

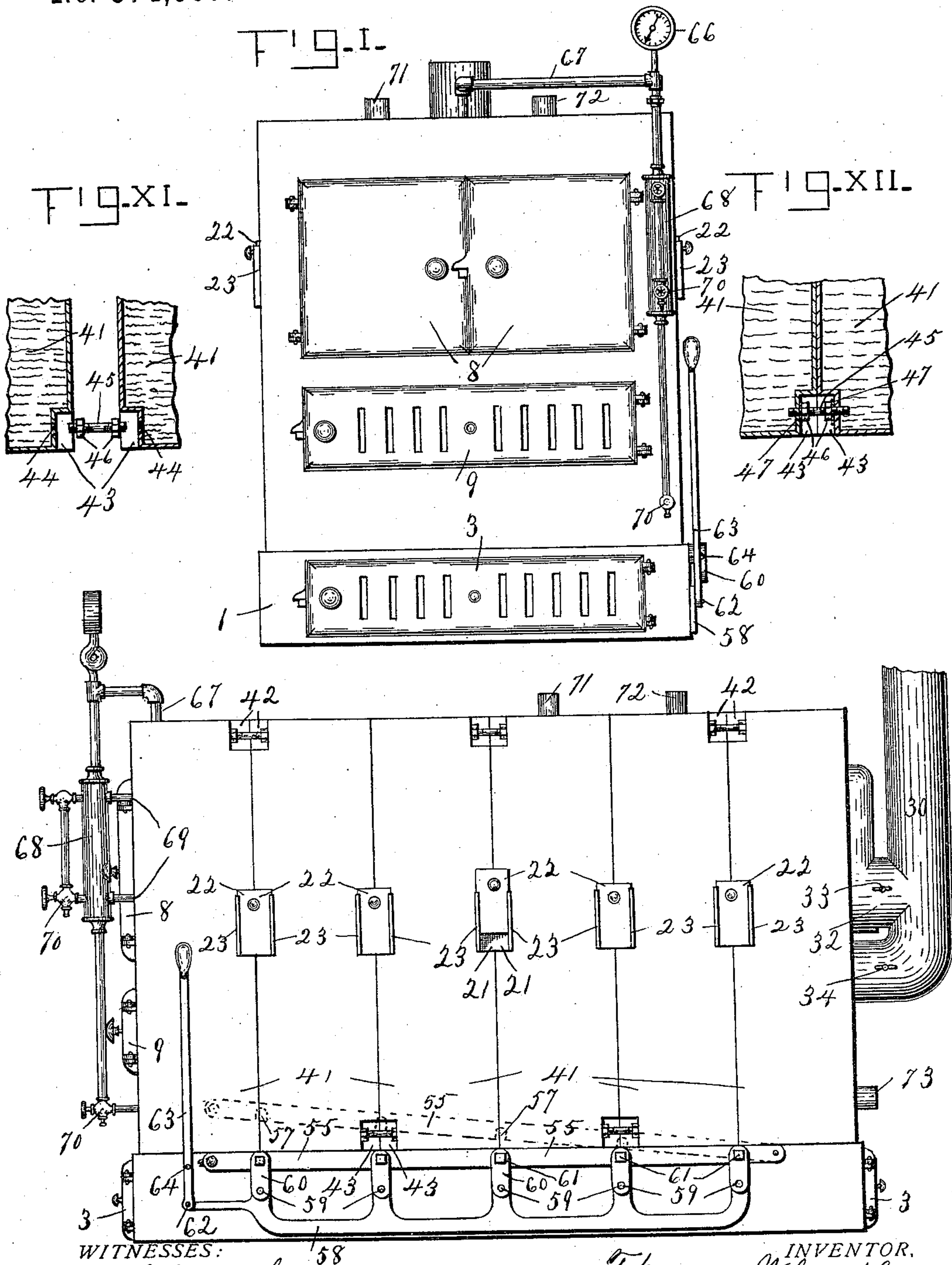
(No Model.)

T. WHEATLEY.  
HEATER.

4 Sheets—Sheet 1.

No. 574,967.

Patented Jan. 12, 1897.



WITNESSES:  
C. Schaeck.  
L. F. Weinburg

FIG. II.

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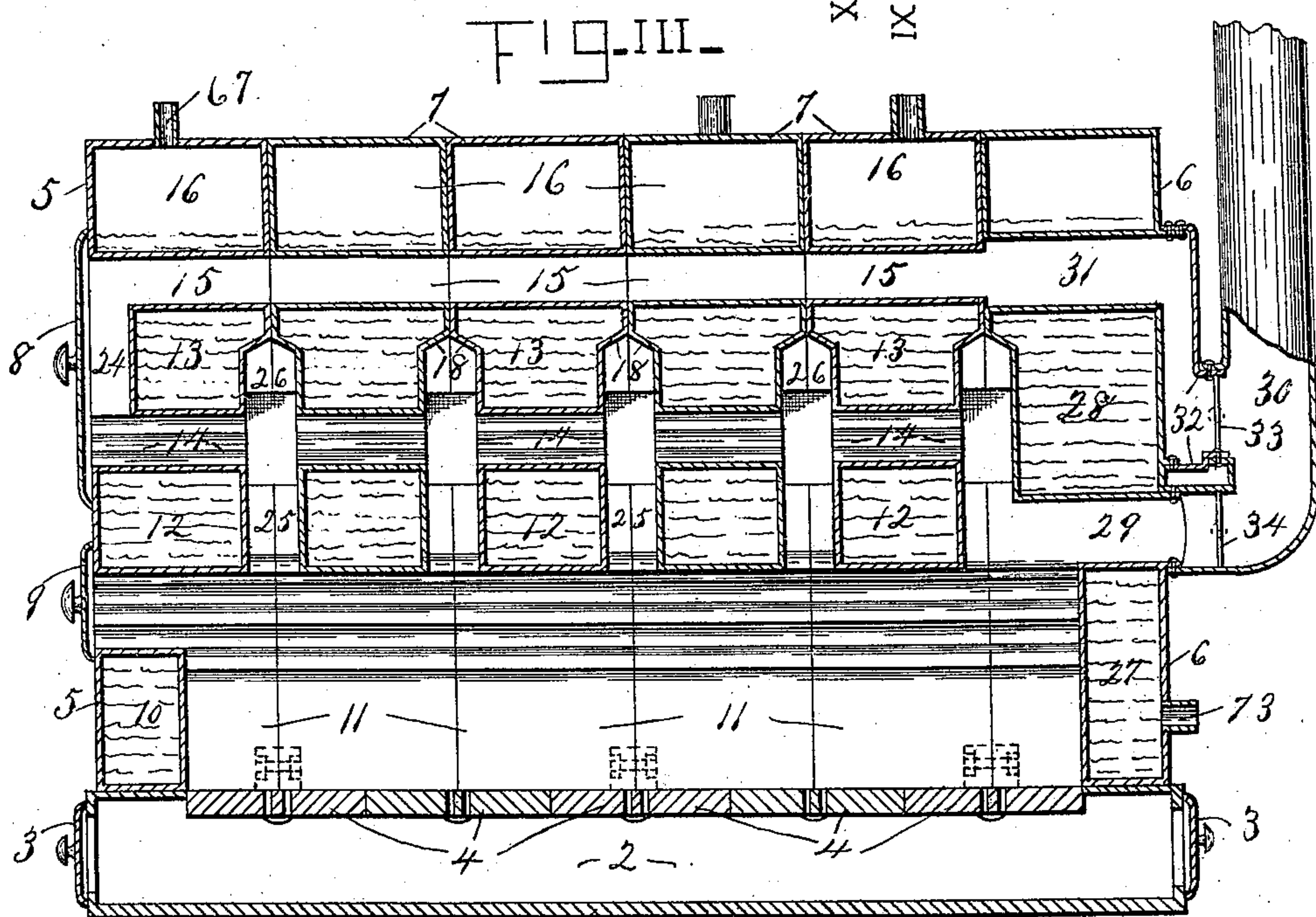
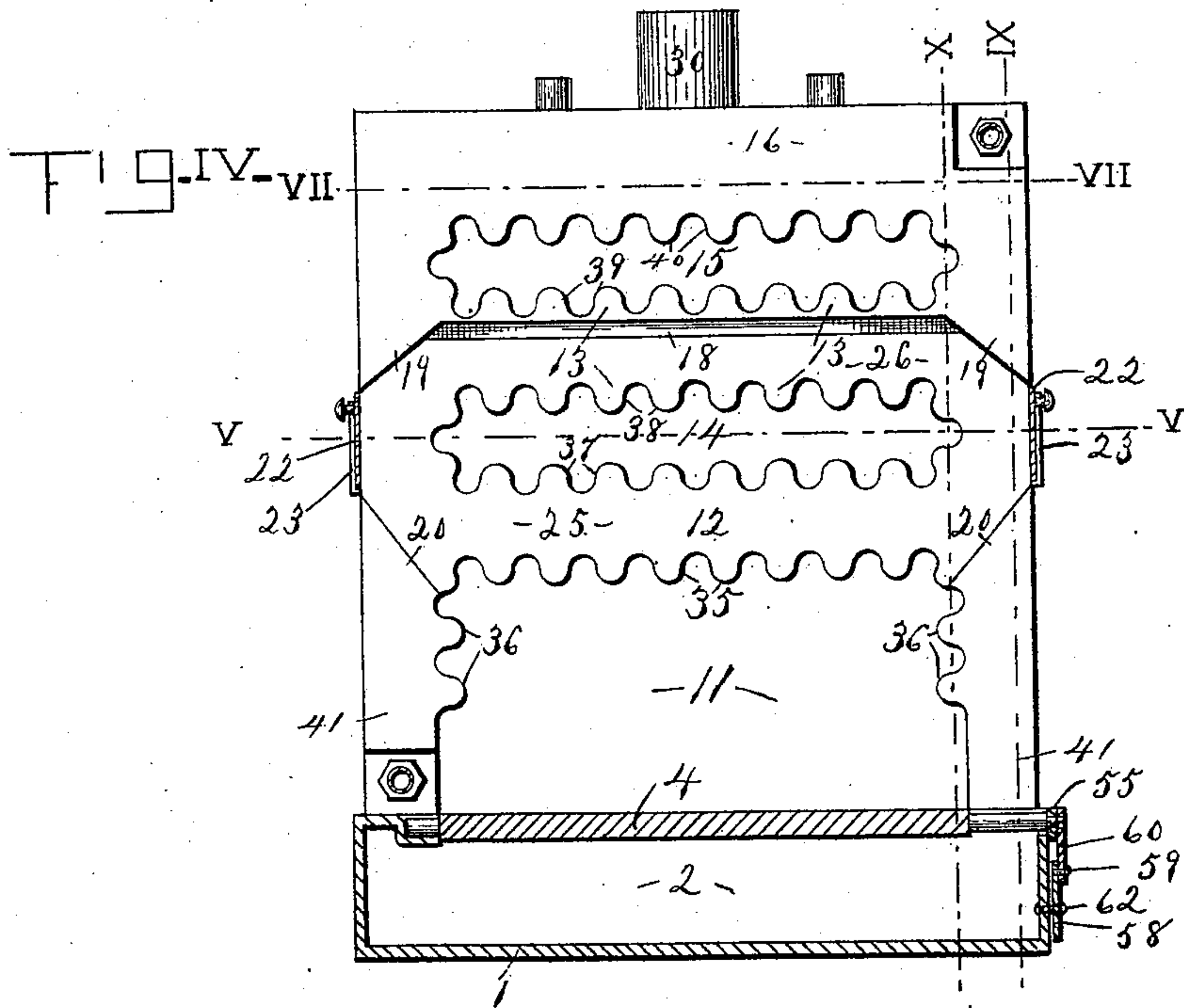
(No Model.)

4 Sheets—Sheet 2.

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WITNESSES:  
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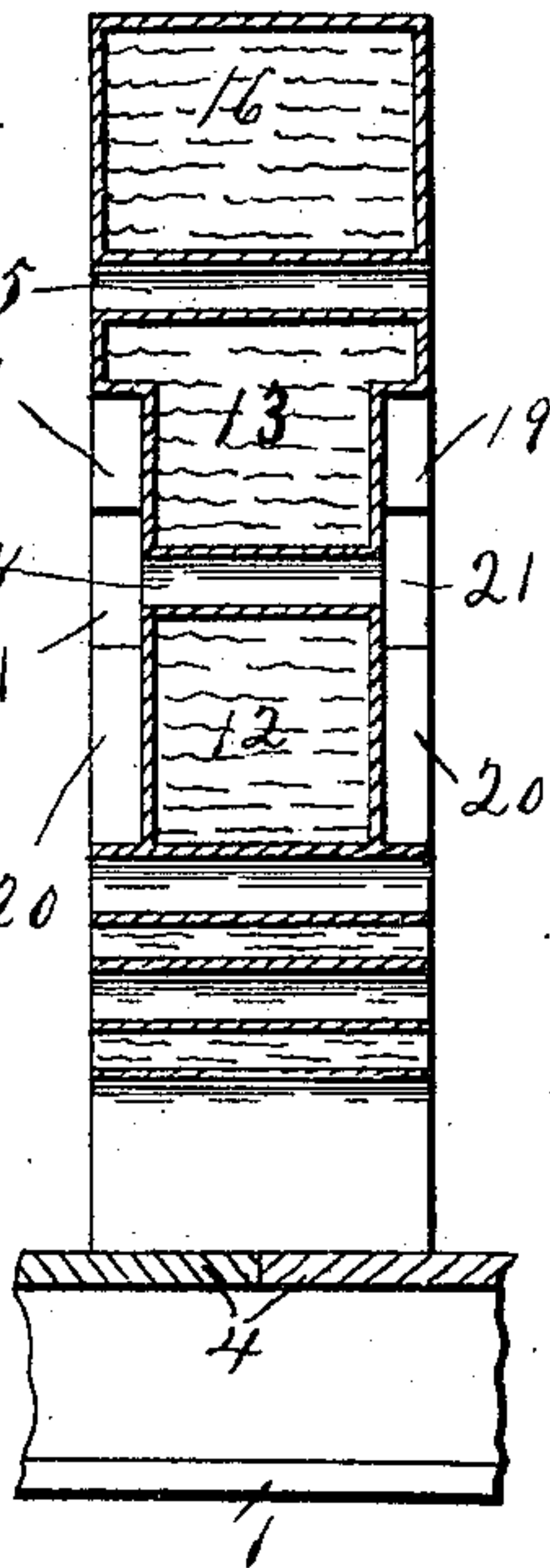
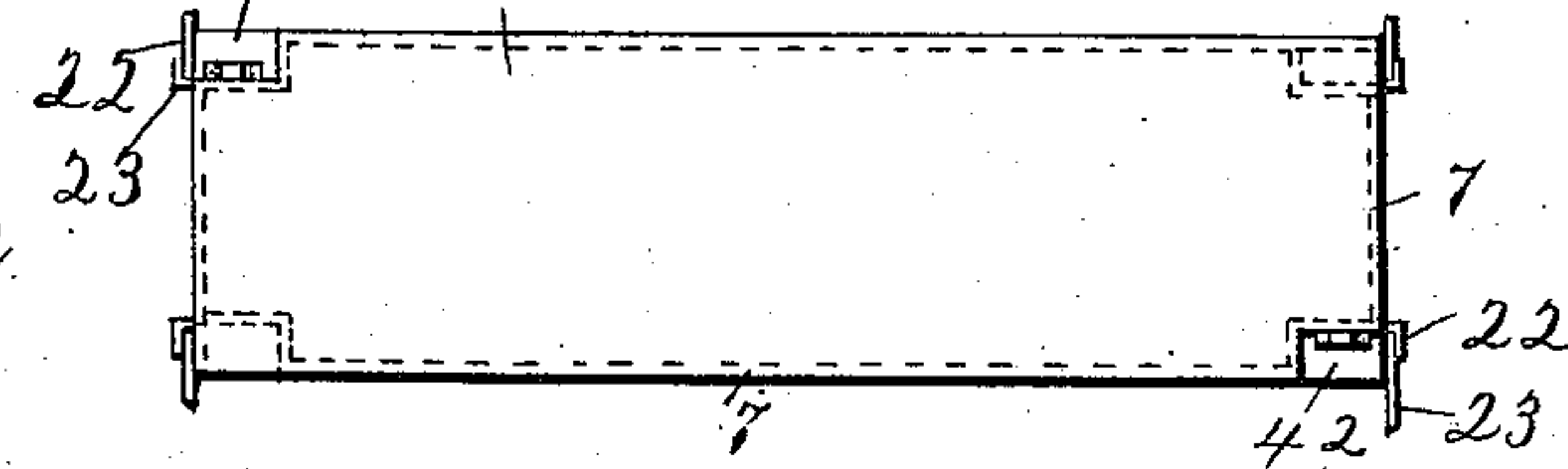
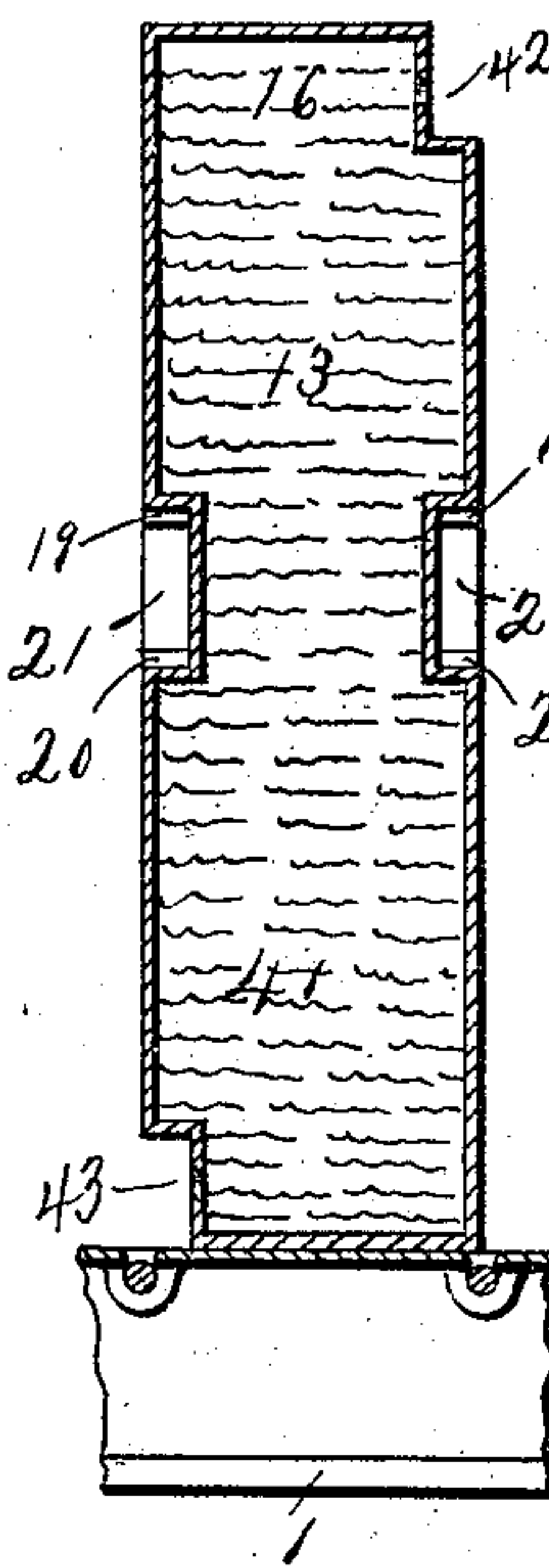
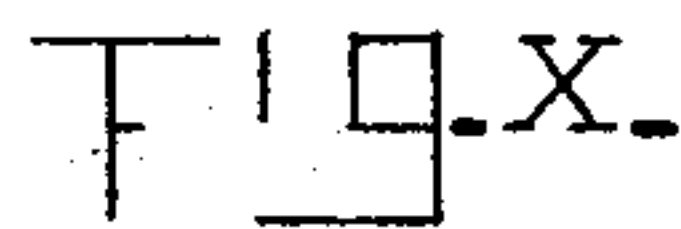
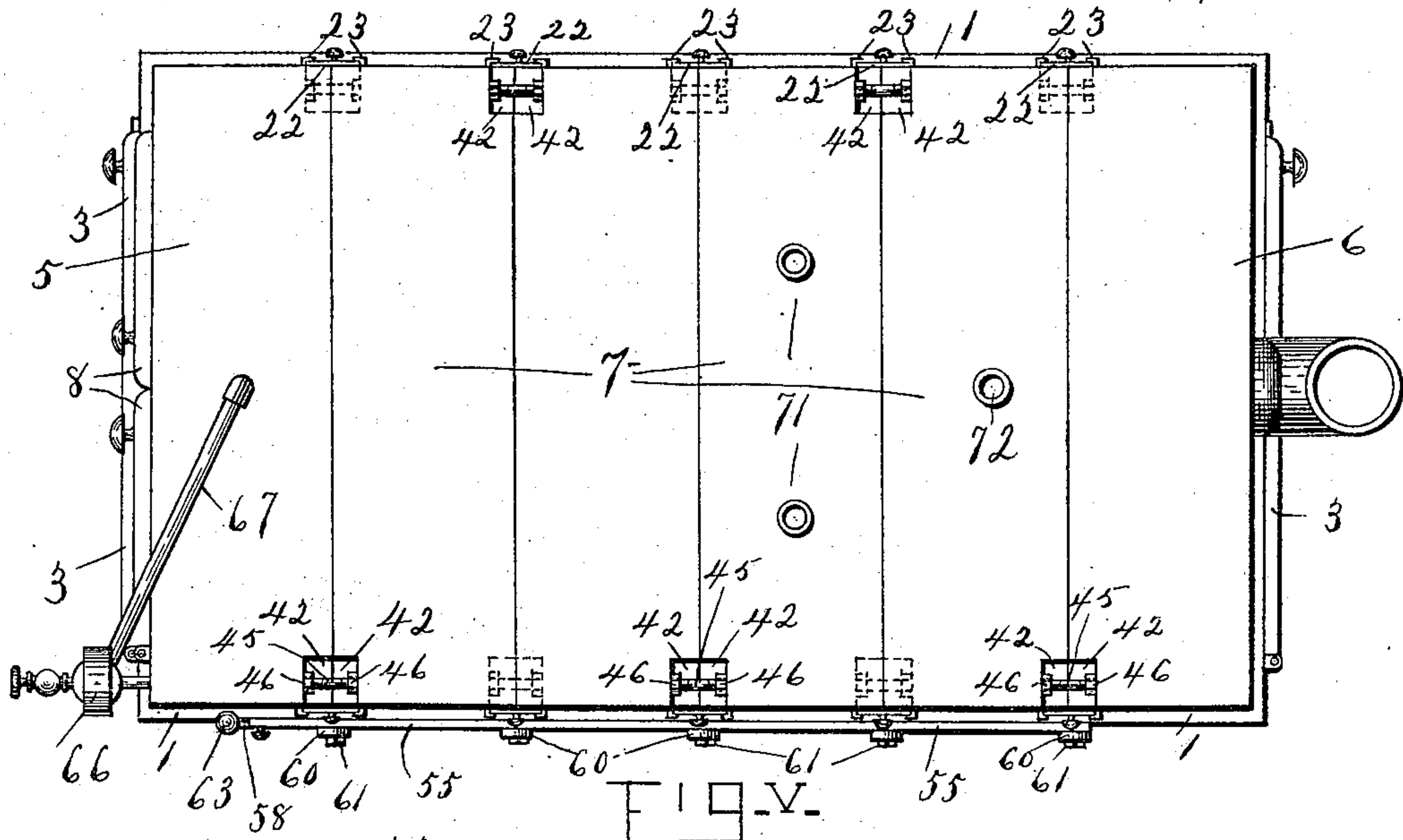
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(No Model.)

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4 Sheets—Sheet 4.

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FIG-XIII.

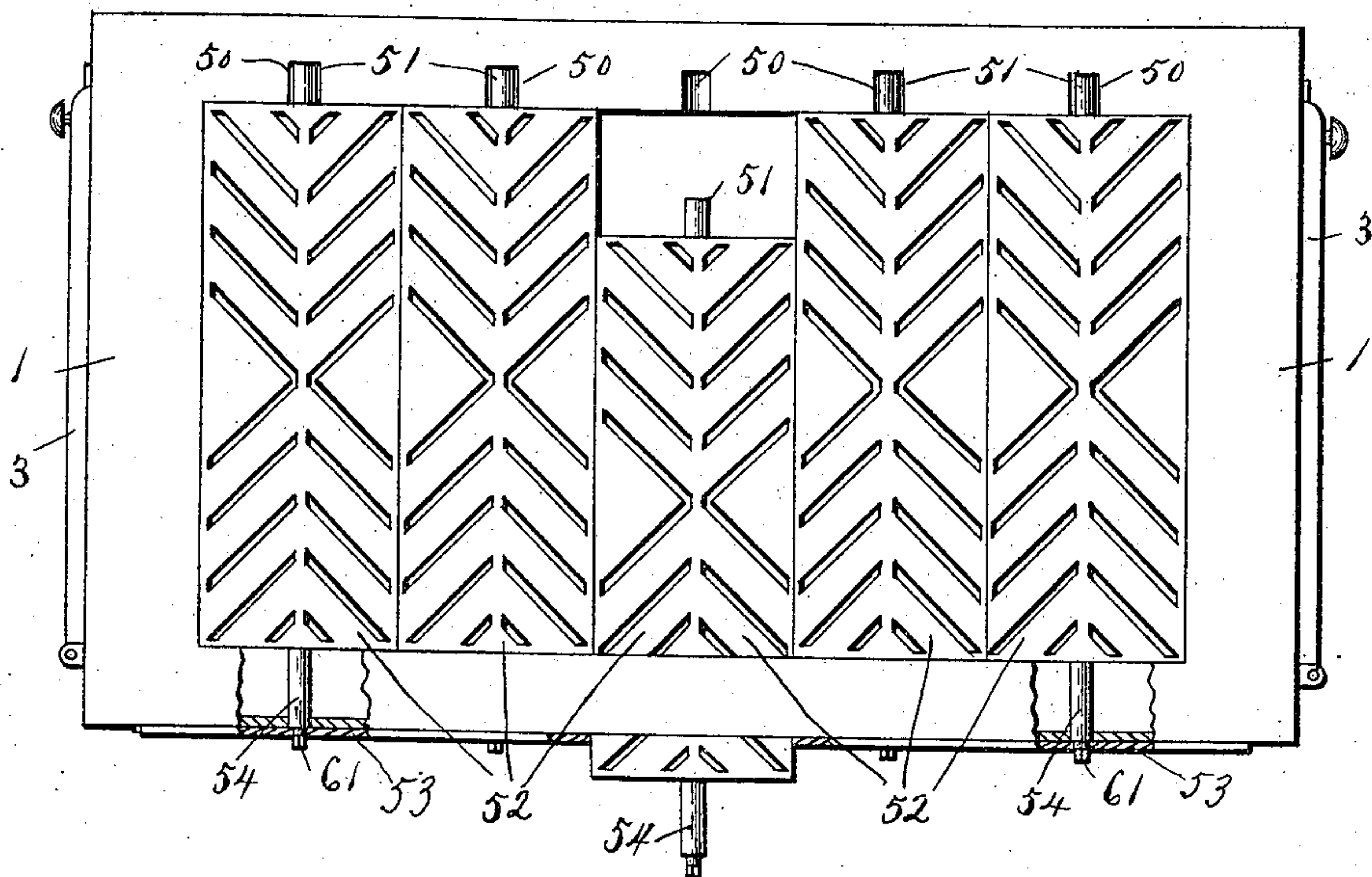


FIG-XIV.

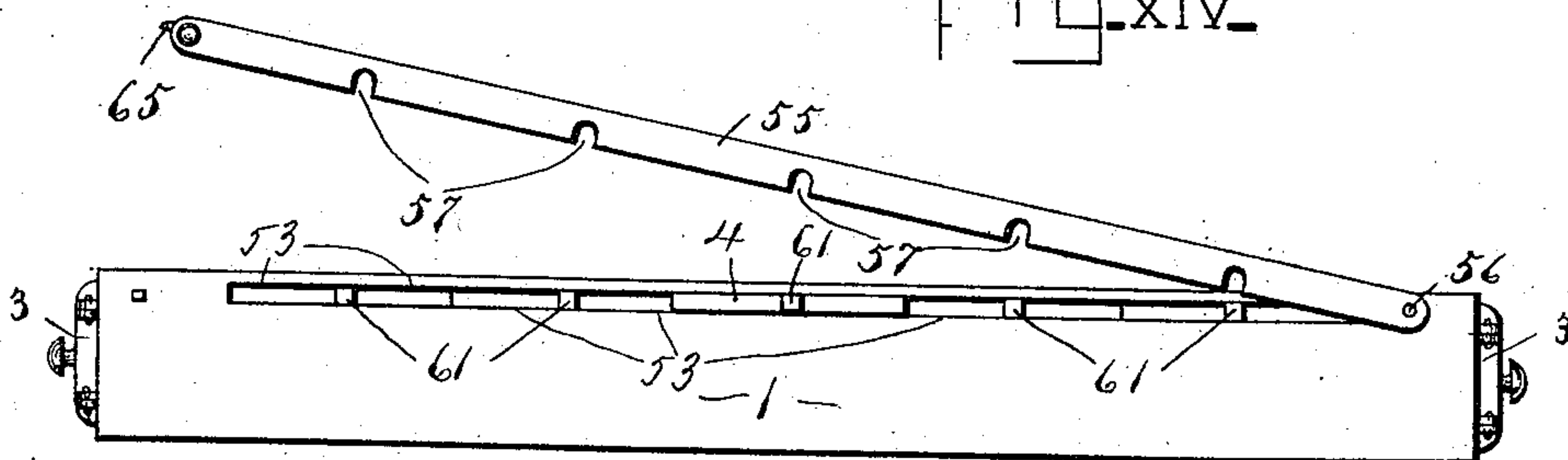
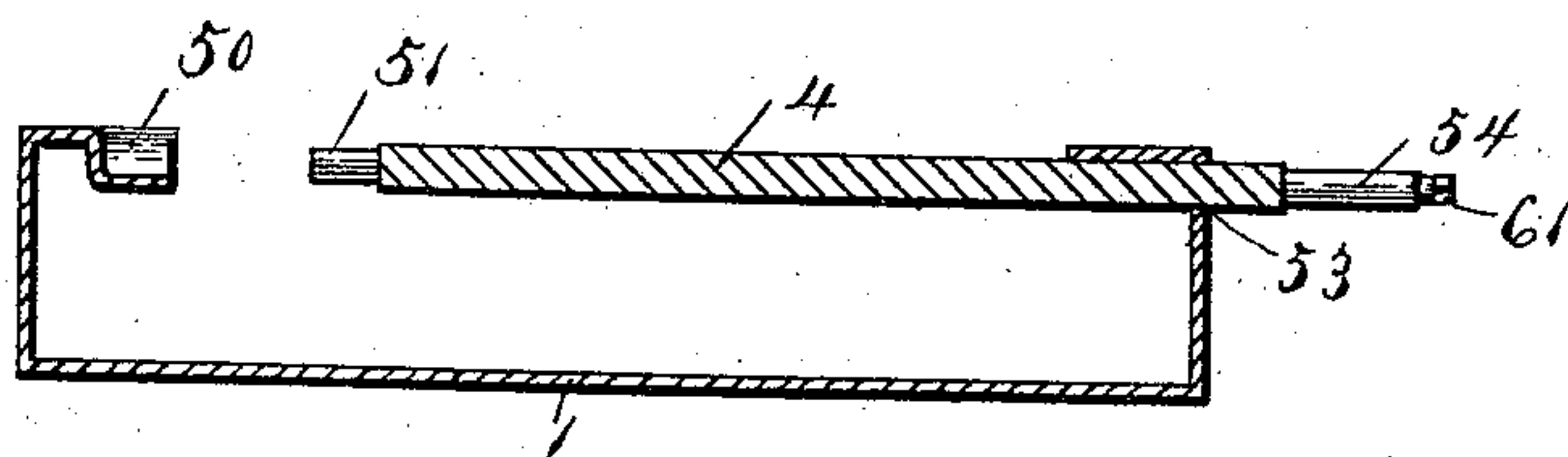


FIG-XV.



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# UNITED STATES PATENT OFFICE.

THOMAS WHEATLEY, OF SYRACUSE, NEW YORK, ASSIGNOR TO ALBERT P. FOWLER, OF SAME PLACE.

## HEATER.

SPECIFICATION forming part of Letters Patent No. 574,967, dated January 12, 1897.

Application filed December 23, 1895. Serial No. 572,987. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS WHEATLEY, a citizen of the United States, residing at Syracuse, in the county of Onondaga and State of New York, have invented a new and useful Heater; and I do hereby declare that the following, in connection with the accompanying drawings, is a full, clear, and exact description of the invention.

My invention is a new and improved heater; and it consists of a suitable base provided with novel bearings for the grate-sections and supporting water-sections of an improved form. These sections are so constructed that the whole body of water is divided up into comparatively small divisions and when assembled form a system of flues and dead ends, so that the heat and products of combustion are brought quickly into contact and are maintained for a prolonged time in contact with large heating-surfaces. These surfaces are for the most part single in thickness and are largely provided with corrugations, which not only increase the heating-surface, so affording a large surface of contact in proportion to the body of water, but act as baffle-plates, changing the direction of the draft at every point, thus holding the heat in contact with the surfaces for a longer time. These same results are also promoted by the arrangement of horizontal flues and of vertical flues and dead ends.

My heater is composed of a base having bearings at one side and an elongated slot at the other, through which the grate-sections are easily and separately inserted and in which they are supported. This base forms the ash-pit and sustains the boiler-sections, front, rear, and intermediate interchangeable sections, each provided with downwardly-extending water-legs longitudinally corrugated, a large central countersunk portion, and upper and lower horizontally-elongated openings through the water-space. These sections are easily assembled and connected together by nipples arranged at diagonally opposite corners on both faces of each intermediate section. When assembled, these sections form by the correspondence of their horizontal openings upper and lower horizontal flues, longitudinally corrugated and con-

nected in front by a single vertical flue, and also form between their adjacent faces vertical flues, leading immediately up from the fire-box to the lower horizontal flue, and above these vertical flues dead ends, extending far into the upper water-space. By means of the front doors the horizontal flues and corrugations may be easily cleaned, and by means of side doors the vertical flues and dead ends, so that every part of the interior may be reached and cleaned with little trouble.

My invention will be better understood by reference to the accompanying drawings, in which the same reference-numbers refer to the same parts in all the views.

Figure I is a front elevation of my heater. Fig. II is a side elevation of the same. Fig. III is a longitudinal vertical section taken on the central line of the heater. Fig. IV is a vertical cross-section showing one of the intermediate sections in elevation. Fig. V is a top plan view of the heater; Fig. VI, a top plan view of one intermediate section. Fig. VII is a cross-section of an intermediate section taken on line 7 7 of Fig. IV. Fig. VIII is a cross-section on line 8 8 of Fig. IV, viewed from below. Fig. IX is a vertical section on line 9 9 of Fig. IV. Fig. X is a similar section on line 10 10. Figs. XI and XII are enlarged views showing the means by which the sections are attached and connected together. Fig. XIII is a top plan view of the base with the boiler sections removed. Fig. XIV is a front elevation of the same. Fig. XV is a vertical cross-section of the same, showing one section of the grate partly withdrawn.

1 indicates the foundation or base of the heater, forming the ash-pit 2 and having front and rear doors 3 3. In the upper portion of this base is supported in suitable bearings the grate 4, and on it is sustained the boiler, composed of front section 5, rear section 6, and intermediate sections 7 7 7.

*Boiler-sections.*—The front section is provided with the usual doors, the clean-out door 8 above, and the sight or feed door 9 below. It has a bottom water-space 10 in front of the fire-box 11, a lower water-space 12, an upper water-space 13, lower and upper horizontally-elongated openings 14 and 15, and steam-space 16. The intermediate sections



7 7 (best shown in Figs. III, IV, and V to X) are made similar and interchangeable and their peculiar construction is an important feature of my invention. They are formed with the central portion of both front and rear faces countersunk. This countersunk, and consequently thinner, portion of the section extends from the bottom of the lower water-space 12 nearly to the top of the upper water-space 13, where it is terminated by the projecting surface 18 of the upper water-space, and toward the sides by the inclined surfaces 19 19, sloping downward from each end of the surface 18. Below and toward the sides it is terminated by the inclined surfaces 20 20, sloping upward and outwardly. These inclined surfaces 19 19 and 20 20 terminate in the rectangular cut-outs 21 21 in the outer edge of these sections, which form openings normally closed by side doors 22 22, sustained in slides 23 23. The intermediate sections 7 7 are also provided with lower and upper horizontally-elongated openings 14 and 15, corresponding with the same openings in the front section of the boiler and also with corresponding water-spaces, the lower 12, the upper 13, and steam-space 16. The rear face of the front section has its central portion countersunk, corresponding with the formation of the intermediate sections. By this construction when the sections of the boiler are assembled the openings through all the sections correspond and form the lower horizontal flue 14 14, extending continuously from front to rear, and also the upper horizontal flue 15 15, connected to said lower flue by a front vertical flue 24, formed in the front section 5 between the clean-out door 8 and the upper water-space 13. By the countersunk formation of the faces of the sections when the sections are assembled vertical flues 25 25 are formed between their adjacent faces, leading, through the lower water-space 12 12, from the fire-box 11 to the lower horizontal flue 14 14, and immediately above these flues 25 25 the dead ends 26 26, extending into the upper water-space 13 13 and terminating near its upper surface. The rear section 6 of the boiler is provided with a lower water-space 27, an upper water-space 28, a lower smoke-flue 29, leading directly to the stack 30 from the fire-box, and an upper smoke-flue 31, into which pass the products of combustion from the upper horizontal flue 15 15. This rear section is preferably countersunk on its forward face to correspond with the countersunk portion of the adjacent intermediate section, as seen in Fig. III. On the back of this section is attached by any suitable means a smoke-bonnet 32, by which the products of combustion, having passed through the horizontal flues in the boiler, are received from flue 31 and thrown downward before they pass out into the stack 30. Upper and lower dampers 33 and 34 are also provided.

*Corrugated surfaces.*—The greater portion of the surfaces with which the heat and the

products of combustion come in contact are longitudinally corrugated. These corrugated surfaces are the top 35 of the fire-box, the sides 36 36 thereof, (being the inner surfaces of the water-legs 41 41,) and both the lower and upper faces of the horizontal flues 14 14 and 15 15, said faces (or walls of the water-spaces) being indicated, respectively, by the numbers 37, 38, 39, and 40. By this peculiar construction of boiler or water sections the heat comes immediately in contact with large heating-surfaces, being for the most part of a single thickness of metal. The heat remains for a long time in contact with said surfaces, the corrugations and the dead ends increasing the heating-surface and acting as baffle-plates to turn the draft at every point.

*Means for connecting the sections.*—I have provided a simple and effective means for firmly connecting together the sections of my boiler and simultaneously making connection between the adjacent water-spaces to take the place of the cumbersome and expensive external connecting-drum in common use. This connection is best shown in Figs. II, V, XI, and XII. On both faces of each intermediate section two of the corners—namely, one upper corner 42 and the diagonally opposite lower corner 43—are cut out, leaving small rectangular recesses, in which are tapped screw-threaded holes 44 through the metal into the water-space. Short pieces of pipe or nipples 45 are provided, with their ends right and left threaded to engage with these threaded holes. When the sections are set together, the cut-out corners or recesses 42 and 43 on adjacent sections correspond. The nipples 45 are set to engage with the holes on each side and screwed tight, whereby the adjacent sections are drawn strongly together and communication is effected between the adjacent water-spaces. Lock-nuts 46 46 are also arranged, engaging with the threads on the nipples for making a tight connection, and where desired rubber washers 47 47 may be interposed between the lock-nuts and the adjacent surface. The rear face of the front section and the front face of the rear section have diagonally opposite corners similarly recessed to permit the use of the nipples and the attachment of these sections by this means to the adjacent intermediate sections. By this means it will be seen that the water-legs of the adjacent sections are connected together alternately on one side and the other, and the adjacent steam-spaces also alternately on one side and the other, the arrangement of these connections being best shown in Figs. II and V, so that the connections between the steam-spaces are arranged in alternation with the connections between the water-legs 41 41 and are never arranged directly over them.

*Manner of sustaining grate-sections.*—This is best shown in Figs. XIII to XV. Base 1 is provided with bearings 50 to receive the inner ends 51 of grate-bars. On the other side



the base is provided with the elongated slot 53, through which the grate-sections 52 are easily slipped into place and in which rest the outer ends 54 of the grate-bars. A lock-bar 55 is pivotally connected at one end 56 to base and is provided with notches 57 57, fitted to the grate-bars 54, and with a latch 65 at its opposite end. When this lock-bar is dropped into position, its notches 57 57 engage with the grate-bars 54 54, preventing the withdrawal of the grate-sections 52. The grate-sections may be connected together by any desirable means, as by the connecting-bar 58, pivoted at 59 59 to the links 60 60, which engage with the angular ends 61 61 of the grate-bars 54 54. To one end, preferably the forward, of this connecting-bar 58 at 62 is pivotally connected the lever 63, journaled to the base at 64, by which means all sections 20 of the grate may be rocked simultaneously. If desired, any single link 60 may be taken off and the particular grate-section 52 left motionless while the rest are rocked, or the connecting-bar 58 and all the links 60 60 may 25 be omitted and each grate-section shaken separately by means of a handle fitting its square end 61.

*Gages and connections.*—My heater is provided with the ordinary fittings of steam-gage 30 66, connected by pipe 67 to steam-space 16, water-gage 68, connected by pipes 69 69 69 to the water-spaces and blow-off cocks 70 70. 71 71 are connections for the outflow-pipes, 72 for the safety-valve, and 73 for the water- 35 supply.

*Advantages.*—By my improved construction of heater I obtain the following advantages: quick contact of heat and products of combustion with maximum of heating-surface; good circulation and maximum of time 40 of contact; corrugations and dead ends increase heating-surfaces and, acting as baffle-plates, prolong time of contact; increase in single-thickness heating-surfaces; therefore 45 sections lighter and saving in metal and expense; simple, cheap, effective means of connecting boiler-sections; simple means for sustaining grate; finally, cleaning made easy, every inch of interior reached directly through 50 front or side doors; corrugated surfaces easily cleaned through front doors, soot falling down; vertical flues and dead ends cleaned through side doors.

It will be evident that this construction of 55 heater can be used either for steam or hot-water heating. If for the latter, there will be no "steam-space," properly so called.

Having thus fully described my invention, what I claim, and desire to protect by Letters 60 Patent, is—

1. The combination with the front and rear boiler-sections having their adjacent surfaces provided with diagonally opposite recessed corners, the end wall of each corner provided 65 with a screw-threaded aperture and said sections connected together, alternately at the top and bottom, by means of right and left

hand screw-threaded nipples, so as to establish an alternate upward and downward circulation through the sections substantially as 70 specified.

2. In a heater, the combination of the base, the grate, the sections set on the base, said sections having in their lower portions a fire-space and water-legs forming the sides of said 75 fire-space, said sides and top of the fire-space being longitudinally corrugated, a lower space, vertical flues leading from said fire-box through said lower water-space into a lower horizontal flue, said flue having its up- 80 per and lower walls corrugated longitudinally, vertical dead ends arranged above said vertical flues and corresponding in position and size therewith extending into an upper water-space from said lower horizontal flue, an end 85 flue connecting said lower flue with an upper horizontal flue, said upper flue being arranged between the upper water-space and the steam-space and having its upper and lower walls longitudinally corrugated, substantially as 90 specified.

3. In a heater, the combination of the supporting-base having on one side bearings for the grate-bars, and on the other an elongated slot for the admission of the grate-sections, a 95 locking-bar for locking the grate in position, a connecting-arm connecting said grate-sections, a handle for operating the same, boiler-sections arranged upon said base, said sections forming a fire-box having its walls and 100 top corrugated above said grate and said sections having horizontal flues longitudinally corrugated, a front flue connecting said horizontal flues, vertical flues and dead ends, substantially as described and shown. 105

4. A heater composed of a base having bearings on one side and an elongated slot on the other side to receive the grate-sections, a boiler supported on said base and having a 110 fire-space beneath, water-legs on both sides of the fire-space, lower and upper water-spaces and a steam-space, two horizontal flues arranged respectively between the lower and upper water-spaces, and upper water-space 115 and steam-space, a single vertical flue connecting said horizontal flues, vertical flues leading from fire-space of lower water-space, dead ends immediately over said vertical flues and extending from lower horizontal flues into the upper water-space, the heating-surfaces 120 forming the walls of said fire-space and walls of both horizontal flues being longitudinally corrugated, substantially as described and shown.

5. In a heater, intermediate boiler-sections 125 each formed with water-legs, lower and upper water-spaces and a steam-space, a fire-space arranged beneath the lower and upper flues, said boiler-sections having both front and rear faces formed with a countersunk central 130 portion extending from the fire-box nearly to the top of the upper water-space and terminating above and below toward each side by inclined planes sloping respectively down-



wardly and outwardly, and upwardly and outwardly and terminating in rectangular cut-outs on their outer edges, substantially as described and shown.

5 In witness whereof I have hereunto set my hand, in the presence of two attesting witnesses, at Syracuse, in the county of Onon-

daga, in the State of New York, this 20th day of December, 1895.

THOMAS WHEATLEY.

Witnesses:

ALFRED WILKINSON,  
CONRAD SCHOENECK.