

No. 672,658.

Patented Apr. 23, 1901.

W. WEWERS.
HOT AIR FURNACE.

(Application filed Aug. 28, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

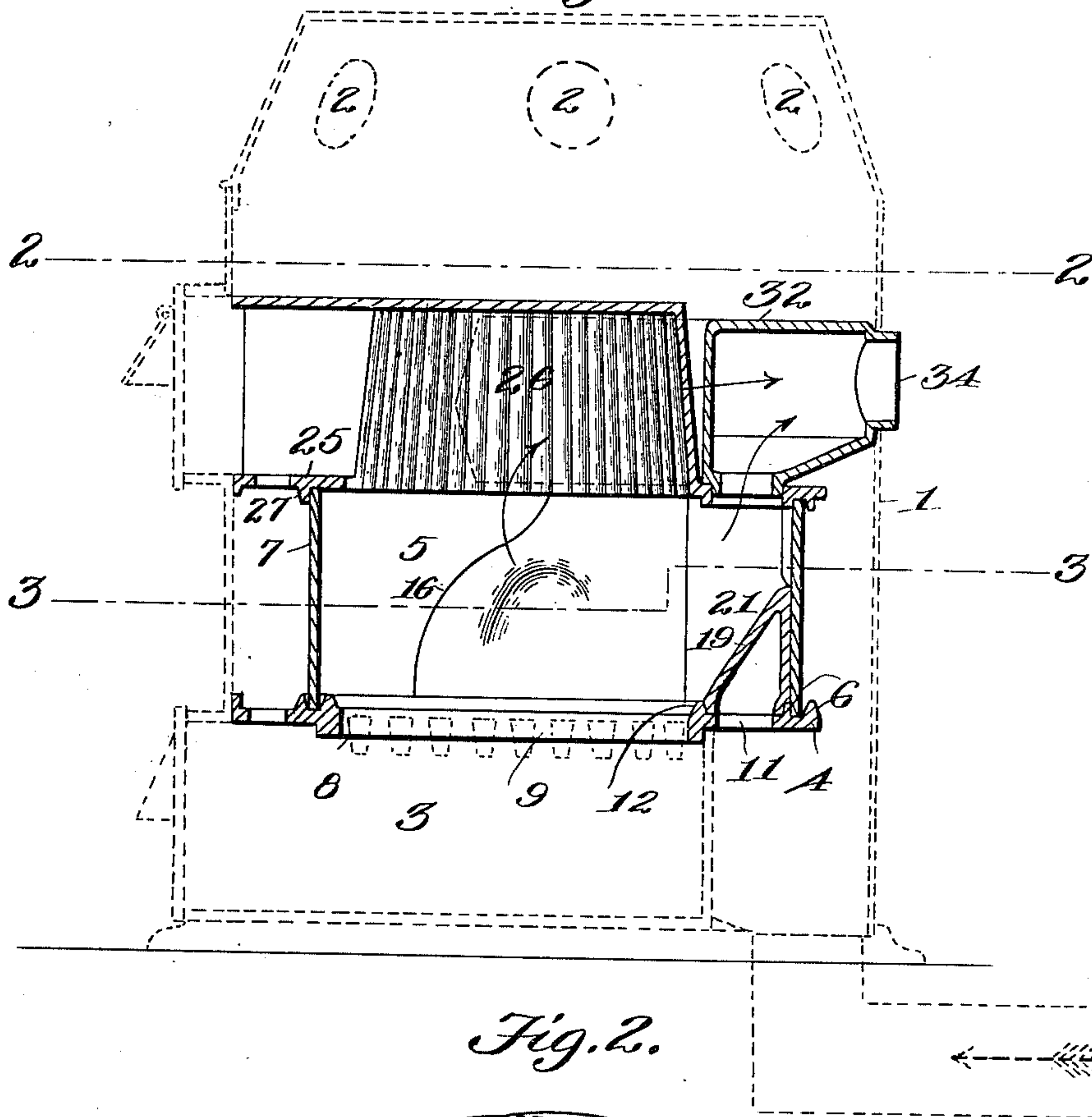
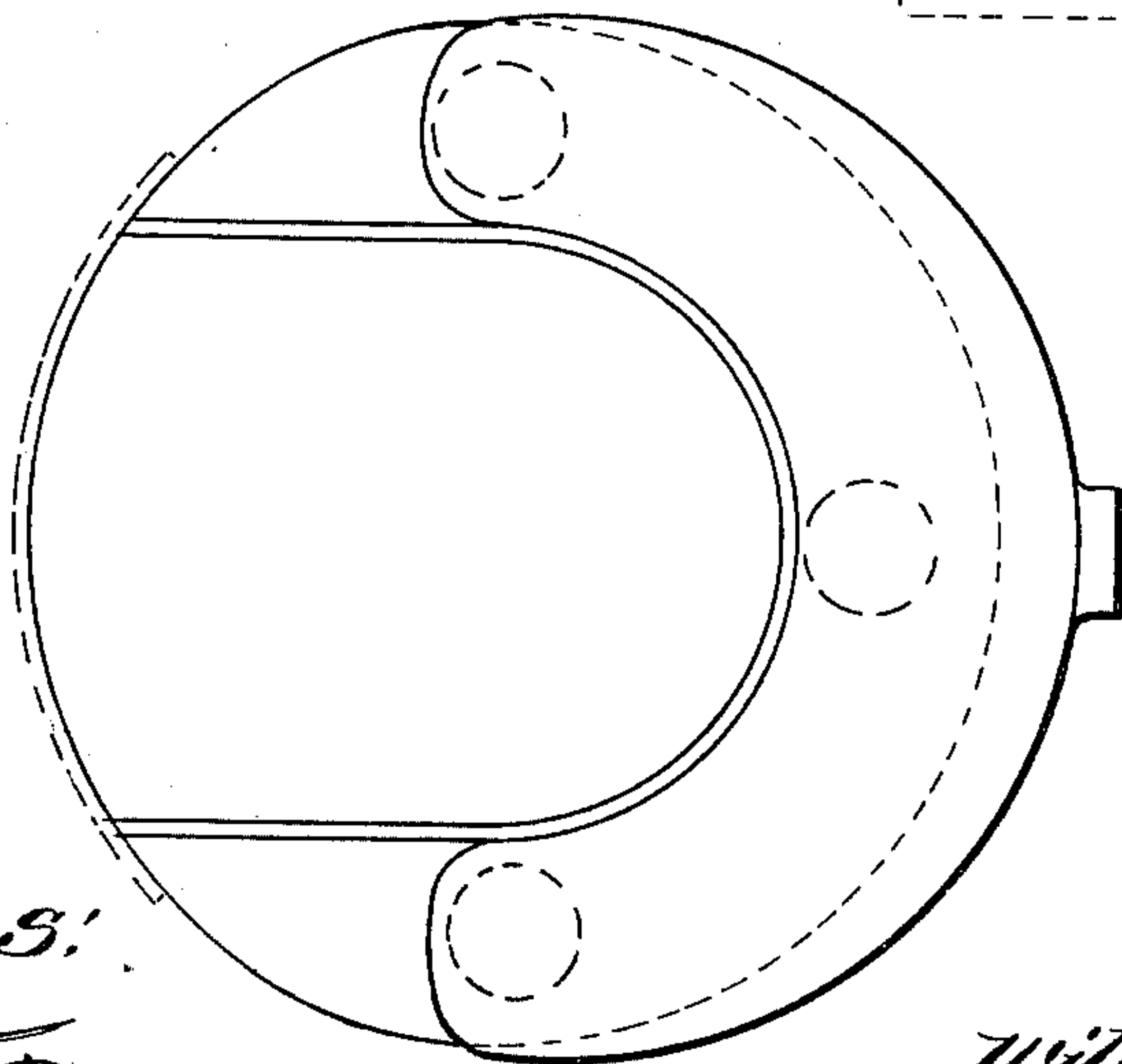


Fig. 2.



Witnesses:

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2 Sheets—Sheet 2.

Fig. 3.

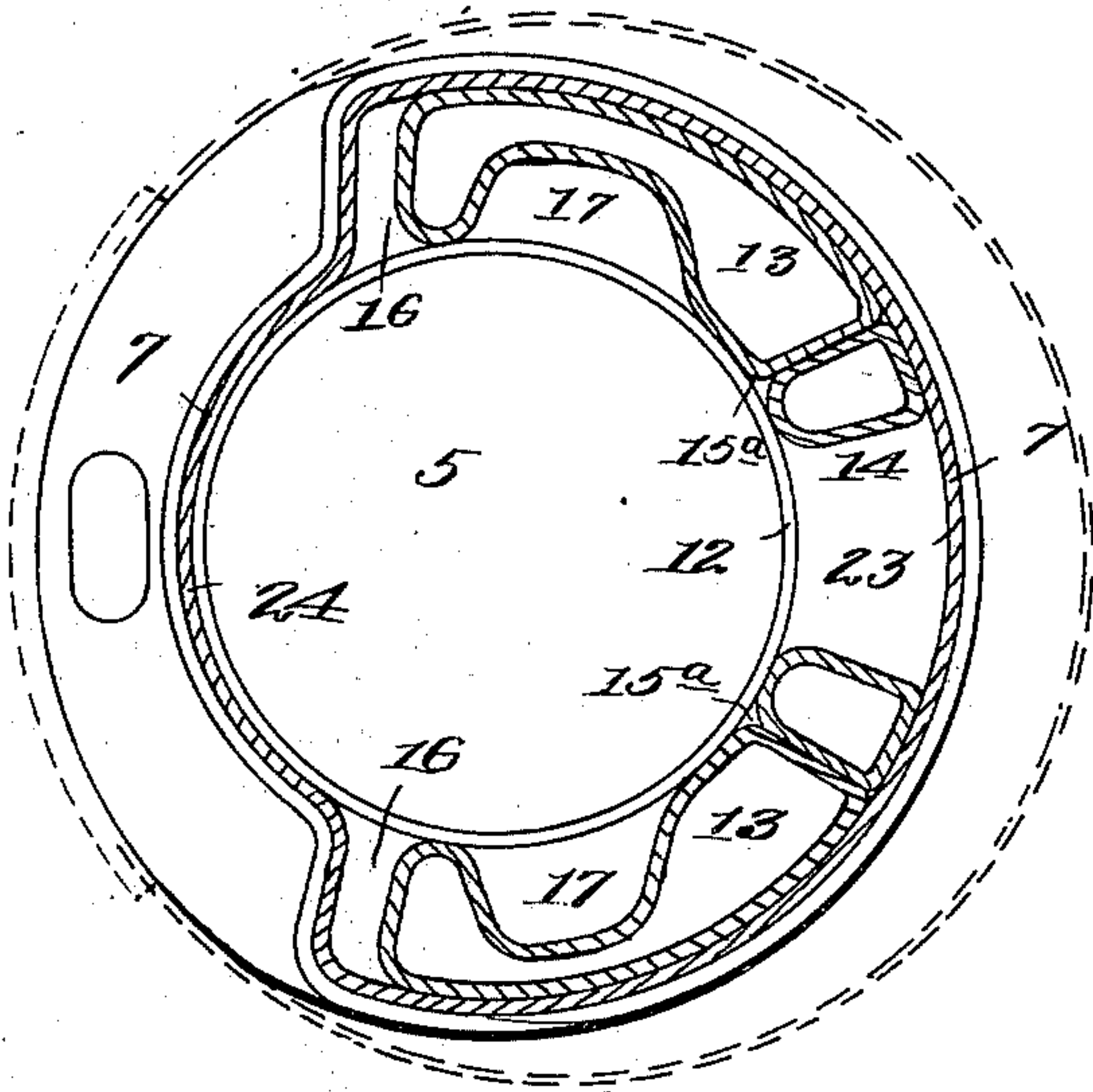


Fig. 4.

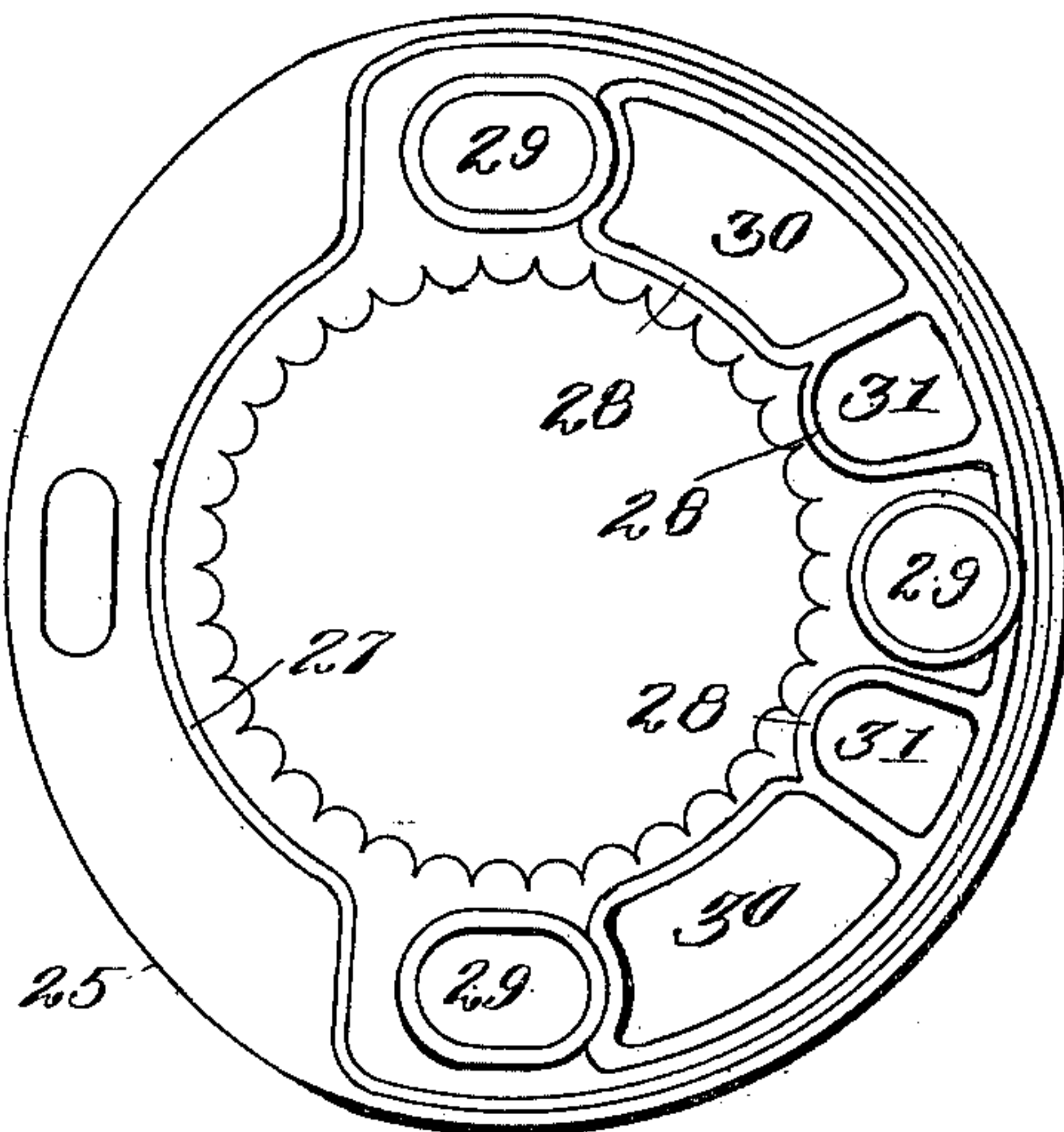


Fig. 6.

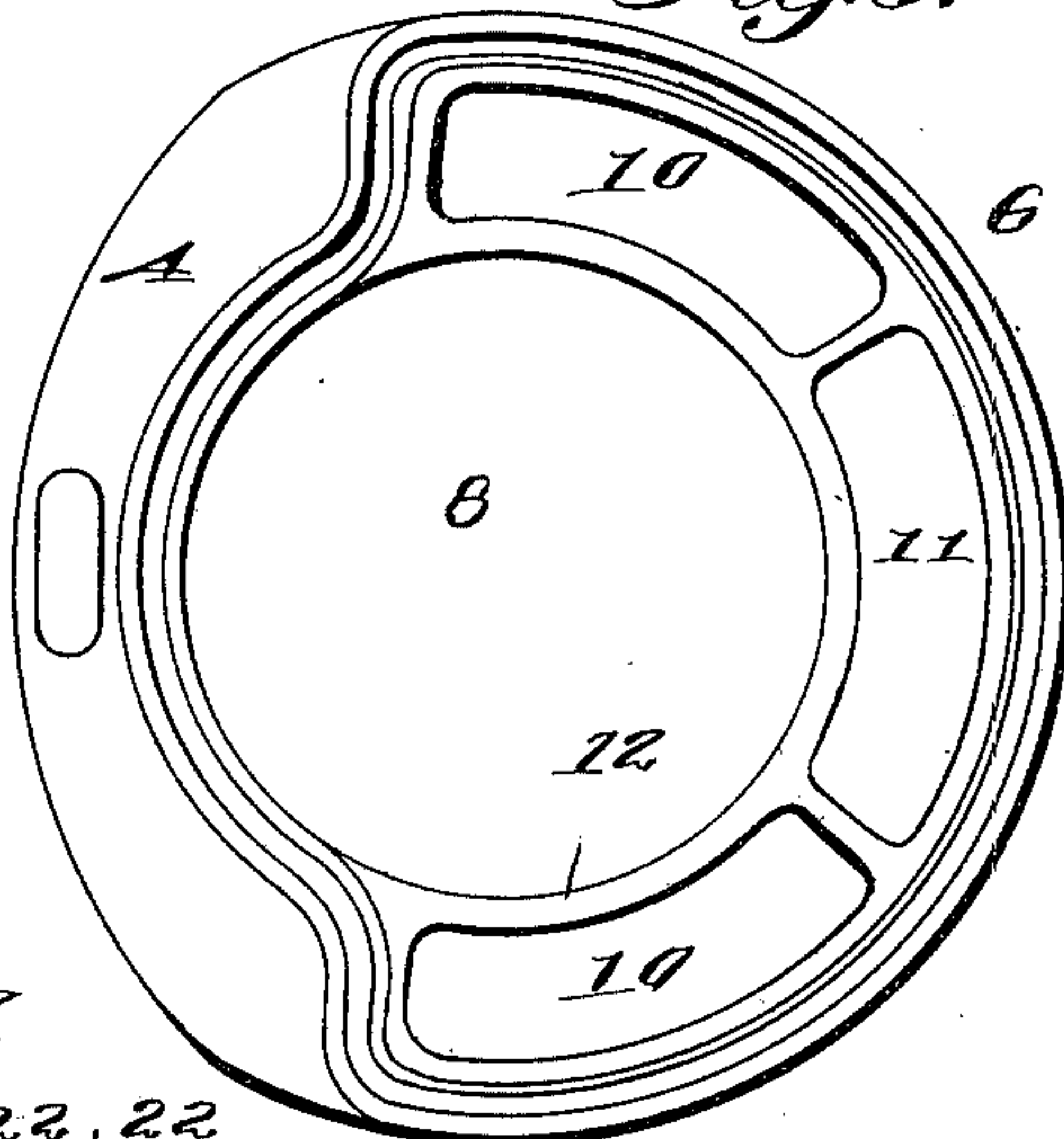


Fig. 5.

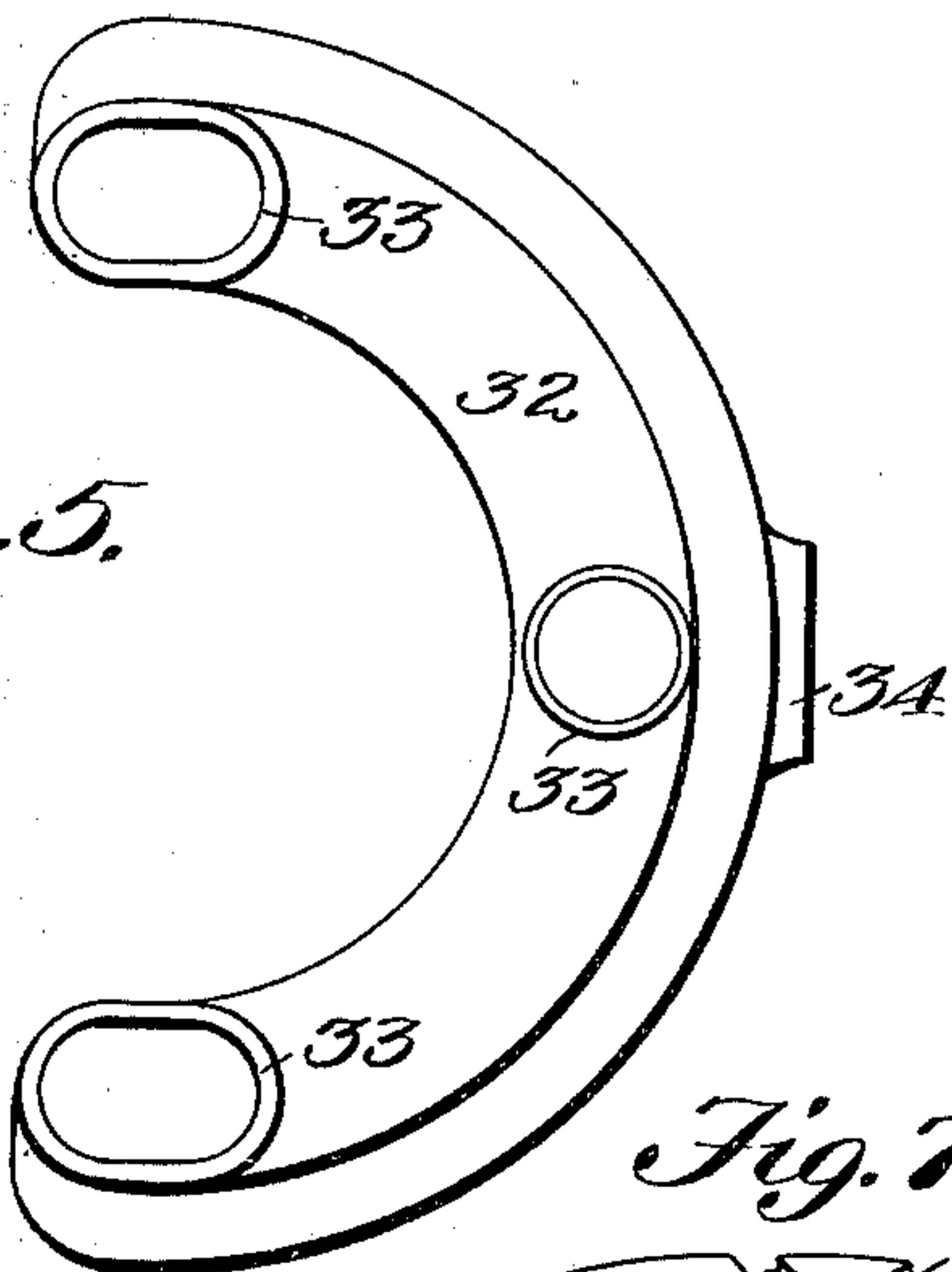
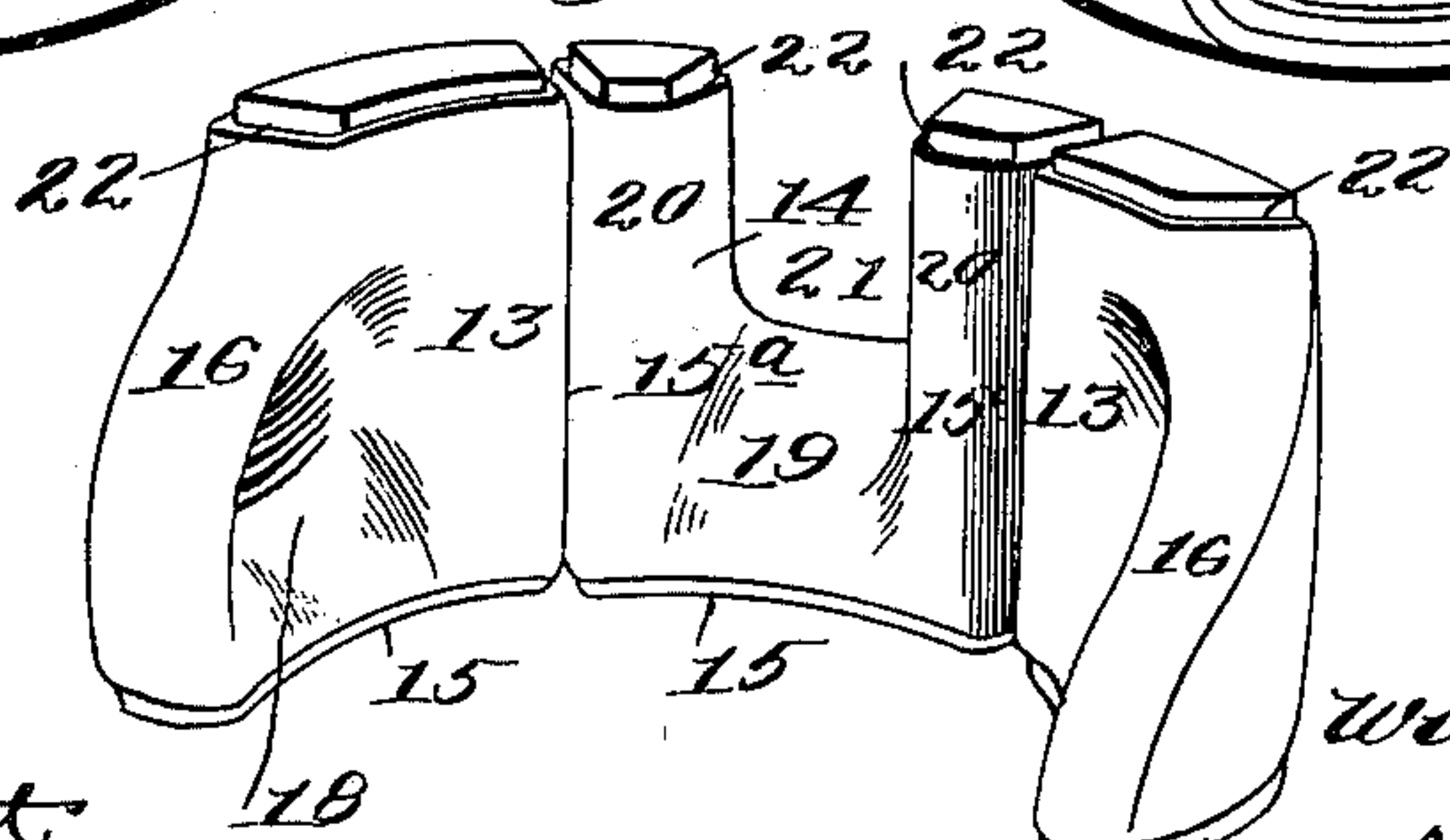


Fig. 7.



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UNITED STATES PATENT OFFICE.

WILLIAM WEWERS, OF QUINCY, ILLINOIS.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 672,658, dated April 23, 1901.

Application filed August 28, 1900. Serial No. 28,310. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WEWERS, a citizen of the United States, residing at Quincy, in the county of Adams and State of Illinois, have invented new and useful Improvements in Hot-Air Furnaces, of which the following is a specification.

This invention relates to hot-air furnaces, and has for one object to provide a furnace of novel and simple construction wherein the hot-air flues will present a very large heating-surface to the fire and a correspondingly large radiation-surface with which the air to be heated is brought into direct contact, where-
by the air in large volumes is quickly heated with the expenditure of a minimum amount of fuel. It also has for its object to improve and simplify the construction and render more efficient and economical this class of furnaces generally; and to these ends my invention consists in the features and in the construction, arrangement, and combination of parts hereinafter described, and particularly pointed out in the claims following the description, reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 is a vertical central sectional view of a hot-air furnace embodying my improvements. Fig. 2 is a horizontal sectional view taken on the line 2 2 of Fig. 1. Fig. 3 is a similar view taken on the line 3 3 of Fig. 1. Fig. 4 is a bottom plan view of the top of the fire-pot. Fig. 5 is a similar view of the smoke-box. Fig. 6 is a top plan view of the base of the fire-pot, and Fig. 7 is a detail perspective view of the air-heating flues.

Referring to the drawings, the numeral 1 indicates the outer furnace-casing inclosing the furnace proper, 2 the hot-air flues for conveying the hot air to the various parts of the building to be heated, and 3 the ash box or pit, all constructed in the usual and well-known manner. Supported on the upper end of the ash-pit is the base 4 of the fire-pot 5, comprising a flat plate or casting approximately circular in shape and provided on its upper side with two parallel or concentric flanges or ribs 6, between which is fitted the lower end of the wall or casing 7 of the fire-pot. The base 4 is provided centrally with a circular aperture 8, in which is arranged a

grate 9 of usual or any preferred construction. The sides and rear of the base 4 overhang or project beyond the ash-pit 3, as most clearly shown in Figs. 1 and 4, and in said projecting portion of the base 4 are formed three air inlets or openings 10 and 11, as most clearly shown in Fig. 6, said openings being concentric with the grate-aperture 8, as shown, the opening 11 being formed centrally at the rear of the base and the openings 10 being formed on each side thereof. As shown, the air-inlet openings 10 and 11 are elongated and extend around the major portion of the periphery of the base 4 or embrace more than one-half of the grate-aperture. The innermost rib or flange 6, before referred to, extends around the outer edges of the air-inlet openings, and a corresponding rib or flange 12 is formed about the grate-aperture 8 and extends around the inner edges of the air-inlet openings. Supported on the base 4, over the air-inlet openings 10 and 11, are three air-heating flues 13 and 14, each comprising a hollow casting, provided at their lower ends with reduced edges or flanges 15, which sit in or seat between the ribs 6 and 12, surrounding the air-inlet openings. As shown, the flues 13 are fitted in or over the air-inlet openings 10, while the flue 14 is in similar manner fitted in or over the air-inlet opening 11. Each of the flues 13 and 14 is segmental or arc-shaped in cross-section to correspond with the circular shape of the grate-aperture about which they extend. Each of the flues 13 is provided with a rear vertical edge 15^a, while their forward edges 16 are curved or inclined upwardly and rearwardly, whereby said flues gradually decrease in size from their lower toward their upper ends. The inner walls of the flues 13 are centrally bulged or deflected outward toward the outer walls to form recesses or pockets 17, the lower portions of the walls of which incline inward and downward, as at 18, toward the grate for the purpose hereinafter made apparent. The central flue 14 is of approximately U shape and comprises a lower central portion, which is sloped or inclined inwardly and downwardly toward the grate, as at 19, and two vertical side members 20, which extend up above the lower central portion 19 alongside the vertical edges 15^a of the flues 13. A space or aperture 21 is thus

formed in the flue 14 between the portion 19 and portions 20 and serves as an outlet for the escape of smoke and products of combustion, as most clearly shown in Fig. 1 of the drawings and as will more fully hereinafter be explained. The upper ends of the flues 13 and 14 are formed with reduced edges or flanges 22.

The fire-pot casing 7 is formed with a segmental or arc-shaped portion 23, which closely embraces the outer walls of the flues 13 and 14 and in front of the forward edges of the flues 13 is deflected inward toward the grate and thence extends around the front edge of the grate-aperture 8, as at 24.

Supported on the upper edge of the casing 7 is the base 25 of the fire-pot top or dome 26, comprising an annular flat plate or casting, provided on its under side with ribs 27 and 28, which fit about the upper edges of the casing 7 and the flues 13 and 14. Formed in the sides and rear of the base 25 are a plurality of apertures 29, 30, and 31, the apertures 29 being smoke-passages that communicate with the interior of the fire-pot, while the apertures 30 and 31 are hot-air passages that register with the upper ends of the hot-air flues 13 and 14. The upper flanged ends 22 of the flues 13 and 14 fit within the apertures 30 and 31, and the upper portions of said flues are embraced by the ribs 28 on the base 25. The hot-air passages 30 and 31 open directly into the upper part of the casing 1 outside the dome 26, while the smoke-passages 29 communicate with a smoke-box constructed as follows: The numeral 32 indicates a substantially semicircular hollow casting provided with three depending sleeves or nipples 33, arranged, respectively, at the ends and intermediate the ends of said casting, and is also provided centrally between its ends with a laterally and rearwardly projecting elbow or sleeve 34, that is adapted to be connected with the smoke-pipe or offtake-flue leading to the chimney. The smoke-box 32 is disposed about the rear and sides of the dome 26, that rises from the inner edges of the annular base 25, and the sleeves or nipples 33 are fitted in the apertures 29 in the base 25.

The operation of my improved furnace is as follows: The parts having been assembled in the manner described, the furnace may be readily set up in operative position by connecting the flue-openings 2 with the hot-air pipes leading to the different parts of the building to be heated, connecting the sleeve or thimble 34 to the smoke-pipe or offtake-flue leading to the chimney, and connecting an air-feed duct to the lower portion of the casing 1, surrounding the ash-pit 3. The furnace is then in readiness for operation. A fire having been built in the fire-pot 5, the smoke and products of combustion pass off through the space 21 and apertures 29 to the smoke-box 32 and from the latter through the sleeve or thimble 34 to the chimney. The in-

candescent fuel resting in contact with the flues 13 and 14, the air entering therein through the air-inlet openings 10 and 11 from the bottom of the casing is highly heated and ascending escapes through the apertures 30 and 31 into the upper part of the casing 1 and from thence is led off through the openings 2 and is conducted to the different parts of the building to be heated. The flues 13 and 14 practically form the rear and sides of the fire-pot, and the incandescent fuel rests directly against the same, and hence the air ascending through said flues is highly heated. Moreover, the flues being provided with the recesses or pockets 17 the heating-surface of the flues is not only greatly increased, but the fire lies in said pockets, and a highly-heated surface is thus interposed in each flue directly in the path of the ascending currents of air, while the inclined portions 18 and 19 of the flues permit the spent fuel or ashes to slide down through the grate, and thus keep the recesses or pockets constantly filled with incandescent fuel. Moreover, the inwardly-bulging walls forming the pockets or recesses and the contracted formation of the flues as they approach their upper ends tend to retard the too-rapid ascent of the air through the flues and hold it in contact with the heated flues until it becomes heated to a high temperature, and this temperature is still further raised by causing the heated air to pass under and around the smoke-box 32, through which pass the escaping smoke and products of combustion from the fire-pot.

The air that enters the casing 1 and ascends in the latter without passing through the heating-flues is heated by radiation from the fire-pot and by coming in contact with the smoke-box and the dome 26 and mixes with the heated air escaping from the apertures 30 and 31.

I have shown the air-heating flues as being three in number; but it will be evident that they may be made in one, two, or any desired number of sections.

Having described my invention, what I claim is—

1. In a furnace, the combination with the inclosing casing, of the apertured base-plate arranged above and projecting beyond the ash-pit, the fire-pot supported on said base-plate, a segment-shaped flue supported on the plate inside the fire-pot and independent of the latter and communicating at its lower end with the aperture in the base-plate, a dome arranged on the fire-pot and provided with a base having a passage communicating with said flue and with smoke-apertures communicating with the fire-pot, and means for conducting off the smoke and products of combustion escaping through said smoke-apertures, substantially as described.

2. In a furnace, the combination with the inclosing casing, of the apertured base-plate arranged above and projecting beyond the ash-pit, the fire-pot supported on said base-

plate, a segment-shaped flue supported on the base-plate inside the fire-pot and independent of the latter and communicating at its lower end with the aperture in the base-plate, a dome arranged on the fire-pot and provided with a base having a hot-air passage communicating with the upper end of said flue, and with smoke-apertures communicating with the fire-pot, and a smoke-box communicating with said smoke-apertures and provided with an outlet adapted to be connected with the chimney, substantially as described.

3. In a furnace, the combination with the inclosing casing, of the base-plate arranged above and projecting beyond the ash-pit and provided centrally with a grate, said base-plate having air-inlet openings formed in its projecting portion communicating with the bottom of the casing, a fire-pot supported on said base-plate, segment-shaped flues supported on the base-plate inside the fire-pot and independent of the latter and communicating at their lower ends with the air-inlet openings in the base-plate, a dome provided with an annularly-projecting base supported on the upper end of the fire-pot and provided with two series of openings, one of which communicates with the fire-pot and the other with the upper ends of the said flues, and a smoke-box communicating with openings leading from the fire-pot, substantially as described.

4. In a furnace, the combination with the inclosing casing, of the fire-pot, segment-shaped flues arranged in the fire-pot near the outer wall thereof and independent of the latter and provided on their inner sides with recesses or pockets, said flues communicating at their lower ends with air-inlet openings in the bottom of the fire-pot and at their upper ends with apertures formed in the top of the fire-pot and leading to the upper portion of the inclosing casing, substantially as described.

5. In a furnace, the combination with the inclosing casing, of the fire-pot, segment-shaped flues arranged in the fire-pot adjacent to the outer wall thereof and provided on their inner sides with recesses or pockets having inwardly and downwardly inclined bottoms, said flues communicating at their lower ends with air-inlet openings in the bottom of the fire-pot and at their upper ends with apertures formed in the top of the fire-pot and leading into the upper portion of the inclosing casing, substantially as described.

6. In a furnace, the combination with the

inclosing casing, of the fire-pot, segment-shaped flues arranged in the fire-pot near the outer wall thereof and provided on their inner sides with recesses or pockets, said flues communicating at their lower ends with air-inlet openings in the bottom of the fire-pot and at their upper ends with apertures formed in the top of the fire-pot, said flues having larger inlet than outlet ends, substantially as described.

7. In a furnace, the combination with the inclosing casing, of the fire-pot provided centrally with a circular grate, and segment-shaped flues arranged in the fire-pot concentrically with the rear and sides of the grate, and adjacent to the wall of the fire-pot, the outer edges of the end flues being inclined upwardly and rearwardly, said flues communicating at their lower ends with air-inlet openings in the bottom of the fire-pot and at their upper ends with apertures formed in the top of the fire-pot, substantially as described.

8. In a furnace, the combination with the inclosing casing, of the fire-pot, of the base on which the fire-pot rests, said base being provided centrally with a circular grate and at its rear and sides with three elongated air-inlet openings arranged concentrically with the grate, a dome arranged above the fire-pot and provided with an annular laterally-projecting base supported on the upper end of the fire-pot, said base being provided with a plurality of smoke and hot-air openings, a U-shaped flue arranged in the rear portion of the fire-pot, and two vertical flues respectively arranged on the opposite sides of said U-shaped flue, said flues being segment-shaped in cross-section and fitted at their lower ends in the elongated air-openings in the base of the fire-pot and communicating at their upper ends with the hot-air openings in the base of the dome, and means for conveying off the smoke escaping from the smoke-openings in said dome-base, substantially as described.

9. A furnace fire-flue segment-shaped in cross-section and gradually decreasing in size from its lower toward its upper end and provided on its inner side with a recess or pocket having an inwardly and downwardly inclined bottom, substantially as shown and described and for the purpose specified.

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

WILLIAM WEWERS.

Witnesses:

WM. H. HEIDBREDER,

J. H. SIECKMANN.