March 7, 1933. S. WHITWORTH 1,900,004

METHOD OF FORMING BRAKE SHOES AND BLANKS THEREFOR

Filed Dec. 15, 1927 2 Sheets-Sheet 1

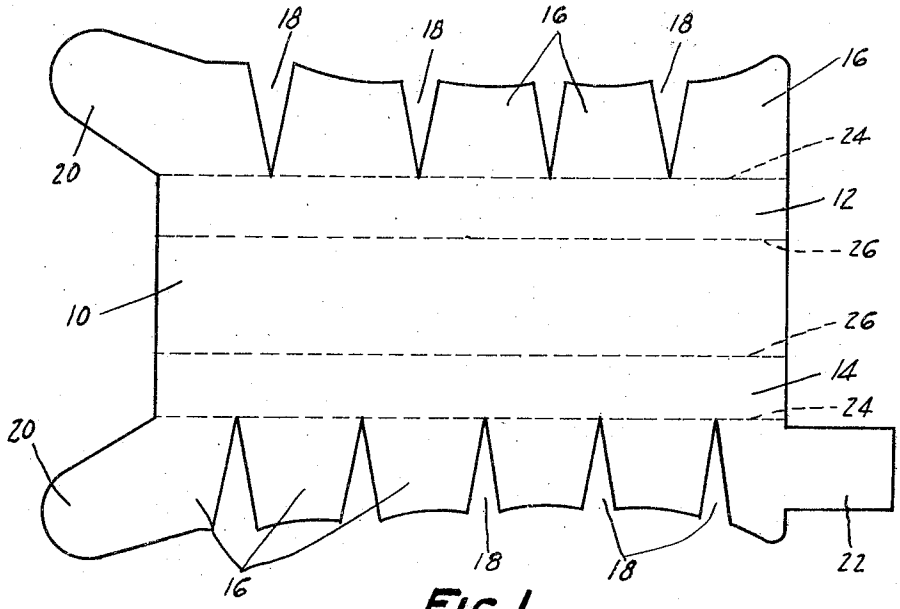


FIG. 1

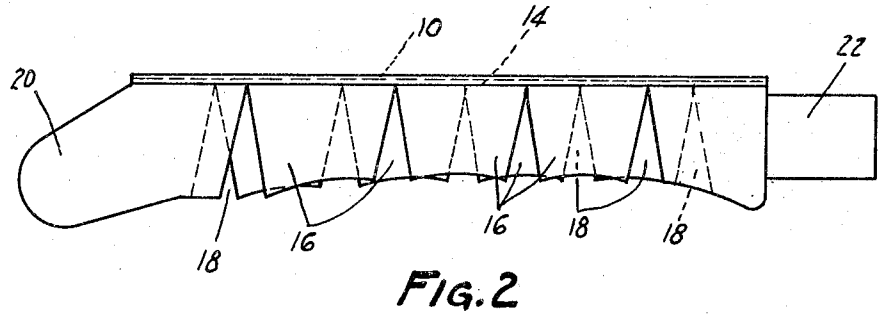


FIG. 2

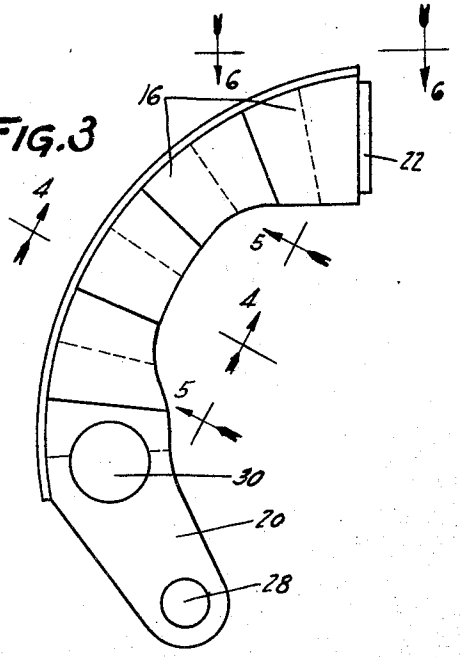
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Filed Dec. 15, 1927 2 Sheets-Sheet 2

FIG. 3



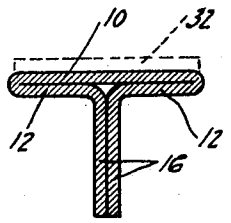


FIG. 4

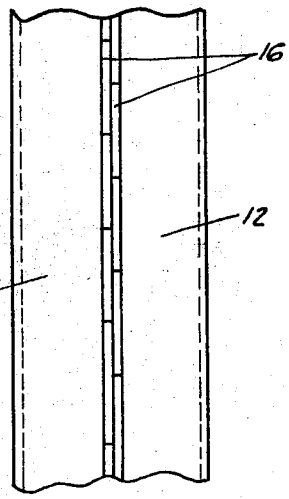


FIG. 5

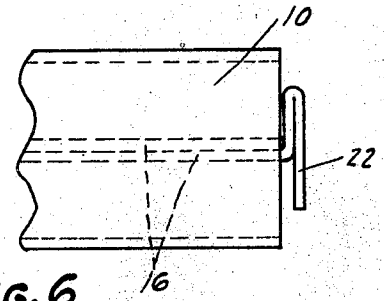


FIG. 6

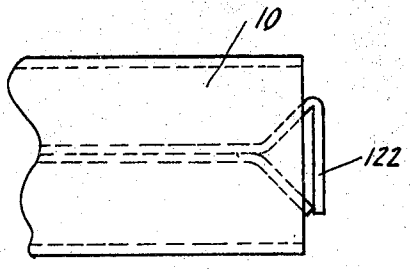


FIG. 7

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Patented Mar. 7, 1933 1,900,004

UNITED STATES PATENT OFFICE

STANLEY WHITWORTH, OF SOUTH BEND, INDIANA, ASSIGNOR TO BENDIX BRAKE COMPANY, OF SOUTH BEND, INDIANA, A CORPORATION OF ILLINOIS

METHOD OF FORMING BRAKE SHOES AND BLANKS THEREFOR

Application filed December 15, 1927. Serial No. 240,175.

This invention relates to brake shoes, and is described in connection with the manufacture of a novel shoe folded from a flat sheet-metal blank, and adapted for use in an internal expanding automobile brake. An object of the invention is to form a light but extremely strong shoe, or the like, preferably by folding it from flat sheet steel in a novel manner, giving it what may be regarded as a laminated structure.

In the arrangement illustrated, the shoe is folded or pressed from a novel blank having, at one or both sides, series of tongues, preferably trapezoidal in form. In the best arrangement the tongues of one series are staggered with respect to those of the other series, and in folding the blank to form a shoe the joints between the tongues of each series are bridged and connected by the tongues of the other series, although in the broader aspects of the invention these joints may be bridged by other means connecting the tongues. The center of the blank, which is generally rectangular in form, constitutes the friction face of the finished shoe, and is ordinarily formed on a cylindrical arc.

In order to fasten the two series of tongues together to form a double-thickness stiffening web for the shoe, it is usually best to fold portions of the blank under the opposite sides of the central position so that the cylindrical part of the finished shoe is also of double thickness. I prefer to fold the blank as described above, prior to bending it to form it on the desired arc.

The blank may, if desired, be formed with one or more portions, which may for example be extensions of tongues at the end of the shoe, and which project beyond the end of the generally-rectangular central portion of the blank, and which form pivot or anchor arms in the finished shoe, and also with an integral extension which forms in the finished shoe a thrust part or cam plate extending crosswise of the shoe.

The above and other objects and features of the invention, including various novel and desirable details, will be apparent from the following description of the construction of the shoe illustrated in the accompanying drawings, in which:

Figure 1 is a plan view of one form of blank for the shoe;

Figure 2 is a side elevation of the blank after it is formed into a T shape in cross-section;

Figure 3 is a side elevation of the shoe, after it is finished except for the attachment of the lining, etc.;

Figure 4 is a section through the shoe on the line 4—4 of Figure 3;

Figure 5 is an inside elevation of part of the shoe, looking in the direction of the arrows 5—5 in Figure 3;

Figure 6 is a top plan view of the end of the shoe, looking in the direction of the arrows 6—6 in Figure 3; and

Figure 7 is a view corresponding to Figure 6, but showing a modified construction.

The novel blank from which the shoe is formed is shown in plan in Figure 1. It includes a generally-rectangular central portion 10, which forms the friction face of the finished shoe, preferably also one or a pair of generally-rectangular side portions 12 and 14, and series of tongues 16 which are preferably generally trapezoidal in form,—i. e. the sides of the openings 18 between the tongues diverge outwardly. I consider it highly desirable that the tongues of the two series should be staggered with respect to each other,—i. e. that the tongues 16 of the upper series should be opposite the openings 18 of the lower series, and vice versa.

The two tongues 16 at one end of the blank may, if desired, be extended as integral projections 20 which form pivot arms in the finished shoe. The illustrated blank also has an integral projection 22 at the other end,

which forms a thrust part or cam plate in the finished shoe.

The blank is first folded into a straight member, such as shown in Figure 2, which is T-shaped in cross-section as shown in Figure 4. This may be done all in one folding operation, or the tongues 16 may be folded 90° in one direction about the dotted lines 24, after which the side portions 12 and 14 are folded 180° in the opposite direction about dotted lines 26. In either case the partly-finished shoe of Figure 2 is obtained, with the same general cross-section as the finished shoe, but straight instead of curved cylindrically and with openings 18 still remaining between the tongues 16.

The shoe is then rolled or pressed into cylindrical arcuate form, the openings 18 being eliminated by bringing the tongues 16 substantially edge to edge. The joint between each adjacent pair of tongues 16 in one of the series of tongues is bridged by one of the tongues 16 of the other series, since as explained above the tongues of the two series are staggered with respect to each other. While held in this cylindrical form, the two series of tongues are permanently secured together, for example by projection-welding or by ordinary spot-welding, thus forming a double-thickness stiffening web for the shoe. An opening 28 may be punched in the pivot arm 20, to receive a bushing or be otherwise formed and arranged to be mounted on a pivot or anchor, and an opening 30 may also if desired be formed to provide clearance for the pivot or anchor of an adjacent shoe.

The tongue, 22, if provided, is folded across the end of the stiffening web, as shown in Figure 6, to provide a thrust member for engagement with a cam or other applying device. Another arrangement for this purpose is shown in Figure 7, where the two end tongues 16 diverge from each other to provide a trussed support for a tongue 122 bent crosswise of the shoe. The tongue 122 may, if desired, be arc-welded at its end to the opposite tongue 16.

The shoe made as described above, completed except for the pivot or anchor bushing ordinarily used in the opening 28 and except for the friction lining (shown however in dotted lines at 32 in Figure 4), is shown in Figures 3–7.

While one illustrative embodiment has been described in detail, it is not my intention to limit the scope of the invention to that particular embodiment, or otherwise than by the terms of the appended claims.

The subject matter herein disclosed and not claimed forms the basis for my copending divisional application Serial No. 603,866 filed April 7, 1932.

I claim:

1. A blank for forming a brake shoe, having a substantially rectangular portion adapted to form the friction face of the shoe and which is integrally connected along at least one side edge with a second rectangular portion which is half as wide as the first portion, and which has along its opposite edge a series of tongues adapted to form a stiffening web for the finished shoe, and which has integrally connected therewith in line with said series of tongues a part projecting beyond the end of the rectangular portion and forming a projecting arm in the finished shoe.

2. A blank for forming a brake shoe, having a substantially rectangular portion which has at least along one edge a series of tongues adapted to form a stiffening web for the finished shoe, and which has integrally connected therewith in line with said series of tongues a part projecting beyond the end of the rectangular portion and forming a projecting arm in the finished shoe.

3. A blank for forming a brake shoe, having a substantially rectangular portion which has along its opposite side edges two series of tongues adapted to form stiffening means for the finished shoe, and which has integrally connected therewith in line with said two series of tongues, respectively, two parts projecting beyond the end of the rectangular portion.

4. A blank for forming a brake shoe, having a substantially rectangular portion which has at least along one edge a series of tongues adapted to form a stiffening web for the finished shoe, and which also has a projecting integral part at one end, adapted to be folded crosswise of the shoe to form a thrust member.

5. A blank for forming a brake shoe, having a substantially rectangular portion for forming the cylindrical part of the shoe, and with portions extending outwardly from its opposite sides and adapted to form stiffening means for the finished shoe, and with portions projecting integrally beyond one end of the rectangular portion in line with the outwardly-extending portions and forming projecting arms in the finished shoe.

6. A blank for forming a brake shoe, having a substantially rectangular portion for forming the cylindrical part of the shoe, and with a portion extending outwardly from at least one of its sides and adapted to form stiffening means for the finished shoe, and with a portion projecting integrally beyond one end of the rectangular portion in line with the outwardly-extending portion and forming a projecting arm in the finished shoe.

7. A blank for making a brake shoe having along its opposite side edges two series of generally trapezoidal tongues, the tongues of one series being opposite the openings between the tongues of the other series.

8. That method of forming a brake shoe which comprises forming a blank with trape-

zoidal tongues along at least one edge, bending the tongues substantially at right angles to the remainder of the blank and bending the blank in an arc to bring said tongues into edge-to-edge abutting engagement to form a continuous stiffening web.

9. That method of forming a brake shoe which comprises forming a blank with trapezoidal tongues along its opposite edges, bending the tongues substantially at right angles to the remainder of the blank and bending the blank in an arc to bring said tongues into edge-to-edge abutting engagement to form stiffening means.

10. That method of forming a brake shoe which comprises forming a blank with two series of trapezoidal tongues along its opposite sides and which are staggered with respect to each other, bending the tongues normal to the blank and bending the blank in an arc to bring the tongues of each series into edge-to-edge abutting engagement and securing the two series of tongues together with the several tongues bridging the joints between the successive tongues of the other series.

11. That method of forming a brake shoe which comprises forming a blank with two series of tongues along its opposite sides and which are staggered with respect to each other, bending the tongues normal to the blank and bending the blank in an arc and securing the two series of tongues together with the several tongues bridging the joints between the successive tongues of the other series.

12. That method of forming a brake shoe which comprises forming a blank with two series of tongues along its opposite sides and which are staggered with respect to each other, bending the tongues at right angles to the blank bending the blank in an arc and securing the two series together with the joint between each two successive tongues of one series being bridged by one of the tongues of the other series.

13. That method which comprises forming a blank with two series of tongues along its opposite sides and which are staggered with respect to each other, bending the tongues at right angles to the blank bending the blank in an arc and securing the two series together with the joint between each two successive tongues of one series being bridged by one of the tongues of the other series.

14. That method which comprises forming a blank with two series of tongues along its opposite sides and which are staggered with respect to each other, bending the tongues at right angles to the blank and bending the entire blank in an arc and securing the two series together with the joint between each two successive tongues of one series being bridged by one of the tongues of the other series.

15. That method which comprises forming a blank with two series of trapezoidal tongues along its opposite sides and which are staggered with respect to each other, folding the blank to bring the tongues at right angles to the remainder of the blank and with the two series of tongues in engagement with each other, the space between each two successive tongues of the one series being bridged by one of the tongues of the other series, and then bending the blank on an arc and securing the two series of tongues together to form a double-thickness stiffening web.

16. That method which comprises forming a blank with a central rectangular portion and with two rectangular portions of half the width along opposite sides of the central portion and with two series of tongues along the sides of the said two portions folding the said two portions under opposite sides of the central portion and folding the tongues at right angles to the double-thickness part so formed, the tongues forming a laminated stiffening means for the double-thickness part.

17. That method which comprises forming a blank with a central rectangular portion and with two rectangular portions of half the width along opposite sides of the central portion and with two series of tongues along the sides of the said two portions, folding the said two portions under opposite sides of the central portion and folding the tongues at right angles to the double-thickness part so formed, the tongues forming a laminated stiffening means for the double-thickness part, and bending the entire blank on an arc, the tongues being trapezoidal in form so that the bending brings them together to form a substantally continuous web.

18. That method which comprises forming a blank with a central rectangular portion and with two rectangular portions of half the width along opposite sides of the central portion and with two series of tongues along the sides of the said two portions, folding the said two portions under opposite sides of the central portion and folding the tongues at right angles to the double-thickness part so formed, the tongues forming stiffening means for the double-thickness part, and bending the entire blank on an arc, the tongues being trapezoidal in form and the tongues of one series being staggered with respect to those of the other series so that the bending brings them together to form a substantially continuous web, with the joint between successive tongues of the one series being bridged by one of the tongues of the other series.

19. That method which comprises forming a blank with a rectangular portion and with a rectangular portion of half the width along

at least one side and with a series of tongues along the side of the said half-width portion and folding the said half-width portion under the side of the first portion and folding the tongues at right angles to the double-thickness part so formed, the tongues forming a laminated stiffening means for the double-thickness part.

In testimony whereof, I have hereunto signed my name.

STANLEY WHITWORTH.

CERTIFICATE OF CORRECTION.

Patent No. 1,900,004. March 7, 1933.

STANLEY WHITWORTH.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, line 14, claim 9, after "form" insert "a laminated"; and that the said Letters Patent should be read with this correctiontherein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of August, A. D. 1933.

M. J. Moore.

(Seal) Acting Commissioner of Patents.