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2,497,266

HINGE

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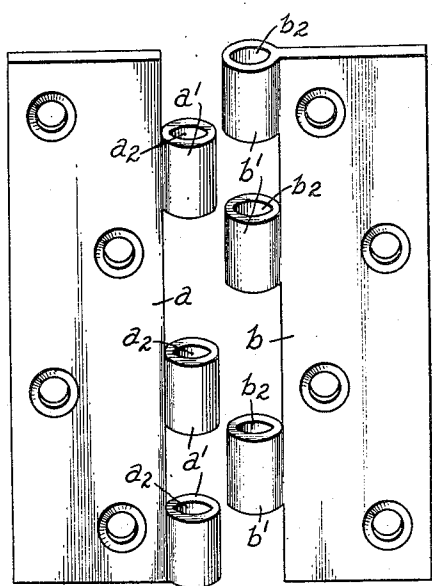


Fig. 1

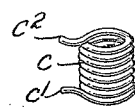


Fig. 2



Fig. 3

Fig. 4

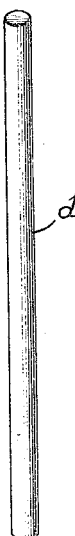
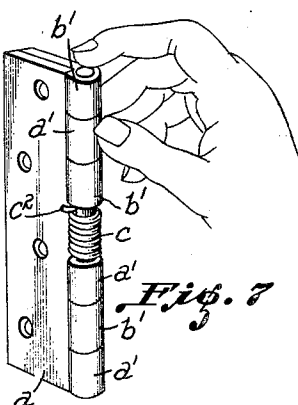


Fig. 7

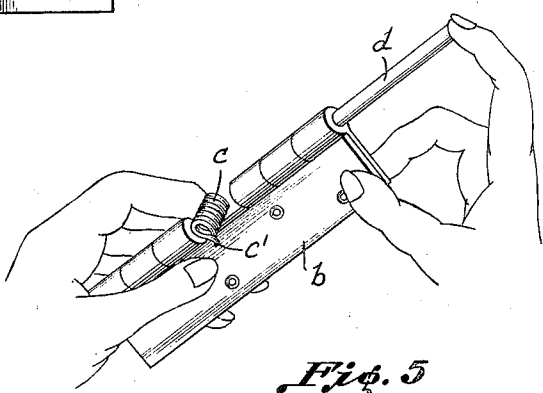


Fig. 5

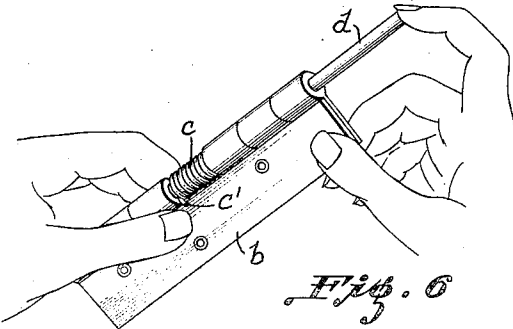


Fig. 6

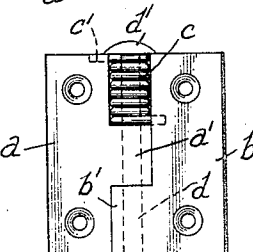


Fig. 8

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HINGE

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This invention relates to hinges and has reference to spring hinges for use on doors and the like to render such doors and the like self-closing.

The object of the present invention is to provide a hinge of this general character which can be economically produced and the parts of which can be assembled and disassembled without the aid of any special tools.

Thus a door fitted with such hinges will be self-closing and moreover can be readily removed and replaced.

A hinge according to the invention consists of a pair of hinge plates each having hinge-pin-receiving lugs inter-engaging coaxially with hinge-pin-receiving lugs on the co-operating plate, said lugs being so positioned as on assembly to leave a space between the two plates, a torsion spring accommodated in the space and said spring having lateral extensions at its ends engaging the faces of the plates and a hinge pin adapted to be passed through aligned holes in the lugs and the spring to effect the union of the parts and to centralise the spring and put it in stress, tending, to pivot the hinge plates together and maintain the same under tension, to maintain the spring under tension developed by the stress against the lateral extensions at its ends, and to maintain the hinge pin under torque by virtue of the tendency of the opposing ends of the spring under stress to move angularly about an axis transverse to its normal longitudinal central axis, respectively the tension on the plates and the spring, and the torque on the hinge pin being increased as the hinge structure is actuated during door opening operations.

In its preferred form the invention consists of a spring door hinge comprising a pair of hinge plates, hinge lugs extending from each hinge plate, the lugs of one plate interengaging with the lugs of the other plate and being so positioned as to leave a space between them and the hinge plates, on assembly, a hinge pin adapted to be passed through aligned holes in the lugs of the hinge plates and a torsion spring having lateral extensions at each end for engagement with the hinge plates adapted to be located in the space between the hinge plate lugs, the arrangement being such that the passing of the hinge pin through the aligned holes in the hinge plate lugs and the spring operates to effect the union of the parts and to centralise the spring and put it in stress tending to pivot the hinge plates into contiguous parallelism.

In the accompanying drawings I have illus-

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trated this preferred form, Figure 1 being a face view showing the hinge plates separated;

Figures 2 and 3 being elevational and end views respectively of the torsion spring;

Figure 4 is an elevational view of the hinge pin;

Figures 5 and 6 are perspective views illustrating the method of assembly of the parts;

Figure 7 is a perspective view of the complete hinge; and

Figure 8 is a view showing a modified form of hinge the hinge plates being for convenience shown opened out against the influence of the spring.

Referring to these drawings and particularly to Figures 1 to 7, the letters *a* and *b* designate the hinge plates which are formed with lugs *a1* and *b1* which are provided with holes *a2* and *b2* to take a hinge pin *d* in the ordinary way. The letter *c* designates a torsion spring which consists of a closely wound spiral of steel or like material and the ends of this spring are extended laterally as indicated at *c1* and *c2*, the extension *c1* at one end of the spring being displaced circumferentially with respect to the other end as shown in Figure 3 the lateral distance between ends *c1* and *c2* as shown in Figs. 3 and 5 being less than the combined thicknesses of the hinge plates when placed side by side with their lugs in alignment. By varying the extent of this circumferential displacement the degree of torsion into which the spring is placed on assembly of the parts can be varied.

The hinge is assembled by interengaging the lugs *a1* of the hinge plate *a* with the lugs *b1* of the hinge plate *b* so as to bring the holes in all the lugs into alignment. The hinge pin *d* is then passed through the lugs at one end of the hinge and the spring *c* located in the central space between the lugs, as shown by Figure 5, with the extension *c1* at one end in abutment against the face of one of the hinge plates. The end of the hinge pin is then entered into the other end *c2* of the spring and forced through it and through the remaining lugs of the hinge plates, as shown by Figure 6 and the parts are assembled into the finished hinge shown in Figure 7, all the parts being united together and the spring *c* put in stress as the pin passes through the coaxial bores of the lugs and spring, the coils of the spring are placed in tension due to the stress against the ends *c1* and *c2*, causing a decrease in diameter of the coils and the development of a torque against that part of the hinge pin within the bore of the spring, by virtue of the tendency of the spring as it is brought under stress to move

angularly about an axis transverse to its longitudinal central axis. It will be found that the parts are all firmly held against accidental displacement but can be readily disassembled by the simple action of forcing the hinge pin a short distance out from one end and then withdrawing it.

Thus, assuming the hinge is applied to a door and it is required to remove the door—during furniture shifting operations, for example—all that has to be done is to close the door and remove the hinge pins from the hinges. Conversely the door can be readily replaced by reassembly in the manner hereinbefore described.

An alternative arrangement, suitable for small houses, is shown in Figure 8. In this case the hinge plates *a* and *b* each have only one lug *a1* and *b1* and a space at the end of the hinge is left for accommodating the torsion spring *c*. The method of assembly is substantially the same as hereinbefore described. That is to say, the two hinge plates *a* and *b* are brought together with their lugs *a1* and *b1* in alignment; the spring *c* is arranged in the space provided for it and the hinge pin *d* pushed through the spring and the co-operating lugs.

In this arrangement it will, however, be desirable to provide the hinge pin *d* with a head *d1* to maintain the spring in position.

Obviously, the number of lugs employed may be varied at will and a second spring provided at the other end of the hinge.

In a long hinge this may prove desirable and when springs are provided at both ends the hinge pin can be divided into two parts, one of which will be introduced at one end and the other at the other end, the inner ends of the two parts meeting, or substantially meeting, in one of the lugs.

I claim:

1. In a hinge structure comprising a pair of hinge plates co-assemblable with respective edges thereof in adjacent parallelism, each of said plates having a set of tubular lugs spaced lengthwise along its said edge and the bores in each set of such tubular lugs being coaxial to constitute hinge-pin-receiving openings, the axial dimensions and spacings of the lugs in each set being such as to provide a space along the edges of the plate when the sets of lugs are coaxially assembled, the combination with a tubular torsion spring accommodatable in said space with its bore in coaxial alignment with those of the lugs and a cylindrical hinge pin adapted to be passed through the coaxial bores of the sets of lugs and of the spring when the plates are coassembled, said torsion spring having projections at its free ends; said projections being laterally spaced relative to the longitudinal axis of the spring and from each other a distance less than the combined thickness of said coassembled hinge plates; said hinge pin, when passed through the bores of said lugs and said spring, serving to align the spring coaxially with the lugs; and to spread the respective projections of the spring laterally; and reduce the diameter thereof, whereby to maintain the hinge structure with the plates under pressure, the spring under tension, and the portions of hinge pin passing through the bore of the spring under torque at all times; the same respectively being increased as the plates are spread apart.

2. A hinge structure comprising a pair of hinge plates of identical formation, each having a pair of spaced tubular lugs at one end, and a single tubular lug adjacent the other end, said hinge plates being positioned so that when arranged in reverse relation the single lug of one plate engages in the space between the pair of lugs on the other plate, and a space is provided centrally of the hinge structure between the innermost of the lugs of the plates thereof, a tubular coil spring having at its free ends projections laterally spaced from each other a distance less than the combined thickness of said hinge plates when in adjacency, a hinge pin of diameter less than that of the lugs and spring adapted to be passed through the lugs and the spring for aligning the spring coaxially with the lugs, and spreading the respective projections of the spring laterally to grip the edge of the plates and reducing the diameter of the coils thereof whereby to interlock the elements of the hinge structure and maintain the same; with the plates at all times under pressure; the spring at all times under tension, and the portions of the hinge pin passing through the bore of the spring at all times under torque; all of which are respectively increased as the plates are spread apart.

3. In a hinge structure comprising a pair of hinge plates co-assemblable with respective edges thereof in adjacent parallelism; each of said plates having a set of tubular lugs spaced lengthwise along its said edge and the bores in each set of such tubular lugs being coaxial to constitute hinge-pin-receiving openings, the axial dimensions and spacings of the lugs in each set being such to provide a central space along the edges of the plate when the sets of lugs are coaxially assembled; the combination with a tubular torsion spring accommodatable in said central space with its bore in coaxial alignment with those of the lugs and a cylindrical hinge pin adapted to be passed through the coaxial bores of the sets of lugs and of the spring when the plates are coassembled; said torsion spring having projections at its free ends; said projections being laterally spaced relative to the longitudinal axis of the spring and from each other a distance less than the combined thickness of said coassembled hinge plates; said hinge pin, when passed through the bores of said lugs and said spring, serving to align the spring coaxially with the lugs; and to spread the respective projections of the spring laterally; and reduce the diameter thereof, whereby to maintain the hinge structure with the plates under pressure; the spring under tension, and the portions of hinge pin passing through the bore of the spring under torque at all times; the same respectively being increased as the plates are spread apart.

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