April 7, 1936. V. MELER 2,036,427

SELF PROPELLED OR WALKING DEVICE

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Fig. 1

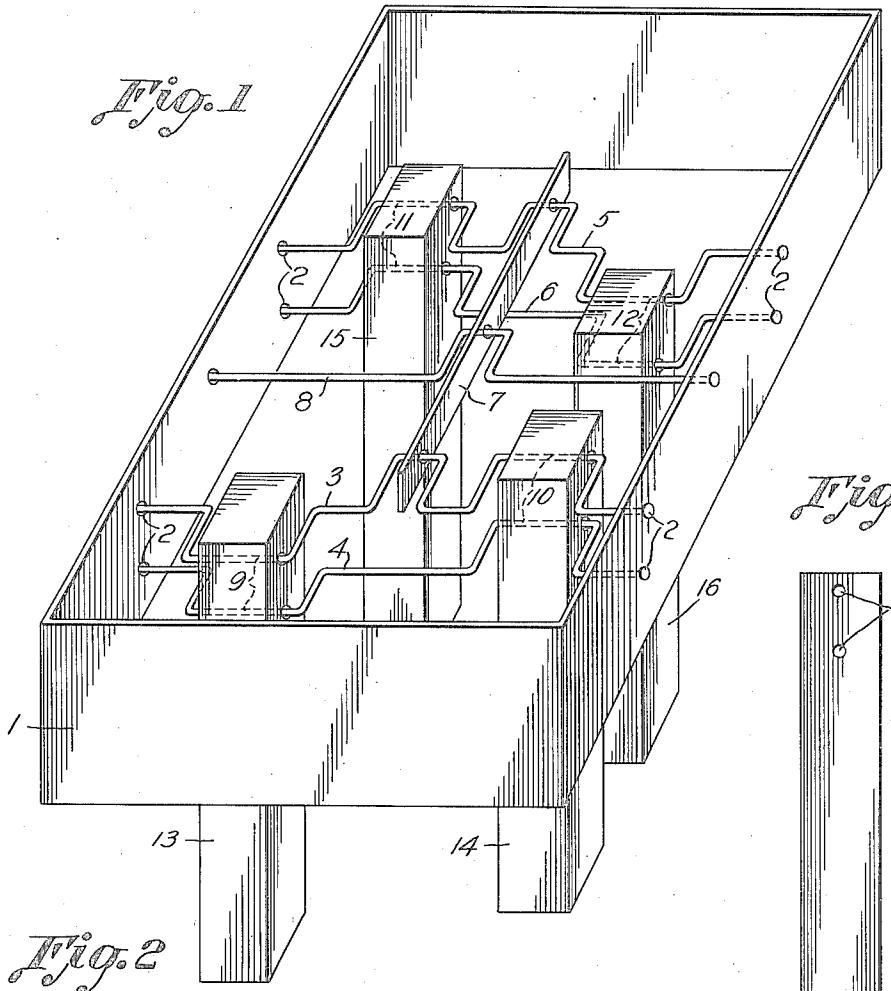
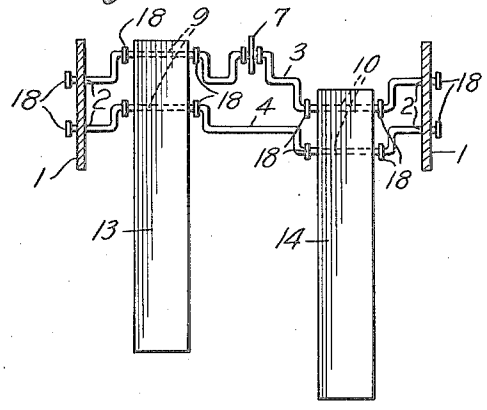


Fig. 3

Fig. 2



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Fig. 4

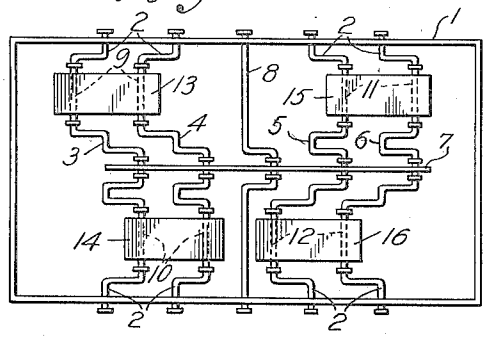


Fig. 5

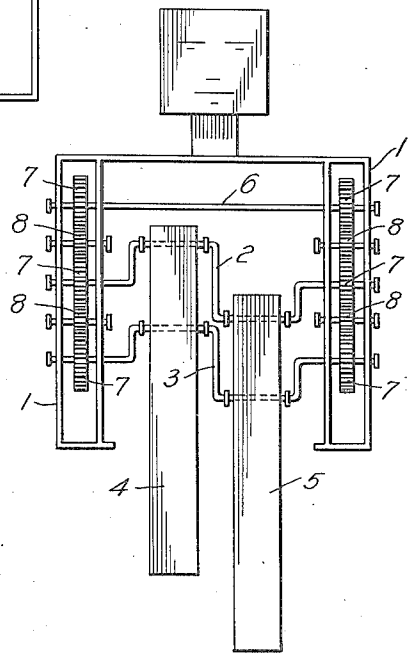


Fig. 6

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SELF-PROPELLED OR WALKING DEVICE

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Application November 7, 1934, Serial No. 751,860

7 Claims. (Cl. 46—102)

One of the objects of the present invention is to produce a self-propelled or walking device which, when used in the body of a mechanical toy animal or robot, will closely simulate the walking movements of an animal or a person and move the toy or robot forward or backward.

This device will be a very useful means for a new type of merry-go-round with walking animals.

A further purpose of this invention is to provide a device for propelling an object by means other than adhesion driving wheels, which device will create a continuous alternating resistance of the body with the ground, resulting in the propulsion of the object.

This device can also be used in certain types of transportation facilities where a walking movement would produce the best results. Such a device equipped with snow-shoes would be very efficient in moving over deep snow.

This device can also be used in propelling a vessel upstream by utilizing the current as the motive power and the side-walls of the stream bed as the point of resistance.

In the accompanying drawings,

Figure 1 represents one form of the invention, being a perspective view of the entire device with two groups of crank-shafts, each group comprising two crank-shafts placed horizontally and parallel to each other in a vertical line, the two groups being parallel to each other in a horizontal line;

Figure 2 is a detailed front view;

Figure 3 is a side view of the leg member adapted to this form;

Figure 4 is a top view of another form of the same device with two groups of crank-shafts, each group comprising two crank-shafts placed horizontally and parallel to each other in a horizontal line, the two groups being parallel to each other in a horizontal line;

Figure 5 shows the same device used in a two-legged toy; and

Figure 6 shows the means by which a two-legged toy can maintain its balance in moving.

In Figure 1 the sides of the frame 1 comprise four pairs of shaft-holders 2, 2, 2, 2, 2, 2, 2, 2, in which shaft-holders revolve four crank-shafts 3, 4, 5, 6, all of the same length. In this illustration said crank-shafts are connected by link 7 to power shaft 8, which shaft can be revolved by means of spring-wind motor, electric motor, etc. (The motive power can be transmitted to the crank-shafts by some other means than a link, which means can be gears and pinions, etc.)

A double crank is placed at both ends of each of the four crank-shafts 3, 4, 5, 6, all of the double cranks being of the same size. Double crank 9 at one end of crank-shaft 3 is placed in the opposite direction to double crank 10 at the other end of crank-shaft 3, which is true also of double cranks 9, 10 of crank-shaft 4, double cranks 11, 12 of crank-shaft 5, and double cranks 11, 12 of crank-shaft 6.

Crank-shafts 3, 4 are parallel to each other in a vertical line with double crank 9 of crank-shaft 3 placed in the same direction as and directly above double crank 9 of crank-shaft 4, and double crank 10 of crank-shaft 3 placed in the same direction as and directly above double crank 10 of crank-shaft 4. Crank-shafts 5, 6 are parallel to each other in a vertical line with double crank 11 of crank-shaft 5 placed in the same direction as and directly above double crank 11 of crank-shaft 6, and double crank 12 of crank-shaft 5 placed in the same direction as and directly above double crank 12 of crank-shaft 6.

Crank-shaft 3 is parallel to crank-shaft 5 in a horizontal line with double crank 9 of crank-shaft 3 placed in the opposite direction to and on the same side as double crank 11 of crank-shaft 5, said double cranks 9, 11 being at the point farthest from the center of the device, and with double crank 10 of crank-shaft 3 placed in the opposite direction to and on the same side as double crank 12 of crank-shaft 5, said double cranks 10, 12 being at the point nearest to the center of the device. Crank-shafts 4, 6 are parallel to each other in a horizontal line with their double cranks 9, 10, 11, 12 placed in identically the same way as double cranks 9, 10, 11, 12 of crank-shafts 3, 5.

Each of the four leg members 13, 14, 15, 16 is suspended freely from two crank-shafts through the two journal bearings 17, 17 (see Fig. 3) at the top of each support. The distance between the two said journal bearings 17, 17 is equal to the distance between two shaft-holders 2, 2 of the same group in the frame 1. Leg member 13 is suspended from double cranks 9, 9 of crank-shafts 3, 4; leg member 14 is suspended from double cranks 10, 10 of crank-shafts 3, 4; leg member 15 is suspended from double cranks 11, 11 of crank-shafts 5,6; and leg member 16 is suspended from double cranks 12, 12 of crank-shafts 5, 6. Means 18 (see Fig. 2) to avoid friction are placed on the crank-pins between supports and cranks and at the ends of the crank-shafts.

Each leg member forms with the frame a parallelogram linkage.

The following is a description of the movement of the device in the direction as shown by arrow in Figure 1:

As the crank-shafts 3, 4, 5, 6 are being turned in unison by means of the link 7 and the power shaft 8, two leg members supports 13, 16 are raised, each leg member remaining always suspended as a result of the use of two crank-shafts, which prevents the leg member from oscillating or rotating. While leg members 13, 16 are being raised the other two leg members 14, 15 remain in contact with the ground due to the downward movement of double cranks 10, 10, 11, 11, from which leg members 14, 15 are suspended, which furnishes a resistance that moves the frame 1 up and forward then down, describing a semicircle, until leg members 13, 16, which are being raised, are lowered to the ground, which leg members 13, 16 in turn remain in contact with the ground while leg members 14, 15 and the frame 1 are being raised and propelled in the same way as described, this movement being repeated as long as the power shaft is revolved.

In Figure 4 the crank-shafts 3, 4, 5, 6 are arranged all parallel to one another in a horizontal line with the end double cranks 9, 9, 10, 10, 11, 11, 12, 12 arranged in the same direction as in Figure 1, the operation of this form of the device being the same as that in Figure 1.

One of the practical applications of this invention is shown in Figure 5, which represents a two-legged toy, consisting of the body 1, of two crank-shafts 2, 3 parallel to each other in a vertical line, of two legs 4, 5, of the power shaft at 6, and of means for maintaining the balance of the toy when walking as illustrated in Figure 6. In this toy the motive power is transmitted to the crank-shafts 2, 3 by means of three pairs of gears 7, 7, 7, 7, 7, 7, all of the same size, and an adequate number of pinions 8, 8, 8, 8. (The motive power can be transmitted to the said crank-shafts by some other means than gears and pinions, which means can be a link, etc.). The arrangements of the double cranks and the operation is the same as that in the description of Figure 1.

Various changes and alterations may be made in the general form of the parts described without departing from my invention, and hence I do not limit myself to the precise details set forth but consider myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of the appended claims.

I claim:

1. In a self-propelled device, the combination of a frame member, a number of sets of crank-shafts journaled in said frame member, each of said sets consisting of a number of crank-shafts mounted in substantial parallelism, a number of main cranks in each crank-shaft various degrees apart, a set of a number of leg members operatively connected with each set of crank-shafts, each of said leg members having a number of journal bearings cooperating with the corresponding cranks of said crank-shafts and constituting with the said frame member a parallelogram linkage, a power shaft journaled in said frame member, each set of crank-shafts being also provided with connecting means with the power shaft, all of which are operatively connected whereby a propulsion of the device is obtained by a revolving of the power shaft.

2. In a self-propelled device, the combination of a frame member, one set of crank-shafts journaled in said frame member, said set consisting of a number of crank-shafts mounted in substantial parallelism, a number of main cranks in each crank-shaft various degrees apart, a set of a number of leg members operatively connected with the said set of crank-shafts, each of said leg members having a number of journal bearings cooperating with the corresponding cranks of said crank-shafts and constituting with the said frame member a parallelogram linkage, a power shaft journaled in said frame member, the said set of crank-shafts being also provided with connecting means with the power shaft, all of which are operatively connected whereby a propulsion of the device is obtained by a revolving of the power shaft.

3. In a self-propelled device, the combination of a frame member, a number of sets of crank-shafts journaled in said frame member, each of said sets consisting of a number of crank-shafts mounted along horizontal axes in substantial parallelism in the journal points one vertically above another, a number of main cranks in each crank-shaft various degrees apart, a set of a number of leg members operatively connected with each set of crank-shafts, each of said leg members having a number of journal bearings cooperating with the corresponding cranks of said crank-shafts and constituting with said frame member a parallelogram linkage, a power shaft journaled in said frame member, each set of crank-shafts being also provided with connecting means with the power shaft, all of which are operatively connected whereby a propulsion of the device is obtained by a revolving of the power shaft.

4. In a self-propelled device, the combination of a frame member, a number of sets of crank-shafts journaled in said frame member, each of said sets consisting of a number of crank-shafts mounted along horizontal axes in substantial parallelism in the journal points one horizontally beside another, a number of main cranks in each crank-shaft various degrees apart, a set of a number of leg members operatively connected with each set of crank-shafts, each of said leg members having a number of journal bearings cooperating with the corresponding cranks of said crank-shafts and constituting with said frame member a parallelogram linkage, a power shaft journaled in said frame member, each set of crank-shafts being also provided with connecting means with the power shaft, all of which are operatively connected whereby a propulsion of the device is obtained by a revolving of the power shaft.

5. In a self-propelled device, the combination of a frame member, a number of sets of crank-shafts journaled in said frame member, each of said sets consisting of a number of crank-shafts mounted along horizontal axes in substantial parallelism in the journal points one obliquely above another, a number of main cranks in each crank-shaft various degrees apart, a set of a number of leg members operatively connected with each set of crank-shafts, each of said leg members having a number of journal bearings cooperating with the corresponding cranks of said crank-shafts and constituting with said frame member a parallelogram linkage, a power shaft journaled in said frame member, each set of crank-shafts being also provided with connecting means with the power shaft, all of which are operatively connected whereby a propulsion of the

device is obtained by a revolving of the power shaft.

6. In a walking toy as in claim 1 further characterized by: The number of sets of crank-shafts is limited to two, the said sets having cranks 180 degrees apart, each of said sets consisting of two crank-shafts mounted along horizontal axes, two main cranks in each crank-shaft 180 degrees apart, two leg members in each set.

7. In a walking toy as in claim 2 further characterized by: The said set of crank-shafts consists of two crank-shafts mounted along horizontal axes, two main cranks in each crank-shaft 180 degrees apart, a set of two leg members, the said frame connected with means to obtain balance when one leg is raised.

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