

June 2, 1931.

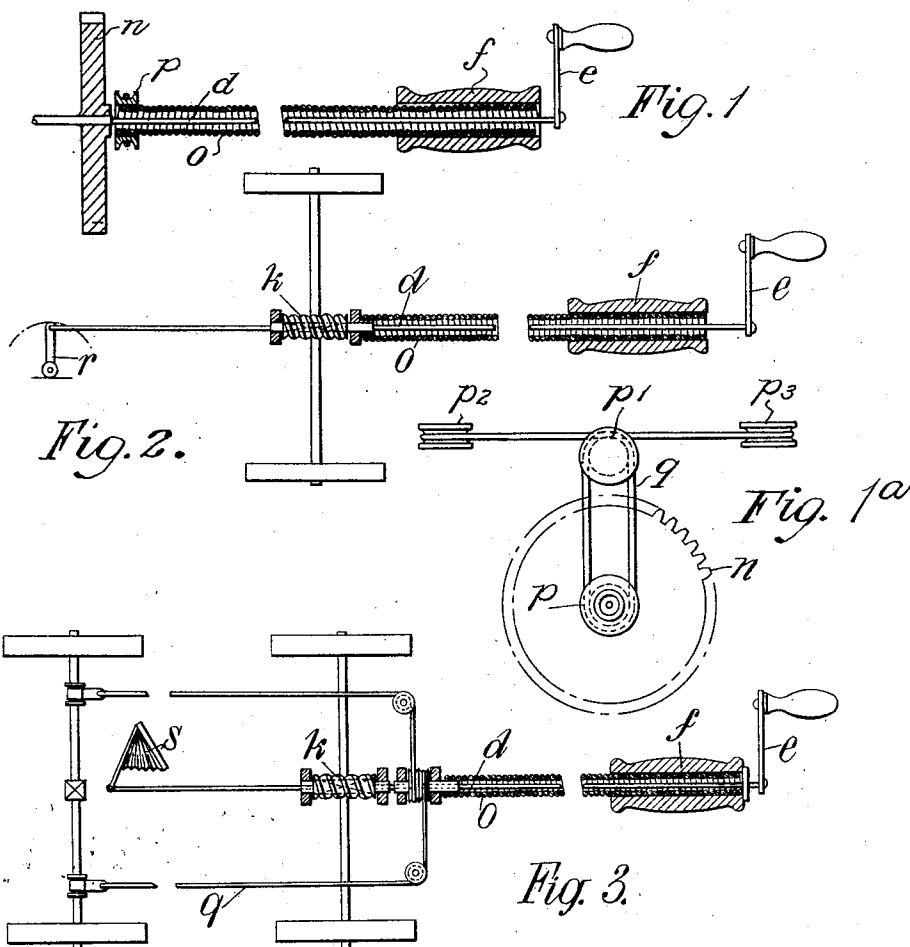
H. J. BUCHANAN-WOLLASTON

1,808,015

MECHANICAL TOY

Filed June 4, 1928

4 Sheets-Sheet 1



H. J. Buchanan-Wollaston
INVENTOR

By: Marks & Clerk
ATTY'S

June 2, 1931.

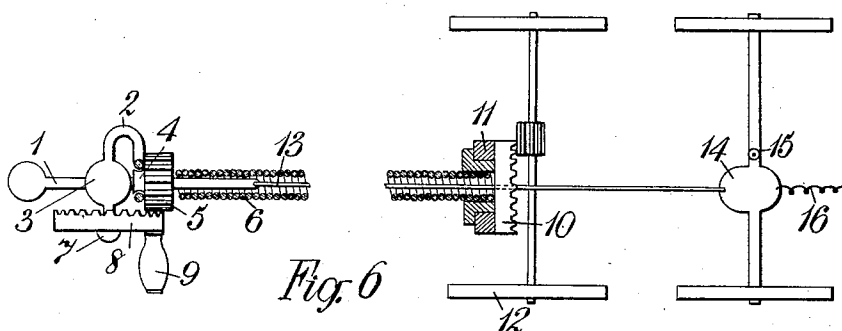
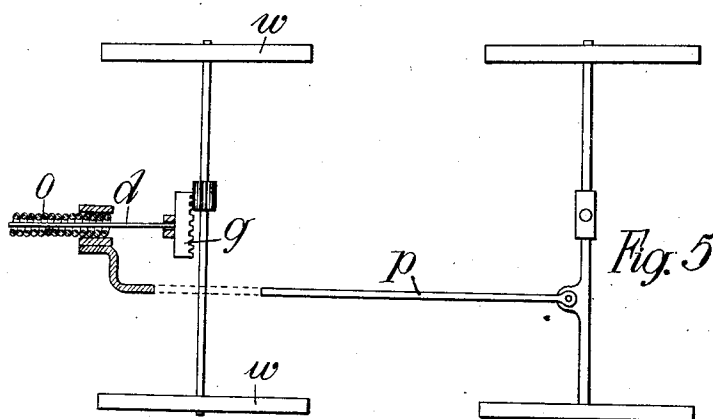
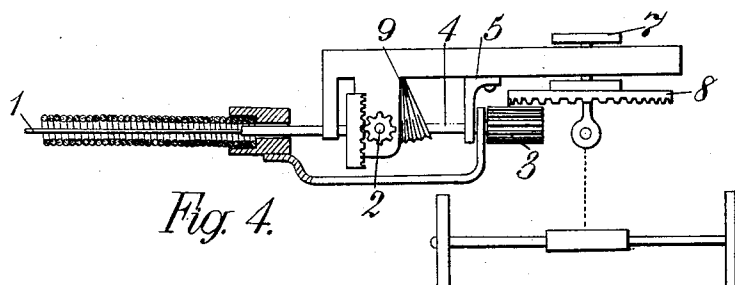
H. J. BUCHANAN-WOLLASTON

1,808,015

MECHANICAL TOY

Filed June 4, 1928

4 Sheets-Sheet 2



H. J. Buchanan-Wollaston
INVENTOR

By: Marks & Clerk
ATTY.

June 2, 1931.

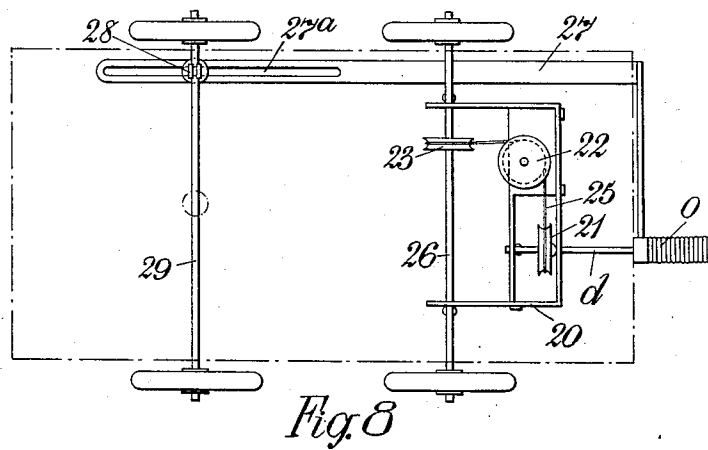
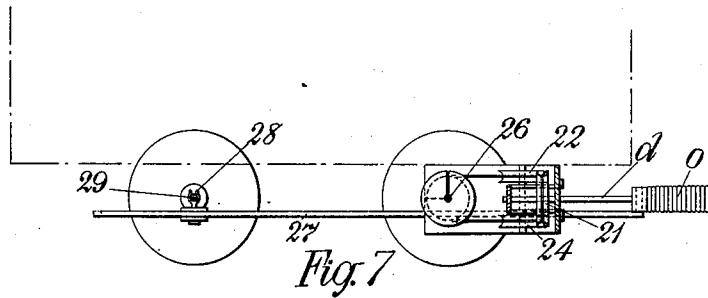
H. J. BUCHANAN-WOLLASTON

1,808,015

MECHANICAL TOY

Filed June 4, 1928

4 Sheets-Sheet 3



H. J. Buchanan-
Wollaston

by Marks & Clerk
ATTYS.

June 2, 1931.

H. J. BUCHANAN-WOLLASTON

1,808,015

MECHANICAL TOY

Filed June 4, 1928

4 Sheets-Sheet 4

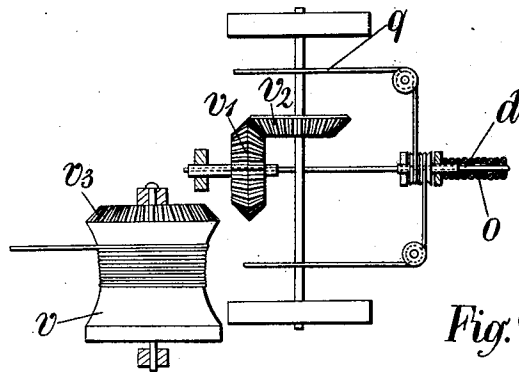


Fig. 9.

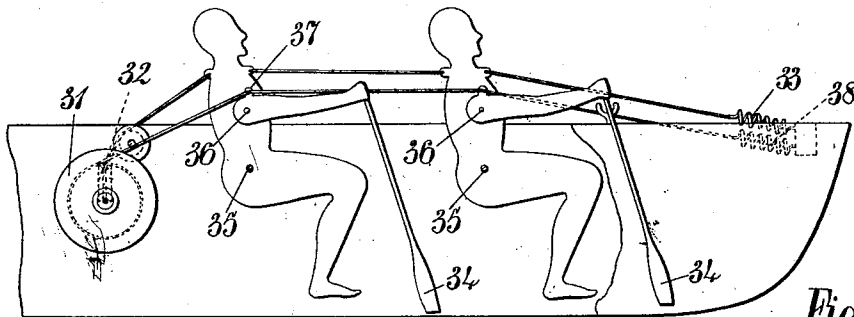


Fig. 10.

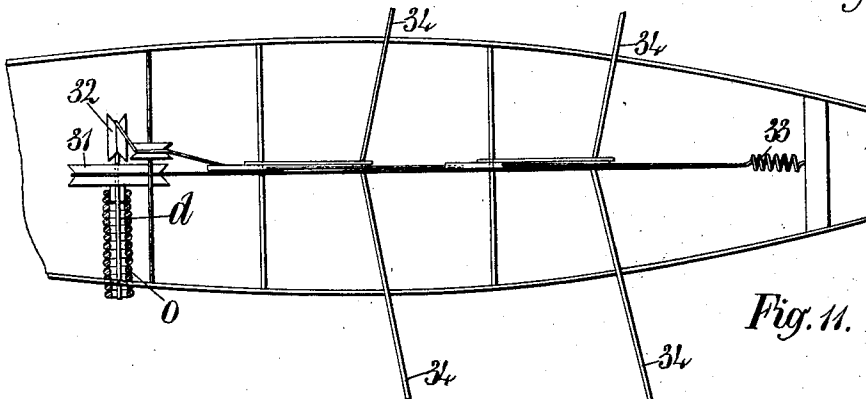


Fig. 11.

INVENTOR:
H. J. Buchanan-Wollaston

By: *Marshall*
ATTY.

UNITED STATES PATENT OFFICE

HUGO JOHN BUCHANAN-WOLLASTON, OF PAKEFIELD, ENGLAND

MECHANICAL TOY

Application filed June 4, 1928, Serial No. 282,694, and in Great Britain June 27, 1927.

This invention relates to mechanical toys and has for its object to devise simple, cheap and efficient means for propelling, steering and/or manipulating such toys without the
 5 necessity for costly or complicated mechanism, the means adopted for manipulating the toys in accordance with the invention being also very convenient from the point of view of the user since he is enabled to walk
 10 about freely during the process of manipulation and so follow the movements of the toys.

With the above object in view the invention consists in the various combinations and arrangements of parts hereinafter described
 15 and more particularly pointed out in the appended claims.

The accompanying drawings illustrate several modes of carrying out the invention.

Figure 1 illustrates in sectional elevation
 20 mechanism both for propelling and for steering a toy.

Figure 1a shows a detail of the steering mechanism shown in Figure 1.

Figure 2 is a plan view of a further form
 25 of propelling and steering mechanism.

Figure 3 shows a still further modification in which there are propulsive and steering means shown combined with means for
 30 operating any other device upon the toy such, for example, as a horn upon a motor-car.

Figure 4 shows yet another form of operative means for propelling, and steering a toy, and operating a horn thereon.

Figures 5 and 6 show other modifications of
 35 propelling and steering mechanism for wheeled toys according to the present invention.

Figure 7 is a side elevation of a form of apparatus which may be attached to an exist-
 40 ing toy.

Figure 8 is a plan of the attachment.

Figure 9 is a modification showing the application of the invention to a toy crane.

Figure 10 shows the application of the in-
 45 vention to a toy rowing boat, and

Figure 11 is a plan view of the device shown in Figure 10.

In carrying my invention into effect in one of its simplest forms and as illustrated in
 50 Figures 1 and 2 in relation to a toy cart or

wagon *a* I rigidly connect to the axle *b* of the driving wheels *c* a flexible hard metal wire *d* which is connected to a suitable handle *e*, the spindle of which is rotatable within a hand member *f*. 55

In carrying the invention into effect in connection with a toy in which it is desired to steer the same in addition to its propulsion and this may very conveniently be effected in accordance with my invention either by
 60 means of the flexible driving shaft or by means of a separate flexible member provided for the purpose, which member may conveniently, although not necessarily, take the form of a flexible tube or sheath surrounding the
 65 driving shaft *d*.

One such arrangement is shown in Figures 1 and 1a where the flexible shaft *d* is connected to the drive wheel *n* so that the latter may be driven by rotation of the handle *e* 70 and the hand member *f* is secured to a flexible tube or sheath *o*, formed of coiled wire, or in any other suitable manner and surrounding the flexible shaft *d*, that end of the sheath *o* remote from the hand member *f* being secured 75 to a grooved pulley *p* which as shown in Figure 1a may co-operate with another series of pulleys *p*¹ *p*² *p*³ to carry a cord, wire, or like flexible member *q*, the two ends of which may be connected to the tiller of a toy boat 80 or to the steering wheels of a toy car or to any other steering element mounted upon a toy, the arrangement being such that rotation of the member *f* in one direction or the other will in consequence of the intervening mecha- 85 nism described cause the toy to be guided in one direction or the other.

Figure 2 shows an alternative form of propelling and steering mechanism, the flexible shaft *d* being in this case employed both for driving the toy by means of the worm and worm wheel *k* and for steering the toy by means of the lever *r*, the member *d* being rotated for propulsive purposes and being moved axially for steering purposes, the nec- 95 essary abutment for the axial movement being provided by the flexible tube or sheath *o* connected to the hand member *f*.

Figure 3 shows a still further modification in which a horn, whistle, or other device may 100

be controlled upon the toy in addition to the propelling and steering of the same, the propulsion in this form being effected by rotation of the flexible shaft *d* through the worm and worm wheel *h* while the steering is effected by rotation of the hand member *f* and flexible sheath *o* through the cord *g* and system of pulleys shown, and the bellows *s* or other member controlling or operating the horn, whistle, or the like is operated by axial movement of the flexible member *d*.

In the embodiments of the invention shown in Figures 2 and 3 the shafting is shaped or keyed where it passes through the worm wheel in order that while free to slide axially through the worm wheel it cannot rotate therein.

In all the foregoing modifications arrangements are shown for propelling the toy by hand but it will be clear that I may, if desired, adopt a clockwork or other motor for effecting the propulsion, such clockwork or motor being carried by a member which may be supported in the hand of the operator and which is arranged to drive the flexible shafting *d* connecting the motor with the propulsive means upon the toy.

Figure 4 shows in sectional elevation actuating means for wheeled toys, in which rotation of the driving wheels of which the axle is shown in end view at 2 is effected by rotation of the flexible shaft 1, through contrate gearing, steering being accomplished by rotation of the flexible sheath, a rigid bridge from which has mounted on it a pinion 3 which on rotation rotates the front wheel axle about a vertical pivot 7 through the medium of a contrate wheel 8, an extension 4 from the pinion 3 passing through a bearing 5 and being utilized to actuate a "squeaker" 9 by pulling the flexible sheath over the shaft 1.

Figure 5 shows in sectional plan a form of toy, in which rotation of the flexible shaft *d* drives the driving wheels *w* through contrate and pinion gearing *g*, while axial movement of the sheath *o* steers the toy through the extension piece *p*.

Figure 6 shows a form of toy in which rotation of the sheath 6 drives the driving wheels 12 of the toy through the contrate and pinion gear 10, the contrate wheel being mounted on bearings 11 which are a rigid part of the toy. Rotation of the sheath is effected by turning the handle 9, 5 being a pinion wheel rigidly mounted on the sheath, and having a concave bearing 4, rotating in a ring made on a wire member 2, the end of this member being headed at 7 to retain the contrate wheel 8 which engages with the pinion 5. 1 is a handle which is grasped in the left hand of the operator, its narrow extension being slidable through the pinion 5, and being attached to a piece of cord, catgut, fine wire, stranded wire or other very flexible material

13. A thumb-piece 3 is mounted on the wire member 2, on which the left thumb is placed. The cord 13 is connected to one side of the front axle 14 of the toy, the said axle being vertically pivoted at 15, a tension spring 16 being utilized to keep the front axle on "left lock". One end of the tension spring is connected as shown while the other end is connected to the chassis of the toy. Steering is effected by pushing away the thumb-piece 3 with the left thumb, while holding the handle 1 in the left palm.

It will be understood that the foregoing modifications are given merely to illustrate the nature of the invention and not by way of limitation since the invention is capable of wide application to all forms of mobile toys and the means adopted for mechanically propelling and steering such toys from a distance by means held in the hand or hands of the operator may be varied according to any particular requirements.

As an example of the application of the invention to a model crane the arrangement shown in Figure 9 may be used:—The propelling wheels of the crane are driven through flexible shaft *d* of wire acting through bevel gearing *v'* and *v''* on the end of the shaft and on the driving axle. The axle of the pulley wheel *v* of the crane also bears a bevel-gear wheel *v''*; the bevel wheel *v'* on the shaft is double sided, and the shaft is moved axially through the flexible sheath to disengage the shaft gear wheel from the driving axle and to engage it in the pulley gear of the crane. The arm of the crane may be moved around a vertical pivot by rotation of the flexible sheath *o* acting through simple gearing or through cord *g* and pulleys in the manner similar to that shown in Figure 7. Thus the crane may be moved and actuated entirely through the hand member.

A similar arrangement may be used for changing gear on a toy motor-car.

Propulsion of a toy according to the present invention may in certain cases be accomplished by pulling the shaft through the sheath or moving the sheath axially over the shaft. It is not intended that this jerky motion should be transformed into rotary motion of wheels or the like on a toy, but the said jerky motion is used to actuate, for example, a crew of rowing men two of which are shown in Figures 10 and 11. The arrangement in such a case is as follows. The sheath *o* passes through a hole in the upper part of the bulwarks of the boat a pulley 31 mounted on the sheath being located inside the boat. The shaft *d* passes over a pulley 32 and is connected to the upper part of the back of the first man. A wire passes from the first to the second man and another wire passes from the second man to a tension spring 33 attached to the boat. Thus upon pulling the shaft the upper parts of the men

rock in accordance with the movement imparted to them. The oars 34 are mounted in rowlocks or thole pins and are pivoted to the hands of the men. The men are pivoted at 35 and the arms at 36. The wire or cord from the pulley 31 is attached to a projection 37 on the arm and from this projection 37 a wire passes to the shoulder of the next man and another wire passes to a tension spring 38 fixed to the boat. The two arms of each man are fixed rigidly to the pivot or axle 36. Turning the pulley 31 one way will raise the hands and cause the oars to dip into the water while turning the pulley in the other way will permit the tension spring 38 to lower the hands and raise the oars out of the water. Making a stroke by pulling on the shaft tends to raise the oars out of the water. The arrangement is such that the oars are just raised out of the water at the end of the stroke. When the shaft is released the tension spring 33 will pull the man forward and will allow the oars to dip into the water again were it not that they are prevented from doing so by the tension on the spring 38.

When ready for the next stroke the pulley 31 is turned in the opposite direction thus permitting dipping of the oars.

Dimensions of the various parts of actuating mechanism in accordance with the present invention vary according to the weight of the model and its types. For actuating a motor-car of about ten inches long according to the method illustrated in Figure 16 of the accompanying drawings, the shaft may be made of hardened steel wire of 21 standard wire gauge, the sheath of a closely coiled wire of 20 S. W. G. the outer diameter of the sheath being an eighth of an inch. The necessary rigid ends of the shaft are made by inserting the ends of the wire into holes in wire of No. 7 S. W. G. and closing the bores in the said wire ends on to the inserted thin wire by pressure in a vise.

Sometimes it is desirable to set the steering gear of the toy by means of tension springs, so that the toy normally moves in a straight line, unless the steering mechanism is deliberately actuated by the operator through the means according to the invention.

It is not necessary to set forth in particular means for connecting a motor held in the hand to the driving shaft or driving sheath of the toy since the said shaft may be connected by any suitable means to any rotating part of the motor. A small gramophone motor makes a very convenient motor for the said actuation of the toy, which is preferably steered through rotation of the flexible sheath, the motor being mounted in a case with a carrying handle to be held in the right hand, while the left hand turns the sheath for steering.

The flexible shafting may be formed of light strong wire, wood, spirally wound cable, universally jointed rod or tube or other suitable material and may be bare or enclosed closed as required.

If desired, the rotational and/or axial movements of the shaft and/or its containing sheath may be combined in other ways than those described to work other mechanisms upon the toy as, for example, to effect the blowing of whistles, the firing of guns, the feathering of oars and other like arrangements.

The invention lends itself readily to attachment to existing toys, and one example of such separate attachment is shown in Figures 7 to 8. In this construction the frame 20 may carry driving pulleys 21, 22 and 24 round which passes a driving belt 25 which also engages the pulley 23 which may be fastened to the driving axle 26 of the motor-car or other toy. The pulley 23 may be secured in position by being split, the split being closed up (and if necessary soldered or brazed) after the pulley has been positioned on the axle. Similarly the frame 20 may be split so that it also may be secured upon the axle. The driving shaft *d* is connected to the pulley 21 for driving the toy, and the steering may be effected by the sheath *o*. For example, the latter may be secured to an arm 27 having a slot 27^a therein in which is adjustably secured a swivelling clip 28 adapted to grip the front steering axle 29. The clip 28 may swivel in a block or sleeve which may be secured in any position in the slot 27^a by a nut, and axial movement of the sheath *o* causes longitudinal movement of the arm 27 which, in turn, causes a swivelling movement of the steering axle 29.

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

1. A mechanical toy comprising driving means, a flexible shaft for operating same, means held in the hand of the operator for rotating said shaft, a flexible sheath movable longitudinally on said flexible shaft and steering means on the toy operated by longitudinal movement of said sheath relatively to said shaft.

2. A mechanical toy comprising a driving member, a flexible shaft for operating said member, a flexible sheath surrounding said shaft, means held in the hand of the operator for rotating said flexible shaft and means whereby said flexible sheath may be moved relatively to said shaft for the purpose of producing other movements of the toy.

In testimony whereof I have signed my name to this specification

HUGO JOHN BUCHANAN-WOLLASTON.

70

75

80

85

90

95

100

105

110

115

120

125

130