

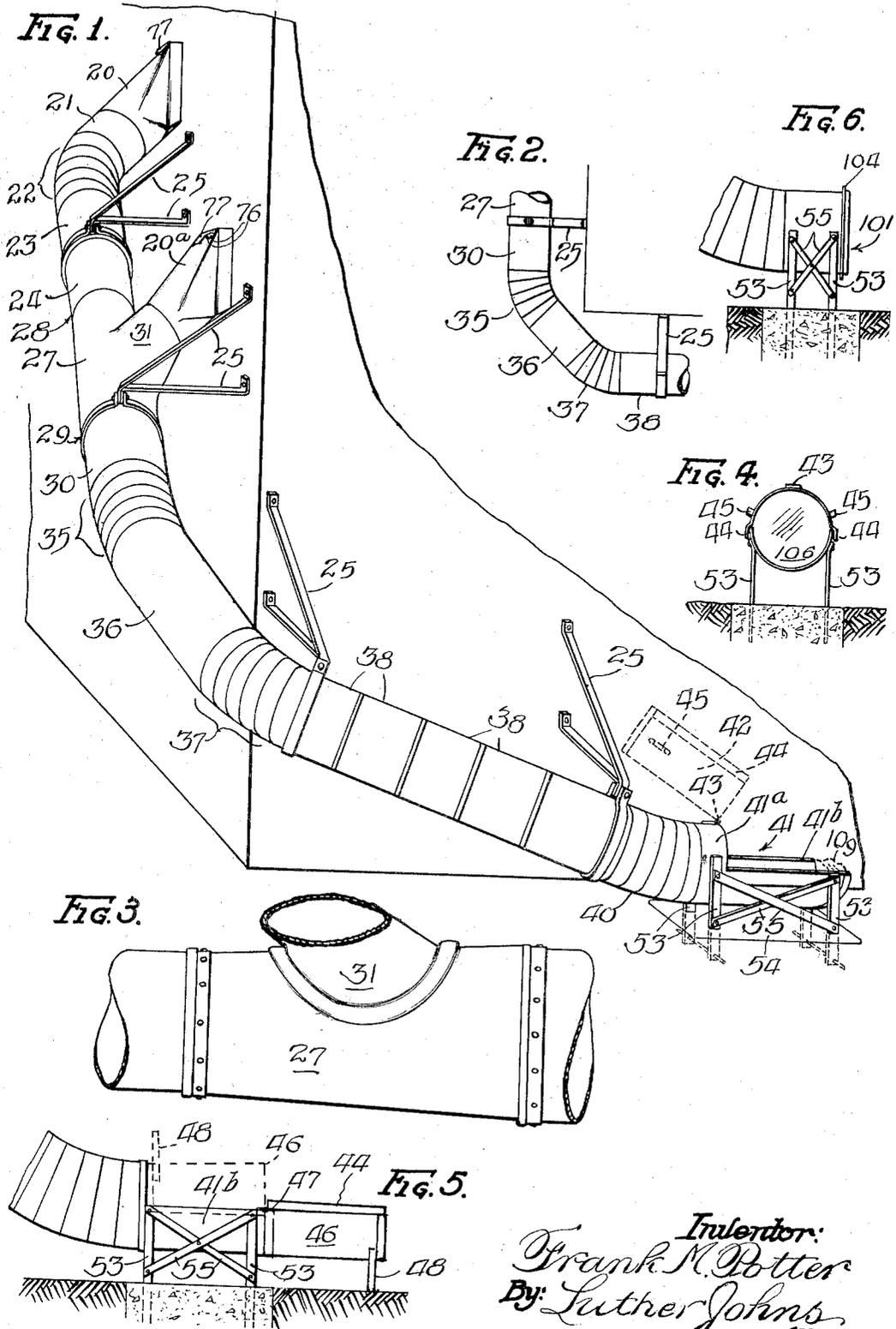
March 13, 1934.

F. M. POTTER
TUBULAR FIRE ESCAPE

1,950,996

Filed July 6, 1931

3 Sheets-Sheet 1



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3 Sheets-Sheet 3

Fig. 15.

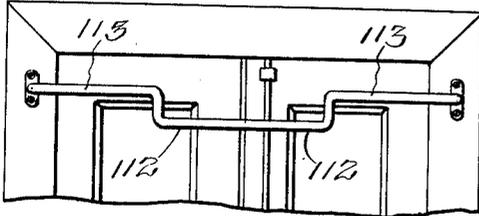


Fig. 16.

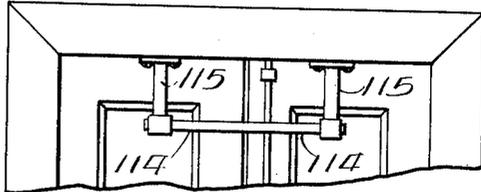


Fig. 17.

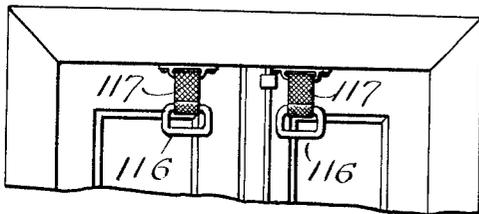


Fig. 10.

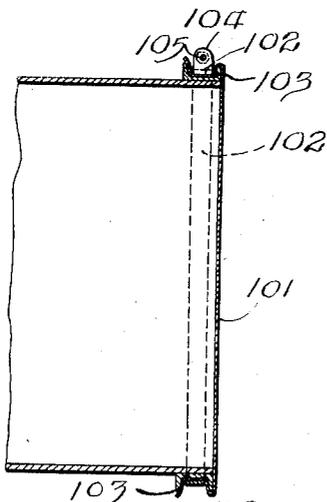


Fig. 11.

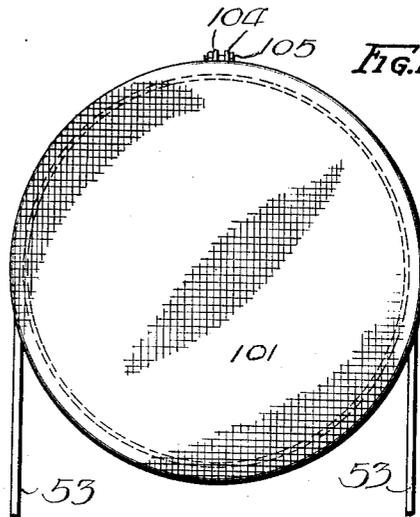


Fig. 12.

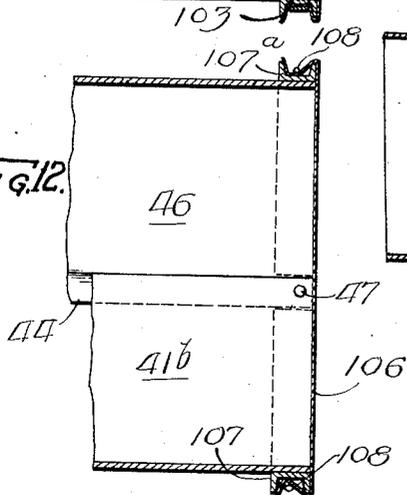
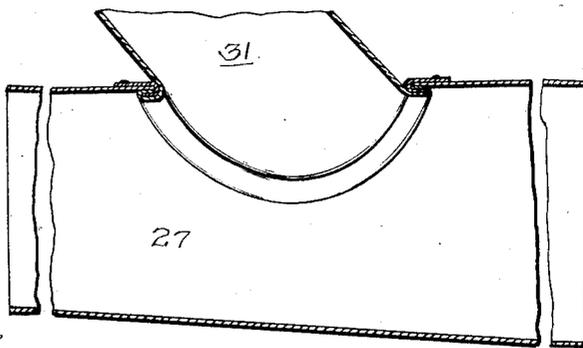


Fig. 9.



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TUBULAR FIRE ESCAPE

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11 Claims. (Cl. 227--7)

These improvements relate to tubular fire escapes. The object in general is to render the use and maintenance of such fire escapes more satisfactory. Specific objects are:

5 First, the provision of a construction whereby undue congestion of bodies in the chute is avoided, with an approach to each successively enlarged portion of the chute at such an angle as to provide the maximum discharge within
10 a given time.

15 Secondly, the provision of protective means for the ordinarily-open lower end of the chute adapted to maintain the interior surface in the proper condition without prejudice to the normal use of the device.

20 Third, the provision of means for maintaining the room into which the fire escape opens more free of the objection of coldness and draughtiness around the entrance to the device. The several provisions to this end include a rupturable partition or partitions; door insulation, and joint-sealing means for the doors.

25 Fourth, means for maintaining the lower inside surface at the bottom of the device against frosting.

30 Fifth, the provision of means peculiarly appropriate to the more satisfactory handling of patients discharged through the device in hospitals and the like. One of these provisions is in an open trough-like extension at the bottom, with cover means therefor; another is in corner construction whereby a bend of ninety degrees in the chute may be made in such a way as to permit a patient on a mattress to make a turn
35 with but slight bending of the patient's body.

Sixth, the provision of ventilation means at the top of the chute.

40 Seventh, a construction which facilitates the assembly of the main body of the chute with the entrance-passageway-forming means.

45 Eighth, hand-hold means so located and individualized to the user's hands as substantially to compel his entering the chute properly.

Other objects and advantages will appear hereinafter.

50 In the drawings Figure 1 is a perspective looking forward and downward toward a corner of a building and showing an embodiment of a tubular fire escape containing present improvements;

Fig. 2 is a fragmentary reduced scale top view of the device of Fig. 1;

55 Fig. 3 is a top view of parts of a straight chute body illustrating the increased diameter of the

lower main part and the angular relation of the intake thereto;

Fig. 4 is an end view of the chute at the bottom of Fig. 1;

Fig. 5 is a side elevation of the lower part 60 of Fig. 1 with a modified form or connection of cover device;

Fig. 6 is a side elevation of the lower end of a chute without the trough-like extension;

Fig. 7 is a face view of the doors at the 65 entrance;

Fig. 8 is a medial longitudinal section through the entrance passageway and first section of the chute body;

Fig. 9 is a longitudinal section through the 70 unit providing for a branch inlet and a diametric enlargement of the lower main chute body;

Fig. 10 is an enlarged longitudinal vertical section through the lower end of a chute in accordance with Fig. 6, showing a diaphragm 75 and its holding means;

Fig. 11 is an end view of the construction of Fig. 10;

Fig. 12 shows a diaphragm attached to the lower end of a chute having an open extension 80 and cover therefor;

Fig. 13 is a horizontal section through the doors and associated parts;

Fig. 14 is an enlarged detail of Fig. 13; 85 and

Figs 15, 16 and 17 are fragmentary face views showing modified forms of the hand-hold means for swinging into the chute.

Referring to Fig. 1, and beginning at the top, there are entrance passageway means 20 to 90 which is connected the tube section 21. There is next an elbow member 22, followed by straight tube sections 23 and 24. Various brackets 25 hold the device upon the building. 95

Entrance-connection unit 27 has a joint at 28 connecting it with section 24. At the opposite open end of unit 27 is a joint 29 connecting that unit with tube section 30, which is of increased diameter over the tube section 24. 100 For example tube section 24 may be thirty inches in diameter and tube section 30 will then appropriately be thirty six inches in diameter. The opposite open ends of unit 27 are of diameters respectively which correspond 105 to those of sections 24 and 30. Unit 27 has a branch connection 31 (see also Fig. 9) which unites with entrance passageway-forming means 20a issuing from the floor or story of the building below the entrance-passageway means 20. 110

The axis of branch 31 is directed downward and forward. It meets the axis of unit 27 at an angle materially less than a right angle and conducts the user into the larger main body of the chute in the general direction of forward travel therein. The larger diameter of the main body section below the entrance passageway means 20a facilitates the simultaneous discharge from both floors of the building. In the larger part persons may slide downward side by side. Those coming in from entrance means 20a do not strike abruptly those in section 27 coming through from above. The angular approach indicated thus promotes the speed or discharge from two or more floors and avoids objectionable interference among the users.

Section 30 unites with a forty-five degree elbow 35 and then follows a straight section 36 followed by another forty-five degree elbow 37, followed in turn by such various straight sections 38 as will lead substantially to the ground. At the bottom is an elbow section 40 defining a very gradual bottom or sliding surface.

The last section shown in Fig. 1 is marked as a whole 41. It has a ring-like part 41a and an open trough-like integral part 41b which extends substantially horizontally from the main body of the chute and continues the sliding surface thereof.

Note from the top view of Fig. 2 that the straight pipe section 36 is opposite the corner of the building while the forty-five degree elbow sections 35 and 37, arranged with their shorter arcs on the same side, are opposite the sides of the building adjacent to the corner. This effects the desired change in the direction of the chute a full ninety degrees around such corner. In the past, in going around such a corner, a ninety-degree elbow section has been employed. There is no particular objection to such a single ninety-degree bend where the chute is being occupied by healthy, able-bodied persons. In hospitals, however, it frequently happens that the patient must be carried to the chute on a mattress and the mattress must be discharged through the chute with the patient on it. By making two forty-five degree turns with a straight section between them the mattress readily passes through the chute, while in the case of a ninety-degree turn it is not only likely to stick but the sharp bend causes the patient's body to bend likewise, and quite suddenly, and to a considerable extent, causing discomfort and, frequently, more serious results.

When the patient on such a mattress reaches the bottom of the present chute the mattress with the patient on it slides out into the trough-like extension 41b. The attendants below now have the patient in full view, can adjust him properly and then lift him and the mattress out of the way of the next person coming down. Ordinarily the attendants will lift and slide the mattress forward until clear of the chute and then carry it and the patient away.

I preferably provide a cover for the chute section 41b. It is shown in dotted lines in Fig. 1 and marked 42. In Fig. 1 it is shown as being hinged to the ring part 41a at 43, thus enabling it to be swung upward into an out-of-the-way position. Fig. 4 shows that the cover part 42 has depending flanges 44 encompassing the upper edges of the trough receptacle 41b, thus keeping out the water at the sides. It has lifting handles 45.

Fig. 5 shows the trough section 41b with a

cover 46 hinged at 47. By swinging cover 46 forward as shown in Fig. 5 until the stop or rest 48 strikes the ground, the extension 41b is increased in length to the extent of the cover part 46 now serving as an additional extension. Patients coming down in quick succession on mattresses can be advanced forward into section 46 and attendants can work upon the removing of two patients at the same time.

It has been customary heretofore, in all cases so far as I am aware, to rest the lower end of the chute, such as is fragmentarily shown in Fig. 6, directly upon a concrete pedestal extending above the ground to such extent as may be desired. There are several objections to that practice. One is the collection and holding of moisture throughout a considerable area immediately under the discharge end of the chute and which causes the chute to rust through. A second disadvantage is that the close proximity of the chute to the ground or to the concrete pedestal causes frosting to occur on the sliding surface inside of the chute which produces, through successive meltings and refrostings, a very pronounced wetness in the lower end of the chute. The proper action of the sliding surface of the chute is interfered with by such frosting and wetness, and that is also highly objectionable to the person using the chute, an additional reason being the collection by such moisture of dirt and dust which is communicated to the clothing of the user.

To overcome these objections I provide an open framework for supporting the lower end of the chute free of the ground whereby there may be a free circulation of air around the bottom as well as elsewhere. In several of the figures such a frame is shown as comprising four uprights 53 riveted to chute portions and extending vertically into a concrete block 54, the top surface of which is shown in Fig. 1, and being embedded therein, with bracing members as 55 for the legs 53. While the provision of such a frame structure adds to the expense, the overcoming of the objections mentioned is deemed sufficient to warrant it.

Turning to Figs. 7 and 8 the entrance passageway construction is shown as including first a rectangular frame of say two-inch by ten-inch lumber having an upper part 60, a bottom part 61 and two vertical side parts 62, one of which is shown in Fig. 8. At the front edges of this frame is secured a three-part facing consisting of an upper member 64 and two side members 65; a pair of doors A and B are hinged to swing inwardly on hinges 66 shown by dotted lines in Fig. 7. There are vertically-movable locking rods 67 for holding the doors closed, and hand-operable means including hand rods 68 for moving the rods 67. Such a hand-operable locking mechanism is shown and described in my Patent 1,596,553 of August 17, 1926, and it is deemed sufficient here to point out that a person desiring to open the door merely presses upon one or the other of rods 68, thereby moving rods 67 to release the doors, which may then be swung inward exposing the entire entrance passageway.

The passageway-forming means shown in Fig. 8, as well as the doors and other construction features of Figs. 7 and 8, may be considered to be the same for the entrance parts 20 and 20a of Fig. 1.

In Fig. 8 the entrance passageway-forming means includes a rectangular ring-like part of

sheet metal marked 70 as a whole, the same being secured as by nails 71 to the frame parts 60, 61 and 62. The large downwardly-slanting part which is marked "20 or 20a" in Fig. 8 is rectangular at the upper end and circular at the lower end and has an upper wall 72, side walls 73 and a bottom wall 74. These walls 72, 73 and 74 are connected with the section marked 70 as a whole by interfolding edge portions thereof together at 75, thus forming a seam.

A departure from prior practice in this connection is in the provision of ventilating means at the top of wall 72. A plurality of small holes 76, one of which is shown in Fig. 8, extend linearly across the upper wall 72 close to the seam 75, and there is a plate-like cover 77 overlying these holes 76 substantially closely and extending considerably beyond the holes, the plate 77 being substantially wide. This plate 77 has its upper edge portion bent around and interfolded with the other interfolds at 75, and thus held in place as part of the operation of seaming the parts 70 and 72 together. The space marked 78 between the plate-like covers 77 and wall 72 is closed at its ends by end walls 79 and is open at the front or lower end marked 80. The present construction provides suitable ventilation for the chute while excluding snow and rain, and the particular construction described is advantageous in the manufacturing operation.

Tube section marked 21 (Fig. 8) interfits with entrance-passageway-forming means 20 or 20a in a peculiar way. These tubular fire escapes are heavy and cumbersome things. The entrance-passageway means 20 or 20a are assembled and fixed in place, and the body portions of the tube are put together on the ground. This heavy tubular body must be raised and connected with the entrance-passageway means. It is also necessary for the best effects to produce a watertight joint at such connections. I have provided means at 82 (Fig. 8) by which the desired ready and watertight assembly can be made, namely the provision of an outer member 83 and an inner member 84, each member being continuous and ring-like and the two being spaced from each other sufficiently to permit the tubular section 21 to enter between them. The overlap is to quite a substantial extent, making for a strong, rigid joint. When the parts have been assembled rivets 85 are applied, holding the parts strongly together.

A construction feature of advantage in this connection is in interfolding the upper edge of the outer and inner ring-like members 83 and 84 with the edge portion of entrance means 20 or 20a. This is shown at 87 (Fig. 8). Thus at one operation the two rings 83 and 84 are secured rigidly in place and with a watertight joint. The deep overlap at 82 also makes a watertight connection.

Referring to Figs. 13 and 14 doors A and B such as are used for this purpose are ordinarily of a paneled construction, chiefly for lightness, the panels being of thin sheets of laminated veneering. Such doors meeting each other at the middle almost necessarily show a considerable space between their meeting edges. In consequence much coldness and draughtiness has been observed in the room about such entrance passageways. I provide insulation material 90, in sheet form, upon the rear surfaces of the doors (see also Fig. 8) which, together with the

air insulation at 91, greatly reduces the objection.

I also provide a seal at the meeting edges of the doors, comprising a springy strip 93 extending from top to bottom of the doors and secured to one of them, with cushioning material 94 such as felt between the springy member 93 and the door. This is a yielding seal, permitting the doors to swing on their hinges while making a tight seal when they are closed.

I provide a further seal against cold and draughts in the form of a diaphragm 95, which may be of paper. It is secured to a three-part frame comprising the top part 196 and the two side parts 97 secured to the frame parts 60 and 62 respectively. I omit a frame part at the bottom for diaphragm 95 to avoid any obstruction at the bottom within the entrance, and the diaphragm is permitted to lie loosely at 95a upon the bottom wall 70a of tubular section 70.

This diaphragm 95 is in the path of the inwardly-swinging doors. The paper or similar material is ruptured by the doors when the fire escape is to be used. I may provide sharp projections 96 on the doors to cooperate in rupturing and tearing the tympanum 95.

I may also provide a readily-rupturable tympanum or diaphragm 98 outside the entrance, held on a frame having a top part 99 and side parts 100. Diaphragm 98 may have its outer surface ornamented, and it may contain directions for using the device. It will be broken at the time the release handles 68 are sought to be operated. Where only one diaphragm at the entrance is to be used I prefer the one marked 95 inside.

Such tympani or diaphragms may be secured to their frames by tacking or by pasting them in place. In applying the inner one 95 the workman enters at the doorway, closes the doors, braces his body in the passageway, applies the cover material, and then descends through the chute.

Such entrance closures as 95 and 100 provide a peculiarly advantageous seal against coldness and air draughts. They are important also in preventing warmth from the room from entering the colder areas of the passageway. Such warmth and humidity cause frosting inside the chute, which is objectionable.

I also provide sealing means for the lower end of the chute in the form of a readily-rupturable diaphragm. Figs. 10 and 11 show such a diaphragm 101 held by a springy ring 102 seated within the channel iron 103 which is rigidly secured at the end of the chute, the ring having ears 104 with a bolt 105 for drawing the ears toward each other to clamp the edge portion of the diaphragm upon the channel iron.

In Fig. 12 the edge portions of the rupturable diaphragm 106 is folded into the channel 107, 107a and tied in place by a readily breakable string 108. Fig. 12 shows the device of Fig. 5 with the cover section in covering position. The same means for securing the diaphragm in place apply to Fig. 1 where the dotted diaphragm 109 is shown as having been broken by raising the lid 42.

Such a diaphragm at the lower end of the chute serves several important functions. It maintains the inside of the tube substantially free of dirt and dust and thus protects the clothing of the user and maintains a better sliding surface. It also protects the interior against

rain and snow and prevents frosting inside under some weather conditions. It avoids air draughts upward through the chute. Another advantage is that it serves as a bar to the commission of various kinds of nuisances and objectionable practices by a person or persons entering at the bottom. In this respect the easily-breakable partition acts as an official seal. Breaking the present diaphragm is evidence that may be attached to persons seen in the neighborhood. It leads to inquiry.

Such a diaphragm may be of paper treated with parafine to withstand the weather. It is cheap and readily replaceable. The first person through the chute breaks it without any injury to himself, even if he were to come through head first. It may be scored or otherwise weakened in places or on lines to facilitate the rupture.

In Fig. 7 I have shown a hand-hold rod having two depending hand-hold elements 111. In Fig. 15 there are two hand-hold elements 112 in the form of a short bar formed in rod 113. In Fig. 16 the two hand-hold elements 114 are held by rigid supports 115. In Fig. 17 the two hand-hold elements 116 are held pendant for swinging movement by woven fabric or other flexible straps 117. In all of these instances the hand-hold elements are so positioned and so individualized to the two hands respectively of the user that he is substantially compelled to get his body into the proper position for swinging straight and centrally into the entrance passageway. The one shown in Fig. 8 is preferred.

The many features of improvement herein disclosed may all be embodied in a single device, except for the several modified forms of the same feature and in which case any of the modifications may be used; or a fire escape may be constructed with any of these improvements or several of them as desired. The several features may be variously embodied, and I contemplate as being included in these improvements all such variations, changes or departures from what is thus specifically illustrated and described as fall within the scope of the appended claims.

I claim:

1. A fire escape comprising at least two main tubular sections with means connecting them to form a tubular chute, the normally lower section having a cross sectional area substantially enlarged over that of the normally upper section, means providing an entrance passageway for persons at the upper end of the normally upper section, and means providing an entrance passageway for persons into the chute near the upper end of the substantially enlarged section and downwardly beyond the lower end of the upper section, said last-mentioned means defining a passageway which leads slantingly downward and forward in the normal direction of travel through the chute.

2. A fire escape comprising at least two main tubular sections with a tubular unit interfitting at its open ends with open ends of said main tubular sections, the lower main tubular section having a cross-sectional area substantially enlarged over that of the upper main tubular section, said tubular unit flaring in diameter from that of the upper tubular section to that of the

lower tubular section, said unit having a lateral opening between its ends, and means at said lateral opening providing an entrance passageway for persons into said unit.

3. A connection for main tubular parts of a fire escape of the character described comprising a tubular unit open at each end and flaring to an enlarged cross sectional area at its normally lower end, said unit having a lateral opening between its ends, and a tubular extension secured about said opening.

4. The device of claim 3 hereof in which the axis of said tubular extension is directed normally downward and approximately toward the axis of said tubular unit and at an angle thereto which is substantially less than a right angle.

5. A tubular fire escape having means forming an entrance passageway, a movable door for said passageway, and a readily-rupturable diaphragm across said passageway and in the path of the door whereby the opening of the door ruptures the diaphragm.

6. A tubular fire escape having means forming an entrance passageway, an inwardly-swinging door for said passageway, and a readily-rupturable diaphragm across said passageway posterior to the door and in the path of the door whereby the opening of the door ruptures the diaphragm.

7. A fire escape having a tubular body and a substantially horizontal open elongated trough-like extension at the lower portion thereof, said extension having a sliding surface continuous with the sliding surface of the body, with a cover forming, with the trough-like extension, a tubular extension of said body, the cover being hingedly mounted to be swung out of its extension-covering position.

8. The device of claim 7 hereof in which, said cover is hingedly mounted to be swung into a position making it a further trough-like extension at the normally free end of the first-mentioned trough-like extension.

9. A fire escape having a tubular body and means including a downwardly-slanting upper wall forming an entrance passageway thereto, and having means for ventilating the fire escape, said last-mentioned means comprising a plurality of small openings in said upper wall and extending linearly substantially from side to side of said passageway-forming means, and a plate-like cover member positioned close to and overlying said openings, said cover member being secured to the passageway-forming means along one edge of and at the ends of the cover member.

10. The device of claim 9 hereof in which said upper wall is of sheet metal and there is another sheet-metal part to which said upper wall is connected by an interfolding of adjacent edge portions of the wall and of said part, and said cover member is of sheet metal and is secured along one edge portion by interfolding same with said other interfolded edge portions.

11. A tubular fire escape having movable door-means and a relatively fixed readily-rupturable diaphragm across the passageway thereof, the diaphragm being in the path of the door-means and rupturable by the opening movement thereof.

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