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356,567

Complete Accepted: Sept. 10, 1931.

COMPLETE SPECIFICATION.

Improvements in Spring Driven Toy Locomotives.

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 the following statement:—

This invention relates to improvements in the construction of toy locomotives whereby the spring driven mechanism may be enabled to run for a longer time than usual with a corresponding increased travel of the locomotive along its track.

According to this invention the second gear wheel of the spring driven clock work train of the toy locomotive is carried upon a stub axle from one side plate only of the movement, instead of such axle passing through both side plates of the movement as in previous arrangements, such an improved construction permitting the driving spring to distend past this axle. Further features of the invention relate to an improved connection of the casing containing the driving mechanism to the loco framework, whereby the casing may be readily detached for repairs; to improved means for connecting the driving spring to its winding shaft and the ratchet retaining mechanism; and to an improved brake and starting lever.

A spring driven toy locomotive in accordance with this invention is illustrated in the accompanying drawings in which Fig. 1 is a longitudinal section and Fig. 2 a lateral section on the line A—A, Fig. 1. Figs. 3 and 4 are end and side views showing the connection of the side plates of the movement casing to its centre piece and Fig. 5 is a fragmentary inverted plan of Fig. 1 showing the connection of the movement casing to the loco framework. Fig. 6, 7 and 8 are details, Fig. 6 of the spring shaft gear wheel, Fig. 7 of the ratchet disc and Fig. 8 side and end views of the element on the driving shaft to which the spring is connected and which engages the ratchet. Fig. 9 is a section showing the parts of Figs. 6, 7 and 8 assembled on the spring winding shaft.

Fig. 10 is a detail of the stub axle support of the intermediate wheel.

In the apparatus according to the invention the geared train movement driven by the spring 1 is housed within a casing consisting of side plates 2 and a centre plate 3, the spindles 4 of the travelling wheels 5 and the winding shaft 6 passing through both cheek plates which form their bearings. The large gear wheel 7 driven by the spring 1 meshes with the pinion 8 of the intermediate or second wheel 9 on its axis 10. Usually the spindle of such intermediate wheel passes also through both side cheek plates of the movement casing and in consequence such spindle, in the present usual constructions, limits the outward distension of the driving spring 1 beyond the spindle, restricting its power and consequently the distance which the toy locomotive is driven. In order to increase the possible distension of the spring and so ensure a longer travel for the toy locomotive, the spindle of the intermediate wheel 9 does not in the present invention pass through both side plates 2 but as shown in Figs. 2 and 10 this intermediate wheel 9 and its pinion 8 are carried on a short stub axle 10 rivetted at 11 in one side plate only. With such an arrangement as shown in Figs. 1 and 2 the outer convolutions of the spring as the latter distends may pass well beyond the axle 10, a much greater range being thus obtained for the clock-work drive of the loco.

In order to provide for easy removal of the movement casing from the loco, in order to repair it, the central plate 3 is connected to the side plates 2 by lugs 12 which pass through slots 13 in the side plates, the opposing tips 14 of the protruding lugs being then bent as shown in Fig. 4 to secure the side plates to the central plate 3 and yet permit of easy disconnection when required. The movement casing itself is also made readily detachable as a whole from the loco bedplate 15 by forming notches 16. Fig. 4, in the side plates 2 into which the edge of the loco bedplate enters. At

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the other end of the casing a lip 19 is bent out from the central plate 3 which fits beneath the bedplate 15, a yoke piece 20, Figs. 1 and 5, being passed round the lip 19, lugs 21 on the yoke entering slots in the bedplate 15 and being bent over to secure the casing in place. By simply removing the yoke 20 therefore the whole movement may be readily detached from its aperture 17 in the loco frame 15. The centre plate 3 of the movement has an upper flange 22 which together with the base forms a guard for the spring 1. see Fig. 2.

The present usual connection of the spring 1 to its winding shaft and ratchet in such toy locomotives is extremely unsatisfactory. In the present invention this connection is improved by fitting on the square winding shaft 6 an element 23, Figs. 8 and 9, having two discs 24, each with squared holes 25 for engaging the shaft 6. The spring 1 is secured to this element. One disc 24 has two lugs 26 which engage shoulders *a* at the ends of slots 27 in a ratchet disc 28, the squared hole 29 of which also fits the shaft 6, resilient portions 18 being thus left on the disc 28 the outer bent over tips 30 of which engage the holes 31 in the main driving gear wheel 7 as shown in Figs. 6 and 9. Consequently in winding up the spring by the shaft 6 the stress as between the shaft 6 and the element 23 is taken by the two discs 24 which give a much stronger connection and a greater area than usual, capable of withstanding considerable wear. The ratchet disc 28 is turned by reason of its squared hole 29 engaging the shaft 6, the tips 30 of its resilient arms 18 clicking past the holes 31 and engaging therein. After the spring is wound up its return thrust to drive the gear train is distributed through the element 23 which, by reason of its lugs 26 engaging the shoulders *a*, rotates the ratchet disc 28 directly, as well as through the shaft 6 by reason of the latter engaging the square hole 29, thus relieving the latter connection of considerable strain.

The starting and stopping of the driving train is controlled by a lever 32 pivoted to one side plate at 33, an open jaw 34 at the foot of the lever pressing against a pinion 35 in the train. This lever 32 projects from the rear of the loco. see Figs. 1 and 2, and is thus very accessible for starting and stopping.

In order to provide for driving and reversal of the travelling wheels 5 a pinion 36 on the rear axle 4 of the travelling wheels 5 is permanently engaged

by two pinions 37, 38, mounted in a bracket 39 pivoted about the axle 4 and operated by a handle 40 from the cab of the engine. This bracket is shown in dotted lines and when its handle 40 is depressed to the position shown in Fig. 1 the pinion 37 couples the intermediate gear 9 with the pinion 36 on the axle, the toy engine then running forward. In order to reverse the engine, the handle 40 is raised, disengaging the pinion 37 from the gear 9 and engaging the pinion 38 with another pinion 41 driven by the gear 9, the direction of rotation of the travelling wheels 5 being thus reversed.

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 toy locomotive in which the intermediate or second wheel of the spring driven clockwork train of the toy locomotive is carried upon a stub axle from one side plate only of the movement, instead of such axle passing through both side plates, whereby distension of the spring past this axle is possible in order to obtain an increased travel of the toy locomotive.

2. In a toy locomotive as claimed in Claim 1 the improved connection of the spring winding shaft with the ratchet mechanism which consists in securing the spring to an element having discs or the like provided with square holes engaging the square winding shaft, the element also having lugs engaging the ratchet disc directly.

3. In a toy locomotive as claimed in Claim 1 the connection of the side plates to the centre plate of the movement casing which consists in forming lugs on the centre plate passing through slots in the side plates, the tips only of the lugs being bent to secure the side plates.

4. In a toy locomotive as claimed in Claim 1 connecting the whole movement casing to the loco framework by means of notches in the movement side plates which detachably engage the loco bedplate, a lip at the other end of the movement casing being secured to the bedplate by a separate yoke which forms the sole permanent connection of the movement casing to the loco framework.

5. The improvements in spring driven toy locomotives substantially as described and shown in Figs. 1 to 10 inclusive of the accompanying drawings.

Dated this 7th day of November, 1930.

A. J. DAVIES,
Patent Agent,
24, Moorfields, Liverpool.

FIG. 1.

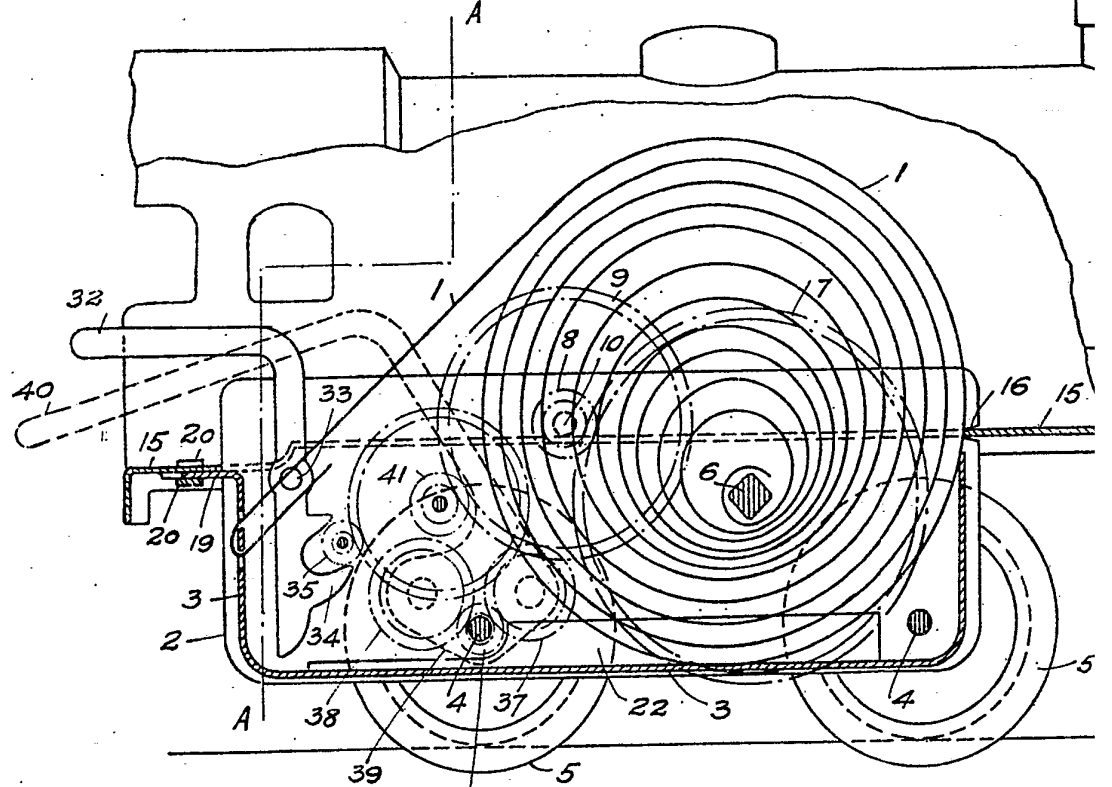


FIG. 5.

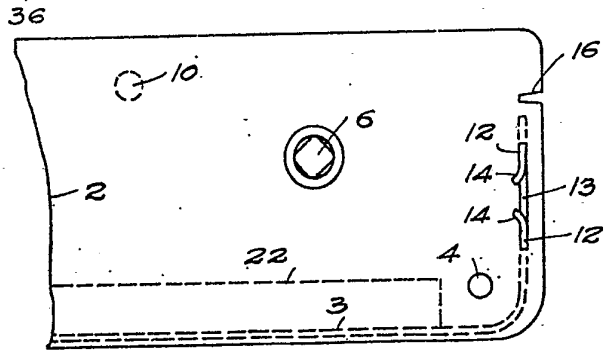
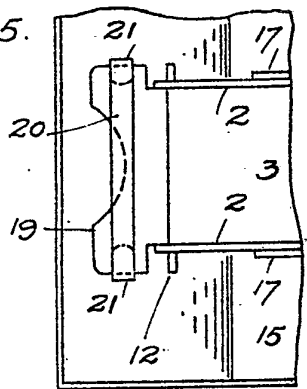


FIG. 4.

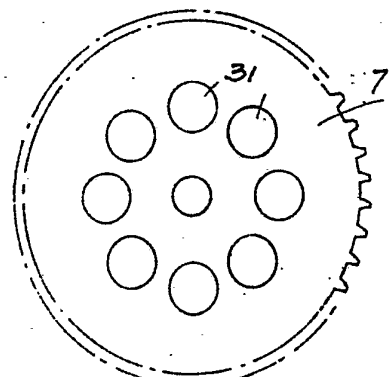


FIG. 6.

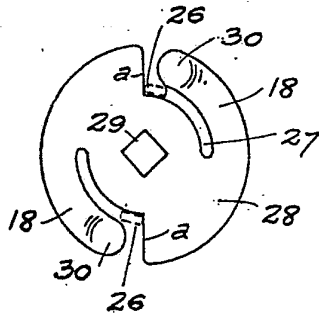


FIG. 7.

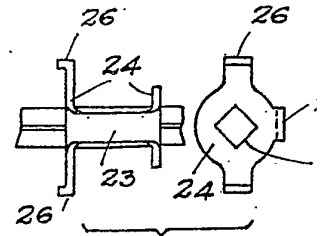


FIG. 8.

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

FIG. 1.

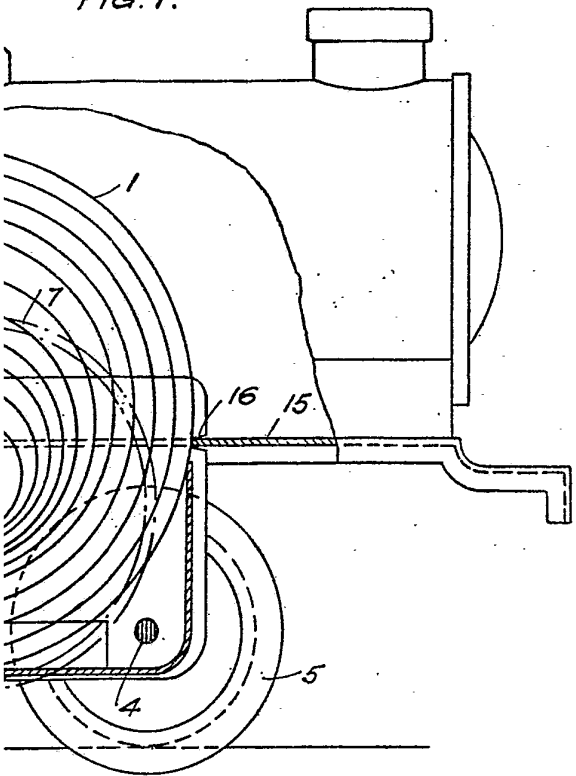


FIG. 2.

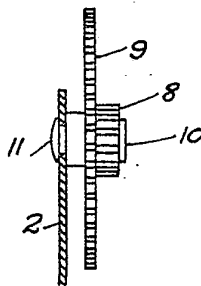
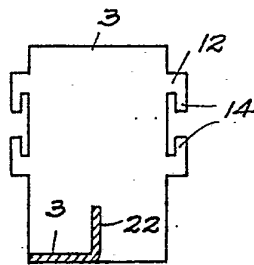
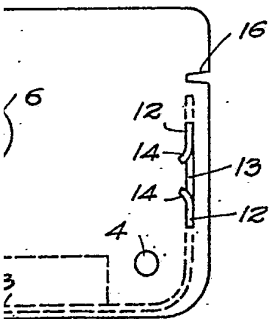
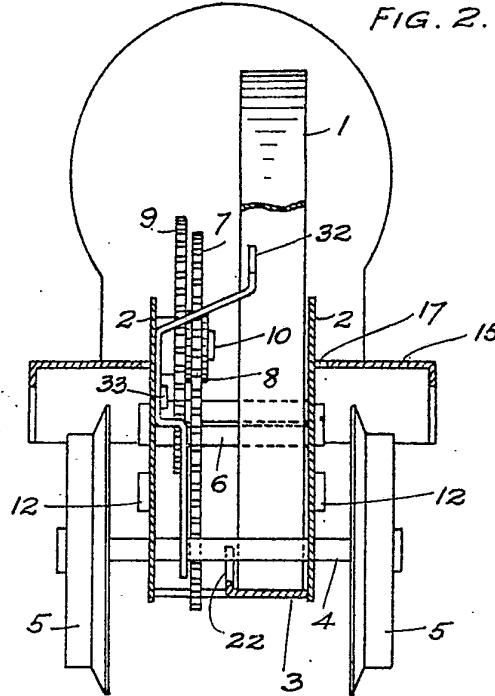


FIG. 3.

FIG. 10.

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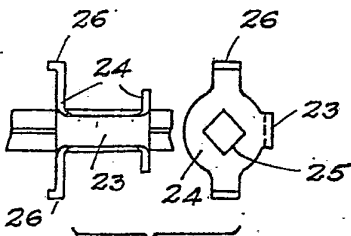


FIG. 8.

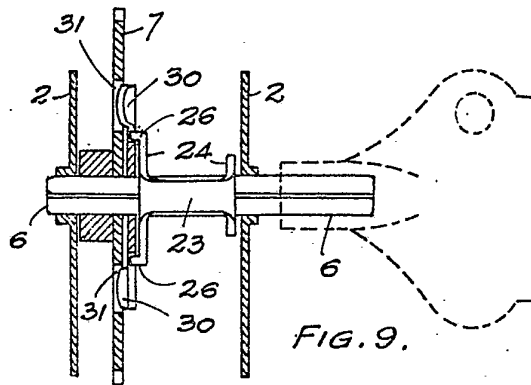


FIG. 9.

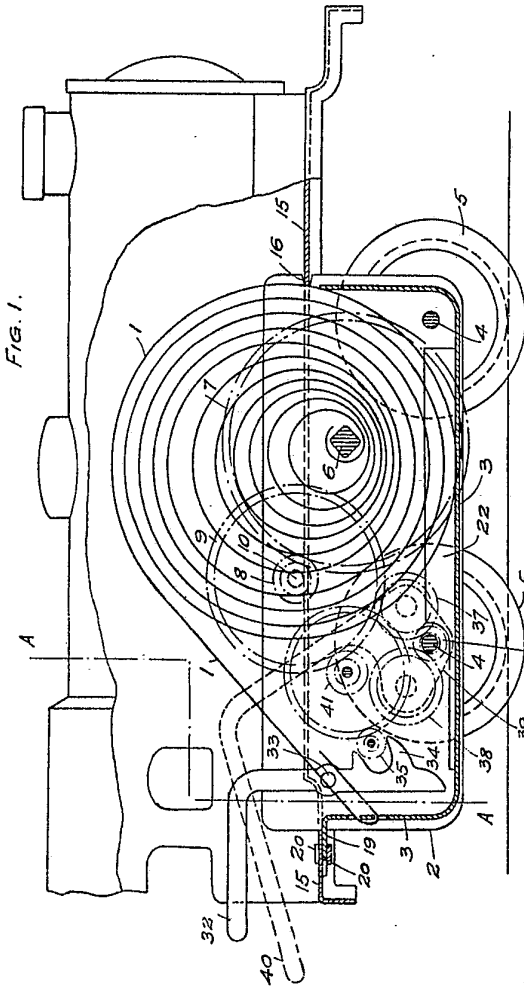


FIG. 1.

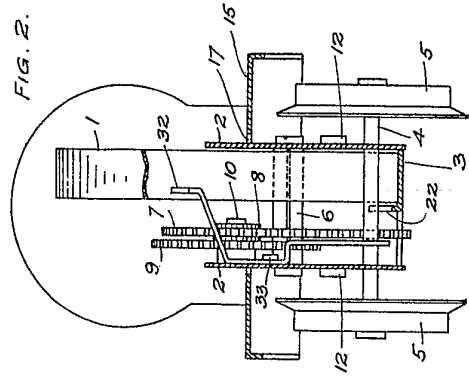


FIG. 2.

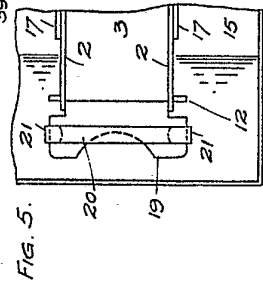


FIG. 5.

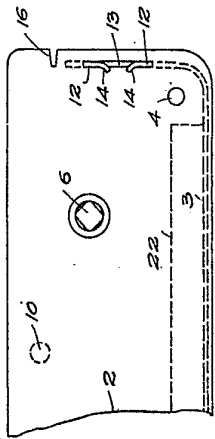


FIG. 4.

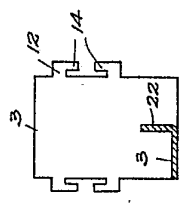


FIG. 3.

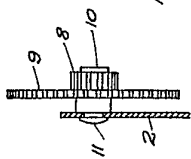


FIG. 10.

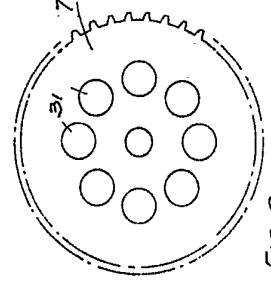


FIG. 6.

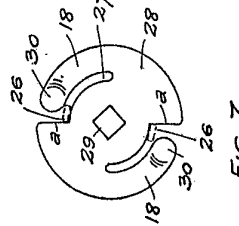


FIG. 7.

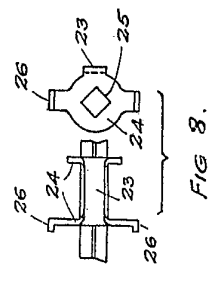


FIG. 8.

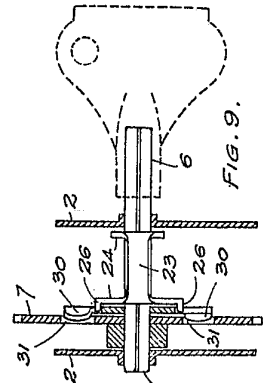


FIG. 9.

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