

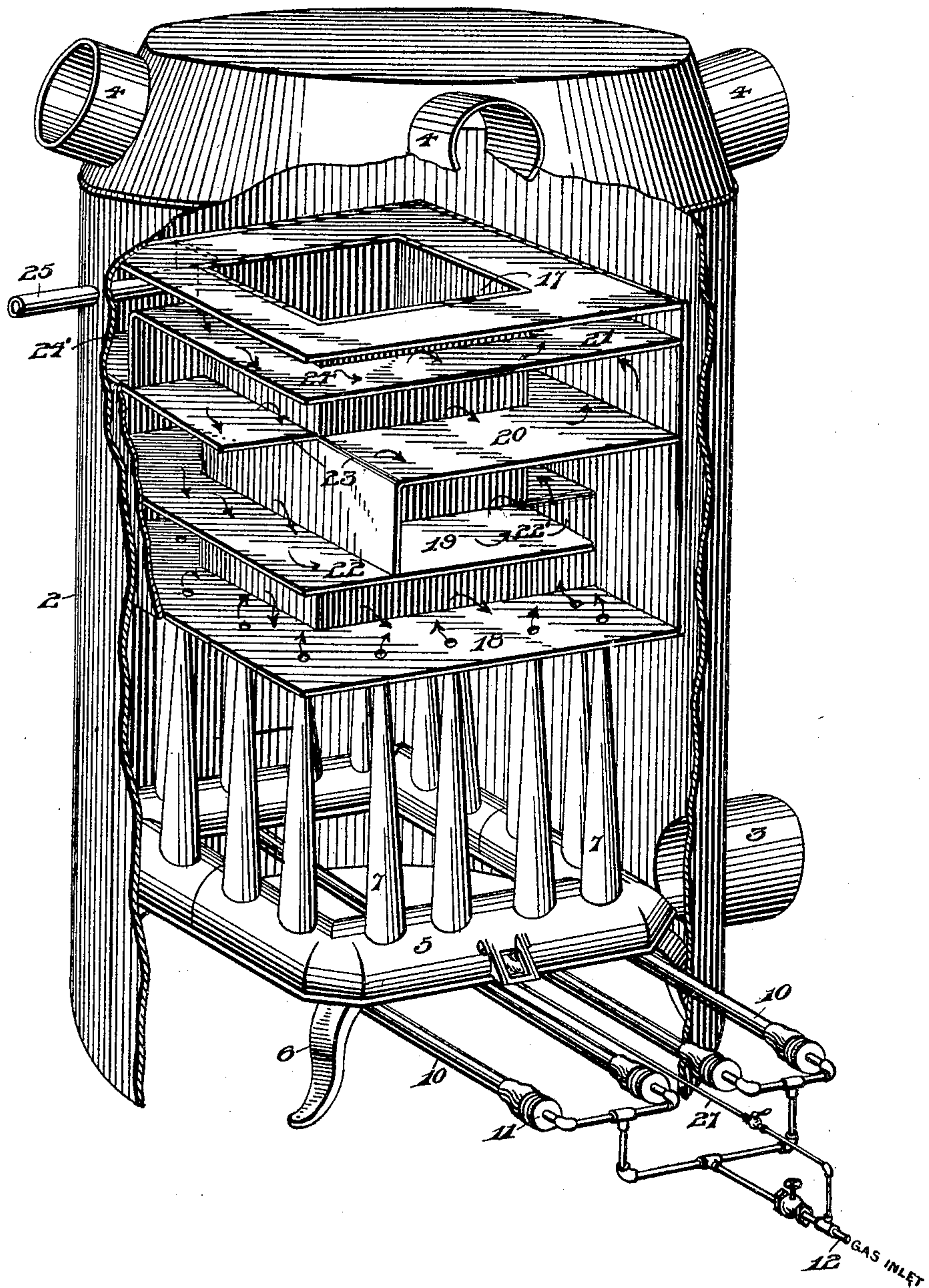
No. 821,971.

PATENTED MAY 29, 1906.

J. F. & F. O. ADAMS.
HEATING APPARATUS.
APPLICATION FILED APR. 9, 1903.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

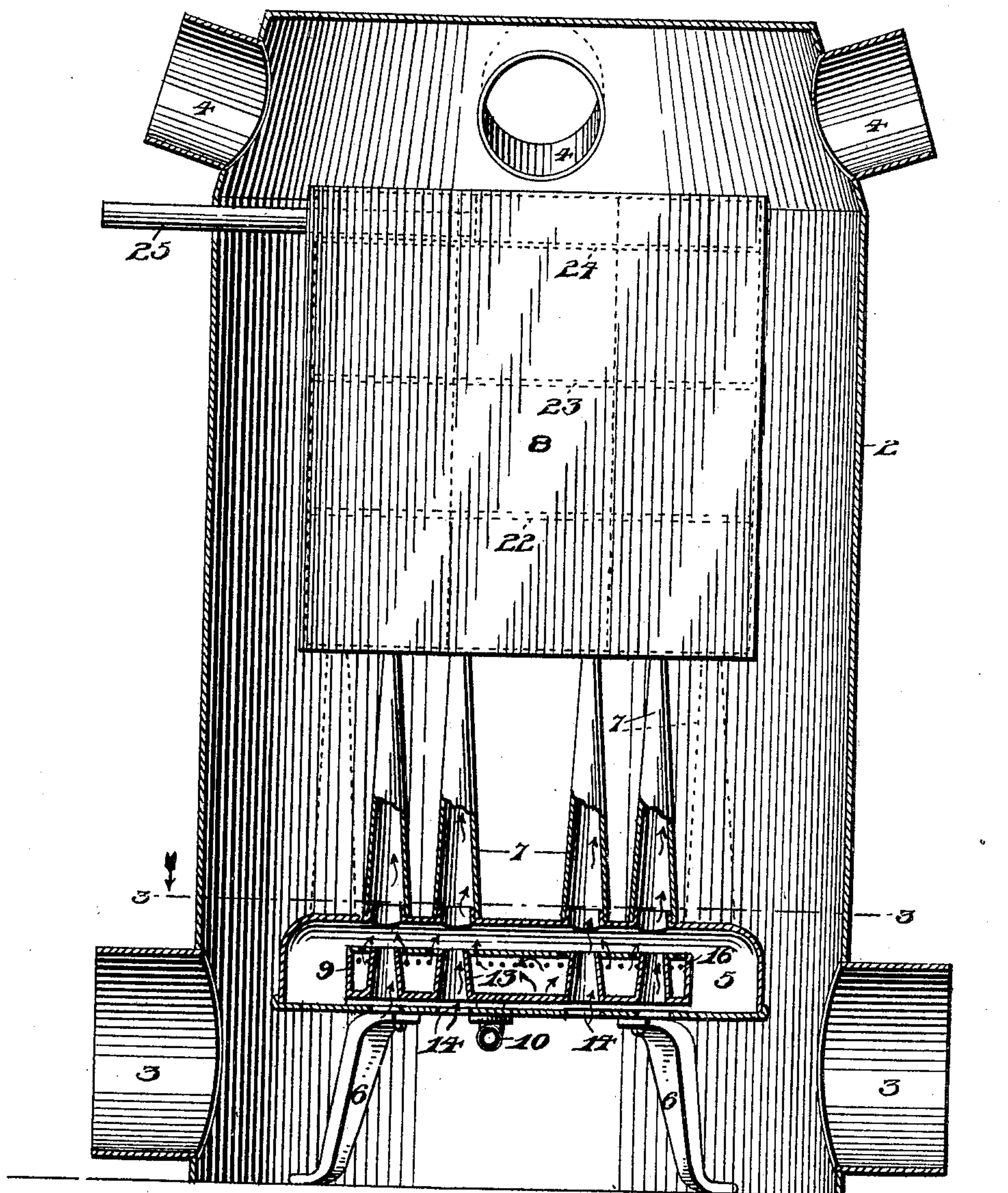
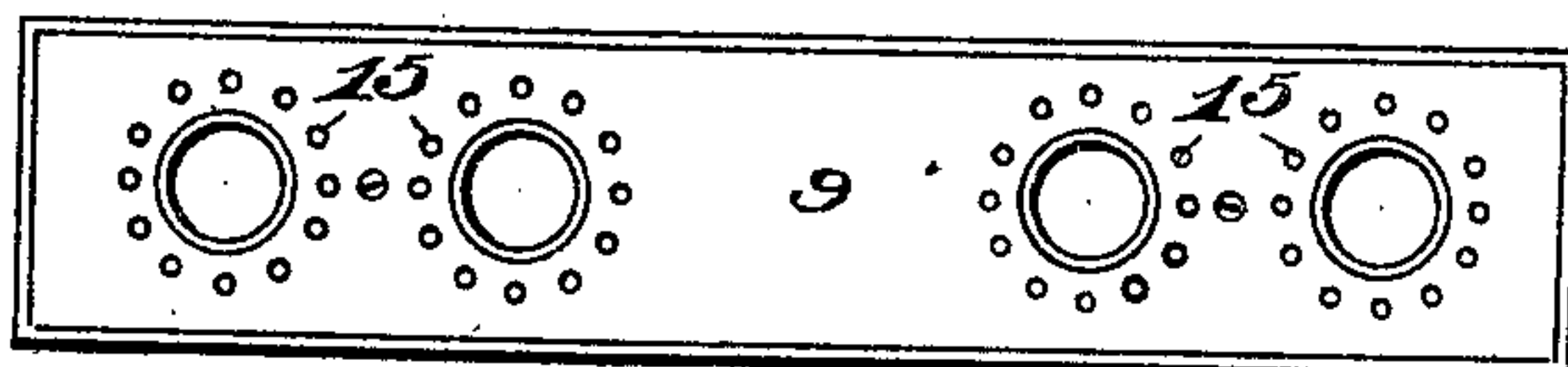


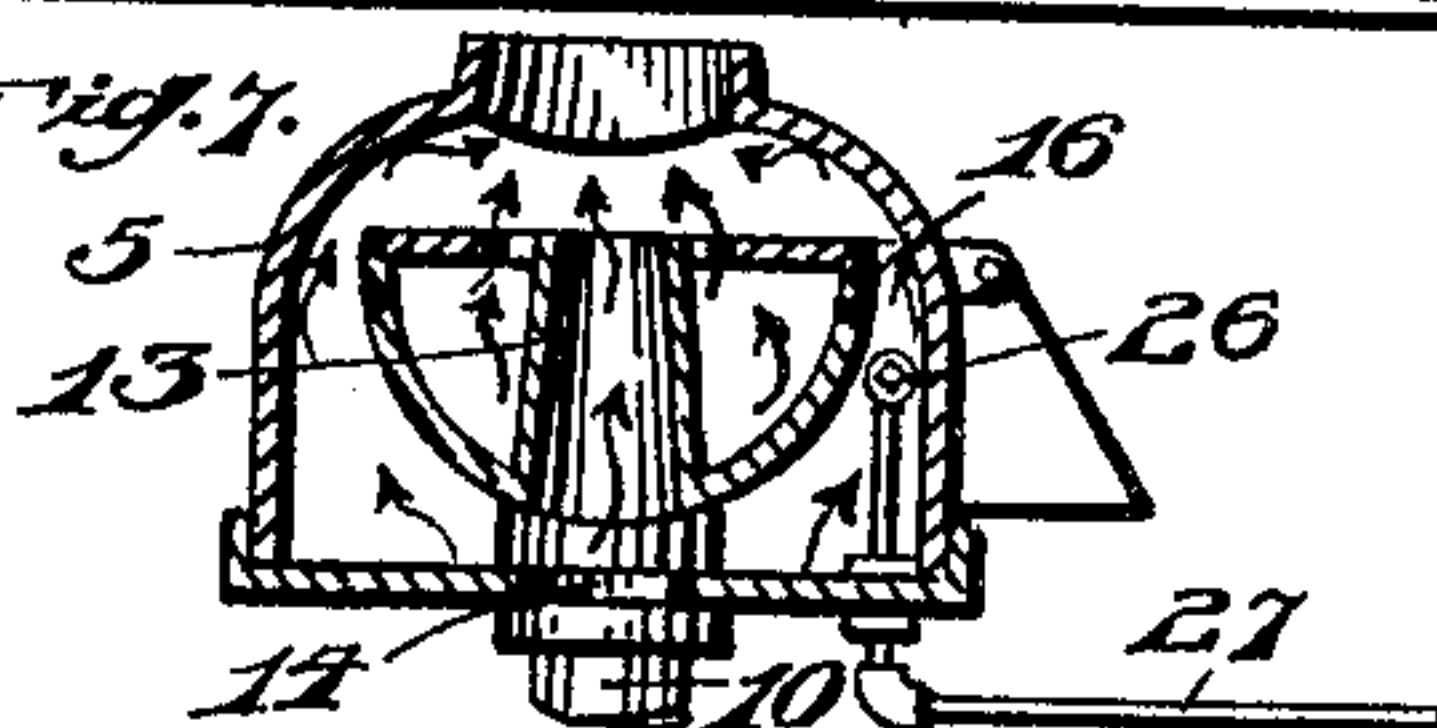
Fig. 6.



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Fig. 7.



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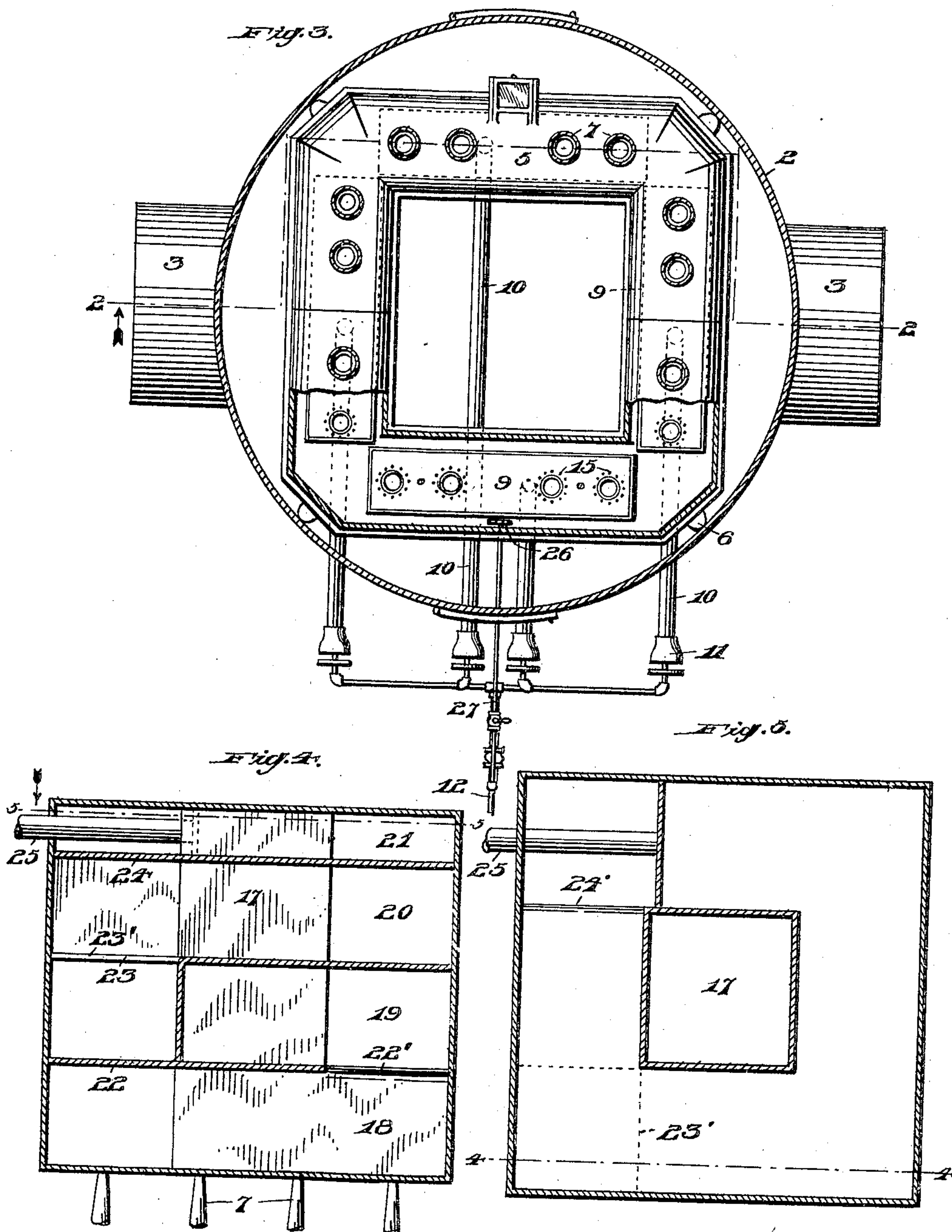
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

JULIUS F. ADAMS AND FRIEDERICH O. ADAMS, OF ALLEGHENY,
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HEATING APPARATUS.

No. 821,971.

Specification of Letters Patent.

Patented May 29, 1906.

Application filed April 9, 1903. Serial No. 151,827.

To all whom it may concern:

Be it known that we, JULIUS F. ADAMS and FRIEDERICH O. ADAMS, citizens of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Heating Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to hot-air gas-burning furnaces; and one object thereof is to provide an efficient burner and combustion-chamber of simple and improved construction.

A further object is to provide a novel arrangement of flue-tubes which, in connection with a fume-drum of novel construction into which the tubes discharge, provide for effective radiation of practically all heat from the products of combustion before they pass to the chimney connection.

The invention consists in the novel structural features and combination of parts, hereinafter fully described and claimed, and illustrated by the accompanying drawings, wherein—

Figure 1 is a perspective view of our improved furnace, portions thereof being broken away to illustrate the interior construction. Fig. 2 is a vertical sectional view taken on line 2 2 of Fig. 3, portions of the furnace interior being shown in elevation. Fig. 3 is a sectional plan view on line 3 3 of Fig. 2, a portion of the combustion-chamber being shown in section. Fig. 4 is a vertical sectional view of the fume-drum, taken on line 4 4 of Fig. 5; and Fig. 5 is a sectional plan view of the same, taken on line 5 5 of Fig. 4. Fig. 6 is a plan view of one of the burner-sections. Fig. 7 is a cross-section of the same.

Referring to the drawings, 2 designates the outer casing of the furnace, having cold-air inlets 3 at its lower end and outlets 4 at its upper end, to which are connected the warm-air conductor-pipes. (Not shown.)

The heat generating and radiating portions of the furnace are entirely inclosed by jacket 2 and consist, primarily, of a continuous tubular combustion-chamber 5, preferably of square outline, which is supported on legs 6, and rising from this chamber are the upwardly-tapering fume-tubes 7, which at

their upper ends open into and support fume-drum 8.

Within each of the four sides of combustion-chamber 5 is a separate tubular burner-section 9, to each of which leads a separately-controlled gas-supply pipe 10, each pipe being provided with a mixer 11 and all connecting with main supply-pipe 12.

Tubes 7 rise centrally over the burners, and arranged in the latter in line with said tubes are thimbles 13, and immediately beneath these thimbles openings 14 are formed in the bottom of combustion-chamber 5, whereby provision is made for direct upward flow of air through the burners into the tubes. The burners are preferably formed with flat tops with circular series of gas-emitting jet-holes 15 surrounding thimbles 13, whereby a central draft is provided for the ignited gas, which burns upwardly directly into the tubes 7. Additional jet-holes 16 in the sides of the burners further assist in completely filling the combustion-chamber with ignited gas. The lower portion of each burner-section is preferably rounded for the purpose of effectively directing the gas to the top and side jet-holes, while, on the other hand, the combustion-chamber is formed with a rounded upper portion to direct the ignited gases to tubes 7. Said tubes are upwardly tapered for the purpose of providing large heat-radiating area. Furthermore, tubes of this form serve to appreciably hold in check the upwardly-flowing gases and products, thereby increasing their heat-radiating efficiency.

Drum 8, supported on the upper ends of tubes 7, which open through the bottom thereof, is formed with a central flue or passage 17, and the space surrounding this flue is divided into compartments 18, 19, 20, and 21, one above the other, by horizontal partitions 22, 23, and 24. The latter are formed with openings 22', 23', and 24', respectively, at different points around flue 17, thus placing adjacent compartments in communication at said points, the arrangement being such that the products after passing from compartment 18 through partition-opening 22' into compartment 19 circulate around or through the latter before reaching opening 23', leading to compartment 20, and so on through the several compartments until they

finally discharge through flue or chimney connection 25. The circuitous course thus provided for the products affords time for the drum to absorb practically all the heat contained therein and radiate it into the upwardly-circulating air within jacket 2, passing to the warm-air outlets 4.

With the combustion-chamber, tubes 7, and drum 8, arranged as shown, a very large area of heat-radiating surface is had, all portions of which are readily accessible to the air rising within jacket 2 to the circulating-pipes. With the burner-sections under separate control all or only one or more of them may be lighted, dependent upon the demands on the furnace. We preferably provide a pilot-burner 26 within the front of the combustion-chamber and connected by pipe 27 with main supply 12. This pilot-burner is conveniently accessible and visible through door 5', and by keeping the same constantly burning the burner-section 9 immediately adjacent the same may be lighted at any time, together with any or all of the other burner-sections.

While our invention has been designed with special reference to the requirements of an efficient and economical hot-air furnace, it will be understood that the underlying

principles may be embodied in other forms of heating apparatus.

We claim as our invention—

1. Improved heating apparatus comprising a combustion-chamber, a fume-drum above the chamber, a plurality of relatively small upwardly-tapering fume-tubes rising from the said chamber and communicating with the drum, and gas-burning means within the chamber.

2. Improved heating apparatus comprising a combustion-chamber of tube-like form extending around or inclosing a vertically-open air-space, a fume-drum above the combustion-chamber, the drum having an air-passage formed therethrough from top to bottom which is in line with the air-space around which the combustion-chamber extends, a plurality of upwardly-tapering fume-tubes connecting the chamber and drum, and gas-burning means within said chamber.

In testimony whereof we affix our signatures in presence of two witnesses.

JULIUS F. ADAMS.

FRIEDERICH O. ADAMS.

Witnesses:

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