(No Model.)

R. S. GROVES.

METAL BRACE.

No. 600,865. Patented Mar. 22, 1898.

FIG. 1

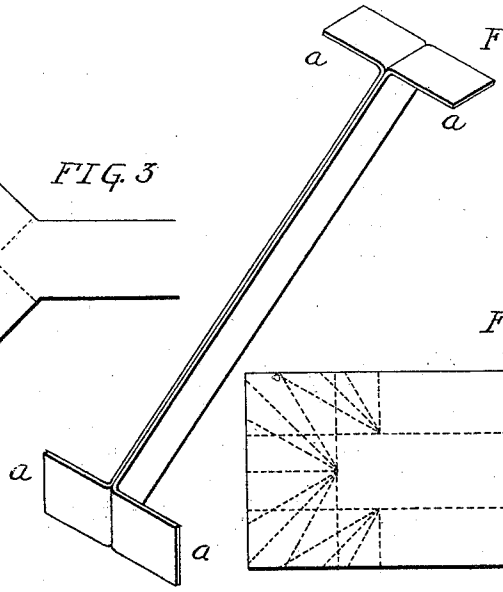


FIG. 3

FIG. 2

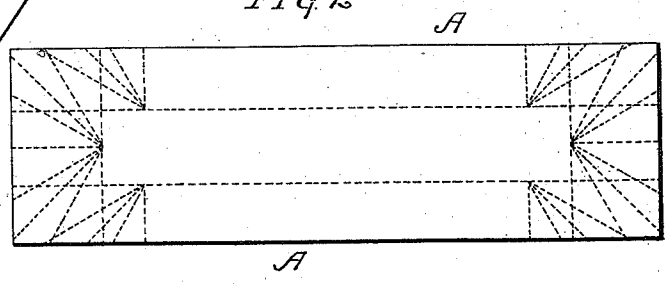


FIG. 4

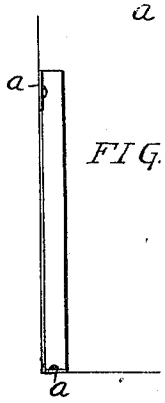


FIG. 5

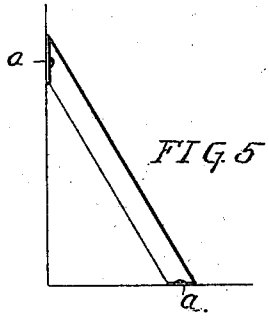


FIG. 6

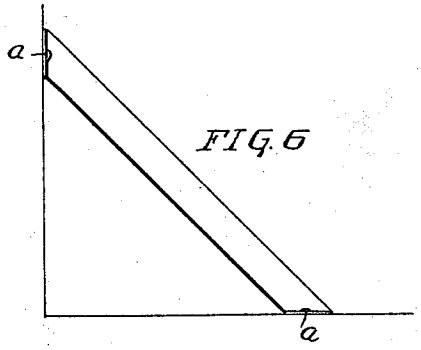


FIG. 7

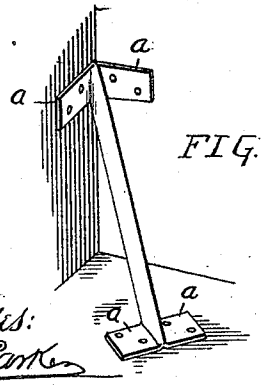
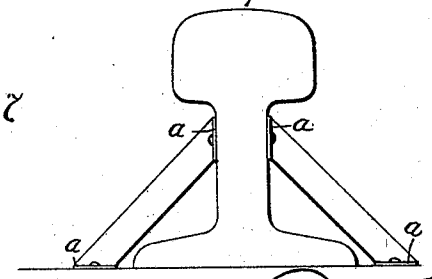


FIG. 8



Witnesses:
Jas. E. Parker
Thomas Killian

Inventor:
Robert S. Groves.
by his Attorney,
Howard Peters.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ROBERT S. GROVES, OF PHILADELPHIA, PENNSYLVANIA.

METAL BRACE.

SPECIFICATION forming part of Letters Patent No. 600,865, dated March 22, 1898.

Application filed October 13, 1897. Serial No. 655,038. (No model.)

To all whom it may concern:

Be it known that I, ROBERT S. GROVES, a citizen of the United States, and a resident of the city of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Metal Braces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to certain improvements in metal braces, and has for its object to provide an improved form of solid steel pressed brace which may be applied to various uses—such as arch-bars, beams, columns, bracing-bars, brackets, rail-chairs, &c.—as more fully set forth hereinafter.

I am aware that ribbed braces have heretofore been constructed with supporting-feet for attachment to flat surfaces, but in such of these with which I am familiar it has been impossible to effect a proper bending of the blank at such angles as will insure the desired inclination of the feet with respect to the strengthening-rib without distorting, crimping, or twisting a portion of the rib and thereby weakening the same.

In my improved brace the desired construction and inclination of the feet or riveting-plates is accomplished by leaving sufficient material in the blanks from which the braces are to be formed at the ends where the feet or integral supporting-plates are desired and regulating the angle of cutting of the slots in the enlarged end portions of the blank, so that the direction of the feet relative to the line of the ribbed portion may be regulated. This is especially desirable in the construction of buildings of structural iron or steel and in bridgework where the angular beam is to be supported upon a narrow cross-beam and the area of support minimized. In such cases the feet may be formed in the precise direction desired, allowing the ribbed portion at the same time the desired angles.

In the accompanying drawings, Figure 1 is a perspective view of a metal brace made in accordance with my invention. Fig. 2 is a plan view of the blank from which the brace is cut, illustrating in dotted lines a number of angles at which the blank may be cut to form braces of different character. Fig. 3 is a plan view of one end of the blank before being bent into form and showing by dotted lines the bending angles of the feet. Figs. 4, 5, 6, and 7 illustrate various forms of side and corner braces formed by bending the feet at various angles to the length of the brace. Fig. 8 illustrates a diagonal brace to be used as a rail-support or chair.

In forming the brace I take a suitable blank A, of steel or other metal suitable for the purpose, of a size sufficient to allow of the formation of the enlarged end portion to form the supporting-feet integral with the main shaft or portion to be ribbed, and by means of a die or other cutting-tool cut away the sides and end of the sheet, preferably on any of the angular lines illustrated in Fig. 2, and so form a blank the feet of which may be bent without any torsion or crimping of the rib into any desired shape and at any desired direction and angle. After cutting the blank is first bent at its longitudinal center to form a strengthening-rib and having at each end feet *a*. Said feet are then readily bent by reason of the construction of the blank to such an angle with respect to the rib as may be necessary for the purpose intended, so that the ribbed shaft may be made to assume with respect to the feet any angle from zero to ninety degrees, or, if desired, an upright position.

It is clear that in forming the blank enough material must be left in the respective feet ends or supporting ends outside of the lines of the main shaft to allow of the formation of the supporting-feet, which necessarily protrude beyond the lines of the shaft, and enough also to provide for the formation of the feet in the desired direction and at the desired angle. In attaching the feet to a curved, or angular, or flat surface the feet are suitably shaped to accommodate the contour of the surface to which they are to be secured.

For tank or building braces or in other places where it is desired to attach a vertical or a horizontal brace to two surfaces at about a right angle to each other the brace is so arranged that in the bending of the feet those at one end of the brace will be at a right angle to those at the opposite end, as shown, for instance, in Fig. 4, the bending angle of the feet being governed by the inclination of

the V-shaped slot cut at the respective ends of the blank A. Braces inclined at different angles are illustrated in Figs. 5 and 6. These may be employed as corner-braces or as brackets for numerous purposes. In Fig. 7 a modification is illustrated in order to show the angle at which the feet *a* may be bent for attachment to three surfaces, as in a corner, the lower feet being attached to the floor or ceiling, as the case may be, and the feet at the opposite end being bent at a right angle to each other for attachment to the vertical walls.

As the braces may be made of any required length from an eighth of an inch or less up to the full length to which it is possible to roll the metallic blank, the braces may be employed for very many purposes. Thus in Fig. 8 I have shown comparatively short braces having their feet bent at about an angle of forty-five degrees to the length of the strengthening-rib and employed as a rail-brace or chair, the braces being disposed either in pairs on either side of the rail or staggered along the length of the rail and secured at one end to the web and at the opposite end to the sill or tie.

It is clear that my invention may also be employed to advantage in arched constructions of ribbed supports.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

As a new article of manufacture a metal brace cut from a blank of metal having a central shank of two thicknesses of metal formed substantially as one and supporting-feet formed integral with the shank beyond the lines of the cut edges of the side walls of the shank, each member of the shank having in its opposite ends a foot portion outwardly flared presenting when formed a flat face, each face being in line with the corresponding face of its adjacent foot member, a V-shaped portion of metal being removed in the blank between each adjacent foot member to attain the desired result, substantially as described.

In witness whereof I have hereunto set my hand this 11th day of October, A. D. 1897.

ROBERT S. GROVES.

Witnesses:

EDMUND S. MILLS,

JNO. E. PARKER.