Nov. 14, 1939. M. B. HARRIS 2,179,931

HINGE

Filed Dec. 7, 1937 2 Sheets-Sheet 1

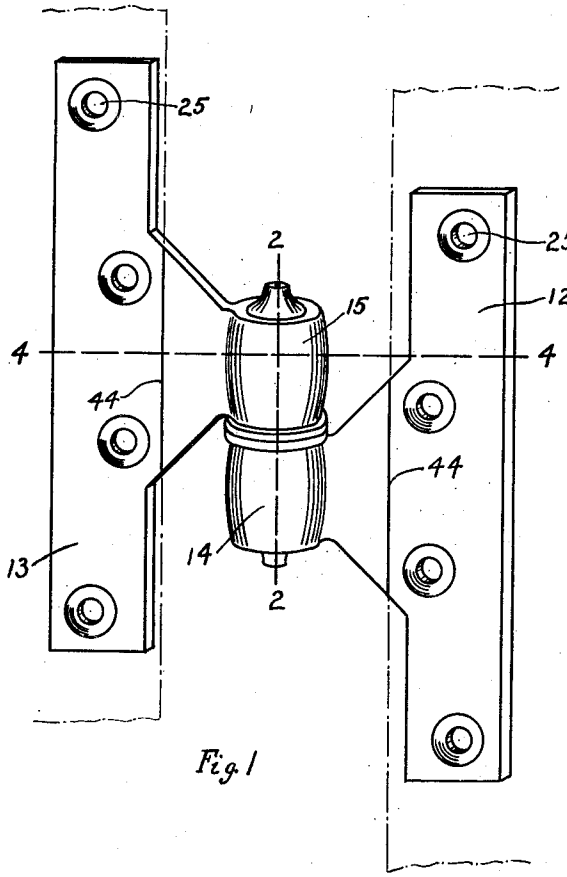



Fig. 1

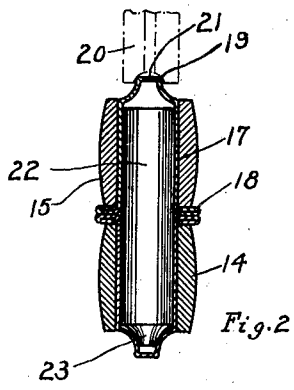



Fig. 2

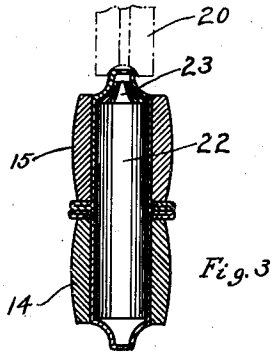



Fig. 3

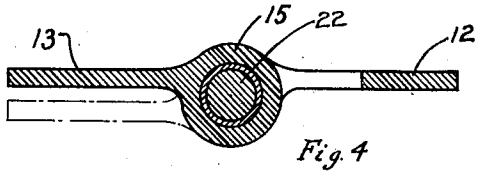



Fig. 4

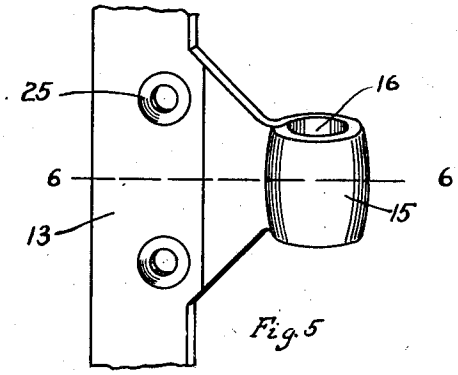



Fig. 5

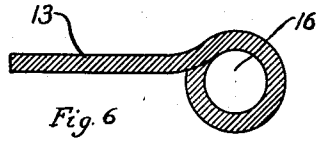



Fig. 6

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Nov. 14, 1939. M. B. HARRIS 2,179,931

HINGE

Filed Dec. 7, 1937 2 Sheets-Sheet 2

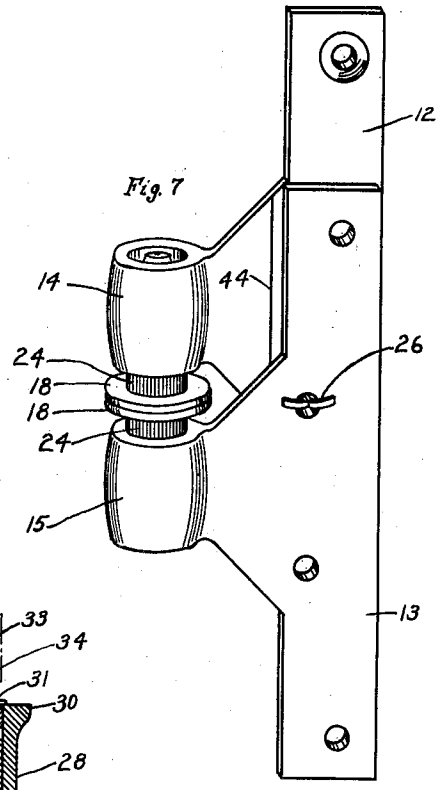



Fig. 7

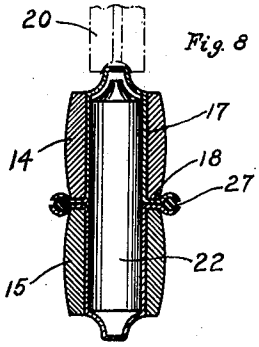



Fig. 8

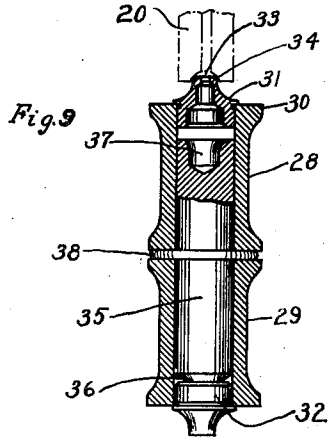



Fig. 9

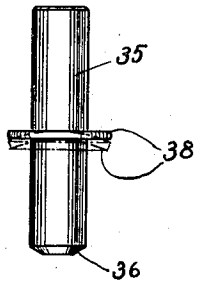



Fig. 11

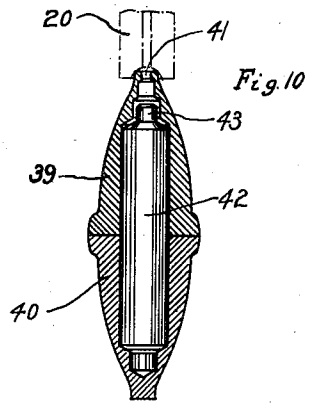



Fig. 10

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# UNITED STATES PATENT OFFICE

2,179,931

## HINGE

Mark B. Harris, Birmingham, Mich.

Application December 7, 1937, Serial No. 178,502

15 Claims. (Cl. 16—161)

This invention relates to hinges.

The main objects of this invention are to provide an improved construction of simple leaf hinge; to provide a hinge of this character in which the two main parts, i. e. leaf with integrally formed knuckle, are of identical construction and, therefore, interchangeable; to provide a hinge which in the embodiment illustrated carries as an integral part thereof a standardized form of widely used lubricant receiving nipple adapted to be lubricated by a pressure lubricator but which may be equally well adapted for any type or style of lubrication; to provide a hinge which is interchangeable for either right or left hand use; to provide in such a hinge improved bushings which are interchangeable for right or left hand parts of the hinge; to provide an improved form of bushing in which one end thereof, in the example illustrated, is shaped and contoured to simulate a well known and widely used form of lubricant receiving nipple and which may be varied to simulate any desired form; to provide an improved form of pintle having one end shaped to facilitate assembly of one hinge member to another; to provide an improved form of bushing which takes axial thrust between the hinge parts as well as radial forces; to provide improved bushings for the hinge parts which, when assembled, will tend to retain lubricant within the hinge joint, and to provide an improved method of partially and loosely assembling the hinge parts in a unitary package for shipment so that the user may finally and permanently assemble the parts for either right or left hand use.

An illustrative embodiment of this invention is shown in the accompanying drawings, in which:

Fig. 1 is a view in perspective of the preferred embodiment of the improved hinge in assembled relation.

Fig. 2 is a transverse vertical sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a similar view but with the pintle in reverse position;

Fig. 4 is a horizontal sectional view taken on the line 4—4 of Fig. 1;

Fig. 5 is a fragmentary view in perspective of one of the hinge members without its bushings;

Fig. 6 is a horizontal sectional view taken on the line 6—6 of Fig. 5;

Fig. 7 is a view in perspective of a complete hinge as partially and temporarily assembled for shipment to the user;

Fig. 8 is a transverse vertical sectional view through the knuckles of a hinge having a modified form of bushing which utilizes an annular packing ring for retaining lubricant;

Fig. 9 is a similar view of another modified form of hinge in which the outer ends of the knuckle portion are closed by plugs having a drive fit therein, wherein one or both plugs have a lubricant receiving aperture therethrough and with the outer ends of both plugs of substantially identical form.

Fig. 10 is a similar view of still another modified form in which the outer ends of the knuckles are shaped to simulate the contour of a lubricant receiving nipple;

Fig. 11 is a view showing the manner of securing the thrust collar of the pintle shown in Fig. 9.

In the manufacture and merchandising of hinges it is extremely desirable to have a hinge which may be used for either right or left hand doors and in which both of the leaves are of identical construction so that a single forging or stamping may be used.

It is also desirable in some instances to have the knuckles of these hinges provided with bushings and in order to secure lubricant retention to the best advantage, it is desirable to have the bushing which is used in the lowermost knuckle of the assembled hinge with a closed bottom so as to form a cup for the lubricant, thus causing any overflow or excess of lubricant to pass out of the hinge at the joint between the knuckles where the thrust is taken and where the lubricant will do the most good.

It is also advantageous and economical to have these bushings standardized so that they can be formed by the same dies and are interchangeable in the leaf knuckles at the time of final assembly.

In the construction shown in the drawings, a pair of leaves 12 and 13 have barrel shaped knuckles 14 and 15 respectively integrally formed therewith which are offset slightly from the center line of the attaching leaf portion as shown more clearly in Fig. 4 of the drawings. These parts are duplicates and of identical construction and may be formed, as shown in Fig. 6, by curling or bending the knuckle portions from relatively flat stock so as to provide a bore 16 through the knuckles.

A standardized form of interchangeable generally cylindrical bushing 17 is provided for the knuckle portion, one end of which is provided with an annular radially extending flange 18, and the other end of which is shaped to provide a relatively small annular dirt cutting and lubricant sealing edge 19 for engagement with the concave end of a pressure lubricant discharge nozzle 20. The shape of this outer end of the bushing may be varied however so as to conform to the lubricant receiving member of any lubrication system, or it may be shaped and adapted to receive lubricant from an ordinary hand oil can. One bushing of each pair

is provided with an axially extending lubricant receiving aperture 21 therethrough through which lubricant is conducted to the moving hinge parts, and this outer end of the bushing is shaped substantially like a well known and widely used lubricant receiving nipple. The flanges 18 may be formed by bending the metal back upon itself so that said flanges are of double thickness, as shown in Figs. 2 and 3 of the drawings, and when assembled the axial faces of the flanges 18 serve as thrust bearings.

The other bushing of each pair, although of identical form to the top bushing, is closed at its outer end so as to retain and position the pintle and form a lubricant receiving and containing cup which insures a bath of lubricant for the lower end of a pintle pin assembled therein and causes any excess lubricant to pass out of the joint through the thrust bearing surfaces formed by the adjacent axial faces of the flanges 18.

A pintle 22 is provided for journaling in the bushings 17 and one end of this pintle is of reduced size and tapered shape, as shown at 23 in Figs. 2 and 3 of the drawings. When two or more of these hinges are used on the same door, assembly is facilitated by placing one of the pintles with reduced end 23 downwardly and the other pintle with the reduced end 23 pointed upwardly, or in reverse position, as shown in Fig. 3, so that the reduced end 23 serves as a guide for loosely holding one hinge in position while the other hinge is brought in registry with its pintle.

A portion of the exterior surface of the bushings adjacent to the flanges 18 is provided with axially extending serrations 24 which are of such size and character that these portions of the bushings must be driven into the bore 16 of the knuckle portion while that portion of the bushing not serrated has an easy slip fit in the bore.

The leaf portions by which the hinge is attached are provided with a plurality of holes 25 therethrough for receiving attaching screws and the like. As shown most clearly in Fig. 7, the holes 25 are so spaced and arranged that when bushings are partially assembled to the extent of their slip fit, and a pintle is within the bushings, the hinge parts may be loosely assembled in a unit with one of the holes 25 of each hinge leaf in registry so that a temporary and removable fastener or clip 26 may be passed therethrough and thus hold the loosely assembled unit for shipment to the user.

When the user receives the hinge, the fastener 26 is readily removed and the bushings driven home so that the serrated portions 24 will prevent rotation of the bushings within their respective knuckles, it being understood that these bushings will not be finally assembled until the user determines whether the hinge is for right or left hand use so that in the usual assembly the bushing having the lubricant receiving opening 21 therein may be assembled at the top. In some instances, however, these bushings are assembled so as to be lubricated from the bottom, i. e. the lubricant receiving bushing is assembled at the under side.

In the modified form shown in Fig. 8 of the drawings the radially extending flanges 18 of the bushings 17 are not bent back upon themselves, but extend outwardly and are shaped to provide an annular groove which, when assembled with another of like character, will provide a seat for an annulus of packing material 27 which tends to retain lubricant within the hinge and at the same time exclude dirt and dust from entry therein.

In the modification shown in Fig. 9 of the drawings, knuckle portions 28 and 29 of identical construction are of slightly different shape than those heretofore described and are thicker and heavier, as shown at 30, near their respective ends for withstanding the drive fit of closure plugs 31 and 32. The plugs 31 and 32 are of identical exterior shape and so proportioned as to have a frictional drive fit within the bore of the knuckle parts. The plug 31 is provided with an axially extending lubricant receiving passageway 33 and both plugs are shaped to provide a relatively small annular dirt cutting and lubricant receiving edge 34 for engagement with the concave end of the pressure lubricating nozzle.

In this construction of hinge one end of the pintle 35 is reduced, as shown at 36, to facilitate assembly, and the other end thereof is provided with a recess 37 of substantially the same shape as the outer ends of the plugs 31 and 32, but with slightly greater center depth so that the pintle 35 may be used as a set tool for driving said plugs without injury thereto. These pintles are, of course, reversible to facilitate assembly.

The pintle 35 is also provided near the middle part thereof with an annular flange or washer 38 which serves as a thrust bearing between the knuckles 28 and 29. This washer may be secured to the pintle 35 with a tight frictional hold by slipping thereon while in dished shape, as shown in dotted outline in Fig. 11, and when moved to the correct off center position thereon, then straightened to the position shown in full lines therein. The pintle 35 is reversible so as to facilitate assembly.

In the modification shown in Fig. 10 of the drawings, the knuckle portions 39 and 40 are of still another shape. Their outer ends are of reduced size so as to simulate a lubricant receiving nipple in the same manner as the bushings 17 and plugs 31. The knuckle 39 is provided with an axially extending lubricant receiving passageway 41 while the knuckle 40 has a closed end for retaining lubricant around the pintle 42. One end of the pintle 42 is reduced, as shown at 43, for the purpose of facilitating assembly thereof in the same manner as heretofore described.

In the use of this improved hinge the manufacturer need make only one shape of hinge leaf and knuckle, which is reversible and interchangeable, one form of bushing of the particular type desired, and one form of pintle. By reversing the positions of the hinge leaves, bushings, and pintle, any combination desired may be had for either right or left hand use.

When the hinge is prepared for shipment to the dealer or customer, the parts are loosely assembled, as shown in Fig. 7, with the bushings only inserted in so far as easy slip fit may be had and with the pintle inside of the bushings. When in this position one of the openings 25 in one of the hinge leaves is in registry with one of the openings 25 in the other hinge leaf, and an easily removable fastener 26, such as a soft split rivet, is inserted through the openings to hold the parts in a loose unit assembly. When the ultimate user receives it, all parts are present and final assembly may be readily made after it is determined which bushing will go on the top side and whether it is right or left hand.

Lubrication of the hinge is easily effected by a

grease gun or oil can, and in the usual assembly, lubricant introduced into the bearing is prevented from running out at the bottom end of the pintle by reason of the use of a closed bushing on the lower side. Any excess lubricant which is either forced or works out of the hinge must come out through the thrust bearing formed by the radially extending flanges of the bushings.

As an aid in properly positioning the hinge leaves when installing, locating lines 44 are placed thereon, which may be lined up with the edge of the door or jamb.

Although one preferred embodiment and several modifications have been herein shown and described, it will be understood that numerous details of the constructions shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

What is claimed is:

1. A hinge comprising a pair of leaves having knuckles assembled in axial alignment, each of said knuckles having a bore therethrough, a bushing in each of said knuckle bores, each of said bushings having an annular radially extending flange at one end thereof, said bushings being assembled in said bores so that said flanges are between said knuckles and the axial faces thereof serve as thrust bearings, the other end of one of said bushings being closed and the other end of the other of said bushings being shaped to form a lubricant receiving nipple, and a pintle journaled in said bushings and retained thereby.

2. In a hinge, a knuckle having a bore therethrough for receiving a pintle, and a bushing in said bore, one end of said bushing being shaped to form a lubricant receiving nipple for sealing engagement with the lubricant discharge nozzle of a pressure lubricator.

3. In a hinge, a knuckle having a bore therethrough for receiving a pintle, and a bushing in said bore, one end of said bushing being reduced in size to form a relatively small annular dirt cutting and lubricant sealing edge for engagement with the concave end of a pressure lubricant discharge nozzle.

4. In a hinge, a knuckle having a bore therethrough for receiving a pintle, said knuckle at one end of said bore presenting a relatively small annular dirt cutting and lubricant sealing edge for engagement with the concave end of a pressure lubricant discharge nozzle.

5. A hinge comprising a pair of leaves having knuckles with bores therethrough and assembled in axial alignment, a bushing in each of said bores and a pintle journaled in said bushings, the outer end of one of said bushings being shaped to receive lubricant and the outer end of the other of said bushings being closed so that lubricant introduced to the pintle through the outer end of the one bushing will be confined and stored by the closed end bushing.

6. A hinge comprising a pair of leaves having knuckles with bores therethrough assembled in axial alignment, frictionally retained bushings for said knuckle bores, one of said bushings having a closed outer end, the other of said bushings having a lubricant receiving outer end, and a pintle in said bushings, said knuckles being offset equally with respect to said leaves, and said bushings being interchangeable so that said hinge may be assembled for either right or left-hand operation.

7. A hinge comprising a pair of leaves with knuckles having bores therethrough, removable frictionally retained bushings for said bores, one having a closed end and the other having a lubricant receiving end, and a pintle, said leaves and bushings respectively being substantially identical and interchangeable so that said hinge is reversible for either right or lefthand use.

8. A hinge comprising a pair of leaves having knuckles with bores therethrough assembled in axial alignment, a bushing for each of said bores, a radial flange on one end of each of said bushings, said bushings being assembled in said bores so that said flanges are between said knuckles and the adjacent axial faces thereof serve as thrust bearings, an annular packing interposed between said flanges for retention of lubricant, and a pintle journaled in said bushing.

9. A hinge comprising a pair of leaves having knuckles with bores therethrough assembled in axial alignment, plugs adapted to be frictionally driven in the outer ends of said bores, said plugs being of substantially identical exterior contour and having one end thereof shaped to form a relatively small annular dirt cutting and lubricant sealing edge for engagement with the concave end of a pressure lubricant discharge nozzle, one of said plugs having an axially extending lubricant passageway therethrough, and a pintle for said hinge, one end of said pintle having a recess therein of substantially the same shape as the outer ends of said plugs but with slightly greater center depth so that said pintle may be used as a set tool for seating said plugs without injury thereto, said pintle recess serving as a lubricant reservoir when assembled in said hinge.

10. In a hinge, a pair of leaves having knuckles with bores therethrough, removable bushings for said bores, and a pintle for said bushings, one of said bushings having one end shaped for retaining and locating said pintle, and said leaves and bushings being interchangeable whereby said hinge may be assembled for either right or left hand use.

11. In a hinge, a knuckle having a bore therethrough, a bushing in said knuckle, a pintle in said bushing, said bushing having one end thereof closed so as to retain and position said pintle.

12. In a hinge, a pair of leaves having knuckles with bores therethrough, bushings in said bores, and a pintle in said bushings, one end of each of said bushings being shaped to form a thrust bearing, the other end of each of said bushings being shaped to retain and position said pintle, and means for introducing lubricant into said bushings around said pintle whereby excess lubricant will pass out through the thrust bearing.

13. In a hinge, a pintle bushing having one end shaped to retain and position the pintle, and a flange on the other end of said bushing forming a thrust bearing.

14. In a hinge, a pintle bushing having one end shaped to retain and position the pintle, and a flange on the other end of said bushing forming a thrust bearing, said pintle retaining end of said bushing having a lubricant receiving opening therethrough.

15. In a hinge, a pair of knuckles assembled in axial alignment on a pintle, a thrust bearing between said knuckles, lubricant receiving means at the outer end of one of said knuckles, the outer end of the other of said knuckles being closed whereby lubricant introduced into said knuckles around said pintle must pass out through said thrust bearing to escape from said assembly.

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