United States Patent [19]

Sailor

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[54] **DOOR WITH IMPROVED CAMBER SETTING MEANS**

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[52] **U.S. Cl.** **52/291**; 52/223

[51] **Int. Cl.**[2] **E04C 23/00**

[58] **Field of Search** 52/291, 223, 227

[56] **References Cited**

UNITED STATES PATENTS

3,049,202	8/1962	Sailor et al.	52/291
3,286,424	11/1966	Weyant	52/291
3,621,626	11/1971	Tylius	52/227

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Assistant Examiner—Carl D. Friedman
Attorney, Agent, or Firm—Oltsch & Knoblock

[57] **ABSTRACT**

A door having front and rear spaced sheet panels applied over opposite sides of a frame. An elongated tensioning rod is carried by a vertical member of the door frame and extends from adjacent the upper edge to adjacent the lower edge of the door. Adjustment devices are provided at each of the upper and lower ends of the tensioning rod in abutment with the vertical frame member at its upper and lower end portions. Tightening of either of the adjustment devices causes the vertical frame member of the door to be bowed and the door to assume a set camber.

3 Claims, 9 Drawing Figures

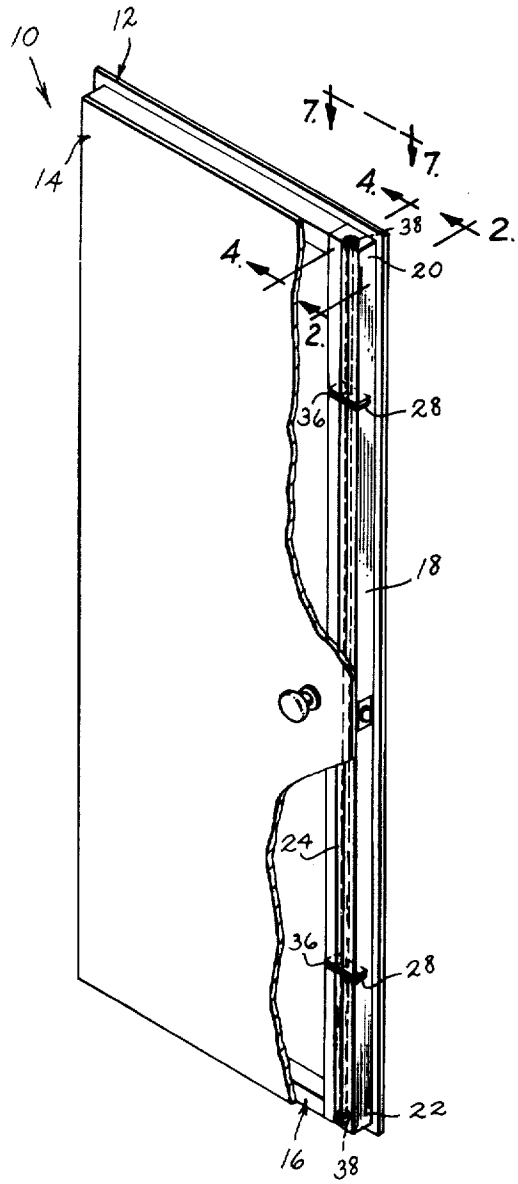


Fig. 1

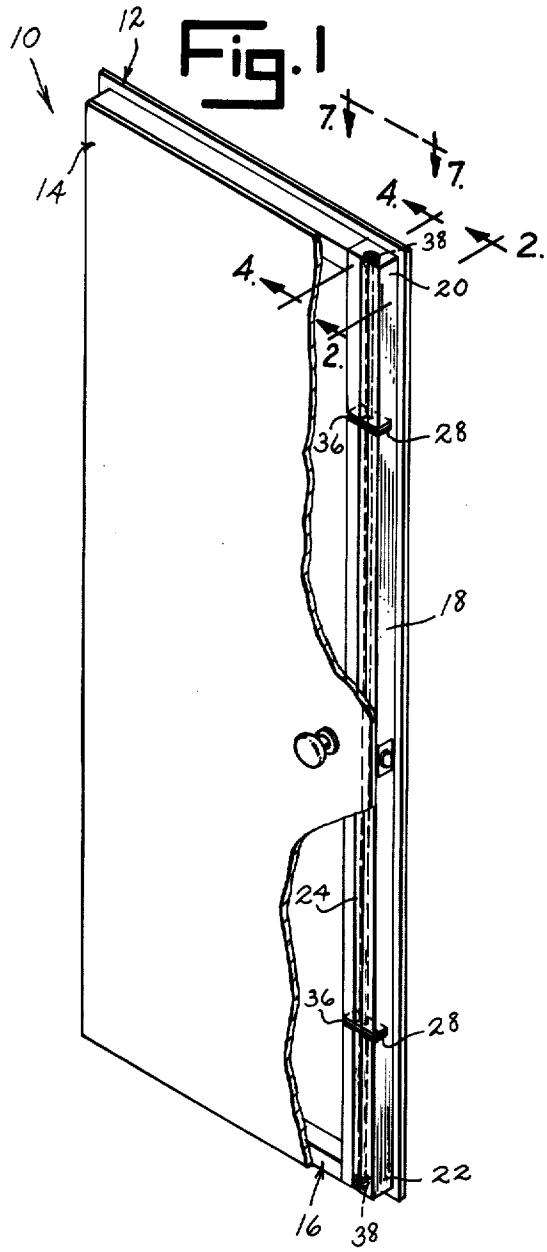


Fig. 2

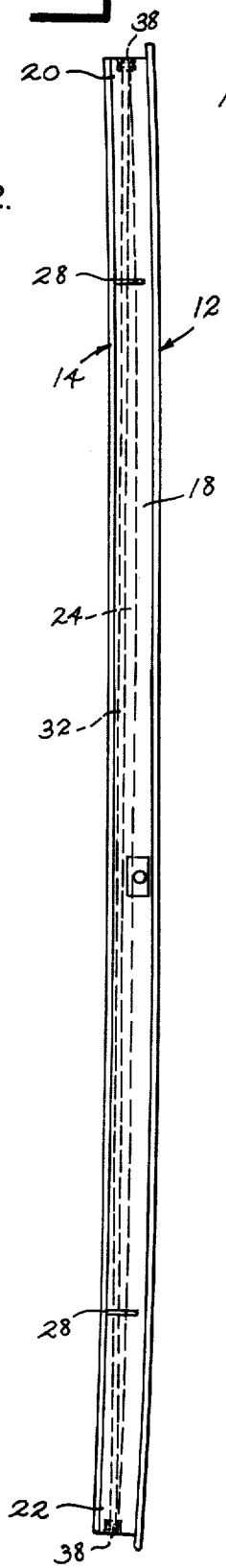


Fig. 3

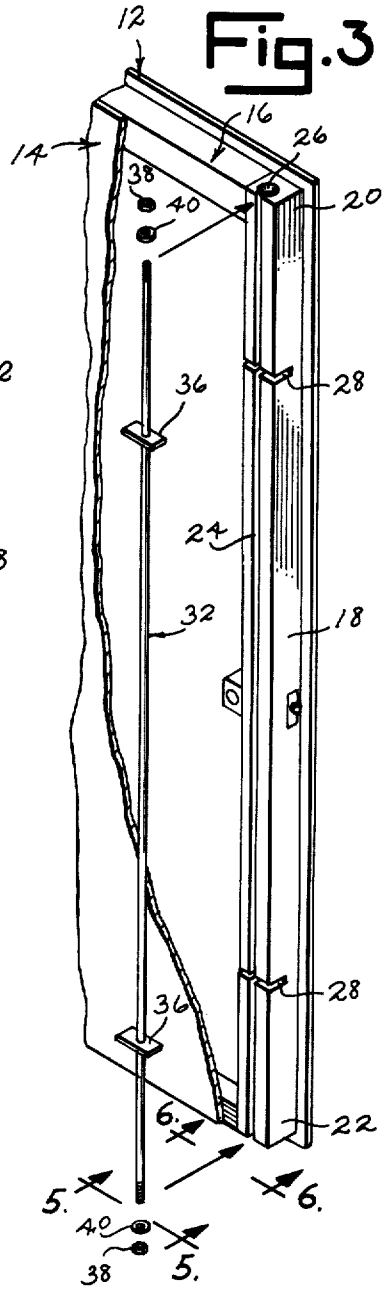


Fig.4

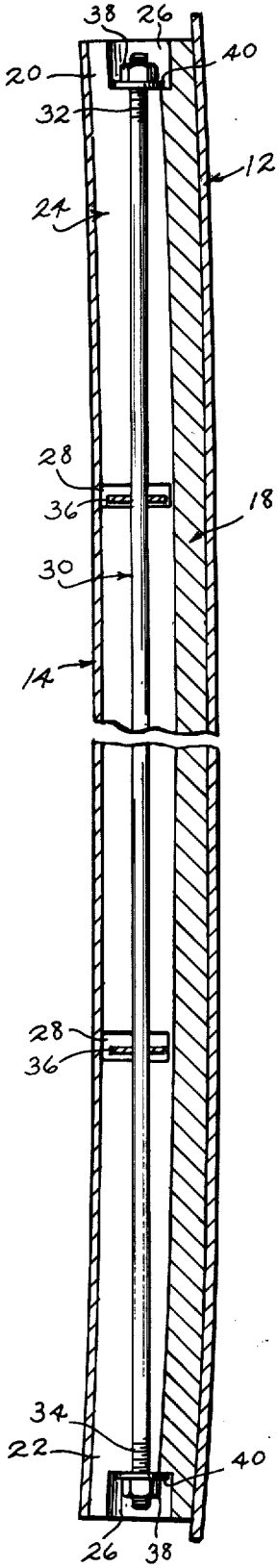


Fig.5

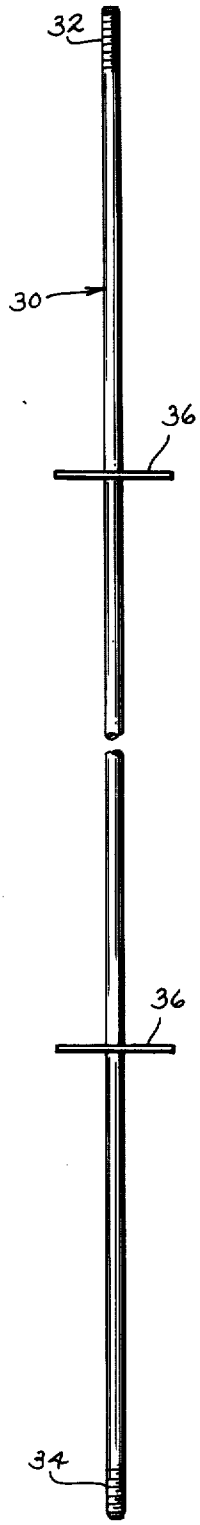


Fig.6

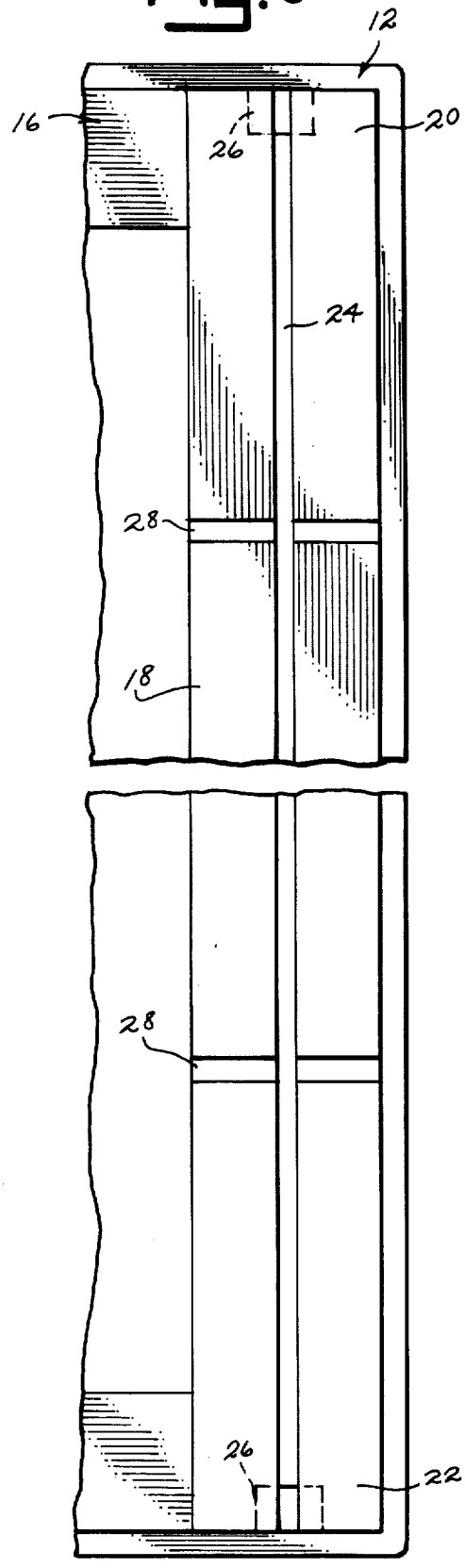


Fig. 7

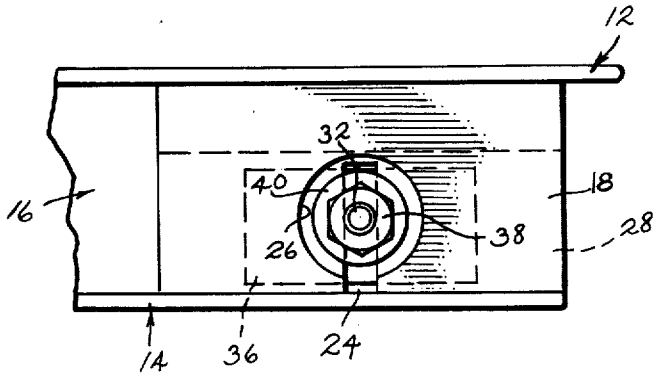


Fig. 8

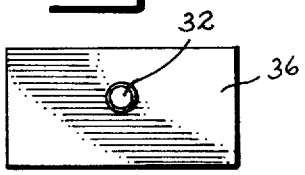
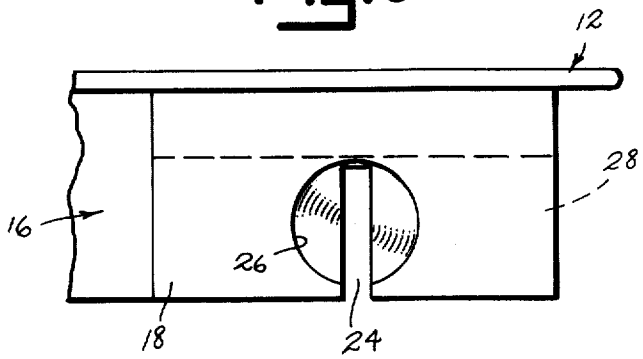


Fig. 9



DOOR WITH IMPROVED CAMBER SETTING MEANS

SUMMARY OF THE INVENTION

This invention relates to an improved means for setting the camber of a door.

The door includes front and rear spaced sheet panels which are applied over opposite sides of a frame. The frame includes a vertical member which extends from adjacent the upper edge to adjacent the lower edge of the door and which has a longitudinal opening therein. A tensioning rod is shiftably carried within the longitudinal opening in the vertical frame member and extends from the upper end portion to the lower end portion of the frame member. Adjustment means are threaded onto the ends of the tensioning rod and abut the upper and lower end portions of the frame member. When the door is hung, either the upper or lower adjustment means can be turned, depending upon the location of the door and access to the adjustment means, so as to cause the door to be provided with a selected camber.

Heretofore, doors, such as that described in U.S. Pat. No. **3,049,202**, having means for setting or adjusting the camber thereof were designed with the camber adjustment accessible only at the upper edge or lower edge of the door, depending upon whether the door was to be left or right-handed and whether the door was to swing inwardly or outwardly. Thus, the manufacturer of such prior art doors had to know how the door was to be used so as to position the camber adjustment in an accessible location. In this invention, the camber adjustment is located at both the upper edge and lower edge of the door, thereby allowing the manufacturer and the contractor more freedom in constructing and hanging the door. Additionally, the tensioning rod utilized in the door of this invention can be positioned in the same location for all doors, whether the door is intended to be utilized as a right or left-handed door, thereby reducing the door inventory of the manufacturer.

Accordingly, it is an object of this invention to provide a door having means by which the camber thereof can be adjusted at either the upper or lower edge of the door at the option of the door user.

Another object of this invention is to provide a door having a universally located camber adjustment means which is accessible whether the door is right or left-handed or swings inwardly or outwardly and which reduces the door inventory of the manufacturer.

Other objects of this invention will become apparent upon a reading of the invention's description.

BRIEF DESCRIPTION OF THE DRAWINGS

A preferred embodiment of this invention has been chosen for purposes of illustration and description wherein:

FIG. **1** is a perspective view of the door having portions of the rear sheet panel thereof broken away for purpose of illustration.

FIG. **2** is an edge view of the door of FIG. **1** as seen along line **2—2** thereof.

FIG. **3** is a fragmentary view of the door with a portion of the rear sheet panel thereof broken away and with parts of the camber setting means shown in disassembled and exploded form for purpose of illustration.

FIG. **4** is a sectional view taken along line **4—4** of FIG. **1.**

FIG. **5** is a fragmentary view of a part of the camber setting means as seen along line **5—5** of FIG. **3.**

FIG. **6** is a fragmentary view of the edge portion of the door seen along line **6—6** of FIG. **3.**

FIG. **7** is a fragmentary top plan view of the door as seen along line **7—7** of FIG. **1.**

FIG. **8** is a top view of the adjustment rod shown in FIG. **5.**

FIG. **9** is a top view of the door edge portion seen in FIG. **6.**

DESCRIPTION OF THE PREFERRED EMBODIMENT

The preferred embodiment illustrated is not intended to be exhaustive or to limit the invention to the precise form disclosed. It is chosen and described in order to best explain the principles of the invention and its application and practical use to thereby enable others skilled in the art to best utilize the invention.

Door **10** shown pictorially in FIG. **1** includes a front sheet panel **12**, a rear sheet panel **14** and a frame **16** interposed between the sheet panels. Panels **12** and **14** may be of aluminum sheet material secured such as by gluing or nailing to opposite sides of frame **16** which may be of a wooden or light-weight metal construction. Frame **16** includes a vertical member **18** which is preferably located at the latch containing edge of the door opposite the door hinge and which has an upper end portion **20** and a lower end portion **22.**

Frame member **18** has a slotted opening **24** formed therein. Opening **24** extends longitudinally from upper end portion **20** to lower end portion **22** of the frame member and transversely from rear panel **14** toward front panel **12,** terminating spacedly from the front panel. Each end portion **20** and **22** of the frame member is countersunk at **26** in alignment with opening **24** to accommodate parts of the tensioning means for the invention. At least one and preferably two or more horizontal slots **28** are formed in frame member **18** between its end portions **20** and **22.** Each slot **28** extends in depth from rear panel **14** to a location rearwardly spaced from front panel **12** as seen in FIG. **4.** Additionally, each slot **28** intersects opening **24** and extends completely across frame member **18.** Slots **28** serve as accommodating anchoring locations for the tensioning means and as locations of relief to permit frame member **18** to be bowed, as illustrated in FIG. **2.**

The tensioning means for selectively setting the camber of door **10** includes a rod **30** having a threaded upper end **32** and a threaded lower end **34.** At least one and preferably two or more anchor plates **36** are fixedly attached to rod **30** along its longitudinal dimension. Each plate **36** extends perpendicularly to rod **30.** Both rod **30** and anchor plates **36** can be made of steel with the plates being welded to the rod. Rod **30** fits with clearance within opening **24** with each plate **36** fitting into a slot **28** in the frame member. Upper end **32** of rod **30** protrudes upwardly into countersink **26** at the upper end portion **20** of the frame member and lower end **34** of the rod protrudes downwardly into countersink **26** at the lower end portion **22** of the frame member. An adjustment nut **38** is threaded onto each end **32** and **34** of rod **30.** One nut **38** abuts end portion **20** of the frame member **18** within its countersink **26** and another nut **38** abuts frame member end portion **22**

within its countersink **26.** To facilitate turning of nuts **38** onto rod **30,** a washer **40** is positioned between each nut **38** and the shoulder created by countersink **26** at each end portion of frame member **18.** Plates **36** are spaced apart the same distance as the spacing between slots **28.** In assemblying door **10,** rod **30** is located within frame member opening **24** prior to the application of rear panel **14** over frame **16.**

The camber of door **10** is set by turning nuts **38** so as to place frame member **18** between countersinks **26** in compression and thus cause front panel **12** to be bowed outwardly or form a convex configuration to which frame **16** and rear panel **14** conform. The width of each slot **28** exceeds the thickness of each plate **36** so as to permit rod **30** to shift vertically relative to opening **24** and frame member **18** as nuts **38** are tightened. Additionally, the maximum transverse dimension of at least one of the plates **36** exceeds the depth of its accommodating slot **28** as measured between panels **12** and **14** so as to prevent rotation of the rod relative to frame member **18,** thereby permitting nuts **38** to be tightened against frame member end portions **20** and **22** and door **10** bowed into a selected camber. By having a nut **38** located at each end of rod **30,** the camber in door **10** can be set or adjusted by turning the nut **38** at either end of frame member **18** after the door has been hung depending upon which end of the frame member is the most accessible.

It is to be understood that the invention is not to be limited to the details above given but may be modified within the scope of the appended claims.

What I claim is:

1. In a door having front and rear spaced sheet panels applied over opposite sides of a frame and including upper and lower edges, said frame including a vertical member extending from adjacent said upper door edge to adjacent said lower door edge, said frame member including upper and lower end portions and having opening means formed therein extending the length of said member from said upper to said lower end portion, a horizontal slot formed in said frame member between and spaced from said upper and lower end portions, said slot intersecting said opening means and extending from said rear sheet panel and terminating spacedly rearwardly of said front sheet panel, the improvement comprising a rod member fitting shiftably within said opening means, one end of said rod member being threaded and located at said upper frame member end portion, the other end of said rod member being threaded and located at said lower frame member end portion, adjustment means having parts threaded onto each of the threaded ends of said rod member, one adjustment means abutting the upper end portion and the other adjustment means abutting the lower end portion of said frame member, anchor means of a length greater than the transverse dimension of said opening means connected to said rod member and fitting within said slot for anchoring said rod against rotational movement within said opening means relative to said frame member, said anchoring means having a thickness less than the width of said slot permitting limited vertical movement of said rod member relative to said frame member during rotation of either of said adjustment means upon said rod member against said abutting frame member end portion to cause said frame member to be compressed between said adjustment means and bowed to provide a camber for said door with said front panel being of a convex configuration.

2. The door of claim **1** wherein said rod member carries a plurality of said plates longitudinally spaced along said rod, said frame member having a plurality of said horizontal slots formed therein, each plate located between said front and rear panels and fitting within a said slot.

3. The door of claim **1** wherein said door includes access means at the upper and lower end portions of said frame member for allowing rotation of either of said adjustment means upon said rod member after said door is hung.

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