

No. 626,773.

Patented June 13, 1899.

F. J. S. ROBERTS.
PORTABLE OVEN.

(Application filed Oct. 5, 1898.)

(No Model.)

9 Sheets—Sheet 1.

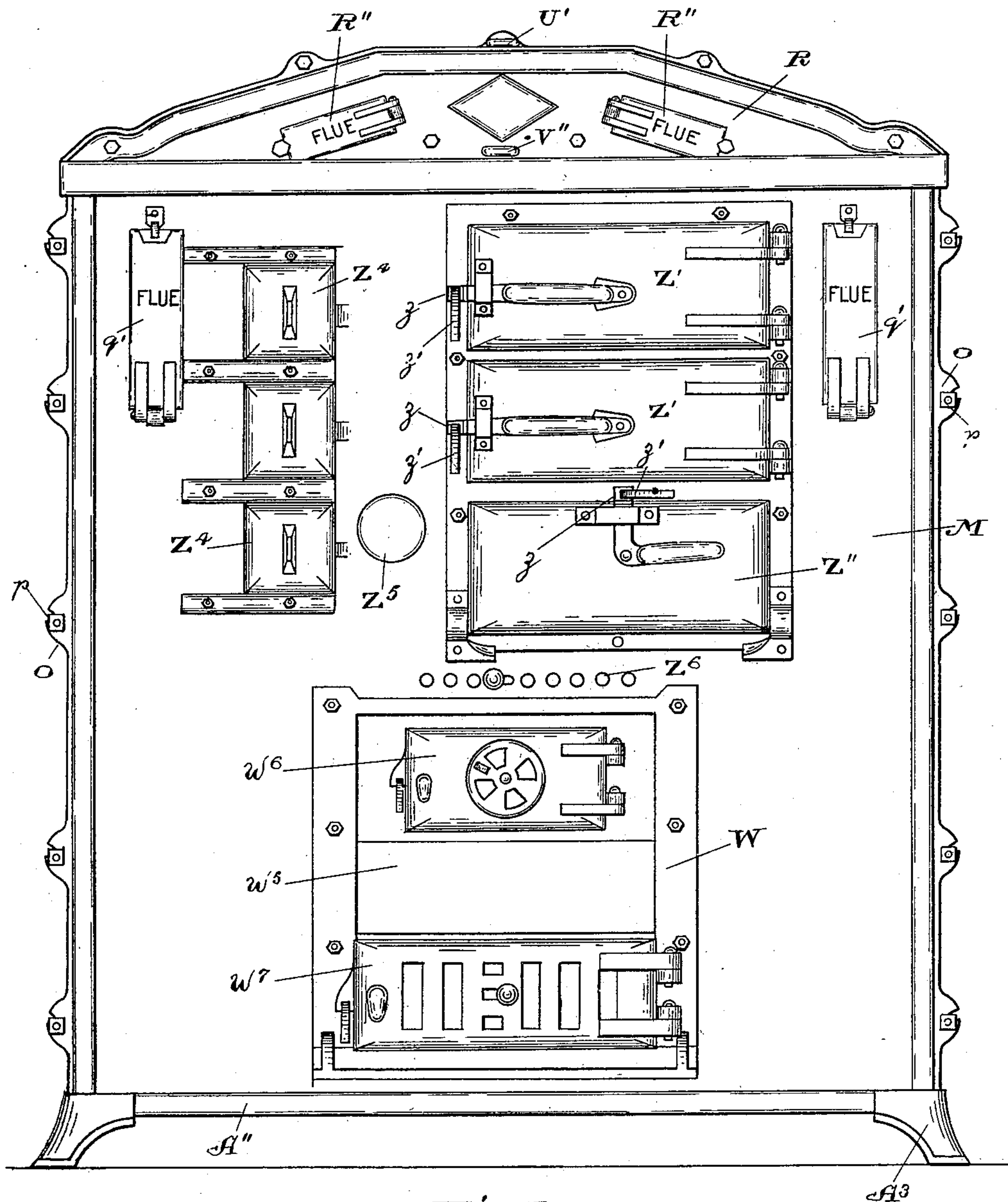


Fig. 1

Witnesses

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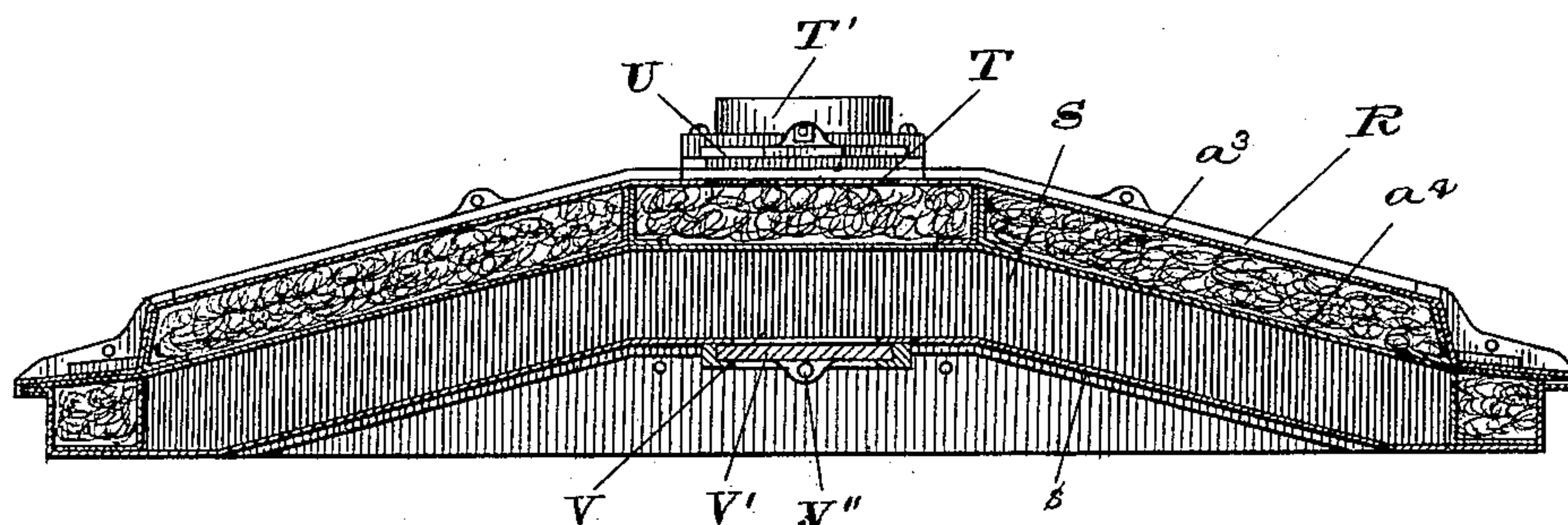
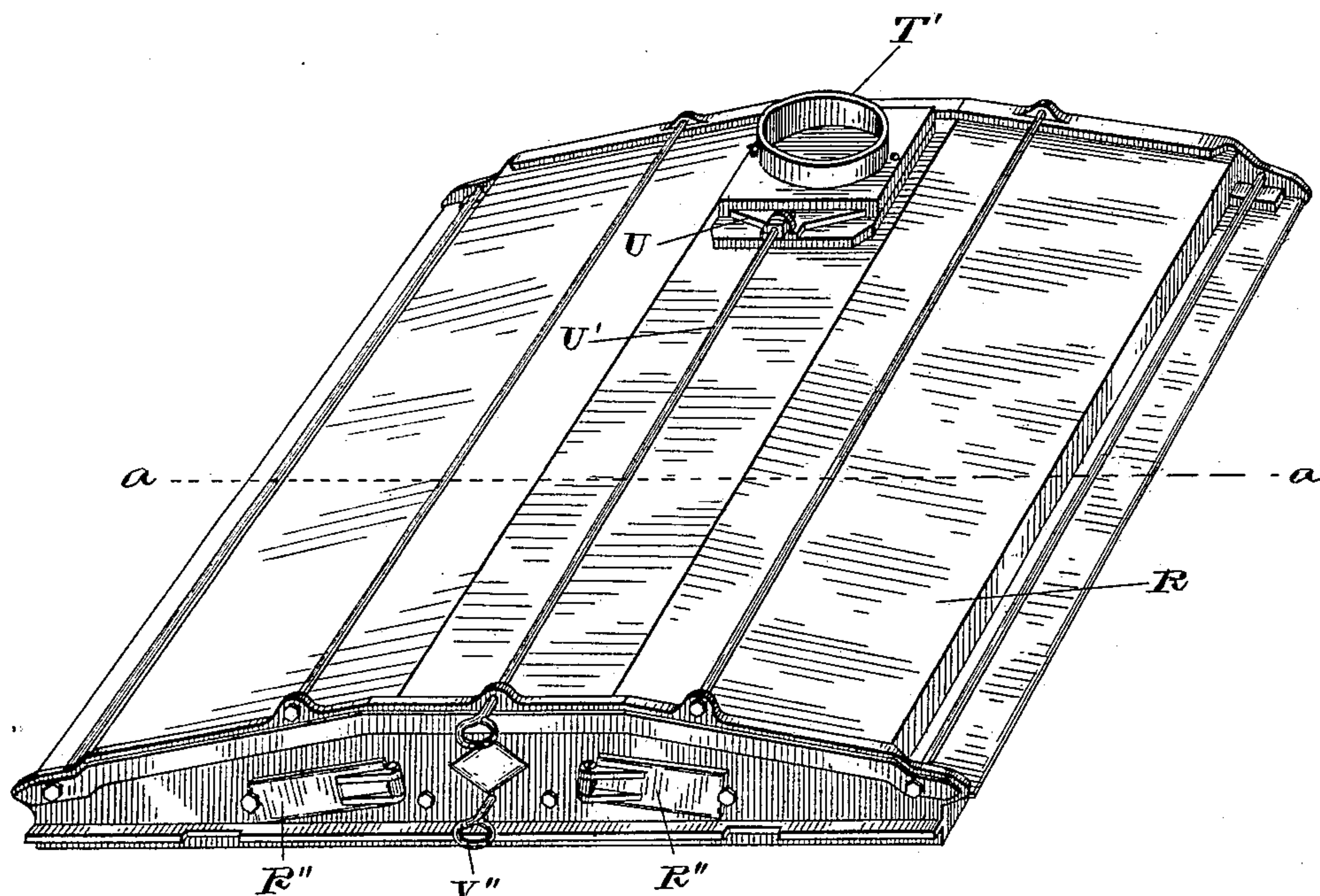
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9 Sheets—Sheet 2.



Witnesses

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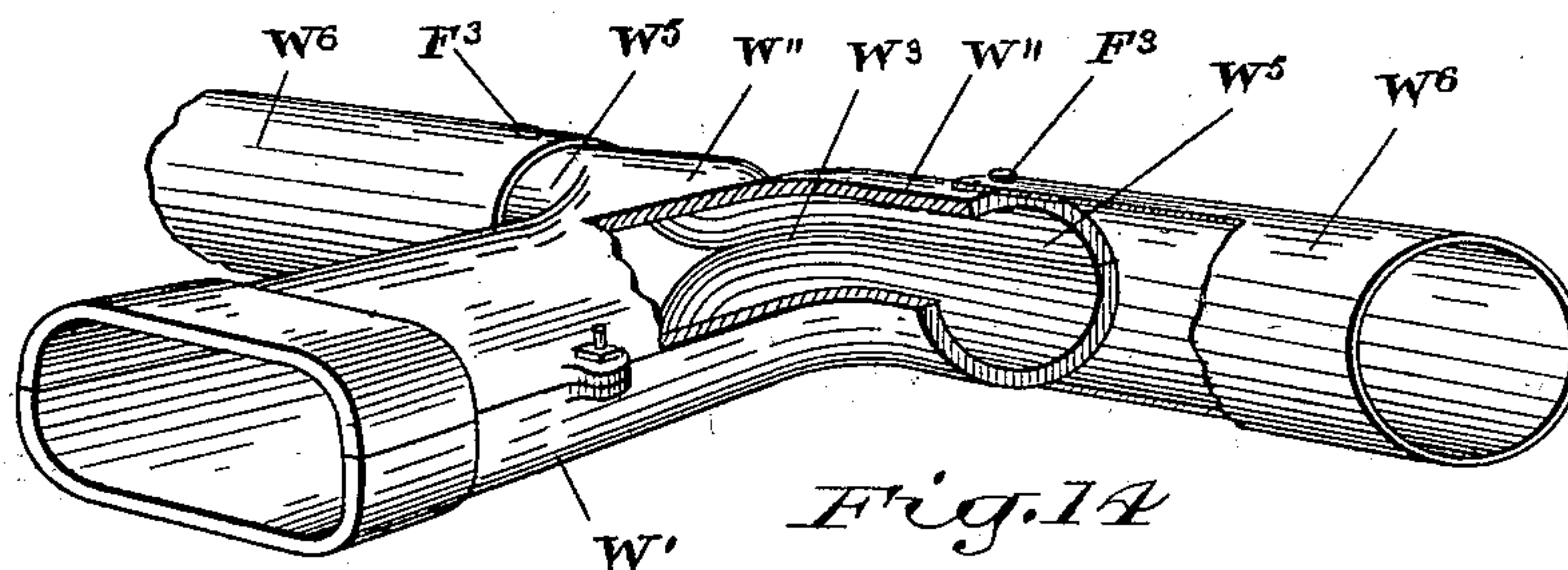
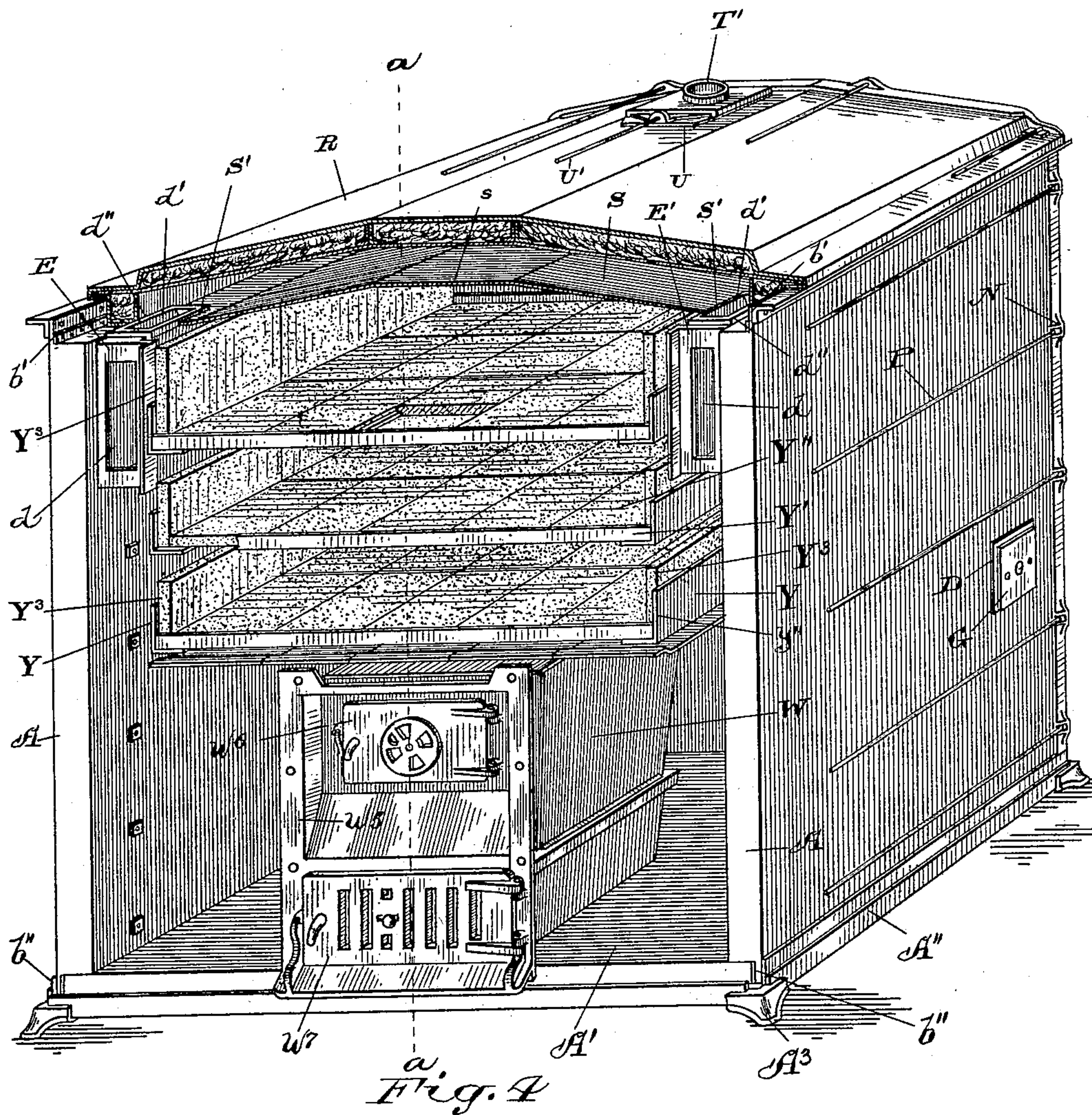
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9 Sheets—Sheet 3.



Witnesses

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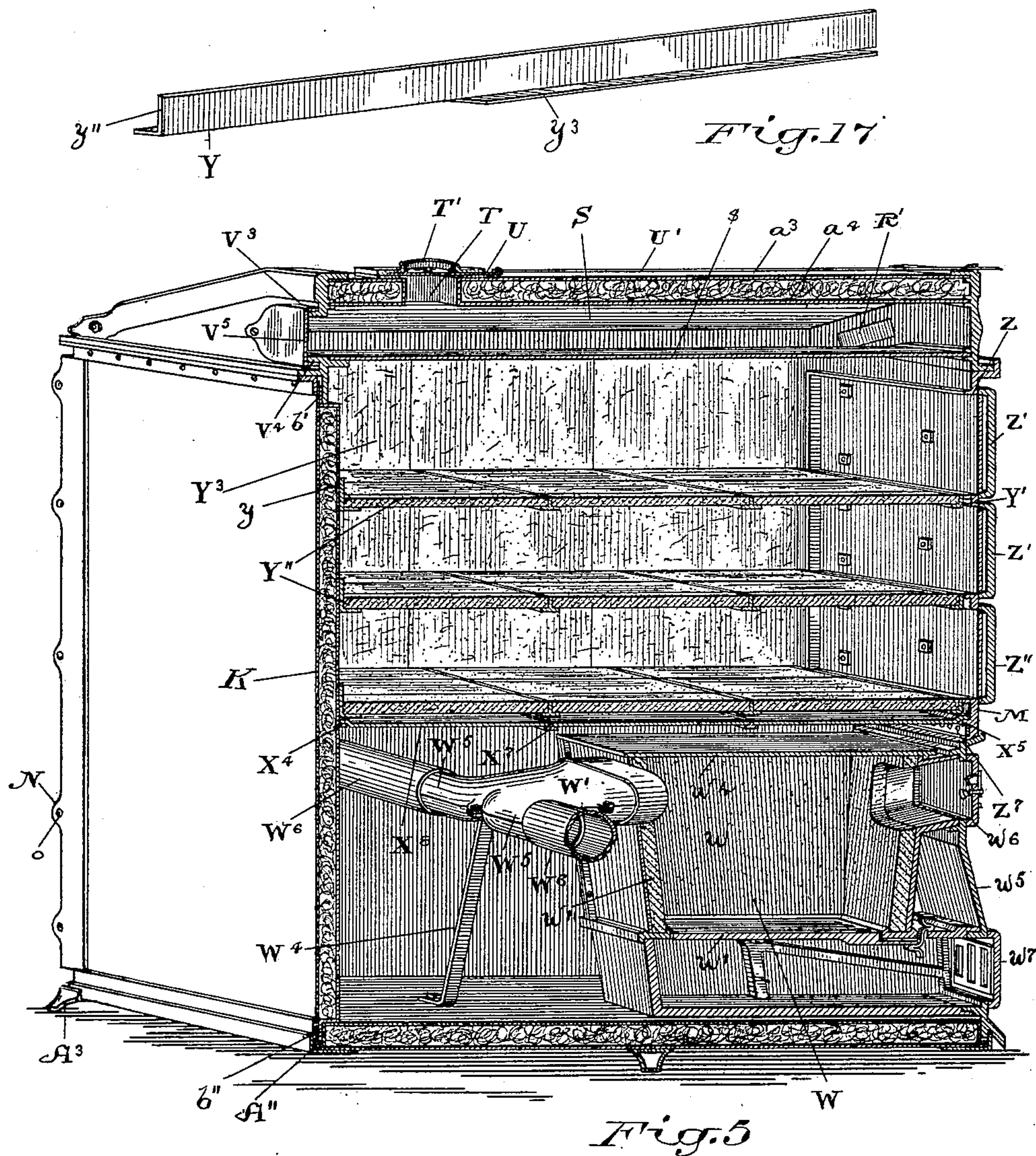
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9 Sheets—Sheet 4.



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9 Sheets—Sheet 5.

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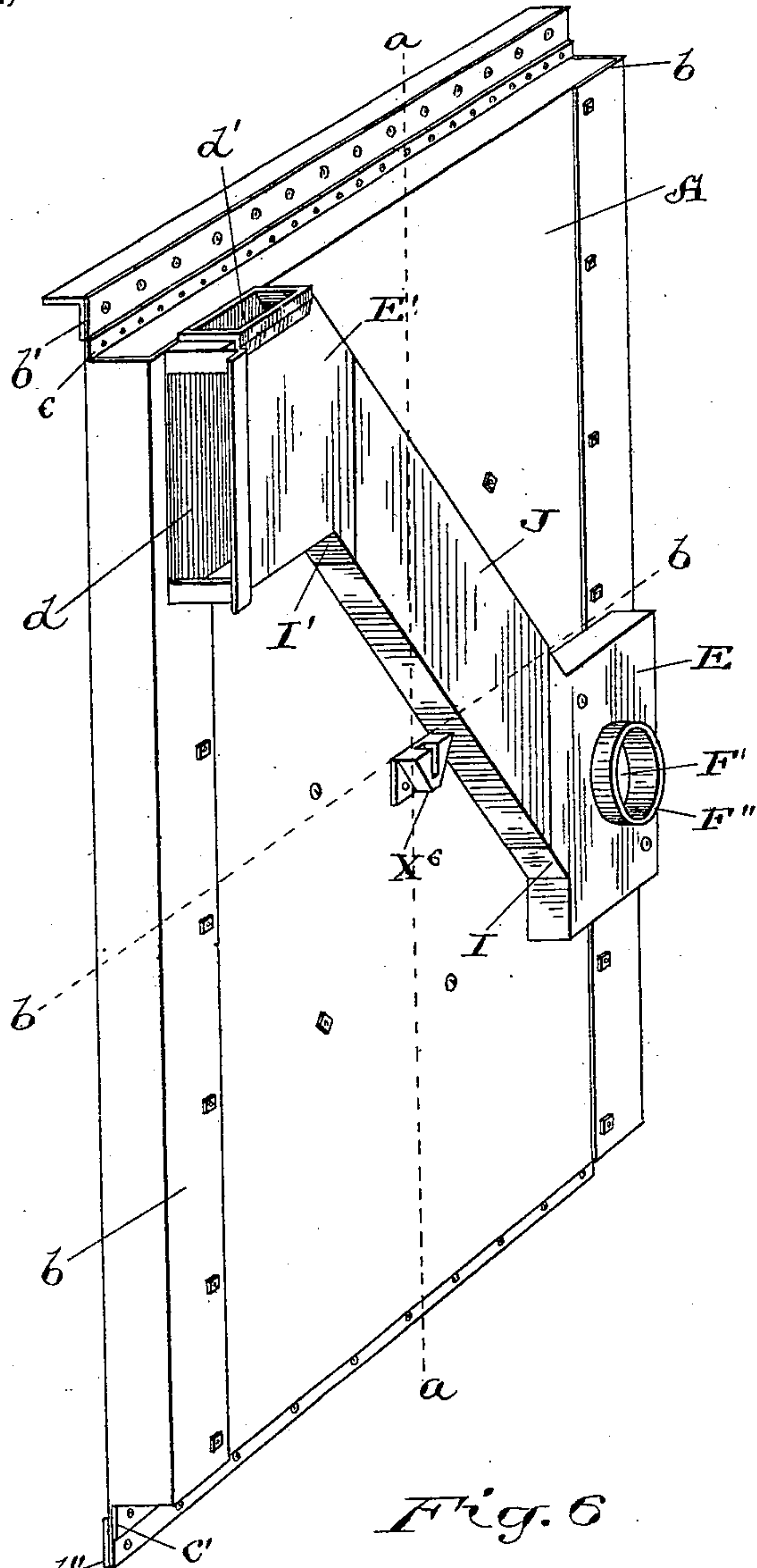


Fig. 6

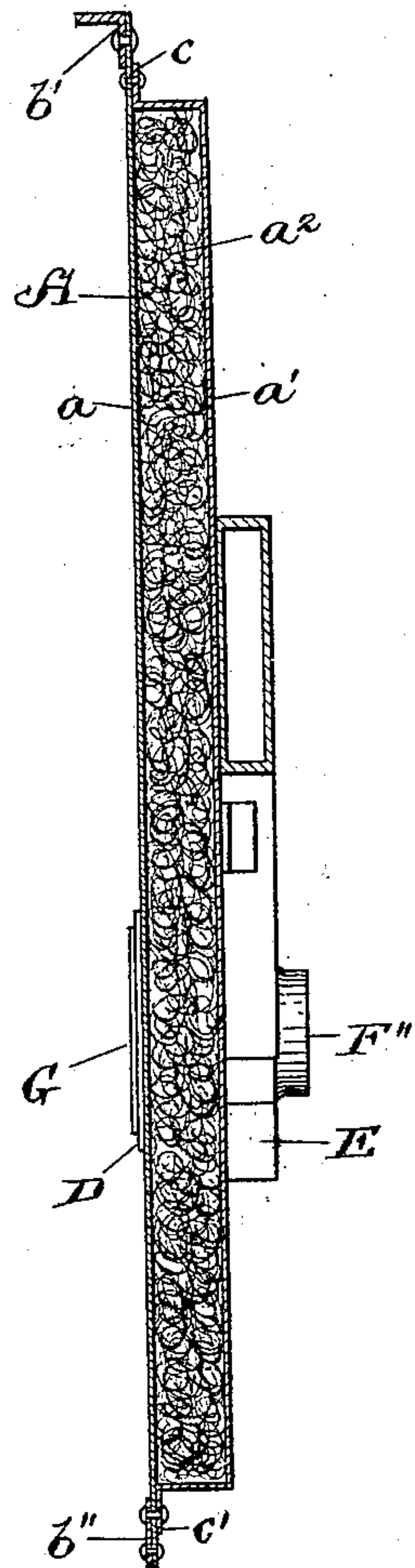


Fig. 7

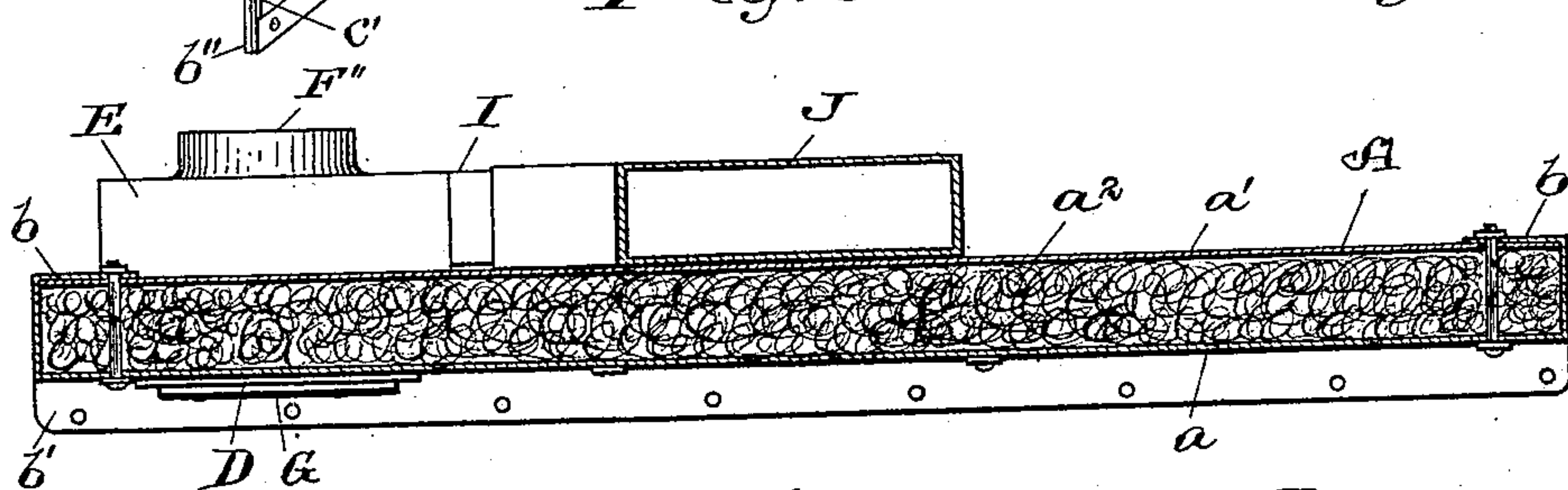


Fig. 8

Witnesses

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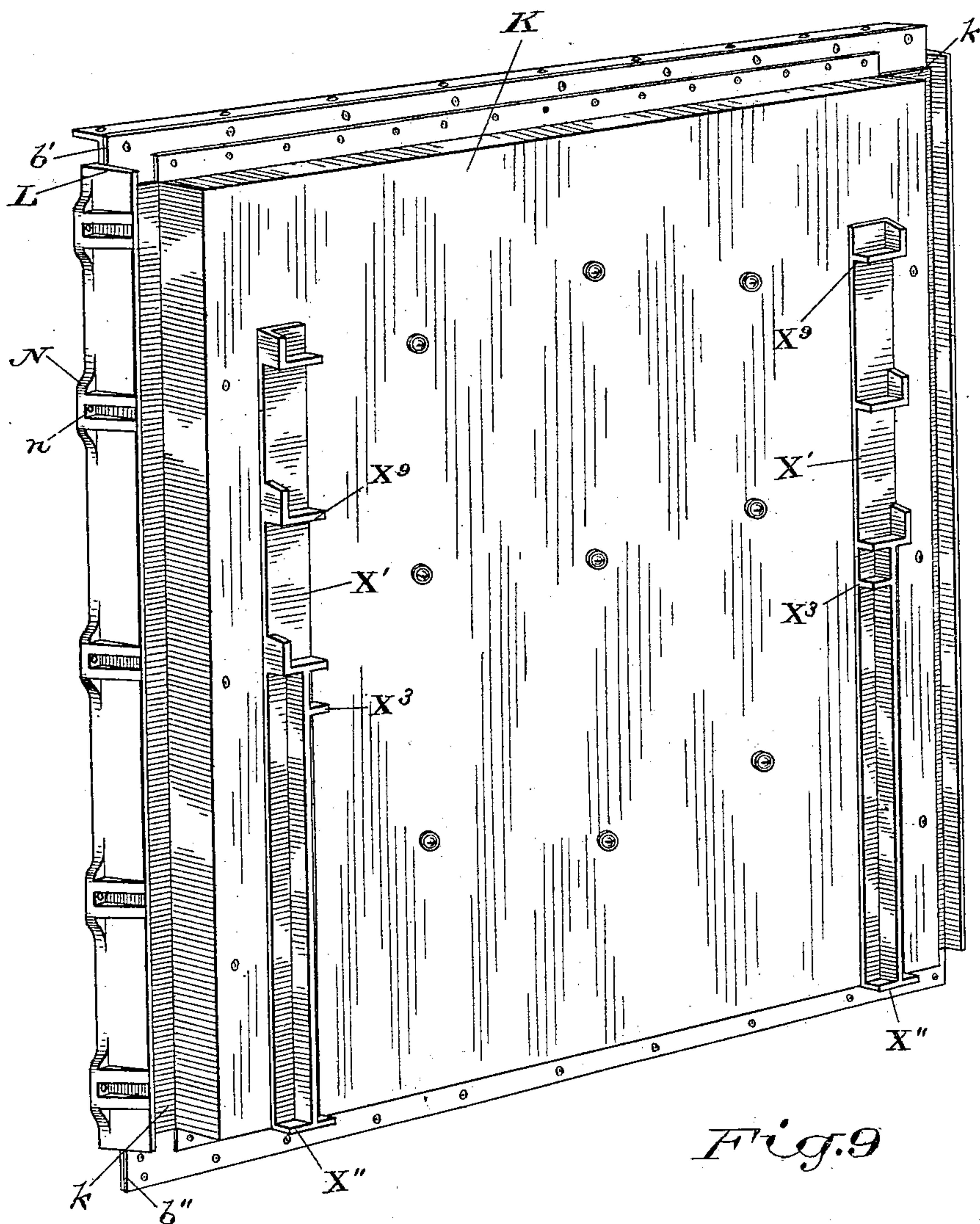
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9 Sheets—Sheet 6.

(No Model.)



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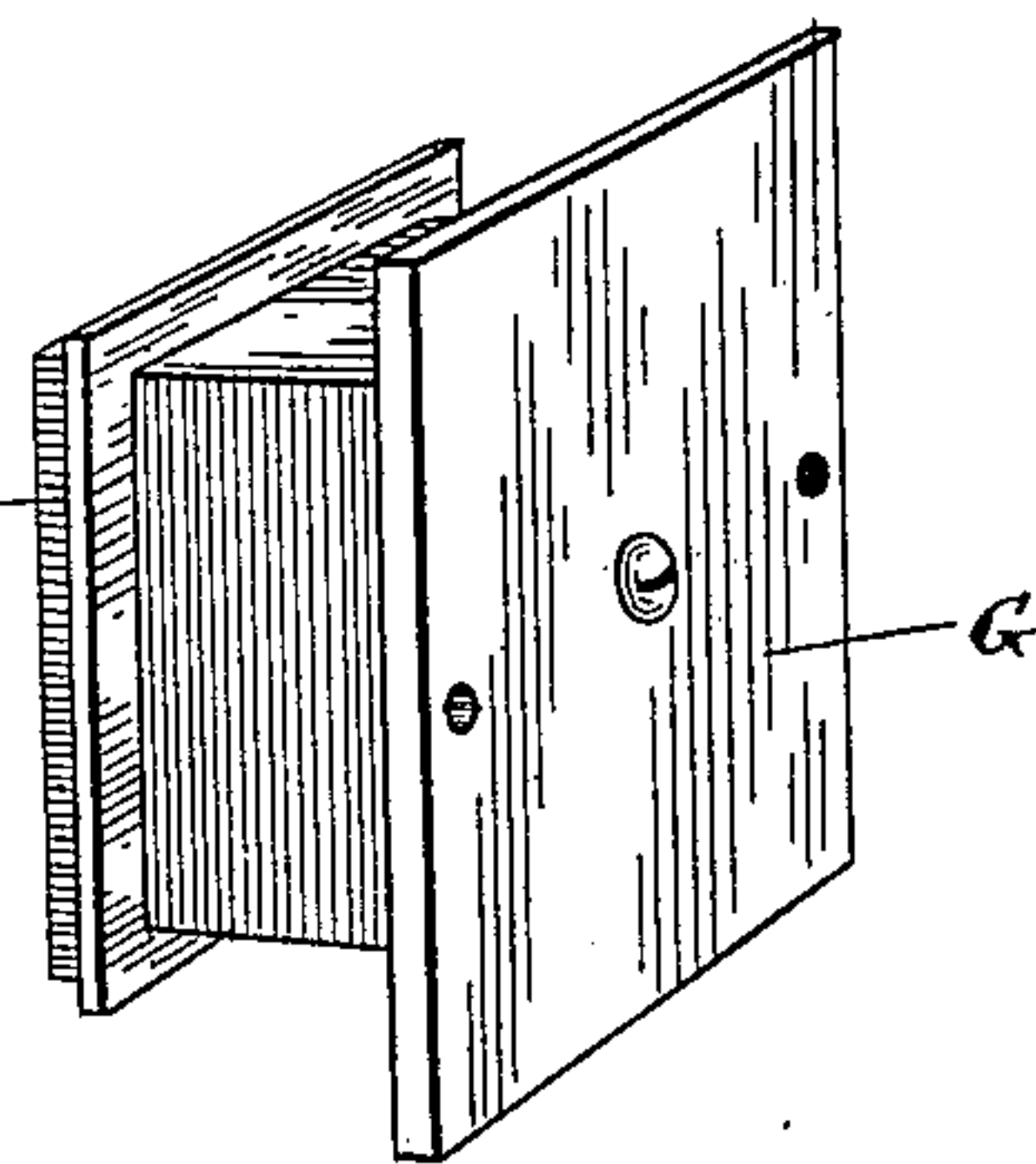
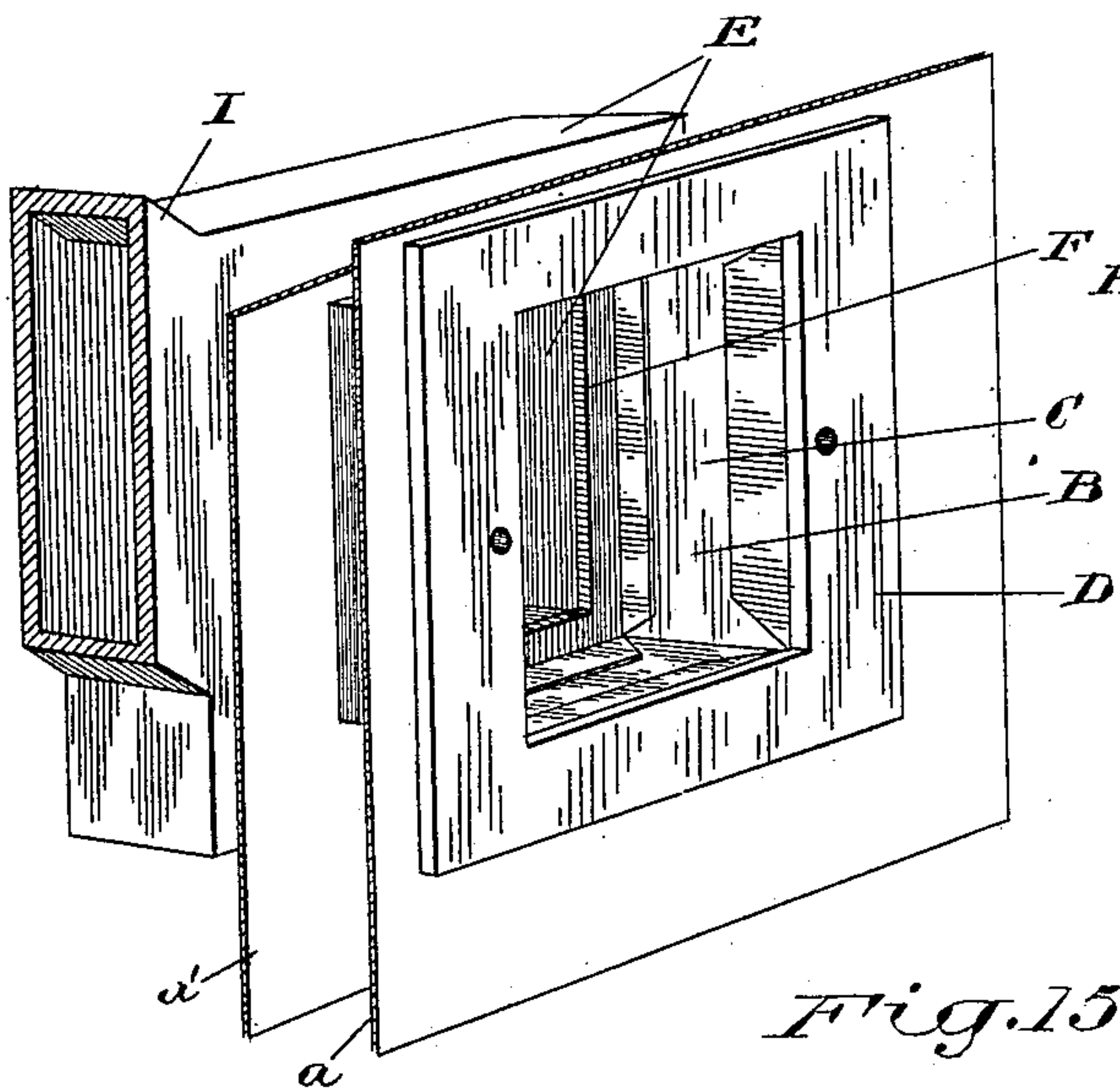
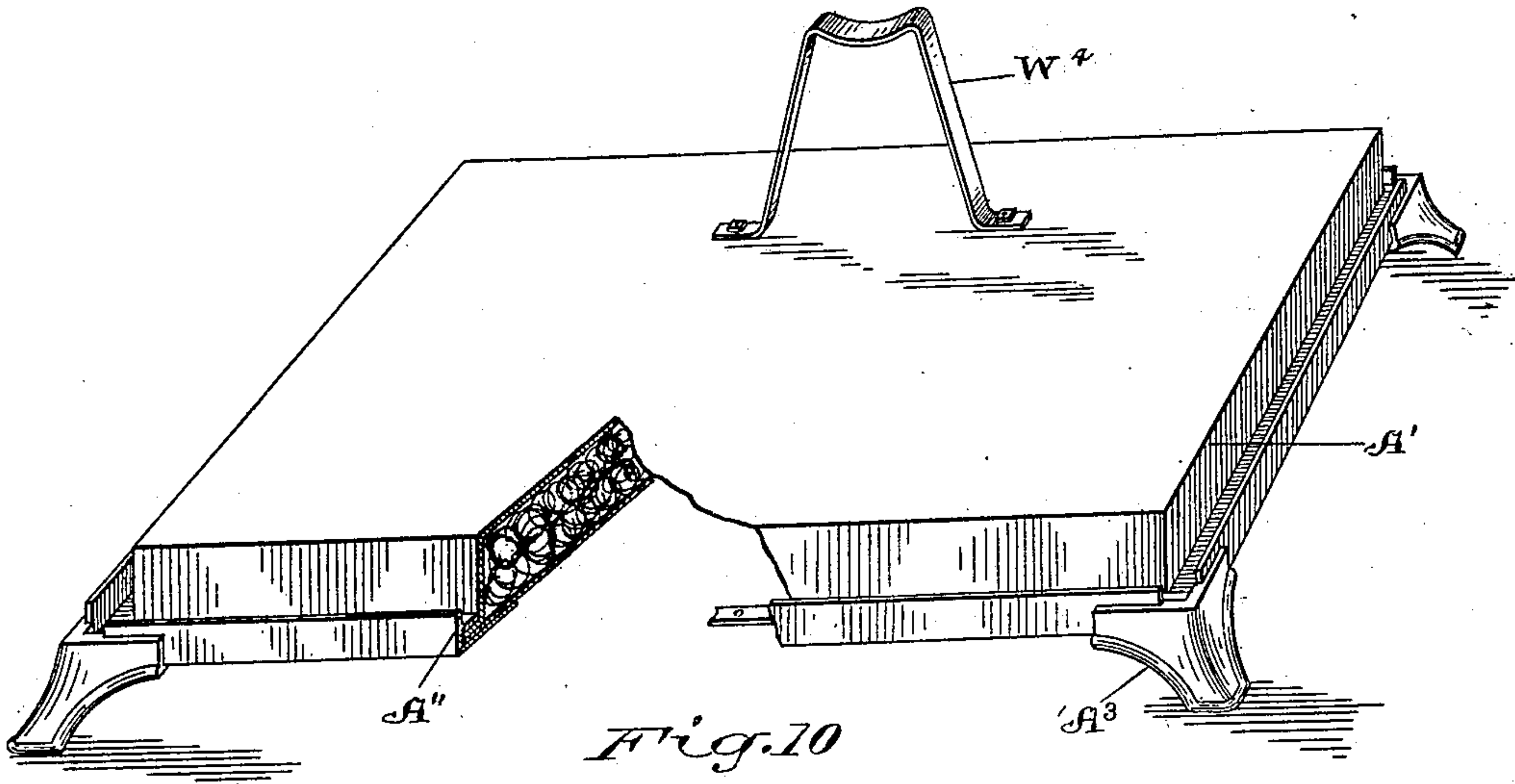
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(Application filed Oct. 5, 1898.)

Patented June 13, 1899.

9 Sheets—Sheet 7.

(No Model.)



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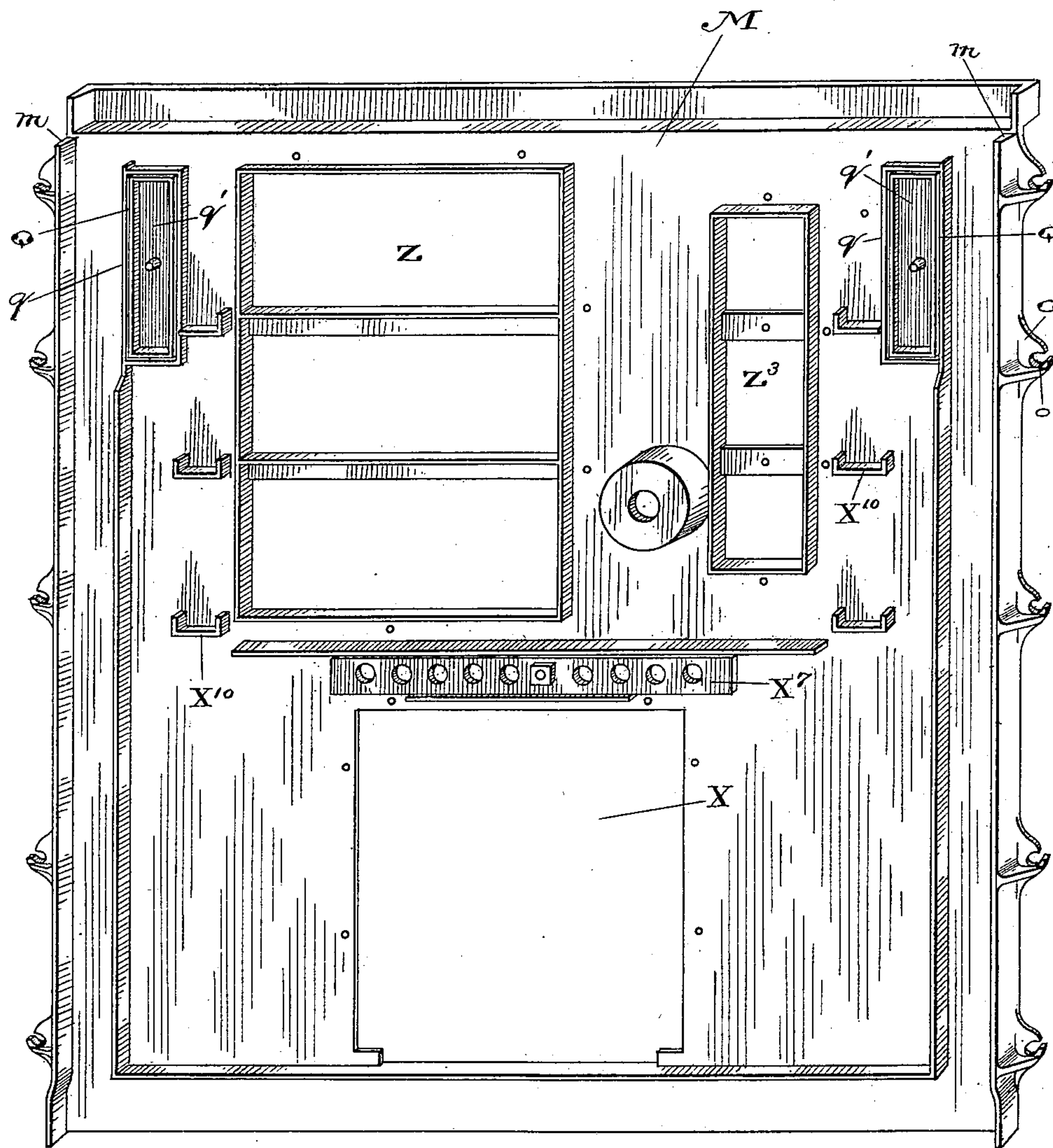


Fig. 11

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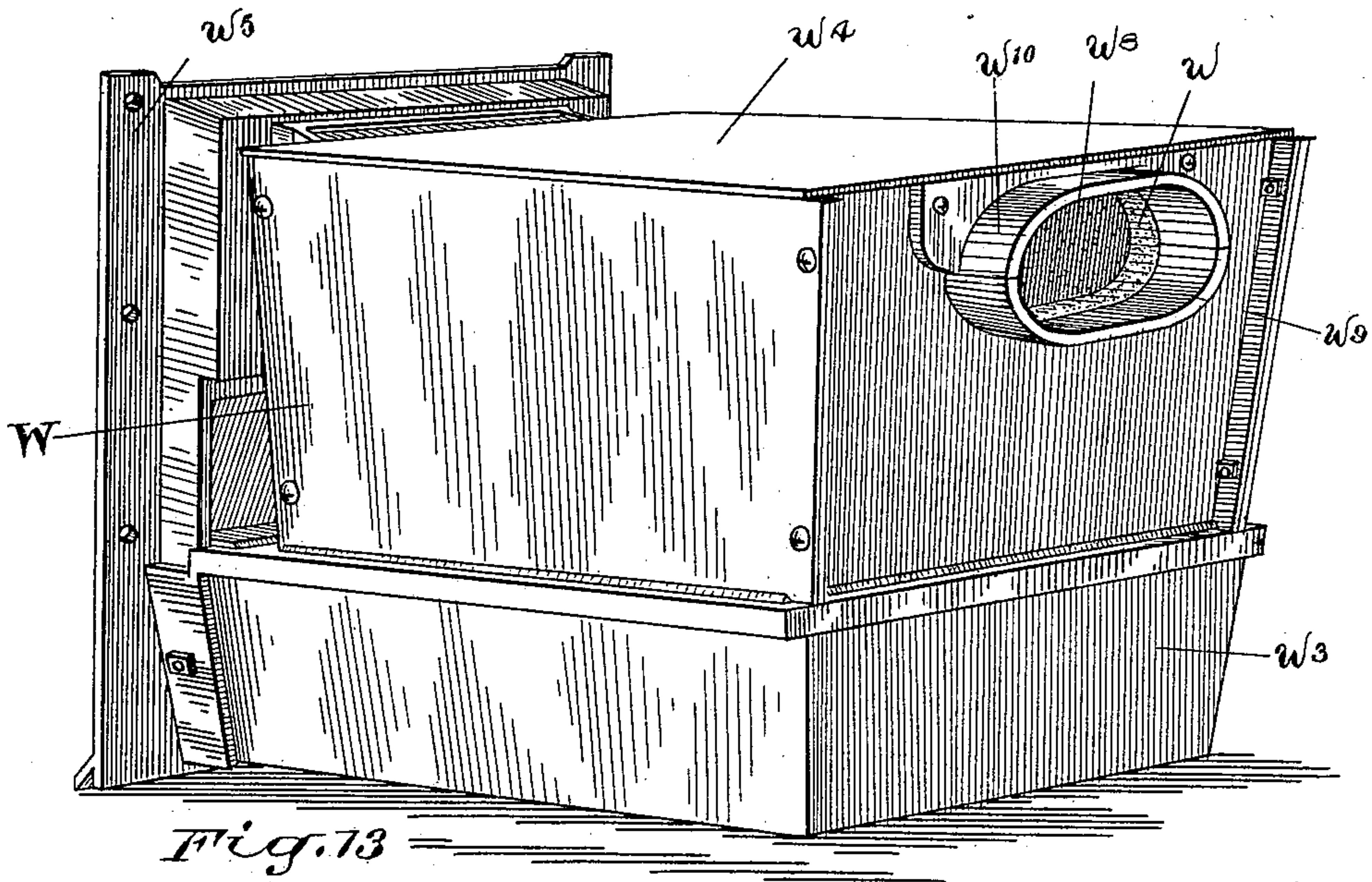
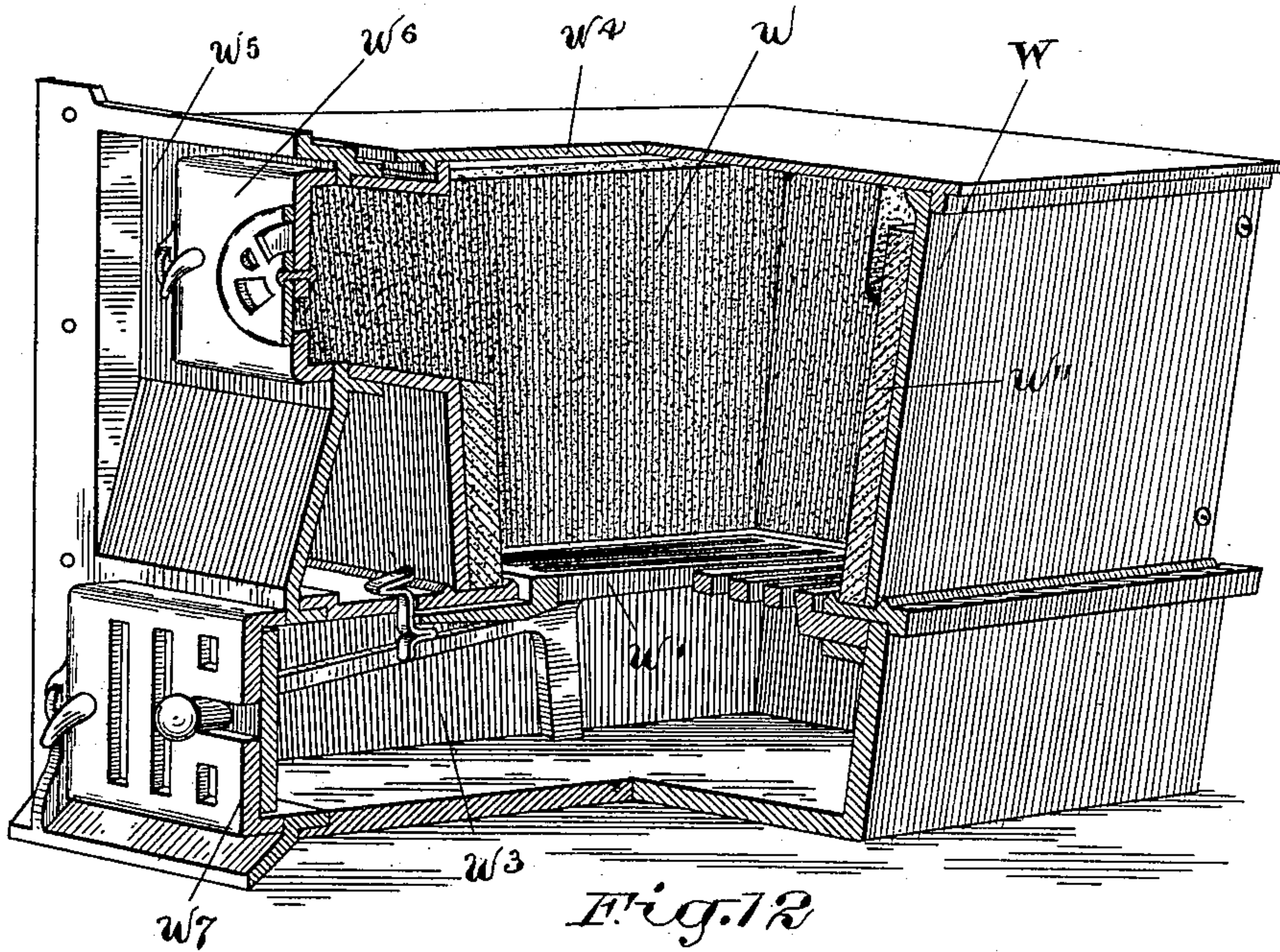
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(Application filed Oct. 5, 1898.)

(No Model.)

9 Sheets—Sheet 9.



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UNITED STATES PATENT OFFICE.

FRANK J. S. ROBERTS, OF TORONTO, CANADA.

PORTABLE OVEN.

SPECIFICATION forming part of Letters Patent No. 626,773, dated June 13, 1899.

Application filed October 5, 1898. Serial No. 692,741. (No model.)

To all whom it may concern:

Be it known that I, FRANK J. S. ROBERTS, of the city of Toronto, in the county of York and Province of Ontario, Canada, have invented certain new and useful Improvements in Portable Ovens; and I hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to certain new and useful improvements in portable ovens; and the object of the invention is to so construct a portable oven that it will do the greatest amount of baking with the least amount of fuel and to so arrange the several parts constituting the oven that they can be made in portable sections and easily and quickly put together by any person of ordinary intelligence; and the invention consists, essentially, of the device hereinafter set forth, and more particularly pointed out in the claims.

In the drawings, Figure 1 is a front elevation of the oven. Fig. 2 is a perspective view of the top. Fig. 3 is a transverse sectional view through the top on the lines *a a*, Fig. 2. Fig. 4 is a perspective view of the interior of the oven with the front removed. Fig. 5 is a perspective section on the lines *a a*, Fig. 4. Fig. 6 is a perspective view of one of the sides. Fig. 7 is a vertical section on the lines *a a*, Fig. 6. Fig. 8 is a horizontal section on the lines *b b*, Fig. 6. Fig. 9 is a perspective view of the back. Fig. 10 is a perspective view of the base looking at it from the top. Fig. 11 is a view of the inside of the front. Fig. 12 is a view of the furnace looking at it from the front, with the cover partly broken away to show the inside. Fig. 13 is a view of the furnace looking at it from the back. Fig. 14 is a view of the Y-pipe for the furnace, partially broken away to show the central partition. Fig. 15 is a view of one of the lower flue-boxes. Fig. 16 is a view of the stopper for the flue-box. Fig. 17 is a perspective view of one of the topmost angle-supports.

Like letters of reference refer to like parts throughout the specification and drawings.

A' represents the base, which consists of a substantially rectangular shell filled with mineral wool or other non-conducting material. Surrounding the body portion of the base A' is an upturned flange A'', which embraces the front sides and back and holds the

bottom of these parts securely in place when these parts are assembled. The flange A'' consists of a piece of angle-iron shaped to correspond with the shape of the base. Bolted to the corners of the base are feet A³, which feet securely fasten together the corners of the sides and ends of the angle-iron flange.

A represents one of the side sections, which consists of a substantially rectangular outer wall *a* and inner wall *a'*, parallel with the outer wall *a*, with a space between them filled with mineral wool *a''* or other non-conducting material. In the construction of the side sections the outer wall *a* is provided with side flanges *b*, which are folded over the sides of the sections and overlap the side edges of the inner wall *a'*, the purpose of this construction being to strengthen the section and form side walls to retain the mineral wool or other packing in place. The top and bottom of the outer wall *a* are provided with flanges, respectively, *b' b''*, for the purpose hereinafter set forth. The top and bottom of the inner wall *a'* are each provided with a flange *c c'* respectively, which are folded over and riveted, respectively, to the top and bottom flanges *b' b''* to serve as the top and bottom of the section.

Formed through the lower part of the section A at or near the back is an opening B, fitted with a metallic collar C. The opening B on the outer face of the section A is surrounded by a metallic frame D.

Located on the inner face of the side section A, contiguous to the opening B, is a flue-box E, and formed through the back of the flue-box E is an opening F, communicating with the opening B. The opening B is closed by a flue-stopper G, corresponding in shape and size with the opening B. The inner face of the flue-stopper G is provided with a flame-plate H, which extends through the opening F into the flue-box E, the inner face of the flame-plate H being flush with the inner face of the flue-box E. Formed through the flue-box E is an opening F', surrounded by a collar F'' to receive the end of the smoke-pipe from the furnace.

The front of the flue-box E is provided with an upwardly-inclined collar I, to which is fitted the lower end of the side flue J, while the upper end of the side flue J is fitted to the

downwardly-inclined collar I' of a flue-box E', attached to the front of the inner face of the section A at or near the top. The side flue J is sufficiently loose on the collars I I' to be
5 longitudinally moved on the collars to permit of its end when so moved clearing the end of the adjacent collar and allow of the removal of the side flue.

The front of the flue-box E' is provided
10 with an opening d , while the top of the flue-box E' is provided with an opening d' .

K represents the back section of the oven, which corresponds in its general construction with the side sections A. The back section
15 K is provided with side flanges k k , which overlap the back edges of the side sections A. Riveted to the edge of each of the side flanges k k is an angle-iron L, which is adapted to overlap the outer face of the walls a of
20 the side sections A when the back and side sections are assembled to protect the corners.

The front M is preferably made of cast metal and is provided with side flanges m , similar to the angle-irons L, to overlap the front edge of
25 the outer face of the walls of the said sections when the parts are assembled. The side of each angle-iron L is provided with outwardly-projecting lugs N, having bolt-holes n , while the side flanges m of the front M are each
30 provided with outwardly-projecting lugs O, having slots o . The lugs O, with their slots o , are horizontally opposed to the lugs N and bolt-holes n . Passing through each pair of
35 lugs N and O is a rod-bolt P, fitted with a nut p . The head of the rod-bolt P bears against the front of its respective lug O, while the nut p presses against the back of its respective lug N. By providing the lug O with
40 the slot o the bolt can be dropped into place in the lug O after the end has been passed through the hole n in the opposite lug N, thus obviating the necessity of feeding the bolt through the front lugs.

When the front, back, and side sections
45 are assembled and the bolt-rods placed in position, the front and back will be rigidly drawn together and hold the side sections securely in place. Each of the side sections extends to the back wall of the back section
50 and engages the sides of the packed part of the back section, leaving no air-space at the corners. The back and front sections are provided with top and bottom flanges b' b'' , corresponding to the top and bottom flanges of
55 the side sections A.

Formed through the front M are two flue-openings Q, one opposed to each of the flue-boxes E' and corresponding in shape and size with the opening d into the flue-box. Surrounding each of the flue-openings Q on the
60 inner side of the front is a collar q , corresponding in size and shape with the size and shape of the opening d . When the parts are assembled in position, the collar q enters the
65 flue-box E' through the opening d . Each of the flue-openings Q is closed by a cover q' , hinged to the outer side of the front M. By

means of the flue-openings Q the flue-boxes E' and side flues J can be easily cleaned without disturbing any of the remaining parts of
70 the oven, and by means of the flue-openings B the flue-boxes E can be readily cleaned without disturbing any of the other parts of the oven. This construction obviates the difficulty heretofore experienced in removing the
75 soot and ashes from the smoke-passages, especially where the smoke-passage consisted of a closed space formed on the inner faces of the sides. By keeping the side flues and flue-boxes free from soot and ashes a perfect draft
80 can be established from the furnace to the outlet to the chimney and perfect combustion within the furnace assured.

R represents the arched top of the oven, which is made in the same manner as the
85 sides and back—that is, it consists of an outer wall a^3 and an inner wall a^4 with a packing of mineral wool or other suitable non-conducting material between them. On the inner side of the wall a^4 is a smoke-chamber S,
90 formed by a sheet of metal s , tightly fastened to the sides and ends of the top. Formed through the sheet of metal s into the smoke-chamber S are two openings S' S', one located
95 above each of the openings d' of the flue-box E' and corresponding in shape and size therewith. Surrounding each of the openings d' is a collar d'' , each of which fits into its respective opening S'.

Formed through the upperside of the top R
100 is an opening T, surrounded by an upwardly-projecting metallic collar T', to which is adapted to be fitted the smoke-pipe leading to the chimney. The collar T' is provided
105 with a slide-damper U, having an operating-rod U' extending through the front of the top, by means of which the damper can be operated to respectively open or close the passage from the smoke-chamber to the pipe to
110 the chimney.

The middle part of the sheet-metal wall s is preferably flattened, and formed through the center of this sheet-metal wall into the smoke-chamber S is an opening V, fitted with
115 a slide-damper V', having an operating-rod V'' extending through the front of the top. By means of the rod V'' the damper can be moved to respectively open or close the passage through the opening V. The purpose of
120 the opening V is to permit of the escape of the heated air from the oven to the smoke-chamber when necessary. By means of this opening and damper the temperature of the oven can be largely controlled and much better baking results attained.
125

The top R is filled with mineral wool or other non-conducting substance in such a manner that when the oven-top is assembled in position with the other parts the filled portion of the oven-top will rest directly on the
130 top of the filled portions of the sides and back.

In some cases it happens that the chamber in which the oven is set is too low to permit of a smoke-pipe projecting upwardly from the

top of the oven, and to obviate a difficulty of this kind an opening V^3 is formed through the back of the top, which opening is provided with a collar V^4 . The opening V^4 when the smoke-pipe is fitted to the collar T' is closed by a cover V^5 , which cover is held in position in any suitable manner. When the pipe is fitted to the opening V^3 , the damper U is moved to close the opening T and the collar T' is filled with sand or other suitable material to prevent the escape of smoke or gas through it.

W represents the furnace, which consists of a substantially rectangular-shaped fire-pot w , having a grate w' and a lining w'' of fire-brick. Below the fire-pot w is a closed ash-pit w^3 integrally formed with the remaining parts of the fire-pot. The top of the fire-pot is closed by a removable lid or cover w^4 . The furnace is provided with a front w^5 , having an opening into the fire-pot closed by a hinged door w^6 , which is lined with fire-brick, and an opening into the ash-pit closed by a door w^7 . The opening to the fire-pot slants downwardly to form an inclined chute to facilitate the entrance of the fuel. The fire-pot, ash-pit, front, and cover are so arranged as to be readily removed from or placed in the oven without disturbing any of the other parts. This is accomplished by forming through the front M an opening X , which extends substantially to the bottom of the oven and of a sufficient size to readily admit the furnace. The front of the furnace overlaps the edges of the opening X to completely close the same when the furnace is in position. Passing through the front w^5 and entering the front M are screws to fasten the furnace in position when assembled in the oven. Formed through the back of the fire-pot w is an opening w^8 , and surrounding the opening w^8 , on the outer side of the back of the fire-pot, is a collar, which is made preferably in two sections, the bottom section w^9 being formed integrally with the back of the fire-pot and the upper section w^{10} made independently of the lower section and bolted to the back of the fire-pot to complete the collar. It has been found from practical experience that the upper part of the collar is subjected to a greater heat than any other individual part of the furnace, and as a result of being subjected to that heat is liable to be burned out. By making the collar in two sections it can be repaired without being obliged to throw away the lower part of the collar or back of the fire-pot.

W' represents a Y -pipe, the stem of which is adapted to be fitted on the collar at the back of the fire-pot. Extending inwardly from the junction of the arms W'' of the pipe W' is a partition W^3 , which extends a short distance down the stem of the pipe in order that the products of combustion from the furnace may be evenly distributed into both of the arms W'' . The mouth of the stem of the pipe W' is so arranged as to readily receive the collar of the fire-pot when the furnace is

pushed into position and to readily allow of the withdrawal of the collar when the furnace is being removed from the oven. The Y -pipe W' is supported by a stand W^4 . Each arm W'' consists of a stationary section W^5 and a telescopic section W^6 , sliding on the section W^5 . By means of the telescopic sections W^6 the arms can be extended or contracted to meet the requirements of the oven and to take up the contraction and expansion of the pipe and to permit of the ends of the Y -pipe being readily fitted on the collars F'' . When the ends of the Y -pipe are fitted on the collars F'' , a bolt F^3 is dropped through each collar and its respective arm W'' to securely hold the same together. The action of this part of the furnace is as follows: The products of combustion pass from the fire-pot through the collar at the back to the pipe W' and being divided by the partition W^3 pass equally through the arms W'' to the flue-box E , striking against the flame-plate H , afterward passing through the inclined collars I' to the side flues J and flue-boxes E' , and through the opening d' in the top of the flue-boxes E' into the smoke-chamber S in the oven-top, and then through the opening T or opening V^3 to the pipe to the chimney.

The front of the oven-top R is provided with flue-openings R' , by means of which the smoke-chamber S can be readily cleaned of soot and ashes. The opening V^3 can be used when required for the purpose of cleaning the smoke-chamber. The flue-openings R' are closed by covers R'' , hinged to the front of the oven-top.

X' X' represent two standards at the back of the oven, the lower end of each of which is provided with a foot X'' , resting upon the oven-bottom. Projecting inwardly from each of the standards X' is a lug X^3 , and upon these lugs X^3 is supported an angle-iron support X^4 . On the inner face of the front M , in horizontal alinement with the angle-iron X^4 , is a flange X^5 . Connected to the middle of the inner face of each of the side sections A is a lug X^6 in the same plane as the lugs X^3 , and supported on the lugs X^6 is a T -iron support X^7 . Held by the supports X^4 and X^7 and flange X^5 are a series of metal pads X^8 , filled with wool or other non-conducting material to protect the lower shelf from the extreme heat of the furnace. Between the side edges of the pads X^8 and the inner face of the sections A is an interval or space to allow of the upward passage of the heat from the furnace. Each of the standards X' is provided with any suitable number of forwardly-extending lugs X^9 , while the inner face of the front M is provided with a series of lugs X^{10} , corresponding in number and location with the lugs X^9 and horizontally opposed thereto. Supported upon each opposite pair of lugs X^9 and X^{10} is an angle-iron support Y , which extends from the front to the back of the oven.

Y' represents a series of supports mounted on the supports Y at the front and back and

intermediate the front and back, the upwardly-projecting flange y of the back supports being of a greater depth than the upwardly-projecting flange of the middle and front supports.

Mounted on the supports Y' are the shelves Y'' of the oven, which are preferably made of tile, which is found to be the best baking-surface obtainable. On each side of the shelves Y is an upwardly-projecting shield Y^3 , of tile, to protect the contents of the shelf from excessive heat at the side and to direct the heat-currents along the bottom of the next successive shelf. The shields Y^3 are held in position by the edges of the shelf Y'' and the upturned flange y'' of the angle-iron support Y .

The bottom and intermediate angle-iron supports Y are sufficiently remote from the inner face of the side sections A to allow of the upward passage of the heat to the bottom of the topmost shelf, while the shields Y^3 are only of a sufficient height to protect the contents of the shelves from excessive heat, so as to allow of the heat passing from the space up the inner face of the side sections to pass along the bottom of the shelves.

Each topmost angle-iron support Y is provided with an outwardly-extending flange y^3 , which engage the inner faces of the side sections A and arrest the further upward passage of the heat along the said side faces in order that it can be distributed along the bottom of all the shelves. The distribution of the heat along the bottom of the shelves acts on the top of the contents of each shelf and bakes the top of the contents, while the heat of the shelves bakes the bottom. The heat radiated from the oven-top bakes the top of the contents of the topmost shelf. It is not possible in this construction and it is not the intention of the invention to completely check the upward passage of all the heat to the outer side of the oven-top, so that when it is necessary to draw off a portion of the heat from the oven it can be done by opening the damper in the under side of the oven-top.

As shown in the drawings, the shelves are three in number, and formed through the oven-front are three openings Z , one opening opposed to each shelf. The two topmost openings Z are closed by side swinging doors Z' , each provided with a latch z and keeper z' , while the bottommost opening is provided with a drop-door Z'' , which acts as a shelf when open and which is provided with a latch z and keeper z' . At the side of the doors are a series of openings Z^3 , one opposed to each shelf, each opening being protected on the inside of the oven by a circular frame of mica secured to the inner face of the front and each opening arranged so that its respective shelf can be lighted, the outer face of the front being provided with three sliding covers Z^4 to close the openings.

Z^5 represents an opening through the front,

by means of which a pyrometer can be fitted to the oven.

Formed through the front M above the furnace are a series of openings Z^6 , closed by a slide-damper Z^7 . The purpose of the opening Z^6 is to admit the cold air over the top of the furnace to cool down the extreme heat from the top of the furnace and to help to create a circulation in the oven.

By using tile in the construction of the shelves the same practical results can be attained as in a brick oven. Rye bread, Vienna rolls, and Irish bread are all baked on the sole of the oven, and it would be impossible in an oven with iron shelves to bake bread of any of these classes. By having the flues arranged on the inner faces of the sides of the oven the heat from the products of combustion can be utilized for heating the oven-chamber, and the flues can be cleaned as readily as if the smoke-pipe from the furnace were carried direct through the oven-wall.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A portable oven embracing in its construction an arched oven-top lined with heat-non-conducting material, and provided at its under side with a correspondingly-arched smoke-chamber having its middle portion flattened and fitted with a central opening forming a means of communication between the interior of the oven and the smoke-chamber, a damper to normally close the opening fitted with a rod extending through the oven-front, and an aperture for the smoke-chamber to communicate with the smoke-pipe, substantially as specified.

2. A portable oven embracing in its construction a chamber having a casing lined with heat-non-conducting material, a furnace within the chamber, flue-boxes attached to the inner face of the chamber, one arranged at or near the top and the other at the lower part of the oven, a smoke-flue connecting the flue-boxes, a smoke-pipe connecting the furnace with the lower flue-box, a smoke-chamber at the under side of the top communicating with the upper flue-box, and an aperture through the top to communicate with the smoke-pipe to the chimney, substantially as specified.

3. A portable oven embracing in its construction a chamber having a casing lined with heat-non-conducting material, a furnace within the chamber, flue-boxes attached to the inner face of the chamber, one arranged at or near the top and the other at the lower part of the oven, a smoke-flue connecting the flue-boxes, a smoke-pipe connecting the furnace with the lower flue-box, a smoke-chamber at the under side of the top communicating with the upper flue-box, an aperture through the top to communicate with the smoke-pipe to the chimney, and an opening through the oven-front into the upper flue-box, substantially as specified.

4. A portable oven embracing in its construction a chamber having a casing lined with heat-non-conducting material, a furnace within the chamber, flue-boxes attached to the inner faces of the sides of the chamber at the lower part of the oven, an adjustable Y-pipe connecting the furnace with the flue-boxes, flue-boxes attached to the inner faces of the sides of the chamber at or near the front of the top of the oven, smoke-flues connecting each lower flue-box with its respective upper flue-box, openings through the oven-front into each of the upper flue-boxes, a smoke-chamber at the under side of the oven-top communicating with each of the upper flue-boxes, and an aperture from the smoke-chamber to communicate with the smoke-pipe to the chimney, substantially as specified.

5. A portable oven embracing in its construction a chamber having a casing lined with heat-non-conducting material, a furnace within the chamber, flue-boxes attached to the inner faces of the sides of the chamber at the lower part of the oven, an adjustable Y-pipe connecting the furnace with the flue-boxes, flue-boxes attached to the inner faces of the sides of the chamber at or near the front of the top of the oven, smoke-flues connecting each lower flue-box with its respective upper flue-box, openings through the oven-front into each of the upper flue-boxes, a smoke-chamber at the under side of the oven-top communicating with each of the upper flue-boxes, an aperture from the smoke-chamber to communicate with the smoke-pipe to the chimney, a central opening through the smoke-chamber communicating with the oven, and a damper to normally close the opening fitted with an operating-rod extending through the oven-front, substantially as specified.

6. A portable oven embracing in its construction a chamber having a casing lined with heat-non-conducting material, a furnace within the chamber, flue-boxes attached to the inner faces of the sides of the chamber at the lower part of the oven, an adjustable Y-pipe connecting the furnace with the flue-boxes, flue-boxes attached to the inner faces of the sides of the chamber at or near the front of the top of the oven, smoke-flues connecting each lower flue-box with its respective upper flue-box, openings through the oven-front into each of the upper flue-boxes, a smoke-chamber at the under side of the oven-top communicating with each of the upper flue-boxes, an aperture from the smoke-chamber to communicate with the smoke-pipe to the chimney, a central opening through the smoke-chamber communicating with the oven, a damper to normally close the opening fitted with an operating-rod extending through the oven-front, an opening into each of the lower flue-boxes through the side casing of the chamber, a stopper to close each of the openings having a flame-plate projecting

into its respective flue-box, substantially as specified.

7. A portable oven embracing in its construction an upper and a lower flue-box attached to the inner face of one of the sides of the chamber, a detachable smoke-flue connecting the flue-boxes, an opening through the side into the lower flue-box, a stopper to close the opening having a flame-plate projecting into the flue-box, and an opening communicating with the upper flue-box and the smoke-passage to the chimney, substantially as specified.

8. A portable oven embracing in its construction an upper and a lower flue-box attached to the inner face of one of the sides of the oven, a smoke-flue connecting the flue-boxes, the lower flue-box fitted to receive the smoke-pipe from the furnace, and the upper flue-box fitted to communicate with the smoke-passage to the chimney, substantially as specified.

9. A portable oven embracing in its construction an upper and a lower flue-box attached to the inner face of one of the sides of the oven, a smoke-flue connecting the flue-boxes, the lower flue-box fitted to receive the smoke-pipe from the furnace, and the upper flue-box fitted to communicate with the smoke-passage to the chimney, and an opening through the front of the upper flue-box, substantially as specified.

10. A portable oven embracing in its construction a chamber having a casing lined with heat-non-conducting material, rigid standards supported upon the base and attached to the back of the chamber, lugs carried by the standards, lugs attached to the oven-front opposed to the lugs of the standards, cross-bars supported upon the lugs to sustain the shelves and the shield for the furnace, and so arranged as to form an air-space between the sides of the shelves and shield and the walls of the chamber, substantially as specified.

11. A portable oven embracing in its construction a chamber, having a cast-metal front and sheet-metal sides and back, lined with heat-non-conducting material, a series of oven-shelves within the chamber, an opening through the front for each shelf, fitted with a hinged door normally held closed, and a sight-opening through the front for each shelf, covered with translucent material and closed by a sliding cover, substantially as specified.

12. A portable oven embracing in its construction a chamber having its front, back and sides each consisting of an independent section, the back and sides being lined with heat-non-conducting material, and arranged to overlap each other to provide a continuous non-conductor, lugs projecting outwardly from each side of the front fitted with bolt-holes, and having a flange to overlap the front edges of the sides, the back provided with angle-irons, one flange of which is bolted to

its respective edge of the back, and the other flange of which overlaps the back edge of the sides to securely hold the sides in their proper relative position to the back, lugs projecting
5 outwardly from the side flanges of the angle-irons, and fitted with transverse slots opposed to the bolt-holes in the lugs of the front, bolts passing through the bolt-holes and slots to unite the back and front, and hold the parts
10 rigidly together, a base lined with non-conducting material to support the lower ends of the front, sides and back, having an up-turned flange to embrace the same, and hold the lower ends rigidly in position, and a top
15 contained within the front, sides and back, having a flange to overlap the flanged tops of the front, sides and back, substantially as specified.

13. A portable oven embracing in its con-

struction a chamber, a furnace in the lower 20 part of the chamber, a shield suspended above the top of the furnace, a passage at each side of the shield, a shelf above the shield, consisting of supporting-bars held at the front and back, a bottom supported by the cross- 25 bars and a shield projecting upwardly from each side edge of the bottom to protect the contents of the shelf from the upward current of heated air at the side of the chamber, and an opening between the top of the shields 30 and the under side of the next successive shelf, substantially as specified.

Toronto, Canada, September 19, A. D. 1898.

FRANK J. S. ROBERTS.

In presence of—

M. A. WESTWOOD,

C. H. RICHES.