W. H. HUTH.

AUTOMATICALLY REVERSIBLE MECHANICAL TOY.

APPLICATION FILED APR. 12, 1919. RENEWED JAN. 29, 1921.

1,386,258.

Patented Aug. 2, 1921.

3 SHEETS—SHEET 1.

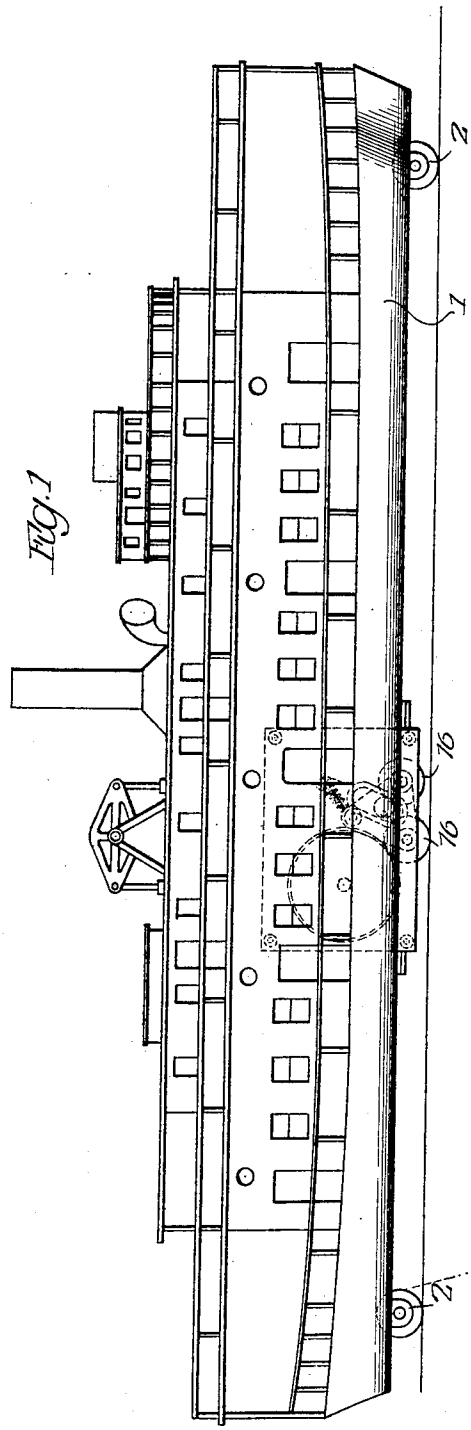


Fig. 1

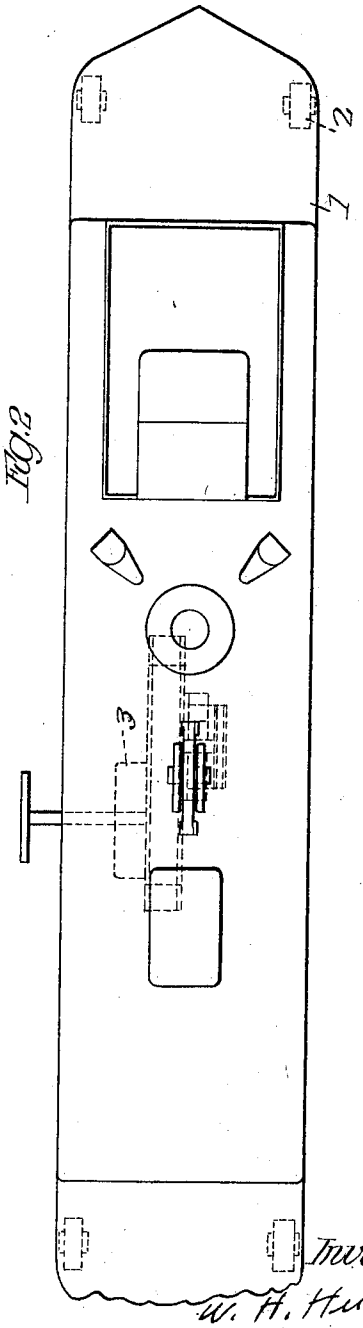


Fig. 2

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3 SHEETS—SHEET 2.

Fig. 3

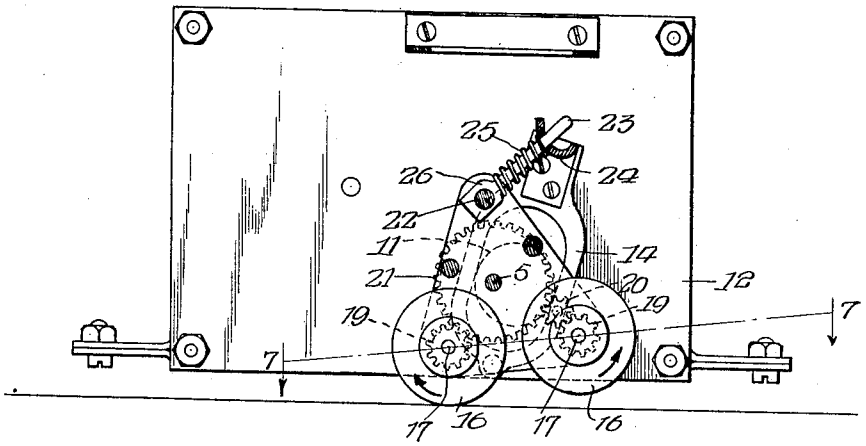


Fig. 4

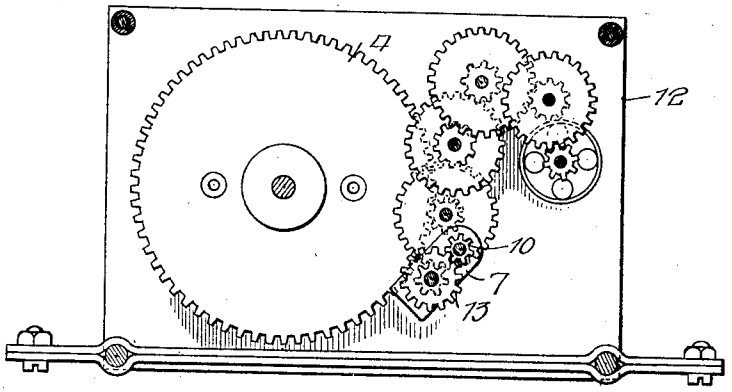
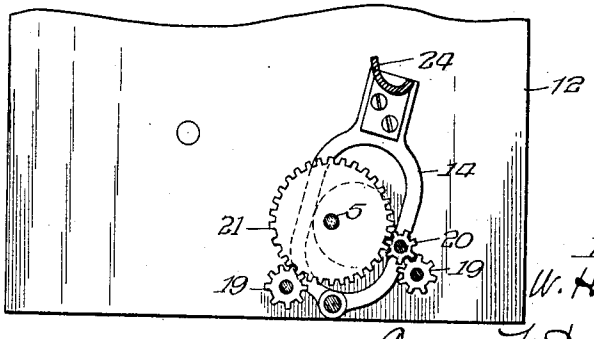


Fig. 5



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3 SHEETS—SHEET 3.

Fig. 6

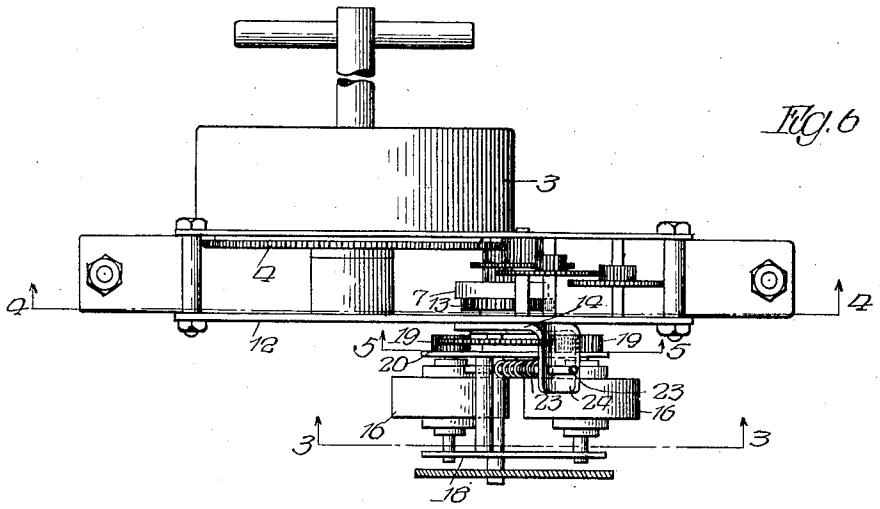
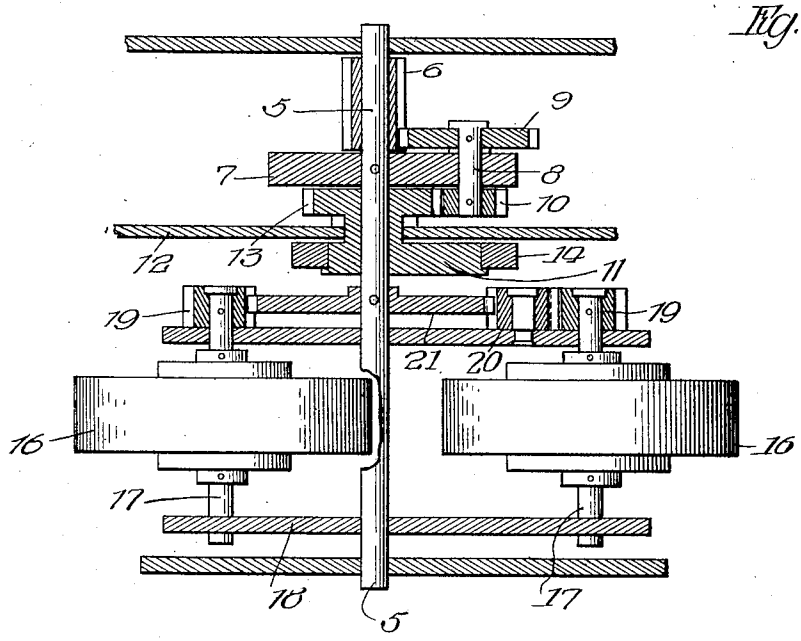


Fig. 7



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UNITED STATES PATENT OFFICE.

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AUTOMATICALLY-REVERSIBLE MECHANICAL TOY.

1,386,258. Specification of Letters Patent. Patented Aug. 2, 1921.

Application filed April 12, 1919, Serial No. 289,633. Renewed January 29, 1921. Serial No. 441,072.

To all whom it may concern:

Be it known that I, WALTER H. HUTH, a citizen of the United States of America, and a resident of Chicago, Illinois, have invented a certain new and useful Improvement in Automatically-Reversible Mechanical Toys, of which the following is a specification.

This invention relates to mechanical toys that travel on the floor, such as toy automobiles or locomotives or boats, or any other similar mechanical toys in which spring motors or other means are employed for propelling the toy along the floor.

Generally stated, the object of the invention is to provide mechanism for automatically reversing the direction of travel of the toy as soon as it encounters an obstruction, or as soon as its motion is retarded, as by an incline or steep grade, so that the toy may travel back and forth automatically or of its own accord.

It is also an object to provide certain details and features of construction and combinations tending to increase the general efficiency and the desirability of an automatically reversible mechanical toy of this particular character.

To the foregoing and other useful ends the invention consists in matters hereinafter set forth and claimed.

In the accompanying drawings—

Figure 1 is a side elevation of a toy ferry boat embodying the principles of the invention.

Fig. 2 is a plan of said boat.

Fig. 3 is an enlarged side elevation of the motor and traction device by which the boat is propelled on the floor, showing certain portions of said device in section, the section being taken on line 3—3 in Fig. 6.

Fig. 4 is a longitudinal section of the motor showing the gearing thereof, being a section on line 4—4 in Fig. 6.

Fig. 5 is a detail sectional view showing the gearing of the traction device, being a section on line 5—5 in Fig. 6.

Fig. 6 is a plan of said motor and traction device.

Fig. 7 is an enlarged section on line 7—7 in Fig. 3.

As thus illustrated, the invention comprises a body 1 which is constructed in the shape of a ferry boat, being provided with wheels 2 that travel on the floor. It will be understood, however, that the body of the toy may have any suitable or desired shape or form or appearance.

The spring motor for driving the toy comprises a spring barrel 3 in which the spring is inclosed, and a large gear wheel 4 which is driven by the spring, in the usual or any desired manner. A main driving shaft 5 is mounted in suitable bearings and provided with a loose pinion 6 which is rotated by suitable connection with said gear wheel 4, thereby to drive the mechanism at the desired speed. The arm 7 is keyed to said shaft and is provided with a short shaft 8 upon which are fixed the gear wheel 9 and the pinion 10, said gear wheel engaging the pinion 6 previously mentioned. A cam 11 is rotatably mounted on said shaft and supported in a bearing formed in the wall 12 of the motor frame. This cam is rigidly connected with the gear wheel 13 which engages the pinion 10 previously mentioned. The cam lever 14 engages said cam and is pivoted below at 15, so that this lever is free to be moved or swung back and forth by said cam.

The traction device comprises a pair of wheels 16 mounted on axles 17 which are supported in the tilting frame 18, the latter being mounted to tilt on the shaft 5 previously mentioned. Said wheels have their axles provided with pinions 19, and one of said pinions engages an idler pinion 20 on the frame. The gear wheel 21 is keyed to the shaft 5, and engages the pinions 19 and 20, whereby the two wheels 16 are rotated in opposite directions. The upper end of the frame 18 is provided with a pivot 22 upon which is mounted a rod 23 that extends through a guide 24 on the upper end of the cam lever 14, and a compression spring 25 is interposed between this guide and the shoulder 26 on the pivoted end of the rod.

As shown in the drawings, one wheel is on the floor and is being rotated to propel the toy in one direction. While the shaft 5 is rotating, the pinion 10 travels around the gear wheel 13, the latter being held stationary because the cam 11 is held against rotation by its engagement with the cam lever 14, said spring 25 exerting its tension in opposite directions to hold one wheel 16 on the floor and to push the lever 14 in the other direction against the cam. However, when the toy is stopped by an obstruction, or when it attempts to climb a hill or steep grade, the retardation thus encountered serves in effect to impose an additional load on the traction device, and on the shaft 5 thereof, so that the latter is retarded or held stationary. With the shaft 5 stationary, the spring motor will continue to rotate the pinion 10, but with the result that the gear wheel 13 will be rotated, thus rotating the cam 11 to shift the lever 14 in a direction to compress the spring 25, bringing the rod 23 to the other side of the center or axis provided by the pivot 22, so that the frame 18 is suddenly tilted in the opposite direction, thereby bringing the other wheel 16 into engagement with the floor. This, of course, causes the toy to instantly begin traveling in the opposite direction.

Thus it will be seen that the traction device comprises two wheels 16 mounted on the tilting frame, and that the tilting of this frame, to reverse the direction of travel, is controlled automatically by the thrust or reaction of the wheel which engages the floor. If an obstruction is encountered, or an incline, so that the wheel stops, the cam 11 will then immediately rotate, inasmuch as the friction of the wheel 16 on the floor is greater than the friction engagement of the lever 14 with the cam 11, and the result is that the latter will rotate to automatically tilt the traction device and thereby reverse the direction of travel. In other words, an overload, so to speak, on the motor of the toy, brought about in the manner stated, so that the progress of the toy is retarded, will automatically cause a reversal of the traction device. The two wheels 16 rotate constantly in opposite directions, while the toy is traveling in either direction. The frame 18, however, tilts sufficiently in either direction to raise one wheel from the floor, so that the direction of travel depends upon which wheel is on the floor. In this way, as soon as the motor feels an over-load of any kind, due to any cause whatsoever, the power of the motor itself automatically reverses the traction device.

Thus any stoppage of the toy whatsoever, as by engagement of any portion thereof with an obstruction, so that the toy is stopped, will automatically operate the movable shifter 14 to reverse the travel of the toy. In this way, engagement of any portion whatsoever of the toy with some obstruction, as by causing either end thereof to run into the wall, will automatically reverse the propelling means, and thereby reverse the direction of travel, so that movable parts carried, for example, at opposite ends of the toy, for engagement with an obstruction, are unnecessary and are not employed.

What I claim as my invention is:—

1. In a mechanical toy, a motor driven traction device to propel the toy along the floor, and mechanism operated by the motor itself and controlled by the retardation of said device to automatically cause a reversal of the direction of travel when an over-load is imposed on the motor by anything tending to retard the progress of the toy.

2. An automatically reversible toy as specified in claim 1, said device comprising a pair of wheels driven in opposite directions, and said mechanism comprising means to lift either wheel from the floor and depress the other wheel into engagement with the floor.

3. An automatically reversible toy as specified in claim 1, said device comprising a pair of traction wheels driven in opposite directions, a pivoted frame on which said wheels are mounted, a spring to yieldingly hold said frame in position to hold either wheel on the floor, and a shaft forming the pivot for the frame and geared to drive said wheels, so that either wheel when on the floor forms a load on said shaft; and said mechanism comprising a cam, gearing to rotate said cam, a pivoted lever engaging said cam and connected to shift said spring and thereby shift said pivoted frame, and means whereby said gearing rotates said shaft when the cam is held against rotation by said lever; said spring being of sufficient strength to hold said lever in position to prevent rotation of said cam, thereby causing rotation of said shaft, but said spring being adapted to yield and permit shifting of the lever by the cam when the load on said shaft is increased by either wheel.

4. An automatically reversible toy as specified in claim 1, said device comprising a wheel for driving the toy in one direction, and another wheel for driving the toy in the opposite direction.

5. In a motor driven mechanical toy, a wheel for driving the toy in one direction, a wheel for driving the toy in the opposite direction, and mechanism operated by the power of the motor itself for automatically bringing either wheel into action to automatically reverse the direction of travel of said toy when the travel of the toy is retarded or interrupted by any obstruction.

6. A toy as specified in claim 5, said

wheels having gearing by which both wheels are driven constantly in opposite directions when either wheel is in action on the floor.

7. In an automatically reversible mechanical toy, the combination of traction means to propel the toy in either direction, a motor to operate said means, and mechanism controlled automatically by any stoppage of the toy to reverse the propelling means, so that if any portion whatsoever of the toy strikes an obstruction which stops the toy, the direction of travel will thereby be reversed.

8. A structure as specified in claim 7, said mechanism comprising a movable shifter which operates the minute the toy is stopped by anything whatsoever.

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