

No. 777,927.

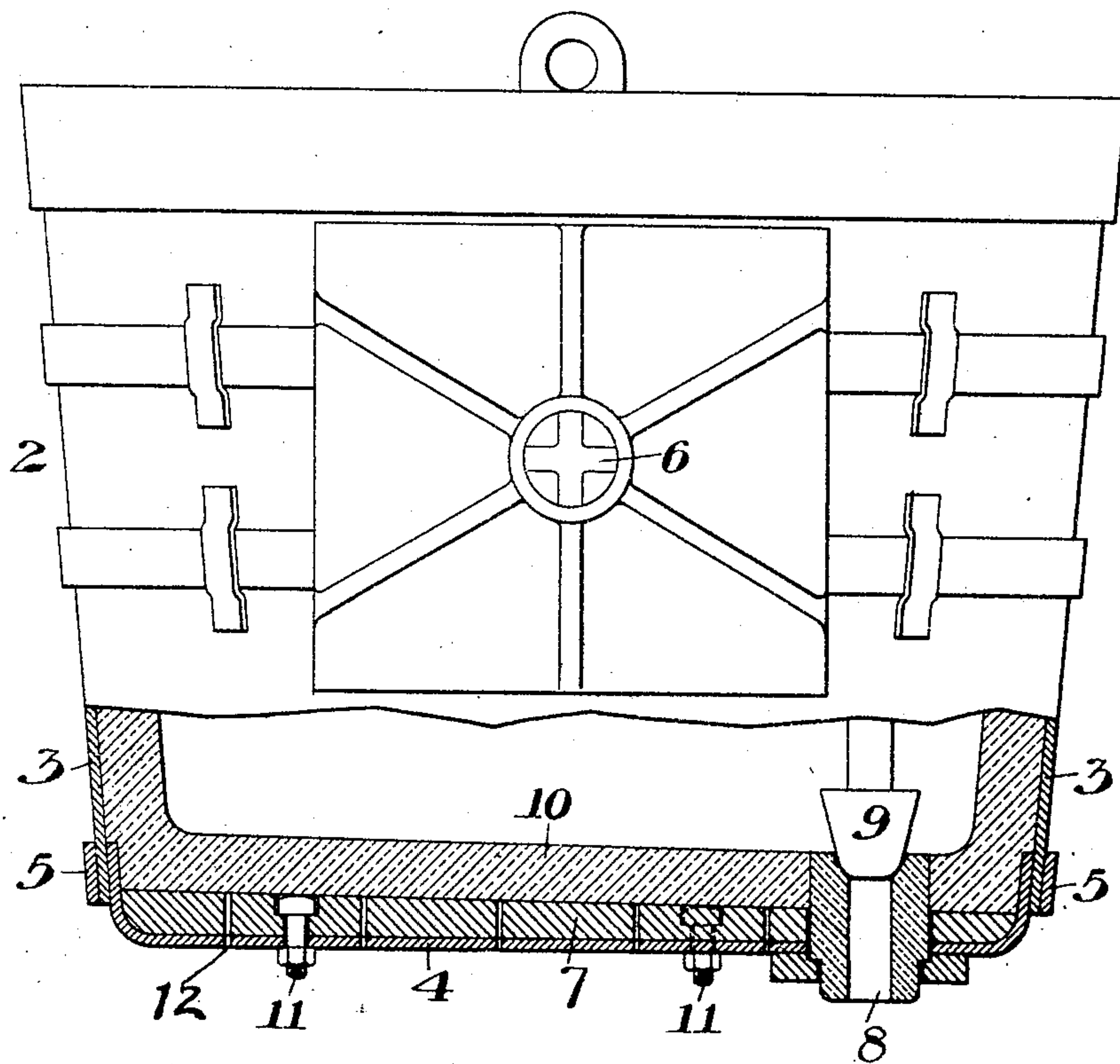
PATENTED DEC. 20, 1904.

R. H. STEVENS.

LADLE.

APPLICATION FILED FEB. 10, 1904.

NO MODEL.



WITNESSES

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UNITED STATES PATENT OFFICE.

RICHARD H. STEVENS, OF MUNHALL, PENNSYLVANIA.

LADLE.

SPECIFICATION forming part of Letters Patent No. 777,927, dated December 20, 1904.

Application filed February 10, 1904. Serial No. 192,906.

To all whom it may concern:

Be it known that I, RICHARD H. STEVENS, of Munhall, Allegheny county, Pennsylvania, have invented a new and useful Ladle, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming part of this specification, in which the figure is a side elevation, partly broken away, showing my improved ladle.

My invention relates to the class of ladles used in steel-mills for transferring metal or slag, and more especially to bottom-pour metal ladles.

The object of the invention is to prevent the sagging of the ladle-bottom, which often occurs from the heat of the contained bath and the heat of the cinder which flows from the ladle into the pit.

Ladles as usually constructed are formed of rolled-metal plates of iron or steel, these plates being shaped up and riveted together to form the shell, which is lined with refractory material.

My invention consists in providing such a ladle with a false cast-metal bottom plate, which lies on the bottom of the ladle and is preferably rounded at its edges to fit the rounded or dished edges of the plate-bottom.

It also consists in the construction and arrangement of the parts, as hereinafter more fully described and claimed.

In the drawing, 2 represents a ladle of ordinary construction, formed of side plates 3 and a rolled and flanged bottom plate 4, the flange of which is riveted to the side plates through an encircling band 5. I have shown the ladle as provided with side trunnions 6, adapted to rest on the bearings of a ladle-car, these trunnions being of sufficient length so that the ladle may be picked up by hooks depending from an overhead crane and engaging the trunnions.

7 is a cast-iron plate which is dropped into the bottom of the ladle and is preferably formed with rounded edge portions, so that it fits neatly within the bottom shell of the ladle. I have shown the bottom shell and the cast-iron plate as provided with registering

holes to receive the stopper-nozzle 8, against which fits the stopper 9 of the usual bottom-pour ladle. After dropping in the cast-iron false bottom the refractory lining 10 is built in place in the ordinary manner.

In order to discharge the slag, which will not flow through the bottom nozzle used for discharging the metal, these ladles are turned upside down to dump the cinder or slag into the pit. In such operation the weight of the cast false-bottom plate would rest on the lining when the ladle is inverted and might injure the refractory material. To prevent this, I may employ a series of bolts 11, which connect the false-bottom plate to the bottom shell, so that when the ladle is inverted the weight of the bottom plate will be carried by the bottom shell. I preferably provide vent-holes 12 leading through the bottom shell and the false bottom, as shown.

The bottom shell of ladles as commonly built is inclined downwardly toward the hole to receive the nozzle in order to drain the ladle. In my construction I preferably make the plane of the lower shell substantially horizontal and cast the false-bottom plate with an inclined upper surface, so that its thickness decreases from one side toward the other.

The advantages of my invention result from the strength, stiffness, and resistance to heat of the ladle-bottom, owing to the use of the cast-metal false plate within the bottom shell. This false plate prevents sagging of the bottom, and hence allows the ladle to be drained, where heretofore the sagging of the bottom would cause pools of metal to remain in the ladle. The surface of the lining can be sloped down to the pouring-nozzle, so that the ladle will be completely drained. The use of the complete bottom plate of the ordinary type in connection with the false bottom causes the bottom shell to protect the false bottom from the heat of the underlying slag in the pit, and thus lengthen its life. The use of the false-bottom plate also enables the ladle to be more easily and cheaply built, as the bottom shell is not inclined, and the false bottom can be as cheaply cast with the inclined upper face as without it. Another advantage is that the

bottom portion of the refractory material will not crack and allow the metal to penetrate it and eat through the bottom, which now often results from the buckling or bulging of the bottom shell. The false-bottom plate can be applied to existing ladles as well as to newly-made ones.

Many changes may be made in the form and size of the ladle and the plate without departing from my invention.

I claim—

1. A ladle having a complete supporting bottom shell, a cast-metal false bottom lying on the bottom shell and a refractory lining extending over the false bottom; substantially as described.

2. A ladle having a flanged complete bottom shell riveted to the side plates, a cast-metal false-bottom plate having curved-edge portions fitting neatly within the bottom shell and a refractory lining extending over the false-bottom plate; substantially as described.

3. A bottom-pour ladle having a complete bottom shell riveted to the sides, a cast-metal false-bottom plate lying on the bottom shell, said shell and plate having registering holes to receive the nozzle, and a refractory lining

extending over the false-bottom plate; substantially as described.

4. A ladle having a complete bottom shell secured to the body or sides, a cast-metal false-bottom plate lying on the bottom shell, and connections between the bottom plate and bottom shell to support the false bottom when the ladle is inverted; substantially as described.

5. A bottom-pour ladle having a complete horizontal bottom shell, a cast-metal false bottom lying on the bottom shell and having an upper surface inclined toward the nozzle-hole, and a refractory lining extending over the false bottom; substantially as described.

6. A bottom-pour ladle having a complete supporting bottom shell secured to the side plates, a cast-metal false bottom lying on the bottom shell and a refractory lining extending over the false bottom, the two shells and the lining having a hole to receive the ladle-nozzle; substantially as described.

In testimony whereof I have hereunto set my hand February 8, 1904.

R. H. STEVENS.

Witnesses:

JOHN MILLER,
H. M. CORWIN.