(No Model.) 2 Sheets—Sheet 1.

W. H. ANDERSON.

MECHANICAL TOY.

No. 311,219. Patented Jan. 27, 1885.

Fig. 1.

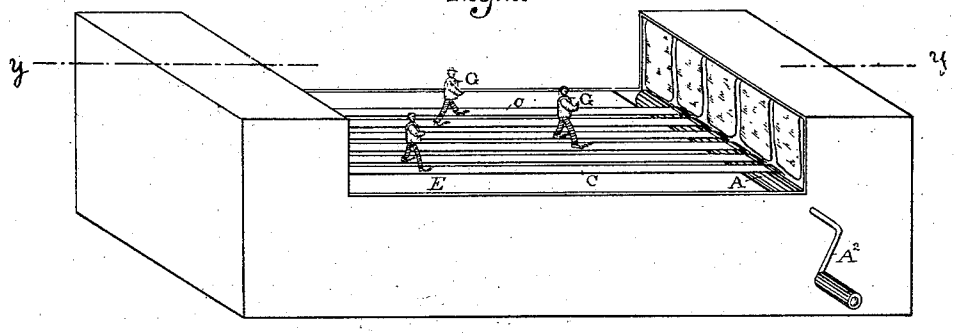


Fig. 2.

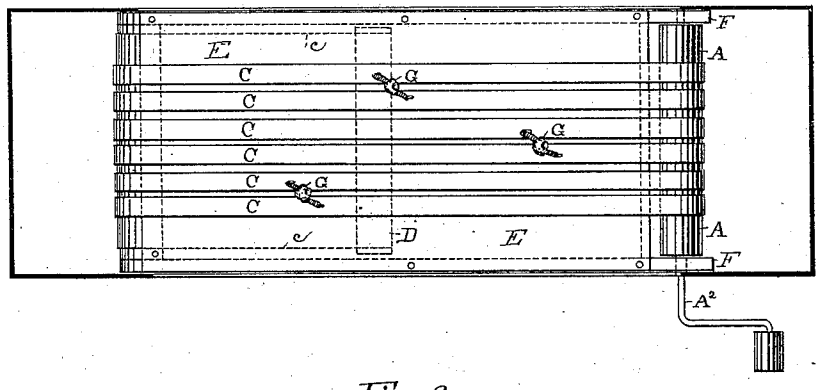


Fig. 3.

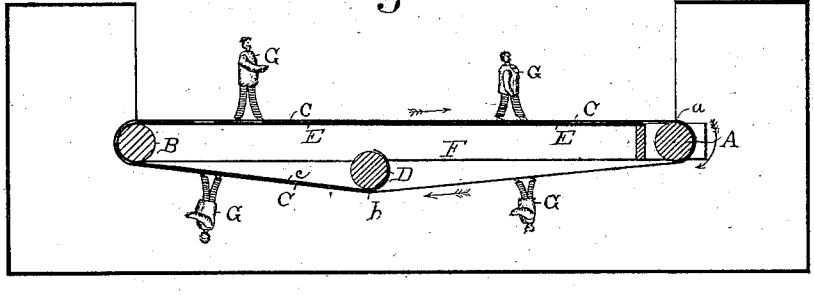
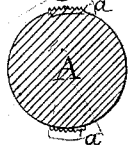


Fig. 4.



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N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

W. H. ANDERSON.

MECHANICAL TOY.

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Fig. 5.

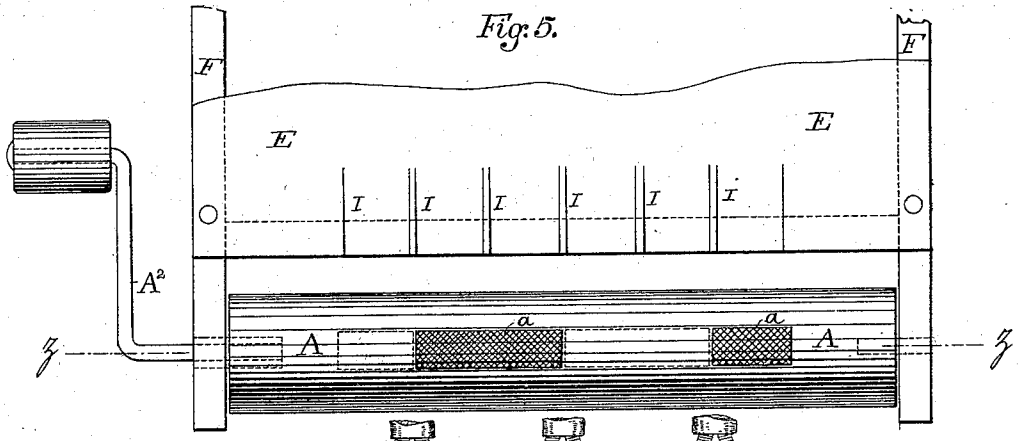


Fig. 6.

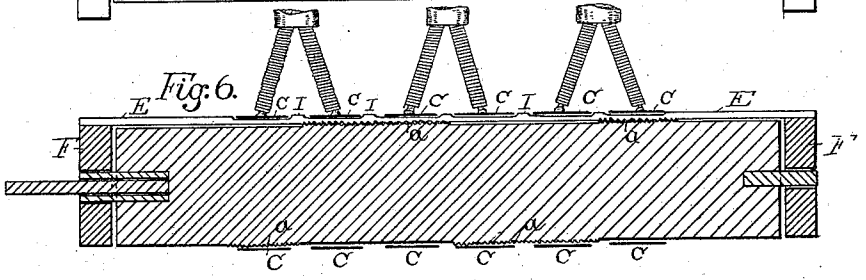


Fig. 7.

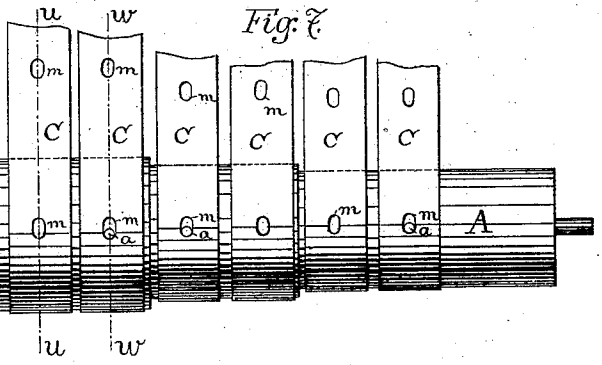


Fig. 9.

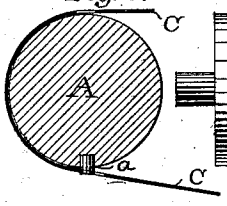


Fig. 10.

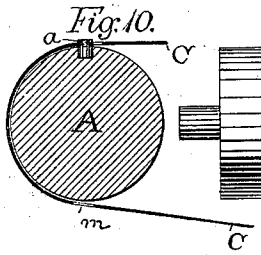


Fig. 8.

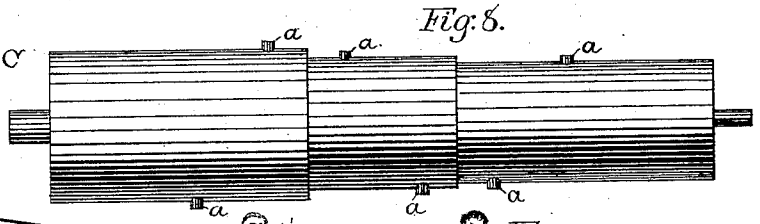


Fig. 11.

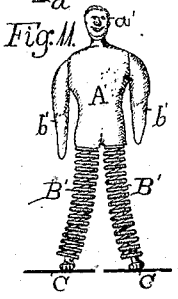
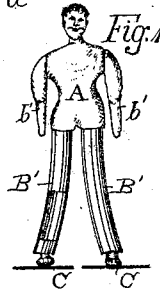


Fig. 12.



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UNITED STATES PATENT OFFICE.

WILLIAM H. ANDERSON, OF BROOKLYN, NEW YORK.

MECHANICAL TOY.

SPECIFICATION forming part of Letters Patent No. 311,219, dated January 27, 1885.

Application filed June 2, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. ANDERSON, of Brooklyn, in the county of Kings and State of New York, have invented certain Improvements in Mechanical Toys, of which the following is a specification.

The object of this invention is to provide a mechanical toy in which toy figures—such, for example, as miniature figures of men or animals—may be given a progressive movement closely imitating that of walking, thereby affording a pleasing means of recreation and amusement, a further object of my invention being to provide figures operated with a movement closely resembling that of walking in such manner that two or more such figures may have a differential movement with regard to each other in such manner as to closely resemble a walking match, the figures being capable of approaching and passing each other with variable speed and at variable intervals, and with no apparent predetermined order of succession, thereby greatly increasing the value, utility, and interest of the invention as a means of amusement. My invention comprises certain novel means, hereinafter fully set forth, whereby these objects are effectually secured.

Figure 1 is a perspective view, and Fig. 2 a plan view, showing mechanical devices in their relation with the miniature figures, to be moved or operated as hereinbefore explained. Fig. 3 is a vertical longitudinal sectional view taken in the line *y y* of Fig. 1. Fig. 4 is a transverse sectional view on a larger scale than Figs. 1, 2, and 3, and representing one of the parts included in the mechanism aforesaid. Fig. 5 is a detail view, also on a larger scale than Figs. 1, 2, and 3, of one portion of said mechanism, and taken in a vertical plane at right angles to that of Fig. 3. Fig. 6 is a longitudinal sectional view of the parts represented in Fig. 5, and taken in the line *z z* of said figure. Figs. 7 and 8 are detail views illustrating a modified construction of the mechanism aforesaid. Fig. 9 is a sectional view taken in the line *u u* of Fig. 7, and Fig. 10 is a similar view taken in the line *w w* of Fig. 7. Fig. 11 is a detail view illustrating the manner in which the miniature figures are arranged in relation with the endless belts or aprons, through or by means of which the walking movement is given to the said figures; and Fig. 12 is a similar view showing a modification of the construction indicated in Fig. 11.

Remarking, first, that the figures to which the walking movement is to be given may be constructed in any suitable manner—as, for example, as represented in Fig. 11, in which the body A′, fitted with an appropriate head, *a′*, and, if desired, with arms *b′*, has legs B′, which are flexible and formed of coiled wire, the upper ends being attached to the body A′, while the lower ends are attached to endless belts or aprons C, or, as represented in Fig. 12, the flexible legs B′ may be made of india-rubber tubing, or of any other material which will be sufficiently flexible to permit their lower ends to follow the alternating movements of the belts or aprons C, as hereinafter explained—I will now proceed to describe the means by which the figures are operated with a movement imitating that of walking.

A is a roller supported on suitable journals or gudgeons in any suitable frame-work or support, as hereinafter set forth. This roller is provided upon its circumference with what I term "gripping-surfaces," which may be either projections, teeth, or merely roughened or friction-producing surfaces, so arranged that when said surfaces act upon the belts or aprons, hereinafter described, the movement of said belts or aprons will be accelerated, and at other times slackened or even stopped altogether.

B is a bar, of cylindrical or any other suitable shape, placed in a position substantially parallel with that of the roller A. It is designed that this bar should be fixed. It may, however, in certain contingencies be permitted to revolve on its axis after the manner of a roller.

C are endless belts or aprons, placed parallel with each other, and passed over the roller A and bar B, as indicated in Fig. 3. The roller A, adjacent to each of the belts or aprons C, passing over the same, is provided with a shoulder or projection, *a*, or, in lieu thereof, with a roughened surface, which, as shown in Fig. 4, may be provided upon the shoulder or projection, but which, when desired, may be flush with the surface of the roller.

As concerns each pair of belts or aprons C, one of the belts or aprons comprising the pair is actuated by a roughened or friction-producing surface at one side of the roller, while the other of the belts or aprons composing said pair is actuated by a like friction-producing surface at the opposite side of said roller, so that the two belts or aprons will be actuated alternately. In lieu of the friction-producing surfaces, shoulders or projections similarly situated on the roller may be employed; or, in lieu of such devices, teeth radially provided to the roller and meshing into holes in the belts or aprons, as indicated in Figs. 7, 8, 9, and 10, may be employed, all as hereinafter further explained.

In practice the belts or endless aprons C are tightened over the roller A to such an extent that the rotation of the latter will cause the shoulders or projections, or their equivalents, herein indicated, to act upon the said belts or aprons, and by elongating the same increasing the frictional or propelling grip of said roller against the contiguous surfaces of said belts or aprons to rotate or move the same. This propelling action of each of the shoulders or projections continues during the contact of the shoulders or projections, or equivalent thereof, with the belt or apron—in other words, as each of said shoulders or projections *a*, or the equivalent thereof, as aforesaid, is brought upward in contact with the contiguous belt or apron C so as to act thereon, an increased rapidity is given to the movement of the belt or apron by reason of the increased gripping or driving action of the shoulders or projections, as aforesaid. When the radius of the roller A extended through such shoulder is greater than the radius at other portions of the same circumference of the roller, the increased speed may be in a measure due to such relatively-increased radius of the driving-roller, and, inasmuch as the shoulders *a* alternate upon the opposite sides of the roller A, it follows that this accelerated movement of the two belts or aprons of each pair alternate, first one moving faster and then the other. By this means an alternating movement may be transmitted from the said belts or aprons to any appropriate mechanism. As the straightening or elongation of the belts or aprons increases their tension upon the roller, it follows that their propulsion by the projections or shoulders is secured, although otherwise—that is to say, when not acted upon by said projections or shoulders or their equivalents—the said belts or aprons, even though acted upon by the bar D, hereinafter described, are sufficiently slack to permit the movement of the roller without moving the belts or aprons; but when the driving-surface of the roller—as, for example, the roughened surface—is flush with the circumference of the roller, or when the toothed modification is used, the belts or aprons will slip on the roller, except when acted upon by the driving-surfaces, and the whole of the movement of the belts or aprons is in such case due to the traction of the roller upon the belt or apron. In order that the belts or aprons C may have the requisite drag or tension upon the roller A, it is desirable that a device in the nature of an idler-pulley be used to take up the slack of the belts or aprons as the shoulders or projections *a* pass out of contact therewith, thereby causing the said belts or aprons to pass upon the diminished circumference of the said roller. This may be accomplished by means of a bar or weight, D, which may be of a cylindrical form, placed upon the lower portions, *b*, of the said belts or aprons, and retained in position by a suitably stiff plate, *c*, which latter may be of wood, metal, or other material, extended inward from the bar B, but which is sufficiently flexible to allow the bar D to press downward upon the belts or aprons C.

To further assist the dragging action of the belts or aprons C, to insure the closer contact of the driving or gripping surfaces or devices of the roller A, there may be placed underneath the latter a fixed table, E, which may be supported upon a frame-work, F, which latter may be employed for supporting the hereinbefore-mentioned portions of the apparatus. The roller A, being rotated in the manner indicated by the arrow in Fig. 3, will rotate the belts or aprons in a direction indicated by the horizontal arrows in said figure, and inasmuch as the upper portions of said belts or aprons pass upon the upper side of this table E, it follows that the friction exerted upon the said belts or aprons causes them to resist to a certain extent the action of the roller A, thereby insuring a sufficient adhesion of the belts or aprons upon the said roller to insure their rotation by the rotation of the roller; and inasmuch as each belt is accelerated when acted upon by the adjacent shoulder or projection *a*, and inasmuch as these projections alternate, as hereinbefore explained, it follows that the increased movement during each revolution of each belt or apron will alternate with the corresponding increased movement of the belts or aprons immediately adjoining the same.

As hereinbefore explained, this peculiar alternating motion may be applied to transmitting an alternating movement to any desired mechanism. Thus, for example, it may be employed in affording a "walking movement," as it may be termed, to the legs of toy figures, which latter are indicated by the reference-letter G in Figs. 12 and 13. In this case the legs *f* of the figures should be made of flexible material, sufficiently stiff, however, to support the bodies *g* of said figures, the feet or lower end of the legs *f* being attached to two adjacent belts or aprons—that is to say, one leg to one belt and one to the other belt—and the said legs being moved forward by the alternately-increased movement of the said two adjoining belts or aprons. Each figure is of

course carried around with the revolution of the two belts with which it is connected, as indicated more fully in Fig. 3. It is of course to be understood that the parts may be so constructed and arranged that, instead of a slow movement of each belt alternating with the rapid movement of said belt, each belt itself may be allowed to become nearly or quite stationary during the intervals between the action of the shoulder or projection *a* upon the belts or aprons.

In order to prevent the belts or aprons from slipping laterally out of their places, fixed guides I are provided upon the table E, near the roller A, thereby preventing any sidewise movement or displacement of said belts or aprons during their operation as aforesaid. In the modification hereinafter described in connection with Figs. 7 to 10, inclusive, these guides may, if desired, be dispensed with.

Instead of the precise construction hereinbefore explained, in which the belts or aprons are actuated by the frictional contact of the circumference of the roller A upon them, the said belts may be made with openings or perforations *m*, as indicated in Figs. 7, 8, 9, and 10. In this case the shoulders or projections *a* constitute teeth, the roller A being provided with one of these teeth or projections *a* for each of the perforated belts or aprons, the latter being indicated by the same reference-letter, as in Figs. 1 to 6, inclusive, so that at each revolution of the roller A the tooth or projection *a* will pass into one of the openings *m*, and communicate an impetus or forward movement to the belt or apron, which continues during half of a revolution of the roller, or until the tooth or projection passes out of the opening during the continued rotation of the roller. By the time this is done the next adjacent tooth or projection *a*, in like manner, passes into the adjacent opening or perforation *n* of the next adjacent belt or apron and imparts motion thereto, while the first belt or apron, being released from the action of the adjacent tooth or projection *a*, runs loose upon the roller, so that by this means the two adjacent belts of each pair receive an alternating motion, each belt or apron being moved during one half a rotation of the roller, and being substantially stationary during the other half of the rotation.

When desired the roller A, whether made as represented in Figs. 3, 5, and 6, or made according to the modification shown in Figs. 7 to 10, inclusive, may be constructed of varying diameter, as substantially illustrated in Figs. 7 and 8—thus, for example, that portion of the roller designed to carry or operate any given pair of belts or aprons may be of a given diameter, while those for another pair of belts or aprons may be of a greater or less diameter, and so on for any desired number of belts or aprons.

When the modification illustrated in Figs. 7 to 10, inclusive, is employed, the teeth or projections *a* serve in a great measure to retain the belts or aprons against lateral displacement; but, when desired, the guides I may be applied in connection with said belts or aprons, and the roller toothed, as aforesaid, to more securely retain the belts or aprons against lateral displacement. It is of course to be understood that a rotatory motion, as indicated by the arrow in Fig. 3, is to be given to the roller A. This may be done by any suitable means—as, for example, by the use of a crank, A^2, as indicated in Figs. 1 and 2. For convenience this crank may be made detachable, and constructed to be applied, when required, to the shaft or gudgeons of the roller A in the same manner that detachable cranks are ordinarily applied for the temporary rotation of shafts or gearings.

It will be observed that, inasmuch as each figure has its two legs attached, one of them to one belt or apron of a pair of the latter, and the other of them to the other belt or apron of said pair, and inasmuch as the two belts or aprons of said pair alternate with each other in their movement, they communicate a correspondingly-alternating movement to the lower ends of the legs of the figure in a direction coincident with that in which the belts or aprons are moved, thereby causing the said figure to advance with a movement of the legs imitating that of a human being in walking.

It will further be observed that each pair of belts or aprons being made to move at a speed greater or less, as the case may be, than that of the other pairs which may be included in the apparatus, the figures carried and operated as described will approach and recede from each other, some of the figures overtaking and passing others of the figures, and that although this relative movement of the different figures is of course a result of the proportionate speed of the several pairs of belts or aprons, yet this is not apparent to the on-looker, and the amusement caused by the apparent racing of the figures is practically as great as if it depended upon chance or upon some property inherent in the figures themselves.

It will be further observed that where but two belts or aprons are employed any desired number of figures may be applied in connection therewith, which said figures will apparently follow each other with a walking movement more or less amusing in appearance, and that by multiplying the number of pairs of belts or aprons a differential movement, as between the figures of the different pairs of the belts or aprons, is caused, as hereinbefore explained.

An apparatus embracing the various features of my said invention may be very cheaply constructed. It is found by trial to be an interesting and amusing toy, and one capable of exciting in children and others great interest in the comical movements of the figures and in their relative speed. It is of course

to be understood that, when desired, the figures, instead of representing human beings, may have the form of quadrupeds, being in such case provided with four legs, B′, instead of two, two of the legs of the quadrupedal figure being attached to one of the belts or aprons of a pair, while the other two of said legs are attached to the other belt or apron of the pair.

For the purposes of this my present application I limit my claims to those which include as an element the flexible legs of a suitable toy figure, inasmuch as the various combinations of parts included in the mechanism represented herein as arranged to give movement to the flexible legs of said figures is set forth and claimed in another application for Letters Patent filed by me of even date with this, and indicated in the records of the Patent Office as application No. 133,629.

What I claim as my invention is—

1. The combination, with the flexible legs of a suitable toy figure, of endless belts or aprons C C, roller A, constructed with gripping surfaces or devices *a* at different portions of its circumference, and a bar or support, B, all substantially as and for the purpose herein set forth.

2. The combination, with the flexible legs of a suitable toy figure, of endless belts or aprons C C, roller A, constructed with gripping surfaces or devices *a* at different portions of its circumference, a bar or support, B, and an idler-bar, D, all substantially as and for the purpose herein set forth.

3. The combination, with the flexible legs of a suitable toy figure, of endless belts or aprons C C, roller A, constructed with gripping surfaces or devices *a* at different portions of its circumference, a bar or support, B, and a table, E, all substantially as and for the purpose herein set forth.

4. The combination, with the flexible legs of a suitable toy figure, of endless belts or aprons C C, roller A, constructed with gripping surfaces or devices *a* at different portions of its circumference, a bar or support, B, an idler-bar, D, and table E, all substantially as and for the purpose herein set forth.

5. The combination, with the flexible legs of a suitable toy figure, of endless belts or aprons C C, roller A, constructed with gripping surfaces or devices *a* at different portions of its circumference, a bar or support, B, and guides I, all substantially as and for the purpose herein set forth.

6. The combination, with the flexible legs of a suitable toy figure, of endless belts or aprons C C, roller A, constructed with gripping surfaces or devices *a* at different portions of its circumference, a bar or support, B, an idler-bar, D, and guides I, all substantially as and for the purpose herein set forth.

7. The combination, with the flexible legs of a suitable toy figure, of endless belts or aprons C C, roller A, constructed with gripping surfaces or devices *a* at different portions of its circumference, a bar or support, B, a table, E, and guides I, all substantially as and for the purpose herein set forth.

8. The combination, with the flexible legs of a suitable toy figure, of endless belts or aprons C C, roller A, constructed with gripping surfaces or devices *a* at different portions of its circumference, a bar or support, B, an idler-bar, D, table E, and guides I, all substantially as and for the purpose herein set forth.

WM. H. ANDERSON.

Witnesses:
JOHN H. FISHER,
GURWALD AAS.