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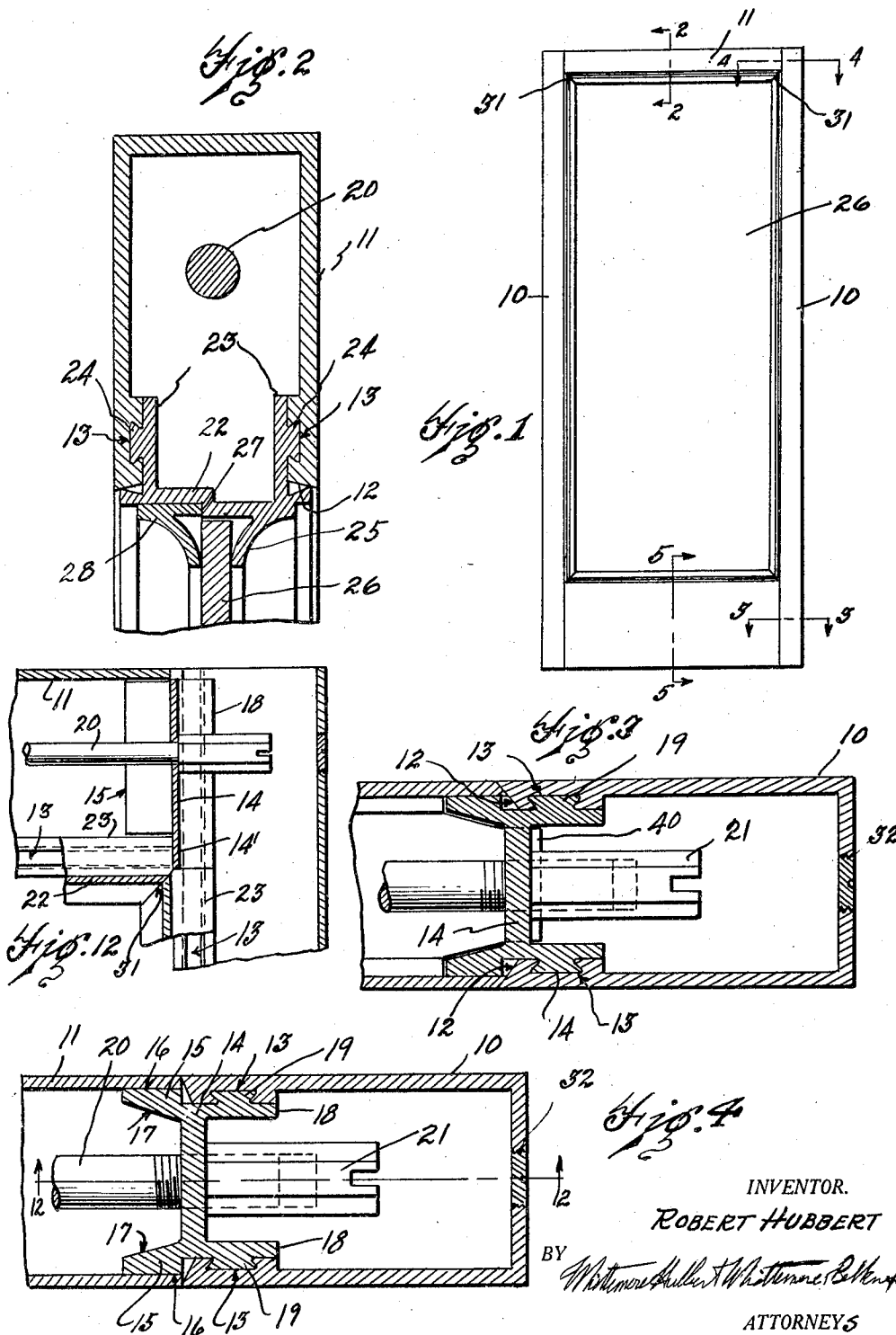
R. HUBBERT

1,799,423

DOOR

Filed Nov. 18, 1926

3 Sheets-Sheet 1



INVENTOR.

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April 7, 1931.

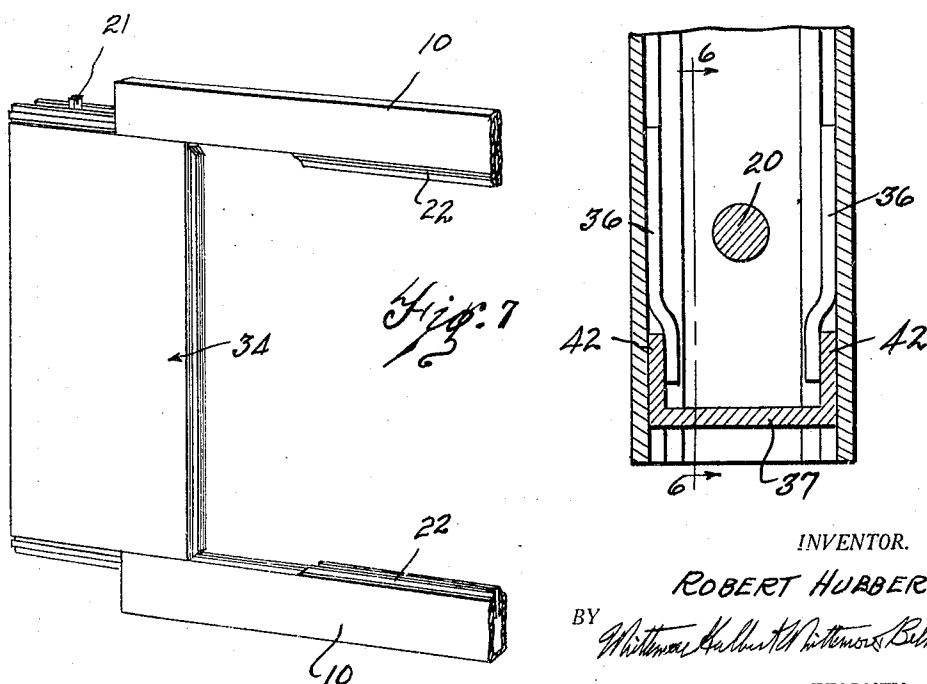
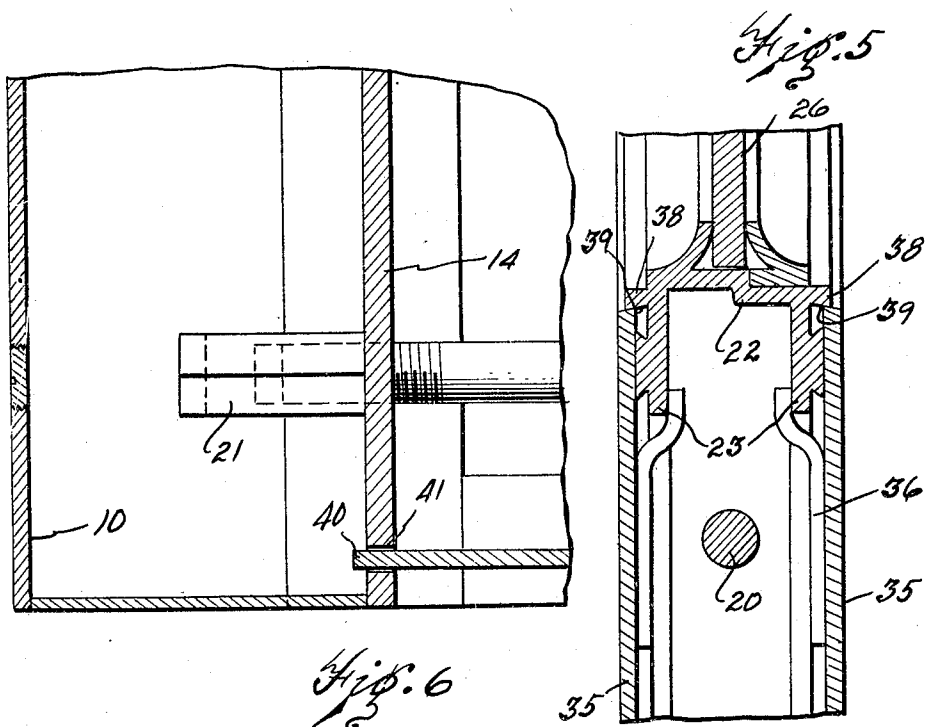
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INVENTOR.

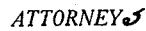
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UNITED STATES PATENT OFFICE

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DOOR

Application filed November 18, 1926. Serial No. 149,215.

This invention relates to doors and more particularly to sectional metallic doors which may be assembled from standardized sections or units. By such an arrangement it is possible to cheapen the cost of manufacture and to facilitate the construction of doors of this character by constructing the units or sections in such a manner as to be applicable for use in connection with all types of doors contemplated by the invention.

The invention furthermore contemplates the manufacture of doors of this character wherein by reason of the interlocking of interengagement of the several sections of the door a rigid and durable structure is obtained without the employment of rivets, welding, or other permanent fastening means.

The invention furthermore contemplates a door structure which includes a pair of side rail sections with which the intermediate panels or sections as well as the top and bottom end sections are assembled by longitudinal sliding engagement between the side rail sections and the said other sections or panels so that the several sections and panels of the door when assembled may be held in place merely by attaching the top and bottom end sections to the side rails.

The several objects, advantages, and novel details of construction of this invention will be made more apparent as this description proceeds especially when considered in connection with the accompanying drawings wherein

Figure 1 is an elevational view of a door constructed in accordance with this invention.

Figure 2 is an enlarged fragmentary sectional view taken substantially on the plane indicated by line 2—2 in Figure 1.

Figure 3 is an enlarged fragmentary sectional view taken substantially on the plane indicated by line 3—3 in Figure 1.

Figure 4 is an enlarged fragmentary sectional view taken substantially on the plane indicated by line 4—4 of Figure 1.

Figure 5 is an enlarged fragmentary sectional view taken substantially on the plane indicated by line 5—5 in Figure 1.

Figure 6 is a fragmentary sectional view

taken substantially on the plane indicated by line 6—6 in Figure 5.

Figure 7 is a fragmentary perspective view of the lower portions of the side rail sections with the lower assembled panel partly disassembled.

Figure 8 is a fragmentary perspective view of one of the spacing bar elements employed.

Figure 9 is a fragmentary perspective view of a section of the panel framing.

Figure 10 is a fragmentary perspective view of a section of the panel stop.

Figure 11 is a perspective view of one of the kick-plate sections.

Figure 12 is a fragmentary sectional view taken substantially on the plane indicated by line 12—12 of Figure 4.

Figure 13 is an elevational view of a door, similar to Figure 1, but of a slightly modified form.

Figure 14 is an enlarged fragmentary sectional view taken substantially on the plane indicated by line 14—14 in Figure 13.

Referring now particularly to the drawings wherein like reference characters indicate like parts and more especially to Figures 1 to 11 thereof, it will be noted that the door comprises a pair of side rail sections 10 and a top rail section 11 of similar cross sectional configuration as will be apparent from Figures 2, 3 and 4. Each of these rail sections is in the form of a substantially U-shaped member in cross section provided adjacent the longitudinal edges thereof with a dove-tail groove 13. The longitudinal edges of each rail section are beveled or inclined as shown at 12 for a purpose to appear more fully hereinafter. Arranged in each open end of the top rail section 11 is a spacing bar section or unit 14 of a substantial I-beam cross section. Each of these members includes a pair of laterally directed flanges 15 each provided with a parallel outer face 16 and an inner inclined face 17. Extending from the opposite side of the web of each spacing bar unit 14 is a pair of spaced parallel flanges 18 the outer faces of which are formed with dove-tail ribs 19. As each of the rail sections 10 and 11 is provided with dove-tail recesses 13 as aforescribed it will be

apparent that the units 14 may be assembled with the adjacent ends of the side rail sections 10 by sliding the units 14 longitudinally of the side rail members 10 with the ribs 19 thereof in engagement with the dove-tail grooves 13. Each of the units 14 is provided, in the web thereof, with an aperture for accommodating a tie rod 20 which is adapted to extend longitudinally within the top rail section 11 with the threaded ends thereof extending through the said apertures in the webs of the units 14 whereupon clamping nuts 21 may be threaded onto the ends of these rods. Thus in assembling the structure in a manner to be explained more fully hereinafter the upper rail section together with the spacing bar units 14 and the tie rod and nuts may be assembled with the side rail sections as a unit.

When the units 14 together with the tie rod 20 have been assembled with the top rail section 11 in the manner aforesaid, with the nuts 21 thereof loosely threaded on the ends of the tie rod, then this unit may be assembled with the side rail sections by slidably engaging the dove-tail ribs 19 of the units 14 with the dove-tail grooves 13 of the side rail sections. The flanges 15 project into the space between the top or outer edge of the top rail section and the relatively heavier edge portions of the section 10 which are provided with the dove-tail grooves 13, with the parallel faces 16 thereof bearing against the vertical walls of the rail section 11. Thus weaving strains or other stresses tending to disalign the door are successfully resisted by the connection between the side rail sections and the top rail section or any of the other transversely extending sections, particularly when the parts are further united by the tie rods in a manner to be more fully referred to hereinafter.

Each spacing bar unit 14 has its web thereof extended at one end to form a projection 14' which extends longitudinally beyond the lateral flanges 15 to abut the ends of the flanges 23 of the panel frame unit 22 associated with the top rail section and to abut that portion of the adjacent end of the top rail section 11 that is provided with the grooves 13. The flanges 15 of the unit 14 engage the vertical side walls of the top rail section 11.

A panel framing 22 is adapted to be associated with the top rail section 11 and the side rail sections 10, this panel frame unit 22 including a pair of spaced parallel flanges 23 provided with dove-tail ribs 24 adapted to engage the dove-tail recesses 13 formed adjacent the edges of the top and side rail sections. Each of the units 22 further comprises a flange 25 constituting a fixed stop for a panel 26, the unit also being provided with a shoulder 27 against which a removable panel stop 28 engages. As shown in Figures

9 and 10 the removable panel stop 28 is provided with a plurality of apertures 29 while the unit 22 is provided with a corresponding number of threaded apertures 30 whereby the removable panel stop 28 may be secured in place against the shoulder 27 by means of screws for holding the panels 26 in place.

One of the panel frame units 22 as mentioned hereinbefore is adapted to be associated with the top rail section 11 and one of these units with each of the side rail sections 10 and the abutting ends of these frame units 22 at the juncture of the top and side rail sections are chamfered or bevelled as indicated at 31. The engagement of these chamfered surfaces also tends to limit and properly position the top rail section 11 with reference to the side rail sections in assembling the door. Thus when the unit 11 has been moved to a position where its outer edge is in alignment with the upper ends of the side rail sections then the chamfered portions of the panel framing of the sections will engage. In this position of the parts the nuts 21 are in alignment with apertures 32 formed in the outer wall of each of the side rail sections 11 whereby a suitable tool such as a screw driver may be inserted to tighten the nuts 21 upon the tie rod 20 to thus rigidly unite the units 14 with the upper ends of the side rail sections 10 owing to the binding action occasioned between the ribs 19 and the grooves 13. These apertures are closed by means of plugs 33 threaded therein.

The side rail sections 10 are united at the bottom thereof by means of an assembled unit indicated generally in Figure 7 by the reference character 34. This unit consists of a pair of kick-plates 35 each provided with a plurality of spaced lugs 36. One of the panel frame units 22 will be associated with the upper edge of the pair of kick plates 35 while one of the spacing bar sections or units 14 will be associated with each vertical edge thereof. A filler bar 37 substantially U-shaped in cross section will be associated with the lower edges of the kick plates 35. The webs of the units 14 are formed with a plurality, here shown as two, apertures for the reception of tie rods 20 which are passed longitudinally through the assembled unit in the same manner as described in connection with the top rail section. Each of the panel frame units 22 is provided with an overhanging ledge or shoulder 38 the underface of which is bevelled as indicated at 39 and in assembling this unit with the kick plates 35 the lugs 36 are caused to engage behind the flanges 23 with the upper edges of the kick plates abutting the inclined lower faces 39 of the shoulders 38. For this purpose these edges of the kick plates 35 will be similarly inclined or beveled to provide an intimate engagement between the kick plates 35 and unit 22 which tends to prevent the lateral

disengagement of the kick plates when thus assembled. The ends of the kick plates are similarly beveled to engage the overhanging beveled surfaces 12 of the side rail sections. The flanges 15 of the spacing bar section afford abutments for spacing the kick plates. The filler unit 37 is provided at each end with an extension or tongue 40 which is adapted to project through a slot 41 formed in the lower end of each of the units 14.

In assembling the unit 34 the filler member 37 is arranged with the extensions 40 thereof projecting through the slots 41 of the units 14 and with the upwardly extending flanges 42 thereof engaging under the lugs 36. The panel frame unit 22 is assembled with the upper edges of the kick plates 35 in the manner aforesaid and the tie rods 20 are put into position with the nuts 21 thereof loosely threaded upon these tie rods. This unit is then assembled with the lower ends of the side rails, by sliding the same longitudinally of the side rails as suggested in Figure 7 with the dove-tail ribs 19 of the spacing bar sections 14 slidably engaging the dove-tail grooves 13 of the side rail sections 10. This section 34 is moved to a position wherein the chamfered or bevelled portions 31 of the panel framing units 22 engage whereupon the lower edge of the unit 34 is in alignment with the lower ends of the side rail sections. In this position of the parts the nuts 21 are in alignment with the apertures 32 formed in the outer walls of the side rails whereupon these nuts may be tightened to bind the several elements of the panel 34 together and to cause a binding action between the spacing bar units 14 and the side rail sections to unite these units 34 as a whole with the side rail sections 10.

While the form of door illustrated in Figure 1 involves a structure wherein the greater part of the area of the door consists of the panel plate 26 nevertheless it is obvious that it is possible with the herein described construction to substitute for the plain panel 26, other types of panels as for instance decorative panels, grating or the like. Obviously it is possible also to construct the panel of glass, metal or any other desired material. In Figure 13 I have illustrated a slightly modified form of construction wherein the door is provided intermediate its length with a hollow panel generally similar in construction to the panel 34.

By particular reference to Figure 13 it will be noted that this panel is indicated generally by the reference character 43. This panel will preferably be constructed of a pair of plate members 44 formed with beveled edges for engagement at the top and bottom with the beveled surfaces 39 of the members 22 and at the sides with the surfaces 12 of the side rail sections 10. A pair of short spacing bar sections or units 14 will be associated with the ends of the plates 44 in the

same manner as described with reference to the top rail sections 11 and the hollow panel 34 together with a tie rod 20. This unit 43 when thus assembled will be assembled with the remaining door structure by sliding the same longitudinally thereof in a similar manner as described with reference to the panel 34.

From the foregoing it will be obvious that doors of any desired design may be built up by the proper introduction of plain panels 26 or grating or decorative panels together with the desired number of hollow panels 43 arranged longitudinally of the door as found desirable or expedient. The whole built up structure is united and a rigid construction produced without necessitating the employment of rivets, welding or any other permanent fastening means. Each unit when assembled has the parts thereof rigidly united and the unit firmly secured in place with the remaining structure by means of one or more tie bolts operable from the exterior of the door construction after the panel or other unit has been properly positioned. The construction of the several parts renders the same interchangeable and applicable for use in various parts of the door so that these units may be standardized and manufactured in large quantities whereupon by properly selecting the correct number and size of units the herein described door construction may be built up. This effects an obvious economy in manufacture and assembly.

While the form of the invention herein described and illustrated has proven itself in practice to be entirely efficient and satisfactory nevertheless it will be obvious to those skilled in this particular art that various changes in the specific construction illustrated may be resorted to without departing from the spirit and scope of this invention and to this end reservation is made to make such changes in the essential and all of the non-essential details as may come within the purview of the accompanying claims.

What I claim as my invention is:

1. In a door, side rail sections, a transverse section, spacing bar sections dove-tailed to said side rail sections and engaging said transverse section and a single means for rigidly holding said parts in assembled relation comprising a tie rod extending longitudinally of said transverse section and engaging said spacing bar sections.

2. In a door, side rail sections, a transverse section, spacing bar sections dove-tailed to said side rail sections and engaging said transverse section and a tie rod for securing said spacing bar sections to said transverse section and for preventing further movement of said dove-tail connections.

3. In a door, side rail sections, a transverse section, spacing bar sections dove-tailed to said side rail sections and engaging said

transverse section and a tie rod for holding said parts in assembled position and for causing a binding action between the parts of said dove-tail connections.

4. In a door construction, the combination with side rail sections, of a hollow panel including plate members, spacing bar sections, and a tie rod assembled into a unit, and tongue and groove means on said side rail sections and spacing bar sections for connecting said unit to said side rail sections.

5. In a door construction, the combination with side rail sections and a transverse section, of filler bar sections telescopically engaging the transverse section, tongue and groove means connecting said filler bar sections to said side rail sections and means contained within said transverse section and operable from without the same for securing said sections in assembled position.

6. In a door construction, the combination with side rail sections provided with dove-tail grooves, of an end panel including, plate members, spacing bar sections arranged at the ends thereof and provided with dove-tail tongues, a panel frame member arranged at one edge of the plates, a filler bar member arranged at the other edge and engaging said spacing bar sections, and a tie rod for holding said parts together, whereby said panel may be inserted as a unit with the tongues on said spacing bar sections engaging said dove-tail grooves.

7. In a door construction, the combination with side rail sections provided with dove-tail grooves, of an end panel including, plate members, spacing bar sections arranged at the ends thereof, and provided with dove-tail tongues, a panel frame member arranged at the one edge of the plates, a filler bar member arranged at the other edge and engaging said spacing bar sections, and a tie rod for holding said parts together, whereby said panel may be inserted as a unit with the tongues on said spacing bar sections engaging said dove-tail grooves, said panel being held in assembled position by tightening said tie rods to cause a binding between said dove-tail tongues and grooves.

8. In a door construction, a rail section substantially U-shaped in cross section, dove-tail grooves formed in the walls thereof adjacent the longitudinal edges, the said edges being beveled, all as and for the purpose set forth.

9. In a door, side rail sections, a transverse section, spacing bar sections engaging said transverse section and provided with laterally extending flanges dove-tailed to said side rail sections and a tie rod for securing said parts in assembled position.

10. In a door, side rail sections, a transverse section, means for connecting said sections including spacing bar sections having web portions provided with lateral flanges dove-tailed to said side sections, said web

portions having lateral flanges extending in a direction opposite to said first mentioned flanges and engaging said transverse section, and a tie rod carried by the said web portions for securing said parts in assembled position.

11. In a door, side rail sections having bevelled edge portions, a transverse section positioned between said side rail sections and provided with bevelled edge portions, and means for securing said parts in assembled position and for retaining the aforesaid bevelled portions in contacting relation.

12. In a sectional door, side rail sections, a transverse section, separate connecting members dove-tailed to said side rail sections and engaging the ends of said transverse section, and means engageable with said connecting members for securing said sections in assembled relation.

13. In a sectional door, side rail sections, a hollow transverse section, separate connecting members extending into the ends of said transverse section and dove-tailed to said side rail sections, and adjustable means engageable with said connecting members for securing the sections in assembled relation.

14. In a sectional door, side rail sections, a transverse section, connecting means between said side rail sections and the ends of said transverse section including dove-tailed tongue and groove connections, and common means for clamping said sections together and causing a binding action between the parts of said connections.

In testimony whereof I affix my signature.
ROBERT HUBBERT.