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**2 Sheets-Sheet 1**

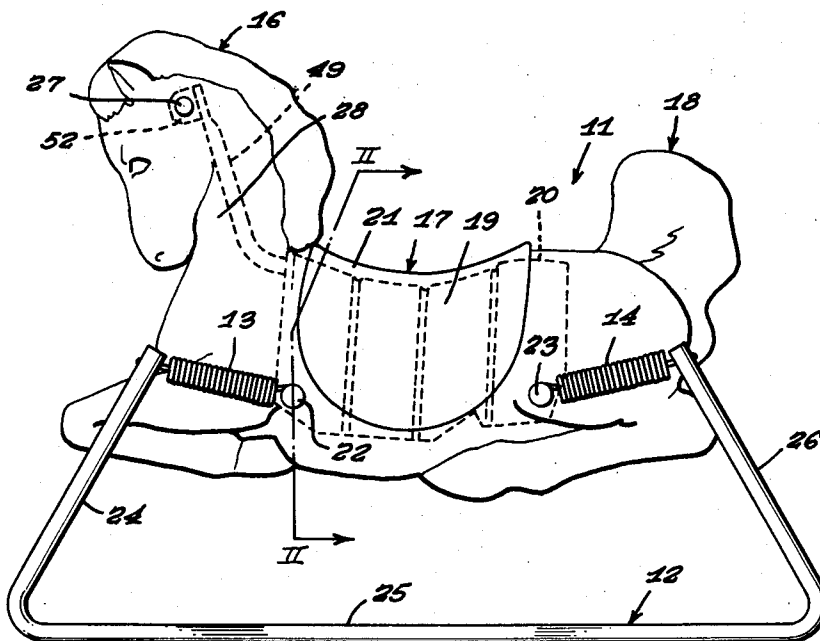


Fig. 1

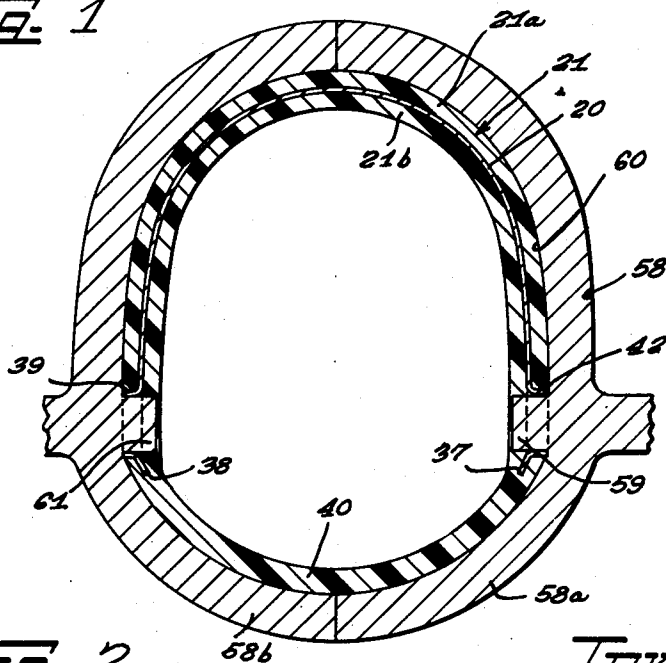


Fig. 2

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May 17, 1960

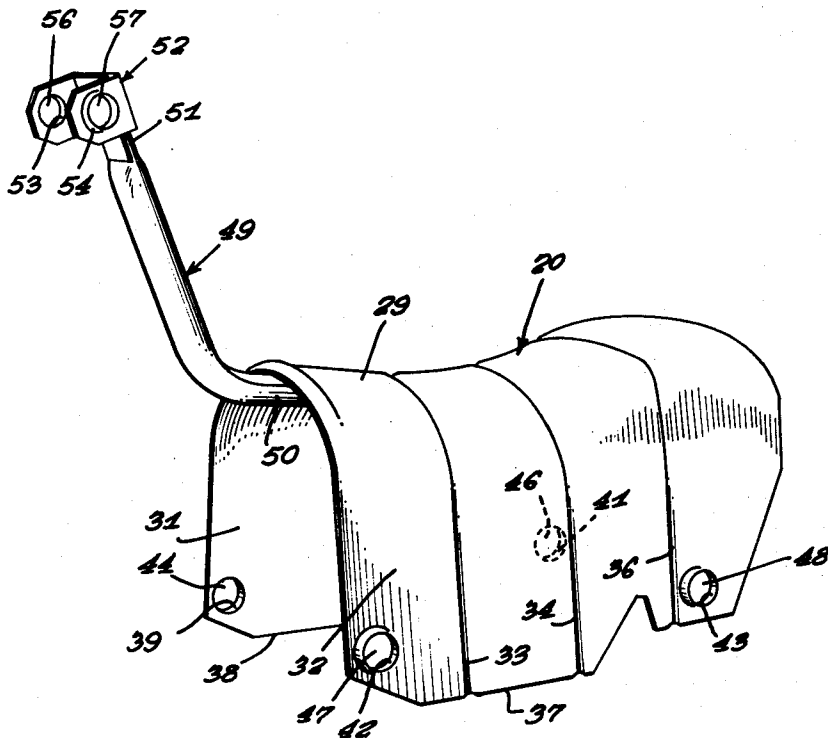
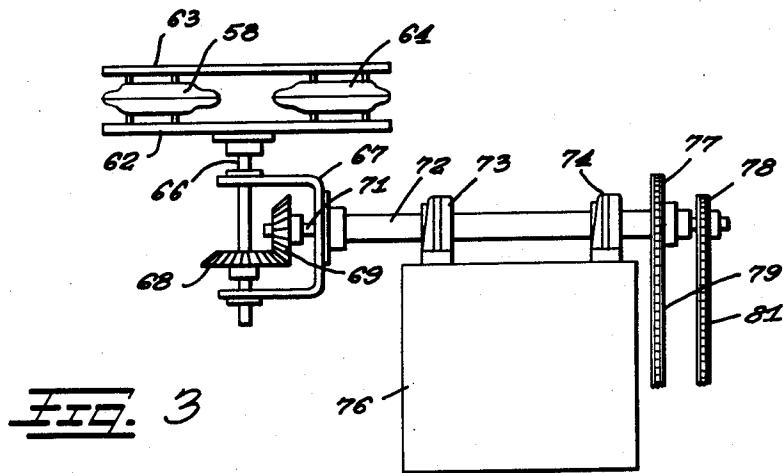
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HOBBY HORSE FRAME

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2 Sheets-Sheet 2



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## HOBBY HORSE FRAME

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17 Claims. (Cl. 272—52)

The present invention relates to improvements in the structure and method of manufacture of a toy suitable for riding by a child, and more particularly to an improved body construction which makes it possible to utilize the advantages of a plastic material of a thickness which is in itself incapable of withstanding stresses at the points of connection of a support and of reliably and rigidly supporting the weight of a rider.

The present invention particularly contemplates utilization in a riding toy, such as a spring suspended toy hobby horse adapted to be ridden by a child. In this type of toy, a body is provided which has the shape of an animal, such as a horse, that is preferably formed of a light-weight material, such as plastic, which is molded so as to be hollow. Cross rods or dowels pass through the body of the horse, and are connected to supports, such as tensioned springs which are secured to uprights for stably yet resiliently supporting the horse. In the vigorous riding of the child, the body of the horse must counter severe stresses, due to the weight of the child, and at the location where the rods pass through the body of the horse.

An advantageous material for the body of the riding horse is a vinyl plastic or other similar material. The plastic is relatively easily molded into a detailed shape, is of light weight, can be permanently and attractively colored and can be shaped into a safe, smooth body which presents no sharp edges or corners or extremely hard surfaces that might injure a child. In spite of the advantages presented by a relatively light-weight plastic material such as vinyl or other softer materials such as rubber, their use has been limited, because of the danger of breakage or cracking of the material, collapse of the horse body, and other damage due to stress concentrations. These stress concentrations are due to the weight and activity of the rider and occur at the point of connection of the supporting members, at the place where the rider is seated, and at the head and neck of the animal when a cross rod is provided at the animal's head, which can be gripped by the rider. The plastic also varies in strength with temperature variation. It is apparent that a toy of this type must be completely safe, and that collapse or breakage during use must be completely avoided.

Accordingly, it is an object of the present invention to provide a body for a riding toy which can utilize the advantages provided by a plastic material, and is capable in itself of supporting the weight of the rider and is capable of withstanding the stresses caused by attached supporting members, and yet which is sufficiently strong to be completely reliable under all operating conditions.

Another object of the invention to provide an im-

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proved hobby horse body structure which will not collapse under weight load and will not be affected by temperature change.

Another object of the invention is to provide an improved reinforcing plastic body for a riding toy which will permit the expansion and contraction of plastic with temperature change without damaging the plastic or creating internal stresses.

A still further object of the invention is to provide an improved reinforced plastic body structure for a riding toy and a method of making the body structure which is well adapted to improved manufacturing techniques and can utilize a slush molding process.

Another object is to provide a spring suspended hollow plastic riding toy body where the plastic can be made thinner and of lighter weight and where the weight of it is more concentrated near the center of gravity of the body.

Another object of the invention is to provide a body structure for a riding toy which has improved strength in various sections of the body, and which also affords a limited degree of flexibility for improved functional operation.

Other objects and advantages will become more apparent with the teaching of the principles of the invention in connection with the disclosure of the preferred embodiments presented in the specification, claims and drawings, in which:

Figure 1 is a side elevational view of a toy riding horse constructed in accordance with the principles of the present invention;

Figure 2 is a vertical sectional view taken substantially along line II—II of Figure 1, and illustrating the body construction;

Figure 3 is a side elevational view of a mechanism for practicing the method of the invention; and,

Figure 4 is a detailed perspective view of the inner shell or liner for the body of the toy.

As shown on the drawings:

As particularly illustrated in Figure 1, the riding toy is provided with a body 11, shown in the shape of a horse. The body is formed of a plastic material which may be shaped in the configuration of other toy riding figures.

The riding body 11 is supported on a stand 12, and is connected to the stand by laterally extending tensioned springs 13 and 14 at one side of the horse, and similar tensioned springs connected between the horse and uprights at the other side of the horse.

The horse body is provided with a head 16 mounted on a neck, which is integral with an intermediate section 17 of the body, which adjoins an integral tail section 18.

The body is formed of a plastic, such as a polyvinyl, which is lightweight, can be attractively colored and is well-suited to the formation of a shaped body. Although a thermo-setting plastic, such as polyvinyl, is a preferred material, it will be understood that other materials are well adapted to the formation of a shaped body, such as other plastics, or rubber materials. It is to be understood that the use of the term "plastic" throughout the specification and claims is to be interpreted as a material such as a plastic or rubber, which is relatively lightweight, is capable of being formed into a thin-walled figure of an animal with the body in itself being incapable of supporting the weight of the rider and stresses of the connecting members.

A salient feature of the present invention is the combination of the outer plastic shell of the body with an inner shell liner 20 formed of a relatively strong material, such as sheet metal. The combination of the inner shell 20 and the outer body shell 21 provides a reliable and stable body which achieves the advantage of a plastic outer shell and yet obtains a safe structure which will not collapse or break under load.

The body assembly 11 is provided with lateral openings to receive cross rods or dowels 22 and 23. The inner ends of the springs 13 and 14 are suitably connected to the ends of the dowels, and are connected at their other ends to uprights 24 and 26, extending upright from a base 25, which is part of the stand 12. Similar uprights are located at the other corners of the stand, and have springs connected to their upper ends to be secured to the other ends of the dowels 22 and 23.

The body of the horse is shaped so as to provide a seat or saddle 19. The child riding the horse, straddles its body, and sits in the saddle 19 and grips a hand-gripping rod 27, which passes transversely through an opening in the head 16 of the horse. In riding, the child will transfer portions of his weight, and exert forces on the hand grip 27, creating stresses in the neck 28 of the horse. A feature of the present invention is the provision of a stabilizing and strengthening arm 49, which is secured to the inner shell 20, and also which mounts the hand-gripping rod 27, thereby preventing breakage and collapsing of the horse's neck.

The inner liner shell is shown in detail in Figure 4 before it is assembled with the outer plastic shell 21. The shell 20 is shaped to conform to the intermediate section 17 of the body of the horse, and provide a supporting surface for the outer plastic shell.

As will be noted in Figure 2, the plastic shell 21 has an outer layer 21a which lies on the outer surface of the inner shell 20. The plastic is also formed with an interior layer 21b, which is formed during the molding process, as will be explained later. In the general description, the outer shell will refer to the outer layer 21a, which is the layer supported by the liner 20.

The liner 20 is formed of sheet metal, or a similar relatively strong material. While being conformed in the shape of the back of the horse, the liner has a general inverted U-shape or channel shape. An upper portion 29 is curved downwardly to join slightly curved side walls 31 and 32. The side walls terminate at lower edges 37 and 38, so as to leave an unsupported portion 40 of the outer shell between the edges 37 and 38.

The liner 20 is provided with pressed grooves 33, 34 and 36, which form inwardly extending ridges to strengthen the liner. The grooves extend vertically up each of the side walls 31 and 32, and over the curved top 29 of the liner.

The liner is provided with outwardly extending annular bosses or flanges 39, 41, 42 and 43. The bosses are arranged at the corners of the lower edges of the wall, and are horizontally spaced. The bosses form laterally extending openings 44, 46, 47 and 48, with the openings 44 and 47 opposite each other so as to receive the dowel 22 in the finished horse, Figure 1, and the openings 46 and 48 are opposite each other so as to receive the dowel 23. The dowels will substantially fill the openings in the liner, permitting limited lateral flexibility of the side walls of the horse to permit shifting and expansion and contraction of the plastic with use and with temperature change. The flanges and openings, however, also transmit the weight of the rider to the dowels 22 and 23, so that the plastic shell 21 does not carry the weight, and the weight is transmitted directly to the metal liner 20 and concentration of stresses occurs only in the liner.

Thus, while the shell provides rigid reinforcement, it has flexibility due to its separated lower edges which permit expansion and contraction of the plastic without cracking.

The forces and weight of the rider transmitted to the hand-gripping rod 27 are transferred directly to the liner by the strengthening or extension arm 49, which projects up through the neck of the horse. The arm has a lower part 50 which is secured directly to the liner, such as by welding, and an upper part 51 which carries a U-shaped bracket 52. The bracket has sides which are provided with annular flanges 53 and 54 which surround laterally opposed openings 56 and 57 for receiving the gripping rod 27. Since the rod fits snugly into the openings in the sides of the head of the horse, the rod 27 will directly strengthen the head and neck.

In the method of making of the body structure of the horse, a mold 58, Figure 2, is employed which coats with the liner 20, and receives and molds plastic material for completing the body. The mold 58 is formed in half-sections 58a and 58b, and is split down the center to permit separating the half-sections. On each side of the mold, and projecting inwardly from the inner surface thereof, are cylindrical bosses 59 and 61. These bosses fit into the openings of the annular flanges 42 and 39, respectively, to positively position the liner 20 with respect to the inner surface of the mold 58. Similar bosses are provided toward the rear of the mold to fit into the openings formed by the flanges 41 and 43.

A liquid plastisol is placed into the mold, and the mold is closed with the liner 20 in place. The plastisol is preferably of a thermosetting nature, and when the mold is heated, will jelly and harden on the inner surface of the mold. The mold is then moved about in a slush molding process so that the plastisol flows over the inner surface 60 of the mold. Since the liner 20 is held in a position positively spaced from the inner surface 60 of the mold, the plastisol fills the area between the liner 20 and the inner surface 60 to form the portion 21a of the outer shell 21. The plastisol will also build up on the mold surface to form the lower unsupported portion 40. As the plastisol builds on the inner surface 60 of the mold and fills the space outwardly of the liner, it will gradually, subsequently build on the inner surface of the liner 20 to form the layer 21b. The layer 21b may be maintained at a minimum thickness, depending upon the amount of plastisol filled into the mold. While the layer 21b is shown as substantially the thickness of the layer 21a, it will be understood that this thickness is not critical, and may be reduced to a minimum.

For causing the plastisol to slush within the mold 58 and for causing it to jelly, the mold is heated and is supported for rotation in a compound manner about two axes. In the mechanism illustrated in Figure 3, the mold 58 and additional molds such as illustrated by the mold 64, are supported between supporting plates 62 and 63. The assembly is supported on a rotatable shaft 66 which is carried in a U-shaped yoke 67. The shaft 66 is rotatable and is supported across the ends of the yoke, and is driven by a connected driving bevel gear 68. The gear 68 is driven by a gear 69 mounted on a shaft 71 which leads coaxially to the interior of an outer hollow tubular shaft 72, the outer shaft 72 providing the support for the yoke 67. The tube is supported on bearing brackets 73 and 74 mounted on a base 76, and internally and relatively rotatably supports the inner shaft 71. The tube 72 and inner shaft 71 are independently driven, and the tube carries a sprocket 77 and the shaft carries a sprocket 78. The sprockets are respectively driven by chains 79 and 81, which are driven in different directions at different speeds to cause rotation of the molds 58 and 64 about the two support axes.

When the material all has jelled and hardened within the mold, the mold halves 58a and 58b are split to remove the completed body with the embedded inner liner 20 within the outer shell 21.

In operation, the rider mounts the body 11 of the horse, illustrated in Figure 1, and bounces up and down with expansion and contraction of the supporting springs

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13 and 14. The weight of the rider is transmitted from the outer shell of plastic 21 directly to the shaped sheet metal inner shell or liner 20. This weight is carried on the dowels 22 and 23 which have bearing points within the annular flanges 39, 41, 42 and 43 on the shell, thus creating no points of stress concentration in the plastic. Additional forces from the rider are transmitted through the hand-gripping rod 21 to the extension arm 49, passing up through the neck of the horse, the arm being secured directly to the shell 20, and thus transmitting forces down through the shell to the supporting dowels 22 and 23.

It is to be particularly noted that while the inner liner or shell 20 is relatively strong and rigid, it affords flexibility to the body of the horse in that the lower edges 37 and 38 of the shell are spaced and an unsupported plastic portion 40 extends therebetween. This will assimilate shock and stress due to the rider's actions.

It is also to be noted that the plastic outer shell 21 and the metal liner 20 have a different coefficient of thermal linear expansion. This is completely accommodated and compensated for by the break in the liner 20 which does not extend completely around the tubular plastic intermediate section 17 of the horse, but which terminates at the spaced edges 37 and 38. Thus, no internal stresses will be caused with temperature change.

The construction makes it possible to utilize the advantages of plastic in the ease of molding, the adaptability to the use of permanent color, the light weight, and the relative softness of various plastics, while still obtaining a body which is completely rigid and safe. A relatively thin shell of plastic may be used, thereby reducing the weight of the body, and the weight required for strength is concentrated in the inner shell which is closer to the center of gravity of the horse, thereby permitting a greater flexibility in design of the characteristics of horse action on the spring supports.

Thus, it will be seen that we have provided an improved riding toy structure and an improved method of making the structure which meets the objectives and advantages hereinbefore set forth.

We have, in the drawings and specification, presented a detailed disclosure of the preferred embodiment of our invention, and it is to be understood that we 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 our invention.

We claim as our invention:

1. A resiliently suspended toy such as an artificial horse adapted to be ridden by a child comprising an outer plastic shell shaped to form a toy figure of light-weight hollow construction with walls shaped to form a seat for the child at the top and forming the head of the toy figure at one end and the tail of the toy figure at the other end and an intermediate body section, said walls curving downwardly to form the body section in a generally tubular form, an inner liner shell formed of a sheet metal positioned within said body section in supporting surface engagement with the inner surface of the body section and with the side walls of the liner terminating along a lower edge to form a gap across the base of the side walls to accommodate unequal thermal expansion of the plastic shell and liner shell, openings formed in the side wall of the inner shell, supporting rods projecting horizontally through said openings, a supporting stand for the toy, uprights on the supporting stand, and tensioned supporting springs connected to the uprights and connected to the supporting rods to form a stably resiliently suspended toy whereby the weight of the rider will be transmitted to said stand through the inner shell and supporting rods.

2. In a spring suspended toy to be ridden by a child and particularly adapted to be stably suspended by springs connected to supporting uprights comprising a

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toy figure formed of a hollow outer plastic shell shaped to form the figure of an animal or the like with a hollow body and head and shaped to form a saddle whereby the toy may be straddled and ridden by a child, an inner reinforcing shell formed of shaped sheet metal in the form of an inverted channel positioned to be in surface supporting engagement with the inner surface of the outer shell, horizontally spaced annular flanged bosses projecting outwardly from the inner shell and open to the side wall of the outer shell and positioned in lateral opposition on the two side walls and projecting through the outer shell, laterally extending rods extending through the openings formed by said flanged bosses, a base having spaced uprights, tensioned spring supports secured to said uprights and secured to said rods for resiliently suspending the toy figure, an arm secured to said inner liner projecting upwardly into the hollow head of the outer shell, a gripping rod extending laterally through the head of the shell, and means securing said gripping rod to said arm whereby the weight of the rider is transmitted to the inner shell from the outer shell and the force of the rider gripping the gripping rod is transmitted to said inner shell by said arm.

3. A riding toy adapted to be supported and to be ridden by a child comprising a light-weight hollow plastic fabricated shell formed of thin walls shaped to the figure of a riding toy, means defining a riding seat at the top of the hollow plastic shell for supporting a child, a light-weight reinforcing shell formed of a relatively rigid material within said plastic shell, and means for supporting said shells.

4. A riding toy particularly adapted to be mounted and ridden by a child comprising an outer thin-walled shell shaped to form a toy body for riding by a child and incapable in itself of reliably supporting the weight of a child, means on the outer shell providing a seat for the child, an inner shell shaped to conform to the configuration of the inner surface of the outer shell and being in overall surface contact therewith, the inner shell having a strength adequate to reliably support the weight of a child and providing a reinforcing backing for said outer shell, and means for supporting said shells in a position for riding.

5. A riding toy particularly adapted to be mounted and ridden by a child comprising an outer thin-walled shell formed of a plastic material incapable of reliably supporting the weight of a child by itself and having a generally hollow tubular shaped body portion extending in a horizontal position, seating means on the tubular body portion providing a riding seat for the child, a thin-walled inner shell supportingly engaging the inner surface of the outer shell over the top and side walls of the outer shell and having a different coefficient of thermal linear expansion than the outer shell, said inner shell having separated edges terminating along said side walls so that the outer shell can expand and contract with temperature change to change the circumferential size of the tubular body without substantial restriction by the inner shell, and means for supporting said shells in a position for riding.

6. A riding toy particularly adapted to be mounted and ridden by a child comprising an outer thin-walled shell formed of a plastic material incapable of reliably supporting the weight of a child by itself and having a generally hollow tubular shaped body portion extending in a horizontal position, a thin inner channel-shaped metal shell extending within the outer shell and in supporting and shape-defining surface engagement with the outer shell and with the edges of the channel projecting downwardly to provide an unsupported free area of the inner shell on the underside of the body which can flex with forces on the supported area of the outer shell, and means for supporting said shells in a position for riding.

7. A riding toy particularly adapted to be mounted

and ridden by a child comprising a body member including an inner shell and an outer shell, said outer shell formed of a thin-walled plastic material incapable in itself of reliably supporting the weight of a child and shaped to form a toy riding figure with a head end and a tail end and an intermediate riding section, said riding section having an upper rounded portion curving downwardly to join rounded side wall portions, said inner shell formed of a thin flexible sheet metal with an upper curved portion and side wall portions terminating at edges along the bottom of the side wall portion and being in surface supporting engagement with the inner surface of the outer shell, means for forming a riding seat on the upper rounded portion of the outer shell, and means for supporting said shells in riding position.

8. A riding toy adapted to be movably suspended for riding by a child comprising a toy figure formed of a light-weight plastic material with thin walls shaped to form a toy figure with a head end and a tail end and with an intermediate hollow body section adapted to be mounted and ridden by a child, means defining a saddle at the top of the body section for receiving a child, said intermediate section forming an outer shell being tubular in shape and extending horizontally from the head end to the tail end, a shaped sheet metal inner shell positioned within the intermediate section and in surface engagement with the inner surface of the outer shell to form a support therefor, said inner shell having integral reinforcing ridges formed thereon, and means for attaching said shells to a support for carrying the toy figure in riding position.

9. A riding toy adapted to be movably suspended for riding by a child comprising a toy figure formed of a light-weight plastic material with thin walls shaped to form a toy figure with a head end and a tail end and with an intermediate hollow body section adapted to be mounted and ridden by a child, means defining a saddle at the top of the body section for receiving a child, said intermediate section forming an outer shell being tubular in shape and extending horizontally from the head end to the tail end, a shaped sheet metal inner shell positioned within the intermediate section and in surface engagement with the inner surface of the outer shell to form a support therefor, said inner shell formed with inwardly formed grooves extending up the sides of the inner shell and over the top beneath said saddle, and means for attaching said shells to a support for carrying the toy figure in riding position.

10. A riding toy body particularly adapted for being movably supported to be ridden by a child, the toy comprising a hollow thin-walled outer shell shaped in the form of a toy figure such as an animal with a central body section and with a tail end and a head end having a neck and head projecting from the body section, a rigid liner within the body section, a rigid projecting member extending upwardly through the neck and into the head of the body and secured to the liner, means for securing said projecting member to the head for rigidly supporting its position relative to the body section, and means for supporting the toy figure in riding position.

11. A toy figure to be ridden by a child and particularly adapted for movable suspension comprising an outer shell having an intermediate body section, a tail section, and a head section and formed of a thin-walled material and incapable of rigid support of a child by itself, the outer shell shaped in the form of an animal or the like with the head section in the shape of a neck and head of the animal, a hollow inner shell within the body section shaped to conform to the inner surface of the outer shell and in surface supporting engagement therewith, the inner shell formed of a rigid material capable of bearing the weight of a riding child, an arm rigidly secured to said inner shell and projecting up into the head section of the animal and connected in supporting relationship to the

head whereby the position of the head is rigidly related to the body section, and means for connecting said inner shell to a support for mounting the toy.

12. A toy figure particularly adapted to be movably supported and ridden by a child comprising a hollow outer shell formed of a plastic thin-walled material and incapable by itself of supporting the weight of a child and formed in the shape of an animal or the like to be ridden, an inner shell formed of a relatively strong material capable of supporting the weight of a child and in inner surface supporting contact with the outer shell, means defining openings in said inner shell and extending in a lateral direction, and supporting dowels projected through the openings whereby the forces caused by the weight of the rider are carried on the supporting dowels and are transmitted to the sides of said openings by the dowels and directly to the inner shell.

13. A reinforcing structure for a riding toy particularly adapted to be movably suspended and ridden by a child and formed with a thin wall constructed of a plastic, the device comprising a thin shell formed in an inverted channel shape with a curved downwardly facing upper wall joining curved downwardly extending side walls, and a pair of laterally spaced annular flange projections extending outwardly in each of the side walls of the shell with openings therethrough, said projections adapted to extend through the plastic of the wall of the riding toy and receive dowels whereby the shell will transmit the stresses of the weight of the riding child from the shell to the dowels and whereby the position of the plastic wall will be fixed with respect to the liner.

14. A riding toy in accordance with claim 3 in which the reinforcing shell extends down within the sides of the plastic shell as well as beneath the riding seat.

15. A riding toy in accordance with claim 3 in which said reinforcing shell is formed of material arranged in a layer of substantially uniform thickness with a smooth outer surface and presents a continuous surface at substantially all locations to engage the inner surface of the outer shell.

16. A riding toy body particularly adapted for being movably supported to be ridden by a child, the toy comprising a hollow thin-walled plastic outer shell shaped in the form of a toy figure such as an animal with a central body section and with a tail end and a head end having a neck and head projecting from the body section, a rigid liner within the body section, a rigid projecting member extending upwardly through the neck and into the head of the body and secured to the liner, means for securing said projecting member to the head for rigidly supporting its position relative to the body section including a hand gripping rod extending laterally of said projecting member and extending through the plastic head of the toy figure, means defining a laterally extending opening in said projecting member having a surface relatively rigidly surrounding the center section of the rod and supporting the rod so that stresses on the head and neck of the horse will be transmitted through the rod and projecting member to said liner, and means for supporting the toy figure in riding position.

17. A riding toy body particularly adapted for being movably supported to be ridden by a child, the toy comprising a hollow thin-walled plastic outer shell shaped in the form of a toy figure such as an animal with a central body section and with a tail end and a head end having a neck and head projecting from the body section, a rigid liner within the body section, a rigid projecting member extending upwardly through the neck and into the head of the body and secured to the liner by being connected to a substantially flat surface of the liner to project forwardly thereof, means for securing said projecting member to the head for rigidly supporting its position relative to the body section including a laterally extending opening at the upper end of the projecting member with a rod extending therethrough and snugly held therein to extend

through the sides of said head, and means for supporting the toy figure in riding position.

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