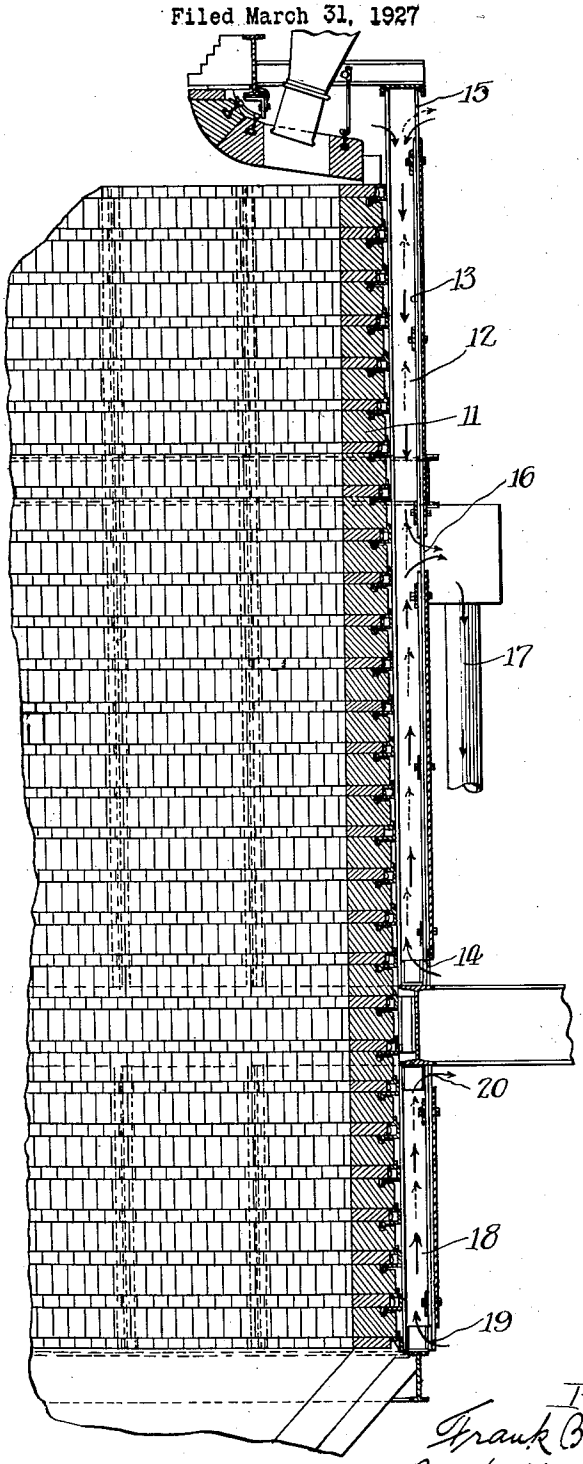
July 26, 1927. 1,636,894

F. B. BIGELOW

COOLED FURNACE WALL

Filed March 31, 1927



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UNITED STATES PATENT OFFICE.

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COOLED FURNACE WALL.

Application filed March 31, 1927. Serial No. 179,771.

My invention concerns features of novelty and advantage in furnace or other heated walls to prevent them from becoming excessively hot under any conditions with resulting injury or serious damage to the bricks or refractories of which the wall is composed.

Heretofore, it has been proposed to cool such walls by an air-jacket or space through which cooling air is drawn by the operation of the furnace itself, and, in such constructions, so long as the furnace is in action, maintaining the proper flow or current of such protecting air, there is ordinarily no substantial probability of the wall becoming unduly heated, but, when such a hot furnace is shut down or temporarily put out of commission, the greatest danger exists, because all of the parts of the structure are at high heat and the protecting air current is shut off or stopped, thus eliminating its beneficial cooling action and the wall becomes more or less seriously impaired.

The leading aim or purpose of my invention is the provision of a wall of this general character which will be adequately shielded and insured against becoming too hot under both operating and shut-down conditions.

To this end, in the preferred embodiment of the invention, when the furnace is in action, cooling air is drawn or sucked downwardly from the top of the air-jacket and also upwardly from the bottom of the same through a passage or flue located at an intermediate point in the height of the wall and delivered into the furnace to assist in carrying on the combustion therein by the oxygen which it supplies, and, when the furnace is shut down, a natural flow of air enters the jacket at such lower opening, and being heated therein, rises and discharges from the jacket at the top of the latter, thereby affording a naturally induced current sufficient to protect the wall under these severe conditions.

To enable those skilled in this art to fully understand this invention, in the accompanying drawing forming a part of this specification, I have illustrated a present desirable and preferred embodiment of the invention, showing fragmentarily a structure of this character in vertical section.

Referring to this drawing, it will be perceived that the suitably-supported, vertical wall 11 of the furnace, which is subjected to a high degree of heat, is composed of many bricks or refractory elements supported in any approved manner, the particular means illustrated forming the subject-matter of a pending patent application of Jack E. Bigelow, Serial No. 106,245, filed May 3rd, 1926.

The outer face of such wall is protected by an upright air-jacket or flue 12 formed by such wall and a suitably-supported sheet-metal wall 13 spaced outwardly therefrom, such chamber or jacket having an air-admission port 14 at or near its lower end, through which air is drawn into the combustion chamber of the furnace by suction, another air port or opening 15 at or near the top of the jacket, and an intermediate port 16 connected by an associated hot-air duct 17 when the furnace is in operation.

The upper part of the furnace frequently tends to become hotter than its lower portion and hence requires the greater assurance of full and complete air-cooling.

Accordingly, the lower section of the wall may be cooled by an air-jacket 18 having an air-admission port 19 at its lower end and an air delivery or discharge port 20 at its upper end, the air always flowing upwardly through such space when the adjacent wall is hot and thus excluding the possibility of that section of the furnace becoming excessively heated.

The air flow in the upper jacket 12 is somewhat different.

When the furnace is in operation, the suction or subatmospheric pressure induced at the port 16 through the conduit 17 draws air through the jacket downwardly in its upper part and upwardly in its lower portion as indicated by the full line arrows, the air, or the greater part of it, entering the jacket through the two ports 14 and 15 and affording a sufficient current of cooling medium to exclude the possibility of heat damage to the wall.

When the furnace is closed down, so that there is no longer any substantial suction at the opening 16, the air, entering the jacket through the lower port 14, by reason of its being heated by the hot brick wall, flows up the full height of the chamber and is discharged as hot air through the upper port

15, thus insuring a reasonable cooling protection for the wall under the specified condition.

As soon as the furnace is started up again, the double direction of air flow will again be inaugurated and maintained as long as the furnace continues in service.

The shift or change from the one method of cooling to the other occurs wholly automatically and hence does not depend in any way for a safety factor upon any human agency which might fail at a critical moment.

The invention obviously is not limited and restricted to the precise and exact details of structure shown and described and these may be modified within comparatively wide limits without departure from the heart and essence of the invention as defined by the appended claim and without the sacrifice of any of the substantial benefits and advantages accruing from the use of such invention.

I claim:

A furnace-wall having a protecting air-jacket with lower, intermediate, and upper ports, and means to apply suction to said intermediate port only when the furnace is in service thereby drawing cooling air into the jacket through said lower and upper ports and out through said intermediate port, cooling air entering said lower port, traversing said jacket, and being delivered through said upper port by natural draft when the furnace is out of service but with the wall still hot.

In witness whereof I have hereunto set my hand.

FRANK B. BIGELOW.