

No. 619,171.

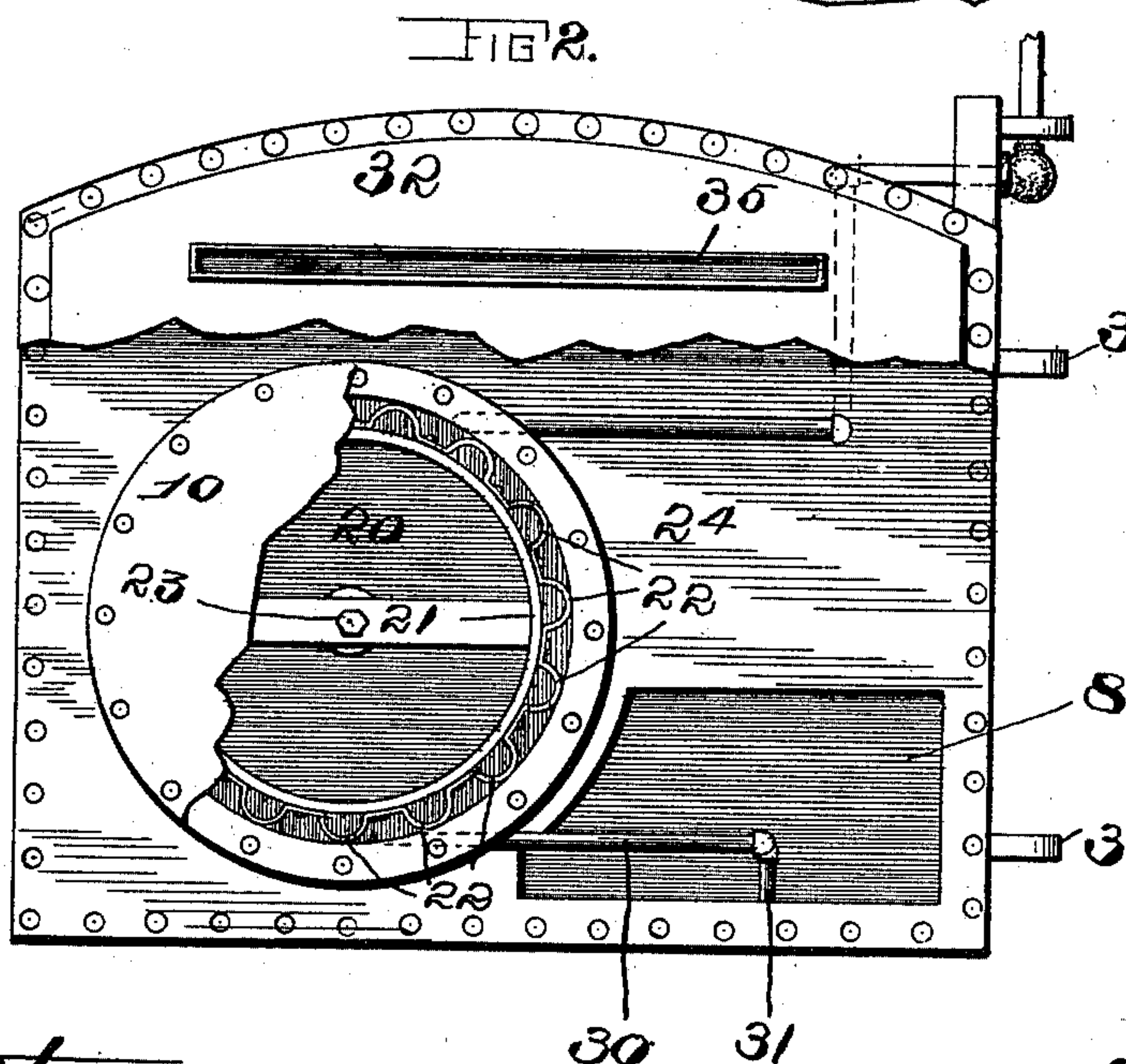
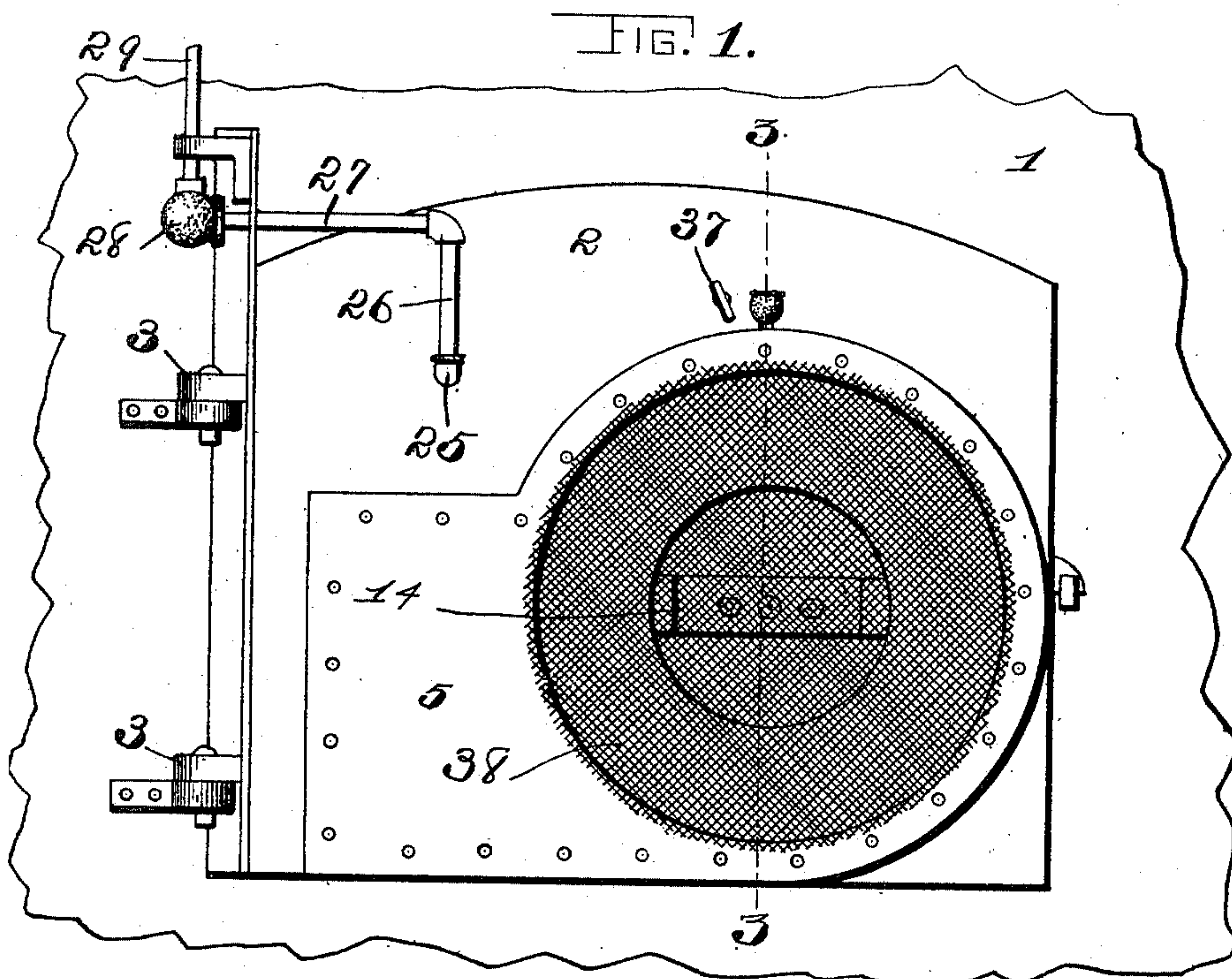
Patented Feb. 7, 1899.

R. W. HAMANN.
SMOKE CONSUMER.

(Application filed May 5, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Attest
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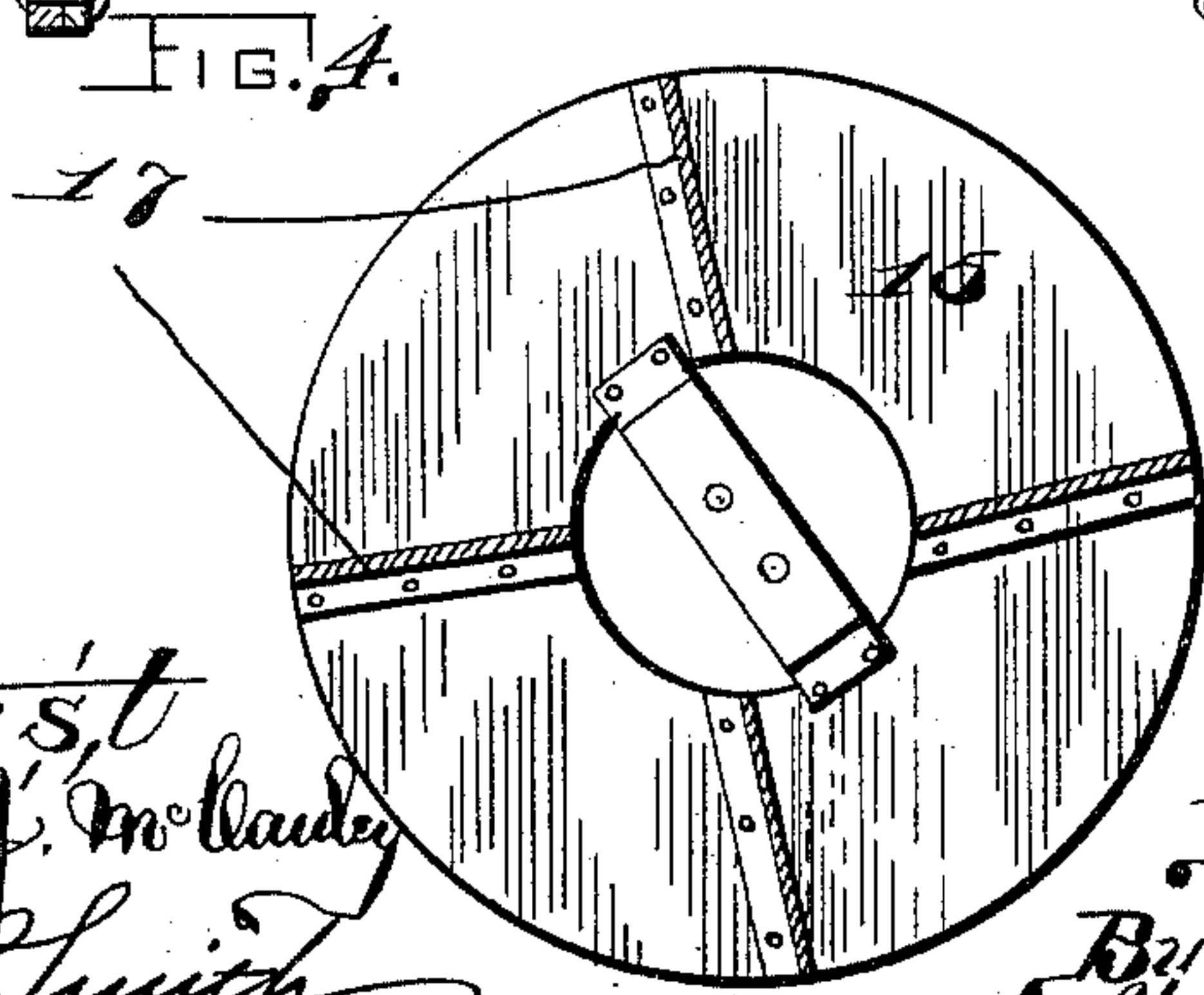
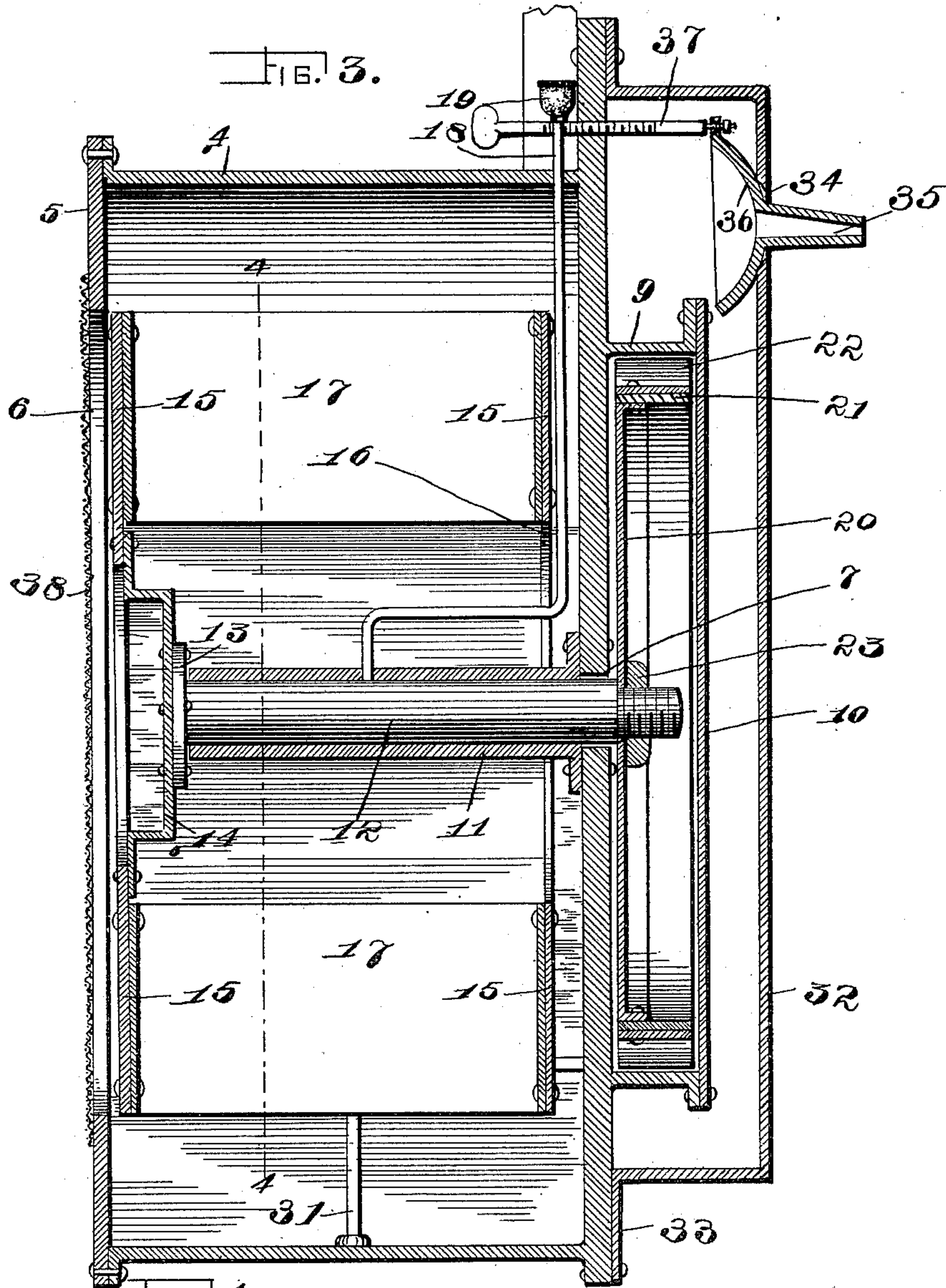
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UNITED STATES PATENT OFFICE.

RICHARD W. HAMANN, OF ST. LOUIS, MISSOURI, ASSIGNOR OF TWO-FIFTHS
TO RICHARD WILLIAMS AND DANIEL BOONE, OF SAME PLACE.

SMOKE-CONSUMER.

SPECIFICATION forming part of Letters Patent No. 619,171, dated February 7, 1899.

Application filed May 5, 1898. Serial No. 679,835. (No model.)

To all whom it may concern:

Be it known that I, RICHARD W. HAMANN, of the city of St. Louis, State of Missouri, have invented certain new and useful Improve-
5 ments in Smoke-Consumers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to smoke-consumers;
10 and it is an improvement upon a smoke-consumer a patent for which was issued to myself and John Voegeli July 7, 1896, and numbered 563,483.

The object of my invention is to provide a
15 furnace-door with a blast apparatus which will force a blast of hot air into the fire within the furnace, which blast of hot air will greatly facilitate the draft in said furnace and will also combine with the elements in
20 the furnace to create a perfect combustion of the smoke that arises from the fire of the furnace.

Figure 1 is a front elevation of a furnace-door constructed and equipped in accordance
25 with the principles of my invention. Fig. 2 is an elevation of the inside of said furnace-door, parts thereof being broken away to more clearly illustrate the same. Fig. 3 is an enlarged vertical sectional view taken approxi-
30 mately on the line 3 3 of Fig. 1. Fig. 4 is a vertical sectional view of the fan used in connection with my improved smoke-consumer, said view being taken approximately on the line 4 4 of Fig. 3.

Referring by numerals to the accompanying drawings, 1 indicates the front wall of the furnace, and 2 the furnace-door, which door is connected to and swings upon the furnace-front 1 by means of the hinges 3. Formed
40 integral with and projecting outwardly from the front face of the furnace-door 2 is a flange 4, irregular in outline, which flange 4 forms a casing, the right-hand portion of which is circular when viewed in elevation and the
45 left-hand portion of which is rectangular when viewed in front elevation. The portions of the casing so formed communicate with each other to form a single chamber. Riveted or bolted to the edge of the flange 4 bounding
50 said casing is a plate 5 so formed as to fit upon said casing, in which plate 5 is formed

a circular aperture 6, which is concentric with the circular portion of the casing formed by the flange 4.

Formed through the furnace-door 2 at the
55 center of the circular portion of the casing is an aperture 7, and formed through said furnace-door, near the lower edge thereof and in the space surrounding the rectangular portion of the casing, is a rectangular aperture
60 8. Formed integral with the furnace-door 2, and projecting from the inner face thereof, is a circular flange 9, the same being concentric with the aperture 7, and riveted or bolted to the edge of this flange 9 is a circular plate 10.
65 A tubular bearing or sleeve 11 is bolted to the front face of the door 2 in such a manner as that the passage through said sleeve is in alinement with the aperture 7, and said bearing or sleeve projects forwardly into the center
70 of the space within the circular portion of the casing formed by the flange 4, and arranged for rotation in said bearing or sleeve is a shaft 12. With the forward end of said shaft 12 is formed integral a flange 13, that is
75 bolted or riveted to a bracket 14.

The blast-fan is composed of a pair of disks
15, identical in form and size, which disks are provided in their centers with circular openings 16, and between said disks 15 are
80 arranged the fan-blades 17. The ends of said fan-blades 17 are turned at right angles to the body portions thereof, and said ends are riveted to the disks 15. The fan so constructed is arranged to rotate in the circular portion
85 of the casing hereinbefore described, the ends of the bracket 14 being riveted or bolted to the inner face of the outer one of the disks 15.

An oil-supply pipe 18 leads from the exterior
90 of the circular casing downwardly to one side of the fan and to the center of the bearing or sleeve 11, said pipe being provided at its upper end with an oil-cup 19.

The inner end of the shaft 12 projects
95 through the aperture 7 in the furnace-door 2 and into the chamber formed by the circular flange 9, that is closed by the plate 10, and upon this end of the shaft 12 is located a circular disk 20, to the edge of which is riveted
100 a rim 21, which rim carries a plurality of semi-circular projections 22, the same being ar-

ranged at equal distances from each other. The disk 20 is held upon the end of the shaft 12 by means of the nut 23, that is located upon the outer end of said shaft 12, which outer end is exteriorly screw-threaded. Thus a turbine wheel is constructed to operate in the space inclosed by the circular flange 9. Leading through the flange 9, at a point near the top thereof, is a pipe 24, that connects with the transverse pipe 25, that leads through the furnace-door 2 to the exterior thereof, said pipe 25 being in turn connected to a short vertical pipe 26, the same being connected by means of an elbow to a horizontal pipe 27, that leads to a swiveled union 28, that is in direct alinement with the hinges 3, upon which the door swings, there being a steam-supply pipe 29, leading to said swiveled union 28.

Leading from the bottom of the chamber formed by the flange 9 is a horizontally-arranged exhaust-pipe 30, that is connected to a vertically-arranged pipe 31, that leads to the ash-pit. Thus supply and exhaust connections are formed to and from the turbine wheel of my improved device.

A rectangular casing 32 of the same shape as is the furnace-door is provided on its edge with a flange 33, which flange is bolted or riveted to the edge of the inner face of said furnace-door. Thus a chamber is formed in which the turbine wheel and its casing are located. Formed in the top of the front wall of this casing 32 is a horizontally-arranged slot 34, having curved inner edges, and a discharge-nozzle 35 projects from the interior of the casing through this slot 34, the inner end of said discharge-nozzle being provided on its inner end with the flanges 36, that engage against the curved edges of the slot 34. A set-screw 37 passes through the front wall of the casing 32, the inner end of which set-screw is rotatably secured to the upper one of the segmental flanges 36.

A section of wire-netting 38 is fixed to the plate 5, that closes the casing formed by the flange 4, which netting allows a free access of air to the fan, but prevents a person from accidentally touching said fan while the same is in operation, and said netting also prevents particles of paper or string from being drawn into the fan while the same is in operation.

The operation of my improved smoke-consumer is as follows: When the furnace-door is closed and it is desired to start the blast, the furnace attendant opens a valve (not shown) in the pipe 29, which leads from the steam-supply, and thus steam is allowed to pass through the pipes 29, 27, 26, 25, and 24, from the end of which pipe 24 it will be discharged onto the periphery of the turbine wheel in the form of a jet. This will cause said turbine wheel to rotate at a high rate of speed, and necessarily the shaft 12 and fan will likewise rotate. The steam after performing its work, together with any condensation, will exhaust and discharge through the pipes 30 and 31 to the ash-pit. As the

fan is rotated at a high rate of speed air will be drawn in through the opening 6 in the front plate 5 and by said fan forced out of the chamber surrounded by the flange 4 through the opening 8 into the chamber within the casing 32, and from said chamber will discharge through the discharge-nozzle 35 onto and into the fire within the furnace. By previously manipulating the set-screw 37 the elevation of the mouth of the discharge-nozzle 35 is changed, so that it will discharge the air downwardly onto the fire or raised to discharge said air just above said fire, this adjustment being differentiated in proportion to the degree of heat that is maintained within the fire-box of the furnace. By providing the casing 32 on the inside of the furnace-door, which casing, of course, is adjacent the fire, all of the air passing into the chamber within said casing 32 is thoroughly heated before it is discharged onto the fire.

In the patent above referred to combined air and steam is forced into the fire; but I find in actual practice that much better results are obtained and the smoke may be more completely consumed by the introduction of hot air only into and onto the fire.

A smoke-consumer so constructed is very simple in construction and operation, requires but very little steam to run the fan at the required speed, there are no parts that will burn out, and the various parts all being carried by the furnace-door are easily accessible in case any of said parts need adjustment or repair.

I claim—

1. In a smoke-consumer, the combination with a furnace-door having a casing formed on its front, of a shaft rotatably arranged in said casing through the furnace-door, a fan rigidly carried by said shaft, a turbine wheel carried upon the shaft inside the furnace-door, steam connections to and from said turbine wheel, a casing inside said furnace-door, there being an opening through the furnace-door that communicates from the fan-chamber to the chamber within the casing inside the door, and an air-discharge nozzle leading from the casing on the inside of the door, substantially as specified.

2. In a smoke-consumer, the combination with a furnace-door, of a fan-casing arranged on the front of said door, a casing arranged on the inside of said door, there being an opening through the door from one casing to the other, a fan rotatably arranged within the first-mentioned casing, means for rotating said fan, and an air-discharge nozzle leading from the casing inside the door, substantially as specified.

3. In a smoke-consumer, the combination with a furnace-door, of a casing arranged on the outside thereof, a casing arranged on the inside thereof, there being communication from the chamber in one casing to the chamber in the other, a fan rotatably arranged in the first-mentioned casing, means carried by

said door whereby said fan is rotated, an air-discharge nozzle passing through the wall of the second-mentioned casing, and means for changing the elevation of the mouth of said
5 discharge-nozzle, substantially as specified.

4. A smoke-consumer, constructed with a furnace-door, a casing formed on the front face thereof, a casing formed on the inner face thereof, a second casing located upon the
10 inner face thereof that incloses the first-mentioned casing on the inner face, there being communication from the chamber of the casing on the exterior of the door to the chamber of the larger casing on the interior of the door,
15 a fan rotatably arranged within the casing on

the exterior of the door, a turbine wheel arranged for rotation within the smaller casing on the interior of the door for driving the fan, steam connections to and from the casing inclosing the turbine wheel, and an adjustable
20 air-discharge nozzle leading from the larger casing on the interior of the door, substantially as specified.

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

RICHARD W. HAMANN.

Witnesses:

A. J. McCAULEY,
M. P. SMITH.