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CARBON BODY AND METAL HOLDER UNIT

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Fig. 1

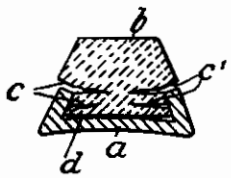


Fig. 2

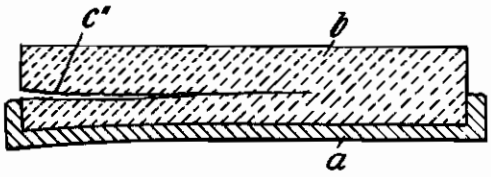


Fig. 3

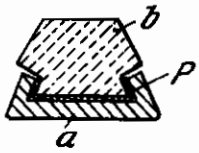


Fig. 5

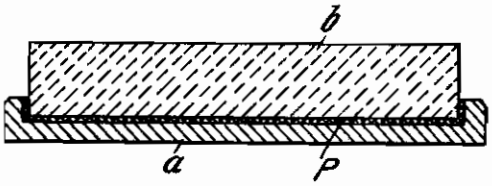


Fig. 4

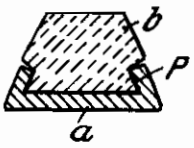
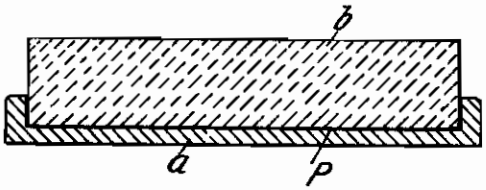


Fig. 6



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ALIEN PROPERTY CUSTODIAN

CARBON BODY AND METAL HOLDER UNIT

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This invention relates to a combined carbon body and metal holder unit of the type used, for example, for contact brushes and more particularly, for brakes.

In units of the type referred to it is difficult to provide an intimate physical connection between the carbon body and its metal holder. The difficulties arise mainly from the fact that the carbon and metal parts have different physical properties and, more particularly, different coefficients of thermal expansion.

It is an object of the present invention to remove these difficulties and to provide a design in which an intimate connection is created and the carbon body is reliably secured to its metal holder without the danger of undue stresses or tensions exerted upon the carbon body by its holder.

With this and further objects in view, as may become apparent from the within disclosures, the invention consists not only in the structures herein pointed out and illustrated by the drawing, but includes further structures coming within the scope of what hereinafter may be claimed.

The character of the invention, however, may be best understood by reference to certain of its structural forms, as illustrated by the accompanying drawing in which:—

Fig. 1 is a cross sectional view of a known unit of the type referred to.

Fig. 2 is a longitudinal section through the same unit.

Fig. 3 is a similar view as Fig. 1, but having the invention applied thereto.

Fig. 4 is the same view as Fig. 3, but showing the parts after shrinking of the metal holder.

Figs. 5 and 6 are longitudinal sections of the arrangements of Fig. 3 and 4, respectively.

Similar reference numerals denote similar parts in the different views.

Referring now to the drawings in greater detail, Figs. 1 and 2 show the condition of the carbon body and metal holder as it may result where the holder is cast around the carbon body. Owing to the considerable shrinking pressure exerted upon the carbon material cracks are formed at c and c' which in turn cause the holder to bend round and form spaces as indicated at *d*. Moreover, due to the longitudinal shrinking the carbon body is bent down whereby the head of the carbon body is separated from the foot portion as indicated at c'' in Fig. 2.

I avoid the said defects by the interposition of an elastic bolster P between the carbon body *b* and its holder *a*, which bolster is embodied in the casting or shrinking operation. The bolster may be of a metallic nature and may consist, for example, of soft copper or aluminum texture or sponge of a thickness corresponding to the amount by which the metal holder will shrink as it is cooling down. Accordingly the texture will be made thicker where a strong and large holder is provided and thinner in case of a thin holder. In each case the bolster material must be of a thickness to be completely compressed after the shrinking of the metal holder. By reason of the shrinking pressure of the surrounding holder it is tightly and completely pressed against the carbon material *b* and in addition it is penetrated by the cast metal of the metal holder *a*.

It will thus be understood that any pressures exerted upon the carbon body *b* by the bolster *a* are compensated by the metal bolster P, whereby a very intimate connection is attained between the carbon and metal holder material while there are no mechanical tensions any more between the top part of the carbon body and the dovetail or foot portion thereof.

As shown by comparison of Figs. 3 and 4, or 5 and 6 respectively, the porous metal bolster P (texture or sponge) of Figs. 3 and 5 is compressed to the dense and much thinner layer P, Figs. 4 and 6 without exerting any excessive pressure upon the carbon body which would cause destruction of the carbon material in the manner as indicated in Figs. 1 and 2.

Figs. 5 and 6 will also make it clear that there is no bending stress exerted upon the carbon body, owing to the uniform and intimate contact between the holder and the carbon body, ensured by the interposed buffer layer P so that there is no danger for the head portion of the carbon body to burst off.

While the figures are especially designed for a carbon body and metal holder unit of the type used as a trolley brush or collector bow for electric railways and the like, my invention may also be applied with very good success for other purposes where a carbon body has to be secured in a metal holder or vice versa. For example, brake blocks of carbon material may be secured in metal holders of iron or cast steel material, steel being used with a view to the high stresses produced by the high pressures with which the carbon blocks are forced against the surface to be braked. However, the shrinking coefficient of iron and cast steel amounts to about 6%. i. e., it is even much higher than that of light metals of the type used as a holder material for electric metal contact devices. Therefore, the danger of

the carbon body being destroyed by the shrinking pressure of the metal holder is even higher in this case. Now, by the provision of intermediate bolster layers of the type above referred to and indicated at P in Figs. 3–6, the carbon body may be protected against any undue pressures.

It will be understood that the interposed bolster material must be heat-proof up to the temperatures occurring by application of the metal holder to the carbon body. For example, where a cast steel holder is applied, the bolster material must be designed to stand the annealing temperature of cast steel.

Where the carbon bodies are not intended to transmit any electric current, such as in the case of brake blocks, non metallic, fire-proof or refractory bolster materials may be used to damp and receive the shrinking pressures of the metal holder. For example, mineral material, asbestos, slag wool, silicate cotton, cinder hair and the like may be used in the form of a texture or loose mass which is compressed as the surrounding metal casting is shrinking together.

It is also contemplated that bolsters of the type referred to may be applied where the metal holder is combined with the carbon body in a heated, but solid condition of the holder, by a mere shrinking operation.

The method and apparatus of the present invention have been described in detail with reference to specific embodiments. It is to be understood, however, that the invention is not limited by such specific reference but is broader in scope and capable of other embodiments than those specifically described and illustrated in the drawing.

OTTMAR CONRADTY.