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METALLURGICAL BRIQUETTE AND METHOD OF MAKING SAME

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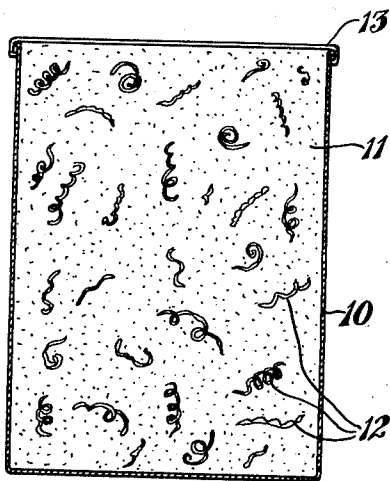


Fig. 1

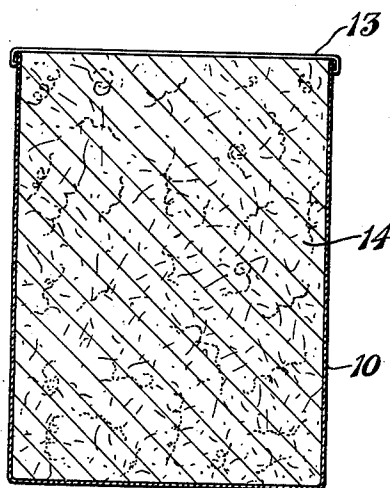


Fig. 2

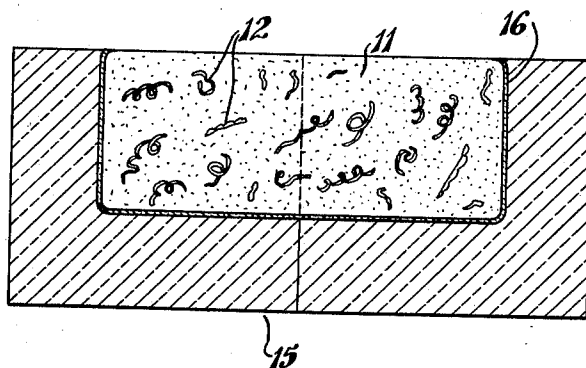


Fig. 3

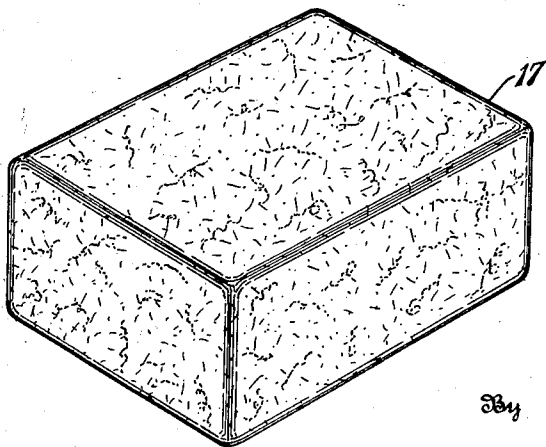


Fig. 4

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METALLURGICAL BRIQUETTE AND METHOD
OF MAKING SAMEJoseph W. Weitzenkorn, Canton, Ohio, assignor
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4 Claims. (Cl. 75-44)

The invention relates to briquettes of metallic content for use as additions, deoxidizers and the like, in the manufacture of irons and steels, and to the method of making such briquettes.

5 In the manufacture of irons and steels it is customary to make additions to the charge or melt, of various metalliferous products or ferro-alloys, such as chromium, silicon, manganese, and the like, either as alloys or deoxidizers.

10 As it is necessary, in order to produce the desired results, that a definite quantity of the desired metalliferous product be added, it is desirable that each piece or lump of the addition be of such size that it will have a definite metallic content.

15 To accomplish this it is common practice to form briquettes of a definite known weight of the desired element, in finely divided form, mixed with cements, clays, lime or other non-metallic material as a binder. This necessitates the handling, transportation, and addition to the charge or melt, of materials that are of no value to the iron or steel production, and further must be fluxed and carried away as slag, thus absorbing

20 heat and requiring energy to discard them. The object of the present invention is the production of briquettes of metallurgical products, utilizing as a binder a metalliferous product, which is of itself of value to the iron or steel to be made, and which has a lower melting point than the metallurgical product to be briquetted.

25 A more specific object of the invention is the production of a briquette containing a definite known quantity of chromium, silicon, manganese or the like, and a smaller quantity of gray iron borings or turnings, or the like, uniformly mixed therewith as a binder.

30 A further object is the production of such a mixture of metalliferous materials packed within a closed container of sheet metal or the like.

35 A still further object is the provision of such a mixture of metalliferous materials, which is then heated to substantially the melting point of the iron, or other metal used as a binder, cementing the mix into a solid metallic briquette.

40 Another object of the invention is to form such a solid metallic briquette, either within a closed container, or within a refractory mold from which the briquette is removed when molded.

45 The above objects, together with others which may be apparent from the drawing and following description, or which may be later referred to, may be attained by producing the improved metallurgical briquettes in the manner hereinafter

described, and illustrated in the accompanying drawing, in which—

Figure 1 is a sectional view through a closed container within which is packed a mixture of a finely divided ferro-alloy, or the like, and iron borings or turnings to form a binder;

Fig. 2, a similar view of the article shown in Fig. 1, after the same has been heated to a cementing heat;

Fig. 3, a sectional view through a refractory mold, showing the manner of molding a metallurgical briquette therein; and

Fig. 4, a perspective view of the briquette molded in the manner shown in Fig. 3.

Similar numerals refer to similar parts throughout the drawing.

In carrying out the invention, the desired metalliferous product, which may be ferro-chromium, ferro-silicon, ferro-manganese, or other ferro-alloy or metallic element, is crushed, or otherwise reduced to about 10 mesh or finer, preferably about 40 to 60 mesh is desirable.

25 A definite known quantity of this finely divided metalliferous product, for example one or more pounds, is mixed with the desired amount of low melting point metalliferous binder, depending upon the strength of briquette required.

30 Preferably at least 10% of the metalliferous binder is used and for most purposes 15 to 20% of the metalliferous binder is sufficient, although a higher percentage may be used if desired.

35 For example, the metalliferous binder may comprise gray iron borings or turnings, or other small shapes and sizes. It should be understood however that the invention is in no way limited to gray iron, as Spiegeleisen or other metalliferous product of comparatively low melting point may be used as a binder.

40 As shown in Fig. 1, a container 10, which may be of sheet iron or steel, may be substantially filled with a mixture of a definite known quantity of the desired ferro-alloy or other metalliferous product, in finely divided state, as indicated at 11, and the desired percentage of gray iron borings or turnings, as indicated at 12, preferably uniformly distributed therethrough.

45 This mixture may be packed within the container 10, and a lid or cover 13 may then be tightly fastened upon the container, as by crimping or seaming, as shown, thus producing a compact briquette of the desired mixture tightly enclosed within the container.

50 The article shown in Fig. 1, may then be heated to a "cementing" heat, approximately 2250° F., in the case where gray iron borings are used,

which cements the mixture into a solid lump or briquette within the container as indicated at 14 in Fig. 2.

When the article as shown in Fig. 2 is charged into the cupola or furnace, the entire container and contents will be melted down and absorbed by the charge or melt, and will be of value to the iron or steel being made. There is thus no handling, transporting or addition of materials that are of no value to the iron or steel production, or which must be fluxed and carried away as slag.

If desired, the article shown in Fig. 1, may be charged as is into a cupola or furnace, in which the heat will "cement" the mixture into the condition shown in Fig. 2, after which the briquette will be melted and absorbed in the same manner as above described.

The briquettes may be formed without a container, as shown in Fig. 3, in which a refractory mold of separable construction, is indicated at 15. The inside of the mold may first be given a lime or clay wash, as indicated at 16, to prevent the briquette from sticking.

A mixture of ferro-alloy and iron borings or turnings, as shown at 11 and 12 respectively, may then be packed in the mold in the manner described relative to Fig. 1, and then heated to a "cementing" heat, as above described.

When the mold is opened the briquette as shown at 17 may be removed therefrom and is a solid metallic block which may be safely handled and transported, and which may be charged into a furnace or cupola as above described.

From the above it will be seen that briquettes of ferro-chromium, ferro-silicon, ferro-manganese and similar alloys can be made wherein the binding material is of value to the production,

and without the use of refractory combinations which must be slagged off.

Attention is called to the fact that the metalliferous binder is a necessary part of the invention even though the container, as shown at 10, is used. Without the binder to hold the finely divided ferro-alloy in a solid block, when the sheet metal container melts away under the heat of the furnace or cupola, there will be a considerable loss of the unmelted finely divided material.

I claim:

1. A briquette composed of a ferrous metal container, and a mixture of finely divided ferro-alloy and a relatively small amount of metalliferous binder having a melting point lower than said ferro-alloy and not less than 1800° F., within said container.

2. The method of making a briquette for iron or steel making additions comprising mixing a finely divided alloy with a sufficient amount of a metalliferous binder having a melting point lower than the alloy and not less than 1800° F., and then heating the mixture to the melting point of the binder to form a solid metallic mass.

3. The method of making a briquette for iron or steel making additions comprising mixing a finely divided ferro-alloy with a sufficient amount of gray iron borings or turnings, and then heating the mixture to the melting point of the gray iron to form a solid metallic mass.

4. A briquette composed of a ferrous metal container, and a mixture of finely divided ferro-alloy and a relatively small amount of binder of gray iron borings or turnings within said container.

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