United States Patent [19]

Weisz et al.

[11] **3,714,678**

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[54] **BALL HINGES**

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[52] **U.S. Cl.**.....**16/128 R**, 16/171, 287/21, 287/89

[51] **Int. Cl.**.....**E05d 1/06**

[58] **Field of Search**....16/171, 172, 128; 287/21, 88, 287/89, 90; 285/381

[56] **References Cited**

UNITED STATES PATENTS

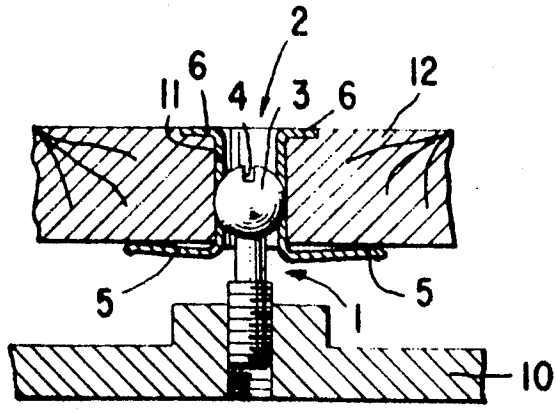
2,242,021	5/1941	Ball	287/89
1,265,445	5/1918	Hagen	287/90
3,282,170	11/1966	Thompson	287/21
3,476,466	11/1969	Hopkins	16/128
2,677,853	5/1954	Ross	16/171 X
3,056,475	10/1962	Benham	49/381 X

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[57] **ABSTRACT**

A ball hinge device characterized by its economical construction in that a ball head screw is used in conjunction with a bracket which may be formed of sheet metal or of non-metallic resilient material which depends for its strength and support on the close fit between it and a slot machined into a supporting panel. A construction is taught in which the hinge may be attached to the supporting panel without the use of additional hardware.

3 Claims, 7 Drawing Figures



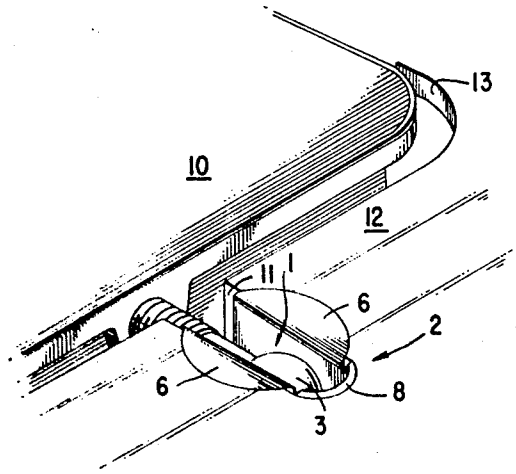


Fig. 2

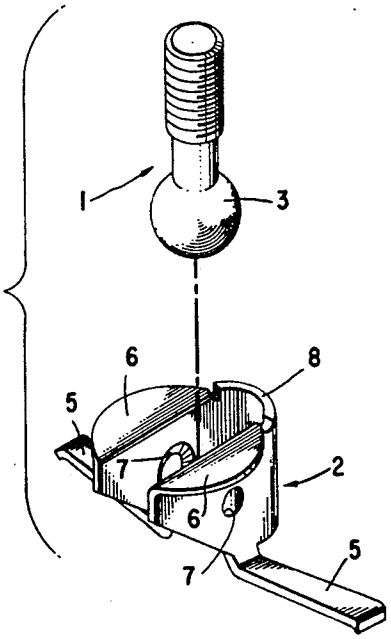


Fig. 1

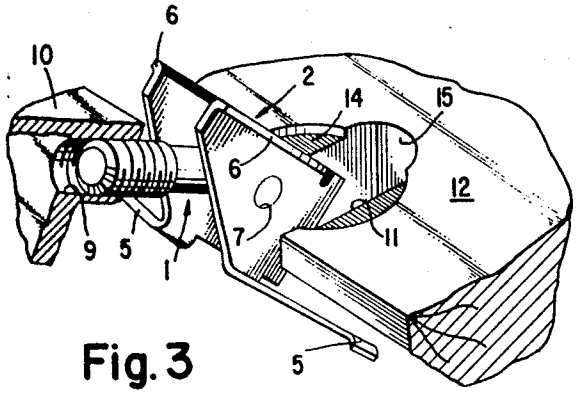


Fig. 3

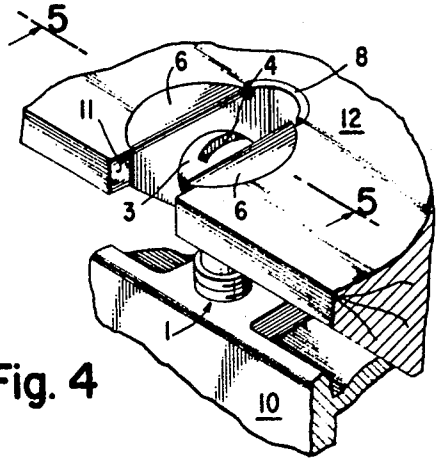


Fig. 4

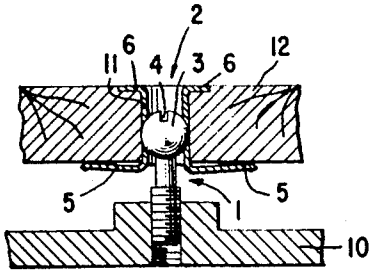


Fig. 5

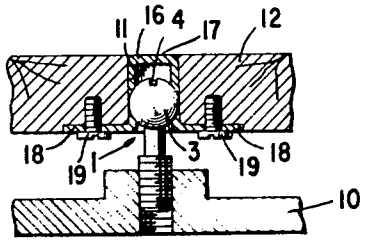


Fig. 6

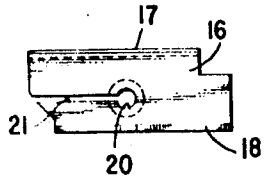


Fig. 7

WITNESS:

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BALL HINGES

SUMMARY OF THE INVENTION

This invention relates to ball hinges for use in sewing machine cabinets or other wood furniture using wood panels of thickness at least equivalent to that of the hinge ball.

Heretofore ball hinges have required the use of relatively large blocks to form the socket for the ball and to permit attachments to be made to the supporting panel. Generally two or more pieces were required to make the socket with additional pieces required to enable attachment to a supporting panel. This type of construction has made the ball hinge relatively expensive to use, difficult to install and somewhat bulky.

Accordingly it is an object of this invention to provide a ball hinge of simple and economical construction.

It is a further object of this invention to provide a ball hinge which may be easily assembled and installed into an article of furniture.

It is a still further object of this invention to provide a ball hinge which will obtain considerable strength and support from the supporting panel in which it is installed.

This and other objects of the invention will become apparent from the following description with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded isometric showing the individual elements of a hinge constructed in accordance with this invention,

FIG. 2 is an isometric view of the assembled hinge of FIG. 1 attached to a sewing machine and installed in a sewing machine cabinet,

FIG. 3 is a perspective view of the assembled hinge attached to the sewing machine as it is being installed in the sewing machine cabinet,

FIG. 4 is a perspective view of the assembled and installed hinge, showing the sewing machine in the stored position,

FIG. 5 is a vertical cross sectional view taken through the centerline of the ball headed stud substantially along the line 5—5 of FIG. 4 showing how the bracket is retained in the cabinet and indicating how the ball is retained in the bracket,

FIG. 6 is a cross sectional view similar to FIG. 5 of a modified form of construction which closes off the slot in the table top,

FIG. 7 is a side view of the bracket of the hinge shown in FIG. 6 showing a lead-in slot for the ball head of the ball headed screw.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Although a specific use of the invention has been described and illustrated in the drawings, this description and illustration is not intended to limit the scope of the invention which is defined in the appended claims.

Referring to FIG. 1, it may be seen that the hinge is made up of a spherical or ball headed screw 1, forming one leaf of the hinge and a hinge bracket 2, forming the other leaf of the hinge. More apparent in FIGS. 4 and 5 the ball head 3 of the screw 1 has a slot 4 for

screwdriver control of the depth to which the screw 1 is inserted in a suitable tapped hole. The hinged bracket 2 is formed from sheet metal stock or from suitable non-metallic resilient material with leaf spring ears 5 and retaining ears 6 located on opposing sides of parti-spherical sockets 7 punched, coined, or molded into the bracket material. The parti-spherical sockets 7 are placed opposite each other by the U-bend 8 in the bracket material at a spacing sufficient to contain the ball 3 of the ball headed screw 1 which may be inserted into the bracket, after forming, owing to the resiliency of the bracket material.

Referring to FIGS. 2 and 3, the ball headed screw is threaded into a suitably tapped hinge hole 9 in a sewing machine bed 10 with the hinge bracket 2 previously assembled to the ball head 3. There are two such hinge holes generally in the back of the sewing machine bed to support the sewing machine in a stored position in a sewing machine cabinet as shown in FIG. 4. The machine is most usually supported in a raised position by rotating the machine about the hinges until upright and preventing its return by a retractable stop (not shown) acting on the front of the sewing machine bed 10. To accommodate the hinge bracket 2 a hinge bracket slot 11 is cut into the top 12 of the sewing cabinet from the edge of the sewing machine accommodating opening 13. The width of the slot 11 is made sufficiently wide to constrain the hinge bracket 2 about the ball 3 and thereby prevent the removal of the ball from the socket 7 of the bracket. In this fashion the resilient bracket material obtains considerable strength and support from the cabinet into which it is inserted. A depression 14 is cut into the top 12 of the sewing table spaced from the U-shaped end of the slot 11 and is contoured to receive the retaining ears 6 of the hinge bracket 2 thereby locating the bracket in the slot so that the outer surface of the hinge bracket is supported by the cabinet. As can be seen in FIG. 5, the leaf spring ears 5 of the bracket pressing against the lower surface of the cabinet top 12 retains the retaining ears 6 securely in the depression 14 cut into the cabinet top 12 for that purpose.

The hinge bracket 2 is installed into the sewing machine table top by holding the sewing machine as shown in FIG. 3 slightly above the cabinet with the hinge bracket 2 canted to the top 12 of the sewing machine cabinet. The application of force to the sewing machine will cause the hinge bracket 2 to snap into position into the sewing machine cabinet. After the hinges are in position on the cabinet, the clearance between the sewing machine bed 10 and the sewing machine opening 13, in the cabinet may be adjusted by changing the depth to which the ball headed screw 1 is threaded into the hinge hole 9.

The hinge bracket 2 may be removed from the sewing machine cabinet top 12 by relieving the tension being applied by the leaf spring ears 5 on the retaining ears 6 of the bracket. This may be achieved by exerting a diagonal pull upwards on the sewing machine to counter the force exerted by the leaf spring ears 5 of the bracket while also exerting a component of force to remove the hinge bracket from the cabinet top 12.

A modified form of construction for the ball hinge is shown in FIGS. 6 and 7. In this construction, a hinge bracket 16 is formed with a slot cover 17 designed to

cover the slot cut for the hinge bracket into the top of the sewing machine cabinet **12** and thereby to present a smooth continuous cabinet top. Attachment is made to the cabinet top by forming the hinge bracket **16** with lower retaining ears **18** which are fastened to the bottom surface of the cabinet top **12** by the retaining screws **19**. To obtain proper support from the retaining screws **19** the hinge bracket **16** must be made of somewhat thicker material than was used in the hinge bracket **2** previously described. If required, an easier access path for the ball screw **1** to the socket **20** may be provided by a ball entering slit **21** which will not appreciably interfere with the operation of the ball hinge.

What is claimed is:

1. A hinge comprising in combination:

a. a ball having attachment means thereon providing one leaf of said hinge;

b. a bracket formed from a resilient material, said bracket having attachment means thereon and having portions opposite each other containing parti-spherical sockets for said ball, said bracket forming the other leaf of said hinge, said ball being received in said parti-spherical sockets; and

c. a supporting panel of a thickness substantially equivalent to the diameter of said ball, said panel having a slot in an edge thereof of a width substantially equivalent to that of said opposite portions of said bracket having said ball received in said parti-spherical sockets thereof, said slot embracing said bracket adjacent said parti-spherical sockets in said opposite portions of said bracket and constraining said ball in said bracket, said attachment means of said bracket retaining said bracket in said supporting panel.

2. A hinge as recited in claim **1** in which said attachment means of said bracket comprises a first and second pair of ears depending from said opposite portions containing said parti-spherical sockets and, said supporting panel contains depressions in the surface adjacent said slot, shaped to receive said first pair of ears, said second pair of ears of said bracket disposed on the opposite surface of said supporting panel whereby said first pair of ears is held in said depression in said supporting panel by said second pair of ears pressing against said opposite surface of said supporting panel.

3. A hinge as recited in claim **1** wherein said bracket is formed with a top section joining said opposite portions containing said parti-spherical sockets, said top section spaced from said sockets to form a continuous surface on said supporting panel covering said slot.

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