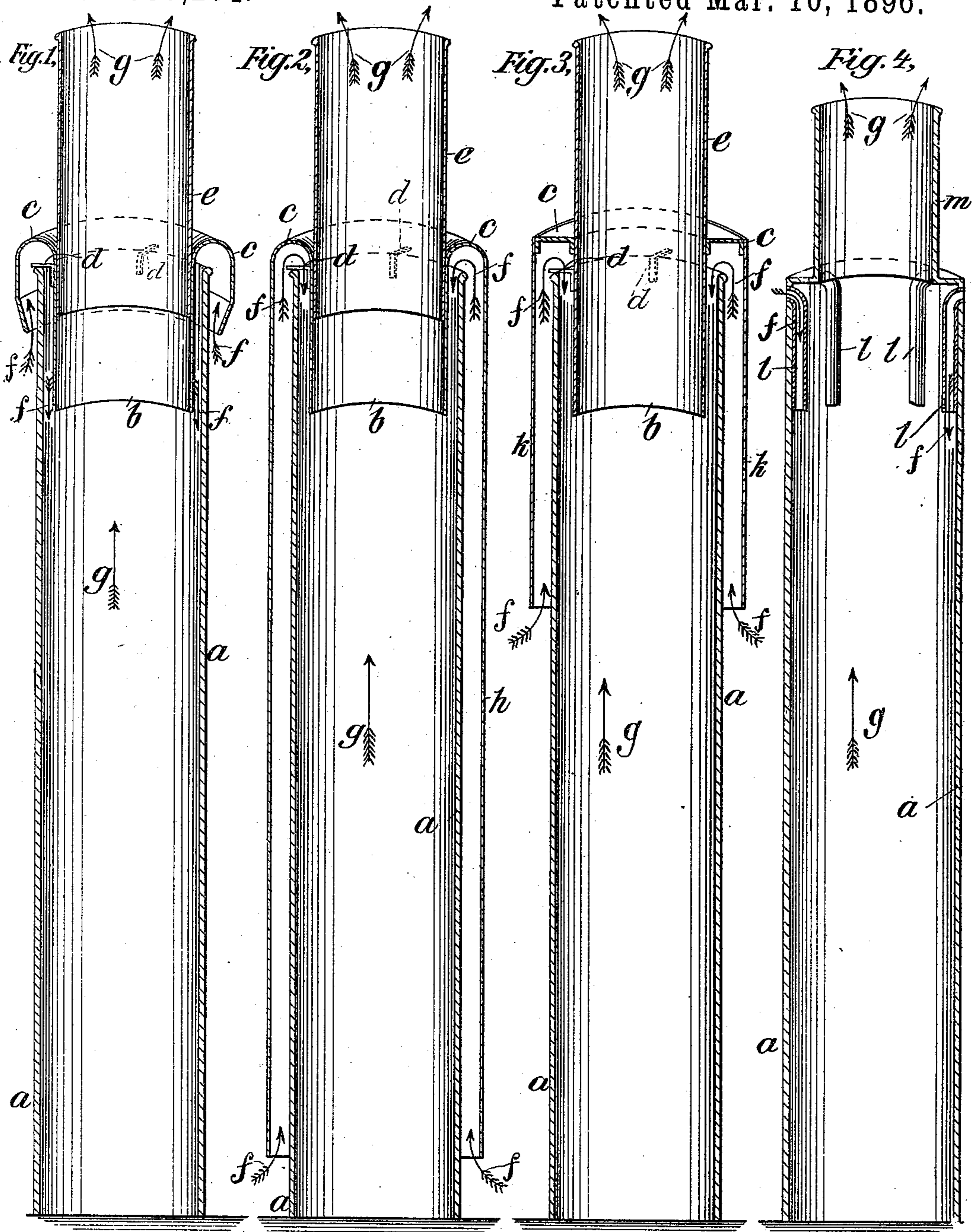


(No Model.)

P. J. SCHLICHT.
APPARATUS FOR PRODUCING COMBUSTION.

No. 556,284.

Patented Mar. 10, 1896.



WITNESSES:

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APPARATUS FOR PRODUCING COMBUSTION.

SPECIFICATION forming part of Letters Patent No. 556,284, dated March 10, 1896.

Application filed January 14, 1896. Serial No. 575,488. (No model.)

To all whom it may concern:

Be it known that I, PAUL J. SCHLICHT, a citizen of the United States, residing at Summit, in the county of Union and State of New Jersey, have invented a new and useful Improvement in Apparatus for Producing Combustion, of which the following is a full, clear, and exact specification, reference being had to the accompanying drawings, which form a part hereof.

My invention relates to means for carrying out the improved method of producing combustion described in my earlier application, Serial No. 523,782, and its object is to provide an efficient and economical apparatus for introducing the air or other supporter of combustion into the chimney or stack and directing it toward the place of combustion so as to cause it to flow thereto in contact with the hot products of combustion escaping therefrom, and for regulating the outgoing current of combustion products and thereby the incoming current of air.

My invention consists broadly in the combination, with a chimney or stack or other flue through which the products of combustion escape, of means for causing a current of air or other suitable supporter of combustion to move downward within said chimney or stack to the place of combustion, so as to come in contact with the hot products of combustion escaping through said chimney or stack, and of a chimney or stack extender adapted to lengthen the passage through which the products of combustion flow, whereby the movement of the current of combustion products is accelerated and the movement of the inflowing current of air correspondingly affected.

My invention also consists in the combination, with the elements already named, of a wind-guard to protect the inflowing current of air.

My invention also consists in the combination, with the deflector or means for introducing the air into the chimney or stack, and the chimney or stack extender, of a heating duct or passage adapted to receive heat from the combustion products within the chimney or stack and to deliver heated air to the deflector or means for introducing the air into the chimney or stack.

My invention also consists in the combination, with the deflector or means for introducing the air into the chimney or stack, and the chimney or stack extender, of a chimney or stack protector adapted to protect the chimney or stack from the external atmosphere and at the same time to deliver heated air to the deflector or means for introducing the air into the chimney or stack.

My invention also consists in certain other features of construction and combinations of parts hereinafter described and claimed.

My invention is fully shown in the accompanying drawings, in which—

Figure 1 is a perspective sectional view of a stack-extender combined with a deflector and wind-guard. Fig. 2 is a similar view of a stack-extender combined with a deflector, wind-guard, and stack-protector. Fig. 3 shows a similar combination to that of Fig. 2, except that the wind-guard and stack-protector are somewhat different in construction; and Fig. 4 is a perspective sectional view of a stack-extender combined with several deflectors.

In Fig. 1, *a* is an ordinary annular stack. *b* is a deflector. It is annular in shape, thus conforming to the shape of the stack, but is smaller in size than the latter, as a result of which there is a space or passage between the deflector and the stack for the admission of air. The length of the deflector may be varied according to the distance which the deflector is to extend into the stack, but in every case the deflector is made to extend only a part of the distance toward the place of combustion, so that the air is brought into contact with the hot products of combustion escaping through the stack. The size of the passage between the deflector and the stack can be varied according to circumstances. Generally it will not do to reduce the outlet for the combustion products to less than half the area of the stack. In most cases the area of such outlet should be much greater than the area of the air-passage. *c* is a wind-guard connected with the upper end of the deflector. It is preferably formed by bending the end of the deflector over so as to form a flange. This flange is annular in shape and extends over the top of the stack and down the outside thereof far enough to prevent the wind

from blowing directly down into the passage between the deflector and the stack, and thus to protect or guard the air-current in such passage from the force or violence of the external gusts or currents of air. The lower end of this flange may be bent in toward the stack, as shown, in order to more completely protect the entering air-current. *d d* are supporting devices adapted to rest on the top of the stack. Any suitable form of supporting devices may be employed. *e* is a chimney or stack extender, which in the form shown is connected with the upper end of the deflector. It consists of a tube, preferably conforming to the shape of the chimney or stack, and so connected with the chimney or stack or with the deflector as to lengthen the passage through which the products of combustion flow. It may be greatly varied in shape from the stack. For example, an extender consisting of a square tube may be used with a round stack, or vice versa. The diameter or size of the extender should be proportioned to that of the chimney or stack so that it will provide an ample passage for the escape of the combustion products. The extender rises above the deflector, and forms a flue or passage for the combustion products above the point where the air-current is initiated by the deflector.

The operation is as follows: The current of air enters the passage between the wind-guard and the stack in the direction indicated by the arrows *ff* and flows through the same and over the top edge of the stack, and is directed and guided downward by the deflector *b*. The initial portion of the air-current which is thus caused to move downward in the stack is separated from the products of combustion by the deflector. At the lower end of the deflector the air-current comes in contact with the hot products of combustion escaping through the stack in the direction indicated by the arrows *gg*. The air continues to flow downward and passes to the place of combustion while the combustion products continue to flow in the other direction, passing through the inner flue or channel formed by the deflector and then through the extender and escaping at the top thereof. The two currents, one of air and the other of hot products, are in contact below the deflector, the air thereby absorbing heat from the products, and the two currents or columns being mutually affected and regulated, as fully explained in my earlier application, Serial No. 523,782. The two currents are further regulated and controlled by the stack-extender. This lengthens the flue or duct through which the combustion products flow, and thereby accelerates their rate of flow, or, as it might be termed, "improves the draft." By reason of the interdependence of the currents of air and combustion products the increase in the rate of flow of the latter produces a corresponding increase in the rate of flow of the former. This variation in speed is secured

without affecting the length of contact between the two currents, so that the two currents are made to flow more rapidly without increasing the extent of hot surface to which the air is subjected. It is sometimes desirable to vary the rate of flow without varying the extent of contact, and this is accomplished by my improvement. In the construction shown in Fig. 1 the current of air is in the general form of an annular column surrounding or encircling the hot stream of combustion products. There is, consequently, an extended contact between the descending air and the ascending products, which secures the highest efficiency in the production and regulation of combustion.

In Fig. 2, *a* is an ordinary annular stack. *b* is a deflector similar in shape to that shown in Fig. 1. *c* is a wind-guard connected with the upper end of the deflector, being similar to the wind-guard shown in Fig. 1, except that its outer end is not bent in toward the stack. *d d* are supporting devices adapted to rest on the top of the stack. *e* is a chimney or stack extender similar to that shown in Fig. 1. *h* is an air-heating device consisting of a stack-protector, which serves both to protect the stack from the external atmosphere and at the same time to cause the feed-air to be heated on its way to the deflector *b*. This stack-protector is a continuation of the wind-guard *c*. It consists of a tube of larger dimensions than the stack surrounding the latter, so as to form an air-passage between it and the stack. The size of this air-passage may be varied according to circumstances, and will naturally be regulated with reference to the size of the air-passage between the deflector *b* and the stack. The protector *h* is preferably made of asbestos or some other suitable material which is a good non-conductor of heat and cold, as a result of which the heat on the inside of the protector will not pass through the same and be lost or dissipated, and such low temperatures as may prevail on the outside will not affect the temperature within. *ff* are arrows indicating the direction of the entering current of air. *gg* are arrows indicating the direction of the current of combustion products. The operation of this form of my invention is the same as that already explained in connection with the form shown in Fig. 1, except that the air enters at the lower end of the duct or passage between the stack *a* and the protector *h* in the direction indicated by the arrows *ff*, and rises through that passage until it comes in contact with the deflector *b* and is directed and guided in a downward direction so as to come in contact with the hot products of combustion escaping through the chimney or stack. While the air is flowing between the protector and the stack it is raised in temperature by the heat which is given off from the outer surface of the stack, so that when it reaches the deflector *b* it is already heated to some extent.

The protector *h* prevents the external at-

mosphere or the external currents of air from coming into contact with the chimney or stack, and thus prevents the chimney or stack from being exposed to low temperatures, which would result in robbing it of its heat.

In this form of apparatus the stack-extender serves to increase the length of the flue or duct through which the combustion products flow, and thereby to accelerate their rate of flow without changing the area of contact between the combustion products and the inflowing air. At the same time the stack-protector enables the entering current of air to more thoroughly absorb or utilize the heat given off from the combustion products without changing in any way the extent of contact.

In Fig. 3, *a* is an ordinary annular stack. *b* is a deflector. *c* is a wind-guard. *d d* are supporting devices adapted to rest upon the top of the stack. *e* is a stack or chimney extender. *k* is a chimney or stack protector. *f f* are arrows indicating the direction of the entering current of air, and *g g* are arrows indicating the direction of the escaping current of combustion products. This apparatus is like that shown in Fig. 2, except that the wind-guard is slightly different in shape and the stack-protector extends only a part of the length of the stack.

In Fig. 4, *a* is an ordinary annular stack. *l l* are deflectors, which consist of pipes projecting into the stack. *m* is a chimney or stack extender. *f f* are arrows indicating the direction of the inflowing current of air. *g g* are arrows indicating the direction of the outflowing current of combustion products. In this form of my invention the air enters the stack through the pipes *l l* and passes downward toward the place of combustion, so as to come in contact with the current of combustion products, as already fully explained. The combustion products flow upward through the stack and escape through the extender *m*.

In Fig. 2 of the drawings I have shown my preferred form of apparatus. It will be apparent, however, that the different parts or elements may be greatly varied in shape and construction. It will also be apparent that the form and character of the stack or chimney or flue can be varied in any manner desired. Thus the stack may be square or rectangular or polygonal, or may be of brick instead of metal. The shape of the various elements could be correspondingly varied.

The different parts of the apparatus can be made of any suitable material. Any other suitable supporter of combustion may be used instead of air.

My invention increases the efficiency of the apparatus and improves its operation.

I do not herein claim the deflector, wind-guard, or stack-protector separately from the stack-extender, and I do not claim herein the deflector, wind-guard, stack-protector, and stack-extender, or any of them, as a separate article of manufacture, as I have included

such claims in my other applications, Serial Nos. 523,782, 575,485, 575,486, and 575,489.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a chimney or stack of means for causing a current of air to move downward within said chimney or stack in contact with the products of combustion, and a chimney or stack extender adapted to lengthen the passage through which the products of combustion flow, substantially as set forth.

2. The combination with a chimney or stack, of means for initiating a downwardly-moving current of air within said chimney or stack in contact with the products of combustion, and a chimney or stack extender adapted to lengthen the passage through which the products of combustion flow, substantially as set forth.

3. The combination with a chimney or stack, of means for initiating a downwardly-moving current of air within said chimney or stack in contact with the products of combustion, and a tube adapted to lengthen the passage through which the products of combustion flow, substantially as set forth.

4. The combination with a chimney or stack, of a deflector for initiating a downwardly-moving current of air therein so that it will flow downward in contact with the products of combustion, a wind-guard to protect said current from the wind, and a chimney or stack extender, substantially as set forth.

5. The combination with a chimney or stack, of a deflector for initiating a downwardly-moving current of air therein so that it will flow downward in contact with the products of combustion, a duct or passage adapted to receive heat from the combustion products within the chimney or stack and to deliver heated air to the deflector, a wind-guard to protect said current from the wind, and a chimney or stack extender, substantially as set forth.

6. The combination with a chimney or stack, of a deflector for initiating a downwardly-moving current of air therein so that it will flow downward in contact with the products of combustion, a duct or passage adapted to receive heat from the combustion products within the chimney or stack and to deliver heated air to the deflector, and a chimney or stack extender, substantially as set forth.

7. The combination with a chimney or stack, of a deflector for initiating a downwardly-moving current of air therein so that it will flow downward in contact with the products of combustion, a chimney or stack protector adapted to protect the chimney or stack from the external atmosphere and to deliver heated air to the deflector, and a chimney or stack extender, substantially as set forth.

8. The combination with a chimney or
stack of a deflector for initiating a down-
wardly-moving current of air therein so that
it will flow downward in contact with the
5 products of combustion, a chimney or stack
protector adapted to protect the chimney or
stack from the external atmosphere and to
deliver heated air to the deflector, a wind-
guard to protect said current from the wind,
10 and a chimney or stack extender, substan-
tially as set forth.

9. The combination with a chimney or
stack of the deflector *b*, and the chimney or
stack extender *e*, substantially as set forth.

15 10. The combination with a chimney or
stack of the deflector *b*, the chimney or stack

extender *e*, and the wind-guard *c*, substan-
tially as set forth.

11. The combination with a chimney or
stack, of the deflector *b*, the chimney or stack 20
extender *e*, the wind-guard *c*, and the chim-
ney or stack protector *h*, substantially as set
forth.

12. The combination with a chimney or
stack, of the deflector *b*, the chimney or stack 25
extender *e*, and the chimney or stack pro-
tector *h*, substantially as set forth.

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Witnesses:

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