

H. D. THOMPSON & B. G. JONES.

CINDER LADLE.

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985,227.

Patented Feb. 28, 1911.

FIG. 2

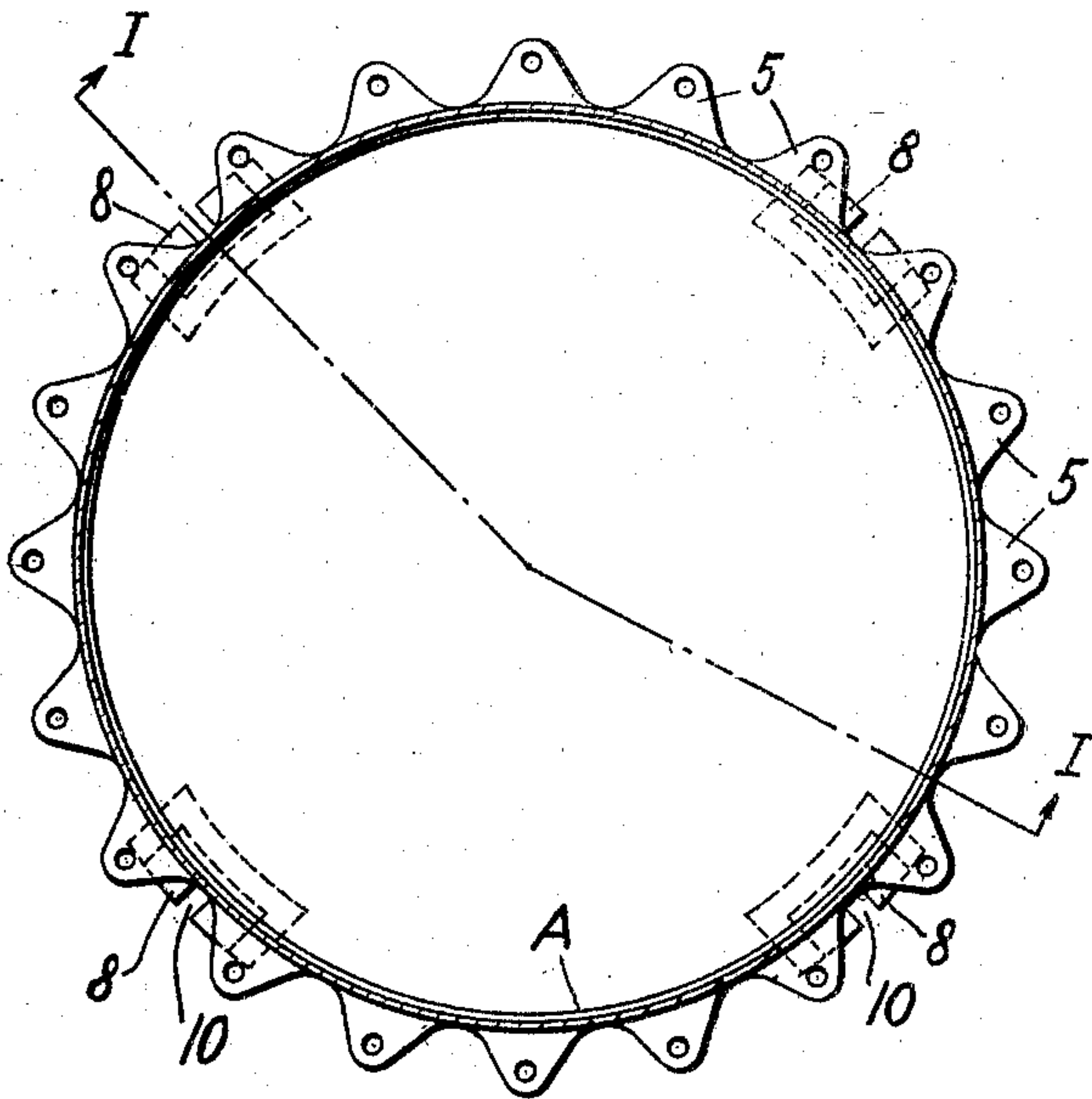


FIG. 3

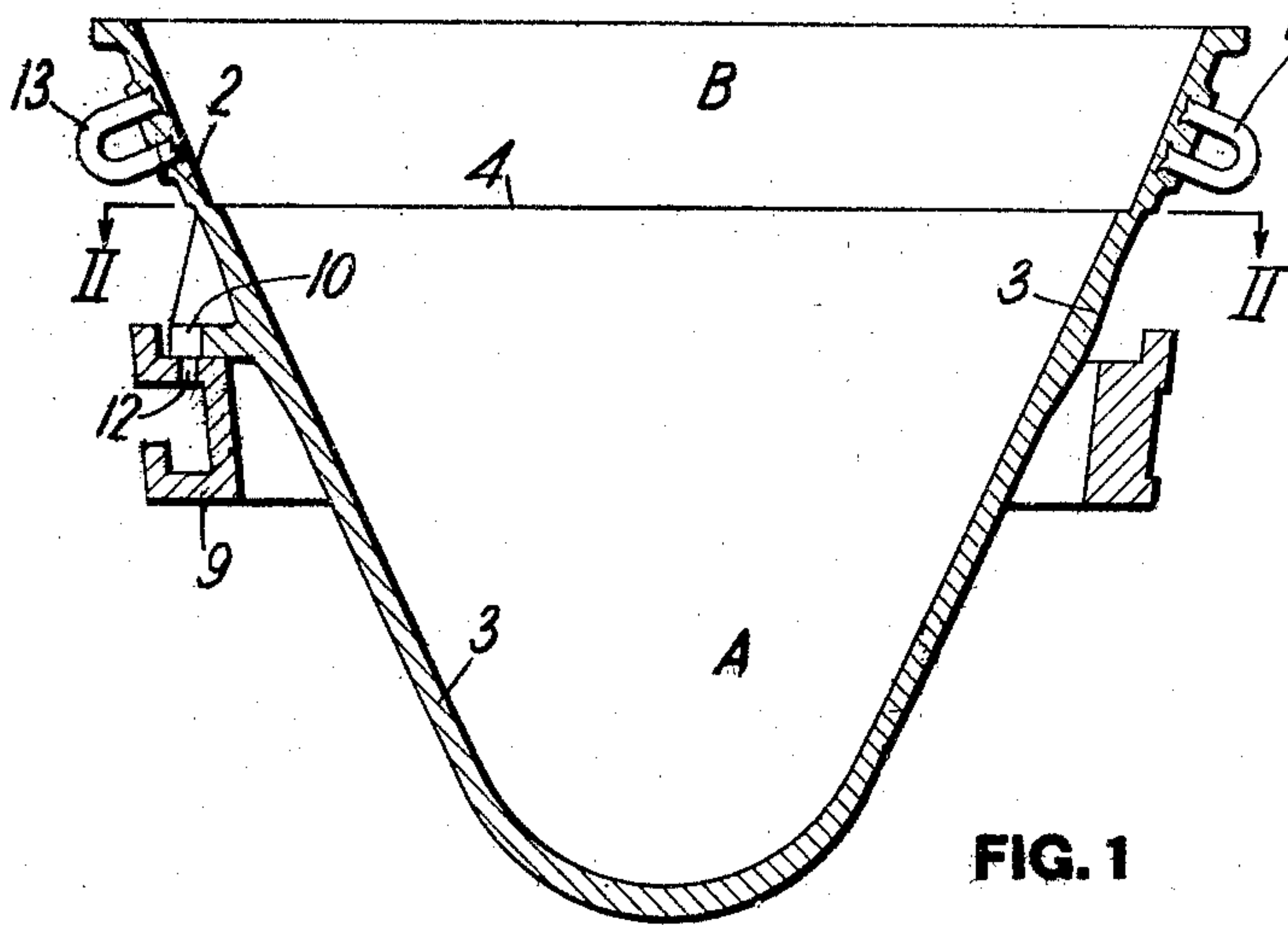
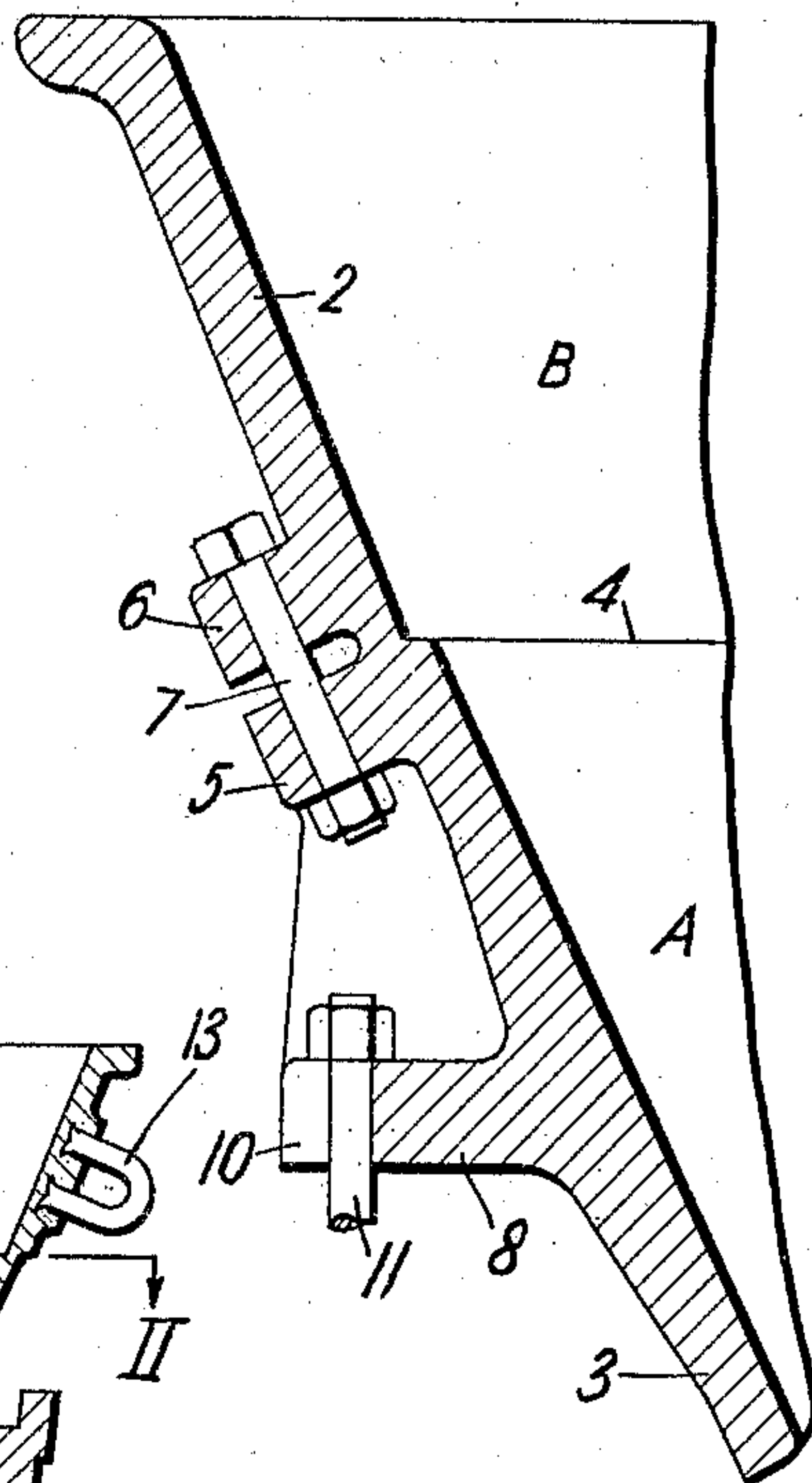


FIG. 1

WITNESSES

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UNITED STATES PATENT OFFICE.

HARRY D. THOMPSON AND BENJAMIN G. JONES, OF YOUNGSTOWN, OHIO.

CINDER-LADLE.

985,227.

Specification of Letters Patent.

Patented Feb. 28, 1911.

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To all whom it may concern:

Be it known that we, HARRY D. THOMPSON and BENJAMIN G. JONES, of Youngstown, in the county of Mahoning and State of Ohio, have invented new and useful Improvements in Cinder-Ladles, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

Our invention relates to apparatus used in handling and conveying molten materials and more particularly relates to apparatus used for handling and conveying molten slag or cinder in transporting the slag or cinder while in a molten condition from a point of supply to a place of disposal. In using such ladles it has been found that the ladles warp and crack after being used, in some cases warping and cracking after being used for a very short time to such an extent as to necessitate frequent and expensive repairs or renewals. The warping and cracking of the ladles are the source of frequent delays and a very large factor in the expense of handling molten slag, cinder and similar materials.

One object of our invention is to provide a ladle of improved construction having novel means whereby such destructive cracking and warping are largely overcome and prevented and is guided and controlled so that the life of the ladle is very materially increased, so as to effect a very great saving in lessening the expense of maintaining the ladles in operative condition.

The invention consists in constructing ladles by forming integral castings of the desired shape and size, with the wall thickness of the ladles materially reduced upon a line approximating the level to which the ladles are ordinarily filled with molten materials and in providing independent means for securing the portion of the ladle above the height to which the ladles are usually filled with molten materials to the portion below this level, so as to influence and control the direction in which the inevitable cracks will extend when formed and to secure the parts on opposite sides of the cracks together for an indefinite time even after the cracking has separated the ladle into a plurality of parts. The height or level to which the ladles are filled with molten materials will vary in ladles put to differ-

ent uses, in the ladle shown, which is intended to be used on slag cars used in transporting molten slag from place to place over the tracks of a railway, the slag line or level to which the ladle is filled with molten slag being some distance below the top marginal edge of the ladle in order to prevent possible splashing when being hauled over the railway tracks.

In the accompanying drawings, Figure 1 is a sectional elevation on the line I—I of Fig. 2, showing the ladle of a slag ladle car constructed and arranged in accordance with our invention. Fig. 2 is a sectional plan on the line II—II of Fig. 2 showing the means employed in securing the top portion of the ladle having, as shown, a reduced wall thickness, to the lower portion of the ladle having a heavier or thicker wall. Fig. 3 is a detail section showing the connections by which the upper portion of the ladle is secured to the bottom portion, and showing the foot or lug by which the ladle is supported upon the bail or trunnion ring of a slag ladle car.

In the drawings, A designates the bottom portion and B the upper portion of a ladle adapted for use on a slag car having the thickness of the wall 2 of the upper portion A less than that of the wall 3 of the bottom portion. The top marginal edge of the ladle is provided with an outwardly extending surrounding flange.

The line defining the junction of the thin wall 2 with the thick wall 3 is approximately the level to which the ladles ordinarily are filled with molten slag or cinder and is the point in the height of the ladle at which the thickness of the wall should be reduced in accordance with this invention. The molten contents of the ladles may extend above this line as a crust or shell of chilled or hardened slag will form above this level, and the top surface of the molten contents becoming chilled to a certain extent, the line 4 represents the level at which the slag will remain molten for a considerable period of time.

The lower portion A and upper portion B of the ladle are provided with lugs 5 and 6 having registering openings in which the bolts 7 are inserted so as to securely bolt the top portion B of the ladle to the bottom portion A, so that should cracks develop in the ladle along the line 4 to such an extent as to

separate the portion B from the portion A of the ladle, the parts will still be securely held together in place.

Lugs or feet 8 are provided by which the ladle is supported upon the bail or trunnion ring 9 of the slag cars. The lugs or feet 8 have holes or slotted openings 10 through which bolts 11 are inserted so as to secure the ladle in place on the bail 9, the bail having openings or holes 12 which register with the slotted openings 10 in the feet of the ladle. Staples or eyes 13 are provided at suitable separated distances on the sides of the ladle to which chain hooks are attached in handling the ladle when being put into or removed from the bail or trunnion ring 9.

In the use of ladles constructed in accordance with our invention, the ladles, which have been cast integral, are secured in place upon the bail 9 of a slag car by means of the bolts 11, and the car is then placed in position to receive a load of molten slag or other material. The ladle is filled to or slightly above the line 4 on the ladle showing the point in the height of the ladle at which the wall thickness of the ladle is reduced in forming ladles in accordance with this invention.

The advantages of our invention will be apparent to those skilled in the art. By reducing the thickness of the wall of the ladle adjacent to the line at which the slag remains molten, the liability of warping and cracking is largely overcome and the life of the ladles thereby lengthened. Any cracks developed in the ladle by the alternate heatings and coolings to which they are subjected in the use of the ladles are controlled and directed, as the cracks will develop approximately at and in the general direction of the line 4. The cracks may extend entirely around the ladle so as to separate the portion B from the portion A, in such cases the lugs 5 and 6 and the bolt 7 maintaining the portion B in position on the bottom portion A, in this way avoiding the necessity for extensive repairs when a crack of any extent develops in the wall of the ladle.

Modifications in the construction of the ladles may be made without departing from our invention. Instead of reducing the wall thickness from the line 4 to the top marginal edge of the portion B, a V-shaped groove may be formed in the wall of the ladles, extending entirely around the surface of the

ladle at the level of the line 4. The inner face of the ladle wall may be made to extend in a straight line vertically instead of having the offset in the wall at the level of the line 4, as shown, in such case the offset being in the outer surface, and the portion B being of less diameter than the adjacent top edge of the portion A.

We claim:—

1. In apparatus of the character described, a ladle having its side walls formed integrally of cast metal and having its wall thickness reduced at approximately the level to which the ladle is filled with molten materials.

2. In apparatus of the character described, a ladle having its side walls formed integrally of cast metal and having its wall thickness reduced at approximately the level to which the ladle is filled with molten materials, and detachable means for securing together the ladle parts on opposite sides of the line at which the wall thickness is reduced.

3. A ladle cast integral and having its wall thickness materially reduced from a line approximating the level to which the ladle is filled with molten materials when in use, to the marginal top edge of the ladle, and means on the outside of the ladle for securing the thin upper portion of the ladle to its thicker bottom portion.

4. A ladle cast integral and having top and bottom portions with the wall thickness of the top portion materially less than that of the bottom portion, and means for securing the parts together along the offset formed by the junction of the reduced wall of the thinner top portion with that of the thicker bottom portion.

5. A ladle for handling molten metals formed of a single casting, whose side walls at or about the normal level of the liquid contents are thinner than the walls above and below said line, and external means for tying or anchoring together the portions of said walls on opposite sides of said reduced portions.

In testimony whereof, we have hereunto set our hands.

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BENJAMIN G. JONES.

Witnesses:

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