

Letters Patent.

Country Canada

Number 611545

Date 27th December 1960

Patentee Autoset (Production) Limited
(Assignees of Claude M. Townsend)

Invention Mounting of Load-Bearing Balls
or Load-Bearing Rollers

Duration Seventeen years from 27th
December 1960

Renewal Fees due None payable

Working Due 27th December 1963

CANADA

NUMBER



611545

To all to whom these presents shall come

Whereas

Claude M. Townsend,

of Birmingham,

Warwickshire,

England,

has petitioned the **Commissioner of Patents**, praying for the grant of a Patent for an invention entitled **Mounting of Load-Bearing Balls or Load-Bearing Rollers**, and has assigned all his interest to **Autoset (Production) Limited**, of Birmingham aforesaid,

a description of which invention is contained in the specification of which a duplicate is hereunto attached and made an essential part hereof, and has complied with the requirements of The Patent Act,

Now Therefore the present Patent grants to the said

Autoset (Production) Limited,

and its legal representatives for the period of **Seventeen Years** from the date of these presents the exclusive right, privilege and liberty of making, constructing, using and vending to others to be used in **Canada** the said invention subject to adjudication in respect thereof before any court of competent jurisdiction.

Provided that the grant hereby made is subject to the conditions contained in the Act aforesaid.

In Testimony Whereof, I have hereunto set my hand, and caused the Seal of the **Patent Office** to be hereunto affixed, at the **City of Ottawa, in Canada**, this
Twenty-seventh day of December in
the year of Our Lord, one thousand nine hundred and

BE IT KNOWN that CLAUDE MORTIMER TOWNSEND, of 72/77 Stour Street, Birmingham 18, Warwickshire, England, having made the invention entitled:

IMPROVEMENTS IN OR RELATING TO THE MOUNTING OF
LOAD-BEARING BALLS OR LOAD-BEARING ROLLERS

the following disclosure contains a correct and full description of the invention and of the best mode known to the inventor of taking advantage of the same.

The application of load-bearing balls carried in a mounting is a familiar one in the case of ball-catches, and so-called ball castors. In the latter case, the load-carrying ball has in the past been supported in a mounting carrying a horizontally disposed ring of balls in contact with the upper part of the ball, a hemisphere of balls contacting its upper hemispherical portion. Both these expedients suffer from the disadvantage that, due to the load on the load-carrying ball being transmitted to the separate supporting balls, the latter were prevented from rotating as the load-carrying ball rotated, the latter in effect merely sliding over the supporting balls as it rotated. This led to rapid wear of the supporting balls, resulting in looseness developing between the load-carrying ball and the supporting balls, and furthermore to an increasing resistance to rotation of the load-carrying ball as the worn surfaces of the supporting balls increased in area with resulting increase in area of frictional contact and resistance.

It is an object of the said invention to provide a load-carrying ball mounting in which the said disadvantage is wholly or largely overcome.

According to the present invention there is provided a load-carrying ball comprising a load ball-mounting having a central mouth and a central concaved recess remote from said mouth, a load ball mounted for rotation in said mouth and having a portion projecting through said mouth to the exterior of said housing, a central partition, having concave and convex surfaces, in said housing said surfaces being symmetrical with said recess and the periphery of said ball and being spaced therefrom so that the spaces combine to form a two tier endless ball race, several anti-friction balls in said ball race and in contact with said load ball, said ball being capable of circulating and recirculating in said raceway, a central socket in said housing and a central peg at the head of said partition engaging said socket, said peg and socket having a machined clearance fit whereby the said concave convex partition is permitted to have a limited rocking movement in relation to said ball.

The supporting ball bearings (which are of smaller diameter than that of the load-carrying ball) as they rotate in their endless track thus pro-

a moving track of constantly changing point supports for the rotating load-carrying ball, thereby ensuring a virtually frictionless long-wearing mounting for the load-carrying ball.

The supporting ball bearings preferably contact the load-carrying ball over a portion of its periphery approximating to a hemisphere, the recirculating part of the endless track being disposed at both ends of and above the contacting part of the endless track.

The endless track is preferably provided by a substantially hemispherical recess in one end of a cylindrical member, the floor of the recess providing one wall of the recirculating part of the endless track, the outer wall of a hollow hemispherical partition spaced by slightly more than the diameter of a supporting ball from the said floor providing the other wall of the recirculating part, and the inner wall of the partition providing one wall of the contacting part of the endless track, the load carrying ball surface providing the other wall of the contacting part.

The said partition is preferably secured in its position in which it separates the two parts of the endless track, by a symmetrically disposed neck secured symmetrically to the said cylindrical member.

The said neck may be screwthreaded and be engaged in a screw threaded aperture disposed symmetrically in the floor of the said recess, the neck projecting from the remote end of the cylindrical member and serving for securing the assembly to an object, for example, a furniture leg. A spacing or bearing nut or washer may be screwed on to the said neck so as to be interposed between the cylindrical member and the said object.

The load-carrying ball mounting has unlimited application where a load needs to be translated in position. It can be applied in positions other than the downwardly disposed position familiar in the case of so-called ball castors, and is equally effective for all directions of loading or translatory movement. For example, it has application in the supporting of heavy plates required to be moved from place to place whilst lying flat,

supporting of glass sheets, other materials can be employed for the load-carrying ball such as nylon or other suitable plastics.

For a better understanding of the invention, reference is made to the accompanying explanatory drawing which illustrates, by way of example, several forms of construction of load bearing balls according to the invention. In the drawing:-

Fig. 1 is a vertical section of a load bearing ball according to the invention.

Fig. 2 is a vertical section similar to Fig. 1 of a modification.

Fig. 3 is a vertical section similar to Fig. 2 illustrating a modified use of the load ball.

Fig. 4 is a vertical sectional elevation of a further modification.

As will be observed in the drawing, there is provided a skid type load bearing ball comprising a mounting 6 for a ball member 7 which is mounted for rotation in a spherical mouth 8; the mounting 6 has an external attachment flange 11 provided with screw holes 12.

The mounting 6 has several supporting ball bearings 13 arranged in an endless track 14 above the ball member 7 and serving as a recirculating enclosure for the ball bearings 13.

The endless track 14 is provided by a substantially hemispherical recess provided between the inner end of a cylindrical member 15 and a hollow hemispherical partition 16 arranged centrally above the load ball 7 and carried by an axially disposed neck 17 which is symmetrically secured to the cylindrical member 15 by screw and nut clamping means 18. Figs. 2, 3 and 4.

The concave-convex partition 16 provides in combination with the cylindrical member 15 and the load ball 7 a two tier ball track in which the floor 19 of the recess provides one wall, and the outer wall 20 of the partition 16 the other wall of the recirculating part of the track, whereas

In the construction of Fig. 1, the load ball 7 is retained in the mounting 6 by the spherical bore thereof of which the mouth 8 serves to exclude dust. In Fig. 2, the mounting 6 is provided with a dust excluding washer 22 made of flexible material which embraces the load ball 7 and is held in a ring seating 23 by means of a ball retaining ring 24 backed up by a snap ring 25 engaging an annular groove 26 in the mounting 6.

In Fig. 3, the ball 7 of the load ball construction is illustrated as being inverted for use in supporting a heavy plate or a glass sheet 27 during translatory movement from place to place whilst lying flat, several such load balls being adapted to be arranged in a common plane with their exposed surfaces facing upwardly for effectively supporting the sheet 27. In this construction, a washer 22 is employed together with a ring seating 23 backed by a snap ring 25 substantially as described with reference to Fig. 2.

In the construction of Fig. 4, the ball mounting 6 provides the floor 19 of the said recess and the annular rim 28 receives a plug 29 formed with a spherical mouth 8, as in Fig. 1; this plug 29 is formed interiorly with a spherical seating 30 corresponding to that in Fig. 2 thereby to provide a part of the circulating track for the ball bearings 13. For particular applications, the load ball 7 may be made of nylon or of plastics instead of steel.

In all the forms of the construction illustrated, a proportion only of the ball bearings 13 are in rolling contact with the load ball 7 at any given instant, each ball 13 being able to circulate within the endless track 14 as it rotates, successively contacting the load ball 7, recirculating, returning into contact therewith and repeating the

proceeds during the particular

rotate in their endless track, they provide a moving track of constantly changing point supports for the rotating load-carrying ball, thereby ensuring a virtually frictionless, long-wearing mounting for the load-carrying ball.

It will be observed that the ball bearings 13 contact the load-carrying ball 7 over a portion of its periphery approximating to a hemisphere, the recirculating part of the endless track 14 being disposed at both ends of and above the contacting part of the endless track.

In order to provide for an easy and ready movement of the ball bearings 13 in the endless track, the floor 19 will be spaced from the corresponding wall 20 slightly more than the diameter of the ball bearings 13.

If desired, the axial neck 17 on the partition 16 may be formed as a spherical peg which engages a corresponding seating socket provided in the member 15 (Figs. 1-3), or in the corresponding part 15 forming the mounting 6 (Fig. 4). The peg and socket engagement has approximately 5 thousandths of an inch machined clearance fit in order that the partition 16 is permitted to have a limited rocking movement, whereby adequate clearance is provided for the recirculating motion of the balls 13 within the endless track 14. The said movement is also of advantage when the load ball 7 is under thrust and is urged in rubbing contact against the mouth 8 in a dust excluding manner.

In the application of the invention where unidirectional movements are required or desirable in industry, the load-carrying ball 7 may be substituted by a roller, the terms ball and roller being synonymous.

It will also be appreciated that the invention is not to be regarded as limited to the details of construction above described in connection with the examples, and that modifications may be made

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:-

1. A load carrying ball comprising a load ball-mounting having a central mouth and a central concave recess remote from said mouth, a load ball mounted for rotation in said mouth and having a portion projecting through said mouth to the exterior of said housing, a central partition, having concave and convex surfaces, in said housing, said surfaces being symmetrical with said recess and the periphery of said ball and being spaced therefrom so that the spaces combine to form a two tier endless ball race, several anti-friction balls in said ball race and in contact with said load ball, said ball being capable of circulating and recirculating in said raceway, a central socket in said housing and a central peg at the head of said partition engaging said socket, said peg and socket having a machined clearance fit whereby the said concave-convex partition is permitted to have a limited rocking movement in relation to said ball.

2. A load carrying ball according to claim 1, and including an annular groove in said housing adjoining the said mouth, said groove housing a flexible dust excluding washer embracing said load ball and means for retaining said washer in its groove.

The attention of Patentees is called to the following section of the Patent Act, Chapter 203, R.S.C., 1952.

67. (1) **14 19 17 15** of Canada, or any person interested may apply to the Commissioner of Patents, after the expiration of three years from the date of the grant of the patent, if he is of opinion that there has been an abuse of the patent, to apply to the Commissioner for relief under this Act.

(2) The Commissioner shall be deemed to be satisfied that there has been an abuse of the patent in the following circumstances:

(a) The patented article is not being worked in Canada on a commercial scale, and no satisfactory reasons are shown for such non-working, but if an application is presented to the Commissioner on this ground, and the Commissioner is of opinion that the cause for the non-working of the invention or for any other reason is such as to justify the grant of the patent to the inventor or his assignee, the invention shall be deemed to be new for the purposes of this Act.

(b) The patented article is being worked in Canada, but the working is not being carried on in a commercial scale, and the person or persons by whom the working is carried on are not taking any effective steps to secure the working of the patented article on a commercial scale, and it is shown that the working of the patented article is being carried on in a non-commercial scale, and it is shown that the working of the patented article is being carried on in a non-commercial scale, and it is shown that the working of the patented article is being carried on in a non-commercial scale.

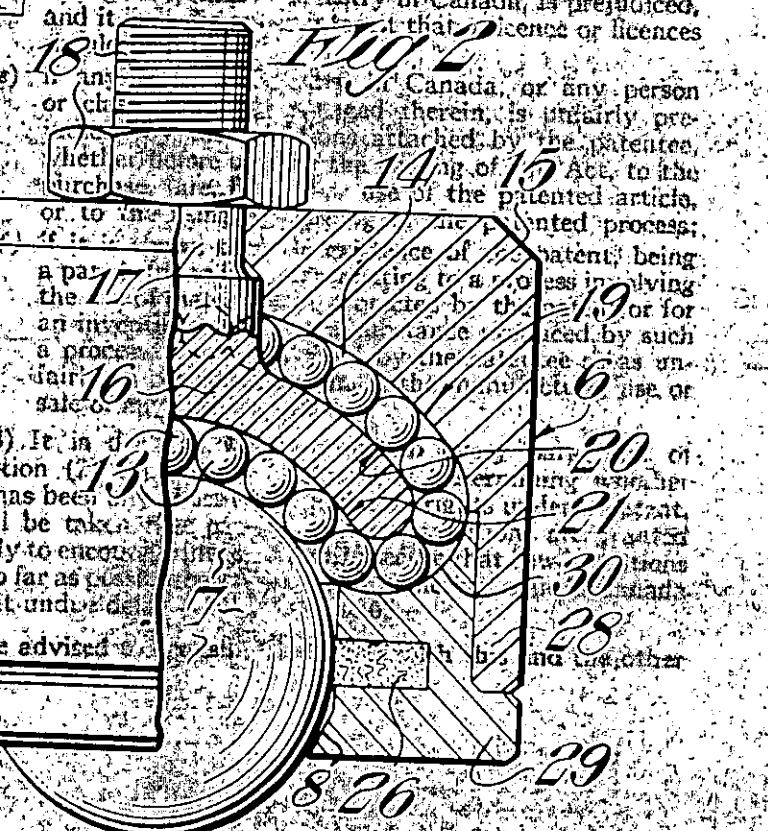
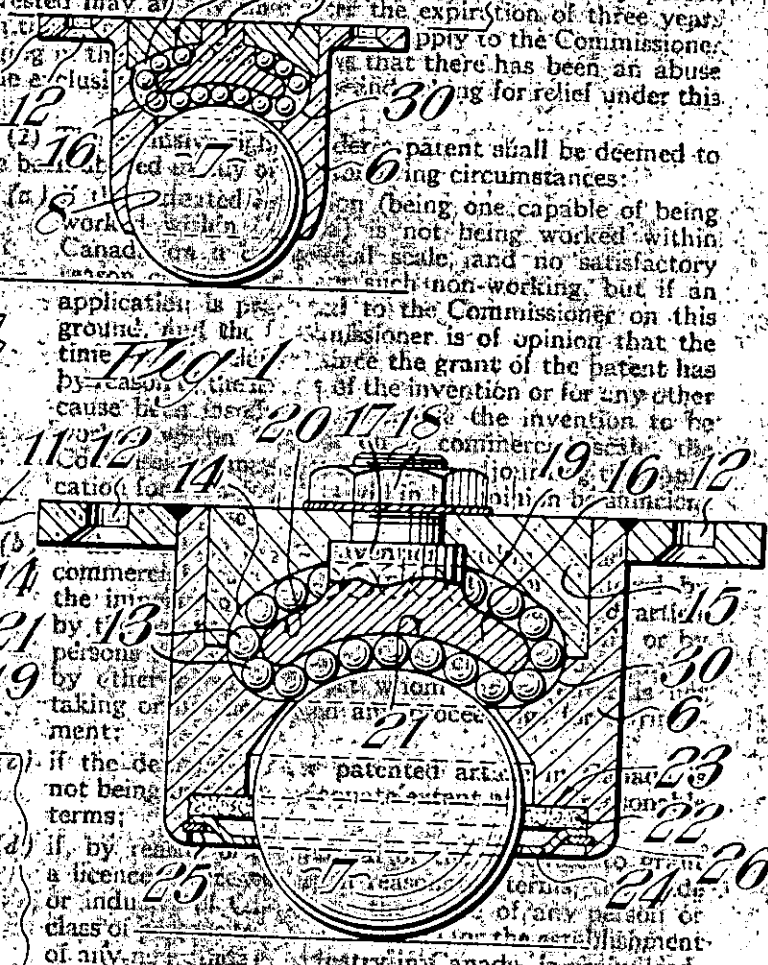
(c) If, by reason of the terms of the patent, or of any condition or restriction of the patent, or of any other cause, the working of the patented article in Canada, is prejudicial to the public interest, or to the health, safety or convenience of the public, or to the industry in Canada, it is shown that the working of the patented article is being carried on in a non-commercial scale, and it is shown that the working of the patented article is being carried on in a non-commercial scale.

(3) It is the duty of the Commissioner to take such steps as he may think fit to secure that the working of the patented article is carried on in a commercial scale, and to take such steps as he may think fit to secure that the working of the patented article is carried on in a commercial scale.

(4) The Commissioner may, if he is of opinion that it is in the public interest, to grant a licence to any person to work the patented article in Canada, on such terms and conditions as he may think fit.

(5) The Commissioner may, if he is of opinion that it is in the public interest, to grant a licence to any person to work the patented article in Canada, on such terms and conditions as he may think fit.

(6) The Commissioner may, if he is of opinion that it is in the public interest, to grant a licence to any person to work the patented article in Canada, on such terms and conditions as he may think fit.



The attention of Patentees is called to the following section of the Patent Act, Chapter 203, R.S.C., 1952.

Abuse of rights under patents.

67. (1) The Attorney General of Canada or any person interested may at any time after the expiration of three years from the date of the grant of a patent apply to the Commissioner alleging in the case of that patent that there has been an abuse of the exclusive rights thereunder and asking for relief under this Act.

What amounts to such abuse.
Not working patented invention.

(2) The exclusive rights under a patent shall be deemed to have been abused in any of the following circumstances:

Prevention of working by importation.

(a) if the patented invention (being one capable of being worked within Canada) is not being worked within Canada on a commercial scale, and no satisfactory reason can be given for such non-working, but if an application is presented to the Commissioner on this ground, and the Commissioner is of opinion that the time that has elapsed since the grant of the patent has by reason of the nature of the invention or for any other cause been insufficient to enable the invention to be worked within Canada on a commercial scale, the Commissioner may make an order adjourning the application for such period as will in his opinion be sufficient for that purpose;

Not meeting demand.

(b) if the working of the invention within Canada on a commercial scale is being prevented or hindered by the importation from abroad of the patented article by the patentee or persons claiming under him, or by persons directly or indirectly purchasing from him, or by other persons against whom the patentee is not taking or has not taken any proceedings for infringement;

Prejudice to trade by refusal to licence.

(c) if the demand for the patented article in Canada is not being met to an adequate extent and on reasonable terms;

Prejudice by reason of conditions attached.

(d) if, by reason of the refusal of the patentee to grant a licence or licences upon reasonable terms, the trade or industry of Canada or the trade of any person or class of persons trading in Canada, or the establishment of any new trade or industry in Canada, is prejudiced, and it is in the public interest that a licence or licences should be granted;

Prejudice in other respects.

(e) if any trade or industry in Canada, or any person or class of persons engaged therein, is unfairly prejudiced by the conditions attached by the patentee, whether before or after the passing of this Act, to the purchase, hire, licence, or use of the patented article, or to the using or working of the patented process;

(f) if it is shown that the existence of the patent, being a patent for an invention relating to a process involving the use of materials not protected by the patent or for an invention relating to a substance produced by such a process, has been utilized by the patentee so as unfairly to prejudice in Canada the manufacture, use or sale of any such materials.

Declaration of basis of grants of patents.

(3) It is declared with relation to every paragraph of subsection (2) that, for the purpose of determining whether there has been any abuse of the exclusive rights under a patent, it shall be taken that patents for new inventions are granted not only to encourage invention but to secure that new inventions shall so far as possible be worked on a commercial scale in Canada without undue delay. 1935, c. 32, s. 65.

Patentees are advised to acquaint themselves with this and the other provisions of the Act.