

June 19, 1923.

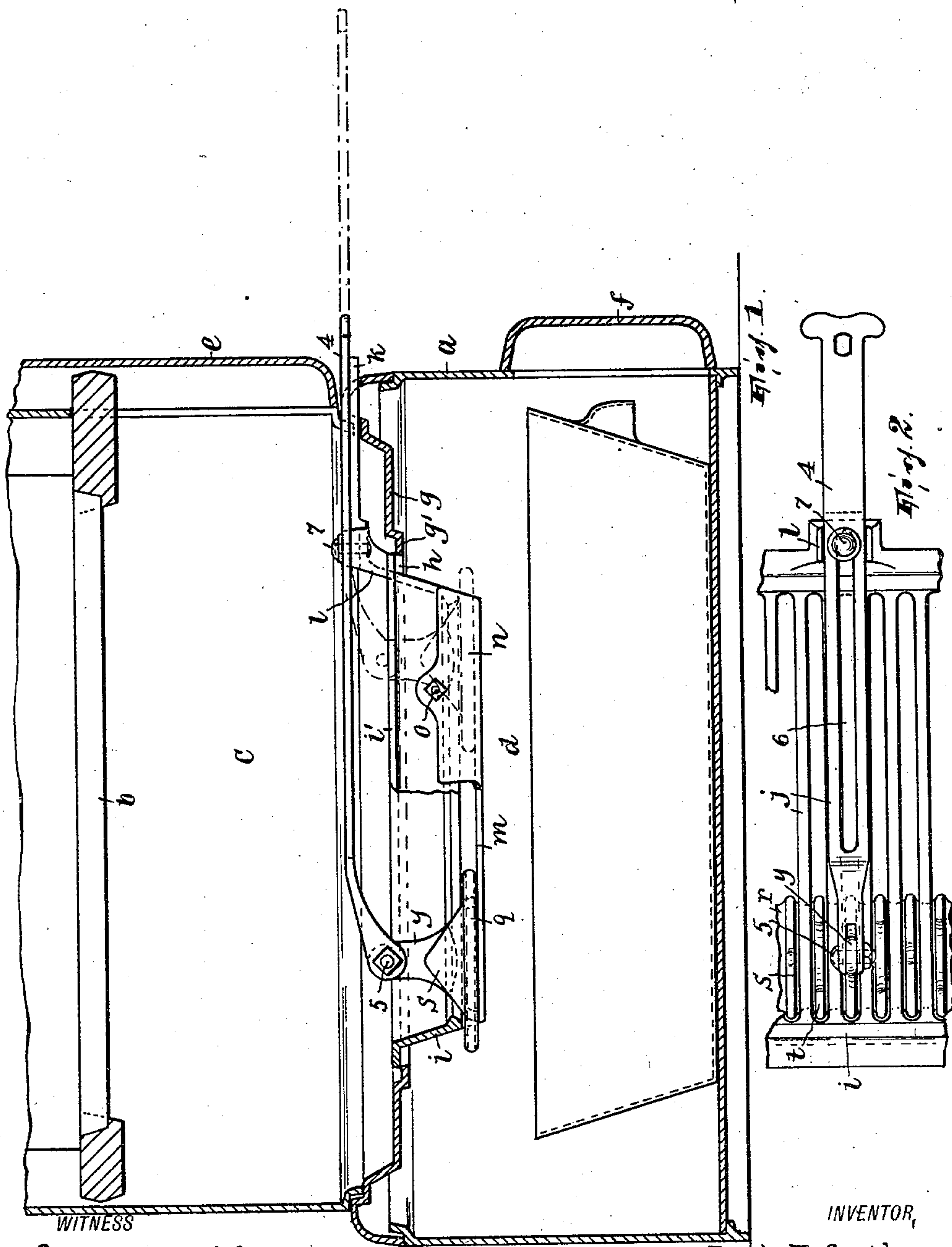
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E. R. STEPHENS

STOVE

Filed March 25, 1922

2 Sheets-Sheet 1



WITNESS

Wm. D. Zell.

INVENTOR,

Earl R. Stephens,

BY
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June 19, 1923.

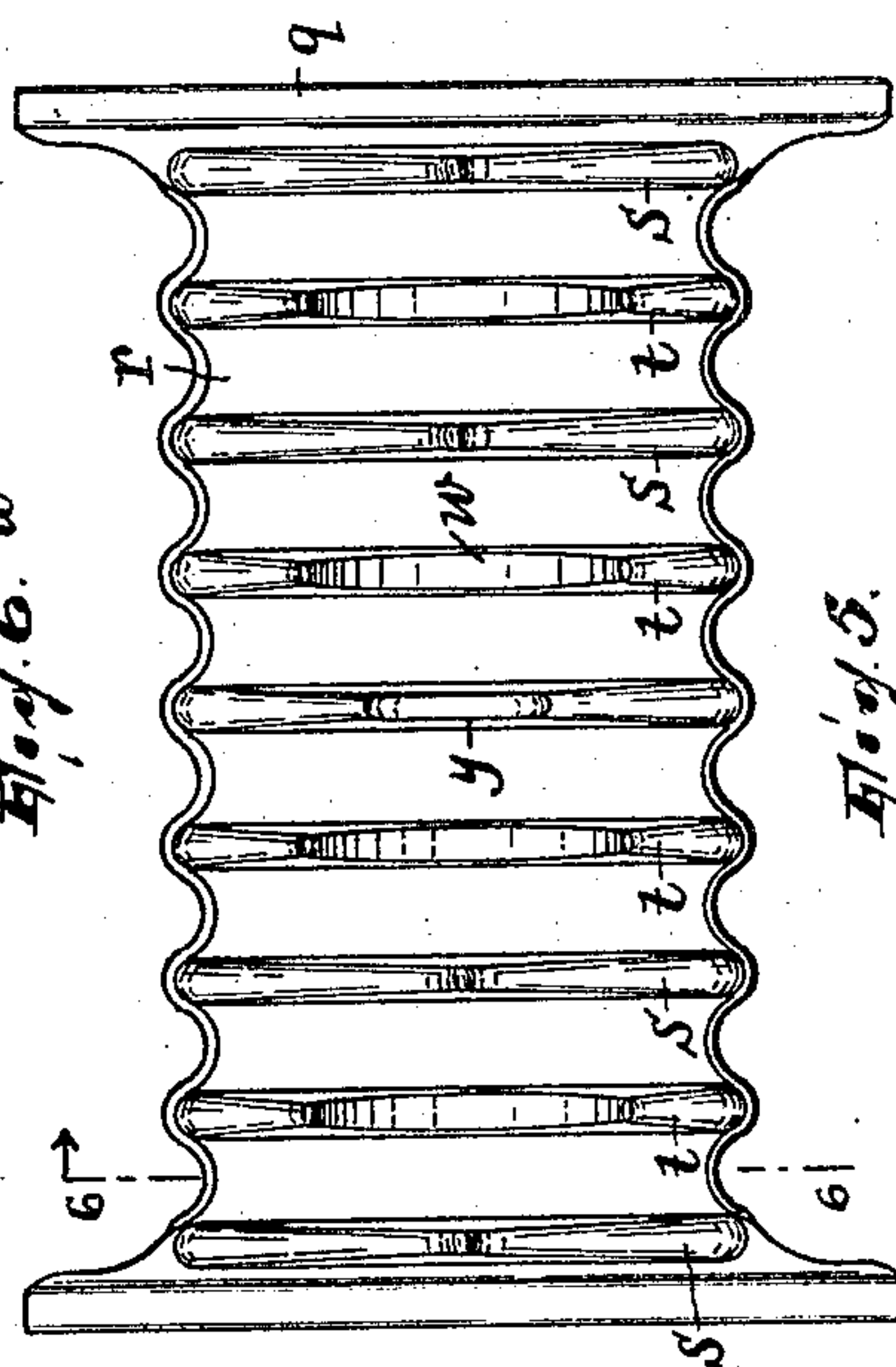
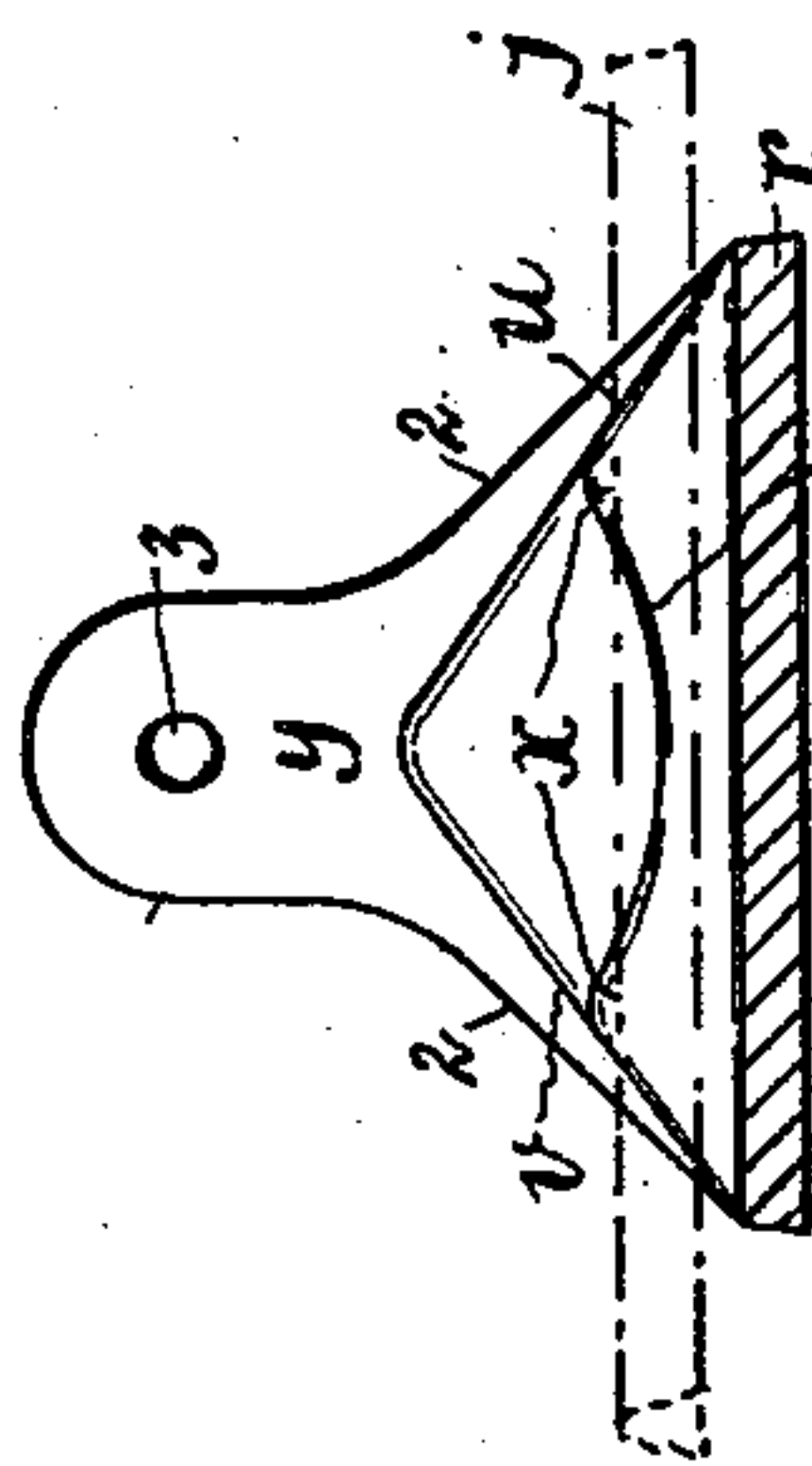
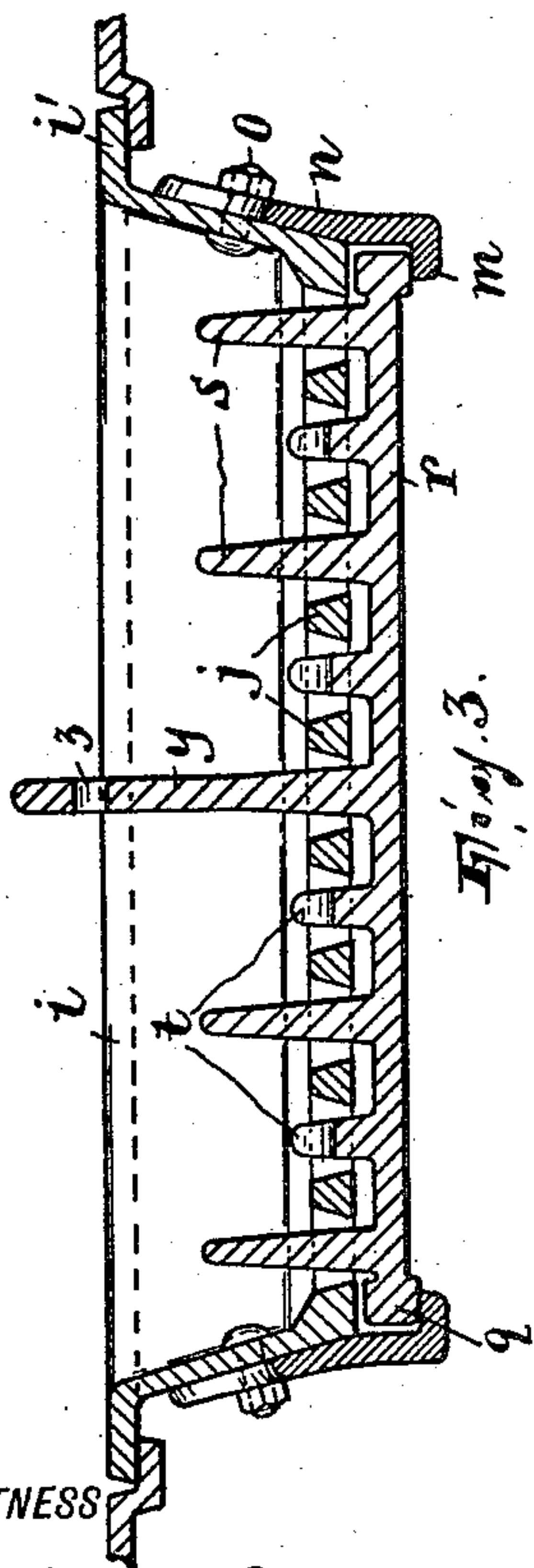
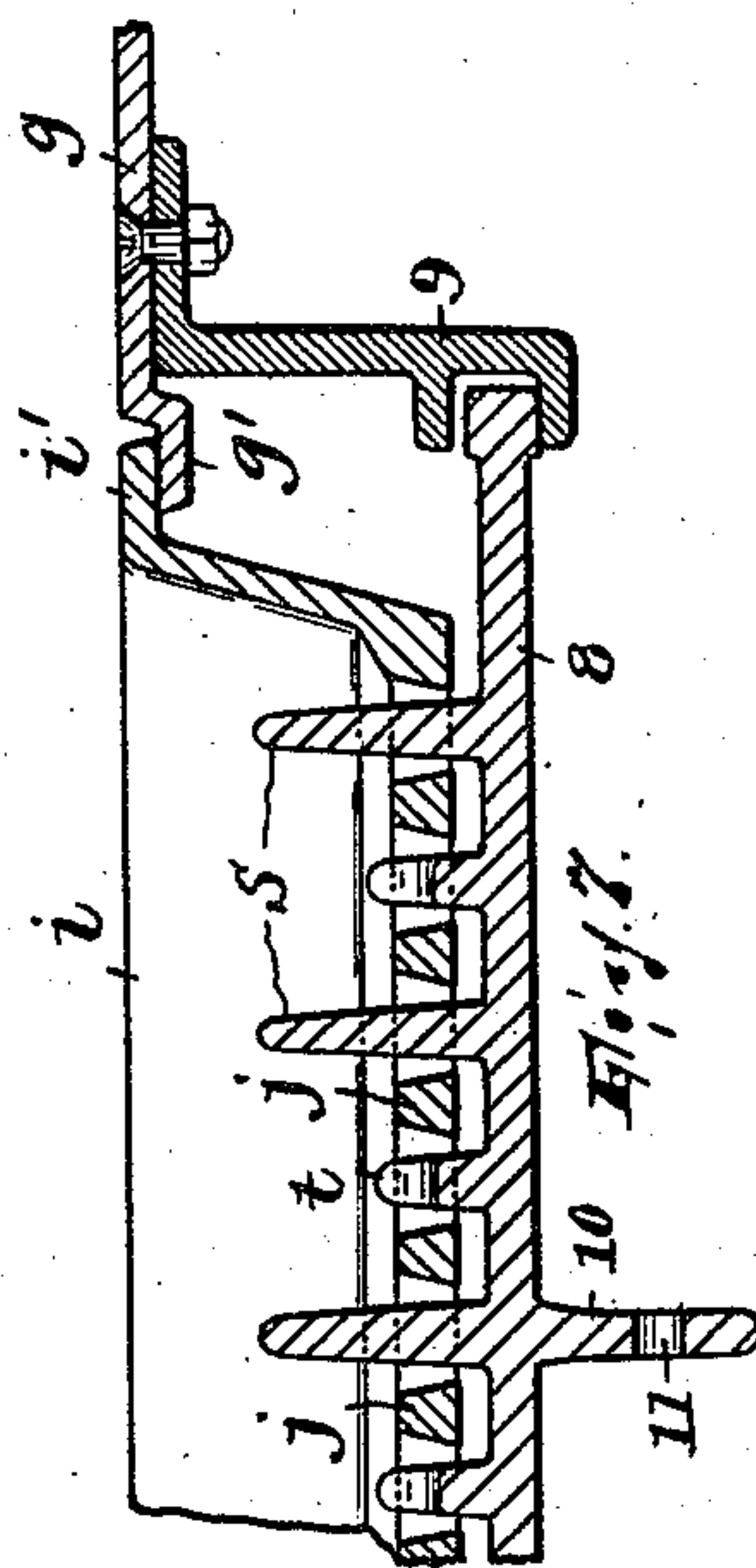
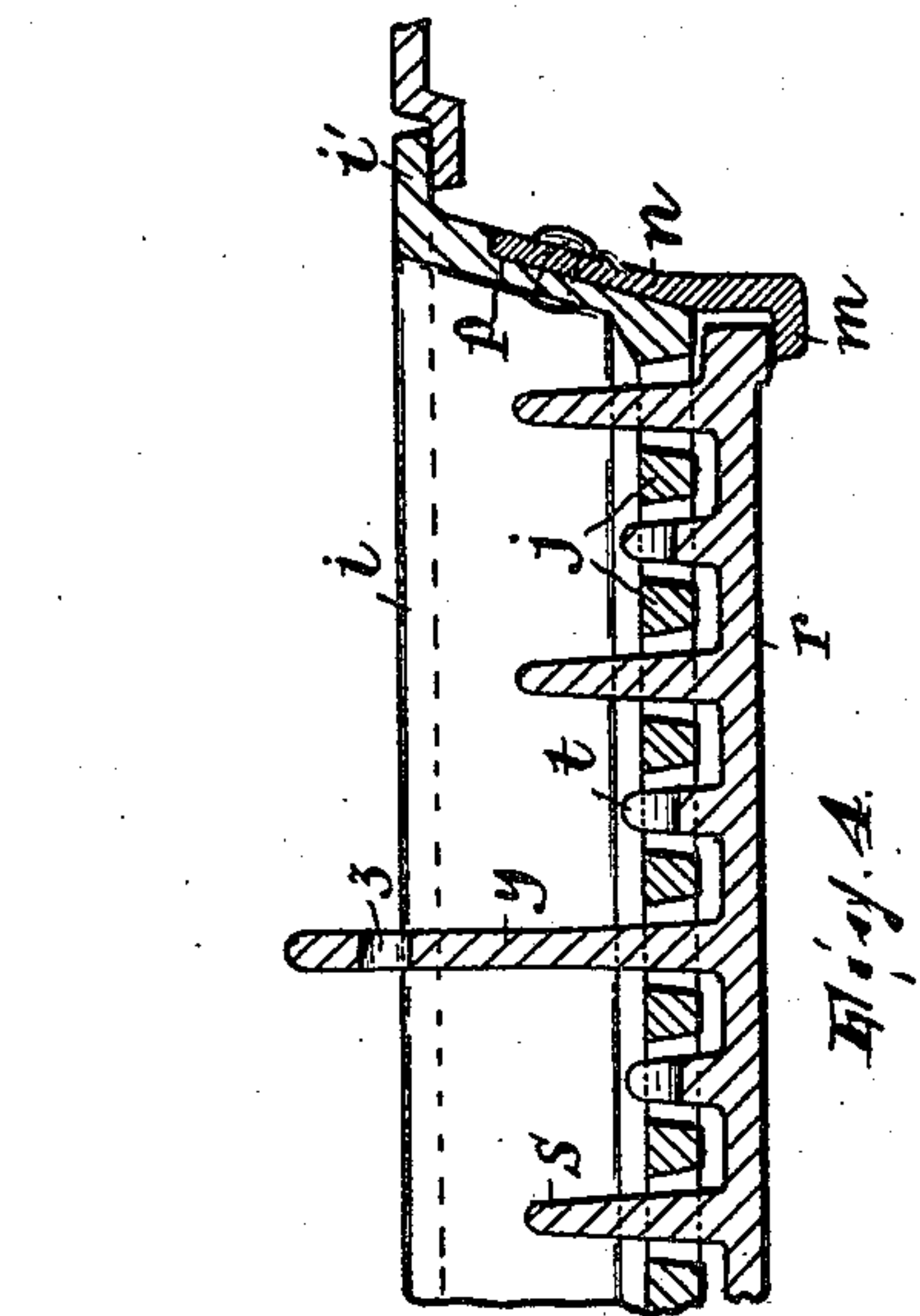
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E. R. STEPHENS

STOVE

Filed March 25, 1922

2 Sheets-Sheet 2



WITNESS

Wm. M. Bell.

INVENTOR,
Earl R. Stephens,
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UNITED STATES PATENT OFFICE.

EARL R. STEPHENS, OF DOVER, NEW JERSEY.

STOVE.

Application filed March 25, 1922. Serial No. 546,625.

To all whom it may concern:

Be it known that I, EARL R. STEPHENS, a citizen of the United States, residing at Dover, in the county of Morris and State of New Jersey, have invented certain new and useful Improvements in Stoves, of which the following is a specification.

This invention relates to cook-stoves and other heating apparatuses embodying a grate structure for supporting the fuel. Many such apparatuses have an auxiliary grate or grid arranged below the main grate—on which the burning fuel rests—which is intended for use in sifting the material that is deposited thereon from the main grate; this is usually accomplished by agitating this grate or grid, as by sliding it back and forth. These contrivances are not efficient means for sifting the ashes from the cinders or coals, and the user therefore frequently discards them. The principal object of this invention is to provide in connection with such a grate or grid a raking agitator or rake which will make it possible to effect thorough separation of the ashes from the cinders and good coal without its movements being encumbered by the material operated upon or acting to crush and so reduce the larger pieces of coal or cinders and which may be applied to existing forms of grates or grids without material alteration in the structure thereof.

In the drawings,

Fig. 1 is a front to rear vertical sectional view of a stove embodying my improvements;

Fig. 2 is a fragmentary plan view of the auxiliary or sifting grate of said stove and of my improvements;

Fig. 3 is a transverse vertical sectional view of the grate and rake, the section being substantially central of the series of teeth of the rake;

Fig. 4 is a fragmentary view similar to Fig. 3 but showing a modification;

Fig. 5 is a plan of the rake;

Fig. 6 is a sectional view on the line 6—6 of Fig. 5, looking toward the right; and

Fig. 7 is a view similar to Figs. 3 and 4 and showing another modification.

The frame or shell of the stove is indicated at *a*, *b* being the fuel supporting grate below which is the chamber *c* and below this chamber the sub-chamber *d* forming the ash-pit. *e* and *f* are doors which when opened allow access to the chambers *c* and *d*, respectively.

The frame or shell *a* includes a horizontal wall or diaphragm *g* which has a square opening *h* affording communication between the chambers *c* and *d*. This opening receives the rectangular cast-iron sifting pan or auxiliary grate *i* in the usual way, the pan having a top exterior flange *i'* which rests in a rabbet *g'* formed in the wall *g* around its opening *h*, the pan or grate thus supported being movable toward and from the front of the stove a limited distance. The bottom or grate portion of the pan or grate is formed by spaced grate bars *j* extending longitudinally of its path of movement. The pan has the usual forwardly extending rigid handle *k* which projects through a suitable opening in the shell of the stove and forms a lateral extension of an upstanding portion *l* of the pan or grate.

Oppositely facing guideways are provided at the bottom of the pan or grate and at both sides thereof. These are formed by inwardly projecting flanges *m* of strips *n* which are secured by bolts *o* to the outer side faces of the pan or grate; in Fig. 4 the construction is substantially the same excepting that the strips are set in recesses *p* in the pan or grate.

On these guideways slide the elongated end portions *q* (preferably thickened up) of a plate *r* which forms the body of the rake. Arranged to intermesh with the grate bars *j* this plate has cast thereon an upstanding series of teeth, the series of teeth extending at right angles to the path of movement of the plate on its guideways *m*. The teeth are formed in two sets, *s* and *t*, alternating with each other. The teeth *s* have their tops appreciably higher than the top surface of the grate; the teeth *t* have their tops approximately in the same plane as the surface of the grate. When the rake is movable back and forth, all the teeth will act to clear the spaces between the grate bars; by forming some of the teeth, as *s*, to extend above the surface of the grate they will be adapted to plow through and thus agitate the mass above said surface, and by forming the remaining or alternating teeth with their tops approximating the level of said surface the larger pieces of coal or cinders in the mass will be permitted to escape the advancing action of the rake, thus avoiding their interfering with its performing a full stroke and their being crushed and so reduced to particles that would fall through the grate. In

order to effect perfect clearance as to the spaces between the grate bars for the full length of each such space all the teeth viewed laterally (Fig. 6) are of the same extent, all their front ends and all their rear ends being in lines at right angles to the path of movement of the rake. All the teeth, furthermore, have forward and rearward slopes *u* and *v* which are coincident with two upwardly converging planes, these slopes acting as cam surfaces against the mass being sifted and so permitting the mass to be agitated without possibility of a jam, as when the rake reaches either end of its stroke and a piece of coal or other hard body stands interposed between any of the teeth and an end wall of the pan or grate *i*. The teeth *t* are preferably formed less high than the teeth *s* by forming a recess *w* at the top of each, so that they have two spaced peaks *x* instead of only one, as in the case of the teeth *s*. At the center of the plate is an upstanding lug *y* which may act as a tooth thereon and extends between two of the grate bars, having forward and rearward slopes 2; this lug is provided with an eye 3 for the reception of a handle or other device for sliding the rake back and forth.

In the preferred construction, this handle may form a handle for the pan or grate itself. It is shown as a bar 4 having a forked rear end which receives the lug *y* and is connected therewith by a bolt 5 passing through said fork and the eye 3 of the lug. The bar 4 has a longitudinal slot 6 and it rests upon a bearing afforded by the top surfaces of the projection 7 of the pan and the aforementioned handle 4; if, as is preferable, the latter is retained; a rivet 7 of the pan, being arranged upon the projection 7, extends through the slot 6, the connection thus afforded between the handle 4 and the pan or grate being such that whereas the handle is slidable inwardly and outwardly relatively to the pan or grate it is confined thereby against other movement relatively thereto. On moving the handle backward and forward longitudinally thereof the rake will obviously be reciprocated, thus agitating the mass on the grate. At the ends of its stroke the teeth *s* *t* will impinge against abutments formed by the end walls of the pan and shift the latter one way or the other, so that there is a shaking as well as a raking of the mass. Upon opening the door *e* the pan or grate may be removed by gripping the handle 4; by first pulling out the handle to the dotted line position in Fig. 1 the operator can obtain a good lifting hold thereon, and if necessary he can then hold the handle 4 with one hand, gripping both handles with the other, so that the pan or grate cannot slip relatively to the handle 4.

In Fig. 7 the construction is shown substantially the same as in the other figures

excepting that the rake 8 moves in guides 9 depending from and bolted to the wall *g* and also excepting that the lug *o* (corresponding in function to lug *y*) projects downwardly from the rake, having an eye 11 by which to connect thereto any suitable appliance for reciprocating the rake.

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

1. In combination, a supporting structure having a series of substantially parallel grate-bars forming a substantially horizontal grate surface, and a rake having a body portion arranged below the bars and slidable longitudinally thereof in said structure and also having two sets of teeth arranged in a series extending substantially at right angles to and upstanding between the several bars, the teeth in the two sets alternating with each other and those in one set having their tops approximately level with, and those in the other having their tops above, said surface.

2. In combination, a supporting structure having a series of substantially parallel grate-bars forming a substantially horizontal grate surface, and a rake having a body portion arranged below the bars and slidable longitudinally thereof in said structure and also having two sets of teeth arranged in a series extending substantially at right angles to and upstanding between the several bars, the teeth in the two sets alternating with each other and those in one set having their tops approximately level with, and those in the other having their tops above, said surface and all the teeth having forward and rearward slopes in substantial coincidence with two upwardly converging planes.

3. In combination, the frame of a heating apparatus, a grate guided to slide therein in a substantially horizontal back and forth path, and a rake arranged to move through the material supported by the grate and slidable back and forth relatively to the grate substantially lengthwise of said path, said grate having spaced abutments to be engaged by the rake in its back and forth movements.

4. In combination, the frame of a heating apparatus, a grate guided to slide therein in a substantially horizontal back and forth path and having bars extending substantially parallel with said path and abutments at the ends of the bars, and a rake slidable back and forth relatively to the grate lengthwise of said path and having teeth to agitate the material on the grate, said teeth intermeshing with the bars and adapted to engage said abutments alternately on back and forth movement of the rake.

5. In combination, the frame of a heating apparatus, a grate removably supported

therein and having a grate-portion and a bearing at a higher elevation than the grate portion, a rake confined to move back and forth in the grate in parallelism with its
5 grate portion, and a handle slidable on said bearing and confined against other movement relatively thereto and attached to the rake.

6. In combination, the frame of a heating
10 apparatus, a grate removably supported

therein, a rigid handle projecting laterally from the grate, another handle projecting laterally from the grate and slidable on the first handle inwardly and outwardly of but confined by the grate against other move- 15 ment relatively to said grate, and a rake connected to the second handle and slidable therewith in the grate.

In testimony whereof I affix my signature.
EARL R. STEPHENS.