

April 2, 1929.

W. H. STOCKING

1,707,543

METHOD OF MAKING TRUCK LEVER SPREADERS

Filed Dec. 14, 1927

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FIG. I.



FIG. II.

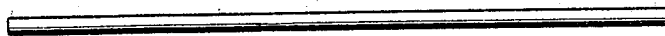


FIG. III.

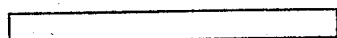


FIG. IV.

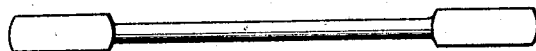


FIG. V.

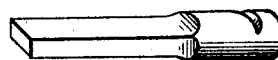
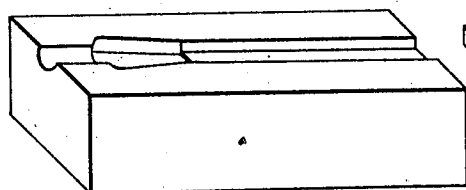


FIG. VI.

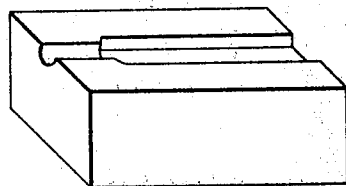
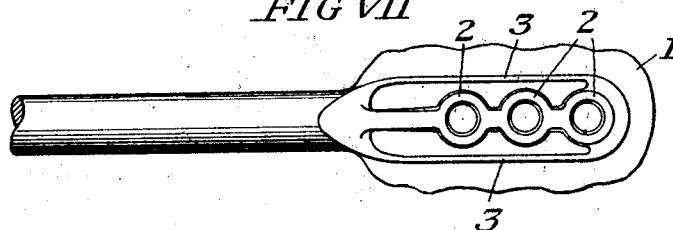


FIG. VII.



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FIG. VIII.

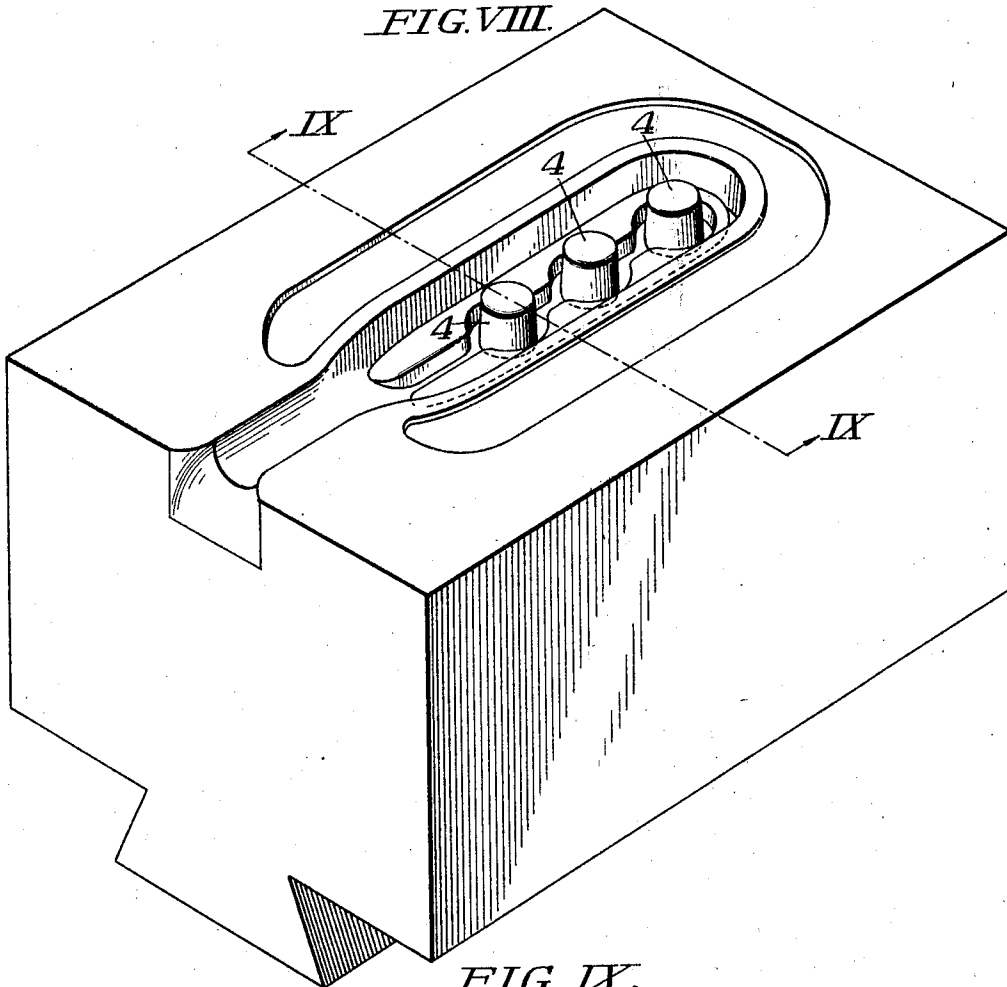
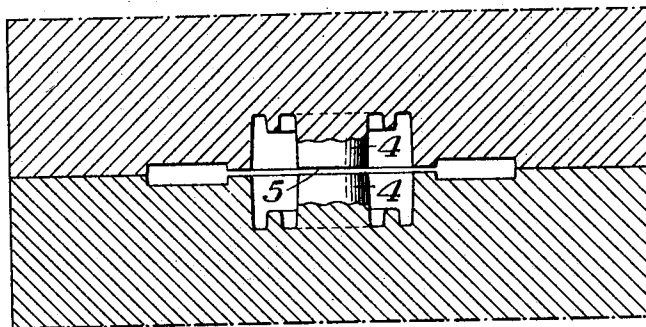


FIG. IX.



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FIG. X.

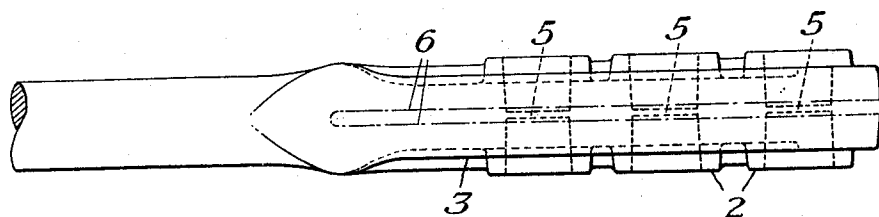


FIG. XI.

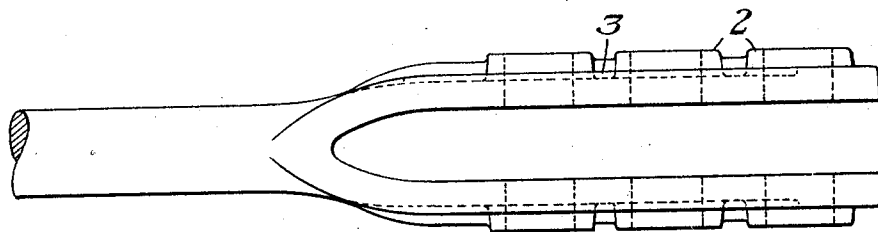
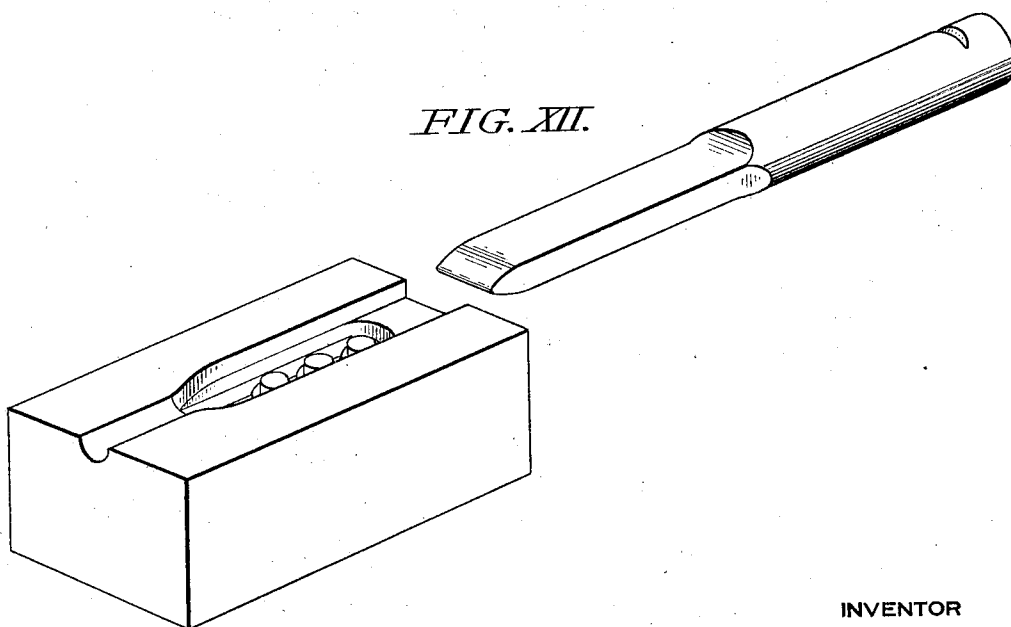


FIG. XII.



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UNITED STATES PATENT OFFICE.

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METHOD OF MAKING TRUCK-LEVER SPREADERS.

Application filed December 14, 1927. Serial No. 239,929.

My invention relates to the forming of truck lever spreaders. These are rod-like members with bifurcated ends, formed of steel. In service they are pivotally attached at their ends to the two brake levers which constitute a pair upon the truck of a railway car, and their purpose is to distribute the strains of braking between the brake-shoes in the engagement of the brake-shoes upon a pair of truck wheels. The object of my invention is, first, to produce a seamless non-welded truck lever spreader. These bifurcated articles are formed, sometimes, of companion strips or bars of steel, bent apart at their ends but throughout their middle portions welded together. When so formed, the articles are seamed from end to end, or, in cases of more perfect weld, the articles still remain seamed or open for some distance from the ends of the weld area. Into this seam water inevitably gains access, causing deterioration. Particularly when water freezes in the seams the article is distorted and the weld ruptured. The article of my invention belongs in another class. It is made of a single piece of metal without welds and is, therefore, seamless. My further object is to produce a one-piece, non-welded, seamless article which shall contain no surplus material; it shall be of minimum weight consistent with its strength, or, conversely stated, of maximum strength consistent with its weight. Finally, it is my object to attain the ends stated by manufacturing operations which are practicable, and to produce the articles economically.

In describing the method in which my invention is found I shall allude to the accompanying drawings. Figs. I, II, and III show each of them in side elevation and, adjacently placed (and to larger scale), in transverse section, three exemplary lengths of stock, either of which I may employ to produce the intended article. Fig. IV shows similarly in side elevation and, adjacently placed (and to larger scale), in transverse section, the blank produced from either of the lengths of stock shown in Figs. I, II, and III, ready for performance upon it of those steps in which my invention particularly is found. Figs. V and VI are diagrammatic views in perspective each of one of a pair of upsetting dies and the corresponding plunger, by the operation of which a length of stock such as that shown in Fig. II, for instance, may be shaped to the

blank of Fig. IV. Fig. VII is a fragmentary view in side elevation (and to larger scale) of one end of the article, after it has undergone the first of the successive steps in which my invention particularly is found: the drop-forging step, namely. Fig. VIII is a view in perspective of one of the dies in which the blank of Fig. IV is shaped to the form shown in Fig. VII. Fig. IX is a view in transverse and vertical section, on the plane indicated by the line IX—IX, Fig. VIII, through the pair of drop-forging dies in closed position. Fig. X is a fragmentary view in side elevation of one end of the article after it has undergone the drop-forging step, and in this view the position of a certain saw-cut is indicated. Fig. XI is a view corresponding to Fig. X, and showing the article after it has undergone the next ensuing step of spreading apart the sawn-asunder bifurcations. Fig. XII is a diagrammatic view in perspective of one of the pair of dies and of the plunger, by which the article as shown in Fig. X is brought to the shape shown in Fig. XI.

Beginning with a length of stock, such as the elliptical rod of Fig. II, $1\frac{3}{8}$ " x $1\frac{3}{8}$ " and 63" long (to give a specific example), I enlarge the ends in one or more successive upsetting operations, illustrated in Figs. V and VI, and produce the blank of Fig. IV. The shank is unchanged. The heads are $2\frac{1}{4}$ " x $1\frac{1}{2}$ ", and 9" long. Were I to begin with the length of stock shown in Fig. III, instead of upsetting the ends, I should, by rolling in well known manner, or by equivalent operation, reduce the mid-portion, and so attain the blank of Fig. IV.

The heads of the blank produced in one or the other of the operations indicated, I subject to a drop-forging operation, between dies, as illustrated in Figs. VIII and IX, and in so doing obtain the article of Fig. VII. This article may by the minor shaping steps to be described, be brought to finished form. The essential features of shape and size have in the drop-forging step been imposed upon it, and the surplus material has been extruded between the forging dies in the form of a flash 1.

Figs. VII and IX will serve to show these features of shape: the head is perforated transversely, in this case with three perforations; these perforations are reinforced, and their bores are prolonged in bosses 2; and the

head is further reenforced with marginal bosses 3; but between the bosses, there are reentrant spaces. Only so much metal is employed as is needed to give bearing surfaces of proper area for prolonged service, and to afford needed strength. This is accomplished by increase of thickness peripherally and relative decrease of thickness throughout intermediate areas. Hitherto, the heads of these articles have been produced by upsetting; but by upsetting no such particular distribution of material as the drawings show is possible. The whole head must in upsetting be made of maximum thickness, or substantially such. In consequence, more material is used than is needed. There is undue weight and waste. Subsequent cutting away of surplus material is forbidden, since the cutting away would cost more than the gain would come to. By introducing the drop-forging step of my invention, substantial economy is attained. And there is still greater economy. The upset head of the prior art is necessarily made solid and, after it has otherwise been completed, the pivot hole or holes have to be drilled through. Perforation in such manner is slow and costly. Having resorted to drop-forging to give to the head its essential external contour, I produce by drop-forging an article which is substantially perforate and which, incidentally to its further preferred method of fabrication, is rendered completely perforate, and this without any boring at all, and with substantial saving of time and money. Referring particularly to Fig. IX, the drop-forging dies will be seen to be formed with cooperating columnar portions 4, which produce in the forged article opposite deep circular recesses or wells separated only by a thin septum 5 of metal. This septum may be understood to be $\frac{1}{8}$ " in thickness. The metal displaced by the columnar portions 4 of the closing dies goes to the formation of the bosses 2 which surround the recesses.

The article as it comes from the drop-forging step of the operation is illustrated in Fig. VII. The flash 1 is cut away, and it then remains in the condition shown in side elevation in Fig. X. The forged head is, as the next step in the operation, split, preferably by sawing. In Fig. X the saw-cut is indicated

by dotted lines at 6. It is sunk from the tip of the article inward, in longitudinal and medial plane, from right to left, Fig. X. The breadth of the kerf is here indicated to be $\frac{1}{4}$ ", and it will conveniently be sufficient to cut away and remove entirely as it is sunk, the septum of metal 5 left by the forging dies separating the aligned recesses sunk from opposite surfaces. Removal of this septum leaves the desired perforations, penetrating completely each of the furcations which the saw-cut produces. Manifestly, the recesses may be less deeply sunk and the splitting of the head may leave portions of the septum still remaining and so boring may be necessary, and yet my invention will still, even though incompletely and imperfectly, be enjoyed.

Referring to Figs. XI and XII, the furcations produced by splitting the head are spread by a plunger between dies, and so the article is brought to its ultimate shape. It then remains only to ream out the perforations, an operation which is necessary, by whatever method the perforations be produced.

I call attention again to the prolongation of the pivot holes through the depth of bosses 4. This prolongation affords maximum resistance to pin wear. By these and by the peripheral bosses the head is strengthened and made rigid, to resist compressive strains, and as I have said, the quantity of metal is reduced to the minimum. The article is light and strong and it is susceptible to rapid and cheap production.

I claim as my invention:

The method herein described of shaping a seamless truck lever spreader of minimum weight and maximum strength, which consists in preparing a stem-shaped blank with enlarged head, drop-forging the head of the blank with opposite reentrant recesses which are separated by a septum of metal, slotting the forged head on a longitudinal plane coincident with the plane of the said septum and in such slotting removing the said septum and leaving the furcations perforate, and spreading apart the perforate furcations.

In testimony whereof I have hereunto set my hand.

WALTER H. STOCKING.