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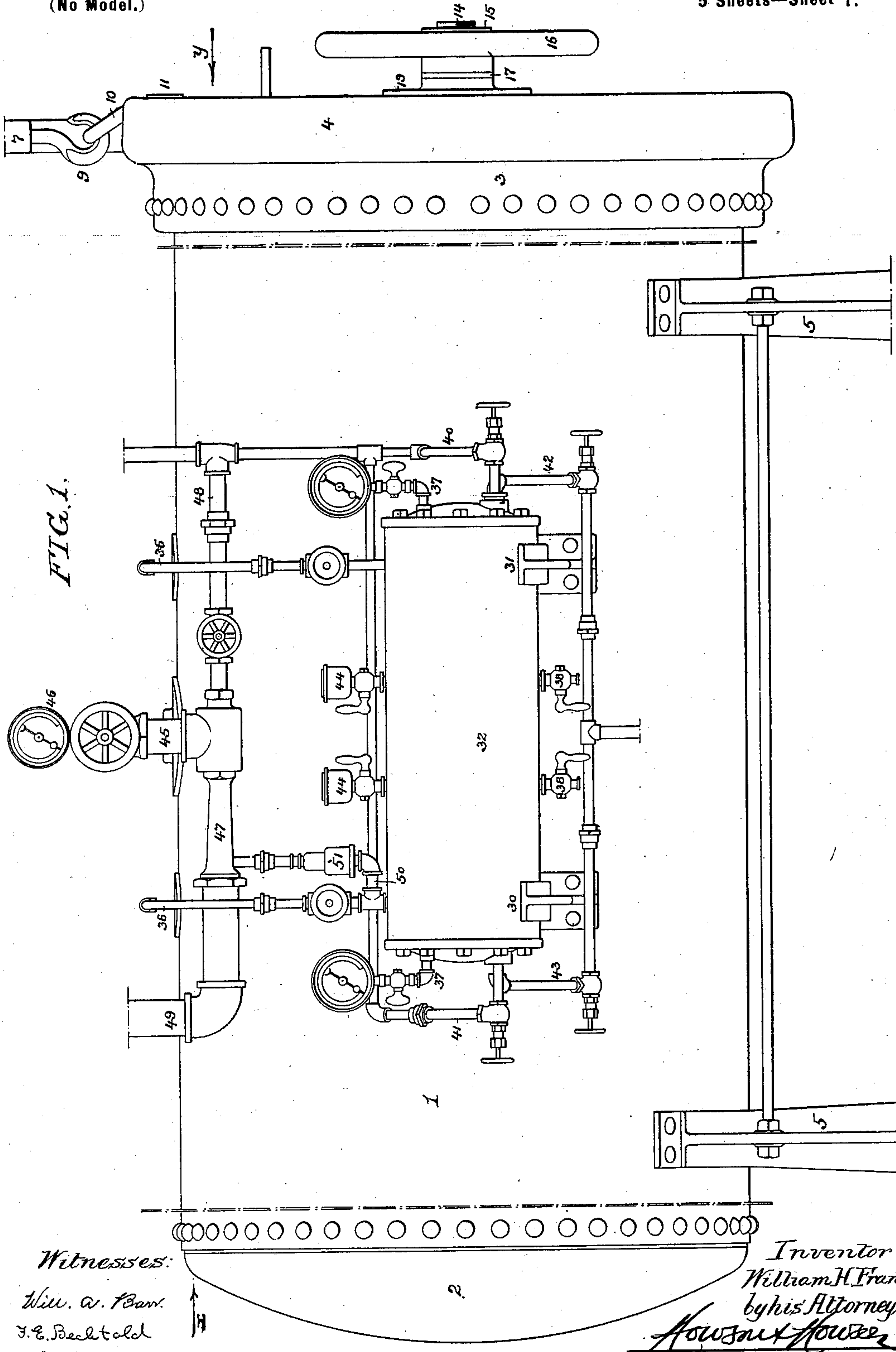
Patented July 31, 1900.

W. H. FRANCIS.
DISINFECTING APPARATUS.

(Application filed Mar. 28, 1898.)

(No Model.)

5 Sheets—Sheet 1.



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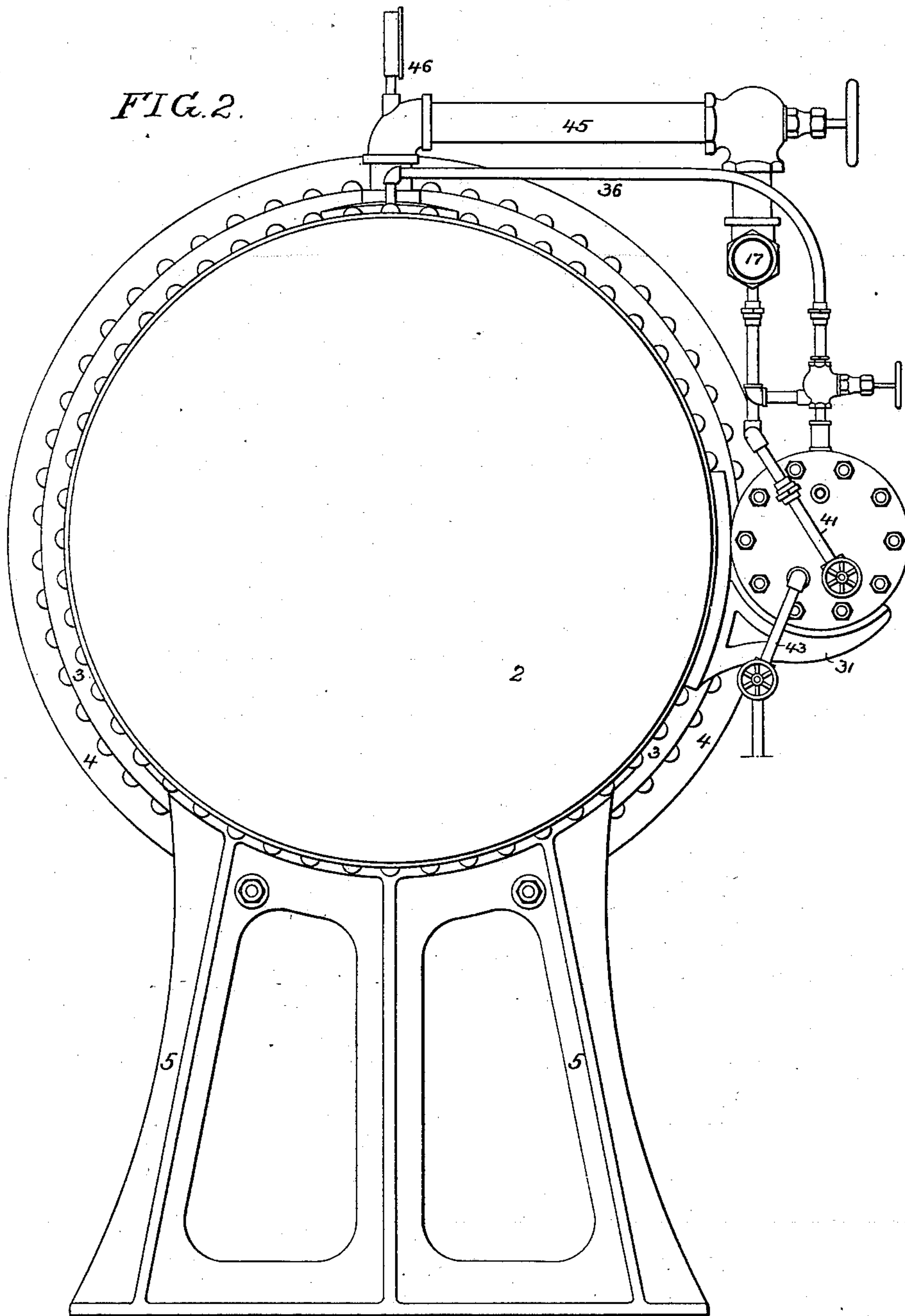
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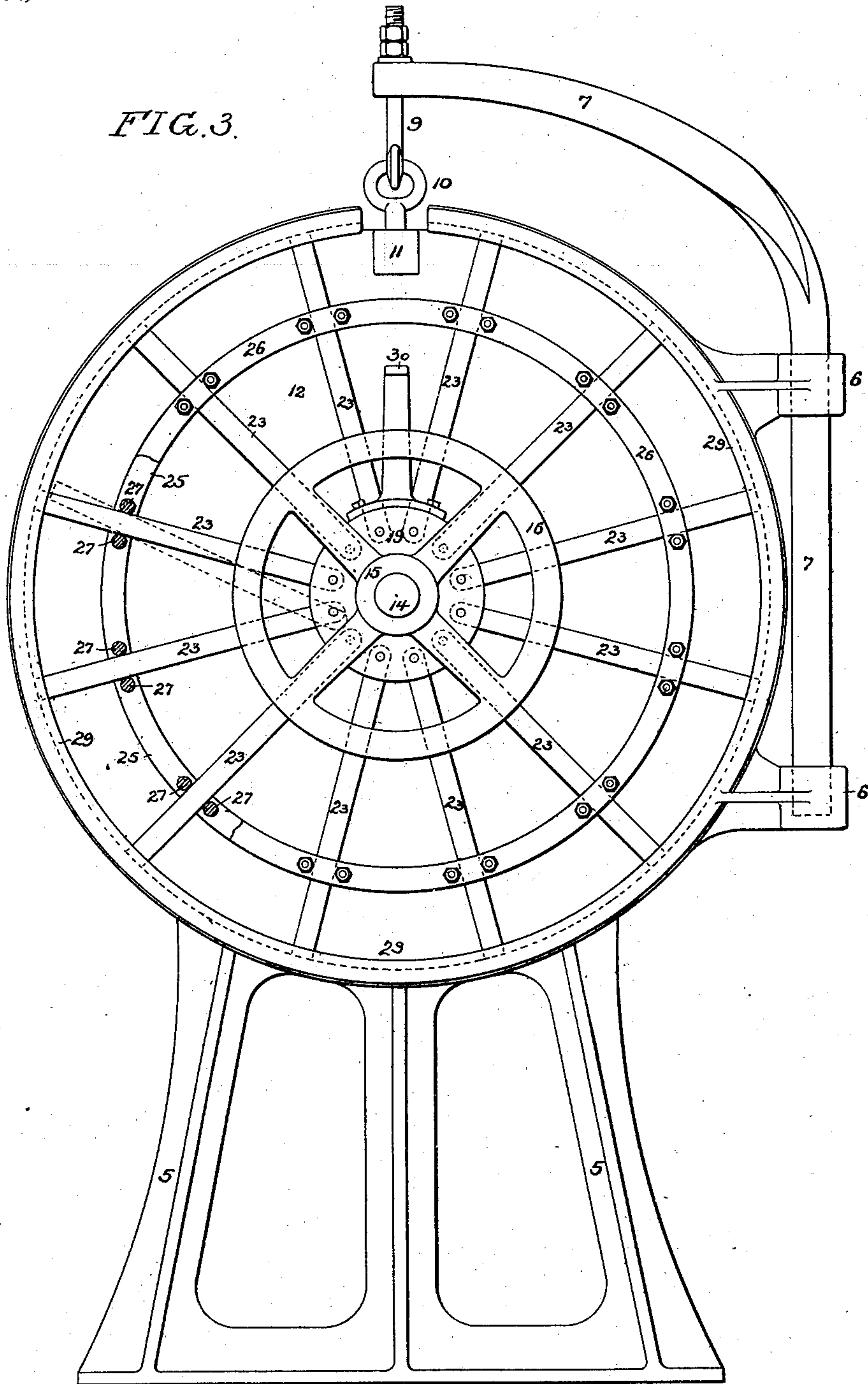
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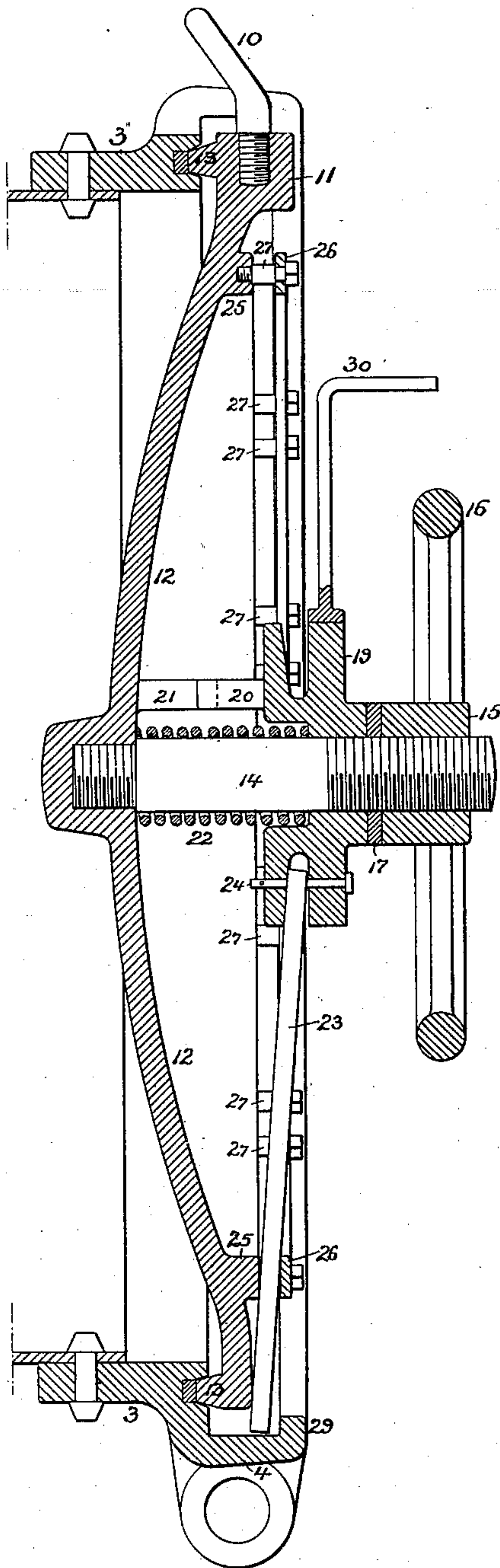
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FIG. 4.



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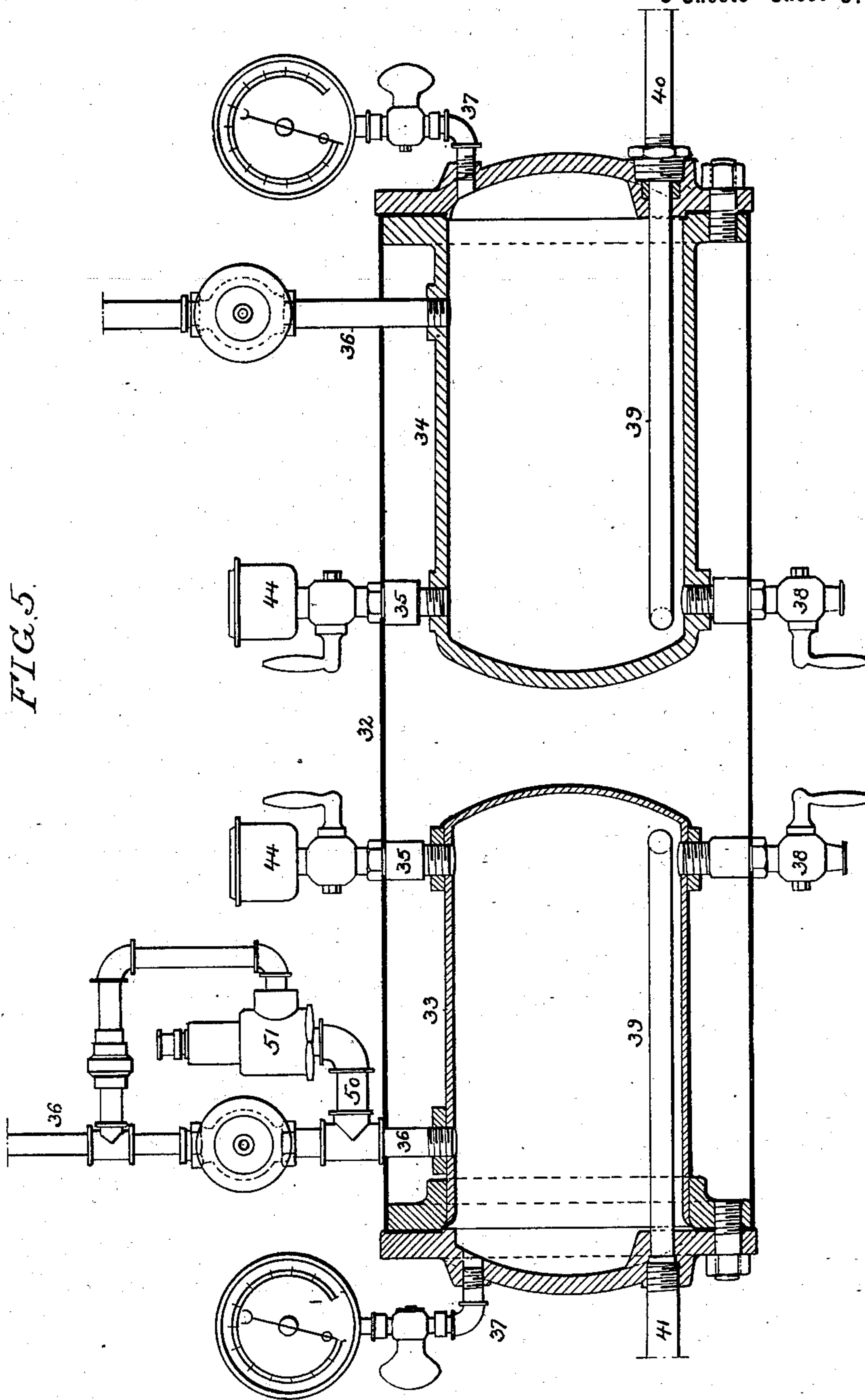
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FIG. 5.



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UNITED STATES PATENT OFFICE.

WILLIAM H. FRANCIS, OF PHILADELPHIA, PENNSYLVANIA.

DISINFECTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 655,070, dated July 31, 1900.

Application filed March 28, 1898. Serial No. 675,355. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. FRANCIS, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain
5 Improvements in Disinfecting Apparatus, of which the following is a specification.

The object of my invention is to construct a disinfecting apparatus into which the articles to be disinfected can be readily introduced, from which they can as readily be removed, and in which they can be subjected to that searching action of the disinfectant which arises from the preliminary formation of a partial vacuum in the treating vessel, the
10 apparatus being also designed for treating articles to the action of different disinfecting agents or to the action of an agent following that of the disinfecting agent and serving to neutralize any objectionable qualities of the
15 latter.

In the accompanying drawings, Figure 1 is a side view of a disinfecting apparatus constructed in accordance with my invention. Fig. 2 is an end view of the same looking in
25 the direction of the arrow α . Fig. 3 is an end view of the same looking in the direction of the arrow γ , and Figs. 4 and 5 are enlarged views of parts of the apparatus.

The treating vessel 1 may be of any suitable size, shape, and dimensions and of any material capable of resisting the destructive effect of the disinfecting or other agent employed, the vessel being so constructed as to effectually withstand either the internal or
30 external pressure to which it is likely to be subjected in practice.

In the present instance the vessel consists of a cylindrical shell closed at one end by a head 2 and open at the other end, said open
40 end being provided with a surrounding and projecting ring 3, having a projecting flange 4, as shown in Fig. 4, the body of the vessel being supported on suitable frames or legs 5 and being provided on the inside with the
45 usual rails or other supports for the drum or cage which contains the articles to be disinfected, the latter being introduced into and removed from the vessel 1 through the open end of the same. If desired, however, the
50 vessel may be open and may be provided with a removable cover at each end, so that arti-

cles may be introduced at one end and removed at the other.

At one side of the end ring 3 of the disinfecting vessel are projecting brackets 6, in
55 which is mounted so as to swing freely the upright post of a crane 7, which overhangs the ring 3 to the extent of about half its diameter and is provided at the upper end with a depending hook 9, which engages with an
60 eye 10, secured to a lug 11, projecting from the face of the cover 12, whereby the open end of the disinfecting vessel is closed when the apparatus is in operation, said cover having a projecting annular flange 13, which enters a groove in the face of the ring 3, as
65 shown in Fig. 4, and bears upon a suitable packing ring or rings inserted in said groove. Projecting outwardly from the center of the cover 12 is a bolt 14, threaded at its outer end
70 for the reception of a nut 15, which is provided with an annular handle 16, whereby it may be readily manipulated, this nut bearing against a washer 17, surrounding the bolt 14, and said washer bearing against the outer
75 face of a ring 19, which is free to turn around the bolt 14 to an extent limited by the contact of lugs 20 and 21, the lug 20 projecting inwardly from the ring 19 and the lug 21 projecting outwardly from the cover 12. 80
A coiled spring 22, surrounding the bolt 14 and interposed between the cover 12 and a recessed portion of the ring 19, serves to press the latter constantly outward and maintain it in contact with the washer 17 and the latter in contact with the nut 15. In the ring
85 19 is formed an annular groove, into which project the inner ends of a series of lever-bolts 23, each of which is hung to the ring 19 by means of a pin 24 and passes between a
90 projecting annular rib 25 on the cover 12 and a ring 26, which is secured to said rib by means of shouldered bolts 27, provided with suitable nuts, the shouldered portions of the bolts maintaining the ring 26 at the proper
95 distance from the rib 25 and also flanking the lever-bolts 23, so that at the rib 25 said bolts are held in their proper position both longitudinally and laterally.

The flange 4 of the end ring 3 of the treating vessel has an inwardly-projecting rib 29, and when the lever-bolts 23 occupy a radial
100

position, as shown in Fig. 3, their outer ends project behind this rib 29. Hence when the ring 19 is pushed inwardly by the action of the nut 15 the outer ends of the levers will find a bearing against this rib 29 and said levers will act upon the rib 25 of the cover 12 so as to push the flange of said cover into the groove of the ring 3 and against the packing ring or rings therein contained. When the nut is backed off, however, so as to loosen the bearing of the lever-bolts against the rib 25 on the cover and the rib 29 of the ring 3, the ring 19, to which said lever-bolts are hung, can be turned by means of a suitable handle 30, so as to cause the lever-bolts to assume such an angle that their outer ends will be withdrawn from behind the rib 29, (see dotted-line position of one of the levers in Fig. 3,) and the cover 12 can then be swung outward by means of its crane 7, so as to expose the open end of the treating vessel, the closing of this end of the vessel being effected by a reversal of the operation. By this means the opening and closing of the vessel can be effected in a very short time, as the cover can be quickly swung into and out of position by means of its crane, and when in place at the end of the treating vessel can be either secured or released by a partial turn of the ring 19 and a few turns of the nut 15.

In brackets 31 on one side of the vessel 1 is mounted a casing 32, which contains two retorts 33 and 34, as shown in Fig. 5, each of these retorts being furnished with a valved inlet-pipe 35, a valved outlet-pipe 36, a valved pressure-gage pipe 37, a drain-cock 38, and a heating-coil 39, the heating-coils having valved supply-pipes 40 and 41 and valved drainage-pipes 42 and 43. The inlet-pipe of each retort is surmounted by a vessel 44, intended for the reception of the liquid disinfectant or other agent employed, and the valved discharge-pipe of each retort communicates with the upper portion of the disinfecting vessel 1, which also has a valved discharge-pipe 45, provided with a vacuum-gage 46 and communicating with an ejector 47 of any appropriate character, said ejector being supplied with steam through the valved pipe 48 and discharging into the take-off pipe 49.

The operation of the apparatus is as follows: The articles to be treated are introduced into the vessel 1 and the cover of the same is swung into place and secured by means of the lever-bolts, so as to hermetically close said vessel. Steam is then admitted to the ejector 47, so as to create a partial vacuum within the vessel, and when this has been done the valve in the pipe 45 is closed, so as to maintain said partial vacuum. Meantime disinfecting liquid has been admitted to either or both of the retorts 33 and 34 and has been vaporized therein by means of the heating-coils, so as to generate any desired degree of pressure in either retort, the valves in the discharge-pipes 36 of the retort of course being closed. The vapor from

either retort is then permitted to enter the vessel 1, and owing to the partial vacuum previously formed therein it will penetrate immediately into all parts of the articles contained in the vessel, the supply of vapor continuing until a pressure of any desired degree is exerted within the disinfecting vessel, which pressure may be continued for a length of time dependent upon the class of work to be performed. As a consequence the effective action of the disinfectant upon all portions of the articles contained in the disinfecting vessel will be insured and substantially-complete disinfection thereby attained.

If it is desired to follow the action of one disinfectant by that of another or by the action of a neutralizing agent, the flow of the first disinfectant from its retort may be cut off, a partial vacuum again produced in the vessel 1 by means of the ejector, and a flow of the other disinfectant or of the neutralizing agent into the disinfecting vessel then permitted. This is sometimes advisable when the modern disinfectant consisting of a solution of formaldehyde and known as "formaline" is used, the formaline treatment being followed by a treatment with ammonia-vapor derived from the second retort.

The discharge-pipe 36 of the retort 33 has a branch 50 communicating with a safety-valve 51, and the discharge-pipe of the latter communicates with the casing of the ejector 47, so that in the event of the predetermined pressure in the retort 33 being exceeded the surplus vapor can escape into the take-off pipe 49 without causing injury. The discharge-pipe of the safety-valve may, however, if desired, communicate with the pipe 36, as shown in Fig. 5, so that the surplus vapor may find its way to the take-off pipe 49 by way of the vessel 1, pipe 45, and ejector 47.

It will be evident that in carrying out my invention a vacuum-producing apparatus of any desired character may be employed in place of the steam-ejector which I have shown and described, the latter being used mainly because of its convenience and simplicity.

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

1. A disinfecting apparatus in which are combined a treating vessel provided with means for tightly closing the same and also with an escape-pipe, provision for exhausting air or vapor from the treating vessel and discharging it through the escape-pipe, a retort provided with means for vaporizing a disinfecting agent therein and also with a safety-valve, and communication between the discharge-pipe of said safety-valve and the escape-pipe of the vacuum apparatus, substantially as specified.

2. The combination in disinfecting apparatus, of the treating vessel having a flange with inwardly-projecting continuous rib, a cover

carrying a series of lever-bolts having a fulcrum bearing on said cover and adapted to engage with the rib of the treating vessel, a bolt having a nut for acting upon the inner ends of the levers to tighten the same, and a ring movable around said bolt and connected to the inner ends of the lever-bolts, and stops arranged to limit the movement of the ring substantially as specified.

10 3. The combination in disinfecting apparatus, of a treating vessel having a flange with internally-projecting rib, a cover-plate for closing said vessel, a series of lever-bolts each bearing against a fulcrum-lug on said cover-plate and adapted to engage with the rib on the treating vessel, a bolt having a nut for acting upon the inner ends of the lever-bolts

in order to tighten the same, a ring movable around said bolt, lugs carried by said ring and by the cover and serving by contact to limit the movement of the ring and an outer confining device for each lever-bolt secured to the fulcrum-lug by means of bolts flanking said lever-bolts whereby, at the fulcrum, each lever-bolt is retained both longitudinally and laterally, substantially as specified. 20 25

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

WILLIAM H. FRANCIS.

Witnesses:

FRANK E. BECHTOLD,
JOS. H. KLEIN.