

Aug. 21, 1962

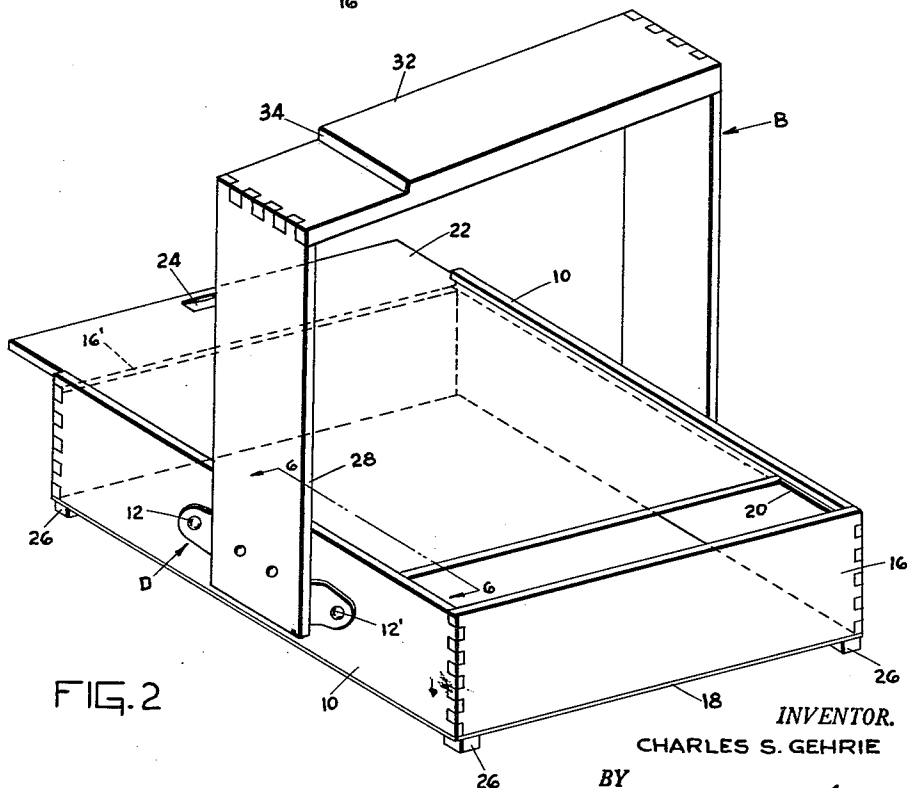
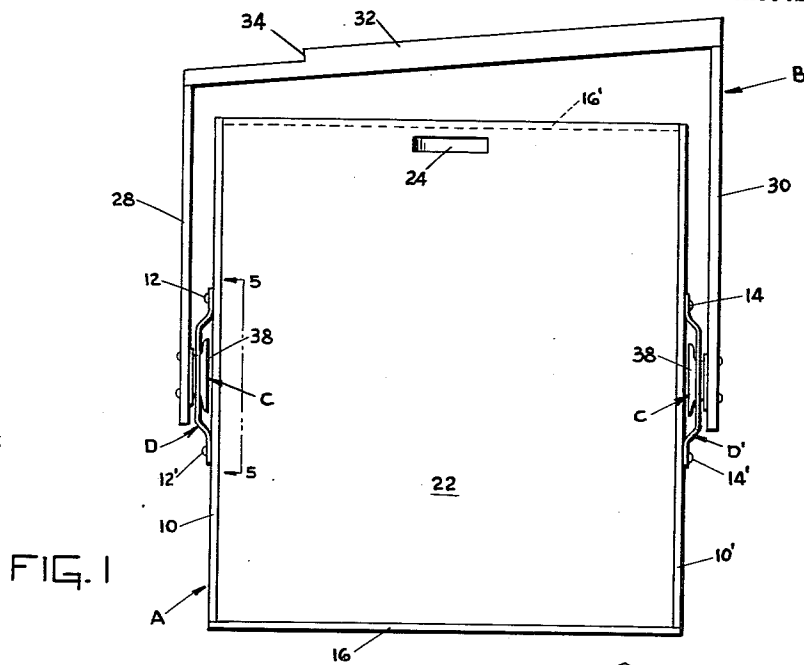
C. S. GEHRLE

3,049,748

HINGES

Filed April 19. 1960

2 Sheets-Sheet 1



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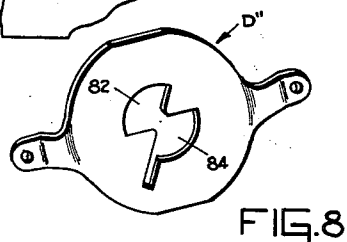
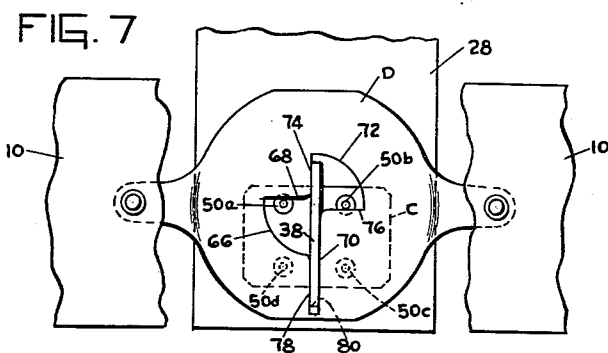
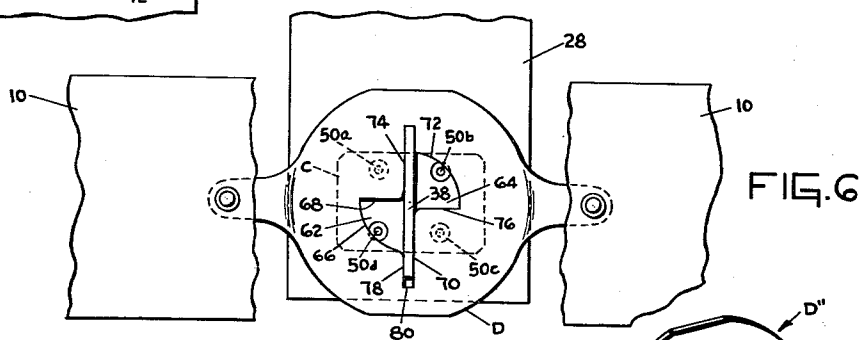
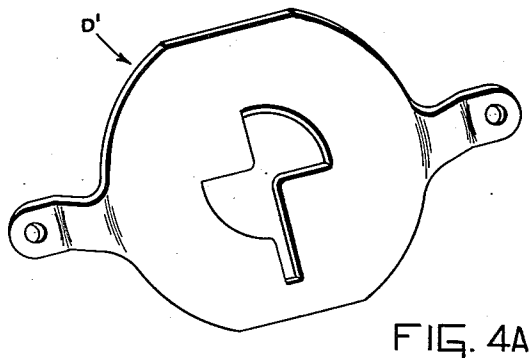
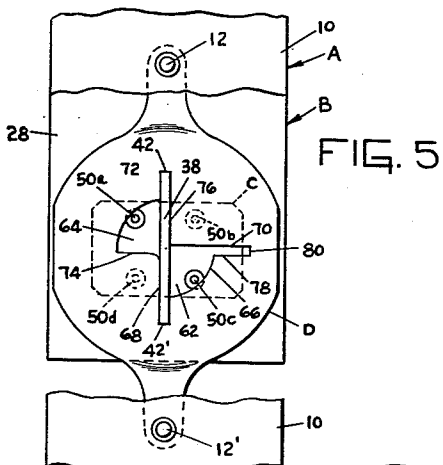
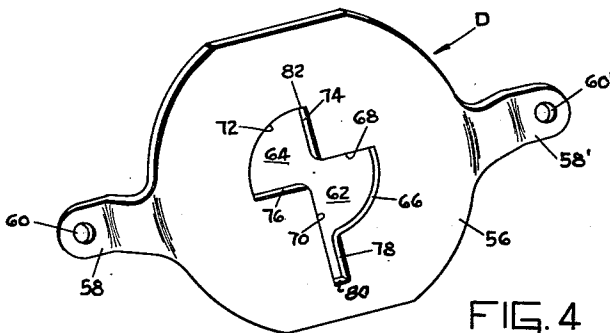
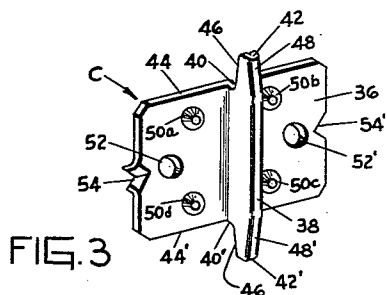
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3,049,748

HINGES

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2 Sheets-Sheet 2



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3,049,748
HINGES

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1 Claim. (Cl. 16-171)

The invention relates to hinges, and is more particularly directed to hinges of the type permitting relative movement in parallel planes of the parts to which the hinge members are secured.

An object of the invention is to provide a hinge assembly of simplified construction enabling relative movement in mutually parallel planes through a predetermined angle.

A further object of the invention is to provide a hinge consisting of only two hinge members which are formed for interconnection with one another for relative movement in mutually parallel planes through a predetermined angle, the hinge members also being provided with means for locking them together in predetermined angular relationship.

Still another object of the invention is to provide a hinge assembly of the type under consideration, wherein the means for locking them in predetermined angular relationship simply involves imparting a linear motion to one of the hinge members.

Still a further object of the invention is to provide a hinge possessing the foregoing characteristics, which is compactly constructed, thereby enabling the pivotal connection of parts in an area where space may be extremely limited.

Another object of the invention is to provide a hinge possessing the foregoing characteristics or functions which lends itself to economical manufacture, the hinge members being capable of manufacture by simply blanking, stamping and forming from metal strip, without necessitating any machining or assembly operations of the manufactured parts.

Still another object of the invention is to provide a hinge construction which, while adapted for use in connection with a wide variety of products, is particularly suitable for use in connection with a shoe-shining kit provided with means for also supporting a shoe-clad foot.

These, and other objects, advantages, and improved results of the invention will be apparent from the following detailed description, taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a side elevational view of a combined shoe-shining kit and foot support which includes a hinge made in accordance with the invention, this view showing the foot-supporting element in retracted position and serving as a handle for carrying the kit;

FIG. 2 is a perspective view of the unit shown in FIG. 1, the foot-supporting element thereof having been rotated relatively to the container portion of the unit for foot-supporting position;

FIG. 3 is a perspective view of one of the hinge members;

FIG. 4 is a perspective view of a hinge member adapted for cooperation with the hinge member of FIG. 3;

FIG. 4A is a view of a hinge member similar to the hinge member shown in FIG. 4, but of opposite hand, for assembly with the hinge member of FIG. 3 when a pair of hinge assemblies are used as for the shoe-shining kit and foot support of FIGS. 1 and 2;

FIG. 5 is a view taken approximately in the plane of line 5-5 of FIG. 1, the side wall of the container being partly broken away to show the relationship of the hinge members;

FIG. 6 is a view taken approximately in the plane of line 6-6 of FIG. 2, or after the hinge members have

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been rotated with respect to one another from the position shown in FIG. 5 and prior to locking of the hinge members;

FIG. 7 is a view similar to FIG. 6 showing the relationship of the hinge members when in locked position; and FIG. 8 is a view similar to FIG. 4 but showing a modified form of hinge member.

FIGS. 1 and 2 illustrate the hinge construction of the invention as applied to a combined shoe-shining kit and foot support. While the hinge construction of the invention is particularly applicable for an application of this kind, it will be understood that the hinge is suitable for use in connection with various other devices wherein it is desired that the connected parts possess relative rotation in mutually parallel planes through a limited or predetermined angle. Depending upon the particular application, a single or a pair of hinge assemblies may be used.

The combined shoe-shining kit and foot support, which also provides a carrying handle for the unit as shown in FIGS. 1 and 2, comprises a box or container, generally designated A, to which is connected the combined foot rest and container carrying means B by a pair of hinge assemblies made in accordance with the invention, designated C, D and C, D'.

The container A comprises a pair of side walls 10, 10' to which the hinge members D and D', respectively, are secured by fastening means 12, 12' and 14, 14', respectively. The fastening means may be rivets, screws or nails, and the container walls and the adjacent areas of the hinge members may be counter-sunk for the usual flush type of connections. The container or box, which is open at the top, further includes the opposite side walls 16, 16' and a bottom wall 18. The side walls 10, 10' are each provided with a longitudinally extending groove or guideway 20 to receive a slidable top or closure panel 22. When in closed position, the closure panel 22 is seated against the side wall 16 and extends over the top edge of the opposite side wall 16', which is of slightly shorter height than the wall 16. A finger-gripping depression 24 is provided to facilitate sliding movement of the closure panel to uncover the contents of the box, or to permit moving the closure panel to box-closing position. If desired, a suitable latch may be provided to separably secure the closure panel in closed position. The box A is adapted for storing and transporting shoe-shine equipment such as brushes, pastes, polishing cloths, etc. The side walls, bottom wall, and closure panel of the box or container may be fabricated from any suitable material, such as wood or fiberboard. The side walls and bottom wall may be joined together by any suitable means such as dovetailing the edges, nailing or gluing. In order to prevent the container from slipping when placed upon a surface, and when the unit is used to support a shoe being shined, rubber or rubber-like rests 26 may be secured to the underside of the bottom wall 18 at each of its corners, as shown in FIG. 2.

The combined shoe or foot rest B, which is hingedly connected to the container A, is generally U-shaped in configuration and comprises a pair of leg members 28 and 30 connected at their outer ends by a cross member 32. The leg member 28 is made shorter than the leg member 30 to provide an incline or pitch from the horizontal. The cross member 32 is provided with a step 34 to catch the heel of a shoe to thereby assist in fixing the position of the shoe when the shoe is being shined.

In accordance with the preferred form for use of the invention, the transverse or cross member 32 is of a thickness and width so that this member may be easily gripped by the human hand for lifting and carrying the unit when the container and the foot support are oriented as shown in FIG. 1. Also, the width of the cross member 32 is preferably the same or slightly greater than the height

of the container A so that the closure panel 22 is blocked and cannot be more than slightly opened when the unit is oriented as shown in FIG. 1, or when the unit may be inadvertently turned upside down from such orientation.

Like the container A, the combined foot support and handle B may be fabricated of wood or fiberboard with the parts thereof secured together by dovetailing, nailing or gluing. A hinge bracket C is suitably fastened to the inner face of each of the leg members 28 and 30, the hinge brackets being interconnected to the respective hinge plates D and D' to enable relative rotation of the foot rest member B with respect to the container A from the position of the parts as shown in FIG. 1 to the positional relationship as shown in FIG. 2. As will be explained subsequently, the hinge assemblies also are constructed to permit locking the foot support with respect to the container in the position shown in FIG. 2.

Referring to FIG. 3, the hinge bracket C, which preferably is of the same construction for assembly with either hinge plate D or D', comprises a base portion 36 having a rib portion 38 which extends or projects transversely therefrom. Preferably, the hinge bracket is symmetrical in configuration, with the rib portion located centrally of the base portion and symmetrical from end to end or lengthwise thereof. While the hinge bracket may be formed by casting, it is preferred to make the part in a progressive die, blanking the same from metal strip, and bending and forming the same to configuration as shown.

The hinge bracket is formed to provide what may be termed root surfaces 40, 40', or surfaces adjoining the base portion which are laterally spaced from one another. The root surfaces are spaced apart a shorter distance than the distance between the rib's laterally spaced extremities 42, 42' so that, in effect, the root surfaces are undercut with respect to the ends of the rib portion. Preferably, and as shown, the root surfaces are located at the juncture of the rib portion with the side edges 44 and 44' of the base portion so that the rib portion extends beyond or overhangs the side edges of the base portion. Thus, the ends of the rib portion are transversely spaced from the top surface of the base portion 36 and extend laterally outward of the root surfaces 40 and 40'. Slopes or bevels 46, 46' are provided between the respective extremities and root surfaces of the rib portion; also, the top edge of the rib portion is provided with slightly downward slopes or bevels 48, 48' at the portions laterally of the root surfaces to provide narrowing sections of the rib portion in a plane perpendicular to the bracket's base in a direction extending towards the extremities of the rib. Such sloped contours facilitate easy and smooth engagement and disengagement of coating surfaces in an assembly of hinge bracket and hinge plate D, the structure of which will be described presently.

The hinge bracket C may be and preferably is provided with four protrusions or projections 50a, 50b, 50c, and 50d, two on each side of the rib portion, as shown in FIG. 3. Actually, only two projections are needed for an assembly of a bracket C with a hinge plate D or D'. The second pair of projections is provided so that the identically constructed hinge bracket may be used in conjunction with either the hinge plate D or hinge plate D', which are of opposite hand. As will subsequently appear, a pair of these projections bear against a hinge plate as the members are rotated relatively to one another to provide firm engagement between the coating hinge members. Preferably, the projections are simply struck up from the base portion 36, the projections extending on the same side of the bracket's base portion as the transversely extending rib portion.

To enable securing a hinge bracket C to a part, in this instance the leg members 28 and 30, the base portion 36 is provided with spaced apertures 52, 52', one on each side of the rib portion 38. The apertures permit passage of the shank of a rivet, screw or nail. Also, to assist in further securing the hinge bracket to a part, particularly

when such part is of wood or fiberboard, the base portion 32 may also be provided at its lateral edges with tangs 54, 54' which will dig into the wood or fiberboard to retain the hinge bracket in desired position.

As shown in FIG. 4, the hinge member or plate D, which in the embodiment of the invention illustrated is fastened to the side wall 10 of the container A and is interconnected to the hinge bracket C, comprises a base portion 56 having a pair of ears 58, 58' at opposite sides thereof, the ears being provided with apertures 60, 60', to enable fastening the hinge plate to the part to be hinged. The base portion 56 is offset from the end tabs or ears to provide a space on the inner side of the plate's base portion to allow movement of the hinge bracket's rib portion 38 when the hinge bracket C is interconnected with the hinge plate D. The offset of the base portion 56 with respect to the ears 58, 58' is sufficient to prevent the rib portion of the bracket C from rubbing on the side wall 10 of the container A when the parts are assembled, as shown in FIG. 1. Such offset obviates the necessity for providing spacing means or shim stock between the ears and the part to which the hinge plate is connected.

As shown in FIG. 4, the base portion 56 of the hinge plate D is provided with a pair of tip-adjoining, oppositely disposed, communicating cutout sectors 62 and 64 which, in the form of the invention here illustrated, are each sectors which circumscribe an arc of 90°. The cutout 62 is bounded or circumscribed by an outer arcuate edge or surface 66 and radial surfaces 68 and 70. The cutout 64 is bounded by an arcuate surface 72 and radial surfaces 74 and 76. Arcuate surfaces 66 and 72 are on essentially equal radii and have a common center. The radial surfaces 68 and 76 are generally parallel to one another, and similarly the radial surfaces 70 and 74 are generally parallel to one another. The radial surfaces 68 and 76 are offset from one another in an amount which is slightly greater than the thickness of the rib portion 38 of the hinge bracket C, and similarly, the parallel radial surfaces 70 and 74 are offset at a like distance. At least a small radius rather than a sharp corner should be provided at the junctures of the radial surfaces 68 and 74, and 70 and 76. The diametral distance between the arcuate surfaces 66 and 72 is slightly greater than the distance between the root surfaces 40 and 40' on the hinge bracket C; these root surfaces are intended to turn on and within these arcuate surfaces, and loose bearing engagement is desired between these surfaces. The distance between the rib's extremities 42 and 42' is, of course, greater than the diametral distance between the arcuate surfaces 66 and 72.

In accordance with the preferred embodiment of the invention, means is provided for locking the hinge members C and D to one another, such locking means being provided as an integral part of one of the hinge members. Preferably, the locking function is accomplished by providing a slot in communication with one of the arcuate cutouts in the hinge plate.

As shown in FIG. 4, the arcuate surface 66, rather than terminating on the radial surface 70, is provided with a continuing surface 78 which extends radially outward, thereby providing a surface or edge in the plate which is parallel to and spaced from the radial surface 70. The radial surfaces 70 and 78, which are joined by a laterally extending surface 80, are separated a distance which is slightly greater than the thickness of the rib portion 38. The radial surfaces 74 and 78 are in parallel and coplanar relationship. The radial surface 78 is somewhat shorter than the radial surfaces 68, 74, and 76. An essentially rectangular slot, bounded by the surfaces 70, 78, and 80 and open to the cutout 62, is provided to form a simple means for locking the hinge members C and D against rotation, as will be explained subsequently. The distance between the surface 80 and the juncture of the arcuate surface 72 with the radial surface 74, at 82, preferably is made slightly shorter than the length of the

rib portion 38, or the distance between its extremities 42 and 42'.

To assemble the hinge bracket C with the hinge plate D, the rib portion 38 is aligned with the rectangularly shaped slot and with the radial surface 74, and by tilting the hinge bracket or the hinge plate, and then returning the hinge members into parallelism, the rib portion may be captured on the inner side of the hinge plate's base portion 56. By linearly displacing the hinge bracket so that a root surface engages the juncture 82, the hinge members are now relatively rotatable with respect to one another through an arc equal to the arc circumscribed by each of the cutouts 62 and 64. The same is true of a hinge bracket with respect to the hinge plate D' shown in FIG. 4A, which is a mirror image of the hinge plate D.

To assemble the shoe-shining kit and combined foot rest and handle arrangement of FIGS. 1 and 2, the hinge plates D and D' may be secured to the side walls 10 and 10', respectively. A hinge bracket C is then interconnected to each of the hinge plates in the manner above described so that the rib portions 38 are captured on the inner sides of the hinge plates, between the hinge plates and the respective side walls of the container. The legs 28 and 30 of the U-shaped foot rest may then be secured to each of the hinge brackets C. This procedure may be reversed; the hinge brackets C may be secured to the leg members 28 and 30, the hinge plates D and D' interconnected with the hinge brackets, and finally the hinge plates may be fastened to the container side walls.

The operation of the hinge assembly of the invention will be apparent from FIGS. 5, 6, and 7, it being understood, of course, that the coaction of a hinge bracket with a hinge plate is the same for each hinge assembly C, D and C, D'. FIG. 5 shows the relationship of the hinge bracket and hinge plate when the foot support and carrying member B is positionally related to the container A, as shown in FIG. 1. The hinge bracket, and hence the part B to which it is secured, cannot be rotated in a clockwise direction in the viewing of the parts from the side shown in FIG. 5, because the rib portion 38 is confined against movement in such direction by the radial surface 76 on one side and the radial surface 68 on the other side of the rib portion. Relative movement can only take place in a direction wherein the rib portion 38 may move through the arc provided by the cutouts 62 and 64. Thus, when the container is placed so that the rests 26 thereof are set on the floor and the foot support and carrying member B is rotated to the position shown in FIG. 2, the hinge members assume the position shown in FIG. 6, the relative rotation of the parts being halted by the engagement of the rib portion with the radial surface 74 on one side and with the radial surface 70 on the other side. During such rotation, the root surfaces 40 and 40' are confined within the arcuate surfaces 66 and 72. The projections 50b and 50d bear against the hinge plate to assist in maintaining the hinge bracket and hinge plate in parallelism during their rotation from the position of FIG. 5 to the position of FIG. 6. The other two projections, 50a and 50c possess the described function when the identical bracket is assembled with hinge plate D'.

In order to lock the hinge members in the angular relationship shown in FIG. 6, and to secure the foot rest in the upright position shown in FIG. 2, linear motion is imparted to the foot rest member in a vertical plane, the foot rest being moved downwardly, causing the rib portion 38 to enter the slot confined by the surfaces 70, 78, and 80, as shown in FIG. 7. In such position, the hinge members cannot rotate relatively to one another, it being necessary to impart movement in an opposite linear direction in order to allow rotation of the parts. It will, of course, be understood that instead of imparting a downward movement to the hinge bracket with respect to the stationary hinge plate, the hinge bracket may be

held stationary and the hinge plate may be moved upwardly to effect the locking action.

While the invention has been described for an application in which it is desired that hinge members be rotated relatively to one another through an arc of 90°, it will, of course, be understood that the hinge members may be made to provide any predetermined angle of rotation less than 180°. FIG. 8, for example, shows a hinge plate D'' which is formed with cutouts 82 and 84 which will provide an arc of rotation of 120°, and has a locking slot for cooperation with the hinge bracket as described. A hinge employing a plate member D'' is suitable for use on hinged-top desks wherein the top is inclined from the horizontal for writing position, but may be turned up to a vertical position to provide access to the interior of the desk. Numerous other applications of the hinge of the invention will be apparent to those skilled in the art; such applications may involve a single hinge assembly or a pair of hinge assemblies as above described.

From the foregoing description of a preferred embodiment of the invention, it will be apparent that a simply constructed hinge consisting of only two parts or members has been provided. A third element, such as a separate pin, is unnecessary to pivotally connect the hinge members; also, added means to limit the relative rotation of the hinge members in parallel planes is unnecessary. The hinge assembly is compact, permitting its utilization in areas of limited space. The disclosed means for locking the hinge members against rotation is simply and inexpensively attained, and the manner in which locking of the hinge members is attained is easily and simply accomplished.

Although a preferred embodiment of the invention has been described, it will be understood that various modifications and changes may be made without departing from the spirit and scope of the invention as sought to be defined in the following claim.

I claim:

A hinge comprising a pair of cooperable hinge members constructed for relative rotation in parallel planes through a limited angle, one of the hinge members comprising a base portion and a rib portion integral with the base portion and extending transversely thereof, said rib portion being undercut with respect to the lateral ends thereof to provide laterally spaced root surfaces adjoining the base portion, a pair of projections on the base portion, one on each side of the rib portion for contact with the second hinge member, the second hinge member comprising a base portion provided with a pair of oppositely disposed, tip-adjoining, communicating cutout sectors each bounded by an arcuate surface and a pair of spaced, substantially radially extending surfaces, the included angles of the cutout sectors being the same and less than 180° the diametral distance between the arcuate surfaces being slightly greater than the distance between said laterally spaced root surfaces, the substantially radially extending surfaces limiting the extent of relative rotation between the hinge members, a tab extending from each side of the second hinge base portion for connecting the second hinge member to a part to be hinged, the tabs being offset from the base portion in an amount slightly greater than the amount said rib portion extends transversely from its base portion, and a slot in communication with one of the cutout sectors to receive a portion of said rib portion to lock the hinge members to one another.

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