

932,765.

2 SHEETS—SHEET 1.



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 APPARATUS FOR HANDLING SLAG.
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Patented Aug. 31, 1909.
 2 SHEETS—SHEET 2.

Fig. 2.

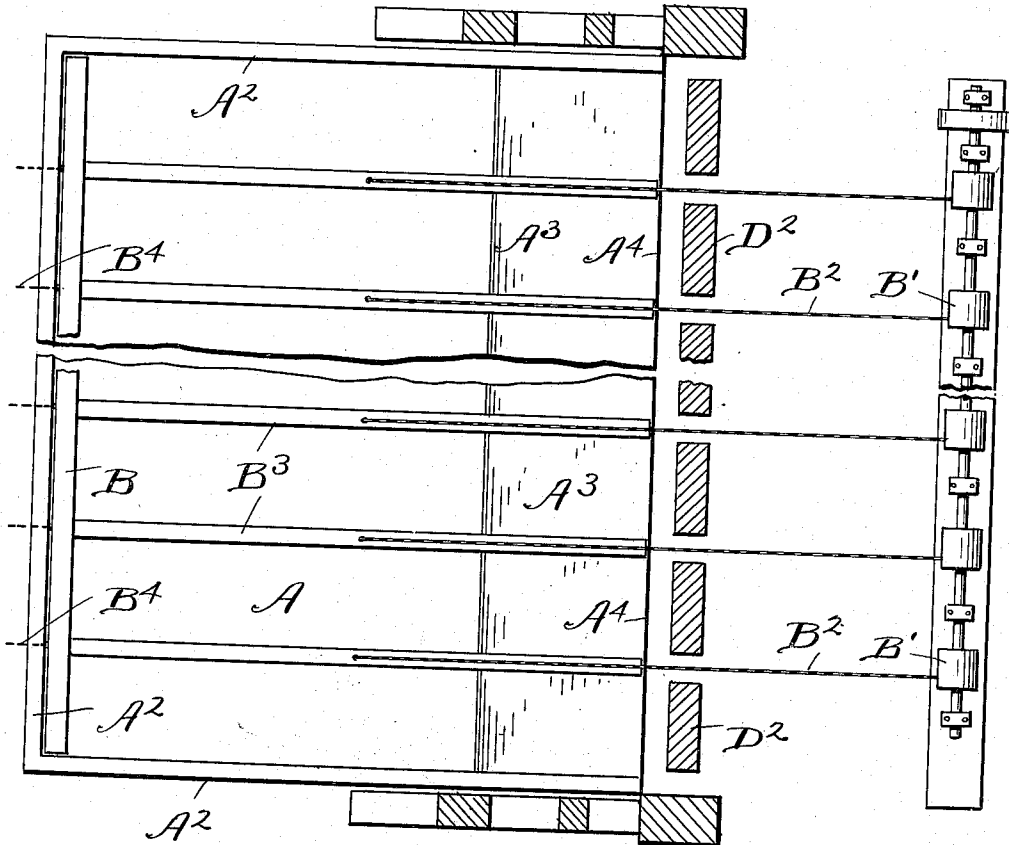
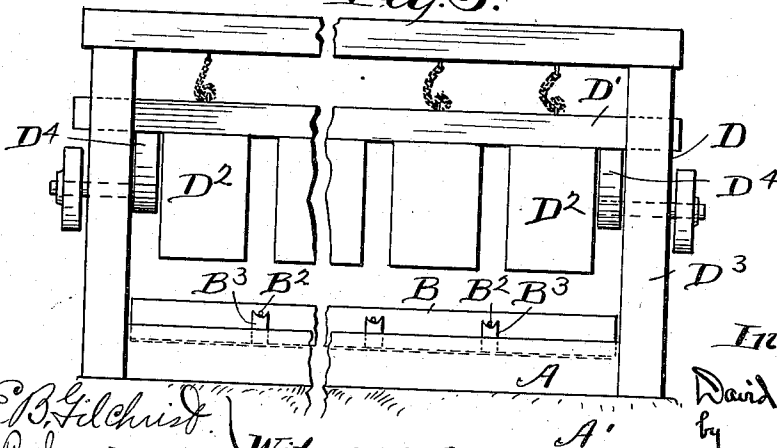


Fig. 3.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR HANDLING SLAG.

932,765.

Specification of Letters Patent.

Patented Aug. 31, 1909.

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To all whom it may concern:

Be it known that I, DAVID T. CROXTON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Apparatus for Handling Slag, of which the following is a full, clear, and exact description.

The object of the present invention is to provide an improved method of and apparatus for handling blast furnace slag in large quantities, with a view not only to properly dispose of the entire furnace run, no matter how large it may be, but with a view to disposing of it economically and improving its condition to such a degree that it will acquire a commercial value of considerable amount.

Heretofore it has been the practice in most places to either dump the slag into piles, where it was wasted, or, in the event that the location of the plant was such as to prohibit the use of slag dumps, to cast it into pits where it was permitted to cool and subsequently broken up by hand labor and shoveled into conveyers for removal either to a dump elsewhere or to such a market as it might be fitted for. I am also aware that it has been proposed to dispose of the slag by running the molten material onto revolving tables, where it is granulated,—the granules being scraped off into traveling receivers. Further it has been attempted to utilize the slag by pouring it into pans, wherein it is molded into bricks, which pans may be disposed on an endless carrier or may be supported on stationary trunnions and inverted for the purpose of delivering the molded brick. I have, however, devised an apparatus and a method of handling the slag distinct from the above mechanisms and practices, which are capable of caring for slag in any amount in which it may be delivered from the furnaces, and by which it may be delivered in an improved condition, such as will bring a high price in the market for such purposes as railroad ballast. Moreover, my procedure dispenses with the large quantity of hand labor commonly employed in slag casting pits, and the rapidity of operation is far in excess of that known in any places where pits are used.

Referring to the accompanying drawings, which illustrate an arrangement by which my invention may be carried into practice, Figure 1 is a cross section showing the gen-

eral relation of the parts. Fig. 2 is a plan of the casting table showing the breaker partly in section together with the connections of the discharging device. Fig. 3 is an end view illustrating the structure of the breaker.

It is my purpose to deliver the slag either in ladles, bogies or run ways in any manner suitable to the plant, to a casting table A which shall be preferably composed of water cooled iron plates. The table should be of a considerable extent so as to take care of all of the slag that may be desired, and should be mounted solidly upon a stationary support A'. The back and the ends of the table should be provided with upwardly extending sides A², while the forward or discharge side of the table floor should be inclined upwardly and gradually as at A³, so as to give the forward edge A⁴ approximately the same level as the three sides A² just mentioned. By this means a retaining inclosure of proper depth is obtained, that depth being sufficient to give the slag the thickness required for the uses to which it is adapted to be put, as for railway ballast. I run the slag onto this table until the proper depth has been reached, whereupon it is permitted to cool so that it will solidify and be in condition for removal therefrom. For the purpose of effecting this removal, I have provided a follower or scraper bar B which, during the operation of casting the slag, is located at the rear end of the table and extends transversely across the same. This bar is connected with any suitable power device, such as a drum B' and cable B², or equivalent structure, by which it may be drawn forward after the slag has solidified and cooled to the proper degree.

In the embodiment of the invention shown in the drawings, it will be seen that instead of connecting the cable directly to the scraper bar I have attached to the latter a series of partitions B³ extending from the bar across the table to the discharge edge thereof, and it is to these partitions that I have secured the drawing cables by which the discharge bar is dragged forward. These partition plates may be grooved in the top, as shown in Fig. 3, to receive the drawing cables and protect them from the slag, if the proportions of the various parts are such as to render this advisable. These partition plates are provided for the purpose principally of separating the large

mass of slag into divisions which may more easily and readily be broken into fragments of the proper size and thickness as the slag sheet is drawn from the table. Immediately below the forward edge of the table and in position to receive the slag drawn therefrom I provide a receiving car C, and above the edge of the table I mount a breaking mechanism D, such as that shown in the drawings.

10 In the breaker illustrated a reciprocating beam D' having drop hammers or breakers D² thereon is mounted in a frame D³ and a cam D⁴ is located underneath the ends thereof in such manner as to lift the beam and permit it to drop at properly timed intervals during the withdrawal of the slag sheet. The descent of the breaking beam upon the sheet of slag, as it projects over the end of the table, will, obviously, result in the crushing off or breaking of that portion of the sheet overhanging the edge,—the resulting fragments falling into the car below. As the slag sheet is continually drawn forward sliding up from the inclined portion of the floor of the casting table, the breaker will intermittently descend upon the inclined overhanging portion of the same and reduce the entire slag sheet to the desired condition for shipment. When the entire mass of slag has thus been brought to the proper form for delivery to the market, the discharge bar is dragged back to the rear side of the table by any means, such, for example, as a cable B⁴ properly reaved around pulleys to the same winding drum which is used to drag it forward. The detailed connection of the operating parts, however, is not of any consequence so long as the general principles of the invention are preserved.

It will be seen that with the disposition of apparatus which I have devised any quantity of slag may be taken care of and may

be handled without the aid of a crew of hand laborers, and consequently may be disposed of with minimum cost. It further enables the furnace man to deliver his slag in that condition in which it has the greatest market value,—a matter which is of decided importance in view of the present methods and prices paid for the ordinary granulated or powdered slag.

Having thus described my invention, I claim:

1. In combination, a stationary table for casting and cooling slag in large sheets, means for sliding the sheet slag from the stationary table, and means for breaking the slag into small fragments as it is delivered from said table.

2. In combination a stationary table for casting and cooling molten slag, the floor being shaped to permit the solidified slag sheet being slid off one side thereof, retaining walls to hold the molten slag on the table in a layer of desired thickness, and mechanical means for positively sliding the solidified slag over the delivery edge of the table.

3. In combination a stationary table for casting and cooling molten slag, the floor being shaped to permit the solidified slag sheet being slid off one side thereof, retaining walls to hold the molten slag on the table in a layer of desired thickness, and mechanical means for positively sliding the solidified slag over the delivery edge of the table, and means for breaking the slag into fragments as it slides off the table.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

DAVID T. CROXTON.

Witnesses:

H. R. SULLIVAN,
E. B. GILCHRIST.