June 6, 1933. A. E. RICE ET AL 1,912,795

ANTIFRICTION BEARING CASTER

Filed Feb. 28, 1931

Fig. 1.

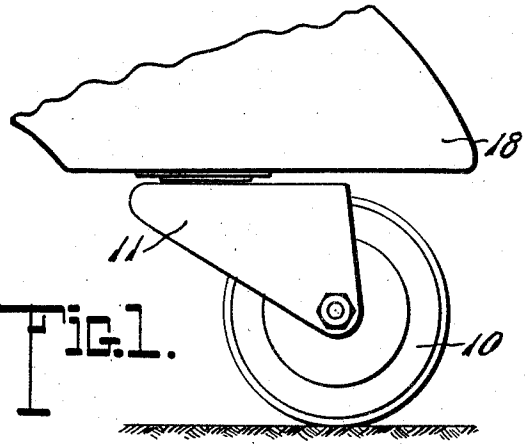


Fig. 4.

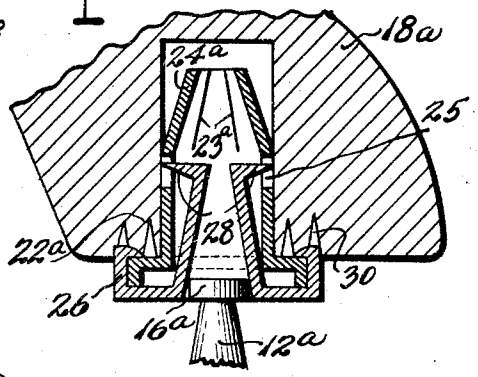


Fig. 2.

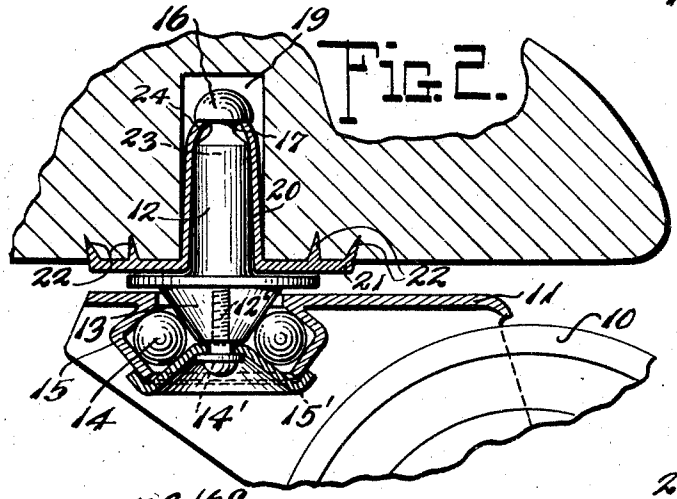


Fig. 5.

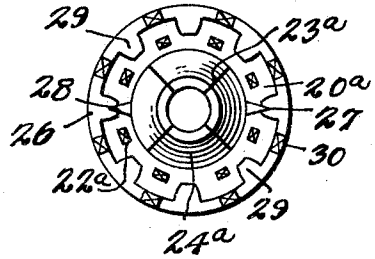
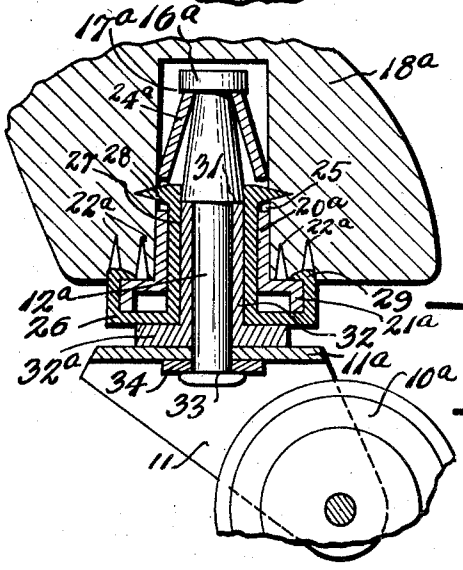


Fig. 3.



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UNITED STATES PATENT OFFICE

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ANTIFRICTION BEARING CASTER

Application filed February 28, 1931. Serial No. 519,207.

The caster comprising the present invention is primarily adapted for use in connection with articles of furniture such as desks, chairs, tables, cabinets and the like, which form the substantial part of every well equipped business office, and also in connection with articles of household equipment such as bedroom and living room suites, radio cabinets, refrigerators, pianos and other sundry furnishings. The principles of the invention, however, are applicable to other uses in stores, warehouses, and in fact, wherever such anti-friction caster devices are desired.

One form of the invention is primarily concerned with casters of the roller ball bearing type, while another form is concerned with roller wheel sleeve type of caster, two forms of the invention being shown. However, the invention contemplates still further modifications without departing from the essential spirit of the same.

Many of the above mentioned articles of furniture, particularly such articles as are employed in business offices are provided with adjusting mechanism whereby the height of the same may be varied throughout a very limited margin. These articles are displayed on the show room floor without casters so that they appear to have a height which is less than the minimum height provided for in actual use. When ordinary casters are applied to the article, which, for the purpose of illustration will be assumed to be a chair, an inch, more or less, may be added to the overall height of the chair. The degree of adjustment permitted by the adjusting mechanism being limited, no further compensation for reducing the height of the chair to its normal height is available and as a result it not infrequently happens that the chair does not suit the tastes of the user.

It is to remedy the above outlined limitation of utility that the present invention has been developed. By the provision of a caster which does not materially increase the overall height of the chair the adjusting mechanism ordinarily provided, remains within the normal limits of everyday use.

To accomplish the objects outlined, the invention contemplates the provision of a caster which is of underslung construction to reduce to a minimum the lowest height to which the chair or other article may be adjusted.

Where the ordinary casters now in everyday use are employed, whether these casters be of the roller ball bearing type or whether they be of the roller steel sleeve type, these casters are conspicuously displayed at the base of the article on which they are mounted. Such casters not only present an awkward appearance but are continually coming into contact with other articles of furniture or with the base boards of the room thereby resulting in marring or damage to the articles or the base boards or, indeed, at times to the casters themselves.

Accordingly, an additional object of the present invention is the provision of an underslung caster of compact arrangement of parts which is attractive in its appearance, but which is not conspicuous and which will blend with any manner of style of article to which it is applied.

Yet another object of the invention is to provide a caster which may be readily and permanently applied to the article without danger of the same becoming dislodged.

Convenience of arrangement of parts, simplicity in design, ruggedness and comparative inexpense of manufacture, are further desiderata that have been borne in mind in the production and development of the invention.

Other objects of the invention, not at this time more particularly enumerated, will become more readily apparent, as the nature of the invention is better understood, and the same consists in the novel construction, combination and arrangement of parts shown in the accompanying single sheet of drawing, in which:—

Figure 1 represents a side elevation of a caster as attached to a piece of furniture.

Figure 2 is a sectional view showing the construction of one form of caster, and the manner in which it is secured to the article of furniture.

Figure 3 is a fragmentary sectional view similar to Figure 2, but showing a somewhat modified form of construction.

Figure 4 is a view similar to Figure 3 but showing the caster shank being inserted, and indicating the relationship of the parts prior to the insertion of the caster shank, and,

Figure 5 is a top view of the assembly of Figure 4, with the caster shank removed.

Referring more particularly to Figure 1 of the drawing, in which one form of the invention is shown, 10 represents the caster wheel which is carried by a forked yoke 11, there being also a pintle 12, one end of which is formed into a bearing surface or cone 13. This cone 13 projects into an opening in the yoke, this opening being located in an intermediate upper portion of the yoke and being crimped downwardly at 15 to provide an annular concave race surface on the inner wall. This concave surface forms with the bearing surface of cone 13, a complete bearing race in which are positioned anti-friction bearings 14. It will be seen that the portion 13 of the yoke 11 is underslung relatively to the wheel 10, that is, it is positioned at a distance above the floor no greater than the height of the wheel, so that the anti-friction bearings 14 are positioned in a plane substantially even with the height of the wheel for purposes which will be hereinafter set forth. The lower end of the pintle, that is, the cone portion 13, is provided with a threaded socket 12 in which is received a screw 13′. A lock washer 14′ is disposed between the head of the screw 13′ and the complementary cone 15′, the screw 13′ thereby serving to attach the complementary cone 15′ to the lower surface of the cone 13. However, the connection is such that the yoke 11 will of course be freely rotatable. The complementary cone 15′ has its edges crimped upwardly and over the bearing portion 15 of the yoke 11 to completely enclose the bearings 14 in a housing which will obviously serve as a protection against admission of foreign material, while permitting the yoke 11 to freely rotate, as has been previously described.

It will be seen that the bearings 14 carry the weight of the chair or other load; and as will be seen, these bearings are positioned backwardly of the wheel at a point not higher from the floor than the height of the wheel. This lowers the center of gravity so that the wheel will not tend to nose into the floor and permits easier swivelling of the caster.

The pintle 12 terminates in a head 16, the shank 12 being grooved as indicated at 17 to form a flange beneath the head 16.

It will be understood that the article of furniture 18, which may be a chair or any other piece of furniture, is recessed at 19 for the reception of the pintle 12, there being inserted in the recess 19, a member 20 which may be designated as a pintle receiving member, this member 20 being provided with a flange 21 which is provided with the pointed projections or spikes 22 for interlocking the member 20 with the article of furniture, as clearly shown in the drawing. The upstanding portion of the member 20 is provided with slots indicated at 23, this upstanding portion of the member 20 being resilient and being inwardly tapered at its end as indicated at 24.

This construction permits the end 24 to be pressed outwardly by the head 16 as the pintle 12 is inserted through the member 20, the end 24 of the member 20 then snapping back into its original position, and into engagement with the underneath side of the head 16 to secure the shank 12, and accordingly the yoke 11 and caster 10 in position. The projections 22 firmly secure the member 20 in place, so that the caster is substantially permanently held in its position on the article of furniture 18.

It will be apparent that the yoke 11 is turnably mounted on the bearing surface 13, and that this turning action is greatly facilitated through reduction of friction because of the action of the balls 14.

Figures 3, 4 and 5 show a somewhat modified form of construction, these figures showing a yoke 11*a* turnably mounted on pintle 12*a*, which is provided with a flanged head 16*a*, in general similar to the head 16 above described, although it may be of a flat form, as indicated in Figures 2 and 4.

The pintle receiving member 20*a* is provided with a depending flange 21*a* and the projections 22*a*, similar to the projections 22 above described.

The upstanding portion of the member 20*a* is provided with slots 23*a* and the inwardly tapering resilient portion 24*a* which is adapted to interlock with the head 16*a*, similarly as described before. It will be understood that as the pintle 12*a* is inserted in the tapering portion 24*a* of the member 20*a*, this portion 24*a* will be expanded until the head 16*a* has passed through it, when the portion 24*a* will return to its original position and snap in the flange 17*a* beneath the head 16*a*. The member 20*a* is also provided with a plurality of transversely aligned apertures 25, conveniently located adjacent the inwardly tapering portion 24*a*, the purpose of which apertures 25 will hereafter become apparent.

As shown on the drawing, there is also very conveniently supplied in accordance with this form of construction, the member 26, which is complementary to the member 20*a*, this member 26 being provided with the upstanding portion 27 which is adapted to fit closely within the upstanding portion of the member 20*a* when the pintle 12*a* is in-

serted. For this purpose, the portion 27 is made yielding, and is inserted in an inwardly tapering manner as shown in Figure 4, the portion 27 being provided with the pointed projections 28 which serve as interlocking spikes for the member 27, these projections 28 being adapted to pass through the apertures 25 when the pintle 12*a* is inserted, and to penetrate into the material of the article of furniture 18*a*.

The complementary member 26 also surrounds the flange 21*a* of the member 20*a*, the upper portion of this member 26 being bent over the flange 21, as indicated at 29, so that the members 20*a* and 26 are firmly secured together. The member 26 is also provided with the pointed projections 30, similar to the projections 22*a* and serving likewise as interlocking spikes for insertion into the article of furniture 18*a*.

As will be seen from the drawing, the shank 12*a* is provided with an intermediate flange 31, and for the purpose of reducing friction as the pintle 12*a* and the yoke 11*a* turn, there is provided a bearing 32 which engages the flange 31 and the yoke 11*a*, as shown on the drawing, the member 32 being provided with a flanged portion 32*a* which is inserted between the yoke 11*a* and the member 26 forming an additional bearing surface or face. This member 32 is desirably formed of a self lubricating metal, of the well known varieties, so that there will be a continuous supply of lubrication for anti-skid friction purposes, thus assuring at all times ready operation of the caster 10*a* and the pintle 12*a*. The shank 12*a* is swaged as shown at 33, against the washer 34, which prevents the caster carrying member 11*a* from disengaging from the pintle 12*a*; and because of the self lubricating character of the flange 32*a*, friction around the yoke 11*a* is reduced to a minimum.

It will be seen that as the pintle 12*a* and the bearing member 32 are inserted into the member 26, the inwardly tapering portions 27 thereof, will be forced outwardly, and the spikes 28 will be forced into engagement with the article of furniture 18*a*.

As the head 16*a* of the pintle 12*a* is further inserted, it will engage the tapering portion 24*a* of the pintle receiving member 20*a*, and cause this inwardly tapering portion to expand until the head 16*a* has passed through the inwardly tapering portion 24*a*, which portion then, because of its resiliency, tends to resume its original position, and thus snaps into place in the flange 17*a* beneath the head 16*a*. It will thus be seen that the pintle 12*a*, the complementary member 26, the bearing member 32, and the member 20*a* are all mutually interlocked in a substantially inseparable relationship, so that the caster 10*a* will be permanently held in position.

It will thus be seen that there is provided a very durable article of this character, all the parts of which are very simply and readily made, and consequently cheap to manufacture, and which are very firmly secured together to perform their cooperating functions. It will be apparent that many changes in the specific details of the construction of the article herein specifically described and illustrated may be made without departing from the inventive concept, and it will be understood that it is intended and desired to embrace within the scope of this invention such modifications, changes as may be required to adapt it to varying conditions and uses.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent of the United States, is:—

1. In a caster construction, in combination, a yoke, a wheel rotatably supported by the yoke between its fork ends, said yoke comprising an intermediate upper portion of annular form crimped downwardly to provide an annular concave race surface on its inner wall, a pintle for securing the caster in position in an article of furniture to be carried by the caster, the pintle terminating at its lower end in an enlarged inverted frusto-conical projection defining a ball race between itself and the said concave race surface, balls positioned in the race to relieve friction between moving parts, a second frusto-conical member secured to the inverted frusto-conical member and having its ends upturned to enclose the lower portion of the downwardly crimped portion of the yoke to form a housing completely enclosing the balls and sealing the race, thereby protecting them from foreign materials while allowing rotation of the yoke, the said housing having its sides bent into substantially right angles to define the race.

2. In a caster construction, in combination, a yoke, a wheel rotatably supported by the yoke between its fork ends, said yoke comprising an intermediate upper portion of annular form crimped downwardly to provide an annular concave race surface on its inner wall, a pintle for securing the caster in position in an article of furniture to be carried by the caster, the pintle terminating at its lower end in an enlarged inverted frusto-conical projection defining a ball race between itself and the said concave race surface, balls positioned in the race to relieve friction between moving parts, a second frusto-conical member secured to the inverted frusto-conical member and having its ends upturned to enclose the lower portion of the downwardly crimped portion of the yoke to form a housing completely enclosing the balls and sealing the race, thereby protecting them from foreign materials while allowing rotation of the yoke, the aforesaid

construction being rearwardly offset at a substantial distance from the wheel, and being positioned at a distance from the floor not more than the height of the wheel.

In testimony whereof we affix our signatures.

ALBERT E. RICE.
ADELBERT FORD RICE.