

[54] **CONNECTING MEANS HAVING A SPLIT COLLAR**

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[30] **Foreign Application Priority Data**

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[51] Int. Cl. .... **B60b 27/06**

[58] Field of Search ..... 64/17 R, 17 A;  
287/52.03, 110, 53 R

[56] **References Cited**

**UNITED STATES PATENTS**

3,501,928 3/1970 Pitner ..... 287/53 R X

1,785,870 12/1930 Marles ..... 287/110 X

*Primary Examiner*—Andrew V. Kundrat

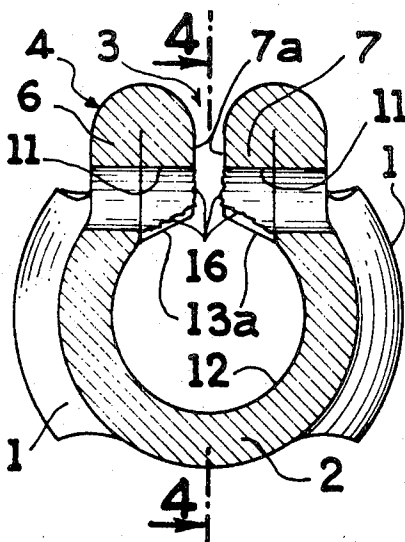
*Attorney*—Robert E. Burns et al.

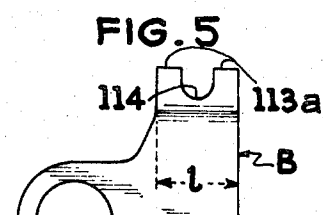
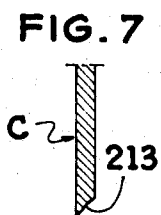
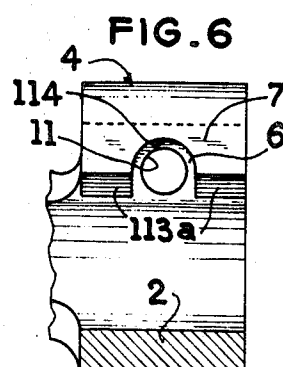
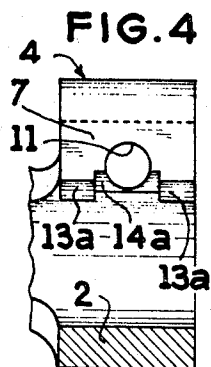
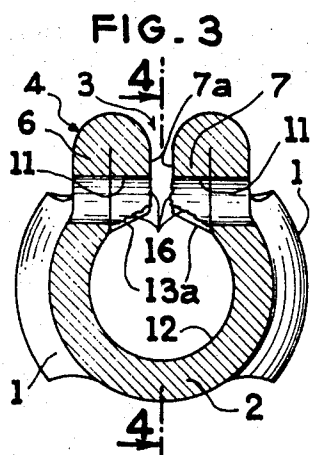
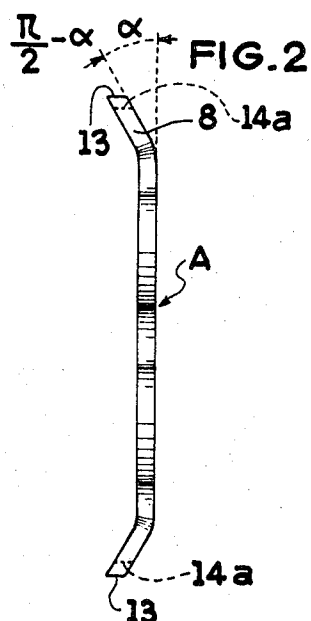
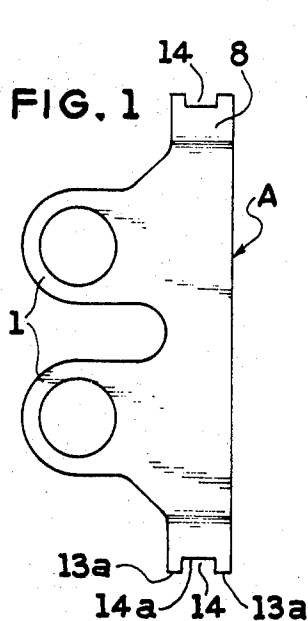
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### ABSTRACT

Connecting means comprising a sheet metal split collar and two ear portions defining the split. Each ear portion consists of a first part of the sheet metal bent over onto a second part of the sheet metal, the first part terminating in a first end face which for example prolongs the part-cylindrical inner face of the collar. An aperture is drilled in each ear portion and the first part of at least one ear portion has a notch in its end face. The purpose of the notch is to arrange that the burrs produced by drilling the corresponding aperture are outwardly offset from the end face of the first part.

**4 Claims, 7 Drawing Figures**





**CONNECTING MEANS HAVING A SPLIT COLLAR**

The present invention relates to connecting means or couplings which are constructed by the forming of a sheet metal blank and comprise a split tubular collar resulting from a folding and rolling of the blank, the split being defined by two ear portions which have a double thickness resulting from inwardly folded over parts at the ends of the blank, said ear portions having apertures which are provided for the passage of for example a fixing screw and open at least partly onto the edge face, adjacent the internal contour of the collar, of the portion of the sheet constituting the folded over part.

Such an arrangement is for example described in the continuation-in part No. 793,090 and in the U.S. application No. 792,915.

The drilling of the apertures in the double thickness of the ear portions produces, when the tool or tools pass through the metal, internal burrs which are of no particular consequence when they are on the inner faces of the ear portions on each side of the slit since their presence is of no hindrance and in any case they may be very easily removed if desired. On the other hand, the drawbacks of the burrs are very serious when the burrs are located in the edge face of the folded sheet which is normally located in the extension of the internal contour of the collar. Indeed, in this position, the burrs hinder the fitting of the shaft or other torque-transmitting member that the connecting means receive inside the collar. These burrs are also liable to scratch the parts or become detached and drop onto adjacent parts. Consequently, they must be removed and this represents an unreliable, difficult and costly operation.

An object of the invention is to overcome such drawbacks.

The invention provides connecting means wherein the intersection between the edge face of at least one of the folded over parts and the face defining the hole in the corresponding ear is located in a middle part of said edge face which is set back and such that said intersection constitutes a curve located outside the inner contour of the collar. The set-back part constitutes a receptacle for the burrs which may remain attached to the surface of the aperture but do not reach the extension of the inner contour of the collar.

If the two apertures are drilled by means of a single tool or drill and in one go, the arrangement just defined may be provided on only one of the ear portions. On the other hand, it may be advantageous to drill the two apertures with two tools travelling in opposite directions, in which case it is of course of utility to form each ear portion in such manner that the burrs are localised in a set-back part.

When the strength of the connecting means so allows, both during its construction and in the course of its utilization, the set-back middle part can have such shape and dimensions that it is completely set back from the drilling tool, so that the removal of material occurs only in the thickness of the ear portion which corresponds to the unfolded part, the burrs then being formed at the exit end of the drilled aperture in a part which is located in the set-back part of the folded over part. The drilling time is of course correspondingly reduced.

The advantages which result from the existence of a set-back part in the edge face of the folded part can be

completed by giving in the starting blank such shape to the end portions intended to form the folded over parts that after folding and rolling, the edge face of the folded over part is in the most advantageous position in which the lateral parts disposed on each side of the set-back part are as exactly as possible inscribed in or prolong the inner contour of the collar. According to the invention, this may be obtained, for example, by blanking the blank after at least one of the end portions of the blank has been slightly bent with respect to the plane of the blank so that the corresponding edge face of the blank makes an angle different from  $90^\circ$  with the adjacent part. This result can also be obtained by cold forming the end of the blank.

Further features and advantages of the invention will be apparent from the ensuing description with reference to the accompanying drawing.

In the drawing:

FIG. 1 is an elevational view of a sheet metal blank for manufacturing a universal joint yoke;

FIG. 2 is an end elevational view of the blank shown in FIG. 1;

FIG. 3 is a sectional view of the collar of a universal joint yoke obtained from the blank shown in FIGS. 1 and 2;

FIG. 4 is an elevational view, partly in section along line 4—4 of FIG. 3;

FIG. 5 is a partial view of a modification of the blank shown in FIG. 1;

FIG. 6 is a view similar to FIG. 4 corresponding to the utilization of the blank shown in FIG. 5; and

FIG. 7 is a sectional view of a modification of FIG. 2.

FIG. 1 shows a sheet metal blank A from which can be produced in accordance with the method disclosed in the U.S. Pat. No. 3,501,928 and the continuation-in-part 793,090, a yoke of a universal joint having two branches 1 and a split collar 2 (FIG. 3) resulting from bending and rolling the blank A, the slit 3 being defined by two ear portions 4 having two thicknesses of sheet 6, 7, produced by inwardly folding over end portions 8 of the blank A. The two ear portions 4 are provided with apertures 11 for the passage of a screw which, by the tightening of a nut thereon fixes a shaft in position in the bore of the collar 2.

The apertures 11 open partly onto the face 7a of the folded over part 7 of the ear portion which defines the slit 3 and partly in the edge face 13 constituting the end edge of this folded over part. In order to arrange that this edge 13 be inscribed correctly in or prolong the inner contour 12 of the collar, the end portions 8 of the blank A are bent in such manner before blanking the blank as to make an angle  $\alpha$  with the plane of the blank so that the edge face 13 make an angle  $\pi/2 - \alpha$  with the folded portions 8 of the blank (FIG. 2).

Further, the end portions 8 have a middle notch 14 which extends from the edge face 13 and has an inner face 14a which is roughly parallel to the edge face 13, there being formed on each side of the notch 14 in the edge portion 13 two lateral portions 13a.

The notch 14 is deep but it has a width and depth which are such that in the manufactured yoke 5 (FIG. 3), the intersection between the cylindrical face defining each of the apertures 11 and the edge face 13 is located in the inner face 14a of the notch. In the absence of the notch 14, a geometric cylinder of the same diameter as the apertures 11 and extending through the ap-

ertures would intersect the inclined end edge faces 13a. However, the face 14a constitutes a face which is set back with respect to the adjacent faces 13a which extend the inner contour 12 of the collar, so that, when the two apertures 11 are drilled by means of two opposed tools, the burrs 16 formed as the tools pass out of the metal are situated outside the inner profile 12 of the collar, some of the burrs being in the inner face 14a of the notch 14 and the others on the plane face 7a of the folded-over part 7 of the ear portions 4.

The blank B shown in FIG. 5 has on its edge face 113 a deep notch 114 whose dimensions in width and depth are such that, in the finished product, the opening formed by the notch 114 has a profile wholly situated outside the cylindrical face 11 formed by the passage of the tool which, in this way, only removes material in the thickness or layer 6 of the unfolded part of the ear portion, as shown in FIG. 6.

The cavity thus formed in the notch 114 of the folded-over part 7 of the ear portion 4 therefore receives the burrs formed as the tool issues from the layer 6 of the ear portion. It will be understood that in this case the drilling time is reduced owing to the reduction in the length of drilling and also to the fact that the aperture opens onto a surface perpendicular to the direction of drilling. However, such an arrangement is possible only if the width l of the end portion of the blank B is sufficient to ensure the required strength of the connecting means, both when producing the connecting means and utilizing the latter, as a function of the remaining dimensions for the lateral parts 113a.

In the blank C shown in FIG. 7, the end edge face 213 of the blank is oblique and has a concave profile obtained, for example, by crushing the metal, so as to afford in the finished product a result equivalent to that of the bending of the end portions 8 shown in FIGS. 1 and 2, and also has locally a part corresponding to the notch 14 obtained by the same method.

Having now described my invention what I claim and desire to secure by Letters Patent is:

1. Connecting means comprising a sheet metal member in the shape of a part tubular collar having a part-annular inner face extending about an axis and comprising two ear portions defining a throughway radially and longitudinally extending split in the collar, each ear portion consisting of an end portion of the member having an outwardly extending outer part and an inner part which extends inwardly in alongside and adjoining relation to the outer part and terminates in a first end edge face adjoining the inner peripheral face of the collar, said first end edge face being inclined relative to said inner part so as to form a substantially contiguous peripheral continuation of said inner peripheral face of the collar, said inner parts having opposed lateral faces

defining said split, means defining a first circular cylindrical throughway drilled aperture in each outer part, said first apertures being coaxial, means defining a second throughway aperture in each inner part coaxial with the first apertures for the passage of collar fixing means, said means defining said second aperture of one of said inner parts corresponding to one of said ear portions comprising a throughway notch extending from said first end edge face of said one of said inner parts radially outwardly of the collar and defining a second edge face outwardly set back from said first end edge face radially of the collar, said coaxial first apertures being so located in the ear portions relative to said first end edge faces that an imaginary geometric cylinder of the same diameter as and extending through said first apertures would intersect said two inclined first end edge faces of said adjoining inner parts in the absence of said throughway notch, whereby no drilling burrs exist on said first end edge face of said one of said inner parts.

2. Connecting means as claimed in claim 1, wherein said notch completely defines said second aperture in said one of said inner parts, said notch having a larger cross-sectional size than the cross-sectional size of the first aperture in the corresponding outer part, whereby said notch is capable of acting as a receptacle for burrs produced on said corresponding outer part when drilling the corresponding first aperture in a direction toward said notch.

3. Connecting means as claimed in claim 1, wherein said first end edge faces have a concave profile so as to form a continuation of said inner face of said collar which has a circular cross-sectional shape.

4. Connecting means comprising a sheet metal member in the shape of a part-tubular collar having a part-annular inner face and comprising two ear portions defining a throughway radially and longitudinally extending split in the collar, each ear portion consisting of an end portion of the member having an outwardly extending outer part and an inner part which extends inwardly in alongside and adjoining relation to the outer part and terminates in a first end edge face adjoining the inner face of the collar, said inner parts having opposed lateral faces defining said split, a throughway notch in at least one of said inner parts and having a second edge face outwardly set-back from said first edge face radially of the collar and a cylindrical face defining a throughway aperture for receiving fixing means in each ear portion and intersecting at least partly said second edge face and defining an intersection edge located outwardly set-back from said first edge face.

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UNITED STATES PATENT OFFICE  
CERTIFICATE OF CORRECTION

Patent No. 3,767,235 Dated October 23, 1973

Inventor(s) Alfred PITNER

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the Heading to the patent, Item [73] Assignee  
should be amended by making the following insertion  
beneath the Assignee's address:

--of a one-half interest--

Signed and sealed this 14th day of May 1974.

(SEAL)  
Attest:

EDWARD M. FLETCHER, JR.  
Attesting Officer

C. MARSHALL DANN  
Commissioner of Patents