

C. P. ASTROM.
LADLE.

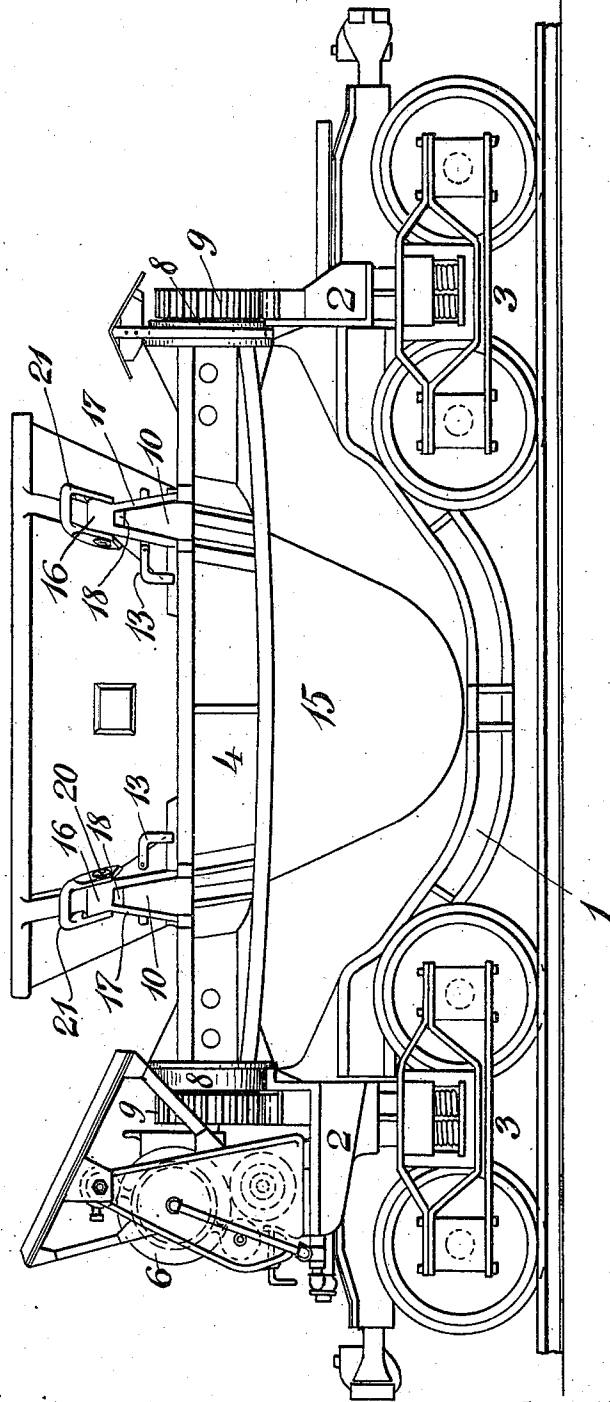
APPLICATION FILED JAN. 8, 1910.

984,877.

Patented Feb. 21, 1911.

2 SHEETS-SHEET 1.

Fig. 1



Witnesses:
A. H. Schneider
Peter A. Roe

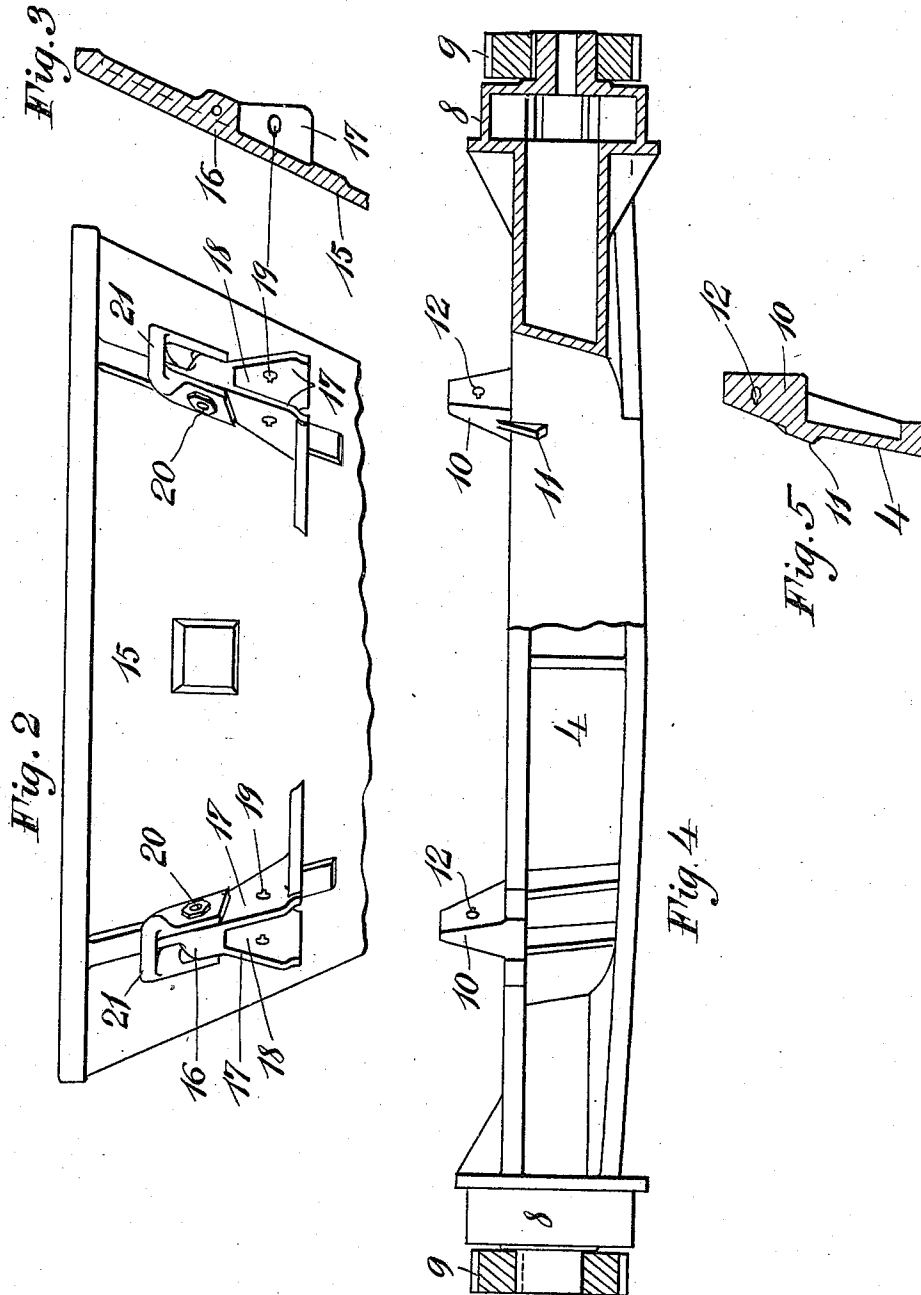
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By his Attorneys
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UNITED STATES PATENT OFFICE.

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LADLE.

984,877.

Specification of Letters Patent.

Patented Feb. 21, 1911.

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To all whom it may concern:

Be it known that I, CARL P. ASTROM, a citizen of the United States, residing at Hasbrouck Heights, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Ladles, of which the following is a full, clear, and exact specification.

This invention relates to ladles, and more particularly has reference to ladles adapted for use in steel works, blast furnace plants, foundries and the like, wherein it is desired to carry molten slag from the furnaces by cars. At many plants it is impracticable to run ordinary standard gage cinder cars close to the furnaces because of lack of room, yet it may frequently be desired to operate such furnaces in connection with cinder cars of standard gage running to other parts of the works in order to carry molten material, for instance, from an open hearth furnace to the slag dump located some distance away.

The object of this invention is to provide in a bail supported ladle means whereby the ladle can be readily attached and detached from the bail carried by the car-body, and lifted by grapples and a crane to places where the car itself could not go. In order to attain this object I provide a ladle having supporting lugs cast thereon and co-operating with a bail having registering lugs adapted to guide the ladle in the proper position when lowered by the crane, together with readily releasable fastenings, whereby the ladle can be transported on the car-body and mechanically dumped without danger of becoming separated from the bail.

The invention will be more fully understood in connection with the description of the accompanying drawings, wherein—

Figure 1 represents a dumping car carrying a tilting and bodily movable bail supported ladle embodying the invention; Fig. 2 is a detailed view of the supporting lugs on the ladle; Fig. 3 is a detailed section through one of the lugs; Fig. 4 is a side view partly in section of the bail, and Fig. 5 is a section of the bail through one of the lugs.

1 represents a car-body of well known construction having end frames 2 at each end and trucks 3 on which a bail 4 is supported to be tilted and moved mechanically by a

fluid pressure or other motor 6 mounted on one end frame. As will be seen, the car-body is supported on trucks running on rails and has couplings at one or both ends for connection to a locomotive or other cars.

The construction of the car frame and the mechanical operating and controlling means is not a part of this invention and need not be more particularly described.

The bail 4 comprises generally a ring-shaped casting having diametrical trunnions 8, 8 which roll on the tracks provided by the end frames 2, and at the same time may have gears 9 which mesh with stationary racks also on the end frames 2. Suitable mechanical engaging means is provided between the movable element of the motor and the bail so that the bail can be bodily moved back and forth and at the same time tilted to an angle. The bail 4, according to the preferred form of the invention herein shown, is provided with a number of upwardly projecting tapering lugs 10, and also with interior guiding lugs 11. Each of the lugs 10 is transversely perforated by a keyhole-shaped slot 12, in order to receive a locking pin 13, which will be more fully described. The lugs 10 and 11 combine to guide and center the ladle 15, which is usually somewhat cone-shaped, as herein shown.

The ladle 15 is preferably made of cast iron, integral or built up in sections, and may have an interior refractory lining, according to the usual practice. On the outside of the ladle somewhat near the top are cast a series of generally Y-shaped lugs 16 having divided base portions or wings 17 forming slots 18; generally shaped like the lugs 10 on the bail. The wings 17 are provided with keyhole-shaped slots 19 so positioned as to register with the slots 12 in the lugs 10 when the ladle is supported by the bail, as by resting on the interior of the bail or the interior lugs 11. The lugs 16 are also perforated to carry pins 20 on which shackles 21 are pivoted to which the hooks or grapples of a crane can be attached. Heretofore, in order to carry ladles, it has sometimes been customary to cast a loop into the body of the ladle in order to lift it, but such construction is not generally strong enough to permit the ladle to be safely

lifted out of the bail when loaded. By attaching the shackles directly to the lugs 16, forming the part of the ladle itself, a fully loaded ladle can be lifted out of the bail 5 without danger of breaking.

In practice, a ladle and car built according to this invention will be used by bringing the car and ladle as near as possible to a furnace, such for instance as an open 10 hearth steel furnace which are commonly built so close together that there is no room to run the entire ladle and car up to the slack spout. The pins 13 will then be slid out so as to release the lugs 16 from the 15 lugs 10, and the grapples attached to the shackles 21. Then the ladle can be lifted out of the bail by a crane and brought up close to the furnace to receive the molten slag from the furnace or a hot-metal ladle. 20 Then the ladle is brought back to the car and lowered upon the bail. By reason of the tapering lugs 10 and the cooperating slots 18, the ladle, when lowered upon the bail, will easily center itself in such position that the pins 13 can be quickly pushed 25 through to a position as shown in Fig. 1 to fasten the ladle to the bail. The pins 13 carry transverse pins at angles to each other in such manner that the pin is locked from 30 withdrawal except when turned to certain positions, and likewise locked against being pushed in too far. In this manner, the pins 13 are capable of being easily removed or replaced if necessary. Other means can, of 35 course, be used for this same object. When the pins are properly placed, as in Fig. 1, it will be seen that the ladle is locked to the bail, and the car can then be moved away and the ladle dumped mechanically 40 by the motor in the usual manner, while at the same time the ladle is prevented from breaking loose.

By means of this invention, ladles of large capacity which have heretofore only 45 been used in connection with blast furnaces having ample space for running the cars up to the furnaces, can be used in crowded works where the cars themselves cannot be operated. It is well understood that it is 50 advantageous to use large motor dumped

ladle cars wherever possible, rather than to handle the cold slag by cranes and flat cars.

It will be obvious that the specific construction of interlocking lugs on the ladle and bail herein described may be varied 55 without departing from the scope of the invention, and the lugs may also be modified or changed. Also, the lugs may be reversed, that is to say the Y-shaped or slotted lugs may be placed on the bail and the solid 60 lugs on the ladle in case it should be found advantageous.

Having thus described my invention, I declare that what I claim as new and desire to secure by Letters Patent, is— 65

1. The combination with a bail having upwardly projecting supporting lugs having inclined faces, of a ladle having depending lugs having inclined faces adapted to register therewith to support the ladle 70 against vertical and sidewise movement, and removable fastening keys adapted to pass transversely through both lugs for securing the ladle to the bail.

2. A ladle having inverted Y-shaped lugs 75 formed on the outside thereof, a bail having tapered lugs engaging therewith, and removable fastening means adapted to pass through both lugs for securing the ladle in the bail. 80

3. A ladle having inverted Y-shaped lugs on the side thereof, shackles on said lugs, a bail having lugs registering in said Y-shaped lugs, and removable fastening means adapted to pass through both lugs for se- 85 curing the ladle in the bail.

4. The combination with a ladle and a supporting bail, of cooperating interlocking registering projections on said bail and ladle having inclined engaging faces ar- 90 ranged to guide and position the ladle when the latter is to be supported within the bail, and detachable fastening means passing transversely through said lugs.

In testimony whereof I affix my signature, in presence of two witnesses. 95

CARL P. ASTROM.

Witnesses:

J. S. WOOSTER,
GEO. N. KERR.