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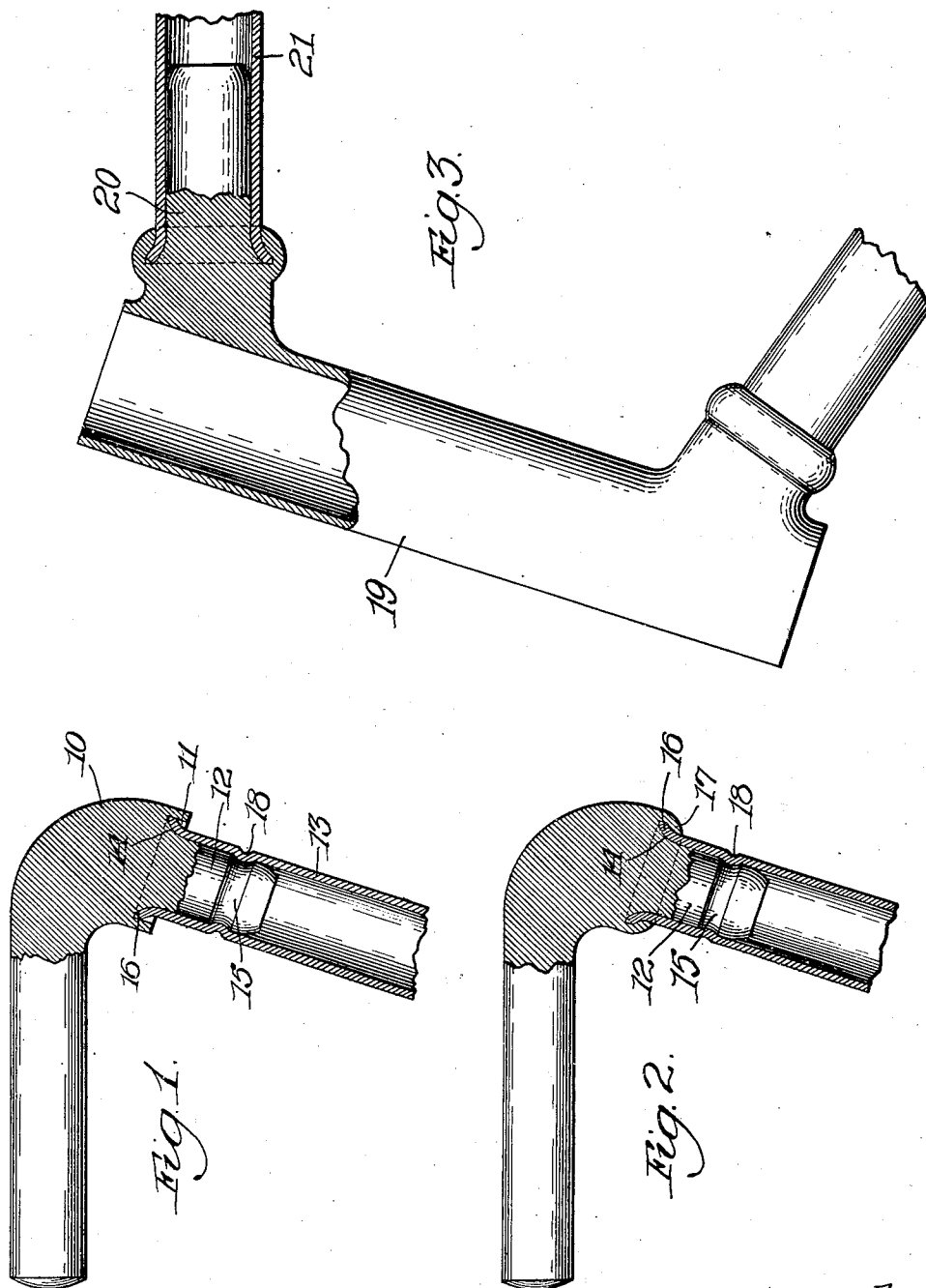
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2,112,673

CONNECTING OF METAL PARTS

Filed Jan. 2, 1935

2 Sheets-Sheet 1



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Fig. 4.

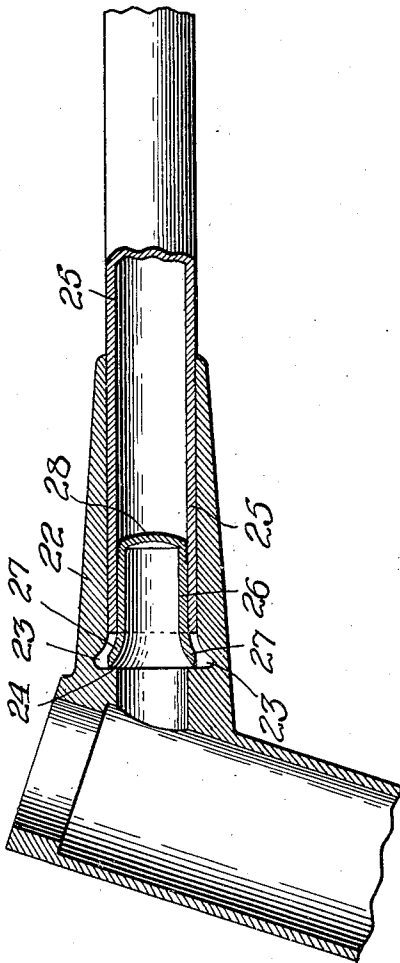
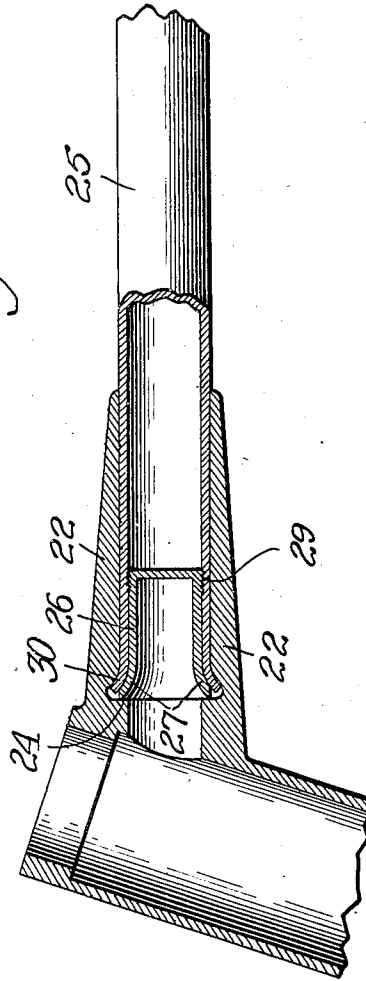


Fig. 5.



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UNITED STATES PATENT OFFICE

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CONNECTING OF METAL PARTS

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4 Claims. (Cl. 29—148.2)

This invention relates to the connecting of metal parts and more particularly to methods of connecting tubes to metal members and to the products so formed.

An object of the invention is to provide methods for connecting tubes to metal members in simple and extremely sturdy construction. A further object is to provide methods of connecting metal members through the flaring of the end of one of the members within a recess afforded by the other member. A further object is to unite aluminum or magnesium alloys in bicycle frames and other frame constructions. Other specific objects and advantages will appear as the specification proceeds.

The invention is illustrated, in preferred embodiments, by the accompanying drawings, in which—

Figure 1 is a broken sectional view showing the seat post of a bicycle in the first operation of being joined to the mast; Fig. 2, a view similar to Fig. 1, but showing the connecting operation completed; Fig. 3, a broken sectional view showing a tube connected to the head casting of a bicycle in accordance with my invention; Fig. 4, a broken sectional view showing a tube being connected to the head casting of a bicycle; and Fig. 5, a view similar to Fig. 4 but showing the connecting operation completed.

In the illustration given in Figs. 1 and 2, a seat post casting 10 of duralumin or other aluminum or magnesium alloy is provided with a recess 11 and with a circular extension 12 received within the mast 13. The inner wall of the recess 11 is preferably inclined or curved as indicated by the numeral 14. If desired, the tubular extension 12 may be provided with an annular groove 15.

In the first operation shown in Fig. 1, the tube is forced inwardly under pressure against the inclined wall 14 so as to flare the ends 16 of the tube; or, alternately, the end of the tube may be flared on some tool prior to its being placed within the recess.

In the second step of the operation, as shown in Fig. 2, the annular flange 17 is spun inwardly about the flared ends 16 to form a rigid connection. If desired, the portion 18 may be spun into the groove 15 either in the first or second step of the operation.

In the construction shown in Fig. 3, the head 19 is provided with an integral extension 20 substantially the same as that provided by the seat post 10, and the method of connecting the tube 21 thereto is the same as described in connection with Figs. 1 and 2.

In the modification shown in Figs. 4 and 5, the head is equipped with a tubular extension 22 which is provided interiorly with an annular recess 23 adjacent a shoulder 24. The tube 25 is provided at its inner end with a thimble or hollow plug 26 having a tapered or outwardly flared end 27. The inner closed end 28 of the thimble is dishd rearwardly and adjacent the convex end, the thimble is provided with threads or serrations 29.

In the operation of the device, the thimble is placed in the end of the tube, as illustrated in Fig. 4, and the tube with the thimble is inserted within the tubular extension 22 until the flared end 27 of the thimble engages the inwardly extending shoulder 24. The pressure upon the tube is continued and increased so as to flare the end 30 of the tube as shown in Fig. 5. In the latter operation, the end of the tube follows the tapered or inclined wall 27 of the thimble. In this manner, the tube is securely locked within the recess 23 of the extension 22. The thimble may be additionally locked by extending a rod through the other end of the tube and straightening the convex wall 28, as shown in Fig. 5, thus forcing the serrations or roughened surface 29 into the inner wall.

While in the illustrations, I have shown the plug or thimble as hollow, it will be understood that a solid plug may be employed, and the shape of the plug may vary considerably just so long as it provides an inclined or tapered wall for forcing the tube into the locking recess.

The foregoing methods have been found particularly adaptable for use with tubes and castings of aluminum alloy, such as duralumin and other similar alloys, such as magnesium alloy. The duralumin tube flares under pressure and is guided by the thimble or tapered plug into the locking recesses. The thimble or plug 26 may be made of steel or other suitable metal.

While I have described the invention particularly in connection with the assembling of bicycle frames from duralumin or aluminum alloy parts, it will be understood that the invention extends to other forms of construction and to other types of metal. While duralumin and the other metals mentioned lend themselves with a high degree of success to the methods described, it is obvious that the invention may be employed in connection with other metals and other frames.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be

construed as broadly as permissible, in view of the prior art.

I claim:

5 1. The method of connecting a tube to a member equipped with a tubular extension comprising: providing said tubular extension interiorly with a locking recess having a shoulder adjacent thereto, inserting a plug within an end of said tube, said plug having an outwardly tapering
10 portion extending outside of said tube, and pressing said tube and plug into said tubular extension so that the flared end of said plug engages said shoulder, and continuing to press said tube inwardly to cause the end-edge thereof to flare
15 outwardly through engagement with the flared end of said plug into said locking recess.

2. The method of connecting a tube to a member provided with a tubular portion comprising: providing said tubular portion interiorly with an
20 annular recess having a shoulder adjacent thereto, inserting a thimble provided with a flared end into said tube, pressing said tube and thimble

inwardly to bring the flared end thereof into engagement with said shoulder, continuing the pressure exerted on said tube to flare the end thereof into said recess, said thimble being provided with a rear convex wall adapted to be straightened to exert pressure against the interior of said tube.

3. The invention of claim 2 in which the rear peripheral portion of the thimble is provided with serrations adapted to be pressed into the metal of the tube.

4. The method of connecting a tube to a member equipped with a tubular portion comprising: providing said tubular portion interiorly with an outwardly flared tubular recess equipped with a shoulder adjacent the inner end of said recess, inserting a plug within the end of said tube, said
15 plug having an outwardly flared end portion adapted to engage said shoulder and pressing said tube and plug inwardly against said shoulder so as to flare the end-edge of said tube outwardly into said annular recess.

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