Jan. 8, 1929.

1,698,390

R. F. CARPENTER ET AL

HINGE

Filed Oct. 24, 1921

FIG. 1.

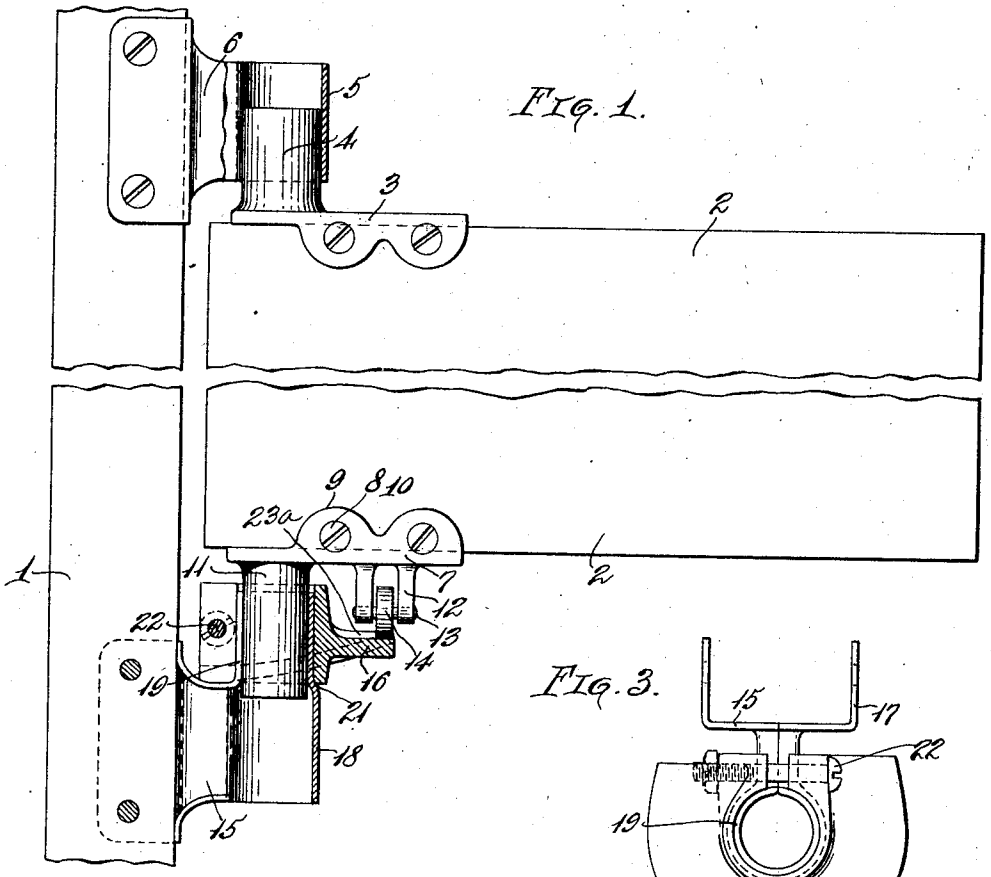


FIG. 3.

FIG. 2.

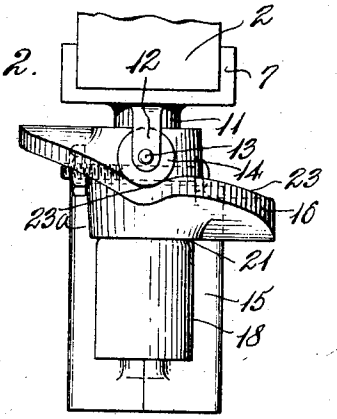
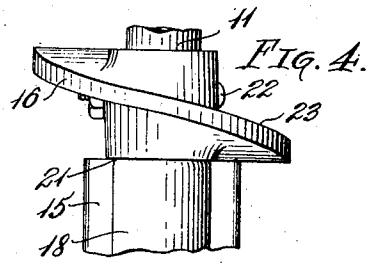


FIG. 4.



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UNITED STATES PATENT OFFICE.

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HINGE.

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This invention relates to improvements in door hinges, and more particularly hinges for doors which should swing automatically to open position as for instance toilet doors.

The objects of this invention are to provide a door hinge of the gravity roller type which always returns by gravity to inner open position; which can be readily adjusted about its vertical axis to correct misalignment of doors; and finally to provide a hinge of simple construction and yet of extreme durability.

Other objects will appear from the following description and claims when considered together with the accompanying drawing.

Fig. 1 shows the door post and swinging door in elevation and the hinge members partly in section; Fig. 2 is a front elevation of the lower hinge member of Fig. 1; Fig. 3 is a plan view of the lower hinge member; and Fig. 4 is a front elevation of the lower hinge member provided without the rest or dwell portion.

Referring to the present illustration, 1 indicates the door post or frame and 2 a door which might be a single door or one of two companion doors. The upper hinge connection, which might be of any suitable type, comprises the door member 3 secured in any suitable manner to the top of the door and having an upwardly extending pin 4 for rotatable engagement in the socket 5 of the fixed member 6 which is secured to the door frame. Proper space is allowed between the upper hinge members to permit upward movement of the door, as will later appear.

The present invention relates more particularly to the lower hinge which comprises the door member 7 suitably secured to the door, as for instance by means of the screws 8 secured through ears 9 on the plate portion 10. The ears 9 embrace the two sides of the door. Attached to or integral with the plate 10 is a depending pin 11, and spaced ears 12 also provided upon the plate portion 10 afford bearing support for the pin 13 upon which turns the anti-friction roller 14. The plane of rotation of this roller is normal to that of the door.

The stationary part of the lower hinge comprises a member 15 secured to the door frame and a cam member 16 mounted upon member 15. The member 15 may follow the type of structure shown in the application above referred to or may be of any other suitable form, as for instance, a pressed metal structure with flanges 17 embracing and secured to the door frame. The tubular portion 18 of the pressed metal member has its upper extension 19 of slightly reduced diameter to receive the cam member 16 which rests upon the shoulder 21. The cam member is clamped firmly in set position by means of the screws 22. Upon loosening the screws 22 the cam member can be adjusted about its tubular support for a purpose to be later explained.

The cam member is provided with a spiral cam surface 23 inclined uniformly in the same direction from end to end of said surface and extending approximately 180° around the axis, the cam shown in the drawing extending a little more than 180°. This arrangement enables the door to be swung through a full 180° and because the inclination of the cam is in one direction from end to end the door, when allowed to move freely over the cam, always moves clear to the end of the cam surface and does not stop at any intermediate position. The hinge parts are so placed upon the door and door support that the final door position with the roller at the extreme low end of the cam will be the inner open position of the door when it is inside of the toilet compartment and substantially parallel to its side wall. The high part of the cam, at the left in Fig. 2, represents the position of the door in another or outer open position standing straight out into the passageway. However, the cam may extend more than 180°, even as much as 270°, in which the outer open position of the door would be back approximately parallel with the front wall of the neighboring compartment.

Whatever the outer open position of the door is, the door will always return to the inner closed position when released and allowed to move freely along the cam.

The cam shown in Fig. 4 is a simple cam of the kind just described with no intermediate position in which the door can be brought to rest. If desired, the cam surface at some suitable intermediate point may

be provided with a dwell portion 23ª, placed for example at approximately 90° from the low end of the cam so that said dwell corresponds to closed door position. By moving the door until the roller reaches this dwell portion the door may be brought to rest and will remain in closed position. However, when the door is pushed a small amount in either direction from the dwell and released it moves freely by a single motion completely to inner open position. When the plain cam, without the dwell, as shown in Fig. 4, is used, the door may be held in closed position by suitable latches connecting it to its companion door in a pair or to the door casing in the case of a single door.

The hinge described answers every requirement for hinges for toilet compartments. The door always stands normally in inner open position indicating at a glance whether or not the compartment is occupied. One entering the compartment may readily swing the door to closed position and either latch it as described or stop it on the dwell in Fig. 2. When leaving the compartment the door is pushed outwardly to any outer open position and when released swings back and passes the dwell 23ª, if used, moving completely to inner open position. It therefore requires no particular attention by one using the compartment and yet always indicates whether the compartment is occupied or not. No matter how the doors are manipulated it is impossible to leave them standing in any outer open position so that there is never any obstruction in the passageway. However, if ever desirable, the hinge may have its cam surface inclined in the opposite direction with a constant tendency to move toward outer open position.

The arrangement also avoids any necessity of locks or latches for holding the door in inner open position when cleaning or other work is to be done in the compartment.

Obviously, the inclination or spirality of the cams of two sets of hinges, one for the right hand door and one for the left hand door must be in opposite directions, as the same cam cannot serve for both the right and left hand hinge. Also, the cam member may be rotated about the extension 19 on which it is mounted and clamped in any position by the screws 22. This adjustment is used for properly aligning the door with the casing or two doors of a pair with each other. If desirable or necessary for any reason, such as because of wear or the like, the cam member may also be reversed or turned up-side-down.

Having described our invention, we claim:

A gravity hing for doors of booths or the like, comprising two cooperative relatively rotatable parts, one thereof having a generally continuous inclined cam member of uni-directional pitch provided at this opposite ends respectively with a high point and a low point and between them with a dwell, and the other part having a member adapted to cooperate with said cam member, said members travelling one along the other as the door swings, one of said parts being adapted for attachment to the booth door, and the other part being adapted for attachment to a relatively stationary element and thereby so positioned as to enable the door to be located and maintained in closed position by said dwell and to be moved to high and low open positions at opposite ends of said cam member, whereby upon release of said door when in the high open position it swings by gravity through the closed position to the low open position.

In testimony whereof we hereby affix our signatures.

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