F. A. WAGNER.

MECHANICAL TOY.

APPLICATION FILED MAR. 27, 1912. RENEWED MAY 22, 1915.

1,164,686.

Patented Dec. 21, 1915.

2 SHEETS—SHEET 1.

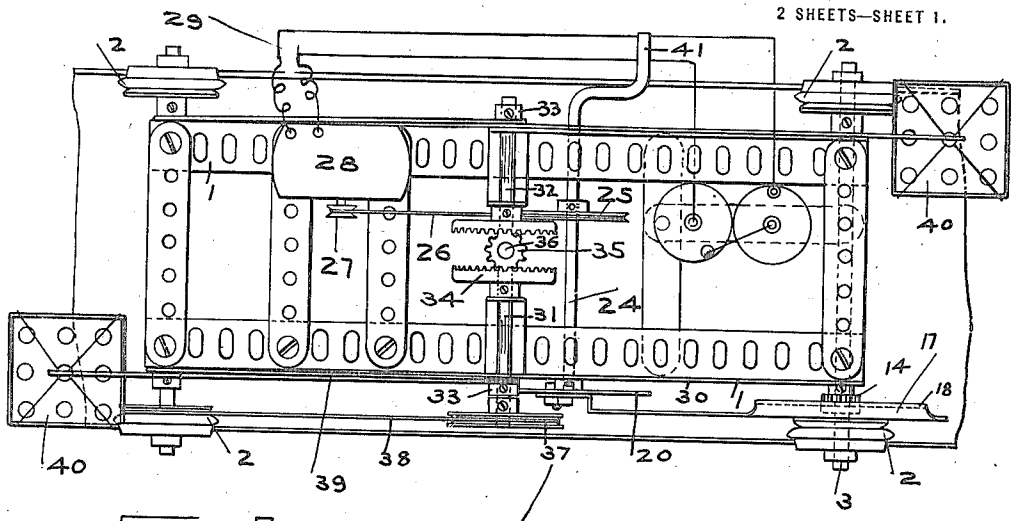


Fig- 2

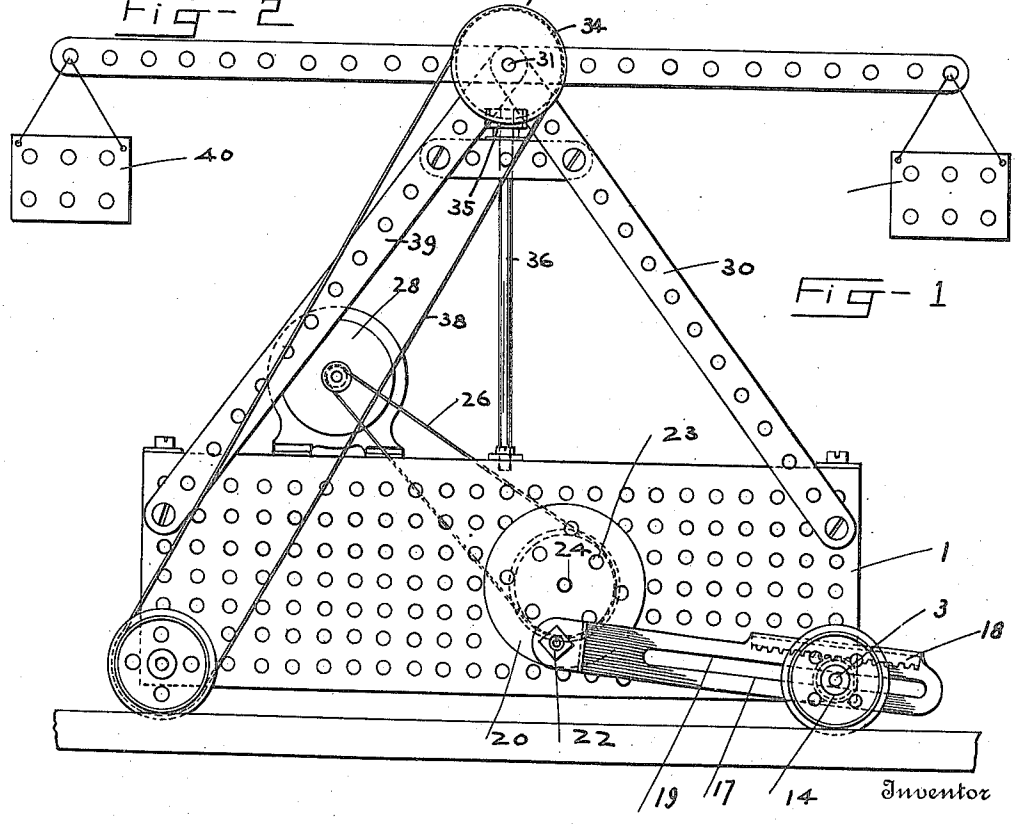


Fig- 1

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Witnesses

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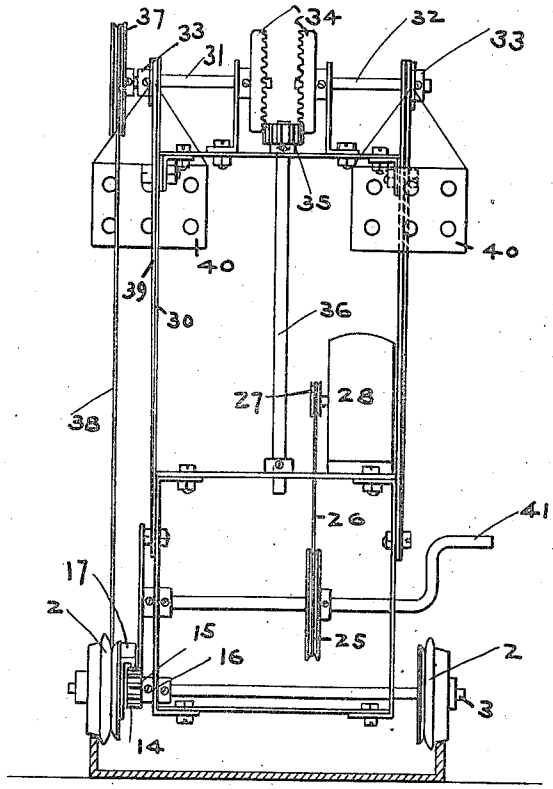
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2 SHEETS—SHEET 2.

Fig-3



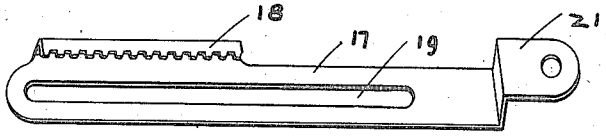


Fig-4

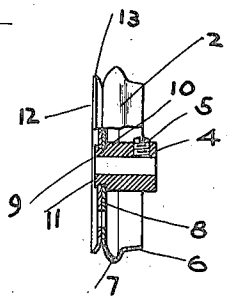


Fig-5

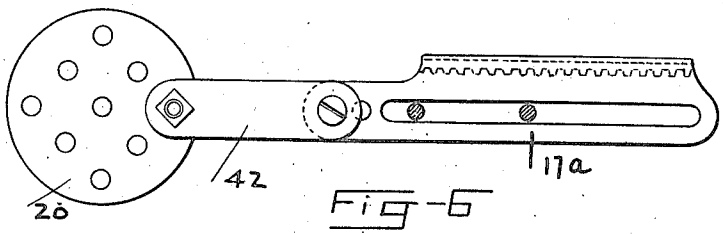


Fig-6

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UNITED STATES PATENT OFFICE.

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MECHANICAL TOY.

1,164,686. Specification of Letters Patent. Patented Dec. 21, 1915.

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To all whom it may concern:

Be it known that I, FRANCIS A. WAGNER, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Mechanical Toys, of which I declare the following to be a full, clear, and exact description.

This invention relates to improvements in toys and has more particular relation to improvements in mechanical toys and devices of the knock-down and build up type for building on a small scale many of the mechanisms and constructions used on railroads, bridges and in many other mechanical commercial enterprises.

The principal object of the invention is to provide devices and mechanism of simplified and improved construction for securing an automatic reciprocation or oscillation of the parts from a continuous rotary motion.

A further object is to provide improved combinations of mechanical elements which may be utilized in different ways for the constructions of different complete mechanisms.

The invention also has other objects all of which will be apparent from the following description and claims and from an inspection of the accompanying drawings in which;

Figure 1 represents a side elevation of a railway work car built up from the devices embodying my invention; Fig. 2 represents a top plan view of the same; Fig. 3 represents a front elevation of the railroad work car shown in Figs. 1 and 2; Fig. 4 represents a detail perspective view of the rack-bar for converting the rotary motion of the motor into oscillating motion of the car, work cranes and other parts carried by the car; Fig. 5 represents a detail vertical section, partly in elevation, of one of the combined pulley and traction wheels, and; Fig. 6 represents a detail side elevation of a modified form of driving rack with connecting link and driving wheel.

The devices shown in the drawings, described in general terms consist of numbers of apertured plates with flanges, connecting strips with slots, link bars with apertures, gear wheels, shafts, collars for attaching parts, bolts and nuts, but as these devices are many of them well known in the art I will not enter into any detail description of them here, it being understood that such parts can be combined and utilized for the construction of trucks, wagons, railway cars, work cars, bridges, working cranes, dredging machines, and many other mechanical operating mechanisms.

As one example of such construction a completed railway crane-car is shown in Fig. 1. The body 1 of the car is built up in the usual manner from the plates and strips of metal bolted together. The traction wheels 2 are fast on axles 3 which are mounted in the side plates of the car by passing through apertures therein. Each of these traction wheels, as best shown in Fig. 5, comprises a hub 4 having an attaching screw 5, a traction wheel proper stamped to form a tread 6 and rail-flange 7 and plate 8 apertured at 9. The hub 4 is formed with a shoulder 10; the reduced part 11 of the hub passing through the aperture in the plate 8 so that the plate rests against the shoulder. A plate 12 having a flange 13 is also mounted on the reduced part of the hub and this plate and the traction wheel are secured firmly together by broaching or forcing out the end of the hub as shown. The flanges 7 and 13 when the parts are secured together form a pulley wheel thus providing a combined traction and pulley wheel which can be utilized as a traction wheel alone, or as a pulley wheel alone, or as a traction and pulley wheel at the same time as shown in Fig. 1. A pinion 14 having an attaching collar 15 provided with a locking screw 16 is, in the example shown in Fig. 1, attached to one of the axles 3 and is engaged by the rack formed on the slotted bar 17; the rack teeth being formed on an angular flange 18 so that they face inward toward the slot 19 and the rack teeth are thus held to engagement with the pinion but the rack bar is free to reciprocate and at the same time rock on the axle as its plane of operation is changed because of its connection with the apertured rotary driving disk 20. The rack bar as shown in Figs. 1 and 4 is formed with an angular apertured end 21 through which a journal bolt 22 passes to pivotally secure the bar at any desired position on the disk 20. The apertures 23

of this disk, it will be observed, are located at different distances from its journal shaft 24 which is mounted in the proper apertures of the side plates of the car. By this means the rack may be made to have a greater or less throw as desired. As the disk 20 is rotated in one direction the rack will be reciprocated and the car will be moved back and forth continually as if it were working at different points and as if the cranes were loading and dumping at different points. A pulley wheel 25 mounted on the shaft 24 is connected by a belt 26 with a pulley 27 on the electric motor 28 which is mounted on the car and is connected to a source of electrical energy either on the car or at the side of track, as shown at 29, suitable flexible wires being provided to permit the car to move back and forth.

In the example of work car shown a sub-frame 30 is built up of the apertured strips to support short shafts 31 and 32 held in position by collars 33 and each provided with a crown-gear 34 secured to it at its inner end; the two gears facing one another as shown in Fig. 3 and meshing with a pinion 35 upon opposite sides. The pinion 35 is mounted on the upper end of a shaft 36 mounted in the sub-frame and its office is simply to transmit motion from one of the crown-gears to the other and at the same time reverse the rotation of shafts 31 and 32 so that the parts carried thereby will oscillate in opposite directions. The shaft 31 is provided with a pulley wheel 37 connected by a belt 38 with one of the pulley wheels on the combined traction and pulley wheels, whereby the shafts 31 and 32 are oscillated first in one direction and then in the opposite direction as the directions of the movements of the car are reversed. Each of the shafts 31 and 32 is provided with an arm 39 carrying a bucket 40, grappling hook, or any other loading device. These buckets will balance in their operation. The shaft 24 is also formed at one end into a crank handle 41 by which the devices can be started or operated without the motor if desired.

In the modified form of my oscillating drive shown in Fig. 6 the rack bar 17^a is straight and is connected to the drive wheel by a pivoted link 42 which may be pivotally connected to the rack bar at different points by different apertures in the bar to allow for the proper location of the bar. In this form the bar is reciprocated in straight lines, the link 42 allowing of this action.

While I have shown my devices, for the sake of illustration, built up into one form or embodiment I do not wish to limit myself to this form as the devices can with equal facility be built up into many other forms having the peculiar rotary, oscillating and reciprocating movements.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. The combination, with a traction car having driving wheels, and a pinion connected therewith, of rotary driving devices mounted on the car, and mechanism between the driving devices and the driving wheels comprising a reciprocating rack bar actuated by the driving devices, engaging said pinion and guided by the axle of the driving wheels for causing a continuous rotary motion of the driving devices to automatically move the driving wheels intermittently in opposite directions to propel the car first in one direction and then in the other.

2. The combination, with a supporting frame, of a driving shaft mounted therein and provided with a disk, a driven shaft carrying a pinion fixed thereon, a rack bar connected to the disk and having a slot to receive the driven shaft and an angular flange with rack teeth to engage the pinion.

3. The combination, with a toy adapted to travel first in one direction and then in the other, of a suitably mounted driving device, a driven shaft, and a slotted rack bar driven by the driving device and guided by the driven shaft, the teeth on the rack bar being parallel with but removed from the plane of the bar, and a pinion fixed to the driven shaft and meshing with the rack bar.

4. The combination, with a stamped out traction wheel having a tread, and a combined rail and pulley flange, of a separate stamped out disk having a pulley flange which, together with the combined rail and pulley flange, forms a pulley wheel when the two parts are brought together, and means for securing the traction wheel and disk together to form a combined rail and pulley wheel.

5. A wheel comprising two stamped disks and a uniting part, one of said disks being bent to form a tread and a flange, one side of the flange coacting with the tread to constitute a traction wheel and the other side thereof to form one wall of a pulley, the other disk being bent to form the other wall of the pulley and the uniting part constituting a hub broached at one end to unite the disks together, and means carried by the hub to secure it to a shaft.

6. The combination, with a traction wheel having a tread and a rail flange, of a disk having a flange which, together with the rail flange forms a pulley wheel, and a shouldered hub passing through the wheel and disk and broached to secure them together.

7. The combination, with a traction car, of a motor, and connections for moving the car back and forth, pivoted cranes on the car, and devices for oscillating the cranes by movements of the car.

8. The combination, with a traction car, of a rotary motor on the car, gearing for

causing the car to automatically move back and forth when the motor rotates, cranes pivoted on the car, and gearing connected to the car for causing the cranes to move in opposite directions and reverse as the car moves back and forth.

In testimony whereof I affix my signature in the presence of two witnesses.

FRANK A. WAGNER.

Witnesses:

MAUD DELLINGER,

EVELYN M. KEYES.