

PATENT SPECIFICATION



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435,492

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PROVISIONAL SPECIFICATION

Improved means for Connecting Wheels or the like to Rods or Spindles

I, FRANK HORNBY, of 236, Binns Road, Old Swan, Liverpool, British, do hereby declare the nature of this invention to be as follows:—

5 It is desirable in the lighter class of mechanism and particularly in constructional toys to have some simple means of readily fixing or removing a wheel, pulley or the like elements to or from a shaft or
10 spindle and the present invention is directed to a simple means of effecting this.

According to this invention the wheel or pulley or other element is adapted to
15 be connected to the rod or spindle by means of a rubber or rubber composition bush which is loosely housed in the element or in the hub of a wheel or pulley, the bore of the rubber or like bush being
20 slightly smaller than the diameter of the rod or spindle on which the element or wheel or pulley is to be fixed so that the element may be pushed on to the rod, the rubber or like bush frictionally gripping
25 the rod in such manner that the element may be readily adjusted axially along the rod to any desired position. Such an arrangement obviates any necessity for keyways or other positive means
30 for securing the wheel or pulley or element, such as grub screws fitted in say the wheel boss which are somewhat difficult to fit, particularly in restricted positions. Preferably the rubber bush is rotatively
35 free in the element or hub of the wheel or pulley so that while the pulley or wheel may be secured against axial or longitudinal movement on the rod it is free to rotate thereon.

40 In order to ensure a more positive keying connection between a pulley and rod against relative rotary movement between the two, the rod may be formed with a gag or short rib or several of these

adapted to engage with a keyway or keyways in the hub of the wheel disc. 45

In one embodiment of the invention and as applied to means for fixing light pulleys or wheels on the rods or spindles of constructional toys, the wheel or pulley is of the disc type that is to say composed of two discs secured together to form the side cheeks of the wheel and enclosed between these at the hub is a rubber pad preferably arranged to have a rotary running clearance between the cheek discs of the wheel, where the wheel is to run freely on the rod. The hole in the rubber pad or bush is arranged to be a tight driving fit on the spindle, clearance holes being provided in the discs of the wheel. With such a construction if the wheel be pushed along the spindle it can be set thereon in any desired axial position by the frictional grip of the rubber pad and the wheel will be quite free to rotate about the pad on the rod. The frictional grip of the pad enables minute axial adjustment of the position of the wheel to be easily effected, the wheel being quite readily fitted on or removed from the rod. Where it is desired to utilize the wheel as a driving wheel rotating with the rod, gaps ridges or flats are formed at certain positions on the rod and corresponding notches or keyways in the eye of one of the cheek discs of the wheel, the gaps engaging the notches or keyways and so rotatively connecting the wheel to the rod, while the rubber disc prevents endwise
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The construction described is especially suitable for constructional toys and similar light articles.

Dated this 11th day of April, 1934.

A. J. DAVIES,
Patent Agent,
24, Moorfields, Liverpool.

COMPLETE SPECIFICATION

Improved means for Connecting Wheels or the like to Rods or Spindles

85 I, FRANK HORNBY, of 236, Binns Road, Old Swan, Liverpool, British, do hereby declare the nature of this invention and

in what manner the same is to be performed, to be particularly described and ascertained in and by the following state- 90

ment:—

This invention relates to wheels, pulleys and the like for constructional toys and other light class of mechanism, of the type in which the wheel or the like is provided with a hub portion enclosing a bush or ring of rubber or other frictional material bored to grip the shaft or spindle and thereby axially locate the wheel or the like.

The object of the present invention is to provide an improved wheel, pulley or other element of this type which, while being secured against axial movement on the shaft or spindle, is capable of free relative rotation thereon.

For this purpose according to the present invention the wheel, pulley or other element is provided with a hollow hub or housing containing a bush or ring of rubber, rubber composition, or like frictional material, such bush or ring having a free rotary running clearance within the hub or housing, and being bored to frictionally grip a rod or spindle on which the wheel or other element is engaged.

Such an arrangement obviates any necessity for keyways or other positive means for securing the wheel or pulley or other element, such as grub screws fitted in say the wheel boss, which are somewhat difficult to fit, particularly in restricted positions.

Several embodiments of the invention, for use in constructional toys, are illustrated by way of example in the accompanying drawing, in which:—

Figs. 1, 2 are front elevational and sectional views respectively of a road wheel formed from a pair of sheet metal discs,

Fig. 3 being a side view of one of the discs.

Figs. 4, 5 are front and sectional views respectively of a flanged wheel, similar views being comprised in

Figs. 6, 7 showing a pulley,

Figs. 8, 9 showing an axle collar, and

Figs. 10, 11 an axle box.

The toy wheel shown in Figs. 1, 2 comprises a pair of sheet metal discs 1, 2 having opposed dish-shaped recesses; the larger disc 2 having its periphery curled to part-circular shape to simulate a tyre 3. Located in a central housing 4 between the discs 1, 2 at the hub of the wheel is a circular rubber bush or ring 5 which is dimensioned to have a running clearance in the hollow hub 4. A central hole or bore 6 is made in the bush 5, and is of such a size as to be a tight driving fit on the rod or spindle 7 supporting the wheel. Coincident central clearance holes 8 are formed in the two discs 1, 2 of the wheel. The two discs 1, 2 are secured

together by means of lugs 9 on the smaller disc 1 which engage in cooperating slots in the other disc 2. With such a construction, if the wheel be pushed on to and along the rod 7, it can be set thereon in any desired axial position by the frictional grip of the rubber bush 5, and the wheel will be quite free to rotate about the bush on the rod. The frictional grip of the bush enables minute axial adjustment of the position of the wheel to be easily effected, the wheel being quite readily fitted on or removed from the rod.

Where it is desired to utilize the wheel as a driving wheel rotating with the rod, gags or ridges 7a are formed at certain positions on the rod 7 and corresponding notches or keyways 7b in the eye of one of the cheek discs of the wheel, the gag 7a engaging the notch 7b and so locking the wheel to the rod while the rubber bush 5 prevents endwise movement.

In the flanged wheel of Figs. 4, 5 the hub comprises a cup-shaped element 10 formed, say, from a sheet metal pressing, and loosely housing a circular rubber bush 5. The hub element 10 is secured to the wheel 11 by means of lugs 9 engaging slots in the wheel. Such a hub element 10 may also be applied to a pulley, fan and similar elements adapted to be mounted on a rod or spindle.

The pulley shown in Figs. 6, 7 comprises a pair of sheet discs 1, 2 having opposed central recesses forming a central hollow hub 4 loosely housing a circular rubber bush 5. The discs 1, 2 are secured together in well-known manner by means of eyelets 13. The peripheral edges of the discs are flanged outwards to produce a peripheral recess 14, of V or other suitable section, at the rim of the pulley.

The element illustrated in Figs. 8, 9 is in the form of a cup-shaped member 10, similar to that forming the hub of the previously described flanged wheel, a circular rubber bush 5 being loosely housed within the cup member 10, which is closed to retain the bush 5 by means of a disc 15, the disc being secured by flanging over the peripheral edge of the cup member. Such rotary elements may be employed for axially locating an ordinary wheel or pulley on a rod or spindle, a rotary element being positioned, for example, on the rod or spindle at each side of the hub of the wheel or pulley.

In the axle-box of Figs. 10, 11 a metal strip 16 is formed with an integral cup-shaped housing 10 within which is a loose rubber bush 5. The strip 16 is secured by nuts and bolts 17 to a support 18, which may be a side chassis member of a toy vehicle, and may consist of a perforated strip member as used in construc-

tional toys. A wheel is secured to the projecting end of the rod or spindle 7, the latter being freely rotatable by reason of the loosely fitting bush 5, and at the same time secured against axial movement by the grip of the bush on the rod 7.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is:—

1. A wheel, pulley or other element of the type referred to for constructional toys and other light class of mechanism, wherein the wheel or other element is provided with a hollow hub or housing containing a bush or ring of rubber, rubber composition, or like frictional material, such bush or ring having a free rotary running clearance within the hub or housing, and being bored to frictionally grip a rod or spindle on which the wheel or other element is engaged.

2. A wheel or pulley according to Claim 1, comprising a pair of discs, one or both of which are shaped to form a central circular recess, the two discs being connected together to produce a wheel or pulley having a hollow hub, freely rotatable within which is the circular bush or ring having a central bore coincident with central clearance holes in the two discs.

3. A pulley according to Claim 2, wherein the peripheral edge of one or both discs is flanged to present an annular peripheral recess of V or other section, at the rim of the pulley.

4. A wheel, pulley, rotary fan or the like in accordance with Claim 1, to which is attached a hollow hub in the form of a cup-shaped member within which is housed the bush or ring, the bush or ring being rotatively free within the hub to

permit of free rotation of the wheel or the like on the rod or spindle.

5. A wheel or the like according to Claim 4, wherein the cup-shaped member is attached to the wheel or the like by means of integral lugs at the open end of the cup-shaped member which engage co-operating apertures in the wheel or the like.

6. An element according to Claim 1, comprising a cup-shaped member housing a circular bush or ring of rubber or like frictional material, the open end of the cup-shaped member being closed by a disc secured by flanging over the free edge of the cup member, clearance holes being made in the cup member and in the disc in alignment with a central bore in the bush or ring.

7. An axle-box according to Claim 1, comprising a member having an integral cup-shaped housing and a bush or ring of rubber or like frictional material freely rotatable therein and bored to frictionally grip the rod or spindle, such axle-box serving to locate the rod or spindle against axial movement.

8. A wheel, pulley or other element according to Claim 1, which is adapted to be locked to the rod or spindle by means of a gag or ridge on the latter which engages a co-operating recess in the hub or housing.

9. A wheel, pulley or other element for constructional toys and other light class of mechanism substantially as described with reference to the constructions shown in the accompanying drawing.

Dated this 11th day of March, 1935.

A. J. DAVIES,
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[This Drawing is a reproduction of the Original on a reduced scale.]

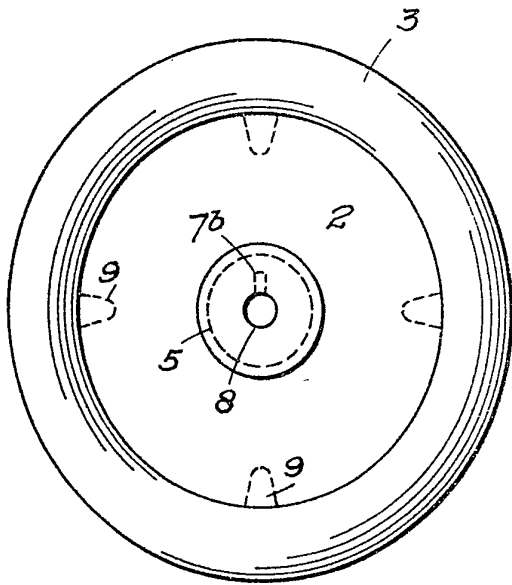


FIG. 1.

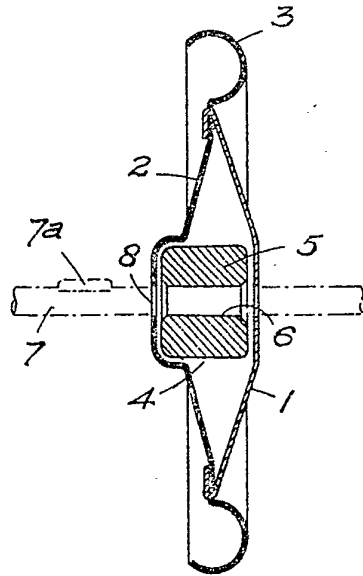


FIG. 2.

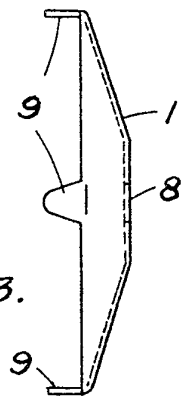


FIG. 3.

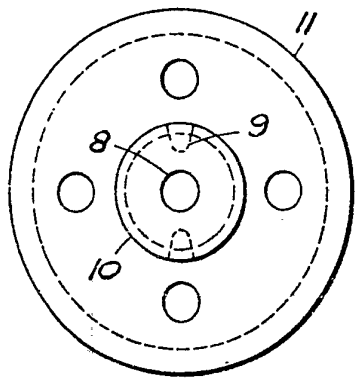


FIG. 4.

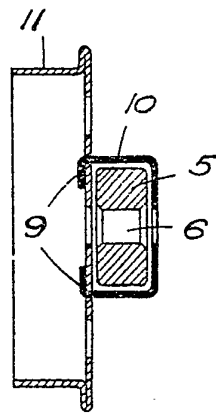


FIG. 5.

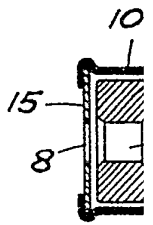


FIG. 6.

FIG

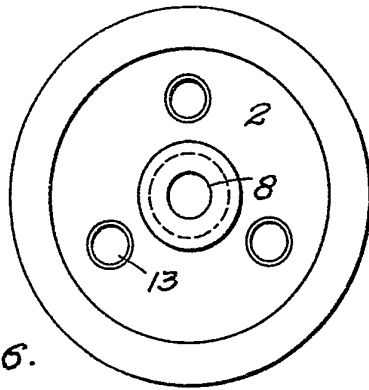


FIG. 6.

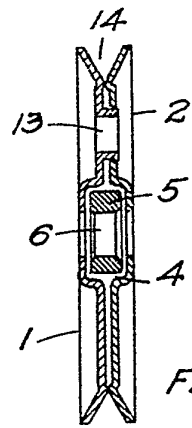


FIG. 7.

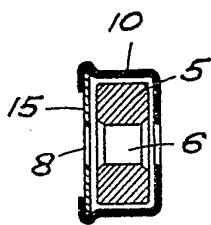


FIG. 9.

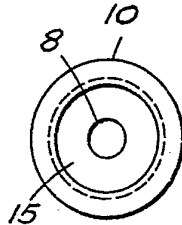


FIG. 8.

FIG. 10.

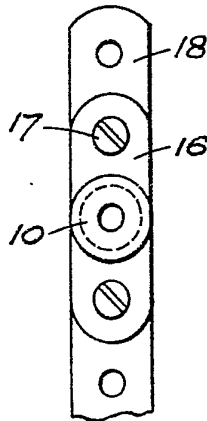
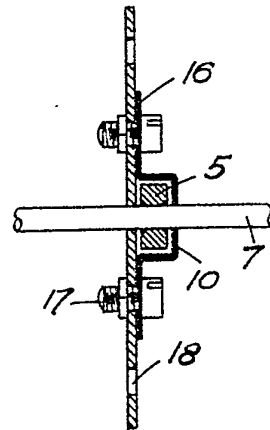


FIG. 11.



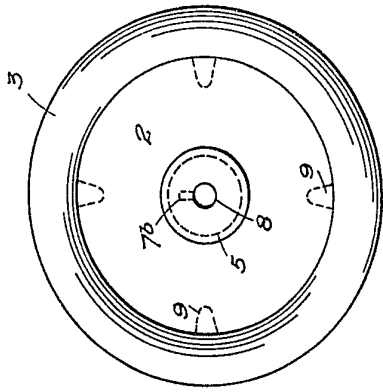


FIG. 1.

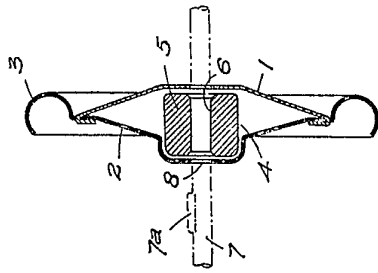


FIG. 2.

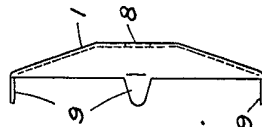


FIG. 3.

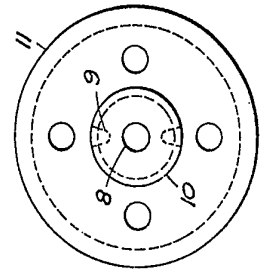


FIG. 4.

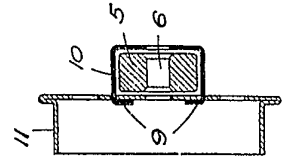


FIG. 5.

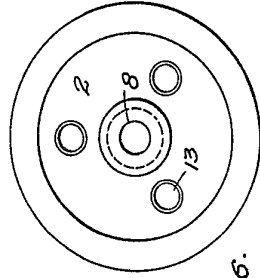


FIG. 6.

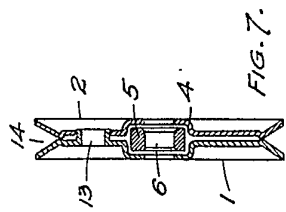


FIG. 7.

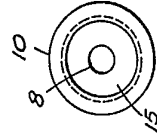


FIG. 8.

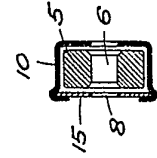


FIG. 9.

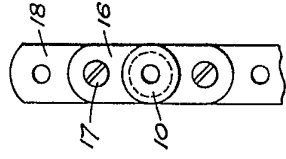


FIG. 10.

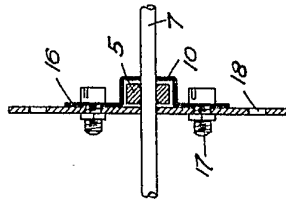


FIG. 11.

[This Drawing is a reproduction of the Original on a reduced scale.]