

(No Model.)

2 Sheets—Sheet 1.

A. FICKETT.

SMOKE AND GAS CONSUMING FURNACE.

No. 407,287.

Patented July 16, 1889.

Fig. 1.

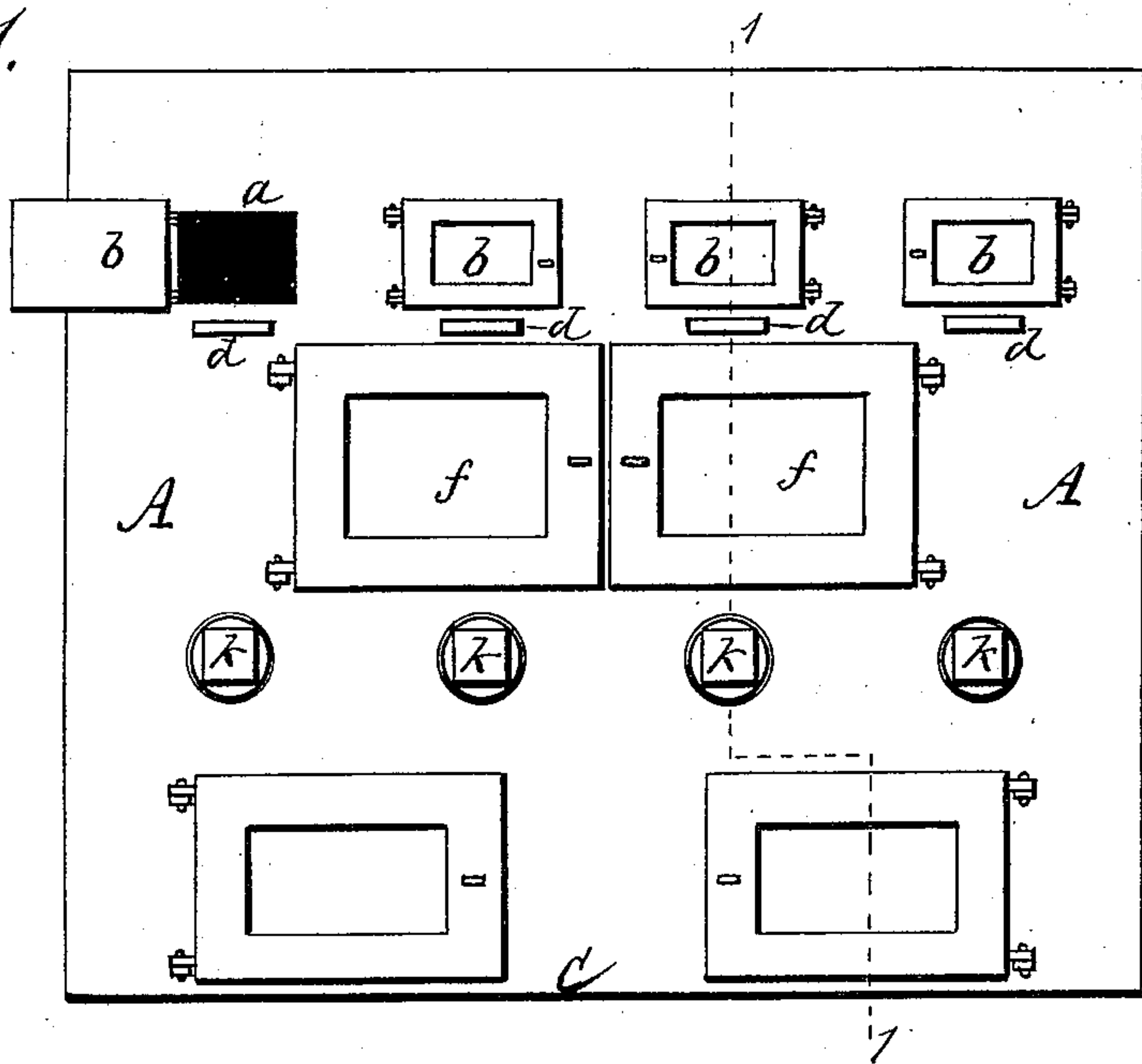
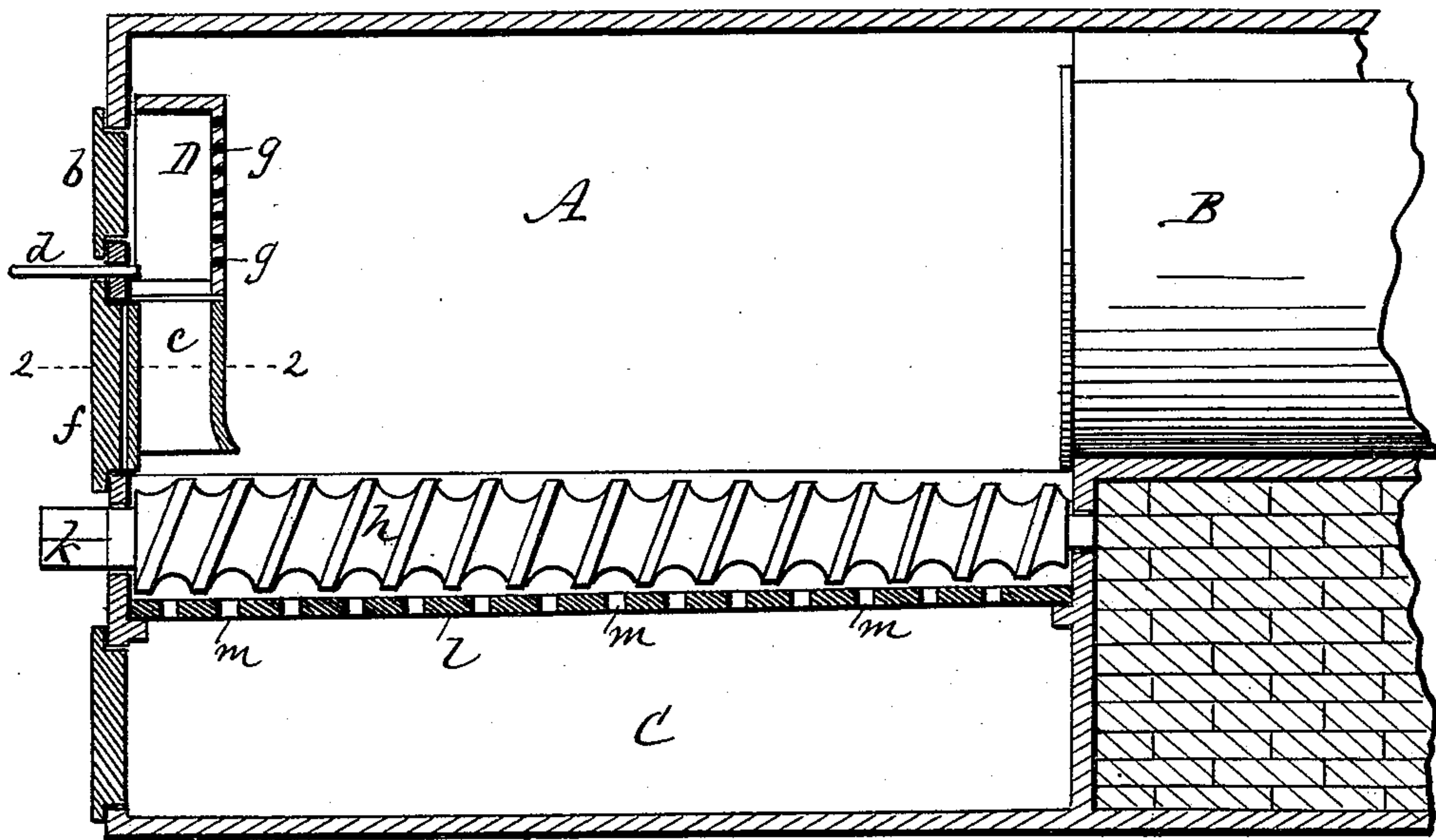


Fig. 2.

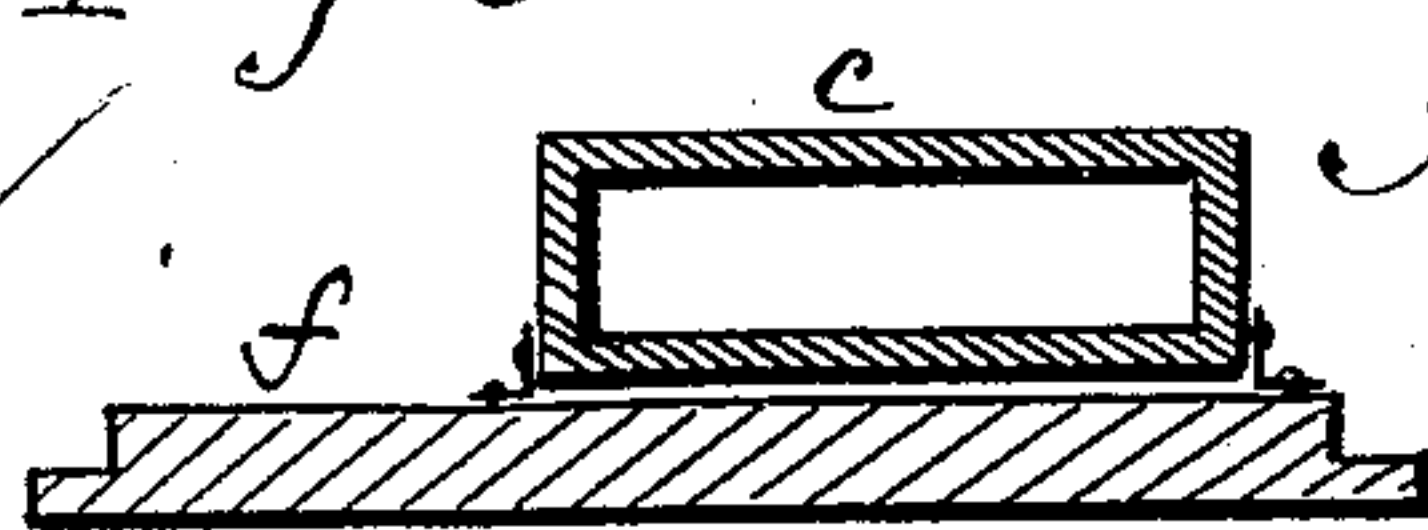


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Fig. 3.

E. A. Adams

H. B. Hutchinson



Inventor.
Albert Fickett,
per R. F. Osgood,
Atty

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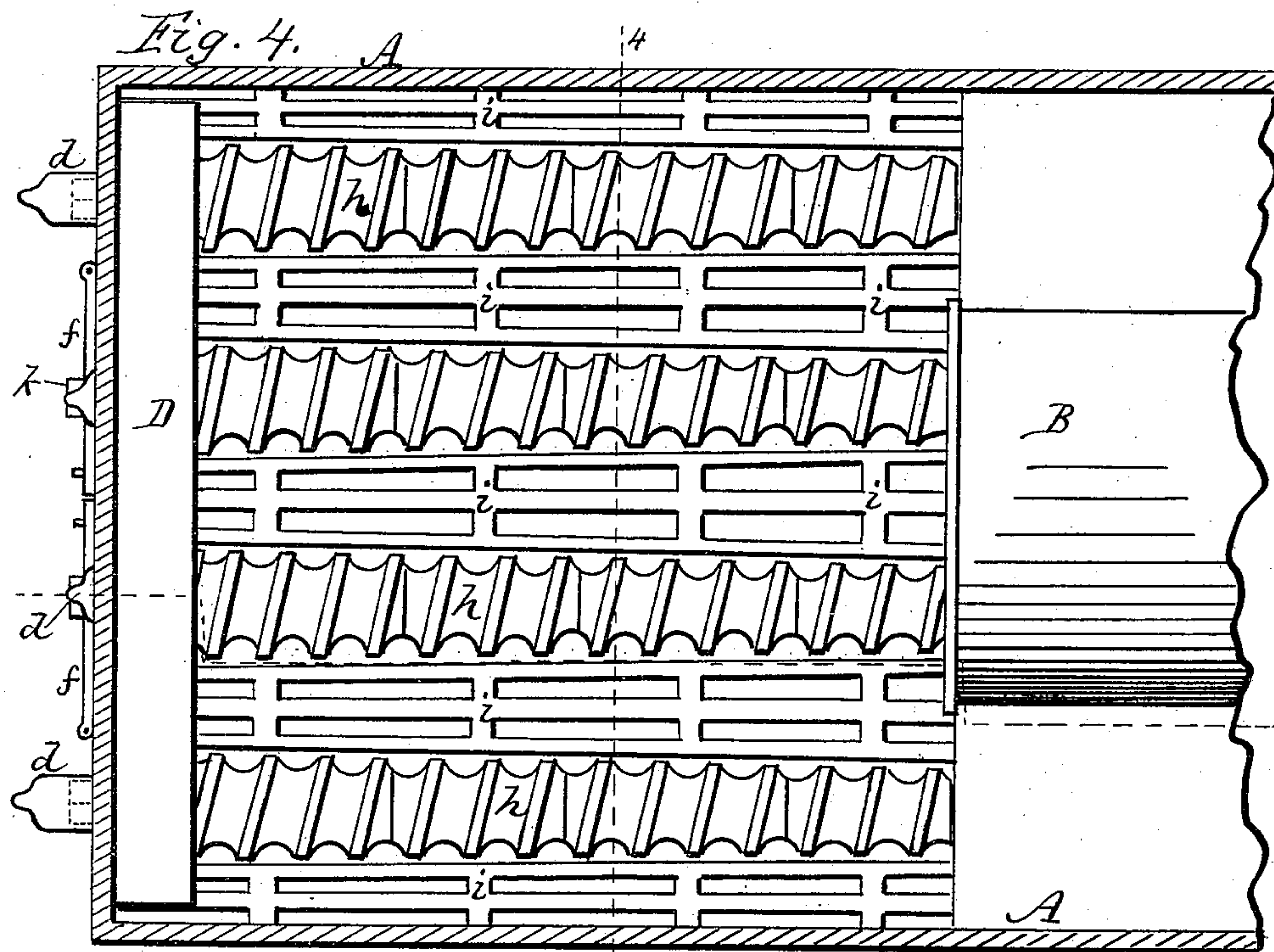
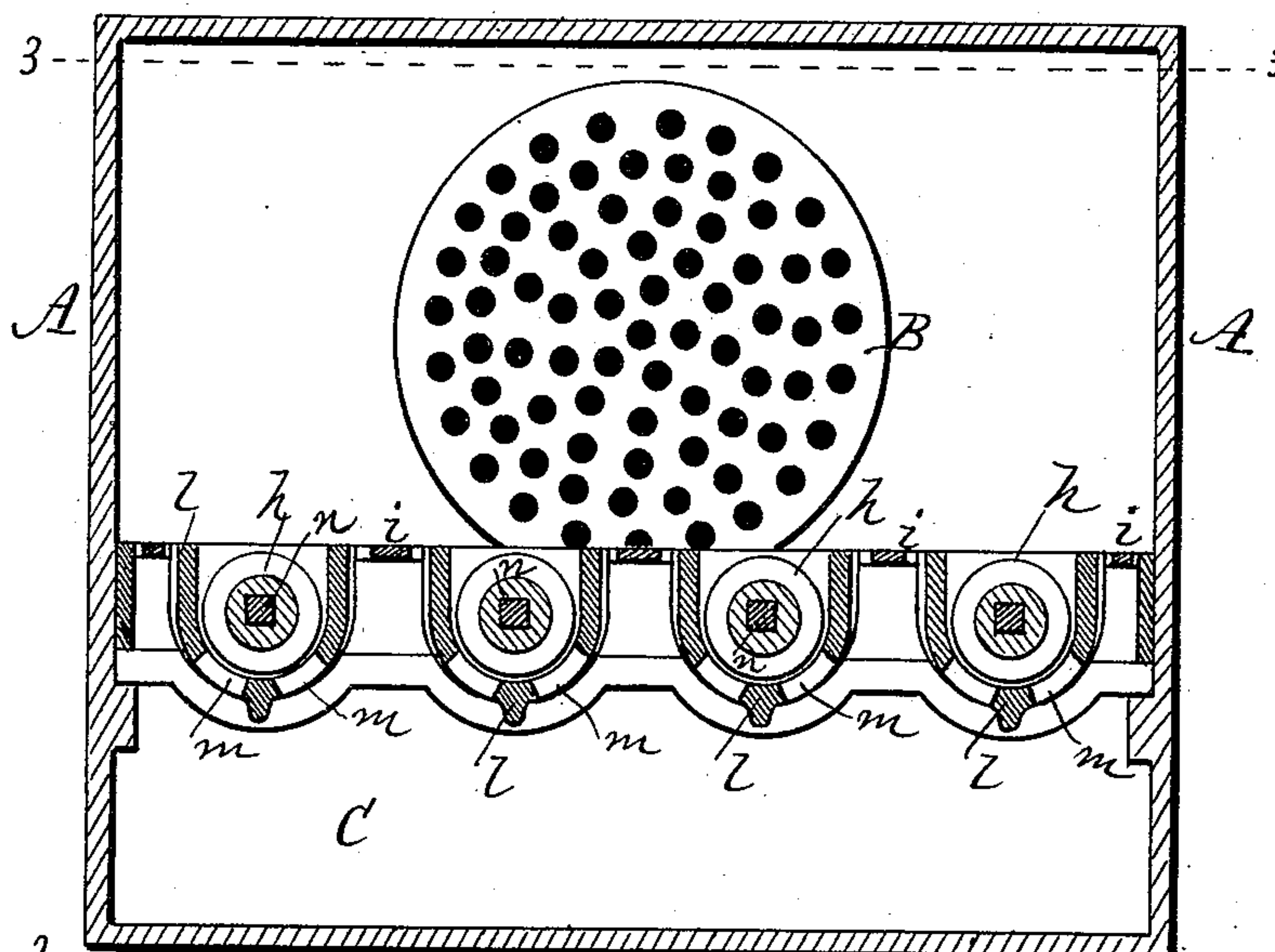


Fig. 5.



Attest.
O. H. Adams
F. B. Hutchinson

Inventor.
Albert Fickett
By R. F. Osgood, Atty.

UNITED STATES PATENT OFFICE.

ALBERT FICKETT, OF ROCHESTER, NEW YORK, ASSIGNOR OF ONE-HALF TO
THADDEUS W. HULETT, OF SAME PLACE.

SMOKE AND GAS CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 407,287, dated July 16, 1889.

Application filed February 11, 1889. Serial No. 299,450. (No model.)

To all whom it may concern:

Be it known that I, ALBERT FICKETT, of Rochester, in the county of Monroe and State of New York, have invented a certain new and useful Improvement in Smoke and Gas Consuming Furnaces for Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the drawings accompanying this application.

My improvement relates to the furnaces of steam-boilers, and the design is to burn the smoke and gases more effectively than is now done.

The invention consists in the construction and arrangement of the furnace, hereinafter more fully described and definitely claimed.

In the drawings, Figure 1 is a front elevation of the furnace. Fig. 2 is a longitudinal vertical section in line 1 1 of Fig. 1. Fig. 3 is a horizontal cross-section of one of the doors in line 2 2 of Fig. 2. Fig. 4 is a horizontal section in line 3 3 of Fig. 5. Fig. 5 is a vertical cross-section in line 4 4 of Fig. 4.

A indicates the furnace, and B the boiler, arranged in the usual way. C is the ash-pit.

The construction of the furnace is as follows: D is a magazine for the reception of the coal, said magazine consisting of a long receptacle extending horizontally across the furnace-space in the front and being fed through openings *a a*, covered by doors or slides *b b*. *c c* are chutes at definite distances apart, which convey the coal from the magazine down to the grate, said chutes being covered by cut-off valves *d d*, shutting the passages between the magazine and the chutes. The chutes in the center of the furnace are attached to the furnace-doors *f f* and swing out and in with them; but those at the side are made stationary, both sets serving the same purpose. An air-space is left between the chutes and the backing to which they are attached to allow circulation of air and prevent burning out.

In filling the magazine with coal the furnace-doors *f f* are kept closed. The valves *d d* are also closed, making the magazine tight. The doors or slides *b b* are then opened and

the coal shoveled in. By this means no gas escapes outward. The gases which are generated in the magazine pass out through perforations *g g* on the inner side, Fig. 2, and escape into the furnace, where they are consumed in passing over the fire.

By the construction above described the furnace is entirely closed in the act of filling the magazine, and the latter is entirely cut off from communication with the furnace; hence there can be no escape of gases or dust outward; but these elements are held in the furnace and entirely consumed. This obviates a great defect in ordinary furnaces, where the doors have to be opened in filling and where the gases generated by the fresh coal coming in contact with the hot fire-bed flow out into the room.

In this invention the coal is inserted in charges into a magazine cut-off from the furnace, and then allowed to pass down into the fire with the furnace all closed.

The grate consists of a series of screw conveyers *h h h*, either solid or hollow, arranged at given distances apart, and intermediate fixed grate-bars *i i* between the conveyers. The conveyers lie longitudinally of the furnace, and are preferably somewhat tapering, the smaller ends being farthest from the entrance of the coal. The coal as it falls from the chutes rests on the conveyers, and is forced inward by the action of the screws. The tapering form of the screws has the tendency to equalize the coal over the whole surface of the grate, as there is less movement at the inner than at the outer ends. The screws have square-sided studs *k k*, which project out through the furnace-front, on which studs can be fitted handles or cranks for turning the screws. The screws rest in concave troughs *l l*, Fig. 5, which are provided with slots or perforations *m m*, through which the ashes sift into the ash-pit below. If desired, the interior of the troughs may be serrated or roughened to assist in grinding up such clinkers as pass under the screws. Usually, however, this is not necessary. The screws are each preferably made in sections and strung on a shaft *n*, that passes entirely through them

and has the stud k on the outer end; but, if desired, each screw may be made in a single piece.

The great advantage of this invention, as before described, is that it enables the furnace to be supplied with coal and run without opening the doors in supplying the coal, whereby there is no loss of fuel and no escape of gas outward. The construction of the grate is such that the coal can be moved back over the grate without opening the doors. It can be equalized if there is a preponderance on one side by turning one screw more than the next. The turning of the screws also has the tendency to loosen up the contents of the fire-chamber and loosen the ashes and sift them through, not only through the troughs in which the screws rest, but also through the stationary grate-bars between the screws. Clinkers can be worked back to the front by reversing the movement of the screws. The coal is coked as fast as it falls in the chutes, and in the coked condition is forced inward by the screws.

Having described my invention, I do not claim, simply and broadly, screw conveyers such as shown in Letters Patent No. 199,000; but

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

1. In a furnace, the combination of a magazine extending across the furnace-space, doors

opening into the fire-chamber provided with chutes which tally with discharge-openings in the magazine, and cut-off valves covering the passage between the magazine and chutes, as shown and described, and for the purpose specified.

2. In a furnace, the combination of a magazine extending across the furnace-space, doors opening into the fire-chamber provided with chutes which tally with discharge-openings in the magazine, cut-off valves covering the passage between the magazine and chutes, and separate screw conveyers having their ends resting, respectively, under the chutes, said conveyers forming part of the main grate of the furnace, as herein shown and described.

3. In a furnace, the combination of the grate-bars $i i$, the separate screw conveyers $h h$, standing on a level with said grate-bars and operated independently, and the troughs $l l$, in which the conveyers rest, provided with slots $m m$ in their bottom for the discharge of ashes below the conveyers, as herein shown and described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ALBERT FICKETT.

Witnesses:

R. F. OSGOOD,

WM. J. MCPHERSON.