

RESERVE PATENT SPECIFICATION



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COMPLETE SPECIFICATION.

Toy Construction Set.

We, **TRIX LIMITED**, a British Company, of 4, Golden Lane, London, E.C. 1, (Assignees of **VEREINIGTE SPIELWAREN-FABRIKEN ANDREAS FÖRTNER & J. HAFFNER'S NACHFOLGER GESELLSCHAFT MIT BESCHRAENKTER HAFTUNG**, of 15, Kobergerstrasse, Nuremberg, Germany, a Company registered under the Laws of Germany), 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 the following statement:—

This invention relates to a toy construction set which, in addition to the known channeled parts of perforated iron strip, shafts, screw spindles, standard nuts, rollers and the like, comprises pinions for making all kinds of gearing. All the existing types of toy construction sets are provided with a plurality of pinions designed to suit the purposes in view in each case, such as the production of spur-wheel gearing, spur wheels, cone-pinion gearing, cone pinions, a worm wheel and worm shaft for constructing worm gearing, and finally chain wheels and chains for making chain gearing. Consequently, each gear wheel, had its own definite use, and could be applied only to that use, with the sole exception that spur wheels have occasionally been employed for constructing mitre-wheel gearing. This multiplicity of special pinions naturally increased the most of the toy construction sets, without thereby affording the advantage of enabling the numbers of gearing to be increased and their kind modified.

The object of this invention is to provide a toy construction set with gear wheels that are designed in such a manner that each individual pinion wheel can serve all purposes, and consequently can be used as a spur wheel, mitre wheel, worm wheel and chain wheel.

According to the invention the gear wheels are characterised in that the width of the teeth, measured along the pitch circle, is about half the width of the tooth gaps, and that the height of the teeth is only about $\frac{4}{10}$ ths of the pitch. This shape of tooth enables it to be employed

for all types of gearing, and a considerably large number of gear drives to be produced, with a given number of pinions, than heretofore, since for example, all the wheels can now be assembled to form a spur-wheel gearing, whereas the special wheels can fulfil their special purpose only. The universal applicability of all the pinions enables the wheel equipment in a toy construction set to be reduced, that is to say, a given number of gears can be produced with fewer pinions, thus considerably cheapening the toy construction set.

The invention will be clearly understood from the following description aided by the accompanying drawing in which:—

Figure 1 represents a comparison between the usual and the new tooth design, whilst Figures 2—6 illustrate the employment of the new pinions for various types of gearing.

In Figure 1 a spur-wheel tooth gearing *a* of the usual type is indicated by broken lines, and a chain-wheel tooth gearing *b* by dot-and-dash lines, with the radius or rounding off between each pair of adjacent teeth, the new pattern teeth being shown in continuous lines. The height and thickness of the new pattern teeth are considerably smaller, and the gap between each pair of adjacent teeth, at the root circle, is accordingly much wider than is usual in this class of pinion. Whereas, in the case of the usual spur-pinion tooth gearing of toy construction sets, the dimensions of the width of the teeth and the tooth gaps, measured along the pitch circle, are $\frac{19}{40}$ ths, and $\frac{21}{40}$ ths, of the pitch, they are approximately $\frac{13}{40}$ ths, and $\frac{27}{40}$ ths in the new pattern; also the height of the teeth is about $\frac{4}{10}$ ths of the pitch, instead of $\frac{7}{10}$ ths; and the gaps are not rounded off at the base. The lost motion resulting from the relatively wide tooth gaps and narrow teeth can be disregarded, because the gearing is only intended for use in toys.

Figure 2 shows the employment of a pinion 1, with the new tooth pattern, as a worm wheel, which is engaged by a worm 2 formed by coiling a stout wire and being

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mounted on a threaded spindle 4, to which it is secured by nuts 5.

Figure 3 shows a pinion 6 which is employed as a chain wheel and engages 5 with an open-link chain 7.

Figure 4 shows a pinion gearing, consisting of the pinions 8, 9 and 6, employed as spur wheels. The pinion 8 is provided with a ring of rectangular openings 10 adapted to engage with another pinion 10 serving as a mitre wheel.

Figures 5 and 6 represent, in side and end elevation, the employment of the pinions 6 and 9 as mitre-wheel gearing.

15 The pinions may be constructed with or without hubs, and be provided with circular holes for the attachment of other structural members, such as pins.

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

1. Toy construction set with gear wheels, characterised in that the width 25 of the teeth of the gear wheels, measured along the pitch circle, is about half the width of the tooth gaps, and the height of the teeth is only about 4/10ths of the pitch, so that each separate wheel can 30 be employed as a spur, mitre, worm or chain wheel.

2. Toy construction set according to Claim 1, characterised in that the root 35 surfaces of the tooth gaps join the flanks of the teeth without any rounding off.

3. In toy construction sets, constructing gear wheels with teeth shaped substantially as described and as illustrated 40 in the accompanying drawings.

Dated this 21st day of December, 1933.

H. GARDNER & SON,
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Agents for the said Applicants.

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1

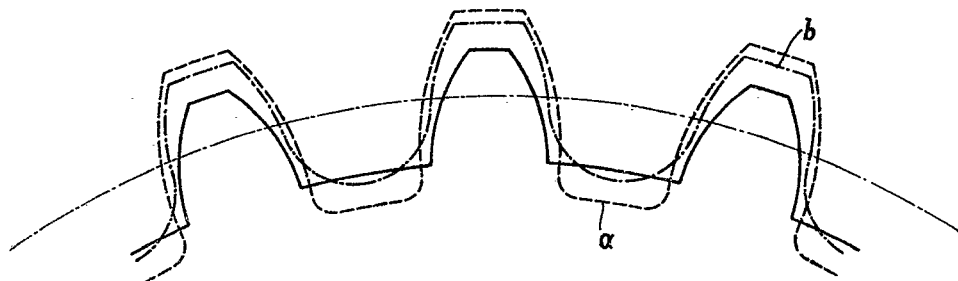


Fig. 2

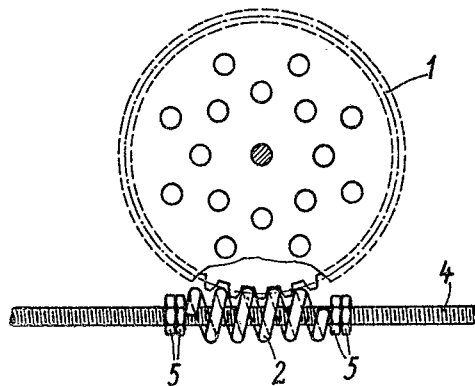


Fig. 3

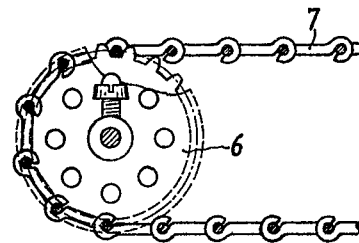


Fig. 4

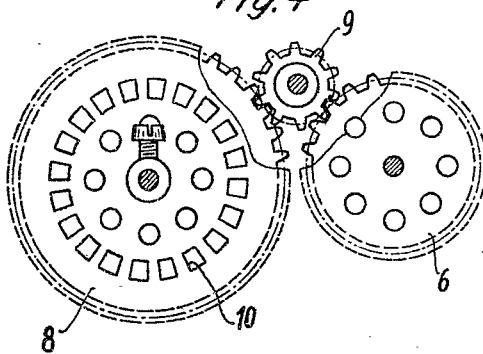


Fig. 5

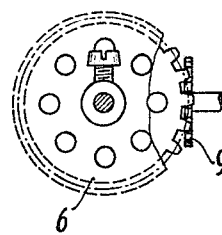


Fig. 6

