Dec. 27, 1932. J. L. KALLUS 1,892,278

LIMB FOR TOY FIGURES

Filed March 31, 1931

Fig. 1.

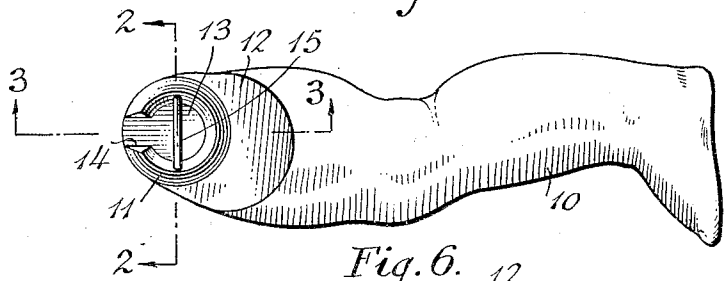


Fig. 6.

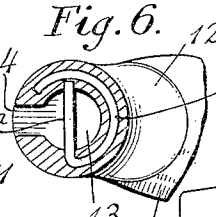


Fig. 2.

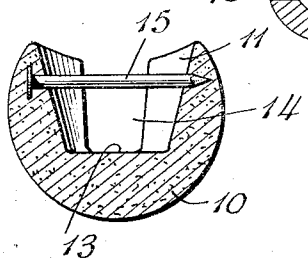


Fig. 3.

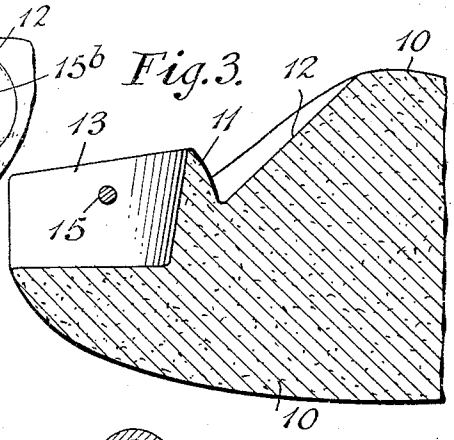


Fig. 4.

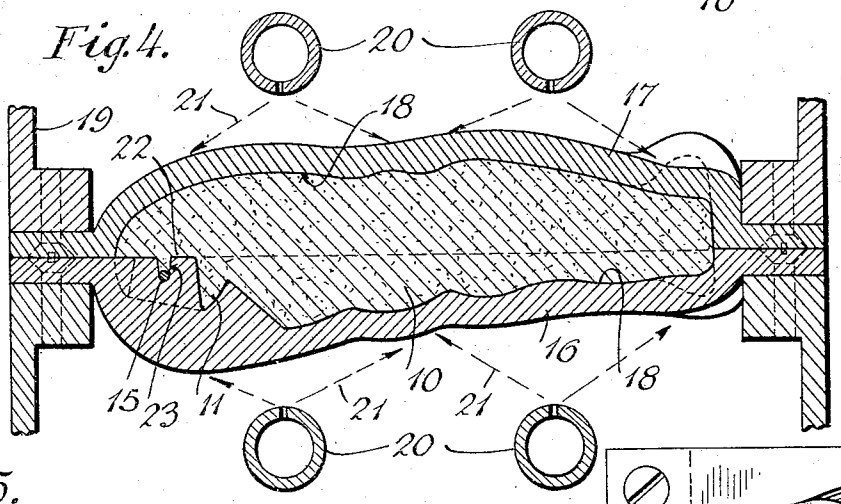


Fig. 5.

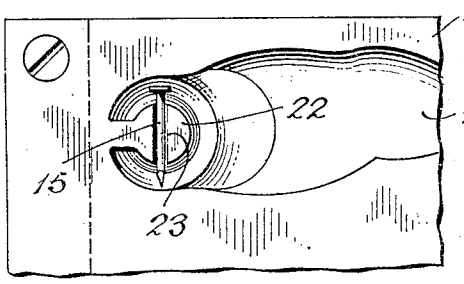
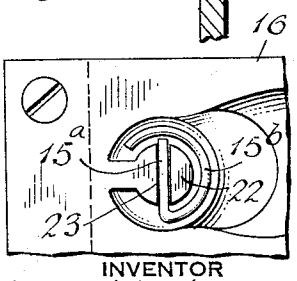


Fig. 7.



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UNITED STATES PATENT OFFICE

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LIMB FOR TOY FIGURES

Application filed March 31, 1931. Serial No. 526,624.

My invention relates to limbs and other members for toy figures such as dolls, toy animals and the like and more particularly to toy figures of the type which include movable limbs and other members such as heads and independently movable hands and feet, made of molded material which in its final condition is relatively hard and brittle. In many instances such limbs and other members are movably secured in place by elastic devices generally in the form of elastic cords which are secured to said limbs and other members and by their tension serve to maintain the limbs and other members in movable connection with the body of the figure or its equivalent. The connection between the elastic cords or their equivalent with the limbs and other members is usually effected by means of a pin which in customary forms of the limb or other members in question extends transversely across a recess with which the limb or other member is provided. The pin, which constitutes an attaching device, in its most common form comprises a small nail or brad which is driven into place after the limb or other member has been molded and baked or otherwise brought to its final hard condition. Because of the nature of the material of which the molded limb or other member is made, the latter in its baked or otherwise hardened condition, is brittle, particularly at the recess thereof, so that the aforesaid operation of driving the nail through and into the material, across said recess, very often results in breakage of or other injury to the limb or other member. The conventional method of combining the usual attaching device, that is the nail, with the limb or other member accordingly is responsible for considerable waste and consequent reduction in production and corresponding increase in the cost thereof.

The invention contemplates the provision of a novel form of limb or other member, in which the aforesaid and other existing objections and disadvantages are overcome, by combining the attaching device or pin with the limb or other member during the molding thereof and fixing said device or pin in place by the baking or other hardening process by which the limb or other member is brought from a plastic to a hardened condition.

Another object of the invention is to provide a novel form of attaching device which, in addition to its other functions, constitutes a reinforcement whereby breakage of the limb or other member as a result of strains developed by the elastic cords or their equivalent is obviated.

The invention has for its further object the provision of a novel mold whereby the aforesaid combination of the attaching device or pin with the limb may be effected in a simple and efficient manner and without interference with the removal of the molded limb from the mold.

The invention will be fully described hereinafter. and the features of novelty will be pointed out in the claims.

In the accompanying drawing which shows an example of the invention without defining its limits, Fig. 1 is a view showing a doll's limb with the novel features embodied therein; Fig. 2 is a detail section on the line 2—2 on an enlarged scale; Fig. 3 is a fragmentary section on an enlarged scale on the line 3—3 of Fig. 1; Fig. 4 is a fragmentary sectional view of the molding means embodying the novel features; Fig. 5 is a fragmentary face view of said molding means; Fig. 6 is a fragmentary view illustrating a novel form of attaching device embedded in a doll's limb, and Fig. 7 is a fragmentary view of the novel molding means with such novel attaching device in place therein.

While the invention has been illustrated and is hereinafter described with relation to the leg member of a toy doll, it is to be distinctly understood that this is not to be construed as a limitation, and that the invention is equally well adapted for use in connection with the arms of a doll, and with other members thereof, such as the heads, independently movable feet, etc., and with the limbs and other members of other toy figures, such as toy animals and the like.

In the illustrated examples, the limb comprises a section 10 of the required shape and characteristics depending upon the type of

the limb, which at one end is provided with a circular projection 11, and in the specific form illustrated, includes an inclined end portion 12 at the base of which said projection 11 is located. The latter is provided with a recess 13, and with an open slot 14 located in the periphery of the projection 11 in open communication with the recess 13 thereof; in other words, in the finished state the projection 11 is of an annular form and constitutes the wall of the recess 13. In the form shown in Figs. 1–5 inclusive, an attaching device in the form of a pin 15 of metal or other rigid material has its opposite ends embedded in the projection 11, and extends transversely across the recess 13 in transverse registry with the slot 14. The pin 15 functions as an attaching device, to which the customary elastic cords are attached in the conventional manner for movably fixing the limbs in position upon or in connection with the body of the figure of which the limbs form a part.

In existing arrangements, it has been customary to use a small nail or brad for the pin 15, and to drive the same through the projection 11 and diametrically across the recess 13, after the limb 10 has been completed. Because of the fact that limbs of the type under discussion are molded to shape, and then baked or otherwise hardened, said limbs in their final condition are relatively hard and brittle, which characteristic is accentuated in the projection 11 because of its recessed form. The operation of driving the pin 15 through and into the wall of the projection 11 and across the recess 13 thereof therefore very often resulted in fracture of said projection 11 whereby the particular limb is rendered useless and considerable waste of material results. Inasmuch as this breakage at the indicated point was of comparatively frequent occurrence, the loss by waste of material and the cost of production of those limbs which remained uninjured was correspondingly increased.

To overcome these objections and difficulties the opposite end portions of the pin 15 are embedded in the material of which the projection 11 is constructed, while said material is in a plastic condition, so that said pin is firmly fixed in position in said material after the limb has been baked or otherwise brought to its final hardened condition.

The embedding of the opposite end portions of the pin 15 in diametrically opposed parts of the projection 11 is preferably accomplished during the molding of the limb 10, for instance, in the mold illustrated in Figs. 4 and 5 of the drawing. The mold in question comprises two sections 16, and 17, each provided with a molding chamber 18 complemental to each other and adapted to define a molding space shaped to properly mold the limb 10. The two mold sections 16 and 17 are fixed together in any conventional way in a chamber 19, which also includes heat developing devices of any customary form. In the illustrated example, these devices comprise gas burners 20, located in proximity to the mold sections 16 and 17 in such relation that the flames 21 from said burners 20 will be effective to heat said mold sections 16 and 17 to thereby bake the molded limb 10 to its final hardened condition. To produce the circular or annular projection 11 with its recess 13 and communicating slot 14 in the limb 10, an upright boss 22 of the desired shape and dimensions is located at one end of the molding chamber 18 or at any other predetermined corresponding point, dependent upon the nature of the limb being produced. The boss 22 is provided with means for removably accommodating a pin 15, which means in the illustrated example comprises an upwardly open slit 23 extending diametrically across the boss 22, as shown in Fig. 5.

In practice, when it is desired to produce a limb in the mold 16—17, the pin 15, which as shown may comprise a small nail or brad, is laid in the slit 23, so as to project in opposite directions beyond the same, preferably to an equal extent, after which the plastic material of which the limb is constructed is placed in the molding chamber 18, so as to completely fill the same and the space in the slit 23 above the pin 15. The complemental section 17 also filled with the plastic material is then placed in position upon the section 16 and fixed in place as indicated in Fig. 4, after which the gas burners 20 are ignited to bake the material contained in the mold to its final hardened condition. After the baking process has been completed, the mold sections 16 and 17 are separated, for instance, by lifting the section 17 away from the section 16 so as to temporarily leave the molded and baked limb 10 in the section 16. The limb 10 may then be removed from the section 16 in any suitable manner, the pin 15 during this operation being free to pass upwardly out of the slit 23, without interference. As a result of these operations, the end portions of the pin 15 are firmly embedded in the projection 11 at diametrically opposite points thereof and all possibility of injury to said projection is accordingly avoided. Subsequent to its removal from the mold, the limb 10 may be subjected to any finishing or other treatment customarily used in connection therewith.

The molding of the pin 15 in position as described not only avoids the possibility of injury to said projection 11, but also securely fixes said pin 15 therein against any relative movement. Toy figures of the kind to which the present invention relates are handled for the most part by children as toys, and the limbs thereof are continuously shift-

ed to different positions in accordance with the whims of children, so that many varieties of strains and stresses are developed upon said pins 15 by the elastic cords or other tension devices whereby the limbs are secured to the body of the toy figure. When as formerly has been the case, the pins 15 have been driven through the projection 11, said pins in their passage through the projection develop a boring action and produce holes in said projections 11, which are slightly larger than the diameters of the pins themselves. The aforesaid strains or stresses under such conditions cause relative movements of the pins 15 in the projections 11 which very quickly injure and destroy the projections 11 whereby the limbs are rendered useless and broken away from the body of the toy figure. The firm and closely fitting connection, which is secured between the pins 15 and the projections 11 in the instant case absolutely prevent any relative movement of the pins 15 and thereby avoid injury from the above causes and consequently result in an increased efficiency and a prolonged period of usefulness of the toy figure in which the improved limb is incorporated.

In the form shown in Figs. 6 and 7, the attaching device, instead of comprising a pin for instance in the form of a small nail or brad, consists of a round device embedded in the material and approximating the form of the projection 11; in the illustrated example the device comprises a preferably metallic pin 15^a and an integral continuing member 15^b extending from one end of said pin and curved in an arc corresponding to the circular or annular shape of the projection 11 or otherwise constructed to conform to the shape thereof. When the illustrated form of the device is combined with the limb 10 or other member, the pin 15^a extends diametrically across the recess 13 as in the form first described, with its opposite end portions embedded in the material of which the projection 11 is made, and with the member 15^b also embedded therein, as illustrated in Fig. 6. The attaching device 15^a—15^b in its illustrated form is so dimensioned that the member 15^b extends from the one end of the pin 15^a into close proximity to the slot 14, as also shown in Fig. 6. With this arrangement the pin 15^a serves as an attaching device as in the form shown in Fig. 1, while the member 15^b constitutes a reinforcing member whereby the projection 11 is strengthened against breakage; at the same time, the device 15^a—15^b develops an increased holding connection with the projection 11 and is capable of resisting maximum strains tending to pull said device from the projection 11, whereby said attaching device is firmly anchored in said projection.

The embedding of the device 15^a—15^b in the projection 11 is preferably accomplished also during the molding of the limb or other member, for instance, in a mold similar to the one illustrated in Figs. 4 and 5. In other words the pin 15^a laid in the slit 23 as in the first form with the member 15^b located in the mold cavity surrounding the boss 22 as shown in Fig. 7. The plastic material to form the limb or other member is then introduced into the mold sections in the manner previously set forth after which the molding and hardening processes may be carried in the same way as set forth hereinbefore.

With the novel arrangements set forth, the heretofore existing wastage is completely eliminated, and the cost of production is therefore materially reduced; at the same time, production is also brought to a maximum point with a minimum of equipment to provide a construction of maximum efficiency and strength. It will be understood that in practice the molding equipment generally comprises a battery of molds in which a plurality of limbs are coincidentally molded and simultaneously baked to a finished condition. It will further be obvious that the molded limb may be brought to a hardened condition by means other than the baking arrangement illustrated in Fig. 4.

The novel features, in addition to their effectiveness in connection with the illustrated doll's limbs, may be incorporated with equal efficiency in the arms, and independently movable feet of dolls and other members thereof, such as the neck portions of the doll's heads, and with the limbs and other members of toy figures of other types such as toy animals and the like. In addition, the recesses 13, projections 11 and associated elements, together with the attaching means may comprise parts of the bodies of the dolls and other toy figures, instead of being incorporated in the limbs or other members thereof.

While the novel features are particularly adapted for use in connection with molded materials which in their final conditions are hard and brittle, they may also be utilized in combination with molded materials which in their final condition are other than hard and brittle but which are subject to destruction and injury under developed strains and stresses such as pulling forces.

Various changes in the specific forms shown and described may be made within the scope of the claims without departing from the spirit of the invention.

I claim:

1. A limb for toy figures comprising a section of molded material, an annular projection molded at one end of said section and constituting the wall of a recess, and an attaching device having a portion embedded in said projection and a continuing portion in open registry with said recess to constitute an attaching means, said embedded portion being molded in place and having a periphery

curved in accordance with the annular form of said projection.

2. A limb for toy figures comprising a section of molded material, an annular projection molded at one end of said section and constituting the wall of a recess, and an attaching device consisting of a curved member embedded in said projection and an integral continuing member extending from said curved member diametrically across said recess to bridge the same and having portions embedded in said projection, the embedded portions of said attaching device being molded in place.

In testimony whereof I have hereunto set my hand.

JOSEPH L. KALLUS.