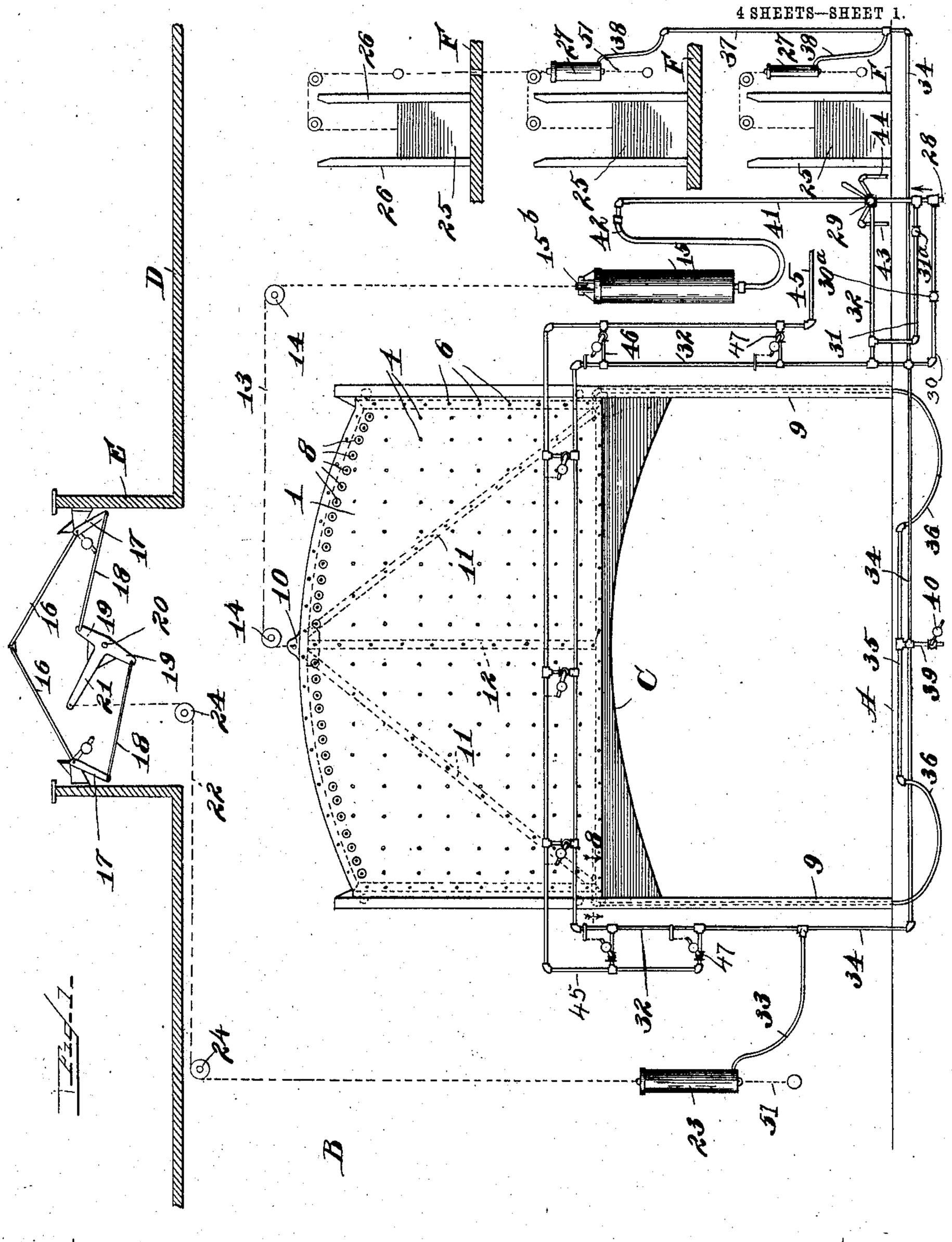
No. 780,546. PATENTED JAN. 24, 1905.

G. WEISS & J. ZIMMER.

SAFETY SYSTEM FOR THEATERS.

APPLICATION FILED JAN. 28, 1904.

4 SHEETS—SHEET 1.



Witnesses—

G. A. Bauerschmidt

George L. Chindahl

Inventors.

George Weiss

John Zimmer

By Luther L. Miller

Atty.

No. 780,546. PATENTED JAN. 24, 1905.

G. WEISS & J. ZIMMER.

SAFETY SYSTEM FOR THEATERS.

APPLICATION FILED JAN. 28, 1904.

4 SHEETS—SHEET 2.

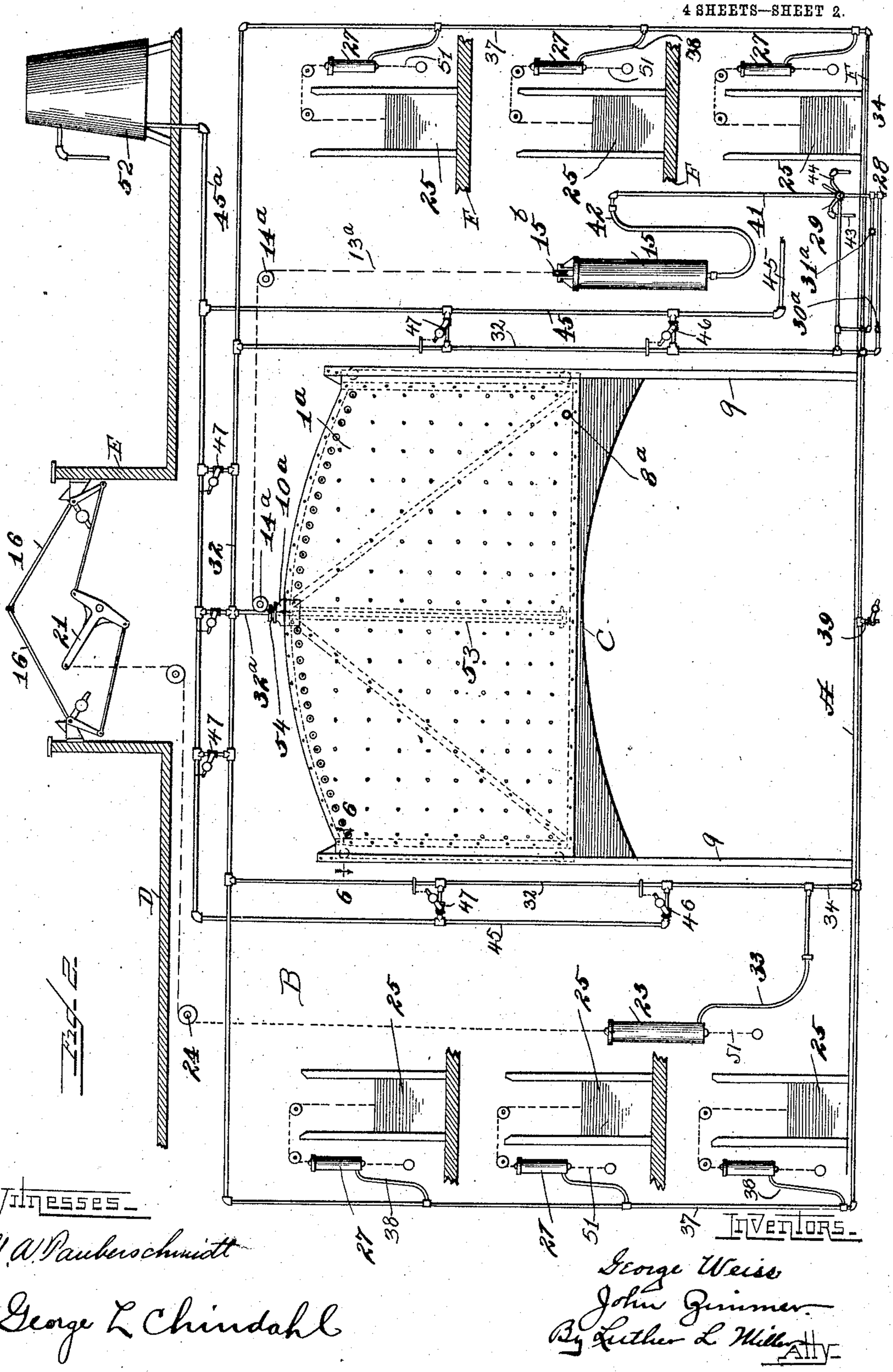


Fig. 2.

Witnesses—

G. A. Pauberschmidt

George L. Chindahl

Inventors—

George Weiss

John Zimmer.

By Luther L. Miller Atty.

No. 780,546. PATENTED JAN. 24, 1905.

G. WEISS & J. ZIMMER.

SAFETY SYSTEM FOR THEATERS.

APPLICATION FILED JAN. 28, 1904.

4 SHEETS—SHEET 3.

Fig. 3.

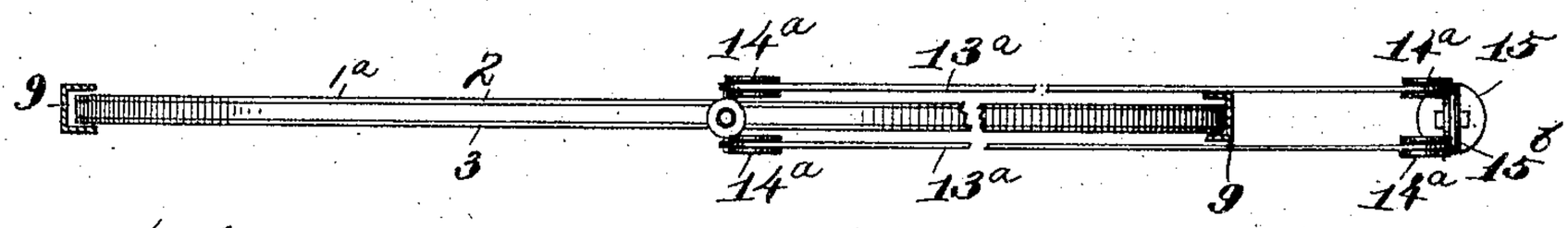


Fig. 4.

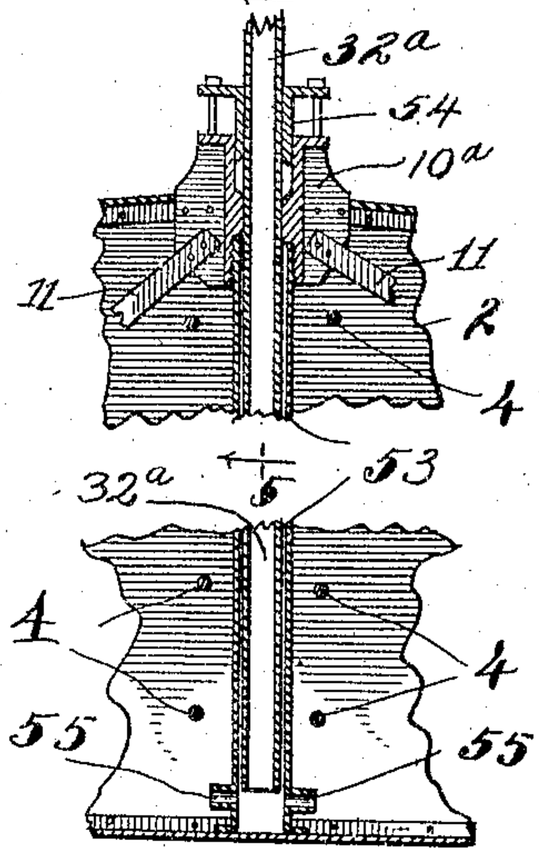


Fig. 6.

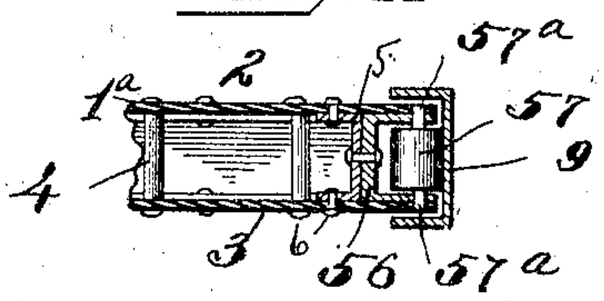


Fig. 5.

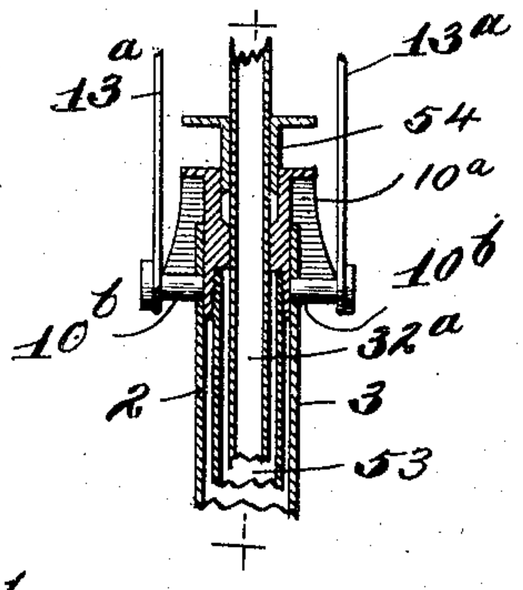


Fig. 9.

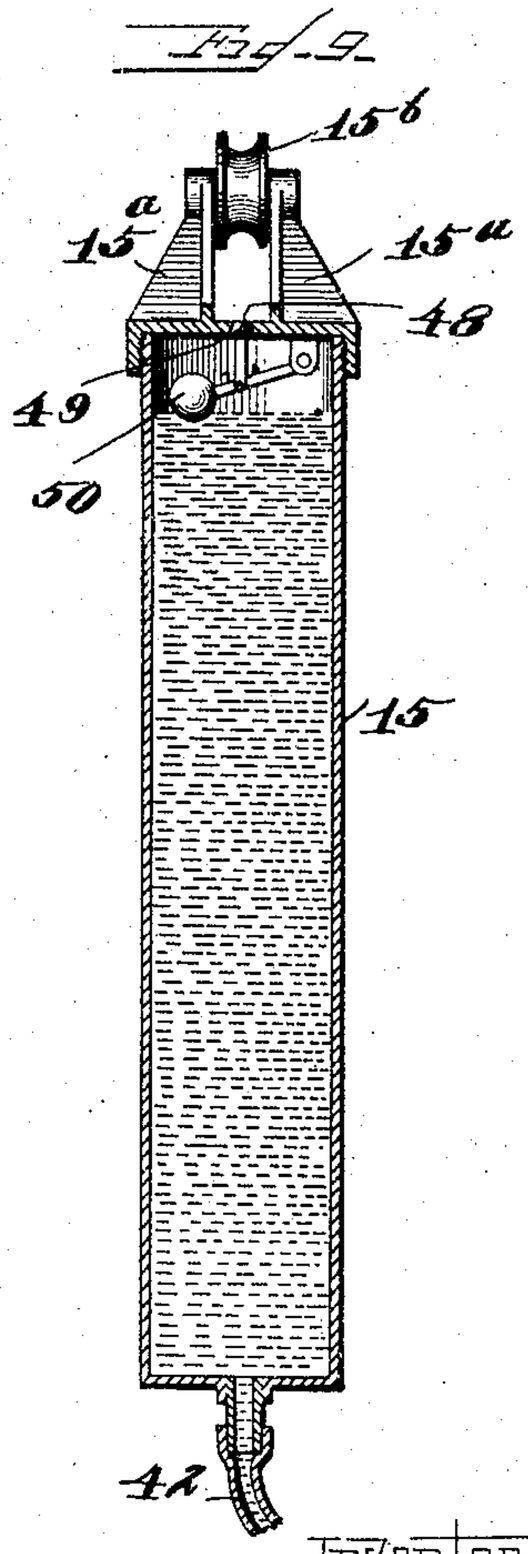


Fig. 7.

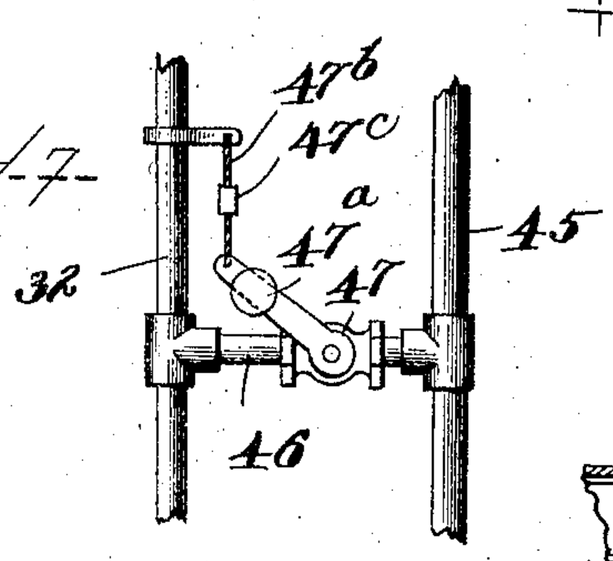
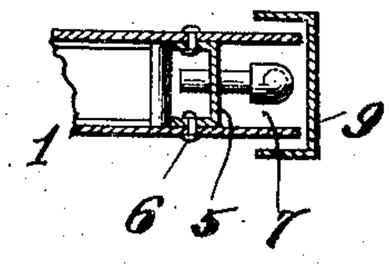


Fig. 8.



Witnesses.

G. A. Pankenschmidt

George L. Chindahl

Inventors.

George Weiss

John Zimmer.

By Luther L. Miller.

Atty.

No. 780,546. PATENTED JAN. 24, 1905.

G. WEISS & J. ZIMMER.

SAFETY SYSTEM FOR THEATERS.

APPLICATION FILED JAN. 28, 1904.

4 SHEETS—SHEET 4.

Fig. 13.

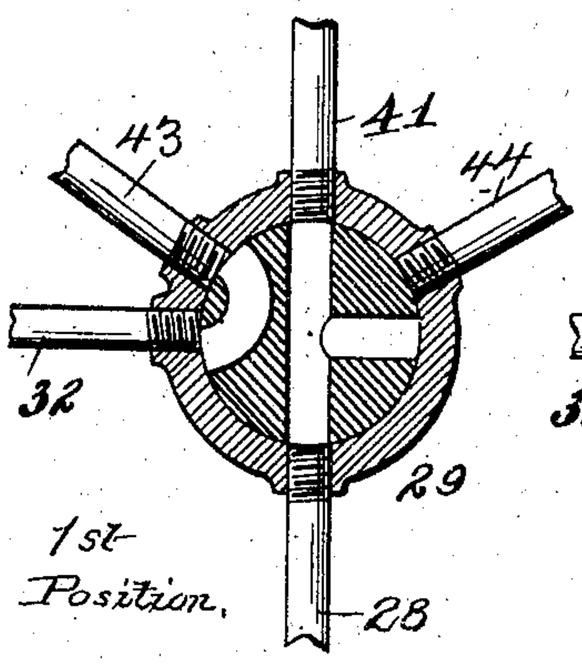


Fig. 14.

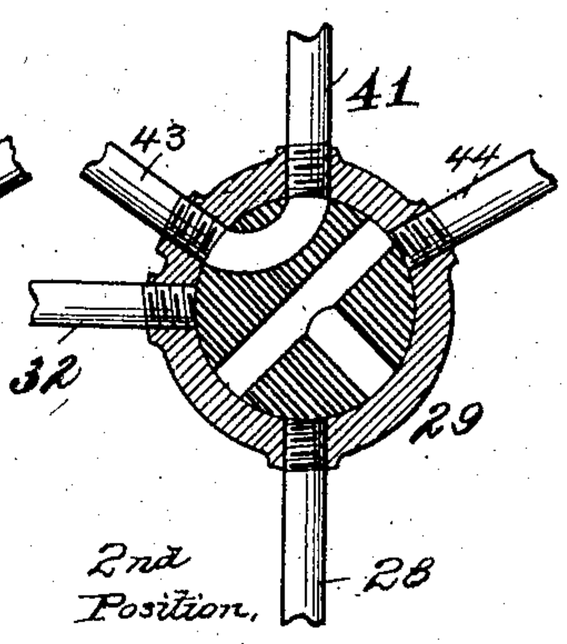


Fig. 15.

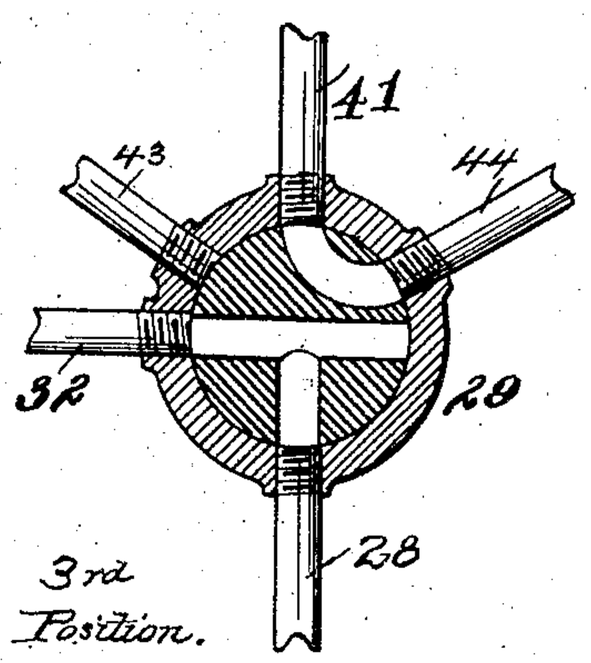


Fig. 10.

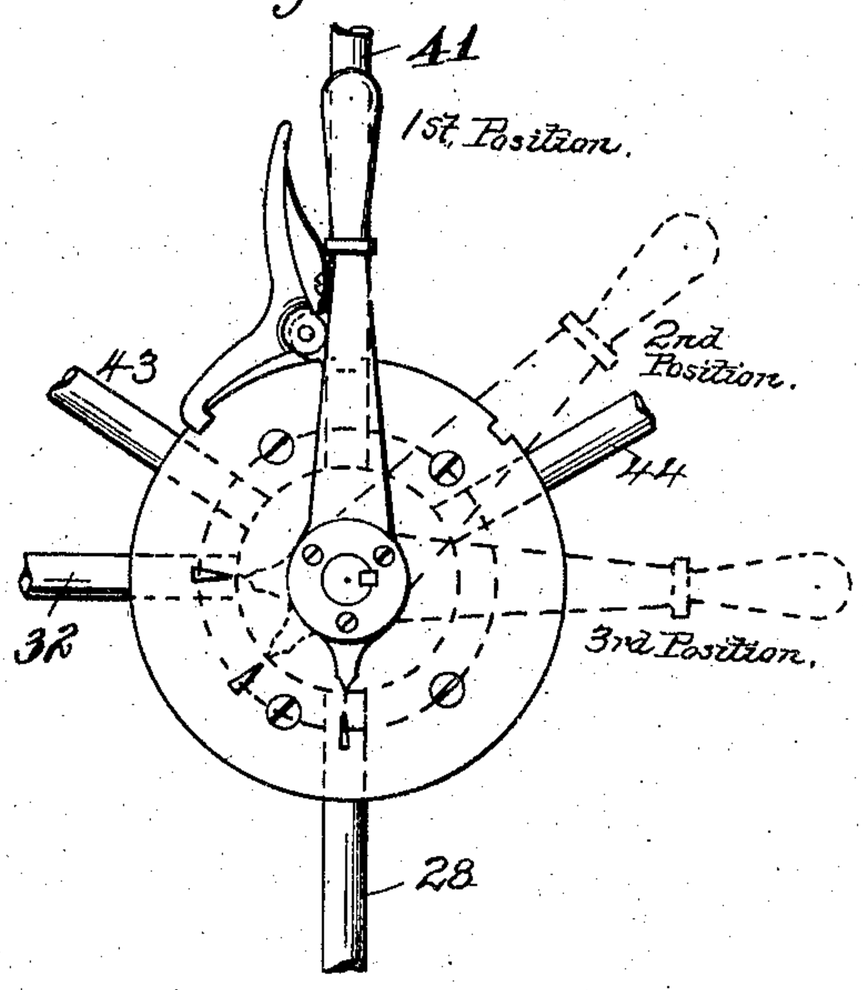


Fig. 11.

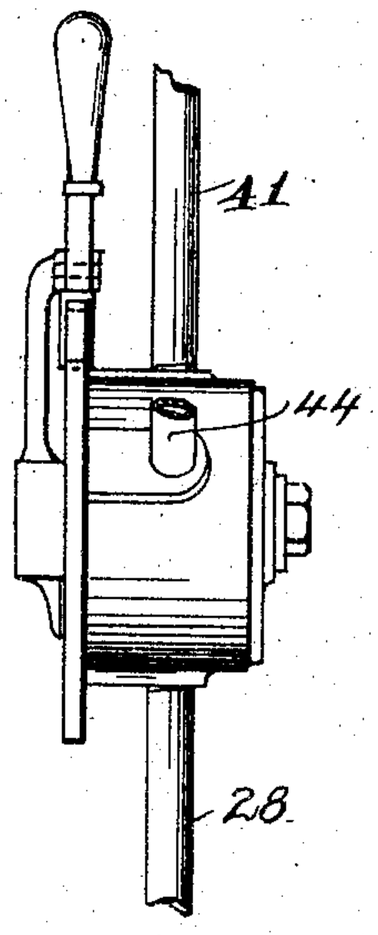
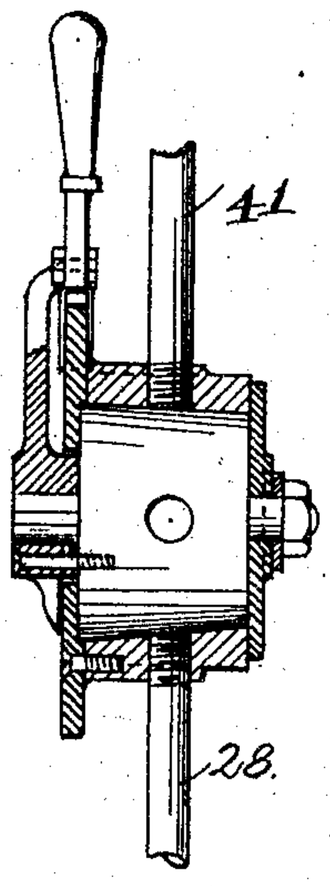


Fig. 12.



Witnesses:

G. S. Noble

George L. Chindahl

Inventors,

George Weiss

John Zimmer

By Luther L. Miller,

Att'y.

No. 780,546. Patented January 24, 1905.

UNITED STATES PATENT OFFICE.

GEORGE WEISS AND JOHN ZIMMER, OF CHICAGO, ILLINOIS.

SAFETY SYSTEM FOR THEATERS.

SPECIFICATION forming part of Letters Patent No. 780,546, dated January 24, 1905.

Application filed January 28, 1904. Serial No. 191,026.

To all whom it may concern:

Be it known that we, GEORGE WEISS and JOHN ZIMMER, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Safety Systems for Theaters, of which the following is a specification.

This invention relates to a safety system for theaters, and refers particularly to an automatically-operated safety system comprising means for completly cutting off communication between the stage and the body of the theater and to means for opening the ventilators over the stage and the emergency-exits in the auditorium.

The invention further refers to a hollow counterbalanced fireproof curtain for theaters, which curtain is adapted to be filled with water and be automatically lowered as the weight of the water in the curtain overcomes the counterbalance.

The invention further refers to a system of pipes for supplying water to said curtain, also for supplying water to counterbalancing-receptacles for operating the emergency-exits in the auditorium and for opening the ventilators over the stage.

It further refers to means for automatically admitting water to said pipe system, and, further, to various constructional details hereinafter pointed out.

In the system hereinbefore outlined a double thick sheet-metal water-containing fire-curtain slidably mounted upon the proscenium-wall in a position to close the proscenium-arch when the curtain is lowered is provided, and this curtain is counterbalanced by a water-cylinder adapted to be filled and emptied to respectively raise and lower the curtain when the latter is not in use as a fire-curtain. The stage-ventilators, required by ordinance in many cities to carry the smoke and flame away from the auditorium in case of a fire on the stage, are pivotally mounted in the ventilator-shaft in the roof of the theater-building, and are similarly counterbalanced by another water-cylinder, while the emergency-exits in various parts of the theater are arranged to be closed by vertically-sliding doors, likewise counterbalanced by water-cylinders arranged so that one weight-cylinder operates only one door, or so that several doors are operated by a single cylinder. Each of the counterbalancing water-cylinders is connected with the water-supply for the system, and this water-supply may be either the city water-pressure or a special pump and elevated tank service.

In the accompanying drawings, Figure 1 is a view in the nature of a diagram, illustrating our invention as installed in a theater-building. Fig. 2 is a similar view showing a modified form of said invention. Fig. 3 is a top plan view of the curtain illustrated in Fig. 2, showing also the arrangement of the supporting-cables for said curtain. Fig. 4 is a detail view illustrating the water-tight joint between the vertical fixed water-supply pipe and the movable curtain. Fig. 5 is a transverse view through the curtain on dotted line 5 5 of Fig. 4, showing the means of attaching the supporting-cable to the curtain. Fig. 6 is a fragmental view through one edge of the curtain shown in Fig. 2, said view being taken on dotted line 6 6 of said figure. Fig. 7 is a detail view showing one of the thermally-operated valves by means of which the system is automatically opened to water-pressure in case of fire. Fig. 8 is a transverse fragmental view through the edge of the curtain on dotted line 8 of Fig. 1. Fig. 9 is a longitudinal central section through the water-cylinder employed to counterbalance the curtain. Fig. 10 is a face view of the manually-operated main valve by means of which water is admitted into the system. In this view the operating-lever is illustrated in full lines in what hereinafter will be described as the "first" position and in dotted lines in the "second" and the "third" positions of the valve. Fig. 11 is a side view of the main valve. Fig. 12 is a transverse central section through said valve, showing the valve-plug in elevation. Fig. 13 is a sectional view taken through the main valve on a plane parallel with its face, showing the parts in a position to fill the curtain-weight—that is to say, the first position, Fig. 10. Fig. 14 is a view similar to the last preceding figure, showing the parts of the

valve in position to drain the curtain-weight—that is to say, the second position, Fig. 10. Fig. 15 is also a sectional view similar to the last preceding figures, showing the parts of the valve in position to drain the curtain-weight and fill the curtain and the entire system—to wit, the third position of the valve, Fig. 10.

Referring to the drawings, A refers to the stage, B to the proscenium-wall, C to the proscenium-arch, D to the roof of the theater-building over the stage, E to the ventilator-shaft over the stage, and F to various floors in the theater-building.

In the installation of a safety system embodying our invention we provide a hollow water-tight curtain 1, composed of plates 2 and 3, of sheet-iron or other suitable metal, connected and held rigidly in position relatively to each other by means of the stay-rivets 4, placed at frequent intervals between said plates. At their outer edges the plates 2 and 3 are connected by means of a channel-iron 5, passing entirely around said curtain and being secured between the plates by means of the rivets 6. At the side edges of the curtain the plates extend outward beyond the channel-iron, providing the grooves 7 between the plates for the reception of a flexible pipe at each side of the curtain for filling said curtain with water. Upon its stage side the curtain is provided with nozzle-openings 8, set in a transverse series across the curtain near the upper edge thereof. When the interior of the curtain is filled, water is forced through the nozzle-openings 8 and discharged in streams upon the stage. Vertical guides 9, also of channel-iron, are secured in any suitable manner to the inner side of the proscenium-wall, within which guides the curtain 1 is adapted to move. At the upper edge of the curtain in its longitudinal center a bracket 10 is secured, and from the lower side of said bracket four diagonal braces 11 extend to the lower corners of the curtain and two vertical braces 12 extend downward to the lower edge of the curtain, said braces being adapted to support the weight of the curtain upon the bracket 10. These braces 11 and 12 are in the form of flat bars and are placed between the plates 2 and 3 of the curtain, to which plates they are secured by means of rivets. A curtain-supporting cable 13 passes over sheaves 14, rotatably secured upon the inner side of the proscenium-wall, one end of which cable is connected with the suspending-bracket 10, the other end being connected to a counterbalance water-cylinder 15, which cylinder, with a quantity of water which it is adapted to contain, constitutes a counterbalance-weight for said curtain. At its upper end said cylinder carries two ears 15^a, between which is pivotally mounted a sheave 15^b.

In the ventilator-shaft E over the stage hinged ventilators 16 are provided, which ventilators are adapted to be swung upon their hinges by means of the arms 17, fixed with relation to said ventilators, and the rods 18, which rods are pivotally connected to the extremities of the opposite transverse arms 19 of a T-shape lever pivotally mounted beneath said ventilators. The main arm 21 of said T-shape lever is connected by means of a cable 22 to a counterbalance water-cylinder 23, which cable intermediate its connections passes over two sheaves 24, rotatably supported upon the inner face of the proscenium-wall.

The emergency-exits from the theater, as hereinbefore stated, are closed by means of doors 25 slidably movable within guides 26, the weight of each of which doors (or of several in a connected series) is partially counterbalanced by means of a water-cylinder 27, the weight of which cylinder alone is not sufficient to raise the doors 25, a quantity of water being admitted to said cylinder when it is desirable to raise the doors. In Fig. 1 the two upper exit-doors are represented as being connected in a series and both operated by one counterbalancing water-cylinder. It is apparent that a number of exits might thus be arranged in a series.

The system of pipe connections for supplying water to the curtain and to the several counterweight-cylinders will next be described. A pipe 28 forms one of the inlets to the system, is in direct communication with the city water-mains or other water-supply, and leads directly to the main operating-valve 29. Intermediate the supply and the main operating-valve the inlet-pipe 28 is directly connected with the system by means of two or more by-pass pipes 30 and 31, passing through different parts of the theater. For instance, the pipe 30 may pass through the theater-office, having an operating-valve 30^a in said office, and the pipe 31 may pass through the auditorium and have an operating-valve 31^a in the aisles or in some other place convenient of access. One of the ports of the main operating-valve 29 is connected by means of the pipe 32 (forming a rectangular arch over the proscenium-arch) and a flexible hose 33 with the water-cylinder 23 of the ventilator-shaft. The by-pass pipes 30 and 31 are connected with the system, as hereinbefore stated, by communicating with said pipe 32, and said by-pass pipe 30 is also in communication with a pipe 34 below the stage-level, which pipe 34 communicates with the interior of the curtain by means of a connecting-pipe 35 and two lengths of flexible hose 36, communicating between opposite ends of said pipe 35 and the curtain. The pipe 34 also supplies water to operate the water-cylinders 27 of the system of doors 25, water passing from said pipe 34 to said cylinders by means of a pipe 37 and the lengths of flexible hose 38, connected with said cylinders. The pipe 34 also extends parallel with the proscenium-wall, bending up-

ward at its end to join the pipe 32. This pipe 34 thus acts not only as a supply-pipe for the curtain and the water-cylinders 23 and 27, but also drains said cylinders, and for this latter purpose is provided with a drain-valve 39, having a counterweighted operating-arm 40, which arm is normally held by its weight in a closed position. When it is desirable to drain the curtain and the weights 23 and 27, said arm is held elevated. Water is supplied to the water-cylinder 15 of the curtain by means of a pipe 41, rising from the main operating-valve and connected with said water-cylinder by means of the flexible hose 42. This water-cylinder is drained through said hose and said pipe, the water escaping through escape-pipes 43 and 44. A drain-cock 8^a is provided for withdrawing the water from the interior of the curtain 1.

The portion of the water system that has just been described is adapted to be put into service by a manual operation of one of the valves 29, 30^a, and 31^a. A means for automatically supplying the system with water will next be described.

A pipe 45 is connected directly with the water-supply for the system—that is to say, with the city water-mains or with a pump (not shown) or an elevated tank. This pipe extends parallel with the pipe 32 and is in communication with said pipe 32 at intervals by means of the connecting-pipes 46, each of which connecting-pipes contains a thermally-operated valve 47, having a weighted arm 47^a, held elevated by means of a two-part cord 47^b, of inflammable material, the adjacent ends of which two-part cord are connected by means of a link 47^c, of easily-fusible metal. Water under pressure stands at all times in the pipe 45, and should fire occur upon the stage one or more of the cords 47^b would be burned or the link 47^c fused, releasing the weighted arm 47^a of the valve 47 and admitting water through said valve into the pipe 32. Water in the pipe 32 will pass into the pipe 34 and the flexible hose 36 to the interior of the curtain 1, filling said curtain with water and causing it to settle in its guides 9, thus closing the proscenium-arch. At the same time water would pass from the pipe 34 into the water-cylinder 23, filling said cylinder and causing its weight to open the ventilators 16 in the ventilator-shaft 3, also filling the water-cylinders 27 and opening the exit-doors 25.

To afford a vent for the air, each of the water-cylinders 15, 23, and 27 is provided with an opening 48 in its upper end, and this opening is adapted to be closed by a valve 49, operated by a float and arm 50.

The cylinders 23 and 27 are each provided with a chain 51, intended to be grasped to lower said cylinders by hand.

The modified form of this invention (illustrated in Figs. 2, 3, 4, 5, and 6) may be called a "high-pressure" system, inasmuch as a pressure considerably in excess of that usually found in city water-mains is necessary to operate it. Therefore it will be understood that for this high-pressure system a pump (not shown) and an accumulator 52 are necessary. In the drawings an elevated tank is shown as the accumulator 52. The pipe 45 of the automatic water-supply is placed in communication with this elevated tank by means of a pipe connection 45^a. The pipe 32 is in communication with two pipes 37 and has a central depending pipe branch 32^a, which telescopes with a pipe 53, placed midway of the width of the curtain and fixed in position between the plates 2 and 3 thereof. A water-tight joint is made between the pipe 32^a and the pipe 53 by means of a stuffing-box 54 of usual construction formed in the bracket 10^a. This bracket 10^a is secured at the upper edge of the curtain 1^a and is provided with two outwardly-extending studs 10^b, to which the opposite ends of the curtain-suspending cable 13^a are attached. Intermediate its ends the cable passes over two pairs of rollers 14^a and under the sheave 15^b at the upper end of the cylinder 15. Near its lower end the pipe 53 is provided with outlet-openings 55, by means of which water is admitted to the curtain 1^a. At its side edges said curtain 1^a is provided with a channel-iron 56, set within the groove 7, and within said channel-iron is provided with bearing-rollers 57, rotatably supported upon pivots 57^a. The bearing-rollers are adapted to roll upon the inner face of the guides 9 and to prevent the curtain from binding in its movement within said guides. The form and arrangement of the remaining parts of the system are the same in the modified form illustrated in Figs. 2, 3, 4, 5, and 6 as in the principal form shown in the remaining figures.

The system hereinbefore described in either of the forms shown is manually placed in service by turning the main valve 29 into the third position, Fig. 10, in which position the parts of the valve are disposed as shown in Fig. 15. In this position of the valve 29 pressure-water is admitted from the pipe 28 through the pipe 32 to the system, and water from the water-cylinder 15 for counterbalancing the curtain is permitted to escape through the flexible hose 42, the pipe 41, and the discharge-pipe 44. From the pipe 32 water passes through the pipes 34 and 35 and the flexible hose 36 to the interior of the curtain. As the curtain fills the weight of the water in it overcomes the weight of its counterbalancing water-cylinder 15, and said curtain settles to the stage A, closing the proscenium-arch C. When the curtain is filled with water, streams are thrown from the nozzles 8 onto the stage. When it is desirable to empty the form of curtain shown in Fig. 1, the drain-

valve 40 is opened and the water within the curtain and the pipes 32, 34, and 35 permitted to escape.

When it is desirable to raise or lower the empty curtain 1 without admitting water to the system, the main valve 29 is turned, respectively, into either its first or its second position, Fig. 10. In the first position the pressure-pipe 28 is placed in communication with the pipe 41 leading to the water-cylinder 15 for counterbalancing the curtain, admitting water to said water-cylinder and causing said cylinder to overbalance and raise the curtain. When it is desirable to lower the curtain, the valve 29 is moved into its second position, Fig. 10, in which position the pipe 41 is placed in communication with the discharge-pipe 43, draining the water-cylinder 15 and permitting the curtain 1 to fall by its preponderance.

When water is admitted to the system by the opening of either the valve 30^a or 31^a, it passes to the water-cylinder 23, to the cylinders 27, and directly to the curtain.

Water flowing into the curtain causes a circulation therein, preventing the generation of steam should the heat rise to a high degree at any point in said curtain. The discharge-nozzles 8 also withdraw water from the curtain and assist in maintaining a circulation therein.

The thermally-operated valves 47 are intended to operate the system should a fire occur when there is no one in the theater-building. The opening of the thermal valves 47 admits water from the pressure-pipe 45 to the curtain and to the water-cylinders 23 and 27, automatically lowering the curtain 1 and opening the ventilators 16 and the exits 25. The opening of the ventilators and of the exits when the auditorium is not occupied by an audience is not strictly necessary, and therefore if it is desirable the cylinders 23 and 27 may be removed from the automatic system—that is to say, said latter system may be made to supply water to the curtain only.

Obviously many changes may be made in the form and arrangement of the parts used in embodying this invention without departing from the spirit and scope of said invention, wherefore we desire to have it understood that we do not limit ourselves to the precise details herein shown and described.

We claim as our invention—

1. A hollow rigid theater-curtain adapted to be filled with water and provided on one side thereof with discharge-nozzles communicating with its interior.

2. A hollow theater-curtain adapted to be filled with water and provided with discharge-nozzles on its stage side near its upper edge.

3. A hollow theater-curtain of substantially rectangular form, adapted to be filled with water and provided with discharge-nozzles communicating with its interior, said curtain having a suspending-bracket at its upper edge, with diagonal braces extending from said bracket to the lower corners of the curtain.

4. In a safety system for theaters, in combination, a hollow rigid theater-curtain adapted to be filled with water and provided with discharge-nozzles communicating with its interior; means for movably supporting said curtain; and means for supplying water to the curtain.

5. In a safety system for theaters, in combination, a hollow theater-curtain adapted to be filled with water; means for movably supporting said curtain; means for counterbalancing the weight of the empty curtain; and means for supplying water to said curtain to overcome said counterbalance and cause the curtain to descend.

6. In a safety system for theaters, in combination, a hollow rigid theater-curtain adapted to be filled with water and provided with discharge-nozzles communicating with its interior; means for movably supporting said curtain; a source of water-supply; and a thermally-operated valve for opening communication between said water-supply and said curtain.

7. In a safety system for theaters, in combination, a theater-curtain adapted to be weighted with water; means for movably supporting said curtain; and means connected at all times with said curtain for supplying water for weighting said curtain to cause its descent.

8. In a safety system for theaters, in combination, a theater-curtain adapted to be weighted with water; means for movably supporting said curtain; means for counterbalancing the unweighted curtain; and means connected at all times with said curtain for supplying water to weight said curtain for overcoming said counterbalance and causing said curtain to descend.

9. In a safety system for theaters, in combination, a hollow rigid theater-curtain adapted to be weighted with water and provided with discharge-nozzles communicating with its interior; means for movably supporting said curtain; a source of water-supply; and a thermally-operated valve for opening said water-supply to weight said curtain.

10. In a safety system for theaters, in combination, a movably-supported curtain adapted to be weighted with water; a ventilator; a receptacle adapted to be weighted with water for opening said ventilator; a movable exit-closure; a receptacle adapted to be weighted with water for moving said exit-closure; a source of water-supply for weighting said curtain and said receptacles; and a thermally-operated valve for controlling said water-supply.

11. In a safety system for theaters, in combination, a rigid curtain having a water-space therein with discharge-nozzles communicat-

ing with its interior; means for suspending said curtain; and means for supplying water to the interior of said curtain.

12. In a safety system for theaters, in combination, a curtain having a water-space therein with discharge-nozzles communicating with its interior; means for counterbalancing said curtain; and means for supplying water to the interior of said curtain.

13. In a safety system for theaters, in combination, a rigid curtain having a water-space therein; means for counterbalancing said curtain; means connected at all times with said curtain for supplying water to the interior of said curtain; and a valve automatically operated for controlling the supply of water to the curtain.

14. In a safety system for theaters, in combination, a rigid curtain having a water-space therein; means for counterbalancing said curtain; means connected at all times with said curtain for supplying water to the interior of said curtain; and means for withdrawing water from said curtain.

15. In a safety system for theaters, in combination, a curtain having a water-space therein; means for suspending said curtain; a ventilator; a counterbalance for said ventilator; a sliding closure for an emergency-exit; a counterbalance for said closure; and means automatically operated for supplying water to said curtain and to the counterbalances for the ventilator and emergency-exit closures.

16. In a safety system for theaters, in combination, a curtain comprising two walls and a water-space between said walls; a cable for supporting said curtain; a water-cylinder for counterbalancing said curtain; means for guiding said curtain; and means for supplying water to said curtain and to said water-cylinder.

17. In a safety system for theaters, in combination, a curtain comprising two walls and a water-space between said walls; a cable for supporting said curtain; a water-cylinder for counterbalancing said curtain; means for guiding said curtain; and means automatically operated for supplying water to said curtain.

GEORGE WEISS.
JOHN ZIMMER.

Witnesses:
L. L. MILLER,
GEORGE L. CHINDAHL.