

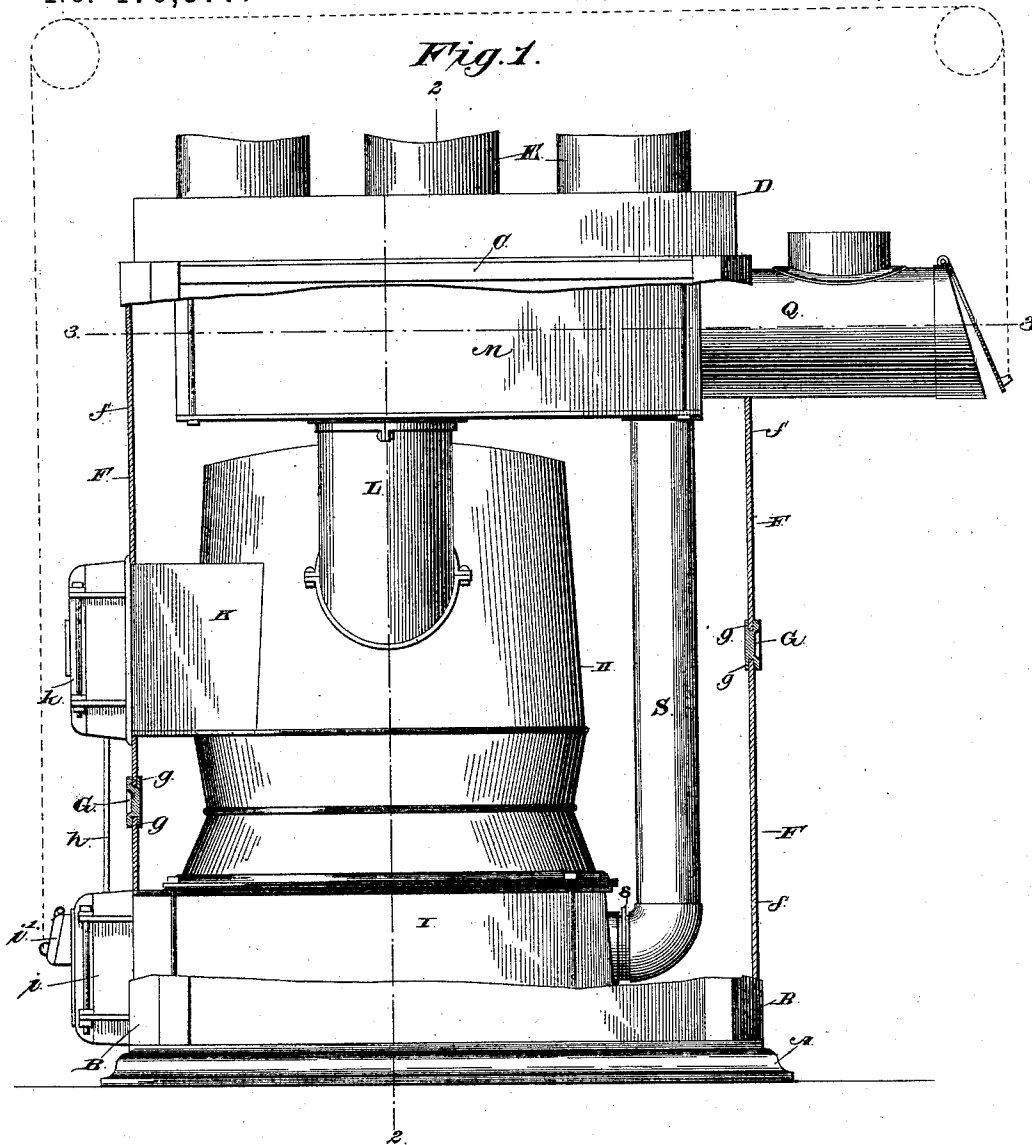
(No Model.)

2 Sheets—Sheet 1.

J. FRIDLEY.
HOT AIR FURNACE.

No. 476,877.

Patented June 14, 1892.



Witnesses

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UNITED STATES PATENT OFFICE.

JACOB FRIDLEY, OF CARLISLE, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO
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HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 476,877, dated June 14, 1892.

Application filed January 18, 1892. Serial No. 418,478. (No model.)

To all whom it may concern.

Be it known that I, JACOB FRIDLEY, a citizen of the United States, residing in Carlisle, in the county of Cumberland and State of Pennsylvania, have invented a new and useful Hot-Air Furnace, of which the following is a specification.

This invention relates to hot-air furnaces; and it has for its object to provide a furnace having an increased radiating area, whereby a greater amount of heat is collected and conducted from the furnace than in those of most ordinary use; and it is also an essential object of the present invention to provide an inclosing casing for inclosing the various parts of the furnace and which may be readily and easily removed without disturbing any of the framework for the purpose of gaining access to the interior of the furnace for cleaning or repair.

With these and many other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a furnace constructed in accordance with my invention, part of the casing being removed to expose the interior construction. Fig. 2 is a vertical sectional view of the same on the line 2 2 of Fig. 1. Fig. 3 is a horizontal sectional view on the line 3 3 of Fig. 1.

Referring to the accompanying drawings, A represents a rectangular cast-iron base, upon which the furnace is mounted. Arising from each corner of the said rectangular base are the angle frame bars or columns B, connected together at the upper ends by the angular connecting-rails C, connecting the upper ends of said columns with each other, and thus forming a strong and permanent furnace-frame inclosing the various parts of the heating devices. The said angle connecting-rails C form a continuous or encircling seat, which receives the inclosed heat or hot-air collecting and inclosing cover D. The said cover D is made of the usual galvanized iron and is provided with a series of hot-air conducting pipes E, which receive the accumulated hot

air and conduct the same to the various parts of the building to be heated. Each of the vertical corner columns B is provided with the inner vertical strip-flanges *b*, which are secured to each end or side of said columns. The said flanges *b* are adapted to receive the casing-sections F, which closely fit between said flanges of each column upon all four sides of the furnace-frame and inclose the interior of the furnace. The said casing-sections are of the ordinary galvanized metal, and are in two sections for each of the four sides of the furnace. The intermediate edges of the side sections of the casing are connected to the intermediate casing bars or rails G. Each of the rails G is provided with the upwardly and downwardly extending receiving-flanges *g*, that receive the upper and lower edges of the casing-sections, respectively, and said rails or bars are secured at each end to the corner angle-columns B. It will thus be seen that while the entire casing comprises two sections of sheet metal for each side of the furnace that the same are connected with the skeleton frame of the furnace in such a manner that the said sections can be quite easily and readily removed without disturbing the frame-work, as already set forth.

Inclosed within the casing F, which, as illustrated, comprises the various sections *f*, is the cast-iron fire-pot H, which may also be made of wrought-iron and fire-brick lined, according to the option of the manufacturer. Said fire-pot H rests upon and is supported by the bottom cast-iron ash-pit I, communicating therewith, and provided with the ordinary draft-inclosed opening *i*, through which the ashes may be removed, and which also provides for a regulation of the draft of the furnace, being closed by the ordinary draft-door *i'*. Mounted in the bottom of the fire-box H and over the ash pit or pan is the revolving grate J, having a center discharge and working on the ball-bearings *j*. An operating-lever *h* is connected with said grate by means of the connecting-rod *h'*, and thus provides for operating the grate when desired. The fire-pot H is provided with the ordinary filling-opening K, extending through the front of the furnace and inclosed by the

ordinary door *k*, that is illustrated in the drawings. Connected with the fire-pot upon each side and extending slightly above the top of the same are the opposite smoke and combustion pipes *L*, supporting and communicating with the interior of the upper radiator *M*. The said radiator *M* consists of an inclosed casing, and is provided with a series of elongated parallel vertical hot-air tubes *N*,
 10 extending entirely through the same and receiving and heating the air ascending from the bottom of the furnace and around the fire-pot and conducts the same into the hot-air-collecting cap *D*, located directly there-
 15 above, from which the hot air is conducted out through the pipes *E*, above referred to. The smoke and combustion flues *L* are connected with said radiator *M* at each end and the bottom thereof, so that as the smoke and
 20 other products of combustion pass therefrom into the radiator that the same will be caused to pass from each end of the radiator toward each other and circuitously between and around the ends of the hot-air tubes *N*, through
 25 the flues *O*, formed between each of the vertical hot-air tubes *N*. Diaphragm-strips *P* are located between alternate ends of the vertical tubes *N* and the walls of the radiator, thus causing the said smoke and other products of
 30 combustion to take the direction indicated by the arrows—that is, first along the ends, the sides, and through the flues between the tubes circuitously to the central escape-pipe *Q*. The said escape-pipe *Q*, as stated, is connected
 35 with the said radiator at the center thereof, so that the draft is equalized through all the flues equally, and thus causes a more uniform heating of the air passing up through the hot-air tubes *N*, and therefore a more
 40 complete and greater amount of radiation than is ordinarily acquired by other furnaces. This construction of radiator and connections provides for a travel of the smoke and products of combustion from both sides of the
 45 fire-pot in three directions at the same time and meeting at the central and common escape, which provides for greater efficiency and heating, as already stated and set forth. A suitable hand-hole *R* is located in one side of
 50 the radiator, which provides means whereby the same may be readily cleaned out when necessary. It may also be noted at this point that the exact location of the radiator directly
 55 above the top of the fire-pot, while being the preferable construction, may nevertheless be located in rear of the same without in any way departing from the spirit of this invention.

A dust-flue *S* extends through the furnace
 60 and is connected with the bottom of the radiator directly at the mouth of the escape-pipe and with the ash-pit *I*, the draft through the same being regulated by the slides *s*, working therein at a point adjacent to said ash-
 65 pit, and the same serves to carry the dust out of the furnace and thus assist materially in

a more perfect combustion of the material therein, as will be understood.

The construction and operation of the herein-described hot-air furnace are thought
 70 to be apparent without further description.

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

1. In a furnace, the combination, with the
 75 rectangular base, of a series of angle corner-pieces or columns arising vertically from each corner of said base and provided with inner offstanding flanges, sectional inclosing casing-sheets secured within the flanges of said
 80 corner-pieces, intermediate casing rails or bars provided with upper and lower flanges receiving the intermediate edges of said casing-sheets and secured at the ends to said
 85 corner-pieces, and heating devices located within said casing, substantially as set forth.

2. In a furnace, the combination, with the rectangular base, of a series of vertical angle corner-pieces or columns arising from each
 90 corner of said base and provided with inner offstanding flanges, sectional inclosing casing-sheets secured within the flanges of said corner-pieces, angular connecting-rails connecting the upper ends of said columns or
 95 corner-pieces with each other, an inclosed hot-air cover seated and secured within said angular connecting-rails, and heating devices located within said casing, substantially as set forth.

3. In a hot-air furnace, the combination,
 100 with the casing and the fire-pot located therein, of an inclosed radiator-box adjacent to the fire-pot and provided with a series of elongated open hot-air tubes extending there-
 105 through, diaphragm-strips located between alternate ends of said tubes and the walls of the radiator, opposite smoke and combustion pipes connected with opposite sides of the fire-pot and opposite ends of said radiator,
 110 and a central escape-pipe centrally connected to said radiator, substantially as set forth.

4. In a hot-air furnace, the combination,
 115 with the casing and the fire-pot located therein, of an inclosed rectangular radiator-box located directly above the fire-pot and provided with a series of elongated parallel open hot air tubes extending through said box, diaphragm-strips located between alternate ends
 120 of said tubes and the walls of the radiator to form circuitous smoke and combustion flues around said flues, opposite conducting and supporting pipes connected with opposite sides of the fire-box and opposite ends of the radiator-box to form opposite drafts drawing
 125 to the center of said box, and a central escape-pipe connected with said radiator-box at the center thereof, substantially as set forth.

5. The combination, with a heater, of a radiator-box provided with a series of elongated
 130 parallel open hot-air tubes extending through said box, diaphragm-strips located between

5 alternate ends of said tubes and the walls of the radiator to form circuitous smoke and combustion flues, opposite conducting-pipes connected with opposite sides of said heater and opposite ends of the radiator-box to form opposite drafts drawing to the center of said box, and a central escape-pipe, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JACOB FRIDLEY.

Witnesses:

JNO. B. LANDIS,
WM. FRIDLEY.