March 1, 1927. 1,619,298

F. HORNBY

CIRCULAR GIRDER

Filed July 10, 1924

FIG 1

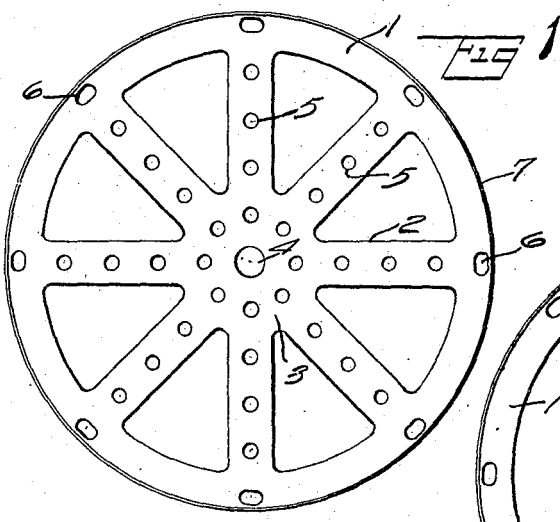


FIG 2

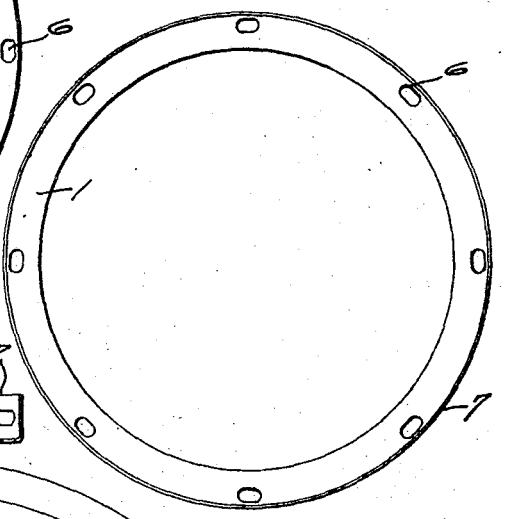


FIG 3

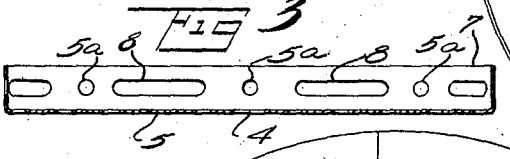
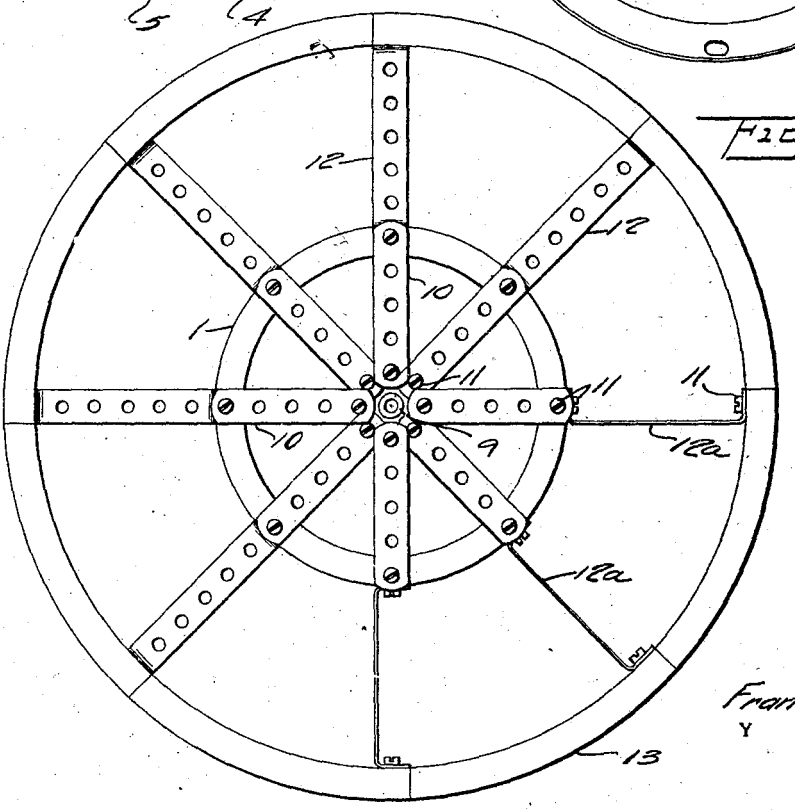


FIG 4



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Patented Mar. 1, 1927. 1,619,298

UNITED STATES PATENT OFFICE.

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CIRCULAR GIRDER.

Application filed July 10, 1924, Serial No. 725,103, and in Great Britain July 25, 1923.

This invention relates to an improved element for use in the building of constructional toys or models made from various interchangeable separate parts—such models being readily taken apart and the elements repeatedly utilized for the building of other devices.

In toys of this kind it is highly desirable that each of the elements be susceptible of a variety of uses, in order that the number of different parts in an outfit may be minimized. It is also desirable that the elements be such as to permit of economical manufacture, as by stamping from sheet metal.

The present invention relates to such an element. It is adapted for many uses with kindred elements having corresponding perforations for receiving the small bolts by which such parts are usually held together, and it may be formed by press tools.

According to this invention, the new element consists in its more complete form of a circular girder provided with radial spokes connected to a central disc or hub. In a more simple form the spokes and hub are omitted, and the element is a circular ring of angular cross-section. The inventive idea involved is capable of receiving a variety of mechanical expressions. The accompanying drawings are for the purpose of illustrating preferred forms, but it is to be understood that they are for that purpose only and are not meant to define the limits of the invention, reference being had to the appended claims for this purpose. In the drawings—

Fig. 1 is a plan of the more complete form of the element,

Fig. 2 is a plan of the simpler form of the element,

Fig. 3 is a section of the peripheral flange of both elements; and

Fig. 4 is a plan of a structure showing one of the elements in use.

In the more complete form, Fig. 1, the element assumes the shape of a wheel having the outer rim 1, the spokes 2, and the hub 3. This hub has a centrally located perforation 4, adapted among other things to receive an axle. The spokes, of any desired number, are provided with equidistant perforations 5, preferably round. The rim 1 is also provided with equi-distant perforations 6.

The hole spacing should be in keeping with the standard used in other elements of the constructional outfit, which spacing is usually one-half inch from center to center. Hence the holes 5 in the spokes are equidistantly spaced from each other in accord with said standard, and the innermost hole is a like distance from the center hole 4, and the outermost hole 5 is a like distance from the hole 6 in the rim.

If preferred, the central hole 4 may be of larger diameter than the holes 5 in the spokes, to receive the hub of a bush-wheel, for example; but it is desirable that such enlargement should not interfere with the uniformity of the hole spacing when measured from center to center.

That the new element may be put to the maximum number of uses, the equi-distant rim perforations are so spaced as to permit the standard perforations in other elements to register therewith. If these rim perforations be but six in number, they are spaced along a chord of a length which is a multiple of the standard unit of measurement. In the preferred forms shown with eight perforations, where absolute conformity to the standardization of hole spacing (when measured from center to center) has given way to the advantage of having diametrically opposite spokes and rim perforations, the said perforations are enlarged preferably by elongating in order that they may be adapted to register with the standard perforations in other elements of the outfit,—such elongated holes permitting of a slight adjustment in either direction of the attached standard parts.

Depending from the rim 1 is a flange 7, a section of which is shown in Fig. 3. This flange is preferably at a right angle to the plane of the rim, and has formed therein a plurality of perforations. In the preferred form shown, opposite each spoke is a round hole 5^a corresponding to the holes 5 in the spokes; and between these holes 5^a are elongated holes or slots 8. All perforations in the flange may be round like those marked 5^a; but it has been found exceedingly difficult, if not impossible, so to dimension one of these elements as to permit of uniformity of hole spacing in the flange wholly in accord with the standard of measurement adopted for the spokes and present in other elements going to make up a complete outfit. Hence the elongated slots 8

are employed. And even when not positioned in accord with the standard of measurement, these slots in conjunction with the holes 5ª will present a sufficient number of openings to register with holes spaced according to the standard as to permit of ready assembly.

In the more simple form, Fig. 2, the rim 1 with its preferably elongated perforations 6, and the peripheral flange 7 with its perforations 5ª and 8 (Fig. 3), are the same as in the more complete form,—but the spokes and hub are omitted in the modification.

In toys of the character in question, circular parts and especially wheels have a prominent place. The element herein disclosed can be put to a multiplicity of uses, but is especially of value in building constructions such as a Ferris wheel, as other elements may be secured to the rim and across the face of the part or directly to the peripheral flange, the new element being the foundation.

As illustrative of a common use for the new element, in Fig. 4 is shown a wheel structure having as a foundation the simple form of circular girder shown in Fig. 2. A bush-wheel 9 is employed as a hub. Radiating therefrom are the short perforated strips 10 forming spokes, the inner end of each being secured to the hub by a bolt 11. The rim 1 is then added; and, when spokes of the proper length have been selected, it will be found that the outermost perforation in each spoke registers with a rim perforation 6, to receive a bolt 11 to hold the parts in position. Radiating from the circumference of the rim 1 are the double angle perforated strips 12, the inner ends of which are secured to the rim by bolts passing through the flange perforations 5ª. The strips 12 may be in the plane of the spokes 10, or at an angle thereto as shown by the strips designated 12ª. If desired, the strips 12 may be staggered with respect to spokes 10 by securing them to the rim at any point in the elongated slots 8, instead of the perforations 5ª. At the outer end of the strips 12 are secured a plurality of channel sections 13, to form a complete wheel of substantial size.

Having thus described the invention, the following is claimed:

1. A circular element for a toy construction outfit comprising a disc having radially disposed rows of perforations equally spaced from center to center according to a predetermined standard obtaining in other elements of said outfit, all of said rows having a common center perforation, the outer perforations of adjacent rows being also equally spaced one from another and adapted to register with standard perforations in said other elements, and a flange at an angle to the plane of said disc having perforations differently spaced but adapted likewise to register with standard perforations.

2. A circular element comprising a disc having a central perforation, concentric circles of perforations radially spaced according to a predetermined standard, and a peripheral flange at an angle to the plane of the disc having perforations not so spaced but adapted to register with standard perforations in other elements of a toy construction outfit.

3. A circular element comprising a disc having a perforation in the center thereof with concentric circles of perforations equally spaced radially from each other and from said center perforation according to a predetermined standard, and a flange at a right angle to the plane of the disc having perforations to register with standard perforations in other elements of a toy construction outfit.

4. A circular element comprising a disc having a central perforation, concentric circles of perforations radially spaced according to a predetermined standard, adjacent perforations in the outer circle being spaced along a chord of a length corresponding to said standard, and a flange at an angle to the plane of the disc having perforations adapted to register with standard perforations in other elements of a toy construction outfit.

5. A circular element comprising a disc having cut-out portions so as to leave material in the form of a wheel, a centrally located perforation adapted to take an axle, a row of perforations extending along each spoke and terminating in the periphery or rim, all of said perforations from center to center being equally spaced radially according to a predetermined standard, and a flange at a right angle to the plane of said disc having perforations to register with standard perforations in other elements of a toy construction outfit.

6. A circular element comprising a disc having cut-out portions so as to leave material in the form of a wheel, a centrally located perforation adapted to take an axle, a row of perforations extending along each spoke and terminating in the periphery or rim, all of said perforations from center to center being equally spaced radially according to a predetermined standard, the adjacent peripheral perforations being spaced along a chord of a length corresponding to said standard, and a flange at a right angle to the plane of said disc having perforations to register with standard perforations in other elements of a toy construction outfit.

7. A circular girder element of angular cross-section having in its flat side a series of perforations equally spaced along a chord

of a length corresponding to a predetermined standard, and in its circumference a series of perforations differently spaced but adapted to register with standard perforations in other elements of a toy construction outfit.

8. A circular girder element of angular cross-section having in its flat side a series of equally spaced perforations, both the diametrically opposite and adjacent perforations being adapted to register with standard perforations in other elements of a toy construction outfit, and having in its circumference a series of perforations of a different spacing but also adapted likewise to register with said other elements.

9. A circular girder element comprising a rim having therein perforations equally spaced from center to center, said perforations being so formed that any two either adjacent or diametrically opposite will present openings to register with standard perforations in other elements of a toy construction outfit, and a peripheral flange at an angle to the plane of said rim having perforations therein of a different spacing but also adapted to register with standard perforations in said other elements.

In testimony whereof, I have signed my name to this specification.

FRANK HORNBY.