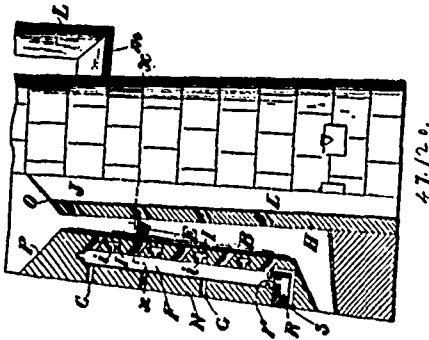
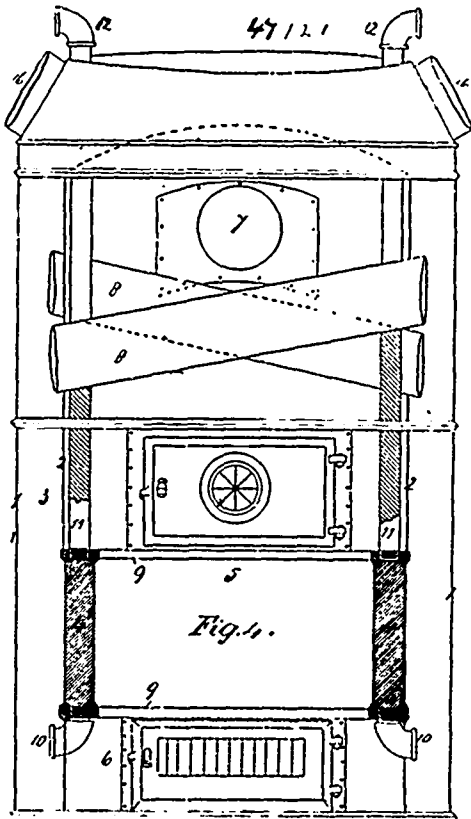


same, a series of vertically arranged combustion chambers encircling the roasting chamber and of substantially the same height as the roasting chamber, and a series of openings to the roasting chamber



in its inner wall from the top to the bottom, said openings being in line with the openings in the opposite wall of the roasting chamber, substantially as described. 2nd. An ore roasting furnace consisting of a stack, a roasting chamber surrounding the same, a series of vertically extending combustion chambers surrounding the roasting chamber and in communication therewith at various points in its height from the top to the bottom thereof, a gas conduit at the bottom of said combustion chambers having an outlet therefrom and an air inlet leading into the combustion chamber above the gas flue, substantially as described. 3rd. In an ore roasting kiln, an annular ore chamber, a series of combustion chambers arranged around said ore chamber and communicating therewith through a series of apertures in the intermediate wall, and air passages in said wall having apertures leading into the combustion chamber, all substantially as described. 4th. In an ore roasting kiln, a central draft space, a stack in connection therewith, an ore chamber encircling said space, with a series of openings at interval in the dividing wall, a series of combustion chambers around the ore chamber and communicating therewith, and a cap covering the upper end of the draft space, substantially as described.

No. 47,121. Heater. (Calorifere.)

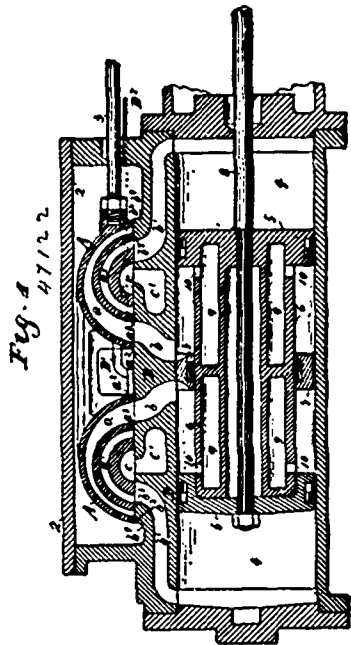


Donald Crawford Brown, Carthage, Missouri, U.S.A., and John Dickieson, Summerside, Prince Edward Island, Canada, 1st October, 1894; 6 years.

Claim.—1st. A combination heater convertible from a hot air to a hot air and steam, or a hot air and hot water heater, substantially

as described. 2nd. In a heater, the combination of a dome having deflectors, a fire-bowl with a surrounding water space, inlet and outlet pipes to said water space, and one or more coils connected to the upper portion of the water space, substantially as described. 3rd. In a heater of the character described, the combination with a fire-bowl, of a water space surrounding the same, inlet and outlet pipes from said water space, and one or more series of coils connected to the upper portion of the water space, substantially as described. 4th. In a hot air heater, the combination of an upper dome and cross deflectors arranged at reverse angles, substantially as described. 5th. In a combined heater, the combination of an upper dome, a water space below said dome having upper and lower rings, inlet and outlet pipes from said space, and a coil attached to the upper ring, said water space surrounding a central fire-bowl, substantially as set forth.

No. 47,122. Engine. (Machine à vapeur.)



The Woolf Valve Gear Company, assignee of Ellis J. Woolf, all of Minneapolis, Minnesota, U.S.A., 1st October, 1894; 6 years.

Claim.—1st. In a compound engine, the combination with a valve-seat having a high and low pressure port, of a valve having an internal fluid passage, which, in one position of the valve, is uncovered and serves to convey the fluid to the high pressure port, and which, in the opposite position of the valve, serves to convey, in a reverse direction, the fluid from the high to the low pressure port, and means for final exhaust operative to permit the exhaust from the low during the admission to the high pressure port, substantially as described. 2nd. In a compound engine, the combination with a valve-seat having a high and a low pressure port, of a valve having an internal fluid passage, which, in one position of the valve, is uncovered and co-operates with the ordinary opening to render available an increased admission area to the high pressure port, for a given valve travel, and which, in the opposite position of the valve, serves to convey the fluid from the high to the low pressure port, and means for final exhaust operative to permit the exhaust from the low during the admission to the high pressure port, substantially as described. 3rd. In a compound engine, the combination with a valve-seat having a high and a low pressure port, of a valve having two internal fluid passages, which, in one position of the valve, co-operate to render available an increased admission area to the low pressure port, for the given valve travel, and means for final exhaust operative to permit the exhaust from the low during the admission to the high pressure port, substantially as described. 4th. In a compound engine, the combination with a valve-seat, having a high and a low pressure port, of a valve having in addition to the final exhaust cavity, two internal fluid passages, one of which in one position of the valve, is uncovered, and serves to convey fluid to the high pressure port, and both of which passages, in the opposite position of the valve, co-operate to render available an increased admission area to the low pressure port, for a given valve travel, substantially as described. 5th. In a compound engine, the combination with a valve-seat having a high and low pressure port, of a valve having, in addition to the final exhaust cavity, two internal fluid passages, one of which, in one position of the valve, is uncovered and co-operates with the ordinary opening, to afford an increased available admission area to the high pressure port, for a given valve travel, and both of which passages, in the opposite position of the