Dec. 10, 1963 S. M. WARGO 3,113,649

DOOR ASSEMBLY

Filed May 23, 1962

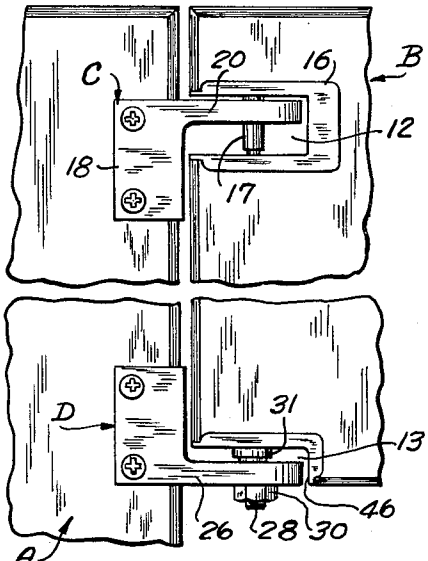


FIG. 1

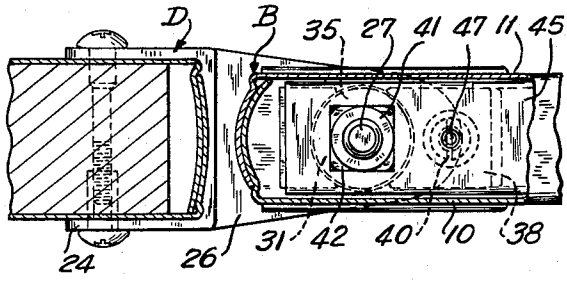


FIG. 3

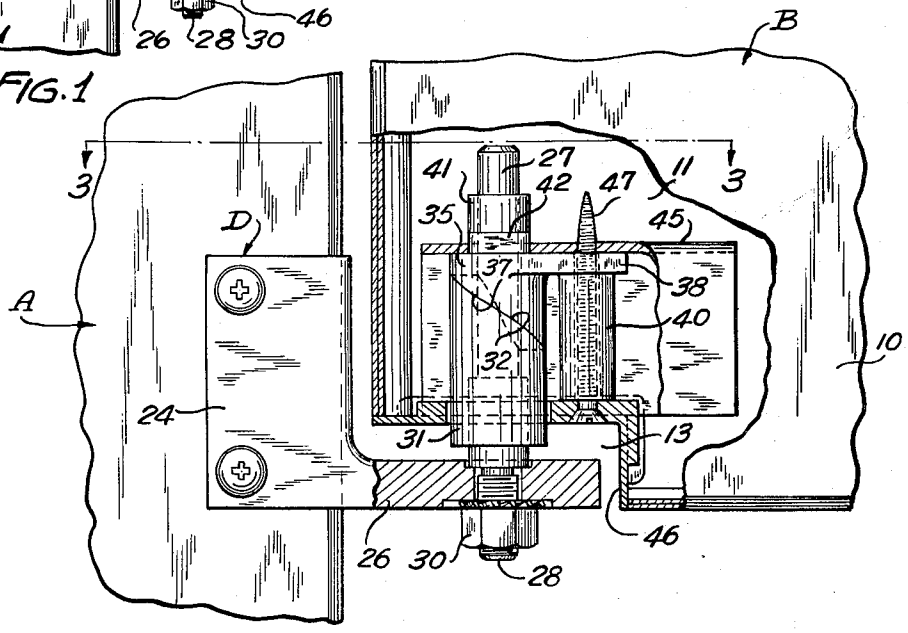


FIG. 2

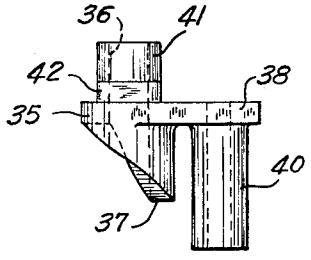


FIG. 4

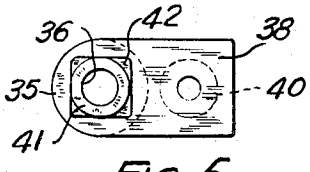


FIG. 5

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United States Patent Office 3,113,649 Patented Dec. 10, 1963

3,113,649

DOOR ASSEMBLY

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Filed May 23, 1962, Ser. No. 197,033
1 Claim. (Cl. 189—46)

The present invention relates to partition structures of the type used mainly in toilet, shower and dressing rooms and more particularly to the doors thereof and to their hinges.

One of the principal objects of the invention is the provision of a novel and improved swinging door assembly which is simple to manufacture and assemble.

Another of the principal objects of the invention is the provision of a novel and improved hinge for swinging doors which is simple in construction, easy to install and adjust, and reliable in operation.

A further object of the invention is the provision of a novel and improved gravity hinge for swinging doors which provides automatic return of the door to its initial position and which is simple in construction, easy to install and adjust and reliable in operation.

The invention resides in certain constructions and combinations and arrangements of parts, and further objects and advantages of the invention will be apparent to those skilled in the art to which it relates from the following description of the preferred embodiment described with reference to the attached drawing forming a part of this specification and in which:

FIG. 1 is a fragmentary side elevation of a partition structure including a door embodying the present invention;

FIG. 2 is an enlarged side elevation with parts broken away and in section of the lower hinge assembly shown in FIG. 1;

FIG. 3 is a section taken along line 3—3 of FIG. 2;

FIG. 4 is a side elevation of the upper cam or follower member of the hinge assembly shown in FIG. 2; and

FIG. 5 is a plan of the cam follower member shown in FIG. 4.

The invention is particularly applicable to space dividers or partition structures of the type used in toilet, shower and dressing rooms and which include or are provided with swinging doors which automatically return to their closed position by gravity upon being released in an open or partly open position. The invention accordingly is herein shown and described as embodied in such a structure comprising a stationary partition member, designated generally as A, to which a swinging door B is connected by upper and lower hinge assemblies, designated generally by the reference characters C and D.

The partition structure A and the door B may be of any suitable construction. The particular partition and door structure shown is similar to that shown in United States patent to G. W. Hult, No. 2,776,029, issued January 1, 1957, and is not herein shown and described in detail. The door B comprises front and rear metal panel members **10**, **11** having overlapping interlocking marginal edges and is provided with upper and lower cutout portions **12**, **13** on the side of the door adjacent to the partition structure A. The cutout recess **12**, which is spaced below the top of the door, is provided for the reception part of the upper hinge assembly C and the other cutout recess **13**, in the lower corner of the door, for the reception of parts of the lower hinge assembly D.

The upper cutout portion **12** of the door B has a U-shaped bracket **16** secured therein provided with a pintle rod **17** which forms a part of the upper or top hinge assembly C. The upper hinge assembly C is completed by a bracket **18** secured to the partition structure A by suitable fasteners and having a projecting arm **20** extending into the aperture in the bracket **16**. The arm **20** has an opening therethrough for the reception of the pintle pin or rod **17** and is considerably narrower than the space between the parallel tines of the U-shaped bracket **16** thus permitting vertical movement of the door B as it swings on its upper and lower hinge assemblies.

The lower hinge assembly D comprises a bracket **24** somewhat similar to the bracket **18** of the upper hinge assembly C and connected to the partition structure A in a similar manner by suitable fasteners. The bracket **24** has a projecting arm or flange **26** formed integral therewith and extending underneath the downwardly facing aperture in the lower near corner of the door formed by the cutout **13**. In the present instance the bottom edge of the bracket **24** and arm **26** is substantially in alignment with the lower or bottom edge of the door B when the door is closed.

The arm **26** of the bracket **24** is provided with an opening therein within which an upwardly projecting pintle pin or rod **27** is supported. As shown in the drawings, the lower end **28** of the pintle rod **27** is of reduced diameter forming a shoulder which engages the upper side of the arm **26**, is threaded and is provided with a nut **30** at the lower side of the arm **26** for securing the pintle rod **27** to the arm **26** of the bracket **24**. The lower pintle pin or rod assembly includes in addition to the pintle pin or rod **27**, a lower cam member **31** fixed to the pintle rod **27** above the arm **26** and having an upwardly facing cam face or surface **32** surrounding the pintle rod **27**, the upper end of which projects upwardly above the cam surface **32**. The lower cam member **31**, as shown, is cylindrical and the cam surface **32** is similar to that shown in British patent to David Smith, No. 17,929 of 1894. Any suitable cam surface, however, may be employed, for example, surfaces such as those shown in United States patents to Neal, No. 1,330,647, and Kuehl, No. 2,904,824.

The remainder of the lower hinge assembly D is carried by the door B and comprises a discrete upper cam member or cam follower member **35** having an opening **36** therethrough to receive the pintle pin or rod **27**. The upper cam member or follower **35** has a downwardly facing cam face or surface **37** which is complementary or conjugate to the cam surface **32** on the lower cam member **31**, and engages and cooperates with the latter to support the door and cause the same to automatically swing to closed position when released in an open or partly open position.

The upper cam member or follower **35** also comprises an outwardly extending flange portion **38** adjacent to its upper end having a downwardly extending boss-like portion **40** on its underside projecting below the cam surface **37**, and an upwardly projecting boss **41**, the lower portion **42** of which is noncircular.

The upper cam member or follower **35** abuts against the underside of the web of a channel member **45**, within the lower corner of the door, and welded or otherwise fixedly secured to the rear and front panels thereof. The web of the channel member **45** forms an abutment in the aperture in the lower left-hand corner of the door B, as viewed in the drawings, spaced above the lower opening thereof and has a noncircular aperture therein through which the boss **31** projects with the noncircular portion **42** thereof in the aperture. The width of the cam follower **35** is the same or substantially the same as that of the channel in the member **45** which helps to hold the follower member **35** in the door B and prevents relative rotation between the follower **35** and the door. The opening formed by the cutout **13** is closed by the face

plate 46, which face plate is secured in position by a threaded fastener 47 projecting upwardly through a suitable opening in the face plate and an opening in the part 40 of the upper cam member 35 and has threaded engagement in a circular aperture in the web of the channel member 45 spaced from the noncircular aperture therein through which the boss 41, of the upper cam member 35, projects. The fastener 47, shown, is of the self-tapping type and forms its own thread in the web of the channel member 45.

The face plate or cover 46 has marginal portions of reduced thickness so as to be more easily fitted into the lower corner of the door and to better retain its desired aligned position therein. The edges of the front and rear panels 10, 11 of the door abut the peripheral edges of the cover 46 and make a neat appearing assembly. The boss-like portion 40 of the cam follower member 35 preferably extends downwardly into engagement with the upper side of the cover 46 and the parts are all securely held together by the fastener 47, etc.

The standing position of the door B may be adjusted by loosening the nut 30 on the threaded lower portion 28 of the pintle rod 27 and rotating the rod so that the position of the cam surface 32 of cam member 31 secured to the rod 27 is changed with respect to arm 26 of the door support bracket 24. This arrangement permits the standing position of the door to be adjusted simply and conveniently without removing the door from its hinges and without disassembling any portion thereof.

While the invention has been described as embodied in a door B formed of spaced metal sheets 10, 11, doors of other shapes and constructions may be employed provided that the door contains a cavity therein to receive the portion of the hinge assembly carried by the door. If a solid door made of a material, such as, wood is employed, it may be advantageous to eliminate the bracket or channel member 45 and provide a cavity of a shape to receive the cam follower 35 and permit engagement of the screw 47 to maintain the cover or face plate 46 and the cam follower in proper alignment.

The employment of the particular cam follower structure of the invention provides a number of advantages heretofore unattainable. For example, the portion of the hinge assembly carried within the door cavity comprises only the one part 35 which can be simply and quickly assembled in the door in contrast to the complicated structures heretofore employed. Furthermore, the cam follower not only has provision for receiving the pintle rod but this same construction provides for proper alignment of the cooperating cam surfaces and this is true even though the cam follower is set back into the cavity in the lower edge of the door. The construction is in fact so simple that the fastener 47 might possibly be omitted if it was not required to hold the cover of face plate 46 in position.

While the preferred form of the invention has been described in considerable detail, it will be apparent that the invention is not limited to the construction shown nor the uses referred to, and it is my intention to cover all adaptations, modifications and changes which come within the practice of those skilled in the art to which the invention relates and the scope of the appended claim.

Having thus described my invention, what I claim is:

In a partition structure having a stationary support, a door connected to the stationary support by an upper hinge and having a downwardly facing aperture in its lower corner adjacent to the stationary support, a member within the door having laterally spaced circular and noncircular vertically extending apertures therein located within the door above the opening of the aperture in the lower corner of the door, a bracket secured to the stationary support and provided with an arm projecting underneath the lower corner of the door, a lower cam member having an upwardly facing annular cam surface nonrotatably connected to the arm of the bracket and projecting upwardly into the aperture in the door, and a pintle rod extending upwardly from the arm of the bracket through the center of the cam surface on the lower cam member, hinge means carried by the door for cooperation with the lower cam member comprising: a discrete upper cam member located within the door and abutting the member within the door having the circular and noncircular apertures therein, said upper cam member having a downwardly facing cam surface in engagement with the upwardly facing cam surface on the lower cam member and having a portion thereof extending downwardly beyond said downwardly facing cam surface, an upwardly extending noncircular boss on said upper cam member projecting into and nonrotatably engaged within the noncircular aperture in the member within the door having the laterally spaced circular and noncircular apertures therein, said upper cam member having two apertures therethrough the first located centrally of said downwardly facing cam surface thereof and said upwardly extending noncircular boss thereof for the reception of the upper portion of said pintle rod and the second parallel with the first and extending through the portion of said upper cam member extending downwardly beyond said downwardly facing cam surface, a plate-like member closing the aperture in the door and engaging the lower end of said portion of said upper cam member extending downwardly beyond said downwardly facing cam surface, and a fastener extending parallel with the pintle rod through said plate-like member and through said second aperture in said lower cam member and threaded into the circular aperture in the member within the door.

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2,904,824 Kuehl ---------- Sept. 22, 1959