

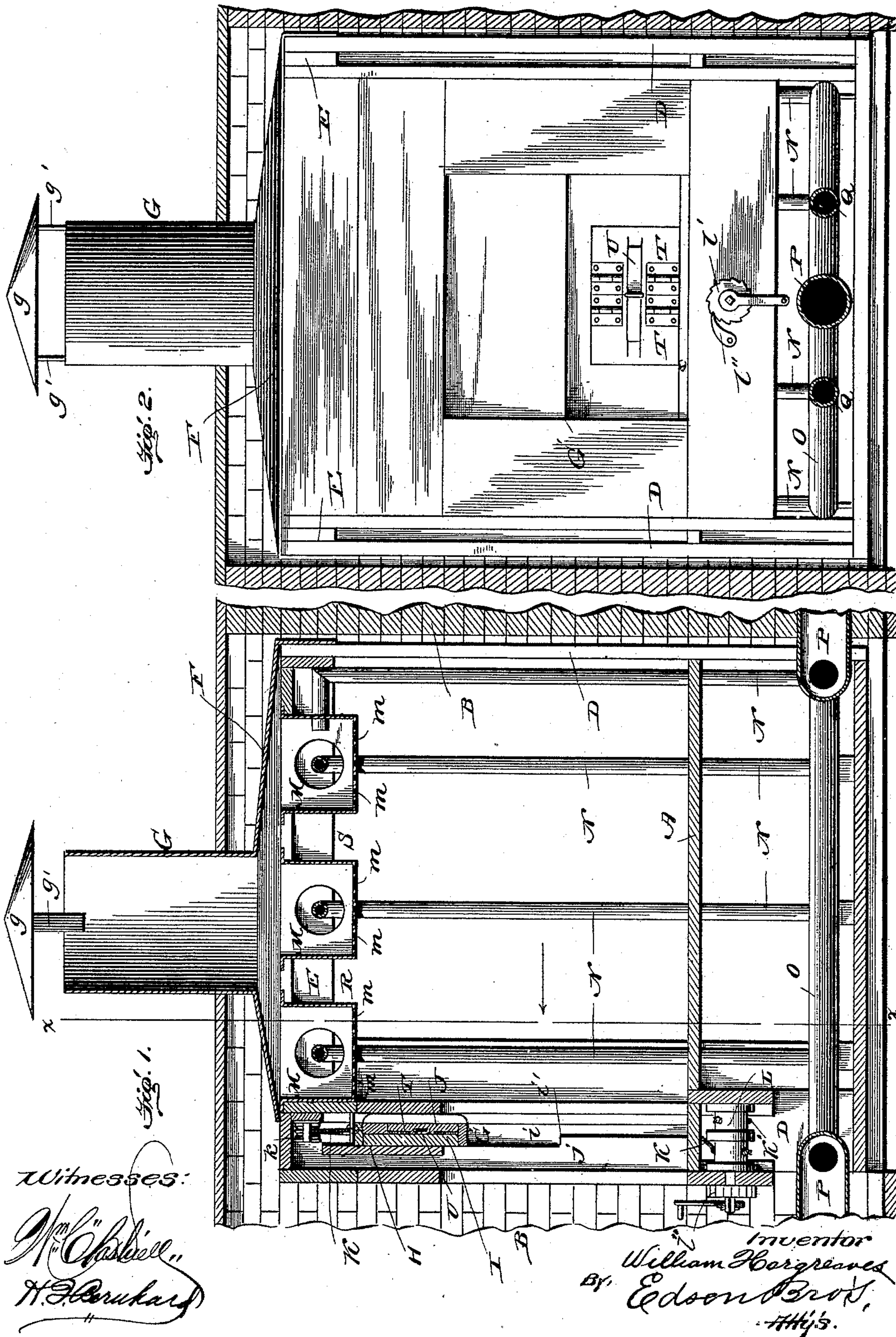
(No Model.)

2 Sheets—Sheet 1.

W. HARGREAVES.
FIREPROOF STAGE.

No. 497,240.

Patented May 9, 1893.



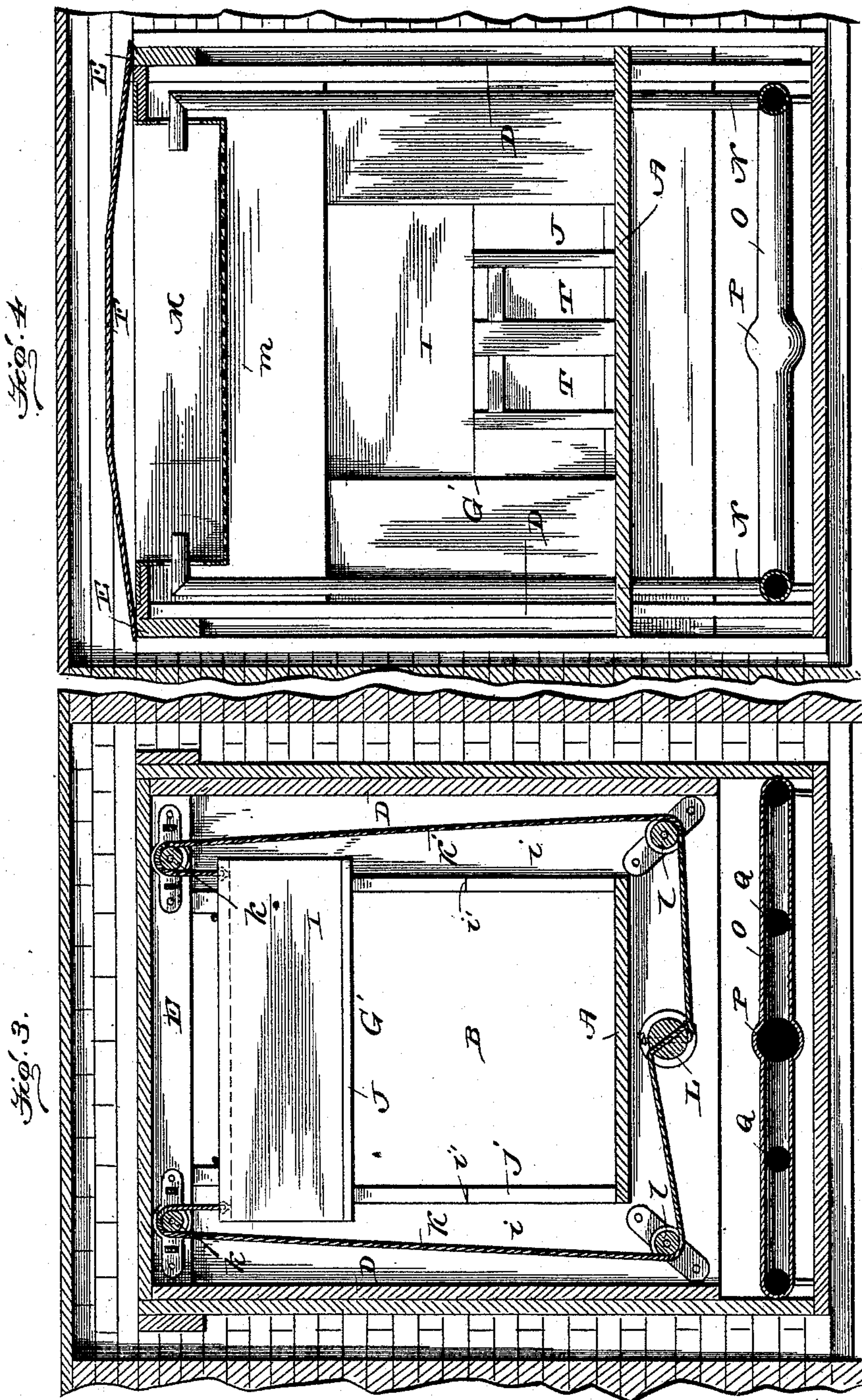
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Witnesses:

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UNITED STATES PATENT OFFICE.

WILLIAM HARGREAVES, OF PHILADELPHIA, PENNSYLVANIA.

FIREPROOF STAGE.

SPECIFICATION forming part of Letters Patent No. 497,240, dated May 9, 1893.

Application filed October 22, 1892. Serial No. 449,555. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HARGREAVES, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Fireproof Stages; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a fire proof stage for theaters and other public buildings where large audiences congregate; and the objects of the invention are, first, to provide simple and effective means which can be easily and quickly brought into service to confine the fire within the limits of the stage and prevent the fire, smoke and steam from spreading into the auditorium, and at the same time provide for the ready escape of the actors or occupants from the stage into the auditorium; secondly, to provide means whereby the stage can be quickly flooded with water in comparatively thin steams over the whole surface of the stage, to operate in extinguishing the fire; and thirdly to construct the stage in a novel manner to prevent the spread of fire to the walls and roof of the structure and at the same time facilitate the escape of the smoke, steam, &c., by causing a draft through the water spreading appliance.

With these ends in view my invention consists in the series of elevated spreader tanks arranged or separated from each other to leave intermediate spaces which form draft flues designed to create an upward draft and permit the smoke and steam from the fire to pass between the tanks; a cover for the stage made of metal or other fire-resisting material and secured to fire proof columns and the walls of the building to prevent the fire from spreading to the roof of the building, and an outlet pipe rising from the stage cover or roof and extending through the roof of a building, the outer end of a pipe having a cap which is situated above the pipe and secured thereto by braces whereby the smoke is permitted to escape and rain prevented from having access to the stage through the exit pipe. And the invention consists further in the combination

of devices and construction and arrangement of parts as will be hereinafter fully described and pointed out in the claims.

To enable others to more readily understand my invention, I have illustrated the same in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a vertical sectional view through a portion of a building in which the stage is erected, and showing my improved fire shield in transverse section. Fig. 2 is a view looking at the proscenium of the stage and showing the fire shield lowered into position to cut off the passage of fire, smoke and steam from the stage into the auditorium. Fig. 3 is a vertical cross sectional view taken through the proscenium and showing the means whereby the sections of the fire shield may be elevated, the shield being shown in an elevated position. Fig. 4 is a vertical cross section through the stage on the plane indicated by the dotted line $x-x$ of Fig. 1.

Like letters of reference denote corresponding parts in all the figures of the drawings, referring to which—

A is the stage and B, B, are the vertical walls forming the proscenium of the stage. These walls may be made of metallic plates or columns, which are preferably constructed to provide spaces within the columns for the operating devices of the fire shield; but I prefer to construct the hollow walls of the proscenium of masonry or brick work which are designed to be erected while the building is in process of construction. In rear of the proscenium walls, and near the corners of the stage, are erected vertical columns D, D, and to the upper ends of the columns and the proscenium walls are united the horizontal beams E, E, on which are supported the water-spreader tanks and the roof or cover F of the stage. This roof or cover is made of fire resisting material, for instance metallic plates; and the cover or roof F is situated between the stage and the roof of the building in which the stage is placed. The walls of the stage-roof or cover F are made to slant or incline upwardly and inwardly from the beams E to the center of the stage, and from the apex or crown of the stage roof rises a vertical exit pipe G which extends through the roof of the

building and terminates a sufficient distance above the same for the escape of smoke and steam from the stage. The upper extremity of the exit pipe is crowned by a cap *g* which is sustained a short distance above the pipe by means of the arms *g'*, thus affording a convenient means for ventilating the stage and preventing the ingress of rain, snow or the elements upon the stage.

The walls of the building are erected alongside of the vertical columns *D, D*, or the latter may be built in the walls, and when the shield is lowered across the front of the stage, the latter is wholly inclosed within metallic or masonry walls which are designed to be fire proof, whereby the fire is prevented from spreading beyond the limits of the stage, and if it is not smothered by cutting off the necessary air to support the combustion, it can be quickly extinguished by flooding the stage with water from the elevated spreader tanks and at the same time the smoke and steam can escape through the exit pipe rising centrally from the fire proof roof or cover of the stage.

I will now proceed to a detailed description of the improved fire shield adapted to be quickly lowered across the front of the stage and which is constructed to permit the occupants of the stage to escape therefrom into the auditorium. This fire shield *G* consists of a series of sections of any desired number, one of which sections is made stationary while the other sections are designed to slide vertically in suitable ways provided in the columns or proscenium walls on opposite sides of the stage at the front thereof. In the drawings I have shown the fire shield as consisting of three sections *H, I*, and *J*, but I would have it understood that I do not restrict myself to the employment of any particular number of sections as the number can be changed to suit the height of the stage. The upper section *H* of the fire shield is stationary, being secured in any suitable fixed way to the proscenium walls *B, B*, at the front of the stage, while the other sections *I, J*, are fitted at their ends to slide in vertical ways *i, i*, formed in the walls *B, B*. The intermediate section *I* is arranged in rear of the fixed upper section *H* so that its upper edge will overlap the upper section, and in like manner the lower sliding section *J* is arranged in rear of the intermediate section *I* so that the upper edge of the lower section will overlap the lower edge of the intermediate section and the latter section is arranged in the path of a forwardly extending ledge or flange *j* at the lower edge of the lower section. This arrangement of parts is important as the sections, when lowered, form a shield through which the fire and smoke cannot pass into the proscenium; and when the lower section is raised, by the means presently described, the ledge or flange *j* thereon will bear against the lower edge of the intermediate section *I* so as to

lift the latter section as the lower section is raised to its fullest limit. The intermediate section is thus automatically raised by and with the lower section, and it is sustained or held in its elevated position thereby; but when the suspending ropes or cables are slackened the intermediate and lower sections are quickly dropped by gravity, the lower section resting on the floor of the stage while the intermediate section is arrested by its ends coming in contact with the fixed abutments *i', i'*, provided in its way or groove *i* in which said intermediate section slides or is guided, as will be readily understood.

The sliding sections of the fire shield are normally raised to their fullest limits so as to avoid obstructing the view of the stage from the auditorium of the theater, and as a convenient means for upholding and raising the sections I have adopted the suspension cables *K, K'*, which are connected at their lower ends to the lower section *J* of the fire shield, thence pass over guide pulleys *k* provided near the upper end of the columns *D* or the proscenium walls *B, B*; thence said ropes or cables extend down to similar guide rollers *l, l*, provided near the bottom of the walls *B* or the front columns *D*, and thence the ropes extend beneath the stage and are connected to a common power drum *L*, one end of one cable being connected to the drum to be wound or coiled in one direction thereon while the similar end of the other cable is connected to said drum to be wound in the reverse direction thereon, whereby the cables are adapted to wind or unwind in reverse directions on the drum *L* at the same time. The shaft of the drum is provided with a ratchet wheel *l'* with which it is adapted to engage a pivoted detent or pawl *l''*. By turning the drum (by a crank or other convenient contrivance), the ends of the cables can be wound thereon and the pull of the cables raises the lower section *J* until its ledge *j* abuts against the intermediate section *I*, and both sections can thus be raised to their highest elevated positions in rear of the fixed section *H* of the shield, after which the pawl is dropped into engagement with the ratchet to prevent the weight of the sections from pulling on the cables to reverse the drum, thus locking the sections *I, J*, in their suspended positions. When a fire breaks out on the stage, it is only necessary to throw the pawl out of engagement with the ratchet, thus freeing the drum and allowing the sections *I, J*, to drop or fall by their own weight, whereby the shield can be easily and quickly lowered across the front of the stage to prevent the fire, smoke and steam from passing into the auditorium of the theater or other structure.

I will now proceed to describe the preferred construction by which the stage can be quickly flooded with water to extinguish the fire. The means I have adopted consists of a series of tanks or shallow receptacles *M* which extend

across the stage, from one side thereof to the other. These spreader tanks are suitably secured to the horizontal beams E supported by the upright columns D, and in the bottoms of the tanks are provided a multiplicity of perforations or openings, *m*, through which the water is allowed to pass in comparatively thin streams upon the fire on the stage as well as the scenery thereon. Water is supplied to these elevated spreader tanks through the vertical pipes N, N, two pipes being preferably provided for each tank, one at each end thereof; and the lower ends of these connecting pipes N communicate with horizontal pipes O arranged beneath and alongside of the stage. The ends of these pipes O are connected to supply mains P, P, P, at the front and rear of the stage, and these mains are connected by pipes with the street mains of the city water-service pipe. These supply mains P are also provided with pipes Q which extend through the side, front or rear walls of the building and to which can be connected lines of hose that lead from the fire engines, so that water can be pumped into the elevated spreader tanks at a faster rate than can be supplied by the pressure from the service mains.

The elevated spreader tanks are preferably arranged parallel with each other, and at short distances apart to leave spaces or flues R, S, between the tanks, and these spaces serve to permit the smoke and steam to pass freely between the tanks and to escape through the exit pipe rising from the center of the fire proof stage roof and extending through the roof of the building, as has been explained.

To facilitate the escape of the occupants of the stage into the auditorium of the structure or theater, I provide the lower section of the fire shield with openings which are closed normally by the doors T, any suitable number of which may be provided to meet the emergencies of the service. In the drawings I have only shown two doors T, but the number can be increased to any desired limit. The doors are preferably hinged to swing outward from the stage into the auditorium, and said doors are normally closed by pressure springs U which are secured to the door stile and press against the doors to normally force them inward so as to close the openings in the lower section I of the fire shield and which also serve to prevent the spread of the fire or the escape of smoke and steam into the auditorium.

The operation and advantages of my invention will be readily understood and appreciated from the foregoing description taken in connection with the drawings.

I am aware that changes in the form and proportion of parts and details of construction of the embodiment of my invention herein shown and described can be made without departing from the spirit or sacrificing the advantages of the same, and I therefore re-

serve the right to make such modifications or alterations as fairly fall within the scope of the invention.

Having thus fully described my invention, 70 what I claim as new, and desire to secure by Letters Patent, is—

1. In a fire proof stage, the elevated spreader-tanks arranged at suitable intervals from each other and forming between themselves the up-draft passages, an impervious stage-roof or cover situated over said tanks and having an outlet-pipe extending through the roof of the building, and a source of water supply to said elevated spreader tanks, substantially as and for the purpose described. 80

2. In a fire proof stage, the combination of the elevated spreader-tanks arranged at suitable distances from each other and forming between themselves the up-draft passages, the impervious stage-roof or cover above said tanks and provided with the outlet-pipe which extends through the roof of the building, a fire-shield situated at the front of the stage and adapted to cut off communication between the stage and the auditorium, and a source of water supply leading to said elevated tanks, whereby a fire can be confined within the limits of a stage and the smoke and steam are free to escape through the up-draft passages and the outlet pipe, as set forth. 95

3. In a fire proof stage, the combination of the columns at the sides of the stage, the stage-roof or cover sustained by the columns below the roof of the building, an exit pipe rising from the stage roof and extending through the roof of the building, the flooding tanks supported over the stage and arranged to leave spaces or flues between said tanks for the escape of smoke or steam, and a fire shield at the front of the stage to shut off communication between the stage and auditorium, whereby a fire on the stage can be confined within the limits thereof, substantially as and for the purpose described. 100

4. A fire proof stage having the columns at the sides thereof, the horizontal beam sustained by said columns, the flooding tanks supported by said beams and spaced relatively to each other to provide the intermediate smoke and steam passages between said tanks, the imperforate stage-roof sustained by the beams above said tanks and having an exit pipe which extends through the roof of the building, and a fire shield arranged at the front of the stage, to close the front part thereof, and having the exit doors for the escape of the occupants of the stage into the auditorium, substantially as described. 110

5. A fire proof stage having the columns at the sides thereof, the horizontal beams sustained by said columns, the perforated flooding tanks supported by the beams, extending over the stage, and spaced relatively to each other to form the intermediate smoke and steam passages between said tanks, the imperforate stage roof sustained by the beams 125

above the tanks and provided with an exit
pipe which extends through the roof of the
building, the supply mains below the stage
having the side pipes, and the vertical con-
5 necting pipes extending from the side pipes
and discharging into the flooding tanks, sub-
stantially as described.

In testimony whereof I affix my signature in
presence of two witnesses.

WILLIAM HARGREAVES.

Witnesses:

JOHN J. GOOD,

HARRY J. BINKLEY.