

Nov. 18, 1924.

1,516,330

C. S. BUTTERFIELD

HINGE

Filed July 21, 1923

2 Sheets—Sheet 2

Fig. 4.

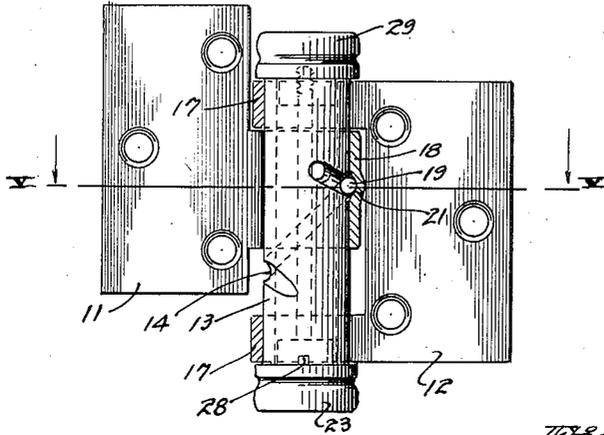


Fig. 5.

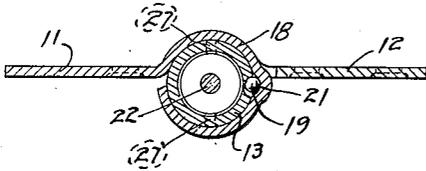


Fig. 6.

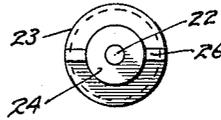


Fig. 7.

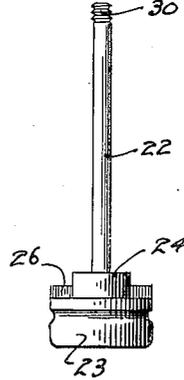


Fig. 8.

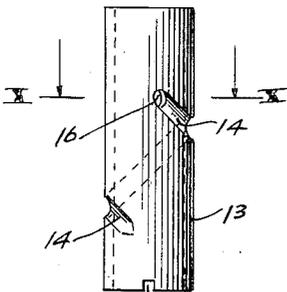


Fig. 10.

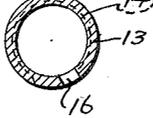
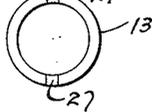


Fig. 9.



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HINGE.

Application filed July 21, 1923. Serial No. 652,958.

To all whom it may concern:

Be it known that I, CHARLES S. BUTTERFIELD, a citizen of the United States, and a resident of San Francisco, county of San Francisco, and State of California, have invented a new and useful Hinge, of which the following is a specification.

The present invention relates to improvements in hinges and its particular object is to provide a hinge for a door or the like that will allow the door to be raised while the same is being opened and to fall back to its original position during the closing action. It is particularly proposed to utilize for this purpose a spiral groove in the hinge pin and a ball riding in the same engaging a recess in the moving hinge member. It is further proposed to provide a particular construction which allows of the easy assembling of the hinge and of the insertion of the ball into the spiral groove without furnishing any possibility of the ball leaving the groove during the operation of the device. Further objects and advantages of my device will appear as the specification proceeds.

The preferred form of the invention is illustrated in the accompanying drawings wherein Fig. 1 shows a front view of a door secured to its support by means of my hinges, Fig. 2 a vertical section drawn along line II—II of Figure 1, Figure 3 a detail view showing my hinge detached in a closed position, Figure 4 a detail view showing the hinge in an open position, Figure 5 a horizontal section taken along line V—V of Figure 4. Figure 6 a detail plan view of a ball used in my device, Figure 7 a side view of the same, Figure 8 a side view of my hinge pin, Figure 9 a bottom plan view of the same and Figure 10 a horizontal section along X—X of Figure 8. While I have shown only the preferred form of my invention I wish it to be understood that various changes and modifications may be made within the scope of the claims hereto attached without departing from the spirit of the invention.

The door (1) is secured to the support (2) by means of the two hinges (3). It will be noted that the upper edge (4) of the door engages the door frame on a slanting plane while the bottom edge (6) of the door is provided with a lining (7) of rubber or any other yielding material allowing of a yielding engagement of the bottom of the door

with the top of the floor (8) disposed underneath the door.

The principal parts of the present invention are the hinges (3) one of which is shown in detail in the various figures. It comprises the two hinge members (11) and (12) and the hollow pin (13). The latter which is shown in detail in Figure 8 is provided with a spiral groove (14) in its outer face and the groove terminates at its upper end in a hole (16) in the wall of the pin. The pin is in length co-extensive with the hinge member (12) and adapted to be engaged by the two projections (17) of the latter which encircles the upper and lower parts of the pin and leaves a considerable space between the same free for engagement with the projection (18) extending from the hinge member (11). The latter part occupies only a portion of the space left between the two projections (17) and is allowed to slide vertically on the sleeve. This sliding motion, however is converted into a spiral motion by the ball (19) riding in the groove (14) and engaging with a recess (21) in the projection (18) of the hinge member (11). It will thus be seen that when the hinge member (11) is turned relative to the hinge member (12) it will slide upwardly on the pin (13) while on the reverse motion it will slide downwardly.

In assembling the hinge the ball is inserted into the groove (14) through the hole (16). It is necessary that when the ball is inserted the recess (21) in the projecting member (18) registers with the hole (16) to allow the ball to enter the groove. It will be seen from Figure 4 in particular that this situation can be brought about only before the pin is in its final position since in the position shown in Figure 4 the hole (16) is too high to allow the recess (21) to register with the same. It is necessary therefore, to slide the pin downwardly relative to the hinge member (12) for the purpose of allowing the recess (21) to register with the hole (16) whereupon the ball may be inserted through the hole from the inside of the hollow pin. The pin then may be turned slightly and pushed into its final position which will cause the ball to ride in the groove (14) into the position shown in Figure 4. It will be readily seen that as long as the pin occupies the position shown in Figure 4 the ball will never pass over the

hole (16) again and there is no danger therefore, that the ball may drop out of its engagement.

To hold the hollow pin in its operative position I provide the bolt (22) shown in detail in Figures 6 and 7. The same is provided with a head (23) and an embossment (24) fitting into the hollow pin. Its head is provided with a transverse member (26) fitting into registering recesses (27) of the pin and (28) of the projection (17) of the hinge member (12) so that when the bolt (22) is pushed into place and is properly engaged it holds the pin (13) against rotary motion. A nut (29) preferably of the same form as the head (23) engages the threaded end (30) of the bolt (22) on the opposite end and holds the bolt in place.

The fact that the hollow pin (13) is held against rotation furnishes further insurance against the dropping out of the ball. Normally a door does not turn through more than 180 degrees which means that in Figure 4 the ball normally will not travel any more than through one-half of the spiral. Since the pin is locked against rotation the same portion of the spiral will be engaged at all times by the wall and the hole (16) being disposed on the opposite side of the pin will never come into registry with the recess (21) except when the pin (13) is turned and lowered at the same time.

To assemble the hinge the best way to proceed is as follows: The hollow pin is passed through the holes in the projections of the two hinge members in such manner that the distance of the hole (16) from the upper projection at least equals the distance of the recess (21) from the same line. The pin is then held so that the hole (16) points downwardly and the ball inserted, whereupon the pin is shaken until the ball rolls into the hole. The recess (21) is then brought into registry with the hole so that the ball engages with the recess, whereupon the hinge member (11) is turned so as to force the ball into the spiral groove (14). The pin

is then pushed upwardly into its final position and turned to allow the transverse member (26) of the ball (22) to be engaged with the respective notches in the hollow pin and the projection (17) of the hinge member (12) whereupon the nut (27) may be engaged with the bolt for holding the same in place. The hinge is now ready to be attached to the door and the door frame.

It will be noted that the particular construction of the hinge allowing of the raising and the lowering of the door makes it unnecessary to provide a threshold underneath the same which is a very important feature of the present invention. The rubber slip at the bottom of the door serves to make the door dust and draft proof. The hinges of course may be constructed to allow the door to open either to the right or to the left.

I claim:

1. In a hinge, a hollow pin having a spiral groove in its outer face, a hinge member supporting the pin, a second hinge member pivoted to the pin and a ball slidable in the groove engaging a recess in the second hinge member for imparting spiral motion to the latter, the spiral groove terminating in a hole in the wall of the pin above the normal travel of the ball which allows of the insertion of the ball while the hinge is assembled.

2. In a hinge, a hollow pin having a spiral groove in its outer face, a hinge member supporting the pin, a second hinge member pivoted to the pin and a ball slidable in the groove engaging a recess in the second hinge member for imparting spiral motion to the latter, the spiral groove terminating in a hole in the wall of the pin allowing of the insertion of the ball while the hinge is assembled and means being provided for locking the pin in a definite position placing the hole out of the normal range of the ball during the operation of the hinge.

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