

Aug. 11, 1953

L. R. SLYTER ET AL

2,648,579

SWIVEL

Filed March 26, 1951

*Fig. 1*

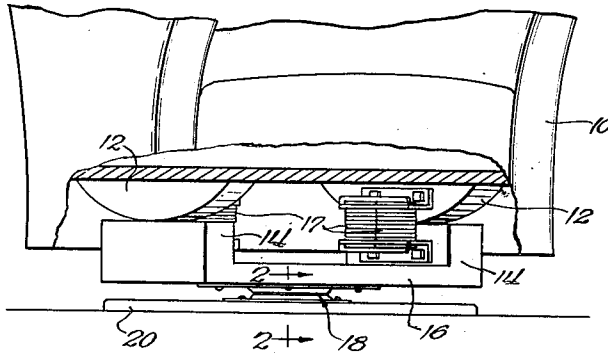


*Fig. 2*

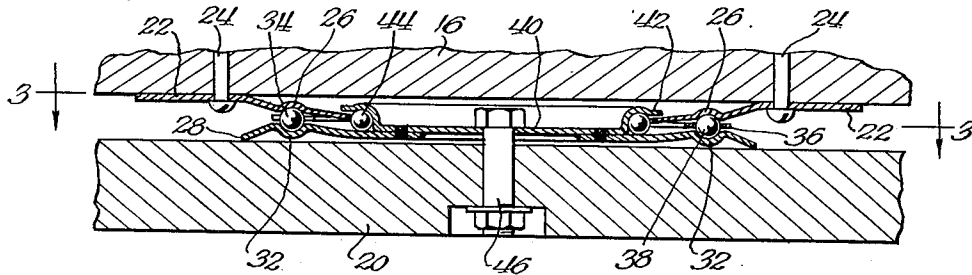
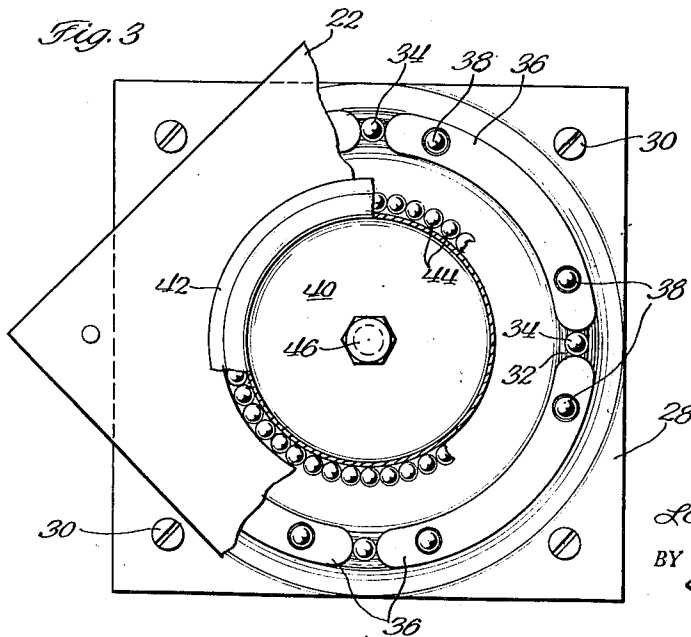


*Fig. 3*



INVENTORS  
*Louis R. Slyter +*  
*Trebor C. Maule*  
BY *Eugene D. Farley*  
ATTORNEY

## UNITED STATES PATENT OFFICE

2,648,579

## SWIVEL

Louis R. Slyter and Trebor C. Maule, Tacoma, Wash., assignors to George W. Slyter & Sons, Inc., Tacoma, Wash., a corporation of Washington

Application March 26, 1951, Serial No. 217,522

6 Claims. (Cl. 308—227)

1

The present invention relates to swivels of the class used for interconnecting two relatively rotating members, particularly rotary rocking chairs.

In our copending patent application, Serial No. 116,884, filed September 21, 1949, now Patent Number 2,625,983, there is described a combination rocking and swiveling chair. This unit comprises a rocking chair of substantial construction mounted upon a platform. The platform in turn is interconnected through a swivel fixture to a base member. In chairs of this construction, which are designed for such uses as viewing television programs, the operation of the swivel obviously is of primary importance in determining the effective use of the chair.

There are, however, several problems which make difficult the proper operation of a swivel fixture as applied to rotary rocking chairs and similar devices. The swivel must operate effectively when the chair is tilted back in any one of numerous positions even though the combined weight of the chair and its occupant may be quite substantial. Also, the construction of the swivel must be such as to resist the very substantial thrust exerted when the chair is tilted. The thrust, furthermore, will be exerted in opposite directions at diametrically opposed parts of the swivel, i. e. upwardly on one portion of the swivel and downwardly on the opposite portion of the swivel. This factor not only interferes with the proper operation of the swivel, but it also tends to bend and warp the component parts so that they do not operate properly, or even to shear those parts bearing the burden of the thrust.

Still, further, the design of the swivel should be such that it is substantially noiseless. It is characteristic of conventional swivel fixtures that they make a scraping sound when the chairs to which they are attached are occupied in certain positions.

It therefore is a primary object of the present invention to provide a swivel for rotary rocking chairs and the like which operates smoothly and easily when the chair to which it is attached is in any one of a number of inclined positions.

It is another object of the present invention to provide a swivel for use in rotary rocking chairs and the like which is constructed to withstand the oppositely directed thrust forces to which it is subjected, and therefore is not subject to permanent warping or deformation of its component parts, or to shearing thereof.

It is another object of the present invention

2

to provide a swivel for rotary rocking chairs and the like which operates noiselessly irrespective of the position of the chair.

Still a further object of the present invention is the provision of a swivel for rotary rocking chairs and the like which is of simple and durable construction.

The manner in which the foregoing and other objects of the present invention are accomplished will be apparent from the accompanying specification and claims, considered together with the drawings, wherein:

Figure 1 is a fragmentary perspective view illustrating the swivel of the present invention and its application to a rotary rocking chair;

Figure 2 is a sectional view in elevation taken along line 2—2 of Figure 1 illustrating the details of construction of the presently described swivel; and

Figure 3 is a plan view taken along the lines 3—3 of Figure 2, being partly broken away better to show the construction of the presently described swivel.

Generally speaking, the presently described swivel comprises a first plate which is centrally perforated and adapted to be affixed to one of two relatively rotatable members. This plate preferably is formed with an annular channel. A second plate is provided which also is centrally perforated, the diameter of its perforation being somewhat less than that of the perforation in the first plate. The second plate also is formed with an annular channel which registers with the channel on the first plate when the two plates are placed in face to face relationship to each other. It will be apparent that when such is the case, the two channels form a raceway for ball bearings.

Also, there is provided a center plate which is centrally dished or recessed. This plate is adapted to nest within the perforation of the first plate, and to engage the second plate adjacent the perforated area of the same. The center plate has a peripheral flange or lip which overlies the edge of the perforation in the first plate and forms therewith a second raceway adapted to receive a plurality of ball bearings.

Still further, the swivel assembly includes screw means for affixing the center plate to the chair assembly. The screw is so disposed that upon tightening it an increased pressure may be exerted on the ball bearings engaged by the flange of the central plate. By thus varying the pressure exerted on these bearings, the freedom

3

of the swiveling movement may be restricted by any desired increment.

Considering the above construction in greater detail and with particular reference to the drawings:

A typical installation wherein the swivel of the present invention is useful is illustrated in Figure 1. As illustrated therein, the swivel is applied to a rotary rocking chair comprising a body portion 10 provided with rockers 12. The latter bear on the side pieces 14 of the platform 16 and are connected to the same through springs 17. The presently described swivel indicated generally at 18 then is inserted between platform 16 and base member 20.

The swivel itself comprises a first plate 22, the marginal portions of which are adapted to be affixed to platform 16 through bolts 24. Plate 22 has a central perforation of substantial area and, a spaced distance away from the perforation, an annular channel or groove 26.

Cooperating with plate 22 is a second plate 28 adapted to be affixed to base 20. Plate 28 is adapted to be affixed to the base by suitable means such as bolts 30 penetrating the marginal areas of the plate. Plate 28 also has a central perforation, although this is of somewhat smaller diameter than is that of plate 22. Also, a spaced distance from its central perforation it has the annular channel or groove 32. When plates 22 and 28 are placed in operative position, their respective channels 26 and 32 register with each other forming a bearing raceway adapted to receive ball bearings.

Thus, as is particularly apparent from Figure 2, there may be provided a plurality of ball bearings 34 maintained separate from each other by means of the spacing elements 36. The latter are substantially flat and have therein spaced perforations adapted to receive the ball bearings 38.

Still another element of the presently described swivel assembly is the centrally dished or recessed center plate 40. Plate 40 is adapted to nest within the perforation of plate 22, resting upon or contacting a portion of plate 28, to which it may be attached by any suitable means as by being spot welded thereto. Center plate 40 has a peripheral flange or lip 42, which is slightly arcuate in cross section and which overlaps the inner edge of plate 22. In this manner plates 22, 28 and 40 form a bearing raceway which may be employed to receive a number of ball bearings 44.

Plate 40 preferably is penetrated by a bolt or screw 46 which is secured to the base member 20. This affords a means of regulating the degree of swiveling freedom provided by the swivel assembly since, upon tightening bolt 46, an increased pressure will be applied to ball bearings 44 so that the assembly swivels somewhat less freely. However, upon releasing screw 46 the pressure applied by flanges 42 against ball bearings 44 will be correspondingly diminished so that the ease with which the assembly swivels will be increased correspondingly.

It will be apparent that when the herein-described swivel assembly is in use, it will withstand substantial vertical thrust, even though the thrust is applied in opposite directions at diametrically opposed portions of the assembly. When, for example, chair 10 is rocked backwardly to an extreme position of rearward displacement, the substantial downward thrust exerted upon plate 22 will be borne by the row of

4

ball bearings 34, 38 which will support this thrust while retaining the ability to move freely. Any horizontal component of thrust exerted on plate 22 during rocking of the chair will be borne by the row of ball bearings 44 which are engaged by the inner edge of the plate 22. In the diametrically opposed section of the swivel assembly, the upward thrust will be borne not by a single bolt such as the bolt 46 of the conventional swivel assembly, but rather by the lip or flange 42 of center plate 40. Since this is of substantial diameter and may be constructed of structurally strong material, it will withstand the force exerted without permanent deformation of the plates, and without shearing or bending of the bolt. Even when subjected to such forces, moreover, the swivel assembly is noiseless in operation, these manifold advantages being obtainable through an assembly which is simple to construct and durable in operation.

It is to be understood that the form of our invention, herewith shown and described, is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of our invention, or the scope of the subjoined claims.

Having thus described our invention, we claim:

1. A swivel for interconnecting two relatively rotatable members comprising a centrally perforated first plate attachable to one of the members, a centrally perforated second plate attachable to the other of the members, the perforation in the first plate being of greater diameter than the perforation in the second plate, a centrally dished plate adapted to nest within the perforation in the first plate, said centrally dished plate having a peripheral flange adapted to overlie the inner edge of the first plate, ball bearing means interposed between the first and second plates, second ball bearing means interposed between the second plate and the peripheral flange of the dish plate for engagement by the inner peripheral edge of the first plate, and means for attaching the centrally dished plate to the said second plate.

2. A swivel for interconnecting two relatively rotatable members comprising a centrally perforated first plate adapted to be attached to one of the members, a centrally perforated second plate adapted to be attached to the other of the members, the perforation in the first plate being of greater diameter than the perforation in the second plate, a centrally dished plate adapted to nest within the perforation in the first plate, the centrally dished plate having a peripheral flange adapted to overlie the inner edge of the first plate, ball bearing means interposed between the second plate and the peripheral flange of the dished plate for engagement by the inner peripheral edge of the first plate, and screw means penetrating the centrally dished plate and engaging the said second member for exerting a predetermined tension on the ball bearings, thereby varying the ease of relative rotation of the first and second plates.

3. A swivel for interconnecting two relatively rotatable members comprising a centrally perforated first plate adapted to be attached to one of the members, a centrally perforated second plate adapted to be attached to the second member, the diameter of the perforation in the first plate being greater than that of the perforation in the second plate, a centrally recessed center plate proportioned to nest within the perforation

5

of the upper plate and to engage the lower plate, the center plate having a peripheral flange adapted to overlie the inner edge of the first plate, the space between the lower plate, the peripheral flange of the center plate and the inner peripheral edge of the upper plate forming a bearing raceway, and a plurality of ball bearings within said bearing raceway for securing the substantially frictionless relative rotation of the two plates.

4. A swivel for interconnecting two relatively rotatable members comprising a centrally perforated first plate adapted to be attached to one of the members and having an annular channel therein, a centrally perforated second plate adapted to be attached to the other of the members and having an annular channel therein, the first plate being adapted to overlie the second plate with the annular channels therein registering with each other and forming a first bearing raceway, the diameter of the perforation in the first plate being greater than that of the perforation in the second plate, a centrally recessed center plate proportioned to nest within the perforation of the first plate and adapted to contact the second plate, the center plate having a peripheral flange adapted to overlie the first plate, the space between the second plate, the peripheral flange of the center plate and the inner peripheral edge of the first plate forming a second bearing raceway, and a plurality of ball bearings in said first raceway and said second raceway for securing the substantially frictionless relative rotation of the two plates.

5. A swivel for interconnecting two relatively rotatable members comprising a centrally perforated first plate adapted to be attached to one of the members and having an annular channel therein, a centrally perforated second plate adapted to be attached to the other of the members and having an annular channel therein, the first plate being adapted to overlie the second plate with the annular channels therein registering with each other and forming a first bearing raceway, the diameter of the perforation in the first plate being greater than that of the perforation in the second plate, a centrally recessed center plate proportioned to nest within the perforation of the first plate and adapted to

6

contact the second plate, the center plate having a peripheral flange adapted to overlie the first plate, the space between the second plate, the peripheral flange of the center plate and the inner peripheral edge of the first plate forming a second bearing raceway, a plurality of perforated spacing elements in the first raceway, a plurality of ball bearings disposed within the perforations of the spacing elements and between the same, and a plurality of ball bearings stationed within said second raceway.

6. A swivel for interconnecting two relatively rotatable members comprising a centrally perforated first plate adapted to be attached to one of the members and having an annular channel therein, a centrally perforated second plate adapted to be attached to the other of the members and having an annular channel therein, the first plate being adapted to overlie the second plate with the annular channels therein registering with each other and forming a first bearing raceway, the diameter of the perforation in the first plate being greater than that of the perforation in the second plate, a centrally recessed center plate proportioned to nest within the perforation of the first plate and to contact the second plate, the center plate having a peripheral flange adapted to overlie the first plate, the space between the second plate, the peripheral flange of the center plate and the inner peripheral edge of the first plate forming a second bearing raceway, a plurality of ball bearings in said first raceway and said second raceway, and screw means for attaching the center plate to the said other member for exerting a predetermined pressure upon said ball bearings.

LOUIS R. SLYTER.  
TREBOR C. MAULE.

#### References Cited in the file of this patent

#### UNITED STATES PATENTS

| Number    | Name      | Date          |
|-----------|-----------|---------------|
| 1,477,669 | Sharpnack | Dec. 18, 1923 |
| 1,752,030 | Roe       | Mar. 25, 1930 |
| 1,809,609 | Turner    | June 9, 1931  |
| 2,094,968 | Searles   | Oct. 5, 1937  |
| 2,500,886 | Torkelson | Mar. 14, 1950 |