T. H. SYMINGTON.

METHOD OF FORMING EXPANDED BEARING SURFACES.

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1,045,341. Patented Nov. 26, 1912.

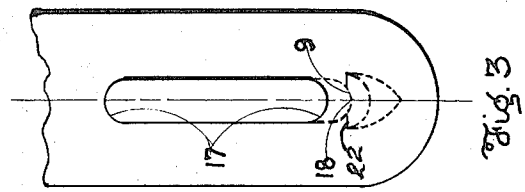

Fig. 3

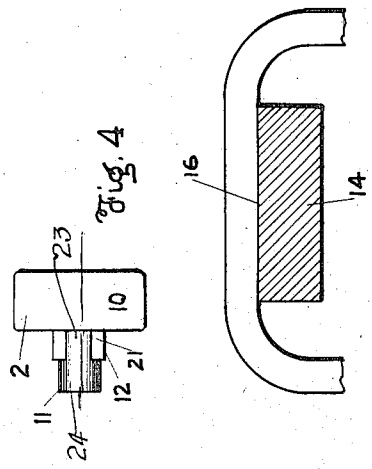

Fig. 4

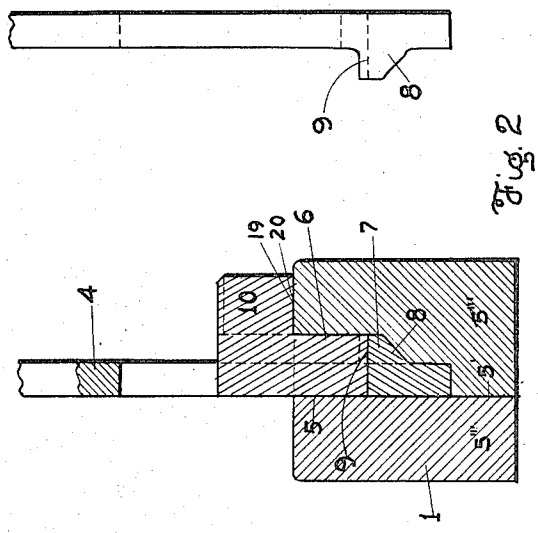

Fig. 2

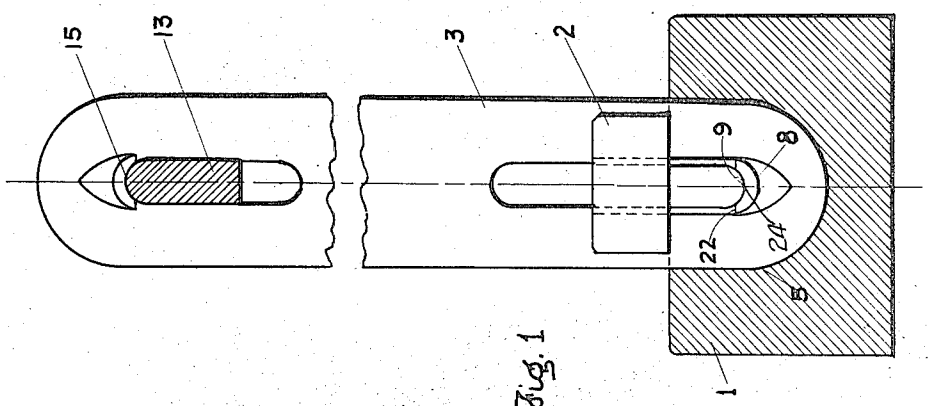

Fig. 1

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METHOD OF FORMING EXPANDED BEARING-SURFACES.

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Application filed March 30, 1912. Serial No. 685,016.

To all whom it may concern:

Be it known that I, THOMAS H. SYMINGTON, a citizen of the United States of America, residing at city of Baltimore, State of Maryland, have invented certain new and useful Improvements in Methods of Forming Expanded Bearing-Surfaces, of which the following is a specification.

In the railway draft gear of the type now in general use, the drawing stress is transmitted to the shock-absorbing member by means of a pair of links or a yoke, the shock-absorbing member being mounted between the links or within the yoke, and inclosed between followers. In either case the links or the arms of the yoke are provided with registering slots at their forward ends, and a key secured to the draw-bar and extending through the slots bears against the front ends or faces of the slots and thus transmits the tension stress to the links or yoke. In the case of the links there are corresponding rear slots, and a rear key therein engages the rear follower, the tension being transmitted from the rear faces of the rear slots to the key and thence to the follower which applies it to the shock-absorbing member. In the case of the yoke, the rear arm of the latter bears against the follower and transmits the tension stress thereto in the same manner as does the rear key used with the links or it may be otherwise arranged. As the bearing stress applied to the front faces of the front slots and the rear faces of the rear slots of the links, and to the front faces of the slots in the yoke, tends to wear these faces and the edges of the key, it has been found advisable to expand the bearing surfaces, and for this purpose shoulders have been provided on the links and yoke adjacent the ends of the slots at which this wear occurs.

In order that there may be no lost motion in the draft gear which would result in unnecessary hammering when the stress applied to the gear changes from tension to compression, or vice versa, it is very important that the bearing surfaces, *i. e.*, the front faces of the front slots and the rear faces of the rear slots in the links, and the front faces of the slots in the yoke, and the front face of the rear arm thereof, be accurately spaced.

Previously, in the manufacture of links and yokes of the kind which I have described, bearing surfaces of a width greater than the normal thickness of the link or yoke have been provided by welding pieces of metal to the blanks from which the links or yokes are to be made. One of these is placed at each point on the blanks where such a bearing surface is to be formed, *i. e.*, where the end of the slot is to be. Then the slot is punched with its end piercing the reinforced portion. The finished link or yoke thus has an increased thickness and an increased bearing surface at the end of the slot, but this is a comparatively expensive operation and defective in that the punch is forced to one side by a variable amount owing to the difference in thickness of metal at the two ends of the slot and the consequent difference in resistance. This makes it difficult to place the slot accurately. The necessity for accurate spacing of the slots has been stated.

To overcome these difficulties and evolve a process by means of which links or yokes having expanded bearing surfaces at the ends of the slots, may be cheaply produced, and whereby these bearing surfaces may be accurately placed, is the object of my invention.

In the practice of my process the slots are first punched in the heated rolled blank, the two end slots in the link and the one end slot in each arm of the yoke being punched short of the desired finished dimension. The punched link or yoke is then reheated, if necessary, at the part where the bearing surface is to be formed. The end slots in the link and the one end slot in the yoke coincide at one end with the finished slot, so that at the forward end where the expanded bearing surface is to be formed the initial slot falls considerably short of the end of the finished slot. Thus there is a considerable amount of metal at the end of the initial slot which has yet to be displaced before the bearing surface can be formed. An important feature of my invention consists in upsetting this metal to increase the

thickness of the link or yoke at this point and thus form an expanded bearing surface. By this operation the slot is lengthened and by by holding the blank in a position which is accurately predetermined, and by likewise accurately predetermining the stroke of the upsetting tool, the bearing surface is spaced from any point on the link or yoke with the utmost accuracy. As I have previously pointed out, the points to be accurately spaced on the links are the bearing surface at the front end of the front slot and the bearing surface at the rear end of the rear slot, and on the yokes, the bearing surface at the front end of the slots, and some other bearing surface as that at the front face of the rear arm of the yoke. As herein pointed out, the link or yoke is preferably supported at one of these points while the bearing surface at the other is being formed.

Preferably the upset metal is caused to flow to one side only of the link or yoke, *i. e.*, that which will be turned toward the center of the draft gear, so that the other side presents a flat face which may be disposed toward the draft timbers.

In the accompanying drawing I have illustrated a draft link and a yoke manufactured in accordance with my process in its preferred form, together with certain features of an apparatus by means of which the method or process may be put into operation.

Figure 1 is a central vertical section through the female die, the male die and link being shown in elevation. Fig. 2 is a section of the dies taken at right angles to Fig. 1 but showing a yoke, partly in section and partly in elevation. Fig. 3 shows a portion of a link or yoke with the preliminary slot, the slot as completed with the upset portion or expanded bearing surface being shown in dotted lines. Fig. 4 is a bottom plan of the male die.

The features illustrated comprise the female die 1, the male die 2, a link 3, and yoke 4 in the process of manufacture. The female die is apertured at 5 to receive the end of the link or yoke, and split at 5′, into parts 5″, 5‴. Centrally disposed in one flat face of the aperture is a guide slot 6. At the bottom of this slot below the traverse of the male die, as hereinafter described, is a chamber 7 to receive the displaced metal from the end of the slot in the link or yoke, and to form the same into a shoulder 8 on the face of the link or yoke whereby the thickness of the latter is increased, and the bearing surface 9 at the end of the slot expanded. Any suitable means may be provided for moving one section of the die as 5‴ and forcing it against the other section 5″ to inclose the end of the blank. The male die 2, shown in plan in Fig. 4, consists of a block 10 having an extension 11 which fits in the preliminary slot in the link and serves as an upsetting tool to enlarge the slot, displacing the metal so that it flows into the chamber 7 forming the shoulder 8. This upsetting tool 11 is enlarged adjacent the block at 12, forming a guide which fits in the groove 6 in the female die. Its bottom face 23 is continuous with the bottom face 24 of the upsetting tool proper, and the continuous bottom face forms the bearing surface on the blank at the end of the finished slot. The lower end of the guide 12 has flat faces 21 at each side which form the top faces 22 of the shoulder 8 of the blank.

For the purpose of holding the yoke or link during the upsetting operation so that the bearing surfaces may be accurately spaced as previously described, I provide stationary supports 13 and 14, the first to be used in connection with the links to engage the bearing face 15 which is opposed to the bearing face 9 being formed, and the second, 14, supports the yoke, preferably engaging the front face 16 of the rear arm of the same.

In the practice of my process or method, in its preferred form, I punch or otherwise form in the heated blank of the desired length a slot 17, see Fig. 3, the word punch being used herein in a broad sense as designating any method of making a slot, one end of which slot is spaced from the point fixed for the end 18 of the finished slot adjacent the end of the link by a predetermined distance. The slotted end, while still hot, or if necessary reheated, a working temperature being thus maintained throughout the operation, is then inserted in the aperture 5 of the female die or in section 5‴ thereof. The section 5″ is forced against the section 5‴ inclosing the end of the blank. The upsetting tool 11 of the male die is fitted in the preliminary slot in the link or yoke, the guide 12 entering the guide slot 6 in the female die. The male die moves down without appreciable resistance until it engages the end of the slot in the blank. When thus seated, the male die is forced down until its lower stop face 19 engages the corresponding stop face 20 of the female die, or the dies are moved relatively in any preferred manner to effect the necessary upsetting stroke. At this time the surplus metal at the end of the slot 17 is displaced, and the chamber 7 is filled by the displaced metal forming the shoulder 8, and the bearing surface at the end of the slot is increased in length by the width of the shoulder, taking its contour from the bottom of the upsetting tool. In forming the slot in the yoke or the second

slot in the link, the bearing surface already formed designated 16 in one case and 15 in the other, should be rested on the corresponding support 14 in the one case and 13 in the other, so that the distance between the bearing faces 9 and 15 of the link, and the distance between the front face 16 of the rear arm of the yoke, and the bearing face 9 of the slot in the yoke, will be exactly the distance between the top face of the support 13 or 14, as the case may be, and the top face of the female die increased by the length of the upsetting tool 11 of the male die, measured from the bottom face 19 of the block 10. It is apparent that if the length of the blanks be accurately determined the bearing surfaces may be spaced with exactness without the supports 13 and 14 as they are formed at a predetermined distance from the adjacent ends of the blanks.

By the practice of the process, which is the subject of my invention, the links or yokes with expanded bearing surfaces at the ends of the slots, are thus manufactured with increased economy and accuracy, the shoulder providing the increased bearing surface being formed and accurately placed by a single stroke.

I have thus described the method or process of my invention in its preferred form, and in connection with that method I have described an apparatus by means of which the method may be put into practice. However, I desire to have it understood that the process is entirely independent of the apparatus which I have described and in nowise limited to the details thereof. The scope of my invention is defined in the claims.

I claim—

1. In the manufacture of a metal draft link or yoke having an elongated key slot, the method of expanding the bearing surface at the end of the slot, which consists in making a short preliminary slot and increasing the length of the slot by displacing the metal at one end thereof, thereby locally increasing the thickness of the link and the area of the bearing surface at the end of the slot.

2. In the manufacture of a slotted metal draft link, the method of expanding the bearing surface at the end of the slot which consists in punching a short preliminary slot and increasing the length of the slot by upsetting the metal at one end only thereof, and causing it to flow to one side only of the link, thereby forming a shoulder and locally increasing the thickness of the link and the area of the bearing surface at the end of the slot.

3. In forging a slotted draft link or yoke, the method of producing an expanded bearing surface at one end of the slot which consists in punching a short preliminary slot, inclosing the end of the link in a female die having a chamber beyond the end of the preliminary slot, and inserting a male die in the slot and moving the male die toward the chamber, upsetting the metal beyond the end of the slot, and elongating the slot whereby the thickness of the metal at this point and the area of the bearing surface are increased.

4. In a slotted draft link or yoke, the method of producing an expanded bearing surface at the end of the slot which consists in punching a short preliminary slot, inclosing the end of the link in a female die having a chamber beyond the end of the preliminary slot, inserting a male die in the slot, and moving the male die toward the chamber, upsetting the metal beyond the end of the slot and causing it to flow to one side only, elongating the slot to the desired dimension and increasing the thickness of the link or yoke at this point.

5. In the manufacture of a slotted draft link or yoke, the method of positioning the bearing surface at the end of the slot, which consists in making an elongated preliminary slot spaced from the point at which the bearing surface is to be located, and further elongating the slot to bring its end with the bearing surface to the predetermined position, thereby unsetting the metal at the end of the slot and increasing the bearing surface at that point.

6. In the manufacture of a slotted draft link or yoke, the method of positioning the bearing surface at the end of the slot, which consists in heating the metal, punching a short preliminary slot spaced from the point at which the bearing surface is to be located, inserting a tool therein and moving it relatively to the blank, thereby elongating the slot to bring its end and the bearing surface thereon to the predetermined position.

7. In the manufacture of a slotted draft link or yoke, the method of positioning a bearing surface at the end of the slot and expanding the bearing surface, which consists in forming a short preliminary slot therein, spaced from the position the bearing surface is to occupy, inserting the slotted portion in a female die having a chamber adjacent the predetermined position of the bearing surface, inserting a male die in the slot, and forcing it down until a stop on the male die engages a stop on the female die, displacing the metal at the end of the slot, causing it to flow into the chamber, forming a shoulder whereby the thickness of the link or yoke is increased at this point and the bearing surface expanded.

8. In the manufacture of a slotted draft link or yoke, the method of positioning a bearing surface at the end of the slot and

spacing the same from another bearing surface on the same link or yoke, which consists in making a preliminary slot in the blank, inserting the slotted portion in a female die, supporting the bearing surface already formed on a member fixed relatively to the female die, inserting a male die in the slot, and forcing it down until a stop surface thereon bears against a stop surface on the female die.

Signed at Baltimore, Md., this 12 day of March 1912.

THOMAS HARRISON SYMINGTON.

Witnesses:
A. H. WESTON,
I. O. WRIGHT.