M. J. WALSH.

FIRE EXTINGUISHING APPARATUS.

APPLICATION FILED MAR. 18, 1914.

1,277,794.

Patented Sept. 3, 1918.

4 SHEETS—SHEET 1.

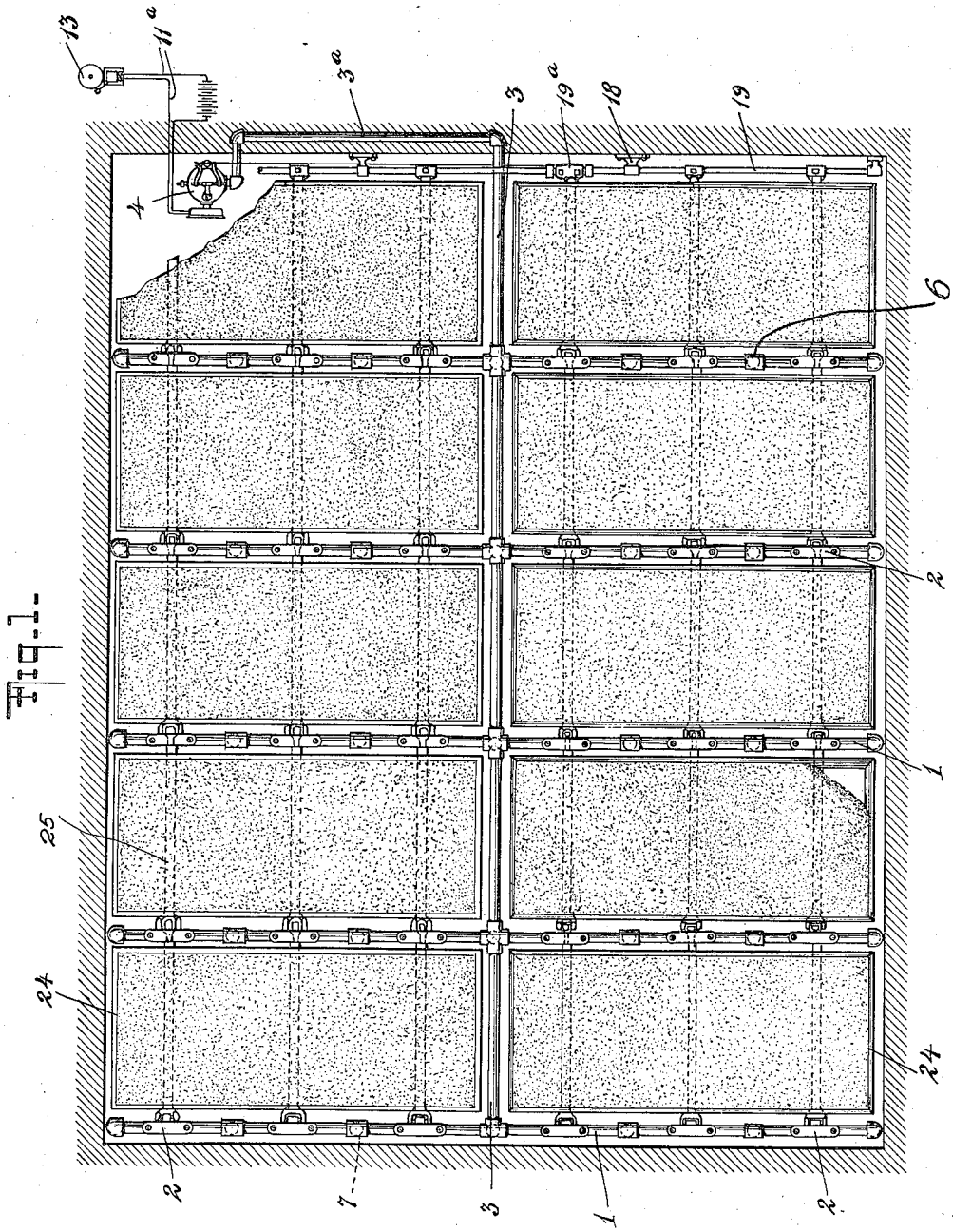


Fig. 1.

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4 SHEETS—SHEET 2.

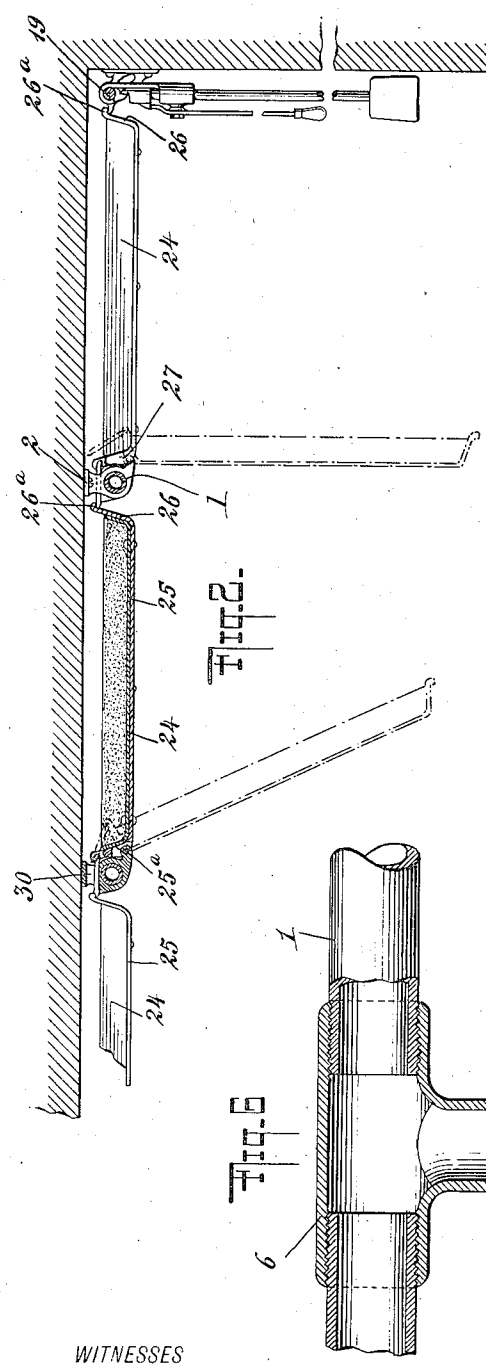


FIG. 2.

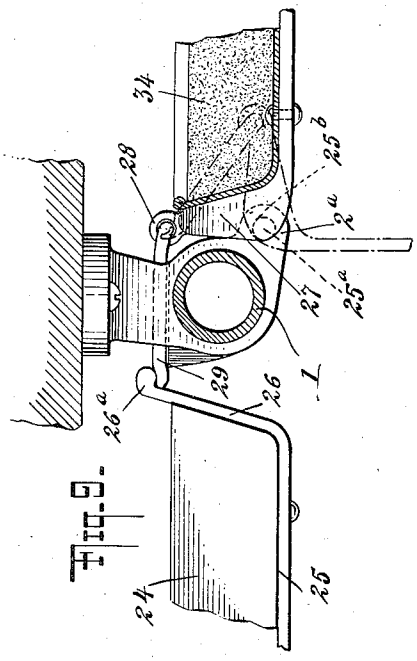


FIG. 3.

FIG. 5.

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4 SHEETS—SHEET 3.

FIG. 3.

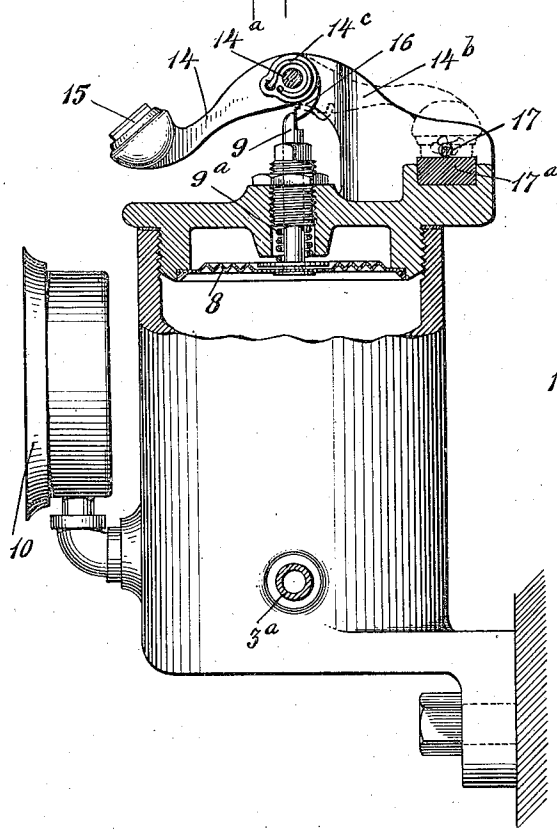


FIG. 4.

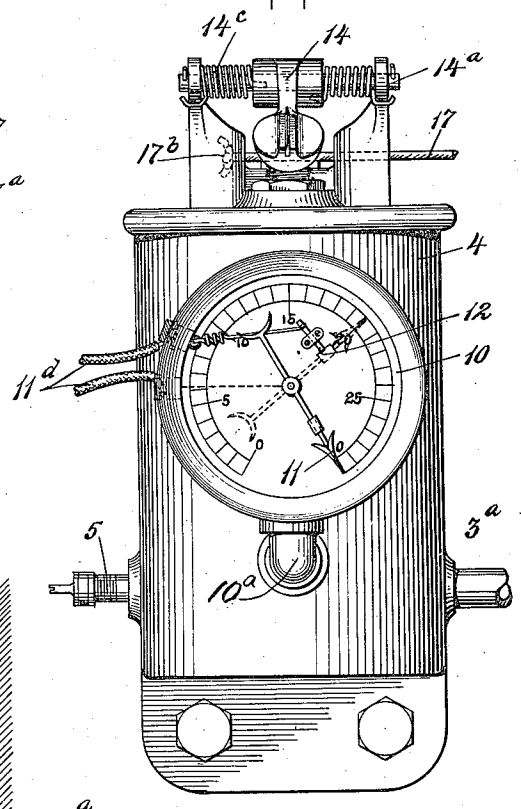
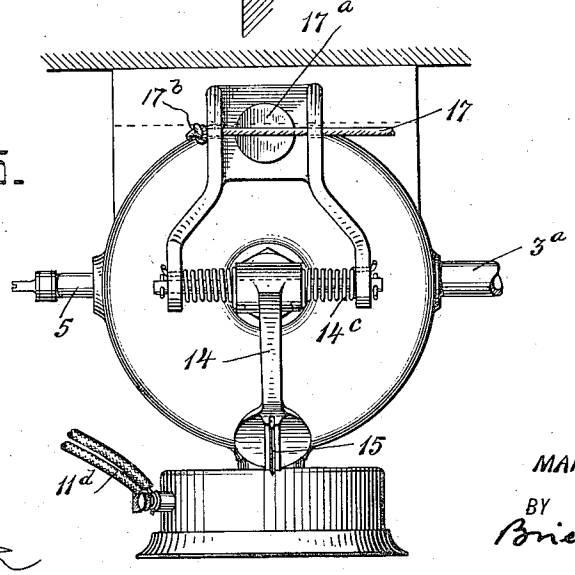


FIG. 5.



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4 SHEETS—SHEET 4.

FIG. 7.

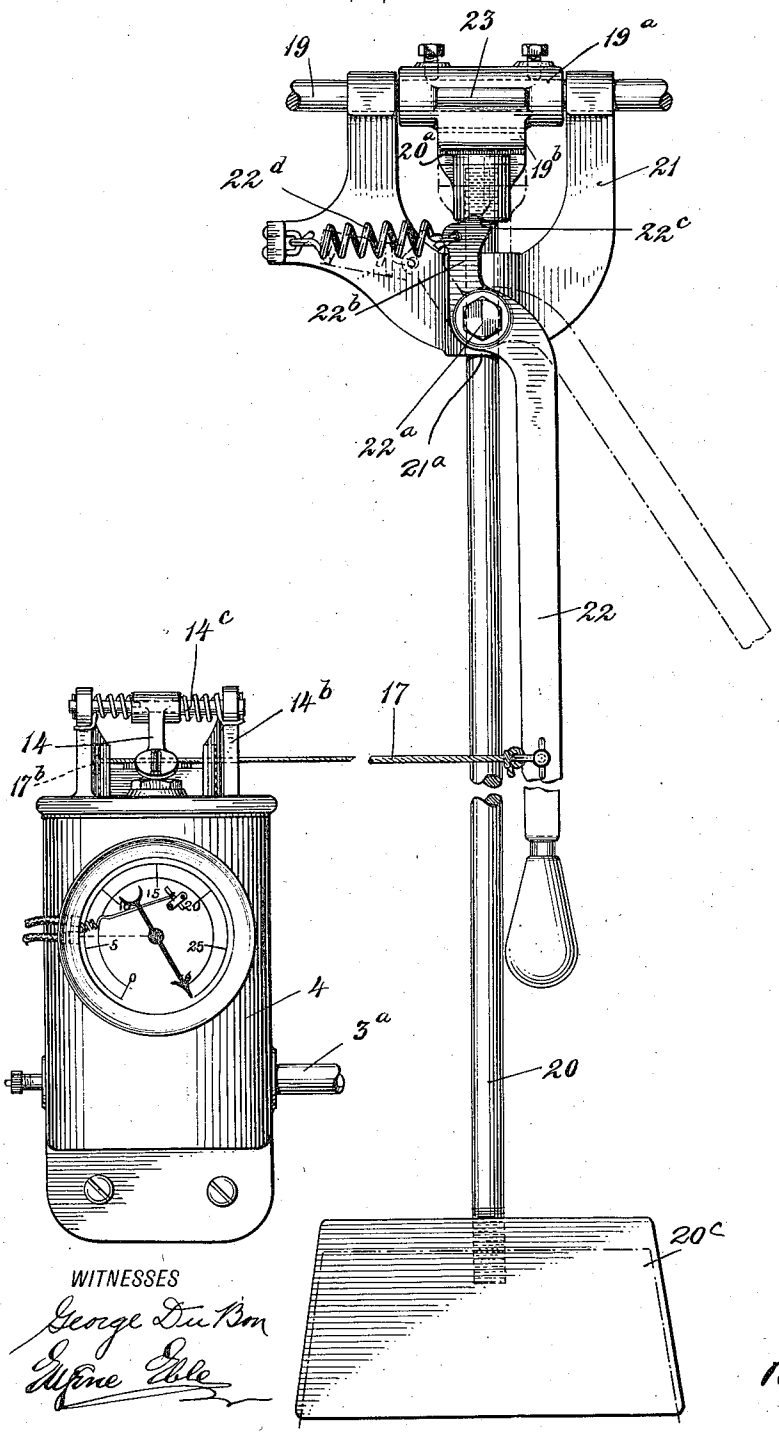
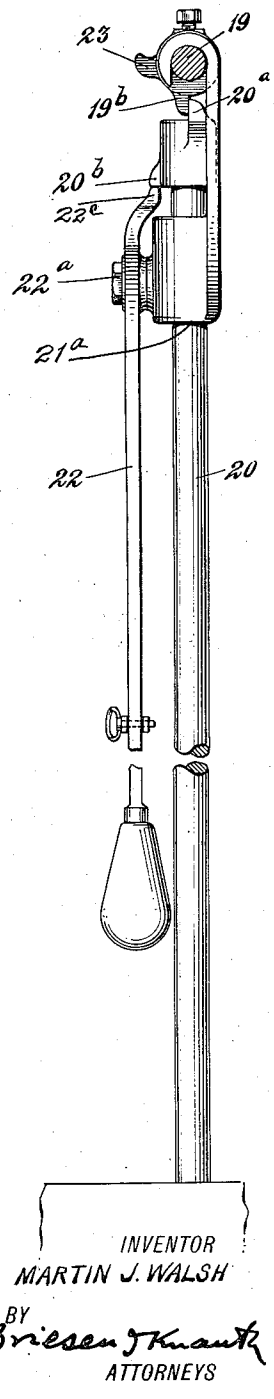


FIG. 8.



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UNITED STATES PATENT OFFICE.

MARTIN J. WALSH, OF NEW YORK, N. Y.

FIRE-EXTINGUISHING APPARATUS.

1,277,794. Specification of Letters Patent. Patented Sept. 3, 1918.

Application filed March 18, 1914. Serial No. 825,513.

To all whom it may concern:

Be it known that I, MARTIN J. WALSH, a citizen of the United States, and a resident of the borough of Manhattan, New York city, N. Y., have invented certain new and useful Improvements in Fire-Extinguishing Apparatus, of which the following is a specification.

My invention relates to a fire extinguishing apparatus and consists primarily in the utilization of sand or other finely divided non-combustible substances to extinguish the fire, the device being operated by hand or automatically as hereinafter described.

It is a well known fact that in the case of highly inflammable material, the sprinkler devices now in use wherein water is automatically liberated from pipes horizontally supported from the ceiling, the water will frequently aid in spreading and distributing the area of the conflagration, this being particularly true in establishments where chemicals, oils, naphtha, gasolene, benzin and other highly inflammable substances are employed, such as in cleaning establishments, garages, laboratories, etc.

By my present invention, this vital objection to the water sprinkler systems is avoided and it will be obvious also that by the employment of my extinguishing means, employing finely divided noncombustible material, such as sand, to quell the fire, the loss through the ruination of goods, wares and merchandise so frequent and enormous in the water sprinkler systems is, in most cases, wholly saved.

In the accompanying drawings, Figure 1 represents a plan view of my device, showing from above, the sand supports or receptacles and the pipes for automatically actuating said receptacles.

Fig. 2 is a cross section of Fig. 1 partly broken away.

Fig. 3 is an elevation partly in section showing the air pressure tank through which, as will hereinafter appear, the air for automatically operating my device is communicated to the pipes and which also contains the releasing mechanism for the receptacles, permitting the sand to be discharged in case of fire.

Fig. 4 is a front view of Fig. 3 in elevation.

Fig. 5 is a plan view of Fig. 4.

Fig. 6 is a detail view partly in cross section of the air containing pipes of my device showing a T-joint uniting two pipe sections, the downwardly extending tubular projection of said joint carrying a fusible metal cap to close the pipes against egress of air.

Fig. 7 is a detail view in elevation showing the mechanism intermediate of the air pressure pump and the operating shaft for releasing the supports or receptacles from their normal horizontal position.

Fig. 8 represents the like mechanism taken at right angles to Fig. 7.

Fig. 9 is a detail view of the mechanism connecting the successive sand supports or receptacles of a series of such supports.

In the form of my construction shown in Figs. 1 to 9 inclusive, I employ a series of intercommunicating pipe sections 1, which are supported from the ceiling of the room or loft by suitable brackets such as 2. The series of pipes 1 are air tight and are filled with air through the supply pipe 3, 3^a, which in turn receives the required air supply through the air pressure tank 4 into which air is pumped through the valve 5, which may preferably be a valve of the self-closing kind, known in the art as a Schroeder valve. The pipe sections 1 which may be of any desired length are united by T-joints 6 serving to bridge and hermetically close the separation between one pipe end and the adjacent pipe end. Each of these T-joints 6 is hermetically sealed by means of a fusible cap 7, which cap is made of such composition of material, preferably metal, that it will fuse when subjected to heat and thus result in the escape of air from the pipes 1, 3 and 3^a to operate the tank mechanism to be hereinafter described.

It is understood, of course, that if it be desired to construct the series of pipes as continuous pipes, instead of having them in sections with the connecting T-joint, such pipes may be formed with any appropriate outlet opening, which outlet opening is hermetically sealed by a fusion cap similar to the fusion cap 7 of the construction above described.

The interior of the tank 4 is provided with a diaphragm 8, which may be formed of any well known material and which completely closes the upper interior portion of the tank 4 against access of air from beneath it. This diaphragm will, by air pressure from

beneath, expand upwardly and through this expansion upwardly move the pin 9, which is carried by said diaphragm and projects through the top plate of the tank. Said pin 9 will thus be maintained in its upper or normal position as long as the air pressure from beneath exerts its force against said diaphragm, but will, upon the escape of air from the tank cause the diaphragm and pin to move downwardly.

The air pressure tank 4 carries a gage 10 and a pointer 11, connected to the interior of the tank by pipe 10^a, which indicate the extent of air pressure in the tank so that any escape of the air will instantly be recorded. In connection with the movement of the pointer 11, I set into operation an electric circuit 11^a so that in the event of escape of air from the tank or from the pipes the retrograde movement of the pointer will cause it to contact with a pin 12 through which contact an electric circuit is established between the dial and an alarm bell 13, causing said bell to sound. 11^d indicates the wires for establishing such circuit.

Supported on the top plate of the air pressure tank 4 a spring-actuated swinging lever 14 is provided, the same having its fulcrum upon a shaft 14^a supported in suitable standards 14^b projecting upwardly from the top plate of the air tank 4. The free end of this lever is provided with a knife or cutter 15 while the opposite or rearward end thereof is provided with a downwardly extending lip 16 which lip is located in vertical line with the upper portion of the movable pin 9. In the path of the swing of the lever 14 and its knife 15, I provide a block which, when the lever 14 operates under the impulse of its spring 14^c, will be violently impacted. In the normal position of the parts the lip 16 of the lever 14 is engaged by the pin 9, the air tank then being under air pressure and the pin 9 being maintained in its elevated position thereby, but when the air pressure from the tank is relieved and the pin 9 descends because of the reduction of such air pressure, its resultant disengagement with the lip 16 of lever 14 will release the knife lever 14 permitting it to swing about its fulcrum under the force of the spring 14^c and to strike the block 17^a, cutting the cord 17 thus to set into operation the releasing mechanism hereinafter described.

Secured in brackets 18 extending from the wall of the room to be equipped with my apparatus, and in proximity to the ceiling, a horizontal shaft 19 is revolubly mounted. This shaft is provided at its one end with a fixed collar 19^a having a downwardly projecting lug 19^b which lug is adapted to engage a lug or abutment 20^a carried by the upper end of a vertically movable rod 20. This lug 20^a in the upper or normal position of the rod 20 is held in abutment with the downwardly projecting lug 19^b of the shaft 19. To maintain the rod 20 in its upper position a depending bracket 21 is loosely mounted upon the shaft 19, the rod 20 passing through an opening 21^a in said bracket. The said bracket 21 carries a trigger lever 22 fulcrumed thereto at 22^a and the upper end 22^b of the trigger lever 22 is provided with a holding face 22^c normally to engage a lug or projection 20^b on the upper end of the rod 20, thus sustaining the rod and its lug 20^a against dropping by gravity out of engagement with the lug 19^b of the horizontal shaft 19. The lower end of the trigger lever 22 is maintained in its vertical, normal position by the rope or cord 17, the one end of which is secured to said lever 22 and the other end of which passes across the cutting block 17^a and is secured under tension at any convenient place beyond the cutting block, as indicated at 17^b. When this cord 17 is cut the holding face 22^c on the upper end of the trigger lever 22 is free to swing, under the tension of its spring 22^d, out of its holding contact with the lug 20^b on the rod 20, and the rod will descend by gravity, thus withdrawing its lug 20^a from engagement with the lug 19^b of the revoluble shaft 19, leaving said shaft 19 free to turn.

In addition to the vertically depending lug 19^b a series of additional lugs 23, are fixedly attached to shaft 19 by means of collars, these lugs 23 in normal position projecting approximately horizontally from the shaft and each of them being provided for the purpose of sustaining the first one of a series of receptacles or supports 24, illustrated in plan view in Fig. 1 (see also Figs. 2 and 9).

The receptacles or supports 24 shown in my drawings comprise a series of trays horizontally supported at a slight distance from the ceiling. These trays may be formed of metal and, as herein shown, by way of example, are secured upon a series of metal rods 25 which sustain the trays horizontally as hereinafter described, said rods 25 also serving to strengthen the tray bottom against curving under the weight of the material carried thereby. Each of these supporting rods 25 is bent upwardly as shown at 26, the upward bend terminating in a lip 26^a which, in the case of the first series of trays, engages the lug 23 secured upon the rock shaft 19. The opposite end of each of these rods is likewise turned upwardly as shown at 27 and terminates in a loop or ring 28 in which a movable member 29 is loosely mounted. This rearward end 27 of the rod 25 is formed also with a shaft or spindle 25^a to engage a bearing 25^b formed on an extension 2^a of bracket 2 whereby this end 27 of the rod will be hingedly supported by

said extension 2^a. A movable member, 29, is adapted to pass through an opening 30 in the pipe supporting bracket 2 and serves as the medium of connection to the next succeeding tray of the series, which contains a rod 25 formed similar to that of the first tray of the series and is similarly connected by a movable member 29 to the succeeding tray of the series, and so on, until the last tray of the series is reached, the rearward end 27 of which simply requires the spindle 25^a and bearing 25^b, without any movable member connection.

In the construction shown, it will be noted that the brackets 2 serve not only to support the pipes 1 but also as the bearing and support for the trays 24.

By the arrangement described, it will be seen that when the shaft 19 and its lug 23 swing downwardly, the lip 26^a will be disengaged from the lug 23 and the tray will swing by gravity from horizontal to vertical position, its opposite end 27 swinging about its bearing in the extension 2^a; the resultant pull upon the movable member 29 for the next succeeding tray, will disengage the movable member 29 from its supporting position for the lip 26^a and said succeeding tray will likewise swing by gravity from horizontal to vertical position and so on throughout the series, in rapid succession. The downward swing of these receptacles 24 will result in the discharge by gravity of their contents of noncombustible material to quell the fire therebeneath.

The supports or receptacles 24 for the minutely divided noncombustible material such as sand after having oscillated to their vertical position may be restored to their normal horizontal position by raising the first of the series of trays to horizontal position by resetting the shaft 19 and the lug 23 to their normal position, (see Fig. 8) and by resetting the vertical rod 20 and its trigger lever 22 (see Fig. 7). The movable member 29 will thereby be restored in the slot of the bracket to its approximately horizontal position and the successive trays in being pushed upwardly will abut against the underside of this movable member 29 carrying it upwardly until the lip 26^a has cleared it whereupon, upward pressure being relieved, the lip 26^a will drop into engagement with the upper surface of said movable member 29. The same operation occurs with all of the next succeeding trays in order to bring them to their normal position. The trays may then again be refilled by pumping the extinguishing material through a hose into these receptacles or any other desired manner.

I shall now describe the full operation of the mechanism above specified:

All the sand receptacles are in the position shown in Fig. 1. The air pressure tank 4 is charged with air and through its pipe 3^a, 3, all of the pipes 1 are under air pressure of, say, thirty pounds; the pointer 11 has moved over the dial indicating the thirty pound pressure. A fire starts beneath the receptacles producing in its early stages a rise in temperature sufficient to result in fusing one or more of the fusible caps 7. Immediately air escapes through the resultant opening of the system of pipes so that the air pressure of thirty pounds originally indicated by the dial pointer is reduced to twenty pounds, the pointer moving to the twenty pound position where it contacts with the contact pin 12 establishing the circuit to ring the electric alarm 13. Meanwhile, the pin 9 is receding from its uppermost position because of the reduced air pressure against the diaphragm or piston. If at this stage of the fire note has been taken thereof and it be found that the sand extinguishment will not be necessary to quench the fire, manual pressure may be brought against the trigger lever 22 to prevent the revolution of the shaft 19 and the resultant emptying of the receptacles. If, however, no note has been taken of the ringing of the alarm, air pressure in the tank will continue to decrease with the result that the pin 9 will descend sufficiently to disengage itself from the knife lever lip 16 causing said lever instantly to swing, bringing its sharp knife violently upon the cord 17 resting on the block 17^a. The cord is thus cut, the holding face 22^c of the trigger lever 22, under the tension of its spring 22^d is instantly withdrawn from its holding contact with the lug 20^b on the vertical rod 20 and this rod by gravity (which may be accelerated by means of a weight 20^c) will drop, carrying its lug 20^a out of engagement with the depending lug 19^b fixed upon the horizontal shaft 19. This release-ment and the weight of the sand receptacles supported by the lug 23 of the shaft 19, will cause the release of the first series of sand receptacles by removing the lug 23 from its holding position for the lip 26^a of the supporting rod 25. As heretofore explained, the receptacle will thereupon swing to vertical position and cause all the other receptacles likewise so to swing, emptying their contents of sand or other noncombustible material.

It will also be understood that, although in Figs. 1–9, inclusive, I have shown my invention in connection with an automatic release of the non-combustible material the automatic releasing feature may be dispensed with and the trigger lever 22 may be manually operated to result in the turning of the shaft 19 and the release of the sand receptacles. In that case the cord may be manually cut or unfastened at either of its holding ends.

It will also be understood that the spirit and gist of my invention, which comprises,

primarily, the employment of sand or finely divided noncombustible material and means for permitting the same to be released may be practised through a variety of mechanisms equivalent to that shown in my drawings, without departing from the spirit of my invention.

I claim:

1. A fire extinguishing apparatus comprising a series of pivoted supports, a movable member connected to one support and extending therefrom into contact with another support of the series; finely divided noncombustible material maintained substantially horizontally upon said supports; a rock shaft, a lug upon said rock shaft engaging one of said supports to maintain it in substantially horizontal position, and means located in proximity to the ceiling for holding said rock shaft and lug and releasing them to release said supports.

2. A fire extinguishing apparatus comprising the combination of a plurality of brackets secured from the ceiling; a plurality of adjacent oscillating supports carried by said brackets and normally maintained in horizontal position; finely divided noncombustible material carried by said supports and means between the adjacent supports so that the movement of one of said supports will cause the movement of the adjacent support.

3. A fire extinguishing apparatus comprising the combination of a series of swinging supports secured adjacent the ceiling and normally maintained in supporting position, finely divided noncombustible material upon said supports, a movable connection extending from one to the other of said supports, said connection serving normally to sustain the latter of said supports in supporting position but through its movement to release the same.

4. A fire extinguishing apparatus comprising the combination of a plurality of successive oscillating supports; finely divided non-combustible material maintained upon said supports, brackets depending from the ceiling supporting said supports, a movable latch connected to one, and extending into engagement with the other of said supports, said latch being adapted by the oscillation of the one of said supports to release the other of said supports.

5. A fire extinguishing apparatus comprising the combination of a plurality of brackets depending from the ceiling; a plurality of swinging supports, supported by said brackets and normally maintained in a substantially horizontal position; finely divided noncombustible material maintained upon said supports; means between adjacent supports so that the movement of one of said supports will cause the movement of the adjacent support, and a fusible means located in proximity to the ceiling for releasing said support.

6. A fire extinguishing apparatus comprising the combination of a plurality of supports pivotally secured adjacent the ceiling and normally maintained in supporting position, finely divided noncombustible material upon said supports and a movable member extending between said supports.

In testimony whereof, I have hereunto set my hand in the presence of two subscribing witnesses.

MARTIN J. WALSH.

Witnesses:
EUGENE EBLE,
GEORGE DU BON.