July 10, 1951 V. C. HELBERG 2,560,290

HEADED AXLE OR ROD AND METHOD FOR MAKING SAME

Filed May 29, 1946

Fig. 1.

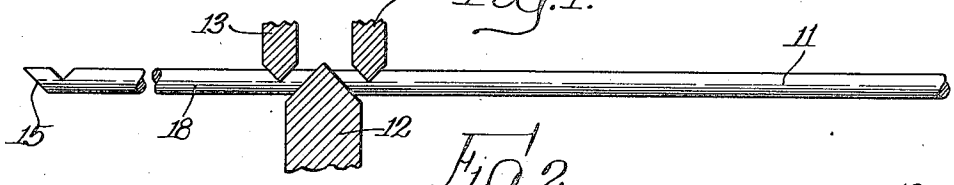


Fig. 2.

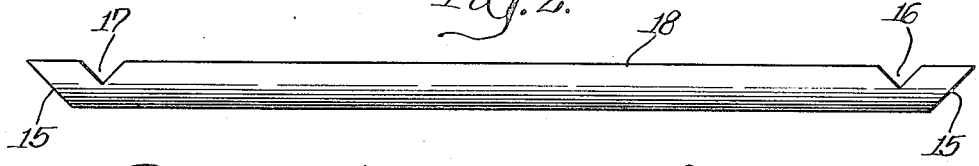


Fig. 3.

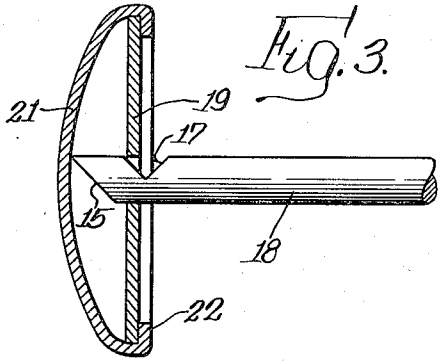


Fig. 4.

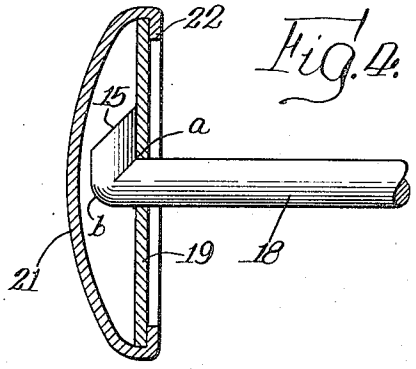


Fig. 5.

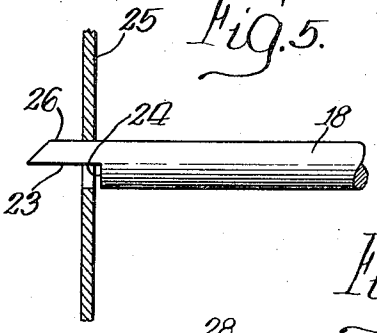


Fig. 6.

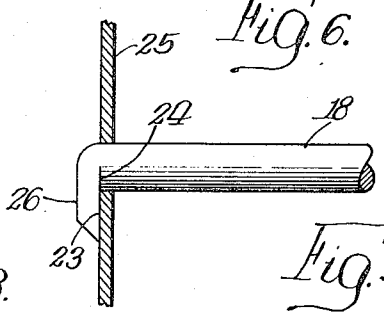


Fig. 8.

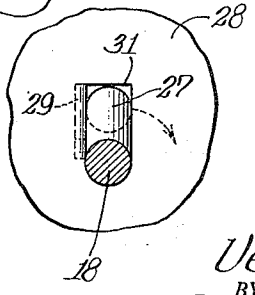


Fig. 9.

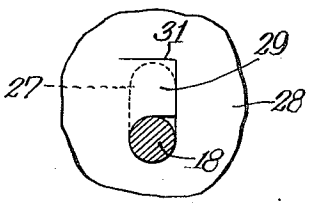
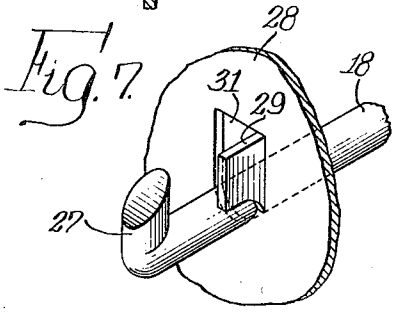


Fig. 7.



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HEADED AXLE OR ROD AND METHOD FOR MAKING SAME

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10 Claims. (Cl. 46—221)

1

This invention pertains in general to headed articles such as rods, pins, rivets and the like comprising an elongated body provided at one or both ends with a head and to a method of producing the same and assembling it with other elements in the manufacture of toys, hinges and other commodities.

I have here chosen to illustrate the principles of my invention in connection with the production of a toy axle assembly, although manifestly the same principles are applicable to the production of various other articles.

In toy vehicles such as wagons, carts, trucks and the like which I have selected as typically illustrating a use of my invention, the axles customarily consist in lengths of iron rods of suitable size upon which the wheels are rotatably mounted. The wheels are held against displacement from the axles either by riveting or upsetting the axle ends sufficiently to prevent the wheel holding washers from slipping over the ends, or the ends are drilled transversely for the reception of cotter pins by which such washers are held against displacement. The production of either of these assemblies is time-consuming and expensive.

The upsetting of the end of the axle involves the employment of a machine which will clamp the axle near the end and apply endwise pressure sufficient to produce the requisite upset. The placing of the axle in such a machine, the operation of the machine itself, and the unloading of the axle from the machine are all time-consuming.

The cotter pin assembly is also expensive as it involves the clamping of the axle so as to hold it against rotation while a drilling operation to produce the transversely extending cotter pin hole is carried out. This drilling operation is slow and time-consuming and results in the breakage of many drills and necessitates de-burring of the drilled holes.

The primary purpose of my present invention is to produce a headed axle, rod, pin or similar article without resorting to the objectionable practices of either upsetting the end of the article to produce a head or drilling the same to receive a cotter pin.

Another purpose of my invention is to provide for the rapid and economical assembly of my novel article with other associated elements into a rugged and durable structure.

For the purpose of facilitating an understanding of my invention I have illustrated on the accompanying drawings preferred embodiments

2

thereof, although it should be manifest that the forms shown are exemplary only.

Referring to the drawing:

Fig. 1 illustrates somewhat schematically the manner in which a stock rod is divided into suitable lengths and provided with notches of substantial depth near the ends thereof;

Fig. 2 is a plan view of a notched rod length thus formed;

Fig. 3 illustrates the first step in the assembly of such a rod length adapted to be used as a toy axle with a wheel hub or similar article;

Fig. 4 illustrates the complete assembly;

Fig. 5 is a view similar to Fig. 3 but illustrating a modified form of notch in the rod;

Fig. 6 shows the rod of Fig. 5 assembled as an axle with a plate or washer;

Fig. 7 is a fragmentary view showing still another method of assembly;

Fig. 8 is a view looking toward the left along the axle rod of Fig. 7; and

Fig. 9 illustrates the manner in which the rod is locked against withdrawal from the plate by restoring the outwardly extending flange of the plate to its original plane.

Referring now to the drawing more in detail, my invention contemplates the production of rod lengths suitable for use as axles or for other purposes from iron or other metal stock rods of suitable composition, one of which is designated in Fig. 1 by reference character 11. Such a rod is fed through a fabricating machine in the nature of a punch press, the feed of the rod being intermittent and the distance of feed in each instance being that of the length of unit desired. Between the feeding steps, the rod is operated upon by a plurality of tools consisting of the cutter 12 and the notchers 13 and 14. These tools are reciprocated in paths intersecting the plane of the paper at substantially right angles. The tool 12 severs the rod into lengths leaving the ends beveled or inclined as indicated at 15. The tools 13 and 14 cut the notches 16 and 17 of substantial depth so that a unit indicated by reference character 18 is in one passage through the machine cut to the proper length and notched near both ends ready to be headed or if preferred assembled at the same time with other associated elements of a structure or mechanism.

In Fig. 3 the unit 18 is shown in an initial stage of assembly with a plate member 19 which, in this instance, is a component part of a hub cap 21 of dome shape having its marginal edges inturned to provide a flange 22 embracing and retaining in position the plate member 19. This hub cap may

serve to retain a wheel (not shown) against displacement from the unit 18 which here serves as a toy vehicle axle.

To connect the hub cap to the axle 18, the axle is forced into the cap or the cap is pressed onto the axle with sufficient force to bend the projecting end of the axle by reason of the engagement of the inclined end surface 15 with the curved inner surface of the cap 21. The compressive force exerted upon the axle and the cap causes the projecting end to be bent until it forms a head projecting substantially at right angles from the axis of the axle in which position the notch is completely closed as illustrated in Fig. 4. A right-angled corner is thus provided between the body of the axle and the end which has been bent over to form the head. It will be observed that because of the notch a sharp bend is obtained and since the distance between the point *a* and the point *b* (Fig. 4) is greater than the diameter of the axle or of the opening in the plate 19, the plate member 19 cannot be tilted so as to clear the point *b* and become disconnected from the axle.

The notch therefore serves not only to make the bending of the rod much easier than it would be were the rod of full size, but it also enables a right angled interior corner to be obtained which would be impossible with the bending of an axle of full size.

In Figs. 5 and 6 a modification is disclosed in which the notch instead of having walls inclined with respect to the axis of the rod has one wall 23 parallel with said axis and the other wall 24 perpendicular thereto. When projected through an opening in the plate member 25 which may constitute a part of the hub element as in Figs. 3 and 4, or may simply be a washer, such member is locked on the shaft by the head 26, produced by bending the rod end into a position at right angles to the axis of the rod.

Another manner of anchoring a plate member on an axle or rod is disclosed in Figs. 7 to 9 inclusive, referring to which it will be observed that the rod 18 is notched and its projecting end 27 is bent to form a head disposed at right angles to the axis of the rod prior to being inserted through an opening in the plate member 28. In this instance the plate member 28 instead of having a round opening for the reception of the rod, has an elongated opening of sufficient size to permit the projection of the head 27 of the rod 18 therethrough. This opening is provided by cutting around three sides of an area of metal to form a tab 29 which is bent outwardly at substantially right angles to the plane of the member 28 as shown in Fig. 7, thereby permitting the passage of the bent-over end of the rod through the opening. One end of the opening 31 formed by cutting the tab is preferably rounded to accommodate the rod as will be apparent from Figs. 7 and 9. After the rod has been projected through the opening 31, it is turned in a clockwise direction viewing Figs. 8 and 9 until the head 27 engages the tab 29 and bends it downwardly or inwardly into its original plane, or, in other words, moves it from the position shown in Fig. 8 to that shown in Fig. 9 where it serves to lock the rod and the plate member in assembled relation.

It will be apparent from the foregoing that by notching a rod or the like in the manner indicated, the bending of the end of the rod into a position to serve as a head is greatly facilitated and made quite easy. Furthermore the notching

enables the formation of a sharp angle instead of a curve at the juncture of axle and the bent end. Such sharp angle precludes separation of the plate member from the rod which could readily take place if the rod were bent on a curve. The bending of the notched rod may itself serve to lock the assembled rod and plate member together, or for heavier work where the axle can best be bent before being projected through the plate member, resort may be had to the type of anchorage disclosed in Figs. 7, 8 and 9.

For many purposes a head at one end only of a rod unit is desired. In such cases one of the notching tools 13 or 14 may be omitted or removed from the cutting and notching machine. An article headed at one end only is adapted for a wide variety of uses as a connecting pin or a pintle or for many purposes where a headed bolt, rod, or pin is desirable.

The structural details disclosed and the order of procedure followed in my method may be varied within considerable limits without exceeding the scope of my invention as defined in the following claims.

I claim:

1. An assembly comprising a member provided with an opening and a rod projecting through said opening, the projecting portion of said rod being bevelled and notched and bent so as to close the notch and dispose the end in a position substantially perpendicular to the axis of the rod to form a head whereby withdrawal of the rod through said opening is prevented.

2. An assembly comprising a member provided with an opening, and a rod having a bevelled end projecting through said opening and provided with a notch inwardly therefrom the walls of which form an angle of substantially 90°, said end beyond the notch being bent into a position at right angles to the axis of the rod to close the notch and provide a head preventing separation of said rod from said member.

3. A headed article consisting of an integral metal rod having a bevelled end and divided by a notch near said end providing a head portion and a body portion, said head portion being positioned substantially at right angles to the body portion whereby said notch is closed by impact against the bevelled end.

4. A headed article comprising an integrally formed metal rod having one end extending outwardly transversely to the axis of the rod to provide a head, the metal of the rod being inclined at said end and notched at the base of said head with the faces of the notch disposed in abutting relation to close said notch.

5. The method of producing an assembly which consists in notching a rod adjacent the end thereof, bevelling said end, projecting the notched and bevelled end through an opening in a plate member, and bending said rod at the notch by impact against the bevelled end whereby to close said notch and position the projecting end substantially at a right angle to the axis of the rod to thereby prevent withdrawal of the rod from said member.

6. The method of producing a toy axle assembly which consists in forming a notch in an axle near an end thereof, the walls of said notch forming an angle of substantially 90°, bevelling the end of the axle adjacent said notch, inserting the notched and bevelled end through an apertured plate, and bending said end of the axle by a force applied to the bevelled end to close said notch.

7. The method of producing a headed article

comprising cutting a rod into suitable lengths, bevelling the ends of the rods, forming adjacent each end of such a length a notch of substantial depth, the walls of said notches intersecting at substantially 90° angles, inserting at least one of said ends through an opening in a plate member, and bending said end by applying an impact against the bevelled end to close said notch and present an abutment preventing withdrawal of the rod from said member.

8. The method of producing a headed article which consists in forming a metal rod with an inclined end, partially severing the rod adjacent its end to provide a notch having converging walls and applying a force against the inclined end whereby to bend the rod at the base of said notch to bring said walls into juxtaposition, thereby disposing a portion of the rod at one side of the notch substantially perpendicular to that portion of the rod at the other side of said notch.

9. The method of producing a toy axle assembly which comprises forming a notch in an axle near one end thereof, cutting the end of the axle to provide an end surface inclined to the axis of the axle, inserting the notched end of the axle through an opening in a plate, and forcing said angled end of the axle against an abutment whereby said end is bent to close said notch and form a stop adapted to lock said member on the axle.

10. The method of producing a toy axle assembly comprising forming a notch in an axle, bending the end of the axle beyond the notch so as to close the notch and dispose said end at substantially right angles to the axis of the axle, forming an opening in a metal plate by cutting around three sides of an area of the metal and bending said metal about the uncut side, inserting the bent end of the axle through said opening, and rotating the axle relative to the plate whereby said bent up metal area is restored to the normal plane of the metal plate by the rotative movement of the axle.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
268,011	Goehler	Nov. 28, 1882
319,305	Paige	June 2, 1885
480,619	Park	Aug. 9, 1892
1,018,573	Lehmann	Feb. 27, 1912
1,798,347	Walter	May 31, 1931
1,836,354	Abrams	Dec. 15, 1931
1,918,306	Williams	July 18, 1933
1,962,286	Schrader	June 12, 1934
2,022,458	Cavicchi	Nov. 26, 1935
2,143,442	Kellog	Jan. 10, 1939
2,236,352	McCarty	Mar. 25, 1941
2,268,117	Gorman	Dec. 30, 1941
2,379,752	Schultz	July 31, 1945