Jan. 3, 1928. 1,655,043

D. W. BLACKWELL

DOUBLE ACTING DOOR HINGE

Filed May 7, 1923

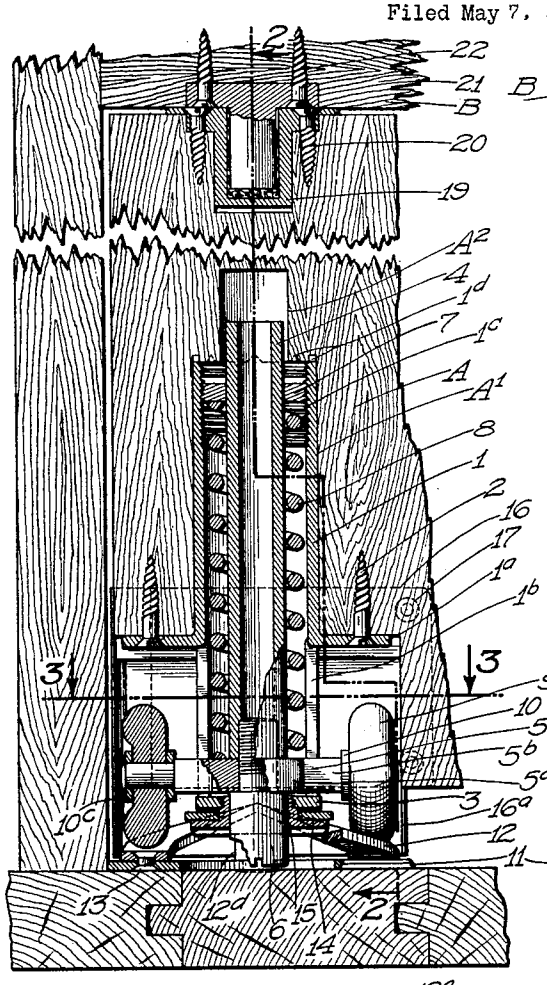


FIG. 1.

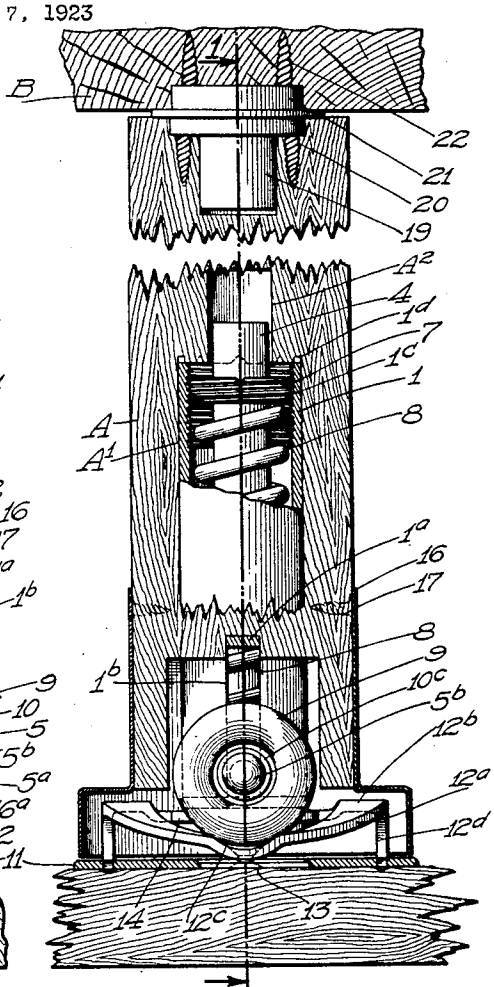


FIG. 2.

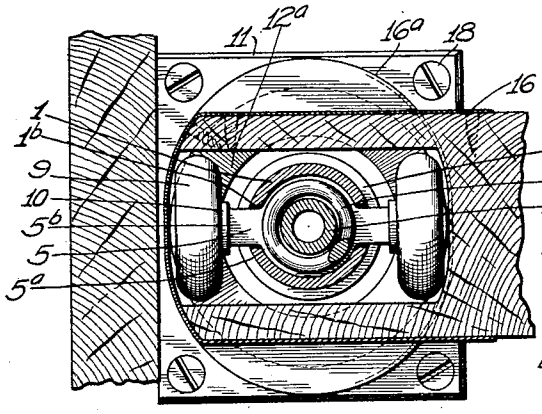


FIG. 3.

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UNITED STATES PATENT OFFICE.

DANIEL W. BLACKWELL, OF SAN DIEGO, CALIFORNIA.

DOUBLE-ACTING DOOR HINGE.

Application filed May 7, 1923. Serial No. 637,118.

My invention relates to double-acting door hinges, and the objects of my invention are: first, to provide a hinge mechanism of this class which will automatically return the door to a closed position when the same has been opened and which will immediately bring the door to rest when closed and not permit the same to swing back and forth needlessly; second, to provide a hinge mechanism of this class which will hold the door in an open position when the same is rotated about its axis more than a quarter of a turn or beyond a right angle to its normally closed position; third, to provide a hinge mechanism of this class in which the door will not be raised or lowered when the same is swung on its axis, but held in place both at the top and bottom of the door; fourth, to provide a hinge mechanism of this class in which a simple compression spring is used to provide the actuating force and in which the compression is substantially the same when the door is in a closed or wide open position, thus reducing the strain on the spring to a minimum; fifth, to provide a hinge mechanism of this class by reason of which the door may be opened with little effort and by which the door will start to close slowly and gradually, thereby permitting a person passing through the passage to clear the door before the same gains much momentum; sixth, to provide a hinge mechanism of this class which may be easily adjusted and which is applicable for doors of different thicknesses; seventh, to provide a novelly constructed hinge mechanism of this class, and eighth, to provide a hinge mechanism of this class which is very simple and economical of construction proportionate to its functions, durable, practical, and which will not readily deteriorate or get out of order.

With these and other objects in view as will appear hereinafter, my invention consists of certain novel features of construction, combination and arrangement of parts and portions as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon which form a part of this application, in which:

Figure 1 is a sectional elevational view of my hinge mechanism at the bottom and top ends of a double acting door, showing the same fragmentarily, with the section taken through 1—1 of Fig. 2, and showing certain parts and portions in elevation to facilitate the illustration; Fig. 2 is another sectional elevational view thereof taken through 2—2 of Fig. 1, also showing certain parts and portions in elevation to facilitate the illustration, and Fig. 3 is a transverse sectional view taken through 3—3 of Fig. 1.

Like characters of reference refer to similar parts and portions throughout the several views of the drawings.

The hinge casing member 1, screws 2, retaining member 3, guide member 4, axle member 5, screw 6, spring adjusting member 7, spring 8, rollers 9, washers 10, base plate 11, cam member 12, rivets 13, plate 14, screw 15, inclosure plates 16, screws 17 and 18, female hinge member 19, screws 20, male hinge member 21, and the screws 22, constitute the principal parts and portions of my double acting door hinge mechanism.

The casing member 1 of tubular construction is positioned in a recess A^1 at the lower end of the door A and is secured in said position by means of the screws 2 extending through laterally extending lugs 1^a, the portions forming said lugs being cut and bent outwardly from said casing member, forming longitudinal slots 1^b in the sides and at the lower end of the casing member. Said casing member is further held in position by sharp pointed teeth 1^d, at the inner end of said member 1, which are driven into the wood at the bottom of the recess A^1. At the lower end of the tubular casing member 1 is provided an annular retaining member 3, preferably welded thereto, and adapted to retain the axle member 5 and spring 8 in position within said casing member 1. Said axle member 5 is provided with a central enlarged portion 5^a, which is reciprocally mounted within the tubular casing member 1 and is provided with outwardly extending portions 5^b, which extend through the slots 1^b of the casing member 1, on the extended ends of which are revolubly mounted the torus-shaped rollers 9, which are secured to said axle by means of the axle being riveted over at its end and washers 10^c being interposed between the riveted portions and the rollers 9, there being also washers 10 interposed between said rollers and the square shoulder of said axle. A guide member 4 is positioned within said casing member and secured at its lower end to the enlarged por-

tion of the axle 5 by means of the screw 6, the head of which also serves as a guide within the screw member 15. At the upper end of the casing member 1 is provided an internally threaded portion 1^e to receive the spring adjusting nut 7, which nut also serves as a guide for the upper end of the guide member 4, which extends above the same and extends into a reduced recess A^2 of the door A. Between the enlarged portion of the axle member and the spring adjusting nut 7 and around the guide member is positioned the compression spring 8 for retaining the rollers 9 in engagement with the cam member 12. Said cam member consists of a ring-like member 12^a, having opposed high ridge portions 12^b with the upper face of the ring-like member 12^a gradually receding therefrom in curved form and with gradually increasing inclination, and terminating in abruptly, downwardly curved, offset portions 12^c, said curved portions 12^c being of less diameter than the diameter of the rollers 9, so that when the rollers are positioned at said portions, as shown in Figs. 1 and 2 of the drawings, as when the door is in a closed position, said rollers will bear against the ridges on either side of the center lines formed by the intersection of the gradually curved portions and the abruptly curved portions 12^c, thus holding said door in a closed position by means of the spring 8 and preventing swinging of the door. Said cam member 12 is provided at the opposed ridge portions 12^b with downwardly extending lugs 12^d, which extend through the base plate 11 and are riveted thereto, said cam member being also secured to said plate 11 by means of the rivets 13 extending through the abruptly curved portions 12^c of the cam member 12. Said cam member is further provided with an annular plate 14, which is supported by the ridge portion thereof and through which extends the screw 15, secured to the retaining member 3 of the casing member 1, which screw assembles the casing members with the cam member. The outer inclosure for the hinge mechanism consists of the plates 16, which extend around the lower, rear portion of the door and are secured thereto by means of the screws 17. Said plates are provided with downwardly extending, semicircular portions 16^a, which extend over and around the cam portion of the mechanism, concealing the same. It will be noted that the door, shown in Figs. 2 and 3 of the drawings, is of considerable thickness and that the inclosure plates 16, as shown in the drawings, can be used for a thinner door, as shown by dotted lines in Fig. 2 of the drawings, by cutting off the inner edges of the plates.

In the upper end of the door I have provided a female hinge member 19, which is secured thereto by the screws 20 and into which extends the male hinge member 21, secured to the door casing B by means of the screws 22, clearance being provided between said members for grease.

Though I have shown and described a particular construction, combination and arrangement of parts and portions, I do not wish to be limited to this particular construction, combination and arrangement, but desire to include in the scope of my invention, the construction, combination and arrangement substantially as set forth in the appended claims.

It is obvious from this construction that there is provided a hinge mechanism which will automatically and gradually return the door to a closed position when the same has been opened and which will bring the door to rest when the same is being closed and not permit the same to swing back and forth; that there is provided a hinge mechanism of this class which will hold the door in an open position when the same is rotated about its axis beyond a right angle to its normally closed position; that there is provided a hinge mechanism of this class in which the door will not be raised or lowered when the same is swung on its axis but will be fixedly held in place both at the top and bottom thereof; that there is provided a hinge mechanism of this class in which a simple compression spring is used to provide the actuating force and in which the compression is substantially the same when the door is in a closed or in a wide open position, thus reducing to a minimum the strain on the spring; that there is provided a hinge mechanism of this class, by reason of which the door may be easily opened with little effort without a great deal of friction, jerks or squeaks and by which the door will start to close slowly by reason of the construction of the cam member, thereby permitting a person passing through the passage to clear the door before the same gains much momentum; that there is provided a hinge mechanism of this class which may be easily adjusted and which is applicable for doors of different thicknesses, and that there is provided a novelly constructed hinge mechanism of this class and a mechanism which is very simple and economical of construction, durable, practical, and which will not readily deteriorate or get out of order.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A hinge mechanism, including a tubular hollow casing member adapted to be secured in a vertical position at the lower end of a door, an axle member extending through the lower portion of said casing member and reciprocally mounted therein, a spring positioned within said casing around said axle member, one end of which is in engagement with said axle member,

a pair of oppositely disposed rollers revolubly mounted at the extended ends of said axle member and wholly outside of the said tubular casing, and a cam member secured to the floor contiguous to said door, said cam member consisting of an annular member provided with opposed high ridges with the face of said annular member receding from said ridged portions in gradual curve and inclination.

2. A hinge mechanism, including a hollow tubular casing member adapted to be secured in a vertical position at the lower end of a door, an axle member extending through slots in the lower portion of said casing member and reciprocally mounted therein, a second tubular member concentrically positioned and spaced apart from said first mentioned tubular casing member, a spring loosely positioned between said first and second mentioned tubular members, the one end of said spring engaging said axle member, means at the other end of said spring for adjusting the tension of said spring, a pair of oppositely disposed rollers revolubly mounted at the extended end of said axle member wholly without said tubular casing, and a cam member secured to the floor contiguous to said door, said cam member consisting of an annular member provided with oppositely high ridges with the face of said annular member receding from said ridge portion in gradual curve and inclination.

In testimony whereof, I have hereunto set my hand at San Diego, California, this 28th day of April, 1923.

DANIEL W. BLACKWELL.