J. SCHMID-ROOST.

METHOD OF MAKING BALL BEARINGS.

APPLICATION FILED NOV. 21, 1912.

1,067,685. Patented July 15, 1913.

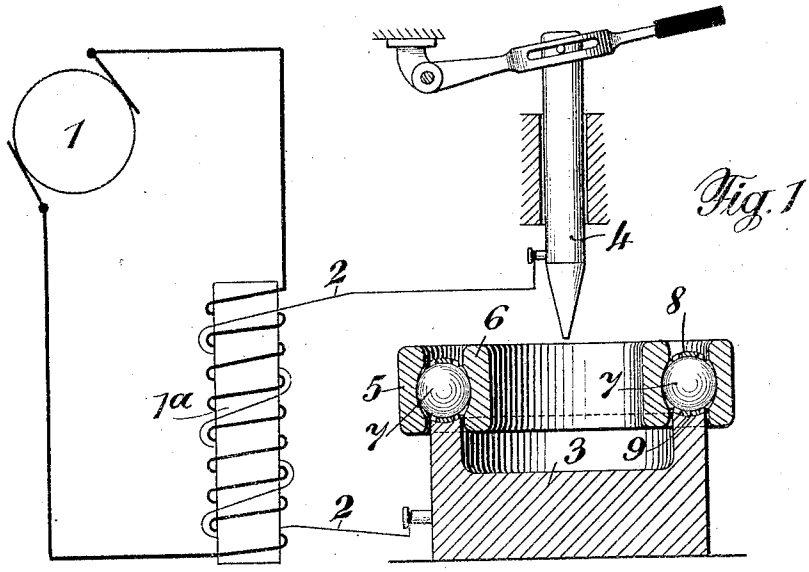


Fig. 1

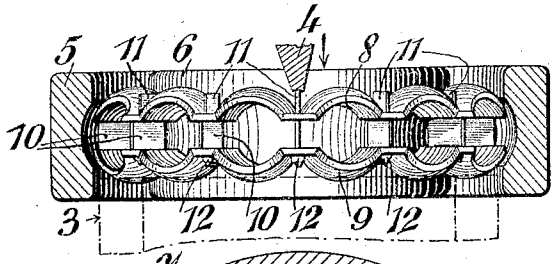


Fig. 2

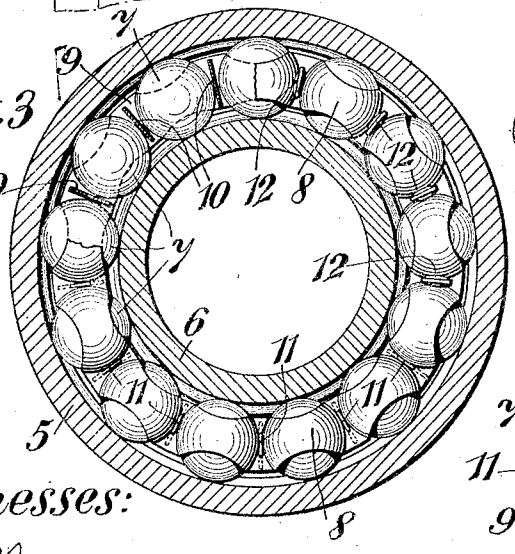


Fig. 3

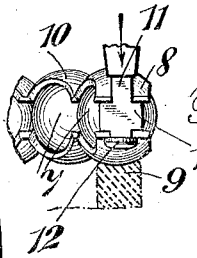


Fig. 4

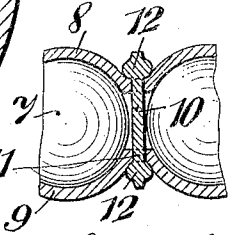


Fig. 5

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UNITED STATES PATENT OFFICE.

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METHOD OF MAKING BALL-BEARINGS.

1,067,685. Specification of Letters Patent. Patented July 15, 1913.

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To all whom it may concern:

Be it known that I, JAKOB SCHMID-ROOST, a citizen of the Republic of Switzerland, residing at Oerlikon, Switzerland, have invented new and useful Improvements in Methods of Making Ball-Bearings; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

In ball bearings of various constructions the balls are inclosed by cages which are composed of two rings. The connection of the rings was hitherto performed either by means of screws, which possess the drawback that they easily become loose by the rotation of the bearing, or the connection was obtained by mechanically riveting the rings to each other. This latter mode of connection cannot be applied in every case, because there is often no room for a riveting tool and often the riveting pressure would easily spoil the parts by bending. In order to avoid the drawbacks of the hitherto used methods, in the method according to this invention electric current is used for making the connection. It has hitherto been proposed to insert rivets in electric circuit before the riveting, however in all these cases the riveting proper was not performed by the electric current, but only the rivet was heated, while the rivet-head was formed in a second working phase by mechanical pressure. Also in this case therefore the drawbacks of the mechanical riveting will be found, which especially arise with ball-cages, because there is only a very small space between the rounded pockets of the rings.

According to this invention the middle portion of thin connecting parts projecting through the rings is electrically melted to a laterally extending pad and this head is formed in a single working phase and without applying mechanical pressure. The riveting therefore is performed by a single applying of the tool, that is to say, within a shorter time and in such a manner that the rings are not damaged since the tool is not subject to a stroke or pressure, as it was in the case of mechanical riveting, and the tool may be made sharper, so that it can more easily be applied to the rivet.

In the accompanying drawing in which a device for carrying out the process is illustrated by way of example, Figure 1 is a diagrammatic side elevation of the device partly in section, Fig. 2 is a cross-section of a ball-bearing before the riveting, Fig. 3 is a longitudinal section through the same, Fig. 4 and 5 are detail views.

1 designates a source of electric current, for example a generator, and 1^a a transformer. The secondary winding is connected at one end to a conducting base-block 3, for instance of copper, and at the other end to a vertically reciprocating contact pin 4.

5 designates the outer and 6 the inner race of a ball-bearing, in which the balls 7 are filled and which contains both rings 8 and 9 of the ball guiding cage, which is provided with thin connecting plates 10 between the balls 7, the ends 11 of the plates projecting through holes of the rings 8 and 9. The rings 8 and 9 are to be connected to each other by forming heads at the ends 11 (Fig. 4). For this purpose the ball-bearing is laid on the copper block 3, so that the pockets lie in recesses in the block 3. If thereafter the contact pin 4 is set on the upper edge of an upward projecting end 11 (Figs. 2 and 4), both rings 8 and 9 and the plate 10 are put in the secondary circuit, whereby in consequence of the small cross-section and thereby in consequence of the high resistance the projection 11 is melted so that the middle portion of the projection is laterally extended to form a pad or head 12, while the upper part remains unchanged.

The electric device may also be constructed otherwise than described. It is also possible to use only a single circuit, for example the current may be produced directly by a dynamo machine without using a transformer.

I claim:

1. The herein described method of connecting the two cage rings of ball bearings to each other, which consists in electrically melting the middle portion of the projecting part of the thin connecting member that extends through the rings to form, with little or no pressure, a laterally extending pad.

2. The method of connecting the cage rings of ball bearings which comprises sup-

porting the cage rings on a copper conductor with their connecting members inserted so that the small ends of said members project beyond a ring between the pockets therein, closing an electric circuit through said members by means of a suitable electrode applied to said small ends with little or no pressure and of sufficient strength to melt the small ends down on the outside of the ring, thereby forming an enlargement on said ends between a cage ring and the point of application of the electrode.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

JAKOB SCHMID-ROOST.

Witnesses:
ERNST FISCHER,
CARL GUBLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."