A. S. HUGHES.

GRAVITY HINGE.

APPLICATION FILED MAR. 25, 1919.

1,327,045.

Patented Jan. 6, 1920.

2 SHEETS—SHEET 1.

Fig. 1.

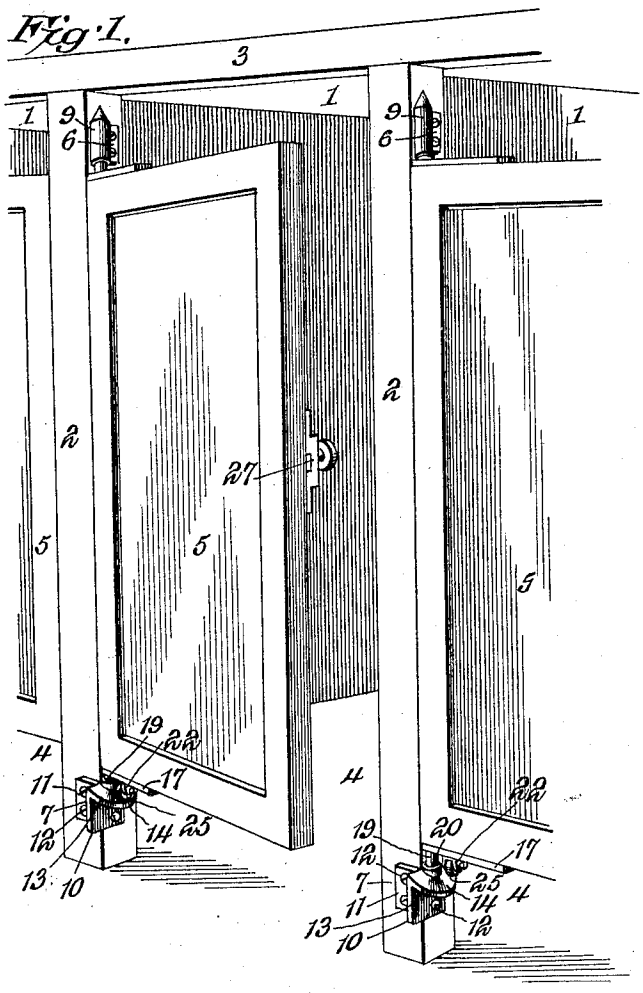


Fig. 2.

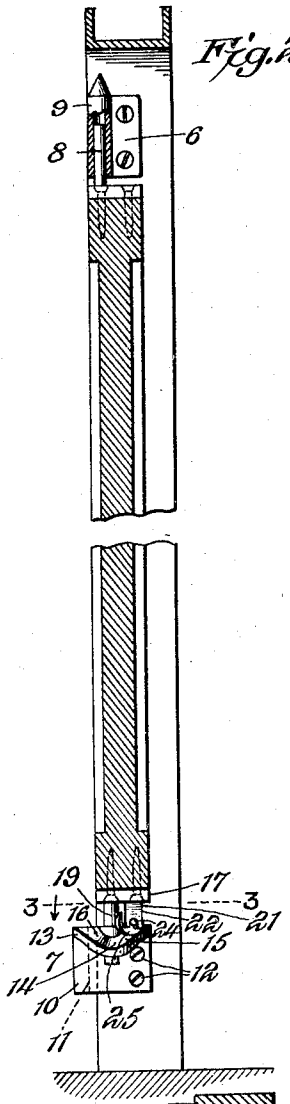


Fig. 3.

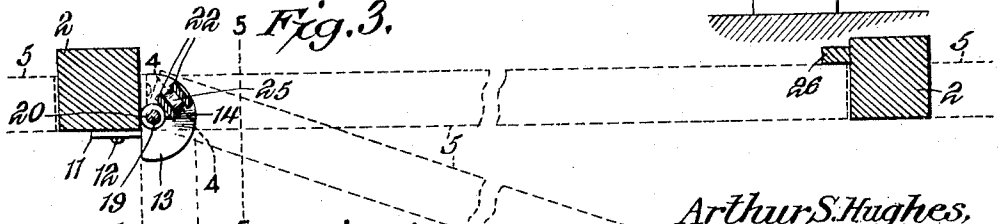
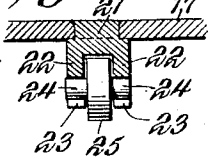


Fig. 4.



WITNESSES

Howard D. Orr.

F. J. Chapman.

Arthur S. Hughes,
INVENTOR,

BY E. G. Siggers.

ATTORNEY

A. S. HUGHES.

GRAVITY HINGE.

APPLICATION FILED MAR. 25, 1919.

1,327,045.

Patented Jan. 6, 1920.

2 SHEETS—SHEET 2.

Fig. 5.

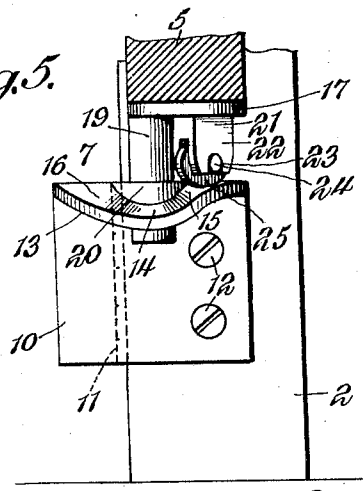
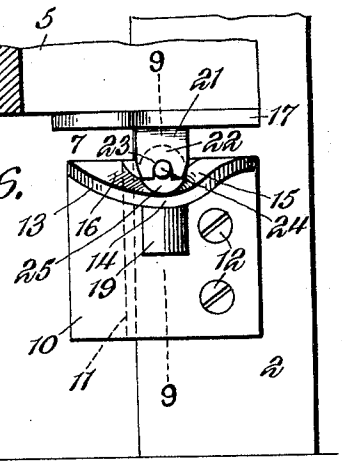


Fig. 6.



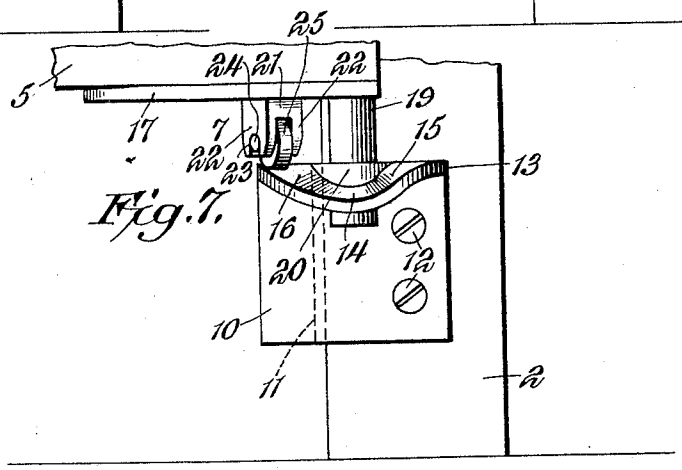


Fig. 7.

Fig. 8.

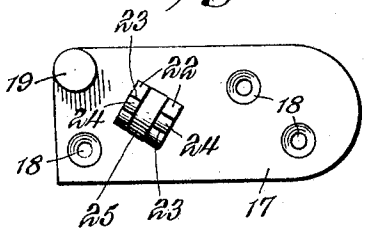
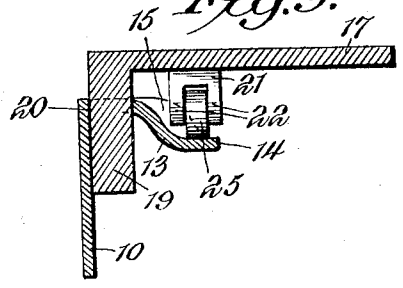


Fig. 9.



Arthur S. Hughes, INVENTOR,

BY E. G. Siggers.

ATTORNEY

WITNESSES

Howard D. Orr

F. T. Chapman.

UNITED STATES PATENT OFFICE.

ARTHUR SHERIDAN HUGHES, OF MANSFIELD, OHIO.

GRAVITY-HINGE.

1,327,045. Specification of Letters Patent. **Patented Jan. 6, 1920.**

Application filed March 25, 1919. Serial No. 285,054.

To all whom it may concern:

Be it known that I, ARTHUR S. HUGHES, a citizen of the United States, residing at Mansfield, in the county of Richland and State of Ohio, have invented a new and useful Gravity-Hinge, of which the following is a specification.

This invention has reference to gravity hinges, and its object is to provide a hinge for a swinging closure, which hinge will cause the automatic movement of the closure to an intermediate position between the fully closed and fully open positions.

The invention is intended more particularly for use in connection with doors of toilet rooms or compartments, whereby, when the compartment is not occupied, the door will tend toward and remain in the partly open condition, thereby indicating that no one occupies the compartment.

The invention has more particularly to do with the lower hinge of the door, which is in the nature of a step bearing for the door, and includes a pintle about the axis of which the door may swing. In conjunction with the pintle there is provided a dished track upon which travels a roller carried by the door, the pintle being free to move lengthwise. The valley portion of the dished track is so situated that when the roller reaches the valley portion further movement in either direction will cause the door to rise, and by properly locating the valley portion the door will gravitate from either the fully closed or the fully open position to an intermediate or ajar position.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawings, but may be changed and modified so long as such changes and modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:—

Figure 1 is a perspective view of a series of compartments provided with the invention, showing one door in the closed position and the other door partly open.

Fig. 2 is a vertical section through the door and through a part of the upper hinge, showing the lower hinge in elevation and the door being shown in the closed position.

Fig. 3 is a section on the line 3—3 of Fig. 2, indicating the door in the closed, open and intermediate positions.

Fig. 4 is a section through the line 4—4 of Fig. 3 and drawn on a larger scale.

Fig. 5 is a section on the line 5—5 of Fig. 3, but drawn on a larger scale and showing the door in the closed position.

Fig. 6 is a section similar to that of Fig. 5, but showing the door in the intermediate position.

Fig. 7 is a section similar to that of Fig. 5, but showing the door wide open.

Fig. 8 is a bottom plan view of the top member of the lower hinge.

Fig. 9 is a section on the line 9—9 of Fig. 6, but limited to the hinge alone.

The invention is particularly useful in connection with toilet room doors, especially where a series of such toilet rooms is provided, so that an observer may ascertain at a glance whether or not any or all of the rooms are occupied.

In the drawings, and especially in Fig. 1, there is shown a series of toilet rooms 1 provided with front posts 2 and a joining cross-piece 3 defining door openings 4, each of which door openings has a swinging door 5, the construction of which is not material to an understanding of this invention. The structural parts, such as posts, cross-piece, partitions and doors, may be made of any suitable material.

Each door is carried by an upper hinge 6 and a lower hinge 7. The upper hinge is provided with an upright pintle 8 fast to the top of the door and an upright socket 9 fast to the door jamb or post 2. The vertical socket is located at one end of a plate, which is fastened by screws to the post 2, which constitutes the door jamb or casing, in such position that the socket is near the outer face thereof and directly above the door. The pintle is located at one corner of an oblong plate, which is fastened to the upper edge of the door. This brings the upper hinge in line with the outer corner of the door. The upper hinge needs no further description except that the pintle has a range of up and down movement in the socket to provide for certain movements of the door, which movement is up and down in addition to the usual swinging

movements of the door, so that the door may rise and fall in opening and closing.

The lower hinge 7 comprises a vertical plate 10 with a web extension 11 intermediate of the side edges of the plate and extending from one face of the plate at right angles thereto so as to form an angle hinge member capable of being applied to a post 2 at the outer corner thereof and to be fastened to the post by screws 12 or in any other suitable manner. The construction permits securing the hinge 7 to a post 2 without the necessity of any mortising or like fitting.

Projecting from the upper edge of the plate 10 on the face thereof remote from the web extension or wing 11 is a substantially semicircular track 13 of plate-like form dished to provide a valley portion 14 from which the plate has a rise 15 on one side and a longer rise 16 on the other side, the rise 15 being somewhat steeper than the rise 16.

The hinge 7 includes a hinge member 17 which may be of flat or oblong form for attachment to the underface of the door close to the rear end thereof, and this hinge member 17, shown separately in Fig. 8 and appearing in others of the figures, is provided with screw-holes 18 for the reception of fastening screws, and at that corner which corresponds with the outer corner of the door carries a hinge pintle 19 adapted to extend through a hole or passage 20 which is provided about midway between the sides of the plate-like track 13. The track 13 is concentric with the axis of the pintle 19 and the hinge member 17 carries a lug 21 with depending spaced ears 22 each having a recess 23 in its lower end to receive journal pins 24 of a roller 25, which roller and lug may be replaced by any other suitable antifriction bearing support for the door. The axis of the roller 25 is radial to the pintle 19, the lugs which carry the roller being located near the longitudinal center of the plate.

When the door is closed the roller 25 is near the top of the track section 15 and when the door is fully open the roller 25 is near or at the top of the track section 16. However, when the door is released from either the closed or the open position it will tend to gravitate to the dished or valley portion 14 of the track, since, in either the closed or open position, the roller 25 is still on an inclined portion of the track section 15 or 16, and the action of gravity will cause the door to seek the lower level of the track section or valley 14, the roller offering so little resistance to the gravitating movement that such movement is not appreciably impeded.

When the door is closed, the free edge of the door may abut against a strip or buffer 26 and the door is furnished with a latch 27 for holding it in the closed position. When the latch is released the door will automatically swing open due to the roller 25 running down the track section 15 until the roller reaches the valley 14 and then the door may be readily pushed wide open. When the door is released from the wide open position it automatically gravitates down the track section 16 into the track valley 14 and its momentum will carry it part of the way up the track section 15, which section, because of its steepness, prevents any chance of the door slamming and fastening on the inside. The door quickly comes to rest at an intermediate position determined by the track valley or depression 14 and is there held in the partly open position apprising an observer that the compartment is unoccupied, without the necessity of looking into the compartment or the necessity of leaving the door wide open, or the door accidentally shutting.

The weight of the door is sufficient to hold the door in the partly open position with the roller 25 at the depressed or valley portion 14 of the track, against all ordinary forces tending to close the door.

For the particular purposes of the invention, that is, for use in connection with a toilet compartment door, the two track sections 15 and 16 are of unequal inclination and of unequal length with the depressed portion or valley between them at a given point to there hold the roller and maintain the door in a partly open or ajar position. The short and steeper incline 15 of the track acts as a bumper or stop gently arresting the closing movement of the door to prevent it from slamming and for automatically starting the door to swing open as soon as the catch is released. In neither the open nor the closed position does the roller pass from the inclined portion of the track so that the door will always have a tendency to return to the intermediate position determined by the depressed portion or valley 14 and the roller 25.

The arrangement of the pivots at the top and bottom of the door permits the hinges to be applied without mortising while at the same time the door may be hung very close to the jamb without rounding the edge of the door, wherefore, the door when closed leaves no visible space between the door and the jamb and consequently makes the use of a rabbet strip unnecessary.

The door is entirely without springs and there is nothing about the hinge construction to get out of order or to become unduly worn by use. As a further precaution against liability of fastening the door shut accidentally the latch 27 may be of a character requiring the door to be fully closed and the latch to be manually operated in

order to fasten the door shut. Since there are latches on the market of such type it is unnecessary to either show or describe such a latch in detail.

It will be understood that the roller 25 may be replaced by any structure capable of rolling action, and, consequently, the term roller is to be interpreted to cover such structure in addition to the type of roller shown.

What is claimed is:—

1. A door hinge structure comprising a track for sustaining the weight of the door and over which the door may swing from the closed to the open position, said track having an intermediate depressed or valley portion and terminal inclines with the incline toward the closed position of the door steeper and shorter than the incline toward the open position of the door so as to serve as a buffer or stop when closing the door.

2. A door structure provided with pivots at the upper and lower portions of the door, with the pivots having a range of up and down movement with the door and the lower pivot having a track concentric with the axis of the pivot, said track having an intermediate depressed or valley portion and terminal inclines, and the door being provided with a roller engaging the track and sustaining the weight of the door, said track having the incline toward the closed position of the door steeper and shorter than that toward the open position of the door, whereby the door tends to be normally ajar, and automatically opens when unlatched and is arrested in its closing movement.

3. A door hinge structure provided with a hinge member for attachment to the under edge of the door and having a pintle near one corner and a roller with its axis of turning radial to the pintle, and another member for attachment to a door jamb, said second member receiving the pintle and provided with a track for the roller concentric with the pintle, said track being provided with an intermediate depressed or valley portion and inclining therefrom toward the terminal portions of the track, the incline of the track toward the closed position of the door being steeper and shorter than the incline of the track toward the open position of the door so that the door will be arrested in its closing movement and not slam nor become latched.

4. A door structure having top and bottom pivots arranged in an upright axis, with said pivots located near the outer corner of the rear edge of the door, the bottom pivot constituting sustaining means for the door, said bottom pivot comprising a plate with an angular web to secure it to the corner of the door jamb in a manner to avoid mortising, and said plate having a substantially semicircular track extending outwardly therefrom beneath the door and having a vertical opening therethrough, said track being intermediately depressed and inclined toward the terminal parts thereof, and a plate secured flat against the underside of the door and having a depending pintle at one corner thereof to pass through the opening of the track, and a roller carried by the pintle plate and spaced from the pintle to run on the track.

5. A door structure having top and bottom pivots arranged in an upright axis, with the pivots located near the outer corner of the rear edge of the door, the upper pivot comprising a plate having a vertically disposed socket at one end, and a plate secured flat against the upper edge of the door and having at one corner a pintle to enter said socket, and the lower pivot comprising a plate with an angular web to secure the same to the corner of the door jamb, said plate having an outstanding substantially semicircular track which extends beneath the door, is provided with a vertical opening, and is intermediately depressed and inclined toward the terminal parts of the track, and a plate secured flat against the underside of the door and having a depending pintle at one corner thereof passed through the opening of the track, and a roller carried by the last-mentioned plate and spaced from and radial to the pintle to engage the track.

6. A door structure having top and bottom pivots arranged in an upright axis, with the pivots located near the outer corner of the rear edge of the door and having a range of up and down movement with the door, the lower pivot having a track concentric with the axis of the pivot, said track having an opening and an intermediate depressed or valley portion and terminal inclines, and the door being provided with a pintle passed through the opening of the track, and a roller to run on the track and sustaining the weight of the door, the incline which is toward the closed position of the door being steeper and shorter than the incline toward the open position of the door, whereby the door opens automatically when unlatched, will normally stand ajar, and will be arrested in its closing movement.

In testimony that I claim the foregoing as my own I have hereto affixed my signature.

ARTHUR SHERIDAN HUGHES.