

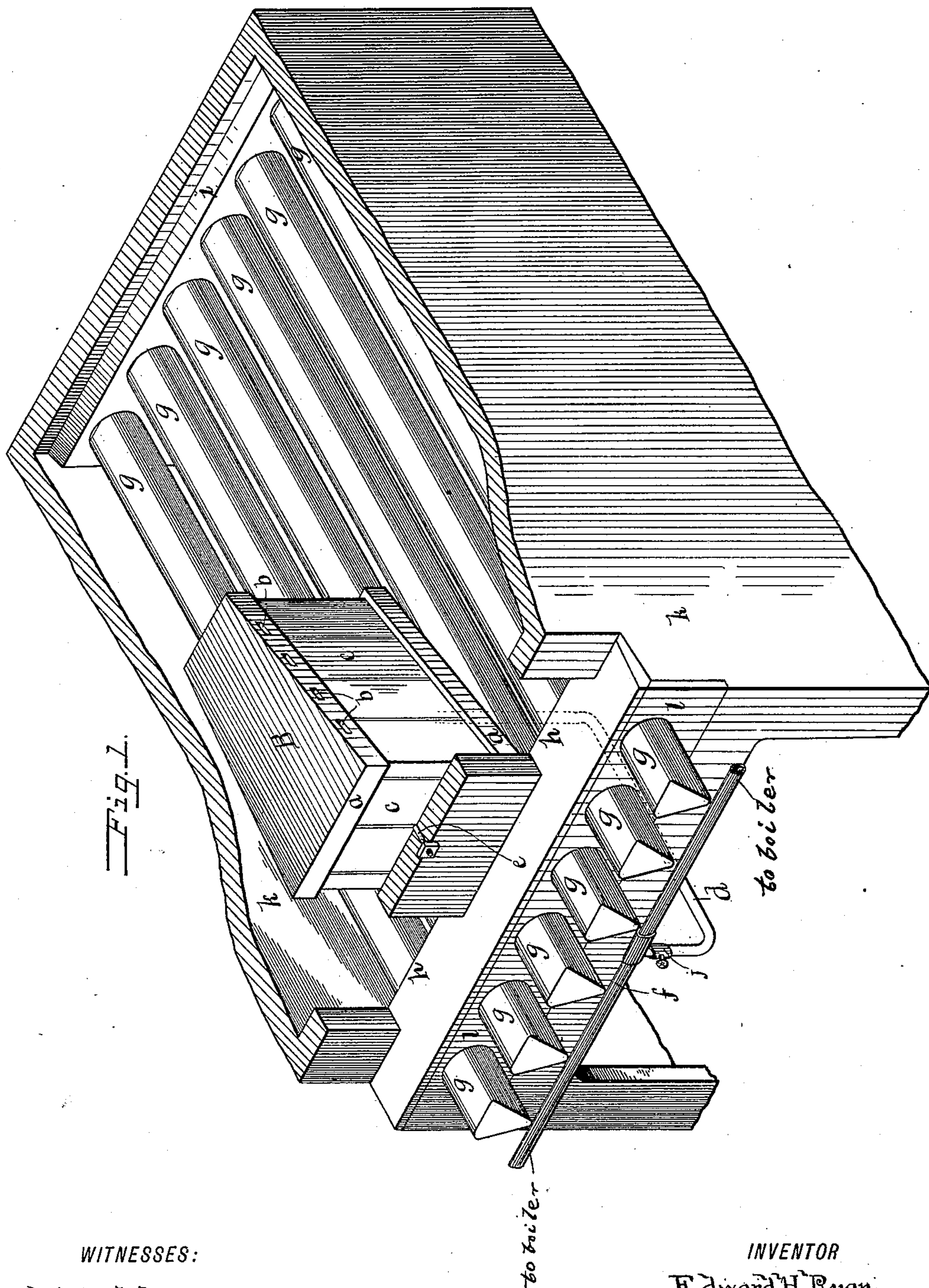
(No Model.)

2 Sheets—Sheet 1.

E. H. RYAN.
SMOKE CONSUMING ATTACHMENT.

No. 426,863.

Patented Apr. 29, 1890.



WITNESSES:

R. A. Balderson

P. G. Fischer

INVENTOR

Edward H. Ryan

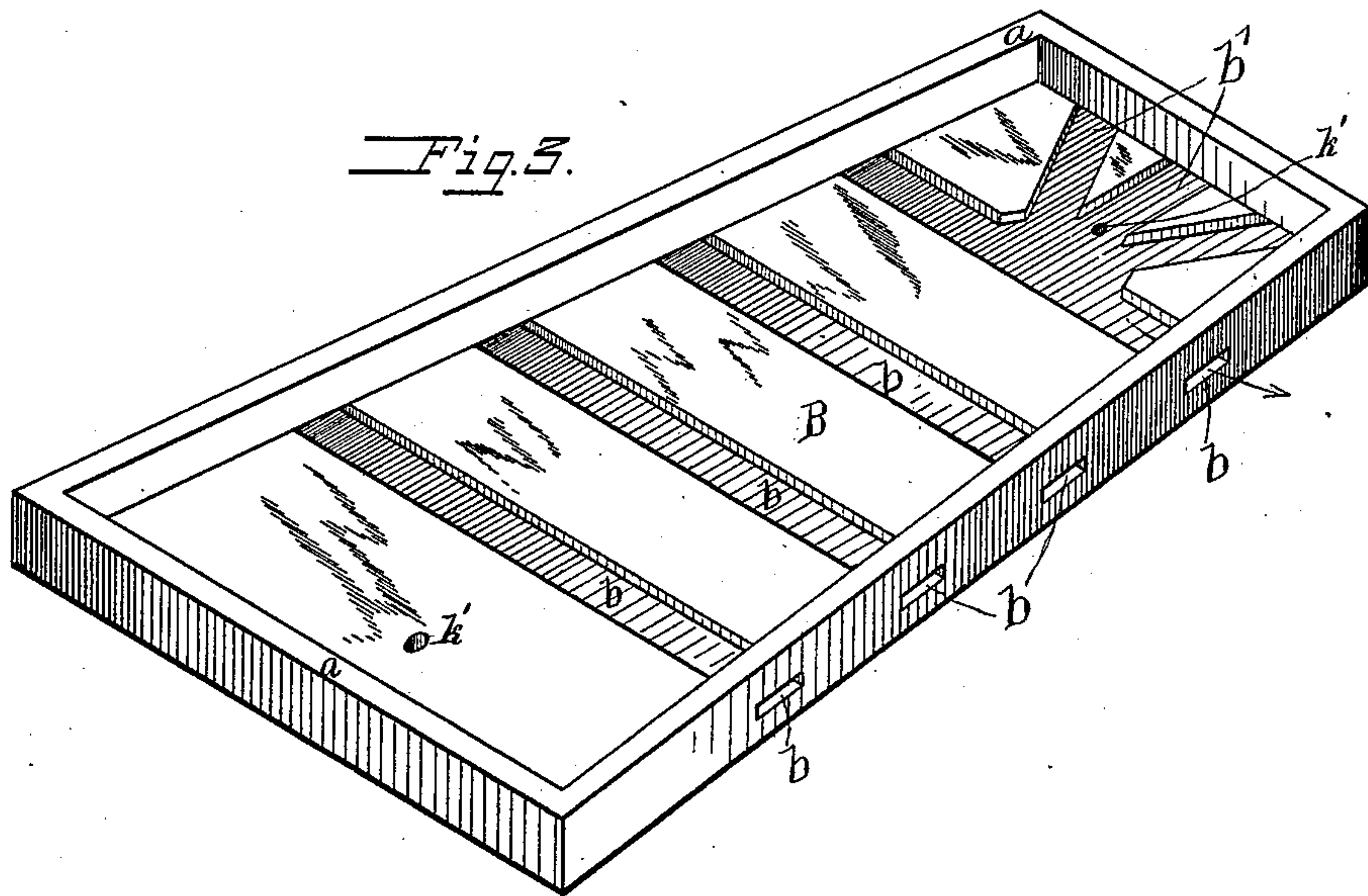
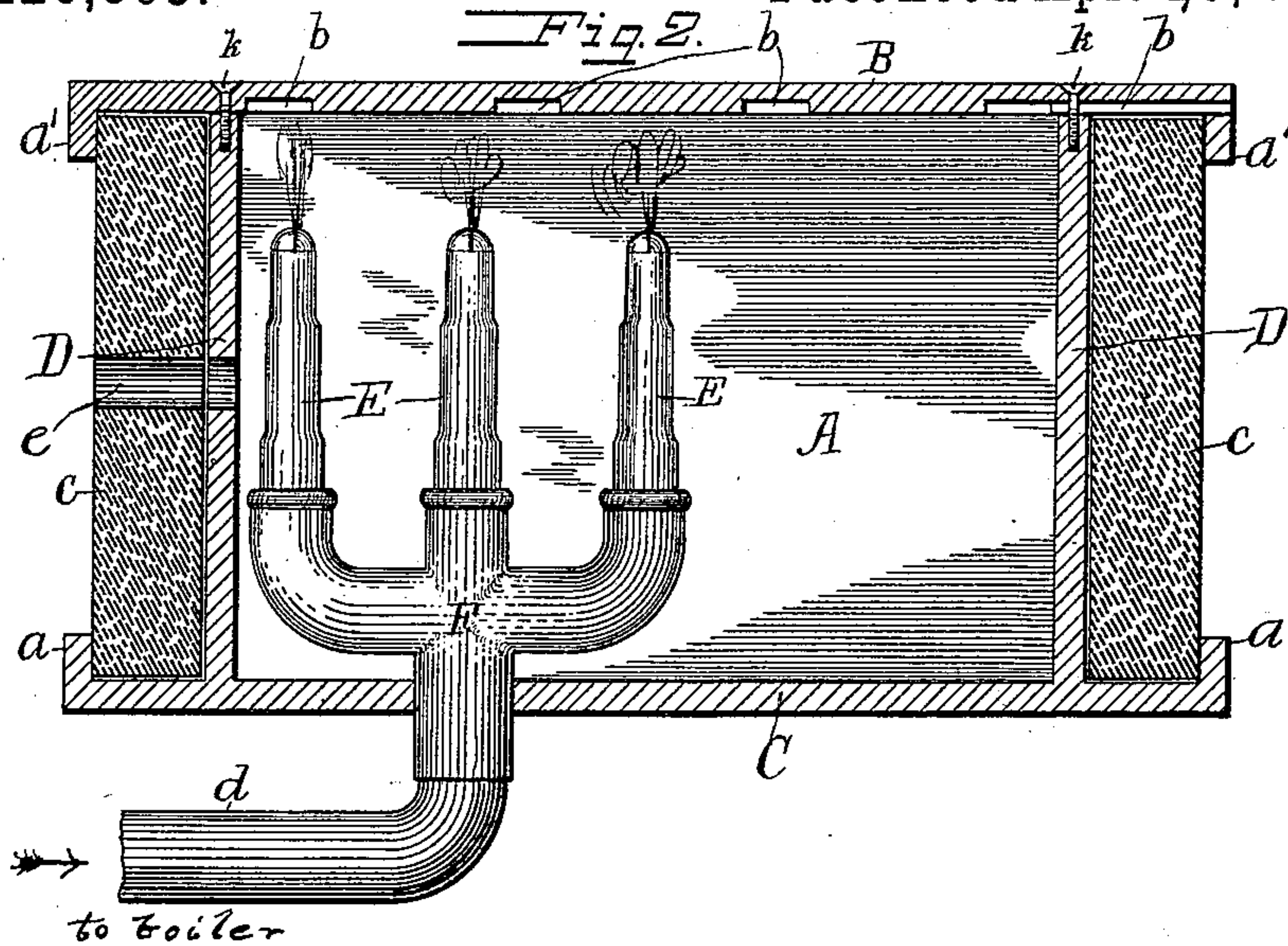
BY

Higdon & Higdon
his ATTORNEYS.

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By His Attorneys

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UNITED STATES PATENT OFFICE.

EDWARD H. RYAN, OF ARMOURDALE, KANSAS.

SMOKE-CONSUMING ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 426,863, dated April 29, 1890.

Application filed August 2, 1889. Serial No. 319,529. (No model.)

To all whom it may concern:

Be it known that I, EDWARD H. RYAN, of Armourdale, Wyandotte county, Kansas, have invented certain new and useful Improvements in Smoke-Consuming Attachments for Steam-Boilers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to an improvement in devices for promoting combustion; and it consists in the peculiar construction and combination of devices that will be more fully set forth hereinafter, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of a furnace provided with my improved smoke-consuming apparatus. Fig. 2 is a detailed longitudinal sectional view of my smoke-consuming apparatus. Fig. 3 is an inverted plan view, in perspective, of the cover, showing the grooves which form exits for the steam.

The box or chamber A is tapered throughout its length, has its upper side open, and is provided with a base-flange *a*, which extends around its sides and projects a considerable distance therefrom. The cover B is removable at will, is secured on the box by screws *k*, and has a depending flange *a'* extending around its sides. This flange *a'*, together with the flange *a*, serves to engage the upper and lower sides of fire-bricks *c*, which are thus made removable, and serve to protect the box from the intense heat generated in the furnace. In the under side of the cover are made a series of transverse grooves *b*, which extend through the sides or flanges thereof, and at the narrower end of the cover and communicating with one of the said transverse grooves are radial grooves *b'*, which extend through the flange at the narrower end of the cover. The box thus equipped is arranged just within the front wall of the furnace *k'*, between the doors *h*, and a bolt *e* is passed through openings in the front wall of the furnace and in the front end of the box, as shown in Fig. 1, thereby securing the box firmly in place in the furnace. A pipe-union F has its lower arm extending through the bottom C of the box, the said union being arranged in the latter, and to the said union are

attached the jets or nozzles E. A steam-pipe *d* is connected to the union and to a similar pipe *f* in front of the furnace, the latter pipe communicating directly with a steam-boiler. (Not shown.) The pipe *d* has a valve or cock *j*.

The grate-bars *g* of the furnace are of the usual construction, having their inner ends pivoted in a cross-plate *i* at the inner ends of the furnace and their outer ends journaled in openings in the front wall *l* of the furnace and projecting therefrom, and thereby adapted to be engaged by a suitable lever and oscillated to shake cinders from the fire.

The position of the box in the furnace is such that the burning fuel surrounds the said box, and thereby the latter becomes heated very intensely. When the cock *j* is opened, steam is forced from the boiler through the jets E into the highly-heated box, and is at once superheated and discharged therefrom through the grooves or openings *b b'* into the furnace, the effect of the steam being to promote such rapid combustion in the furnace that the smoke and gases are consumed.

I have one of my improved smoke-consuming devices now in practical operation in a steam-boiler furnace, and so perfect is the combustion that the products that escape from the chimney or stack are absolutely colorless and no smoke can be seen. I also find that a very great economy in fuel is realized from the use of my invention.

I am aware that it has been heretofore proposed to arrange a tube in the furnace with one end of the tube open and communicating with the outer air, and a steam-nozzle to discharge steam mingled with air through said tube, and from thence into the fire through openings in the tube; but such is not my invention and this I disclaim. My invention differs from this in that the box which I arrange in the furnace has no communication with the external atmosphere, but serves merely to superheat the steam before its admission to the fire.

The devices of this class in which air is admitted to the furnace directly with the steam are defective, for the reason that the admixture of the air reduces the temperature and pressure of the steam and the same is rendered partially inefficient. My invention ob-

viates this objection and excludes the air from direct contact with the steam. Consequently the latter enters the furnace at a very high temperature and in a state of decomposition into
5 its constituent gases and renders maximum service in promoting combustion.

Having thus described my invention, I claim—

1. In smoke-consuming apparatus for furnaces, the box A, having the base-flange *a*,
10 the cover B, having the flange *a'*, the fire-brick around the sides of the box and engaged by the said flanges, and the pipe to discharge live steam into the box, the latter being

arranged in the furnace and having the open- 15 ings for the exit of the steam, substantially as described.

2. In smoke-consuming apparatus for furnaces, the box having the cover provided with the grooves *b b'*, and the pipe for discharging
20 live steam into the box, substantially as described.

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

EDWARD H. RYAN.

Witnesses:

F. G. FISCHER,
PERRY C. PHILLIPS.