

Feb. 5, 1963

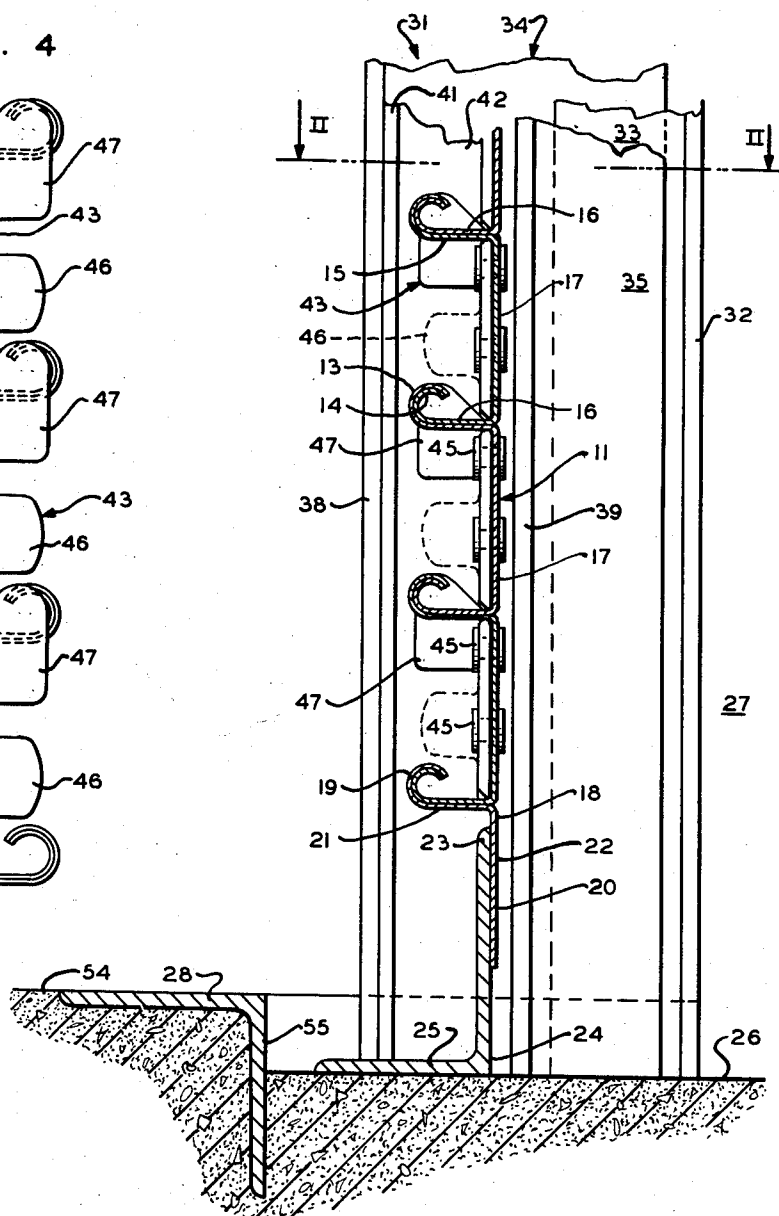
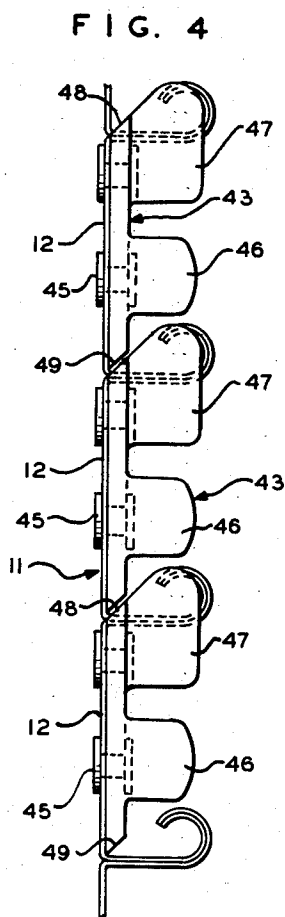
M. B. ZOLL ET AL
ROLLING METAL DOOR

3,076,499

Filed Sept. 10, 1958

4 Sheets-Sheet 1

FIG. 1



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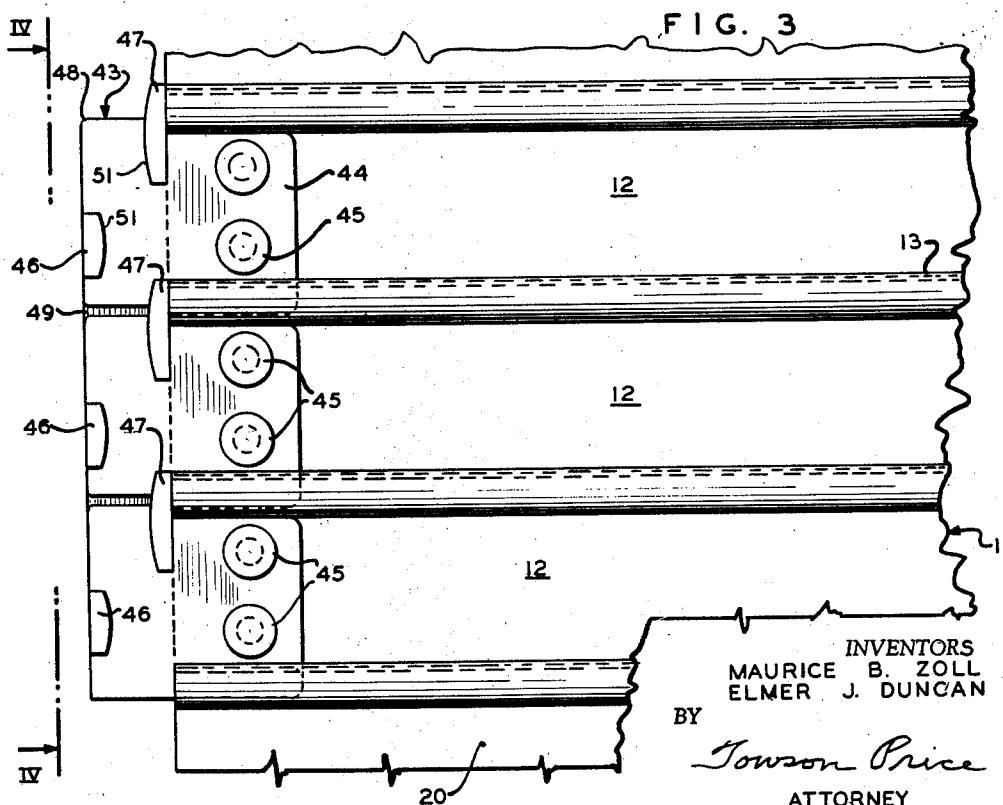
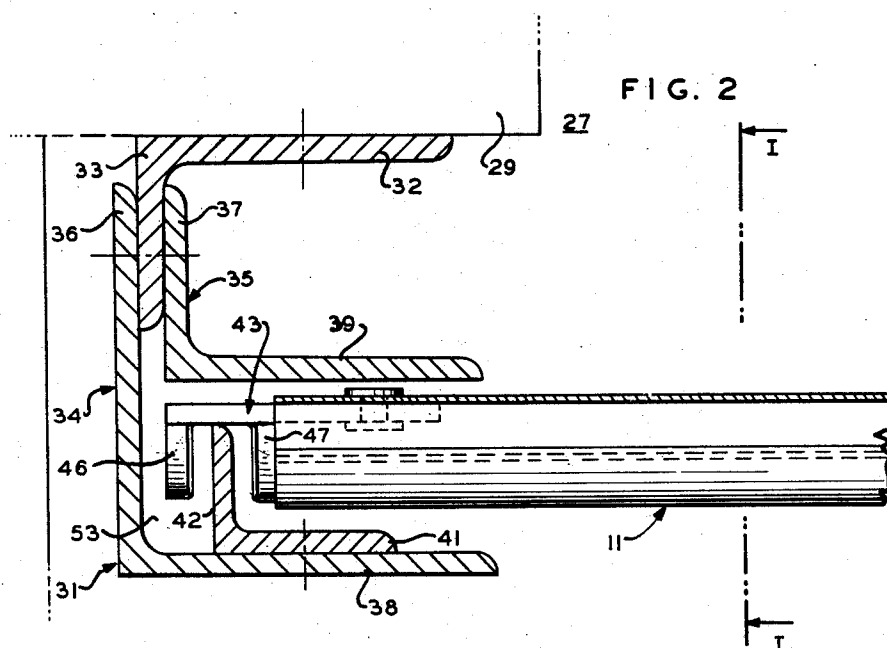
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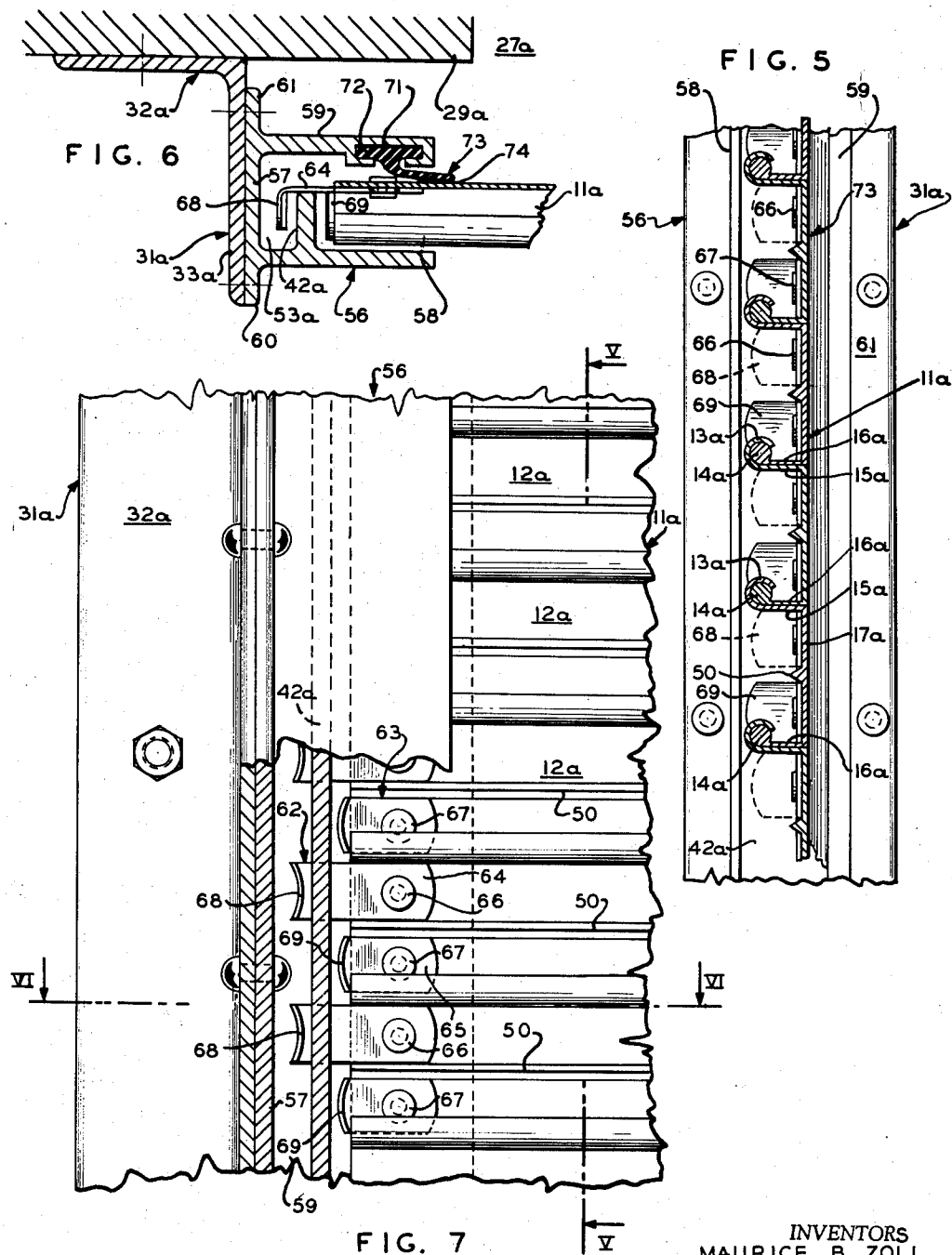
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FIG. 9

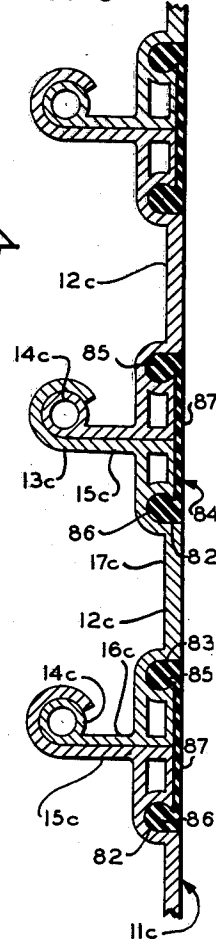


FIG. 8

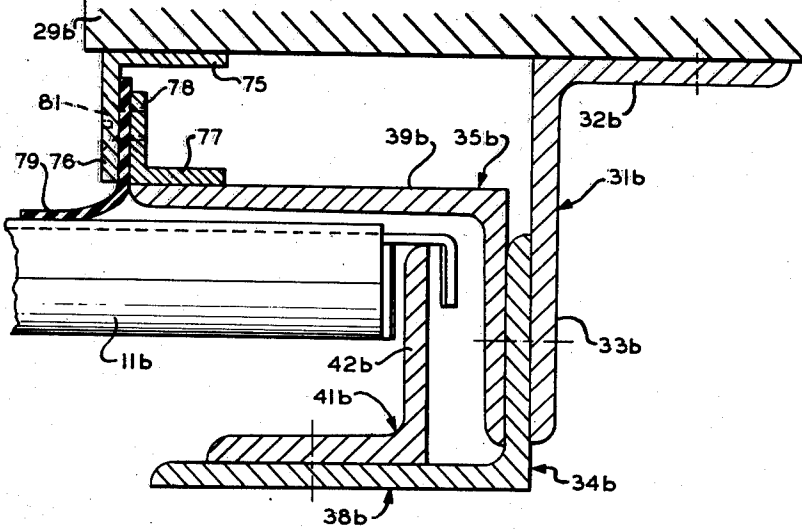
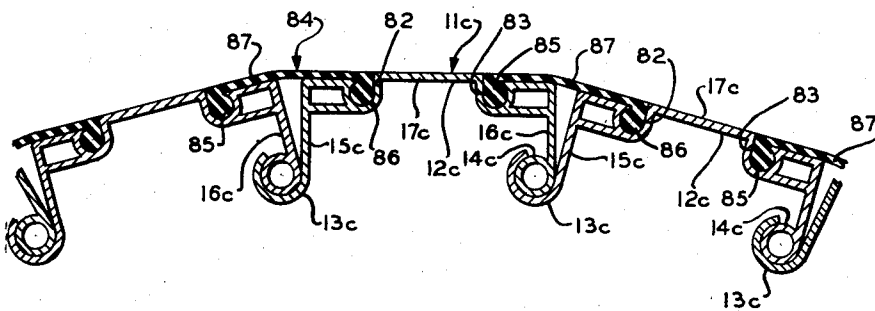


FIG. 10



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ROLLING METAL DOOR

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Filed Sept. 10, 1958, Ser. No. 760,160
17 Claims. (Cl. 160-41)

This invention relates to closures in the form of metal doors composed of jointed or interengaging slats and, more particularly, to such mounted for vertical reciprocation or up-and-down movement with respect to a door frame or structure presenting an opening to any space and, when in closed position, substantially sealing that frame against the passage of fluid, without the need of flexible sealing strips, but adapted for use therewith if desired.

Such doors may be used by themselves or in combination with other elements for closing openings, either with or without safety mechanism to prevent them from being lifted from the outside by unauthorized persons. The advantages of our new rolling metal doors or closures lie not only in the general construction of such but also in the means sealing the lateral edges thereof against the passage of fluid, particularly water.

An object of our invention is to provide a rolling metal door consisting of interengaging slats, with means supporting the door for up-and-down movement with respect to a frame, means being employed for guiding each lateral edge of the door, including a flange extending along each of said edges, members secured to the end portions of said slats and cooperating with said guiding means, said members comprising portions secured to said slats and with lugs outstanding therefrom and lying on one side of the flange of the adjacent guiding means, other lugs outstanding therefrom and lying on the other side of said flange, the means supporting said door being such that at least some of the secured portions of said members lie in sealing engagement with the free edge of the cooperating flange, and the flanges guide the door in its up-and-down movement with said lugs preventing undesired displacement of the door.

Another object of our invention is the provision of flexible means for sealing the joints between adjacent slats of a door, even when the door is flexed as when rolled up on a supporting device.

A further object of our invention is the provision of a rolling metal door consisting of slats hinged with respect to one another, and guiding means at the ends of said slats including parts which perform the additional function of end locks for preventing longitudinal displacement of said slats with respect to one another.

A still further object of our invention is the use of flexible sealing strips as additional, instead of the main means of preventing leaking through a rolling metal door.

These and other objects and advantages will become apparent from the following detailed description when taken with the accompanying drawings. It will be understood that the drawings are for purposes of illustration and do not define the scope or limits of the invention, reference being had for the latter purpose to the appended claims.

In the drawings, wherein like reference characters denote like parts in the several views:

FIGURE 1 is a fragmentary vertical sectional view of a rolling metal door embodying our invention, on the line I—I of FIGURE 2, in the direction of the arrows.

FIGURE 2 is a fragmentary plan of the door and one of the guides for a lateral edge thereof, with parts in horizontal section on the line II—II of FIGURE 1, in the direction of the arrows.

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FIGURE 3 is a fragmentary inside elevational view of the door of FIGURE 1, or in a direction from the left of said figure.

FIGURE 4 is a fragmentary end elevational view in the direction of the arrows on the line IV—IV of FIGURE 3.

FIGURE 5 is a fragmentary vertical sectional view of a modification, on the line V—V of FIGURE 7, in the direction of the arrows.

FIGURE 6 is a fragmentary horizontal sectional view on the line VI—VI of FIGURE 7, in the direction of the arrows.

FIGURE 7 is a fragmentary interior elevational view, or one from the left of FIGURE 5.

FIGURE 8 is a fragmentary plan of another modification but otherwise corresponding with FIGURE 2, with parts shown in horizontal section, but illustrating the other side edge portion of a door embodying our invention and its modified guiding and sealing means.

FIGURE 9 is a fragmentary vertical sectional view showing a further embodiment of our rolling metal door, the slats thereof being shown in coplanar or normal positions.

FIGURE 10 is a view corresponding to FIGURE 9, but showing the slats in angled positions, as when the door is rolled up or raised.

Referring to the drawings in detail, and first considering the embodiment of our invention illustrated in FIGURES 1 to 4, inclusive, there is shown a rolling metal door, generally designated 11, which may be connected to, operated by, and rolled up on a reel, not shown, but which may be conventional as illustrated, for example, in the Greeger Patent, No. 1,989,513, or in the Zoll copending application, Serial No. 623,398, filed November 20, 1956, now Patent No. 2,898,988, dated August 11, 1959 and owned by the assignee of the present application.

The door 11 consists of a plurality of metal slats 12, each of which has edge portions rolled or turned to generally cylindrical form, as indicated at 13 and 14, to receive in or be received by the correspondingly rolled edge of an adjacent slat. In the present embodiment, these rolled edges are formed respectively on flanges 15 and 16, extending from the inner surfaces of webs 17. Although we do not wish to be limited to the material forming the slats, which may be of any durable metal, in the present embodiment a preferred material is stainless steel.

By virtue of the interengaging rolled or generally cylindrical edge portions of the slats, the same may be hinged with respect to one another and relatively angled during a raising or rolling-up operation. The slats are hingedly assembled with respect to one another by inserting one end of each of the smaller rolled edges, such as those designated 14, in the opposite end of the larger rolled edge such as that designated 13 of the adjacent slat, and sliding said slats longitudinally with respect to one another until they lie with their corresponding ends disposed in the same vertical lines as viewed most clearly in FIGURE 3.

Each door 11 may be terminated at its lower end by a special slat 20, the upper edge of which is rolled, as indicated at 19, at the end of a flange 21, the remainder of the slat being a flat web or depending portion 22 secured to the upstanding flange 23 at an angle iron 24. The other or lower flange 25 of said angle iron is adapted to lie flat on the ground or pavement 26 outside of a door opening 27. The latter may be defined by a sill 28 in the form of an angle iron, and vertical side members 29 only one of which is illustrated. Alternatively, the flange 25 of said angle iron 24 may carry flexible sealing means for engagement with the ground 26 such, for example as the dust-

proof member 32 disclosed in the Cookson et al. Patent No. 2,820,516. Each lateral edge of the door 11 is slidable in a guide generally designated 31.

In the present embodiment, each guide 31 consists of a fixed metal angle iron 32 secured to a vertical door frame side member 29 and with a flange 33 projecting therefrom. Pairs of angle irons 34 and 35 have flanges 36 and 37, respectively, engaging opposite faces of the flanges 33 and are secured thereto in any desired manner as by means of rivets, not shown. The other flanges 38 and 39 of said angle irons 34 and 35, respectively, are spaced from one another as shown most clearly in FIGURE 2 to receive a lateral edge portion of the door 11. Each of the flanges 38 has secured thereto in any desired manner a fourth metal angle iron 41 which has a flange 42 which has a generally straight free edge and projects therefrom toward a flange 39 to form a seal as well as the guides for the corresponding lateral edges of the door 11.

In order to provide means at lateral edge of the door 11 to cooperate with a flange 42 and prevent undesired displacement of the door in the plane of its slats, we secure at each end of each slat a guide member 43 comprising a generally flat web or other portion 44 directly secured to the inner face of the web 17 of its slat, as by means of rivets 45, desirably formed of aluminum or aluminum alloy. Extending from each web 44 in the same direction as the flanges 15 and 16 is a lug 46 adjacent the outer side edge of each member 43 and a lug 47 disposed laterally inward, and vertically, in this case upwardly, offset or displaced therefrom so as to overlap the member 43 thereabove and the corresponding hinged connection between a pair of slats, thereby lying along the ends of the slats and providing an end lock to prevent lateral displacement of the slats with respect to one another.

In the present embodiment, although each of the members 43 is desirably formed as an aluminum or aluminum alloy casting and the edges are closely bevelled, as indicated at 48 and 49, so as to overlap the correspondingly bevelled edges of adjacent members to thereby further inhibit the leakage of fluid between slats, we do not wish to be limited to the material used or the manner of shaping it. When a door is in place, the lugs 46 and 47 lie on the opposite sides of the corresponding flange 42 and desirably have their flange-adjacent faces 51 formed convex or cylindrical to prevent biting into the adjacent sides of said flange 42 upon vertical reciprocation of the door.

From the foregoing it will be seen that if water or other fluid attempts to go through the door opening 27 to the inside of the door 11, it has to pass from the outside between the flanges 39 of the angle irons 35 and the side edges of the door 11 around the guide member webs 44 and their lugs 46, where it is effectively stopped by the flat metal to metal engagement between said webs 44 and the edges of the flanges 42 of the angle irons 41 which thereby form an effective seal, as viewed most clearly in FIGURE 2. Also, any water reaching the spaces 53 in which the lugs 46 are disposed, will drain downwardly to the bottom of the door, thereby discharging on the surface 26 which, as viewed in FIGURE 1 is below the floor or surface 54 inside of the door 11. Any water, of course, passing under the bottom angle iron 24 will not usually get to the floor 54 because it will be stopped by the depending flange 55 of the angle iron 28. Thus the members 43 perform the double function of preventing undesired lateral displacement, or such in the plane of the door 11, and providing a durable metal to metal seal against the passage of fluid around the side edges of the door.

Referring now to the embodiment of our invention illustrated in FIGURES 5, 6 and 7, there is shown a door 11a similar to that of the first embodiment except that the slats and some of the associated parts are formed somewhat differently. Specifically, the door 11a consists of a plurality of metal slats 12a which may be formed from aluminum or an alloy thereof by an extrusion process rather than by rolling. One edge of each slat, in

this case upper, may be formed hollow and slightly more than semi-cylindrical, as indicated in 13a, and the other, in this case the lower edge portion 14a, instead of being hollow, as in the previous embodiment, may be solid and somewhat more than semi-cylindrical and of corresponding size to be hingedly received in the turned edge portion 13a of the adjacent slat. As in the preceding embodiment, these edge portions are formed on the edge portions of flanges 15a and 16a, respectively, extending from the inner surfaces of webs 17a. Each web 17a, in the present embodiment, is desirably reinforced by a longitudinally extending bead or boss 50, desirably triangular in cross-section, thereby presenting a pleasing appearance. Each boss 50 thus presents sloping sides serving to guide the adjacent associated members 62 and 63, to be later discussed in detail, to seating engagement on the web 17a.

By virtue of the interengaging generally cylindrical edge portions of the slats, the same are hinged with respect to one another and may be relatively angled during a raising or rolling-up operation. The slats are assembled with respect to one another by inserting one end of the solid bead 14a in the opposite end of the hollow cylindrical edge portion 13a of the adjacent slat and sliding said slats longitudinally with respect to one another until they lie with their corresponding ends disposed on the same vertical lines, as viewed most clearly in FIGURE 7.

The door 11a may be terminated at its lower end by a special slat formed generally like that designated 20 of the preceding embodiment, except that it may be extruded rather than rolled. It may have secured to its flat depending portion the upstanding flange of an angle iron as in the preceding embodiment. Each lateral edge of the door 11a is slidable in a guide generally designated 31a.

In the present embodiment, each guide 31a consists of an angle iron 32a secured to a door frame member 29a by suitable means such as bolts, not shown, and with a flange 33a projecting therefrom. A special structural member 56 is connected to each of the flanges 33a by suitable means such as rivets, not shown. Each structural member 56 is generally U-shaped in section and consists of a base 57 from which extend flanges 58 and 59. Flanges 60 and 61 extend beyond the flanges 58 and 59, respectively, to provide portions through which the attaching rivets, if used, may extend. Each of the flanges 58 has projecting therefrom toward the corresponding flange 59, an interior flange 42a to form the guides for the corresponding lateral edges of the door 11a.

In order to provide means at each lateral edge of the door 11a to cooperate with a flange 42a and prevent lateral displacement of the door in the plane of its slats, we secure at each end of each slat a pair of, rather than a single guide member, said guide members being here designated 62 and 63. In the present embodiment, the guide members comprise base portions 64 and 65 respectively disposed between the slat boss 50 and the flange 15a thereof and said boss and the flange 16a thereof and respectively secured to said web as by means of rivets 66 and 67. At the outer ends of said base portions 64 and 65 are respectively provided lugs 68 and 69.

The guide members 62 and 63 are so formed and connected to the slats that one of them, in this case the member 62, has its lug 68 laterally offset with respect to the lug 69 on the member 63 so that said lugs may lie on opposite sides of the flanges 42a, as viewed most clearly in FIGURE 6, one of said lugs, in this case that designated 69, being of such width that it overlaps the bead 14a of its slat, thereby providing an end lock to prevent lateral displacement of the slats with respect to one another.

Although in the present embodiment each of the members 62 and 63 is formed desirably of material such as stainless steel and the rivets, 66 and 67, are desirably formed of aluminum or an alloy thereof, we do not wish to be limited in the material used. The lugs 68 and 69 desirably have their faces which are adjacent to flanges 42a formed convex or cylindrical to prevent biting into

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the adjacent sides of said flanges upon vertical reciproca-
tion of the door.

In order to further weatherproof the joints between the door edges and the special structural members 56, we may find it desirable to form the flanges 59 of said members with inwardly opening pockets 71 for receiving the heads 72 of flexible T-shaped members 73, the stems or projecting portions 74 of which resiliently engage near the side edges the adjacent face of the door 11a, as viewed most clearly in FIGURE 6. It will be understood, however, that such a resilient sealing member need not be employed and if desired it may be employed in any one or all the other embodiments. It may be formed of flexible rubber or rubber-like material such as "neoprene."

From the foregoing, it will be seen that if water or other fluid attempts to go through the door opening 27a to the inside of the door 11a, it has to pass between the flanges 59 of the special structural members 56 and the side edges of the door 11a along the base portions 64 and around the lugs 68 where it is effectively stopped by the engagement between the base portions 64 of the guide members 62 and the edges of the flanges 42a which form an effective seal as viewed most clearly in FIGURE 6. However, such a seal is not quite as effective as in the preceding embodiment, because the base portions 64 do not form a substantially continuous vertical surface like webs 44 of the casting members 43 of the preceding embodiment. However, this seal is, in the present embodiment, supplemented by the flexible member 73 so that the sealing is sufficiently effective for the purpose. Any water reaching the spaces 53a in which the lugs 68 are disposed will drain downwardly to the bottom of the door, thereby discharging on the surface corresponding with that designated 26 in FIGURE 1, just below the floor or surface designated 54 inside of the door.

Referring now to the embodiment of our invention illustrated in FIGURE 8, there is shown a door 11b which may be constructed like the door 11 of the first embodiment or like the door 11a of the second embodiment. In the present embodiment, guides 31b at the door edges each consists of an angle iron 32b secured to a door frame member 29b, with a flange 33b projecting therefrom. As will be observed in the present embodiment, the door frame member 29b opposite the door frame member 29 or 29a of the first and second embodiments, respectively, is illustrated.

A pair of angle irons 34b and 35b, which have flanges overlapping one another, are secured to the inner surface of each flange 33b in any desired manner, as by means of rivets, not shown. The other flanges 38b and 39b of said angle irons 34b and 35b are spaced, as illustrated, to receive the lateral edge portions of the door 11b. Each of the flanges 38b has secured thereto, in any desired manner, a fourth angle iron 41b which has a flange 42b projecting therefrom toward a flange 39b, to form the guides for the corresponding lateral edges of the door 11b. The cooperation between the flanges 42b and the door 11b may be identical with that between the flanges 42 of the first embodiment and the door 11 or that between the flanges 42a of the second embodiment and the door 11a.

As a further means of inhibiting the passage of fluid around the door edges, we provide angle irons 75, each secured to a door frame member 29b by suitable means, not shown, or with a flange 76 projecting therefrom. We also provide angle irons 77, one flange of each of which may be disposed in engagement with the corresponding flange 39b of an angle iron 35b, without connection thereto. Alternatively, these engaging flanges may be connected in any desired manner. If connected to the flanges 39b, then the angle irons 75 need not be secured to the door frame members 29b. Each angle iron 77 has a flange 78 projecting therefrom and between which and a flange 76 is sandwiched a flexible weather proofing

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member 79, the free edges of which members extend to and resiliently engage the adjacent face of the door 11b. The means for holding the weather strip members 79 between the flanges 76 and 78 may comprise a series of screws or other fastening means 81. It will be understood that similar flexible weather proofing may be used as a substitute for the flexible members 73 of the second embodiment.

Referring now to the embodiment of our invention illustrated in FIGURES 9 and 10, there is shown a fragmentary portion of a door 11c which consists of a plurality of metal slats 12c, each of which has edge portions formed generally cylindrical as indicated at 13c and 14c, to receive in or be received by the correspondingly formed edge of an adjacent slat. In the present embodiment these edge portions are formed on flanges 15c and 16c, respectively, extending from the inner surfaces of webs 17c. Although we do not wish to be limited to the material forming the slats, which may be of any durable metal, in the present embodiment the metal is desirably aluminum or an aluminum alloy.

By virtue of the interengaging generally cylindrical edge portions of the slats, the same are hinged with respect to one another and may be relatively angled during a raising or rolling-up operation. The slats are assembled with respect to one another by inserting one end of the smaller cylindrical edge portion, such as that designated 14c, in the opposite end of the larger cylindrical edge portion, such as that designated 13c, of the adjacent slat and sliding said slats longitudinally with respect to one another until they lie with their corresponding ends disposed on the same vertical lines, as viewed most clearly in FIGURE 3 or FIGURE 7. The door 11c may be terminated at its lower end as described in connection with the first embodiment and each lateral edge of the door is or may be provided with guide members, such as those designated 43, or those designated 62 and 63, slidable in a guide, as described in one of the preceding embodiments, thereby preventing the passage of fluid, particularly water, past the lateral edges of the door.

In the present embodiment, special provision is made for also preventing passage of water between the slats around the hinged connections. This sealing of the joints between the slats is effected by the provision of pockets 82 and 83 in each slat 12c, or in each web 17c thereof, each pocket extending longitudinally from end to end of its slat and being desirably generally cylindrical except where it opens to the outer face or weather side of its slat. Received in said pockets are weather seals formed of flexible rubber or rubber-like material such as "neoprene," each of which may consist of enlarged side edge portions 85 and 86 snugly fitting and insertible longitudinally of the adjacent pockets 83 and 82, respectively, of the slats, like the slats are assembled with respect to one another, and thereby locked in place in said pockets. These enlarged side edge portions are connected by resilient flexible portions 87 spanning the distance therebetween to seal the joints between adjacent slats, even when the latter are rotated with respect to one another, as to the position illustrated in FIGURE 10, as during the process of being elevated or rolled up. It is understood that, if desired, the joints between the slats of any one or all of the preceding embodiments may be similarly sealed.

Having now described the invention in detail in accordance with the requirements of the patent statutes, those skilled in this art will have no difficulty in making changes and modifications in the individual parts or their relative assembly in order to meet specific requirements or conditions. Such changes and modifications may be made without departing from the scope and spirit of the invention, as set forth in the following claims.

We claim:

1. A rolling metal door, composed of interengaging

slats, means supporting said door for up-and-down movement with respect to a door frame, a fixed metal guide for each lateral edge of said door including a flange extending along said edge and having a generally straight free edge, metal members secured to the end portions of said slats and cooperating with said guides, said members comprising generally flat portions secured to the slats, lugs outstanding therefrom and lying along the ends of the slats on one side of the flange of the adjacent guide and other lugs laterally displaced beyond the ends of the slats and also outstanding from said flat portions and lying on the other side of said flange, the means supporting said door being such that at least some of the secured portions of said members lie in flat metal to metal sealing engagement with the straight free edge of the cooperating flange and the flanges guide the door in its up-and-down movement, with the lugs performing the additional function of preventing undesired displacement of the door in the plane of said slats.

2. The combination recited in claim 1, wherein each guide comprises an angle iron secured to the door frame and with a flange projecting therefrom, a pair of angle irons, numbers two and three, with flanges engaging opposite surfaces of said first-mentioned flange and secured thereto and the other flanges of said pair of angle irons being spaced to receive a lateral edge portion of said door, and the flange extending along said edge portion being formed by a flange projecting inwardly from a fourth angle iron secured to the inner surface of the outer flange of said pair of angle irons.

3. The combination recited in claim 1, wherein the flange-engaging sides of the lugs are convex to avoid binding.

4. The combination recited in claim 1, wherein one of each of the first-mentioned lugs forms an end lock to prevent lateral displacement of the slats with respect to one another.

5. The combination recited in claim 1, wherein flexible weather seals extend from said guides and engage the outer surface of said door.

6. The combination recited in claim 1, wherein each guide comprises an angle iron secured to the door frame and with a flange projecting therefrom, a pair of angle irons, numbers two and three, with flanges overlapped and secured to said first-mentioned flange, other flanges of said pair of angle irons extending laterally away from said overlapped flanges and defining a groove for receiving a lateral edge of said door, a fourth angle iron with a flange projecting from the door frame, a fifth angle iron with a flange overlying said last-mentioned flange, and a flexible weather seal secured between said last-mentioned flanges and engaging the outer surface of said door.

7. The combination recited in claim 1, wherein each guide comprises an angle iron secured to the door frame and with a flange projecting therefrom, a U-shaped member with its base secured to said projecting flange and opening toward a cooperating U-shaped member to form guides for the lateral edges of said door, the element forming the side of said U-shaped member more remote from the door frame having an inwardly projecting flange forming the guide for a lateral edge of the door.

8. The combination recited in claim 7, wherein the other element forming a side of each of said U-shaped members has secured thereto the head of a T-shaped flexible element, the stem of each of said flexible elements projecting inwardly therefrom to engage the outer surface of said door.

9. The combination recited in claim 1, wherein each slat is formed with a web and flanges projecting from one side thereof for hinging connection with adjacent slats, said web having pockets opening in its face away from said flanges, and weather seals each with a pair of enlarged side edge portions locked in said pockets and each pair of side edge portions being connected by flexible portions spanning the distance therebetween to seal the joints be-

tween adjacent slats, even when rotated with respect to one another.

10. The combination recited in claim 1, wherein each of the members secured to said slats is a casting with a web engaging a slat and a pair of lugs outstanding therefrom, one of said pair lying at the outer side edge of its casting and disposed between the upper and lower edges thereof, and the other of said pair projecting beyond a horizontal edge of said casting to function as an end lock.

11. The combination recited in claim 1, wherein each slat has a web portion rigidified by a longitudinally extending boss and terminates at its lateral edges in flanges for hinged connection with adjacent slats, and the members secured to the end portions of the slats comprise one with a portion secured to an end portion of the slat between said boss and a flange and another secured to the same end portion of said slat between said boss and the other flange.

12. A rolling metal door composed of interengaging slats, means supporting said door for up-and-down movement with respect to a door frame, a guide for each lateral edge of said door including a flange extending along said edge, members secured one to each end portion of each slat and each having a web secured to the end portion of a slat and a lug outstanding therefrom and lying on one side of the flange of the adjacent guide and another lug outstanding therefrom and lying on the other side of said flange, the means supporting said door being such that the webs of said members lie in sealing engagement with the free edge of the cooperating flange and the flanges guide the door in its up-and-down movement with the lugs preventing undesired displacement of the door in the plane of said slats.

13. The combination recited in claim 12, wherein the slats are formed of stainless steel and the members secured to the end portion of a slat each comprises an aluminum casting.

14. The combination recited in claim 12, wherein each guide comprises an angle iron secured to the door frame, second and third angle irons with flanges lying on opposite sides of the outstanding flange of said first-mentioned angle iron and secured thereto, the other flanges of said second and third angle irons being spaced to receive the lateral edge of said door, and a fourth angle iron with one flange secured to the inner face of the outermost flange of the second and third angle irons and with its other flange extending into the space between said spaced flanges and forming the guide for a lateral edge of said door to be engaged by the webs of said means secured to the end portions of said slats for sealing purposes.

15. The combination recited in claim 1, wherein each slat is formed with a web and flanges projecting from one side thereof for hinging connection with adjacent slats, said web having pockets opening in its face away from said flanges, and weather seals each with a pair of enlarged side edge portions locked in said pockets and each pair of side edge portions being connected by flexible portions spanning the distance therebetween to seal the joints between adjacent slats, even when rotated with respect to one another.

16. The combination recited in claim 1, wherein each guide comprises an angle iron secured to the door frame and with a flange projecting therefrom, means secured to said flange and providing flanges spaced to receive a lateral edge portion of said door, and the flange extending along said edge portion being formed by a flange projecting inwardly from another angle iron secured to the inner surface of the outer flange of said means.

17. A metal door composed of interengaging slats, means supporting said door for movement to cover or expose an opening, a guide for each lateral edge of said door including a flange extending along said edge and having a generally straight free edge, members secured to the end portions of said slats and cooperating with said

guides, said members comprising generally flat portions secured to the slats, lugs outstanding therefrom and lying along the ends of the slats on one side of the flange of the adjacent guide and other lugs laterally displaced beyond the ends of the slats and also outstanding from said flat portions and lying on the other side of said flange, the means supporting said door being such that at least some of the secured portions of said members lie in flat metal-to-metal sealing engagement with the straight free edge of the cooperating flange, and the flanges guide the door in its movement, with the lugs performing the additional function of preventing undesired displacement of the door in the plane of said slats.

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