Oct. 1, 1957 H. G. WARRINGTON 2,808,322

BRIQUETTES FOR METAL RECOVERY

Filed March 11, 1954

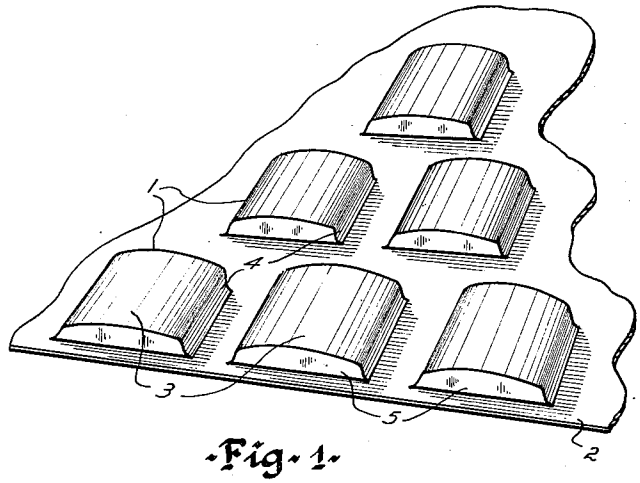


Fig. 1.

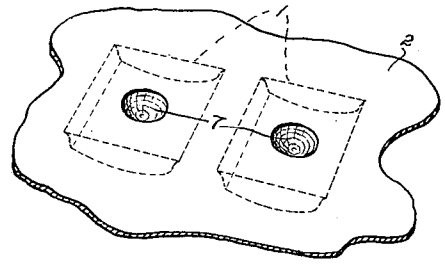


Fig. 2.

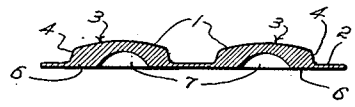


Fig. 3.

INVENTOR.
Harold George Warrington
BY Alex. E. MacRae
Attorney.

United States Patent Office

2,808,322

Patented Oct. 1, 1957

2,808,322

BRIQUETTES FOR METAL RECOVERY

Harold George Warrington, Toronto, Ontario, Canada, assignor to Dominion Magnesium Limited, Toronto, Ontario, Canada

Application March 11, 1954, Serial No. 415,650

5 Claims. (Cl. 75—3)

This invention relates to briquettes and more particularly to briquettes of raw materials employed in the production of metals by reduction and distillation in retorts or furnaces and the like.

In the production of alkaline earth metals, it is well known to form the starting raw materials into briquettes for charging into the retort in which reduction of the raw materials and distillation of the metal takes place. In the distillation of metals from a briquetted reduction charge, the size and shape of each individual briquette should be such that the metal vapors can easily escape from the individual briquette and also can easily escape from the mass of briquettes in the charge. The briquettes must also be of such shape that they can be easily made by available commercial means. Shapes and sizes of the briquettes which satisfy one condition do not readily satisfy the other; for example, thin cylindrical tablets will pack in the charge so that no space is available between the briquettes for escape of vapors.

It is an object of this invention to provide a briquette of the type set forth which is of a reduced size and of a shape which will satisfy to a greater degree than briquettes heretofore proposed the desirable conditions set forth above.

The invention will be described with reference to the accompanying drawing, in which

Figure 1 is a perspective view of a portion of a sheet of briquettes in accordance with the invention,

Figure 2 is a perspective view of a sheet of briquettes in modified form, and

Figure 3 is a cross-sectional view of the briquettes shown in Figure 2.

In the formation of briquettes from granules or particles of raw materials, it is common practice to pass such granular materials between a pair of pressing rolls having briquette forming depressions or recesses therein. In order to reduce the size of the formed briquettes to approximately one-half the thickness of previously produced briquettes, in accordance with the invention, it is proposed to employ pressing rolls only one of which has briquette impressions cut therein, the other roll comprising a smooth surfaced cylinder.

Referring to Figure 1, the briquettes in accordance with the invention and produced in the manner described, are of a composite nature and may comprise a plurality of shaped briquettes **1** joined together by an integral connecting sheet or flashing **2**.

Each briquette is preferably of the following dimensions:

	Not Substantially Greater Than—	Preferred Approximately
	Inches	*Inches*
Length	2¼	1⅛
Width	2¼	¾
Thickness	1½	½

It will be appreciated that the thickness will comprise the thickness of the briquette shape proper plus the thickness of the sheet **2**. The approximate thickness of the sheet **2** is 3/16".

The shape of each individual briquette may vary within wide limits. Thus, they may be of hemispherical or half-ovoid shape or their upper surfaces may be slightly rounded contour. It will be appreciated that a rounded contour will provide minimum contact with each other when assembled in stacked relation to each other in a retort to provide space for escape of vapors. A preferred shape is as shown wherein each briquette has a generally tetragonal or orthorhombic shape. As shown also, and preferably, the major upper surface **3** and side surfaces **4** of each briquette are of slightly rounded contour. The end surfaces **5** may also be of rounded contour with rounded corners. Each briquette also has one plane major surface **6** in opposed relation to the major upper surface **3**, such surface **6** being extended as a joining flash or fin by means of the sheet **2**.

In use, sheets of joined briquettes are broken up into rough pieces each containing from two to five briquette shapes to produce a multiple or composite briquette. This facilitates handling of the briquettes. Moreover, such a multiple briquette has the advantage of minimum thickness so that vapors pass readily from the middle of a mass of such briquettes to its surface since integral gas passages are provided between the raised portions whereby even with close packing, escape of vapors readily takes place.

The following table shows the results of a series of tests in the production of calcium from appropriate raw materials employing (1) individual briquettes each substantially double the size of each individual briquette form as herein described and of corresponding shape (designated as "whole briquettes"), and (2) multiple briquettes of the type herein described and illustrated (designated as "half briquettes"):

	Weight of Metal Recovered Briquettes		Percent of Theoretical recovery Briquettes		Improvement with "Half" briquettes	
	"Whole"	"Half"	"Whole"	"Half"	Weight in Lbs.	Recovery, Percent
Test No.:						
1	225	225.5	86.5	86.7	0.5	0.2
2	205.6	211.3	71.9	73.9	5.7	2.0
3	90	106	62.9	74.1	16.0	11.2
4	206.5	221.5	75.2	82.9	15.0	7.7
5	161.5	165	82.8	84.6	3.5	1.8
6	113	113	87.0	87.0	0.0	0.0
7	318	327.6	81.6	84.0	9.6	2.4
8	204	203.2	78.5	78.1	−0.8	−0.4
9	195.5	199	75.2	76.6	3.5	1.4
Totals	1,719.1	1,772.1			53	
Weight, percent improvement					3.08	
Recovery, percent improvement						2.9

It will thus be apparent that the briquette of the present invention constitutes a substantial improvement over those heretofore employed and that a considerably improved yield of metal is obtained.

The surface area to volume ratio of the briquettes described may be increased without increasing the bulk density by providing one or more shallow depressions **7** in the plane surface of each briquette form, as shown in Figures 2 and 3.

What is claimed is:

1. A briquette consisting of a compacted mixture of particles of raw materials for recovery of metal there-

from, said compacted mixture having a pair of sharply defined exposed surfaces each of major extent, one of said major surfaces being of curved contour, and the other of said major surfaces being substantially plane and in opposite relation to said first surface, the shortest distance between any point on said second surface and said first surface being substantially less than the width of said second surface, and a fin of irregular outline having a surface constituting a continuation of said plane surface and extending therearound.

2. A briquette as defined in claim 1, each said surface being of rectangular shape and having an overall length and width each not substantially in excess of two and one-quarter inches, and the greatest thickness between said surfaces being not substantially in excess of one and one-half inches.

3. A multiple briquette consisting of a compacted mixture of particles of raw materials for recovery of metal therefrom, said briquette comprising a sheet having one side surface thereof substantially plane and free from projections, the opposite side surface of said sheet having thereon a plurality of spaced integral projecting portions, each said portion having a major surface of curved contour, the combined thickness of said sheet and one of said projecting portions being not substantially in excess of one and one-half inches.

4. A multiple briquette as defined in claim 3, the number of said enlarged portions being not more than five.

5. A briquette consisting of a compacted mixture of particles of raw materials for recovery of metal therefrom, said briquette comprising a sheet of irregular outline having one side surface thereof substantially plane and free from projections, the opposite side surface of said sheet having thereon an integral projecting portion, the combined thickness of said sheet and said projecting portion being not substantially in excess of one and one-half inches.

References Cited in the file of this patent

UNITED STATES PATENTS

784,850	Furukawa	Mar. 14, 1905
1,073,381	Wolle	Sept. 16, 1913
2,386,073	Stewart	Oct. 2, 1945
2,485,128	Adams	Oct. 18, 1949