A. A. DAY.

DOOR STRUCTURE FOR AIR WASHERS AND THE LIKE.

APPLICATION FILED SEPT. 18, 1919.

1,392,305. **Patented Oct. 4, 1921.**

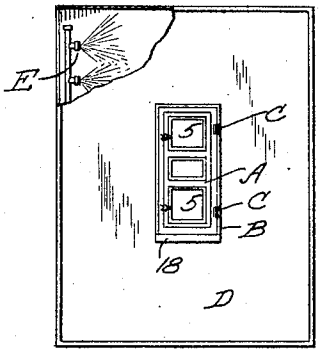


Fig. 1.

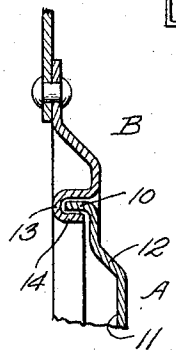


Fig 4.

Fig. 2.

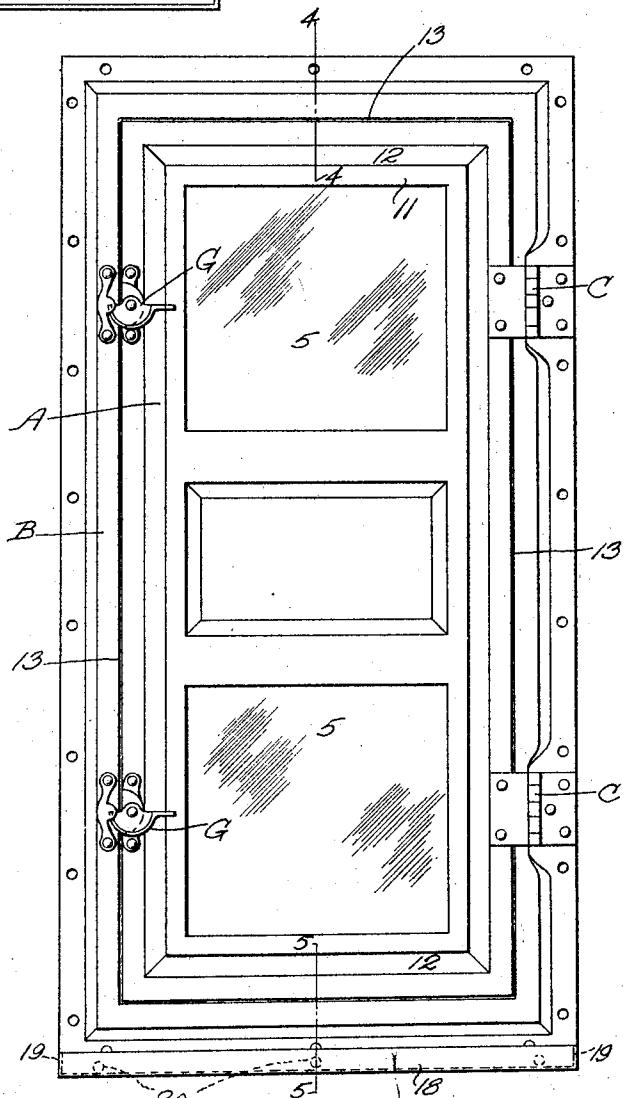


Fig. 3.

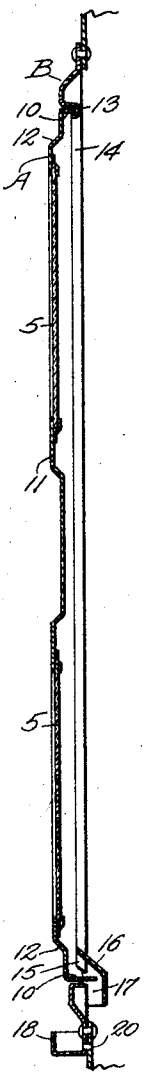
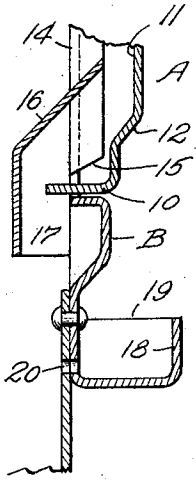


Fig. 5.



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UNITED STATES PATENT OFFICE.

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DOOR STRUCTURE FOR AIR-WASHERS AND THE LIKE.

1,392,305. Specification of Letters Patent. Patented Oct. 4, 1921.

Application filed September 18, 1919. Serial No. 324,651.

To all whom it may concern:

Be it known that I, ARTHUR A. DAY, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Door Structures for Air-Washers and the like, of which the following is a specification.

This invention relates to doors or manhole closures for the casings of air washers, humidifiers or analogous apparatus by which air or gas is caused to contact with water or other liquid usually discharged in a fine spray into the casing for washing or otherwise treating or conditioning the air or gas by contact with the liquid. In the ordinary operation of such devices the casing is practically filled with the liquid spray and the air or gas is caused to flow through the casing and through the spray by means of a fan or propelling device, thus causing an intimate contact of the air or gas with the finely divided liquid.

Casings of this sort are ordinarily constructed of sheet metal and are provided with doors to afford access to the casing for cleaning the same or for other reasons, the doors usually being provided with windows to facilitate observation of the operation of the apparatus. These doors and their frames have heretofore usually been made of cast iron. Such cast iron constructions are objectionable for various reasons. They are heavy and cumbersome and much care and labor is required to insure the necessary water-tight joints between the frame and the wall of the casing to which it is attached, and between the door and its frame, and ordinarily rubber gaskets or other suitable packings for the joints are required. It is necessary to galvanize or coat the doors and frames to prevent them from rusting and in addition to the initial expense of manufacture of the cast iron doors and frames, which is considerable, a very material loss results from the breakage of the parts, both in the manufacture and shipping of the same and in securing the door frames in place on the casings. The doors also have to be provided with special hinges and fastenings to enable a uniform pressure on the packing gasket all around the door required to insure a tight joint, and the gaskets deteriorate and cause leaks, thus adding to the expense of manufacture and maintenance. The invention is also applicable to doors for other purposes where more or less similar conditions prevail.

One object of this invention is to produce a strong, durable, sheet metal door and frame structure for the purposes stated, which is of much lighter and much less expensive construction than the cast iron doors and frames heretofore used and which is constructed so as to provide joints between the door and its frame which will prevent the escape of water from the casing without necessitating the use of joint packings or special hinges and fastenings. Another object of the invention is to produce a door and door frame for the purpose stated which are of improved construction in the other respects hereinafter described and set forth in the claims.

In the accompanying drawings:

Figure 1 is a side elevation, on a reduced scale, of an air washer casing provided with a door structure embodying the invention.

Fig. 2 is an enlarged front elevation of the door and frame.

Fig. 3 is a sectional elevation thereof.

Fig. 4 is an enlarged fragmentary sectional elevation of the door and frame on a still larger scale, on line 4—4, Fig. 2.

Fig. 5 is a similar sectional elevation on line 5—5, Fig. 2, showing the lower portion of the door and frame.

A represents the door and B the door frame, or open frame to which the door is preferably connected by hinges C of any suitable sort and which frame is adapted to be riveted or stationarily secured on one wall of the casing D, around an opening therein in any suitable manner adapted to form a water-tight joint. E, Fig. 1, represents nozzles for spraying the water or liquid into the casing, through which air or gas is caused to flow by a fan or propelling device, (not shown) for washing or otherwise treating the air or gas with the liquid. The door A, as usual, is preferably provided with glass panels or windows 5 so that the operation of the apparatus can be observed through the windows without opening the door. The window glass is secured in the door in any suitable manner. G represents latches or devices for fastening the door when closed. These latches may be of any suitable construction but are preferably of a kind adapted to force the door tightly against the frame. The body of the door preferably consists of a single piece of sheet

steel or other metal which is pressed or stamped into the cross-sectional shape shown in the drawings by suitable dies. The door is thus formed with a lateral or inwardly projecting marginal flange 10 which surrounds the door, and preferably the door has an outwardly pressed or offset central panel or portion 11 in which the window openings are made and which is connected by inclined or beveled faces 12 to a surrounding marginal portion of the door. This stiffens and strengthens the door and retains the marginal flange of the same intact in the intended plane.

The door frame B also preferably consists of sheet steel or other metal pressed or stamped into the shape shown by means of suitable dies. The inner edge of the door frame along the opposite upright and top edges of the door opening is preferably bent first inwardly and then outwardly forming an outwardly-opening groove or channel 13, surrounding the two upright sides and top of the door opening, into which the inwardly extending flange of the door projects when the door is closed. The inner wall of this groove forms a flange 14 which projects outwardly from the frame and fits within the surrounding flange 10 on the door. The upright portions of the groove 13 at the sides of the door opening terminate above the lower edge of the door opening and are open at their lower ends 15 so that any water finding its way into the groove can run out of these open, lower ends. The inwardly projecting door flange 10 at the lower horizontal edge of the door preferably projects inwardly farther than the remaining portions of the flange, so as to extend inwardly beyond the inner face of the door frame, see Fig. 5, and shed any water falling thereon into the casing.

16 represents a shield or guard which extends horizontally across the inner side of the door frame adjacent the bottom of the door opening. This shield projects above and below the crack between the bottom edge of the door and the door frame and preferably has an inwardly and downwardly inclined upper portion. At its ends the shield is provided with outwardly-bent, upright flanges 17, which are welded or otherwise secured to the door frame. The shield prevents water which runs down the inner face of the door and drips over the bottom flange thereof from being blown out through the crack between the bottom of the door and the lower edge of the door opening, and its inclined upper portion is adapted to deflect the falling water inwardly over the inwardly-projecting flange at the bottom of the door. On its outer side at its lower portion, or below the door opening, the door frame is provided with a narrow, horizontal, transverse trough or gutter 18 which can be formed by bending the lower margin of the frame outwardly and upwardly. This trough has closed ends 19. The trough is so located that it is adapted to catch any water which may escape through the crack at the bottom of the door or run out of the groove 13 at the sides of the door, and return the water into the casing through one or more drain holes 20 in the inner wall of the trough and the casing wall to which it is attached.

With the door and frame constructed as described, the interfitting flanges or edges of the door and frame obstruct the escape of water from the casing, but it is not necessary for the joints to be absolutely watertight, because any water working through them will run into the trough 18 and be returned to the casing.

I claim as my invention:

1. A door structure for air washer casings and analogous apparatus, comprising a door and door frame made of pressed sheet metal, said door and frame having integral lateral flanges extending along the side and top edges of the door and door opening of the frame and interfitting to obstruct the escape of water, and means adjacent the lower end of the door for directing into the casing any water escaping through the joint between the door and the frame.

2. A door structure for air washer casings and analogous apparatus, comprising a sheet metal door and a sheet metal door frame, each having an outer marginal portion offset from the plane of the middle portion, said door and frame having integral lateral flanges extending along the side and top edges of the door and door opening of the frame and interfitting to obstruct the escape of water, and means adjacent the lower end of the door for directing into the casing any water escaping through the joint between the door and the frame.

3. A door structure for air washer casings and analogous apparatus, comprising a metal door frame having a door opening and an outwardly projecting flange extending along the side and top edges of the door opening, a metal door having a flange extending along the corresponding edges of the door and projecting inwardly around said flange on the frame, and means adjacent the lower end of the door opening for directing into the casing any water escaping through the joint between the door and door frame.

4. A door structure for air washer casings and analogous apparatus, comprising a metal door frame having a door opening and an outwardly facing groove extending along the side and top edges of the door opening, a metal door having a flange extending along the side and top edges of the door and projecting inwardly into said groove, said groove having open lower ends,

and a flange on the lower end of the door which projects inwardly below said open ends of the groove for directing into the casing any water running out of said groove.

5. A door structure for air washer casings and analogous apparatus, comprising a metal door frame having a door opening and an outwardly facing groove extending along the side and top edges of the door opening, a metal door having a flange extending along the side and top edges of the door and projecting inwardly into said groove, said groove having open lower ends, a flange on the lower end of the door, said flange projecting inwardly below said open ends of the groove, and means adjacent the lower end of the door for redirecting into the casing any water that may escape between the joints between the door and the frame.

6. A door structure for air washer casings and analogous apparatus, comprising a door and door frame made of pressed sheet metal, said door and frame having integral lateral flanges extending along the side and top edges of the door and door opening of the frame and interfitting to obstruct the escape of water, and a trough on the outside of the frame below the door opening and having a drain hole leading into the casing.

7. A door structure for air washer casings and analogous apparatus, comprising a door and door frame made of pressed sheet metal, said door and frame having integral lateral flanges extending along the side and top edges of the door and door opening of the frame and interfitting to obstruct the escape of water, a shield located inside of the door adjacent its lower end and covering the crack between the bottom of the door and the frame, and a trough on the outside of the frame below the door opening and having a drain hole leading into the casing.

8. A door structure for air washer casings and analogous apparatus, comprising a door and door frame made of pressed sheet metal, said door and frame having integral lateral flanges extending along the side and top edges of the door and door opening of the frame and interfitting to obstruct the escape of water from the casing, said door frame having an inwardly projecting flange extending along the lower edge of said door, a lateral flange on the bottom of said door and extending inwardly beyond said inwardly projecting door frame flange, and a shield fixed to said door frame adjacent the bottom edge of said door and extending above and below and projecting the joint between the bottom flange of said door and the door frame.

9. A door structure for air washer casings and analogous apparatus, comprising a sheet metal door and a sheet metal door frame, said door frame having outwardly opening grooves extending along the top and side edges of the door opening, said grooves terminating at the side edges of said door opening above the lower edge of the door opening and being open at their lower ends, inwardly projecting flanges on the top and side edges of said door and fitting into said grooves in the frame, and an inwardly projecting flange at the bottom horizontal edge of said door, said last named flange projecting inwardly beyond the other said door flanges, whereby water running out of the open ends of said grooves is directed back into said casing, and a shield in said casing and extending above and below said bottom door flange to prevent water dripping over said flange from being blown out of said casing.

Witness my hand, this 13th day of September, 1919.

ARTHUR A. DAY.

Witnesses:
CHARLES A. BOOTH,
ORVILLE K. DYER.