(No Model.)

R. W. HAMANN & J. VOEGELI.

SMOKE CONSUMER.

No. 563,483. Patented July 7, 1896.

Fig. 1

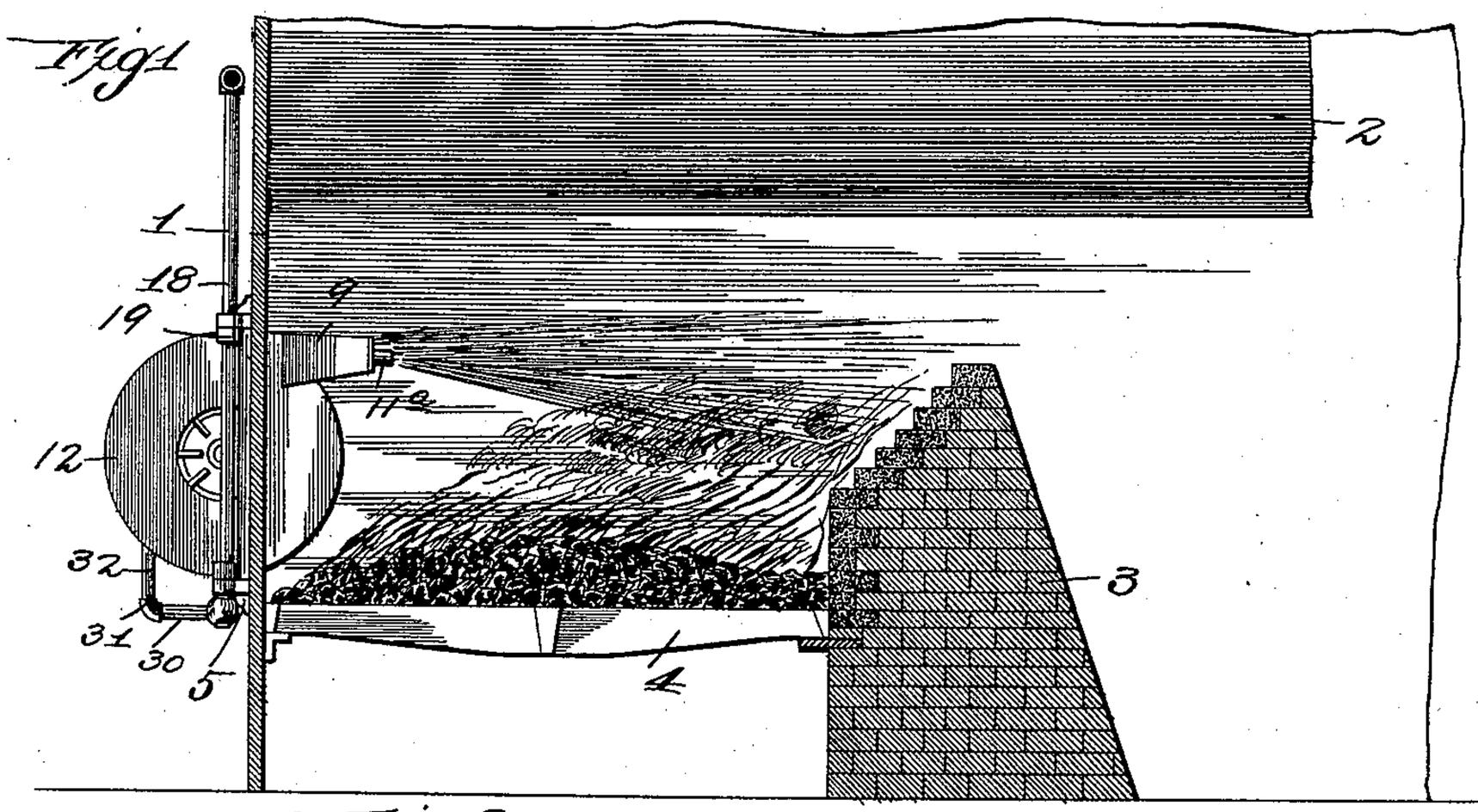
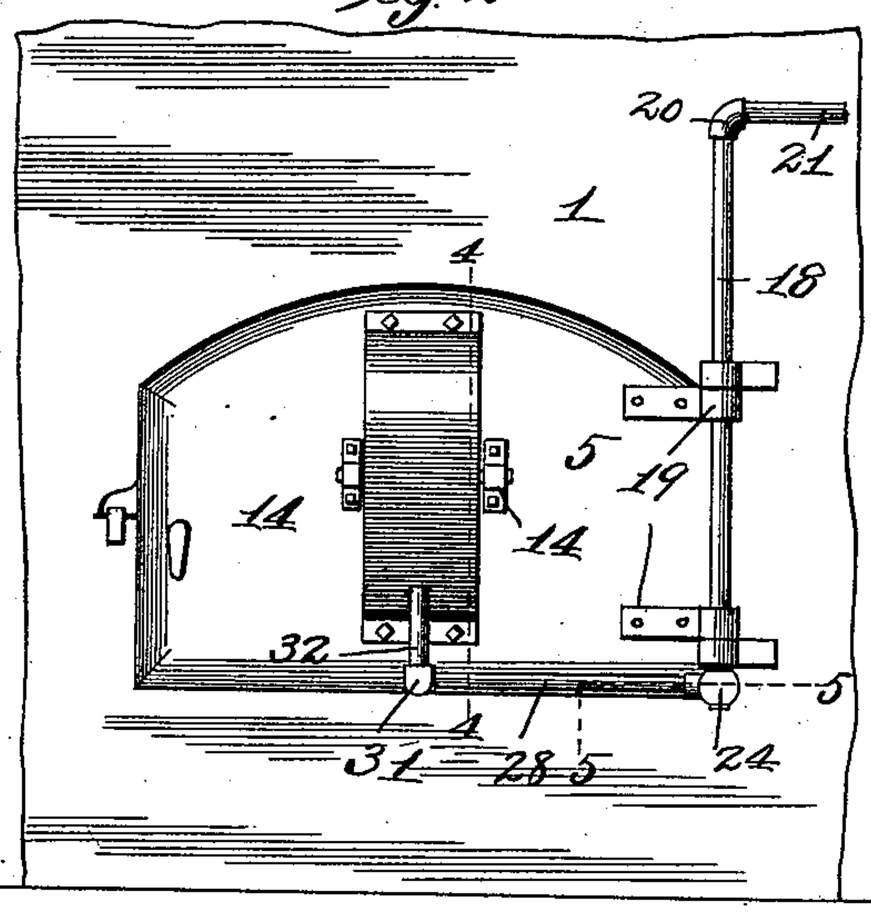


Fig. 2



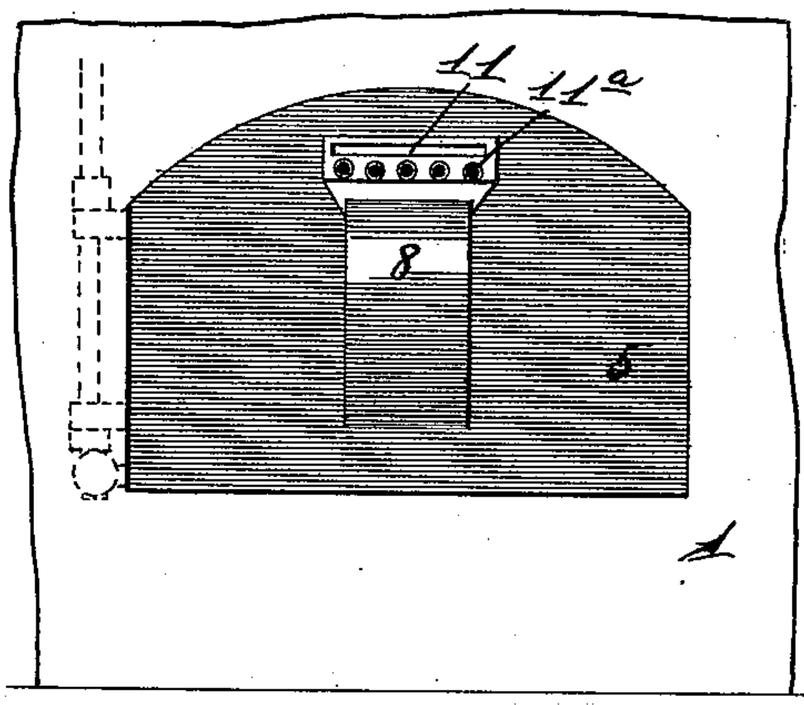


Fig. 3

Fig. 4

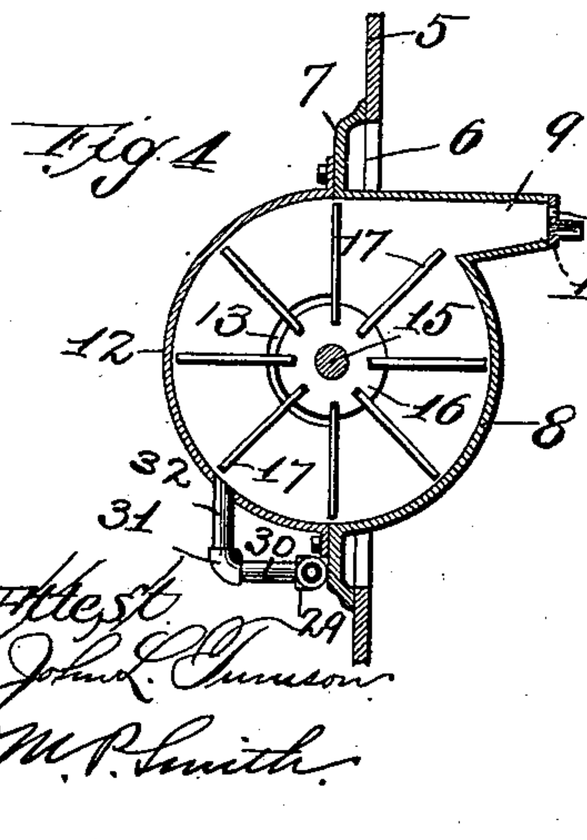


Fig. 5

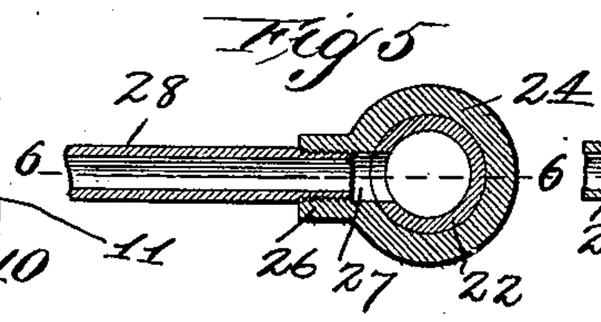


Fig. 6

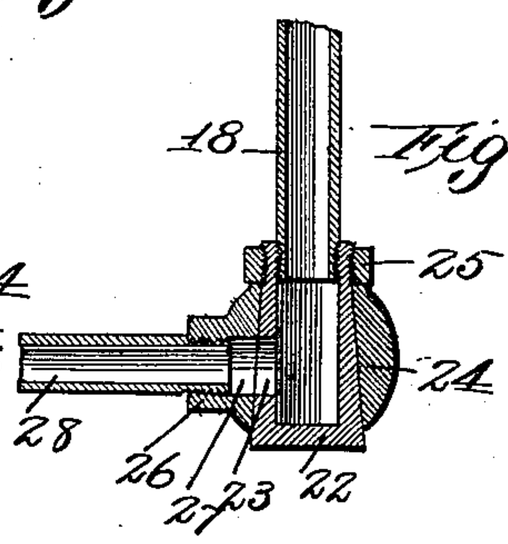
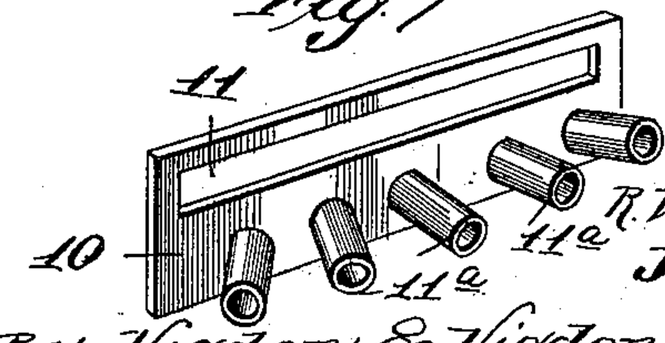


Fig. 7



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UNITED STATES PATENT OFFICE.

RICHARD W. HAMANN AND JOHN VOEGELI, OF ST. LOUIS, MISSOURI.

SMOKE-CONSUMER.

SPECIFICATION forming part of Letters Patent No. 563,483, dated July 7, 1896.

Application filed October 21, 1895. Serial No. 566,367. (No model.)

To all whom it may concern:

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

Our invention relates to an improved smoke-consumer; and it consists in the novel construction, combination, and arrangement of parts hereinafter described and claimed.

In the drawings, Figure 1 is a longitudinal sectional view taken approximately through the center of a boiler-furnace, the same having our improved smoke-consumer applied to the door thereof. Fig. 2 is a front elevation of a furnace-door, the same having the consumer applied thereto. Fig. 3 is a rear elevation of said door. Fig. 4 is a vertical sectional view taken approximately on the indicated line 4 4 of Fig. 2. Fig. 5 is a horizontal sectional view taken approximately on the indicated line 55 of Fig. 2. Fig. 6 is a vertical sectional view taken approximately on the indicated line 6 6 of Fig. 5. Fig. 7 is a view in perspective of a plate constructed with a series of discharge-nozzles of which we make use in carrying out our invention.

Referring by numerals to the accompanying drawings, 1 indicates a boiler-front, 2 the boiler, 3 the bridge-wall, and 4 the grate-bars, these being all of common construction, and located in the boiler-front 1 are the usual furnace-doors 5. Formed in the furnace-door is a vertically-arranged aperture 6, and bolted to the face of the door immediately over this aperture 6 is a plate 7, with which is formed integral an inwardly-extending semicircular casing 8, from the upper end of which projects inwardly into the fire-box of the furnace a discharge spout or chute 9. Bolted to the mouth of this discharge-chute is a plate 10, in the top of which is arranged a horizontal slot or aperture 11, and formed integral with and extending outwardly from the face of the lower portion of this plate is a series of tubular discharge-nozzles 11^a, the same being arranged on converging lines in order to spread or diffuse the blast passing through said nozzles.

Formed on or fixed to the front face of the door 5, and arranged to coincide with the semicircular casing 8, is a semicircular casing 12, the same being constructed with semicircular apertures 13 in its side walls.

14 14 indicate suitable bearing-boxes that are bolted to the front face of the door 5 at points in alinement with the center of the circular casing formed by the mating portions 8 and 12. Mounted for rotation in these boxes 14 is a shaft 15, and upon said shaft, within the interior of the casing, is fixed a disk 16, from which projects radially a series of fan-blades 17.

18 indicates a vertically-arranged tube that passes through the apertures in the coinciding hinge-plates 19 of the door and boiler-front, and said tube acts as a hinge pin or bolt between said door and boiler-front. Connected to the upper end of said tube 18 by means of an elbow 20 is a tube 21, that leads from a suitable steam or compressed-air supply or the like. Arranged upon the screw-threaded lower end of this tube 18 is a slightly-conical cap 22, in which is formed an aperture 23. Arranged to rotate upon this conical cap 22 is a casing 24, the same being held upon said cap 22 by a collar 25, that is threaded upon the upper end of said cap. A tubular interiorly-screw-threaded projection 26 is formed integral with one side of the casing 24, and the same communicates by an aperture 27 with the aperture 23.

One end of a pipe 28 is screw-threaded and located in the tubular projection 26, said pipe 28 extending along the lower edge of the fire-door 5 to a point immediately beneath the center of the circular casing. At this point said pipe 28 is connected by an elbow 29 to a horizontally-arranged tube 30, that extends forward from the face of the fire-door 5, and the outer end of said tube 30 is connected by means of an elbow 31 to a vertically-arranged tube 32, the upper end of which passes through the casing 12, and said tube 32 is so arranged as to discharge directly onto the fan-blades 17.

The operation is as follows: When the furnace-door is closed, the discharge-nozzles are so arranged that they are approximately in the same horizontal plane as that occupied by the top of the bridge-wall, this being preferable, though not essential. Assuming that

the tube 21 is connected to a steam supply and the valve in said tube is open, the steam will pass through said tube downwardly through the pipe 18, through the valve at the lower end of said pipe, and from thence through the pipes 28 and 30 to the vertically-arranged pipe 32, from which it is discharged directly onto the fan-blades 17. The fan will, by reason of said discharging-jet, be rotated at a very high rate of speed, and in so rotating a certain amount of air will be by suction drawn in through the apertures 13 in the sides of the casing 12, and said air, together with the steam, will be forced outwardly in the form of a blast through the discharge chute or spout 9 and through the slot 11 and discharge-nozzles 11^a. Said blast of combined air and steam, being thrown into and commingled with the flame of the furnace-fire at a point immediately before said flame passes over the bridge-wall, will, as we have found in practice, very completely cause a combustion of the smoke and gases arising from said fire and at the same time assisting the draft of said fire and thereby increasing the heat. Whenever the furnace-door carrying the casing is opened, the casing 24 will rotate upon the conical tube 32 and the aperture 27 in said casing will, by this movement, be thrown out of coincidence with the aperture 23, thereby cutting off the blast or passage of steam or air through the valve while the door is open.

A smoke-consumer of our improved construction is applicable either with steam or compressed air, is simple, requires no attention, can be used on any form of furnace, and is very effective in creating a combustion of the smoke and gases arising from a furnace-fire.

We claim—

1. In combination with a furnace-door, a casing arranged in said door, a discharge-spout formed integral with the casing on the inside of the door, a plate having a horizontal slot formed therein fixed to the mouth of the discharge-spout, a series of diverging discharge-nozzles formed integral with the lower side of said plate, a fan arranged to operate within said casing, and means for rotating said fan.

2. In combination with a furnace-door, a cylindrical casing arranged within said door, a discharge spout or nozzle for said casing, a plate fixed to the mouth of said discharge-spout, said plate being provided with a horizontal slot, a series of diverging discharge-nozzles formed integral with said plate, a vertically-arranged tube acting as a hinge pin or bolt for said door, a tube extending from the lower end of said vertically-arranged tube to the under side of the fan-casing, and a valve connecting the ends of said tubes, the same being arranged to close when the door is opened.

3. A smoke-consumer, comprising a furnace-door, a cylindrical casing arranged therein, a discharge spout or nozzle formed integral with the inner and upper side of said casing, a plate located upon the mouth of said discharge-spout, said plate being provided with a horizontal slot, a series of diverging discharge-nozzles formed integral with said plate, a vertically-arranged tube acting as a hinge pin or bolt for said door, a tube extending from the lower end of said vertically-arranged tube to the upper side of the fan-casing, and a valve connecting said tubes, the same being provided with normally-coinciding apertures, the same being thrown out of coincidence when the door is opened.

In testimony whereof we affix our signatures in presence of two witnesses.

RICHARD W. HAMANN.
JOHN VOEGELI.

Witnesses:
JOHN C. HIGDON,
MAUD GRIFFIN.