(No Model.)

W. J. TAYLOR.
COMPOUND METALLIC ARTICLE.

No. 565,243. Patented Aug. 4, 1896.

Fig: 1.

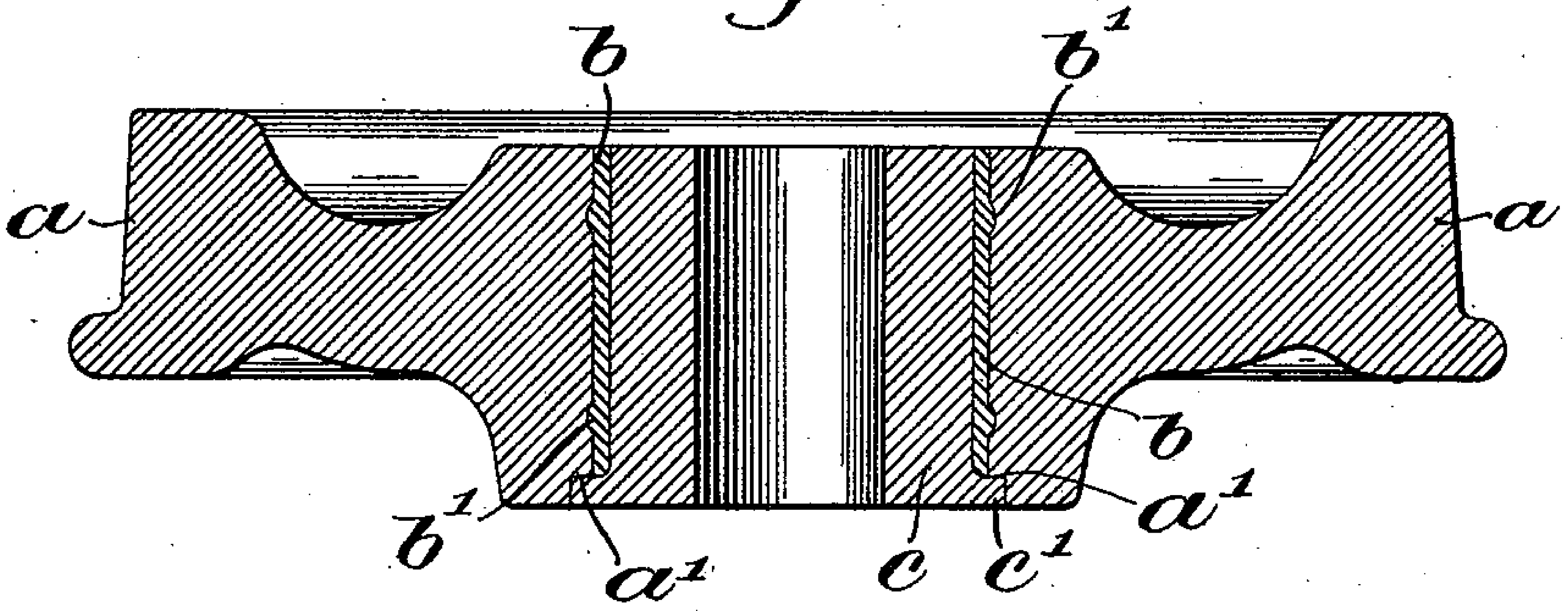


Fig: 2.

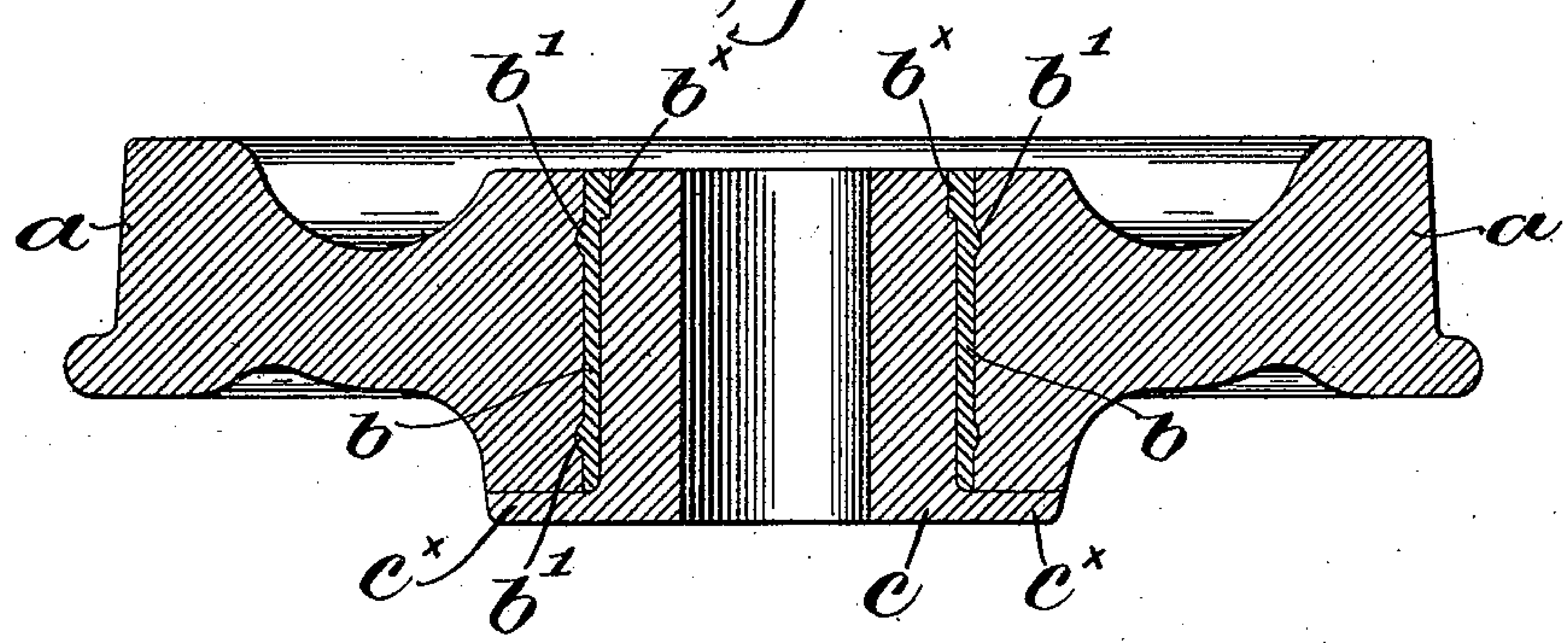
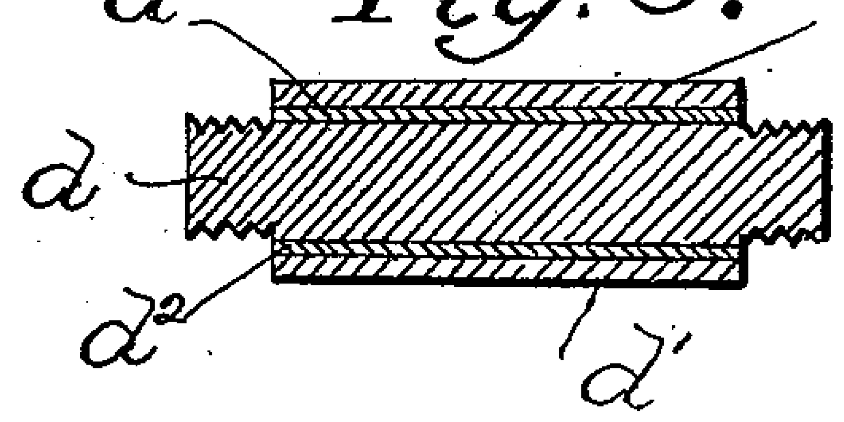


Fig. 3.



Witnesses
Edward F. Allen.
Thomas J. Drummond

Inventor.
William J. Taylor.
by Crosby & Gregory Attys.

UNITED STATES PATENT OFFICE.

WILLIAM J. TAYLOR, OF BOUND BROOK, NEW JERSEY, ASSIGNOR TO THE TAYLOR IRON AND STEEL COMPANY, OF HIGH BRIDGE, NEW JERSEY.

COMPOUND METALLIC ARTICLE.

SPECIFICATION forming part of Letters Patent No. 565,243, dated August 4, 1896.

Application filed March 17, 1894. Serial No. 504,042. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. TAYLOR, of Bound Brook, county of Somerset, State of New Jersey, have invented an Improvement in Compound Metallic Articles, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object the production of compound metallic articles, that is to say, those composed of a plurality of metals having different properties, the said articles being thus adapted to various purposes, and by reason of the mode of manufacture they are cheaply and easily produced.

It is frequently desirable that different portions of a metallic article should have different properties, as, for instance, one part of the article may be very hard and another part relatively soft, in order that it could be readily cut or worked to a given accurate size, or one part of the article might be of high electric conductivity and another part might not. Hitherto one method of making such compound metallic articles has been to unite the two portions of metal by casting one around or within the other, which is thus initially solid. This method is in many cases objectionable, for the two metals might form an objectionable alloy at their junction, or the solid metal might be melted by contact with the molten metal. Again, if the initially solid portion of metal is of sufficient thickness to admit of much subsequent cutting or working, it is so strong and unyielding that it resists the contraction of the cast metal in cooling, causing the said cast portion to split or setting up dangerous stresses within it. Indeed, such a thick piece of initially solid metal heating up relatively slowly would continue expanding while the cast metal was contracting immediately after its solidification. At this time the cast metal is extremely tender and the expansion of the initially solid metal, because continued into this time, is especially liable to burst the tender casting. If a very thin portion of the solidified metal is used, only a small amount of cutting or working is permissible, whereby the availability of the article is diminished.

By my invention I overcome the foregoing objections and produce easily and cheaply a superior article, as will be hereinafter described and claimed.

Figure 1, in section, represents a car-wheel embodying my invention. Fig. 2 is a similar view of a modification to be described, and Fig. 3 is a sectional view of a bridge-pin to be described.

I have herein shown my invention as embodied in a car-wheel consisting of a main or body portion *a*, a thin metallic facing *b*, about which the body portion is cast, and a sleeve or bushing *c*, forced into engagement and held by contact with said facing.

It is very desirable that the body portion *a* of car-wheels should be composed of a hard tough metal, manganese steel being peculiarly adapted for such use, by the term "manganese steel" meaning steel containing from three and one-half to twenty per cent. of manganese, and especially that containing from seven to twenty per cent. of manganese, as specified in United States Patents Nos. 303,150 and 303,151, granted to Robert Hadfield, but as it is very difficult to cut or work it is unfitted to form the bore of the hub, which must be turned or bored to exactly fit the axle therefor.

As axles are made entirely independent of the wheels, it is obvious that they will vary considerably in size, so that each pair of wheels must be fitted to their particular axle. It follows that wheels of manganese steel or other refractory metal must be provided with a hub the bore of which must be of relatively soft metal, which can be easily turned out to fit the axle, in order to produce such wheels at a reasonable cost.

In carrying out my invention I employ what I term a "metallic facing," meaning thereby a comparatively thin metallic sleeve or part, as *b*, of such a nature that it will not injure the cast portion of the wheel to be described nor be in turn injured thereby to a prohibitory degree, the thickness of the facing permitting the contraction of the casting in cooling, and preferably the facing is made of a metal sufficiently soft to be readily worked to size and shape, and it may be in one or more parts. The facing is placed in position in the mold, and the body portion, as a, is cast about it, and if desired the facing may be provided with projections, as b', to enter into the molten metal. After the metal has cooled the facing b is turned accurately to size and a thick bushing or sleeve c of a relatively soft metal is forced into engagement therewith, thereby completing the article. The bushing or sleeve c is thick enough to accommodate any possible variation in size of the axle, and is bored out to form a perfect fit therewith to correct any deviation in the position of the facing from its true center. The cutting of the facing and the bushing is accomplished with ease, as the metal of which they are composed can be easily and cheaply manipulated. Such a thin facing not only has not enough resistance to crushing to burst the cast metal when this is still tender from having recently solidified, but the facing reaches practically its highest temperature by the time that the surrounding molten metal begins solidifying. As the cooling further progresses, and when the cast metal, after solidifying, begins contracting, the facing also has begun cooling and contracting, and therefore offers no resistance to the contraction of the freshly-solidified casting. The advantage in this respect which the thin facing offers is, first, that it is not unyielding; second, that it begins cooling and contracting as soon as the casting reaches the solid state, while a thick bushing would continue expanding while the casting was contracting after solidification in its most tender state.

In Fig. 1 I have shown small fins or projections $b^{\times}$ on the inner side of the facing b to enter suitable recesses made in the exterior of the bushing or sleeve c, as it is sometimes desirable so to construct the facing and sleeve.

In Fig. 1 the body portion is provided with a shoulder a' to receive the flange c', formed on one end of the bushing or sleeve c, while in Fig. 2 the flange $c^{\times}$ on the bushing or sleeve is extended to abut against the face of the central portion of the body a, the flange in each instance, however, being located on the flange side of the wheel.

In certain cases, as, for instance, when the size of the axle is accurately known beforehand, the whole bushing or sleeve, as well as the body of the wheel, may be of manganese steel. In this case, after shaping the metallic facing, I insert into and attach to it a central bushing or sleeve of manganese steel which has previously been shaped accurately, as, for instance, by grinding or pressing while hot. The thickness of the bushing or sleeve depends upon the character of the metal composing it and the diameter of the wheel.

In practice I have found that in a wheel of thirty-three inches diameter a facing of three-sixteenth-inch wrought-iron gas-pipe, six and five-eighths inches inside diameter, gives good results. The outside diameter is six and three-fourths inches, to which diameter the facing is turned.

While I have herein chosen to illustrate my invention in a car-wheel, it is to be understood that my invention is not restricted thereto, for it is obvious that it is applicable to all compound metallic articles wherein two or more metals having different properties are to be united.

I have herein shown the sleeve or bushing held by friction or contact to the facing owing to its having been powerfully forced into it, but I do not restrict myself thereto, as other methods of attachment may be used in many cases.

By way of illustration I make bridge-pins, as shown in Fig. 3, composed of a main or central solid portion d of common steel or other suitable metal, the outside consisting of a shell d' of manganese steel, by attaching the shell to a thin internal facing d^2 of common steel, preferably by casting the manganese steel about said thin facing. The outside of the main central portion d and the interior of the facing d^2 are turned accurately to size, making an allowance for shrinkage. The manganese-steel shell and its facing are then heated and shrunk upon the main central portion.

I claim—

1. The herein-described tripartite article which consists of a main or body portion of manganese steel cast about a thin annular facing, the latter being adapted to be shaped upon its inner side, and a thick sleeve or bushing permanently inserted into and held by contact with the shaped surface of the facing to complete said article, substantially as described.

2. The herein-described car-wheel, consisting of a main or body portion of manganese steel cast about a thin annular facing, the latter being adapted to be shaped upon its inner side, and a thick sleeve or bushing permanently inserted into and held in contact with the inner surface of the facing, to form the hub of and complete the wheel, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM J. TAYLOR.

Witnesses:

LEO SCHWAB,

WILLIAM RAMSEY.