May 31, 1938. W. E. MITCHELL 2,119,112

METAL HANDLING

Filed March 11, 1936

Fig. 1,

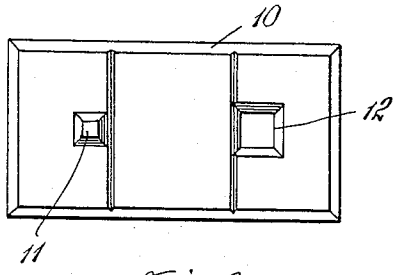


Fig. 3,

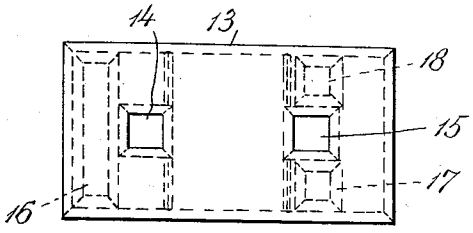


Fig. 2,

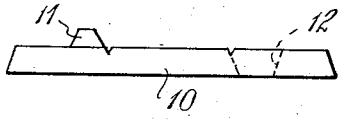


Fig. 4,

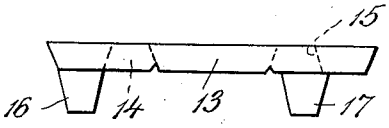
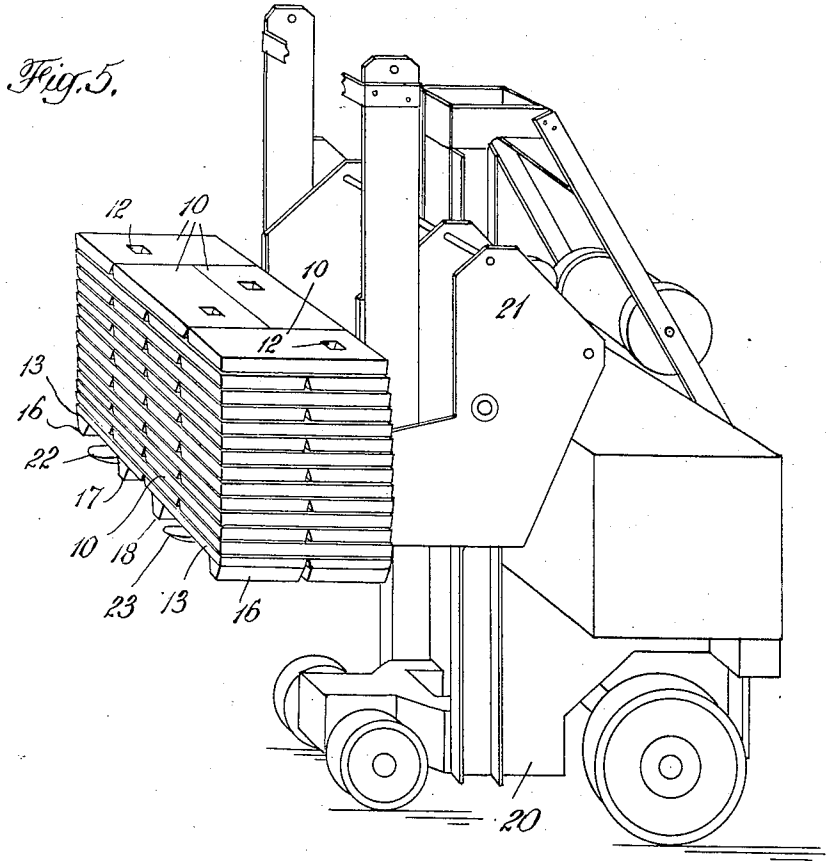


Fig. 5.



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METAL HANDLING

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14 Claims. (Cl. 214—152)

This invention relates to metal handling and has for an object the provision of a novel method of preparing metals for transportation from points of production to points of use. The invention further contemplates the production of improved cast metal shapes which facilitate the loading and unloading of conveyances used in shipping metals. A further object of the invention is to provide improved shipping units comprising cast metal elements which reduce the labor and expense involved in transporting metals.

It is customary to cast metals in forms of various shapes and sizes for shipment from their places of production to their places of use. In some instances as, for example, in the case of metals to be used in the production of wire, it is necessary to cast the metals in special forms while in other instances as, for example, when the metals are to be re-melted, the forms of the castings are immaterial. In these latter instances, it has been customary to cast the metals in the form of pigs of various shapes and in the form of flat slabs, the chief consideration being to produce pigs and slabs of fairly uniform weight and not too heavy for convenient handling by laborers.

The cast metal shapes or forms produced heretofore have been satisfactory from the standpoint of size and convenience in handling individual pigs or slabs, but their shipment has involved considerable inconvenience and expense. Thus, for example, it has been customary heretofore to cast zinc in the form of flat slabs, each weighing about fifty pounds. In shipping such slabs in a conveyance such as a railroad freight car, it has been necessary to pile them in the car individually by hand, and, in order to prevent shifting in transit, it has been necessary to provide timber bulkheads and braces at considerable expense. At the destination of the shipment, it has been necessary to remove the braces and bulkheads and again handle the slabs individually.

The present invention provides for the elimination of a considerable portion of the individual handling of metal shapes required heretofore, and permits the elimination of bulkheads and braces to prevent undesirable shifting of the slabs in transit. The invention is particularly applicable to the handling of zinc metal in view of the heretofore common practice of casting the metal in relatively small, flat slabs and the consequent difficulties encountered in loading, unloading and transporting, but it may be employed advantageously in the handling of other metals such, for example, as copper and lead.

For purposes of illustration, the invention will be described more particularly hereinafter with reference to its application to the handling of zinc.

In accordance with the invention, molten zinc is cast in the form of slabs having openings extending therethrough and provided with projections extending outwardly from their faces. The openings and projections are so arranged as to permit interlocking of an opening and a projection of a slab with a projection and an opening, respectively, of another slab. The openings and projections are preferably of such sizes, in cross-section as to permit the projections to fit relatively tightly in the openings, and, while they may be of any suitable configuration, they are preferably non-circular or rectangular in cross-sectional outline. The projections may be of any suitable length, but they preferably are of a length substantially equal to or somewhat shorter than the thickness of the slabs. This form of slab permits the forming of piles of slabs in which the slabs are interlocked and held against relative movement or displacement incident to jarring or bumping of a conveyance in transit.

In order to facilitate loading and unloading, the invention provides skid or base elements comprising cast zinc slabs having openings extending therethrough and provided with supporting legs adjacent their ends to support the slab above a surface in contact with the outer extremities of the legs and provide a space for the insertion of a lifting or supporting portion or platform of a truck or other lifting device. The openings in the slab elements of the bases are preferably of the same size and shape as the openings in the slabs and, therefore, are adapted to receive the projections of the slabs in interlocking relationship.

The preferred form of zinc slab is flat, relatively thin and generally rectangular in outline and provided with two substantially parallel plane faces. The side faces preferably are bevelled to facilitate removal from the moulds. The openings extend between the parallel plane faces and the projections extend outwardly from the plane faces. The slab elements of the bases are preferably of the same size and shape as the slabs. To permit the building of compact shipping units containing more than single piles of slabs, the slabs preferably are formed with lengths which are even multiples of the widths. This permits transverse as well as parallel arrangement of the

slabs relatively to one another and provides for more effective interlocking. The centers of the openings and projections should be so disposed relatively to the end and side edges as to permit effective interlocking. Thus, for example, in the case of slabs and slab elements of the bases having lengths equal to twice the widths, the centers or longitudinal axes of the projections and openings should be disposed at points equi-distant from the side and end edges to permit effective registration of the openings and projections. The bases may be provided with any suitable numbers of supporting legs, and the supporting legs may be disposed in any suitable positions.

A simple shipping unit may comprise a single base and a plurality of slabs mounted on the base, one above the other, and interlocked with the base by means of the registering projections and openings. More complex shipping units may comprise several bases interlocked by means of layers of slabs mounted thereon and each comprising a plurality of slabs.

The invention will be better understood from a consideration of the following description in conjunction with the accompanying drawing in which

Fig. 1 is a plan of a cast zinc slab formed in accordance with the invention;

Fig. 2 is an elevation of the slab shown in Fig. 1;

Fig. 3 is a plan of a cast zinc metal base or skid formed in accordance with the invention;

Fig. 4 is an elevation of the base or skid shown in Fig. 3; and

Fig. 5 is a view of a shipping unit formed of slabs and bases of the type illustrated in Figs. 1 to 4 and illustrating the method of handling shipping units of the invention by means of lift trucks.

The zinc slab illustrated in Figs. 1 and 2 comprises a relatively thin body member 10 of a length substantially equal to twice its width and having two relatively large parallel plane faces. A projection 11, formed integrally with the body member, extends outwardly from one of the parallel faces and an opening 12 extends between the parallel faces. The centers or longitudinal axes of the projection 11 and the opening 12 are located at points equi-distant from the side and adjacent end edges of the body member 10.

The base or skid illustrated in Figs. 3 and 4 comprises a body member or slab 13 similar in size and shape to the size and shape of the body member 10 of the slab shown in Figs. 1 and 2. Two openings 14 and 15 extend between the plane faces of the body member adjacent its opposite ends with their centers or longitudinal axes located at points equi-distant from the side and adjacent end edges. A solid continuous supporting leg 16 extends transversely of the body member for substantially its entire width adjacent one end. The opposite end-portion of the body member is provided with two supporting legs 17 and 18 on opposite sides of the opening 15 and spaced inwardly from the adjacent end of the body member. The legs 17 and 18 are spaced inwardly from the end to provide for better distribution of support when the base is used in forming a complex shipping unit comprising more than one base and pile of slabs. The supporting legs may be of any suitable length and they may be spaced apart in any suitable manner to permit the insertion therebetween of a lifting or supporting portion or platform of a truck or other lifting device.

The shipping unit illustrated in Fig. 5 comprises four bases and a number of layers of slabs each comprising four slabs. The bases are arranged in two rows in the form of a rectangle with their slab elements all extending similarly, whereas the layers of slabs are so arranged that two slabs extend similarly to the bases and two extend transversely, or at right angles, to provide for effective interlocking of the slabs with bases and with one another. The spacing of the centers of the openings and projections at points equi-distant from the side and end edges of the slabs and slab elements of the bases permits registration of the openings and projections and the production of an effectively interlocked and compact shipping unit.

The method of handling the shipping units by means of a truck is illustrated in Fig. 5. The lift truck 20 provided with a lifting or elevating mechanism 21 having forked lifting elements 22 and 23 is merely driven toward a shipping unit in such a manner as to permit the lifting elements 22 and 23 to enter the spaces between the supporting legs of the bases. The lifting mechanism is then operated to lift the unit to a suitable point above the ground or platform on which the truck operates, and the truck is then ready to transfer the unit to the desired point. The shipping unit may be deposited at the desired point simply and without disturbance. The slabs for shipment may be stored in piles of suitable heights and units of suitable sizes until needed. Then suitable trucks or other devices may be employed to pick them up and place them in the conveyances rapidly and conveniently. The interlocked condition of the slabs makes bracing and bulkheading unnecessary. At the destination of the shipment, trucks may be used again to simply and expeditiously unload the shipment.

I claim:

1. A rectangular metal slab having an opening extending therethrough and having a projection extending outwardly from a face thereof, said slab having a length substantially equal to twice its width and the opening and projection being disposed adjacent opposite ends with their centers at points substantially equi-distant from the side and end edges of the slab.

2. A metal base or skid for use in handling metal slabs comprising a metal slab having a centrally disposed opening extending therethrough and having supporting legs disposed adjacent its ends to support the slab above a surface in contact with the outer extremities of the legs and provide a space for the insertion of a lifting or supporting portion or platform of a truck or other lifting device.

3. A base or skid for use in handling metal slabs comprising a rectangular metal slab having an opening extending therethrough and having supporting legs formed integrally therewith and disposed adjacent the ends thereof, said slab having a length substantially equal to twice its width and the opening therein being disposed adjacent its end with its center at a point substantially equi-distant from the end and side edges.

4. A base or skid for use in handling metal slabs comprising a rectangular metal slab having a length substantially equal to twice its width and having an opening extending therethrough adjacent each end with its center disposed at a point substantially equi-distant from the end and side edges of the slab, and supporting legs formed integrally with the slab adja-

cent its ends to support the slab above a surface in contact with the outer extremities of the legs and provide a space for the insertion of a lifting or supporting portion or platform of a truck or other lifting device.

5. A shipping unit comprising a metal base and a plurality of metal slabs mounted on and interlocked with the base and with one another by means of registering openings and projections formed in and on the base and slabs, said base being provided with legs for supporting the unit above a surface in contact with the outer extremities of the legs and the legs being spaced apart to provide for the insertion therebetween of a lifting or supporting portion or platform of a truck or other lifting device.

6. A shipping unit comprising a metal base or skid provided with supporting legs, and a plurality of layers of metal slabs each comprising a plurality of slabs mounted on the base and interlocked with the base and with one another by means of registering openings and projections, the legs of the base being spaced apart to provide for the insertion therebetween of a lifting or supporting portion or platform of a truck or other lifting device.

7. A shipping unit comprising four metal base or skid elements provided with supporting legs, and a plurality of layers of metal slabs each comprising four slabs mounted on the base and interlocked with the base and with one another by means of registering openings and projections, the legs of the base being spaced apart to provide for the insertion therebetween of a lifting or supporting portion or platform of a truck or other lifting device.

8. A shipping unit comprising four base or skid elements each comprising a rectangular metal slab, of a length substantially equal to twice its width, having an opening extending therethrough adjacent each end with its center disposed at a point substantially equi-distant from the end and side edges of the slab and provided with supporting legs formed integrally therewith and disposed adjacent the ends thereof, and a plurality of layers of metal slabs each comprising four metal slabs mounted on the base elements, each of the metal slabs of the layers being similar in size and shape to the size and shape of the slab portions of the base elements and each having an opening extending therethrough and a projection extending from a face thereof with the centers of the opening and projection being disposed at points equi-distant from the side and end edges of the slab to permit interlocking of the slabs with the base and with one another.

9. The method of shipping metal which comprises casting a portion of the metal in the form of base elements each comprising a slab having an opening extending therethrough and having supporting legs formed integrally therewith and disposed adjacent the ends thereof, casting another portion of the metal in the form of slabs provided with openings and projections so arranged as to permit registration of the projections of the slabs with the openings in the bases and the openings in adjacent slabs when the slabs are piled on the bases, and placing the slabs and the bases in or on a suitable conveyance with the slabs mounted on the bases, with the outer extremities of the legs of the bases in contact with the supporting surface of the conveyance and with the openings and projections of the bases and slabs in registration to prevent substantial displacement of the slabs relatively to the base and relatively to one another by jarring or bumping incident to movement of the conveyance in transportation and to facilitate removal of the piles of slabs at their destination by the insertion between the supporting legs of the bases of a lifting or supporting portion or platform of a truck or other lifting device.

10. The method of shipping metal which comprises casting a portion of the metal in the form of base elements each comprising a rectangular metal slab, of a length substantially equal to twice its width, having an opening extending therethrough adjacent each end with its center disposed at a point substantially equi-distant from the end and side edges of the slab and having supporting legs formed integrally therewith and disposed adjacent the ends thereof, casting another portion of the metal in the form of slabs similar in size and shape to the slab portions of the base elements and each having an opening extending therethrough and a projection extending from a face thereof with the centers of the opening and the projection disposed at points equi-distant from the side and end edges of the slab to permit registration of the projections of the slabs with the openings in the bases and the openings in adjacent slabs when the slabs are piled on the bases, and placing the slabs and the bases in or on a suitable conveyance in compact, interlocked units comprising four bases disposed with the outer extremities of their legs in contact with the supporting surface of the conveyance, and a plurality of layers of slabs each comprising four slabs mounted on the bases with the openings and projections of the bases and slabs in registration to prevent substantial displacement of the slabs relatively to the bases and relatively to one another by jarring or bumping incident to movement of the conveyance in transportation and to facilitate removal of the piles of slabs at their destination by the insertion between the supporting legs of the bases of a lifting or supporting portion or platform of a truck or other lifting device.

11. A metal slab having an opening extending therethrough and having a projection extending outwardly from a face thereof at a point removed from the vicinity of the opening, said opening and said projection being so disposed as to permit interlocking with projections and openings, respectively, of other slabs in such manner as to form a stack of interlocked slabs more than two slabs in height.

12. A metal slab having an opening extending therethrough and having a projection formed integrally therewith and extending outwardly from a face thereof at a point removed from the vicinity of the opening, said opening and said projection being so disposed as to permit interlocking with projections, and openings, respectively, of other slabs in such manner as to form a stack of interlocked slabs more than two slabs in height.

13. A metal slab having a non-circular opening extending therethrough and having a projection non-circular in cross section formed integrally therewith and extending outwardly from a face thereof at a point removed from the vicinity of the opening, said opening and said projection being so disposed as to permit interlocking with projections and openings, respectively, of other slabs in such manner as to form a stack

of interlocked slabs more than two slabs in height.

14. A metal slab having a rectangular opening extending therethrough and having a projection rectangular in cross-section formed integrally therewith and extending outwardly from a face thereof at a point removed from the vicinity of the opening, said opening and said projection being so disposed as to permit interlocking with projections and openings, respectively, of other slabs in such manner as to form a stack of interlocked slabs more than two slabs in height.

WILLARD E. MITCHELL.