July 8, 1941. C. A. MAY 2,248,372

HINGE

Filed Jan. 11, 1939

Fig. 1.

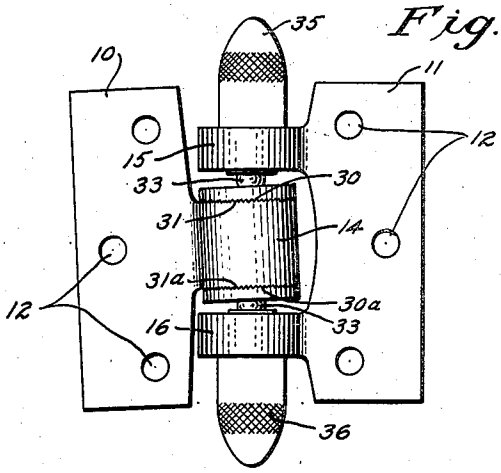


Fig. 2.

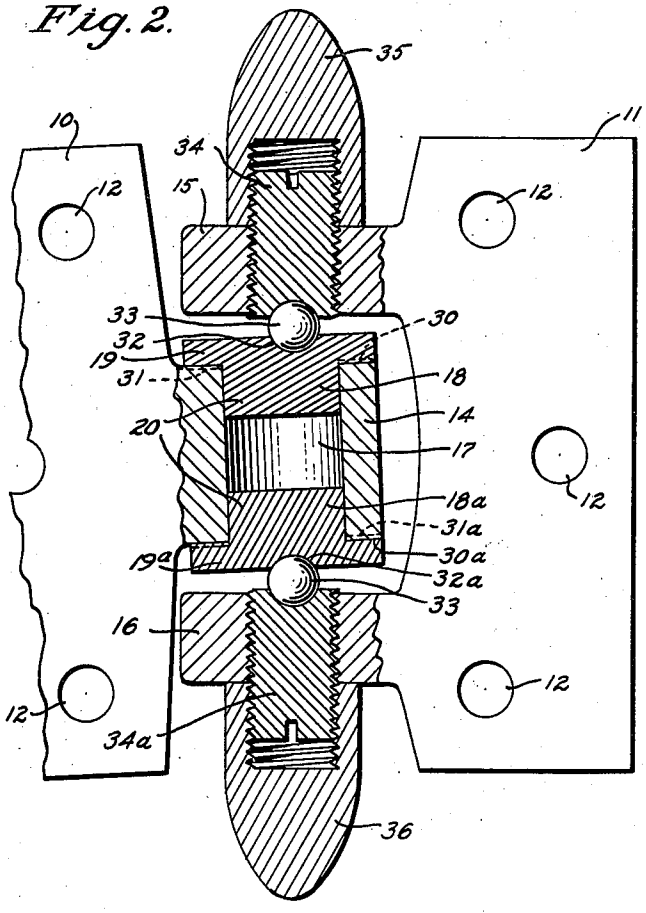


Fig. 3.

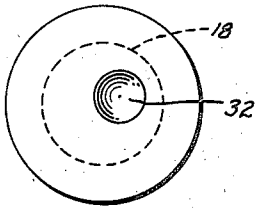


Fig. 4.

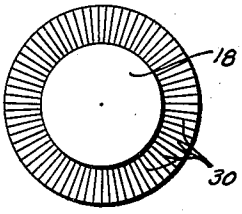
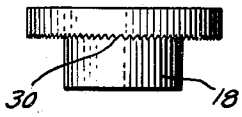


Fig. 5.



INVENTOR:-

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BY HIS ATTORNEY

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Patented July 8, 1941 2,248,372

UNITED STATES PATENT OFFICE

2,248,372

HINGE

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Application January 11, 1939, Serial No. 250,341

1 Claim. (Cl. 16—129)

This invention relates to adjustable hinges and is an improvement of the hinge described in my co-pending application Serial No. 209,271.

Hinges heretofore known of an adjustable type are expensive and are limited to a narrow range of adjustment while the adjustment requires painstaking care and involves a great amount of time and skill to suspend a door at a desired position in a door frame.

The general objects of the present invention are to obviate such faults and to reduce the cost of such hinges. These objects are accomplished specifically by providing a hinge with a pair of hinge leaves having interfitting knuckles, said knuckles being so formed and proportioned as to permit limited relative movement of the leaf supporting a door in all directions for the purpose of suspending doors in their frames at the position which permits the door to swing on its hinges freely and in the event a door becomes bound against its frame due to sagging or swelling of the frame or the door or other causes the door may be easily repositioned in its frame by a simple adjustment of hinge, the inner knuckle of the hinge having adjustable rotatable adapters in opposite edges formed with hemispherical sockets or bearing seats, one or more of such sockets or bearing seats in said adjustable adapters being formed non-concentric with the said adapter, a pair of smooth surfaced balls disposed in said sockets or bearing seats and serving with said adapters to register the hinge knuckles, adjustable screws connecting said balls, said adjustable screws having their inner ends formed with hemispherical sockets or bearing seats, said adjustable screws serving to snugly engage said balls in opposition to said bearing seats.

Of the accompanying drawing:

Figure 1 is an elevation of a hinge embodying the invention;

Figure 2 is a vertical longitudinal sectional view of the same on a larger scale;

Figure 3 is a detail view of one end of the eccentric adapter;

Figure 4 is a similar view of the other end of said adapter;

Figure 5 is a front elevation of said adapter.

Referring to Figs. 1 and 2, it will be seen that the novel hinge there shown comprises a pair of relatively flat leaves 10 and 11 which are pivotally connected together, said leaves being provided with apertures 12 for accommodation of bolts or screws whereby they may be secured to the door and door frame respectively. The leaf 10 is integrally formed with a knuckle 14 which is adapted to be straddled by knuckles 15 and 16 of the leaf 11. A round opening 17 extends through knuckle 14 in the opposite ends of which are adapters 18 and 18a. These adapters 18 and 18a have enlarged heads as 19 and 19a which are of a substantially larger diameter than the opening 17. The body portion as 20 of the adapters 18 and 18a, respectively, is round and of a diameter to fit snugly into the opening 17 of the knuckle 14 so that the adapter will not rattle against the sides of the opening 17, however, the fit is sufficiently loose to permit the turning and movement of the said adapter in the said hole for the purpose of adjustment which will be discussed in detail hereinafter. The underneath portions of heads of the adapter 18 and 18a have radial notches or serrations 30 and 30a respectively which are designed to cooperate with similar radial notches or serrations 31 and 31a formed on the edges of the knuckle 14 against which the heads 19 and 19a of the adapter 18 and 18a seat. As is clearly shown in Fig. 2, the space between the knuckles 15 and 16 is greater than the width of the knuckle 14 plus the thickness of the adapter heads 19 and 19a, and as a result there is a certain amount of clearance between the said adapter heads and the knuckle 14. This clearance makes possible the adjustable connection between the knuckles as will be explained.

The upper and lower adapter 18 and 18a respectively are formed with non-concentric hemispherical recesses or sockets 32 and 32a for seating steel bearing balls 33. These balls are held in their place by recessed ends of set-screws 34 and 34a, which are screwed into aligned openings in the knuckles 15 and 16. By reason of the previously mentioned clearance between the knuckles, it will be evident that by axially adjusting the set-screws 34 and 34a, the relation between the leaves 10 and 11 may be varied along the axis of the set-screws 34 to compensate for inaccuracies or inequalities in the door mounting. Also by reason of the recesses or sockets 32 and 32a being non-concentric and the adapter 18 and 18a being capable of being turned to different positions in the opening 17 it will be seen that the sockets 32 and 32a may be aligned on a line parallel with the axis of the set-screws 34 or by turning the adapter 18 so that the socket 32 is to its extreme limit of range to one side of the opening 17 and by turning the adapter 18a so that the socket 32a is to its extreme limit of range to the opposite

side of the opening 17 from that to which the socket 32 has been turned that the leaf 10 will be thrown or tilted to a substantial degree from its former position. It will also be seen that the adapters 18 and 18a may be turned to various positions in order to modify the tilt of the leaf 10, which is the leaf that carries a door, in order to fit the door to its frame. It will now be seen that the door may be moved up or down in its frame by adjusting the set-screws 34 and 34a as for example, by backing away set-screw 34 and running in set-screw 34a when the socket 32 and 32a are aligned with the axis of the set-screws 34 and 34a. It will also be seen that by keeping the sockets 32 and 32a aligned with the axis of the set-screws 34 and 34a and by turning the adapter 18 and 18a together in the opening 17 so as to not destroy the alignment that the leaf 10 may be moved to one side and outwardly from the leaf 11 without tilting and also as shown above by selecting positions for the adapter 18 and 18a which throws the sockets 32 and 32a out of alignment with the axis of the set-screws 34 and 34a that the door may be tilted. Because the adapters 18 and 18a are formed with flat heads of a diameter greater than the diameter of the opening 17 it is obvious that the sockets 32 and 32a travel in a wider arc than could be the case if the said heads were the same or less diameter than that of the opening 17. This feature is important in that it substantially increases the range of adjustment of the door to its frame. The adapter 18 and 18a are held from turning from their selected position when the door is opened or shut due to the radial notches or serrations 30 and 30a interlocking with the radial notches or serrations 31 and 31a respectively.

It will now be evident that this invention has provided an adjustable hinge that is capable by adjustment to move a door supported by it a substantial distance in any direction. For ornamentation cap-nuts 35 and 36 may be used or if found desirable a combination cap and lock-nut may be used for 35 and 36.

Although the invention has been described in connection with a preferred form, it will be apparent that different changes will suggest themselves to those skilled in the art without departing from the spirit of the invention which is to be limited, therefore, only by the prior art and the scope of the appended claim.

What I claim is:

A hinge of the class described comprising a pair of hinge leaves, a pair of relatively spaced knuckles associated with one of said leaves, an intermediate knuckle associated with the other of said leaves, said intermediate knuckle having its opposite edges formed with axially aligned holes therein, and radial serrations extending from the edges of said holes, a pair of adapters adjustably mounted in said intermediate knuckle, said adapters being each formed with a body portion extending into one of said holes and an outer flange portion on the under side of which are formed radial serrations adapted to cooperate with the said radial serrations extending from the edges of the axially aligned holes in said intermediate knuckle to prevent said adapters from turning in said holes, said outer flange portions having formed therein a hemispherical socket constituting a bearing seat, the combined width of said flange portions and intermediate knuckle being sufficiently less than the distance between the two spaced knuckles to permit a substantial tilting movement of the intermediate knuckle and the said flange portions between the said relatively spaced knuckles, a pair of smooth surfaced balls disposed in said sockets for pivotally connecting the knuckles, adjustment screws contacting said balls, said adjustment screws serving to snugly engage said balls in opposition to said bearing seats and being adapted to be adjusted to move the assembled said intermediate knuckle and adapters between said pair of relatively spaced knuckles along a line parallel with the axis of said adjustment screws whereby taken in conjunction with the said adjustably mounted adapters a door supported by said hinge may be moved in any direction to facilitate the hanging of the door.

CARL A. MAY.