July 12, 1960 G. R. THOEMING 2,944,814

PLASTIC HORSE

Filed Jan. 24, 1957

Fig. 1

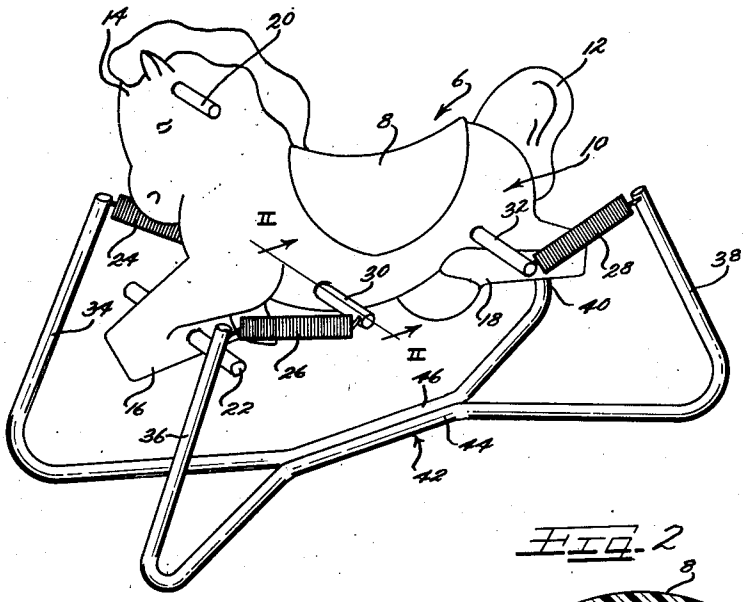


Fig. 2

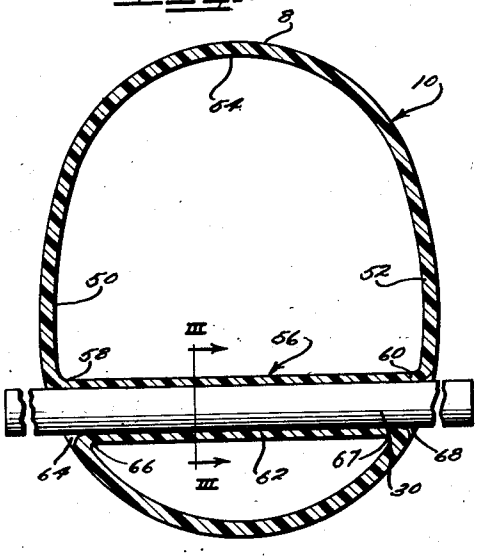


Fig. 4

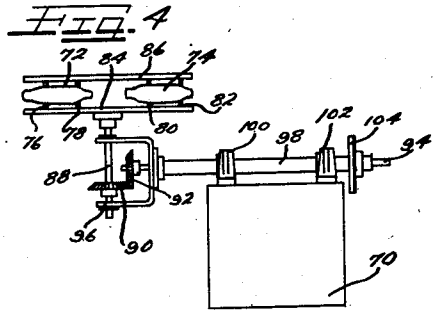
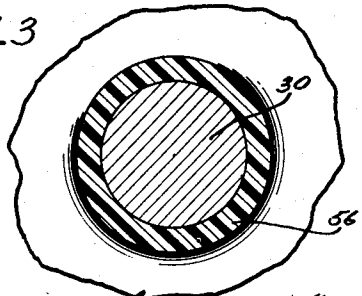


Fig. 3



Inventor
GEORGE R. THOEMING

By Mill, Thomas, Mellen, Grace & Singleton Attys

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2,944,814

PLASTIC HORSE

George R. Thoeming, Memphis, Tenn., assignor to Wonder Products Company, Collierville, Tenn., a corporation of Tennessee

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The present invention relates to improvements in the structure of a hollow plastic horse or other toy suitable for riding, and more particularly to a construction of the plastic toy body in such a way as to eliminate or reduce the tendency of the body to crack or become deformed at or near its points of support upon crossbars extending through the hollow body of the toy.

In a structure of the type embodying the present invention, the toy is one suitable to be ridden by a child. The body of the toy may be a simulation of an animal such as a horse, and is suitably hollow. The body is formed of a plastic and in accordance with the present invention is provided with a plurality of horizontally extending integral tubes extending within the hollow body of the toy figure and open at their ends. The tubes are of substantially uniform diameter, with their walls joining the walls of the body in an integral construction. The tubes are smoothly flared at their extreme ends in joining the outer surface of the body, with an inner fillet. Such a structure may be suitably manufactured by a rotational molding of the plastic whereby the thin walled tubes are made simultaneously with the body of the toy. The completed toy is balanced in structure and weight for suitable suspension.

The toy figure is adapted to be supported by bars or dowels inserted through the tubes in snug engagement with the walls of the tubes to distribute the weight of the toy figure and its rider in such a manner as to avoid concentrations of stresses. The structure is well adapted for suspension by the connection of springs to the ends of the dowels and to supporting uprights quadrilaterally arranged so that the figure is stably supported when ridden by a child.

An object of the invention is to provide an improved hollow toy figure suitable for riding by a chlid and having improved strength and a longer useful life and providing increased safety for the child.

Another object of the invention is to provide a hollow toy figure suitable for riding which is light in weight and which is evenly balanced to adapt it for stable, spring suspension.

A general object of the invention is to provide an improved toy structure suitable for riding by a chlid.

Other objects and advantages will become apparent from the teachings of the principles of the invention in connection with the disclosure of the preferred embodiment presented in the specification, and from the claims and appended drawings, in which:

Figure 1 is a perspective view of a suspended toy figure embodying the principles of the invention;

Figure 2 is a vertical sectional view taken along line II—II of Figure 1;

Figure 3 is an enlarged vertical sectional view taken along line III—III of Figure 2; and

Figure 4 is a somewhat diagrammatic elevational view of mechanism for carrying out the steps in the method of manufacture in accordance with the present invention.

As illustrated in the drawings, the structure and the method contemplated by the present invention will be disclosed in connecion with a toy figure shown in the form of a horse **6**. The horse is an example of one of many animal and other figures that may be ridden by a child. The horse **6** is provided with a seat **8**.

The body **10** of the horse may be formed of a plastic

or other suitable material and is described as made of a thermoplastic plastic, for example, such as a polyvinyl plastic. This is a lightweight plastic that can be attractively colored and is well suited to the formation of a child's toy. The toy, shown as molded in the form of a riding horse, is molded to provided a tail **12**, a head **14**, forelegs **16** and hind legs **18**. The child may ride the horse by sitting on the seat or simulated saddle **8**, grasping the hand bar **20** and resting his feet on the foot rest bar **22**.

The weight of the horse **6** and its rider is stably suspended by springs **24**, **26** and **28** (the fourth spring being hidden behind the body of the horse). The inner ends of the springs are suitably connected to laterally extending crossbars or dowels **30** and **32**. These dowels extend crosswise through the body of the horse to carry its weight and the weight of the rider.

The outer ends of the springs **24**, **26** and **28** (and the spring hidden behind the horse) are suitably connected to the relatively rigid uprights **34**, **36**, **38** and **40**. These uprights are integrally bent up from a base **42**, which is shown in the form of a pair of tubes or pipes **44** and **46** shaped to come together at their mid-lengths, where they are secured together by any suitable means (not shown). The tubes are continuous throughout their respective lengths with the uprights **34** and **40** being formed at the ends of the tube **46** and the uprights **36** and **38** being formed at the ends of the tube **44**.

As illustrated in Figure 2, the body of the horse is tubular in form and is shaped to provide side walls **50** and **52** merging into a smoothly curved top wall **54**, which forms the seat **8** of the horse. The weight of the rider on the seat **8** is transferred downwardly through the vertical walls **50** and **52** to the supporting tubes **56**, of which only one is shown. Each of the tubes **56** is arranged to extend laterally and horizontally across the body **10** of the horse between the side walls **50** and **52**. The tubes **56** are formed of the same plastic material as the body **10** and join the side walls **50** and **52** at their ends **58** and **60** in an integral relationship. Preferably, the tubes are molded at the same time as the body **10**.

The central portion **62** of the tube **56** is cylindrical in shape and of such diameter as to snugly receive the dowel **30**. The dowel, or rod **30** is thus in contact with the tube substantially the full length of the tube so that the weight of the rider and body will be evenly distributed along the tube to the supporting dowel **30**. The tube **56** at its ends **58** and **60** has its interior diameter enlarged as illustrated at **64** and **68**. This enlarged interior diameter provides a face gently flaring outwardly to join the outer surface of the body **10** of the horse. At the points of enlargement **64** and **68** of the tube, the supporting engagement between the dowel **30** and the interior of the tube **56** is discontinued and the weight and therefore the stresses, are not localized at the outer surface at the point where the tube joins the body, thereby reducing the possibility of cold flow of the plastic or of cracking the material of the body at the tube opening.

The outer ends of the tube **56** are of substantially uniform thickness, but fillets are formed at **66** and **67** where the outer surface of the tube **56** joins the inner surface of the body **10**.

It will be understood that the structure of the forward tube **56** is identical with the tube which receives the dowel or the rod **32** at the rear of the horse and, therefore, only one need be described in detail. Additional tubes of a similar nature may also be provided to carry the dowels which form the hand bar **20** and the foot rest bar **22**. The attributes of being light in weight, having balance and strength are available for the tubes at these other locations.

In the method of manufacturing the figure of the horse,

there may be used molding apparatus such as illustrated in a diagrammatic form in Figure 4. The molding apparatus, which employs a rotational molding procedure, is suitably supported on a base **70**. The apparatus is shown provided with two molds **72** and **74** whereby two of the figures can be formed at the same time. The molds are carried on cross rods **76**, **78**, **80** and **82**. The interior of the molds are fitted with cross cores which are cylindrical and shaped in accordance with the size desired for the tubes carrying rods **30** and **32**.

The molding equipment, shown in Figure 4, is constructed to carry the molds **72** and **74** on a rotating shaft **88**. This shaft is turned about its own axis by bevel gear **90** driven by a bevel gear **92** carried on a stationary shaft **94**. The shaft **88** is supported in a yoke **96** which rotates about the axis of the shaft **94** while the shaft **94** is held stationary. This causes a rotation of the molds **72** and **74** about the axis of the shaft **88** and simultaneously about the axis of the shaft **94**. The yoke **96** is carried by the tube **98** which coaxially houses the fixed shaft **94** and which is supported on pillow blocks **100** and **102** mounted on the base **70**. The hollow tube **98** is suitably driven by a sprocket **104**.

The molds **72** and **74** with the rods **76**, **78**, **80** and **82** in place, are filled with a measured amount of plastic in the first step of forming the structure. The mold is then rotated in a compound manner, such as about the two axes shown, and at the same time is heated by means not shown. The plastic, when flowable, is thus caused to flow over the interior surface of the mold by centrifugal force to form an even layer or film on said surface. The film also forms as a uniform layer around the core rods within the molds to complete the tubes for rods **30** and **32**, and **20** and **22**, that are to extend across the body of the figure.

Heating of the mold is continued until the plastic reaches the proper temperature for smooth flowability in accordance with the plastic used. The mold is then cooled and opened and the finished article removed by separation of the sections of the mold and withdrawal of the core rods forming the tubes, thereby making the mold ready for the next cycle. Thus, in one operation the completed figure and the crossbar supporting tubes have been formed into an integral structure of optimum strength.

The method affords an improved product. Accurate control of the product weight is important since it must be related to the strength of the product and to the strength of the springs and other factors. Control of the product weight is possible because a precisely measured quantity of material can be placed in each mold cavity. The use of the described molding equipment requires a minimum of floor space and the operation is cleaner and conducive to closer control of variables. Scrap and rejects are kept to a minimum and figures of intricate and attractive design can be readily molded using the supporting tube structures extending across the hollow body.

Thus, it will be seen that I have provided a structure and method of manufacture for hollow toy figures, which are adapted to be supported on suspending springs in a stable manner in order to be ridden, which meets the objectives and advantages hereinbefore set forth. The construction achieves a toy of optimum strength and safety which is well suited for use in the type of toy illustrated in the preferred embodiment of the disclosure.

I have, in the drawings and specification presented a detailed disclosure of the preferred embodiment of my invention, but it is to be understood that I do not intend to limit the invention to the specific form disclosed, but intend to cover all modifications, changes and alternative constructions and methods falling within the scope of the principles taught by my invention.

I claim as my invention:

1. In a spring suspended toy to be ridden by a child and particularly adapted to be stably suspended by springs connected to supporting uprights, a toy figure having a hollow plastic body forming a seat whereby said body may be straddled and ridden by a child, a first tube extending laterally across the interior of the hollow plastic body to join the body walls in integral relationship therewith and form a substantially rigid support therefor to transfer and distribute the weight uniformly from the walls of the body to the tube, a second similar tube extending across the plastic body spaced horizontally from the first to form an additional substantially rigid support for the body, and rods extending through said tubes and projecting therefrom for connection at their ends to said spring so that the body is supported and the weight of the body and rider are transferred to the supporting rods and suspending springs.

2. A spring suspended toy resembling an animal to be ridden by a child and adapted to be resiliently suspended and carried by springs connected between the toy and supporting uprights, the toy comprising a toy figure formed of a lightweight plastic and having a hollow body with rounded walls extending downwardly from a seat formed in the upper portion of the body whereby the toy may be straddled and ridden by a child, a hollow cylindrical weight distributing tube extending across the interior of the body and integrally joining the body walls, said tube having its outer ends adjacent the surface of the body of enlarged diameter to form a curved surface whereby uniform surface distribution and transferral of weight is enhanced, said tube being formed with a substantially uniform wall thickness and the outer ends joining the interior of the body wall with a fillet providing an even distribution of stress to the interior surface of the body, and a body supporting rod projecting through the tube in snug relationship therewith and adapted for securement to the ends of the suspending springs whereby the body is resiliently supported and the weight of the body and a rider is uniformly transferred through said rods to the suspending springs.

3. A resiliently suspended toy adapted to be ridden by a child, comprising a toy figure of a lightweight hollow construction with walls forming a seat for a child at the top and curving downwardly to form a body of generally tubular form with the seat substantially rigidly supported on the body, integral open-ended supporting tubes extending interiorly across the hollow body and joining the side walls, supporting rods snugly received in said tubes and projecting beyond the exterior wall of the body, supporting springs connected to and extending substantially horizontally from the ends of the supporting rods, upright members connected to the free ends of said springs, and a base for fixedly supporting the uprights in spaced relationship to suspend the body in a stable manner and support a rider on the seat.

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