C. E. PATRICK.

SMOKE CONSUMER.

APPLICATION FILED OCT. 18, 1911.

1,036,320.

Patented Aug. 20, 1912.

2 SHEETS—SHEET 1.

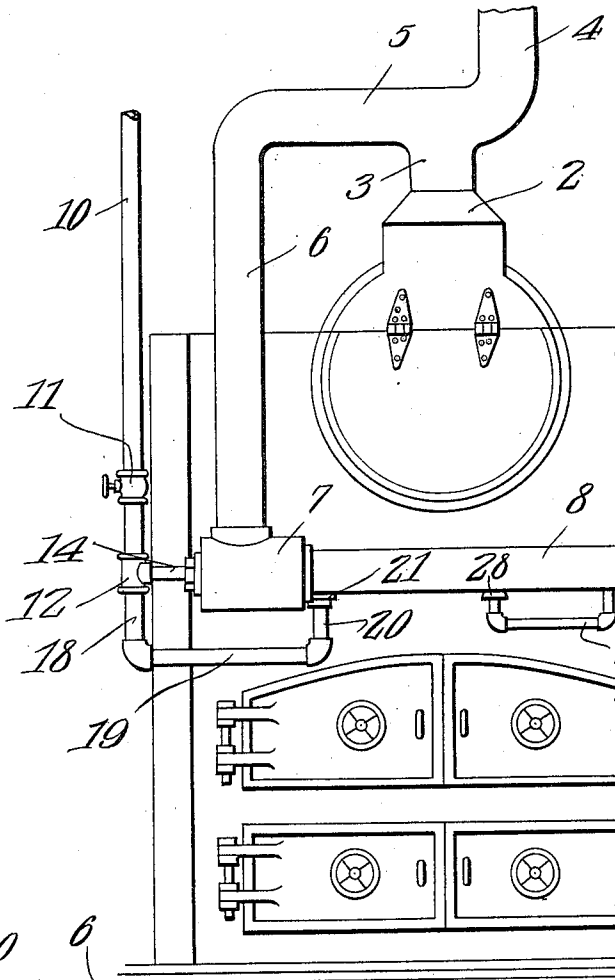

Fig. 1.

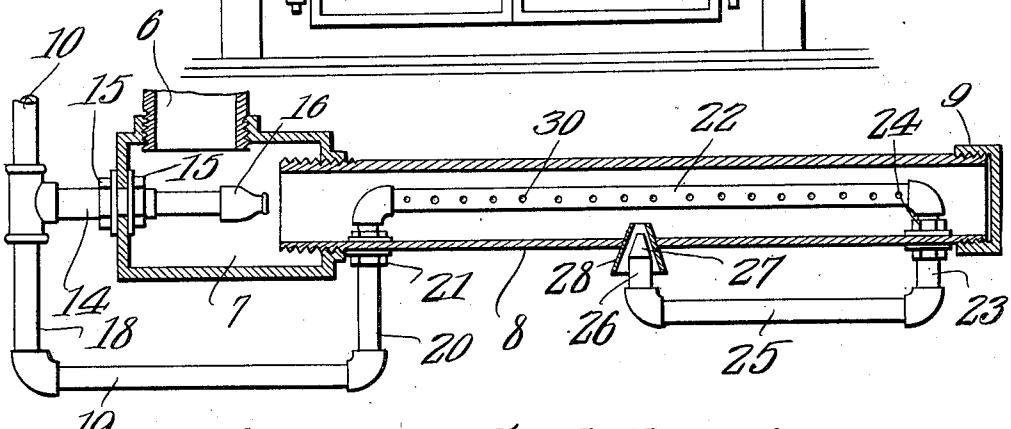

Fig. 2.

Witnesses

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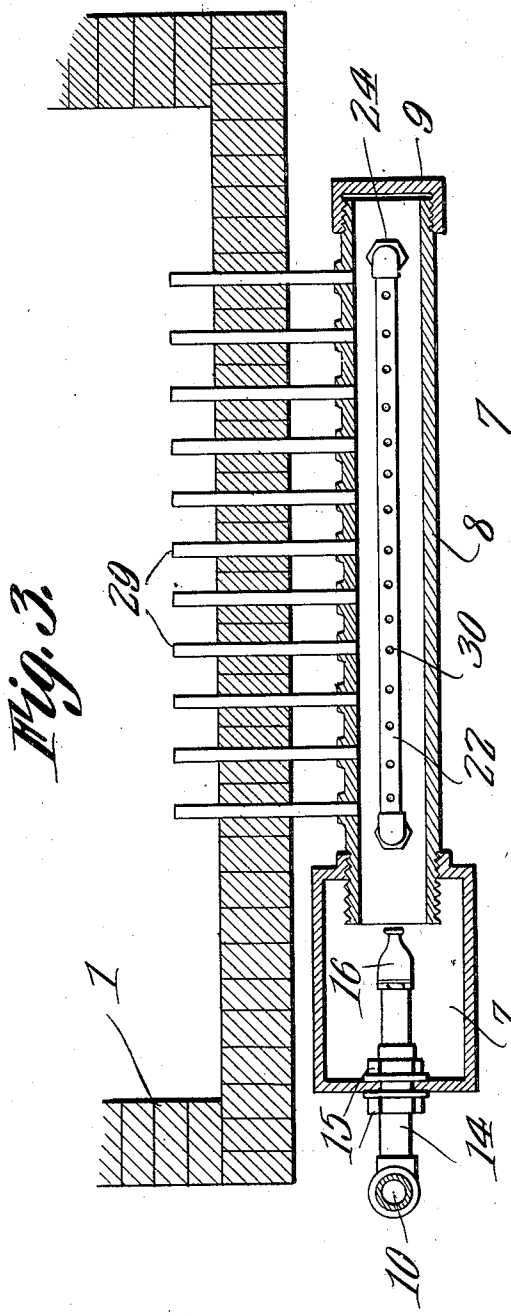

Fig. 3.

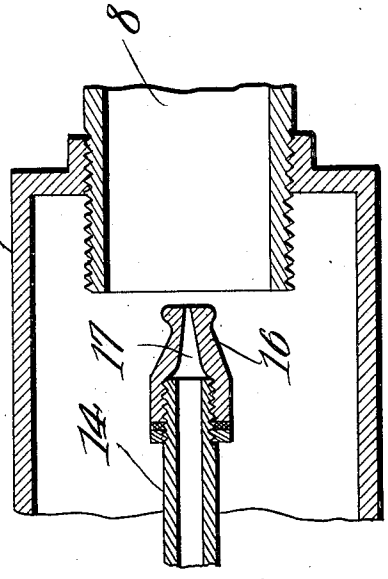

Fig. 4.

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UNITED STATES PATENT OFFICE.

CHARLES E. PATRICK, OF DES MOINES, IOWA.

SMOKE-CONSUMER.

1,036,320. Specification of Letters Patent. Patented Aug. 20, 1912.

Application filed October 18, 1911. Serial No. 655,335.

To all whom it may concern:

Be it known that I, CHARLES E. PATRICK, a citizen of the United States, residing at Des Moines, in the county of Polk and State of Iowa, have invented a new and useful Smoke-Consumer, of which the following is a specification.

It is the object of this invention to provide a device of simple construction, whereby a portion of the smoke passing out of the furnace, is returned through the furnace, to effect a further consumption of the particles of carbon held in suspension in the smoke, a further object of the invention being the provision of means adapted to effect a consolidation of the particles of carbon, air being admitted along with the smoke, to effect combustion of the consolidated particles.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the accompanying drawings,—Figure 1 shows in front elevation, a furnace equipped with the device of the present invention; Fig. 2 is a vertical section of the casing in which the smoke, steam and air are mingled, previous to the return of the mixture into the furnace; Fig. 3 is a horizontal section through the casing and through a portion of the furnace wall; and Fig. 4 is a detail enlarged from Fig. 3.

In the accompanying drawings, a furnace is shown, and denoted generally by the numeral 1, the furnace 1 having a smoke box 2, from which proceeds a smoke flue 3, having an upstanding portion 4, located to one side of the portion 3. Communicating with the smoke flue 3—4, is a horizontally extended smoke pipe 5, carried downwardly, as shown at 6, to enter the primary part 7 of a casing, the casing including a secondary part 8, of less diameter than the primary part 7. The casing, comprising the parts 7 and 8, is horizontally disposed, at the front of the furnace 1. The secondary part 8 of the casing is closed at its outer end by a cap 9.

The numeral 10 indicates generally, a steam pipe, having a valve 11, the pipe 10 entering one side of a T 12, from which projects a pipe 14, constituting the primary branch of the steam pipe 10. The primary branch 14 of the steam pipe 10 passes through packing nuts 15, and through the end wall of the primary part 7 of the casing. The primary branch 14 of the steam pipe 10 terminates in a nozzle 16, having a reduced bore 17. The nozzle 16 is disposed in the axis of the casing, and is located inwardly of the discharge end of the portion 6 of the smoke pipe. From the other side of the T 12, the pipe 10 is continued vertically as at 18, thence horizontally as at 19, and then vertically as shown at 20, the portion 20 passing through packing nuts 21, and through the side wall of the secondary part 8 of the casing. Within the secondary part 8 of the casing, the pipe 20 is carried horizontally, as shown at 22, this part 22 being located in the axis of the secondary part 8 of the casing. One end of the portion 22 is carried outwardly through the side wall of the part 8 of the casing, and through packing nuts 24, as shown at 23. The part 23 is carried horizontally along one side of the part 8 of the casing, as at 25, the portion 25 being rectangularly disposed, at its end, as shown at 26, the part 26 terminating in a reducing nozzle 27 discharging into a funnel 28, secured in the side wall of the part 8 of the casing. The pipes 18, 19, 20, 22, 23, 25, and 26, together with the nozzle 27, may be considered broadly, as the secondary branch of the steam pipe 10. The secondary part 8 of the casing is connected with the interior of the furnace 1, through the medium of a plurality of pipes or nozzles 29, as clearly shown in Fig. 3. In the side wall of the part 22 of the secondary branch of the steam pipe 10, there are a plurality of openings 30.

In practical operation, the steam, entering the pipe 10, will pass through the primary branch 14 and pass out of the branch 14 into the primary part 7 of the casing, through the reducing nozzle 16. The steam issuing from the nozzle 16 will cause a down draft through the smoke pipe 6—5, the volume of smoke which is delivered from the flue 3 into the branch 5 being increased by reason of the fact that the portions 3 and 4 of the smoke flue are not disposed in co-axial relation. A portion of the steam will traverse the secondary branch 18, 19, 20 and 22, the steam passing outwardly

through the reduced openings 30 in the portion 22, to mingle with the smoke and products of combustion which are forced into the secondary part 8 of the casing due to the entraining action of the nozzle 16. A portion of the steam which traverses the branch 22 in the steam pipe, continues through the pipes 23, 25, 26, this portion of the steam passing through the nozzle 27, and thence into the part 8 of the casing, through the funnel 28. That portion of the steam which passes through the nozzle 27 and through the funnel 28, will draw inwardly, along with it, a liberal supply of air, which air, with the products of combustion and with the steam, will pass through the pipes 29 into the furnace, for further consumption. The openings 30 are of small size, so that there will be sufficient pressure at the nozzle 27 to overcome the steam pressure within the part 8 of the casing, and thus the air will flow inwardly through the funnel 28, instead of the steam and products of combustion being forced outwardly through the funnel 28. In operation, also, there will be a draft through the furnace, and across the discharge ends of the pipes 29, which draft will serve to reduce the pressure within the part 8 of the casing.

The device hereinbefore described, is simple in construction and of few parts. In practical operation it will result in combining the particles of carbon held in suspension in the smoke, into minute, but larger particles, and will, at the same time, permit the entrance of air, in sufficient quantities to facilitate the combustion.

Having thus described the invention, what is claimed is:—

1. The combination with a furnace having a smoke flue, of a casing extended across the front of the furnace and having an opening in its side wall; a pipe leading from the casing into the furnace; a smoke pipe leading from the flue into the casing, adjacent one end of the casing; a steam pipe having primary and secondary branches, the primary branch entering the casing adjacent said end of the casing, the secondary branch entering the side of the casing and being extended longitudinally of the casing, said extended portion being carried outwardly through the side wall of the casing, and being positioned to discharge into the opening in the side wall of the casing, and to draw air into the opening, there being an opening in that portion of the secondary branch which extends longitudinally of the casing.

2. The combination with a furnace having a smoke flue, of a casing extended across the front of the furnace and comprising primary and secondary parts, the primary part being of greater diameter than the secondary part; a pipe leading from the secondary part of the casing into the furnace; a smoke pipe leading from the flue through the side wall of the primary part of the casing, adjacent one end wall of the casing; a steam pipe having primary and secondary branches, the primary branch entering said end wall of the casing and being terminally provided with a reducing nozzle, located within the secondary part of the casing, the secondary branch being extended through the side wall of the secondary part of the casing and being prolonged to extend longitudinally of the secondary part of the casing, said secondary branch being carried outwardly through the side wall of the secondary part of the casing, there being a funnel in the side wall of the secondary part of the casing, into which the secondary branch of the steam pipe discharges, to create an air suction; there being an opening in that portion of the secondary branch which is extended longitudinally of the secondary part of the casing.

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

CHARLES E. PATRICK.

Witnesses:
L. A. SMYRES,
H. R. MILLER.