

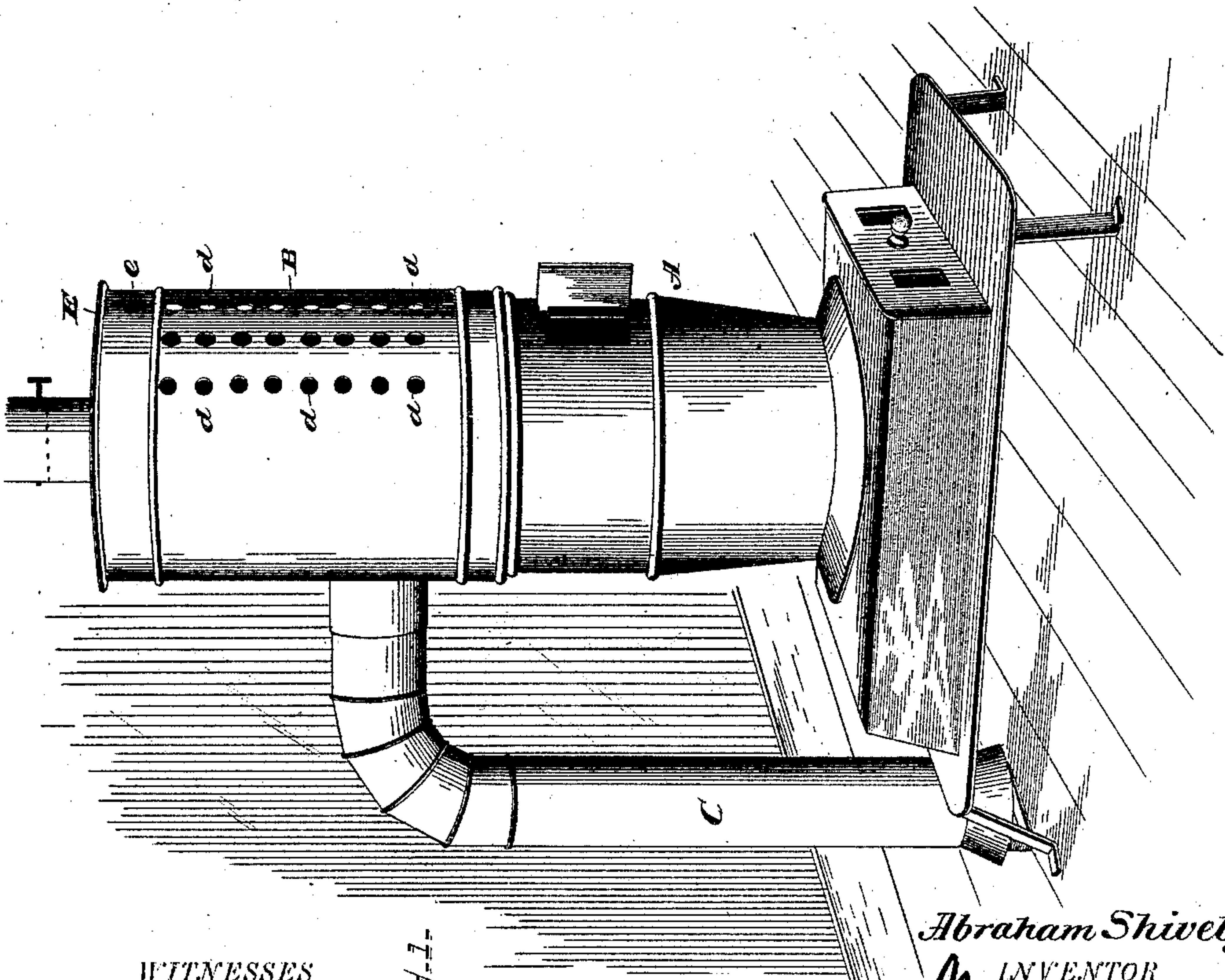
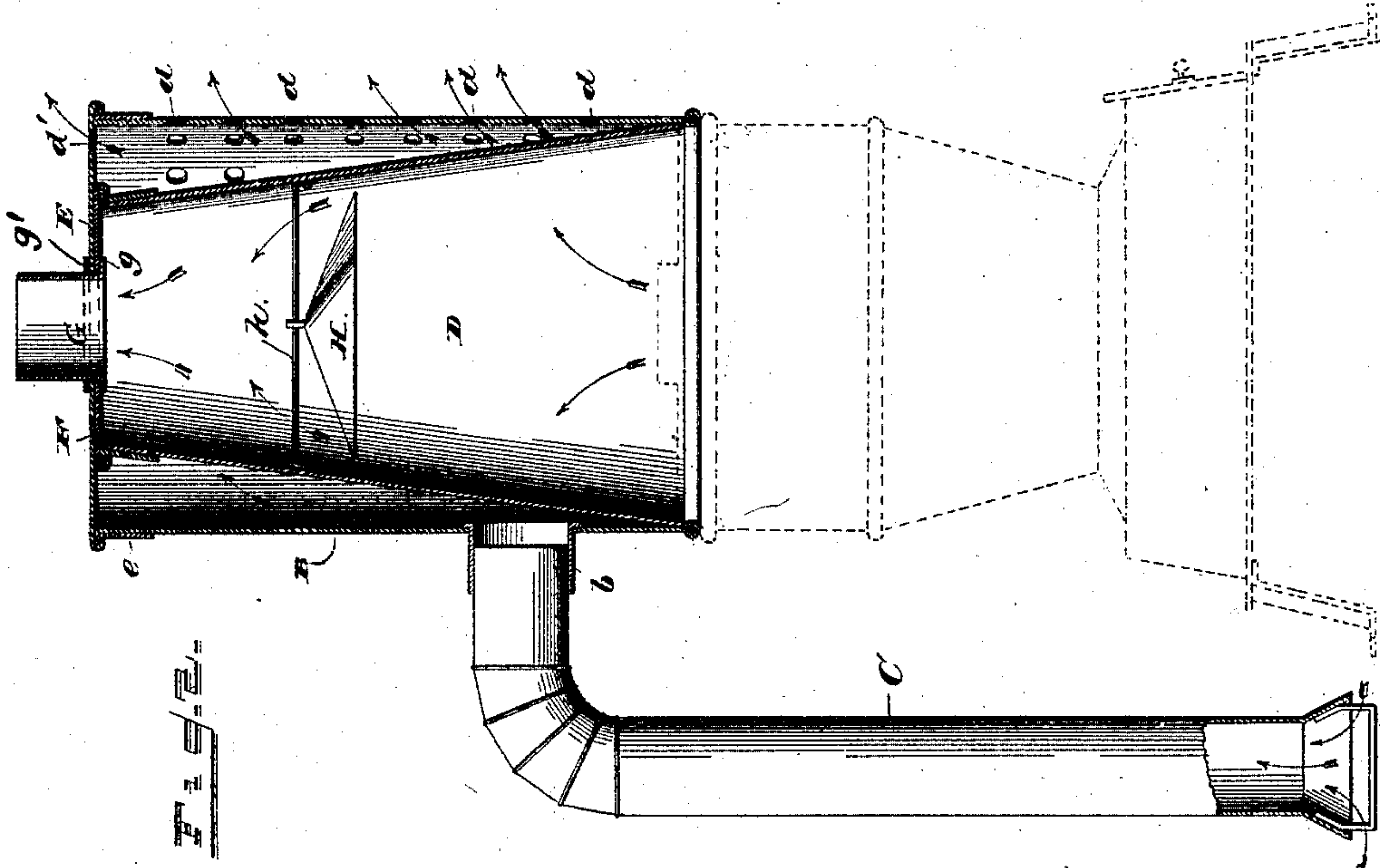
(No Model.)

A. SHIVELY.

AIR HEATING AND CIRCULATING DEVICE.

No. 413,097.

Patented Oct. 15, 1889.



WITNESSES

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AIR HEATING AND CIRCULATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 413,097, dated October 15, 1889.

Application filed February 17, 1888. Serial No. 264,378. (No model.)

To all whom it may concern:

Be it known that I, ABRAHAM SHIVELY, a citizen of the United States of America, residing at Hanoverton, in the county of Columbiana and State of Ohio, have invented certain new and useful Improvements in Air Heating and Circulating Devices; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to certain new and useful improvements in heating-stoves, the object being to provide an improved heating and air-circulating drum which can be readily applied to a stove of ordinary construction, and when properly applied will form no part of the stove, but will form an auxiliary heating means, thereby increasing the heating capacity of the stove, as well as providing a means for causing a circulation of air in the apartment.

My invention consists in the construction and organization of the parts as an attachment for a stove, as will be hereinafter set forth, and specifically pointed out in the claims.

In the accompanying drawings, which form a part of this specification, Figure 1 is a perspective view showing my heating attachment and air-circulating device applied to a heating-stove. Fig. 2 is a sectional view.

In the annexed drawings, A refers to a heating-stove which is of ordinary construction, the same being provided with a flat or conical top, with a central opening, through which the products of combustion pass—ordinarily through a stove-pipe—to the chimney. Upon such a stove my improvement is adapted to be applied.

B refers to a metallic cylinder, which is provided on one side at a proper distance above its lower edge with an opening, to which is secured a collar *b*, for securing thereto a pipe C. The pipe C has a downward bend or elbow, and its lower end has a flaring edge, to which a supporting bar or legs are suitably

attached. The cylinder B on the side opposite the pipe C is provided for about one-quarter of its circumference with perforations *d d*, which perforations do not extend to the upper or lower edge of the cylinder.

D refers to the inner conical drum, the base thereof being of about the same diameter as the interior of the cylinder B; and the lower edge thereof may be formed into a bead, which will be overlapped and inclosed by the head formed on the lower edge of the cylinder B, thus providing a means for rigidly supporting the conical drum D within the cylinder. This construction will also provide a tight joint between the parts, and water may be placed between the cylinder and drum up to the level of the lower line of perforations, so as to moisten the heated air.

The cover or top plate E of the cylinder B is provided centrally with a perforation, and at its periphery with a downwardly projecting flange *e*. This top plate adjacent to its periphery is provided with perforations *d'*, through which the heated air will escape. To the underside of the top plate E is secured a flanged covering plate F. The flange which depends therefrom fits over the upper end of the conical drum D, and this plate F has a central opening, which registers with the opening in the plate E. The two plates E and F are held securely to each other by the flanges of a collar G. This collar is provided with an outer flange *g'*, surrounding the body thereof a short distance above its lower end, and rests on the top surface of the plate E. The lower end of the collar G has also a flange *g* formed therewith by bending the said lower end thereof upward. The lower flange *g* is not formed until the lower end of the collar G is inserted through the central openings in the plates E and F, and the upper flange *g'* rests on the top surface of the plate E. When the said collar shall have thus been mounted in position, the flange *g* is formed by outwardly turning over the lower edge of the collar, and thus clamping the two plates E and F together. By this construction I not only provide a means for holding the plates E and F securely to each other, but also provide a means for attaching the stove-pipe thereto, and holding the central conical drum in place.

The outer cylinder and inner conical drum are made of sheet metal, the outer one of light material and the inner one of heavy sheet-steel, the construction being such that
 5 the outer shell, which is weakened by the perforations, is braced by the interior rigid conical shell.

The conical drum D has a conical deflector H supported therein nearer its upper end, which is supported on a cross-rod *h*, bolted to the sides thereof. The said deflector is centrally suspended in the conical drum D. The distance between the edge of the deflector and the drum D should be greater than the
 15 area of the central openings in the top plates E and F of the drums, which are rendered unitary through the connecting-collar G for the purpose of preventing a retarding influence on the rising particles of combustion
 20 at this point to such an extent as to make the draft of the stove irregular and intermittent, but staying the progress of the said particles of combustion long enough to allow the lower part of the drum D to become more thoroughly
 25 heated, and the heating thereof be sustained. The common form of smoke-damper is employed in the escape-flue.

The operation of my invention when constructed as shown in the accompanying drawings is as follows: The heat and products of combustion from the stove arise from the top plate of the stove. Passing through the opening, the heat strikes or impinges in its upward course against the sides of the conical drum.
 35 What heat passes directly upward comes in contact with the deflector and is caused to contact with the sides of the drum before arising above the same. With the form of drum shown practice has demonstrated that almost
 40 all the heat is utilized and but very little passes to the chimney. As soon as the inner drum is heated an upward current of cold air from near the floor of the compartment will be drawn through the pipe into the space between the exterior of the inner drum and interior of the outer cylinder, which air will be
 45 caused to pass partially around the heated cylinder, so as to become heated, and will be discharged through the opening in the front and top of the cylinder.

The conical shape of the drum D has important advantages from two standpoints. The first advantage results from the contraction of the rising column of particles and
 55 gases of combustion, which results in a continuous contact with the inner surface of the drum by the heated column, and the said drum is thereby more uniformly and equally heated throughout, it being understood that
 60 the greatest point of heat of said drum is maintained nearest the seat of combustion, or at the lower end thereof. A rising column of the character above set forth loses its caloric proportionately to the distance it recedes from
 65 the seat of combustion, and without any contraction or deflection, as in passing through

a cylinder of equal diameter throughout, would, as it neared the escape-flue opening, become centralized toward said opening and not contact with the upper part of the cylinder. The second advantage obtained by the conical construction of the drum D is the form of air-chamber established between the drum D and cylinder B. The air coming in through pipe C strikes the lower part of one
 75 side of the drum D at or near its greatest point of heat and becomes heated. The air thus heated rapidly expands and rises in the chamber and contacts with the outer surface of the conical drum D and a circulation is
 80 instituted. The essential feature of this formation of chamber is the continuous impingement of the column of air against the most intensely-heated part of the conical drum.

As hereinbefore set forth, the front part of the cylinder B and the front part of the top plate E thereof are provided with apertures through which the heated air is allowed to escape into the room or compartment. The incoming column of air through the pipe C
 90 sets up a current, and as the air becomes heated, it, being lighter, seeks the escape-openings after having passed around the heated conical drum D. It will also be observed that the openings in the cylinder B are
 95 situated in the opposite side thereof to that to which the pipe C is connected, and is airtight all around, except the aforesaid apertures. This causes the air to circulate around the conical drum, and is not allowed to escape until after passing over a large heating-
 100 surface.

The deflector H could be dispensed with, as hereinbefore stated, and the retarding of the upwardly-flowing current therein be considerably lessened.

It will be seen that by the use of this device as an auxiliary for heating-stove a constant circulation of air will be maintained in the apartment, the cold air being continuously drawn from near the floor and discharged above the stove out into the compartment, and by the use of the same the temperature in the room may be maintained at about a uniform degree of heat.

I am aware that prior to my application for Letters Patent air-drums have been constructed with a direct passage-way for the products of combustion from a stove, the upper edge of the outer drum having perforations through which the heated air would pass, and I do not claim such as my invention, as with a straight passage-way a great deal of heat escapes to the chimney without being utilized.

I am also aware that heating-drums have been constructed with a central pipe having a series of deflecting-plates supported thereby which obstruct the products of combustion on their way to the chimney; also, that it is common to use deflectors in heating-furnaces; but these devices are not of the same con-

struction and do not produce the same effective result as the device hereinbefore described.

What I claim is—

1. The combination, in an air heating and
5 circulating attachment for stoves, of an outer
cylindrical drum B, provided near its lower
edge with an air-inlet opening to which is at-
tached a depending pipe, the opposite side of
said drum having perforations $d\ d$, an inner
10 conical casing the walls of which converge
upwardly, said casing being of the same di-
ameter at its base as the inner portion of the
drum B, a top plate having a central exit-
opening for the products of combustion, and
15 depending flanges which engage with the up-
per portions of the inner and outer drums,
said top having perforations d' located on a
line with the perforations $d\ d$, the parts being
organized substantially as shown, and for the
20 purpose set forth.

2. The combination, in an air heating and

circulating device which is adapted to be used
in connection with a stove and supported
thereon, of an outer cylindrical drum B, hav-
ing a depending air-inlet pipe connected near 25
the base thereof, the opposite side of said
drum having exit-perforations $d\ d$, an inner
conical drum D, secured at its base to the
lower edge of the outer drum, a deflector of
less diameter than the inner drum supported 30
within the same, and a top plate E, with a
central exit-opening and depending flanges
which engage with the upper edges of the in-
ner and outer drums, the parts being made
up of sheet metal and organized substantially 35
as shown, and for the purpose set forth.

In testimony whereof I affix my signature
in presence of two witnesses.

ABRAHAM SHIVELY.

Witnesses:

S. S. ROBERTSON,

A. V. JOHNSON.