April 18, 1950 E. A. RING 2,504,351

FRICTION-CONTROLLED HINGE

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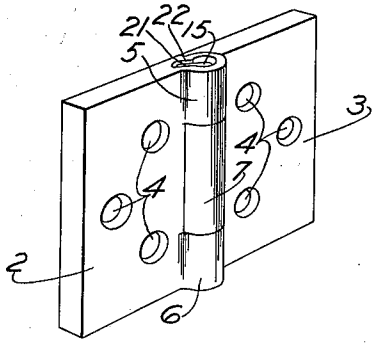


Fig. 1.

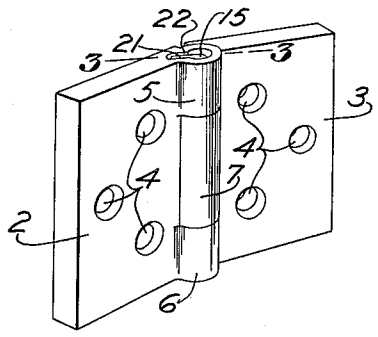


Fig. 2.

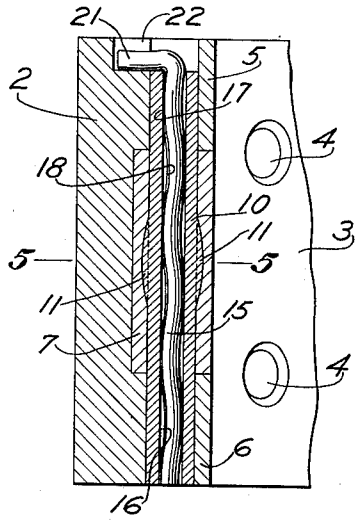


Fig. 3.

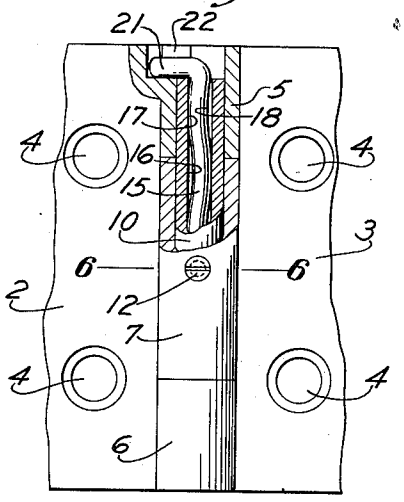


Fig. 4.

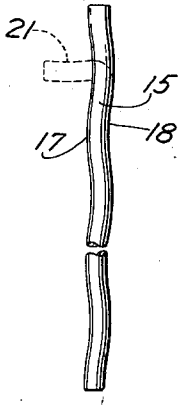


Fig. 7.

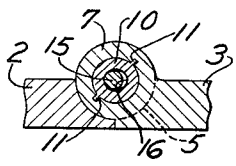


Fig. 5.

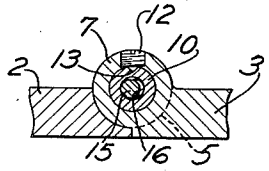


Fig. 6.

Inventor:
Ernest A. Ring
By Pennington & Pennington
Attorneys.

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FRICTION-CONTROLLED HINGE

Ernest A. Ring, Providence, R. I., assignor of one-half to Francis M. Blakeney, Cranston, R. I.

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3 Claims. (Cl. 16—142)

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This invention relates to improvements in hinges adapted for various uses in pivotally connecting two parts or objects to swing relatively to each other about a central axis.

One object of the invention is to provide a hinge of general use having means for frictionally resisting the swinging movement between the parts connected thereby to yieldingly maintain them in relatively fixed position.

Another object is to provide a hinge of the type indicated having its two connected members pivoted to swing about an axial pivot-pin acting to exert frictional resistance to their pivotal movement.

Another object is to provide a hinge of the type indicated in which the connected hinge-leaves or other parts are pivoted to swing about a hinge-pin of undulating or wavy contour and of resilient nature for applying frictional resistance to the turning movement of the parts.

Further objects of the improvement are set forth in the following specification which describes one form of construction of a hinge having the present improvements applied to use therewith as illustrated by the accompanying drawing. In the drawing:

Fig. 1 is a perspective view of a common type of butt-hinge embodying the improvements of the present invention;

Fig. 2 is a similar view showing a slight modification in the form of the holding means for the bushing about which the leaves of the spring pivot;

Fig. 3 is an enlarged, sectional detailed view of a portion of the hinge-joint taken on line 3—3 of Fig. 2;

Fig. 4 is a fragmentary view of the hinge members part-sectional through the axis of the pivoting means;

Fig. 5 is a transverse sectional view on line 5—5 of Fig. 3 showing the splines on the bushing for holding it from turning in the boss of one of the hinge-leaves;

Fig. 6 is a similar transverse sectional view taken on line 6—6 of Fig. 4 and illustrating an alternative method of locking the bushing in the boss on one of the hinge-leaves; and

Fig. 7 is a view of the resilient friction-applying hinge-pin of the device, the dotted lines indicating the manner in which one end of the hinge-pin is bent at right-angles to form a prong for keying the pin to prevent it from turning relatively to one of the hinge-members.

The present improved hinge is susceptible of various uses, such as for hanging doors, hinging

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covers to boxes and chest, mounting the doors of cabinets and other furniture, and generally for connecting the foldable part of various objects such as spectacle frames or the like.

In the accompanying drawing, the present improvements are shown by way of illustration as applied to a common type of butt-hinge such as used for hanging doors in buildings, lids on boxes, and mounting other parts in furniture manufacture. In other instances, the improvements may be incorporated in the hinged joints of folding parts of various articles without the use of butts or other attaching means.

Referring to the drawing, Fig. 1 is a perspective view of a butt-hinge comprising two opposed leaves 2 and 3 provided with chamfered screw-holes 4 for attaching one leaf to a door and the other to a jamb or for a similar use on the lids of boxes and the like. The leaf 2 is formed at the top and bottom with integral cylindrical bosses 5 and 6, while the opposite leaf 3 has a single central boss 7. The boss 7 is of a length equal to the combined length of the two bosses 5 and 6 and is interleaved therewith with the bores of the several bosses in axial alinement. Referring to Fig. 3, a tubular sleeve or bushing 10 is inserted through the bores of the several bosses 5, 6 and 7 and means provided for fixedly holding it from turning in the boss 7 so that the bosses 5 and 6 on the leaf 2 will pivot about its axis. As shown in Fig. 3, the bushing 10 is provided with a pair of relatively thin radially-projecting splines 11 adapted to engage in grooves in the bore of the boss 7 on the leaf 3. This form of construction is particularly adapted for use when the parts of the hinge are constructed of plastic since the bushing may be driven through the bore in the boss 7 to cause the splines to form their own grooves on the interior thereof. In other instances when the parts are constructed of metal the bushing 10 may be held from turning in the bore of the boss 7 by means of a set-screw 12 having a pointed end 13 perforating the periphery of the bushing. In either case the bushing 10 is held fixedly in the boss 7 of the leaf 3 with the bosses 5 and 6 on the leaf 2 rotatable thereon.

To control the relative rotative swinging movement between the two parts of the hinge I provide a hinge-pin 15 of spring metal having an undulating surface arranged to frictionally press against the sides of the bore 16 in the bushing 10. As shown in Fig. 7, the hinge-pin 15 may be constructed from round wire, such as hardened steel having a spring temper, and shaped to an undu-

lating or wavy contour throughout substantially its full length. The wire for the hinge-pin 15 may be bent or formed with an undulatory contour along its length comprising alternating convex sections 17 and concave portions 18 on its opposite sides by shaping it in dies or with a bending tool before it is hardened to a spring temper. The transverse dimension between the opposite convex sides of the wire or pin 15 is slightly greater than the diameter of the bore 16 in the bushing 10 so that when the pin is forced through the bore it will exert a resilient pressure on the sides of the bore to apply frictional resistance to the turning of the bushing about the pin; or vice versa, the turning of the pin in the bushing.

The hinge-pin 15 may be fixedly held to the leaf 2 of the hinge to adapt the bushing 10, fast in the other leaf 3, to rotate thereon by means of a laterally-projecting prong 21 bent at right-angles from its end as represented by dotted lines in Fig. 7. The lateral prong 21 of the pin 15 is engaged in a slot 22 in the upper end of the boss 5 on the leaf 2 as shown in Figs. 3 and 4. With this form of construction the leaf 2 may be considered the stationary element of the hinge with the leaf 3 mounted to swing with respect thereto as the bushing 10 keyed thereto turns about the pin 15. On the other hand, if desired, the leaf 3 may be secured in fixed relationship and the leaf 2 permitted to pivot with respect thereto with the pin 15 turning in the bushing 10. In either case the resilient nature of the undulatory eccentric portions 17 of the pin 15 act to exert a lateral thrust against the sides of the bore in the bushing 10 to apply frictional resistance to the relative turning movement of the parts. The amount of such resistance may be regulated by forming the pin 15 with its undulating portions of greater or lesser eccentricity with respect to the axis of the bore 16 of the bushing 10 so that varying degrees of resistance may be secured in accordance with the requirements in different types of mountings. When the improvements are applied to door-hinges the frictional resistance to the turning movement of the hinge-leaves may be just sufficient to hold the door in either open or closed relationship and, likewise, when used for the lids of chests, the doors of cabinets or the like, sufficient friction may be applied to hold the lid raised or the door open without the use of other sustaining means. In small articles such as foldable spectacle-frames, only slight resistance to the turning of the folding parts is required and this may be accomplished by using a spring-pin made from wire of relatively small diameter with its undulations or offset lobes of relatively slight eccentricity with respect to the axis of the hinge.

It will be observed from the foregoing description that the present improvements provide an extremely simple construction of frictionally-controlled hinge for connecting various parts or objects with its parts economical to manufacture and durable in use over long periods of time. The spring-pin for connecting the parts may be made of material suitable to resist deformation and deterioration and when employed in combination with a bushing of different material it will operate practically without requiring lubrication.

The present means for keying the hinge-pin to one of the parts of the hinge consisting in the bent prong 21 provides a simple form of construction, but other means may be employed for the same purpose. It is also to be understood that while the present improved hinge is herein shown and described in a particular form of construction, variations may be made in the shape and arrangement of its parts without departing from the spirit or scope of the invention. Therefore, without limiting myself in this respect, I claim:

1. In a hinge of the type indicated, a pair of members having bosses bored to receive an axial bushing extending therethrough, means for fixedly holding the bushing from turning in one of the bosses, a spring-pin having an undulating contour extending throughout its length with eccentrically-offset lobes adapted to bear frictionally against the sides of the bore in the bushing, and means at the end of the pin engaging a slot in one of the hinge-members to prevent the pin from turning with respect thereto.

2. An improved hinge comprising a pair of opposite members having bosses with aligning bores, a bushing extending axially through the bores in the bosses and formed with splines along its sides engaging grooves in the bores of one of said members to hold it from turning therein, and a pin formed with an undulating contour extending substantially throughout its length to provide convex portions offset eccentrically from its longitudinal axis, and means for holding the pin from turning with respect to one of the hinge-members to effect relative rotation between the pin and the bushing, said pin being tempered to adapt its offset portions to bear against the sides of the bore in the bushing to exert frictional resistance to the relative turning movement between the hinge-members.

3. In a hinge of the type indicated, a pair of members having portions formed with axially-alined bores, a bushing extending through the bores in both members, means for fixedly securing the bushing from turning in the bore of one member, a spring-pin having an undulating contour extending throughout its length with eccentrically-offset lobes frictionally engaging against the sides of the bore in the bushing, and means for securing the pin to one of said hinge-members to prevent it from turning relatively thereto.

ERNEST A. RING.

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