Dec. 31, 1957 C. FERRY 2,817,871

HINGE

Filed July 18, 1955

FIG. 1

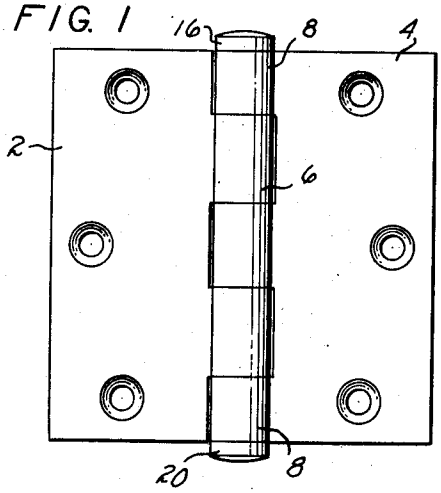


FIG. 3

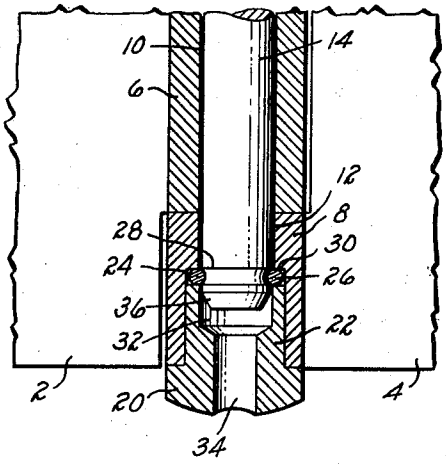
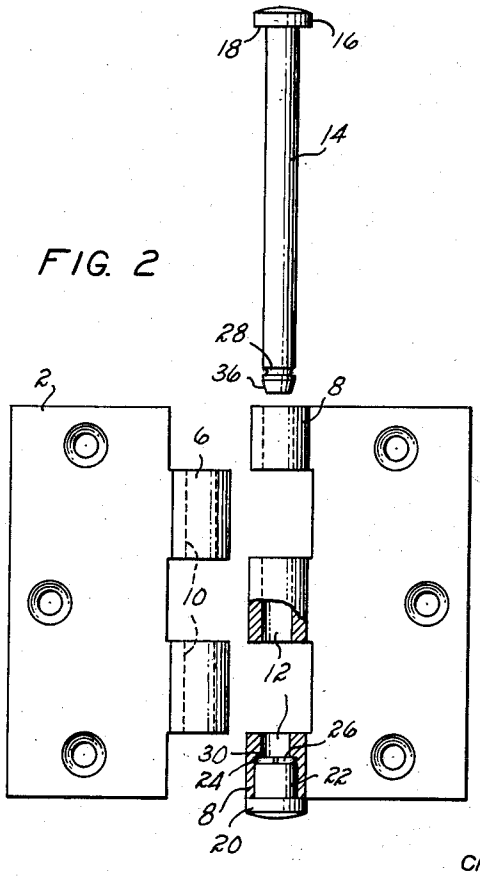


FIG. 2



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2,817,871

HINGE

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1 Claim. (Cl. 16—169)

This invention relates to improvements in hinges of the type having a pair of leaves with interfitting knuckles and a removable pin extending through the knuckles for pivotally connecting the leaves together. The invention is directed, more particularly, to a novel arrangement for retaining the pin in assembled position in the hinge to prevent the pin from rising during normal operation of the hinge, yet permitting disassembly of the hinge when desired.

The objects of the invention are to provide a hinge having means which is highly effective for preventing the pin from rising or working out of the knuckles during normal operation of the hinge and yet which permits easy assembly and disassembly of the hinge, which is simple and inexpensive to make, which reduces friction in the operation of the hinge, and which is highly resistant to wear and hence will be fully effective for the life of the hinge.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth and the scope of the application of which will be indicated in the appended claim.

In the drawing:

Figure 1 is a front face view of an open hinge constructed in accordance with the invention;

Figure 2 is a view of the hinge in exploded or disassembled condition and with one of the leaves partly sectionalized to show the detail of the knuckles; and

Figure 3 is an enlarged fragmentary view partly in section of a portion of the structure shown in Figure 1.

Referring to the drawing, the hinge has two leaves **2**, **4** formed of sheet metal and respectively provided with interfitting rolled knuckles **6**, **8** having aligned bores **10**, **12**.

The hinge pin includes an elongate shank **14** adapted to be inserted into the bores of the knuckles and an enlarged head **16** having a flat underside **18** adapted to engage the outer edge of the uppermost knuckle in the hinge. The bottom of the lowermost knuckle **8** is closed by an ornamental tip having an enlarged head **20** engageable with the bottom edge of the knuckle and a stem **2** adapted to be pressed or otherwise permanently secured in the knuckle.

In accordance with the invention, the bottom knuckle is formed with an enlarged counterbore **30** to receive the stem **22** of the tip which is made somewhat larger in diameter than the bore **12** of the bottom knuckle, and which is slightly shorter than the counterbore **30** so that, when the tip is firmly seated in position, the inner end of the counterbore is spaced from the inner end of the tip stem and forms therebetween a pocket **24**. Prior to the insertion of the tip into the bottom knuckle, a split ring **26** is dropped into the counterbore **30** and is thus retained in the pocket **24** when the tip is inserted. The split ring **26** is adapted to engage a circumferential groove **28** formed in the lower end of the pin and thus act as the retaining

means for preventing the pin from rising or working up in the knuckles during use of the hinge.

The spring ring **26** is dimensioned so that in its normal or unflexed position its outer diameter is slightly smaller than the outer diameter of counterbore **30**, and its inner diameter is approximately the diameter of the notch **28** in the pin. The ring is made of a resilient yet relatively hard material which permits insertion and withdrawal of the pin therefrom many times with minimum wear. One such material which has been found to be highly satisfactory is music wire. To facilitate flexing of the ring as well as permit its rotation in groove **24**, the cross sectional diameter of the ring is made slightly less than the height of the pocket **24**.

The bottom end of the pin is slightly beveled as at **36** to facilitate easy camming thereof through the ring, and thus the pin may be snapped into place with moderate force while being securely retained against rising out of the knuckles when once installed. As a result of this construction, it is noticeably easier to insert the pin than it is to remove it. Engagement of the ring in notch **28** makes a pronounced snap or click providing a sure audible indication that the pin is fully inserted and in place.

The tip stem **22** is formed with an axial cavity **32** at its inner end for accommodating the bottom end of the pin when the pin is inserted fully into place, and the tip preferably has an axial bore **34** through which a tool may be inserted to facilitate lifting the pin up out of the ring. With this arrangement the tip and bottom knuckle of the hinge may be formed as described with a minimum of operations additional to those normally required to form the hinge, and thus the anti-rising arrangement described adds little to the cost of the hinge. When fully inserted, the pin is in effect supported by the ring **26** against substantial axial movement, and yet there is a slight axial movement possible providing some floating action and facilitating operation of the hinge with minimum friction. Also, the use of this retaining means does not prevent the pin from turning which has a tendency to even out the wear.

Thus it may be seen that the improved hinge pin retaining arrangement above described effectively prevents rising of the pin yet is inexpensive to manufacture, facilitates hinge operation with minimum friction, and is highly resistant to wear.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope hereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claim is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim:

In a hinge of the type including a pair of leaves provided with a plurality of interfitting knuckles with the top and bottom knuckles of the hinge carried by one of said leaves, said knuckles having aligned pin-receiving bores, and a removable pin engaged in said bores and journaled in the bores of said top and bottom knuckles, a tip for closing the bottom of the bottom knuckle bore having a head engaged with the bottom edge of the bottom knuckle and a cylindrical stem larger in diameter than said knuckle bores, said bottom knuckle having a counterbore at its lower end forming a shoulder therein, the tip stem being permanently secured in the counterbore and being of such a depth that the tip is spaced from said shoulder and forms therewith an internal annular pocket in the bottom

knuckle between the tip and the bottom of the bottom knuckle bore, a spring retained in the pocket between said shoulder and the inner end of the tip, said spring extending about the pin and being dimensioned so that in unflexed condition there is a clearance between the outer edge of the spring and the counterbore permitting the spring to be flexed outwardly and the spring extends into the bore for engagement by the pin, said pin having an external annular groove adjacent the lower end thereof into which said spring is adapted to snap when the pin is fully inserted into said knuckles, and a tapered portion on the lower end of said pin engageable with the spring and facilitating insertion of the pin therethrough, said tip being formed with an axial cavity in its inner end for accommodating the lower end of the pin.

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