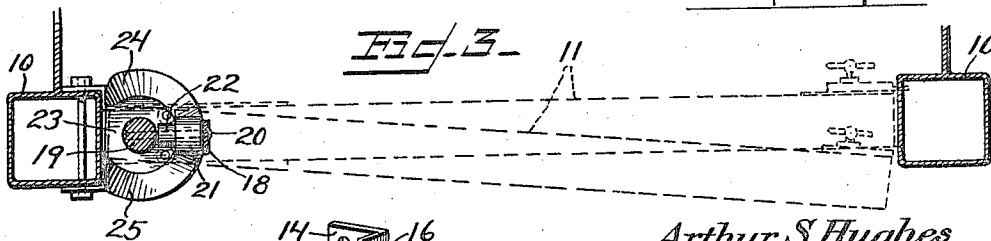
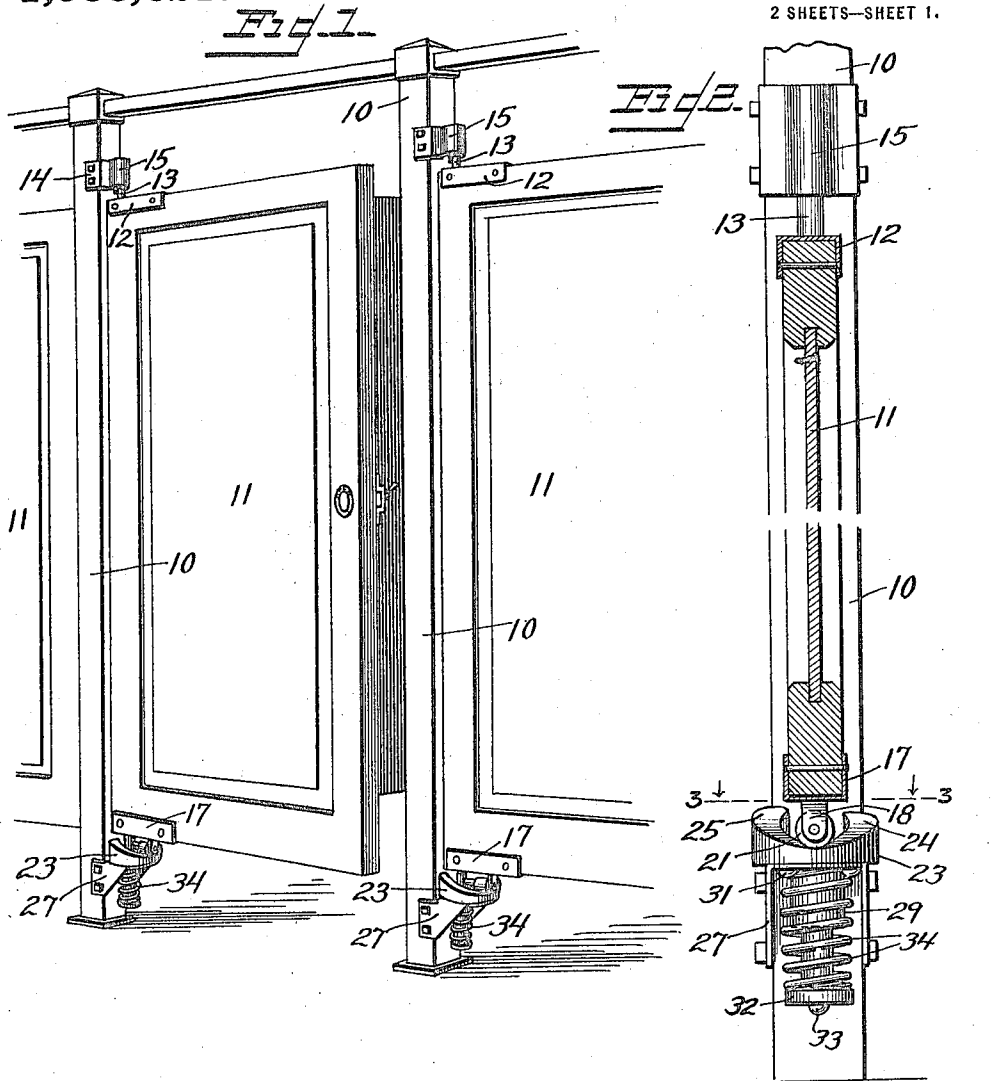


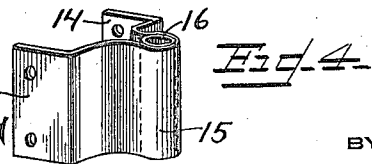
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 APPLICATION FILED JULY 7, 1920.

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 2 SHEETS—SHEET 1.



WITNESSES  
 Charles A. Curand  
 Philip E. Siggers



Arthur S. Hughes  
 INVENTOR

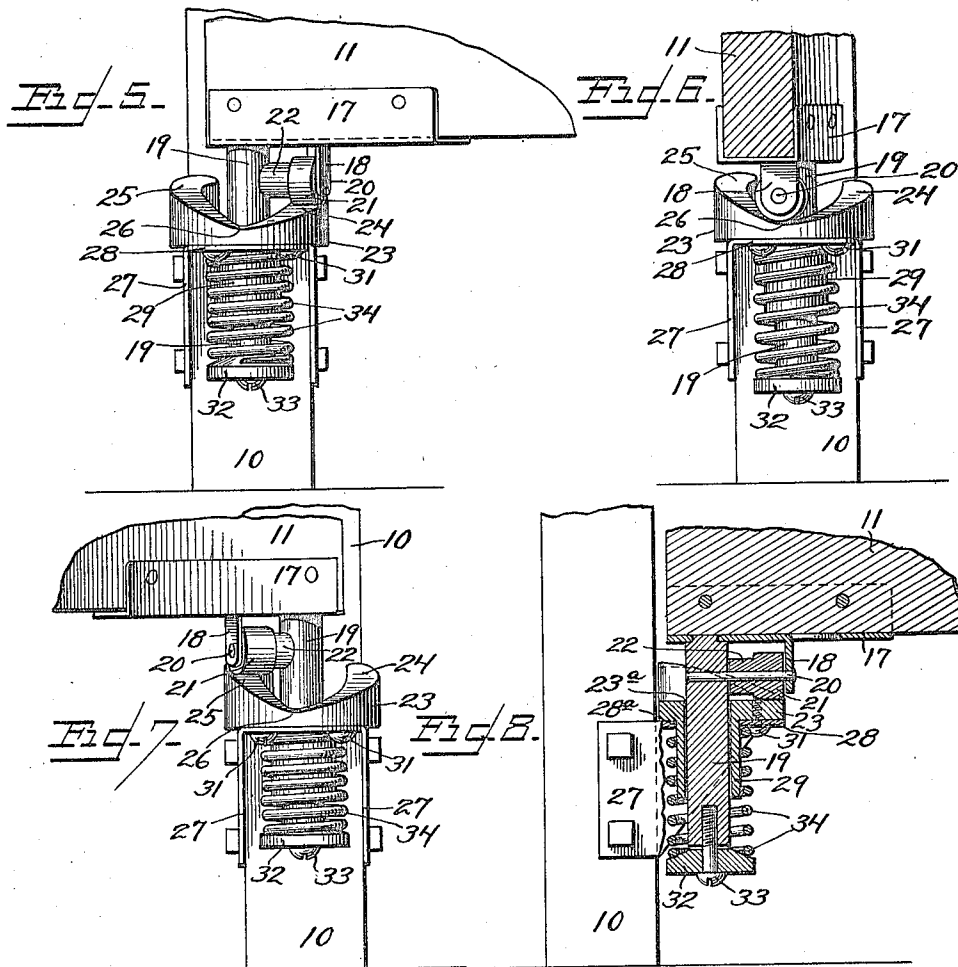
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# UNITED STATES PATENT OFFICE.

ARTHUR SHERIDAN HUGHES, OF MANSFIELD, OHIO.

## SELF-CLOSING HINGE.

1,386,621.

Specification of Letters Patent.

Patented Aug. 9, 1921.

Application filed July 7, 1920. Serial No. 394,437.

*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 Self-Closing Hinge, of which the following is a specification.

This invention relates to hinges, and the general object of the invention is to provide a hinge for a swinging closure which will cause automatic movement of the closure to a predetermined adjustable position.

The present invention is an improvement on the hinge patented by me January 6, 1920, No. 1,327,045.

A specific object of the invention is to effect improvements in the patented hinge particularly by providing a spring therefor to give more life to the hinge; by providing an adjustable track over which the roller travels as the door is swung; by improving the construction of the roller so as to give a large bearing surface, thus insuring long life; to provide an improved support for the roller; to provide means whereby the door rises higher above the hinge support when pushed inwardly than when pulled outwardly; and finally to improve upon the top hinge connection.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing in the drawing, 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 drawing:—

Figure 1 is a perspective view of a series of compartments provided with the invention, showing two doors in closed position and an intermediate door ajar, each of the doors being hung on the left side.

Fig. 2 is a vertical cross-sectional view showing the hinge parts in elevation, the door being indicated as hung on the right side.

Fig. 3 is a section on the line 3—3 of Fig. 2.

Fig. 4 is a perspective view of the member which receives the upper pintle.

Fig. 5 is a detail view of the lower hinge

member and its connection with the door, showing the parts in the position when the door is swung outwardly.

Fig. 6 is a detail view of the lower hinge member and its connection with the door, showing the parts in the position when the door is swung intermediate or neutral.

Fig. 7 is a detail view of the lower hinge member and its connection with the door, showing the parts in the position when the door is swung inwardly.

Fig. 8 is a vertical cross-sectional view through the lower hinge with the door shown in the intermediate position.

Fig. 9 is a perspective view of the bracket.

The numeral 10 represents the posts upon which doors 11 are hingedly mounted. Each door 11 has a channel plate 12 fixed on its upper edge near one corner. From the top of the channel plate 12 rises the upper pintle 13. The pintle 13 is received within a cylindrical tube or bushing 16 supported by a housing including a pair of arms 14 and an intermediate roll section 15. The roll section 15 surrounds the main part of the outer surface of the bushing 16 and prevents lateral movement on the part of the bushing. The arms 14 are secured in any convenient way upon the post 10. Preferably the bushing is welded or otherwise permanently secured within the roll 15, and after being so secured, is reamed out to provide a true fit for the pintle 13. This pintle both swings and slides within the bushing 16 when the door swings in either direction and it is highly desirable that the fit of the pintle 13 within the bushing be a nice one.

While the upper hinge connection which has just been described forms a part of the present invention, it is to a certain extent independent of the lower hinge construction, and in fact might be used with a lower hinge made similarly to the one disclosed in the patent referred to above. It is the lower hinge structure which forms the principal part of the present invention.

Along the lower edge of the door near one corner thereof a channel-shaped member 17 is secured. From the web of this channel member an ear or lug 18 is struck out, as most clearly shown in Fig. 8. The ear 18 extends in a vertical plane at right angles to the face of the door. A long pintle 19 is secured in any desirable way to the web of the channel member 17 with its longitudinal axis vertical and therefore parallel to

the ear or lug 18. A pin 20 is secured to the ear 18 and extends transversely through the pintle 19 near the secured end thereof, whereby the pintle and ear together support the pin in fixed position parallel to the lower edge of the door and lie in a horizontal plane. The pin 20 carries a roller generally cylindrical in form but comprising an enlarged head 21 and a reduced neck 22. The length of this roller is substantially equal to the distance between the ear and the pintle 19.

The head 21 of the roller has a wide bearing surface to ride upon a track provided on the upper face of a block 23. The block 23 at its lower face is flat and is supported by means to be described upon that face. A central bore 23<sup>a</sup> is provided in the block 23 and a sleeve 29 is in alinement with the bore 23<sup>a</sup>, providing substantially a continuation of said bore. The sleeve 29 is disposed vertically when the parts are assembled. A portion of the upper face of the block 23 is flat, but the edge or marginal part of the block has the raised track portions 24, 25, both track sections being arcuate and rising from either side of a depressed or valley portion 26. The block at the valley portion 26 is of least thickness. The head 21 of the roller has a width fully equal to the width of the track portions 24, 25, and as the door is swung to and fro the roller rides over the tracks, thus raising or lowering the door, causing movement of the upper pintle 13 into or out of the bushing 16. The bushing 16 has a length at least equal to the length of the pintle 13.

Each track section 24, 25 has an even or constant inclination in the present construction. The track section 24 is shown as on the outside of the door and rises to a less height above the upper face of block 23 than does the section 25. The effect of this is that the door may be more easily pulled outwardly than pushed inwardly; and if pulled inwardly, returns more quickly to the intermediate position. Furthermore, if the door is pulled outwardly and then rebounds or swings backwardly, the higher inclined section 25 prevents much of a rebound or back swinging on the part of the door. The neutral position of the door is the one illustrated in Figs. 2, 3, 6 and 8, where the roller has its head seated upon the section 26 of the track. It will be clear that by shifting the angular position of the block 23, the neutral position of the door will also be shifted so that the door may be brought to rest either in a position ajar, as illustrated in Fig. 1, or may be made to automatically close and latch itself.

The block 23 is supported upon a bracket shown by itself in Fig. 9. This bracket comprises a pair of arms 27 adapted to inclose the sides of posts 10 and be secured

thereto. Joining the two arms 27, which are normally disposed vertically, is a plate 28 at right angles to the two arms. The plate 28 has a central aperture 28<sup>a</sup> of a size sufficient to receive the sleeve 29. The sleeve 29 passes through the aperture 28<sup>a</sup> and provides a pivot for the block 23 whereby the angular position of the block with respect to the plate 28 may be varied. Concentric with the aperture 28<sup>a</sup> is a pair of arcuate slots 30. The lower face of block 23 has a pair of screw-threaded bores for receiving set screws or the like 31 which also pass through the arcuate slots 30. This construction allows shifting of the block with respect to the bracket and securing of the block in adjusted positions.

The lower end of pintle 19 has an axial screw-threaded bore receiving an adjusting screw 33. A washer or equivalent element 32 is mounted on the adjusting screw 33. A coil spring is mounted on the sleeve 29 and bears at the lower end against the washer 32 and at the upper end against the under side of plate 28. It is possible to vary the tension of the spring 34 by turning the screw 33. The effect of spring 34 is to maintain the pintle 19 in its lowermost position, this position being determined by the roller where seated upon the low section 26 of the track.

The advantage gained in mounting the roller as described is to provide a broad substantial bearing for the door. The only wearing part of the hinge is the axle or bearing of the roller. It is therefore very desirable to have a broad bearing so that the stress may be distributed over a larger area. The construction is economical as two of the essential members of the hinge proper are used to support the roller, consequently cutting down the number of parts otherwise required. The adjustment of the track is a very important feature since it allows the hinge to be used with doors which should automatically close and latch, as well as with doors which come to rest in a partly open position, as disclosed in the patent referred to. It is only necessary to move the track slightly one way or the other in order to bring the door to the position desired when the screws 31 will be tightened and the door will always be brought to the desired position without any considerable rebounding or swinging. The use of the spring is very desirable since it has been found that a door provided with hinges, as disclosed in my prior patent, acts very lazily. The manner of mounting the spring has special features in that the spring is relieved of anything in the way of a twisting or turning stress and consequently is relieved of liability of breakage. The method of mounting the spring brings the compression square upon it. The adjustment of the ten-

sion of the spring makes it possible to cause the doors to close with the desired speed.

What is claimed is:—

1. A door hinge structure comprising a member secured upon an edge of the door, a pintle secured to the member and extending at right angles thereto, a cylindrical bushing or tube having a length at least equal to the pintle, and a holder for the bushing, said holder comprising flanges for mounting on a support, and an intermediate roll partly embracing the sides of the bushing and being permanently connected thereto and holding the bushing in a position to receive the pintle and allow sliding and swinging of the pintle therein.
2. A hinge structure including a member adapted to be secured upon the lower edge of the door, a roller mounted on and carried by said member, and a block providing a track for the roller, said block being adjustable in various angular positions about its center to adjust the neutral position of the door.
3. A door hinge structure including a bracket, a block supported by the bracket, and a roller mounted on the door and bearing against the block, said bracket including a pair of arms adapted to be secured to the vertical surfaces of a support, and a plate joining the arms and disposed at right angles thereto, said plate having an aperture, said block having a flat face adapted to rest upon the plate, and an opposed face having an inclined track upon which the roller runs when the door is swung, a sleeve passing through said aperture, a bore in alinement with the sleeve, and means whereby the relative angular position of the block and plate may be adjusted and maintained.
4. A door hinge structure including a bracket, a block supported by the bracket, a pintle secured upon the door and passing through the block and bracket, and a roller carried upon the door and movable over the block, said bracket including a pair of arms adapted to be fixed upon a support and a plate joining the arms and at right angles thereto, said plate having an arcuate slot, the block having a screw-threaded bore, a spring adjustably mounted on the pintle and engaging the plate, and means passing through the slot and engaged with the screw-threaded bore for permitting adjustment of the position of the block on the bracket.
5. A door hinge structure comprising a bracket secured to a support, a block mounted on said bracket, a member secured to the lower edge of the door, a pintle secured to said member and extending through both the block and bracket, a sleeve secured to the block and passing through the bracket and receiving the pintle, a spring mounted on the sleeve and pintle and tending to move the pintle downwardly through the sleeve, and a roller supported by the pintle and bearing upon the upper face of the block.
6. A door hinge structure comprising a bracket mounted upon a support, a block adjustably mounted upon the bracket, and a pivotal connection between the door and bracket, said connection including a roller movable over the face of the block.
7. A door hinge structure comprising means for pivotally mounting the door, and means for causing the door to return to a given position, said latter means being adjustable whereby the neutral position of the door may be varied at will.
8. A door hinge structure comprising means for pivotally supporting a door, said means causing rising of the door with respect to its support when it is swung in either direction, the rising being of greater extent when the door is swung one way than when it is swung the other way.
9. A door hinge structure comprising means for pivotally supporting a door, said means causing rising of the door with respect to its support when it is swung in either direction, the rising being of greater extent when the door is swung one way than when it is swung the other way, and means whereby the rise of the door as it is swung either way may be retarded or advanced.
10. A hinge structure comprising a bracket, a block mounted upon the bracket and having raised track portions rising from either side of a depressed or valley portion, one of said track portions rising to a less height than the other portion, and a member carrying a pintle and a roller, the latter traveling upon the track portions.
11. A hinge structure comprising a bracket, a block mounted upon the bracket and having raised track portions rising from either side of a depressed or valley portion, one of said track portions rising to a less height than the other portion, a member carrying a pintle and a roller, the latter traveling upon the track portions, and means for adjustably mounting the block upon said bracket whereby the depressed or valley portion of the track may be shifted for the purpose set forth.
12. A bracket for a door hinge structure including a pair of arms adapted to be secured to the vertical surfaces of a support, a plate at right angles to the arms and joining the arms, said plate having a central aperture, and an arcuate slot in the plate concentric with the aperture.
13. A door hinge structure including a support, a block mounted on the support, said block being flat on one face and having a raised arcuate track on the other face, a sleeve secured to the block and extending from the flat face thereof through the support, a bore in the block in alinement with the sleeve, and a pintle passing through the

bore of the block and through the sleeve for pivotally mounting the door.

14. A door hinge structure including a bracket, and a block supported by the bracket, said bracket including a plate having a central aperture, an arcuate slot in the plate concentric with the aperture, said block having a flat face adapted to rest upon the plate, a sleeve passing through the aperture, a bore in alinement with the sleeve, and means whereby the relative angular positions of the block and plate may be adjusted and maintained.

15. A door hinge structure including a bracket, a block supported by the bracket, a pintle secured upon the door and passing through the block and bracket, and a roller carried upon the door and movable over the block, said bracket including a plate having an arcuate slot, the block having a screw-threaded bore, and means passing through the slot and engaged with the screw-threaded bore for permitting adjustment of the position of the block on the bracket.

16. A door hinge structure including a bracket, a block supported by the bracket, a pintle secured upon the door and passing through the block and bracket, and a roller carried upon the door and movable over the

block, said bracket including a plate having an arcuate slot and a central aperture, the block having a screw-threaded bore, a sleeve integral with the block and passing through the aperture and receiving the pintle, and means passing through the slot and engaged with the screw-threaded bore for permitting adjustment of the position of the block on the bracket.

17. A door hinge structure including a bracket, a block supported by the bracket, a pintle secured upon the door and passing through the block and bracket, and a roller carried upon the door and movable over the block, said bracket including a plate having an arcuate slot and a central aperture, the block having a screw-threaded bore, a sleeve integral with the block and passing through the aperture and receiving the pintle, a spring mounted on the sleeve and pintle and engaging the plate, and means passing through the slot and engaged with the screw-threaded bore for permitting adjustment of the position of the block on the bracket.

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

ARTHUR SHERIDAN HUGHES.