

No. 711,803.

Patented Oct. 21, 1902.

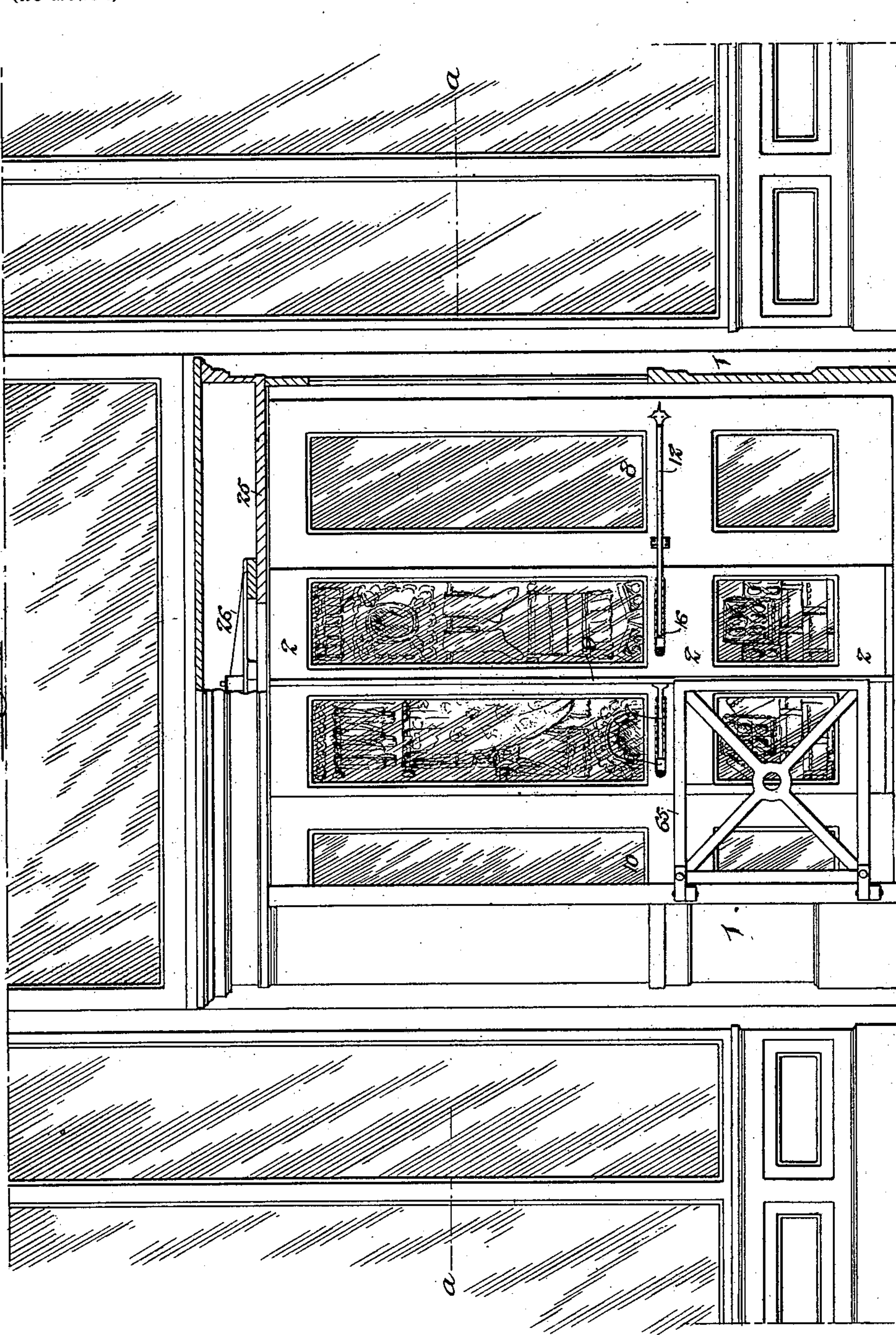
T. VAN KANNEL.
REVOLVING DOOR STRUCTURE.

(Application filed Mar. 23, 1900.)

(No Model.)

9 Sheets—Sheet 1.

Fig. 1.



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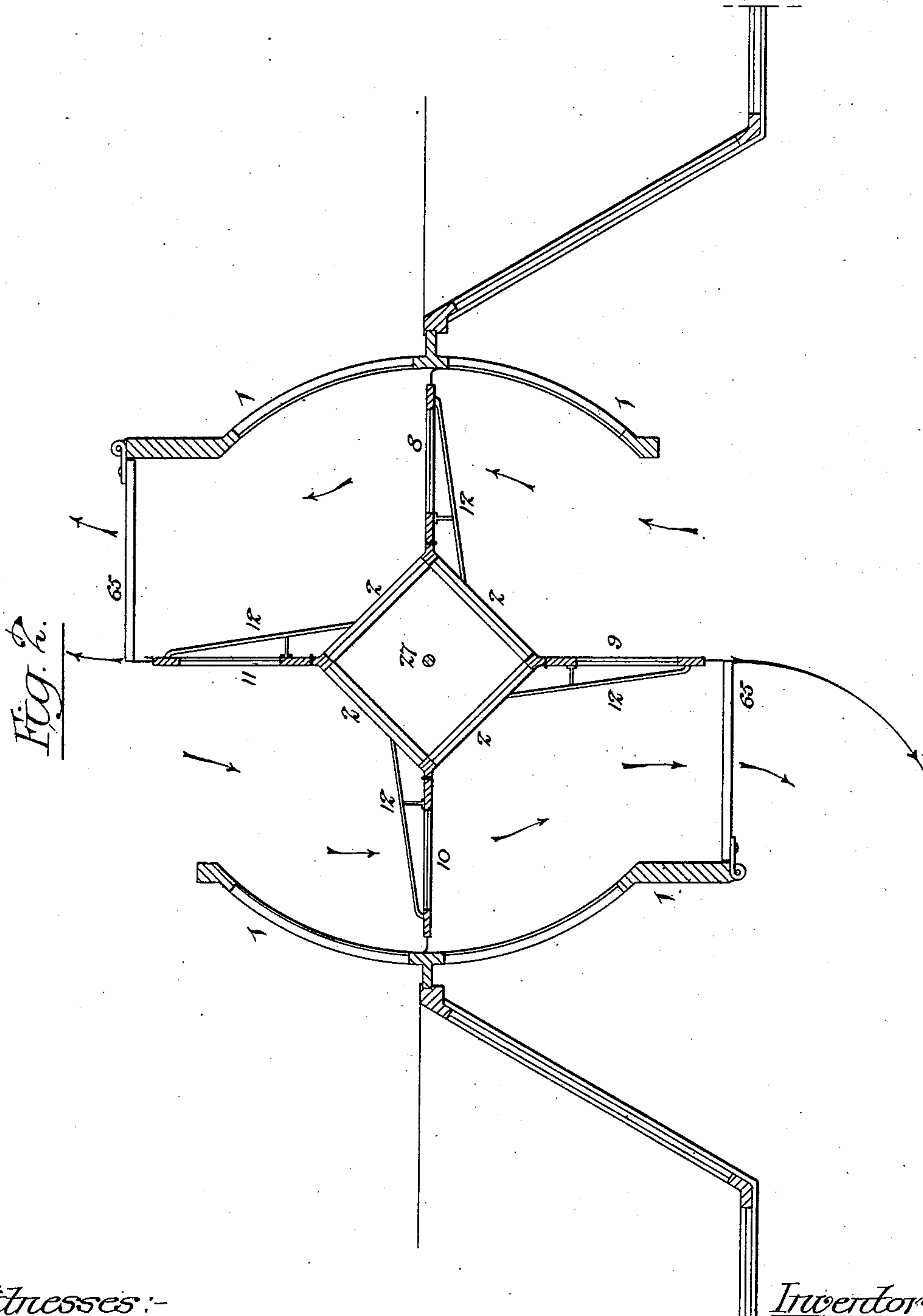
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9 Sheets—Sheet 2.



Witnesses:-

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9 Sheets—Sheet 3.

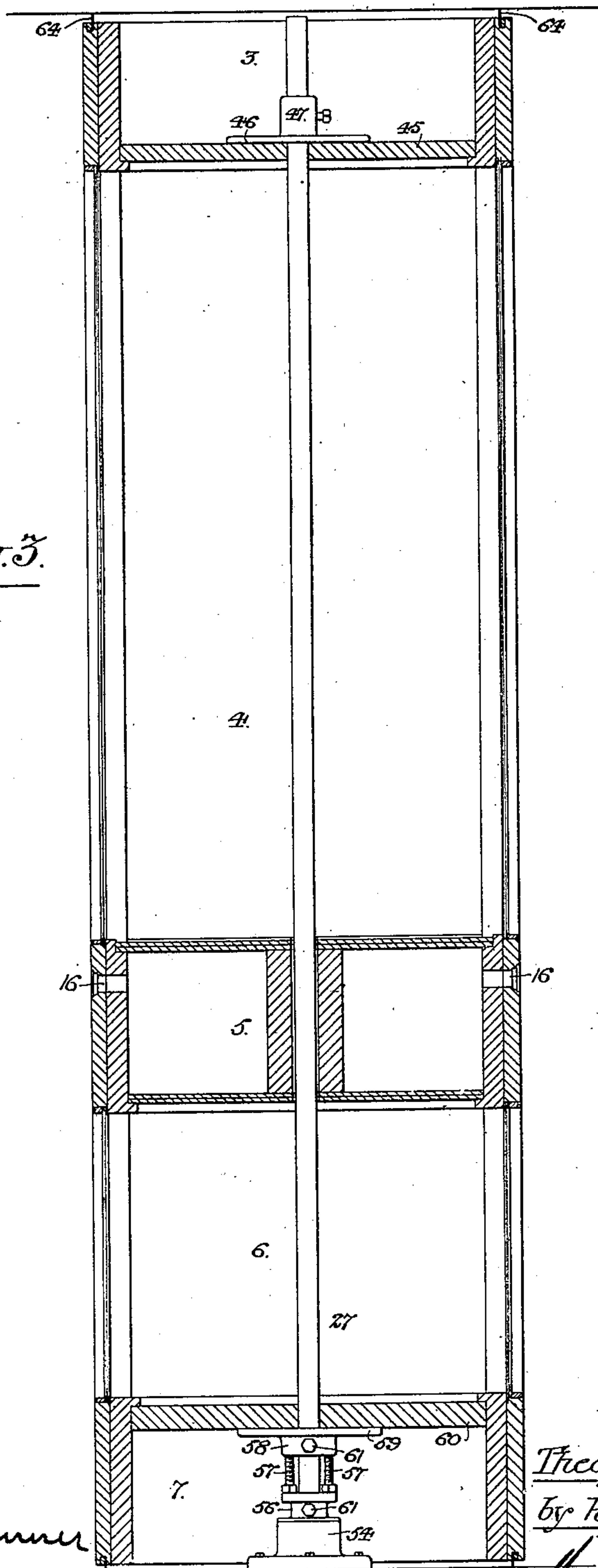


Fig. 3.

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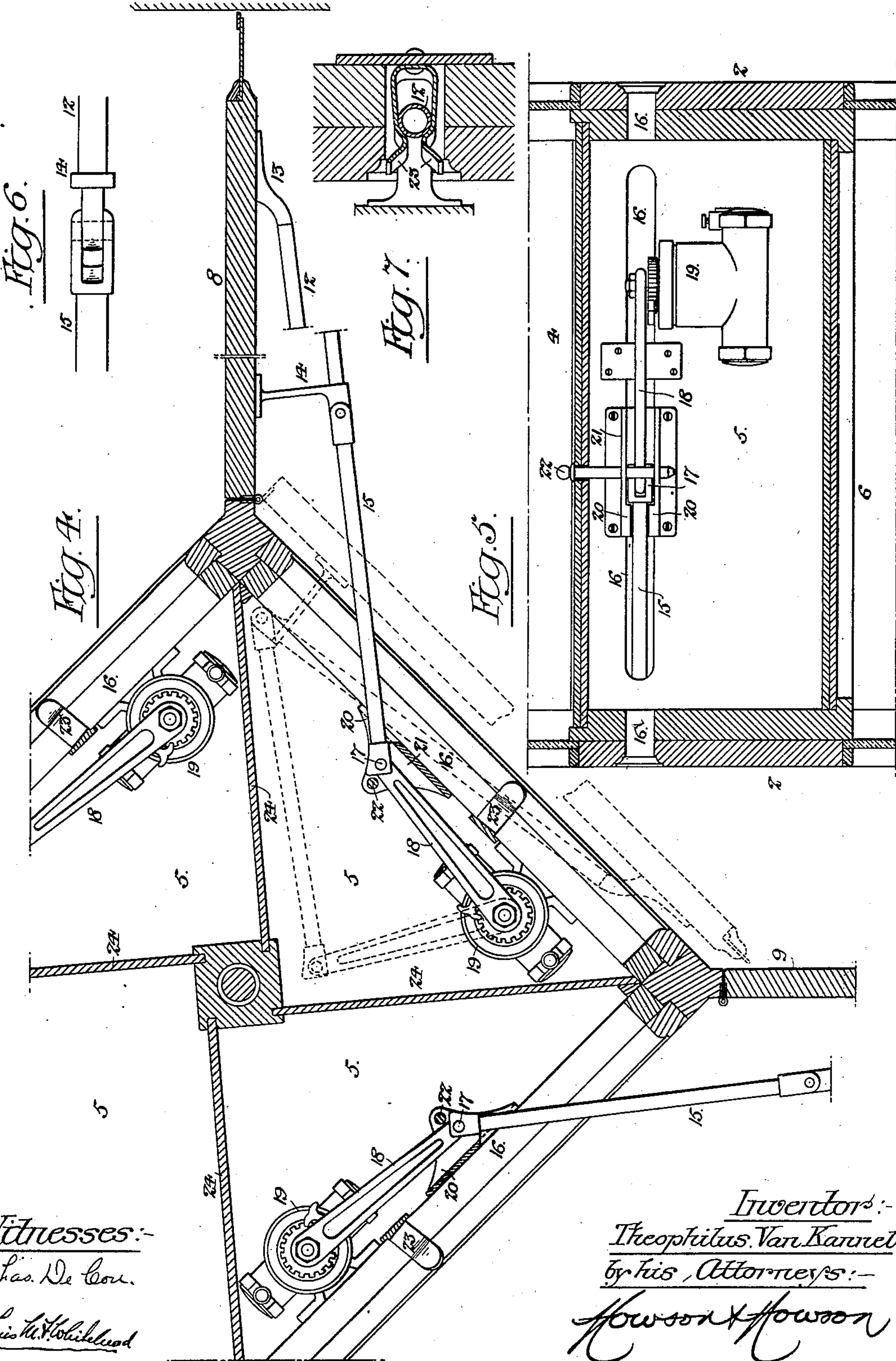
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9 Sheets—Sheet 4.



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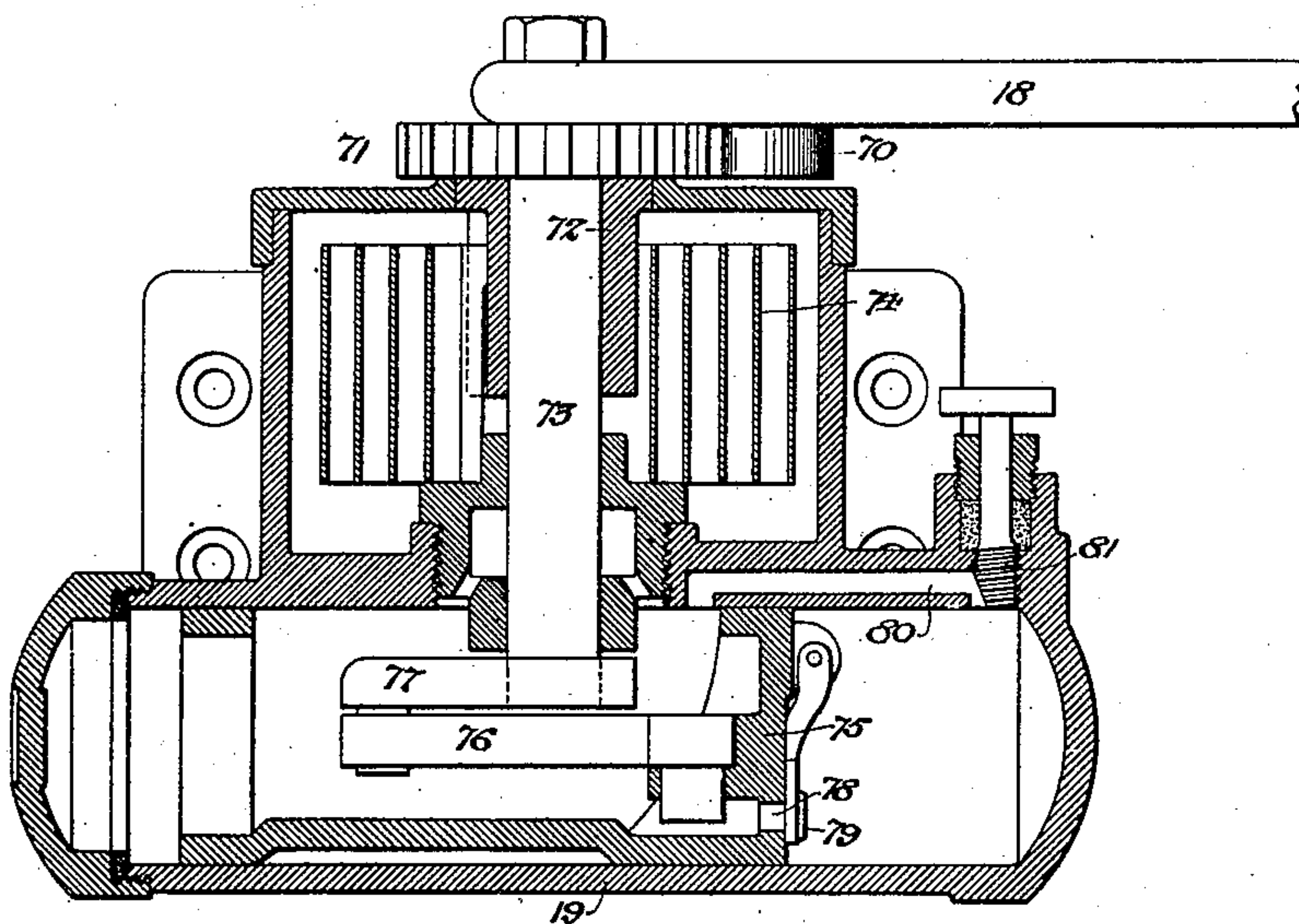
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9 Sheets—Sheet 5.

Fig. 5^a



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9 Sheets—Sheet 6.

Fig. 8.

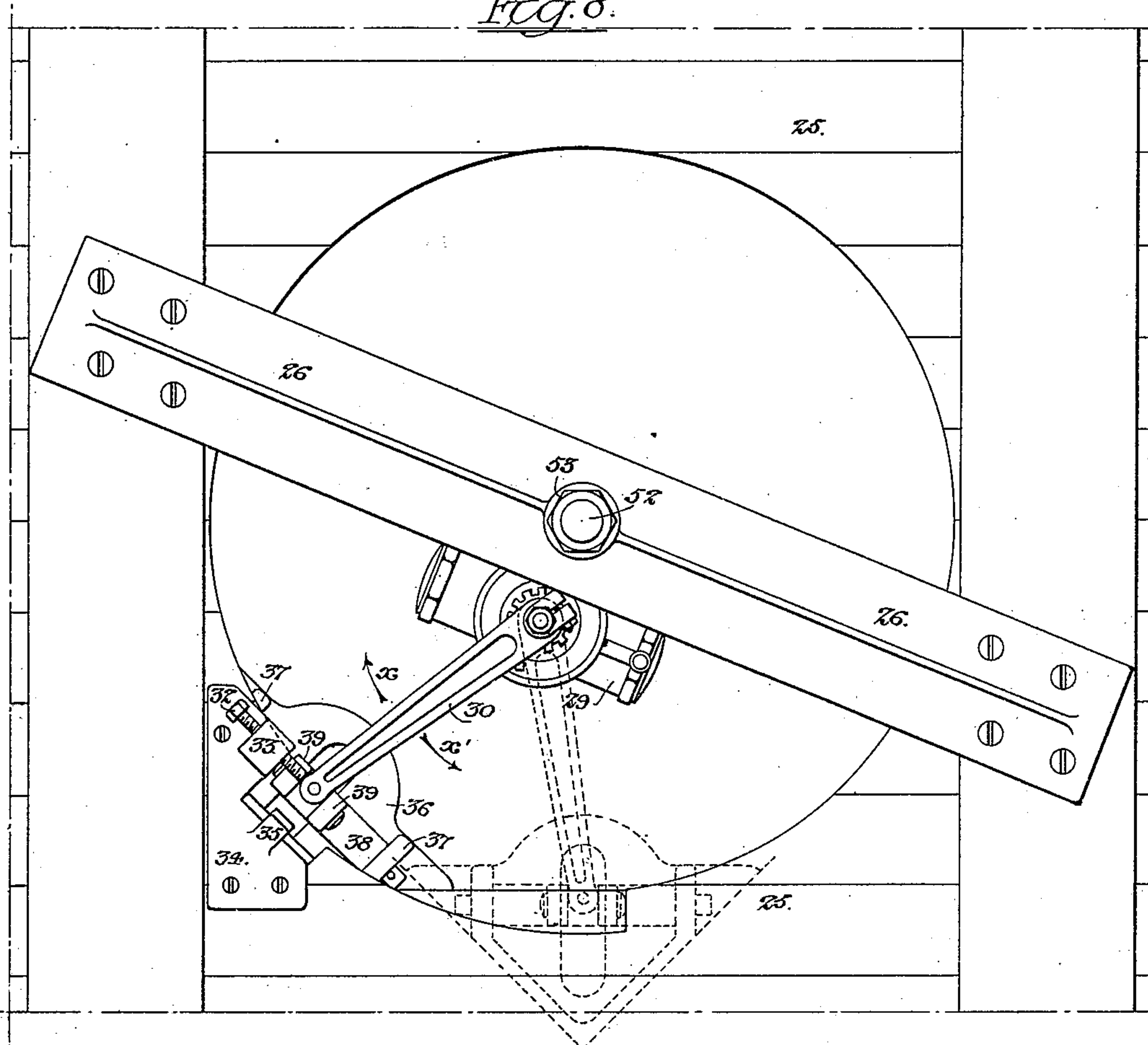
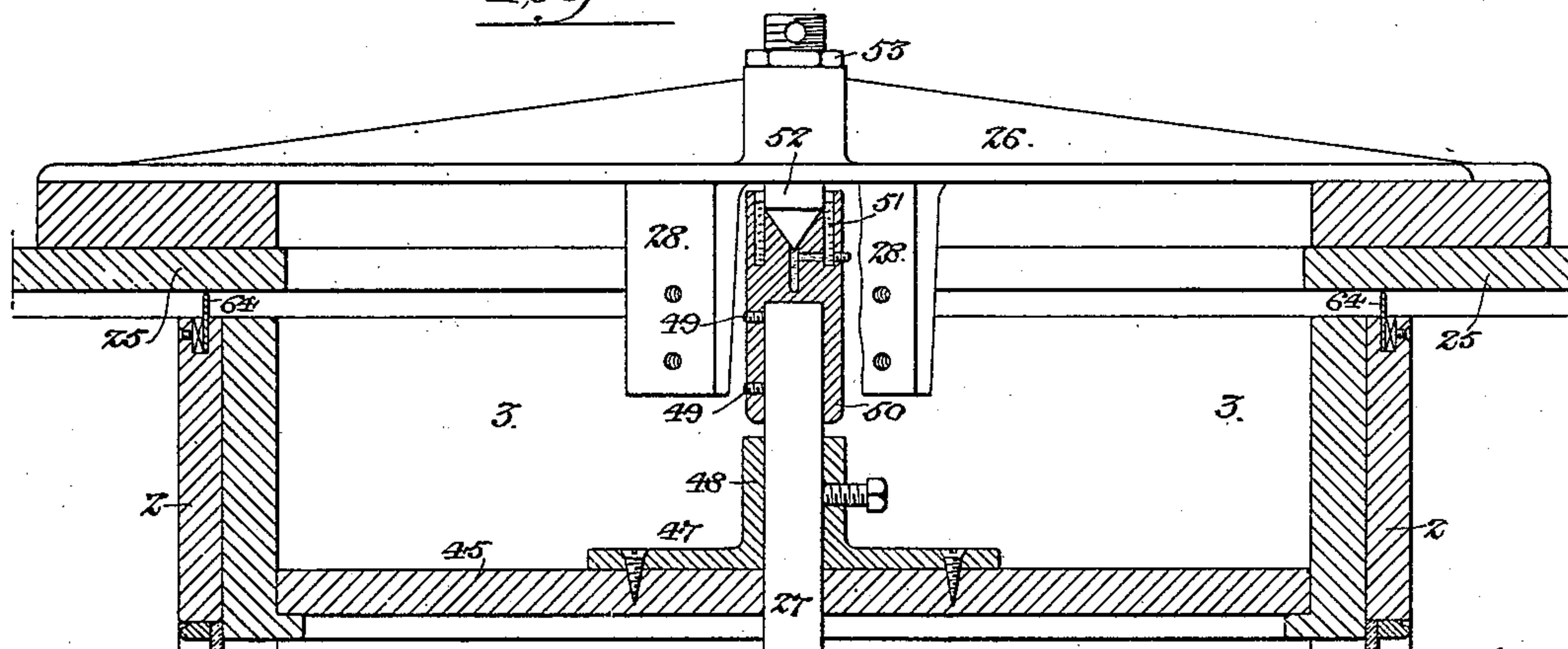


Fig. 9.



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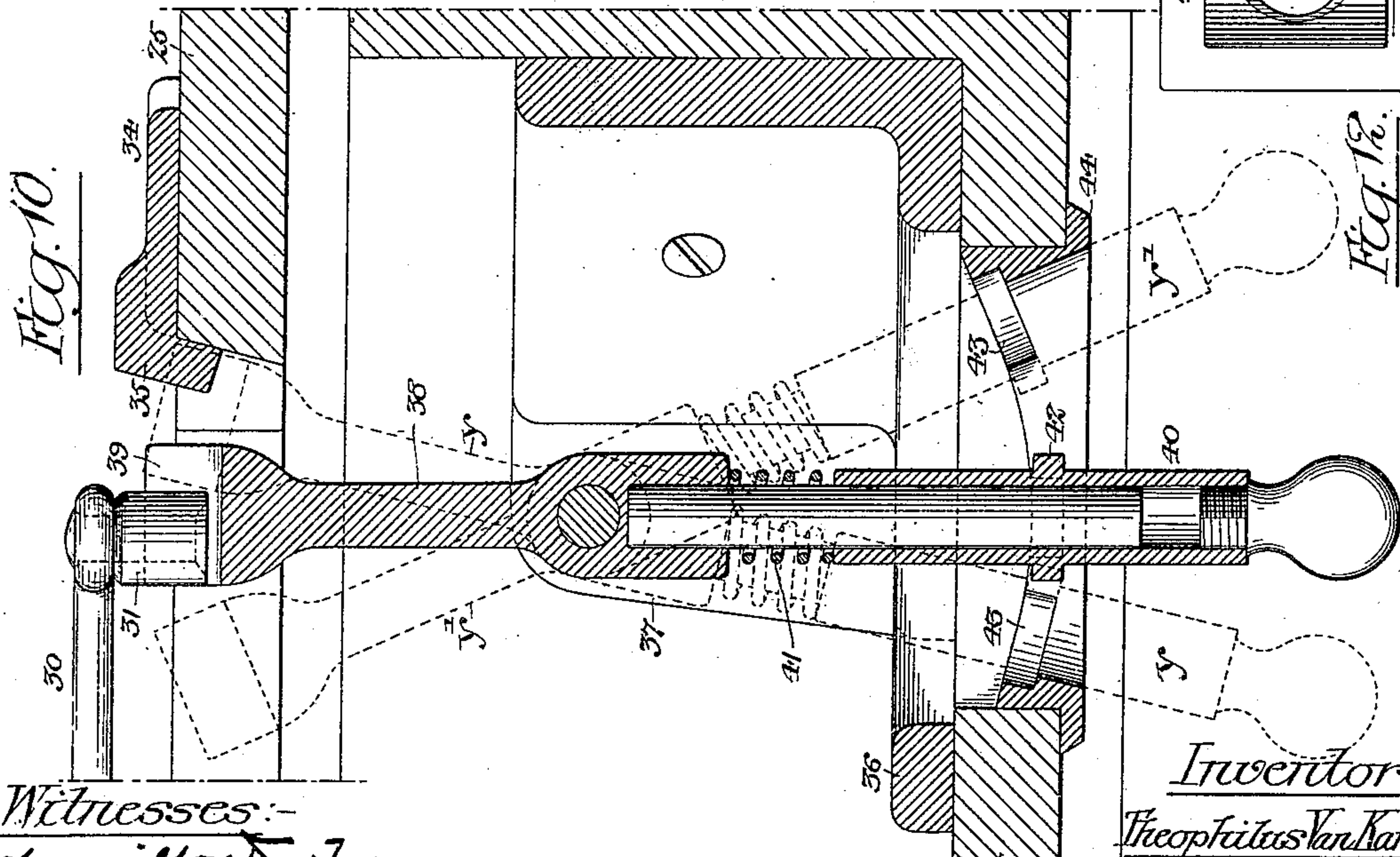
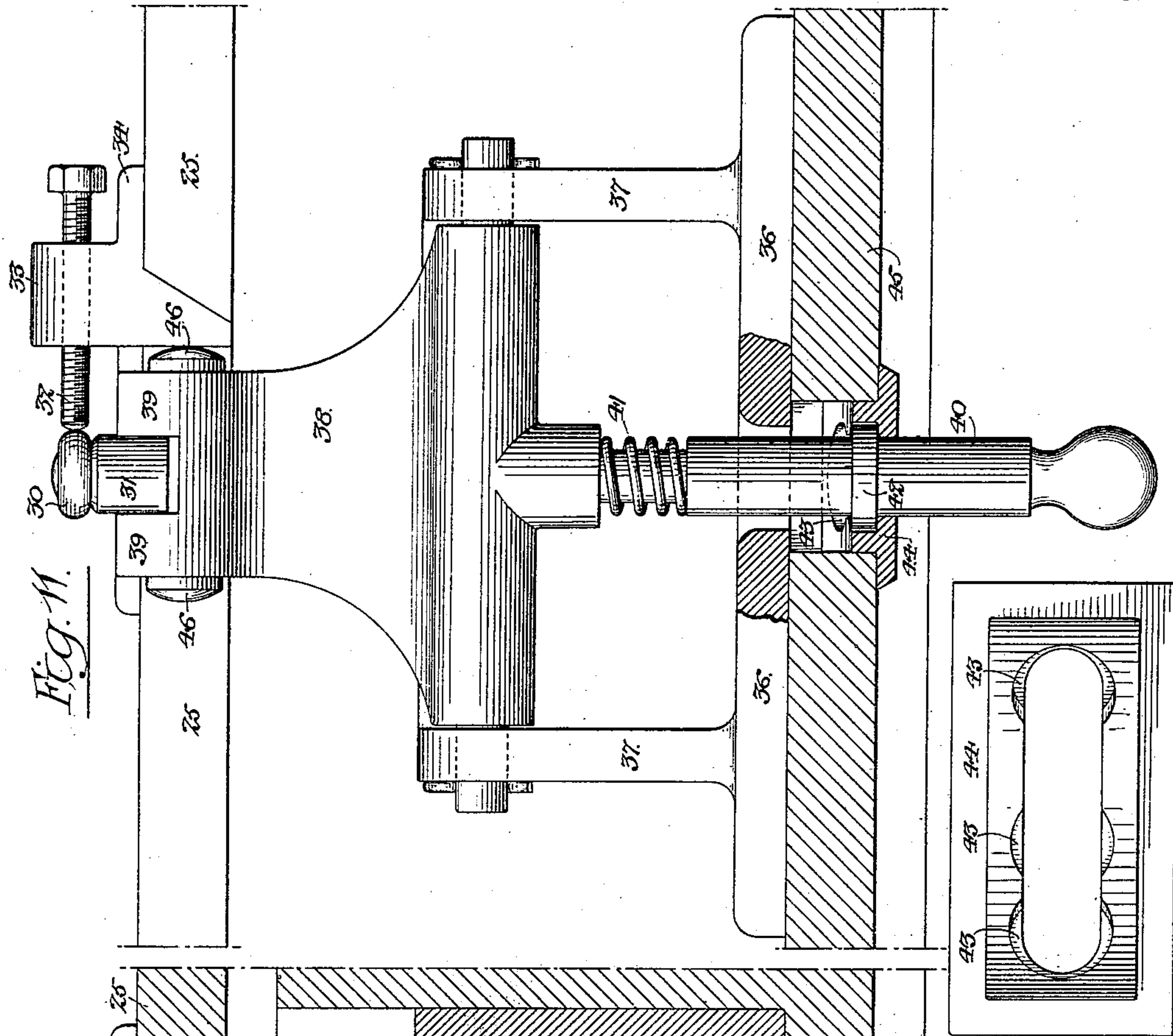
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(No Model.)

9 Sheets—Sheet 7.



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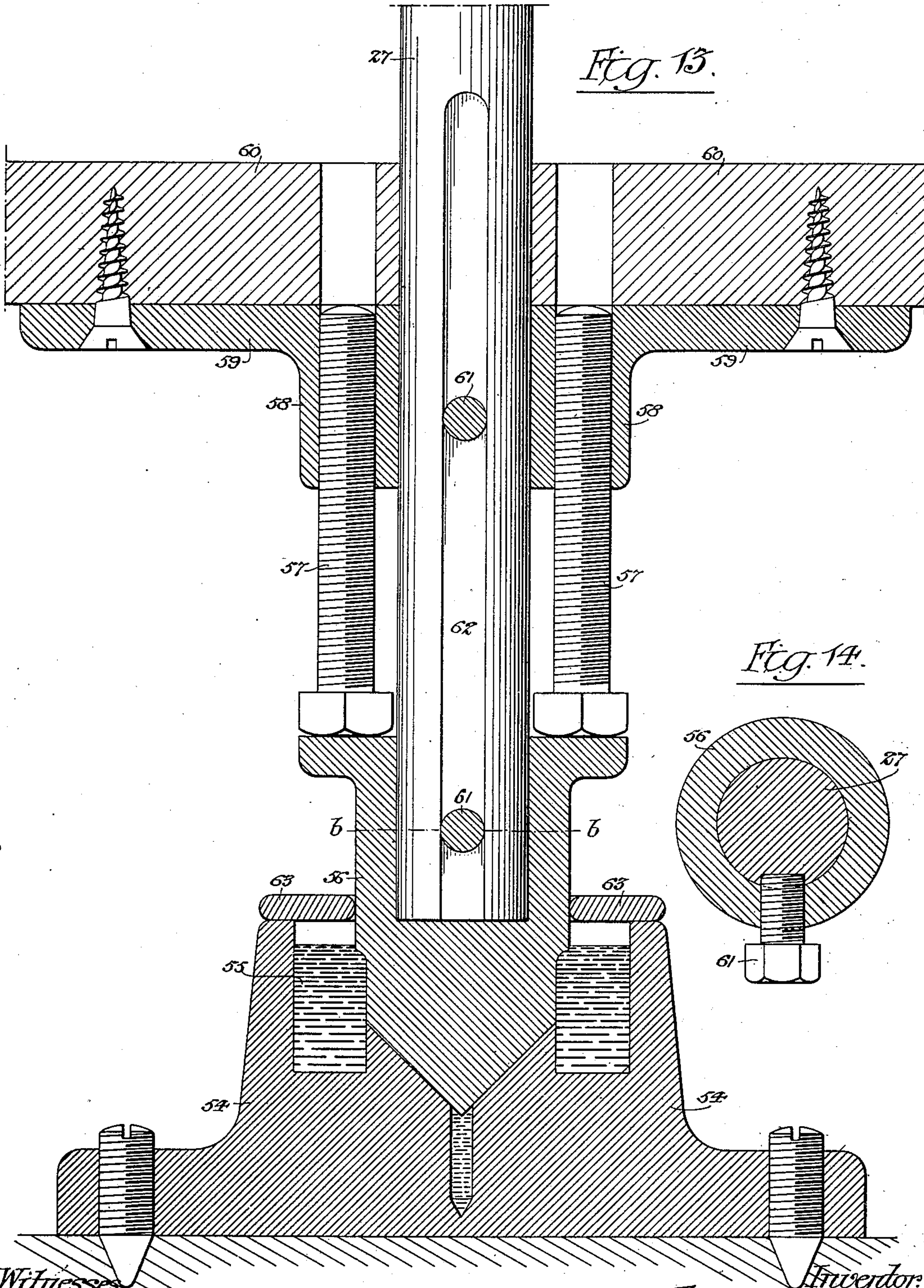
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9 Sheets—Sheet 8.



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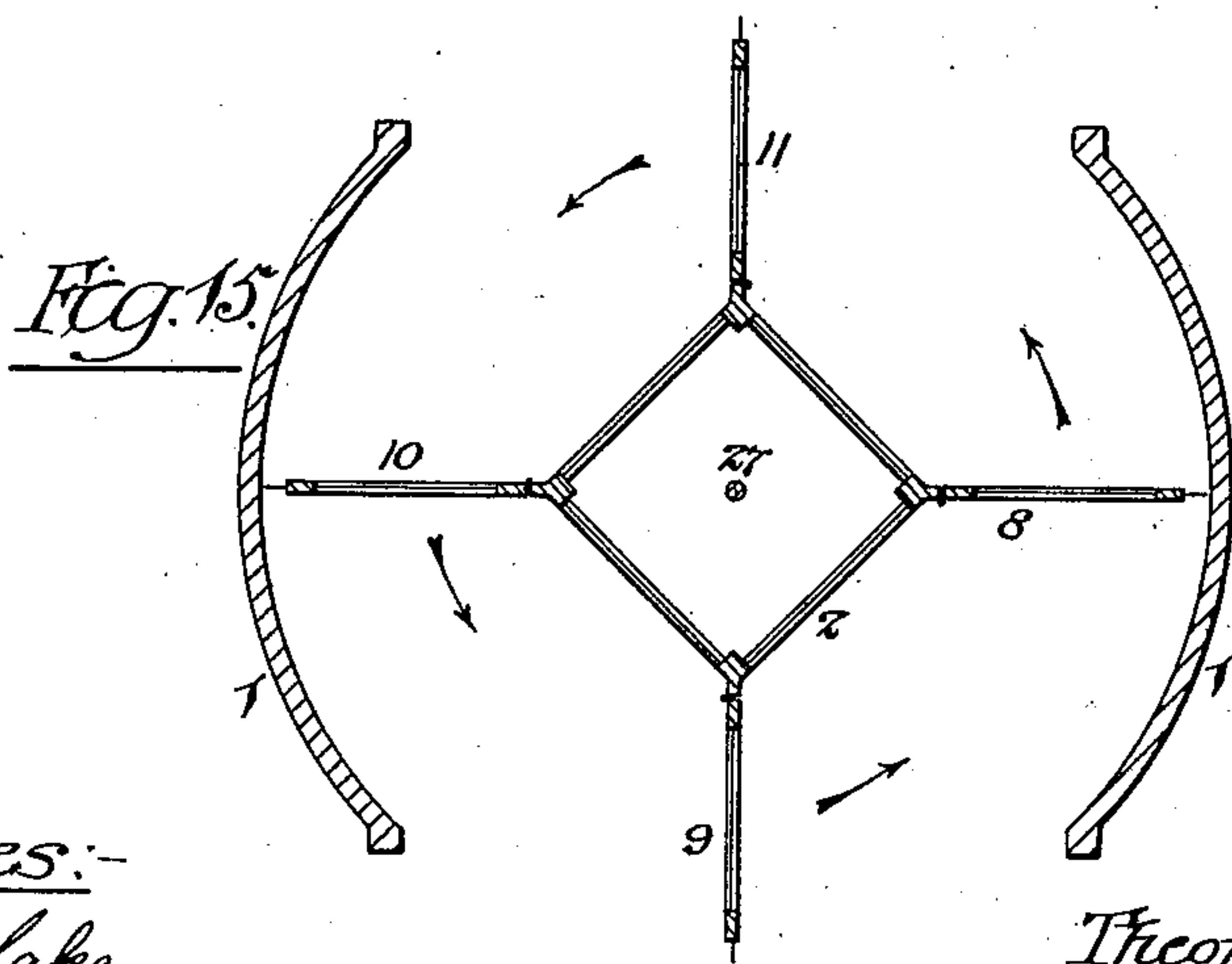
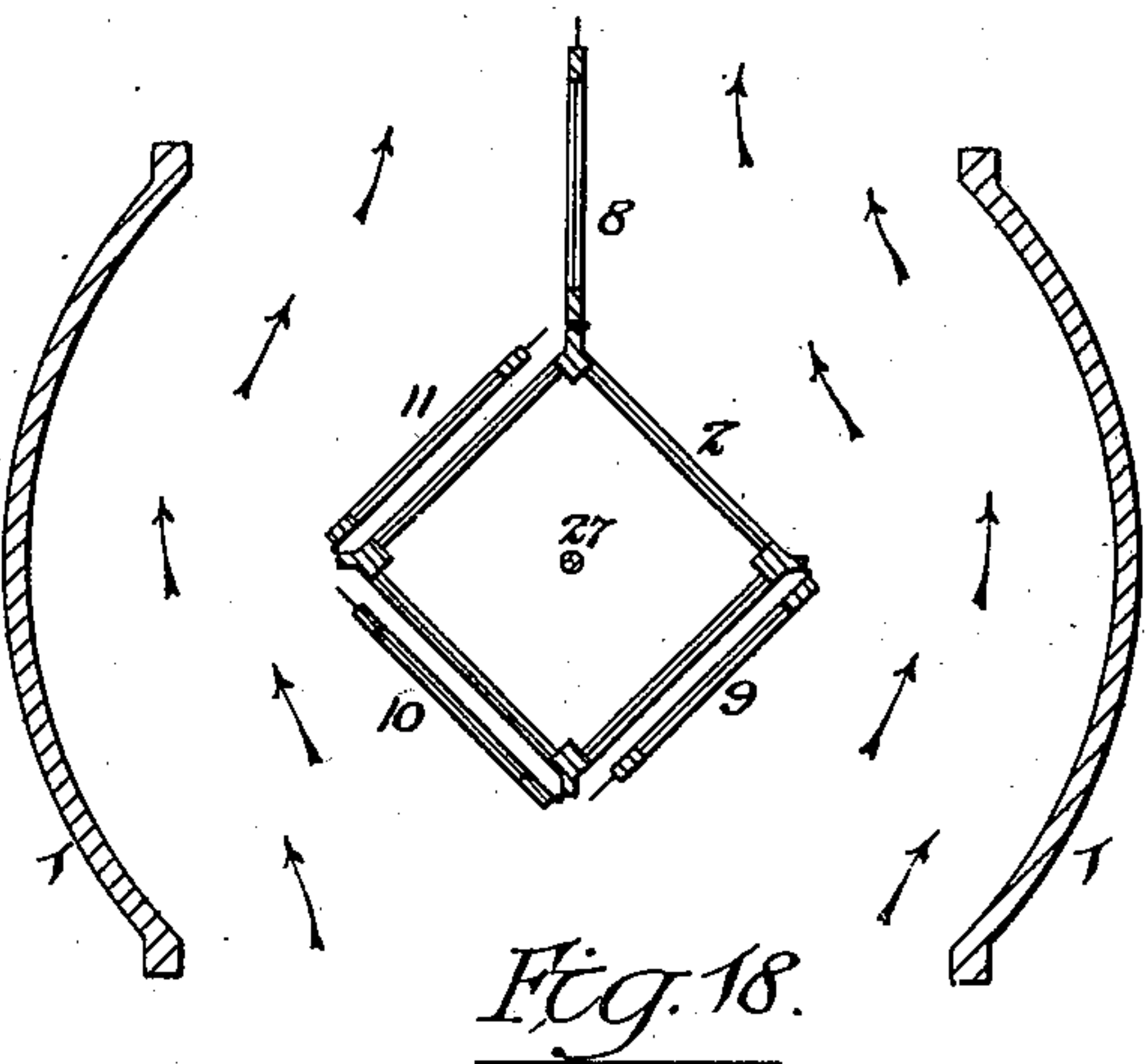
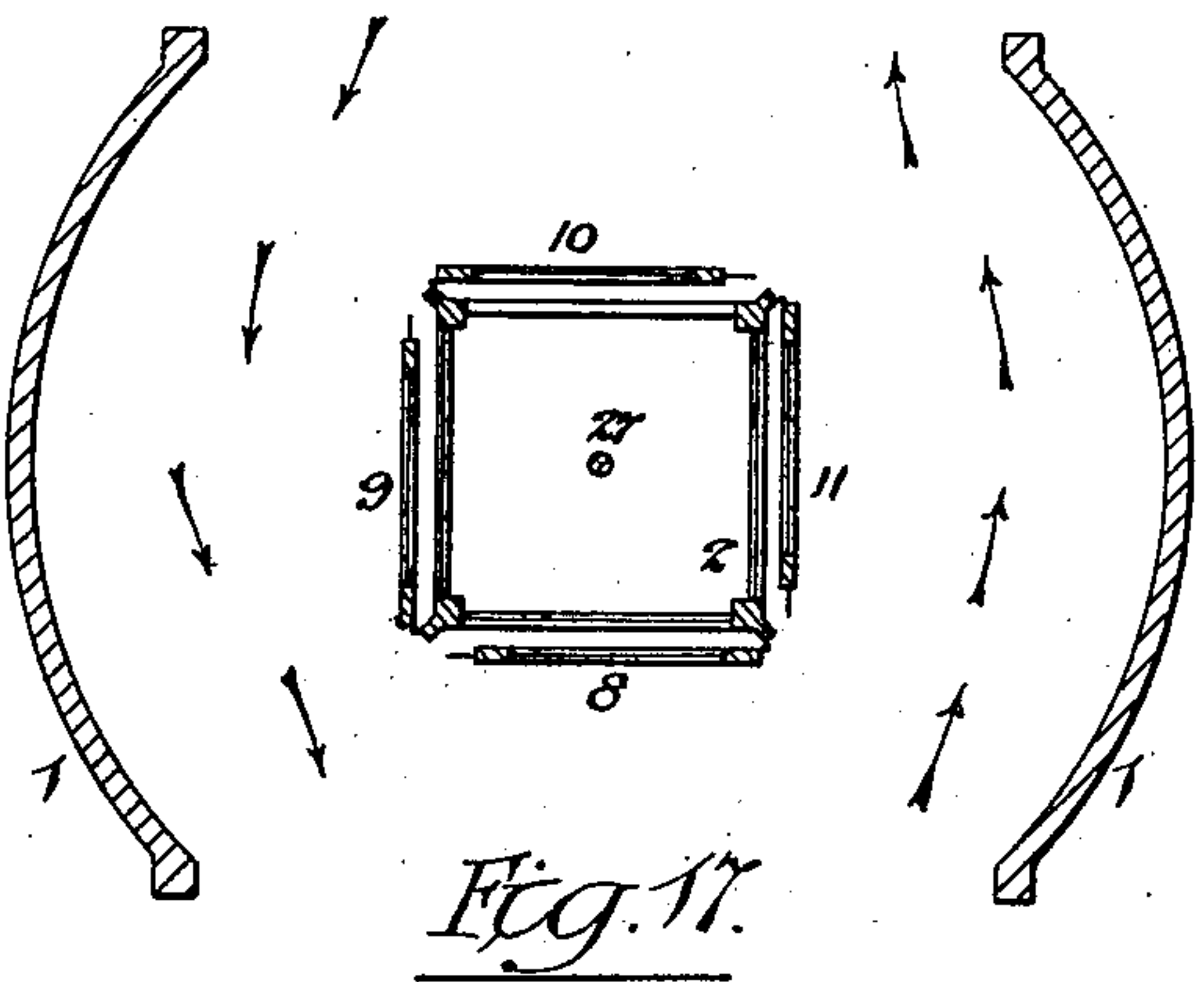
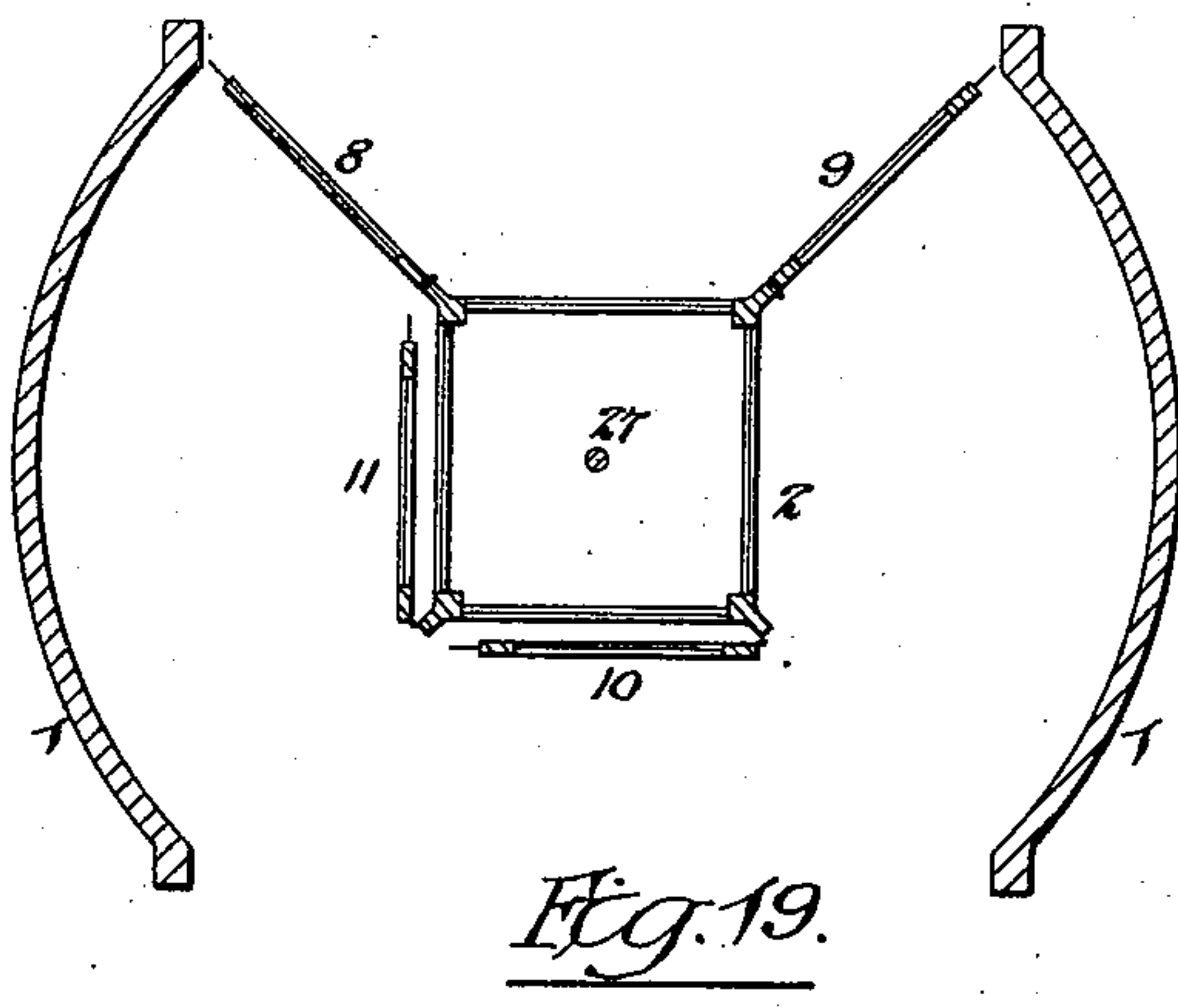
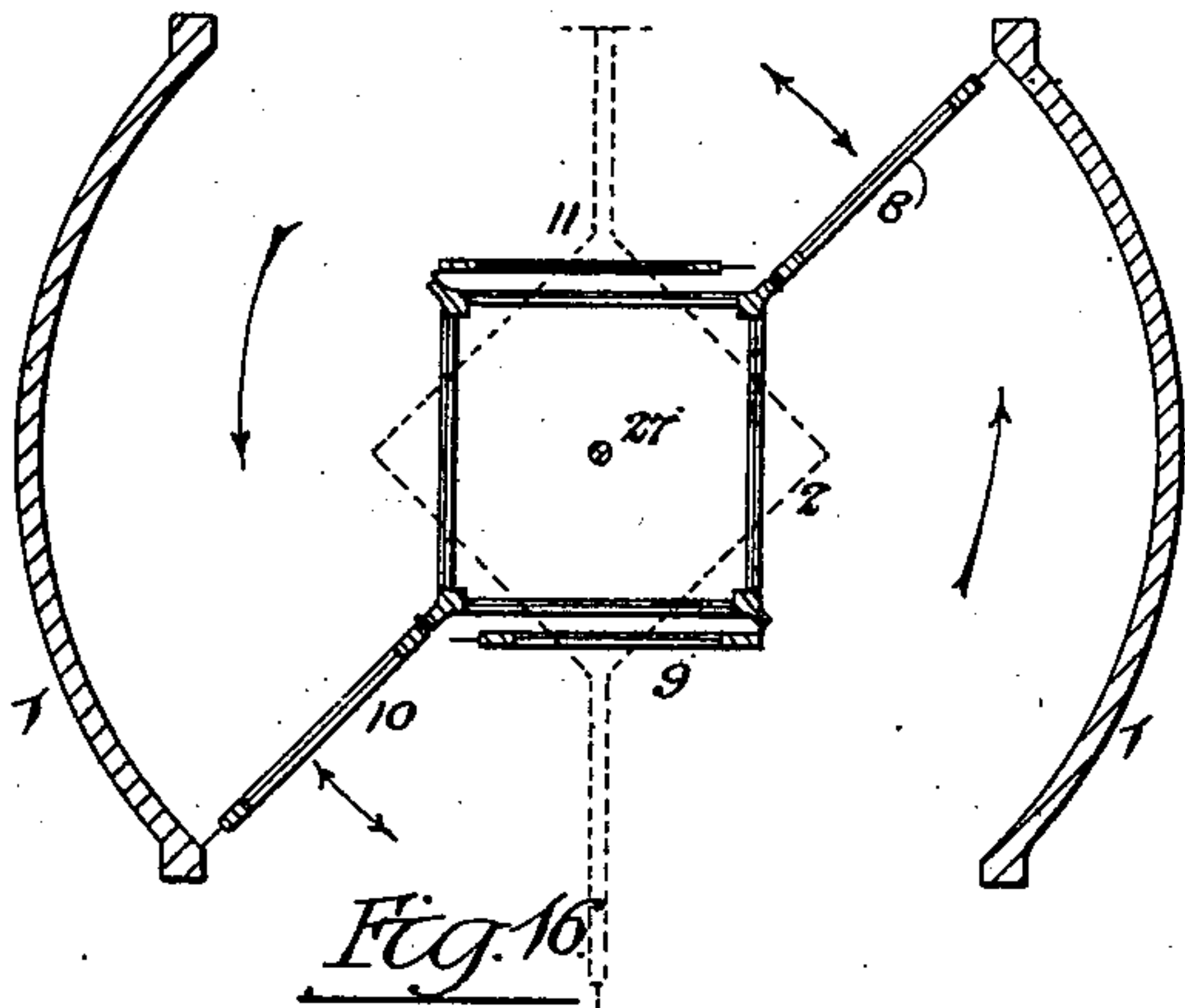
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(No Model.)

9 Sheets—Sheet 9.



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UNITED STATES PATENT OFFICE.

THEOPHILUS VAN KANNEL, OF NEW YORK, N. Y., ASSIGNOR TO THE VAN KANNEL REVOLVING DOOR COMPANY, OF NEW YORK, N. Y., AND CHARLESTON, WEST VIRGINIA, A CORPORATION OF WEST VIRGINIA.

REVOLVING-DOOR STRUCTURE.

SPECIFICATION forming part of Letters Patent No. 711,803, dated October 21, 1902.

Application filed March 23, 1900. Serial No. 9,949. (No model.)

To all whom it may concern:

Be it known that I, THEOPHILUS VAN KANNEL, a citizen of the United States, and a resident of New York city, State of New York, have invented certain Improvements in Revolving-Door Structures, of which the following is a specification.

My invention consists of certain improvements in revolving-door structures of the general character set forth in a number of previous patents which I have obtained, such structures comprising a central post having radiating wings and mounted so as to rotate on a vertical axis, this portion being termed the "door," and partial side inclosures for such door, usually of segmental form and combined with a ceiling, this portion of the structure being termed the "casing."

The objects of my present improvements are to render the central portion of the door available for use as a show-case, to prevent injury to persons who may be caught between either of the wings of the door and the casing, to provide for the use of the structure with a vibrating door instead of a rotating door, to permit of the ready locking of the wings of the door, so as to prevent unauthorized passage of persons through the door in either direction, to permit of the ready flexing of the wings of the door, so as to provide an unobstructed passage through the casing of the doorway on both sides of the central structure of the door in case of panic or at other times when such unobstructed passage is desired, and to direct persons to the right side of the door without interfering with the proper movement of the latter or the proper passage of persons through the doorway. These objects I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a view, partly in side elevation and partly in section, of a rotating-door structure in accordance with my invention. Fig. 2 is a sectional plan view of the same on the line *a a*, Fig. 1. Fig. 3 is a vertical sectional view of the central structure of the door. Fig. 4 is a sectional plan view, on an enlarged scale, of part of said central structure and

one of the projecting wings with the spring connections, whereby said wing is normally held in the projected position, but is permitted to swing backward, this view also showing parts of the spring structures of two of the other wings of the door. Fig. 5 is a vertical section of part of the central structure of the door, showing one of said spring structures in elevation. Fig. 5^a is an enlarged sectional view of one of the spring structures. Fig. 6 is a detached view of one of the joints of the spring connection. Fig. 7 is a sectional view of the retainer, whereby the wing of the door is held in the folded position. Fig. 8 is a plan view of mechanism employed in order to permit of the operation of the door by vibration instead of rotation or to lock the door against such movements. Fig. 9 is a vertical sectional view of the upper portion of the door, part of the ceiling structure, and the upper pivot-bearing for the central vertical shaft of the door. Fig. 10 is a vertical sectional view, on an enlarged scale, of part of the mechanism shown in Fig. 8. Fig. 11 is a side elevation of part of the same. Fig. 12 is a plan view of one of the elements of said mechanism. Fig. 13 is an enlarged vertical sectional view of the lower pivot-bearing for the central shaft of the door. Fig. 14 is a sectional plan on the line *b b*, Fig. 13; and Figs. 15, 16, 17, 18, and 19 are diagrams illustrating the different adjustments or methods of use of the rotating structure of the door.

In Figs. 1 and 2 the opposite fixed segmental side portions of the casing are represented at 1 and the central structure of the door at 2, said central structure being in the form of an upright rectangular box or casing divided by suitable horizontal partitions into five compartments or chambers 3, 4, 5, 6, and 7, the uppermost compartment 3 containing the upper pivot and the locking and vibrating mechanism of the door, the lowermost compartment 7 being intended for the reception of the lower pivot, the compartments 4 and 6 having glazed sides and being intended for use as show-cases, and the compartment 5 containing the spring mechanism for act-

ing upon the projecting wings of the door. There are in the present instance four of these wings which I have numbered, respectively, 8, 9, 10, and 11, these wings being
 5 alike in general structure and each being at its inner end hinged to one corner of the central structure 2, so that it may project radially from said structure or may be folded back against one side of the same. Normally
 10 each wing is held in the radially-projected position by the action of the spring mechanism contained in the chamber or compartment 5 of the central structure, and this mechanism, which is shown in detail in Figs.
 15 4, 5, 6, and 7, I will now describe. The fixed rail or handle 12 of each wing is connected to the latter at the outer end by the usual bracket-casting 13 and at the inner end by a bracket 14, which has a projecting lug, to
 20 which is pivoted, as shown in Fig. 6, the forked outer end of a pitman 15, the latter passing through a slot 16, formed in the casing of the central structure 2 of the door, in line with the chamber 5 of the same. The
 25 inner end of the pitman 15 has a head 17, which is pivoted to the outer end of an arm 18, the latter forming part of a combined spring and check structure 19, which may be similar to any of these now employed for ef-
 30 fecting the slow closing of a door after the same has been swung open. One of these structures is shown in section in Fig. 5^a, on reference to which it will be seen that the arm 18 has a pawl 70, which engages with a notched
 35 disk 71 on a sleeve 72, the latter surrounding the central shaft 73 and being connected to one end of the coiled spring 74, the other end of said spring being connected to the casing 19. Hence as the arm 18 is locked to the disk
 40 by the pawl 70 the spring tends to move the arm in one direction, this movement, however, being resisted by the movement in the direction of the arrow, Fig. 5^a, of a piston 75
 45 in the cylindrical lower portion of the casing 19, which is filled with liquid. The piston 75 is connected by a link 76 to a crank 77 on the shaft 73 and has a passage 78, provided with a valve 79, which closes when the piston
 50 moves in the direction of the arrow and opens when the piston moves in the opposite direction. The liquid trapped in the end of the cylinder is forced through a valve-controlled
 55 passage 80, so that by adjusting the controlling-valve 81 the rate of flow of the liquid, and consequently the speed of movement of the piston, can be accurately governed. Move-
 60 ment of the piston in the opposite direction is not obstructed, as the valve 79 opens and permits free flow of liquid from one side of the piston to the other.

When the wing of the door is projected, the parts occupy the position shown by full lines in Fig. 4, the head 17 of the pitman being in contact with a shoulder 20 on a bracket 21,
 65 which is secured to the inner side of the central hollow structure 2, and, if desired, the pitman may be locked in this position by

means of a pin 22, passing through openings in the wings of the bracket and engaging with the head 17 of the pitman. In the ordinary
 70 use of the door, however, this pin is removed. Hence the wing can, when the necessity arises, be swung backward upon its hinges, so as to lie snugly against the side of the central
 75 structure 2, the parts then assuming the position shown by dotted lines in Fig. 4, and being retained in this position by means of a spring-clip 23, contained in the slot 16 and adapted to engage with the hand-rail 12 of
 80 the door, as shown in Fig. 7.

The spring structure 19 is strong enough to hold the wing in the projected position under ordinary circumstances, but permits the fold-
 85 ing back of the wing when any undue pressure is exerted against its forward side, so that injury to any part of the person by being caught between a wing and the casing is effectually prevented, the wing, unless fully
 90 folded back and retained by the clip 23, being restored to its projected position as soon as the pressure upon it has been removed.

The chamber 5 of the central structure 2 is divided by radiating partitions 24 into four compartments, each containing the spring
 95 mechanism for one wing of the door, the purpose of thus partitioning the chamber 5 being to prevent the passage of drafts of air from the outside to the inside of the door through the slotted portions of the casing of
 100 the central structure 2.

While I prefer the rectangular form for the central structure 2, it should be under-
 105 stood that I am not limited to this form, as said central structure may be of rectangular or other desired cross-section without departing from my invention.

The ceiling 25 of the fixed casing has formed in it a central opening which is bridged by a substantial metallic beam or
 110 cross-bar 26, carrying the upper pivot for the central shaft 27 of the door, and this beam or girder has depending legs 28, Fig. 9, to which is secured a check-spring structure 29, Fig. 8, of a character similar to those employed in
 115 connection with the swinging wings of the door. The arm 30 of this spring structure 29 has at the outer end a depending lug or projection 31, preferably in the form of an anti-friction-roller, and movement of said arm 30
 120 in the direction of the arrow x , Fig. 8, under the influence of the spring is restricted by a stop-screw 32, adapted to a threaded opening in the lug 33, formed upon a plate 34, which is suitably secured to the ceiling structure
 125 25, and has another lug 35 projecting into a segmental recess formed in said ceiling structure, as shown in Fig. 8, and intended for a purpose hereinafter set forth.

To the central structure 2 of the door, above the topmost horizontal partition 45 of the
 130 same, is secured a bracket 36, to which are adapted the ends of the pivot-spindle of a rock-lever 38, which has a forked end 39, adapted when the lever is in the intermedi-

ate position (shown by full lines in Fig. 10) to engage with the antifriction-roller 31 of the spring-arm 30, or when in one of the extreme positions (shown by dotted lines y) to engage with the lug 35 of the ceiling-plate 34, or when in the opposite extreme position (shown by dotted lines y') to be free from engagement with either the lug 35 or the antifriction-roller 31.

10 The rock-lever 38 carries a catch-handle 40, acted upon by a spring 41, tending to press said catch-handle downward and to cause a flange or collar 42 upon the same to engage with either of a series of three recesses
15 or pockets 43, formed in a slotted plate 44, which is let into an opening in the topmost horizontal partition 45 of the central structure of the door, as shown in Fig. 10. Hence by proper manipulation of this catch-handle
20 40 the rock-lever 38 may be caused to assume either of its three positions and may be retained in either of such positions. When the rock-lever is in the position shown by dotted lines y' in Fig. 10, the spring-arm 30 ex-
25 ercises no control over the central structure 2 of the door and the latter is free to rotate. When the said rock-lever is in the position shown by dotted lines y in Fig. 10, the central structure of the door is locked to the
30 fixed ceiling structure by engagement of the rock-lever with the lug 35. Hence any rotating or other movement of the door within the fixed casing is prevented.

When the rock-lever 38 is in engagement
35 with the roller 31 of the spring-arm 30, rotating movement of the door is prevented; but vibrating movement of the same under control of said spring-arm 30 is permitted within the limits of the segmental slot or recess
40 formed in the ceiling structure 25 of the casing. Thus the parts can move in the direction of the arrow x' from the position shown by full lines in Fig. 8 to that shown by dotted lines in said figure against the action of
45 the spring-arm 30 and can move back again in the direction of the arrow x under the influence of said spring-arm, suitable elastic plugs 46, carried by the forked upper end of
50 the rock-lever 38, serving by contact with the shoulders at the opposite ends of the segmental recess in the ceiling 25 to prevent injurious shock or jar at either termination of movement.

The uppermost partition 45 of the central
55 structure 2 of the door has a plate 47 with hub 48 secured to the central vertical pivot-shaft 27 of the door, and the upper end of said pivot-shaft has secured to it by set-screws 49 a journal-box 50 with oil-chamber
60 51 and seat for the conical lower end of the upper pivot-pin 52, which is screwed into a central threaded opening in the cross-beam or girder 26, so as to be readily adjustable to compensate for wear and is locked in posi-
65 tion after adjustment by means of a suitable jam-nut 53. The lower pivot is shown in Fig. 13, and consists of a step 54, secured to

the floor and containing an oil-chamber 55 and a seat for the conical lower end of a block 56, which supports a pair of adjusting-screws 70 57, adapted to threaded openings in the hub 58 of a plate 59, secured to the lowermost horizontal partition 60 of the central structure 2 of the door, so that by proper adjustment of these screws 57 the said central
75 structure of the door may be supported at any desired height above the floor.

Screws 61 are adapted to threaded openings in the block 56 and hub 58, the inner ends of these screws entering a groove 62 in the cen- 80 tral pivot-shaft 27, so as to prevent any rotating movement either of the block 56 or central structure 2 independently of said pivot-shaft. A loose ring 63 rests upon the top of the step-bearing 54, so as to prevent the ac- 85 cess of dust or dirt to the oil-chamber therein.

The wings of the door have the usual flexible bearing-strips at the edges, and the central structure of the door also has such flexible strips at top and bottom, the strips used 90 in connection with the top of said structure being shown at 64 in Fig. 9.

The diagrams Figs. 15 to 19, inclusive, illustrate the various conditions of use of my im- 95 proved door. Fig. 15 shows the usual revolving door with all of the wings 8, 9, 10, and 11 projected, the door rotating as shown by the arrows as persons pass in on one side and out on the other. Fig. 16 shows the door with the wings 8 and 10 projected and the 100 wings 9 and 11 folded, this being the plan resorted to when a vibrating door is desired. The wings can now swing from the position shown by full lines to that shown by dotted lines and back again, so as to permit persons 105 to pass in or out. Fig. 17 shows all of the wings of the door folded back against the central structure, so as to provide an open passage on each side on warm days or other occasions when a closed door is not required. 110 Fig. 18 shows the positions assumed by the wings when a panic-stricken crowd rushes against the door. Supposing that the door is originally in normal condition, as shown in Fig. 15, and persons press forwardly at the 115 same time against the wings 8 and 10, the wing 10 will yield and fold forward against the central structure 2, the wing 8 swinging forward and carrying the central structure around with it. As the door turns the per- 120 sons going out on the left-hand side will meet the wing 11 and fold it against the central structure, and if persons are crowded in the inner entrance to the doorway they will cause the wing 9 to fold back against the central 125 structure 2 as the latter turns, finally leaving the wing 8 projecting forwardly from the center of the door, as shown in Fig. 18, while the crowd rushes out on each side of the door, as indicated by the arrows, or if the wing 9 130 cannot fold back against the central structure 2 by reason of a crowd on each side of it it becomes the wing whereby the door is turned and finally reaches the forwardly-pro-

jecting position, the wing 8 being folded by the pressure upon it of the persons passing out on the left-hand side of the doorway.

By locking the central structure 2 to the ceiling, folding the two wings 10 and 11, and locking the projected wings 8 and 9 to the side structure 1 of the casing by means of an ordinary key-lock the doorway will be closed against the passage of any one not having the proper key for the lock.

In order to direct persons to the right-hand side of the doorway, and thus prevent those passing in from interfering with those passing out, I prefer to use in connection with the side structure 1 of the door-casing light swinging gates 65, such as shown in Figs. 1 and 2, one of these gates being at the inner end of one side structure and the other at the outer end of the other side structure. Each gate is normally held in the position shown by means of a spring and cannot be pushed into the doorway, but will readily swing outwardly or in the direction of the arrow. Hence it will offer no obstacle to persons passing through the doorway in the proper direction, but will prevent any one from entering the doorway on the wrong side. Each gate may be such as to be readily moved out of the way or removed when its use is not desired, and it may be so light as to be destroyed by the rush of a crowd against it, and thus offer no material obstacle to the escape of persons on both sides of the door, as indicated in Fig. 18, in case of a panic.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. A rotating-door structure having a hollow central portion with glazed sides whereby it may serve also as a show-case, substantially as specified.

2. A rotating-door structure comprising a central pivot portion, and wings hinged thereto so as to be rigid against pressure in one direction but free to fold back against pressure in the opposite direction, and springs interposed between the wings and the central pivot portion of the door, said springs serving to project the wings and oppose a yielding resistance to backward movement of the same, substantially as specified.

3. A revolving-door structure comprising a central pivot portion of polygonal cross-section and wings hinged to said central portion at the angles so as to be rigid against forward pressure but free to fold back against the sides of the central portion, substantially as specified.

4. A revolving-door structure comprising a central pivot portion, wings projecting therefrom and hinged thereto so as to be rigid against movement in one direction, and spring connections whereby said wings are normally projected but are free to fold back on their hinges when pressure is exerted thereupon, substantially as specified.

5. A rotating-door structure comprising a

central pivot portion having a chamber containing a series of spring structures, wings projecting from and pivoted to said central portion, and connections between said wings and the spring structures, substantially as specified.

6. A rotating-door structure comprising a central pivot portion carrying a series of swinging arms, wings hinged to said central portion, pitmen connecting said wings to the swinging arms, and springs acting upon said swinging arms so as to project the wings of the door, substantially as specified.

7. A rotating-door structure comprising a central pivot portion, a series of swinging arms carried thereby, a series of wings hinged to said central portion, pitmen connecting said wings to the swinging arms, springs acting on said arms to move the same so as to project the wings, and stop-shoulders on the pitmen and pivot structure whereby the extent of such projection is limited, substantially as specified.

8. A rotating-door structure comprising a central pivot portion, swinging arms carried thereby, wings pivoted to said central portion of the structure, pitmen connecting the swinging arms to said wings, springs acting on said arms so as to cause projection of the wings, and locking-pins whereby said arms may be held in the projected position, substantially as specified.

9. A rotating-door structure comprising a central pivot portion, wings hinged thereto so as to be folded back against said pivot portion, spring structures for projecting the wings, and elastic clips or retainers for holding the wings when they are folded back against the pivot structure, substantially as specified.

10. A rotating-door structure comprising a central hollow pivot portion, wings hinged thereto so as to be folded back against the pivot structure, and spring mechanism for projecting said wings contained in a chamber of the pivot structure, said chamber having slotted walls and internal partitions whereby draft of air through the same is prevented, substantially as specified.

11. A rotating-door structure comprising a central hollow pivot portion with projecting wings, said pivot portion being divided by hollow partitions into end portions containing the upper and lower pivot structures, and an intermediate portion with glazed walls and constituting a show-case, substantially as specified.

12. A rotating-door structure comprising a central hollow pivot portion with projecting wings hinged thereto so as to be folded back against the same, said central pivot portion being divided by horizontal partitions into top and bottom chambers containing respectively the upper and lower pivot structures, a central chamber containing spring mechanism for acting upon the hinged wings, and upper and lower show-case chambers, the

latter having glazed walls, substantially as specified.

13. A rotating-door structure comprising a central pivot portion with projecting wings, a fixed structure carrying a swinging arm, a spring acting upon said arm to move it in one direction, means for locking the pivot structure of the door to said arm or releasing it therefrom, substantially as specified.

14. A rotating-door structure comprising a central pivot portion with projecting wings, a fixed structure carrying a swinging arm, a spring acting upon said arm to move it in one direction, means for locking the pivot structure of the door to said arm or releasing it therefrom, and stops for limiting the swinging movement of the arm when the pivot structure is locked thereto, substantially as specified.

15. A rotating door comprising a central pivot structure with projecting wings, a fixed structure upon which is mounted a swinging arm, and a locking-plate, a spring for moving said arm in one direction, a swinging bolt mounted upon the rotating structure of the door and adapted to engage either with the swinging arm or locking-plate or to be moved out of engagement with either, substantially as specified.

16. The combination in a rotating door, of a central pivot structure with projecting wings, a fixed structure having a swinging arm, a spring for acting on said arm to move it in one direction, an adjustable stop-screw for limiting said movement, and a bolt mounted upon the central pivot structure and movable into and out of engagement with a portion of said swinging arm, substantially as specified.

17. A rotating door comprising a central pivot structure with projecting wings, a fixed structure having a swinging arm mounted thereon, a spring for moving said arm in one direction, a bolt mounted upon the pivot structure of the door and movable into and out of engagement with a portion of said swinging arm, stops for limiting the movement of the door when it is locked to the arm, and buffers interposed between the locking-bolt and said stop-shoulders and serving to cushion the movement of the door at each

limit of such movement, substantially as specified.

18. A rotating door comprising a central pivot structure with projecting wings, a fixed structure having a locking-plate and a swinging spring-actuated arm, a swinging bolt on the pivot structure movable so as to engage either with the locking-plate or swinging arm or so as to be out of engagement with either, and means for retaining said bolt in either of its positions of adjustment, substantially as specified.

19. A rotating door comprising a central pivot structure with projecting wings, a shaft extending vertically through said central pivot structure, a block carried by the lower portion of said shaft and adapted to a step-bearing, and adjusting-screws interposed between said block and the pivot structure of the door and serving to adjust the latter vertically in respect to the bearing substantially as specified.

20. A rotating door comprising a central pivot structure with projecting wings, a shaft extending vertically through said pivot structure and having a vertical groove at its lower end, a block carried by the lower end of said shaft and adapted to a step-bearing, said screws being interposed between said block and a plate on the pivot structure, and a screw carried by said plate and engaging with the vertical groove in the shaft, substantially as specified.

21. A rotating door comprising a central pivot structure with projecting wings, side casings partly inclosing said rotating door, and swinging gates hung to one of said casings at the outer end and to the other of said casings at the inner end, and serving to direct persons to the right side of the door without interfering with the passage of persons through the doorway, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THEOPHILUS VAN KANNEL.

Witnesses:

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WALTER S. ELY.