

No. 787,282.

PATENTED APR. 11, 1905.

C. E. DINKEY & H. A. BRASSERT.  
MEANS FOR PROTECTING BLAST FURNACE HEARTHS.

APPLICATION FILED OCT. 19, 1903.

2 SHEETS—SHEET 1.

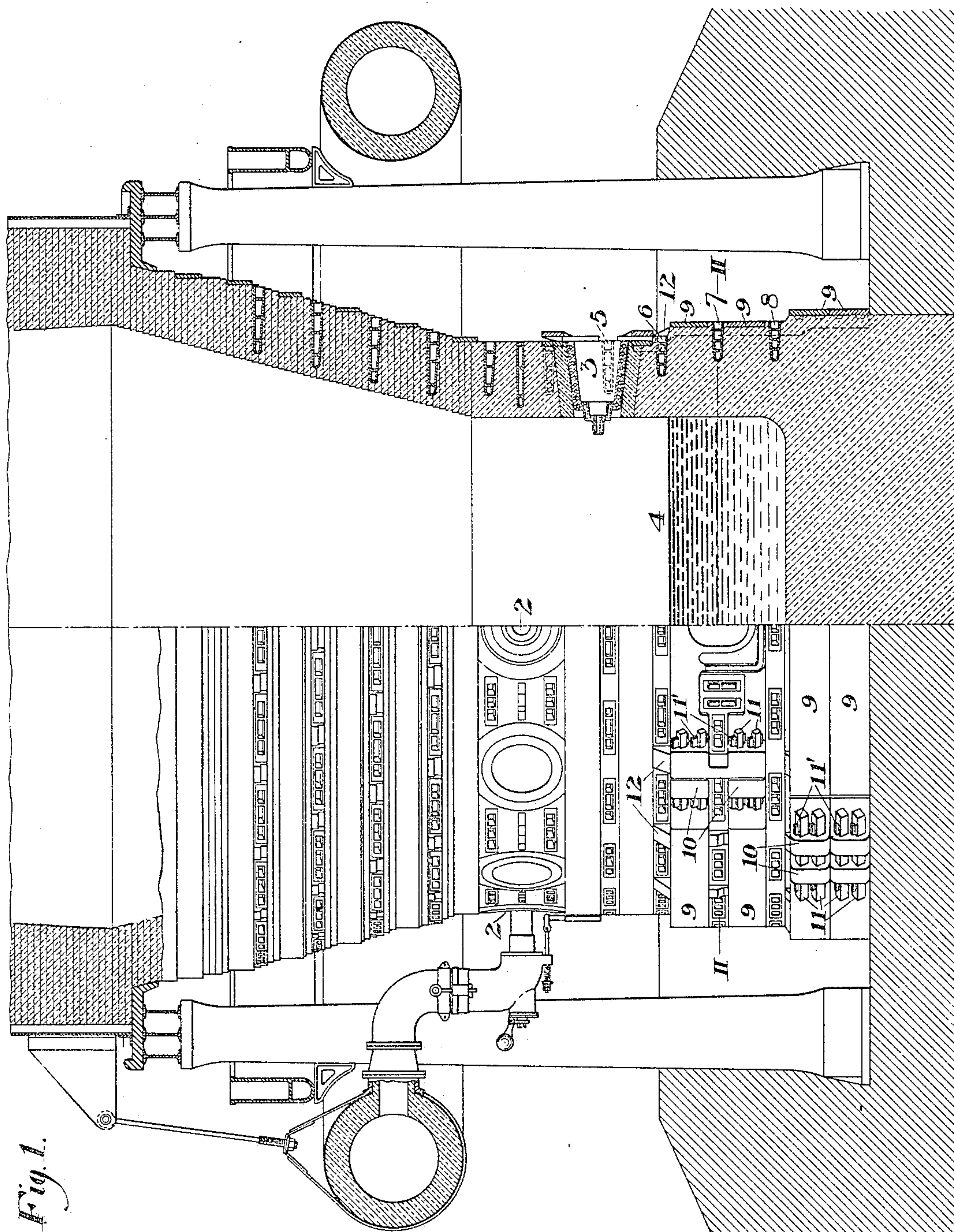
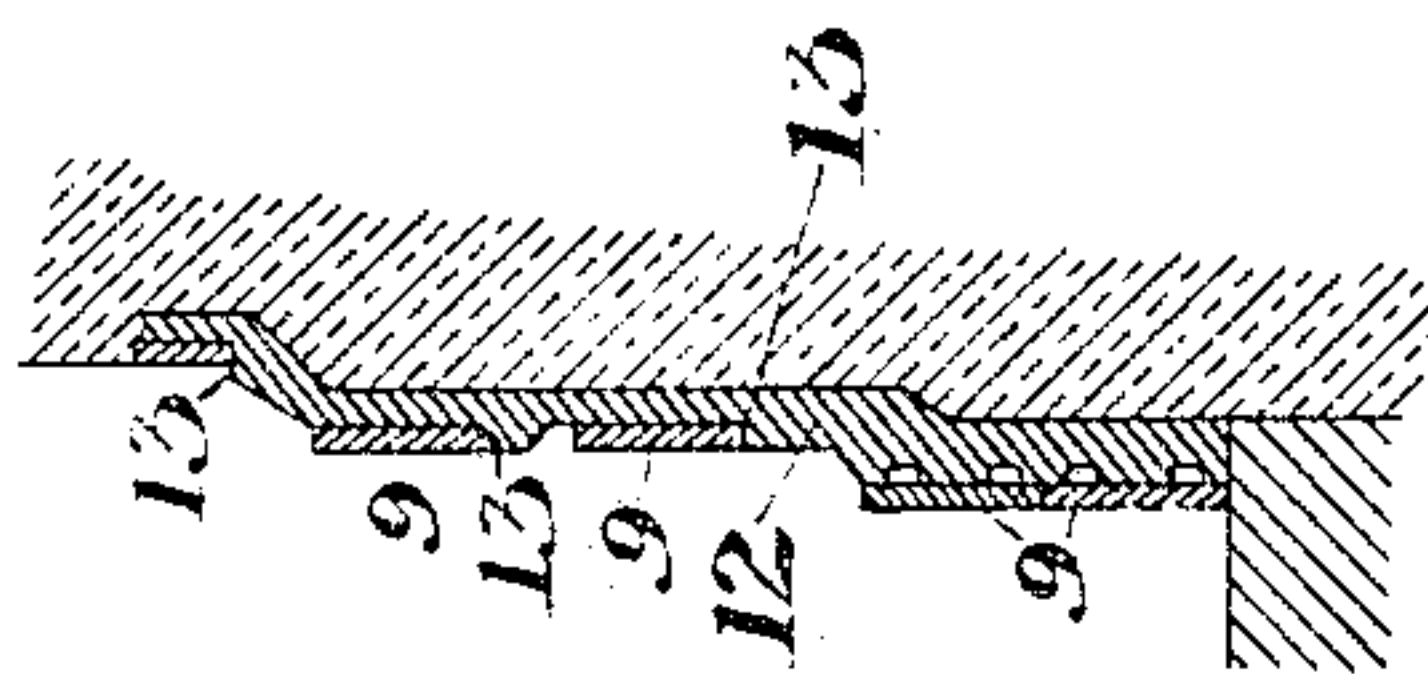


Fig. 1.

WITNESSES

Warren W. Swartz  
J. M. Convin

Fig. 3.



INVENTORS

C. E. Dinkey  
H. A. Brassert  
by Bakewell & Reynolds  
their attys



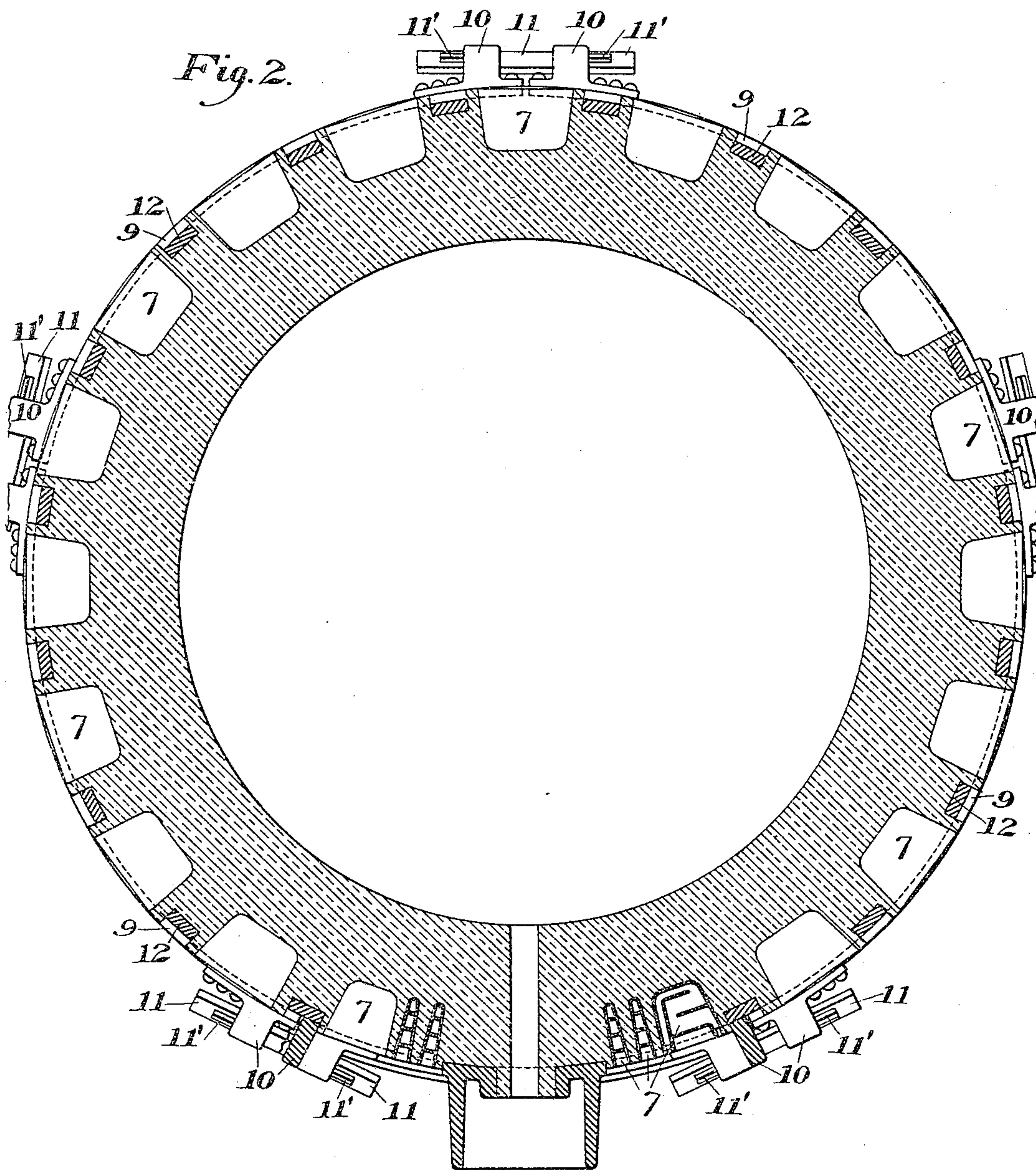
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# UNITED STATES PATENT OFFICE.

CHARLES E. DINKEY AND HERMANN A. BRASSERT, OF NORTH BRADDOCK, PENNSYLVANIA.

## MEANS FOR PROTECTING BLAST-FURNACE HEARTHS.

SPECIFICATION forming part of Letters Patent No. 787,282, dated April 11, 1905.

Application filed October 19, 1903. Serial No. 177,594.

*To all whom it may concern:*

Be it known that we, CHARLES E. DINKEY and HERMANN A. BRASSERT, of North Braddock, Allegheny county, Pennsylvania, have  
 5 invented a new and useful Means for Protecting Blast-Furnace Hearths, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification,  
 10 in which—

Figure 1 is a side elevation of a furnace provided with our invention, the furnace-wall being partly in vertical section. Fig. 2 is a horizontal section on the line II II of Fig. 1,  
 15 and Fig. 3 is a detail view of one of the buckstaves.

Great trouble has been experienced heretofore in the maintenance of the hearth-walls of iron blast-furnaces, and although many expedients have been tried for preserving the wall  
 20 none of them has hitherto proved satisfactory. The common practice has been to incase the wall of the hearth in a water-cooled jacket or to surround it with a jacket of steel over  
 25 which a stream of water is maintained. The great heat of the furnace at its hearth and the wear to which it is subjected render these devices unsatisfactory, and notwithstanding  
 30 their use the furnace-wall rapidly grows thin and breaking out of the molten iron frequently occurs.

Our invention consists in the discovery that we can do away with the surrounding jacket which has heretofore always been used for the  
 35 hearth of a blast-furnace below the cinder-notch and use in this hearth portion which incloses the molten metal a system of separated cooling-plates with exposed brickwork between them. We are thus enabled to easily  
 40 repair this hearth portion in case of a break-out, while the liability to break-outs is greatly lessened by our system.

In our preferred form the hearth of the furnace below the cinder-notch is preserved by  
 45 placing horizontal water-cooled plates in the masonry around the circumference of the hearth below the level of the cinder-notch and banding the hearth strongly with encircling

bands of metal and also, preferably, with vertical buckstaves set within the circumference of  
 50 the bands. These bands and staves support the furnace-wall against pressure from within, and the water-cooled plates preserve it from corrosion sufficiently to maintain a substantial  
 55 thickness of brickwork within the bands, so that by the coaction of the bands and staves and plates the furnace-wall is preserved with entire safety. We dispense entirely with the  
 jacket heretofore employed to incase the hearth, so that access to the wall can always  
 60 be had for the purpose of removing or replacing the plates. The bands are made in removable sections, so that they may be replaced or repaired without difficulty.

In the drawings, 2 2 are the tapers.  
 65 3 is the cinder-notch, and 4 is the level to which the iron ordinarily rises within the hearth before it is tapped. We employ below the level of the cinder-notch inserted in the masonry of the furnace series of horizontal  
 70 water-cooled plates 5 6 7 8, each extending around the circumference of the furnace. In the drawings we show one of the rows 7 on the level of the iron tapping-hole and one row 8 below this level. Further,  
 75 lower rows of plates may be used, if desired. The ordinary water-cooled hearth-jacket is dispensed with, and we use bands 9 9, which encircle the furnace between the rows of  
 80 plates and are preferably made in sections held together detachably at their ends by lugs 10, slotted connecting-bars 11, and keys 11'. Within these bands at the lower part of the  
 85 hearth are vertical buckstaves 12 12, which are built in the furnace-walls at the outside and distribute thereto the retaining pressure of the bands. These staves are provided with  
 90 recesses 13, forming seats for the bands, and they thus preserve the bands from vertical displacement.

It will be noted that if molten iron collects upon the inner end of the cooling-plate the plate may be pulled out by digging around  
 it through the masonry. This enables us to easily and quickly remove plates from the  
 95 hearth-wall.

We claim—

1. A blast-furnace having a hearth-wall provided with circular rows of separated holes extending horizontally and inwardly from its  
5 outer vertically-extending face below the level of the cinder-notch, and water-cooled plates arranged in series in said holes, the outer vertically-extending face of the masonry wall being exposed and accessible between  
10 the sides of the plates, and separated horizontal retaining-bands between the rows, the hearth-wall being free from any inclosing jacket; substantially as described.
2. A blast-furnace having a hearth-wall  
15 provided with circular rows of separated holes extending inwardly from its outer face below

the level of the cinder-notch, and water-cooled plates arranged in series in said holes, the outer vertically-extending face of the masonry wall being exposed between the sides of the  
20 plates, separated horizontal retaining-bands between the rows, and buckstaves between the bands, said structure constituting the sole retaining means for the hearth-wall; substantially as described. 25

In testimony whereof we have hereunto set our hands.

CHAS. E. DINKEY.  
H. A. BRASSERT.

Witnesses:

GEO. B. BLEMING,  
H. M. CORWIN.