J. GUARDIOLA.

HEATER.

No. 186,725. Patented Jan. 30, 1877.

Fig: 1.

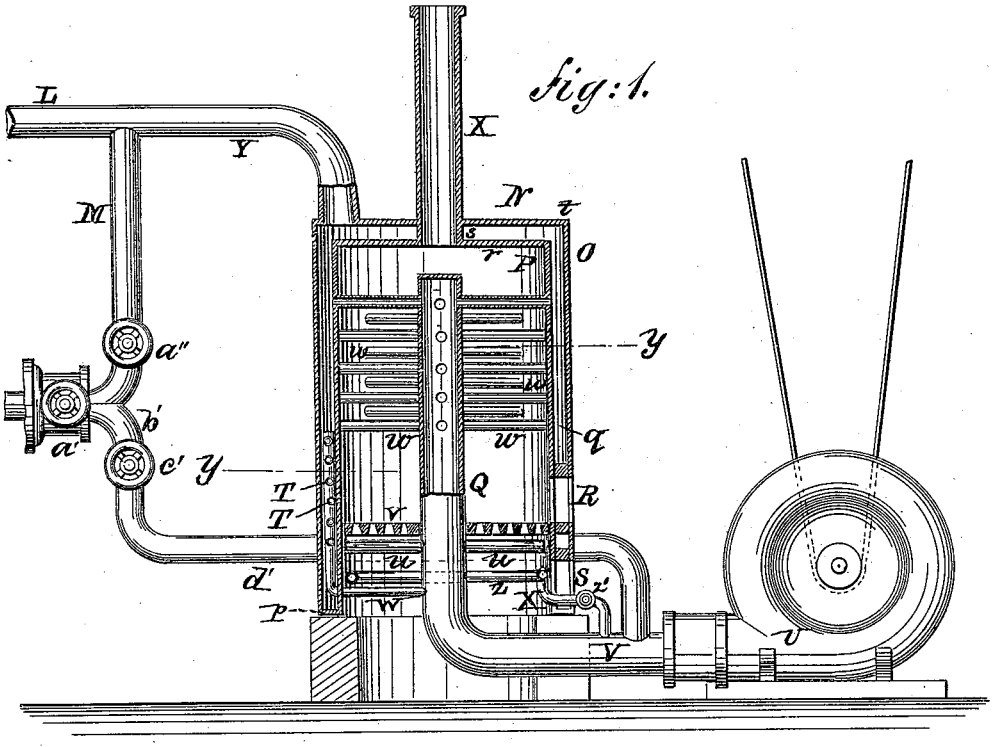
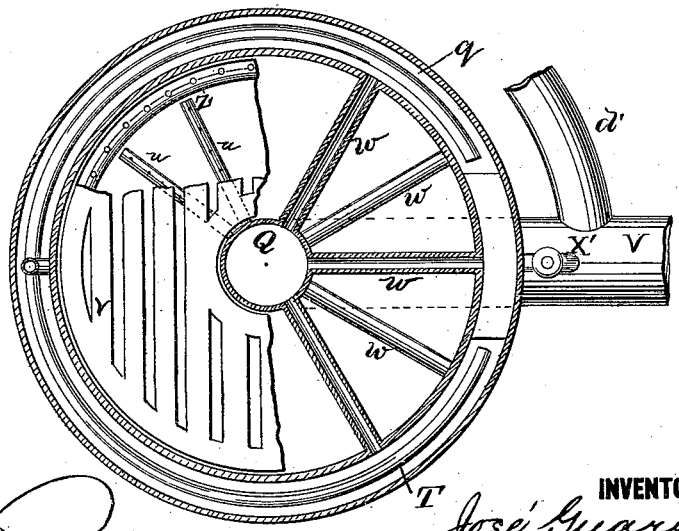


Fig: 2.



WITNESSES:

Chas. Nida.

J. H. Scarborough

INVENTOR:

José Guardiola.

BY

Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOSÉ GUARDIOLA, OF CHOCOLÁ, GUATEMALA.

IMPROVEMENT IN HEATERS.

Specification forming part of Letters Patent No. **186,725**, dated January 30, 1877; application filed January 8, 1877.

To all whom it may concern:

Be it known that I, JOSÉ GUARDIOLA, of Chocolá, Republic of Guatemala, Central America, have invented a new and Improved Heater, of which the following is a specification:

Figure 1 is a side elevation, in part section. Fig. 2 is a horizontal section on line *y y*, Fig, 1.

Similar letters of reference indicate corresponding parts.

This invention consists of a heating-furnace of new and improved construction, for heating air for drying purposes, and for heating buildings, &c., having an inner and outer cylindrical shell inclosing an annular air-space, and a central air-pipe and radial pipes, that connect the same with the annular air-space, and a fire-grate and fire-place. It also consists of a cold-air pipe leading from the blower-pipe to the hot-air pipe beyond the heater, for the purpose of introducing cold air in the place of hot air into the drying-apartment when desired.

The air-heating apparatus is made of sufficient size and capacity to supply air to a drying-apartment at a sufficiently-high temperature to accomplish the drying of grain or coffee, &c., within the required time.

The heater consists of an outer cylindrical shell, O, and an inner cylindrical shell, P, attached to the head or base-piece *p*, so as to inclose the annular space *q* between them. The inner shell P is shorter than the outer shell, and is provided with a head, *r*, having a central opening, from which the collar *s* projects upward. A head, *t*, is secured to the outer shell O, and is provided with a central opening for receiving the collar *s*, to which it is also attached. Q is a pipe projecting centrally into the space surrounded by the inner shell P, and terminates a short distance below the head *r*, where its end is stopped. *u u*, &c., are radial pipes, that extend from the central pipe Q to the inner shell P, for supporting the fire-grate *v*, and for conducting air from the pipe Q to the space *q*. *w w* are radial pipes connecting the pipe Q and the shell P, and arranged in series, the pipes of the second series being arranged above the spaces between the pipes of the first series, and the pipes of the third series being arranged above the spaces between the pipes in the second series, and so on. The space between the lower series of pipes *w* and the grate *v* is sufficient for the fire, and the space beneath the grate *v* is sufficient for the reception of the ashes. A door, R, is provided for feeding and adjusting the fire, and a door, S, for regulating the draft.

The openings covered by the doors R S communicate with the fire-place and ash-pit only, being shut off from the space *q* by a flanged piece of iron that surrounds the openings, and connects the inner shell P and outer shell O. T T are curved pipes placed in the space *q*, so as to surround that portion of the shell P that is in proximity to the fire. These pipes T are connected together at their ends and are pierced with a number of holes at their inner surface, so that when air is forced into the pipes it will be directed through the perforations against the hot surface of the inner shell P.

The heater is set upon a suitable foundation located near the drying-cylinder, and a blower, U, is placed conveniently near the heater, and connected by a pipe, V, with the lower end of the pipe Q, and is also connected, by the branch pipe W, with the pipes T. A perforated curved pipe, Z, is placed under the grate *v*, and the air-supply pipe X′ connects it with the blower-pipe V. The pipe X′ is provided with a suitable valve or stop-cock, *z′*, for regulating the supply of air to the fire.

This arrangement is designed for urging the fire when the natural draft is insufficient. X is a smoke-pipe for conveying away the products of combustion, and Y a pipe for conducting the heated air to the pipes L M, which conduct it to the drying-apartment. A pipe, *d′*, is provided for conducting cold air by the heater, and delivering it to the hot-air pipe beyond the heater. The various parts of the heater may be made of iron or other material suitable for the purpose.

The operation of the heater is obvious: A fire being built upon the grate *v*, and the blower U being driven by any convenient power, air is forced through the pipes V and Q, and through the radial pipes *u* and *w* into the space *q*, whence it passes to the pipe Y.

A volume of air is also conducted from the blower-pipe V by the pipe W, and delivers it to the pipes T, which direct it against the heated surface of the shell P. The heated air is conducted away from the heater by the pipe Y.

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

1. A heater, N, consisting of an inner and an outer cylindrical shell, inclosing an annular air-space, and a central air-pipe and radial pipes, that connect the latter with the annular air-space, and a fire-grate and fire-place arranged within the inner shell, substantially as herein shown and described.

2. The combination, in an air-heater, of the perforated pipes T, the double-walled heater-shell O P, and the air-supply tube V, substantially as and for the purpose set forth.

3. A perforated curved pipe, Z, placed under the grate *v*, and the air-supply pipe X′, provided with the valve *x*′, for supplying a blast of air to the fire in the heater, substantially as herein shown and described.

JOSÉ GUARDIOLA.

Witnesses:
C. SEDGWICK,
GEO. M. HOPKINS.