers is controlled by a pressure gang release mechanism a^5 of the type illustrated in the

copending application of Daniel Mapes, Ser. No. 216,508, filed August 31, 1927.

A selector valve b serves as a connection between the distribution piping a' at each location, and the main pipe line a^2 , the construction of such valve being described more fully hereinafter. Control cylinders b' contain a fire extinguishing medium under pressure and communicate with the selector valves b . The discharge of the medium in the control cylinders is effected by a weight b^2 which is normally suspended and prevented from operation by means of a cable b^3 in which fusible links b^4 are connected. In the event of fire within any of the locations a , the fusible links b^4 will part and permit the fire extinguishing medium from the control cylinders to be discharged to the selector valves b of the locations in which the above operation has taken place. The pressure of the medium from the control cylinders is transmitted, in a manner to be described hereinafter, through the selector valves and to the pressure gang release mechanism a^5 which causes the discharge of the fire extinguishing medium within the main bank of containers a^3 into the pipe line a^2 . Each selector valve to which the pressure of the respective control cylinders b' has been applied permits the fire extinguishing medium from the main bank of containers a^3 to be discharged within the respective locations a , in a manner to be described hereinafter.

Referring to Figure 4, a selector valve is shown having a valve body c in which an inlet c' is formed for communication with the main pipe line a^2 . Within the valve body, a valve seat c^2 is provided upon which a valve c^3 normally seats, this valve being hinged at c^4 to the valve body c . A port c^5 is formed on the side of the valve c^3 opposite from the inlet port c' and a bonnet c^6 is secured to the valve body c adjacent port c^5 . An outlet c^7 is formed in the bonnet c^6 and is adapted to be connected to the distribution piping a' . Within the bonnet, a one-way valve c^8 is seated upon the valve seat or port c^5 by means of a spring c^9 . In order that the fire extinguishing medium may be discharged within the desired location, the corresponding valve or valves c^8 must be lifted from their seats against the action of the springs c^9 .

A second bonnet c^{10} is secured to the valve body on the side of the valve c^3 adjacent the inlet c' and is formed with a cylinder c^{11} in which a piston c^{12} moves. This piston is connected through a piston rod c^{13} to the hinged valve c^3 and the movement of the piston is thus transmitted to the valve. A port c^{14} communicates with the cylinder c^{11} at one end thereof and is adapted to communicate with the control cylinders b' of the proper location. A plug c^{15} serves as a cylinder head or closure for the upper end of the

cylinder and a positive stop for the piston c^{12} . A passage c^{17} communicates with the cylinder c^{11} and the interior of the valve body c adjacent the inlet c' and, in this manner, pressure from the port c^{14} moves the piston to an elevated position and, after the piston has moved beyond the passage c^{17} , supplies pressure within the main pipe line to actuate the pressure gang release mechanism. The valve c^3 , having been lifted from its seat, permits the pressure of the fire extinguishing medium from the bank of containers a^3 to be applied to the valve c^8 , unseating the same and supplying the fire extinguishing medium to the proper distribution piping.

In the construction shown in Figure 5, the valve body c is provided with a port c^{18} , positioned on the side of the valve c^3 opposite from the inlet port c' and communicating with the control cylinders b' . A bonnet c^{19} is used in place of the bonnet c^6 and slidably carries a stem c^{20} having a head c^{21} . The stem c^{20} is connected to the valve c^3 in a similar manner to that in which the connecting rod c^{13} is connected to the valve c^3 . A spring c^{22} is connected to the bonnet c^{19} to engage the head c^{21} and hold it in an elevated position after having been moved to such position by the valve c^3 . Pressure from the control cylinders b' applied to the valve c^3 through the port c^{18} effects such movement and the fire extinguishing medium will be released in a manner similar to that described in connection with the construction shown in Figure 4. It will be observed that the pressure from the control cylinders b' must not be sufficient to lift the valve c^3 from its seat c^5 .

A further modification in the construction of the selector valve is shown in Figures 6 and 7, in which a valve body d is formed with a port d' which is adapted to be connected to the desired control cylinders b' . The valve body d is formed with bonnets d^2 and d^3 at the opposite sides thereof, the bonnet d^2 having a port d^4 which is adapted to be connected to the main pipe line, and the bonnet d^3 having a port d^5 which is adapted to be connected to the distribution piping. A frangible disc d^6 is secured between the valve body and the bonnet d^3 , while a second frangible disc d^7 is connected between the valve body and the bonnet d^2 . A suitably formed reenforced grating d^8 is formed on the valve body d and serves as a seat for the frangible disc d^7 to prevent its rupture from pressure through the inlet port d^4 . The frangible disc d^7 is designed to rupture at a much smaller pressure from within the valve body d than the frangible disc d^6 , in this manner permitting a relatively small pressure from the control cylinders b' to rupture the frangible disc d^7 and operate the pressure gang release mechanism as described above. The frangible disc d^7 , having been ruptured, per-

mits the pressure of the fire extinguishing medium to be applied to the frangible disc d^9 , resulting in the rupture thereof, and the flow of the fire extinguishing medium through the outlet d^5 into the appropriate distribution piping. Suitable guards d^9 may be mounted upon legs d^{10} to prevent the frangible discs from being blown into the piping and resulting in the clogging thereof.

In the construction shown in Figure 3, the distribution piping a' is connected to auxiliary pipe lines e through valves e' which are similar to the construction shown in Figures 6 and 7, save that the frangible disc d^7 has been omitted therefrom. In this manner, pressure from the control cylinders b' is applied directly through the valves e' to pipes e . These pipes communicate with a manifold or distributing mechanism e^2 which is connected to the bank of containers a^3 through a main pipe line a^2 . Figure 8 illustrates the manifold construction and shows the manifold e^2 as having an inlet port e^3 for communication with the main pipe line a^2 . The manifold is formed of a plurality of sections e^4 , corresponding in number to the number of auxiliary pipe lines e . The sections are united by suitable fittings e^5 and an end cap e^6 serves to provide the necessary closure. Each section e^4 is provided with an extension e^7 carrying a fitting e^8 . This fitting is formed with an outlet e^9 which is connected to the proper auxiliary pipe line e and a frangible disc e^{10} is secured between the fitting e^8 and the extension e^7 . The aperture in the fitting e^8 communicating with the frangible disc e^{10} is smaller than that in the extension e^7 , thus permitting the seating of the reinforcing disc e^{11} , hereinafter referred to. After the rupture of the frangible disc e^{10} by the pressure from the auxiliary pipe line e , the pressure of the appropriate control cylinders is applied through the main pipe line a^2 and actuates the pressure gang release mechanism as applied above. The fire extinguishing medium will thus flow through such auxiliary pipe lines e as have conducted the medium from their respective control cylinders to the respective frangible discs e^{10} to cause the rupture thereof.

In order that the frangible discs not ruptured due to pressure from their respective auxiliary pipe lines may not be ruptured by the pressure of the fire extinguishing medium within the manifold e^2 , a reinforcing disc e^{11} may be secured to the frangible disc e^{10} and bear upon the shoulder formed by the restricted portion of each fitting e^8 . A cage e^{12} is mounted within each section e^4 and below the respective frangible discs to receive the discs which have been ruptured.

Referring to Figures 9, 10 and 11, the main pipe line a^2 communicates with the bank of cylinders a^3 through the pipe a^4 as described above. In place of the pressure gang release

mechanism, described above, the fire extinguishing medium from the cylinders a^3 is discharged by means of a weight f connected to the respective cylinders by a cable f' . This weight f is normally suspended and restrained from movement by means of a cable f^2 which engages a self-locking mechanism including a hook f^3 and a trigger f^4 . The trigger is moved by a cable f^6 , clamped at f^5 , to which a weight f^7 is connected. A lever f^8 is pivoted at f^9 and is formed with a yoked extremity f^{10} which engages a spool f^{11} secured to the cable f^6 . The lever f^8 normally sustains the weight f^7 in an inoperative position through the cable and spool since the opposite end of the lever is engaged by a trigger f^{12} which is connected to a diaphragm f^{13} . This diaphragm is connected in a housing f^{14} which communicates through a pipe line f^{15} with the main pipe line a^2 . Upon the existence of a sufficient pressure within the main pipe line, the diaphragm causes the trigger f^{12} to disengage the lever f^8 and permit the weight f^7 to release the trigger f^4 , thus causing the weight f to release the fire extinguishing medium within the cylinders a^3 . To prevent damage to the diaphragm, due to excessive pressure, a back plate f^{16} is provided, thus permitting only a limited movement of the diaphragm.

It will of course be understood that with the arrangements illustrated in Figures 9, 10 and 11, the diaphragm f^{13} can be made so sensitive as to respond to exceedingly small pressures, so that it is possible to actuate the diaphragm from control cylinders which, when released, have free and open communication with the outlet which they control, but which develop sufficient pressure to actuate the particular selective mechanism and send a pressure wave back through the conducting means to actuate the diaphragm.

While the invention has been described with specific reference to the construction shown in the accompanying drawings, it is not to be limited, save as defined in the appended claims.

I claim as my invention:

1. A fire extinguishing system comprising a source of fire extinguishing medium, a plurality of outlets to which said medium is supplied, means to conduct said medium to said outlets, controlling means to discharge the medium into said conducting means, means cooperating with each outlet to normally prevent the flow from said conducting means to the respective outlets, means to render ineffective such flow preventing means, a source of fluid pressure independent of the source of fire extinguishing medium adjacent each outlet for actuating the respective last named means, and means actuated by pressure transmitted through the conducting means from the last named source of pressure to actuate the controlling means.

2. A fire extinguishing system comprising a source of fire extinguishing medium, a plurality of outlets to which said medium is supplied, means to conduct said medium to said outlets, controlling means to discharge the medium into said conducting means, a source of pressure adjacent each outlet and independent of the source of fire extinguishing medium, means to actuate the controlling means by one of the sources, and means actuated by the source of pressure adjacent an outlet to direct the fire extinguishing medium from the conducting means to the corresponding outlet.

3. A fire extinguishing system comprising a source of fire extinguishing medium, a plurality of outlets to which said medium is supplied, means to conduct said medium to said outlets, controlling means actuated by a pressure within the conducting means to discharge the medium into the conducting means, a source of fluid pressure adjacent each outlet and independent of the source of fire extinguishing medium, means to prevent the pressure of said last named sources from being applied to the outlets, and means to direct the pressure through the conducting means to actuate the controlling means.

4. A fire extinguishing system comprising a source of fire extinguishing medium, a plurality of outlets to which said medium is supplied, means to conduct said medium to said outlets, controlling means actuated by a pressure within the conducting means to discharge the medium into the conducting means, a source of fluid pressure adjacent each outlet and independent of the source of fire extinguishing medium, means normally tending to release each of the last named pressure sources, heat actuated means to restrain the last named means, means to prevent the pressure of said sources from being applied to the outlets, and means to direct the pressure through the conducting means to actuate the controlling means.

5. A selective mechanism of the character described comprising a valve body, an inlet and an outlet communicating therewith, a check valve adjacent the outlet, a second check valve in the valve body, a port in the valve body, and means to unseat the second check valve.

6. A selective mechanism of the character described comprising a valve body, an inlet and an outlet communicating therewith, a check valve adjacent the outlet, a second check valve in the valve body, a port in the valve body, and means to maintain the second check valve unseated.

7. A selective mechanism of the character described comprising a chamber, an inlet and an outlet communicating therewith, means to prevent, normally, pressure from the inlet being applied to the outlet, a port associated with the chamber and means operable by a pressure from the port to render the means to prevent pressure from the inlet being applied to the outlet inoperative.

8. A selective mechanism of the character described comprising a chamber, an inlet and an outlet communicating therewith, means to prevent, normally, pressure from the inlet being applied to the outlet, a port associated with the chamber, means to prevent pressure from the port from being applied to the outlet, and means operable by a pressure from the port to render the means to prevent pressure from the inlet being applied to the outlet inoperative.

9. A fire extinguishing system comprising a source of fire extinguishing medium, a plurality of outlets to which said medium is supplied, means to conduct said medium to said outlets, fluid pressure operated controlling means to discharge the medium into said conducting means, distributing means in the conducting means to direct the medium to selected outlets, means adjacent an outlet to be supplied to actuate the distributing means to direct the flow from said conducting means to such outlet, and fluid pressure means adjacent such outlet operable upon a predetermined condition to actuate the controlling means.

10. A fire extinguishing system comprising a source of fire extinguishing medium, a plurality of outlets to which said medium is supplied, means to conduct said medium to said outlets, fluid pressure operated controlling means to discharge the medium into said conducting means, a distributing manifold in the conducting means connected to the respective outlets by independent pipes, said manifold including fluid pressure responsive means for normally preventing flow of the medium to the respective pipes, and means adjacent an outlet to be supplied to render ineffective the corresponding flow preventing means of the manifold and actuate the controlling means.

11. A fire extinguishing system comprising a source of fire extinguishing medium, a plurality of outlets to which said medium is supplied, means to conduct said medium to said outlets, controlling means to discharge the medium into said conducting means, means cooperating with each outlet to normally prevent the flow from said conducting means to the respective outlets, a source of fluid pressure independent of the source of fire extinguishing medium adjacent each outlet for rendering ineffective such flow preventing means, and means actuated by pressure transmitted through the conducting means from the last named source of pressure to actuate the controlling means.

This specification signed this 19th day of Sept. A. D. 1929.

DANIEL MAPES.