

(No Model.)

2 Sheets—Sheet 1.

J. CURTIN.  
VENTILATION APPARATUS.

No. 542,554.

Patented July 9, 1895.

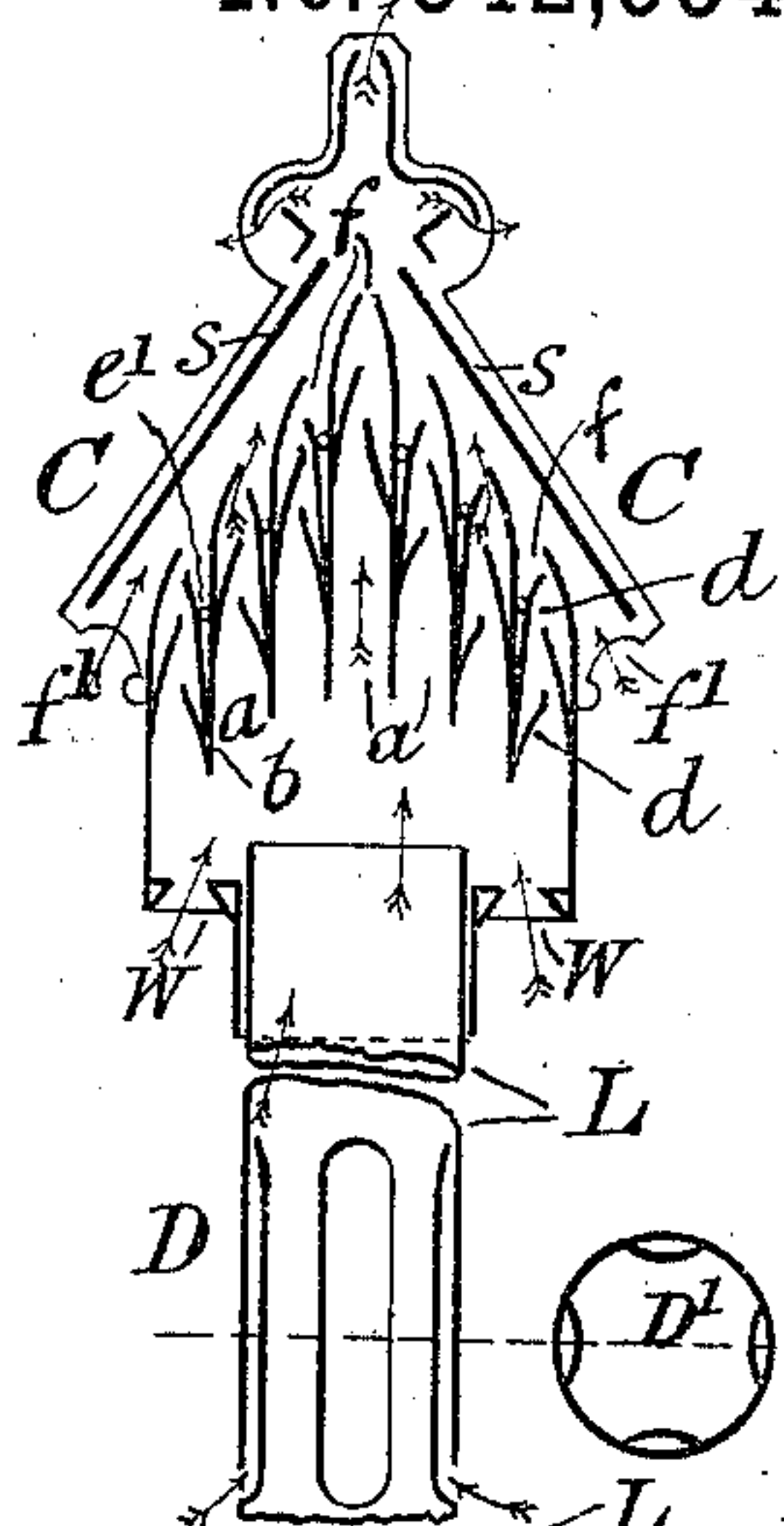


Fig 1

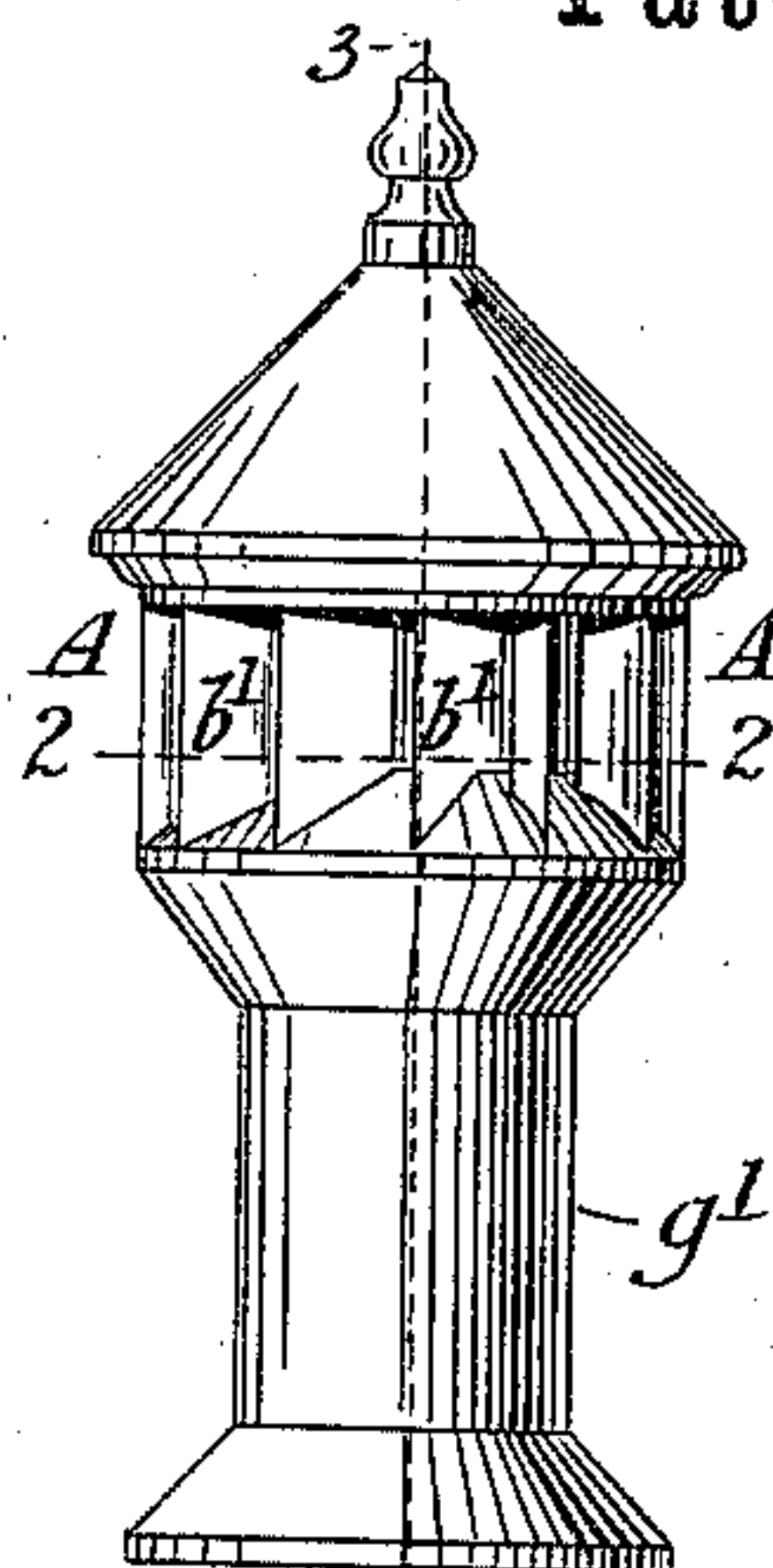


Fig 2

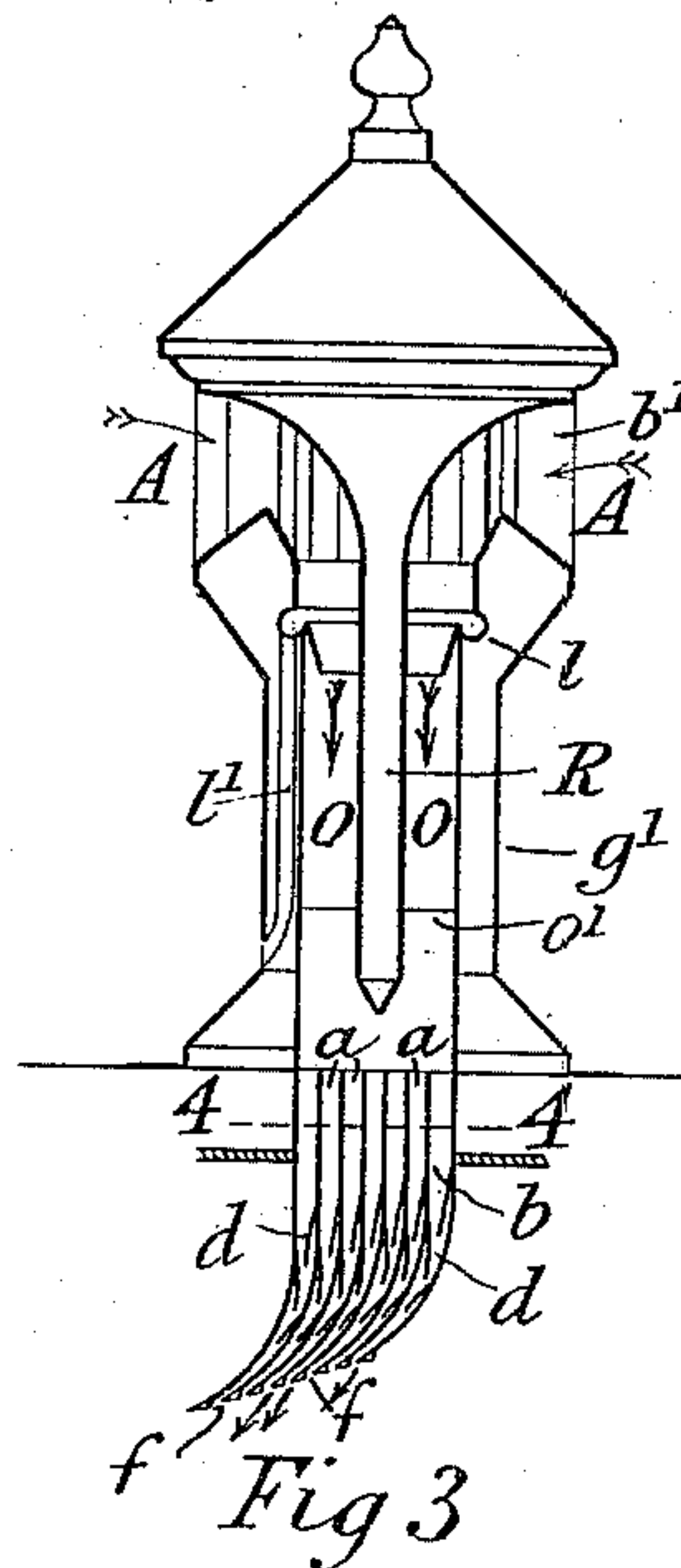


Fig 3

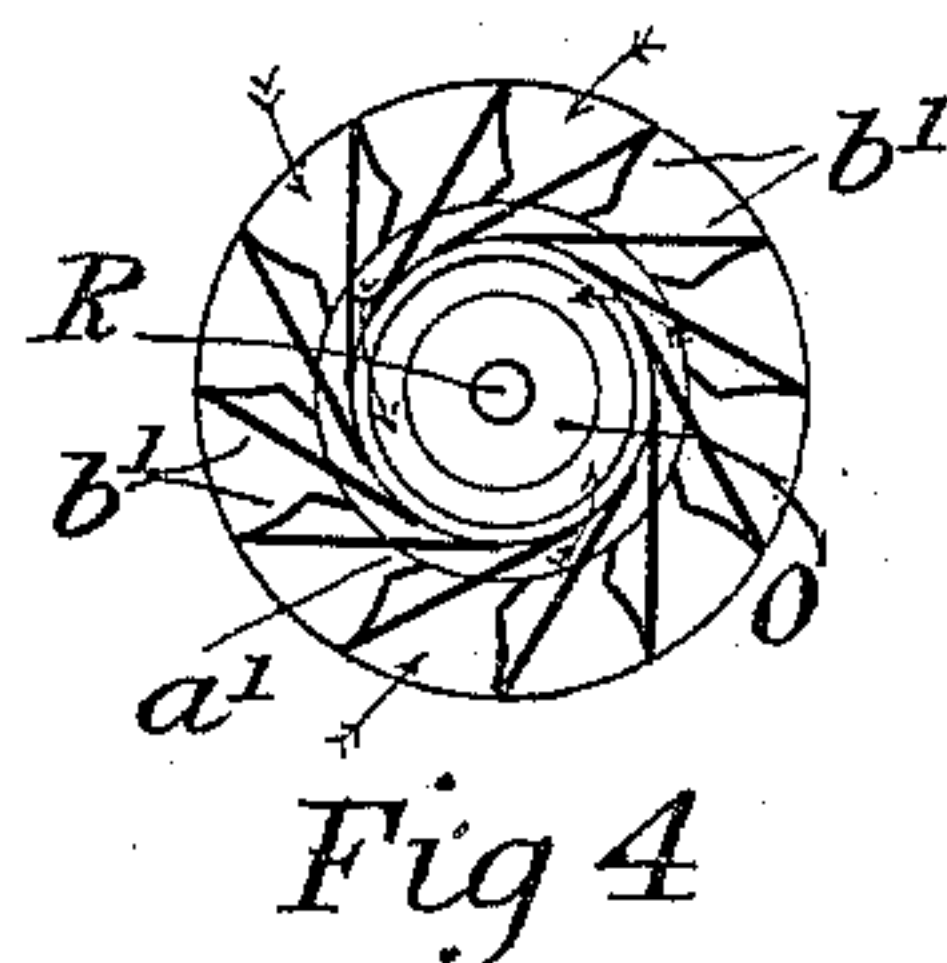


Fig 4

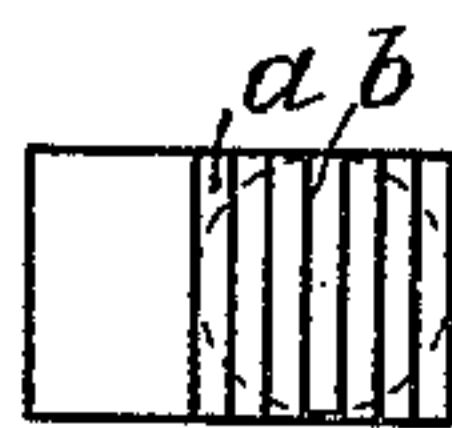


Fig 5

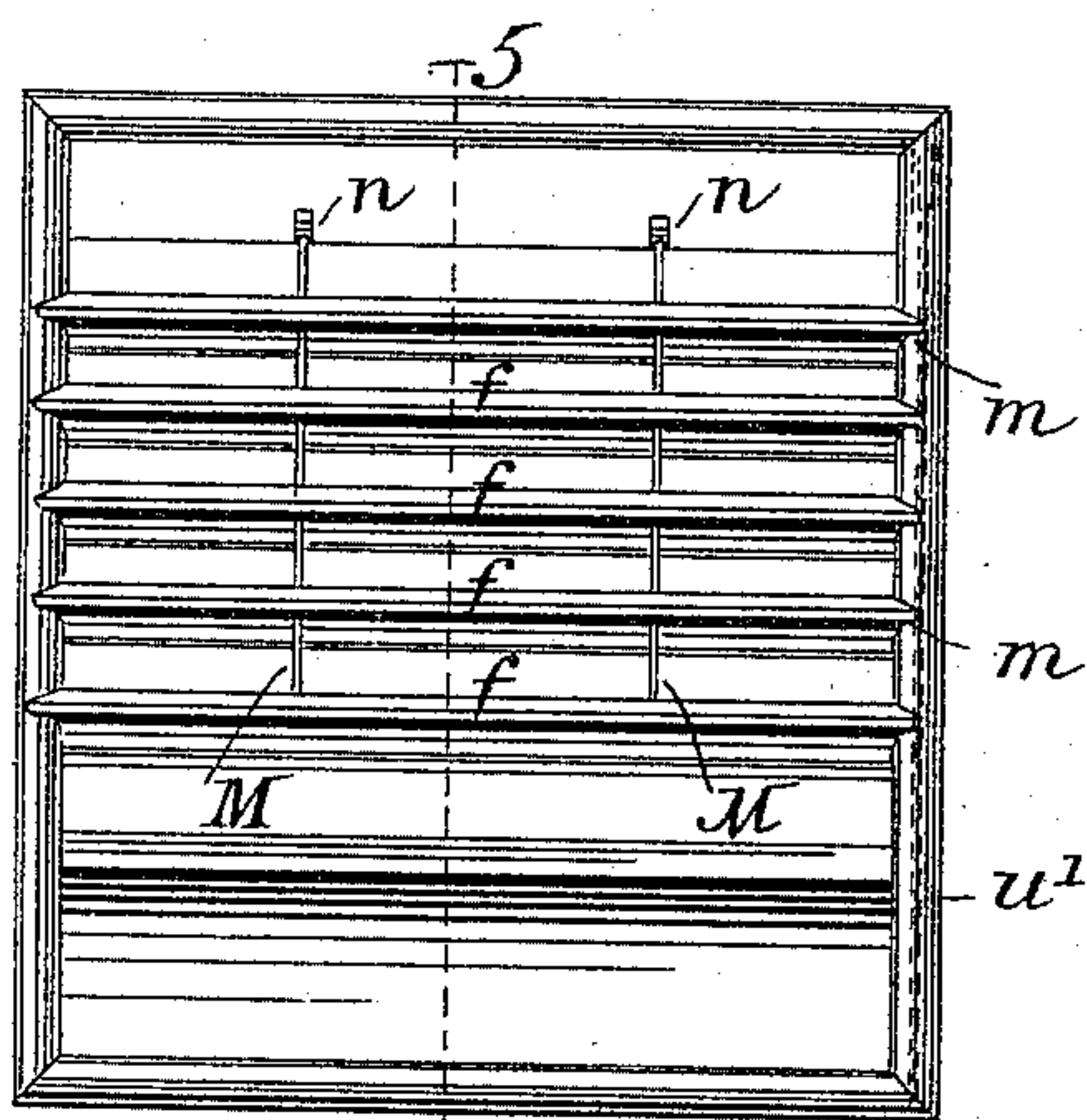


Fig 6

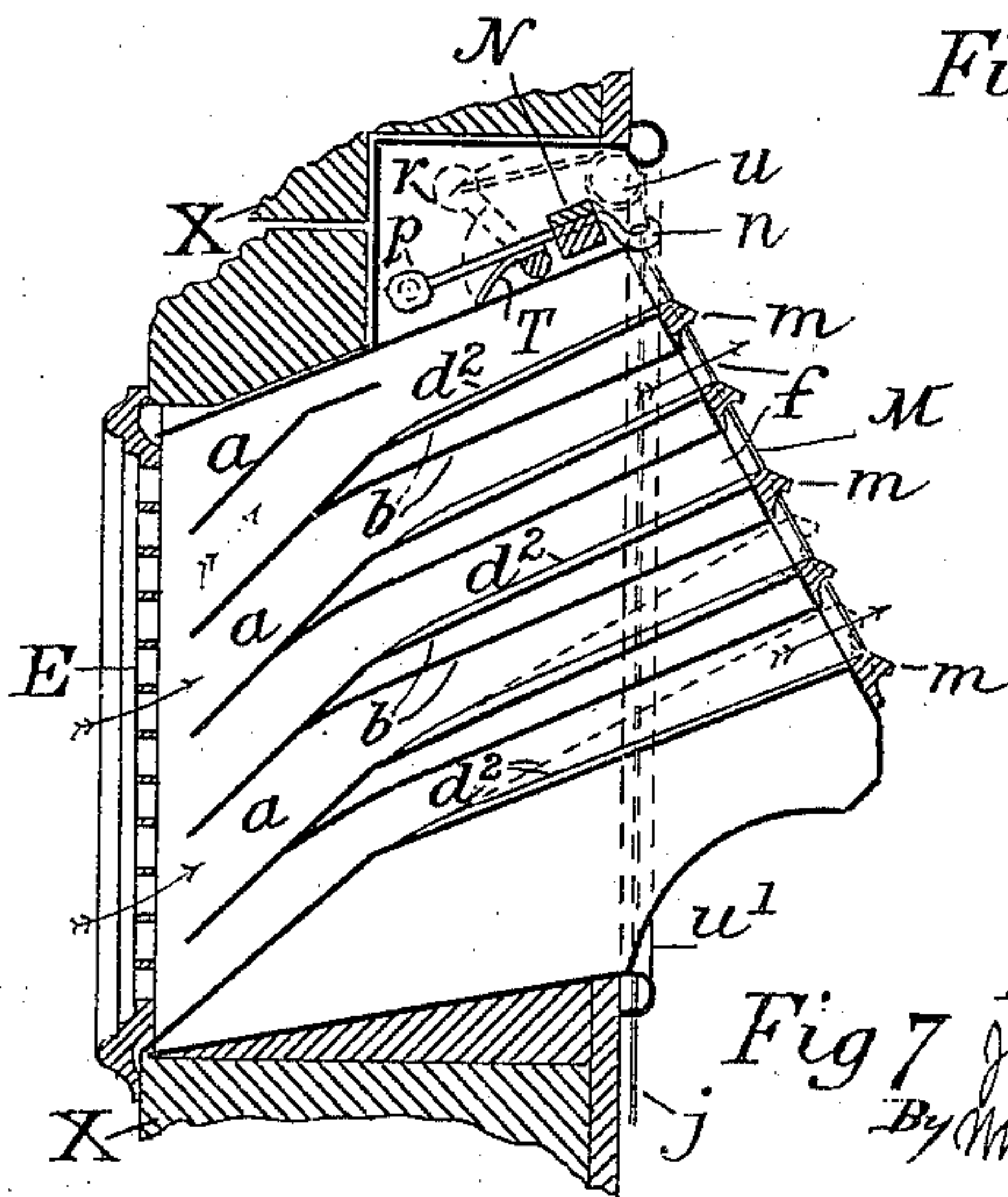


Fig 7

Witnesses:  
J. Wilson  
R. C. Bowen.

Inventor:  
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By Whitman & Williams  
Attorneys.



(No Model.)

2 Sheets—Sheet 2.

J. CURTIN.  
VENTILATION APPARATUS.

No. 542,554.

Patented July 9, 1895.

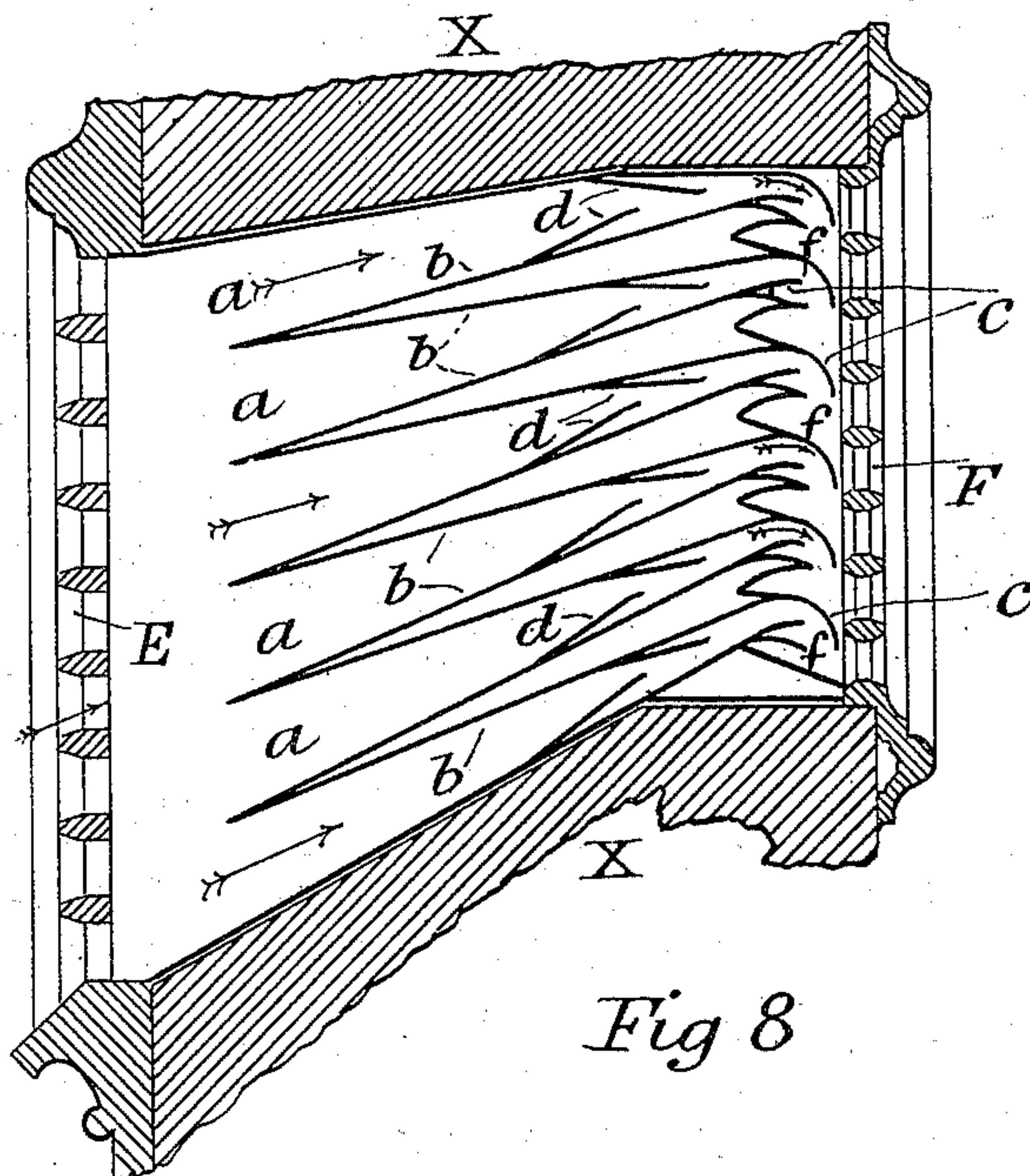


Fig 8

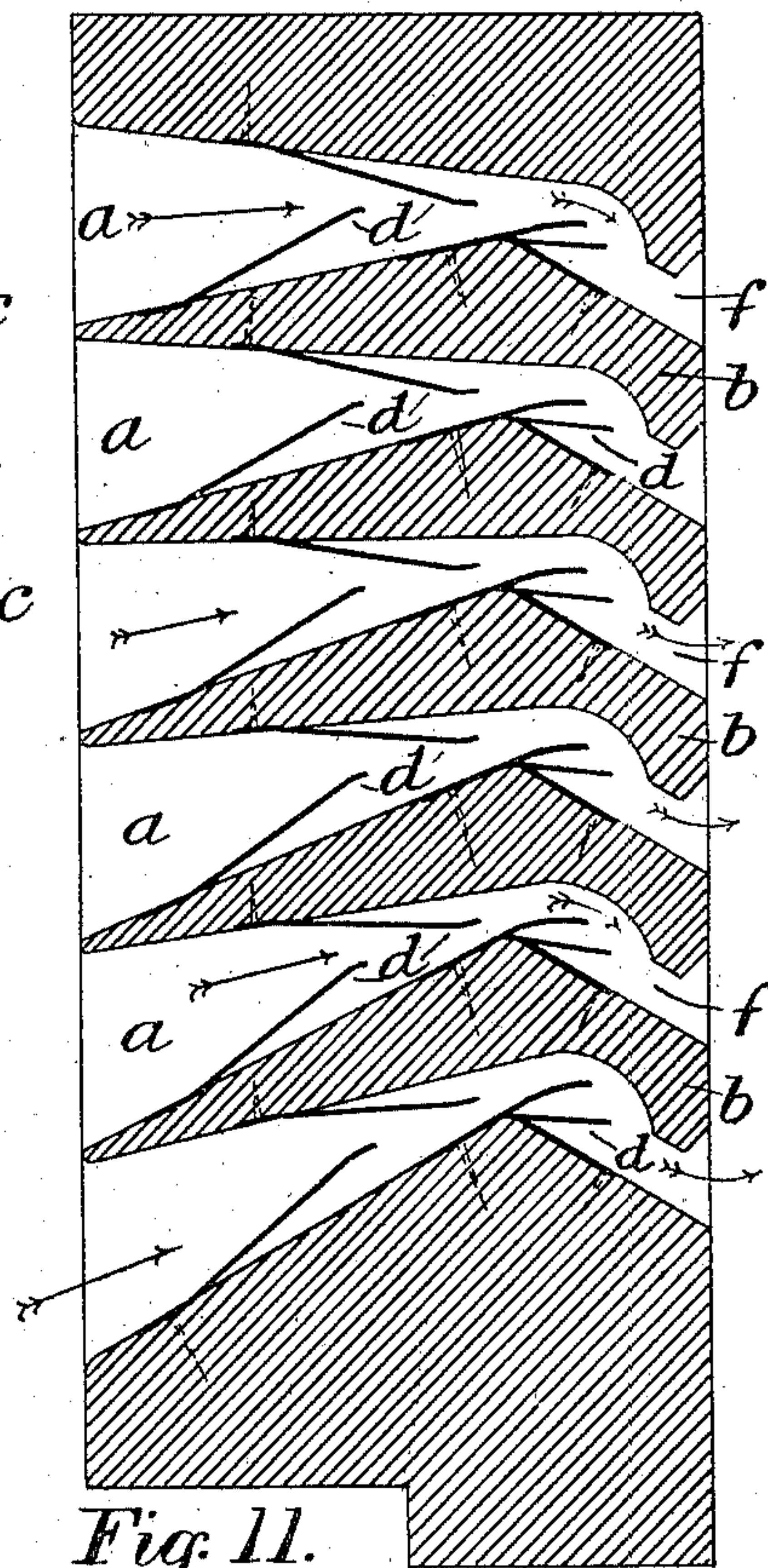


Fig 11.

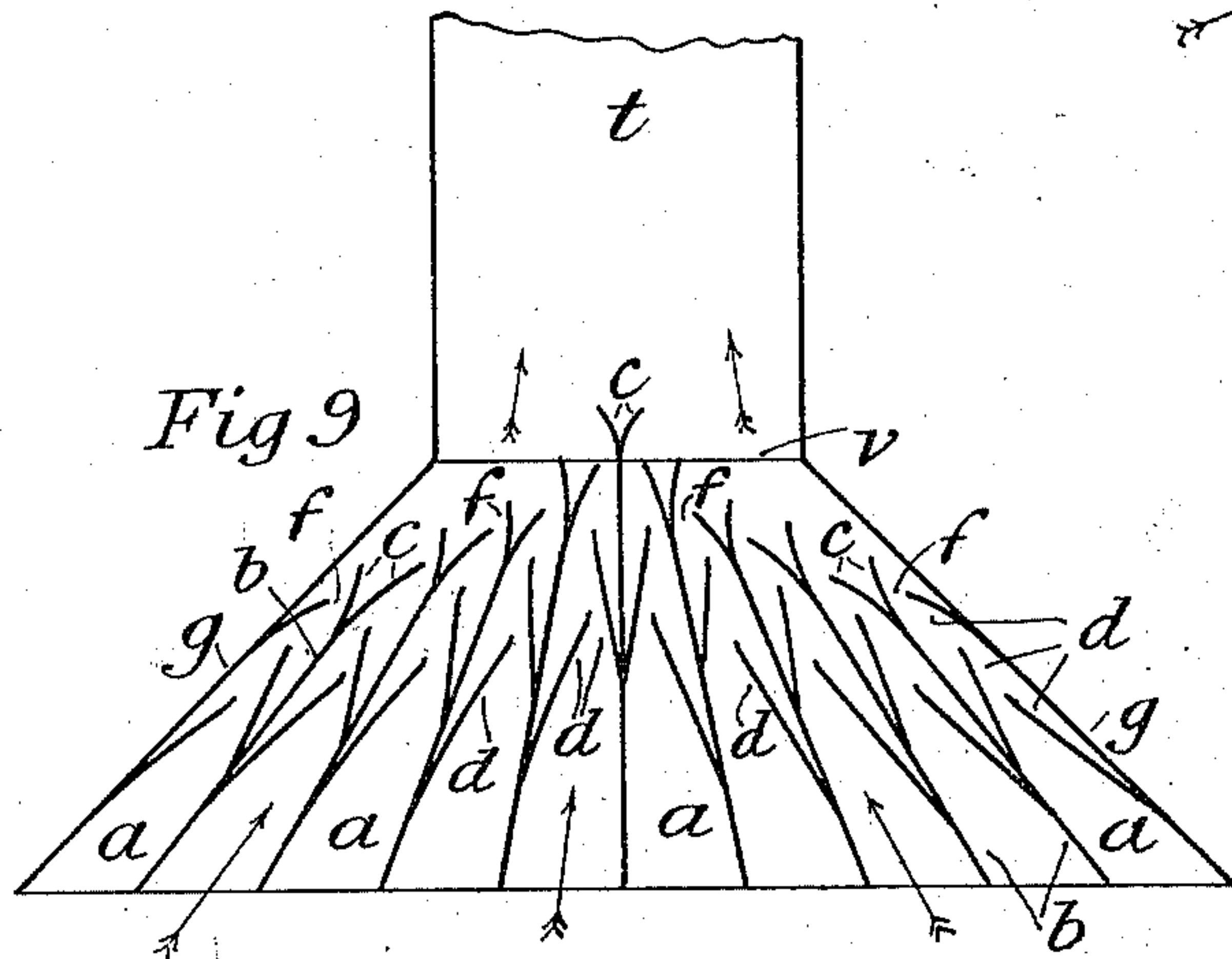


Fig 9

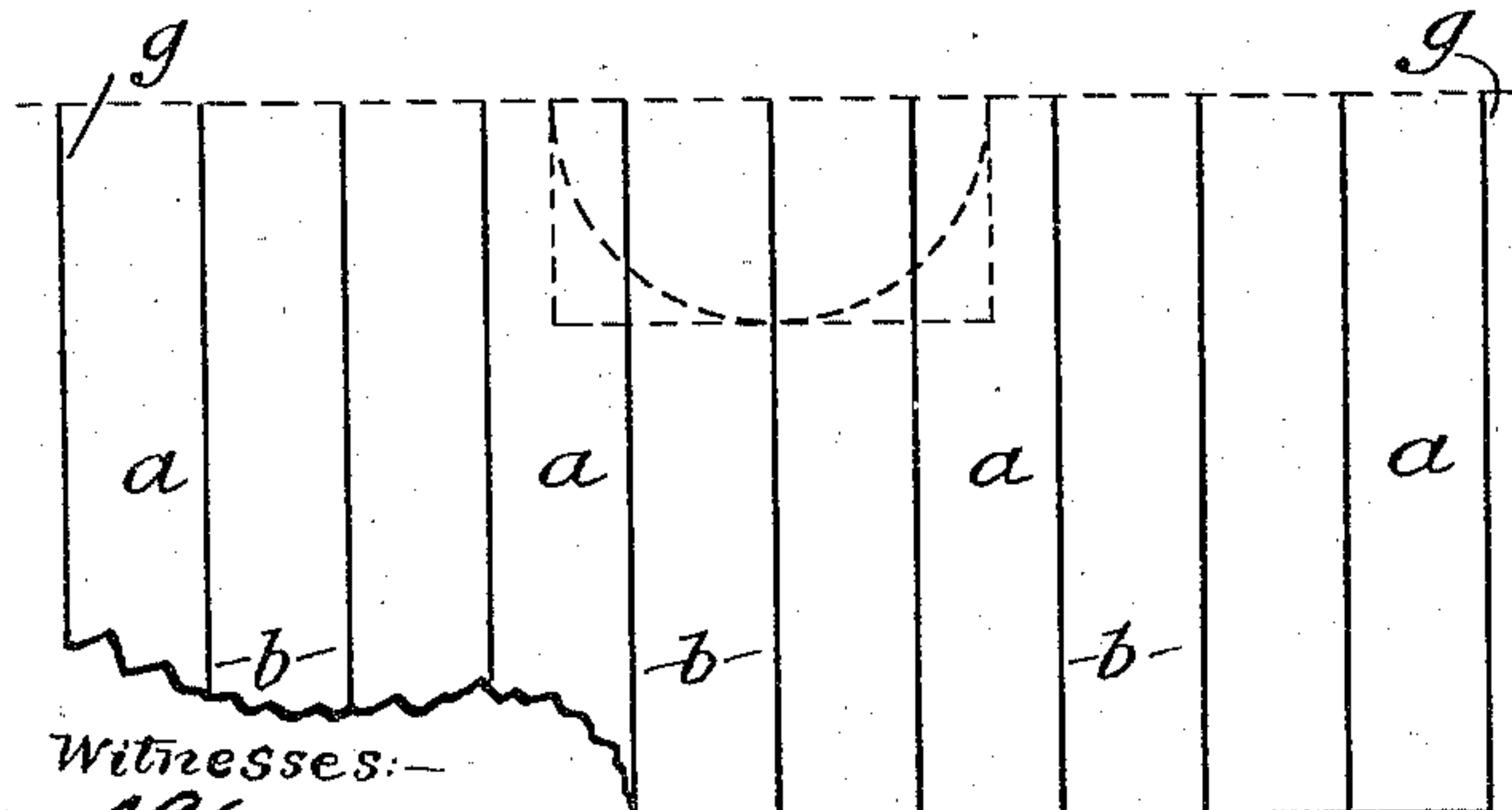


Fig 10

Witnesses:—

J. H. Wilson.  
Roy C. Bower.

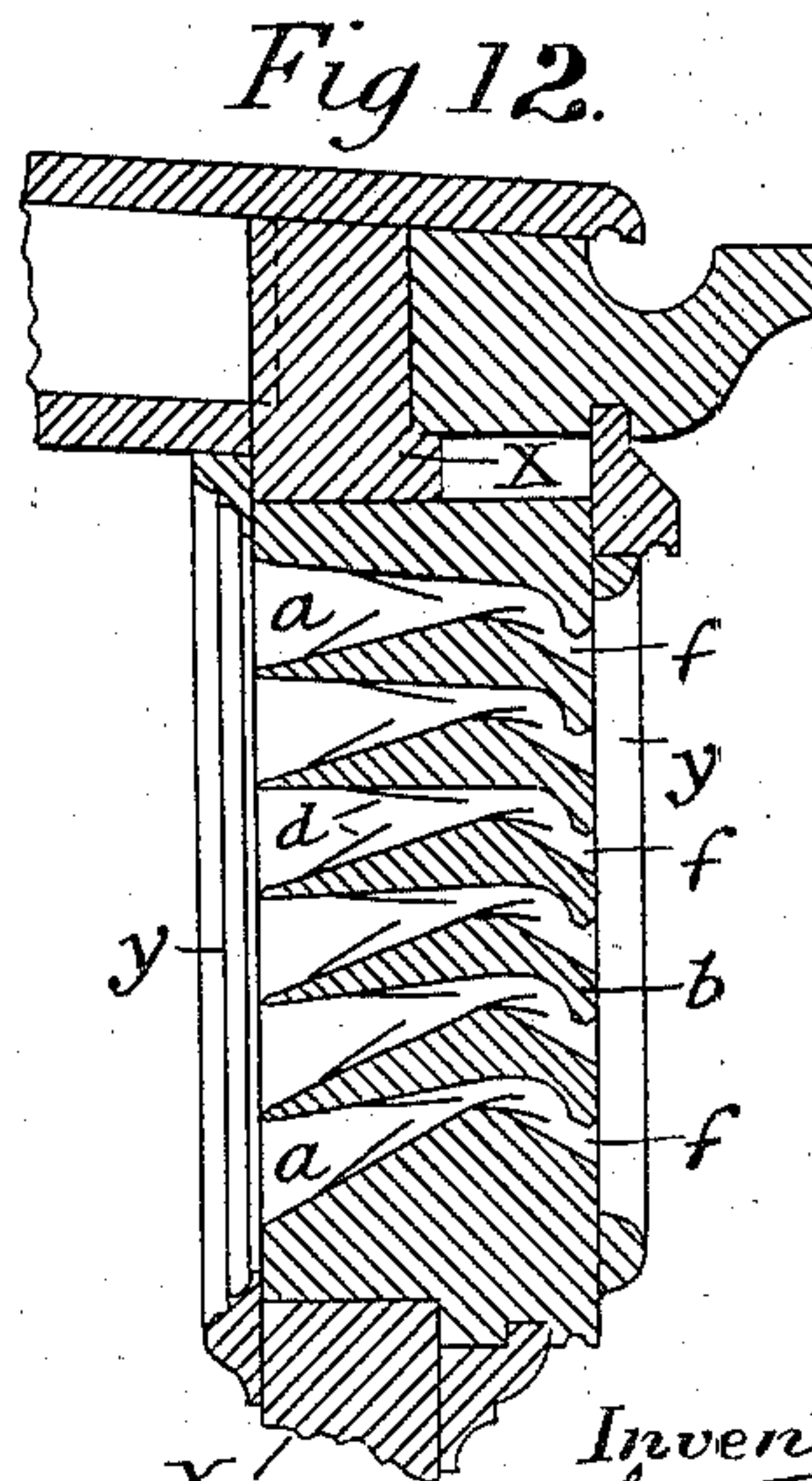


Fig 12.

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# UNITED STATES PATENT OFFICE.

JAMES CURTIN, OF CARLTON, VICTORIA.

## VENTILATION APPARATUS.

SPECIFICATION forming part of Letters Patent No. 542,554, dated July 9, 1895.

Application filed April 17, 1895. Serial No. 546,091. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES CURTIN, builder and manufacturer, a subject of the Queen of Great Britain and Ireland, and a resident of 409 Lygon street, Carlton, near Melbourne, in the Colony of Victoria, have invented certain new and useful Improvements in Ventilation Apparatus, of which the following is a specification.

10 This invention is designed chiefly to supply apparatus comprising means of ventilation for the admission of fresh air into dwellings, public halls, and other buildings, railway or other carriages, ships, sewers, drains, and  
15 other places requiring ventilation, and also for the withdrawal of foul or vitiated air from such places; and it consists of certain novel features hereinafter described and claimed.

Referring to the drawings, Figure 1 is an elevation in vertical section of my apparatus as applied to the ventilation of sewers and drains, said apparatus comprising inlet and outlet arrangements and uptake-shaft. Fig. 2 is an elevation showing the exterior parts of a downdraft inlet-ventilator as improved by me. Fig. 3 shows in sectional elevation the ventilator in Fig. 2 on the line 3 3 in the latter figure. Fig. 4 shows a sectional plan view on the line 2 2 in Fig. 2. Fig. 5 represents a sectional plan view of parts in Fig. 3, taken on the line 4 4 in the latter figure. Fig. 6 is an elevation from within; and Fig. 7 is an elevation in transverse section on the line 5 5 in Fig. 6, showing my apparatus with modifications applied to the walls or partitions of buildings, carriages, or other places for inlet-ventilation. In this form parts of the ventilator are adjustable to enable the shapes and sizes of the flues to be adjusted as required.  
40 Fig. 8 is a transverse sectional elevation illustrating a form of my outlet-ventilation apparatus as applied to walls, partitions, railway-carriages, &c. Fig. 9 shows an elevation in vertical section of an outlet-ventilation apparatus applicable to ceilings. Fig. 10 shows half of the same apparatus in plan view from beneath. Fig. 11 shows an elevation in vertical section of one form of my improved apparatus as applicable to the side of a rail-  
50 way-carriage or other suitable structures, and

Fig. 12 shows the said appliance, on a reduced scale, applied to a railway-carriage as an outlet-ventilator.

The arrows in the drawings show in each case the direction in which the ventilator is adapted to allow the air to pass through.

Referring to the figures, it will be observed that the feature common to my ventilators is that they are each composed of or contain a series of distinct flues *a a a*, formed by means of rigid divisions or plates *b b b* of sheet metal or any other material, wooden divisions being shown in Figs. 11 and 12. These divisions *b b* are so arranged that the flues have wide inlets and become more and more contracted as they extend toward the narrow outlets *f f*. The divisions *b b b* are also so arranged that any back-draft of air will be unable to take a straight course but will be diverted and will meet with practically insuperable obstacles. This is effected by curving the outlet ends of the division-pieces *b b b*, as shown, and in some cases forming branched or forked ends thereto *c c*, as in Figs. 8 and 9. The interior of each flue is also narrowed and given a kind of zigzag course by means of a series of trap-plates *d d d*, affixed obliquely and rigidly therein, their ends nearest to the ventilator-inlets being affixed to the divisions *b b b*, and their sides being fixed to the sides of the ventilator, (as the sides of *b* are,) the latter being shown in Fig. 5, so that there are a series of pockets formed one behind another, by means of which back-draft will be caught in the pockets, be split up, and arrested. The air caught in such pockets will become somewhat compressed and will tend to rebound and act as a resisting-pad to the passage of further air as a back-draft past it, but will not prevent air passing through the flues in the predetermined direction indicated by arrows in the drawings. I show in the drawings several (usually three) distinct pockets in each flue, and, as will be seen, I arrange the plates *d* successively on alternate sides of the flue, so that the pockets occur on alternate sides of the flue successively. This is necessary for effective results.

There may be an ordinary metal grating at the ventilator entrance and exit, as E and F



in Fig. 8, or a molding, as *y y* in Fig. 12, the wall or partition in which the ventilator is fixed being shown by *X X*.

The flues are not necessarily of equal length and size; but some of them may be modified and extended in their dimensions, as in the case where an inclination is given to the external sides *g g* of the apparatus.

In the case shown in Fig. 9 the aforesaid variation in the flues is shown. The part of this ventilator above the line *v* (the base of the upshaft) is preferably made square for a short distance up, so as to suit square-topped flues. The shaft *t* may be carried up to the outer air in any suitable way. A cap or cowl, as shown in Figs. 2, 3, and 4, (but omitting the parts below the line *H* in Fig. 3,) is in some cases used in combination with the shaft *t* of the ventilator in Fig. 9 for the eduction of vitiated air.

In Fig. 1 *K K* is a sewer or drain. *B* is an inlet-air ventilator; *C*, an outlet-ventilator fixed to the top of the ventilating-shaft *L*, which is connected to the drain at *w'*, and which has an arrangement of small flues at *D* (shown in plan at *D'*) for the purpose of assisting the upcurrent by admitting external air upwardly, said flues being curved and narrowed at the top, forming traps to prevent back-draft, the direction of the air-currents being shown by arrows. *F* is a movable metal grating covering a well-hole, as shown. A half-drain pipe *S* is used at the bottom of the well-hole, and at *G*, which shows the foot of the side of said hole, the latter is sloped toward the upshaft, as shown, to allow space for draft. *H* shows the level of the ground.

In *B*, Fig. 1, *a a* are a series of flues (the more flues the better) having wide inlets for the ingress of fresh air and contracted outlets *f f*, with curved divisions *b b*, preferably of sheet metal, and trap-plates *d d*, all as previously set forth.

A cover consisting of plates, as *d'*, preferably of sheet metal, is provided immediately over the flue-inlets to prevent the entry of rain or dust into the flues.

*e e* are holes in the vertical sides of the ventilator for admitting fresh air.

*q* is a metal plate to which the whole ventilator *B* is affixed, as by solder, this plate being made to fit accurately a metal support *h*, built into the well-hole. The joint between *q* and *h* is made air-tight in any suitable manner, as by a rubber fillet *i*. I may use also a small pipe perforated on top and trapped, as *P*, formed at the foot similarly to one of the outlets *f* at the foot on the inlet-ventilator *B*, for the purpose of carrying away surface-water that may enter through the grating *F*. The pipe *P* may be placed in any convenient position on the metal plate *q*.

The entire ventilator *B* may be removed for cleaning and may be refixed again by any suitable means, as by screws *k k*.

At the top of the ventilating-shaft *L* (*vide*

Fig. 1) is the outlet-ventilator *C*, in which are flues *a* with divisions *b* and trap-plates *d*, as already described, to prevent downdraft.

*s s* are capping or roof plates fixed immediately above the outer ends of the divisions *b* to protect the flues from direct exposure to the weather and also serving to assist the up-draft. There are small holes *e' e'* provided to allow water or dust that may get into the angles of the flues to escape. Wires or bars are preferably fixed at uptake-openings *f'*, which are on each side of the ventilator to prevent birds and rubbish entering.

*W W* are holes or one continuous opening for increasing the updraft. The openings *f'* and *w* face downwardly, and are situated below the outlets *f*, so as not to act as exits.

When the ventilator *C*, Fig. 1, is to be used as a cowl for chimney-shafts, the trap-plates *d* should be removed and the flues *a* be made parallel instead of being narrowed together at their exit or upper ends.

The modified ventilator shown by Fig. 3 has a lower series of trapped flues *a*, (as in *B* Fig. 1,) but with the wide end of the flues straight, and an upper series, as next described, the two series being connected by a chamber *O* of any suitable length. This modified form may be used (as a part of the apparatus in Fig. 1) in lieu of the ventilator *B*. The upper part (see Fig. 2) may be used without the lower part (containing the flues *a*) in suitable cases for house-ventilation.

*A A* are mouths or openings for admitting fresh air, *a' a'* being flues formed by partitions *b' b'* of sheet metal or other suitable material. The flues are narrowed internally to accelerate the rate at which fresh air entering *A A* passes into the chamber *O*. The air then travels down *O* around the exterior of the pipe or core *R* into the flues *a a*. The foot of chamber *O* is preferably made square or rectangular (as from the line *O'* downward) for convenience in fitting the flue partitions *b*, (as shown in Fig. 5.) A small interior channel *l* around the top of *O* is provided to receive rain-water that may be blown through *A A*, such water being carried away by a down-pipe *l'*.

*g'* is an outer protective casing.

The form of ventilator shown in Figs. 6 and 7 is shown projecting obliquely outward from the face of the wall, but it might be made with a vertical face and be flush with the wall. This ventilator has movable trap-plates *d<sup>2</sup> d<sup>2</sup>*, which are usually tongues of sheet metal hinged or suitably connected to the flue divisions at the ends of the tongues nearest the flue entrances. The other ends are fixed to transverse bars *m m*, to which vertical connecting wires or rods *M M* are secured. When this ventilator is fully open the movable plates *d<sup>2</sup> d<sup>2</sup>* remain close to the flue-divisions, but at other times the flue-exits *f* are made narrower, or, if desired, wholly closed, as hereinafter described. There may be (although



not shown in the drawings) within the flues *a a* fixed trap-plates *d d*, as well as the movable ones *d<sup>2</sup> d<sup>2</sup>*, the fixed plates being arranged so as to catch and arrest any draft entering at *f f*. The wires or rods *M* are connected at their upper ends to the outer ends of levers *n n*, which are fixed at their other end to an axle *p*, which extends transversely from side to side of the ventilator and is pivoted to said sides. The levers *n* may be raised in any suitable manner, as by tumblers *T*, which are attached to an axle (parallel and pivoted similarly to *p*) connected to a crank *r*, attached to which is a cord *j*, which is passed over a pulley *u*, and down, as through a hollow bead *u'*. The lower end of the cord is made accessible to enable said cord to be pulled and secured suitably when the ventilator trap-plates *d<sup>2</sup>* are to be raised or lowered. A weighted fillet, as *N*, may be used for connection of the levers *n n* to insure their moving evenly, the weight of the fillet pressing down the levers and keeping the ventilator fully open when the cord is released. The particular form of the mechanism for operating the parts *d<sup>2</sup> d<sup>2</sup>* is, however, quite immaterial, so long as the adjustability of *d<sup>2</sup>*, as described, is secured.

Having thus described my invention, what

I claim, and desire to secure by Letters Patent of the United States, is—

1. An improved ventilation apparatus consisting of a series of flues *a*, with wide openings, and narrow exits *f*, said flues formed by a series of divisions *b* and having attached to said divisions a series of fixed trap-plates *d*, arranged to form successive traps or pockets in said flues on alternate sides, substantially as and for the purposes set forth.

2. An improved adjustable ventilation apparatus having in combination a series of flues *a*, movable trap-plates *d<sup>2</sup>* within said flues, bars *m m* connected to said plates at the outlets *f* of said flues and means for moving said bars and plates, substantially as and for the purposes set forth.

3. In an inlet ventilation apparatus the arrangement and combination of inlets *A*, flues *a'*, divisions *b'*, chamber *O*, channel *l*, pipe *l'*, flues *a*, divisions *b*, trap-plates *d* and outlets *f* substantially as described.

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

JAMES CURTIN.

Witnesses:

GEORGE G. TURRI,  
N. TURRI.