Feb. 25, 1958 W. A. BRODRIB 2,824,409

LEAPING ANIMAL TOY

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FIG. 1

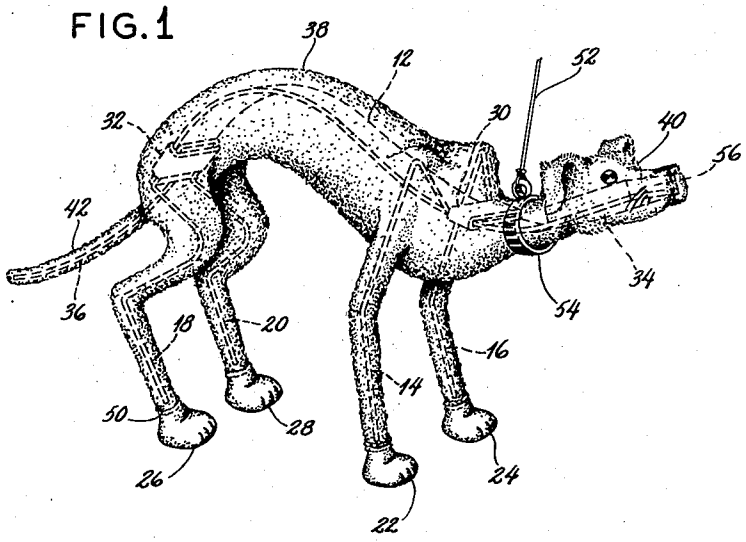

FIG. 2

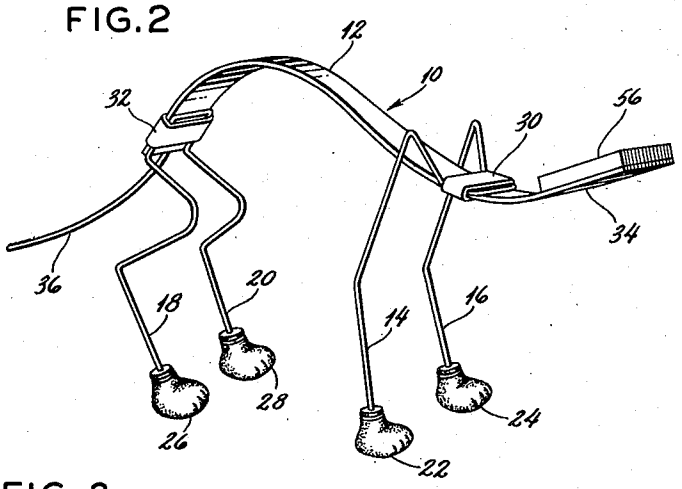

FIG. 3

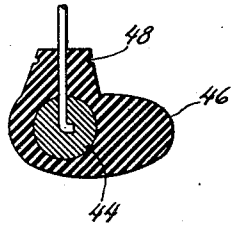

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FIG. 4

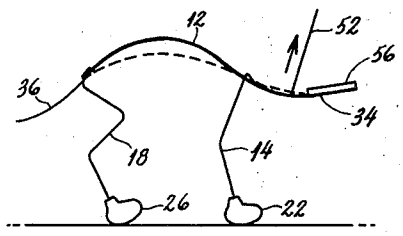


FIG. 5

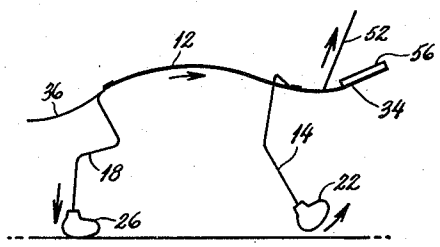


FIG. 6

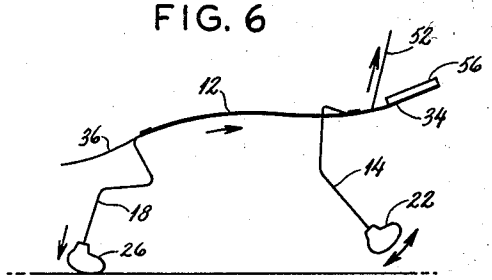


FIG. 7

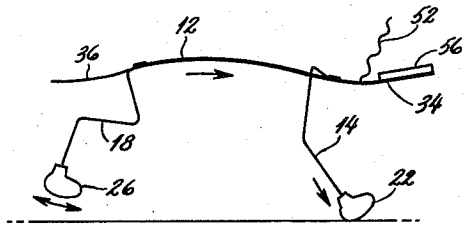


FIG. 8

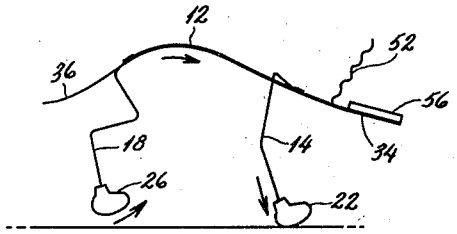
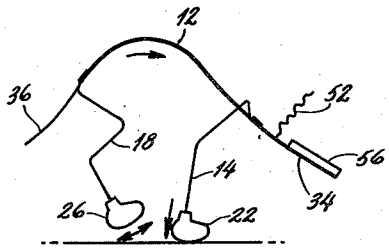


FIG. 9



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LEAPING ANIMAL TOY

William A. Brodrib, Hartford, Conn.

Application February 20, 1956, Serial No. 566,669

4 Claims. (Cl. 46—129)

The general object of the invention is to provide a toy in the form of a dog or other four-footed animal and having various parts including a skeleton and feet which cooperate to effect leaping movements approximating those of a live animal, the said leaping movements of the toy being effected by the application of external force, as for instance by means of a cord attached to the neck portion.

A more specific object of the invention is to provide various features of structure and arrangement for attaining the above-stated more general object.

Other objects of the invention will be apparent from the drawings and from the following description and claims.

In the drawings I have shown in detail one embodiment of the invention, but it will be understood that various changes may be made from the construction shown, and that the drawings are not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawings:

Fig. 1 is a perspective view of a leaping animal toy embodying the invention.

Fig. 2 is a perspective view of the skeleton of the toy.

Fig. 3 is an enlarged vertical sectional view of one of the feet.

Figs. 4 to 9 are schematic views showing representative motions.

Referring to the drawings, **10** represents generally the skeleton of a leaping animal toy embodying the invention, the skeleton being preferably formed entirely from metallic parts. The skeleton includes a longitudinal spine **12**, two similar front legs **14** and **16** and two similar rear legs **18** and **20**. The upper ends of the several legs are rigidly secured to the spine **12**. The two front legs are transversely spaced and symmetrically located with respect to a vertical longitudinal plane through the spine and the two rear legs are also transversely spaced and symmetrically located with respect to the said plane. Front feet **22** and **24** are secured to the bottoms of the front legs **14** and **16** and rear feet **26** and **28** are secured to the bottoms of the rear legs **18** and **20**. The several parts of the skeleton have predetermined relative positions of repose, as shown in Fig. 2, in which positions the bottoms of the four legs and the four feet are in a predetermined relationship.

The spine **12** is flexible upwardly and downwardly and is resilient, being preferably formed of a flat spring strip. The legs are relatively rigid throughout, being preferably formed of wire. The two front legs may be formed from a single piece of wire which is rigidly clamped to the front portion of the spine by means of a sheet metal member **30**. The two rear legs may be formed from a single piece of wire which is rigidly clamped to the rear portion of the spine by means of a sheet metal member **32**. The spine has a forwardly extending neck portion **34** and preferably includes a separate tail portion **36**.

The skeleton as generally described above may be provided with a suitable covering to simulate an animal as shown in Fig. 1. A dog is illustrated but it will be understood that the invention is not so limited. The covering for the skeleton includes a "skin" **38** formed from a suitable fabric and also includes suitable stuffing to hold the skin in the required snape. The bottom of the leg portions of the skin are suitably connected with the several feet. It will be understood that the skin and the stuffing are readily flexible to the extent necessary to permit free relative movements of the parts of the skeleton as hereinafter described. A head **40** is carried by the neck portion **34** of the spine and a tail **42** may be carried by the tail portion **36** of the spine.

Each of the feet **22**, **24**, **26** and **28** preferably includes an outer floor engaging covering or portion formed of a material serving to provide substantial frictional resistance to sliding movement of the foot with respect to the floor. This covering is preferably rubber or an equivalent material. It will be understood that the term "rubber" is herein used in a generic sense and is intended to include not only natural rubber but also various rubber substitutes. In order to insure firm engagement of the feet with the floor and to thus enable the rubber portion to effectively resist sliding movement, the said feet together with the corresponding legs are relatively heavy. Preferably each foot is provided with an individual weight.

As to the exact structure of the feet there may be wide variation, but each of the feet may advantageously be formed as shown in Fig. 3. A relatively heavy weight **44**, formed preferably of lead, is cast in place around the lower end portion of the leg and a body **46** of rubber is molded in place around the weight and around the portion of the leg adjacent the weight. As shown the rubber body **46** has a groove **48** for use in connecting the skin **38** with the foot. The portion of the skin constituting the leg surrounds the upper portion of the foot and is pressed into the groove **48** by a wire ring **50**.

Means is provided for connecting a cord such as **52** with the front portion of the spine **12**, preferably at the neck **34**. As shown, a collar **54** surrounds the stuffed neck and the cord **52** is connected to the collar.

Secured to the neck portion **34** of the spine and within the head is a counterweight **56**. The counterweight **56** is of such mass and is so positioned that it approximately balances the rear portion of the toy, tending to cause it to pivot about the front feet **22** and **24**. In fact, the mass and position of the counterweight may advantageously be such as to slightly overbalance the weight of the rear portion of the toy.

The manner of operation of the toy is illustrated generally in Figs. 4 to 9, but it will be understood that the action shown is intended to be representative and not necessarily actual. The toy moves approximately in the manner shown and to be described and the reasons for the movement will be explained so far as now understood.

Fig. 4 shows the parts in their positions of repose. The flexible and resilient spine **12** has an unflexed position, as shown by dotted lines, to which it tends to move, but by reason of the counterweight **56** the spine in the position of repose is flexed upwardly from its said unflexed position. By reason of the action of the counterweight the rear feet exert little or no pressure against the floor. In fact when the counterweight overbalances the rear portion of the toy, it is necessary to maintain a slight tension in the cord **52** in order to prevent the toy from pivoting forwardly.

To start the movement of the toy, the cord **52** is pulled in a forward and upward direction as shown in Fig. 5, it being understood that the user moves forwardly as the

toy moves forwardly. The tension in the cord is sufficient to lift the front feet 22, 24 from the floor. The lifting of the front feet causes the rear feet 26, 28 to firmly engage the floor and they remain momentarily in fixed position with respect thereto. When the front feet are so lifted, the spine 12 returns to its before-mentioned unflexed position, thus moving the front feet forwardly as shown in Fig. 5. The action of the spine in moving the front feet forwardly is supplemented by the forward and upward tension in the cord. By reason of momentum the front feet move forwardly to such an extent as shown in Fig. 6 that the spine is flexed downwardly beyond its before-mentioned unflexed position.

As soon as the front feet 22, 24 have reached their maximum forward positions, as shown in Fig. 6, the tension in the cord 52 is released and the front feet engage the floor, as shown in Fig. 7. The front feet firmly engage the floor and they remain momentarily in fixed position with respect thereto. The weight of the counterweight 56 together with its downward momentum, serves to lift the rear feet 26, 28 from the floor as shown. As soon as the rear feet leave the floor the spine flexes upwardly toward its unflexed position and the rear feet 26, 28 are moved forwardly, as shown in Fig. 8. The momentum of the forwardly moving rear feet causes them to move beyond a position corresponding to the unflexed position of the spine 12, the spine being then flexed upwardly as shown in Fig. 9. As soon as the position shown in Fig. 9 is reached, the tension is restored in the cord 52 and the before-described sequence of movements is repeated, as shown in Figs. 5 to 9. It will be observed, however, that after the first cycle there is an increased force tending to move the front feet forwardly as shown in Figs. 5 and 6. This is due to the fact that the spine 12 is flexed upwardly to a greater extent in the Fig. 9 position than it is in the Fig. 4 position of repose.

The action as described is due at least in part to the relatively great stiffness of the legs 14, 16 and 18, 20 and to the relatively great vertical flexibility of the resilient spine 12, said spine although readily flexible vertically as stated having very large resistance to lateral flexing and very large resistance to twisting.

From the foregoing description it will be observed that the toy constituting the present embodiment of the invention is actuated by intermittently tensioning and releasing the cord 52. The front feet move substantially in unison and the rear feet move substantially in unison, and the action therefore resembles leaping rather than walking. The tensioning and releasing of the cord must be timed in synchronism with the leaping movements.

The invention claimed is:

1. In a leaping animal toy, the combination of a skeleton comprising a longitudinal spine and two transversely spaced rigid front legs and two transversely spaced rigid rear legs all of which legs are rigidly secured to the spine and extend downwardly therefrom, the spine of the said skeleton between the front and rear legs being resilient and being flexible upwardly and downwardly and thus enabling the front legs and the rear legs to move out of predetermined relative positions of repose and forwardly or rearwardly with respect to each other, front and rear feet secured respectively to the bottoms of the front and rear legs said front and rear feet together with the corresponding legs being relatively heavy, and a counterweight on the spine spaced forwardly from the front legs and the front feet and substantially balancing the portion of the toy at the rear of the front feet.

2. In a leaping animal toy, the combination of a skeleton comprising a longitudinal spine and two transversely spaced rigid front legs and two transversely spaced rigid rear legs all of which legs are rigidly secured to the spine and extend downwardly therefrom, the spine of the said skeleton between the front and rear legs being resilient and being flexible upwardly and downwardly and thus enabling the front legs and the rear legs to move out of predetermined relative positions of repose and forwardly or rearwardly with respect to each other, front and rear feet secured respectively to the bottoms of the front and rear legs said front and rear feet together with the corresponding legs being relatively heavy, a counterweight on the spine spaced forwardly from the front legs and the front feet and substantially balancing the portion of the toy at the rear of the front feet, and means for connecting a cord with the forward portion of the spine for applying intermittent force thereto in a direction inclined forwardly and upwardly, the said counterweight and the said connected cord cooperating with the resilient spine to cause the front feet and the rear feet to move alternately in the forward direction so that the toy has a leaping action.

3. In a leaping animal toy, the combination of a skeleton comprising a longitudinal spine and two transversely spaced rigid front legs and two transversely spaced rigid rear legs all of which legs are rigidly secured to the spine and extend downwardly therefrom, the spine of the said skeleton between the front and rear legs being resilient and being flexible upwardly and downwardly and thus enabling the front legs and the rear legs to move out of predetermined relative positions of repose and forwardly or rearwardly with respect to each other, front and rear feet secured respectively to the bottoms of the front and rear legs, said front and rear feet together with the corresponding legs being relatively heavy and each of said feet including a floor engaging portion tending to resist sliding movement of the foot with respect to the floor, and a counterweight on the spine spaced forwardly from the front legs and the front feet and substantially balancing the portion of the toy at the rear of the front feet.

4. In a leaping animal toy, the combination of a skeleton comprising a longitudinal spine and two transversely spaced rigid front legs and two transversely spaced rigid rear legs all of which legs are rigidly secured to the spine and extend downwardly therefrom, the spine of the said skeleton between the front and rear legs being resilient and being flexible upwardly and downwardly and thus enabling the front legs and the rear legs to move out of predetermined relative positions of repose and forwardly or rearwardly with respect to each other, front and rear feet secured respectively to the bottoms of the front and rear legs each of which feet includes a relatively heavy weight and a floor engaging portion tending to resist sliding movement of the foot with respect to the floor, and a counterweight on the spine spaced forwardly from the front legs and the front feet and substantially balancing the portion of the toy at the rear of the front feet.

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