(No Model.)

W. VOGEL.

SMOKE CONSUMER.

No. 310,156. Patented Dec. 30, 1884.

Fig. 1.

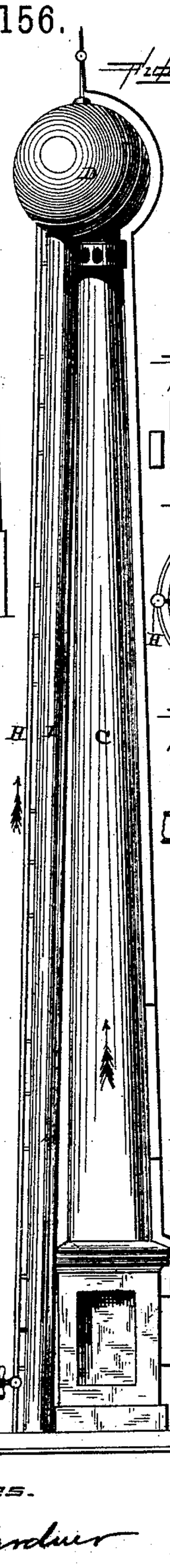


Fig. 2.

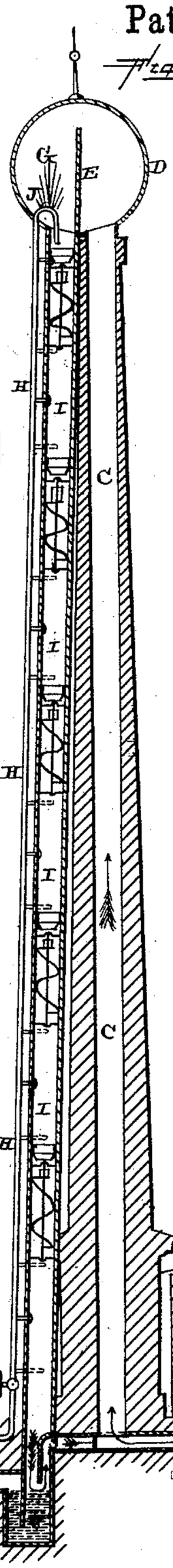


Fig. 5.

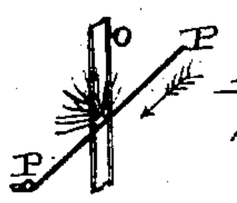


Fig. 4.

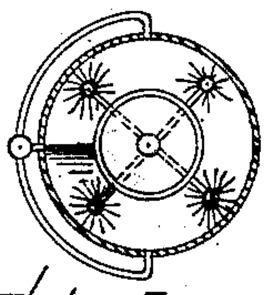


Fig. 3.

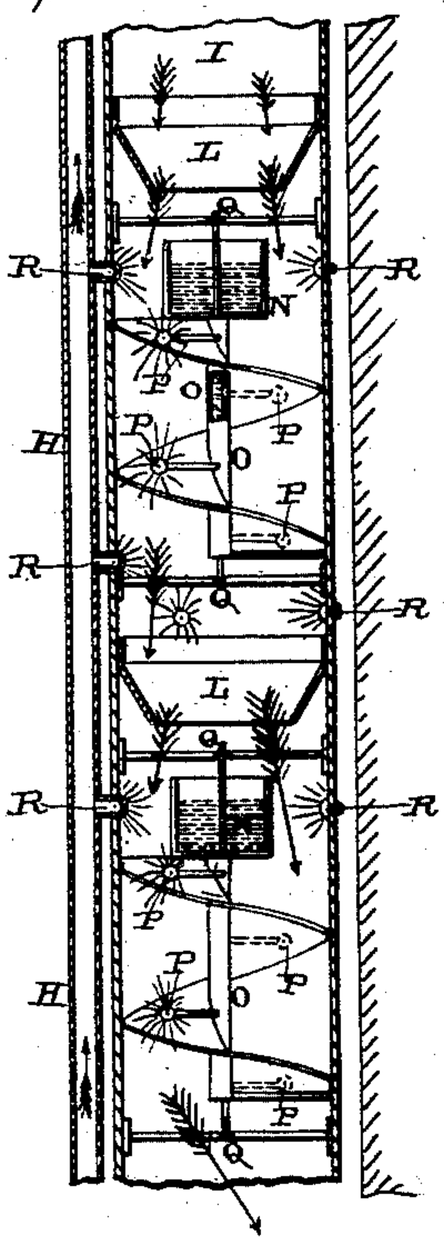


Fig. 9.

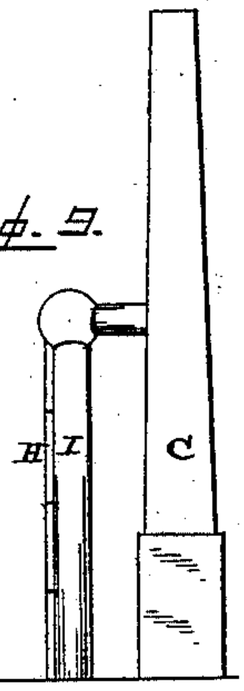


Fig. 6.

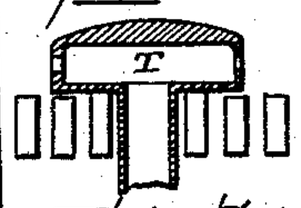


Fig. 7.

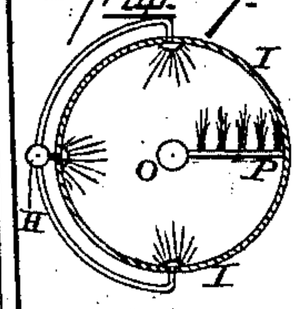


Fig. 8.

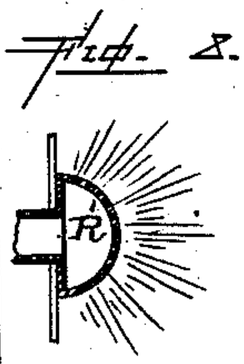
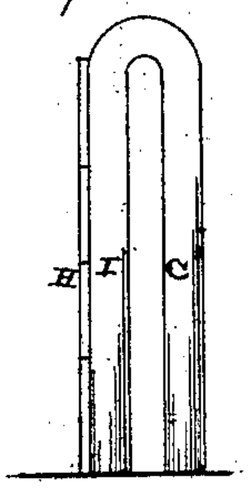
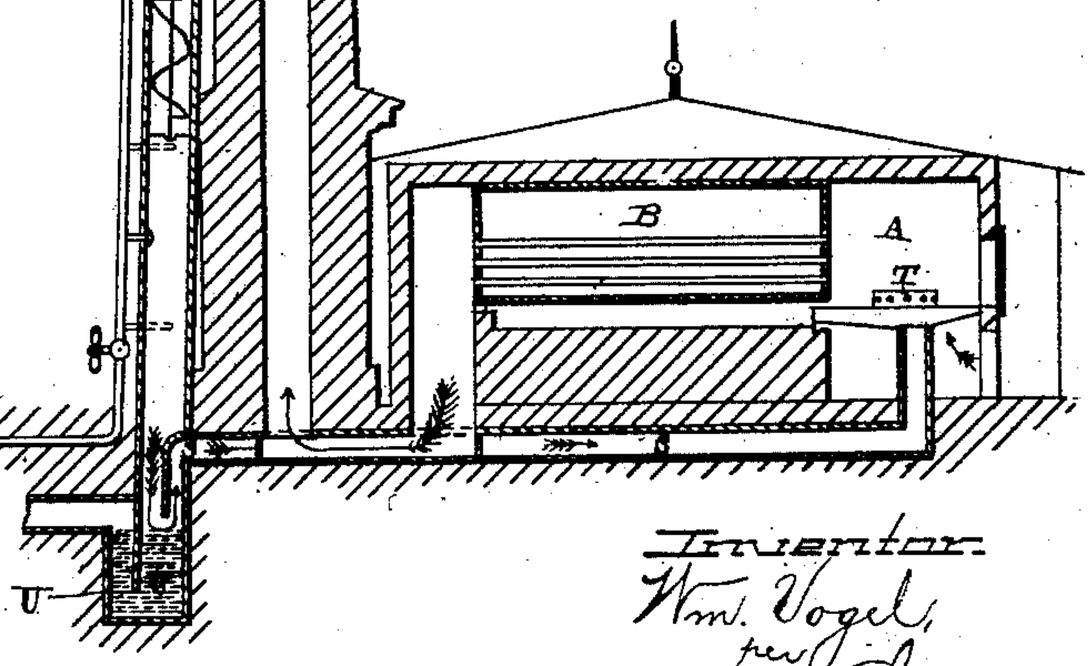


Fig. 10.





Witnesses.

L. F. Gardner

A. L. Pattison

Inventor.

Wm. Vogel,

per

F. A. Lehmann, Atty.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM VOGEL, OF CHICAGO, ILLINOIS.

SMOKE-CONSUMER.

SPECIFICATION forming part of Letters Patent No. 310,156, dated December 30, 1884.

Application filed May 31, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM VOGEL, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Smoke-Consumers; 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in smoke-consumers; and it consists in the combination of a chimney or stack with the pipe down through which the products of combustion are made to pass, and in which pipe are placed suitable water-jets for the purpose of cooling and condensing the smoke, after which the smoke is passed through the burner into the furnace, where it is consumed, as will be more fully described hereinafter.

The object of my invention is to cool the products of combustion after they have passed through the chimney or stack, and then pass them directly back to the fire, where all the waste gases are consumed as fuel, without any smoke being allowed to escape into the air.

Figure 1 represents a side elevation of a chimney or stack to which my invention is applied. Fig. 2 is a vertical section of the same. Fig. 3 is an enlarged detail view of the pipe through which the products of combustion are made to pass, and showing the water-jets and other devices used for acting upon the products of combustion. Figs. 4, 5, 6, 7, and 8 are details of construction. Figs. 9 and 10 show different forms of chimneys or stacks to which my invention is applied.

A represents an ordinary furnace in connection with a steam-boiler, B, and C is the chimney or stack, which is connected with the furnace, and through which the products of combustion ascend in the usual manner. Upon the top of this chimney or stack is formed a chamber, D, which may either be of the form here shown or any other that may be preferred, and in which is placed a partition, E. This partition divides this chamber into two parts, the one, G, of which is the chamber in which the products of combustion receive their first cooling.

For the purpose of cooling the smoke a water-pipe, H, which is connected to the water-main or any other suitable source of supply, is made to extend upward to any desired height along either the chimney C or the pipe I, through which the products of combustion are made to pass on their way back to the furnace. The chimney C and pipe I need not necessarily be much over twenty feet, so that the pressure from the water-main will readily supply all the water that is necessary to condense the smoke. From this pipe H, at its upper end, is forced a jet of fine spray at J, which, meeting the heated products of combustion as they pass into the chamber G, cools them and causes them to descend from their own gravity. The water which is discharged from the jet J falls back into the pipe I and is conducted by means of the funnel L into a chamber, reservoir, or receptacle, N, which is secured to and made to revolve with the screw-shaft O. The screw-shaft O is made hollow, and projecting out from it over the blade of the screw are suitable small jets, P, from which the water is freely discharged, as shown in Fig. 7. This water serves to cool the products of combustion still more, and the back action from the water, not only from these jets P, but from the weight of the water which falls upon the screw, causes it to revolve freely around in its bearings at Q. Also, extending from the water-pipe H are suitable pipes, R, from which extend suitable jets, R′, which discharge water into the pipe I in the form of fine spray. The whole interior of the pipe being filled at certain points with fine spray, all of the products of combustion become thoroughly dampened and cooled in their passage through the pipe. There will be any number of revolving screws and water-tanks, N, and any suitable number of jets arranged one above the other, as shown. After the products of combustion pass beyond this revolving screw or screws, which serve to cause downward drafts in the pipe I, they pass through the pipe S to the burner T, which is arranged upon the top of the grate-bars, as shown in Figs. 1 and 6, from whence the gases pass directly into the fire in the furnace. The gases escaping directly into the fire form so much addition to the fuel. All the fresh air which is necessary

to perfect combustion passes through the grate-bars in the usual manner. After the products of combustion leave the furnace they are returned to the furnace again for consumption, but none of them escape into the air at any point.

By means of a smoke-consumer constructed as here shown and described the air never becomes vitiated with smoke or soot, and a great saving is made in the consumption of fuel. The water which is used in cooling the products of combustion being taken directly from the water-main, no power of any kind is necessary in operating devices of any kind. As soon as the fire is lighted the water is turned on and the operation of the furnace begins at once, and it is not necessary to allow smoke to escape until steam has been raised for the purpose of driving a motor. It is not necessary that the pipe I should extend up the full height of the chimney or stack, as shown in Fig. 9.

In case it is desired to apply my invention to one of the tall stacks or chimneys already in use, it will only be necessary to attach the pipe I and the water-pipes connected to this pipe to the side of the stack, and then close the top of the stack, so as to prevent the escape of the products of combustion at this point.

In Fig. 10 is shown another form of my invention, where the chimney or stack C and the pipe I are formed together. The two may be either cast together or in sections and put up as shown. The smoke after reaching the bottom of the pipe I is prevented from escaping with the water by means of a water-seal, U.

Having thus described my invention, I claim—

The combination of the stack, the pipe I, and the water-pipe H with the water-tanks N and hollow screw-shafts, substantially as set forth.

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

WILLIAM VOGEL.

Witnesses:
F. A. LEHMANN,
A. S. PATTISON.