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(54) A WHEEL FOR A TOY BUILDING SET
RAD FÜR EIN SPIELZEUGKONSTRUKTIONSSET
ROUE POUR UN JEU DE CONSTRUCTION

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Description

The invention concerns a wheel for use in a toy building set and comprising a tire for mounting on a rim with a substantially cylindrical mounting face.

Various vehicles have always been among the basic structures which it should desirably be possible to build with the interconnectable elements of a toy building set. As more and more elements for the toy building sets are developed, it is possible to build models which resemble real vehicles to an ever greater degree. Thus, greater requirements are now also made by the consumer since it is now no longer satisfactory to use the same wheel for a model of e.g. a loader tractor and another model of e.g. a passenger car. US-A-3 642 048 describes an example of the structure of a wheel of the above-mentioned type.

The object of the invention is to provide a wheel structure for use in a toy building set which can be used in various models of vehicles in a manner such that the wheels contribute to a realistic overall appearance of the vehicle.

This object is achieved as stated in the characterizing portion of claim 1 because the tire is asymmetric. When the tire is seen in its radial direction, the actual "tread" will be approximately symmetric, while the asymmetry of the tire entails that one side approximately exposes the rim and the hub, while the rim and part of the hub toward the other side are covered. As the tire is turnable, the wheel will seem to have a thin tire from one side, while, when the tire is turned, the corresponding wheel will pretend to have a very thick tire. Thus, with simple means it is possible for the user to use the same components in two widely different models where the wheels still support the intended general impression.

In the preferred embodiment the tire is made of an elastic material, e.g. rubber, and can be received slidably in the axial direction on the rim. Usually, it is not necessary, but may be expedient in some cases to provide the contact faces between the tire and the rim with an annular bead and a groove to receive the bead.

The wheel part on which the tire is mounted, preferably comprises a cylindrical rim which is integral with a hub via a disc-shaped wheel part. The hub usually also has a cylindrical part for rotatable reception of a shaft part, e.g. shaped as a screw whereby the wheel can be attached to other elements incorporated in the toy building set.

In the preferred embodiment the tire is cylindrical and open at one end, so that the rest of the wheel can be received by movement in the axial direction. The other end of the wheel is partly closed and thus serves as a stop for the axial movement. The partly closed end of the tire may be formed with an internal, annular channel, in which part of the rim is received and retained as a frictional fit against two of the tire faces, partly inwardly partly outwardly. The depth of the channel may expediently correspond to the part of the rim which extends outside the disc-shaped wheel part.

The disc-shaped wheel part is usually displaced with respect to the central plane of the rim, and stiffening elements in a radial direction may therefore expediently be provided behind the disc-shaped wheel part. These stiffening elements may then expediently serve as a stop for the innermost edge of the annular channel of the tire.

In an alternative embodiment where the wheel shaft is shaped as a screw, this may be attached to the hub in snap manner. It will here be the screw that is turnable with respect to the rest of the wheel. Here too, it is possible to utilize the asymmetric shape of the tire. However, the screw will just be a relatively small single part, which is not always expedient, in particular if the toy building set is intended for small children. It will be appreciated that it is also possible to combine the two above-mentioned structures so that both screw, hub/rim and tire are mutually turnable. Thus, it can also be utilized here that hub/rim may likewise be constructed asymmetrically.

The invention will be explained more fully below with reference to the drawing, in which

fig. 1 is a sectional view of a preferred embodiment of a wheel according to the invention,

fig. 2 is a sectional view of an alternative embodiment of a wheel according to the invention,

fig. 3 is a sectional view of a further embodiment of a wheel according to the invention,

fig. 4 shows in perspective how a wheel according to the invention may be used in a toy building set,

fig. 5 is a side view of the wheel shown in fig. 1, and

fig. 6 is a side view of the wheel of fig. 1 with turned tire.

A wheel according to the invention is shown in fig. 4 where the wheel is adapted for use in a toy building set. In the shown embodiment the wheel comprises a substantially cylindrical tire which is generally designated by the reference numeral 10. The tire 10 has a tread face 9 and a ring-shaped outer face 11 provided at the end of the cylindrical section of the tread face. The tire 10 can be pushed inwardly over a substantially cylindrical rim 12 and be retained as a frictional fit. Via a disc-shaped wheel part 13 the rim 12 is integral with a hub 14 (see fig. 1), in which a shaft in the form of a screw with a shank 16 is rotatably journalled. The screw 16 has a head 18 with a profile such that a tool (not shown) suitable for the purpose can attach the wheel to a building element 30 incorporated in the toy building set. This attachment is provided in that the shank 16 of the screw is formed with a threaded section 19 which is received in a threaded hole 35 in the building element 30 complementary to the threaded section 19.

Fig. 1 is a detailed sectional view of the structure shown in fig. 4. It will be seen that the head 18 on the
screw serves as a stop for the hub 14. It will moreover
be seen that the shank 16 of the screw has an annular
bead 17 which is asymmetric, so that one side of the
bead serves as a guide face in the mounting of the hub
14, while the other side serves as a stop face when the
hub 14 has been mounted on the screw. During assem-
bly of the individual parts of the screw it will thus be pos-
sible to slide the hub up along the shank 16 of the screw
and inwardly over the bead 17. However, backward
movement of the hub 14 will not be possible so that the
hub 14 is retained rotatably between the head 18 of the
screw and the bead 17. As will be seen, the hub 14 con-
stitutes a cylinder tube which, via a disc-shaped section
13, is integral with a rim 12 coaxial with the hub 14. In
a preferred embodiment the outer cylinder face of the rim
12 is formed with an annular groove 22 so that when the
tire 10 is removed the wheel can be used for other build-
ning purposes, e.g. fixing caterpillar®-treads and the like.
The tire 10 itself is shown to be asymmetric, having at its
one side a portion which extends beyond the edge of the
rim 12 and forming an annular channel in which the edge
of the rim 12 is received. The central plane of the tire
preferably corresponds to the central plane of the rim,
and in a preferred embodiment the tire therefore has a
width corresponding to the width of the rim plus twice the
thickness of the portion 11. This means that the part of the
screw head 18 extending outside the contour of the tire
will be constant no matter which way the tire points.
For reasons of strength it will often be an advantage that
the rim 12 and the shaft 14 are connected with stiffening
elements 23 in addition to the disc-shaped part 13.
These stiffening elements 23 extend from the hub 14
toward the rim 12 in a radial direction. When the wheel
is provided with such stiffening elements 23, the depth
of the ring-shaped channel of the tire - formed by the por-
tion 11 - can correspond to the distance from the disc-
shaped part 13 to the outer edge of the rim 12 as well as
to the distance from the stiffening elements 23 to the
other outer edge of the rim 12.

Fig. 2 shows a second embodiment of the wheel
according to the invention in which, like the embodiment
shown in fig. 1, the hub 14 is rotatably journaled between
a bead 17 and a head 18 on a screw with a shank 16.
The hub 14 is here connected with a rim 12 via a disc-
shaped wheel part 13. The rim 12 is provided with an
annular groove 22, which is somewhat deeper than the
annular groove shown in fig. 1, and which is adapted to
receive a corresponding annular bead 24 on the internal
cylinder face of the tire 10. The tire 10 is preferably of
a flexible material, such as rubber, and the bead 24 can
therefore be deformed and pushed inwardly over the rim
12 until it is received in the groove 22. The frictional fit
explained in connection with fig. 1 will thus be strength-
ened additionally through the coupling between the tire
10 and the rim 12 achieved with the bead 24. As will be
seen, the tire 10 is terminated toward one side, so that
the tire termination substantially follows the edge of the
rim, while the tire at its other side terminates in a portion
25 that extends inwardly over and covers the tire 12. Like
in fig. 1, it will be possible to mount the tire 10 on the rim
12 from both sides so that the tire seems thick (e.g. like
a tractor tire), or thin (e.g. like a tire for a passenger car).

Fig. 3 shows a third embodiment of a wheel accord-
ing to the invention, where the hub 14 is connected with
the rim 12 via a disc-shaped wheel part 13 and stiffening
elements 23. At its one side the tire 10 has a portion 11
extending outwardly over and inwardly below the rim 12.
A portion 25 at the other side of the tire 10 extends down-
wardly over the rim 12 and functions in substantially the
same manner as the bead 24. Here too, the tire 10 will
be so elastic that it can be mounted on and removed from
the rim 12 from both sides. In this embodiment the hub
14 is mounted on a screw with a head 18 and a shank
16. The shank will also have a bead 26 which, in contrast
to the bead 17, has two inclined guide faces, thereby
making it possible to remove the shaft from the hub.
When hub/rim is formed with different front and rear
sides, it will be possible to obtain a wheel with four dif-
ferent appearances with both a turnable shaft and a turn-
able tire.

Fig. 5 is a lateral view of the tire shown in fig. 1, where
the wheel has the appearance of a solid tractor tire
because of the thick portion 11. From this side it is also
possible to see the screw head 18 as well as part of the
disc-shaped plate 13. Fig. 6 shows the wheel of fig. 1,
where the tire 10 is turned, and it appears from this figure
that the wheel seems considerably smaller, e.g. like a
wheel for a passenger car or the like. In addition to the
relatively narrow tire 10, the figure shows the rim 12 on
which the tire 10 is mounted, as well as the disc-shaped
plate 13 which is shown in its entirety. Also the screw 18
is visible.

The invention has been explained above in connec-
tion with a hub which is rotatably journaled on a screw
by means of which the wheel as a whole can be secured
to another building element incorporated in the toy build-
ning set. However, nothing prevents the connection
between the screw and the hub 14 from being fixed, i.e.
the shaft forms an integral part with both the rim and the
hub. When the threaded hole 35 shown in fig. 4 is rotat-
bly journaled as a separate shaft part in the building
element 30, this shaft part can be connected with a
motor, where rotation of the shaft part can cause the
wheel to rotate to propel a vehicle.

Claims

1. A wheel for use in a toy building set and comprising
a rim (12) having a substantially cylinrical mounting
face and two rim sides as well as a tire (10) having
a substantially cylinrical engagement face facing
ward the rim (12), said tire having an annular bead
(11; 21), characterized in that the tire (10) has an
outer surface which is asymmetric about its central
plane perpendicular to the wheel axis, that the annu-
lar bead (11; 21), when the tire (10) is mounted on
the rim (12), extends inwardly across said rim (12)
in radial direction of the wheel, and that the rim sides
in the area around the bead (11; 21) of the tire (10) are positioned within the cylindrical body formed by the mounting face, whereby the tire (10) is turnable.

2. A wheel according to claim 1, characterized in that the central plane of the tire (10) corresponds to the central plane of the rim (12).

3. A wheel according to claim 2, characterized in that the tire (10) is made of an elastic material, and that the rim (12) and the tire (10) are formed with an annular groove (22) and a bead (24), respectively, in the engagement faces at respective central planes.

4. A wheel according to claim 1 or 2, characterized in that the rim (12) is connected with a hub (14) through a disc-shaped wheel (13) part perpendicular to the wheel axis.

5. A wheel according to claim 4, characterized in that a shaft part (16) shaped as a screw is rotatably received in the hub (14) by means of which the wheel can be secured to other elements incorporated in the toy building set.

6. A wheel according to claims 1-5, characterized in that the tire (10) is shaped as a cylinder which is open at one end and partly closed at the other end, the bead (11; 21) of the tire (10) forms an inwardly facing flange that forms an engagement face for the edges of the rim (12).

7. A wheel according to claim 6, characterized in that the flange is formed with an internal bead to provide an annular channel in which one of the edges of the rim (12) can be received.

8. A wheel according to claim 7, characterized in that the distance from the outer edge of the flange to the disc-shaped wheel part (13) corresponds to the depth of the annular channel.

9. A wheel according to claim 7, characterized in that the hub (14) and the rim (12) are additionally connected with stiffening elements (23) in the radial direction of the wheel, and that the distance from the inner edge of the rim (12) to the stiffening elements (23) corresponds to the depth of the annular channel.

10. A wheel according to claim 5, wherein the screw has a threaded end, characterized in that the screw end facing away from the threaded end has a stop (18) preventing axial movement of the hub, and that an annular bead (17; 26) is provided between the stop (18) and the threads so that the hub, when displaced in the axial direction, can be moved over the bead and be retained in a snap manner between the stop (18) and the bead (17; 26).

Patentansprüche

1. Ein Rad zur Verwendung in einem Spielzeugkonstruktionsset, aufweisend eine Felge (12) mit einer im wesentlichen zylindrischen Montagefläche und zwei Feigenseiten sowie einen Reifen (10) mit einer im wesentlichen zylindrischen Eingriffsfäche zur Felge (12), wobei der Reifen einen ringförmigen Wulst (11; 21) aufweist, dadurch gekennzeichnet, daß der Reifen (10) eine Außenflache hat, die um ihre Mittelebene, die rechtwinklig zur Radachse ist, asymmetrisch ist, daß der ringförmige Wulst (11; 21) in radialer Richtung vom Rad nach innen über die Felge (12) hinaus geht, wenn der Reifen (10) auf die Felge (12) aufgezogen ist, und daß die Feigenseiten im Bereich um den Wulst (11; 21) des Reifens (10) innerhalb des zylindrischen Körpers angebracht sind, der von der Montagefläche gebildet wird, wobei der Reifen (10) umkehrbar ist.

2. Ein Rad nach Anspruch 1, dadurch gekennzeichnet, daß die Mittelebene des Reifens (10) der Mittelebene der Felge (12) entspricht.

3. Ein Rad nach Anspruch 2, dadurch gekennzeichnet, daß der Reifen (10) aus elastischem Material besteht und daß die Feige (12) und der Reifen (10) an den Eingriffsfächen in ihren Mittelebenen mit einer ringförmigen Vertiefung (22) bzw. einem Wulst (24) versehen sind.

4. Ein Rad nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Felge (12) durch einen scheibenförmigen Radteil (13), der rechtwinklig zur Radachse ist, mit einer Habe (14) verbunden ist.

5. Ein Rad nach Anspruch 4, dadurch gekennzeichnet, daß ein schraubenförmiger Wellenteil (16) drehbar in der Nabe (14) gelagert ist, wodurch das Rad an anderen Elementen im Spielzeugkonstruktionsset gesichert werden kann.

6. Ein Rad nach Anspruch 1-5, dadurch gekennzeichnet, daß der Reifen (10) wie ein Zylinder geformt ist, der an einem Ende offen und am anderen Ende teilweise geschlossen ist, und der Wulst (11; 21) des Reifens (10) einen nach innen weisenden Flansch bildet, der eine Eingriffsfäche für die Felgenränder (12) bildet.

7. Ein Rad nach Anspruch 6, dadurch gekennzeichnet, daß der Flansch mit einem Innenwulst versehen ist, um einen ringförmigen Kanal zu bilden, in dem einer der Felgenränder (12) aufgenommen werden kann.


10. Ein Rad gemäß Anspruch 5, bei dem die Schraube ein Gewinde hat, dadurch gekennzeichnet, daß das Schraubenende, das vom Gewinde wegzeigt, einen Anschlag (18) hat, der eine axiale Bewegung der Nabe verhindert, und daß zwischen dem Anschlag (18) und dem Gewinde ein ringförmiger Wulst (17, 26) vorgesehen ist, so daß die Nabe, wenn sie in axialem Richtung verschoben wird, über den Wulst bewegt und zwischen dem Anschlag (18) und dem Wulst (17, 26) eingerastet festgehalten werden kann.

Revendications

1. Roue destinée à être utilisée dans un jeu de construction et comprenant une jante (12), comportant une face de montage sensiblement cylindrique et deux côtés de jante, ainsi qu'un pneumatique (10) présentant une face coopérante sensiblement cylindrique tournée vers la jante (12), ce pneumatique présentant une collerette annulaire (11 ; 21), caractérisée en ce que le pneumatique (10) comporte une surface extérieure qui est asymétrique vis-à-vis de son plan médian perpendiculaire à l'axe de roue, en ce que, lorsque le pneumatique (10) est monté sur la jante (12), la collerette annulaire (11 ; 21) s'étend vers l'intérieur en travers de la jante (12) suivant une direction radiale de la roue et en ce que les côtés de jante, dans la zone située autour de la collerette (11 ; 21) du pneumatique (10), sont disposés à l'intérieur du corps cylindrique formé par la face de montage, de sorte qu'il est possible de renverser le pneumatique (10).

2. Roue selon la revendication 1, caractérisée en ce que le plan médian du pneumatique (10) correspond au plan médian de la jante (12).

3. Roue selon la revendication 2, caractérisée en ce que le pneumatique (10) est réalisé en une matière élastique et en ce qu'une gorgue annulaire (22) et une collerette (24) sont formées respectivement sur la jante (12) et le pneumatique (10), dans les faces coopérantes et à l'endroit des plan médians respectifs.

4. Roue selon la revendication 1 ou 2, caractérisée en ce que la jante (12) est reliée à un moyeu (14) par l'intermédiaire d'une partie de roue (13) en forme de disque qui est perpendiculaire à l'axe de la roue.

5. Roue selon la revendication 4, caractérisée en ce qu'il est prévu, reçue d'une manière rotative dans le moyeu (14), une partie formant arbre (16) qui est conformée à la façon d'une vis et au moyen de laquelle la roue peut être fixée à d'autres éléments faisant partie du jeu de construction.

6. Roue selon les revendications 1 à 5, caractérisée en ce que le pneumatique (10) est formé sous forme d'un cylindre qui est ouvert à une première extrémité et partiellement fermé à l'autre extrémité et en ce que la collerette (11 ; 21) du pneumatique (10) forme un rebord qui est tourné vers l'intérieur et qui constitue une face coopérante pour les bords de la jante (12).

7. Roue selon la revendication 6, caractérisée en ce qu'un collet intérieur est formé sur le rebord pour constituer un canal annulaire dans lequel l'un des bords de la jante (12) peut être reçu.

8. Roue selon la revendication 7, caractérisée en ce que la distance séparant le bord extérieur de la collerette de la partie de roue (13) en forme de disque correspond à la profondeur du canal annulaire.

9. Roue selon la revendication 7, caractérisée en ce que le moyeu (14) et la jante (12) sont en outre solides d'éléments de raidissement (23) suivant la direction radiale de la roue et en ce que la distance séparant le bord intérieur de la jante (12) des éléments de raidissement (23) correspond à la profondeur du canal annulaire.

10. Roue selon la revendication 5, dans laquelle la vis comporte une extrémité filetée, caractérisée en ce que l'extrémité de la vis qui est située à l'opposé de l'extrémité filetée comporte une butée (18) empêchant un déplacement axial du moyeu et en ce qu'une nervure annulaire (17 ; 26) est prévue entre la butée (18) et les filets, de sorte que, lorsqu'on déplace le moyeu suivant la direction axiale, on peut le faire passer pardessus la nervure et il peut être retenu par enclenchement entre la butée (18) et la nervure (17 ; 26).