F. H. BEEBE.

LADLE FASTENING.

APPLICATION FILED OCT. 14, 1914.

1,126,687.

Patented Feb. 2, 1915.

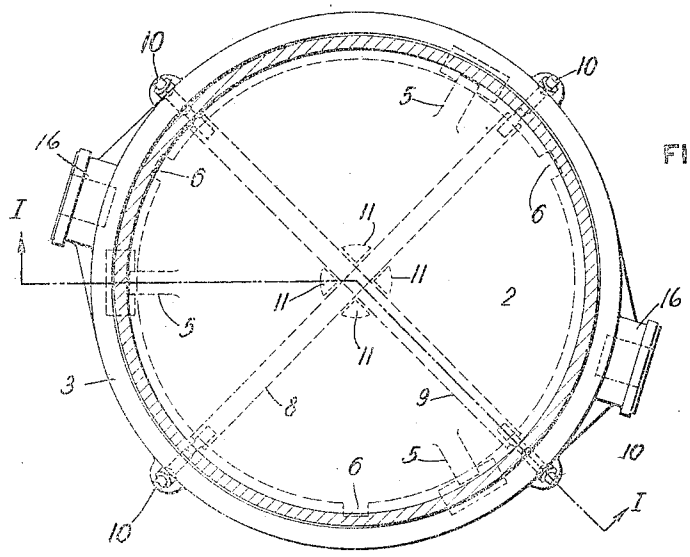


FIG. 2

FIG. 1

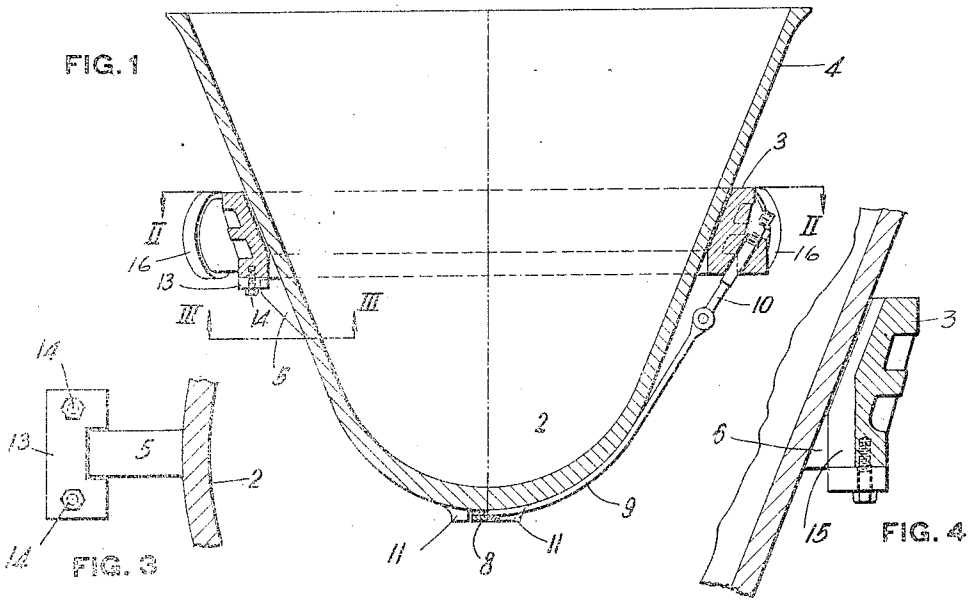


FIG. 3

FIG. 4

WITNESSES

Chas. Osterman

R. D. Settle

INVENTOR

F. H. Beebe

by C. C. Linthicum

his attorney

UNITED STATES PATENT OFFICE.

FREDERICK H. BEEBE, OF ELYRIA, OHIO.

LADLE-FASTENING.

1,125,687. Specification of Letters Patent. Patented Feb. 2, 1915.

Application filed October 14, 1914. Serial No. 866,723.

To all whom it may concern:

Be it known that I, FREDERICK H. BEEBE, a citizen of the United States, and resident of Elyria, in the county of Lorain and State of Ohio, have invented certain new and useful Improvements in Ladle-Fastenings, of which the following is a specification.

My invention relates to fastenings employed in removably securing ladles in the ladle supports and while not restricted to such use, more particularly relates to the fastenings used in securing the ladles or cinder pots in the trunnion rings of dumping ladle cars employed in transporting blast furnace cinder or like molten materials.

One object of my invention is to provide a ladle fastening having improved means whereby the ladle is removably secured in place on the trunnion ring or equivalent ladle support upon which the ladle is mounted when in use.

Another object of the invention is to provide novel means for supporting and fastening the ladles in the ladle supporting rings.

A further object of my invention is to provide improved means whereby the ladles are supported and centered on the trunnion rings.

Other objects of my invention will become apparent as it is more fully described hereinafter and is specifically pointed out in the appended claims.

Referring now to the drawing, forming part of this specification, Figure 1 is a sectional elevation showing a ladle mounted in a trunnion ring or ladle support and secured in place thereon in accordance with my invention, the section being taken on the irregular line I—I of Fig. 2. Fig. 2 is a sectional plan of the apparatus shown in Fig. 1, the section being taken on the line II—II of Fig. 1, showing the means employed in supporting and fastening ladles on the trunnion rings in accordance with my invention. Fig. 3 is an inverted sectional plan on the line III—III of Fig. 1, showing the manner of securing the lugs on the ladle in position on the trunnion ring of the ladle car. Fig. 4 is a detail sectional elevation showing a supplemental modified form of fastening for centering and securing the ladle in place on the trunnion ring.

In the accompanying drawing, the numeral 2 designates a ladle or cinder pot which as shown is of the integrally formed cast type. This ladle is mounted in an annular trunnion ring or ladle support 3, the opening in the support being made frusto-conical so as to obtain a surface contact with the conical outer surface 4 of the ladle. The ladle 2 is provided on its outer surface, at an intermediate point in its height with a series of three lugs 5 which project outwardly from the sides of the ladle. The trunnion ring is provided with a series of three lengthwise vertical slots 6 in the inner surface thereof, these slots being provided to enable the ladle to be put in position on the trunnion ring, the relative angular position of the slots 6 in a horizontal plane, being the same as that of the lugs 5 on the ladle 2. The trunnion ring 3 also is provided with oppositely extending trunnions 16 on a line extending through the diametral center of the trunnion ring, by which it is mounted in suitable bearings on a ladle car or other support so as to permit the ladle to be tilted or dumped to empty the ladle. The construction of the car or other support for the trunnion ring not forming part of this invention, is not shown nor further described.

To assist in supporting the ladle 2 in the trunnion ring, a pair of straps 8 and 9 having eye bolts 10 pivotally connected to the ends thereof are provided on the trunnion ring 3 the eye bolts 10 extending through suitable openings formed in the trunnion ring 3 for that purpose. As shown one strap extends at right angles to the other, the straps intersecting one another at the bottom of the ladle. At the points of intersection of the straps 8 and 9 are lugs 11, these lugs projecting outwardly so as to engage with the sides of the straps 8 and 9 and prevent rotation of the ladle in the trunnion ring 3.

A notched plate 13 is secured by tap bolts 14 to the under side of the trunnion ring 3 between the slots 6 in the ring 3, the end of the lugs 5 on the ladle entering the notches in the plates so as to securely hold and prevent possible rotation of the ladle in the trunnion ring when the ladle is in use.

In some cases the ladles 2 will not exactly fit the trunnion rings 3 to which they are applied and when this occurs fillers 15 like that shown in Fig. 4 are employed, these

fillers positioning the ladle in the trunnion ring and, as they fill the slots 6 in the trunnion ring, serving also to prevent the ladle being dislodged or being removed from the trunnion ring in the ladle dumping operations.

In placing the ladle 2 in the trunnion ring 3 the ladle is suspended above the trunnion ring 3 and is turned until the lugs 5 thereof register with the vertical slots 6 in the inner surface of the annular trunnion ring. The ladle is then lowered into position in the ring 3 until the upper surfaces of the lugs 5 on the ladle are in a plane below the bottom surface of the trunnion ring 3, the lugs passing downwardly through the slots 6. The ladle is then rotated or turned on a vertical axis so as to move the lugs 5 into a position between the slots 6 in the trunnion. When in this position the lugs 5 will engage the lower surface of the trunnion ring and prevent the removal or dislodgment of the ladle, when the ladle 2 is tilted in the dumping operations. When lugs are employed on the bottom of the ladle the lugs are positioned on the ladle so as to project between the adjacent edges of the intersecting straps and by engagement therewith prevent rotation of the ladle in the trunnion ring 2. The notched plates 13 are then fastened to the lower surface of the trunnion ring 3 the lugs being positioned in the notch in these plates and in this way the ladles 2 are securely fastened in place on the trunnion rings.

The advantages of my invention will be apparent to those skilled in the art.

The apparatus is simple and is easily and cheaply constructed.

By the use of my improved fastening means the ladles are securely held in position on the trunnion rings and the ladles may be tilted without liability of accident or damage to the apparatus by reason of the ladle becoming displaced.

Modifications in the construction and arrangement of the apparatus may be made without departing from my invention as defined in the appended claims.

I claim—

1. In a ladle fastening, the combination with an annular ladle supporting ring having a frusto conical ladle (engaging) supporting surface, and a lengthwise vertical slot in said surface, of a ladle engaging the supporting surface of said ring, and having a lug engaging the under surface of the ring in fastening the ladle on the ring, said lug being adapted to pass through the slot in said ring in positioning the ladle thereon.

2. In a ladle fastening, the combination with an annular ring forming a ladle support and having a lengthwise vertical slot in the side surface thereof, of a ladle having a lug on its outer surface engaging the under surface of the ring to fasten the ladle on the support, said lug being adapted to pass through the slot in said ring in positioning the ladle thereon, and means on the ring engaging with the ladle to prevent relative rotation of the ladle and ring.

3. In a ladle fastening, the combination with an annular ring forming a ladle support and having a lengthwise vertical slot in the side surface thereof, of a ladle having a lug on its outer surface engaging the under surface of the ring to fasten the ladle thereon, said lug being adapted to pass through the slot in said ring in positioning the ladle on the ring, and means detachably secured on the ring and engaging the lug on the ladle to prevent rotation of the ladle in the ring.

4. In a ladle fastening, the combination with an annular ring forming a ladle support and having a lengthwise vertical slot in the side surface thereof of a ladle having a lug on its outer surface engaging the under surface of the ring to fasten the ladle thereon, said lug being adapted to pass through the slot in said ring in positioning the ladle on the support, and means detachably secured on said ring and arranged to prevent registration of the lug with the slot.

5. In a ladle fastening, the combination with an annular trunnion ring having a strap suspended therefrom, of a ladle having a series of lugs on the side thereof arranged to engage the under side of the trunnion ring and prevent dislodgment of the ladle on the ring, said ring having a series of lengthwise vertical slots in the inner surface thereof through which the lugs pass in placing said ladle in position on the trunnion ring and means on the ladle engaging with said strap whereby relative rotation of the ladle and trunnion ring is prevented.

6. In a ladle fastening, the combination with an annular trunnion ring having straps suspended therefrom, of a ladle having a series of lugs arranged to engage the under side of the trunnion ring and prevent displacement of the ladle on the ring, said ring having a series of lengthwise vertical slots in the inner surface thereof through which said lugs pass in placing the ladle in position on the trunnion ring, means on the ladle engaging with said straps whereby relative rotation of the ladle and trunnion ring is prevented and means removably secured on the trunnion ring to prevent registration of the vertical slots therein with the lugs on the ladle.

7. In a ladle fastening, the combination with an annular trunnion ring having straps suspended therefrom, of a ladle having a series of lugs arranged to engage the under side of the trunnion ring and prevent dislodgment of the ladle on the ring,

said ring having a series of lengthwise vertical slots in the lower surface thereof through which said lugs pass in placing the ladle in position on the trunnion ring, means on the ladle engaging with said straps to prevent relative rotation of the ladle and trunnion ring, means removably secured on the trunnion ring to prevent registration of the vertical slots therein with the lugs, and means in said slots for centering the ladle in said trunnion ring.

In testimony whereof, I have hereunto set my hand.

FREDERICK H. BEEBE.

Witnesses:
JAMES J. CARE,
J. NORMAN CASSEL.