May 19, 1953 M. C. MASON 2,638,709

WALKING FIGURE TOY

Filed Jan. 30, 1948 2 Sheets-Sheet 1

Fig. 1.

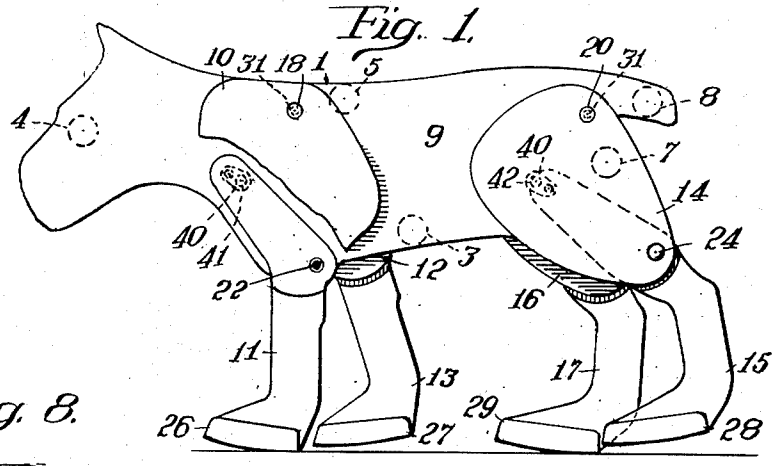


Fig. 8.

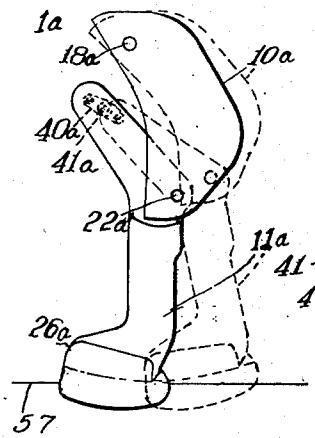


Fig. 2.

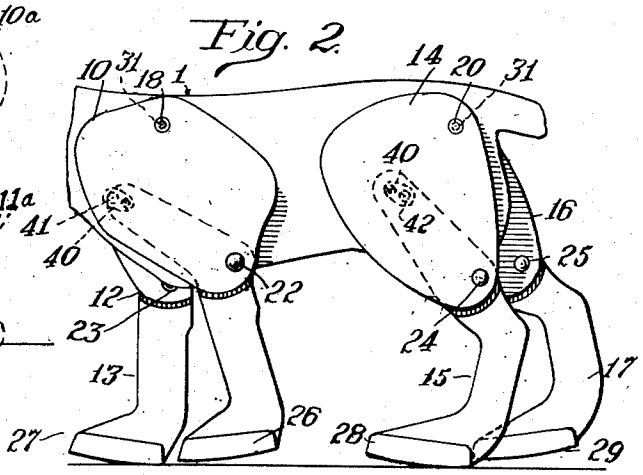
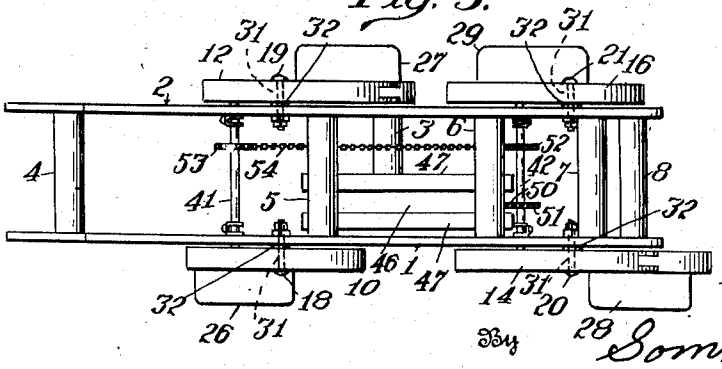


Fig. 3.



Inventor

Max C. Mason

By Sommers & Young

Attorneys

May 19, 1953 M. C. MASON 2,638,709

WALKING FIGURE TOY

Filed Jan. 30, 1948 2 Sheets-Sheet 2

Fig. 4.

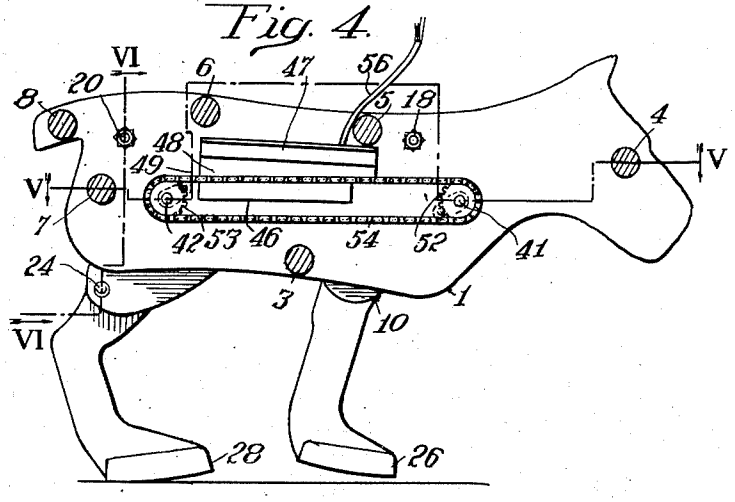


Fig. 5.

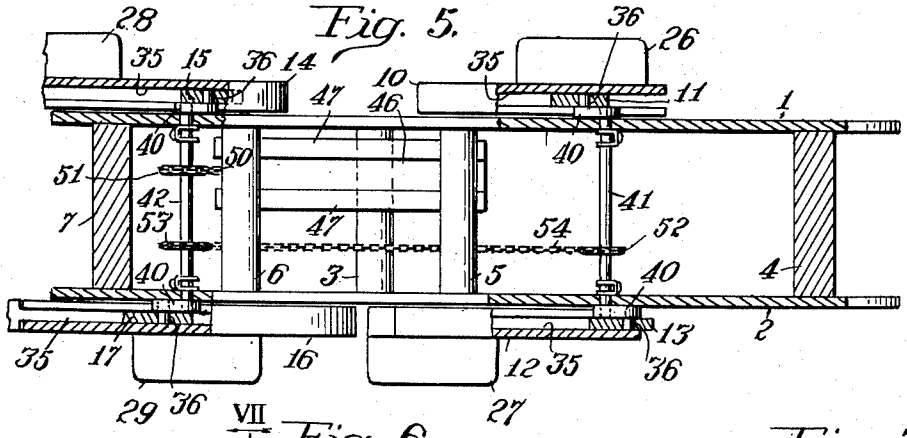


Fig. 6.

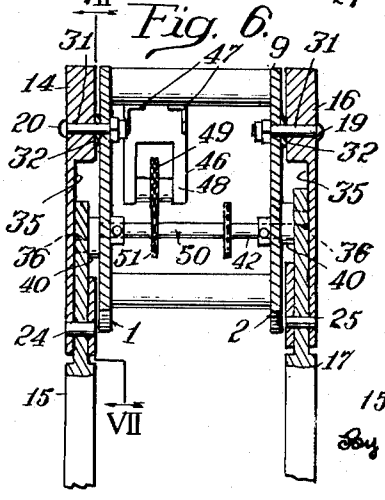
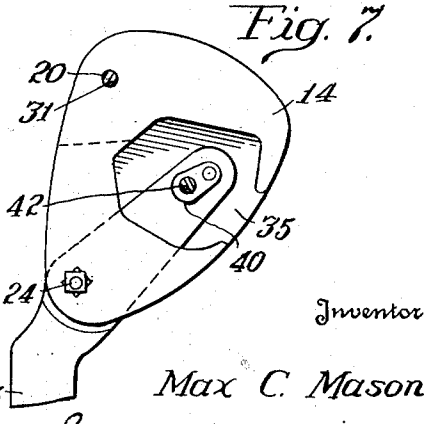


Fig. 7.



Inventor

Max C. Mason

By Sommers & Young

Attorneys

Patented May 19, 1953

2,638,709

UNITED STATES PATENT OFFICE

2,638,709

WALKING FIGURE TOY

Max C. Mason, Bethesda, Md.

Application January 30, 1948, Serial No. 5,229

3 Claims. (Cl. 46—150)

1

This invention relates to improvements in the leg and foot construction of walking toys and has for an object to provide a simple arrangement of parts of the legs and operating mechanism therefor.

A further object of the invention is to provide for legs of at least two parts which move relative to the body of the toy and the parts of which move relative to each other.

A further object of the invention is to provide feet for the toy which are of such shape that as the toy progresses in the walking movement the body will remain at substantially the same height, that is, will not have an up and down motion.

In the accompanying drawings an embodiment of a toy according to the invention is represented and also an illustration of a method and device for determining the proper shape of the feet.

In the drawings Fig. 1 is a side view partly broken away of a toy representing a four legged animal, for instance, a dog.

Fig. 2 is a view similar to Fig. 1 with the legs of the toy animal in different position.

Fig. 3 is a top view showing operating mechanism located within the body part of the toy animal.

Fig. 4 is a vertical sectional view of the toy animal showing part of the operating mechanism.

Fig. 5 is an enlarged horizontal view partly in section of the toy animal on line V—V of Fig. 4.

Fig. 6 is an enlarged sectional view partly broken away of the toy animal on line VI—VI of Fig. 4.

Fig. 7 is a sectional view on line VII—VII of Fig. 6 showing part of one leg of the toy animal.

Fig. 8 is a diagrammatic view of a device for obtaining the curvature for the bottoms of the feet of the toy animal which will keep the body at approximately a fixed elevation while walking.

In the drawings numerals 1 and 2 designate two side plates, which together with cross stays 3, 4, 5, 6, 7 and 8 constitute a frame for the body 9 of the toy animal, for part of a housing for holding some of the operating mechanism, and for providing a base to which the legs can be pivotally secured. In the present illustration the toy represents a quadruped having legs each composed of two parts, the upper or thigh parts, 10, 12, 14, 16, being pivotally secured to the sides 1, 2 of the body part at 18, 19, 20 and 21 respectively and lower leg parts 11, 13, 15 and 17 are pivotally attached to the upper or thigh parts at 22, 23, 24 and 25 respectively. The feet, 26, 27, 28, 29, of the toy animal are preferably of

2

sufficient breadth to provide substantial stability of the toy figure in standing and walking.

At the points where the upper or thigh parts are pivotally secured to the body part, bolts 31 may be used to provide the attachment and preferably washers 32 are placed between the thighs and the body (Fig. 6) to maintain a slight spacing and reduce friction.

The lower leg parts extend angularly upwardly beyond the points where they are pivoted to the upper parts and the upwardly extending parts are preferably underneath the upper parts, that is, located between the body and the upper parts, or else may be located in recesses 35 in the upper parts of the legs. The upper parts of the lower legs are provided with small openings 36 in which are engaged cranks 40 which are arranged on the ends of shafts 41, 42 which, preferably, extend across the body and through the sides thereof. The axes of the shafts 41 and 42 are located at points spaced away from the points 18, 19, 20 and 21 respectively where the upper or thigh parts of the leg are pivoted to the body part of the toy. The cranks located on the same side of the body are arranged on their shafts in substantially oppositely extending directions, that is, approximately 180° angularly to each other, and the cranks on the same shafts are also approximately 180° apart angularly.

For driving the shafts and consequently the legs, a small motor 46 is mounted in the body by brackets 47, and is provided with a drive shaft 48 having a sprocket 49 over which travels a chain 50, which also runs over a sprocket 51, secured on shaft 42. The shafts 41 and 42 are provided with other sprockets 52 and 53 respectively, which are interconnected by a chain 54. The driving motor is diagrammatically illustrated as a small electric motor which would be supplied with power by any suitable means such as a battery or wires 56 leading to the motor from outside the body of the toy, but it is to be understood that any other suitable type of motor may be used such as a spring motor.

Preferably the bottoms or soles of the feet of the toy animal are so shaped that while walking the body remains at substantially a uniform height from the surface on which the toy is supported. To produce the proper curvature of the soles of the feet, the body may be secured in fixed position with the feet slightly overlying a line preferably a straight line representing the surface on which the toy is to walk, and the toy is set in walking operation. Then a marking instrument is held against the side of the foot

at the level of the line representing the supporting surface approximately at the base of a perpendicular dropped to the line from the hip pivot and the proper shape is thus marked on the side of the foot, and the bottom or the sole of the foot is then shaped to conform with the part of the mark corresponding to the part of the cycle of operation during which the respective foot is in engagement with the supporting surface.

An alternative method of obtaining a proper shape of the bottoms of the feet is to make a model or representation of the parts of a leg and foot of flat material such as cardboard with the pivot points and crank properly located and having the bottom of the foot extending slightly beyond a line representing the supporting surface. Then by holding a marking instrument at the level of the line approximately at the base of a perpendicular dropped to the line from the hip pivot, marking the curve on the simulated foot while moving leg through its walking motion. The appropriate part of the curve so produced is then laid out on the side of the foot and the foot is shaped to conform thereto. If desired the length of the foot may be extended and the proper curve provided by modifying the procedure by holding the marking instrument at other points on the line and moving the simulated leg through its walking motion.

In Fig. 8 of the drawing a sheet material model or simulation of a leg is illustrated. The model is laid or secured on a flat surface *1a* simulating in part the side of the body of the toy and having a line **57** marked thereon at approximately the level of the bottom of the foot, representing the surface on which the toy is to walk. By proceeding as above described, a curve, corresponding to the part of the step when the foot is in contact with the supporting surface, represented in dashed lines in Fig. 8, is marked on the side of the sheet material simulating the foot, which conforms to the shape to be given the bottom of the foot in order to obtain the desired object of keeping the body of the toy at approximately a uniform height from the supporting surface while walking. The appropriate part of the curve so produced is then marked on the feet of the toy and the feet are then shaped in conformity therewith. In Fig. 8 the reference numerals employed are similar to those designating equivalent parts in the figures of the drawing representing the actual toy except that the numerals have the latter—*a*—added.

In operation, the motor **46** drives sprocket **49** and in turn sprocket chain **50** which then drives sprocket **51**, and shafts **41** and **42** are turned thereby. The cranks **40** secured on the ends of shafts **41** and **42** are turned by the shafts and the cranks then move the upper parts of the lower legs through circular motions. This in turn causes a swinging of the upper parts **10**, **12**, **14** and **16** of the legs and a compound motion is thus imparted to the lower parts of the legs and feet in which the feet are raised from the supporting surface during the forward motion of a foot in the step but engage the supporting surface while the body is moving forwardly relative to the respective foot.

I claim:

1. In a mechanical walking figure toy, in combination a body portion, legs for supporting and carrying the body, said legs having upper or thigh portions, means pivotally securing said thigh portions to the body for swinging movement substantially in the direction of travel of the toy, said legs having lower portions pivotally secured to the thigh portions at knee points remote from the first-mentioned pivot means, said lower leg portions having rigid extensions beyond said last-mentioned pivot means, controlling cranks connected with said extensions at points considerably spaced from the knee pivot points, means for turning said cranks to impart motion to the legs, the bottom ends of said lower leg portions being formed as feet, the bottoms of which conform to curves formed on the feet, as the feet move in walking, by consecutive points located equidistant from and in fixed position relative to the respective first-mentioned pivot means, whereby in walking the body is continuously maintained equidistant from the supporting surface.

2. In a mechanical walking figure toy, the combination of a body portion, thigh portions and leg portions for supporting and carrying the body, hip pivot means securing the thigh portions to the body for swinging motion, knee pivots for securing the leg portions to the thigh portions for relative swinging motion at points intermediate the upper and lower ends of said leg portions, cranks connected directly with said upper ends at points substantially spaced from the knee pivots, said cranks having their axes at points remote from the respective hip pivots, and means for turning said cranks to impart circular motion to the points of said upper ends of the legs where the cranks engage and forward and rearward walking movements to the lower ends of the legs.

3. In a mechanical walking figure toy, the combination of a body portion, legs for supporting and carrying the body, said legs comprising upper or thigh portions and lower portions, hip pivot means securing the thigh portions to the body for swinging motion, knee pivot means for securing the lower leg portions to the thigh portions for relative swinging motion, said lower leg portions having rigid extensions rigidly connected therewith and extending beyond said knee pivots underneath the outer surface of the respective thigh portions, cranks connected directly with said extensions of the lower leg portions at points substantially spaced from the knee pivots, said cranks having their axes at points remote from the respective hip pivots, and means for turning said cranks to impart circular motion to the points of said extensions where the cranks engage and walking movements to the lower leg portions.

MAX C. MASON.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
61,416	Goodwin	Jan. 22, 1867
81,491	Goodwin	Aug. 25, 1868
469,169	Norton	Feb. 16, 1892
491,927	Rygg	Feb. 14, 1893
1,649,910	Mik	Nov. 22, 1927
1,687,675	Lehmann	Oct. 16, 1928

FOREIGN PATENTS

Number	Country	Date
490,393	Germany	Jan. 29, 1930