

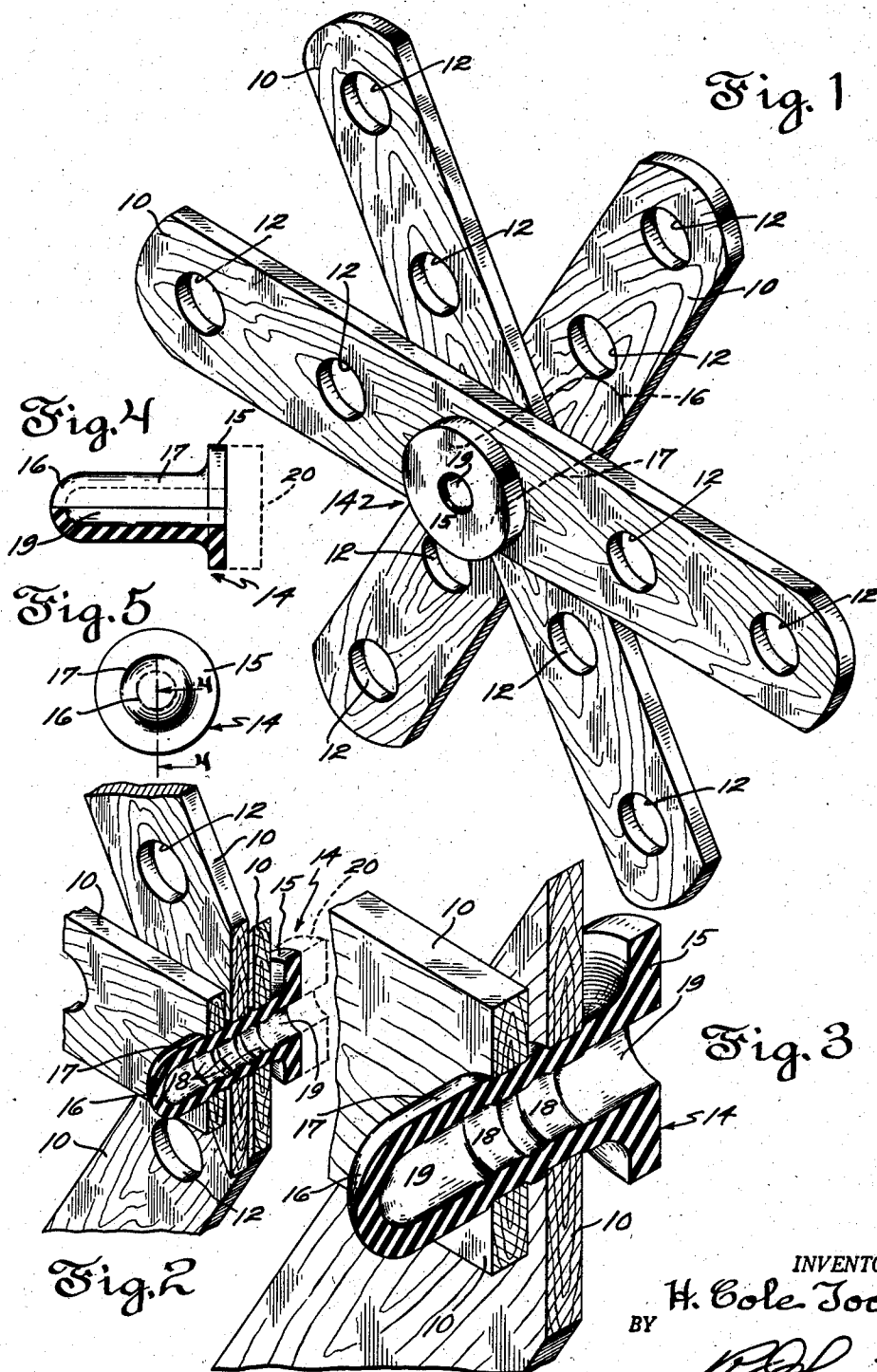
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H. C. TOOMS

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COUPLING PIN FOR TOY PARTS

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INVENTOR,
H. Cole Tooms,
BY
W. Smith
ATTORNEY.

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COUPLING PIN FOR TOY PARTS

H. Cole Tooms, Memphis, Tenn., assignor to The
A. C. Gilbert Company, New Haven, Conn., a
corporation of Maryland

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This invention relates to separable joints involving an improved pin for temporarily coupling together by frictional engagement, for relative pivotal movement if desired, a choice of interchangeable constructional toy members.

In the sets of cheaper and more elementary forms of structural toys the component parts of the built-up toy, such as may include parts representing a girder of a building, trusswork of a bridge, beam of a derrick, arm of a doll, etc., are often provided with one or more coupling anchorage holes whereby a plurality of interchangeable toy parts may be fastened quickly together in various relationships by inserting through selected holes in such parts a single coupling pin which in some cases may serve as a pivotal hinge pin. For such use the coupling pin needs to be readily and easily pushable endwise into such holes and as easily removed therefrom with or without the use of tools and without requiring more strength than can be exerted by a child's fingers.

It has been proposed heretofore to use for this purpose split wooden pins which somewhat resemble in miniature a clothespin in that they have a shank split or bifurcated for only part of its length, the split therein opening outward through only the entering end of the pin. The opposite end of such pin is made solid and firm and sometimes enlarged so that it can be grasped by an operator's fingers for manipulating the pin and moving its entering end into and out of selected coupling holes in chosen constructional toy pieces. This type of coupling plug gives unsatisfactory performance partly because the prongs of its bifurcate shank at either side of the split remain individually straight and stiff as they spring together or spread apart at the entering end of the pin. The ability of such prongs to spring together or spread at the base of the split is nil. Thus the effective exterior shape of such kind of pin is most often tapering or conical. Since it is desirable in this kind of toy that the pin receiving holes in the different toy parts be of uniform size, it follows from the foregoing that one of such toy parts must always have a looser or tighter fit on a coupling pin of the afore-described "clothespin type" than does an adjacent toy part embracing the same pin.

It is an object of this invention to provide an improved kind of pin for pivotally or otherwise coupling together constructional toy members which pin may be pushed easily through a plurality of selected holes of uniform size in a plurality of chosen constructional toy parts and then

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exert a uniform tightness of frictional fit in each such hole simultaneously.

A related object is to provide a frictional coupling pin having a shank capable of inward diametrical compression in each of separate or localized sections of the axial length of the shank with resilient tendency automatically to resume its original girth in each of said sections substantially unaffected by compression of the pin shank at any other of such localized sections of its length.

A further object is to make use of this improved kind of pin as a hinge pin for pivotally coupling toy parts together in a manner to resist the relative swinging movement of each coupled part with equal resistive frictional force.

These and related objectives are explained in greater detail in the following description of a satisfactory embodiment of the invention, said description having reference to the accompanying drawing wherein:

Fig. 1 is a perspective view drawn on an enlarged scale showing three elementary constructional toy parts pivotally coupled together by a pin embodying the present improvements.

Fig. 2 is a view like Fig. 1 showing the parts in section on a vertical diametral plane passing through the longitudinal axis of the pin.

Fig. 3 is an enlarged view similar to Fig. 2 showing in clearer detail the nature of the localized inward yielding of the shank of the pin at separate localized sections of its axial length.

Fig. 4 is a side view of the pin shown partially in central vertical section separated from other structure, the section plane being at 4—4 in Fig. 5.

Fig. 5 is a view looking in an axial direction at the entering end of the pin.

In Fig. 1 toy members which may be interchangeably assembled in selective relationship are represented by the thin bars 10 which may be of wood or other firm or rigid material and each of which is provided with a plurality of circular coupling holes 12 of preferably uniform size. Since any hole in each member may selectively be placed in co-axial alignment with any hole in a chosen companion member, my improved coupling pin 14 can be grasped by means of its enlarged head 15 and its entering end 16 thereby pushed straightway through aligned holes 12 in a plurality of members 10 to any desired extent. When thus inserted the pin 14 will possess a clinging fit of equal tightness with respect to the hole bordering edges of the rigid material in each of the side-by-side toy members by which

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it is embraced owing to its particular physical characteristics which are novelly made use of in these improvements.

This desired result is obtained by providing the pin 14 with a shank 17 of resilient material that is of uniform cross-sectional size or girth throughout its length and sufficiently soft at all points in its length to yield inward at any separate localized spot or ring-like section as 18 when squeezed or transversely compressed in such section by an embracing toy member 10, it being understood that shank 17 is slightly oversize in relation to the size of the holes 12 so as to exceed the cross section thereof. For insertion in a 1/4" diameter round hole the shank may have an outside cylindrical diameter of slightly more than 1/4". The cross-sectional or profile shape of hole and shank may be oval or of any desired geometrical shape so long as the shank is slightly oversize in relation to the hole.

Fig. 4 shows that shank 17, when not squeezed by any embracing toy member, may be smoothly cylindrical or otherwise uniform in girth nearly throughout its length. Figs. 2 and 3 indicate at 18 separate slight inward ring-like bulges that may be enforced on the tubular wall of shank 17 when it is transversely squeezed and separately bedded into by the embracing toy members 10 which it serves to couple together.

By making shank 17 of compressible resilient material, such as rubber, each of the locally yielding sections 18 will tend individually to assume its original girth or uncompressed external size shown in Fig. 4. This enables shank 17 to fill different holes 12 in a plurality of the toy members 10 as shown in Figs. 2 or 3 and to exert sufficient outward or expansive pressure in each such hole simultaneously to set up an equal degree of frictional cling between the shank and each of the toy members embracing it.

While I might make coupling pin 14 soft and resilient by forming it of resilient cellular material such as sponge rubber in solid rather than hollow fashion, I find that suitably soft grades of soft resilient solid rubber produce a pin that will operate successfully particularly if the undivided shank is made hollow or tubular and preferably shaped like a nipple composed of a cylindrical wall of solid resilient rubber integral with a resilient distortable undivided cross wall which forms a tapering closed entering end 16 of the pin and providing a hollow interior space or cavity 19 opening through the head 15 and extending lengthwise of the pin past a plurality of the individually yieldable localized body sections 18.

Broken lines 20 in the drawing indicate that the head 15 may be thickened axially to any desired extent for facilitating finger grasp of the pin, the preferred proportions of the head depending somewhat upon the cross-sectional size of the pin. Obviously the cavity 19 need not open through the head end of the pin but when it does, the increased bodily size of the pin head affords firmness to keep the handle end of the pin from collapsing when grasped for maneuvering the shank. Where the walls and head of a hollow

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rubber pin are not sufficiently firm to withstand manipulation as described, an undersized rod may be inserted in the hollow of the pin and be pushed against the pin nose 16 thereby to thrust the pin into place.

While rubber nipples as such are of course well known in various arts I believe that the hollow interior thereof has always been used to give entrance to some joined structure outside of or over which the tubular wall of the nipple has been fitted or stretched into place. The use of a hollow rubber nipple as a frictional holding pin to be compressed by joined structure within which it has an oversize fit is I believe new with these improvements and consequently the appended claims are directed to and intended to cover all substitutes for and variations of the structure and arrangements herein taught which fall within the most inclusive interpretation of the claim language.

I claim:

1. A toy constructing knockdown assemblage of separable toy parts comprising relatively movable toy members incorporating rigid material containing co-axially aligned coupling holes, and a hollow non-metallic coupling nipple having an undivided resilient tubular shank normally exceeding the cross section of said holes and extending straightway through a plurality of said holes in side by side toy members, the hole bordering edges of said rigid material where they contact said nipple squeezing and separately bedding into successive portions of said tubular shank which respectively occupy said holes in a manner frictionally to oppose relative movement of each of said members relative to said nipple.

2. A toy constructing knockdown assemblage of separable toy parts as defined in claim 1, in which the said coupling holes and the said shank are circular in cross section thereby to form a pivotal joint in which the said shank offers less frictional resistance to turning movement of the said members than to movements thereof in other directions relative to the said nipple.

3. A toy constructing knockdown assemblage of separable toy parts as defined in claim 1, in which the said undivided resilient tubular shank of the said hollow non-metallic coupling is reinforced at its hole entering end by a resilient distortable undivided cross wall having a bluntly pointed external contour yieldably reinforcing the tubular wall of said shank in a manner to facilitate forcing it endwise through the said holes.

H. COLE TOOMS.

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