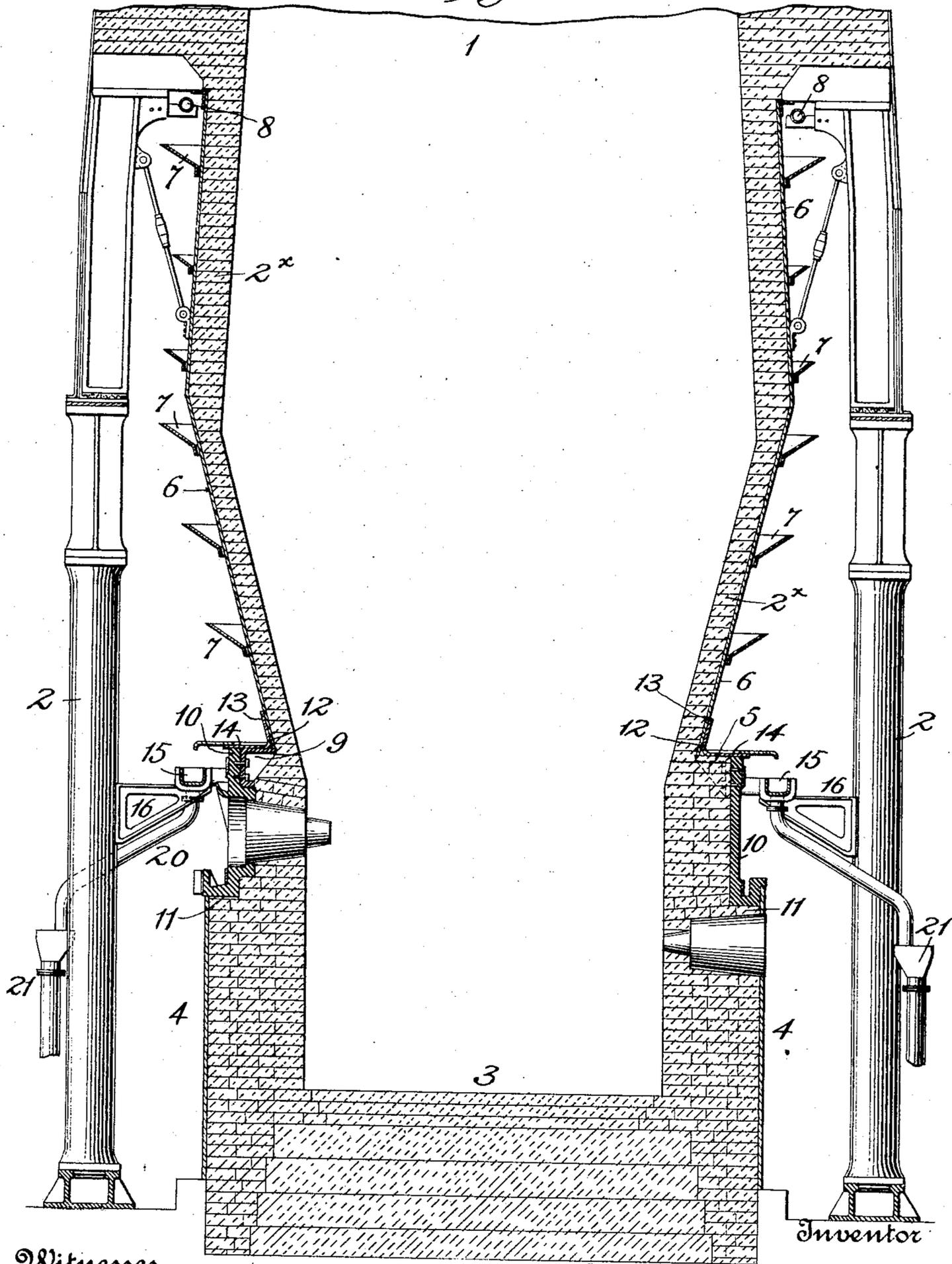


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APPLICATION FILED MAR. 14, 1904.

2 SHEETS—SHEET 1.

Fig. 1.



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No. 786,180.

PATENTED MAR. 28, 1905.

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2 SHEETS—SHEET 2.

Fig. 2.

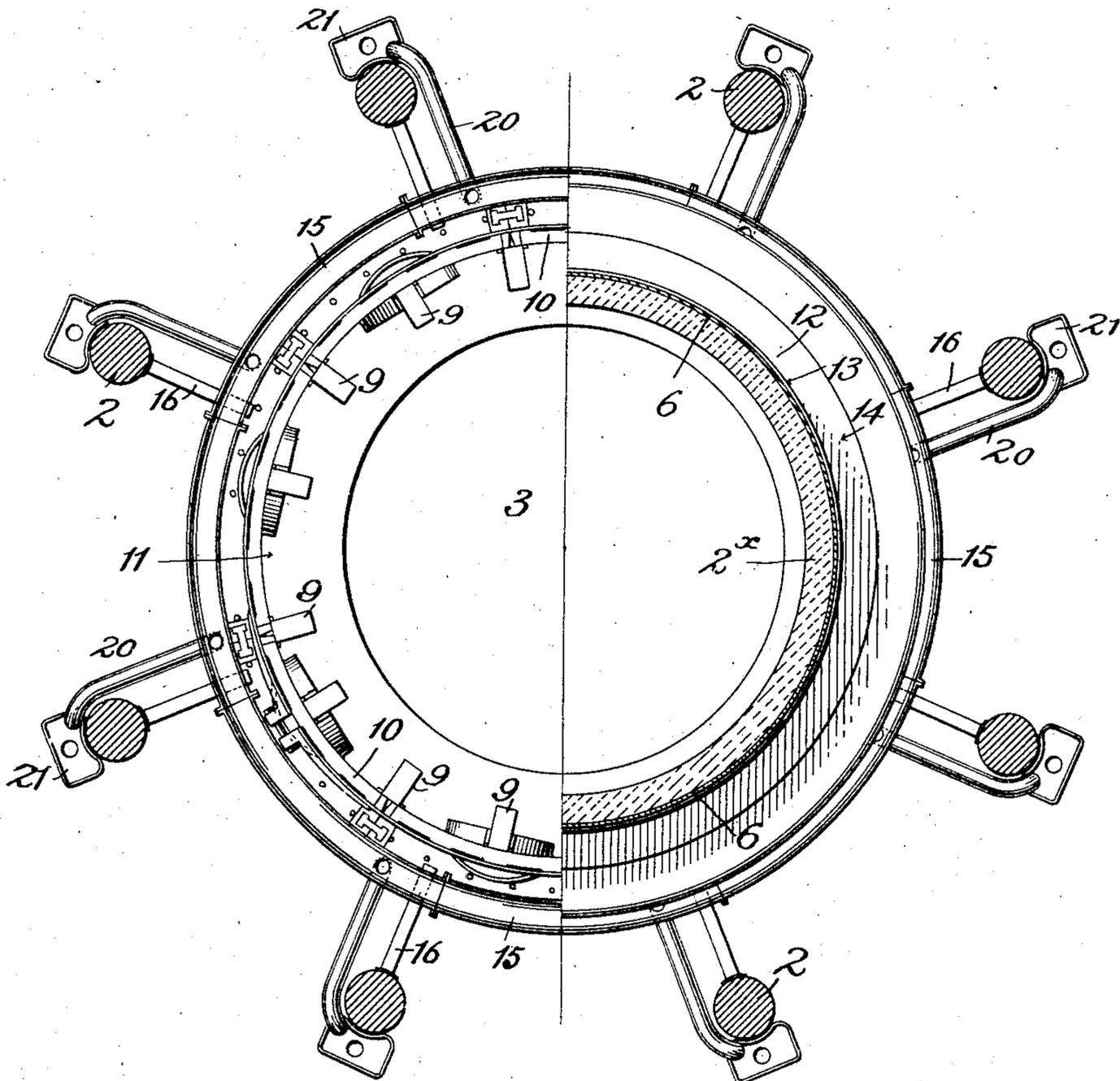
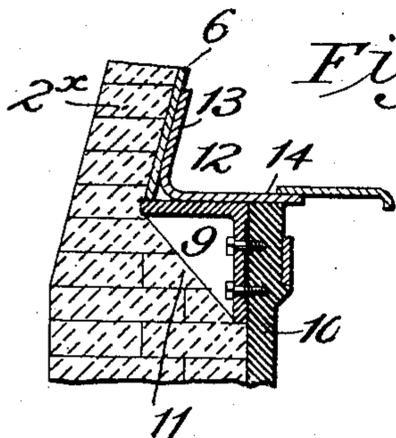


Fig. 3.



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# UNITED STATES PATENT OFFICE.

DAVID BAKER, OF NEWTON, MASSACHUSETTS.

## COOLING-JACKET FOR BLAST-FURNACES.

SPECIFICATION forming part of Letters Patent No. 786,180, dated March 28, 1905.

Application filed March 14, 1904. Serial No. 198,162.

*To all whom it may concern:*

Be it known that I, DAVID BAKER, of Newton, county of Middlesex, and State of Massachusetts, have invented a new and useful Improvement in Cooling-Jackets for Blast-Furnaces, of which the following is a specification.

This invention relates to cooling devices for furnaces, and has reference more particularly to cooling-jackets for the bosh-walls of blast-furnaces, which jackets are usually in the form of a metallic sheath or casing closely surrounding the bosh-wall and provided at intervals with encircling gutters, each discharging into the one below, so that the water supplied at the top of the series of gutters is distributed in a film over the intervening surface of the jacket and is received in a trough supported at the base of the bosh-wall on a horizontal projecting portion of the furnace-wall, from which trough the water is finally discharged. In the use of constructions of this character it has been found that owing to the expansion and contraction of the furnace-wall under the trough and the expansion and contraction of the metallic jacket the joints of the trough open, permitting the water to leak into the furnace, which leakage when the blast is turned off increases to such extent as to greatly cool the interior of the furnace, resulting in irregular product, extra work, and great expense in restoring the furnace to its normal working condition.

A further objection is found to exist owing to the accumulation of dirt and sediment in the trough, which greatly retards its cooling effect, particularly at the bottom of the trough where the heat from the furnace is most intense, with the result that the bottom of the trough is soon burned out.

It is the aim of my invention to overcome these objections; and the invention consists, primarily, in sustaining the receiving-trough outside and free of the furnace-wall and in forming the jacket at the base of the bosh-wall so that the water will be permitted to pass freely over the same at this point and will be directed into the trough.

The invention also consists in improved means for giving support at the base of the

bosh-wall to the cooling-jacket and attached gutters.

The invention also consists in the details of construction and combination of parts hereinafter described and claimed.

In the accompanying drawings, Figure 1 is an elevation, partly in section, of the lower part of a blast-furnace having my invention embodied therein. Fig. 2 is a sectional plan view looking downward, portions being broken away to expose their parts to view. Fig. 3 is a vertical section, on an enlarged scale, showing the supporting-brackets at the base of the bosh-wall for sustaining the cooling-jacket.

Referring to the drawings, 1 represents the body of the furnace, supported by the usual columns 2, arranged at intervals around the same.

2<sup>x</sup> represents the bosh-wall of the furnace, and 3 the hearth, inclosed by a wall 4, which at its junction with the bosh-wall extends outward, forming a ledge 5.

6 represents a cooling-jacket comprising a metallic sheath or casing which closely surrounds the bosh-wall and which is encircled by a number of distributing-gutters 7, fixed thereto one above the other and formed at their bases so that water supplied to the upper gutter from supply-pipe 8 will be received by the several gutters and be by them distributed in a film over the intervening surface of the jacket.

At its lower end the jacket rests on and is supported by the inner ends of a series of brackets 9, fixed to the inner face of a heavy band or ring 10, encircling the upper portion of the wall 4, which band is supported at its lower end by a projecting portion 11 of said wall, the said brackets being embedded or built in the wall. As a result of this arrangement the bosh-wall is free from the weight of the jacket, which latter is given firm support from beneath and is effectually retained in position.

In the angle formed where the bottom of the jacket meets the ledge 5 is fixed an angular annular plate 12, comprising an upright portion 13, closely surrounding the lower end of the jacket, and a horizontal outwardly-pro-

jecting portion 14, which rests on the ledge 5 and extends outward beyond the same and has its edge turned downwardly and forming a discharge-plate, so that the water as it passes  
 5 over the jacket is received by this annular plate and is permitted to pass freely over the same, and flowing over the discharge-plate it is directed into and enters a receiving-trough 15, surrounding the wall 4 some distance from  
 10 it and arranged vertically beneath the edge of the discharge-plate.

The trough 15 may be sustained in any suitable manner provided that it is free of the furnace-wall and receives no support there-  
 15 from; but I prefer to support the trough on the inner ends of a series of brackets 16, fixed at their outer sides to the inner faces of the supporting-columns 2, as clearly shown in Fig. 1. By thus sustaining the trough free of the  
 20 furnace-wall and allowing the water passing over the jacket to flow freely from the base of the same into the trough there will be no accumulation of water at the base of the bosh-wall and no danger therefore of leakage into  
 25 the furnace in the event of the wall cracking or parting. Furthermore, the trough being outside and free of the wall will not be subjected to strains from the expansion or contraction of the walls or jackets, such as would  
 30 cause the seams of the trough to open.

The water may be discharged from the receiving-trough in any suitable manner, and I have shown for this purpose a series of drain-  
 35 pipes 20, leading from the bottom of the trough and discharging into spouts 21.

It will be observed from the construction shown and described that the annular plate at the bottom of the jacket forms a horizontal uninterrupted continuation of the outer sur-  
 40 face of the jacket, so that the water flowing over the exterior of the jacket is not retarded or interrupted, but passes freely and uniformly onto the plate and in like manner over the same and is finally discharged over  
 45 its edge. This manner of discharging the water is peculiarly applicable to a form of cooling-jacket adapted for the circulation of water over its exterior surface, where it has been customary to receive the water in a  
 50 trough set at the base of the jacket and which accumulation of water has been the cause of much injury to the furnace and interruption in the working of the same, as before pointed out. Under my construction  
 55 there is no accumulation of the water at any point where it can cause injury; but the water is directed outward from the furnace and discharged without in any manner interfering with its natural flow and effective circulation.

Having thus described my invention, what I claim is— 60

1. In a blast-furnace and in combination with the bosh-wall, a cooling-jacket surrounding the same and provided at its lower end with a horizontal flat annular plate forming a  
 65 continuation of the outer surface of the jacket and having its edge terminating beyond the body of the furnace, said plate adapted to receive without interruption the water flowing downward over the exterior of the jacket and  
 70 adapted to permit it to be discharged freely outward, and a receiving-trough sustained free of the furnace-wall vertically beneath the discharge edge of the plate in position to receive the water flowing over said plate. 75

2. In a blast-furnace and in combination with the bosh-wall, a cooling-jacket surrounding the same and provided at its lower end with a horizontal flat annular discharge-plate  
 80 with its edge turned downwardly and terminating beyond the body of the furnace, said plate adapted to receive the water flowing downward over the jacket and to permit it to be freely discharged outward, and a receiving-trough sustained free of the furnace-  
 85 wall vertically beneath the edge of the discharge-plate to receive the water flowing over said plate.

3. In a blast-furnace and in combination with the bosh-wall, a cooling-jacket surround-  
 90 ing the same, an angular annular plate at the base of the jacket, comprising an upright portion closely surrounding the jacket and forming a continuation of the same and a horizontal  
 95 portion, forming a continuation of the upright portion and projecting outward beyond the furnace-wall and forming a discharge-plate over which the water is adapted to freely flow, and a receiving-trough in position to receive the water flowing over the dis-  
 100 charge-plate.

4. In a blast-furnace and in combination with the bosh-wall, a cooling-jacket surrounding the same, a wall inclosing the hearth of the furnace and supporting the bosh-wall, a  
 105 band or ring encircling said hearth-wall, and a plurality of supports or brackets fixed to the inner face of said band and extending inwardly beneath the lower end of the cooling-jacket and giving support to the same. 110

In testimony whereof I hereunto set my hand, this 23d day of February, 1904, in the presence of two attesting witnesses.

DAVID BAKER.

Witnesses:

HARLEY BROOKHOUSE,  
 FRANKLIN T. MILLER.