

(No Model.)

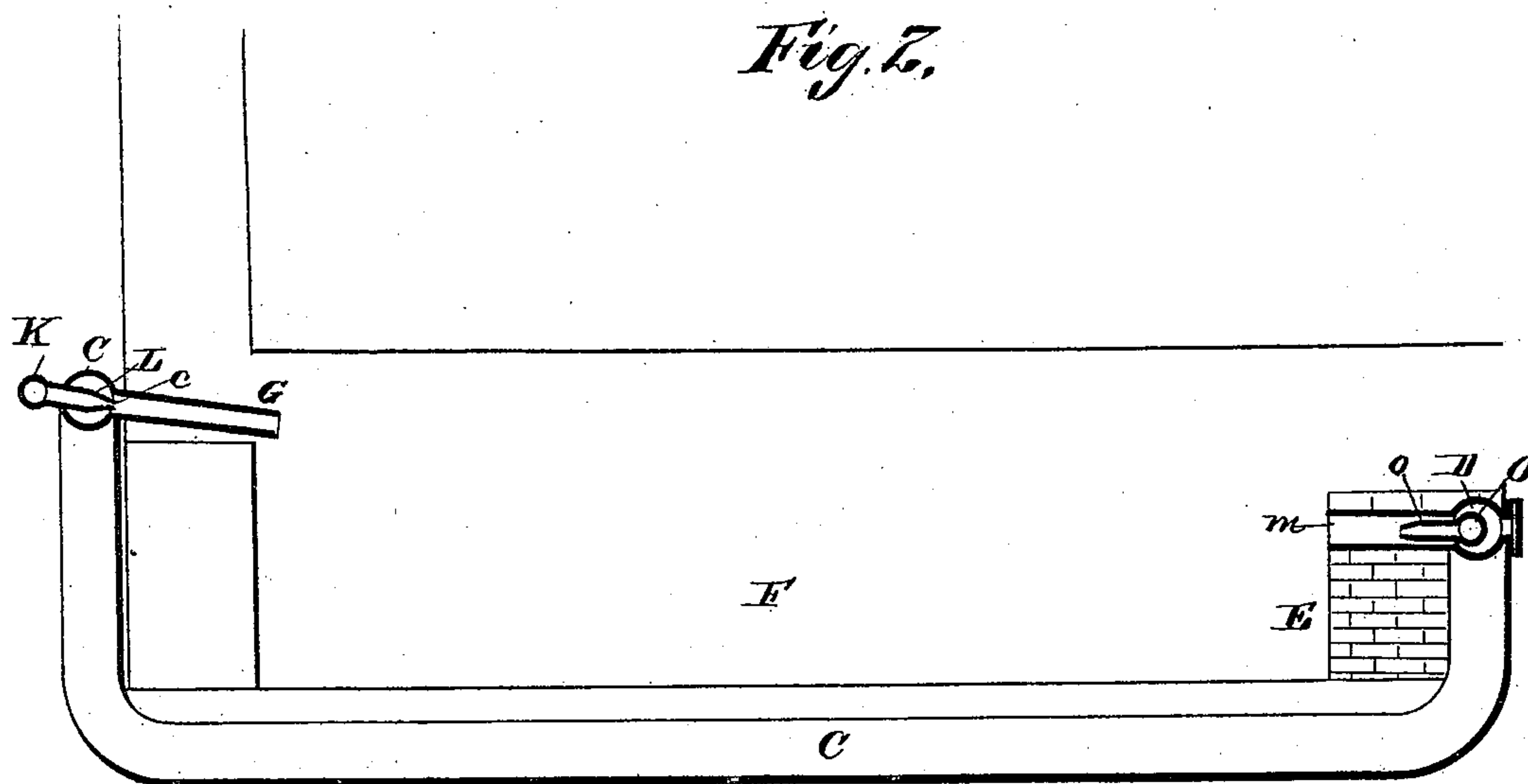
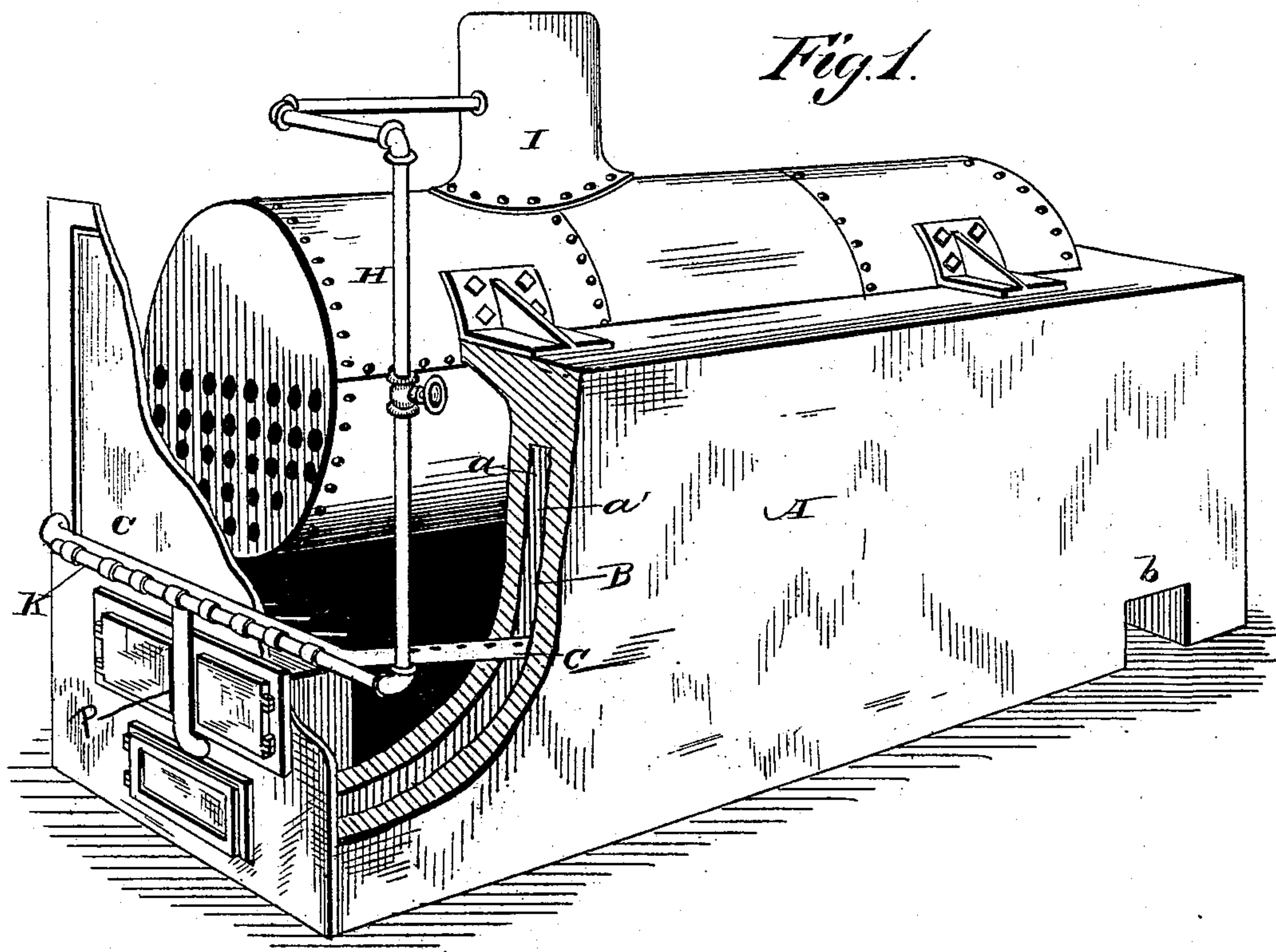
2 Sheets—Sheet 1.

A. F. BUSCHICK & M. VAN ALLEN.

Smoke Consuming Furnace.

No. 238,759.

Patented March 15, 1881.



WITNESSES

E. C. Nottingham

A. L. Lawrence

INVENTORS

A. F. Buschick

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2 Sheets—Sheet 2.

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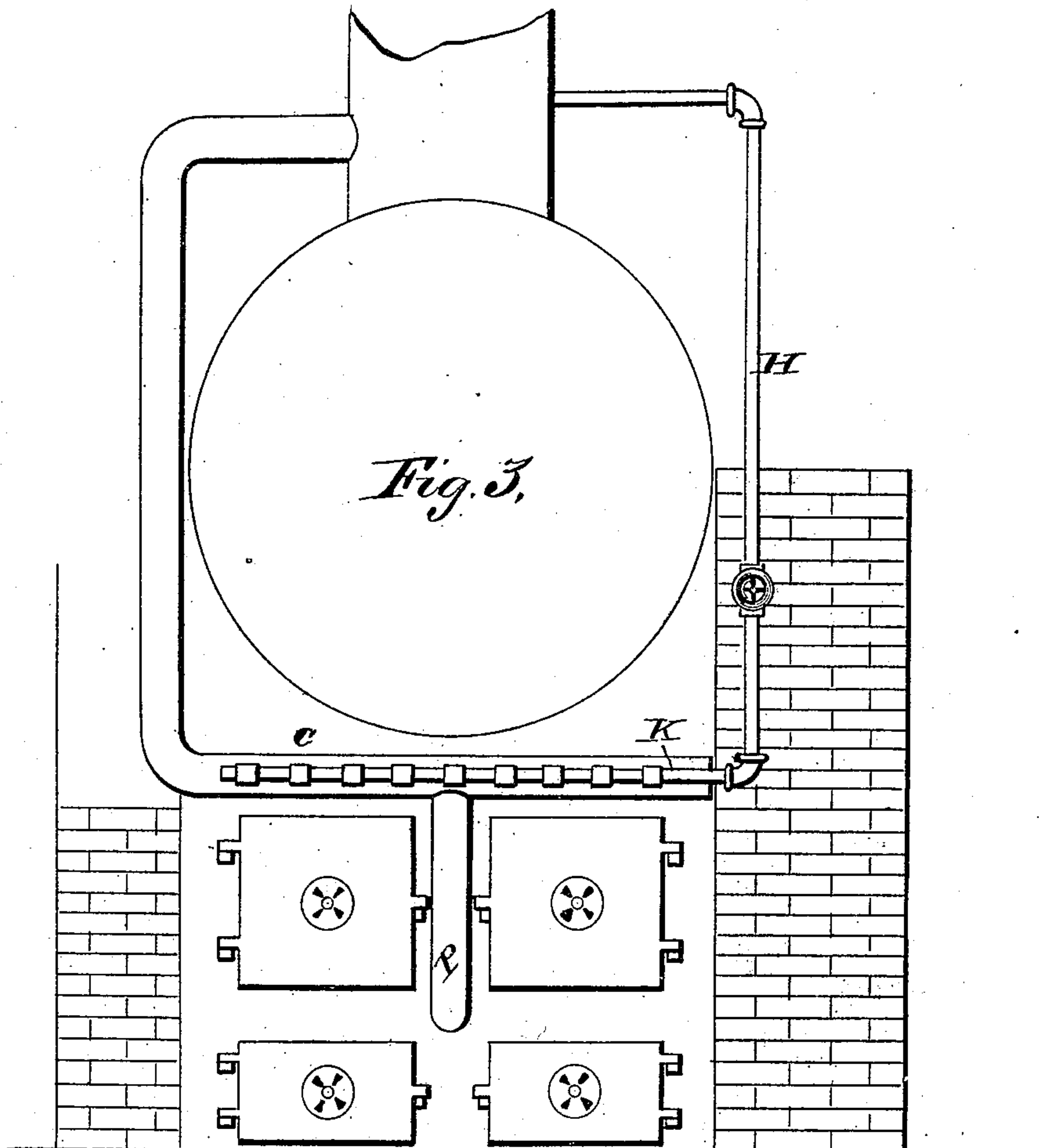
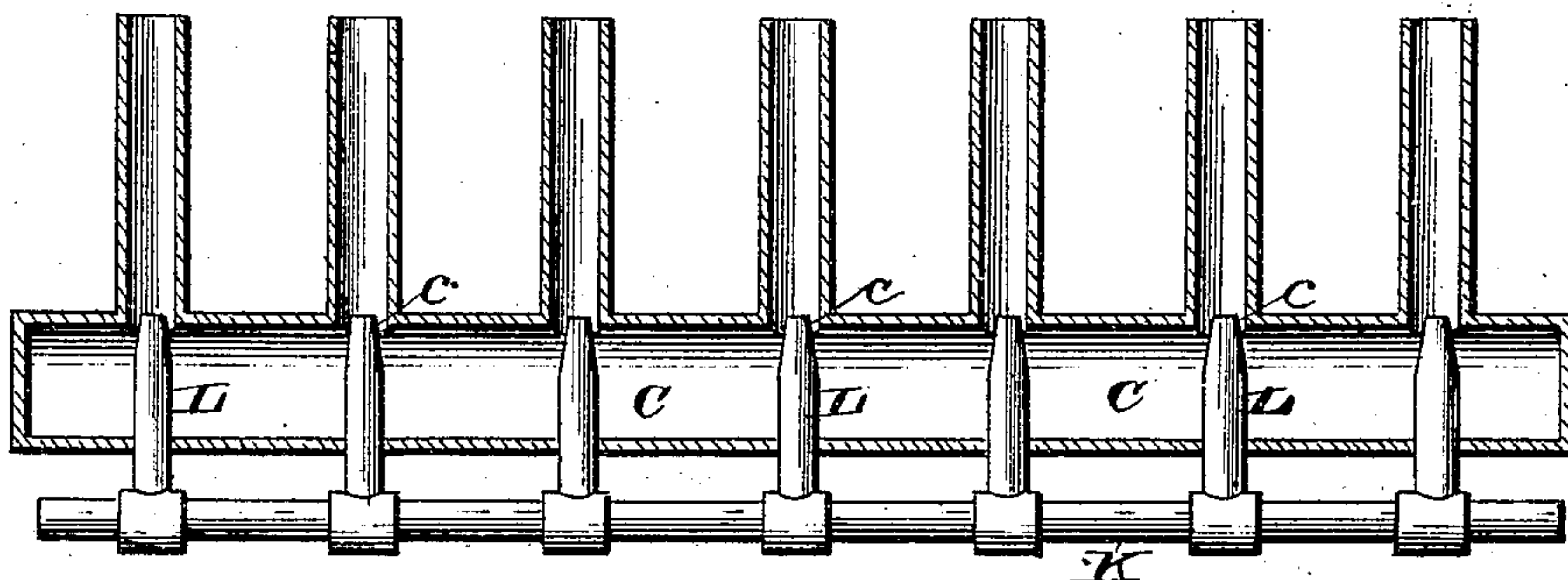


Fig. 4.



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UNITED STATES PATENT OFFICE.

AUGUSTUS F. BUSCHICK AND MARTIN VAN ALLEN, OF CHICAGO, ILLINOIS.

SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 238,759, dated March 15, 1881.

Application filed December 4, 1880. (No model.)

To all whom it may concern:

Be it known that we, A. F. BUSCHICK and M. VAN ALLEN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Smoke-Consuming Furnaces; and we 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.

Our invention relates to an improvement in smoke-consuming furnaces, the object being to provide a furnace with attachments for supplying heated air and steam to the fire-box in small jets, and at such points as will serve to insure a perfect combustion of the fuel and combustible gases liberated therefrom; and to this end our invention consists in a combined air and steam feeding apparatus for furnaces, embodying certain details of construction and combinations of parts, as will hereinafter be described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view, in perspective, of a furnace, having a portion of its walls broken away to illustrate our improvement. Fig. 2 is a longitudinal section of the same. Fig. 3 is a front-end elevation of the same. Fig. 4 is a horizontal section through the air and steam supply pipes, the steam-pipe being located inside or outside of the air-pipes, and the steam-jets extending into the same.

A represents a furnace formed with an intervening hot-air space, B, between its walls *a a'*. Outer air enters the space B through openings *b* (one or more) communicating with the outer air. C is an air-pipe extending from the opposite ends of the air-cylinder D in the bridge-wall E along the sides of the fire-box F, and above the line of the bed of fuel in the fire-box, and across the front of the latter. Air-cylinder D is provided with suitable air-openings, to allow the warm or heated air from the air-spaces B on opposite sides of the fire-box to flow into the air-supply pipes.

G are air-jet pipes, (any desired number being employed,) which connect with the air-supply pipe C, and project into the fire-box at such an angle as to thoroughly commingle the air

with the flame or combustible gases in the fire-box.

H is a steam-pipe connecting with the steam-dome I of the boiler, and leading down to a branch steam-pipe, K, with which it is connected, said branch pipe K being located in close proximity to the air-pipe C, and provided with steam-jets L, which extend through the air-supply pipe C, and project slightly into the air-jet pipes G. The ends of the steam-jet pipes are formed conical or tapering, and thus there is formed around each steam-jet an annular air-passage, *c*, through which the air flows from the air-supply pipe C to its several jets. The supply of air may be easily regulated by varying the adjustment of the steam-pipe K, as the latter is adapted to be adjusted toward or from the air-supply pipe C, whereby the air-passages *c* are enlarged or restricted at will, and thus the admixture of air and steam may be regulated as desired. The sides of the fire-box may also be furnished with the air and steam jets, arranged and constructed as hereinbefore described, whereby steam and air are thoroughly intermingled and injected into the sides as well as the front of the fire-box.

In the bridge-wall E, or in rear thereof, is placed an air chamber or drum, D, having air-jets *m*. Within the air-cylinder is placed a steam-supply pipe, O, provided with conical steam-jets *o*, which register with the air-jets and introduce steam into said air-jets, thereby withdrawing the heated air from the air-cylinder into the air-jets, and therein commingling the air and steam, and forcing the admixture into the fire-box.

That portion of the air-supply pipe located in front of the fire-box is connected with the air-cylinder in the bridge-wall by a pipe, P, extending downwardly beneath the grate. The air in pipe P is thoroughly heated by the superposed bed of fuel, and thus serves to convey heated air to both the air-supply pipe and the air-cylinder.

If desired, an air-supply pipe may lead through the smoke-stack, to convey heated air to the supply-pipes in the furnace. It will thus be observed that the steam-jets serve to withdraw the heated air from the air-supply pipes into the air-jets, and therein thoroughly

commingle the air and steam and force such mixture in fine jets over any portion or every part of the bed of burning fuel.

If desired, the ends of the air-jets, instead
5 of being round, may be flattened to produce a fan-shaped jet of combined air and steam. Thus it will be observed, from the foregoing description of our improved furnace attachment, that the proper amount of oxygen can
10 be readily supplied to the combustible gases arising from the burning fuel, and completely consume the free carbon, and thereby economize the fuel, and also prevent the escape of smoke or unconsumed products of combustion.
15 It is evident that slight changes in the construction and relative arrangement of parts may be resorted to without departing from the spirit of our invention, and hence we do not restrict ourselves to the exact construction
20 and arrangement of parts shown and described; but,

Having fully described our invention, what

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

1. In combination with a furnace fire-box, a
25 front air-pipe and a rear air pipe or chamber, a connection, C, between the same, and steam-jets O L, arranged to discharge through the air-jets *m* G of said air-pipe and air-chamber, substantially as set forth. 30

2. In combination with the furnace fire-box and the hollow wall surrounding the same, the pipe C, discharging into said fire-box and perforate, so as to communicate with the air within said hollow walls, substantially as set forth. 35

In testimony that we claim the foregoing we have hereunto set our hands and seals this 11th day of November, 1880.

AUGUSTUS F. BUSCHICK. [L. S.]
MARTIN VAN ALLEN. [L. S.]

Witnesses:

R. C. ELLIOTT,
GEO. K. CONELL.