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Patented Dec. 25, 1900.

C. H. BRYANT, A. C. ROESSLER, J. M. MITCHELL & G. T. AUGSPURG.  
SMOKE CONSUMING AND FUEL SAVING DEVICE.

(No Model.)

(Application filed July 6, 1900.)

FIG 1

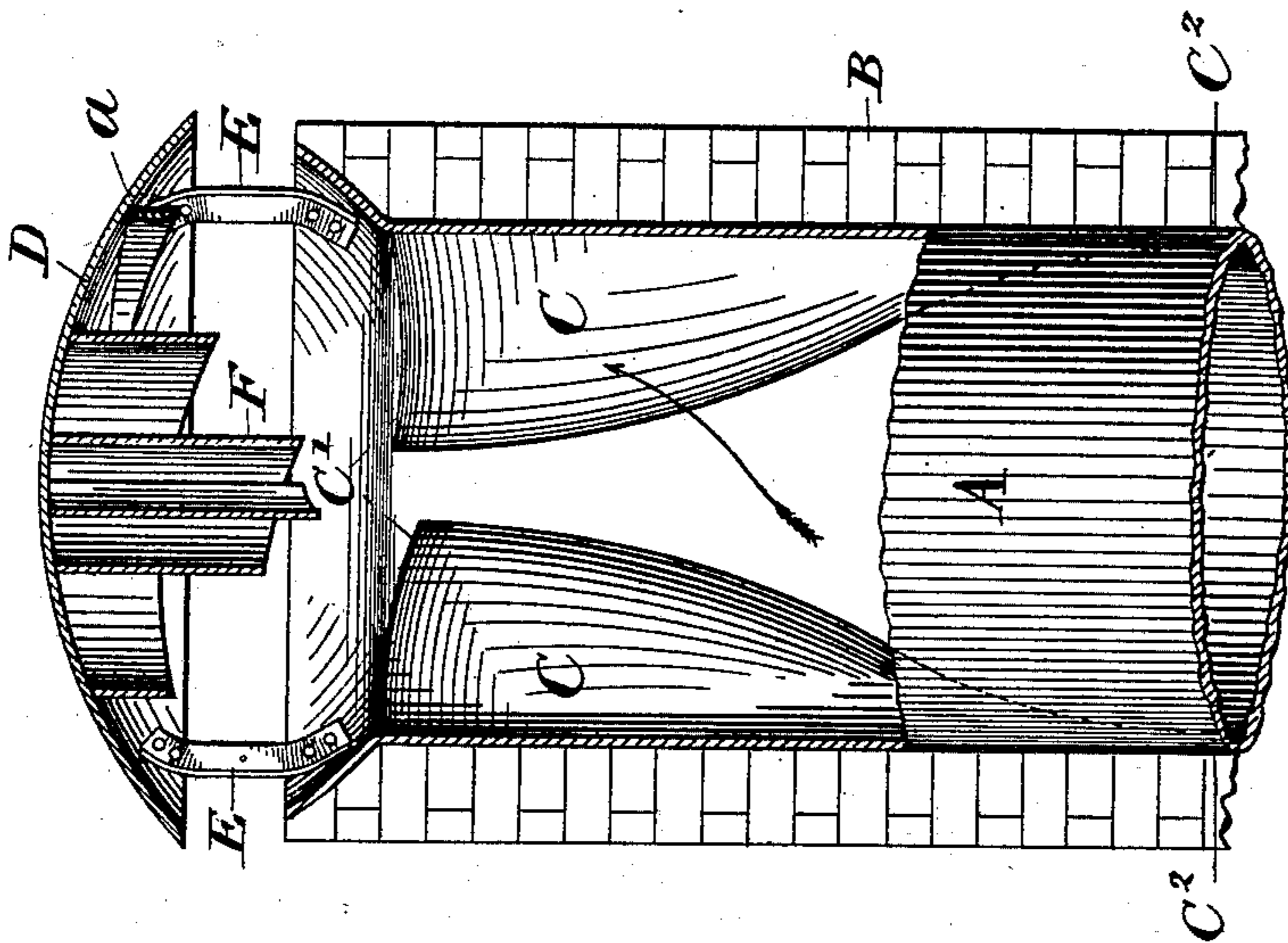
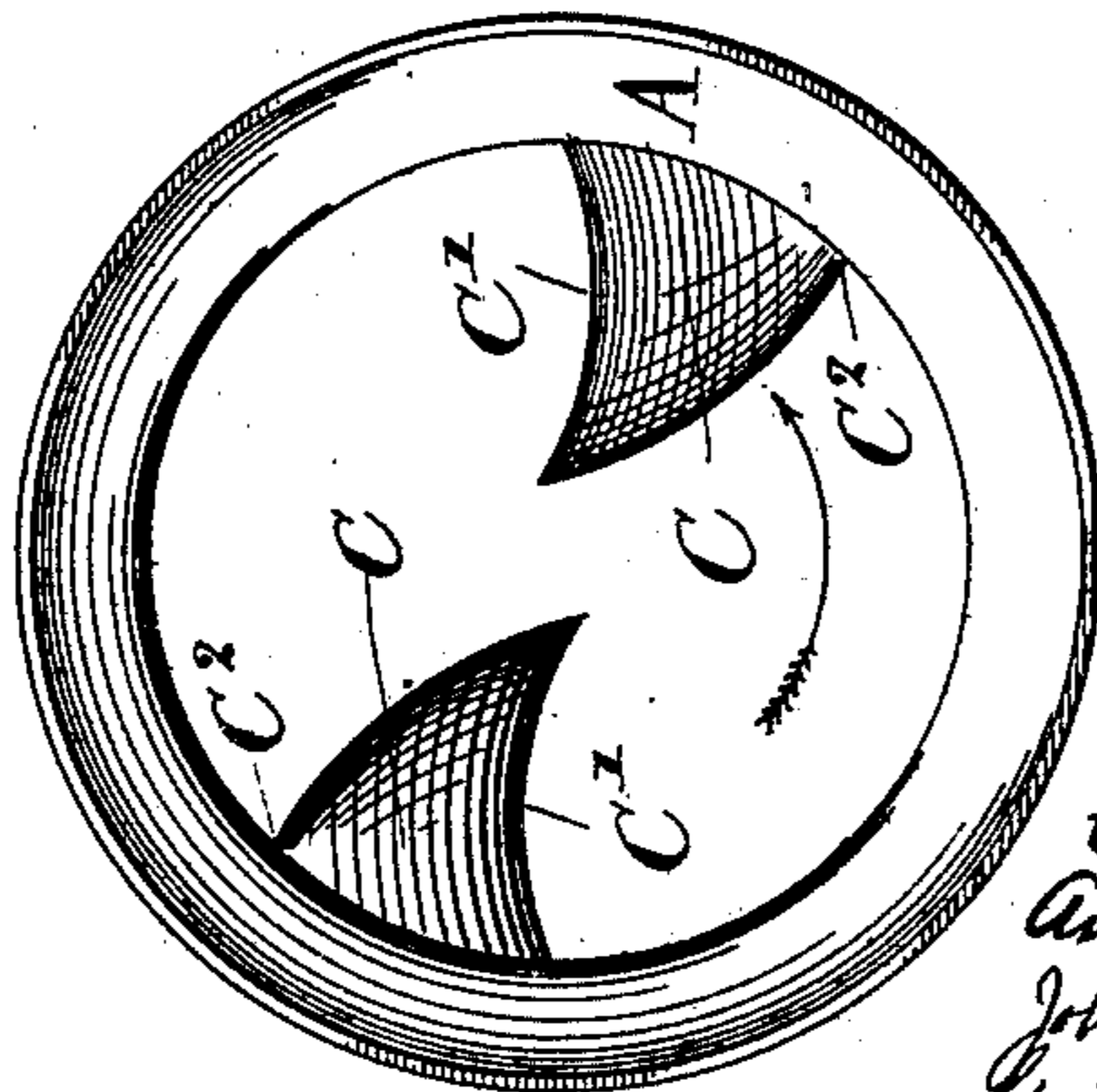


FIG 2



WITNESSES:

*Ella L. Giles*  
*Otto Munk*

INVENTORS.

*Charles Henry Bryant*  
*Amandus Charles Roessler*  
*John Mitchell Mitchell*  
*Guillermo Toribio Augspurg*

BY *Richard R.*

ATTORNEYS

# UNITED STATES PATENT OFFICE.

CHARLES HENRY BRYANT, AMANDUS CHARLES ROESSLER, JOHN MITCHELL MITCHELL, AND GUILLERMO TORIBIO AUGSPURG, OF LONDON, ENGLAND.

## SMOKE-CONSUMING AND FUEL-SAVING DEVICE.

SPECIFICATION forming part of Letters Patent No. 664,381, dated December 25, 1900.

Application filed July 6, 1900. Serial No. 22,738. (No model.)

*To all whom it may concern:*

Be it known that we, CHARLES HENRY BRYANT, residing at Woodroffe House, The Mall, Chiswick, London, S. W., AMANDUS CHARLES ROESSLER, residing at 189 Earlsfield road, Wandsworth, London, S. W., JOHN MITCHELL MITCHELL, residing at Monument Square Chambers, Monument Square, London, E. C., and GUILLERMO TORIBIO AUGSPURG, residing at 48 Bessborough street, Westminster, London, S. W., England, subjects of Her Majesty the Queen of Great Britain, have invented certain new and useful Improvements in Smoke - Consuming and Fuel-Saving Devices, (for which we have applied for Letters Patent in Great Britain, No. 8,265, dated May 4, 1900,) of which the following is a specification.

Our invention relates to a new or improved device or apparatus for attachment to, within, or upon the uptake-shafts, chimneys, or funnels of all kinds of furnaces, domestic or otherwise, but more especially those of marine and other boilers, as a means for improving the updraft of such shafts or chimneys and consuming the smoke or gases formed by imperfect combustion and passing there-through, thus effecting a material saving in the fuel necessary for maintaining the said furnace, while obviating the annoyance usually experienced of emitted smoke.

Our invention consists in building or otherwise placing and fixing within the upper end of such an uptake shaft or chimney two or more suitably - disposed metallic or other vanes or smoke-guides so placed and arranged as to impart to the rising smoke or product of imperfect combustion a twisting or spiral motion in one direction and to exercise thereon a certain degree of centrifugal force, so that the smoke is thereby caused to hug the wall of the shaft and reach the top thereof in the form of a hollow cylinder or tube. At a suitable distance above the top of the said shaft or chimney is mounted and fixed a preferably circular canopy concave upon its under surface, and in this concave portion is provided a graduated fixed convolute partition or partitions so arranged as to receive the issuing smoke in its outer convolution or convolutions and impart thereto a twisting

motion in a direction preferably, but not imperatively, opposite to that in which it leaves the shaft, and such twisting motion causes the smoke to be intimately mixed with a certain proportion of atmospheric air taken in between the top of the shaft and the said canopy, where a physical combination is created, the specific gravity of which is believed to be greater than that of the upcoming products of combustion or smoke, while the said twisting motion exercises a certain degree of centripetal force upon the mixture, the special formation of the convolution or convolutions within the said canopy also operating to twist the said mixture into the form of an inverted cone and impart thereto a thrust in a downward direction centrally of and within the partial vacuum formed in the upcoming smoke, and by reason of the supposed greater density of the said mixture, together with the centripetal force and downward thrust imparted thereto, the said mixture is caused to travel down the said shaft within the cylinder of upcoming smoke until it reaches the furnace, whereat perfect combustion of the mixture ensues.

In order that our said invention and the manner of its operation may be understood, we have hereunto appended a sheet of drawings in which we have chosen to illustrate our invention as self-contained and adapted for fixation within and upon the upper end of a smoke shaft or chimney; but we wish it understood that this is given merely to illustrate the principle of our invention and that such portion as is shown fixed within a cylinder adapted to be placed within the shaft or chimney may be built in or fixed directly to and within the shaft or chimney itself, if desired.

Figure 1 is a vertical part-sectional view of our said invention, while Fig. 2 is a top end view of same with the canopy removed, Fig. 3 being an under plan view of the said canopy.

In the method of construction illustrated by the drawings our invention consists of a metal or other cylinder A, adapted to fit within and rest upon the upper end of an uptake shaft or chimney B in connection with any form of furnace. Within the said cylinder A we place and fix two or more metallic, earthenware, or other vanes or guides C, these being each spi-

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rally formed, with the upper end C' of suitable breadth, from which it tapers in width to its lower end C<sup>2</sup>, whereat it may finish flush with the cylinder A, and these collectively  
5 impart a spiral motion to the upcoming smoke in the direction of the arrows in Figs. 1 and 2, the said vanes or guides also exercising a certain degree of centrifugal force upon the smoke, whereby it is pushed toward the wall  
10 of the chimney or shaft B, so that the smoke forms itself into a hollow cylinder, the center of which thereby becomes a partial vacuum.

The cylinder A is surmounted by a metallic or other canopy D, concave upon its under  
15 surface and attached to the said cylinder A or the shaft B by any convenient means—such, for instance, as that of ties E. Within the concave under surface of D is placed and fixed a metallic, earthenware, or other parti-  
20 tion F, of convolute formation, the outer end *a* of which is shallow and gradually increases in depth toward its innermost end *b*, the direction of the said convolution being such that as the smoke issues from the top of A  
25 (or B, as the case may be) and mixes, as stated, with the atmosphere entering between A and D a circular motion is imparted to the new mixture preferably, but not imperatively, in a direction opposite to that imparted to the  
30 smoke by the vanes or guides C, as indicated by the arrow in Fig. 3, and by reason of this the mixture is directed toward the center of the convolutions, and a centripetal force is thereby imparted thereto, while the increased  
35 width or depth of the convolutions at *b* operate to impart a downward thrust to the mixture, and this, acting in combination with the supposed greater specific gravity of the mixture, causes the latter to pass down the cen-  
40 ter of the chimney in the form of a narrow current with a force sufficient to carry it into the furnace, where perfect combustion of the mixture takes place, the heat given off from which operates for increasing the purposes  
45 for which the furnace is provided, thus effecting a material saving in fuel, while the after products of combustion would contain less unconsumed carbon, and consequently a lesser volume of smoke would be passing up  
50 the shaft.

In order that the convolute guide F in the canopy D may be in a position to present its initial end *a* to the direction of the wind, we may provide two or more such convolutions  
55 in D in such a way that their respective initial ends *a* may be disposed around and with-

in the outer edge of the canopy D, while all their inner ends may be arranged to finish at the point *b*. The vanes C may be arranged to extend any depth down the cylinder A or shaft B even to within a short distance of the furnace, if desired.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, 65 we declare that what we claim is—

1. In combination in a smoke-consuming device, two spirally-disposed vanes arranged within the chimney, a canopy surmounting the chimney flue with an air-space between, 70 said canopy being concaved upon its lower side and graduated convolute partitions fixed upon the lower side of the canopy, substantially as described.

2. In combination with the chimney, of 75 vanes within the same to cause the products of combustion to assume a hollow cylindrical form, a canopy surmounting the chimney and means carried thereby for arresting the ascending products of combustion and return- 80 ing them axially of the chimney, substantially as described.

3. In combination with the chimney, means within the chimney for giving to the smoke a rotary motion and a canopy surmounting the 85 chimney with a space between, said canopy having means to give the smoke a rotary motion in an opposite direction to that imparted by the means in the chimney, substantially as described. 90

4. In combination, the chimney and a canopy having convolutions, said canopy surmounting the chimney, substantially as described.

5. In combination, the chimney and a canopy having convolutions to give the smoke a rotary motion, said convolution being deeper at the center of the canopy, substantially as described. 95

6. In combination, the chimney and a canopy having convolutions to give the smoke a rotary motion inwardly and downwardly, substantially as described. 100

In witness whereof we have hereunto set our hands in presence of two witnesses.

CHARLES HENRY BRYANT.  
AMANDUS CHARLES ROESSLER.  
JOHN MITCHELL MITCHELL.  
GUILLERMO TORIBIO AUGSPURG.

Witnesses:

GEORGE THOMAS HYDE,  
HENRY CONRAD HEIDE.