

J. H. MEISSNER

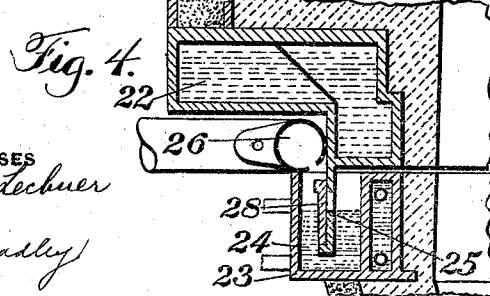
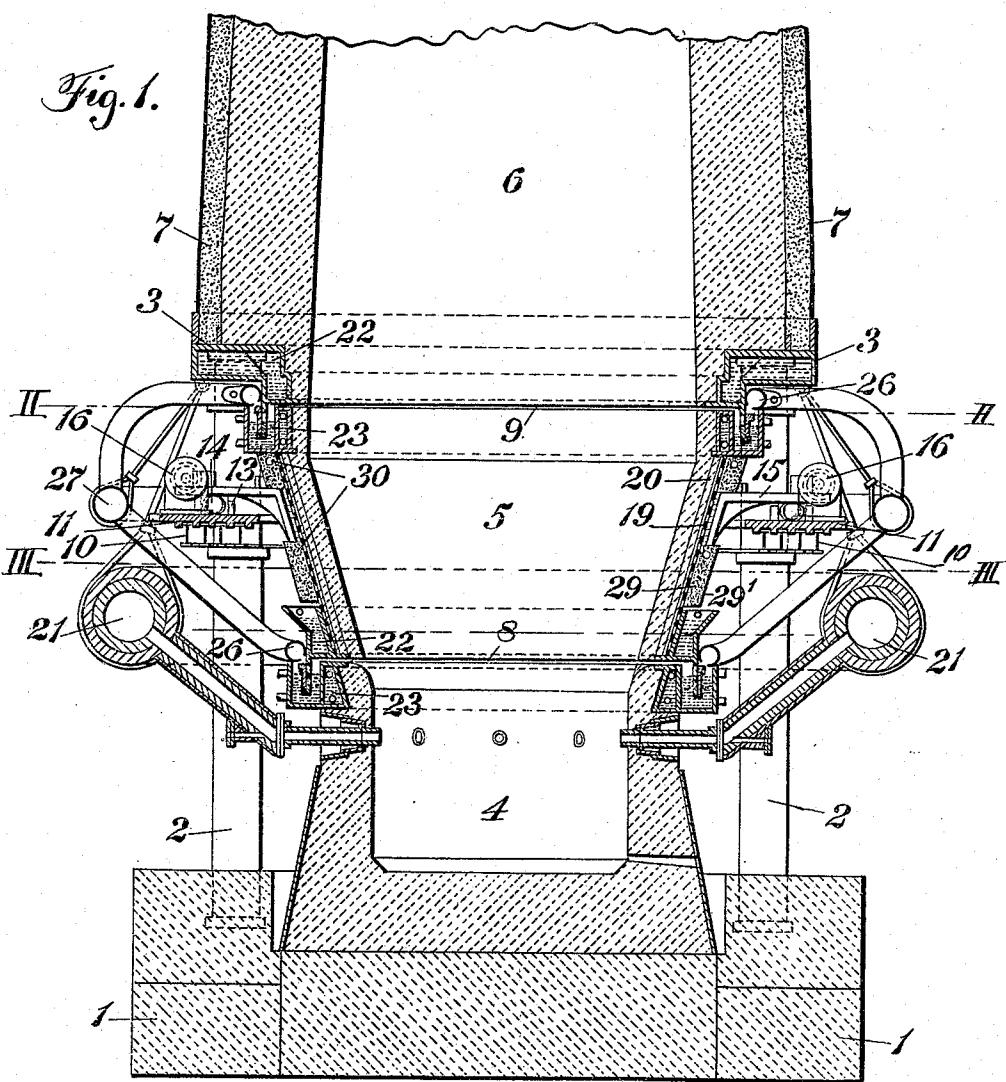
BLAST FURNACE.

APPLICATION FILED JUNE 28, 1907.

900,291.

Patented Oct. 6, 1908.

2 SHEETS—SHEET 1.



WITNESSES

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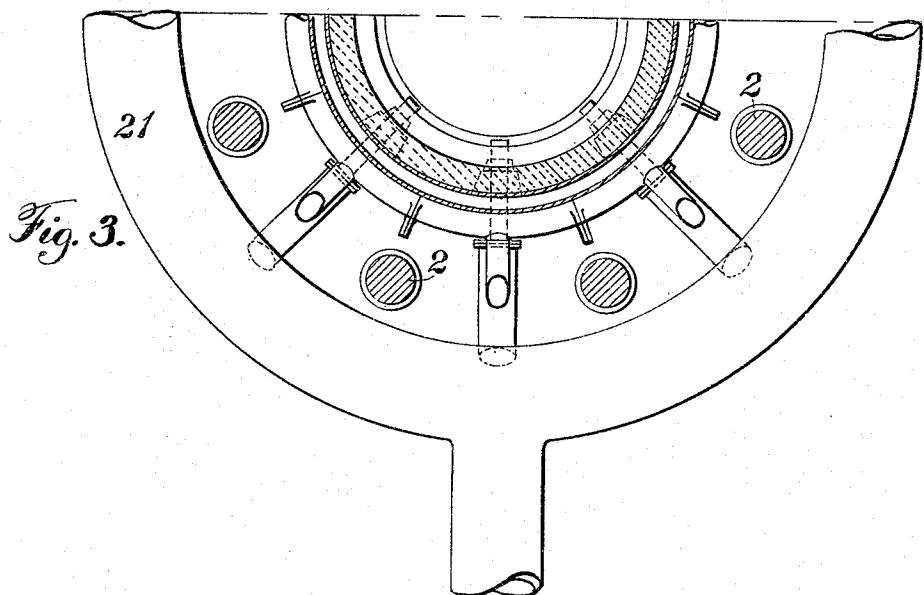
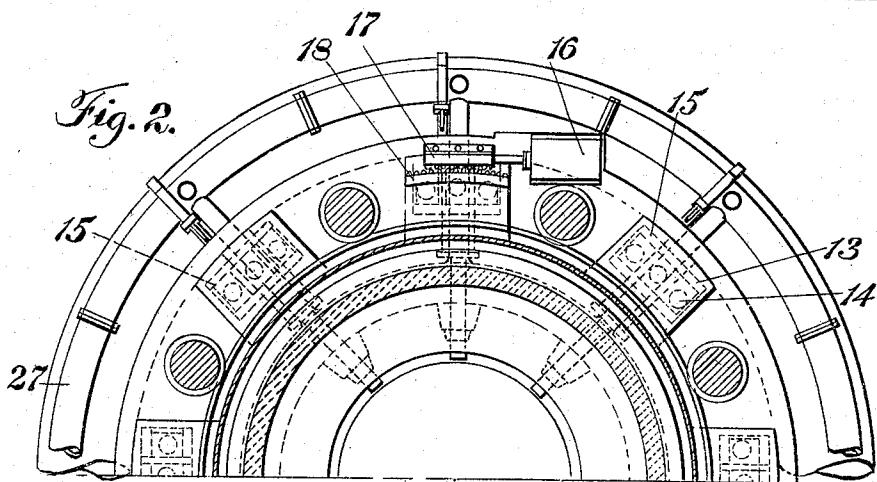
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UNITED STATES PATENT OFFICE.

JULIUS H. MEISSNER, OF PITTSBURG, PENNSYLVANIA.

BLAST-FURNACE.

No. 900,291.

Specification of Letters Patent.

Patented Oct. 6, 1908.

Application filed June 28, 1907. Serial No. 381,193.

To all whom it may concern:

Be it known that I, JULIUS H. MEISSNER, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State 5 of Pennsylvania, have invented certain new and useful Improvements in Blast-Furnaces, of which the following is a specification.

My invention relates to blast furnace mechanism, and has for its primary object 10 the provision of a construction wherein all danger of clogging, sticking or hanging of the contents or burden with the resultant dangerous slip is avoided, and wherein a positive and reliable feed is secured. One form of the invention is illustrated in the accompanying 15 drawing wherein:

Figure 1 is a longitudinal section through the lower portion of a blast furnace built in accordance with my invention,

20 Figure 2 is a transverse section on the line II—II of Figure 1,

Figure 3 is a transverse section on the line III—III of Figure 1, and

25 Figure 4 is an enlarged detail section through the joint.

Heretofore in blast furnace work, the feed through the furnace has been entirely by gravity, the weight of the contents or burden, as it is termed in the art, being dependent 30 upon to give the proper downward movement through the furnace, and as a result clogging or choking in the furnace has been of frequent occurrence, such choking occurring ordinarily at the lower portion of the 35 furnace where it is contracted in diameter, which contracted portion is known in the art as the bosh. Such choking interferes with the proper operation of the furnace, materially reduces the output, because of the irregularity of feed, and still more important is 40 often productive of disastrous accidents to life and property, as the material beneath the upheld burden melts out leaving large open spaces, and the sudden freeing of the 45 choke permits of a slip or fall of a tremendous weight of ore often a considerable distance, which disturbance in the furnace is productive of violent explosions of gas. My 50 invention is designed to prevent any possibility of choking and secure a positive feed at the bosh and adjacent portions of the furnace, which result is accomplished by making

a section of the furnace rotatable and at desired intervals giving this section a slow steady movement to insure the feed of the 55 ore past such section, and into the hearth below.

Referring now to the drawings, and particularly to Figure 1, 1 is the foundation of the furnace, upon which the supporting columns 2 rest and carry at their upper ends the supporting plate 3, 4 is the lower portion of the furnace or hearth which is provided with the twyers shown and other usual parts, 5 is the bosh made independent and movable, 6 is 65 the upper body of the furnace carried on the plate 3, which upper body is provided with an outer heavy casing 7. The hearth and body portion are independent of the bosh 5, thus making the two open joints 8 and 9. In 70 order to support the bosh a circular structure 10 of I beams is provided which beams rest on the brackets projecting from the columns 2, and on this structure is mounted the heavy circular bed plate 11, which is provided on its 75 upper surface with guides 13 for the anti-friction rollers 14, which rollers carry on their upper sides the brackets 15, which are secured to the bosh 5, one between every two columns (Figure 2). In order to give the 80 bosh its desired movement back and forth, two hydraulic cylinders 16 are placed on opposite sides of the bosh on the bed plate 11 outside of the travel of the brackets 15. These cylinders are provided with pistons 85 carrying racks 17, which engage the circular racks 18 secured to the brackets 15. The frame work of the bosh 5 is a perforated steel shell 19 which carries the brick lining and to which the brackets 15 are riveted. In order 90 to prevent any movement of rotation between the shell 19 and its brick lining, longitudinal T sections 20 are riveted to the interior of the shell. The hot blast to the furnace is supplied by the pipe 21 shown, which pipe 95 encircles the furnace and is provided with the ordinary twyers shown.

The means whereby the joints between the edges of the movable section 5 and those of the sections 4 and 6 are kept cool, and an outflow of fluid from the interior of the furnace prevented, constitutes a feature of my invention and will now be described, it being noted that the general constructions for the two

joints 8 and 9 are similar, the only difference being in the shape of the water boxes, so that a description of one joint will suffice for both. Adjacent each of the joints a pair of opposing metal water boxes 22 and 23 are provided (Figure 4), through which a flow of water is sent in order to keep the parts cool. For the purpose of forming a seal the lower box is also provided with a compartment 24 into which the plate or apron 25 from the box 22 projects. The compartment is practically filled as shown either with a liquid or a semi-fluid mass thicker than water, which is prevented from being forced from its position by the pressure in the furnace, by the provision of air pressure from the pipe 26, which pipe is provided with a slot communicating with the compartment 24 and is supplied with air at the same pressure as that in the hot blast pipe. As shown a pipe 26 is provided for each joint and these pipes are fed from a main 27 leading to the blast engine. The use of a thick semi-fluid mass in the compartment 24 prevents a discharge due to the sudden change in pressure on the opposite sides of the plate 25, and if the mass is sufficiently thick and viscid it will maintain a seal even when the blast from the main 27 is cut off. Holes are also provided at intervals in the plate 25 controlled by a rotatable damper 28, so that when desired the two sides of the compartment 24 may be thrown into communication and the pressure from the interior of the furnace balanced directly by the blast from the pipe 26. This arrangement prevents any escape of gas from the furnace and keeps the joints from over heating, and prevents injury to the brick work at these joints.

Another feature of the construction illustrated is the means for keeping the walls of the bosh cool. This means consists in the provision of a layer of sand 29 or other material capable of holding moisture outside the perforated plate 19, which sand is held in position by means of screening 29' and is continuously moistened by a flow of water from a perforated water pipes 30. The water percolates down through the sand, and passing through the perforations in the plate 19 is drawn by capillary attraction into the brick work, thoroughly cooling it. The screening permits the escape of the heated vapor and steam. The water will also work down behind the brackets 15 and the box 22. The water will not flood the brickwork as the screening 30 readily permits its escape in the opposite direction and any surplus is caught in the trough in the top of the box 22. This arrangement is much cheaper than the bronze plating now employed and could be used on the upper portion of the furnace if desired, and the low temperature secured in

the walls tends to prevent the sticking of the burden to the wall.

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In operation it is ordinarily necessary to give the bosh 5 a slow back and forward movement only at intervals as a very slight movement will insure a proper feed. The walls of the section 5 in their movement either 70 carry with them an adjacent body of ore thus agitating the interior of the mass, or move past the adjacent burden loosening its hold upon the wall, and in either case the mass is caused to move freely and with a uniform 75 movement downward. Choking is thus done away with and the sudden violent rushes of ore incident to the freeing of the choked portion avoided.

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Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is the following:—

1. In combination, a blast furnace having a hearth and an independent movable section 85 thereabove, and means for giving the section a movement of rotation.
2. In combination, a blast furnace having a hearth and an independent movable section thereabove, and means for giving the 90 section a back and forth movement.
3. In combination, a blast furnace comprising a plurality of independent sections, means for giving one of the sections a movement of rotation, and means for applying air 95 pressure to the exterior of the joints between the relative movable sections whereby an outward flow of fluid from the interior of the furnace is avoided.
4. In combination, a blast furnace comprising a plurality of independent sections, means for giving one of the sections a movement of rotation, and water boxes adjacent the joints between the movable section and the other sections whereby such joints are 105 cooled and protected.
5. In combination, a blast furnace comprising a plurality of independent sections for giving one of the sections a movement of rotation and a liquid seal for the opposing 110 relatively movable edges of the sections.
6. In combination, a blast furnace comprising a plurality of independent sections, means for giving one of the sections a movement of rotation, a liquid seal at the opposing 115 relatively movable edges of the sections, and means for applying air pressure to the outside of the seal to counteract the pressure from the furnace on the inner side of the seal.
7. In combination in a furnace, a bosh 120 comprising a conical perforated steel shell provided on its interior with longitudinally extending sections provided with projecting flanges and having a brick-work lining, means for rotatably supporting the shell and means 125 for giving the shell a movement of rotation.

8. In a blast furnace, an independent bosh mounted for rotation about its axis.

9. In a blast furnace, an independent rotatable section above the hearth comprising a 5 conical bosh portion and a cylindrical portion of the furnace wall at the top of the bosh portion.

10. In combination, a blast furnace comprising a plurality of independent sections, 10 means for giving one of the sections a move-
ment of rotation, and means for applying blast to one of the joints.

In testimony whereof I have hereunto signed my name in the presence of the two subscribed witnesses.

JULIUS H. MEISSNER.

Witnesses:

F. E. GAITHER,
J. C. BRADLEY.