

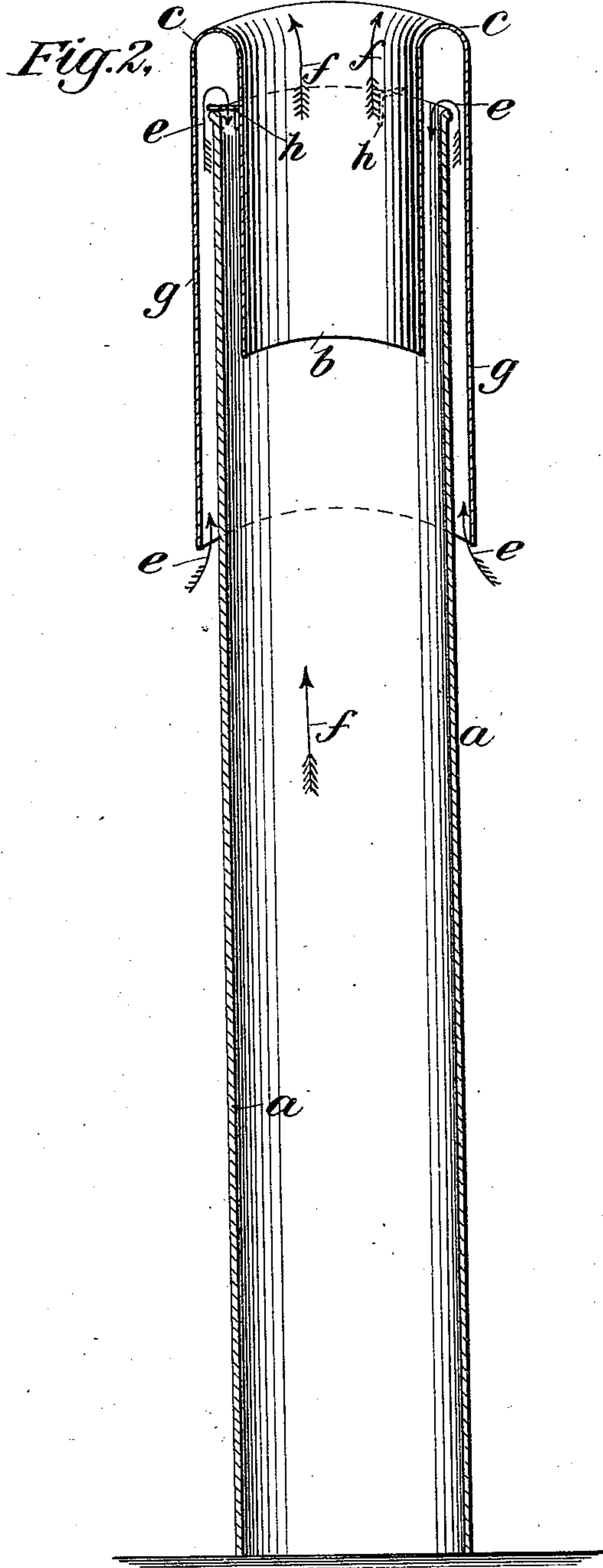
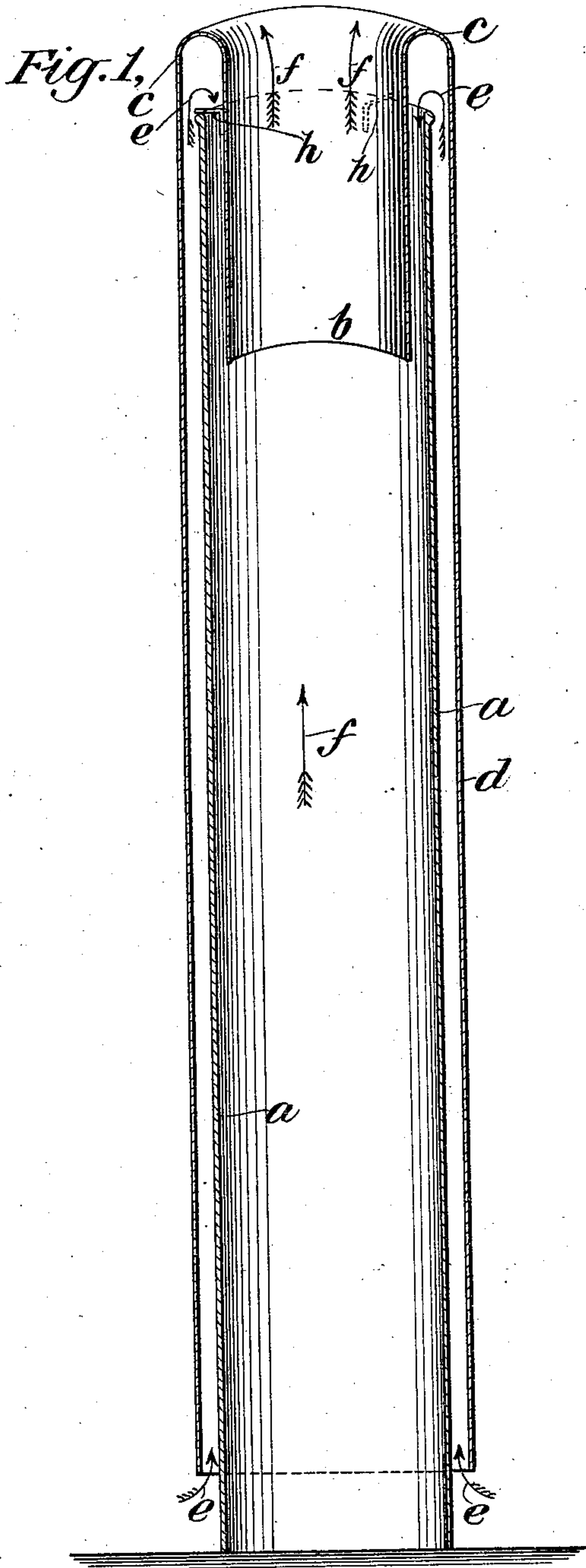
(No Model.)

2 Sheets—Sheet 1.

P. J. SCHLICHT.
APPARATUS FOR PRODUCING COMBUSTION.

No. 556,282.

Patented Mar. 10, 1896.



WITNESSES:

Edwin Segar.
Sidney Mann.

INVENTOR

Paul J. Schlicht,
BY
Witter Kenyon,
ATTORNEYS.

(No Model.)

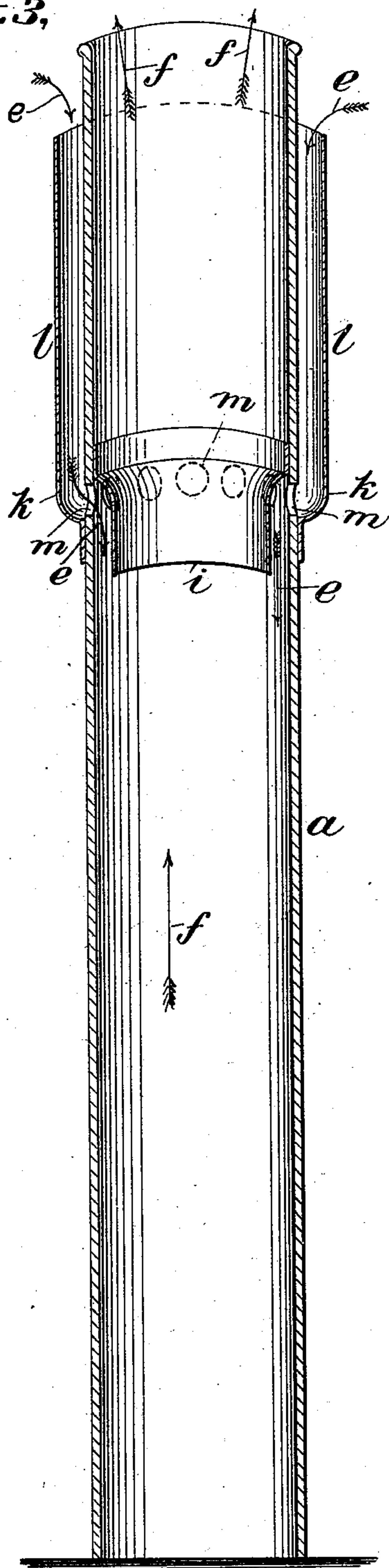
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Fig. 3,



WITNESSES:

Edmund Seger
Edmund Seger

INVENTOR

Paul J. Schlicht
BY
Witter Meryon
ATTORNEYS.

UNITED STATES PATENT OFFICE.

PAUL J. SCHLICHT, OF SUMMIT, NEW JERSEY, ASSIGNOR TO EDMUND FRANCIS ELDREDGE, OF NEW YORK, N. Y.

APPARATUS FOR PRODUCING COMBUSTION.

SPECIFICATION forming part of Letters Patent No. 556,282, dated March 10, 1896.

Application filed January 14, 1896. Serial No. 575,486. (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 supplying or feeding air to the deflector or other means employed for introducing air into the chimney or stack and directing it toward the place of combustion, and heating the said air while it is being so supplied or fed to the deflector or other means.

Another object of the invention is to protect the chimney or stack from the external atmosphere or wind and thereby to prevent the waste or loss of heat by radiation from the exterior of the chimney or stack or by having heat-units carried away from the exterior of said chimney or stack by currents 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 to move downward within said chimney or stack in contact with the products of combustion, and an air-heating device or duct adapted to receive heat from or be heated by the combustion products within the chimney or stack and to deliver heated air to said means, whereby some of the heat which is given off from the products of combustion escaping through the chimney or stack, and which would otherwise be wasted, is utilized in heating the air while it is passing to the deflector or other means for introducing it into the chimney or stack.

My invention also consists in the combination, with a chimney or stack or other flue through which the products of combustion escape, of means for initiating a downwardly-moving current of air within said chimney or stack, so that it will flow downward in contact with the products of combustion, and a stack-

protector adapted to protect the stack from the wind or the external atmosphere and at the same time to cause the air to be heated while it is passing to the deflector or other means for introducing it into the chimney or stack, whereby the stack is protected from exposure to the lower temperature of the external atmosphere and whatever heat is given off from the exterior of the chimney or stack is prevented from being lost or wasted, and is utilized in heating the feed-air while it is passing to the deflector or other similar means for properly initiating it into the chimney or stack.

My invention also consists in inclosing the stack throughout substantially its entire length with such a protector, whereby the stack is completely shielded and protected, and at the same time an extended air-passage is formed between the protector and the stack which is adapted to heat the air on its way to the deflector at the top of the stack.

My invention also consists in making the stack-protector out of some material which is a non-conductor of heat and cold, such as asbestos or wood fiber, whereby the loss of heat through the wall of the stack-protector is absolutely prevented, and the heat given off from the outer surface of the stack or chimney is entirely absorbed by the inflowing current of air.

My invention also consists in combining with the other elements above named a wind-guard adapted to protect the air-current from the wind.

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 one form of my improvement. Fig. 2 is a perspective sectional view of another form of my improvement, and Fig. 3 is a perspective sectional view of still another form.

Similar letters indicate similar parts in different figures.

In Fig. 1, *a* represents 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 guard or protect the air-current in such passage from the force or violence of the external gusts or currents of air. *d* 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, in the form shown in Fig. 1, a continuation of the 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 the circumstances, and will naturally be regulated with reference to the size of the air-passage between the deflector *b* and the stack.

In the best form of my invention the protector *d* is 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.

h h are supporting-devices for holding the deflector in place on the stack. Any other suitable form of supporting devices may be employed.

The operation of my apparatus is as follows: The hot products of combustion escape up through the chimney or stack in the direction indicated by the arrows *f f*. The air enters the lower end of the duct or passage between the stack *a* and the protector *d* in the direction indicated by the arrows *e*, and rises through that passage and flows over the top of the stack, and is guided by the deflector *b* in a downward direction until it comes in contact with the hot products of combustion escaping through the chimney or stack. The air continues to flow downward and passes

to the place of combustion while the combustion products continue to flow in the other direction, the two being in contact, and the air thereby absorbing heat from the combustion products and the two currents or columns being mutually affected and regulated, as fully explained in my earlier application, Serial No. 523,782, above referred to.

With many forms of chimneys or stacks the wall of the stack will become heated and a certain amount of heat will be given off from its exterior surface. Ordinarily this heat is carried off by the external currents of air and is lost. In my improvement this heat is taken up or absorbed by the inflowing current of air, and the air is thereby raised in temperature, so that when the air reaches the deflector *b* it is already heated to some extent. This heating is accomplished by utilizing heat that would otherwise be wasted. My improvement therefore increases the economy of the apparatus. The protector *d* prevents the external atmosphere 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. This also secures a saving of heat, and hence of fuel. When the protector is made of non-conducting material, its operation is greatly improved.

In Fig. 2, *a* is an ordinary annular stack. *b* is a deflector. *c* is a wind-guard. *g* is a stack-protector. In this form of my improvement the protector *g* extends only a part of the length of the stack. *e e* are arrows indicating the direction of the inflowing current of air. *f f* are arrows indicating the direction of the current of combustion products. *h h* are supporting devices for holding the deflector in place on the stack. Any other suitable form of supporting devices may be used for this purpose.

As already stated in connection with the description of Fig. 1, I prefer to make the stack-protector *g* of asbestos or some other suitable substance which is a non-conductor of heat.

The operation of this form of my invention is substantially the same as already explained, except that the stack-protector *g* does not protect the entire stack but only the upper part thereof. The current of air enters the lower end of the passage between the stack and the stack-protector, as indicated by the arrows, rises through that passage, flows over the top of the stack and is directed and guided downward by the deflector *b*. At the lower end of the deflector the air comes into contact with the hot combustion products, the air continuing to flow downward to the place of combustion, while the combustion products continue to flow in the opposite direction. While the air is rising through the passage between the stack and the stack-protector it is raised in temperature by the heat given off from the stack, as already explained.

Referring to Fig. 3, *a* is the stack. *i* is the deflector. *k* is the wind-guard. *l* is the stack-protector. *m m* are openings or holes in the wall of the stack connecting the passage between the stack-protector and the stack with the interior of the stack. *e e* are arrows indicating the direction of the inflowing current of air. *f f* are arrows indicating the direction of the current of combustion products.

The stack-protector is in this construction also an extension of the wind-guard. The wind-guard and stack-protector are supported in place by a flange bolted or otherwise fastened to the exterior of the stack. The deflector *i* is held in place by a similar flange fastened to the interior of the wall of the stack.

As stated in connection with the other figures, I prefer to make the stack-protector *l* of asbestos or some other suitable substance which is a non-conductor of heat.

The operation of this form of my invention is substantially the same as that already described, except that the current of air enters at the upper end of the passage between the stack and the stack-protector and flows downward therein and passes into the stack through the openings *m m* and is directed and guided downward by the deflector *i*, so as to flow downward in contact with the products of combustion.

In Fig. 1 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 different elements could be correspondingly varied.

The different parts of the apparatus can be made of any suitable material.

Any suitable supporter of combustion may be used instead of air.

My improved apparatus secures great economy by the conservation and utilization of the heat passing through the wall of the stack and given off from the exterior thereof.

I do not herein claim the deflector or wind-guard separately from the stack-protector, and I do not herein claim the deflector wind-guard and stack-protector 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, 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 an air-heating device adapted to receive heat from the combustion products within the chimney or stack and to deliver heated air to said means, 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 an air-heating device adapted to receive heat from the combustion products within the chimney or stack and to deliver heated air to said means, substantially as set forth.

3. 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 an air duct or passage adapted to receive heat from the combustion products within the chimney or stack and to deliver heated air to said means, substantially as set forth.

4. 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 an air duct or passage adapted to receive heat from the combustion products within the chimney or stack and to deliver heated air to said means, substantially as set forth.

5. The combination with a chimney or stack of means for initiating a downwardly-moving current of air within said chimney or stack, so that it will flow downward in contact with the products of combustion, and an air-heating device consisting of a chimney or stack protector adapted to protect the chimney or stack from the external atmosphere and to deliver heated air to said means, substantially as set forth.

6. The combination with a chimney or stack of means for initiating a downwardly-moving current of air within said chimney or stack, so that it will flow downward in contact with the products of combustion, and an air-heating device consisting of a chimney or stack protector made of non-conducting material adapted to protect the chimney or stack from the external atmosphere and to deliver heated air to said means, substantially as set forth.

7. The combination with a chimney or stack of means for initiating a downwardly-moving current of air within said chimney or stack, so that it will flow downward in contact with the products of combustion, and an air-heating device consisting of a chimney or stack protector inclosing the chimney or stack throughout substantially its entire length and forming an air-passage between it and the chimney or stack and adapted to protect the chimney or stack from the external atmosphere and to deliver heated air to said means, substantially as set forth.

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

9. The combination with a chimney or stack of means for initiating a downwardly-moving current of air within said chimney or stack, so that it will flow downward in contact with
5 the products of combustion, and an air-heating device consisting of a chimney or stack protector adapted to protect the chimney or stack from the external atmosphere and to deliver heated air to the said means, and a
10 wind-guard adapted to protect said current from the wind, substantially as set forth.

10. The combination with a chimney or stack of means for initiating a downwardly-moving current of air within said chimney or
15 stack, so that it will flow downward in contact with the products of combustion, and an air-heating device consisting of a chimney or stack protector inclosing the chimney or stack throughout substantially its entire length and
20 forming an air-passage between it and the

chimney or stack and adapted to protect the chimney or stack from the external atmosphere and to deliver heated air to said means, and a wind-guard adapted to protect said current from the wind, substantially as set forth. 25

11. The combination with a chimney or stack of the deflector *b*, and the stack-protector *d*, substantially as set forth.

12. The combination with a chimney or stack, of the deflector *b*, the stack-protector *d*, and the wind-guard *c*, substantially as set forth. 30

13. The combination with a chimney or stack, of the deflector *b*, the stack-protector *d*, made of non-conducting material, and the
wind-guard *c*, substantially as set forth. 35

PAUL J. SCHLICHT.

Witnesses:

E. FRANCIS ELDREDGE,
EDWIN SEGER.