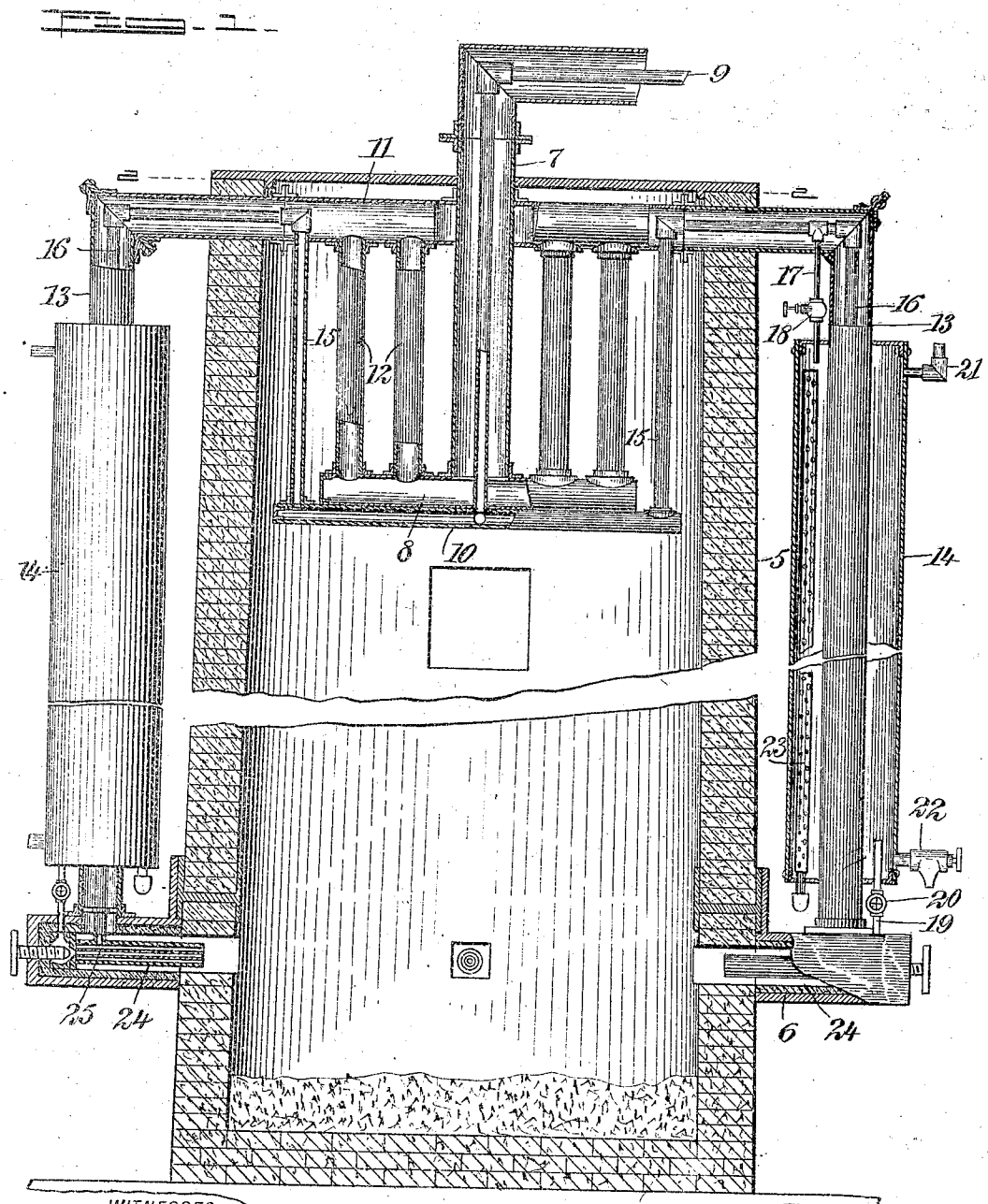
No. 820,210. PATENTED MAY 8, 1906.

J. H. KOONS.

CUPOLA.

APPLICATION FILED MAR. 22, 1904. RENEWED SEPT. 14, 1905.

2 SHEETS—SHEET 1.



WITNESSES:

C. A. Jarvis

C. E. Ferguson

INVENTOR

John H. Koons

BY

Munn & Co.

ATTORNEYS

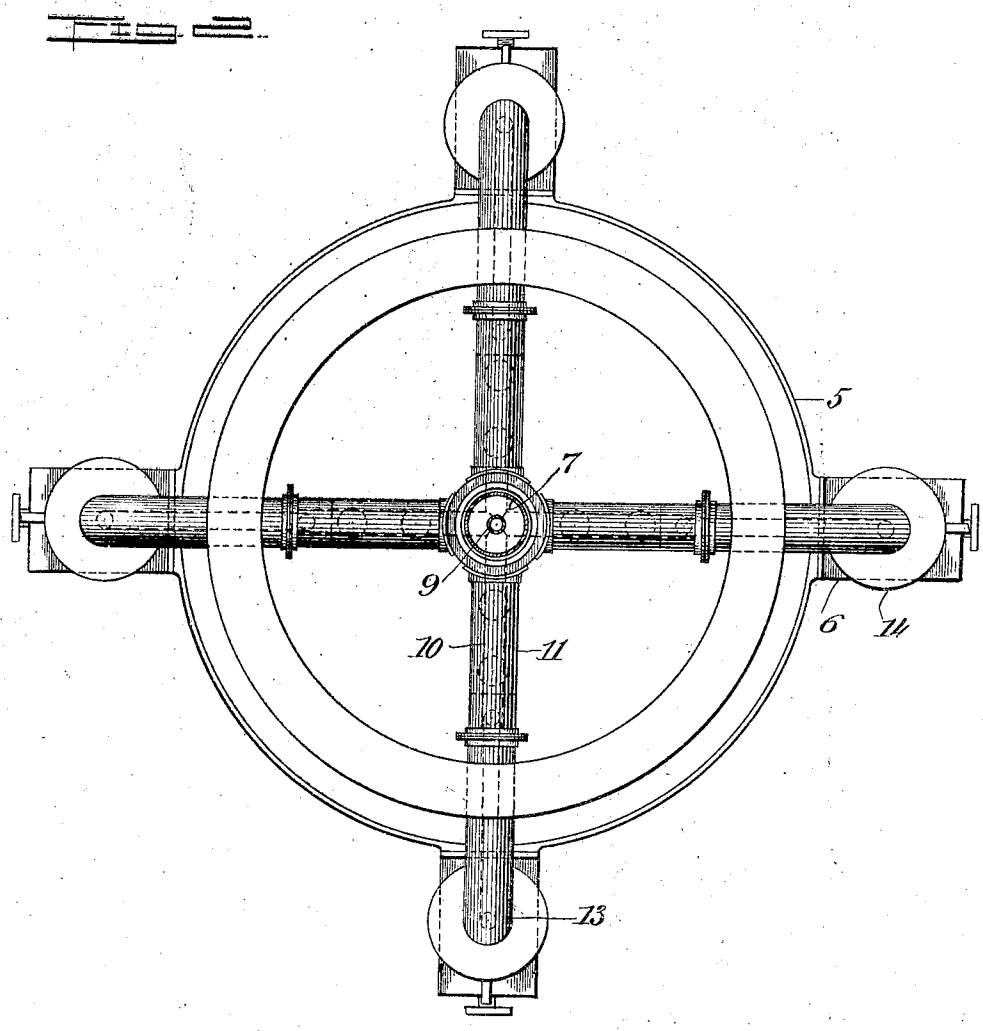
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2 SHEETS—SHEET 2



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UNITED STATES PATENT OFFICE.

JOHN H. KOONS, OF DELPHOS, OHIO.

CUPOLA.

No. 320,210. Specification of Letters Patent. Patented May 8, 1906.

Application filed March 22, 1904. Renewed September 14, 1905. Serial No. 278,481.

To all whom it may concern:

Be it known that I, JOHN HARRISON KOONS, a citizen of the United States, and a resident of Delphos, in the county of Allen and State of Ohio, have invented a new and Improved Cupola, of which the following is a full, clear, and exact description.

This invention relates particularly to heaters for cupolas or furnaces in which hydrocarbon oil is used as the fuel, the object being to provide a device of this character by means of which the oil mixed with air or steam will be caused to enter the cupola under a high degree of heat, resulting in an intense and practically even heat from an economical supply of burning fuel.

I will describe a cupola embodying my invention and then point out the novel features in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in both the figures.

Figure 1 is an elevation, partly in section, of a cupola with a heater embodying my invention connected therewith; and Fig. 2 is a plan on the line 2 2 of Fig. 1 with the top of the cupola removed.

Referring to the drawings, 5 designates a cupola practically of the usual construction and at the lower portion of which are twyer-boxes 6. Leading downward through the top of the cupola is an air-pipe 7, through which low-pressure or atmospheric air passes to branch pipes 8 at the lower portion of the heater. Leading through the low-pressure pipe 7 at the top is a high-pressure pipe 9, which is connected with a suitable compressor, and at its lower end this high-pressure pipe communicates with branch pipes 10 below the low-pressure branch pipes 8. At the upper portion of the heater and over the pipes 8 are low-pressure pipes 11, communicating with the pipes 8 through tubes 12, and these pipes 11 extend outward through the cupola-wall and connect with pipes 13, which lead downward through oil tanks or reservoirs 14 and communicate with the twyer-boxes.

From the high-pressure pipes 10 tubes 15 lead upward and communicate with high-pressure pipes 16, which pass downward through the low-pressure pipes 13 and communicate with the twyers 24.

It will be noted that the high-pressure pipes are considerably smaller than the low-pressure pipes. From the high-pressure pipes tubes 17 lead into the upper portion of the oil-tanks, and these tubes 17 are provided with valves 18 when air or steam is used to give pressure in the oil-tank, as it will be understood that either compressed air or steam may be used with equally good results.

Leading from the lower portion of each oil-tank into the twyer beneath it is an oil-supply pipe 19, provided with a valve 20. At the upper portion of each oil-tank is an oil-supply tube 21, and at the lower portion is a tap 22 for drawing off sediment that may accumulate in the tank, and extended upward through each oil-tank is a steam-pipe 23, provided with perforations through which steam passes to mingle with the oil before discharging into the small tubes 25 in the twyers 24. This mixed oil and air or steam passes into the twyers 24 and mingles at the outlet of the twyers with the high and low pressure air or steam.

It will be seen in the construction of my heater the air will be thoroughly heated, and hot air or superheated steam passing through the pipes surrounded by the oil-tanks will cause the oil to be heated, and by thus heating the oil and air or steam an intense volume of heat will be maintained in the furnace.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination with a cupola and twyer-boxes communicating therewith, of a heater comprising low-pressure pipes arranged in the cupola and communicating with the twyer-boxes, high-pressure air-pipes arranged in the heater and communicating with the twyer-boxes, oil-tanks communicating with the twyer-boxes, and means for heating the oil therein.

2. The combination with a cupola and twyer-boxes arranged at the lower portion thereof, of a heater comprising low-pressure air-pipes arranged in the heater and communicating with the twyer-boxes, high-pressure air-pipes arranged in the heater and communicating with the twyer-boxes, and oil-supply tanks surrounding the air-pipes at the outer side of the cupola.

3. The combination with a cupola and twyer-boxes arranged at the lower portion thereof, of a heater comprising a low-pressure air-pipe leading through the top of the cupola, branch pipes with which the lower end

of said low-pressure pipe communicates, branch pipes at the upper portion of the heater, pipes connecting the lower and upper branch pipes, a low-pressure pipe leading from the upper branch pipes to the twyer-boxes, a high-pressure pipe leading through the low-pressure pipe, branch pipes with which the lower end of the high-pressure pipe communicates, low-pressure pipes leading from said branches through the low-pressure pipes and communicating with the twyer-boxes, and oil-tanks surrounding the pipes at the outer side of the cupola and communicating with the twyers.

4. The combination with a cupola and twyer-boxes at the lower portion thereof, of a heater comprising low-pressure air-pipes arranged in the cupola, high-pressure air-pipes having portions arranged in the heater and portions extended through the low-pressure pipes at the lower side of the cupola, all of said pipes communicating with the twyer-boxes, oil-tanks surrounding the pipes at the outer side of the cupola, and air-supply pipes leading from the high-pressure pipes into the upper portions of the tanks.

5. The combination with a cupola and twyer-boxes arranged at the lower portion thereof, of a heater comprising low-pressure air-pipes arranged in the cupola and communicating with the twyer-boxes, high-pressure air-pipes passing through the first-named pipes and communicating with the twyer-boxes, oil-tanks surrounding the pipes at the outer side of the cupola and communicating with the twyer-boxes, valve-controlled tubes leading from the high-pressure pipes into the tanks at the upper portion, and steam-supply pipes leading into the tanks.

6. A heating apparatus for a cupola, comprising an oil-supply tank, means for heating the oil in the tank, and means for supplying air to the burners under high and low pressures independently one of the other.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN H. KOONS.

Witnesses:
GEO. L. FISHER,
HENRY METZGER.