

No. 698,809

Patented Apr. 29, 1902.

E. R. CAHOONE.
AIR INTRODUCER FOR STOVES.

(Application filed Jan. 14, 1902.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

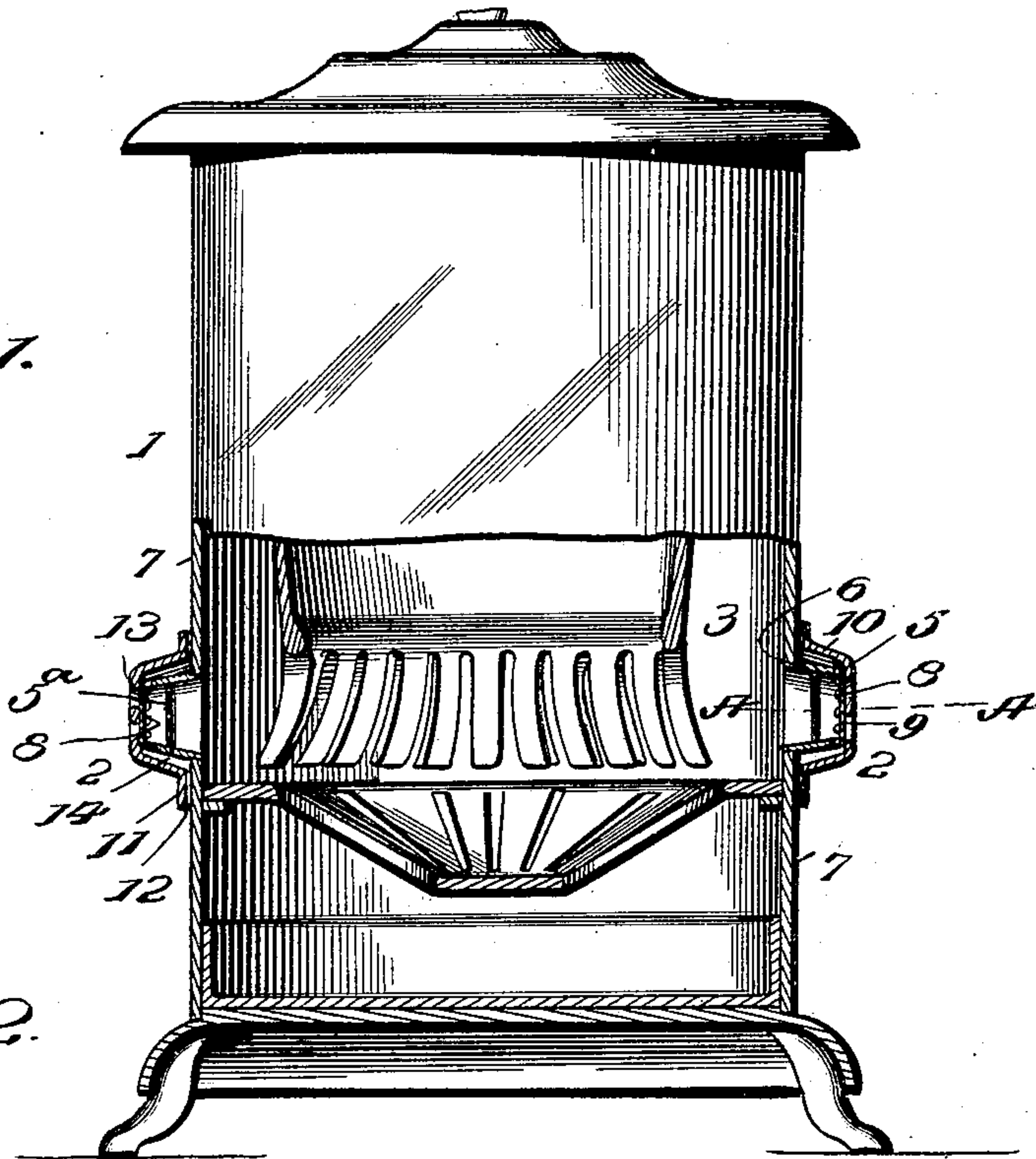


Fig. 2.

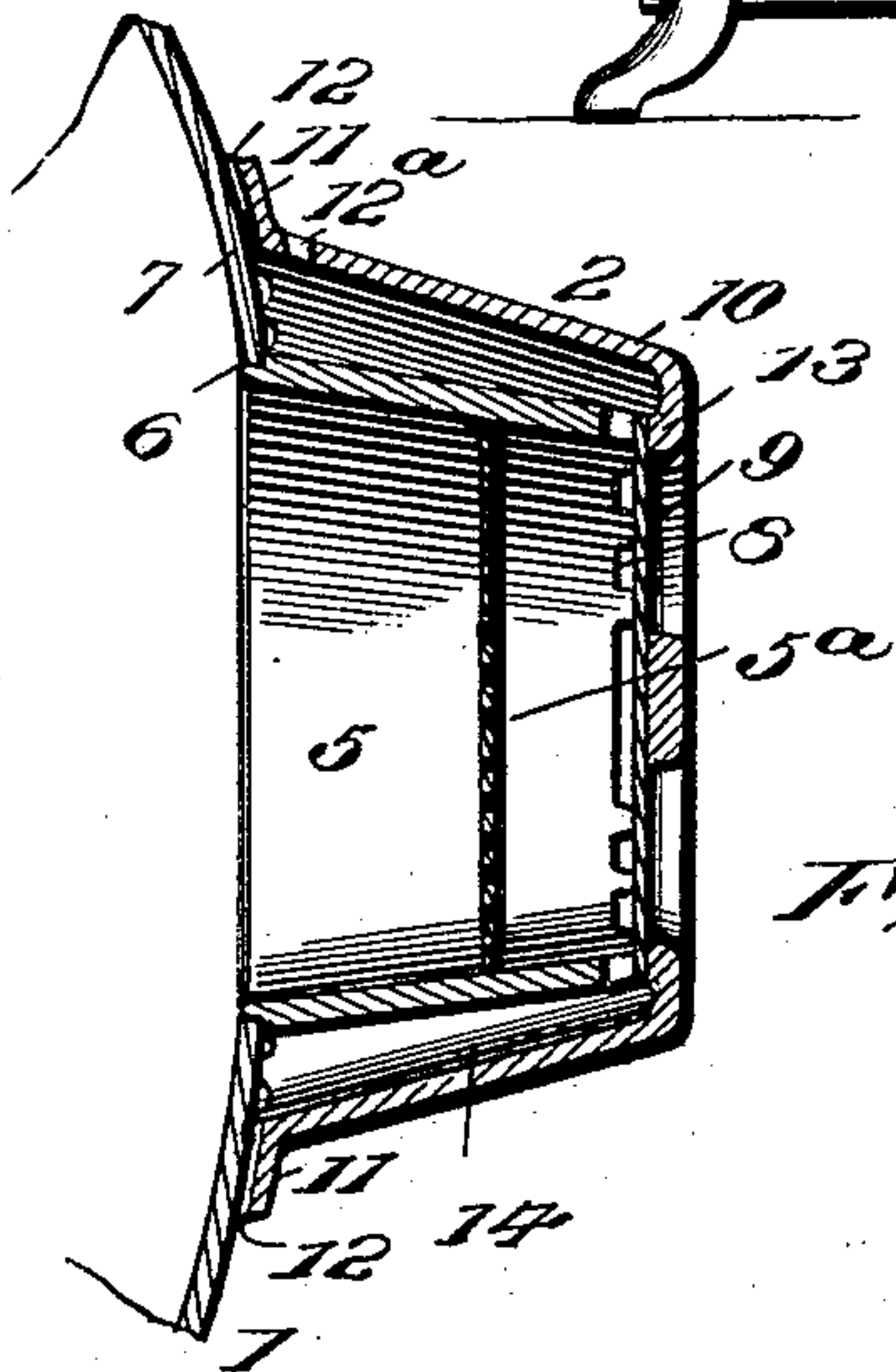


Fig. 3.

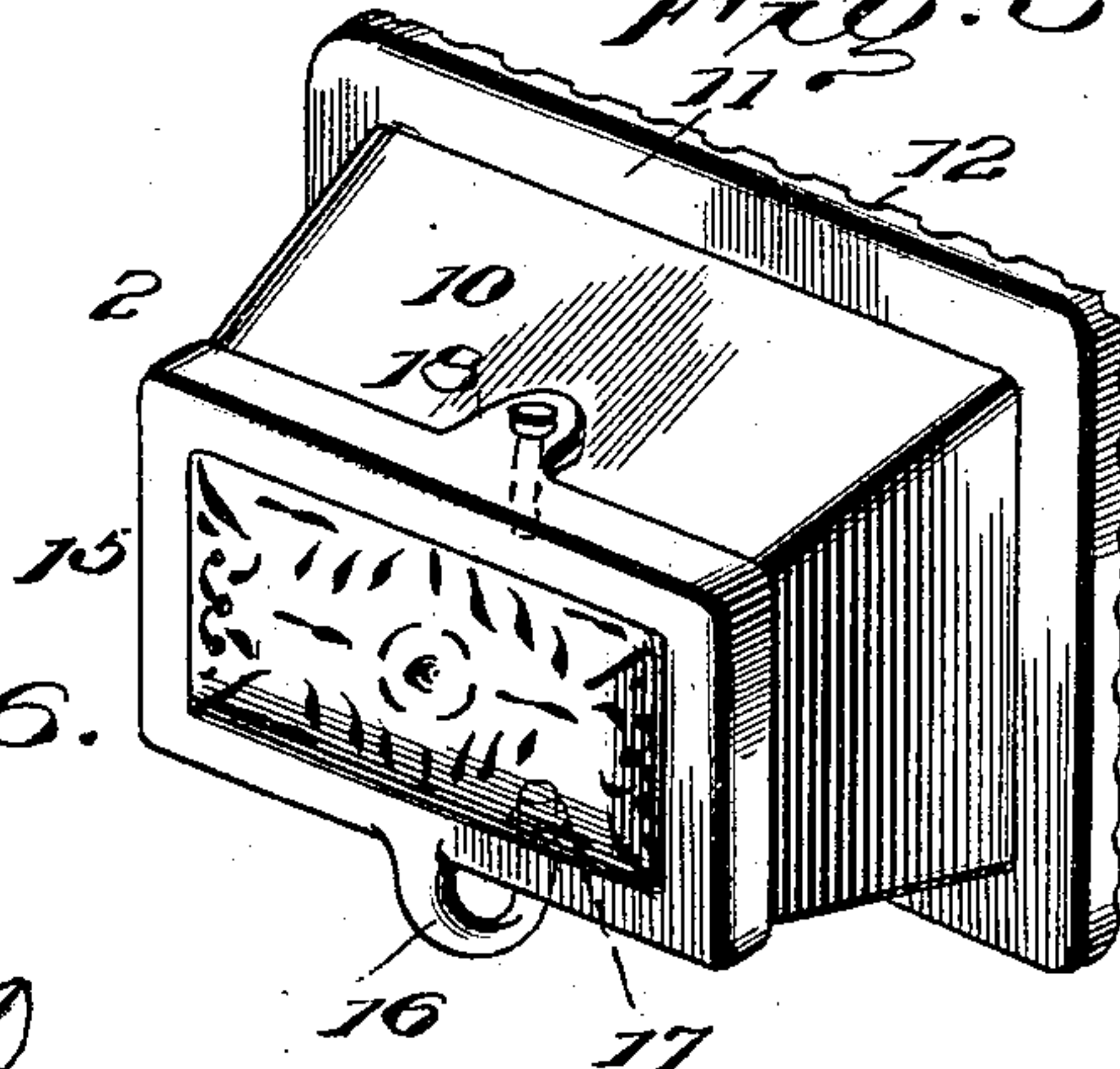
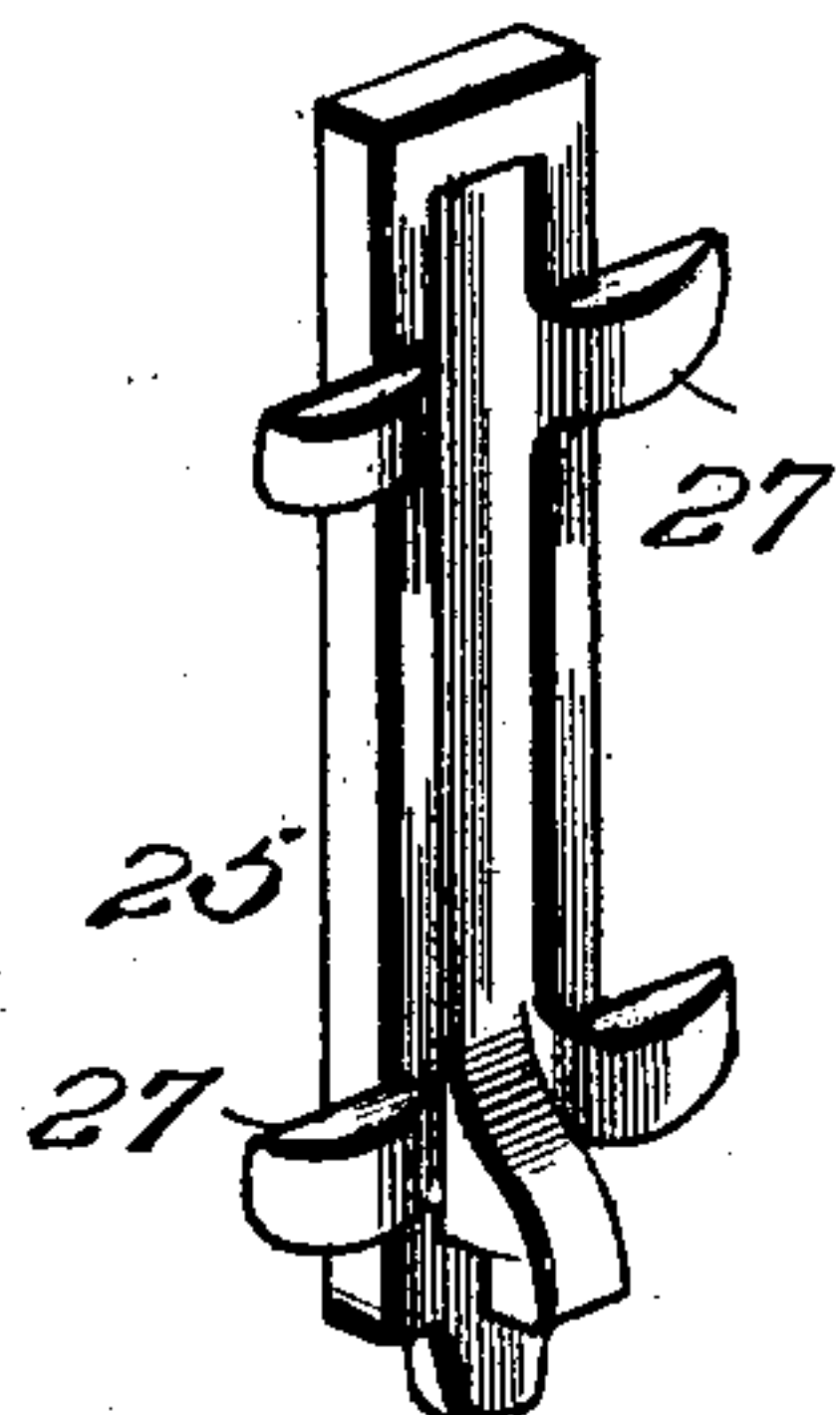


Fig. 6.



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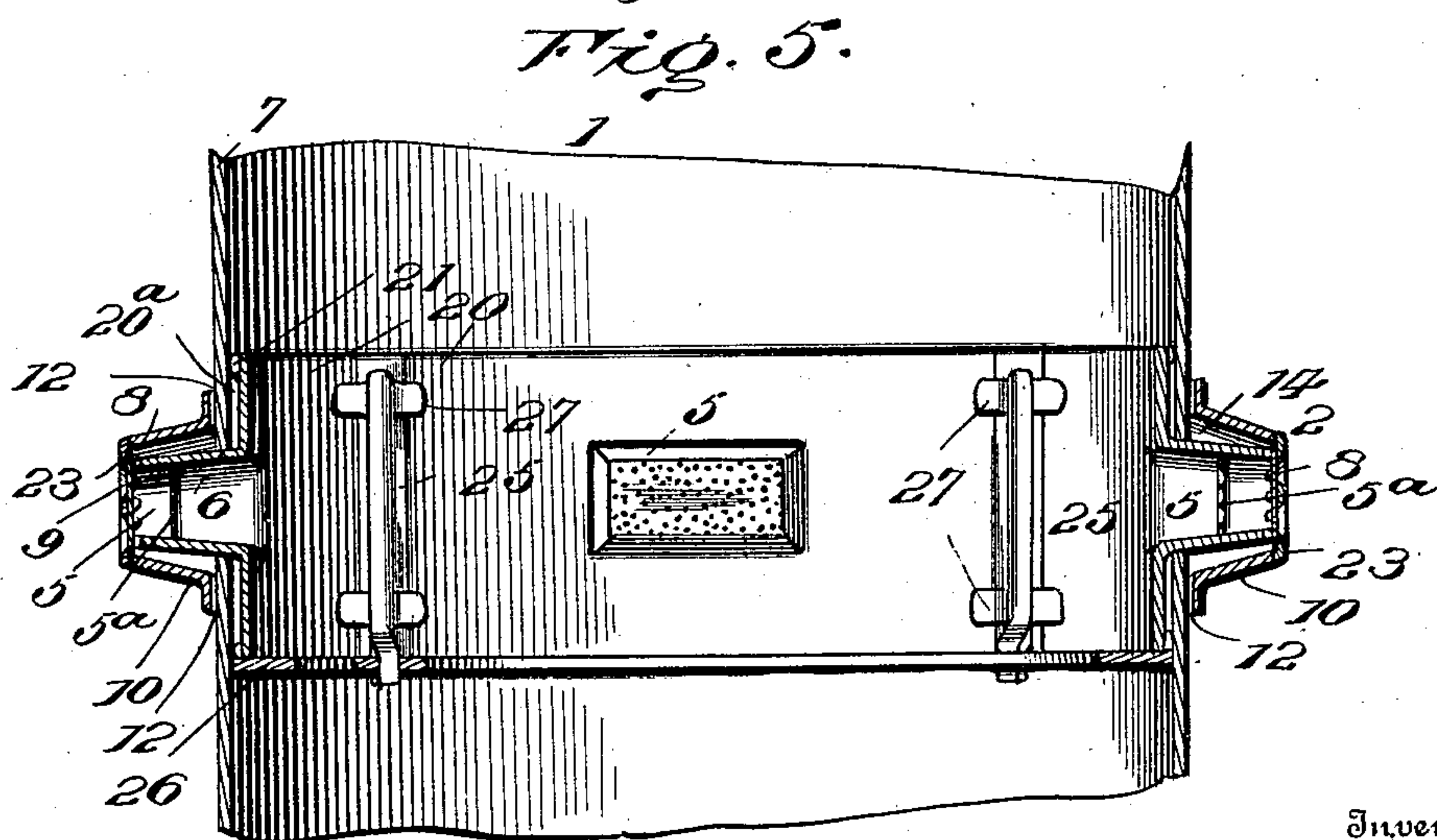
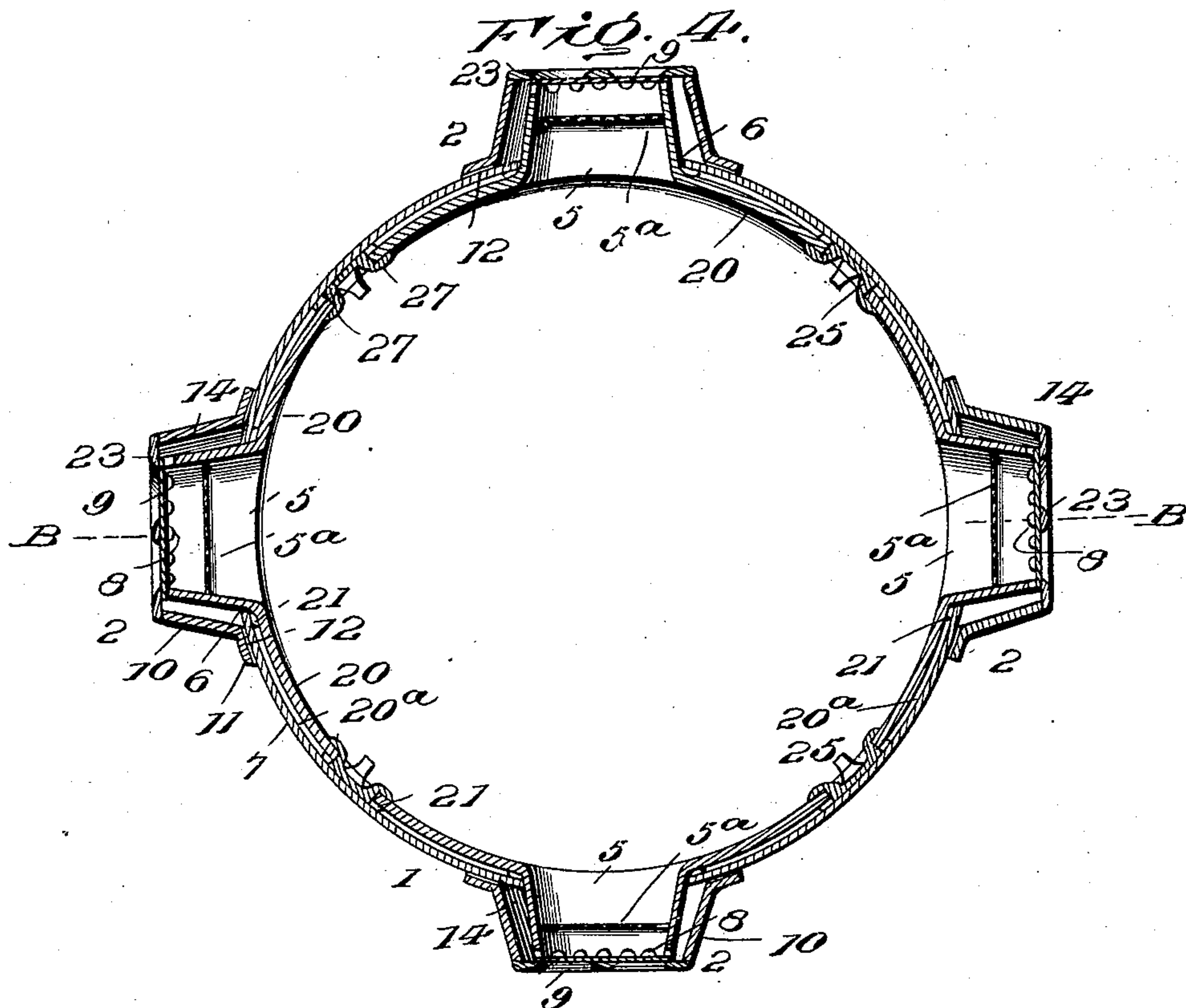
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

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AIR-INTRODUCER FOR STOVES.

SPECIFICATION forming part of Letters Patent No. 698,809, dated April 29, 1902.

Original application filed March 5, 1901, Serial No. 49,819. Divided and this application filed January 14, 1902. Serial No. 89,740. (No model.)

To all whom it may concern:

Be it known that I, EDWIN R. CAHOONE, a citizen of the United States, residing at Troy, in the county of Rensselaer and State of New York, have invented certain new and useful Improvements in Air-Introducers for Stoves; and I do 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 the figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in means for introducing heated air to stoves for promoting combustion and forms a division of my application for patent filed March 5, 1901, No. 49,819.

The primary object of the invention is to provide a structure which will take in or gather in, as it were, the heated air surrounding the stove-casing, preheat it, and in this condition disintegrate it into as finely-divided molecules of heat as possible. It is a well-known fact that the finer the particles heated air can be divided into and in such state delivered to promote combustion the better the results obtained. It is therefore my purpose to so direct the heated air that it will in transit to its mission contact with the heated walls of the structure, where it is preheated, and then pass it in this state through a foraminous piece of material to break and divide it into finely-divided heated molecules. These molecules in scattering again contact with the walls of the structure and are further heated before they are introduced to the products of combustion.

Many other objects and advantages will be hereinafter referred to, and be particularly pointed out in the claims.

In the drawings forming a part of this specification, Figure 1 is a vertical section of a stove, showing one way of applying my invention. Fig. 2 is a detail horizontal section on the line A A, Fig. 1. Fig. 3 is a detail perspective view of a modification of my invention. Fig. 4 is a horizontal sectional view of a further modification, the support for the

locking means intermediate the flanges of the introducers being omitted. Fig. 5 is a vertical sectional view of the same on the line B B of Fig. 4 and looking from the inside. Fig. 6 is a detail perspective view of the lock used in connection with the modifications shown in Figs. 4 and 5.

The numeral 1 indicates a stove of the down-draft pattern, and 2 my improved air-introducers. It may be well to state that while I have located the introducers at a point near the fire-pot I do not desire to be in any wise limited to the particular location, as very good results have been obtained by placing introducers at other points. However, for the purpose of illustrating the features of my invention it is deemed best to show and describe the improvement where the products of combustion leave the fire-pot to enter the exit-space 3.

In the embodiment of the invention the numeral 5 indicates an inner casting or open frame placed adjacent to and registering with an opening 6 in the stove-casing 7, said inner casting being fixed in its position and is open at both ends. The casting 5 preferably tapers outwardly and carries a foraminous piece of material 5^a, which is rigidly located. The extreme outer end of the casting is provided with a series of notches 8, and seated against said end is a sheet of transparent material 9 to permit the operator to note the condition of the fire.

A jacket 10, slightly larger than the casting 5, has at its inner end a flange 11, provided on the face adjacent the stove-casing 7 with a plurality of notches 12, and, if desired, perforations 12^a, as shown in Fig. 2, forming air-inlets when the parts are assembled. The outer end of the jacket 10 is formed into a turned-in flange 13, designed to bear on and retain the transparent sheet 9 in position against the end of the casting 5. Furthermore, the front of the jacket is made ornamental to present a neat and striking appearance. By reason of the jacket 10 being larger than the casting 5, a passage 14 is thus formed intermediate the two, through which the air enters through the notches 12. In the modification disclosed in Fig. 3 a sep-

arate cover 15 is substituted in lieu of the end of the jacket 10 being turned in to retain the sheet of transparent material in place. The cover 15 is provided on its lower edge with a hook-shaped lug 16, adapted to fit an opening 17 in the bottom of the jacket, and a perforated lug 18 projects from the top of the cover and a lock-pin passed through the perforation thereof and a perforation in the top of the jacket to retain the parts in position. To remove the cover, the pin is withdrawn, which permits the cover to be swung down and the lug 16 disengaged from its perforation.

15 In the modification disclosed in Figs. 4, 5, and 6 the casting 5 is cast with a flange 20 bearing lugs 21. Said casting in this instance is passed through the opening 6 and the flange becomes a lining or protector for the casing. The jacket 10 is substantially the same as that before described, except that instead of its outer end being formed with a retaining-flange to hold the transparent material a separate plate 23 is used, said plate being bolted or otherwise fastened to the jacket. Owing to the intense heat at this particular location, bolts, rivets, or the like would soon become burned out were they used to secure the plates together in series. Hence I have devised a novel locking device for this purpose. This lock 25 consists of a standard whose lower end is reduced and is pocketed in a suitable support 26. Lugs 27, projecting outwardly from each side of the standard, are designed to overlap the ends of the flanges 20, making a seat for securely fastening this part of the introducers in position. Obviously this construction is practically a continuous casting when assembled, and in no point is it weaker than another.

The parts thus assembled, the operation and some of the advantages are substantially as follows: It has been found in operating downdraft-stoves that even though a predetermined volume of air be admitted above the fuel-bed to promote combustion and the draft be good the rushing out of the products of combustion from the fire-pot to the space 3 is with such force that some of the molecules of gas cannot be ignited. Hence a large percentage of combustion is lost; but if finely-divided air heated to approximately the temperature of the products of combustion is introduced to the escaping gases before such gases are formed into smoke-gas the grade of combustion is commercially improved upon. The heated air which surrounds the casing is drawn through the notches 12 into the air-heating passage 14 broken somewhat more than when it came from the atmosphere. In this state it contacts with the walls of the casting and jacket and is further heated thereby, whereupon it is drawn through the notches 8 into the interior of the casting, thus having again been subdivided in its passage through the notches. By this time the introduced atmospheric air is highly heated

and could be utilized for promoting combustion; but I have found far better results are obtained by again dividing the heated air into fine molecules just before introducing it to the products of combustion, so that now I pass the heated air through the numerous perforations in the partition 5^a, it being remembered that the pull of the draft is very great at this point. Consequently the force with which the air encounters the partition readily breaks and scatters it. The air thus divided now mixes with the escaping products of combustion and any unconsumed molecules of gas are made susceptible to ignition, whereupon the grade of combustion has very materially been increased. After the finely-divided particles of heated air have passed the partition 5^a provision must be made for its spreading to obtain the desired results, and to meet this requirement the casting 5 increases in size toward the opening 6. This prevents the congestion of the ingoing air and permits the particles to spread out to create a resistance with the molecules of heat.

This improvement has another decided function and that is it prevents the unlimited drawing of the products of combustion to the exit-flue—that is to say, without the introduction of heated air to the escaping gases smoke is generated, whereas if the smoke generation be prevented and heat influences substituted therefor, obviously the fuel will not be as readily consumed and a greater heat-power gained in proportion to the amount of fuel used, so that this invention also comprehends the function of retarding the escape of the products of combustion without jeopardizing the heat influences.

Experience has demonstrated that by increasing the grade of combustion and the consequent increase of heat at this point the casing of the stove becomes destroyed, which of course is a decided disadvantage, and to overcome this objection I provide the flanges 20 to form a lining, the lugs 21 making an air-space 20^a adjacent the casing 7. While the flanges become exceedingly hot, the air-space prevents the destroying influences of the heat reaching the casing, and it is for this purpose, as well as a desirable means of fixing the castings in position, that I provide the flanges and the particular locking means therefor.

Having thus fully described my invention, what I claim as new is—

1. In a stove the combination with a casing having one or more openings, a fire-pot, an air introducer or introducers registering with the opening or openings in the casing each introducer comprising a frame which is open at its receiving and exit ends, a jacket surrounding said frame forming a passage intermediate the two, said passage communicating with the interior of the frame at or near the receiving end of the latter, and at its opposite end with the atmosphere.

2. The combination with a stove-casing

having an opening, and an air-introducer registering with said opening, said introducer comprising a frame which is open at its receiving and exit ends, a jacket surrounding the frame, a passage being formed intermediate the frame and the jacket, openings for admitting air to the passage, openings located at the opposite end of the frame for admitting air from the passage to the interior of the frame, and means in the frame for breaking the air, substantially as described.

3. The combination with a stove-casing having an opening therein, an air-introducer registering with said opening, said introducer comprising a frame which is open at its receiving and exit ends and has a plurality of air-inlets at or near one end, means in the frame for breaking the air, a jacket surrounding the frame, a space being formed intermediate the frame and the jacket, and a plurality of air-inlets formed in the jacket at or near the base thereof to introduce air to the space, substantially as described.

4. The combination with a stove-casing having an opening therein, an air-introducer registering with said opening, said introducer comprising an open frame having a plurality of notches at one end, means in the frame for breaking air, said means being displaced from either end of the open frame, a jacket surrounding the frame, a space being formed intermediate the frame and the jacket, and a series of notches in the jacket to admit air at or near the end of the space opposite to that of the notches in the open frame, substantially as described.

5. The combination with a stove-casing having one or a plurality of openings, air-introducers registering with the openings, each introducer comprising an open frame registering with one of the openings in the casing, a flange on the frame which is on the inner side of the casing, means for securing the flange in position, a jacket surrounding the frame, a space being formed between the two, openings being formed for the introducing of air to the space, at or near one end, and openings being formed at or near the opposite end of the space, for the introduction of air from said space to the interior of the frame, substantially as described.

6. The combination with a stove-casing having a plurality of openings, air-introducers registering with the openings, each introducer comprising an open frame which registers with one of the openings in the casing, a flange on the frame which is located on the inner side of the casing, means for spacing the flange from the casing, means for securing the flange in position, a jacket surrounding the frame, a space being formed between the jacket and frame, openings communicating with the space for the introduction of air thereto.

7. An air-introducer comprising an open

frame, a jacket surrounding the frame, a removable cover on the jacket, means for securing the jacket in position, a space being formed intermediate the frame and jacket, openings being formed in the jacket to admit air to said space at or near one end thereof, said space communicating at or near its opposite end with the interior of the open frame, and means in the interior of, and displaced from either end of the frame to break the air, substantially as described.

8. An air-introducer comprising a frame open at its receiving and exit ends and tapering toward its receiving end, means in the frame for breaking air, a jacket larger than the frame and surrounding the latter, forming a space intermediate the frame and the jacket, said space communicating with the atmosphere at one end and the interior of the frame at the opposite end, substantially as described.

9. The combination with a stove-casing having openings therein, air-introducers registering with the openings, a flange extending from each introducer and placed on the inside of the casing, a space being formed intermediate the flange and casing, a lock for fastening adjoining flanges, lugs extending from the lock which embraces the flanges, and a seat being formed to position the lock, substantially as described.

10. An air-introducer comprising an open frame, having a plurality of notches at its outer end, a piece of foraminous material in the interior of the frame, a transparent cover fitted over the outer end of the frame, a jacket surrounding the frame, a series of inlets being formed at the inner end of the jacket, and a space being formed intermediate the jacket and casing whereby air is introduced to the passage, thence to the interior of the frame, substantially as described.

11. In a downdraft-stove, the combination with a fire-pot, a casing having a plurality of openings adjacent the fire-pot, a space being formed intermediate the fire-pot and casing, air-introducers registering with the openings, each introducer comprising an open frame, a jacket surrounding the frame, a space being formed intermediate the two, means for introducing air to the space, openings being formed between the space and the interior of the open frame, and means for breaking the air, whereby a plurality of finely-divided heated-air currents are delivered to the products of combustion as the latter leave the fire-pot, substantially, as described.

12. The combination with a stove-casing having an opening therein, an air-introducer registering with said opening, said introducer comprising an open frame having air-inlets at or near one end, means in the frame for breaking air, a jacket surrounding the frame, a space being formed intermediate the frame, and the jacket, and a plurality of air-inlets

formed in the jacket at or near the opposite end of the space, substantially as described.

13. The combination with a stove-casing having an opening therein, an air-introducer
5 comprising a frame having a passage therein, inlets being formed for admitting air to said passage, an exit-opening being formed for the escaping of air into the interior of the frame, a flange extending from the introducer and

being located within the casing and a space 10 being formed intermediate the flange and casing, substantially as described.

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

EDWIN R. CAHOONE.

Witnesses:

JOHN LAVENDER,
FRANK SHRANDER.