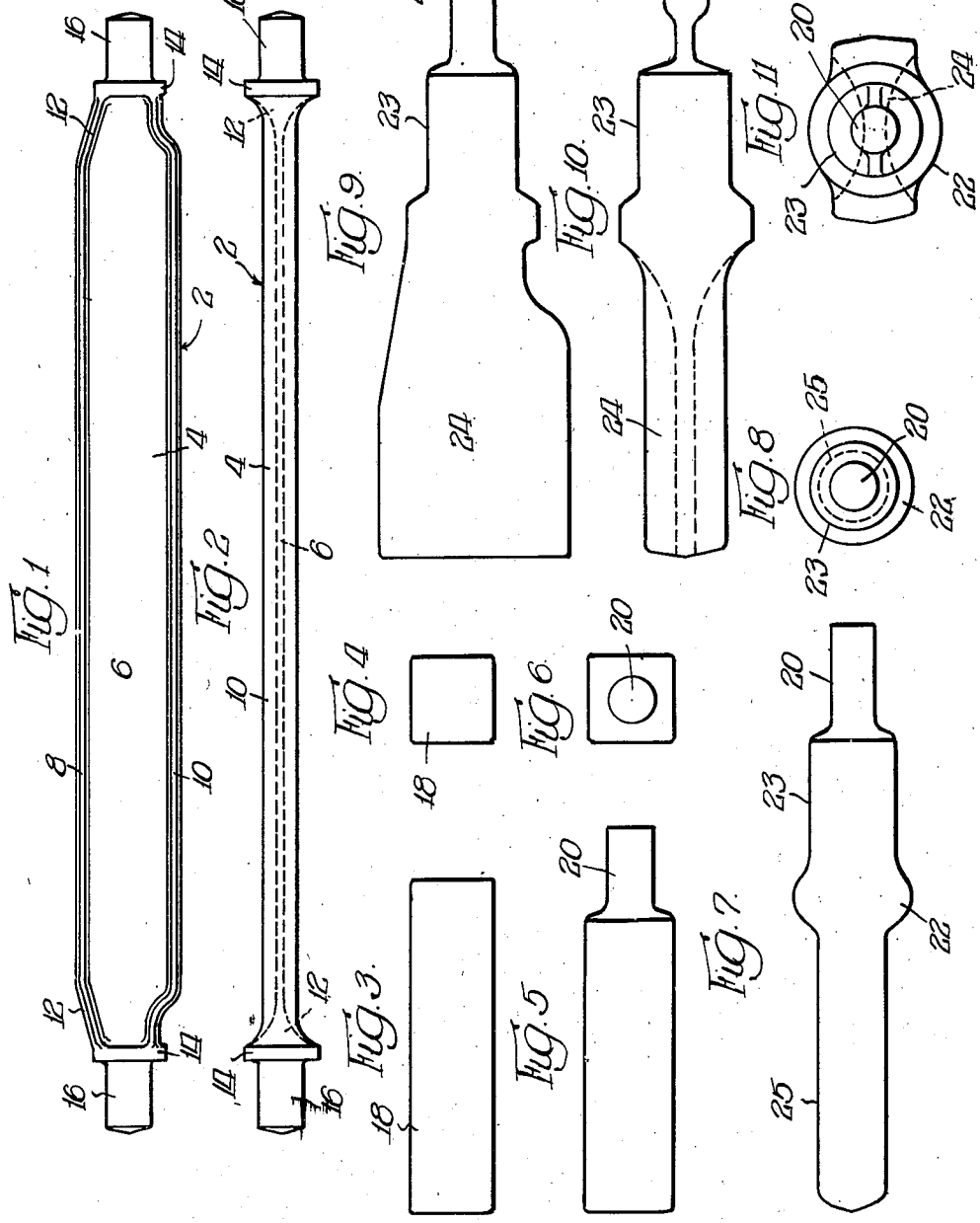
March 31, 1942. L. L. WHITNEY 2,278,386

METHOD OF MAKING BRAKE BEAMS

Filed July 31, 1939 4 Sheets-Sheet 1



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March 31, 1942. L. L. WHITNEY 2,278,386

METHOD OF MAKING BRAKE BEAMS

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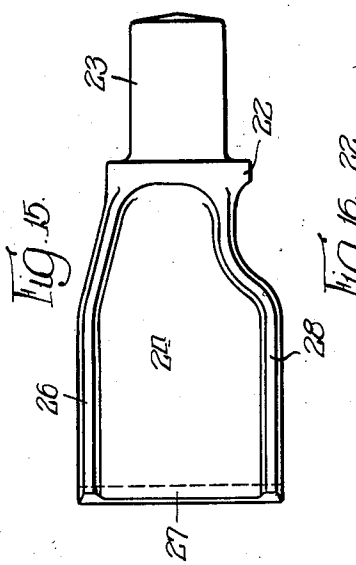


Fig. 15.

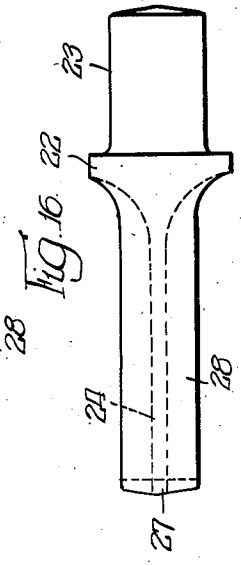


Fig. 16.

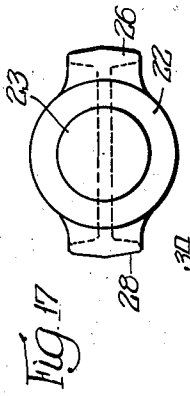


Fig. 17.

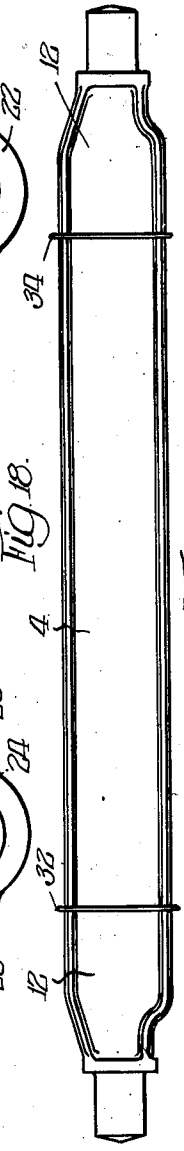


Fig. 18.

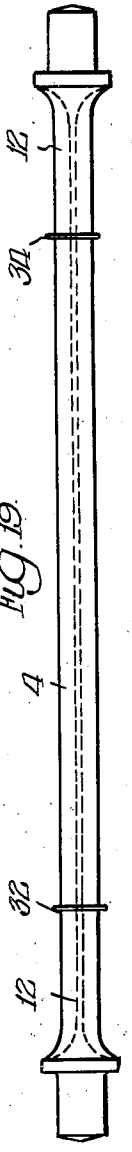


Fig. 19.

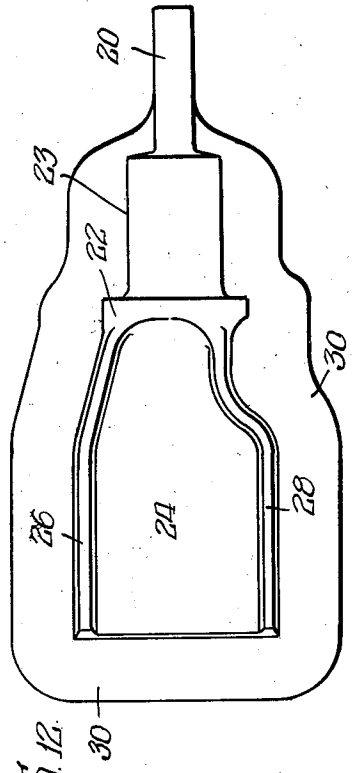


Fig. 12.

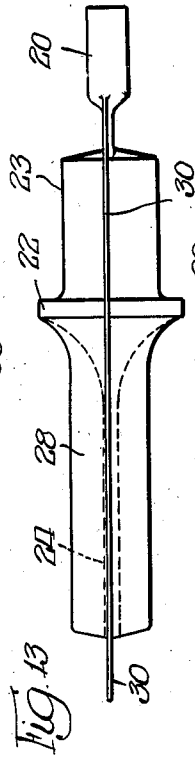


Fig. 13.

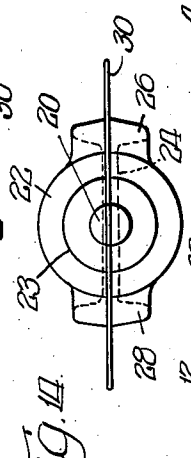


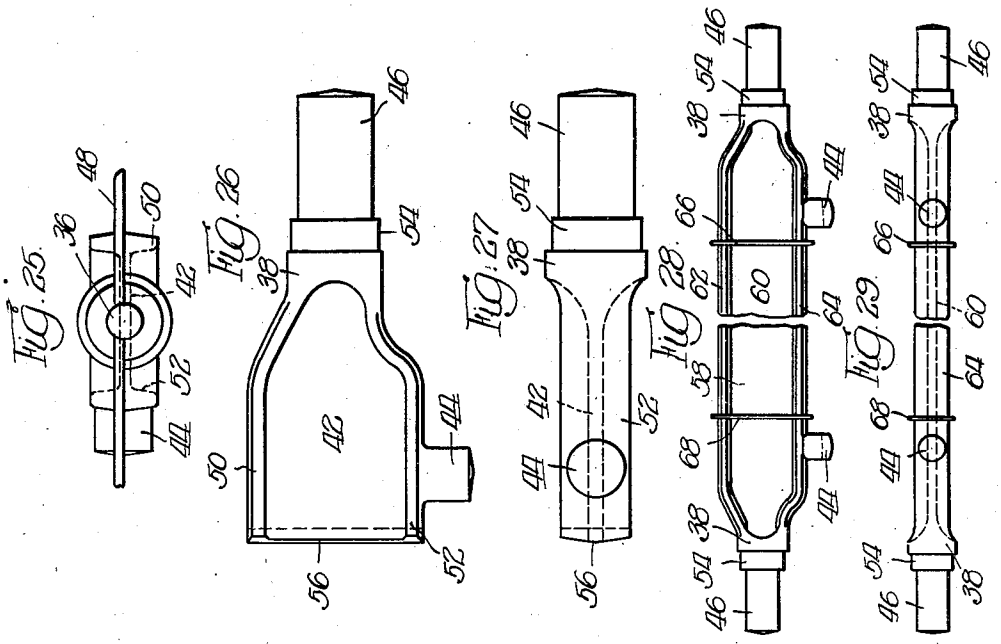
Fig. 14.

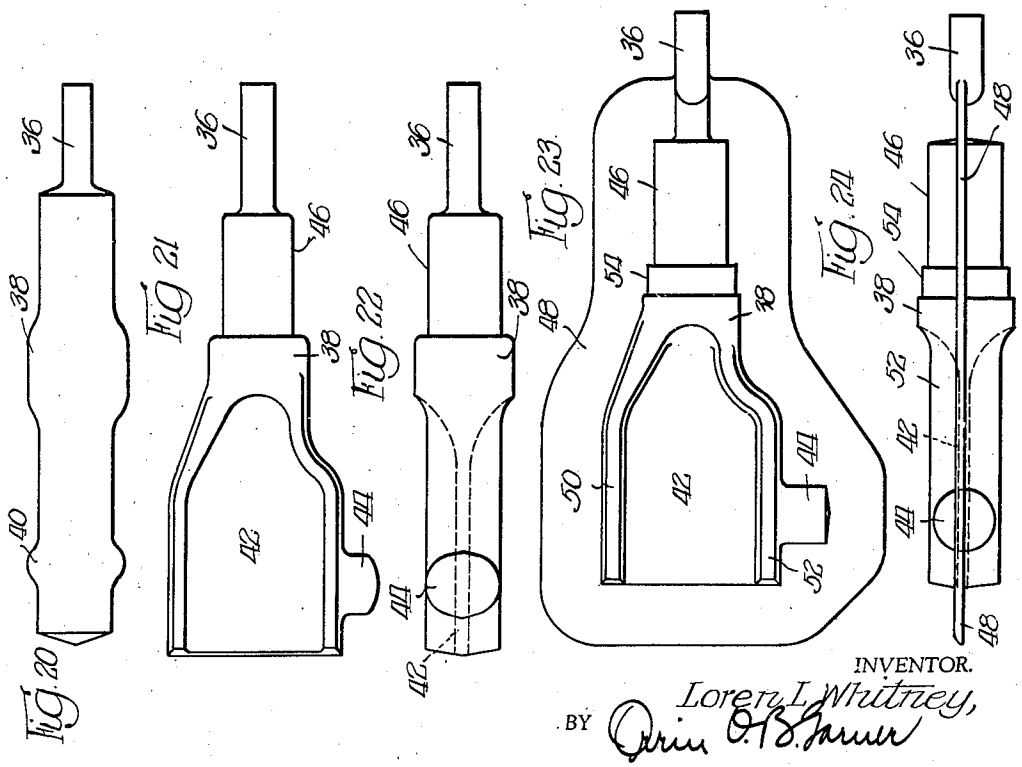
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March 31, 1942. L. L. WHITNEY 2,278,386

METHOD OF MAKING BRAKE BEAMS

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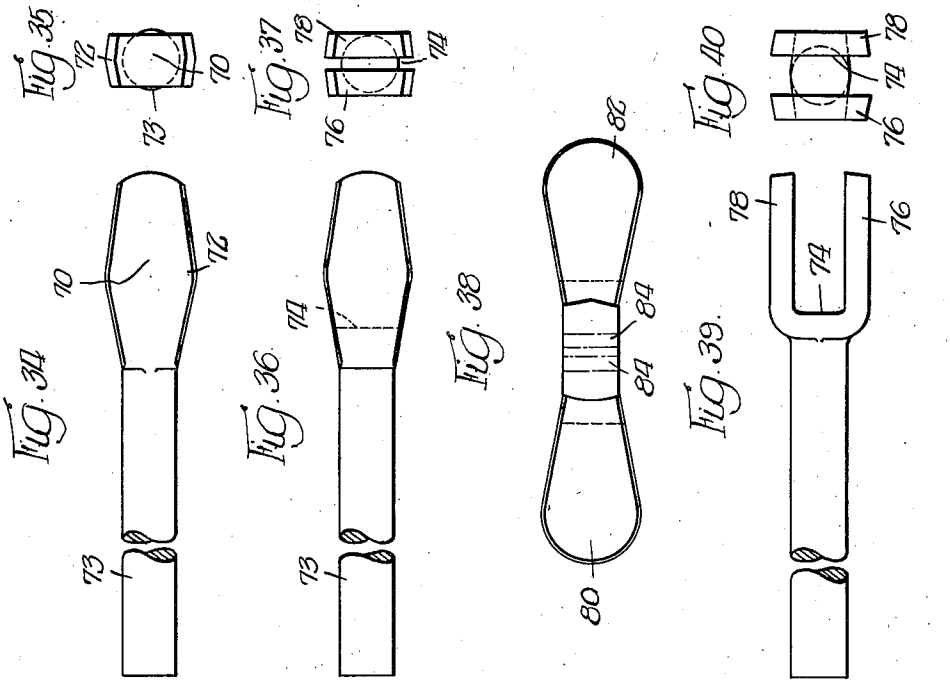


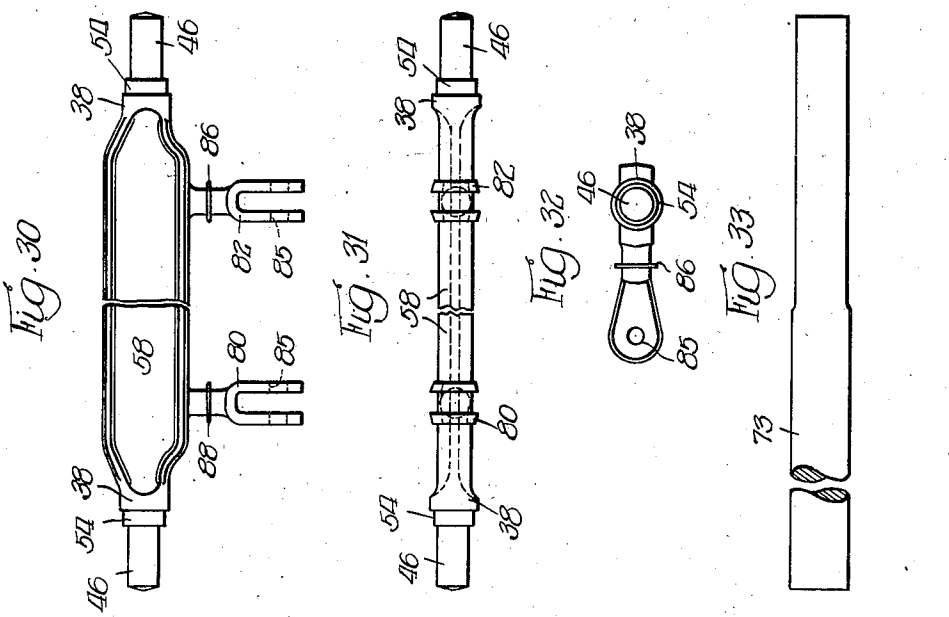
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March 31, 1942. L. L. WHITNEY 2,278,386

METHOD OF MAKING BRAKE BEAMS

Filed July 31, 1939 4 Sheets-Sheet 4





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Patented Mar. 31, 1942 2,278,386

UNITED STATES PATENT OFFICE

2,278,386

METHOD OF MAKING BRAKE BEAMS

Loren L. Whitney, Hammond, Ind., assignor to American Steel Foundries, Chicago, Ill., a corporation of New Jersey

Application July 31, 1939, Serial No. 287,539

6 Claims. (Cl. 29—164)

My invention relates to brake beams for railway brake rigging and more particularly to a novel method of producing such beams.

Heretofore the common method of producing brake beams with trunnion ends for connection to brake heads has been to secure rolled stock of desired form, usually I-section, cut to the proper length and forge the trunnion ends to their general shape, after which exact dimensions have been secured by machining. Fulcrums are commonly secured to such beams by means of bolts or rivets. The above process necessarily involves a rather cumbersome forging operation owing to the necessity of handling a rather large and heavy piece of metal which handicaps the operator somewhat and reduces his efficiency.

My novel method provides for the production of the trunnion ends independently of each other and the securing of the trunnion ends to the middle section of the beam after said trunnion ends have been roughly shaped. Thereafter the machining may be performed in the usual manner.

My invention also contemplates a novel arrangement for securing any desired number of fulcrums to such beams and contemplates also a novel machining method for trunnion ends of the beams where such fulcrums are required.

The manner in which I have attained these objects and others which will be apparent is more clearly set forth in the accompanying specification, drawings and the appended claims.

Figure 1 is a plan view of a brake beam formed according to my method, Figure 2 being a view in elevation thereof.

Figures 3 to 17, inclusive, show the various steps in my novel method of forming a trunnion end for a brake beam.

Figures 3 and 4 show a billet sheared to length for use in production of the trunnion end and being elevation and end views respectively of the billet I use.

Figures 5 and 6 show the operation of forming the tong hold.

Figures 7 and 8 are elevation and end views of a rolling pass.

Figures 9, 10 and 11 show plan, elevation and end views respectively of a flattening pass.

Figures 12, 13 and 14 show a plan view, side elevation and end view respectively of a finish pass.

Figures 15, 16 and 17 show the trunnion in final form, Figure 15 being in plan, Figure 16 in elevation and Figure 17 an end view.

Figure 18 is a plan view of the beam structure with the trunnion ends welded to the central body portion, Figure 19 being a side elevation thereof;

Figures 20 to 27 show the method of operation where the trunnion end is to be formed for the application of a fulcrum and in which Figure 20 corresponds generally to Figure 7 above described, a rolling pass, except that provision is made for the additional metal required for the juncture with the fulcrum.

Figures 21 and 22 are plan view and side elevation respectively of the next operation, a flattening pass.

Figures 23, 24 and 25 are plan view, side elevation and end elevation respectively of the next operation, the finish pass.

Figures 26 and 27 show the final form of the trunnion end, Figure 26 being a plan view and Figure 27 a side elevation.

Figures 28 and 29 show the completed beam with the trunnion ends applied, Figure 28 being a plan view and Figure 29 a side elevation thereof.

Figures 30, 31 and 32 show the same beam with the fulcrums applied thereto as provided for on the trunnion ends, Figure 30 being a plan view thereof, Figure 31 a side elevation taken from the bottom as seen in Figure 30 and Figure 32 an end elevation.

Figures 33 to 40 show my method of forming the fulcrums to be applied to the beam, Figure 33 showing the form of stock used, Figures 34 and 35 the first pass and upsetting operation, Figure 34 being in plan and Figure 35 an end view.

Figures 36 and 37 show the next operation wherein the fulcrum is split to form jaws, Figure 36 being in plan and Figure 37 an end view.

Figures 38, 39 and 40 show the next operation, a finish pass, Figure 38 being a plan view, Figure 39 a side elevation and Figure 40 an end view.

For purposes of illustration I am describing in detail the two modifications of brake beams shown herein, the final forms of which are illustrated respectively in Figures 1 and 2 and 30 to 32, inclusive. It will readily be understood, however, that similar operations might be performed on other sections in order to produce similar desired results.

Describing my invention in greater detail, the beam 2 shown in Figures 1 and 2 comprises a central body portion 4 of I-section having the web 6 and the flanges 8 and 10. Trunnion end portions 12, 12 are secured to opposite ends of the body portion 4, each trunnion portion comprising the annular shoulder 14 and the project-

ing trunnion 16. The relative proportions of the body portion 4 and the trunnion ends 12, 12 are best seen from a consideration of Figures 18 and 19, showing the welding operation from which the final beam is produced.

Figures 3 and 4 show the square stock from which I form the trunnion end. In the first operation the stock is cut to a piece 18 of proper length upon which a tong hold 20 may be formed by the next operation, a rolling pass. The billet assumes the form shown in Figures 7 and 8 with the metal gathered centrally thereof in the shoulder at 22 to support the subsequent formation of the trunnion shoulder. Between the shoulder 22 and the tong hold 20, the trunnion 23 assumes a rounded form and of rounded form also is the opposite end as indicated at 25. In the following operation, a flattening pass, the structure assumes the form shown in Figures 9, 10 and 11 with the metal flattened at one end to form the web 24 thickened at its opposite edges in preparation for the flanges to be formed in the final pass. In the next operation or finish pass the trunnion end is formed to its final shape, being of I-section at the end later to be welded to the central body portion of the beam with the web 24, the flanges 26 and 28 and the flash 30, 30 formed about the perimeter of the structure. The I-section end merges into the shoulder 22 outwardly of the trunnion end 23. Figures 15, 16 and 17 show the finished trunnion end structure with the flash 30 and the tong hold 20 removed. Excess metal is afforded at the I-section and as at 27 for use in the subsequent flash welding operation.

Figures 18 and 19 show the central body portion of the beam 4 flash welded as at 32 and 34 to the trunnion ends 12, 12 formed as above described. When the excess flash metal resulting from the flash weld is trimmed the beam shown in Figures 18 and 19 is ready for the final machining operation of the trunnion ends after which the structure assumes the form shown as finished in Figures 1 and 2.

The beam shown in Figures 1 and 2 may be drilled for the attachment of fulcrums in the usual manner if desired. However, I have provided a novel method of flash welding such fulcrums and my method for the production of such a beam with fulcrums is shown in detail in Figures 20 to 40, inclusive. Figure 20 shows the trunnion end structure after the formation of the tong hold 36 with the metal gathered as at 38 for the later formation of the trunnion shoulder and gathered also to a lesser extent as at 40 to provide for the attachment of a fulcrum. Figures 21 and 22 show the next operation with the metal flattened at one end to form the web 42 thickened at its opposite edges on one of which as at 44 is formed the projecting lug for attachment of a fulcrum. The flattened portion merges into the shoulder at 38 and therebeyond is formed the round trunnion end 46. The next operation is the finish pass which produces the trunnion end in its final form with the excess metal forced into the flash 48, 48 entirely around its perimeter. By the finish operation the metal at one end is formed to an I-section similar to that of the I-section to which it is to be welded to form the completed beam with the flanges 50 and 52 at opposite sides of the web 42 already mentioned. The said I-section merges into the shoulder 38 which in final or finish pass may be formed with an offset as at 54 to provide a double trunnion end, a form sometimes desired in order to afford enlarged area for the seating of a brake head thereon. Upon removal of the flash by the usual trimming method the structure assumes the form shown in Figures 26 and 27. Excess metal is provided at the I-section end as at 56 for use in the subsequent flash welding operation. Figures 28 and 29 show the finished beam with the central body portion 58 of I-section with the web 60 and the flanges 62 and 64 welded as at 66 and 68 to the trunnion end structures, each of the form just described with the trunnion ends 46, 46, the offset at 54, 54, the shoulders 38, 38 and the fulcrum lugs 44, 44.

Figures 33 to 40 show my method of producing fulcrums for attachment to the fulcrum lugs on the beam structure, Figure 33 showing the round stock, Figures 34 and 35 showing the first upsetting operation to flatten the material into the generally rectangular shape indicated at 70 widened centrally thereof as at 72, the opposite end of the blank or billet being used as a tong hold by comprising an excess of metal as indicated at 73 for a purpose hereafter described. In the next operation as shown in Figures 36 and 37 the portion 70 is split or slotted as at 74 to form a jaw-like structure with similar right and left halves indicated at 76 and 78. Thereafter, a similar series of operations is formed on the other end of the same billet using the first formed end as a tong hold, thus producing as a finished forging a structure such as shown in Figure 38 with the fulcrum jaws 80 at one end and the fulcrum jaws 82 at the opposite end each having a configuration similar to that shown in Figures 39 and 40. Between said jaws a surplus of stock is afforded as at 84, 84 and the jaws may be separated at the middle as by shearing and, thereafter, drilled as indicated at 85 (Figure 32) for the reception of pins or bushings. After the fulcrum jaws have been thus formed they may be flash welded as at 86 and 88 (Figure 30) to the main body of the beam and the excess metal resulting from the flash trimmed away. In the said welding operation the surplus metal indicated at 84, 84 (Figure 38) will be absorbed in the flash produced by the welding operation. The structure thus will be of the form shown in Figures 30, 31 and 32 at the conclusion of the forging and welding operations. Thereafter, it is necessary to machine the trunnion ends of the beam, a process requiring great refinement. In order to produce an accurately finished product I clamp or otherwise secure a counterbalance on the central body of the beam at the edge opposite which the fulcrums have been welded in order that said beam may rotate about its longitudinal axis without wobbling in the operation of machining the trunnion ends. By this device I have greatly simplified the machining operation and insured accuracy. It may be noted that the trunnion ends shown in Figures 26 and 27 differ from those shown in Figures 15 and 16 principally in that one shows a so-called two-step trunnion wherein a portion of the trunnion is of a larger diameter than the remainder thereof so formed for a purpose I have already mentioned and, further, in the provision of the fulcrum lug 44 in the trunnion end shown in Figures 26 and 27. It will readily be understood that the trunnion end structure shown in Figures 15 and 16 might likewise be formed with a fulcrum lug if desired.

It will thus be seen that my novel method of producing brake beams are afforded a greatly increased efficiency in that the forging operators may handle the formed billets with much greater ease with a resultant saving of time and accuracy

of performance. At the same time, the welding of the trunnion ends to the central body I-beam-section is a relatively simple operation of welding together the similar sections of material.

Likewise the forging of the fulcrum jaws in a form suitable for welding to the main portion of the beam and the preparation of the main portion of the beam for such welding results in a unified structure such as can not be secured by riveting the fulcrums to the beam. The said unified structure eliminates the bolts or rivets otherwise used and thereby does away with the danger of loosened or lost fulcrums.

It is to be understood that I do not wish to be limited by the exact embodiments of the device shown which are merely by way of illustration and not limitation as various and other forms of the device will of course be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

I claim:

1. The method of forming a brake beam comprising the steps of cutting to length a rolled member, forging separate trunnion end pieces to the section of said member at adjacent ends thereof with excess metal at said adjacent ends, gathering a surplus of metal in said forging operation to form a fulcrum lug at one side of each of said end pieces, heating all of said ends to bring said excess metal to a forging temperature, welding said end pieces to said member under pressure to dispel said excess metal, and welding fulcrums to said lugs.

2. The method of forming a brake beam having trunnion ends comprising the steps of cutting to approximate length a rolled member, forging separate end pieces with trunnions on their opposite ends and corresponding in section at adjacent ends to the section of said member, gathering excess metal near said adjacent ends at corresponding sides thereof to form fulcrum lugs, welding said end pieces to said member under pressure to dispel any excess metal to bring said beam to its finished length, and welding fulcrums on said lugs.

3. The method of forming a brake beam having trunnion ends comprising the steps of cutting to length a rolled member of I-section, forging separate trunnion ends for said beam to an I-section similar to that of said member at adjacent ends thereof with an excess of metal at said adjacent ends, gathering metal near said adjacent ends at corresponding sides thereof in said forging operation to form fulcrum lugs, welding said trunnion ends to said member under sufficient heat and pressure to dispel said excess metal, and welding fulcrums to said lugs.

4. The method of forming a brake beam having trunnion ends comprising the steps of cutting to approximate length a rolled member, forging separate end pieces with trunnions on their opposite ends and corresponding in section at adjacent ends to the section of said member, gathering excess metal near said adjacent ends at corresponding sides thereof to form fulcrum lugs, and welding said end pieces to said member under pressure to dispel any excess metal to bring said beam to its finished length.

5. The method of forming a brake beam which comprises cutting to length a rolled member, forging separate trunnion ends therefor to conform at adjacent ends to the section of said member, gathering excess metal in said forging operation to form fulcrum lugs adjacent said ends at corresponding sides thereof, welding said trunnion ends to said member, and welding fulcrums to said lugs.

6. The method of making a brake beam comprising cutting to length a rolled member, forging separate trunnion pieces with ends corresponding in section to the section of said member and other ends of trunnion form, and flash welding said corresponding ends to said member.

LOREN L. WHITNEY.