Dec. 26, 1967 C. G. WILSON, SR 3,359,964

FLOOR-TYPE RADIANT SPACE HEATER

Filed Nov. 12, 1965

FIG. 1.

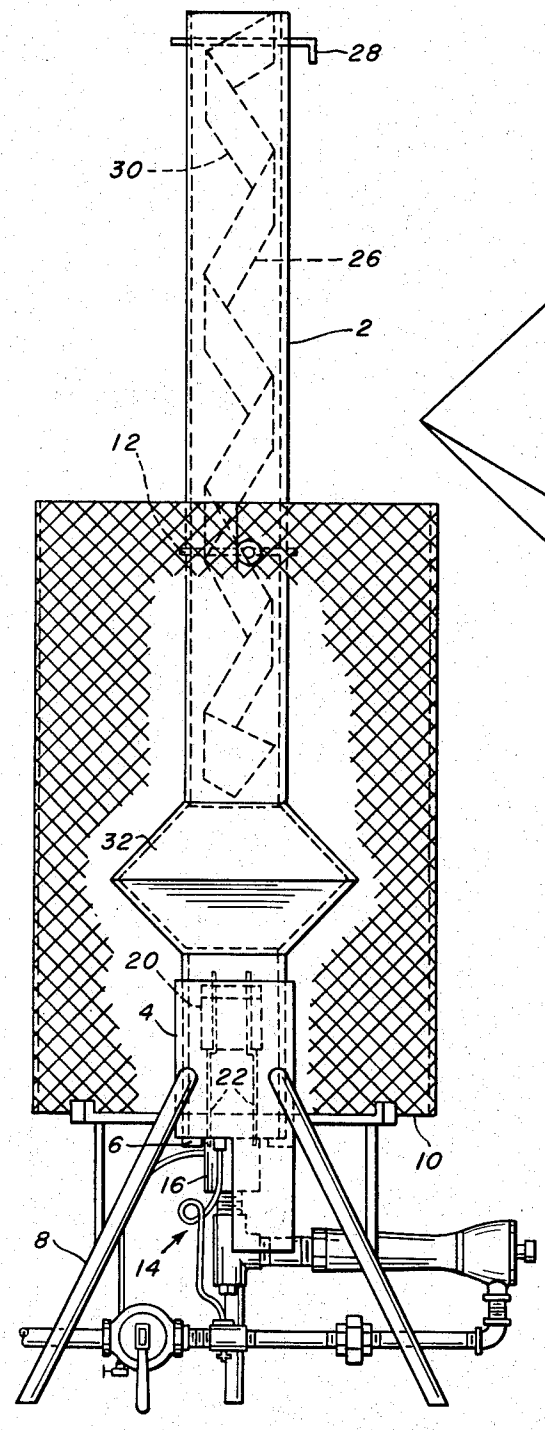
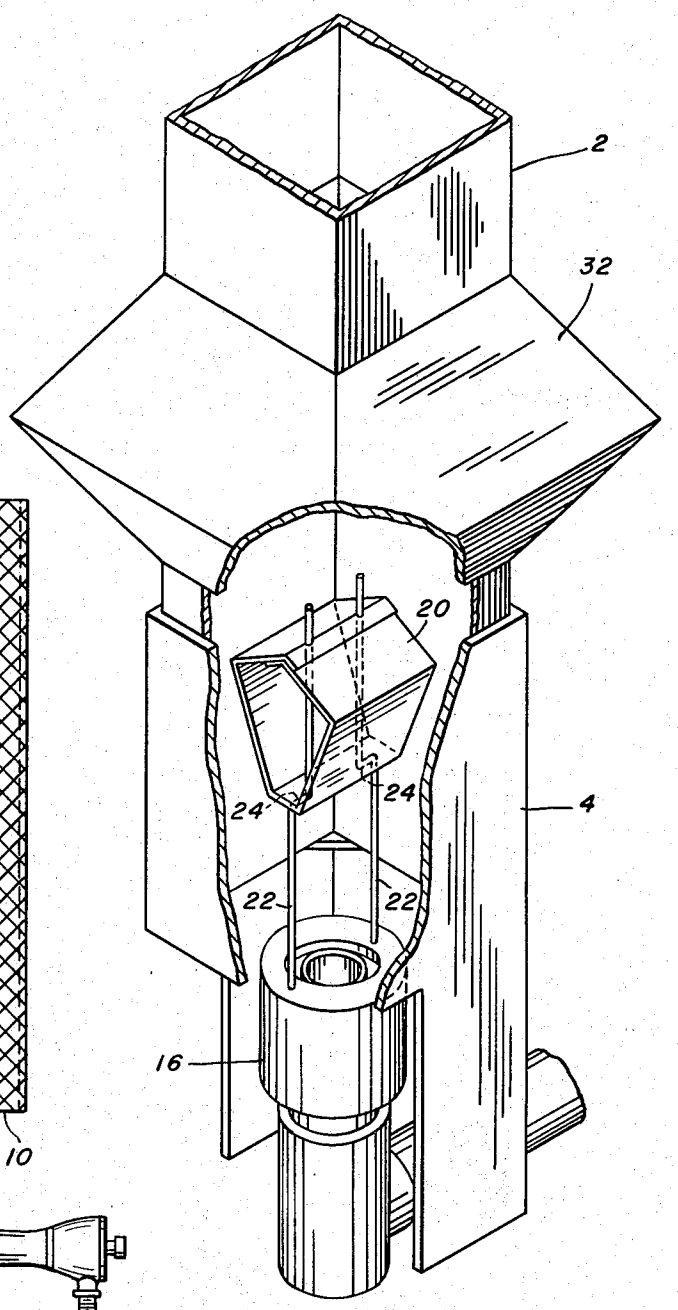


FIG. 2.



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United States Patent Office 3,359,964 Patented Dec. 26, 1967

3,359,964

FLOOR-TYPE RADIANT SPACE HEATER

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Filed Nov. 12, 1965, Ser. No. 507,386
1 Claim. (Cl. 126—91)

ABSTRACT OF THE DISCLOSURE

Heater includes rectangular vertical radiant tube, havin a zig-zag baffle strip extending longitudinally thereof, mounted on a leg-supported holder. A burner in the holder is mounted to fire into the bottom end of the radiant tube. A shield-baffle is mounted on the burner spaced above and aligned with its nozzle below the zig-zag baffle. A circumferential bustle is formed in the radiant tube between the longitudinal baffle and the shield-baffle for directing heat downwardly.

The present invention relates generally to radiant heaters and more particularly to an improved fuel-fired floor-type radiant space heater especially suitable for heating an outdoor work area or a work area in a large mill or factory building where it is impractical to attempt to heat the entire building.

Frequently, space heaters are utilized in areas which are not readily accessible so it is essential that such heaters be capable of operating over a relatively long period of time at high thermal efficiency without requiring frequent adjustment or maintenance.

It is, accordingly, the primary object of the invention to provide an improved radiant space heater which in simple and durable in construction, inexpensive to manufacture, and capable of long efficient service with a minimum of maintenance.

This and other objects will become more apparent after referring to the following specification and attached drawing, in which:

FIGURE 1 is an elevational view with parts broken away for clarity; and

FIGURE 2 is an enlarged partial view in perspective with parts broken away to show the shield-baffle element of the invention.

Referring more particularly to the drawing, reference character **2** designates the radiant tube of the heater of the invention which is disposed in vertically upright position and which is preferably rectangular in cross section and has a length many times its width. It has been found that tubes of rectangular cross section create more desired turbulence in the hot combustion gases traveling therethrough than is experienced with cylindrical tubes. The bottom end of the tube **2** is fitted in an open-end metal holder **4** with its bottom edge resting on corner ledges **6** formed on the inside of the holder. A tripod frame **8** is connected to and supports the holder **4** above the ground surface. The upper portion of the frame **8** encircles the mid portion of the holder **4** and supports the bottom of a guard screen **10**, the purpose of which will become apparent. The upper portion of the guard screen is supported by a support **12** which surrounds the stack and has arms extending outwardly thereof.

In the bottom of the holder **4** there is a gas or other fluid fuel burner **14** of the type having a vertically directed nozzle **16** with a flame-retaining ring integral thereon.

A combination deflector shield and air baffle **20** is disposed in the lower portion of the tube **2** spaced above the burner nozzle **16**. The combination shield-baffle **20** is preferably made of stainless steel and is supported over the burner nozzle by two stainless steel rods **22** having offsets **24** formed therein upon which the body of the shield-baffle **20** rests. The bottoms of the rods **22** are fitted in the upper circumferential edge of nozzle **16**. Although I have shown the shield-baffle **20** shaped as a pentagonal figure, it may be of any configuration desired so long as it occupies a horizontal area less than the cross-sectional area of the tube **2**.

The shield-baffle **20** has a two-fold function; first, it shields or deflects from the burner nozzle **16** any scale or dirt which may fall from the upper portion of the tube **2** and thereby prevents clogging of the burner nozzle, secondly, it controls or regulates the amount of secondary air entering the tube **2** so that the thermal efficiency of the heater is not detrimentally affected by the entry of an excessive amount of cold secondary air. It has been found that best results are achieved when the shield-baffle **20** is designed to admit 20 percent secondary air. This has been found to be the amount of cold excessive air required in addition to the primary air needed for combustion of gas without generating carbon monoxide. The shield-baffle **20** permits the use of low-cost carbon steel in the manufacture of the radiant tube **2** rather than the usual more expensive stainless steel. Low carbon steel has, up to the time of my invention, been avoided in the manufacture of radiant tubes due to the fact that scale would form readily on the inside of a low carbon radiant tube. Such scale would fall into the burner in the bottom of the tube and cause clogging thereof. This condition would necessitate frequent cleaning of the burner to maintain efficient operation. The deflector of the shield-baffle **20** prevents any scale from falling into the burner so that radiant tubes made of low carbon can be used without detrimental results.

An elongated baffle strip **26** made of stainless steel is removably disposed in the upper portion of the tube **2** suspended from a pin **28** which extends transversely across the top of the tube **2**. The baffle **26** is a continuous strip of metal which is formed into a series of deflecting plates **30** disposed at an angle to the longitudinal axis of the tube. The plates **30** of the baffle **26** serve to interrupt the upward flow of the hot combustion gases in the tube **2** and to cause these gases to wash against the walls of the tube thus transferring heat to the tube surface.

A bustle **32** may be formed in the tube **2** in the portion thereof between the lower end of the elongated baffle **26** and the shield-baffle **20** for the purpose of directing heat from the tube downwardly to the ground surface.

Although I have described the shield-baffle **20** as made of stainless steel, it will be noted that this baffle may be made of other materials such as earthen refractories.

Although I have shown but one embodiment of my invention, it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claim.

I claim:

A space heater comprising a vertical radiant tube, said tube being substantially polygonal in cross-section, a polygonal holder having an open upper end and an open lower end, the bottom end of said tube being removably fitted in said holder, a plurality of elongated leg members spaced around said holder each connected to said holder by one end and extending angularly therefrom to thereby support the holder above ground surface, a fuel burner disposed in the open bottom end of said holder firing into the bottom end of said tube, a shield-baffle fixedly mounted in the bottom end of said tube spaced above said burner, said shield-baffle being detached from said radiant tube, means connected with the nozzle of

said burner supporting said shield-baffle, said shield-baffle being a polygonal tube extending transversely of said radiant tube and having a horizontal area less than the cross-sectional area of said radiant tube, an elongated baffle disposed in said tube spaced above said shield-baffle, said elongated baffle comprising a continuous strip of metal formed into a series of deflecting plates extending longitudinally along said radiant tube disposed at an angle to the longitudinal axis of said tube, and a circumferential bustle formed in said radiant tube in the portion thereof between said shield-baffle and said elongated baffle.

References Cited

UNITED STATES PATENTS

880,710	3/1908	Bennett.	
1,368,067	2/1921	Staten.	
1,725,974	8/1929	Brautigam	110—97
1,948,064	2/1934	Cartter	122—17
1,978,177	10/1934	Sweet	158—113 X
2,348,901	5/1944	Handley	158—113 X

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