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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Tyre for Incorporation in a Toy

I, ARTUR FISCHER, a German citizen, of Tumlingen, Kreis Freudenstadt, Germany, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a tyre for incorporation in a toy, more especially a constructional toy, in order to transmit drive forces by engagement with the periphery of a like tyre.

According to the present invention there is provided a tyre for incorporation in a toy in order to transmit drive forces by engagement with the periphery of a like tyre, the tyre including an area of untoothed profile provided on its tread surface and an area of toothed profile provided on the surface of a side-wall of the tyre and the arrangement being such that in accordance with the relative positions of engagement of two such tyres drive forces can be transmitted between them, either in friction drive through mutual engagement of the untoothed profiles, or in geared drive through mutual engagement of the toothed profiles.

Preferably, the untoothed profile is provided centrally of the tread surface of the tyre, toothed profiles extending on both sides of the untoothed profile.

The profile providing for friction drive may consist of raised ribs on the tread surface of the tyre. Their arrangement is preferably such that two ribs of one tyre form a guiding and centering means for one rib of another like tyre which can penetrate between them and is the "running" rib. The recesses available on the tread surface of the tyre between the ribs can thus mate with the ribs of the other tyre which then make positive frictional engagement with the surface of the tyre. In order to enable the tyres to be coupled by toothed engagement, the toothed profile is arranged on either side of the untoothed surface the teeth

extending radially of the rotational axis and projecting beyond the radius of the basic tyre profile. The coupling of the tyres by means of this toothing can thus be effected over a range of angles, including the position in which one tyre lies flat against the other.

The tyre profile thus had the advantage that the tyres may serve not only for the transmission of drive forces by positive frictional engagement of the ribs provided on the tread surface, but may also assume the function of an angled gearing, due to the arrangement of the toothed profiles. Such a geared coupling is of great advantage in that it remains effective over a wide angular range, up to the position in which one tyre lies flat upon the other. This enables the construction of a unit including two juxtaposed tyres in positive mating engagement and safeguarded against mutual rotation, which is very advantageous where drives with wide running surfaces are needed. The unit may also be employed, for example, as a pulley. Alternatively, a single tyre may be used as a pulley, two raised ribs on the tread surface of the tyre being arranged to define a pulley groove. In this way drive forces may be transmitted between two such tyres arranged in spaced relation, by means of for example a cord, band or belt arranged in the grooves.

If the tyres are used in an angled drive, the arrangement of the toothed profiles offers the special advantage that the relative positions of the shafts of the driving and the driven tyres may be variable, so that the toothings remain engaged even when displacements occur due to the inaccuracy of the shaft positions — as may easily happen in the case of toys.

The invention is illustrated by way of Example in the accompanying drawing, in which

Fig. 1 is a plan view, partly in section, of two tyres coupled by positive frictional engagement; and

Fig. 2 is a similar view of two tyres coupled in an angled-drive arrangement by toothing.

Referring to the drawing, two tyres 3, 4 mounted on shafts 1, 2, each comprise two profiles of different type i.e. a profile comprising peripheral ribs or flanges 7, 8 and 9, 10, and another comprising radially extending teeth 11 — 14. Friction drive can be transmitted between the tyres by the ribs 7, 8 and 9, 10 respectively, arranged on the running surfaces 5, 6. To couple the two tyres 3, 4 for friction drive they are applied edge to edge as shown in Fig. 1 in such a way that one rib 7 of one tyre 3, as well as one rib 10 of the other tyre 4, engages the running surface (6 and 5 respectively) of the other tyre. The distance between the ribs 7 — 10 are such that a like rib of another tyre can fit freely between them. The ribs of one tyre also serve as lateral stops for centering that rib of the other tyre running between them. The height of the ribs is such that the recesses between them match with the ribs running in these recesses. In addition to friction drive by way of the ribs 7 — 10, the tyres can form a geared drive by way of the teeth 11, 12 and 13, 14 provided laterally of the ribs. In order that these teeth may function effectively as a toothed gearing, they are arranged radially of the rotational axis of the tyre and project beyond the radius of the basic tyre profile.

As shown in Fig. 2 the shafts 1, 2 of the tyres 3, 4 are at right angles, so that the teeth 11 and 13 function as an angled drive. However the use of this drive arrangement is not confined to the position of the shafts 1, 2 illustrated in Fig. 2. The transmission of drive by means of the teeth 11 — 14 may take place in any angular position of the shafts. A special case is the approximation of the two tyres 3, 4 to a point when they are applied flat to one another. In that case the two tyres form a unit safeguarded against relative rotation and useful where drive elements with a wide running surface are needed, for example if the two tyres are used to form a pulley.

WHAT I CLAIM IS:—

1. A tyre for incorporation in a toy in order to transmit drive forces by engagement with the periphery of a like tyre, the tyre including an area of untoothed profile provided on its tread surface and an area of toothed profile provided on the surface of a side-wall of the tyre and the arrangement being such that in

accordance with the relative positions of engagement of two such tyre drive forces can be transmitted between them, either in friction drive through mutual engagement of the untoothed profiles, or in geared drive through mutual engagement of the toothed profiles.

2. A tyre as claimed in claim 1, in which the said untoothed profile comprises circumferential raised ribs.

3. A tyre as claimed in claim 2, in which the said untoothed profile comprises two such raised ribs so spaced that a like rib of another tyre can be located between them.

4. A tyre as claimed in claim 3, in which the arrangement is such that with the ribs of two like tyres in mating engagement to prevent relative lateral displacement of the tyres, the extremity of each rib that is located between the two ribs of the other tyre can make positive frictional engagement with the surface of the tyre.

5. A tyre as claimed in any one of claims 1—4, in which the untoothed profile is provided centrally of the tread surface of the tyre, toothed profiles extending on both sides of the untoothed profile.

6. A tyre as claimed in claim 5, in which the teeth of the toothed portion of the tyre extend radially with respect to the rotational axis of the tyre, and project beyond the radius of the basic tyre profile.

7. A tyre as claimed in any of claims 1—6, in which the arrangement is such that the toothed profile is effective to transmit drive in a range of relative angular positions of two engaging tyres, including the position in which the side walls of the tyres lie in face to face contact.

8. A tyre as claimed in claim 3, or any one of claims 4—7 as appended thereto, in which the two raised ribs of the tyre are arranged to define a recess suitable for use as a pulley groove.

9. A tyre for incorporation in a toy, substantially as described herein with reference to the accompanying drawing.

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