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E. H. SCHMIDT

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MECHANICAL MOVEMENT AND TOY

Filed April 23, 1928

Fig. 1

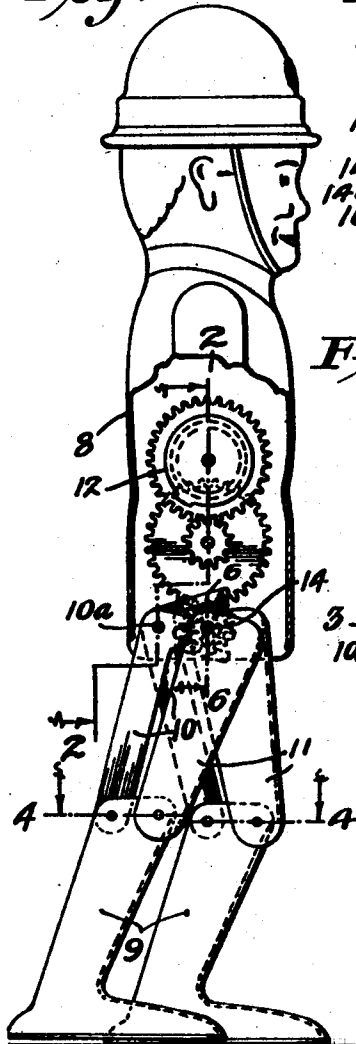


Fig. 3

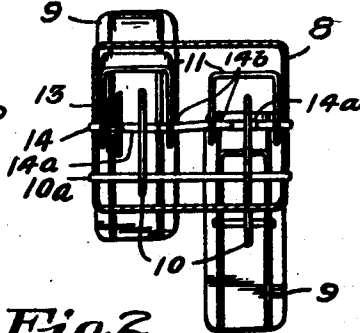


Fig. 2

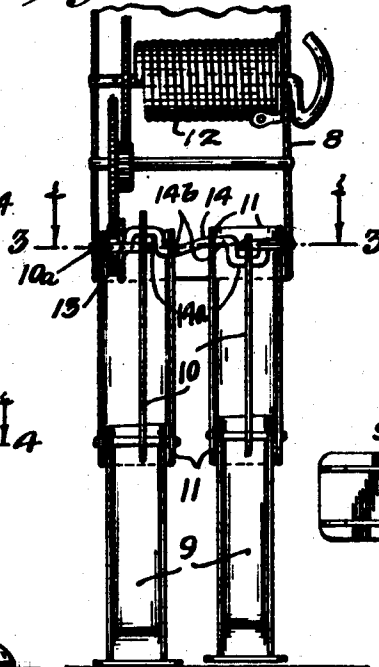


Fig. 4

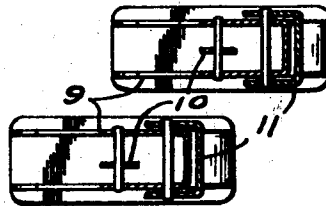


Fig. 5

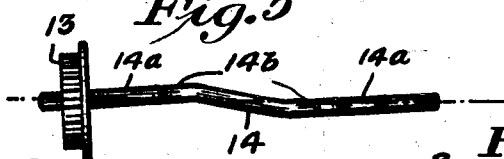


Fig. 6

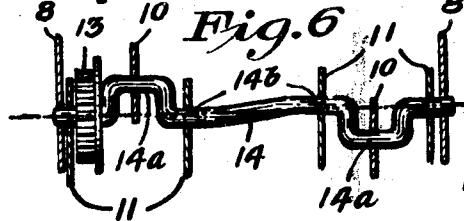
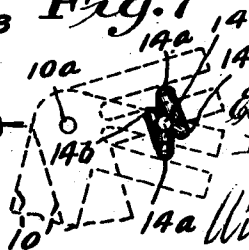


Fig. 7



Inventor

Ernest H. Schmidt

By his Attorneys

Williamson, P. & Williamson

UNITED STATES PATENT OFFICE

ERNEST H. SCHMIDT, OF MANKATO, MINNESOTA

MECHANICAL MOVEMENT AND TOY

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My invention has for its object to provide a new mechanical movement and an automatic walking toy embodying said movement; and, to this end, my invention consists of the novel devices and combinations of devices hereinafter described and pointed out in the claims.

In the accompanying drawings, I have illustrated a walking toy having my invention embodied therein. As illustrated, the toy is intended to simulate the appearance and reproduce the walking actions of a human being.

In said drawings, like notations referring to like parts throughout the several views:—

Fig. 1 is a view chiefly in side elevation, but partly in vertical section and some portions broken away;

Fig. 2 is a view chiefly in rear elevation but partly in vertical section on the irregular line 2—2 of Fig. 1 with the upper portion of the figure broken away, the parts shown being in the same position relative to each other as in Fig. 1;

Fig. 3 is a horizontal section on the line 3—3 of Fig. 2;

Fig. 4 is a horizontal section on the line 4—4 of Fig. 1;

Fig. 5 is a plan view of the crank shaft and its pinion detached with the crank shaft in the same position as shown in Fig. 6;

Fig. 6 is a view in vertical section on the line 6—6 of Fig. 1 with the crank shaft shown in elevation, and

Fig. 7 is a right end view of the crank shaft in full lines as it would appear when in the position shown in Fig. 6, and with the bell crank levers shown in dotted lines.

The numeral 8 represents the body of the toy and is of such form as to simulate the headed trunk of the human body. This body 8 is supported by a pair of legs intended to simulate the appearance of human legs and each of which is composed of a lower and upper leg section. The lower leg sections are marked with the numeral 9 and are each composed of an integrally formed lower leg and foot. The upper leg sections or thighs of the legs are each composed of two members, one of which is in the form of a bell crank

lever 10 with arms of unequal length. The said bell crank lever 10 is pivoted at its elbow to the body 8 by pivot pin 10a and has its short arm slotted for a purpose which will later appear. The other member of the upper leg section is marked 11 and is indirectly connected to the body 8 at its upper end by means which will later be noted. These two levers 10 and 11 are disposed in parallel relation to each other and their lower ends are pivotally connected respectively to the back and front of the lower leg section 9 at the knee, thus affording the articulation at that point.

In the body 8 is suitably mounted a spring actuated clock work drive of common standard construction marked collectively with the numeral 12. This clock work drive 12 is, of course, provided with the customary speed reducing train of gearing, the final or delivering member of which engages with a pinion 13 mounted near one end of a crank shaft 14, which has its ends journaled in the side walls of the body 8. Said shaft 14 is located approximately at the center of said body 8, from front to rear, and extends crosswise of the body from right to left, in respect to the body as shown in Figs. 1 and 2. This crank shaft 14 is of special and peculiar conformation for the purposes which will presently appear.

Said crank shaft 14 has two relatively large throw identical cranks 14a located 180° apart in a common plane through the axis of said shaft's rotation and spaced apart from each other lengthwise of the axis of said shaft so as respectively to be near the opposite end portions of said shaft, as clearly shown in Fig. 6 of the drawings; and the said crank shaft 14 has two other identical cranks 14b of relatively small throw located 180° apart and lying in a common plane passing through the axis of said shaft's rotation, said plane, however, intersecting said first mentioned plane wherein cranks 14a are located at an angle of from 45° to 70°. These short throw cranks 14b are spaced apart from each other lengthwise of the shaft 14, so that they are respectively on the opposite sides of the longitudinal center of said shaft, as best shown in Fig.

6. Said short throw cranks 14b are of very small throw compared with the throws of the large cranks 14a, and these surfaces of the crank shaft 14, which afford these short throw cranks, are secured simply by properly bending the body of the crank shaft 14 so that one portion of it will be above and the other below the axis of the shaft's rotation, as best shown in Fig. 6.

10 . The bell crank levers 10, of the upper leg sections, pivoted to the body 8 at 10a eccentric to the axis of the crank shaft 14 have their short arms slotted, as before noted, and these slots are engaged by the long throw cranks 14a of the crank shaft 14, and, under the rotation of the said crank shaft, the said bell crank levers 10, of the upper leg sections, will receive a pivotal reciprocating motion at right angles to the axis of rotation of the said crank shaft as needed to impart a step of motion to the figure. The other or straight line levers 11 of the upper leg sections have their upper ends pivoted on the short throw cranks 14b, as clearly shown in Figs. 2 and 6, and in view of the planes in which they stand relative to the planes of the large throw cranks, the short throw cranks will impart a wabbling or side to side motion of the body in respect to the legs of the figure, and this is so timed, relative to the moving step, that the center of gravity of the figure will be shifted from the moving to the stationary leg either exactly at or an instant before the forward step of the moving leg, imparted by its bell crank lever 10, takes place. It follows necessarily that the figure, in its walking action, simulates the walking action of a human being with great accuracy. The human being as he starts to take a step coincidentally throws his center of gravity over onto his standing leg and sustains it there until the foot of the moving leg has again struck the ground. This is just exactly what is done in my toy figure. At the time the center of gravity is shifted from the right to the left or stationary leg of the figure, the right leg will be lifted clear of the ground, as shown in Fig. 1 of the drawings, and be ready to make a forward step under the action of the bell crank lever 10 of its upper leg section.

I have built and tested out a full sized working toy, which was constructed in accordance with my invention herein disclosed and claimed, and I found it to work with success precisely as herein described.

While I have herein illustrated by new mechanical movement, as applied to secure the desired walking motions to my human figure toy herein illustrated, it will, of course, be understood that this new mechanical movement may have many other serviceable applications in the useful arts.

To avoid any confusion, it perhaps should be noted that each thigh section of the figure's leg is made up of a single bell crank lever 10

and two of the straight line levers 11. So far as functions are concerned, however, the outer one of the two straight line levers 11 might be omitted, as the wabbling motion gained from the adjacent short throw crank 14b is transmitted through the inner one of said straight line levers 11. The presence of the two members 11 is chiefly to produce an appearance in the figure's upper leg sections similar to a human being's upper leg sections. It should perhaps be further noted that the crank shaft 14 should be seated somewhat loosely in its journal seats of the body 8.

What is claimed is:

1. An automatic spring actuated walking toy comprising a body containing a clock work drive, upper and lower leg sections articulated together at the knee joints and supporting said body and a crank shaft supported by said body and receiving motion from said clock work drive, which shaft has two identical cranks of relatively long throw, located 180° apart in a common plane through the axis of said shaft's rotation and two identical cranks of relatively short throw located 180° apart in a common plane extending through the axis of said shaft's rotation, said plane intersecting said first mentioned plane wherein said long cranks lie, through said axis and at an acute angle and connections from said long cranks to the upper leg sections for imparting the pivotal or step by step motion to the legs and connections from said short cranks to said upper leg sections to secure the sidewise wabbling motion of said body relative to said legs and shift the center of gravity of the load from the moving to the stationary leg at the instant the step of the moving leg is being started.

2. An automatic spring actuated walking toy simulative of a human figure, which toy comprises a body simulative of a headed human trunk, a clock work drive in said body, a crank shaft journaled in said body and receiving motion from said clock work drive which shaft has two identical cranks of relatively long throw located 180° apart in a common plane through the axis of said shaft's rotation, and two identical cranks of relatively short throw located 180° apart in a common plane passing through the axis of said shaft's rotation said plane intersecting said first mentioned plane along said axis and at an acute angle, and upper and lower leg sections articulated together at their knee joints and which upper leg sections each consists of two members, one of which is in the form of a bell crank lever with arms of unequal length, and has its elbow pivoted to said body at a point eccentric to the axis of said crank shaft, and has its short arm slotted and in engagement with one of said long throw cranks, and the other of which members is a straight line link with its upper end pivotally connected

to one of the short throw cranks, the lower ends of which members are both pivotally connected to the lower leg at points spaced apart from each other, all for cooperation substantially as described and for the purposes set forth.

3. Means for transferring rotary motion into pivotal reciprocating motion at right angles to the axis of the rotating element and into a wabbling motion lengthwise of said axis, comprising a body or frame in which said rotating element is mounted, a crank shaft mounted in said frame having two cranks of equal throw located 180 degrees apart in a common plane which passes through the axis of the crank shaft's rotation, said crank shaft also having two cranks of equal and relatively short throw located 180 degrees apart in a common plane also extending through the axis of said crank shaft's rotation and intersecting said first mentioned plane at an acute angle and connections extending from the said cranks of said crank shaft to said frame, which receives the combined pivotal and wabbling motions.

4. An automatic walking toy comprising a body containing a rotary source of power, upper and lower leg sections articulated together and supporting said body, a substantially horizontal crank shaft journaled in said body and drivably connected with said source of power, said shaft having two identical cranks of relatively long throw located 180 degrees apart in a common plane which passes through the axis of said shaft's rotation and also having two identical cranks of relatively short throw located 180 degrees apart in a common plane also extending through the axis of said crank shaft's rotation and intersecting said first mentioned plane at an acute angle and connections from said longer cranks to the upper leg sections for imparting pivotal or step by step motion to the legs, and connections from said short cranks to said upper leg sections for causing sidewise wabbling motion of said body relatively to the legs, which wabbling motion shifts the center of gravity of the body from the moving to the stationary leg at the instant the step of the moving leg is started.

In testimony whereof I affix my signature.
ERNEST H. SCHMIDT.

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