

No. 707,957.

Patented Aug. 26, 1902.

R. D. BRETT.

SMOKE CONSUMING APPARATUS FOR STEAM BOILER OR LIKE FURNACES.

(Application filed June 9, 1902.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.

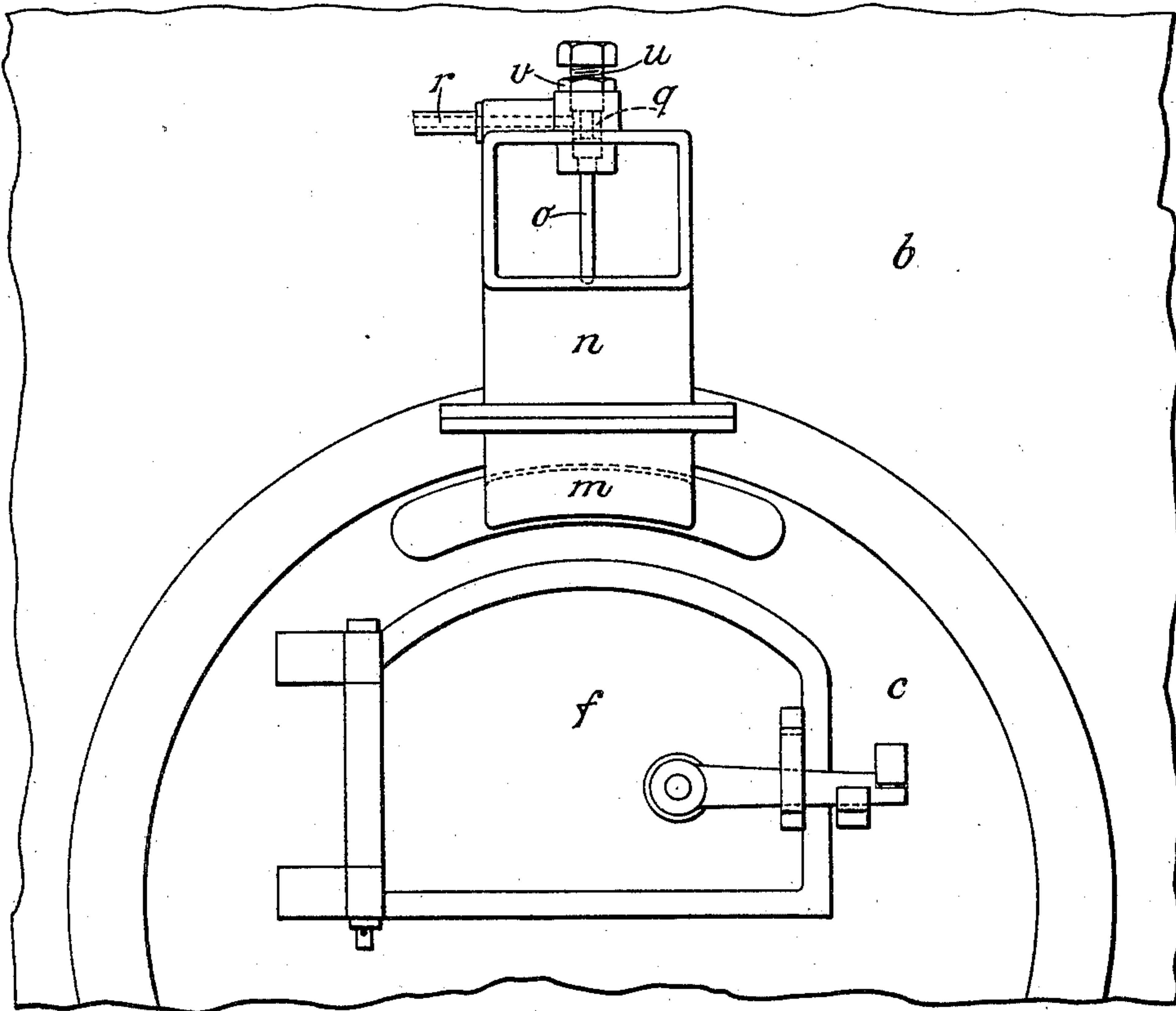


Fig. 5.

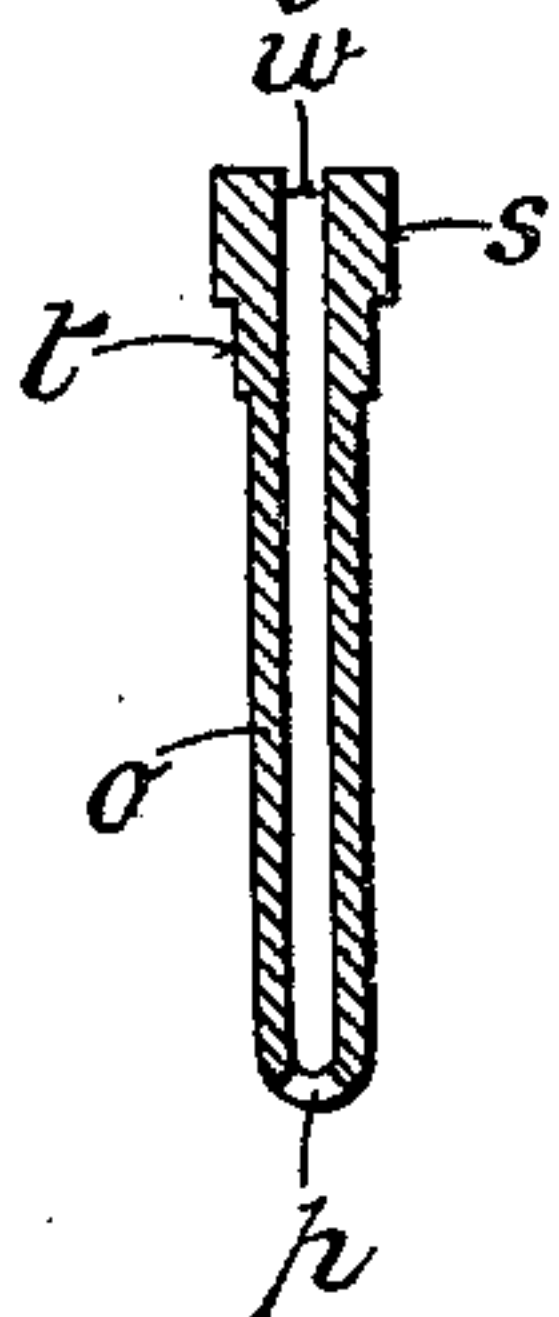
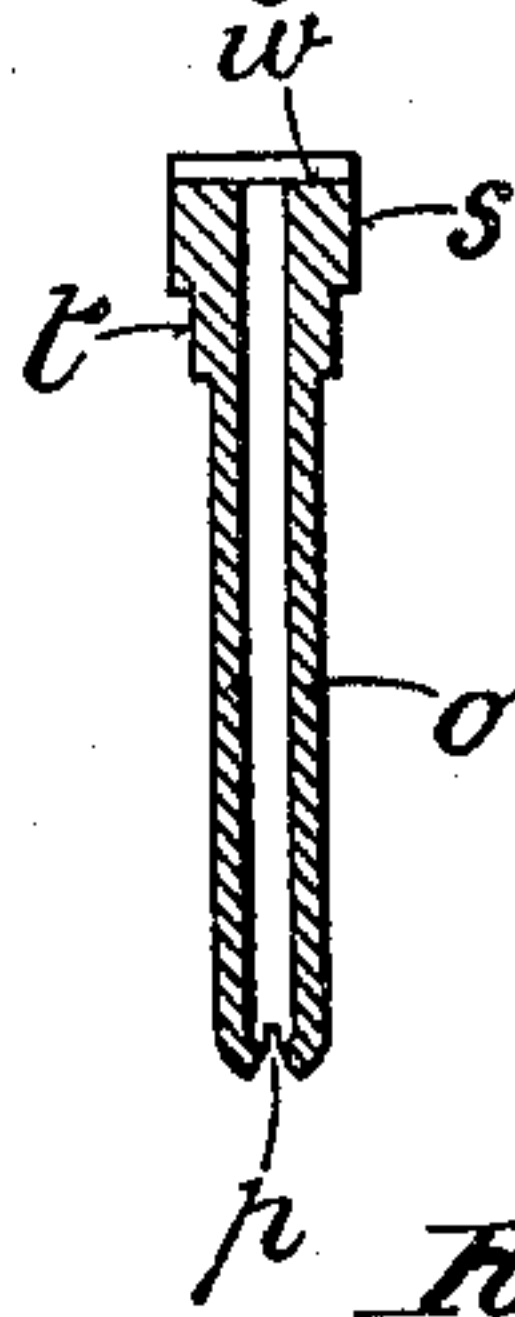


Fig. 6.



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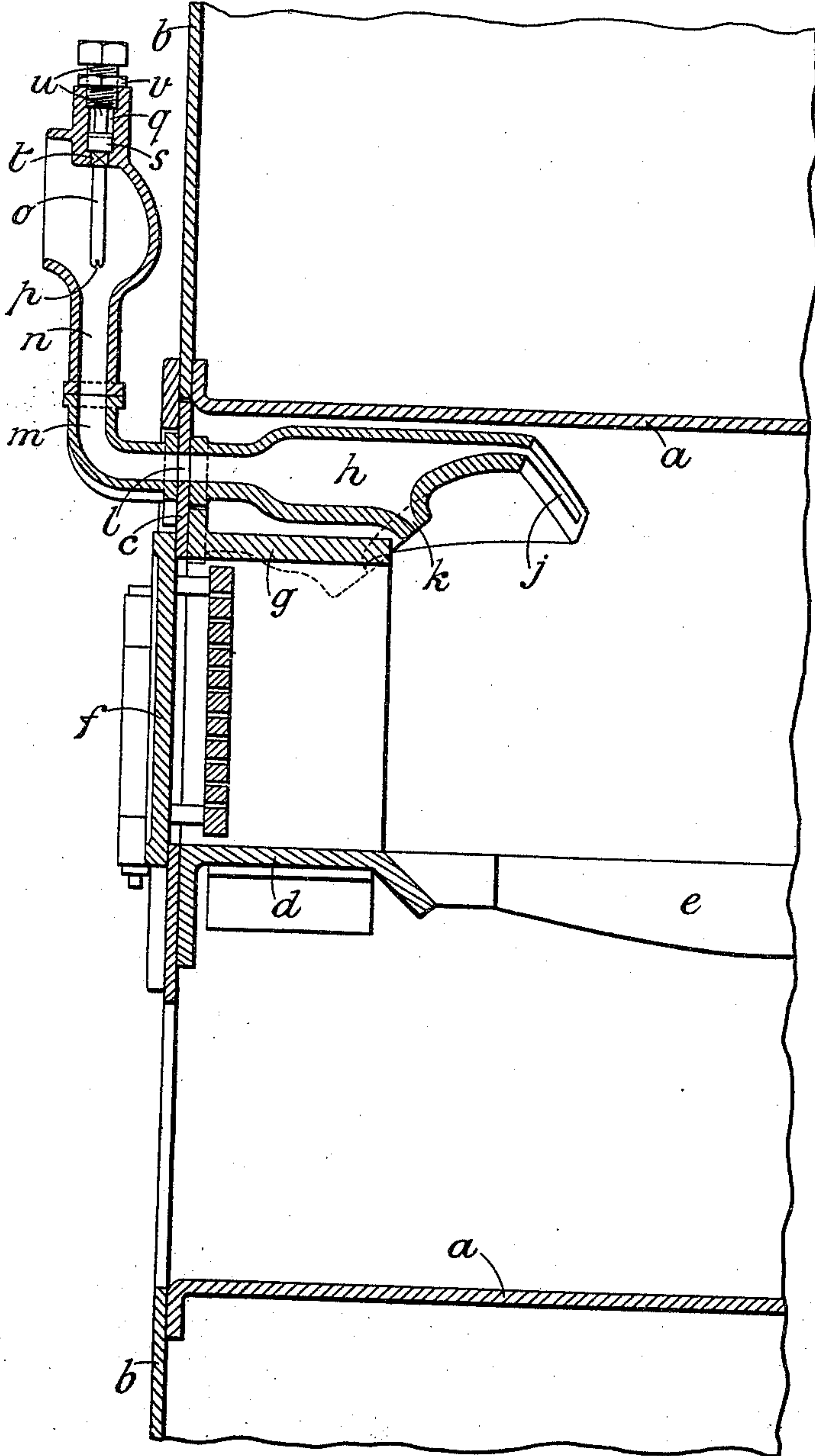
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Fig. 2.



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3 Sheets—Sheet 3.

Fig. 3.

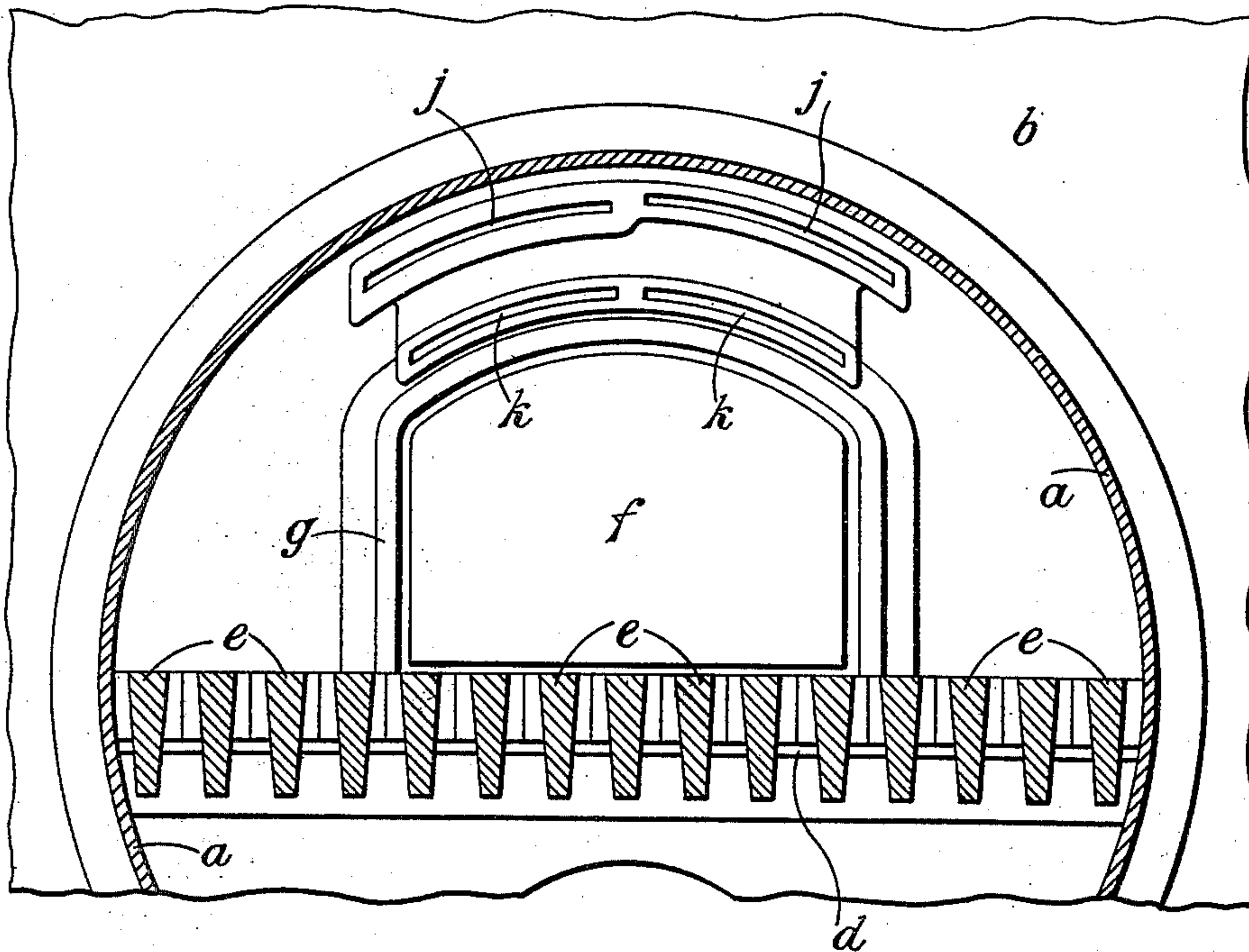
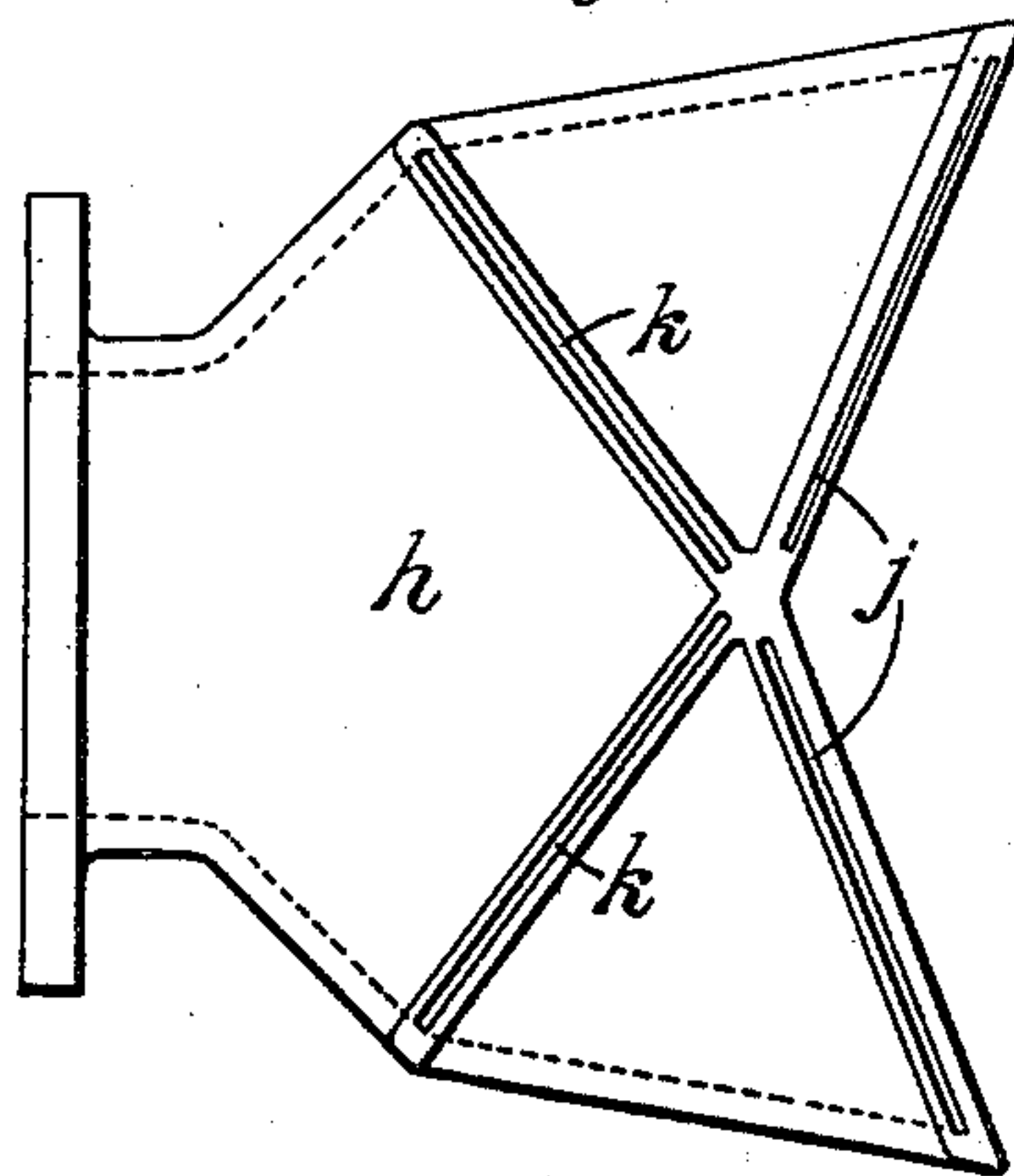


Fig. 4.



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UNITED STATES PATENT OFFICE.

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SMOKE-CONSUMING APPARATUS FOR STEAM-BOILER OR LIKE FURNACES.

SPECIFICATION forming part of Letters Patent No. 707,957, dated August 26, 1902.

Application filed June 9, 1902. Serial No. 110,924. (No model.)

To all whom it may concern:

Be it known that I, ROBERT DANIEL BRETT, a subject of the King of Great Britain, residing at London, England, have invented certain new and useful Improvements in Smoke-Consuming Apparatus for Steam-Boiler or Like Furnaces, of which the following is a specification.

My invention relates to apparatus for supplying air to steam-boiler and like furnaces; and the said invention provides a novel construction of such apparatus whereby more perfect combustion is obtained than heretofore and the smoke is more effectually consumed.

An important feature of my said invention consists in the employment of air-jets in the form of thin sheets, which are directed over the fuel on the grate in such a manner as to accelerate the draft and at the same time cross each other at different levels above the fuel on the grate, so as not to interfere with each other, for the purpose of uniformly distributing the air throughout the interior of the said furnace—i. e., throughout the combustion-space above the fuel on the grate. For this purpose according to one construction a box is arranged in the upper part of the furnace, at or near the front thereof, this box having air supplied thereto in any suitable manner and being formed with two laterally-extended slits inclined toward the center line of the furnace and two other similar slits in different planes and inclined away from the said center line. Said pairs of slits are preferably arranged one above the other. The said box is made shallow and presents a large surface to the air inclosed therein, thus efficiently heating the entering air, and the box can be flat or curved or otherwise shaped to correspond to the contour of the interior of the furnace. Air under pressure is supplied to the said box, for example, by means of an injector consisting of a laterally-extended flared or bell-mouthed aperture corresponding approximately in cross-section to that of the box mentioned above, this aperture having arranged centrally therein a steam-pipe provided with a flattened flaring orifice or slit. By this means a flattened or laterally-extended jet of steam is thrown into the bell-

mouthed aperture above mentioned, filling the same and causing air to be drawn into the said aperture along the whole width thereof. By my said invention I cover the whole fire area of the furnace with thin sheets of air, and thus mix the air with the smoke and vapors emitted by the fuel on the grate in a very complete manner, so as to enable the same to be efficiently consumed. Moreover, by reason of the air-jets being projected forward in substantially the direction of flow of the gases through the furnace the draft is accelerated and a very high rate of combustion can be attained.

In the accompanying drawings, Figure 1 is a front elevation, Fig. 2, a vertical substantially central longitudinal section, and Fig. 3 a transverse section looking from the rear, showing a flue-tube of an internally-fired boiler having my invention applied thereto. Fig. 4 is an under side view of the box for distributing the air. Figs. 5 and 6 are sections, taken at right angles to each other, of the steam-pipe of the injector.

Like reference characters indicate corresponding parts throughout the drawings.

a is the flue-tube, and *b* the front end plate, of the boiler.

c is the casting forming the front wall of the furnace; *d*, the dead-plate; *e*, the fire-bars, and *f* the fire-door.

g is an arch arranged over the opening of the fire-door above the dead-plate.

The box *h* for distributing the blast is made shallow and is curved so as to correspond in contour to the furnace-crown, thus presenting a large heating-surface to the air passing through it. The said box *h* is provided at its forward or inner end with two slits *j*, inclined away from the center line of the flue and producing converging jets of air, which are preferably arranged at different elevations above the grate, as shown in Fig. 3, so that the said jets shall not interfere with each other. At an intermediate point nearer to the grate there are two slits *k*, inclined toward the said center line so as to form divergent jets. By this means a series of superposed laterally-extended jets or films of heated air are projected in different directions over the surface of the fuel, so as to thoroughly mix with the

gases issuing from the fuel and insure complete combustion thereof. If desired, additional slits for producing divergent or convergent jets can be arranged in the said box, either at the sides of or above or beneath those above mentioned.

The box *h* is flanged and is secured to the inner side of the casting *c* by bolts or in any other suitable manner, so that its opening shall register with a correspondingly-shaped opening *l* in the casting *c*. On the front of the said casting is mounted an elbow *m*, to which an injector for producing the air-blast is secured. This injector comprises a flared or bell-mouthed tube or pipe *n*, which, with the elbow *m*, corresponds approximately in cross-section with the box *h*. Air is drawn into the tube *n* by means of a steam-jet issuing from a pipe *o*, which extends at its lower end into the said pipe, where it is provided with a laterally-extended and flared slit *p*, arranged in the major axis of the cross-section of the pipe *n*. The pipe *o* opens at its upper end into a chamber *q*, to which steam or air under pressure is supplied through a pipe *r*. The upper end of the pipe *o* terminates in a block *s*, having a squared part *t* of smaller dimensions fitting into a correspondingly-shaped hole in the bottom of the chamber *q*, so as to insure that the slit *p* shall register with the major axis of the pipe *n*. The block *s* is held down on its seat by a set-screw *u*, provided with a lock-nut *v*, the steam, compressed air, or the like entering the pipe *o* through a lateral slot *w* in the said block.

My invention can be applied to the furnaces of internally and externally fired steam-boilers and to other furnaces of a similar kind.

What I claim is—

1. A smoke consuming or preventing device for steam-boiler and like furnaces, comprising a shallow box having superposed slits inclined respectively away from and toward the center line of said box, and means for conducting air under pressure to the interior of said box, substantially as described.

2. The combination, in a furnace, of a shallow box mounted in the upper part of said furnace, said box having slits formed therein at different levels and inclined respectively

away from and toward the center line of said box, an outward extension of said box having approximately the same cross-section as said box, and having a flaring aperture, a steam-pipe arranged centrally in said flaring aperture, said steam-pipe having a flattened flaring aperture, substantially as described.

3. The combination, in a furnace, of a shallow box mounted in the upper part of said furnace, said box having narrow laterally-extended slits formed therein at different levels and inclined respectively away from and toward the center line of the said box, said slits opening substantially in the direction in which the gases flow through the furnace, and means for conducting air under pressure into the interior of said box, substantially as described.

4. The combination, in a furnace, of a box mounted in the upper part of said furnace, said box having narrow laterally-extended slits formed therein at different levels and inclined respectively away from and toward the center line of said box, said slits opening substantially in the direction in which the gases flow through the furnace, a pipe forming an outward extension of said box and corresponding approximately in cross-section with said box, said pipe having a flaring aperture, and a steam-pipe arranged centrally in said aperture and having a laterally-extended and flared slit, substantially as described.

5. A smoke consuming or preventing device for steam-boiler and like furnaces, comprising a shallow box having a pair of converging slits facing forwardly and arranged at different levels, and a pair of divergent slits also facing forwardly but arranged on the same level as each other, said slits being arranged symmetrically to each other, and means for conducting air under pressure into the interior of said box, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ROBERT DANIEL BRETT.

Witnesses:

HERBERT ARTHUR BEESTON,
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