

PATENT SPECIFICATION



Application Date: Nov. 25, 1927. No. 31,723/27.

290,121

Complete Left: Jan. 14, 1928.

Complete Accepted: May 10, 1928.

PROVISIONAL SPECIFICATION.

Improvements in Ball or Roller Bearings.

I, FRANK HORNBY, of Meccano Limited, of 236, Binns Road, Old Swan, Liverpool, British, do hereby declare the nature of this invention to be as follows:—

5 This invention relates to an improved arrangement and construction of ball or roller bearings and/or races which are specially applicable for use in the building up of constructional models or toys. 10 The invention is directed to a construction of ball or roller bearing and a ball or roller race such that these parts may be made up from stamped sheet metal.

15 In carrying out the invention as applied to the construction of ball bearings the ball races are made of stamped sheet metal discs having an annular channel which may be of curved section or V-section. These annular channels are 20 formed in the discs or rings by the operation of press tools. Two such discs or rings are provided for each bearing the channels engaging opposite sides of the balls, the diameter of the balls and the 25 form of the plates being such that the latter do not actually contact when assembled to form a bearing. The ball cage is made up of two sheet metal rings in which 30 are stamped a number of holes corresponding to the number of balls to be retained in the bearing the holes being formed with short flanges preferably inclined to the plane of the ring, the flanges thus forming shallow conical dishings stamped 35 out from the metal of the rings. Two such rings reversed are placed together to enclose the balls and retain them in position in the ring cage, the conical flanges round each of the apertures forming a housing which securely holds the 40 ball in position, the latter projecting well up above each face of the double ring. The rings may be secured together by riveting, eyeletting, or by forming nibs or 45 projections on the one ring adapted to be bent over the adjoining edge of the other ring. A ball ring cage constructed as described is then inserted between the two annularly channelled discs or rings to 50 form a complete ball bearing. Such a ball bearing is of considerable advantage in the building up of constructional models from interchangeable parts as for instance

to form the footstep of a jib crane.

The race discs or rings may be formed 55 on their periphery with a toothed edge to enable the one element of the ball bearing to be driven upon the other element and preferably one of the discs is toothed 60 in this way at its edge while the other is formed with an upstanding flange which when the bearing is assembled more or less encloses the balls. The race discs of the ball bearing may be perforated with 65 circular apertures and/or slots in order to enable such elements readily to be connected up to other parts of the toy building outfit in order to enable them to be built in to the models.

70 For use in the heavier class of model where it is desirable to have roller instead of ball bearings; the disc races instead of being stamped with an annular channel 75 are preferably provided near the periphery with a peripheral edging parallel to but raised above the plane of the disc or ring an annular shoulder being thus 80 formed round each disc. The roller cage or frame consists of a ring of angled section the rollers being pivotally carried on the peripheral flange of this ring. Preferably the rollers are mounted upon studs 85 which pass through bosses in the rollers and are secured by nuts to the angle section ring, the bolts or studs being radially disposed to the roller frame. The rollers are preferably flanged at one side of their tread, the tread of the roller running on 90 the raised peripheral edge of the race disc and the flange engaging the shoulder. As in the case of the ball race the discs may be formed with slots and circular 95 holes to enable the elements to be connected up interchangeably to other parts of the toy outfit and one or both of the race discs may be toothed on its periphery to enable it to be driven by a sprocket chain or pinion engaging therewith. The roller frame may be further centralised in the bearing by fitting a perforated strip 100 diametrically across the frame, the central perforation of the strip engaging the usual axial rod which passes through the two discs and the intervening roller frame when assembled to form a unit. This 105 latter form of roller bearing is suitable

for building up the heavier type of constructional toy for use in demonstration models for shop windows or the like situations.

Dated this 16th day of November, 1927.
A. J. DAVIES,
Patent Agent,
24, Moorfields, Liverpool.

COMPLETE SPECIFICATION.

Improvements in Ball or Roller Bearings.

5 I, FRANK HORNBY, of Meccano Limited, of 236, Binns Road, Old Swan, Liverpool, British, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by
10 the following statement:—

This invention relates to an improved arrangement and construction of ball or roller bearings and/or races which are
15 specially applicable for use in the building up of constructional models or toys. The invention is directed to a construction of ball or roller bearing and a ball or roller race such that these parts may be
20 made up from stamped sheet metal and adapted to be built in to models made from interchangeable parts such as perforated strips and plates connected by bolts and nuts.

25 As applied to ball bearings the races are made of stamped sheet metal discs having annular channels of curved or V-section. Two such channel discs are provided for each bearing engaging opposite sides of
30 the balls. The ball cage is made of two sheet metal rings in which are stamped a number of flanged holes forming conical dishings. Two such rings reversed are placed together to retain the balls in the
35 ring cages the conical flanges forming housings for the balls. The ball rings are secured together by riveting or otherwise. For a heavier type of roller bearing the disc races are stamped with a
40 peripheral edging raised above the plane of the disc to form an annular shoulder. The roller cage consists of an angled section ring on the peripheral flange of which rollers are mounted upon studs
45 secured by nuts or riveting to the angle ring. The rollers are preferably flanged, the tread of the roller running on the raised peripheral edge of the race discs and the flanges engaging the shoulders.
50 In both the ball and roller type of bearing the discs are formed with means such as slots or circular holes or both to enable the elements to be connected up interchangeably to other parts of a toy model.
55 One or both of the race discs may be toothed to enable it to be driven by a sprocket chain or pinion.

Bearings in accordance with this invention are illustrated in the accompanying

60 drawing Figs. 1 to 7 showing a ball bearing and Figs. 8 to 12 a roller bearing, in which Fig. 1 is a plan and Fig. 2 a cross section of a geared race disc, Fig. 3 being a plan and Fig. 4 a cross section of a flanged race disc. Fig. 5 is a plan and
65 Fig. 6 a cross section of the ball cage. Fig. 7 is an end view of a complete ball bearing the left hand side of the figure being in section and the right hand side in elevation. Fig. 8 is a plan of a geared race disc for a roller bearing, Fig. 9 being a cross section. Fig. 10 is a plan of the roller cage and Fig. 11 is a cross section. Fig. 12 is an end view of the complete
70 roller bearing.

In carrying out the invention as applied to the construction of ball bearings, Figs. 1 to 7 inclusive, the two ball races are made of stamped sheet metal discs 1, 2, each having an annular channel 3 which may be of curved section as shown or of
80 V-section. These annular channels are formed in the discs or rings by the operation of press tools. As shown in Fig. 7 two such discs or rings are provided for each bearing the channels 3 engaging opposite sides of the balls 4 of the ball race the diameter of the balls 4 and the form of the plates 1, 2, being such that the latter do not contact with each other
90 when assembled to form a bearing. The ball cage, Figs. 5 and 6, is made up of two similar sheet metal rings 5 in which are stamped a number of holes corresponding to the number of balls 4 to be housed, the holes being formed with short flanges 6 preferably inclined to the plane of the ring, the flanges thus forming shallow conical dishings (see Fig. 6) stamped out from the metal of the rings. Two such
100 rings reversed are placed together to enclose the balls and retain them in position in the ring cage, the conical flanges 6 round the apertures forming a housing which securely holds the ball in position the latter projecting well above each edge of the flanges 6 of the ring cage. The rings may be secured together by riveting, eyeletting, or as shown by forming
105 nibs or projections 7 on one ring which are bent over the adjoining edge of the other ring. A ball ring cage constructed as described is then inserted between the two annularly channelled discs or rings

to form a complete ball bearing. Such a ball bearing is of considerable advantage in the building up of constructional models from interchangeable parts as for instance to form the footstep of a jib crane.

The race discs or rings may be formed on their periphery with a toothed edge 8, Fig. 1, to enable the one element of the ball bearing to be driven upon the other element and preferably one of the discs is toothed in this way at its edge while the other is formed with an upstanding flange 9, Fig. 4, which when the bearing is assembled more or less encloses the balls, Fig. 7. The race discs of the ball bearing are perforated with holes 10 spaced apart at some standard pitch and/or slots 11 to enable such elements readily to be connected up interchangeably to other parts of a toy building outfit by bolts and nuts and so built in to the models to be constructed.

For use in the heavier class of model where it is desirable to have roller instead of ball bearings, the race discs 1a, Figs. 8, 9 and 12, instead of being stamped with an annular channel are preferably provided near the periphery with a peripheral edging 12 parallel to but raised above the plane of the disc or ring, an annular shoulder 13 being thus formed round each disc. The roller cage or frame consists of a ring 14, Figs. 10 and 11, of angled section the rollers 15 being pivotally carried on the peripheral flange 14a of this ring. Preferably the rollers are mounted upon studs 16 which pass through bosses 17 on the rollers and are secured by nuts 18 to the angle section ring, the bolts or studs being radially disposed to the roller frame. The rollers are preferably flanged at 19 on one side of their tread, the tread of the roller running on the raised peripheral edge 12 of the race disc and the flange engaging the shoulder 13. As in the case of the ball race the discs 1a is formed with slots 11 and circular holes 10 spaced apart at some standard pitch to enable the elements to be connected up interchangeably to other parts of the toy outfit and one or both of the race discs may be toothed on its periphery as shown at 20, Fig. 8, to enable it to be driven by a sprocket chain or pinion 21 engaging therewith. The roller frame may be further centralised in the bearing by fitting a perforated strip 22 diametrically across the frame, the central perforation of the strip engaging the

usual axial rod 23 which passes through the two discs and the intervening roller frame when assembled to form a unit, as shown in Fig. 12. This latter form of roller bearing is suitable for building up the heavier type of constructional toy for use in demonstration models for shop windows or the like situations.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A ball or roller bearing for use with constructional toys comprising stamped sheet metal upper and lower discs annularly channelled or recessed to form races for the balls or rollers and a ball or roller frame or cage in the form of a stamped sheet metal ring in or on which the balls or rollers are housed, the said discs being provided with means such as slots or holes or both to enable these elements to be connected up interchangeably with other parts of a constructional toy model.

2. In a ball or roller bearing as claimed in Claim 1 the provision of a toothed edge on one or both race discs.

3. In a ball or roller bearing as claimed in Claim 1 providing on one race disc an upstanding flange for the purpose described.

4. In a ball bearing as claimed in Claim 1, forming the ball cage of two sheet metal rings having a series of holes with shallow conical flangings, the reversed flangings when the discs are connected providing housings for the balls.

5. In a roller bearing as claimed in Claim 1 forming the race discs with a peripheral edging raised above the plane of the disc and forming an annular shoulder thereon for engagement by the rollers.

6. In a roller bearing as claimed in Claim 1 forming the roller frame as an angle section sheet metal ring on which a series of flanged rollers are carried.

7. The improved ball bearing substantially as described and shown in Figs. 1 to 7 inclusive of the accompanying drawings.

8. The improved roller bearing substantially as described and shown in Figs. 8 to 12 inclusive of the accompanying drawings.

Dated this 13th day of January, 1928.

A. J. DAVIES,
Patent Agent,

24, Moorfields, Liverpool.

Fig. 1.

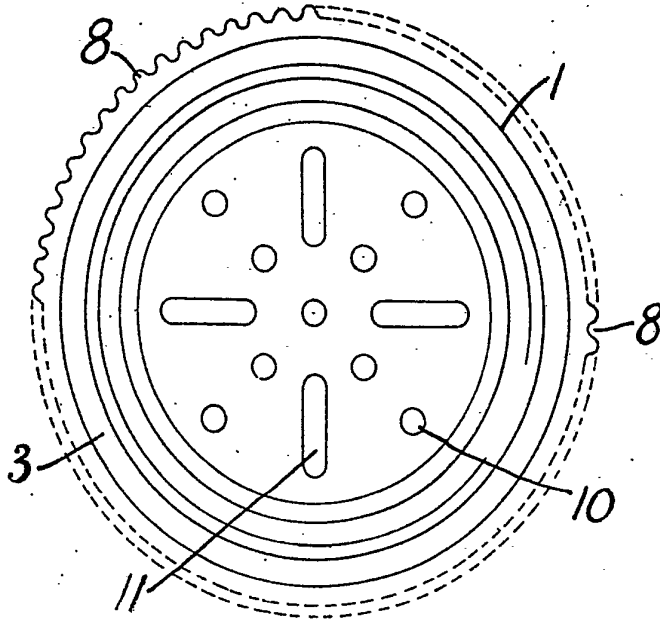


Fig. 5.

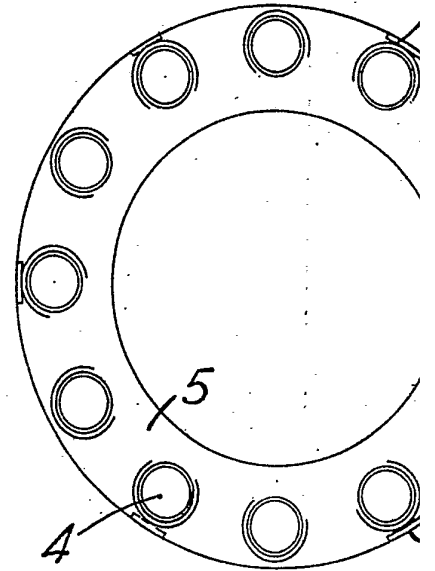


Fig. 2.

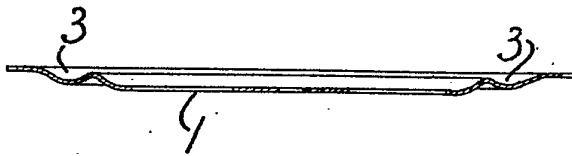
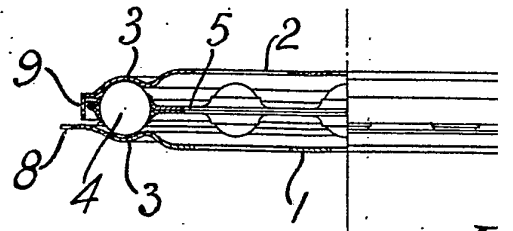
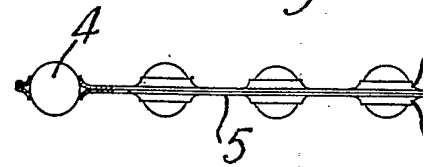


Fig. 6.



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Fig. 5.

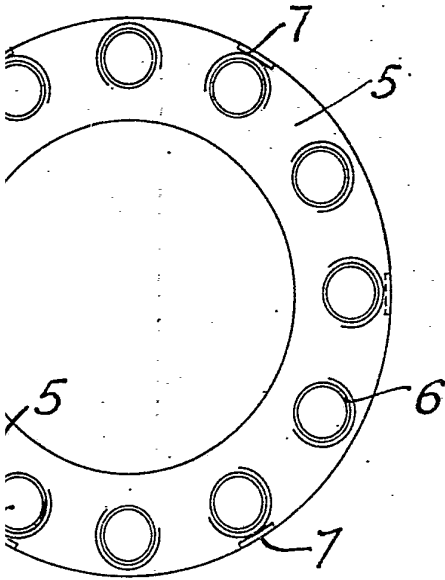


Fig. 3.

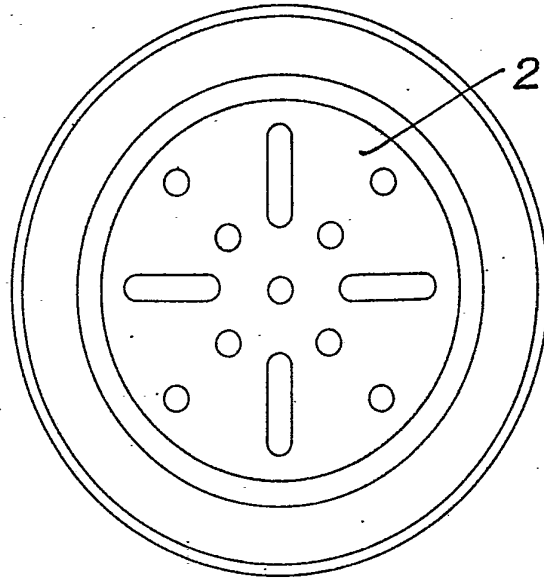


Fig. 6.

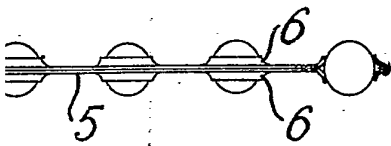


Fig. 4.

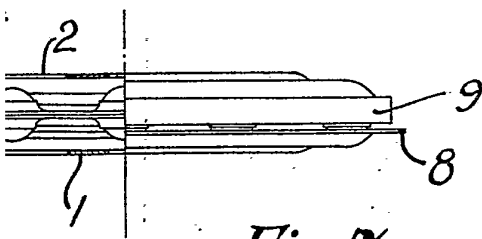
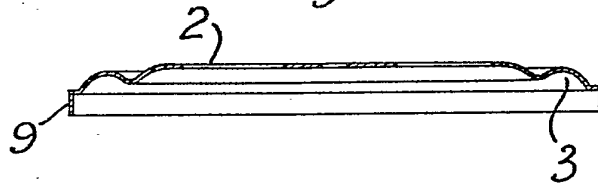


Fig. 7.

Fig. 1.

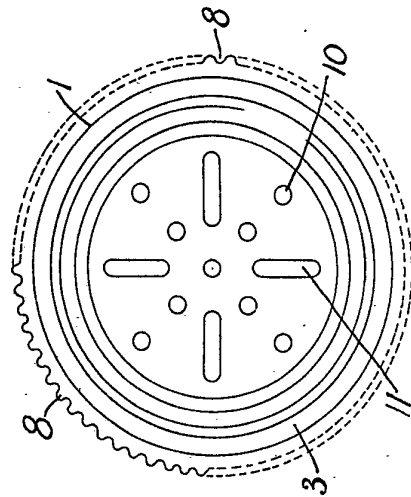


Fig. 5.

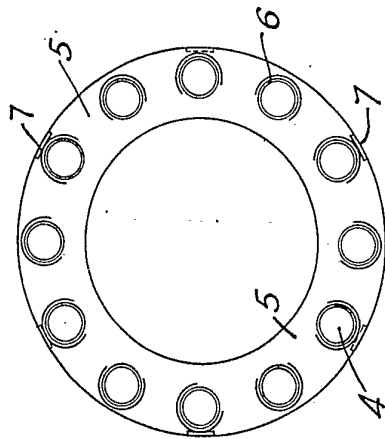


Fig. 3.

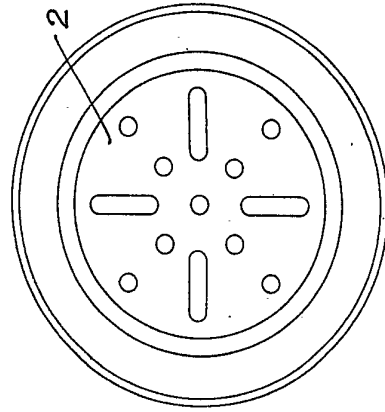


Fig. 2.

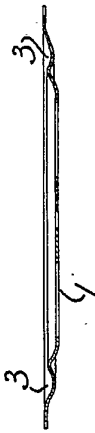


Fig. 6.

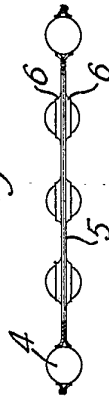


Fig. 4.

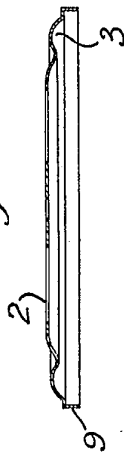
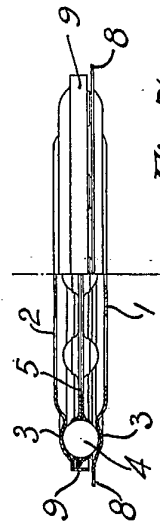


Fig. 7.



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Fig. 8.

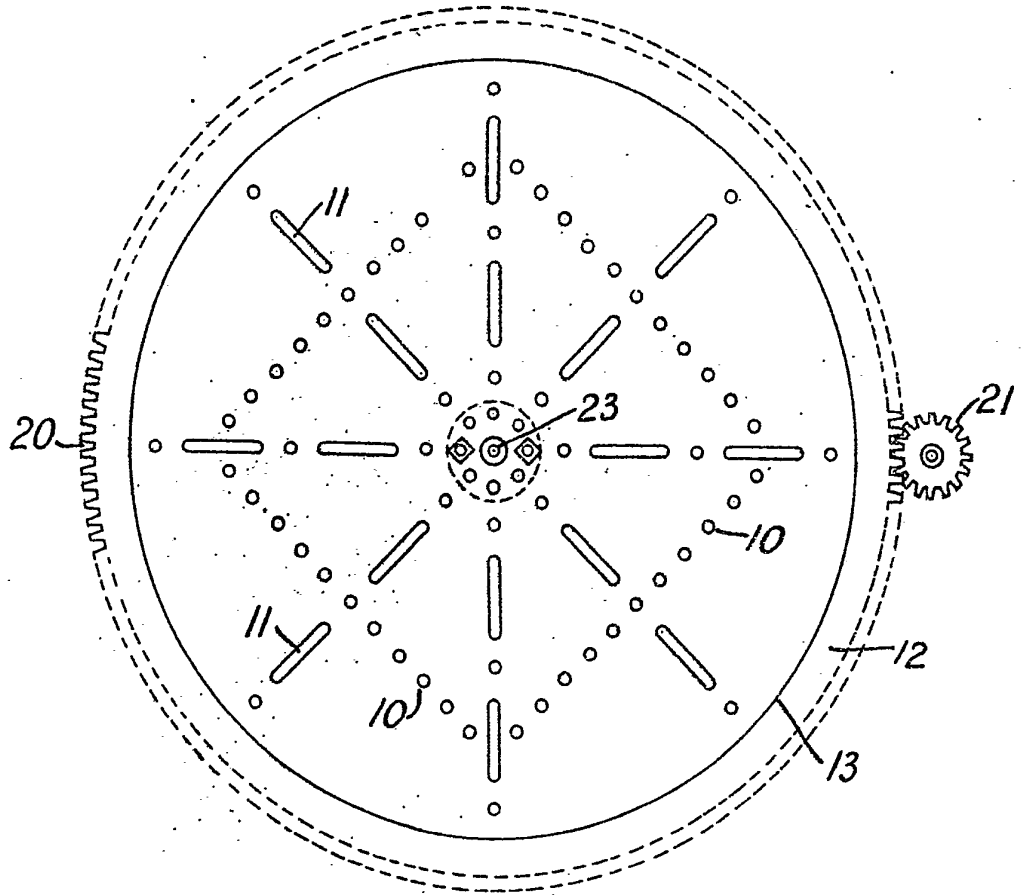


Fig. 9.

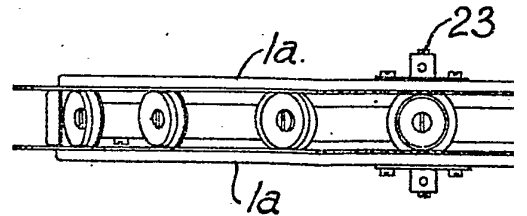
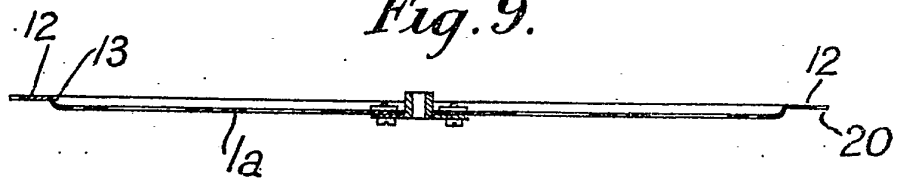


Fig. 1

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Fig. 10.

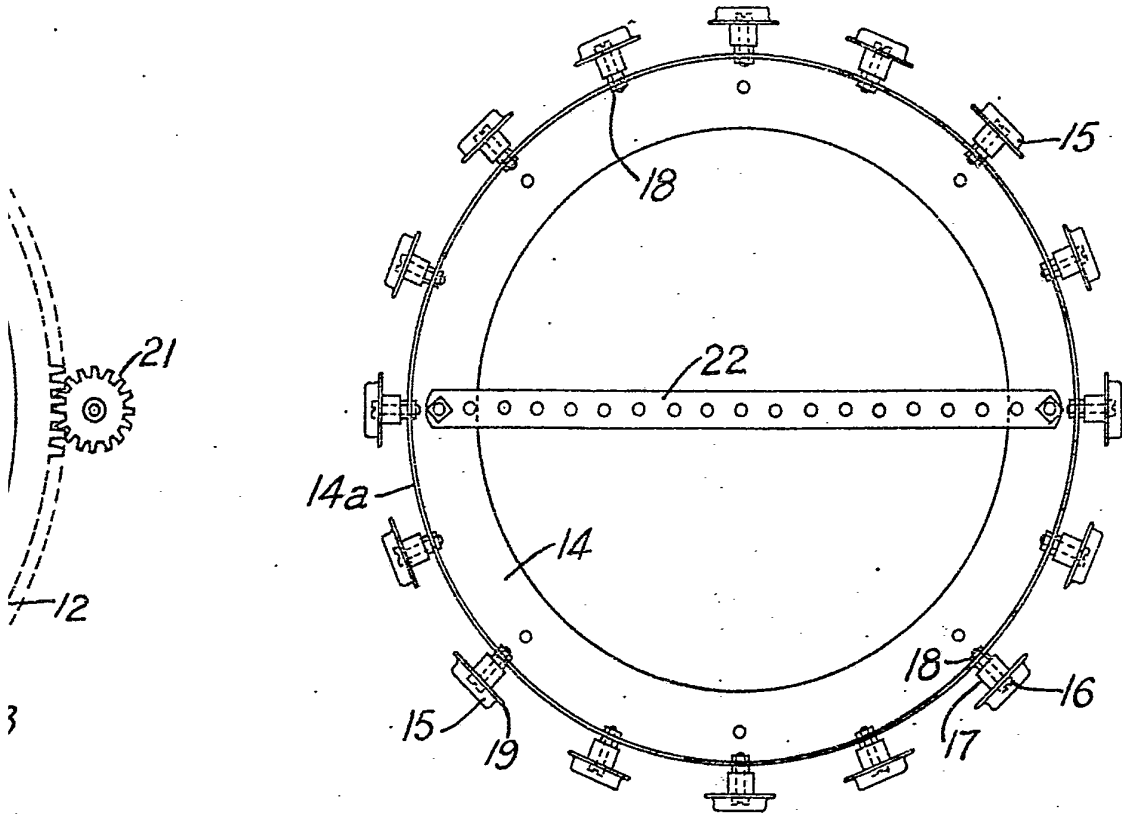


Fig. 11.

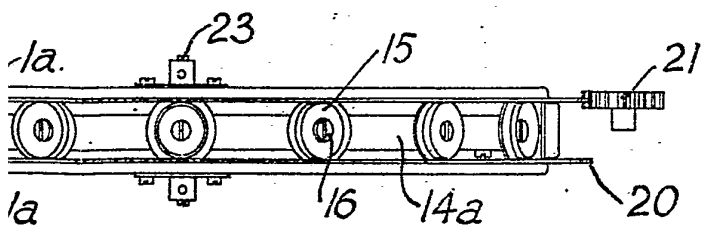
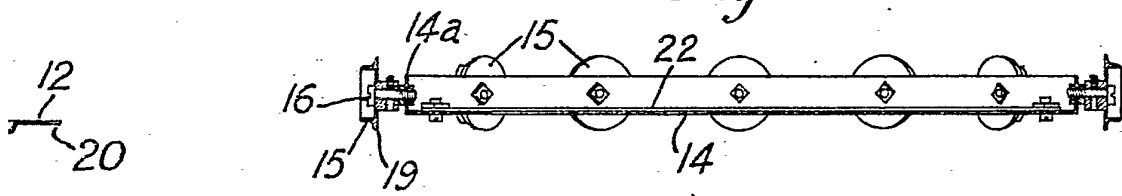


Fig. 12

Fig. 8.

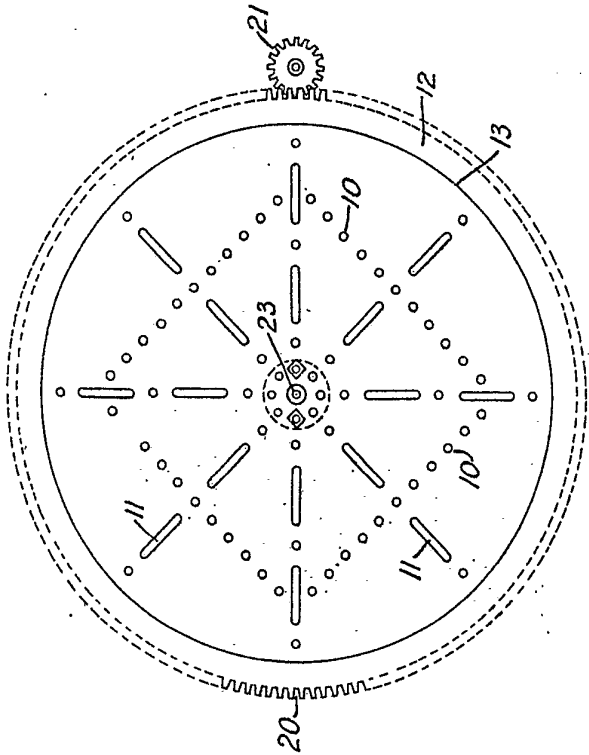


Fig. 10.

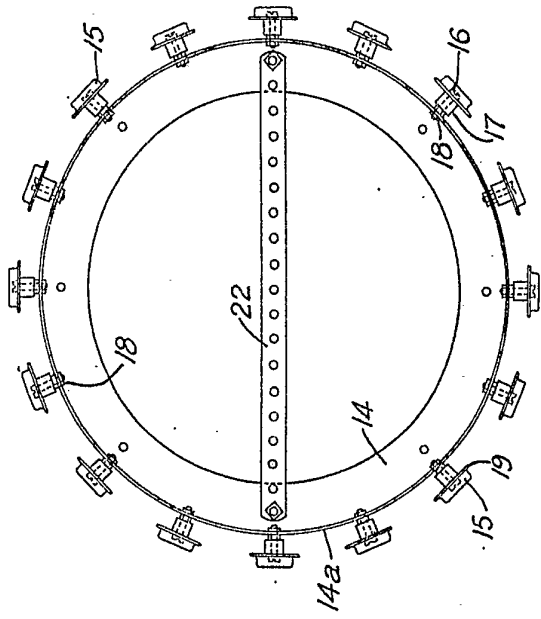


Fig. 11.

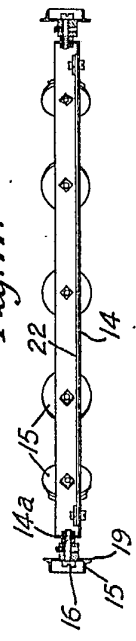
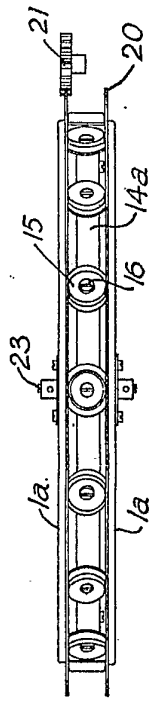


Fig. 9.



Fig. 12.



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