April 16, 1929. J. D. HAY 1,709,129

METHOD OF CASTING

Original Filed Dec. 17, 1925

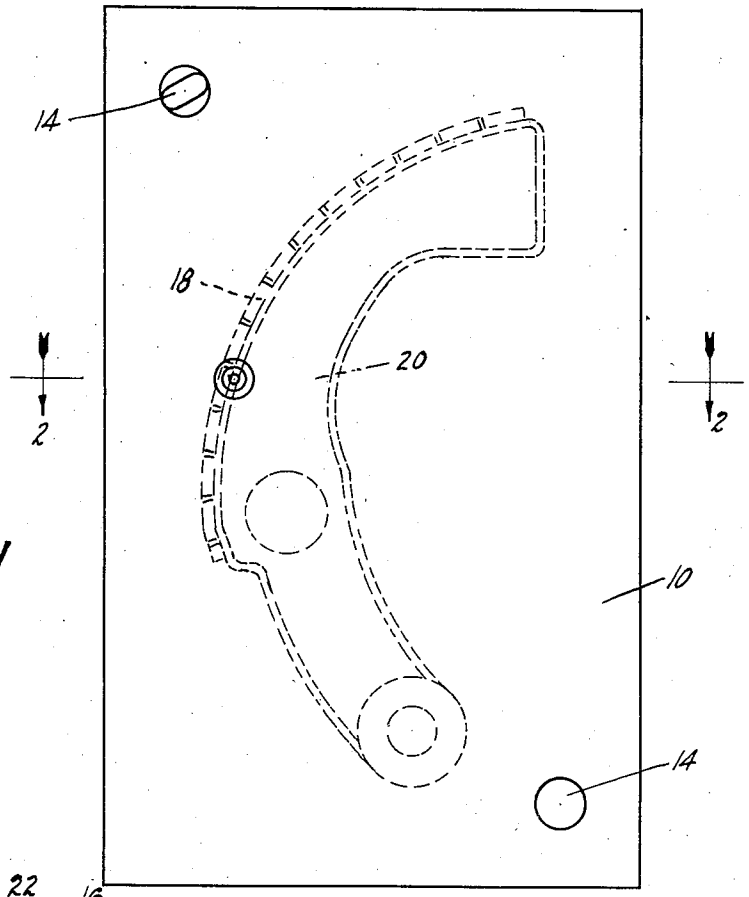


FIG. 1

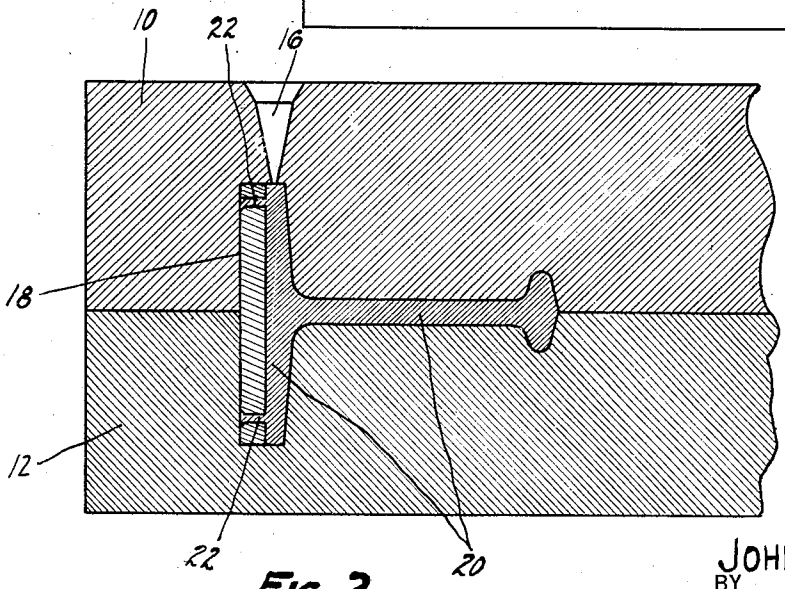


FIG. 2

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UNITED STATES PATENT OFFICE.

JOHN D. HAY, OF SOUTH BEND, INDIANA, ASSIGNOR TO BENDIX BRAKE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

METHOD OF CASTING.

Original application filed December 17, 1925, Serial No. 75,899. Divided and this application filed September 19, 1927. Serial No. 220,329.

This invention relates to the casting of metal articles such as brake shoes, and is illustrated as carried out in casting the brake shoe in such a manner as to form in a predetermined manner a flexible outer material such as brake lining, and at the same time permanently to attach the material to the shoe. Preferably the lining or other flexible material is positioned against one wall of a mold or die and is forced against that wall in such a manner as to assume the same curvature, by the pressure of the metal which is forced into the mold back of the lining, the metal at the same time being forced into the structure of the lining in such a manner as to attach the lining permanently to the shoe as the metal hardens in the mold.

Heretofore, in making brake shoes and the like of metal castings, it has been necessary first to make a rough shoe by casting, then to machine the shoe carefully to make its outer surface truly cylindrical with respect to the center of the brake assembly, then to attach the lining by riveting or the like, and finally to grind or burnish the outside of the brake lining to a truly cylindrical outline. This is because the rough casting has a surface which is not sufficiently accurate in the first place, and then the lining itself necessarily has a tolerance of some twenty thousandths in thickness.

By my invention the two finishing operations on the shoe and on the lining are eliminated, all inaccuracies both in the shoe and in the lining being thrown into the casting, while the outer surface of the lining assumes an accurate cylindrical form as it is forced under the pressure of the casting metal against the wall of the mold. Thus the shoe is accurately finished when removed from the mold except for reaming out the anchor holes, etc.

The above and other objects and features of the invention will be apparent from the following description of one illustrative method shown in the accompanying drawing, in which:

Fgiure 1 is a top plan view of the mold with the shoe shown in dotted lines; and

Figure 2 is a section through the mold and substantially radially through the shoe on the line 2—2 of Figure 1.

According to my invention, the shoe is die-cast under pressure in a mold of any suitable form, and which is illustrated as comprising upper and lower halves 10 and 12 assembled in predetermined relation by the use of guide pins 14 carried by the lower section 12 and received in corresponding openings in the upper section 10. The metal is introduced under pressure, as for example with a die-casting machine of the type employing a permanent mold, through an opening 16 in the upper section 10.

Prior to introduction of the metal, which is ordinarily an alloy of aluminum, a piece of brake lining 18 or equivalent flexible material is placed in the mold in intimate contact with a cylindrical wall which is illustrated as being half in lower section 12 and half in upper section 10. As the metal forming the shoe 20 is introduced through the opening 16 under pressure, behind the lining 18, it forces the lining into intimate contact with the wall of the mold throughout its length, thus assuring an accurate cylindrical surface on the outer face of the lining and throwing all inaccuracies in the lining into the thickness of the metal casting 20. The metal of the casting 20 penetrates into the small openings in the structure of the brake lining 18, thus attaching the lining permanently to the shoe as the metal hardens in the mold. If desired, openings may be formed in the lining 18 through which comparatively large projections 22 of casting metal will be projected during the casting, thus forming in effect rivets integral with the casting 20.

This application is a division of my application No. 75,899, filed December 17, 1925.

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

I claim:

1. That method of forming a metal article faced with a flexible material which comprises introducing an elongated strip of flexible material into a mold in intimate contact with a wall of the mold, then introducing metal under pressure behind the flexible material to force the flexible material against

said wall and also to force the metal into the structure of the flexible material, and then allowing the metal to harden.

2. That method of forming a brake shoe which comprises positioning friction material in a mold and simultaneously forming the body of the shoe and attaching the friction material thereto by casting, under pressure, said body in the mold onto said friction material.

In testimony whereof, I have hereunto signed my name.

JOHN D. HAY.