

E. A. & J. A. JONES.
ROTARY PUDDLING-FURNACE.

No. 174,537.

Patented March 7, 1876.

Fig. 1.

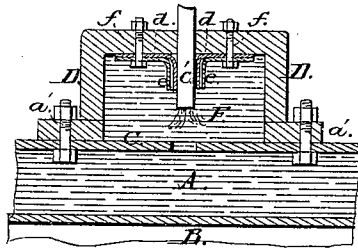


Fig. 2.

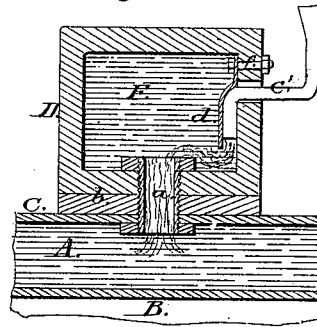


Fig. 12.

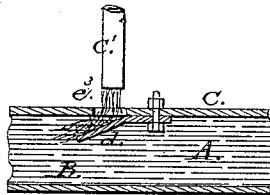
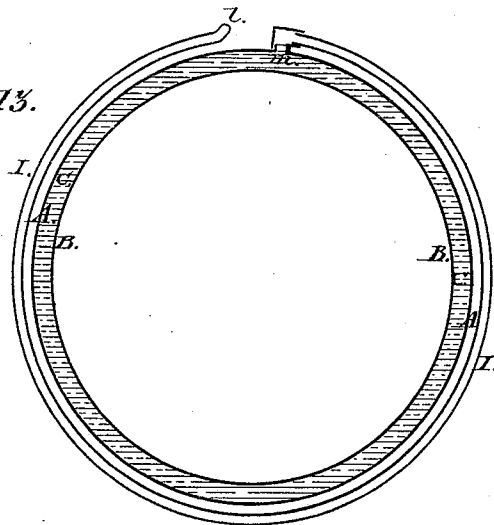


Fig. 13.



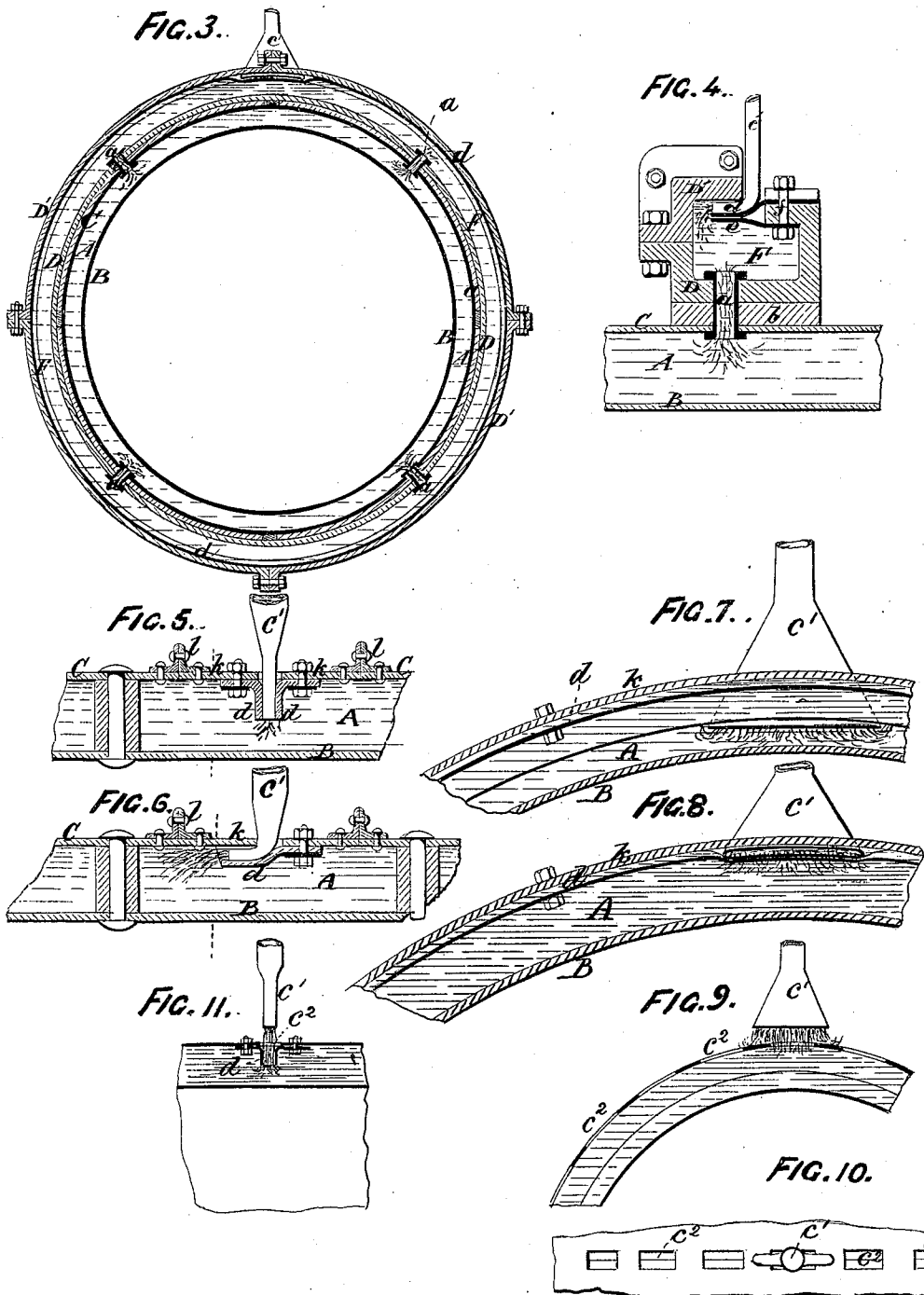
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Fig. 14.

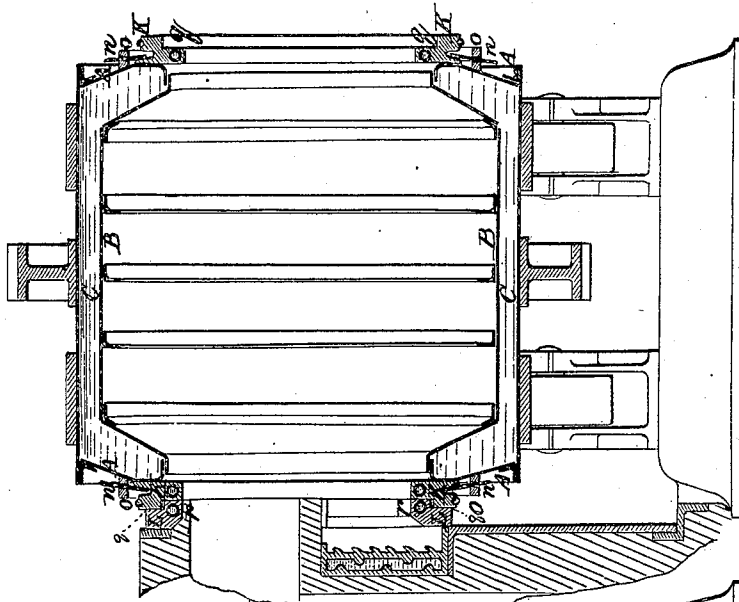
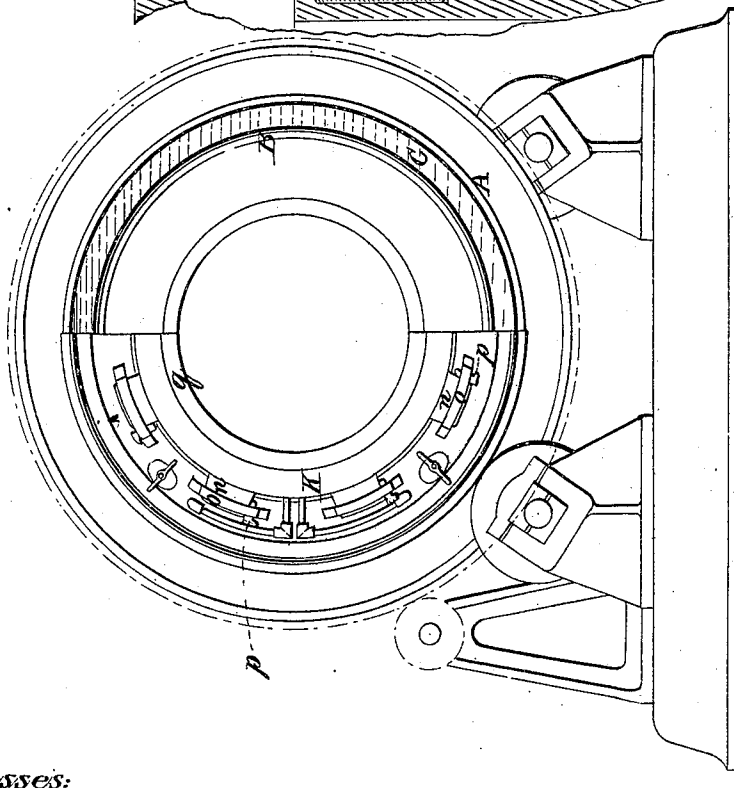


Fig. 15.



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UNITED STATES PATENT OFFICE.

EPHRAIM A. JONES AND JOHN A. JONES, OF MIDDLESBROUGH, ENGLAND.

IMPROVEMENT IN ROTARY PUDDLING-FURNACES.

Specification forming part of Letters Patent No. **174,537**, dated March 7, 1876; application filed July 14, 1875.

To all whom it may concern:

Be it known that we, EPHRAIM ALLCOCK JONES and JOHN ALLCOCK JONES, both of Middlesbrough, in the county of York and Kingdom of England, have invented Improvements in Rotary Puddling-Furnaces, and in apparatus or means employed in connection therewith, of which the following is a specification:

Our invention relates to the construction of rotary puddling-furnaces, and to apparatus or means to be employed in connection therewith for supplying water for circulation around the furnace; and it consists, first, in admitting water to the water chamber or space between the casings of the furnace, (when the furnace is composed of two casings practically water-tight,) in the manner and by the means as hereinafter described; secondly, of means for effecting the egress of the water from the water space or chamber of the rotary puddling-furnace; thirdly, of a peculiar mode of forming the joint at the ends of the furnace.

For the purpose of admitting a continuous stream of water to the water chamber or space between the two cases of the furnace we employ a ring duct or channel, either attached to the outside of the rotary furnace, and composed of one or more pieces, or forming part of the outer casing of the furnace, which ring duct or channel, or the casing of the furnace, as the case may be, is provided with an open slot or passage, extending around the whole of its circumference, in which a pipe or water communication above the furnace is inserted, such slot or passage being covered or protected around its whole circumference by a band of leather or india-rubber, or other suitable substance, to prevent the escape of the water. By means of this arrangement no leakage or escape can take place at the top, where the pipe is inserted between the packing and the ring or duct, or the casing of the furnace, except when the casing is full of water.

Figures 1 to 8 illustrate this portion of our invention.

In the arrangement, Fig. 1, which is a longitudinal section of a portion of one side of a rotary furnace, the outer casing C has attached to it, by bolts *a'*, two rings, D D, of a Z shape in cross-section, which are so placed and ar-

anged as to leave a space between them for the insertion of the stationary water-pipe *c'*, and to form a chamber, F, for the reception of the water, which is constantly introduced thereinto by the pipe *c'* during the revolution of the furnace with the rings D D, and is thence discharged into the water-chamber A of the furnace. Packing-rings *d d* and metal washers *e e*, attached by bolts *f f*, are provided, in order to prevent leakage from the water-space F. These rings *d d* work in contact with the pipe *c'* in such a manner that the rings are constantly gripping the pipe at one portion or other of their annular sides, the other portions of the sides successively closing behind the pipe as they revolve.

In Fig. 2, which shows a modification of the preceding arrangement, a single ring, D, is employed, which ring is made hollow, so as to form the water-space F, and is provided with an annular groove on one side for the reception of the stationary pipe *c'*. This pipe is bent round for the purpose of directing the water downward, and is covered by a packing-ring, *d*, which extends round the ring D, and is secured by bolts *f* to the same, in such a manner as to prevent leakage from the water-space F, the operation being similar to that of the rings *d d*, Fig. 1. The water introduced into the space F is discharged into the water-chamber A through pipes *a*, which also serve to connect the ring D to the casing C.

A further modification of this part of our invention is illustrated in Figs. 3 and 4, which represent, respectively, a transverse section of a furnace, and a detail longitudinal section of a portion of the same, drawn to an enlarged scale. In this arrangement the ring is made in two parts, D D', bolted or otherwise secured together, so as to leave a space at the outer periphery for the insertion of the bent stationary water-pipe *c'*, which is covered by the packing-ring *d*, the latter being protected, if desired, by a metal ring or guard, *e*, attached by bolts *f* to the ring D.

In lieu of employing a chamber for the introduction of the water the slot or space for the passage of the water-pipe may be made in the outer casing of the furnace itself, in which case the external rings D are dispensed with.

Figs. 5 and 6 are longitudinal sections, and

Figs. 7 and 8, respectively, transverse sections, of a portion of a furnace, illustrating two modes of carrying out this modification of our invention. In the outer casing C we form an annular slot or opening, in which there are fitted tubes or rings *k k*, which are attached, by angle-iron *l l*, to the casing C, in such a manner as to leave an opening between them for the insertion of the stationary water-pipe *c'*, which may be either straight, as shown in Figs. 5 and 7, or bent, as shown in Figs. 6 and 8, packing-rings *d d* being in both cases provided, as hereinbefore described.

The open slot or passage, in lieu of extending unbroken round the furnace, may be intercepted, and a series of slots or openings, *c''*, be provided by the division or cutting up of the continuous passage, as shown in transverse-section plan and longitudinal section in Figs. 9, 10, and 11, respectively, the water-pipe *c'* in this modification being above the slot or passage. The packing-rings *d d*, of leather, india-rubber, or other flexible material, may be continuous, as shown in the drawing, or, if preferred, divided, so as to cover each opening *c''*, to prevent the escape of water.

The water-pipe *c'* may also, if desired, be arranged above the furnace in those cases in which both the slot or passage and the packing-rings *d d* are continuous, as shown in Fig. 12, the pressure of the water depressing the leather or other material for its admission through the slot *c''* into the chamber A. This mode of applying the pipe *c'* may be substituted for that employed in the arrangement shown in Figs. 1 and 8.

The second part of our invention, which is illustrated by Fig. 13 of our drawings, consists in effecting the egress of the water from the water-space C of the rotary furnace by means of pipes, channels, or ducts, one of which is shown at I, but any suitable number of which may be employed; such pipe or pipes, which are open at the end *l* to the atmosphere, and in communication, at the opposite end *m*, with the water-space C, being coiled either round the exterior of the outer casing A, as shown in our drawings, or in the water-space C, one end in the latter case passing through the outer casing A.

Fig. 14 is a longitudinal section, and Fig. 15 is an end sectional elevation, of a furnace with the improvements which constitute the third part of our invention applied thereto. This part of our invention relates to an improved mode of forming the rings, which are secured round the ends of the rotary furnace, so as to obtain a more effective joint, and it is applicable both to double-cased furnaces, as shown in Figs. 14 and 15, and to furnaces constructed with a single casing.

K K are the rings, which may be constructed in two or more segments, and are secured (one at each end) to the outer casing A in any

convenient manner; but we prefer to attach them thereto by means of keys *n n*, which pass through slotted lugs *o o*, provided on the casing A, and enter an annular groove formed in the respective ring K, so as to firmly maintain the ring K in contact with the casing A of the furnace when the keys *n n* are tightened by the aid of wedges *p p*, driven in between them and the internal sides of the slotted lugs *o o*. Each of the rings K is, according to our invention, formed with an annular recess, *q*, which fits over a corresponding annular flange or projection, *r*, provided on the fixed ring L, which is formed on, or attached to, the stationary portion of the furnace, and against which the respective furnace-ring K revolves.

In Fig. 14 of our drawings one only of the rings L—videlicet, that applied to the left-hand end of the furnace—is shown. A similar ring is, however, intended to be fitted at the opposite end; but the ring and the stationary portion of the furnace at that end are represented as removed, for the purpose of indicating more clearly the shape of the ring K.

By means of the arrangement hereinbefore described a tight junction of the rotary barrel with the stationary portions of the furnace is insured, and the waste of cinder and iron at the parts where the joints occur is, consequently, prevented.

We claim—

1. The described means of supplying water to the water-space of double-cased rotary puddling-furnaces, consisting of circumferential slots or apertures for reception of a stationary water-pipe, or for the passage of water, communicating with the water-space of the furnace, in combination with bands or packing, which, while yielding to permit the water-pipe or water to enter, will prevent undue leakage or escape of water, the whole being fitted, arranged, and operating as herein shown and described.

2. In combination with the water-chamber of a rotary puddling-furnace, tubular coils or annular channels or ducts, for effecting the egress of the water from said chamber, substantially as set forth.

3. In combination with the revolving barrel and stationary flanged rings of a rotary puddling-furnace, recessed rings intermediate between the revolving barrel and stationary rings, engaged with, and fitted to, said parts for the purpose of effecting the junction of the same, substantially in the manner shown and set forth.

In witness whereof we have signed our names to this specification in the presence of two subscribing witnesses.

E. A. JONES. [L. S.]
J. A. JONES. [L. S.]

Witnesses:

WILLIAM WARD, *Solicitor, Leeds.*
GEO. BARKER, *Leeds, his Clerk.*