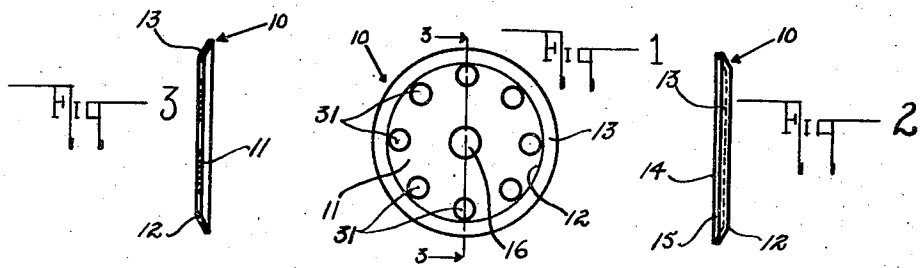
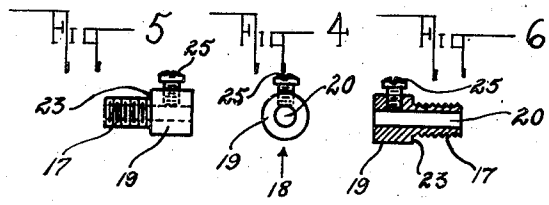
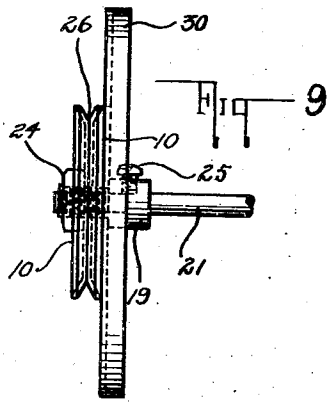
Nov. 5, 1946. E. W. FARMER 2,410,409

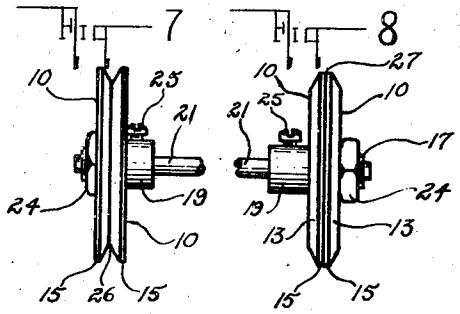
CONSTRUCTION TOY ELEMENT

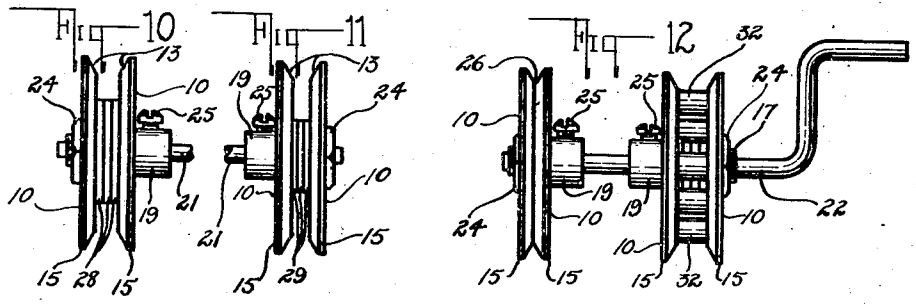
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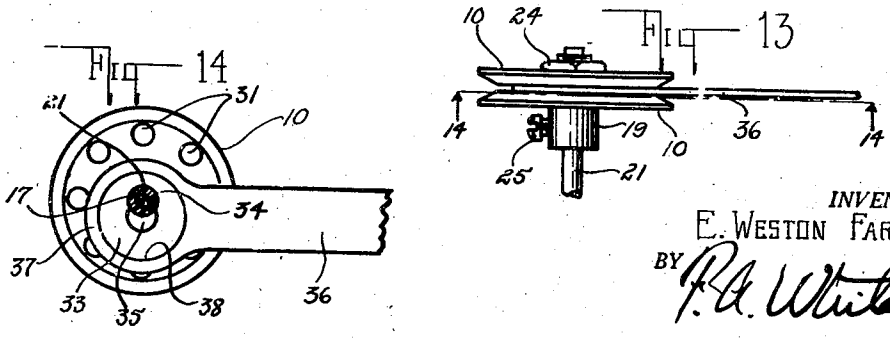



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2,410,409

## CONSTRUCTION TOY ELEMENT

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Application September 27, 1945, Serial No. 618,867

2 Claims. (Cl. 46—23)

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My invention relates to construction toy elements and has for its object to provide cooperating elements for construction toys which make possible a multiplicity of arrangements to produce a very large number of devices.

Heretofore construction toys have consisted of plates, bars, pre-fabricated wheels and the like, with perforations suitably distributed therein, which, in combination with screw bolts or other fastening means, has enabled the owners of the toy set—usually boys from eight to fifteen years old—to put together these elements in many different ways to produce recognized and known small replicas of various operative structures such as wagons, trucks, towers, windmills and the like.

I have discovered that a disk member formed with a central portion with flat plane faces and an angularly flaring rim with its edge in a plane spaced from and parallel with the faces of the central portion, and having a central opening and a circumferentially disposed series of other openings adjacent the juncture of the rim with the central portion can be employed in many relations with other elements of toy construction sets to produce a large number of different and distinctive articles.

It is a principal object of my invention to provide as an element of a construction toy set a disk-like member being dished by having a flat central portion with plane inner and outer surfaces and provided with a flaring rim portion having its lower edge united with and continuous from the flat central portion and its outer edge falling in a plane parallel with the surfaces of the central portion.

It is a further object of my invention to provide such element with a central, preferably circular, opening and a series of openings inside the edge of the central portion and the edge of the rim, said edge openings being spaced apart equally and being each radially equidistant from the center of the element.

It is a further object of my invention to provide means for securing together a multiplicity of said dished elements in various ways to produce wheels, pulleys, gears and the like, and to secure said united elements upon a rotary element such as a shaft, a crank or the like.

It is a further object of my invention to employ the disk elements having the central and circumferential row of openings therein in combination with the different toy construction elements of a set and with fastening means such as screw bolts and the like to make a multiplicity of articles of

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distinctive character, wherein the disk element aways functions as an essential and distinguishing feature of said articles.

It is a further object of my invention to form the collar member above defined with a central opening adapted to receive a crankshaft or the like, and to have a set screw in the collar of said collar member by which the collar member and the disk parts carried thereby may be fixedly secured to said crankshaft or the like.

It is a further object of my invention to employ washers which may be placed between pairs of said disks, and thereby a windlass or reel or a wide V-belt pulley may be constructed.

It is a further object of my invention to provide, in combination with said disk elements and the collar member for securing them together, a washer member having a perforation or opening at one side of the center thereof and to secure it between a pair of said elements in combination with an arm of slightly less thickness than the eccentrically punched washer, and having an opening adapted to extend around said washer, whereby an eccentric drive shaft may be developed.

It is a further object of my invention to employ the openings at the sides of the disk elements for the reception of a series of transverse pins between a pair of disks, whereby an enlarged gear member is produced.

It is a further object of my invention to use the edge perforations for attachment of other elements, such as plates or bars, whereby a windmill structure or other forms of rotary structure may be produced.

The full objects and advantages of my invention will appear in connection with the detailed description now to be given in the appended specification, and the novel features of my invention by which the aforementioned interesting, advantageous and useful results may be obtained will be particularly pointed out in the claims.

In the drawing illustrating an application of my invention in some of its forms:

Fig. 1 is a plan view of the disk element viewed toward the inside of the dished part thereof.

Fig. 2 is an edge view of the disk element shown in Fig. 1.

Fig. 3 is a central sectional view taken on line 3—3 of Fig. 1.

Fig. 4 is an end elevation view of the collar element adapted to be employed in connection with a plurality of said disk elements.

Fig. 5 is a side elevation view of the part shown in Fig. 4.

Fig. 6 is a sectional elevation view similar in position to Fig. 5.

Fig. 7 shows a pulley constructed from a pair of disks of Fig. 1, the collar member of Figs. 4 and 5 and a nut upon the threaded portion of the collar member.

Fig. 8 is a wheel formed by two disks held by a collar member and nut on the same with their outer edges meeting.

Fig. 9 illustrates the combination of a flywheel and pulley on a shaft taken as an edge elevation.

Fig. 10 shows a combination of the disks with washers of relatively large diameter to make a windlass or reel.

Fig. 11 similarly shows the use of the disk elements and smaller washers secured on a shaft to make a V-belt pulley.

Fig. 12 illustrates the union of disks to make a pulley and also disks separated by washers with pins extending through the openings in the disks to make a form of gear, all mounted on a crankshaft.

Fig. 13 shows a top plan view of the use of the disks to make an eccentric crank.

Fig. 14 is a sectional view taken on line 14—14 of Fig. 13, showing the mounting of the crank member.

As shown, a disk 10 is provided with a central portion 11 which is formed with flat parallel surfaces. From the circular edge 12 of the central portion 11 is a flaring rim 13 which has the limits of its outer edge 14 falling in a plane parallel to said surfaces. Furthermore, the rim 13 is provided with an outer cylindrical limiting margin 15 which is parallel to the vertical axis passing through the center of plate 10.

At the center of the flat portion 11 is a circular aperture 16 which is adapted to receive the threaded portion 17 of a collar piece 18, Figs. 4, 5 and 6. The collar piece 18, in addition to the threaded portion 17, has a cylindrical collar part 19, and a cylindrical opening 20 extends centrally through the collar piece 18.

The opening 20 is adapted to receive a shaft member such as 21 in Figs. 7, 8 and 9, or a crankshaft member such as 22, in Fig. 12.

The threaded portion 17 of the collar member 18 may be made of any desired length and is of a size to just pass through the opening 16 in the central portion 11 of element 10.

When two or more of said elements are placed over the threaded portion 17, the inner side of one of said elements will come against the shoulder 23 of the collar portion 19, and a nut 24 is screwed upon the threaded portion 17 and firmly secures the elements upon the collar member.

A set screw 25 may be forced against the body of shaft 21 or 22. Thus the combinations brought about by the assembly of a multiplicity of disks upon the threaded extension 17 of collar piece 18 results in a rigid fixed attachment of said disks to the shaft or crankshaft in that combination.

A very great number of combinations may be made in this way, a few of which are shown in Figs. 7 to 14. Thus, as shown in Fig. 7, the two disks 10 are united to shaft 21 with the flaring rims of the disks adjacent, producing a V-groove 26 for an effective pulley construction as in Figs. 7 and 9.

In Fig. 8 two disks 10 are shown fixed to the shaft 21 with the cylindrical margins 15 in contact, thus producing a wheel with a tire face 27. The face 27 may be made larger or wider in transverse extent by simply adding more of the disks 10, thus where four of such disks are used instead of the two shown in Fig. 8, the wheel face 27 will be twice as wide.



In Fig. 10 two disks 10 are shown with their flaring rims faced toward each other but separated by a group of washers 28 of considerable size, which produces a very good windlass or reel structure.

In Fig. 11 the disk members are similarly held apart by smaller washers 29 which gives a wider V-belt pulley.

In Fig. 9 two disk members 10 are united to form the V-groove 26 adjacent flywheel or belt pulley member 30, thus producing an excellent flywheel structure on shaft 21.

The central portion 11 of the disks 10 are provided with a multiplicity of round edge apertures 31. These apertures may be employed in securing to the disk other parts such as bars or plates which may thus simulate a windmill construction. In Fig. 12 there are shown secured by means of these openings a series of pins or washers 32 whereby a cog gear is produced.

A very excellent example of the utility of the disk elements in producing interesting mechanical structures is shown in Figs. 13 and 14.

As there shown, two disks 10 are secured upon the shaft 21 in the manner heretofore described, excepting that a single washer 33 is held between them. This washer has a perforation 34 offset from the central perforation 35 and the threaded section 17 of the collar piece 18 goes through this offset or eccentric opening in the washer, as clearly shown in Fig. 14. In assembling the two disks 10 and the intermediate washer 33 a flat bar or shaft member 36 is employed, which is slightly thinner transversely than the thickness of washer 33.

This bar or crank rod has a head 37 having therein a circular opening 38 which just fits about the outer circumferential limits of the washer 33. The nut 24 for securing the parts together thus presses the flat faces of the disks 10 upon the washer 33 between them and leaves the bar 36 or the head 37 therein free from any binding action. It follows that when the combination is turned by the shaft 21, the bar 36 will be given a back and forth reciprocating movement corresponding to that of any eccentric crankshaft or crank bar.

The advantages of my invention are thus apparent. This simple element, in combination with the hollow collar piece, entirely separate from it, lends itself to the production of a very large number of interesting and useful structures in the field of construction toys. In this way it becomes the very heart of a construction toy set adapted for the use of the ingenious boy in the construction not only of many different types of devices, but particularly in the construction of unusual devices having an unusual interest appeal.

I claim:

1. In combination, a toy element consisting of a pair of circular disks of metal, each having a central opening and a plane-faced central portion with an angularly flaring rim, a tubular collar member having a central opening adapting it to be secured to a shaft and having a threaded part to extend through said openings in the disks, a washer on said threaded part having an opening eccentric to the center of the washer, a crank blade on said washer of less thickness than the thickness of the washer, a nut on the threaded extension clamping the disks upon the eccentric washer to leave the crank blade free to move thereon, and a shaft extend-

ing through the opening in the collar and secured thereto.

2. In combination with a multiplicity of toy construction elements such as perforated plates and bars, screws, and the like, a toy construction element adapted to be united to a shaft and to said multiplicity of toy construction elements, said toy construction element consisting of a circular disk of metal, plastic or the like, having a unitary central portion with its faces in unbroken planes and having an angularly outwardly flaring rim joined to the central portion with its outer edge in a plane spaced from and parallel with the faces of the central portion, a circular hole formed through the center of said central



portion, a series of circular holes through said central portion spaced from the central hole and lying with their centers in a circle, said holes being equidistant one from the other and having their outer limits at substantially the inner point of junction of the flaring rim and the central portion of the disk, said last-named element being adapted for connection by means of at least one of said holes with one or more of the first-named toy construction elements in varying relations thereto, wherein the said hole or holes and the flaring rim are conjointly effective in producing numerous different types of toy constructions.

E. WESTON FARMER.