Nov. 19, 1929. A. C. GILBERT 1,736,310

TOY BUILDING CONSTRUCTION

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Fig. 1.

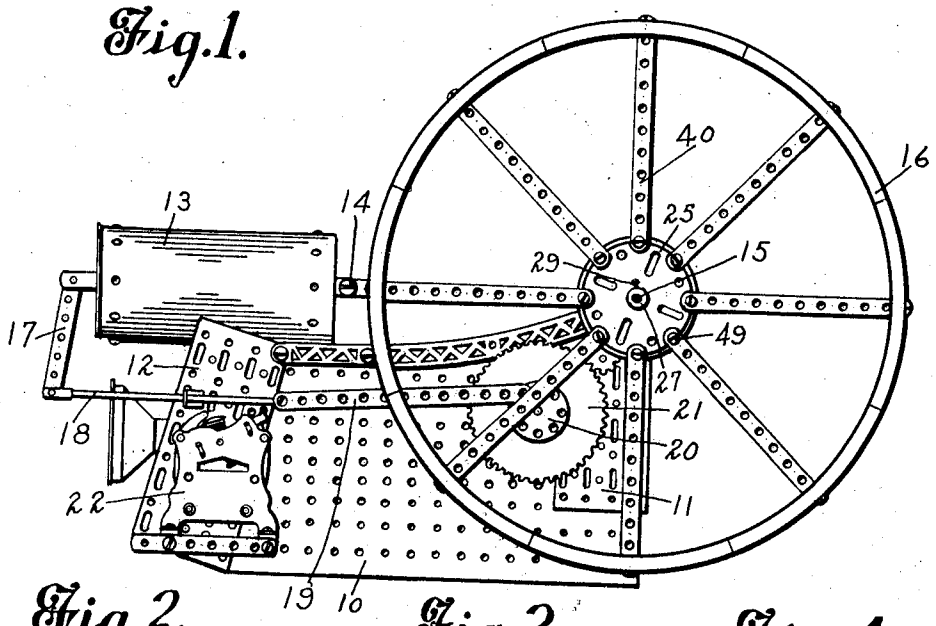


Fig. 2.

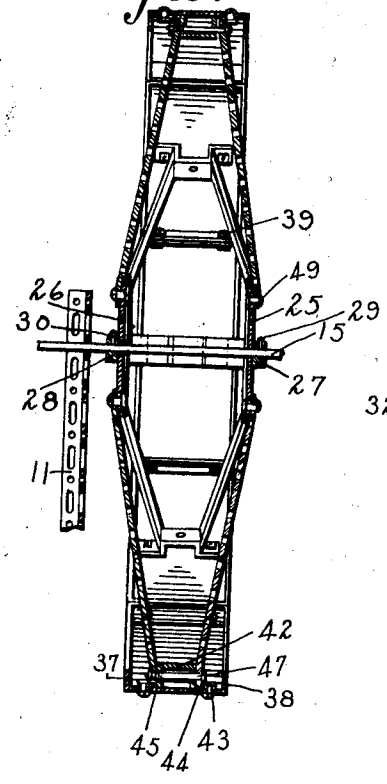


Fig. 3.

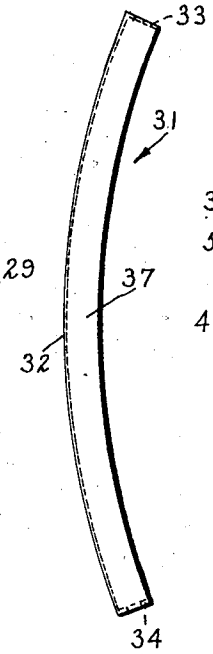


Fig. 5.

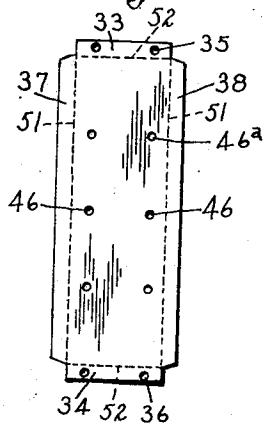
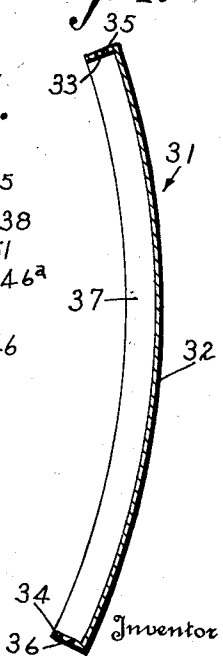


Fig. 4.



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Fig. 6.

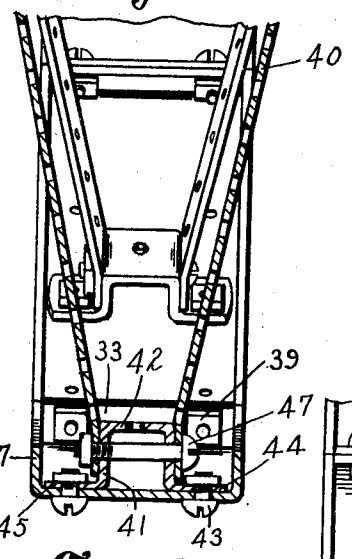


Fig. 7.

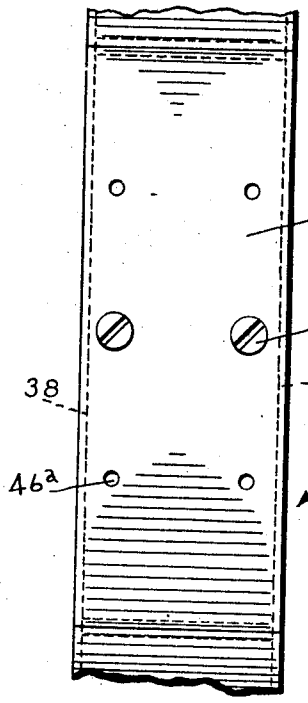


Fig. 9.

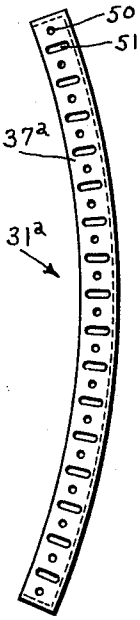
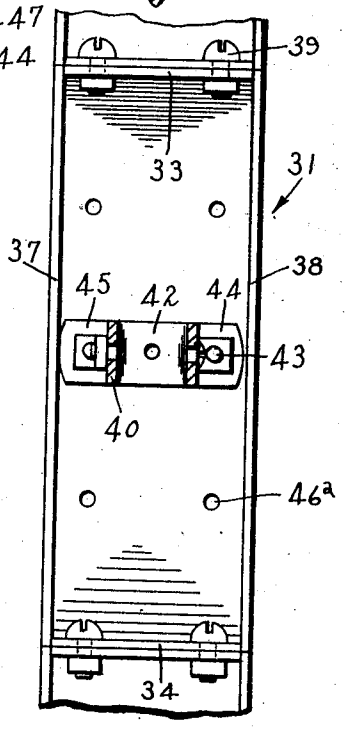


Fig. 8.



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UNITED STATES PATENT OFFICE

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TOY BUILDING CONSTRUCTION

Application filed April 16, 1926. Serial No. 102,488.

This invention relates to construction toys. Such toys are commonly sold as toy sets each set containing a number of construction elements of various kinds which may be assembled to form a large number of different models, the models usually simulating various actual mechanical structures. The invention particularly relates to such of these toys wherein are employed one or more relatively large wheels, such as pulley wheels, fly wheels, and the like, and more particularly has to do with the provision of elements which may be readily and easily assembled to form a rigid wheel member of light weight. At the same time, the wheel may be easily disassembled and the parts thereof may be compactly stored so as to occupy a minimum amount of room in the container in which they are sold.

One object of this invention, therefore, is the provision of an arcuate rim member of such construction that a number of such members may be readily secured together to form the rim or felly of a wheel.

A still further object of the invention is the provision of a number of toy construction elements which may be readily assembled into a wheel structure comprising a rim, hub and spokes, such that the resulting structure will be of light weight and will at the same time be strong and rigid.

A still further object of the invention is the provision of a novel form of connection between the wheel rim or felly and the elements serving as the wheel spokes.

Still another object of the invention is the provision of a number of similar rim elements, arcuate in shape, and having end flanges projecting radially inwardly from the outer surface of the rim member so that these flanges may be secured together to form a rigid circular wheel rim.

Still another object of the invention is the provision of a number of flanged rim elements which may be economically made, and at the same time rigidly secured together to form a circular rim which will be of sturdy and somewhat massive appearance so as to simulate the rim of a heavy fly wheel or the like.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a side elevational view of a model of a gas engine, embodying my invention;

Fig. 2 is a sectional view of the fly wheel of the engine;

Fig. 3 is an enlarged side elevational view of one of the rim elements;

Fig. 4 is a longitudinal sectional view of the same;

Fig. 5 is a plan view of the blank from which the rim element is made;

Fig. 6 is an enlarged fragmentary sectional view of the wheel;

Fig. 7 is an enlarged plan view of the outer surface of one of the rim elements;

Fig. 8 is a similar view of the reverse side of one of the rim elements;

Fig. 9 is an enlarged side elevational view of a rim element of modified form.

In order to illustrate a preferred embodiment of my invention, I have selected to show in Fig. 1 a model of a gas engine the frame of which may be formed of a pair of side plates 10, only one of which is shown, which are set up in parallel relation and suitably secured together. At the front end of each of these plates is secured a smaller perforated plate 11, and at the rear end a similar plate 12. It will be understood that these elements are duplicated upon the opposite side of the model, as shown in Fig. 1, in order to suitably support the parts of the device. The cylinder of the engine is simulated by the cylindrical element 13 from one end of which extends the piston rod 14, connected in any suitable manner which it is not necessary to illustrate for the purposes of the present invention, to the shaft 15 of the fly wheel 16. The shaft is passed through perforations in the plates 11, so as to be rotatably supported by these plates.

The valve operating members are simulated by the link 17 and valve rod 18, connected by the link 19 to an eccentric 20, secured to the gear 21, which is in turn connected by appropriate gearing, not shown,

to the shaft 15. The fly wheel 16 may be operated from the electric motor 22, positioned at the side of one of the plates 10.

The hub of the wheel 16 consists, as shown, of the two hub plates 25 and 26, mounted in spaced relation upon the shaft 15, and secured frictionally in place by means of the collars 27 and 28, having set screws 29 and 30 therein set against the shaft 15.

The rim of the wheel is made up of a number of arcuately shaped elements 31, shown more particularly in Figs. 3 to 5. Each of these members is provided with a relatively broad rim or tread surface 32, having end flanges 33 and 34 provided with perforations 35 and 36. These end flanges extend inwardly from the rim surface in a substantially radial direction toward the wheel axis. The members 33 are also provided with side flanges 37 and 38, which give the wheel an appearance of solidity and weight so that it simulates a heavy fly wheel used in commercial mechanical structures. These arcuate members are secured together, as shown more particularly in Fig. 8, by means of screw bolts or the like 39, passed through the perforations in the abutting end flanges 33 and 34 of the rim elements. It will be seen that as these flanges extend inwardly in a substantial radial direction, when these flanges have been secured together these rim elements will be united into a rigid rim or hoop structure, which will maintain its shape without further supporting elements. Moreover, when viewed from the side, the rim gives an appearance of having considerable thickness and weight.

The rim is secured to the hub plates 25 and 26 by means of the spokes 40. These spokes are as shown arranged in pairs, one of each pair being connected to one of the hub plates 25 and 26, and secured, as shown more especially in Fig. 6, against one of the legs 41 of a U-shaped element or bracket 42. These brackets are secured to the rim elements 31 by means of bolts 43 passing through flanges 44 and 45 on the legs of the brackets, and through perforations 46 provided in the rim elements substantially intermediate the ends thereof. Bolts 47 passing through perforations in the outer ends of the spokes 40 and through perforations in the legs 41 of the bracket 42 rigidly secure the spokes to this bracket and the rim member.

The spoke members 40 comprise relatively long perforated straps or plates, and are longer than the vertical distance between the bracket members to which they are connected, and their point of connection with the hub plates 25 or 26. It is seen, therefore, that when these elements are connected to the bracket members 42 at one end, and connected to the hub plates at the other, the latter connection comprising bolts 49 passing through perforations arranged adjacent the periphery of the hub plates, these members must be sprung outwardly at their inner ends so as to cause each pair of the elongated elements 40 to diverge outwardly from the rim toward the hub of the wheel, as clearly shown in Figs. 2 and 6. They are formed of sufficiently thin material to possess considerable resilience, and this resilience will tend to urge the hub plates toward each other as far as permitted by the length of the elements and their connections with the rim brackets and hub plates, the elements themselves tending to occupy a vertical position, as shown in Fig. 2, due to the fact that they are clamped against the sides of the legs 41 of the brackets. In this manner, no spacing collars or blocks are necessary on the shaft 15, between the hub plates 25 and 26, and the collars 27 and 28, when pressed tightly against the hub plates and fixed upon the shaft by the set screws 29 and 30, will secure the hub plates and, therefore, the wheel non-rotatably upon the shaft 15. If desired, the collars 27 and 28 can, of course, be slightly spaced from the hub plates so as to permit the rotatable mounting of the wheel on the shaft.

It will be apparent that I have provided a wheel structure which may be built up or fabricated from a number of readily detachable elements and which, at the same time, will be strong and rigid and although light in weight will present an appearance closely simulating, for example, a heavy fly wheel.

In Fig. 5 of the drawings I have shown a blank from which the rim elements of the wheel are made. When the blank is stamped out in the form shown, the two side and two end flanges may be turned inwardly about the dotted lines 51 and 52 to provide the inwardly and radially extending flanges. Additional perforations 46a may be provided in the body portion of this element adjacent the ends thereof so that the brackets 42 may be connected adjacent the ends of these elements if desired, instead of at the central portion thereof, as shown.

In Fig. 9 of the drawings I have shown a rim element 31a of somewhat modified form. This element is substantially like the corresponding part shown in Fig. 3, except that the side flanges 37a are provided with alternate perforations 50 and slots 51. These perforations and slots are suitably spaced to conform to the spacing of the perforations and slots in the other elements of the toy set, such as the elongated members 40 and the plate 12, so that these side flanges may be connected to these elements in building certain of the models.

While I have shown and described some preferred embodiments of my invention, it is to be understood that it is not to be limited to all the details shown, but is capable of modification and variation within the spirit

of the invention and within the scope of the appended claims.

What I claim is:

1. A wheel rim element for a construction toy having a body portion of arcuate shape in the direction of its length, and provided at either end of said arcuate portion with an inwardly and radially extending flange having perforations formed therein and means for detachably securing spokes to said rim elements.

2. A wheel rim element for a construction toy having a body portion designed to form the outer rim of the wheel, and of arcuate shape in its longitudinal dimension, and inwardly and radially extending flanges on the four sides of said element, each of said flanges having spaced holes therein.

3. A wheel rim element for a construction toy having a body portion designed to form the outer rim of the wheel, and of arcuate shape in its longitudinal dimension, and inwardly and radially extending flanges on the four sides of said element all of said flanges being of the same width, the flanges on the opposite ends of the element being provided with perforations therein closely adjacent the body portion whereby a number of such elements may be secured together to form a circular wheel.

4. A wheel structure for construction toys, comprising spaced hub elements, a rim, U-shaped brackets arranged on the inner side of the rim, and spoke elements arranged in pairs, and each connected at one end to one of said hub elements and at the other secured flatwise against one of the legs of one of the U-shaped brackets.

5. A wheel structure for construction toys, formed of detachable units, said structure comprising a pair of spaced hub elements, a rim, U-shaped brackets detachably secured to the inner face of the rim, and spoke elements each detachably connected at one end to one of the hub elements and at the other end to the leg of one of the brackets.

6. A wheel structure for construction toys, formed of detachable units, said structure comprising a pair of spaced hub elements, a rim having perforations formed therein, brackets applied to the inner face of the rim and having perforations corresponding to those of the rim, fastening members passed through the perforations of the brackets and rim to secure said parts together, and spoke elements each connected at one end to one of the hub elements and at the other end to one of the brackets, said spoke elements comprising elongated resilient strap members sprung outwardly to be secured to the hub elements tending to urge the spaced hub elements toward each other.

7. A wheel structure for construction toys, formed of detachable units, said structure comprising a pair of spaced hub elements, a rim composed of a plurality of similar elements of arcuate shape, detachably secured together, brackets secured to the inner face of the rim, and spoke elements each connected at one end to one of the hub elements and at the other end to one of the brackets, said hub elements being provided with centrally disposed perforations, a shaft passing therethrough and collars secured to the shaft adjacent the outer faces of the hub elements.

8. A wheel structure for construction toys, comprising spaced hub elements, a rim, elongated strap members each secured to one of the hub elements and at the other end to the rim to form spokes for the wheel, said elements being arranged in pairs diverging toward the center of the wheel, and said elements being resilient and tending by their resilience to assume a parallel position.

9. A wheel structure for construction toys, comprising a rim formed of a plurality of elements of arcuate shape secured together in end to end relation, and each of said members having a body portion forming a flat outer rim surface for the wheel, a bracket secured at the inner side of each of said elements intermediate the ends thereof, a plurality of elongated strap elements secured to said brackets in pairs to form spokes for the wheel and tending to occupy a parallel position, a pair of spaced hub members, the inner ends of said spoke elements being sprung outwardly to be connected with said hub elements adjacent the periphery thereof.

10. A wheel structure for construction toys, having a rim portion formed of a plurality of elements of arcuate shape secured together in end to end abutting relation to form a circular rim, U-shaped brackets secured at the inner side of said elements and having parallel leg portions extending toward the wheel axis, a pair of spaced hub elements arranged centrally of the wheel, and resilient strap members forming spokes for the wheel, said members being clamped at their outer ends against the legs of the bracket and having their inner ends sprung outwardly to cause the strap members to diverge toward the hub of the wheel and the inner ends being connected to the hub members adjacent the periphery thereof.

11. A wheel structure for construction toys, having a rim portion formed of a plurality of elements of arcuate shape secured together in end to end abutting relation to form a circular rim, U-shaped brackets secured at the inner side of said elements and having parallel leg portions extending toward the wheel axis, a pair of spaced hub elements arranged centrally of the wheel, and resilient strap members forming spokes for the wheel, said members being clamped at their outer ends against the legs of the brackets and having their inner ends sprung outwardly to cause the strap members to diverge

toward the hub of the wheel and the inner ends being connected to the hub members adjacent the periphery thereof, said hub members having centrally arranged perforations, a shaft passing through said perforations, and collars secured to said shaft adjacent the outer faces of the hub elements.

12. In a toy wheel construction, a wheel rim composed of a plurality of elements of arcuate shape, each having longitudinally disposed side flanges, said elements being secured together to form an annulus, a pair of disks smaller than said annulus and disposed in spaced relation concentrically therewith, each of said disks having a central opening and a plurality of perforations adjacent its periphery, and a plurality of wheel spokes comprising flat elongated elements secured at one end to the rim, the said spokes overlapping the edges of the disks at their other ends and having perforations to register with the peripheral perforations of the disks, and means passing through the perforations in the spoke members and disks to secure the parts together, whereby the disks form the wheel hub.

In witness whereof, I have hereunto set my hand this 31st day of March, 1926.

ALFRED C. GILBERT.