No. 623,652. Patented Apr. 25, 1899.

R. A. CARTER.

PILE FOR MANUFACTURING BARS.

(Application filed Dec. 27, 1897.)

(No Model.)

FIG. 1.

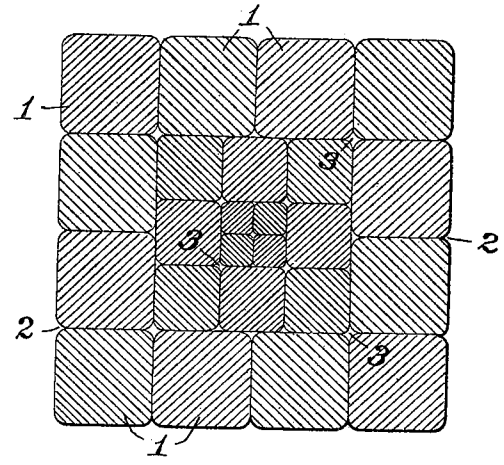


FIG. 2.

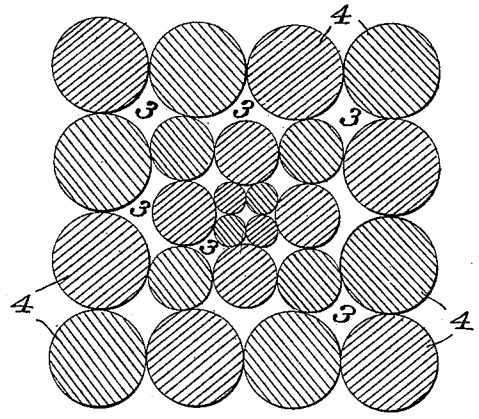
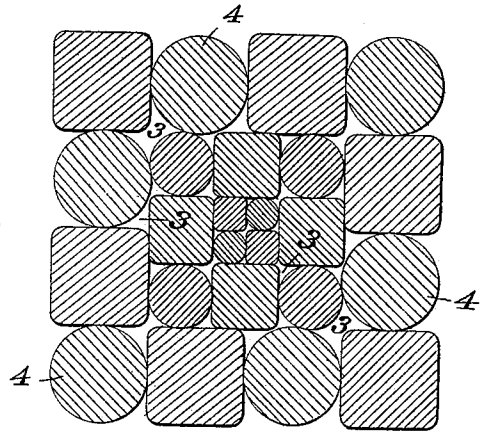


FIG. 3.



WITNESSES:

Chas. F. Miller.

F. E. Gaither.

INVENTOR,

Robert A. Carter

by Dennis S. Wolcott

Att'y.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ROBERT A. CARTER, OF PITTSBURG, PENNSYLVANIA.

PILE FOR MANUFACTURING BARS.

SPECIFICATION forming part of Letters Patent No. 623,652, dated April 25, 1899.

Application filed December 27, 1897. Serial No. 663,667. (No model.)

To all whom it may concern:

Be it known that I, ROBERT A. CARTER, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in the Manufacture of Iron, of which improvements the following is a specification.

The invention described herein relates to certain improvements in piling iron billets for the manufacture of finished bars, &c., and has for its object such an arrangement of billets as will permit of a thorough permeation of heat to the interior of the pile and the thorough drainage of slag or cinder from the interior of the pile.

It is a further object of the invention to so arrange the pieces or billets that one piece or billet will overlap or cover the joint or line of contact between contiguous pieces, so as to insure a union of the contiguous pieces not only along their contacting edges, but also their being bound together by the piece covering the joint between such edges.

It is also the object of the invention to insure a uniform working of all parts of the finished bar.

The invention is hereinafter more fully described and claimed.

In the accompanying drawings, forming part of this specification, Figure 1 is a sectional elevation of a billet-pile, illustrating my invention. Figs. 2 and 3 are similar views illustrating modifications of the invention.

In the practice of my invention the puddled ball is rolled or hammered out to form muck-bars, which are then cut up into suitable lengths or sections. The muck-bar sections are then piled, heated, and rolled down to billets rectangular in cross-section. These billets are then cut into sections of a length dependent upon the size of the finished bar to be produced. These billet-sections are then arranged in piles, which are heated and rolled to finished bars. In order to secure a thorough welding together of the billets forming the pile, adjacent pieces should be in contact with each other. When the billets are made rectangular in cross-section, as has been customary heretofore, it is practically impossible to obtain such contact of surfaces of adjacent billets without forming a practically solid pile. In heating such a form of pile the interior portions are raised to the desired temperature by conduction only, which form of heating is slow and is also objectionable, as the exterior portions must either be raised to an injuriously high temperature or must be maintained at the desired welding temperature for such a length of time as to produce injurious effects, and, further, the compactness of the pile will prevent the escape of slag and cinder, the presence of which will prevent the welding together of the billets. In order to overcome these difficulties, I employ billets of an irregular or unmatchable shape in cross-section, and under this term is included any cross-sectional shape which will preclude the arrangement of a number of such billets in a solid compact imperforate body. In other words, the billets which are to form the pile should be of such cross-sectional shape that when arranged together in a pile portions, but not all, of their adjacent surfaces are in contact. This object can be attained by beveling or rounding the corners of the square or oblong billets now employed, as shown at 1 in Fig. 1, such beveling or rounding being effected during the rolling operation by forming fillets in the corners of the roll-passes, or the sides of the billets may be made concave. If desired, the billets may be made round, oval, or polygonal, as shown at 2 in Figs. 2 and 3. When these irregularly-shaped billets are arranged in piles, portions of their adjacent surfaces will be in contact, and by reason of the irregular cross-sectional shape of the billets passages 3 will be formed through the piles. These passages will permit of the flow of heat through the piles, thereby insuring the heating of the interior portions of the piles with practically the same rapidity as the exterior portions. In addition, the passages will permit of the easy escape of slag or cinder which would prevent the thorough welding together of the billets. As shown in Fig. 3, a pile having passages therethrough may be formed by a combination of rectangular and irregularly-shaped billets, the different shaped billets alternating with each other.

It is generally characteristic of finished bars rolled from piles formed in the usual manner that the exterior portions are dense, while the

interior portions are more or less open and spongy. This difference results from the fact that the billets forming the piles are of the same size—*i. e.*, have had an equal amount of working in the rolls or under the hammer. The piles formed from such billets are heated and then rolled or hammered; but the condensing or compacting effect of the rolls or hammer gradually diminishes from the surface to the interior, and hence the metal in the interior does not receive sufficient working to bring it up to the same character as the exterior portions. In order to overcome this objectionable feature, the pile should be formed of billets of different sizes in cross-section—as, for example, the core or middle portion of the pile should be formed of billets half an inch in diameter or half an inch square. Outside of this core are placed billets one inch square or in diameter, and billets an inch and a half square or in diameter are placed around the latter. As all these varying sizes of billets are produced from the same or approximately the same sized muck-piles, it follows that the smaller billets will receive during reduction a proportionally greater amount of work. By placing these small billets in the middle of the pile and the larger outside, the latter will receive the greater amount of working during the reduction of the billet-pile. By properly proportioning the sizes of the billets forming different portions of the pile, a finished bar having all its portions equally worked and therefore equally compact will be produced.

In addition to insuring an equal working of all parts of the finished bar the employment of different sizes of billets in the formation of the piles facilitates such an arrangement of billets that the joints between two adjacent billets will be covered or overlapped by a third billet. Such a formation is desirable, as it changes the planes of weld and insures the covering of one plane of weld by a solid or unwelded body of metal.

While it is preferred to reduce the puddled ball to muck-bars, which are then piled and rolled to form the billets, the latter may be rolled direct from the puddled ball.

I claim herein as my invention—

1. A pile for the manufacture of finished bars, &c., formed in part at least of billets of such shape or contour as to prevent the arrangement of the billets in a compact pile, the billets having different degrees of working, and those having the greatest working being nearest the center of the pile, substantially as set forth.

2. A pile for the manufacture of finished bars, &c., consisting of billets having different degrees of working, those having the greatest working being nearest the center of the pile, substantially as set forth.

In testimony whereof I have hereunto set my hand.

ROBERT A. CARTER.

Witnesses:
DARWIN S. WOLCOTT,
F. E. GAITHER.