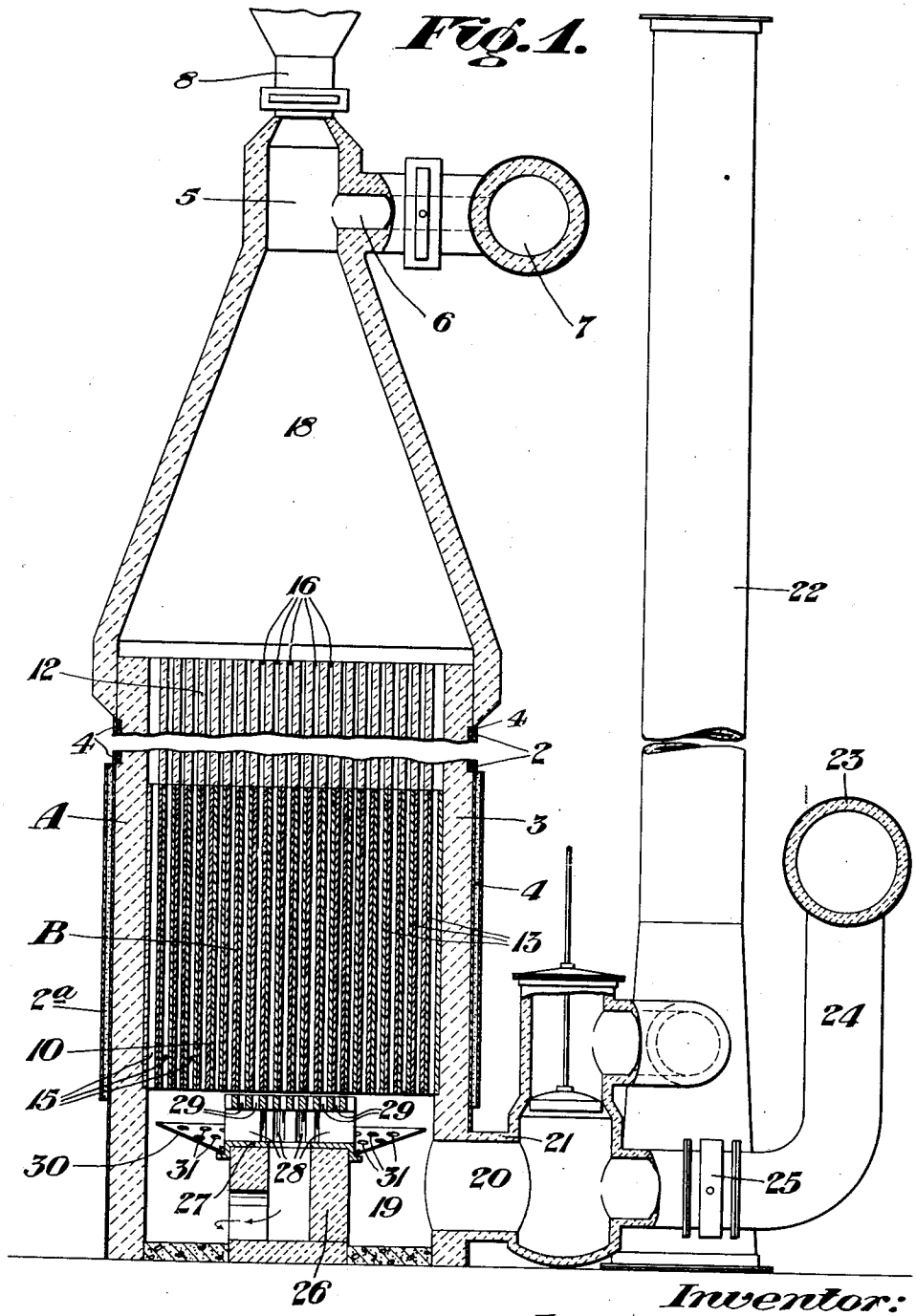
Aug. 13, 1929. F. R. McGEE 1,724,848

HOT BLAST STOVE

Filed Nov. 2, 1927 2 Sheets-Sheet 1

Fig. 1.



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Filed Nov. 2, 1927 2 Sheets-Sheet 2

Fig. 2.

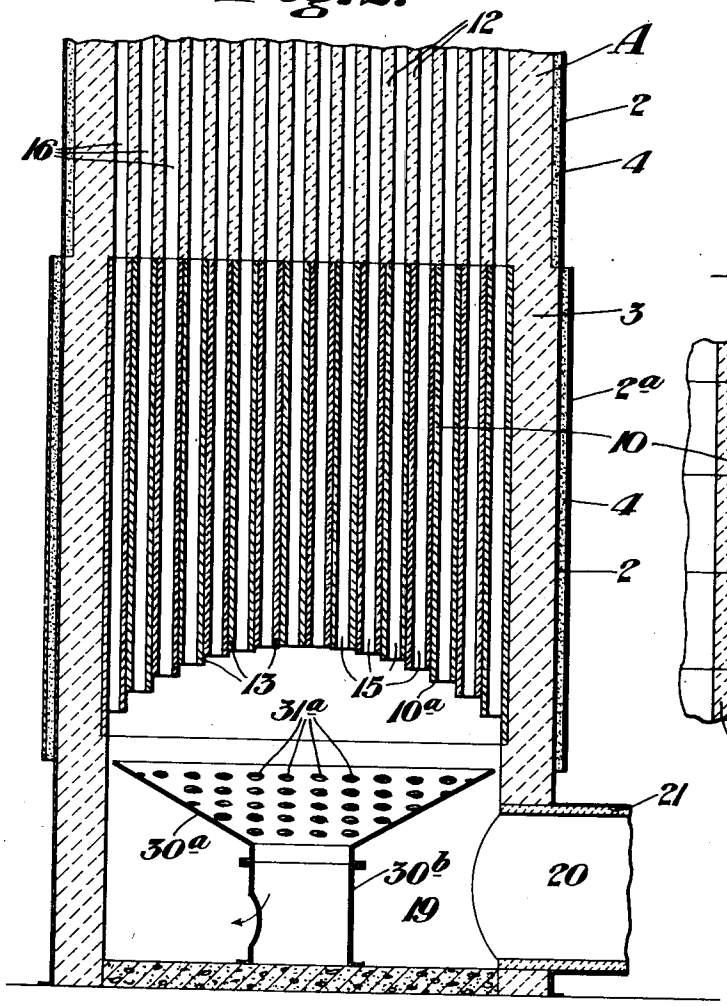
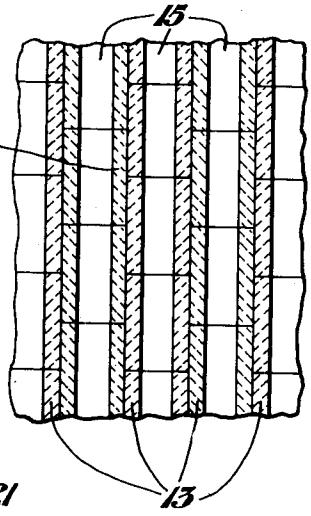


Fig. 3.



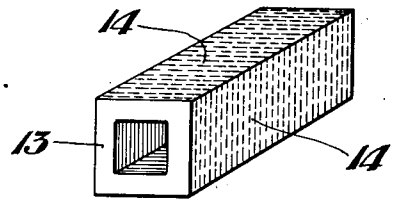


Fig. 4.

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Patented Aug. 13, 1929. 1,724,848

UNITED STATES PATENT OFFICE.

FRANK R. McGEE, OF STEUBENVILLE, OHIO.

HOT-BLAST STOVE.

Application filed November 2, 1927. Serial No. 230,628.

This invention relates to hot blast stoves and, while not limited thereto, relates more particularly to single pass hot blast stoves, and has for its object the provision of a stove of this class in which the checkerwork is self-supporting. That is, supported directly by the side walls of the stove without the use of arches or other supporting elements so as to permit the free circulation of air and gases over the entire lower face of the checkerwork.

Another object is to provide a safety pier, spaced slightly below the checkerwork, for preventing the collapse of the checkerwork if the checkerwork fails for any reason after use.

Another object is to provide a combined baffle and distributing member between the lower end of the checkerwork and the point of communication of the stack and cold blast main for preventing short-circuiting of the gases and air passing through the checkerwork.

In the drawings—

Figure 1 is a side elevation, partly in section, of a hot blast stove constructed in accordance with my invention.

Figure 2 is a sectional elevation of the lower end of a slightly modified form of stove.

Figure 3 is a fragmentary sectional elevation of a portion of the checker-plug.

Figure 4 is a perspective view of one of the special bricks used to form the checker-plug.

Referring more particularly to the drawings, the letter A designates the cylindrical side wall of the stove which is composed of a metal shell 2 and a brick or other refractory lining 3.

In the construction of the drawing the novel features of my stove are shown applied to an old stove shell and, therefore, the lower portion of the shell is reenforced by an outer reenforcing ring 2^a. It will be understood, however, that if an entire new stove was being constructed, the shell may be made heavier at the lower end if desired instead of using the reenforcing shell or ring 2^a. A layer of insulating material 4 is provided between the bricks and the shell 2 above the reenforcing ring 2^a and between the shell 2 and the reenforcing ring 2^a to protect the metal and prevent the escape of heat from the stove.

The upper end of the stove is formed conical and has a combustion chamber 5 formed thereon, which communicates through a conduit 6 with a hot blast main 7 and has a burner 8 mounted on and communicating through its upper end.

A self-supporting checkerwork B is built in the stove and extends entirely across the cross-sectional area of the stove and terminate short of each end thereof. The checkerwork B is composed of a checker-plug 10 at its lower end and the standard or usual checkerwork 12 which is supported on the plug 10.

The checkerwork plug 10 is composed of a special hollow tile 13 having its outer surface roughened by transverse indentations or ribs 14. The tiles 13 are laid up, end for end, vertically so as to form vertical checker flues or passages 15 and are preferably laid up with a high temperature cement having high refractory tensile and shearing values so that the cement will fill the indentations 14 and combine with the tile surfaces so as to act as keys between the tiles and form a monolithic whole. The passages or checker flues 15 in the checker-plug 10 are in line and communicate with the vertical checker passages 16 in the checkerwork 12.

The spaces at each end of the stove form distributing and receiving chambers 18 and 19 for the products of combustion or gases and the air passed or to be passed through the checkerwork B.

The lower chamber 19 is free of arches or other supporting members which are usually provided to support the checkerwork of the stove since the checker-plug 10 extends or bridges across the entire cross-section of the stove and is self-supporting. The lower chamber 19 is provided with a single port 20 communicating with a chimney valve casing 21 to permit the products of combustion to escape to a stack 22. A cold blast main 23 communicates with the valve casing 21 through a branch 24, having a valve 25 therein to control the flow of the cold blast.

If desired, the stove may be constructed as above described and will operate satisfactorily. However, as a safety feature, a safety pier 26 is built in the chamber 19 and provided with a cast iron cap piece 27 having transverse passages 28 therethrough and vertical perforations 29 communicating with the passages 28.

The upper face of the cap piece 27 is spaced a material distance below the lower

face of the checkerwork plug 10 and is provided to act as a support for the checkerwork in case the checkerwork should fail after prolonged use or for any unforeseen reason. The vertical perforations in the cap piece 27 are in line with the vertical passages in the checkerwork so that if the checkerwork slips or falls so as to rest on the cap piece the passages in the checkerwork will remain open and the efficiency of the stove will not be materially impaired.

In order to prevent short-circuiting of the gases and air and provide an even or uniform flow through the entire checkerwork, a combined baffle and distributing member 30, of generally frusto-conical or dish-shape formation is secured around the pier 26 at a point between the lower face of the checkerwork plug 10 and the port 20.

The member 30 is provided with perforations 31 to permit the passage of air and gas therethrough and is of less diameter than the stove so that air and gas may pass around the member. The member 30 serves to retard or baffle the flow of the air and gas and thereby cause the air entering from the cold blast main to spread out or distribute over the entire chamber 19 and enter all the passages of the checkerwork, and it serves to retard the flow of hot gases from the checkerwork and prevent such gases making a short circuit or cut to the port 20.

In Figure 2 I have shown a slightly modified form of stove. This modified form of stove is substantially the same as that of Figure 1 except that the checkerwork plug 10 has its lower end arched as at 10^a so as to increase the area of the lower distributing and collecting chamber and, theoretically, such a construction will be less liable to settle or fail in use.

In Figure 2 a modified form of combined baffle and distributing member 30^a is provided. The member 30^a is of true frusto-conical shape and is supported by a hollow metal pedestal or pier 30^b. The function of the member 30^a is the same as the baffle and distributing member 30 of Figure 1.

While I have shown and described specific embodiments of my invention it will be understood that I do not wish to be limited thereto since various modifications may be made without departing from the scope of my invention, as defined in the appended claims.

I claim:—

1. A single pass hot blast stove comprising a lined shell, a checkerwork extending across the entire cross-sectional area of said stove and terminating short of each end of said shell so as to provide distributing and receiving chambers for the gases and air passing through said checkerwork, said checkerwork comprising a self-supporting plug portion bridged across the entire cross-sectional area of said stove adjacent the lower end thereof, said plug being composed of hollow bricks laid up end for end to form vertical passages, said bricks being provided with roughened surfaces adapted to interlock with the cement used to lay up said brick, and standard brick checkerwork supported on said plug and having its vertical passages registering with the vertical passages in said plug.

2. In a single pass hot blast stove comprising a lined shell and a self-supporting checkerwork extending across the entire cross-sectional area of said stove and terminating short of each end of said shell so as to provide distributing and receiving chambers for the gases and air passing through said stove, a safety pier mounted in the distributing and receiving chamber at the lower end of said stove and terminating short of the lower end of said checkerwork, said pier being adapted to receive said checkerwork should said checkerwork drop, due to deterioration after prolonged use.

3. In a single pass hot blast stove comprising a lined shell and a self-supporting checkerwork extending across the entire cross-sectional area of said stove and terminating short of each end of said shell, so as to provide distributing and receiving chambers for the gases and air passing through said stove, a hollow safety pier mounted centrally in the distributing and receiving chamber at the lower end of said stove and terminating short of the lower end of said checkerwork, a cap member on said pier having vertical perforations therein in line with the vertical passages in said checkerwork, said pier being adapted to receive and support said checkerwork should said checkerwork drop due to deterioration or failure after prolonged use.

4. In a single pass hot blast stove comprising a lined shell and a self-supporting checkerwork extending across the entire cross-sectional area of said stove and terminating short of each end of said shell, so as to provide distributing and receiving chambers for the gases and air passing through said stove, a burner and hot blast main communicating with the upper combined distributing and receiving chamber, a stack and cold blast main communicating with the lower combined distributing and collecting chamber, and a frusto-conical baffle and distributing member mounted in the lower distributing and receiving chamber, between said checkerwork, the point of communication of said stack and cold blast main adapted to prevent short-circuiting of the air and gases through said checkerwork and provide for a uniform flow through all of said checkerwork.

5. In a single pass hot blast stove comprising a lined shell and a self-supporting

checkerwork extending across the entire cross-sectional area of said stove and terminating short of each end of said shell so as to provide distributing and receiving chambers for the gases and air passing through said stove, a burner and hot blast main communicating with the upper combined distributing and receiving chamber, a stack and cold blast main communicating with the lower combined distributing and collecting chamber, a pier mounted centrally in the distributing and receiving chamber at the lower end of said stove, and a baffle and distributing member mounted on said pier between said checkerwork and the point of communication of said stack and cold blast main and adapted to prevent short-circuiting of the air and gases through said checkerwork and provide a uniform flow through all of said checkerwork.

6. In a single pass hot blast stove comprising a lined shell and a self-supporting checkerwork extending across the entire cross-sectional area of said stove and terminating short of each end of said shell so as to provide distributing and receiving chambers for the gases and air passing through said stove, a burner and hot blast main communicating with the upper combined distributing and receiving chamber, a stack and cold blast main communicating with the lower combined distributing and collecting chamber, and a transversely extending perforated baffle plate mounted in the lower distributing and receiving chamber between said checkerwork and the point of communication of said stack and cold blast main, and adapted to prevent short-circuiting of the air and gases through said checkerwork.

In testimony whereof, I have hereunto signed my name.

FRANK R. McGEE.