June 16, 1936. H. PELTON 2,044,735

MOTORIZED CONSTRUCTION TOY

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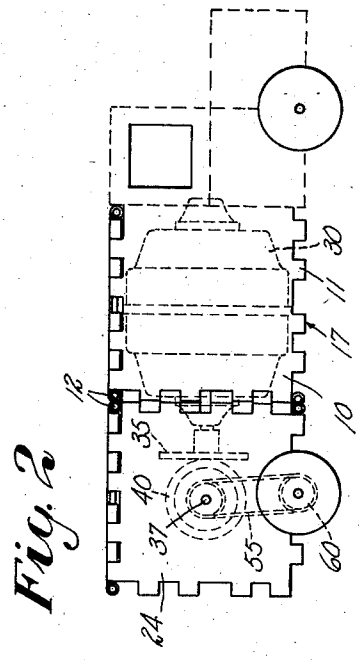


Fig. 2

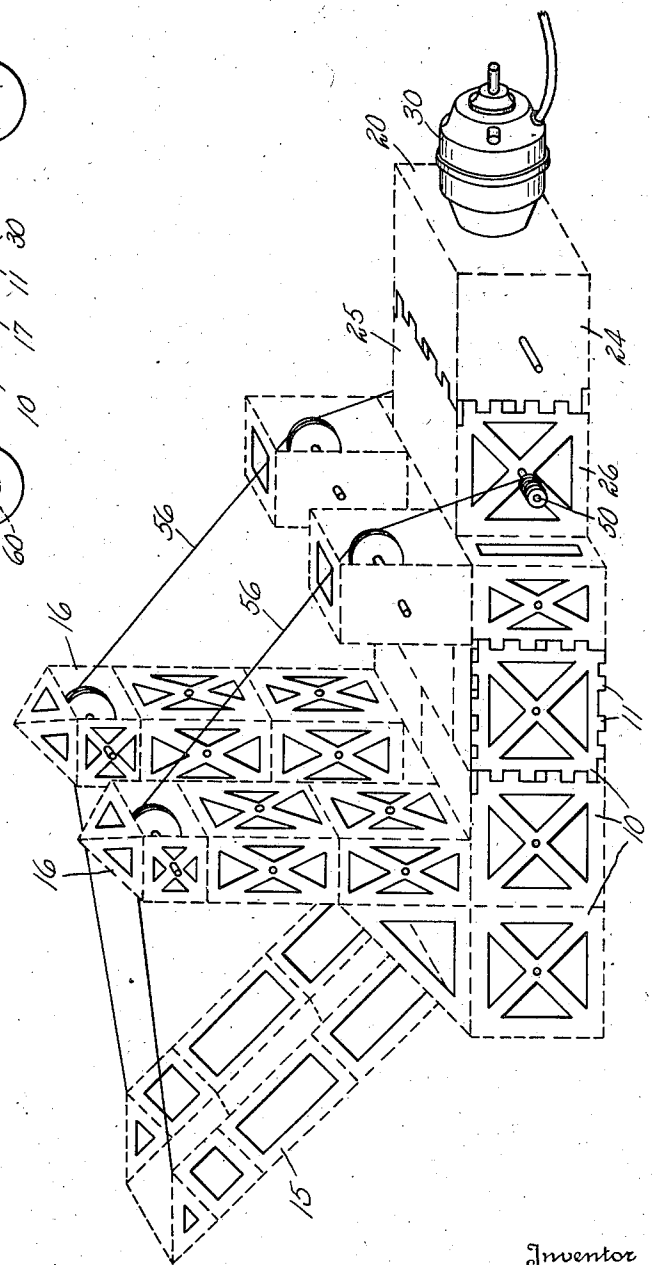


Fig. 1

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Fig. 3

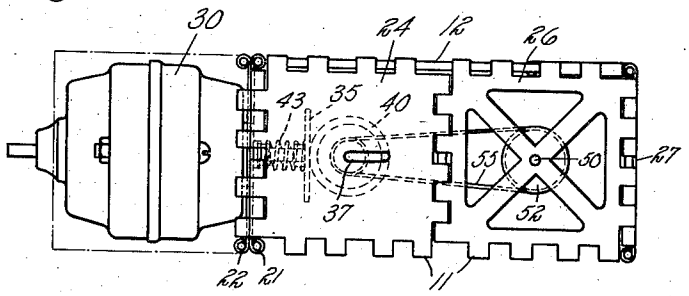


Fig. 4

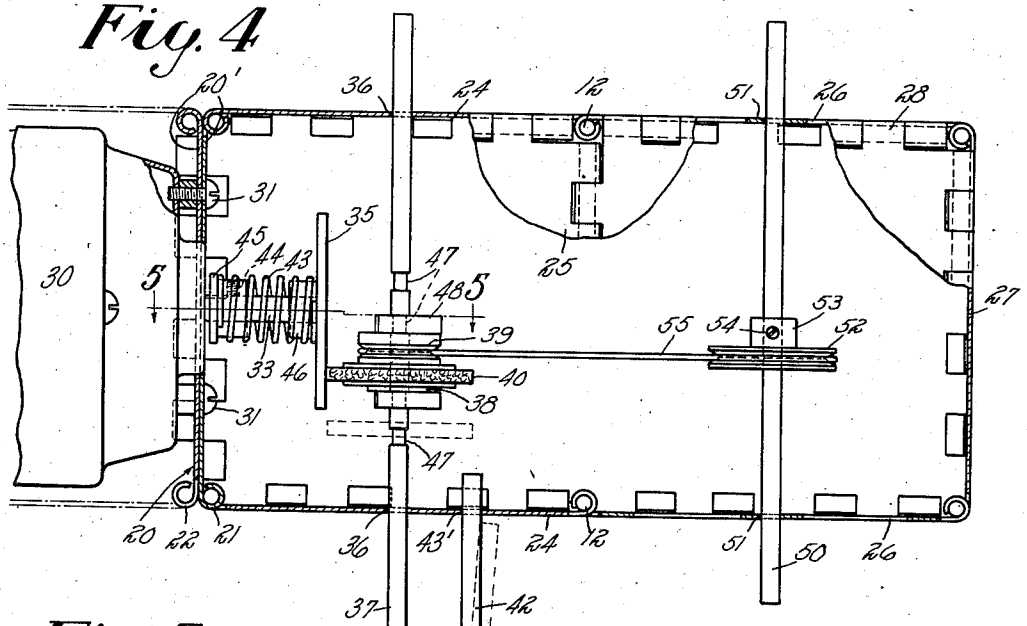
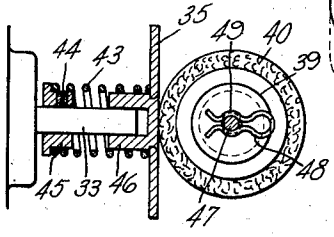


Fig. 5



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Patented June 16, 1936 2,044,735

UNITED STATES PATENT OFFICE

2,044,735

MOTORIZED CONSTRUCTION TOY

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Application January 25, 1935, Serial No. 3,516

12 Claims. (Cl. 46—31)

This invention relates to construction toys of the type having a plurality of plate elements adapted to be interchangeably assembled in edge to edge relation and secured together by pins or the like and providing the opportunity of building structures of indefinite varieties and designs such as, for example, bridges, boats, automobiles, etc.

The aim of the present invention is to provide in a construction toy of this sort an improved, novel, and simple arrangement for driving assembled toys (such as vehicles) or operating parts thereof (such as the boom of a crane, the leaves of drawbridges, etc.)

More particularly, an aim of the invention is to provide an improved driving arrangement which is characterized by its extreme simplicity and cheapness in construction, the ease with which the parts of the unit may be assembled, and the facility with which the driving mechanism may be controlled so as to operate at any desired speed and in the desired direction.

A further particular aim of the invention is to provide an improved arrangement wherein the driving elements may be suitably supported by the plates of which the toy may be in part formed.

Other objects will be in part obvious, and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the appended claims.

In the accompanying drawings wherein is shown for illustrative purposes several applications of my improved arrangement.

Fig. 1 is a perspective view of a portion of a drawbridge in which my improvements are incorporated;

Fig. 2 is a side view of a vehicle in which is incorporated my improved motor unit;

Fig. 3 is a side view of the assembled motor unit;

Fig. 4 is a horizontal sectional view of the unit on a larger scale; and

Fig. 5 is a detail view in section through the driving mechanism, this view being taken substantially on line 5—5 of Fig. 4.

Referring to the drawings in detail, I have shown the toys as comprising a plurality of metal plates 10 each having a flat form of polygonal shape and each provided on each of its edges with a plurality of spaced apart knuckles 11 preferably offset out of the plane of the plate. The dimensions of the plates and the arrangement of the knuckles are such that the plates may be interchangeably and universally assembled edge to edge with the knuckles thereof in intervening relation. The plates are preferably formed of metal by stamping out a blank of desired configuration with projecting ears, and then curling the ears into the form of cylinders. The plates are held in assembled relation by pins 12 extending through the aligned ears.

In Fig. 1, I have shown these plates as being assembled to form a portion of a drawbridge having a suitable pivoted leaf 15 and towers 16. In Fig. 2 I have shown the plates as forming a vehicle 17. It will be understood, of course, that these disclosures are by way of illustration only, as obviously my improved driving mechanism may be used in connection with other structures.

In accordance with the present invention, I provide a driving arrangement the parts of which are supported by a box made up of the interchangeable plates which form parts of the assembled toy. This box may include an end wall 20 made up of two plates 20' constructed similarly to to the other plates and adapted to be interchangeably and universally matched and assembled therewith. In the present illustrative disclosure, these plates 20' are positioned back to back to provide two sets of spaced knuckles, one set of knuckles 21 being offset to one side and the other set 22 of the other side so that the end wall may be used as a partition. Secured by the pins 12 to opposite side edges of the end wall 20 are side plates 24 which are similar to the other plates of the toy in that they are provided with knuckles similarly positioned and they are adapted to be interchangeably matched with any of the other plates. The plates 24 may be maintained in parallel position and at right angles to the plane of the end wall 20 by a top plate 25 of the same construction as the side plates and having its knuckles at its respective edges intervening with the knuckles on the top edges of the side plates and one of the plates 20'. The top plate is held in place by the pins 12 passing through the registering knuckles. Obviously, if desired, the box may have a bottom and a top plate. In the event that it is desired to operate or drive a part of the toy through a jackshaft, the arrangement shown in Figs. 3 and 4 may be used. In this case, the supporting box may include additional side plates 26 connected to the edges of the plates 24 and an end plate 27 between the rear edges of the plates 26 and also an additional top plate 28, all of these plates

being of the same construction and arrangement as the plates employed for making the toy.

The driving mechanism preferably includes a small electric motor **30** secured to, so as to be carried by, the end wall **20**. In the present instance, the motor is secured to this wall by screws **31**, and the plates have a central hole for accommodating the boss on the adjacent end of the motor casing. The motor shaft is indicated by the numeral **33**. Mounted on this shaft, as hereinafter described more in detail, is a friction drive disk **35**. The side plates **24** are provided with aligned and centrally disposed apertures **36** which more or less closely and slidably receive a shifting rod **37** which extends transversely through the box. Rotatably mounted upon, but held against axial movement relative to, the rod **37** is a sleeve **38** having a grooved portion **39** which forms a pulley. Carried by this sleeve is a leather wheel **40** the periphery of which is adapted to engage the face of the disk **35**.

For the purpose of holding the rod in any longitudinal position of adjustment, a very simple and economical arrangement is provided. To this end, the rod **37**, which is resilient, has one end turned back upon itself so as to provide a U-shaped handle **41**, and the short arm **42** of the handle is engaged in an aperture **43'** in one of the side plates **24**. This aperture is so located relative to the aperture **36** of that plate that the distance therebetween is less than the distance between the main length of the rod and the free end of the arm **42** when the latter is not engaged in the aperture **43'**, as shown most clearly by broken lines in Fig. 4. With this arrangement, when the arm **42** is engaged in the aperture **43'**, the handle is placed under compression so that the main portion of the rod and the arm **42** thereof will be pressed against and frictionally engage the edges of the apertures **36** and **43'**, respectively. Thus the rod will be frictionally held in any position of adjustment. The speed and the direction of rotation of the driven member will depend, of course, upon the position of the wheel with respect to the axis of the driving member **35**. When the wheel engages the face of that driving member adjacent the periphery of the latter, the wheel is rotated at maximum speed, and as the wheel approaches the center of the disk, the speed is gradually reduced until when the wheel engages the exact center of the disk no rotation will be imparted to the wheel. When it is desired to reverse the direction of rotation of the drive member, it is merely necessary to move the wheel from one side to the other side of the axis of rotation of the disk. Thus it will be seen that the speed of the driven member may be very nicely and easily controlled, and its direction of rotation may be changed at will.

By preference, the drive disk is resiliently urged into engagement with the periphery of the driven wheel **40** in order to avoid close tolerances, to take up wear, and to obtain the desired frictional driving engagement. In the present instance, there is provided a very simple, economical and effective arrangement wherein the spring **43** for urging the disk against the wheel, also serves the function of forming a driving connection between the motor shaft and the disk. As shown most clearly in Figs. 4 and 5, the shaft **33** has secured to it, as by means of a screw **44**, a flanged collar **45**, and the disk has a cylindrical collar or boss **46** which slidably receives the outer end of the motor shaft **33**. The spring **43** is in the form of a coil into the opposite ends of which the collars **45** and **46** frictionally fit. With this arrangement, when the shaft **33** is rotated, the collar **45**, due to its frictional engagement with the spring, will tend to wind up the spring, thereby causing the convolutions about the collar to securely grip the latter; likewise, the convolutions encircling the hub or boss **46** of the disk will grip that boss, and thus the disk will be driven.

The driven member, which includes the sleeve **38** and the wheel **40**, may be very simply and conveniently held against sliding movement relative to the rod **37** by providing grooves **47** in the rod and clips **48** engaging in these grooves. The clips are preferably made of spring wire cut to lengths and bent into U shape. The arms of the clip have humps **49** which form registering recesses adapted to receive the reduced portions formed by grooving the rod. The end portions of the arms are flared outwardly so as to facilitate positioning of the clips.

In the embodiment shown in Figs. 1, 3, and 4, the part to be operated, in the present instance the leaf of the drawbridge, is operated through a jackshaft **50** which is journaled in centrally disposed apertures **51** provided in the side plates **26** of the supporting box. Secured to this jackshaft and located within the box is a pulley **52** having a hub **53** fixed to the jackshaft as by a set screw **54**. A belt in the form of an endless string **55** passes about the pulleys **39** and **52** so that rotation of the wheel is imparted to the jackshaft. The string **56** (or strings) which represent a cable associated with the part to be operated is connected to the jackshaft so as to be wound up thereon and played off therefrom as the same is rotated. In the embodiment shown in Fig. 1, two such cables are illustrated.

In the embodiment shown in Fig. 2, my improved arrangements are shown incorporated in a vehicle. In this case, the motorized unit forms a part of the body of the vehicle. The rear axle of the vehicle is provided with a pulley **60** about which passes the belt **55**, the jackshaft in this instance being omitted.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim as my invention:

1. In a construction toy composed of a plurality of plate elements arranged to be secured together in edge to edge relation, a supporting structure formed from said elements, a motor carried by said supporting structure, a drive disk carried by the shaft of said motor, a rod disposed at right angles to the axis of said motor shaft and supported by said supporting structure, a friction wheel on said rod and having its periphery engaging the face of said disk, and means for adjusting said friction wheel to vary the point of engagement between said wheel and disk along a diametrical line of the latter.

2. In a construction toy composed of a plurality of plates having knuckles at their edges

and adapted to be secured together by means of pins, a supporting structure formed from said plates, a motor carried by one of the plates of said supporting structure, a drive disk carried by the shaft of said motor, a longitudinally shiftable rod disposed at right angles to the axis of said motor and supported by a pair of plates of said supporting structure, a friction wheel journaled on and held against axial movement relative to said rod and having its periphery engaging the face of said disk, and means for holding said rod in adjusted position.

3. In a construction toy composed of a plurality of plates having knuckles at their edges and adapted to be secured in edge to edge relation by means of pins, a supporting structure formed from said plates, a motor carried by one of said plates, a drive disk secured to the shaft of said motor, a longitudinally shiftable rod disposed at right angles to the axis of said disk and supported by a pair of plates of said supporting structure, a friction wheel journaled on and held against axial movement relative to said rod and having its periphery engaging the face of said disk, and means for frictionally holding said rod in adjusted position.

4. In a construction toy composed of a plurality of plates having knuckles at their edges and adapted to be secured together in edge to edge relation by means of pins, a supporting structure formed from said plates and including an end plate, a pair of side plates connected to the opposite edges of said end plate and a plate at right angles to said end plate and connected at its opposite sides to said side plates, a motor carried by said end plate and having a shaft extending into said structure, a disk carried by the shaft of said motor, a longitudinally shiftable rod disposed at right angles to the axis of said disk and supported by said side plates, a friction wheel journaled on and held against axial movement relative to said rod and having its periphery engaging the face of said disk, and means associated with said rod for holding the same in adjusted position.

5. In a construction toy composed of a plurality of plates having knuckles at their edges and adapted to be secured together by means of pins, a supporting structure formed from said plates and including an end plate and a pair of parallel side plates connected to the opposite respective edges of said end plate, said end plate having a central hole and said side plates having aligned apertures, a motor secured to said end plate and having a casing provided with a boss extending through said opening and having a shaft extending into said supporting structure, a disk on the inner end of said shaft, a rod extending through said apertures of said side plates, a driven member journaled on said rod and fixed against longitudinal movement relative thereto, said driven member including a friction wheel disposed at right angles to and having its periphery engaging the face of said disk, said rod being longitudinally adjustable to move said wheel so that its point of engagement with said disk may be adjusted along a diametrical line thereof, and means for frictionally holding said rod and wheel in any desired position of adjustment.

6. In a construction toy composed of a plurality of plates having knuckles at their edges and adapted to be secured together by means of pins, a supporting structure formed from said plates, a motor carried by one of the plates of said supporting structure, a drive disk carried by the shaft of said motor, a longitudinally shiftable rod disposed at right angles to the axis of said motor and supported by a pair of plates of such supporting structure, and a friction wheel journaled on and held against axial movement relative to said rod and having its periphery engaging the face of said disk, said rod having a U-shaped handle and one of the plates supporting said rod having a pair of spaced apertures for receiving the arms of said handle, said handle being under spring tension when the arms thereof are engaged in said apertures whereby said rod is frictionally held in any desired position of adjustment.

7. In a construction toy composed of a plurality of plates having knuckles at their edges and adapted to be secured together by means of pins, a supporting structure formed from said plates and including an end plate and a pair of parallel side plates connected to the opposite respective edges of said end plate, a motor secured to said end plate and having a shaft extending into said structure, a disk on said shaft, a longitudinally shiftable rod disposed at right angles to the axis of said disk and supported by said side plates, and a driven member journaled on said rod and fixed against longitudinal movement relative thereto, said driven member including a pulley and a friction wheel disposed at right angles to and having its periphery engaging the face of said disk, said rod comprising a length of spring metal one end of which is turned back to form a U-shaped handle and one of said side plates being provided with a pair of spaced apertures for respectively receiving the main length of said rod and the turned back end thereof and being so positioned as to maintain the U-shaped handle under compression whereby said rod is frictionally held in any desired position of adjustment.

8. In a construction toy composed of a plurality of plates having knuckles at their edges and adapted to be secured together by means of pins, a supporting structure formed from said plates, a motor carried by one of the plates of said supporting structure, a drive disk carried by the shaft of said motor, a longitudinally shiftable rod disposed at right angles to the axis of said motor and supported by a pair of plates of the supporting structure, a driven member journaled on said rod and fixed against longitudinal movement relative thereto, said driven member including a pulley and a friction wheel disposed at right angles to and having its periphery engaging the face of said disk, means for holding said rod in any desired position of adjustment, a shaft journaled on said supporting structure and parallel to said rod, a pulley on said last mentioned shaft, and a belt passing about said pulleys.

9. In a construction toy of the character described and including a plurality of construction elements forming a supporting structure, a motor carried by said structure, a drive disk associated with the shaft of said motor, a rod disposed at right angles to the axis of said disk and supported by said supporting structure, a friction wheel on said rod and having its periphery engaging the face of said disk, means for adjusting said wheel to vary the point of engagement between said wheel and disk along a diametrical line of the latter, and spring means for urging said disk against said wheel.

10. In a construction toy of the character de-

scribed and including a plurality of construction elements forming a supporting structure, a motor carried by said structure, a drive disk associated with the shaft of said motor, a longitudinally shiftable rod disposed at right angles to the axis of said disk and supported by said supporting structure, a friction wheel journaled on and held against axial movement relative to said rod and having its periphery engaging the face of said disk, means for holding said rod in adjusted position, and a spring between said shaft and disk forming a driving connection therebetween and urging said disk against said wheel.

11. In a construction toy of the character described and including a plurality of construction elements forming a supporting structure, a motor carried by said structure, a drive disk associated with the shaft of said motor, a longitudinally shiftable rod disposed at right angles to the axis of said disk and supported by said supporting structure, a friction wheel journaled on and held against axial movement relative to said rod and having its periphery engaging the face of said disk, means for holding said rod in adjusted position, and a driving connection between said shaft and disk and including a coiled spring, and members on the shaft and disk and respectively engaging in a frictional manner in the opposite ends of said coiled spring, said spring urging said disk against said wheel.

12. In a construction toy of the character described and including a plurality of construction elements forming a supporting structure, and driving means carried by said structure and including a rod, a member rotatably mounted thereon, said rod having circumferential grooves at opposite ends of said member, and U-shaped spring clips having their arms straddling said rod in said grooves.

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