

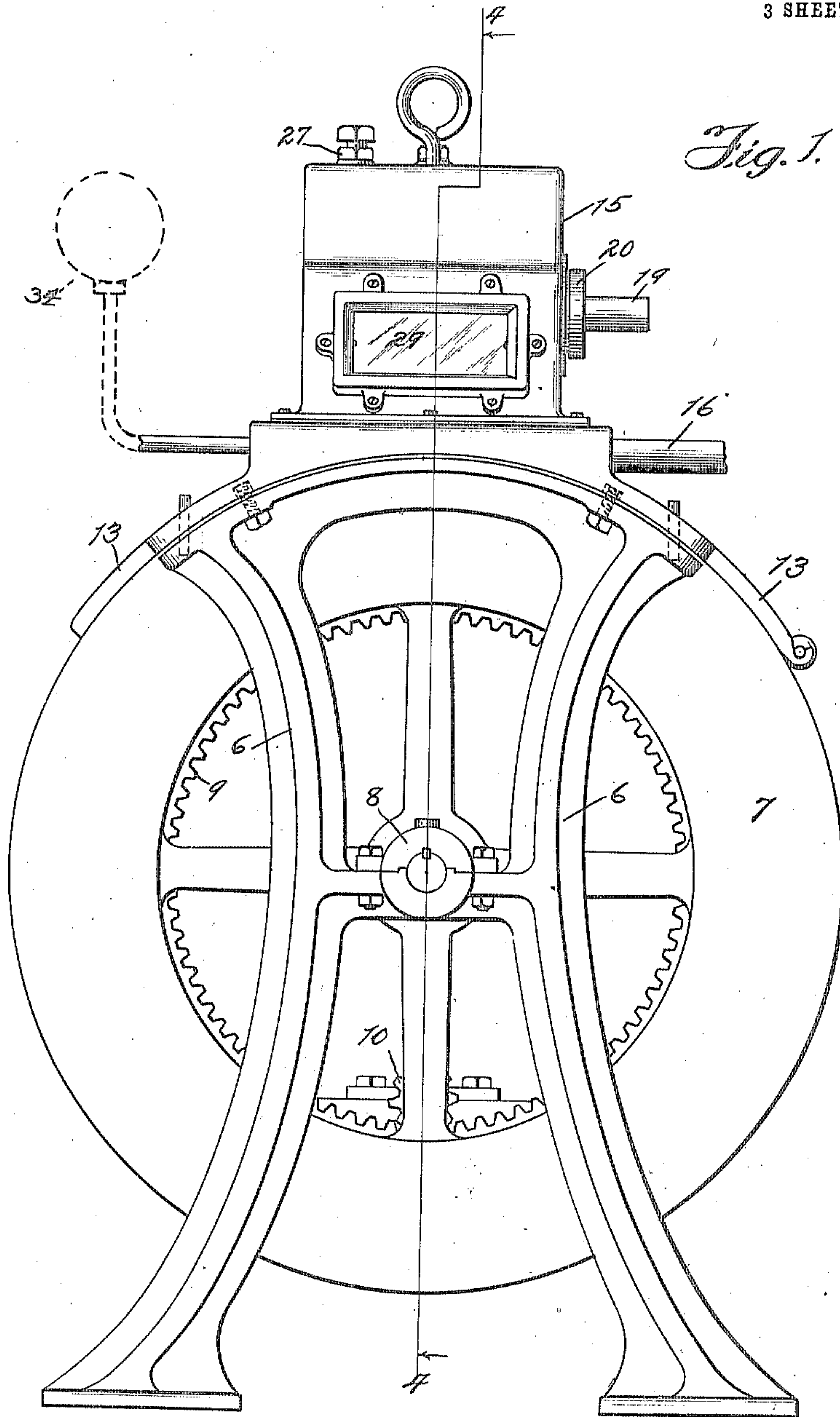
No. 817,306.

PATENTED APR. 10, 1906.

H. EACHUS.
VACUUM SOLDERING MACHINE.

APPLICATION FILED MAY 6, 1905.

3 SHEETS—SHEET 1.



Witnesses:
D. D. Terry
J. B. Weir

Inventor:
Holton Eachus
by Bond Adams Rickard & Co.
His Attys.

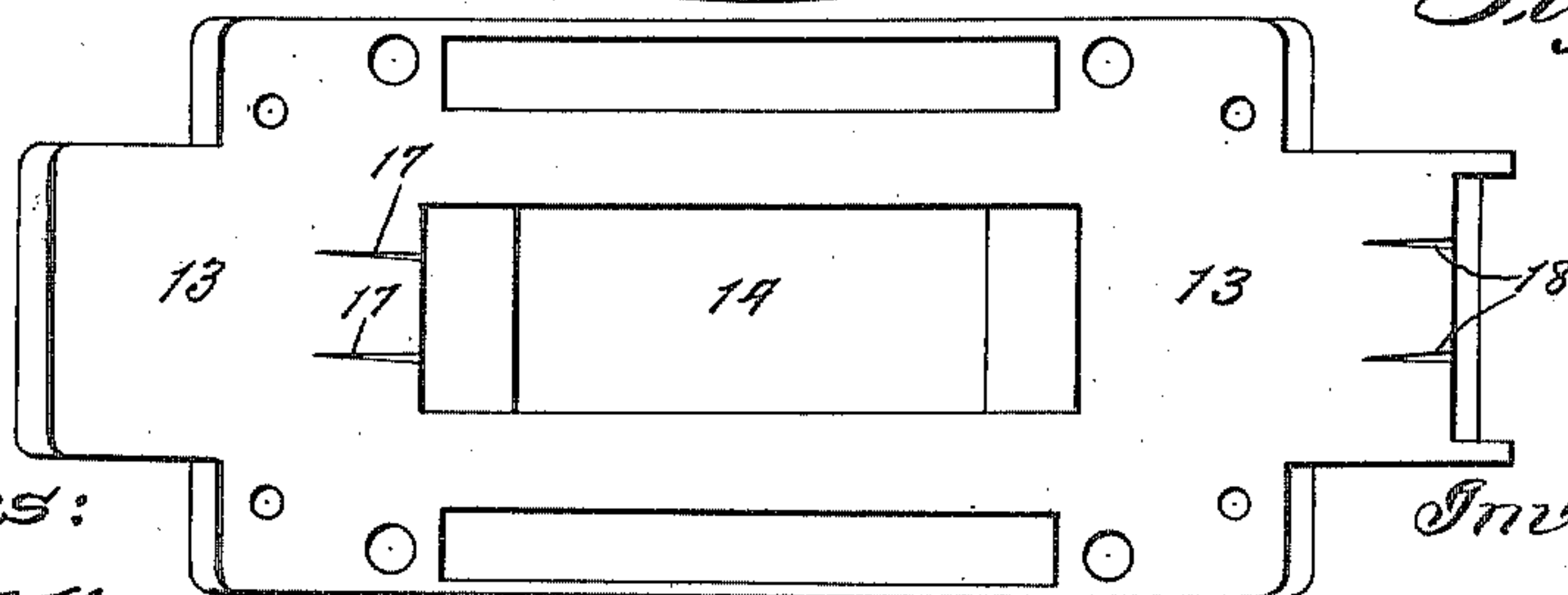
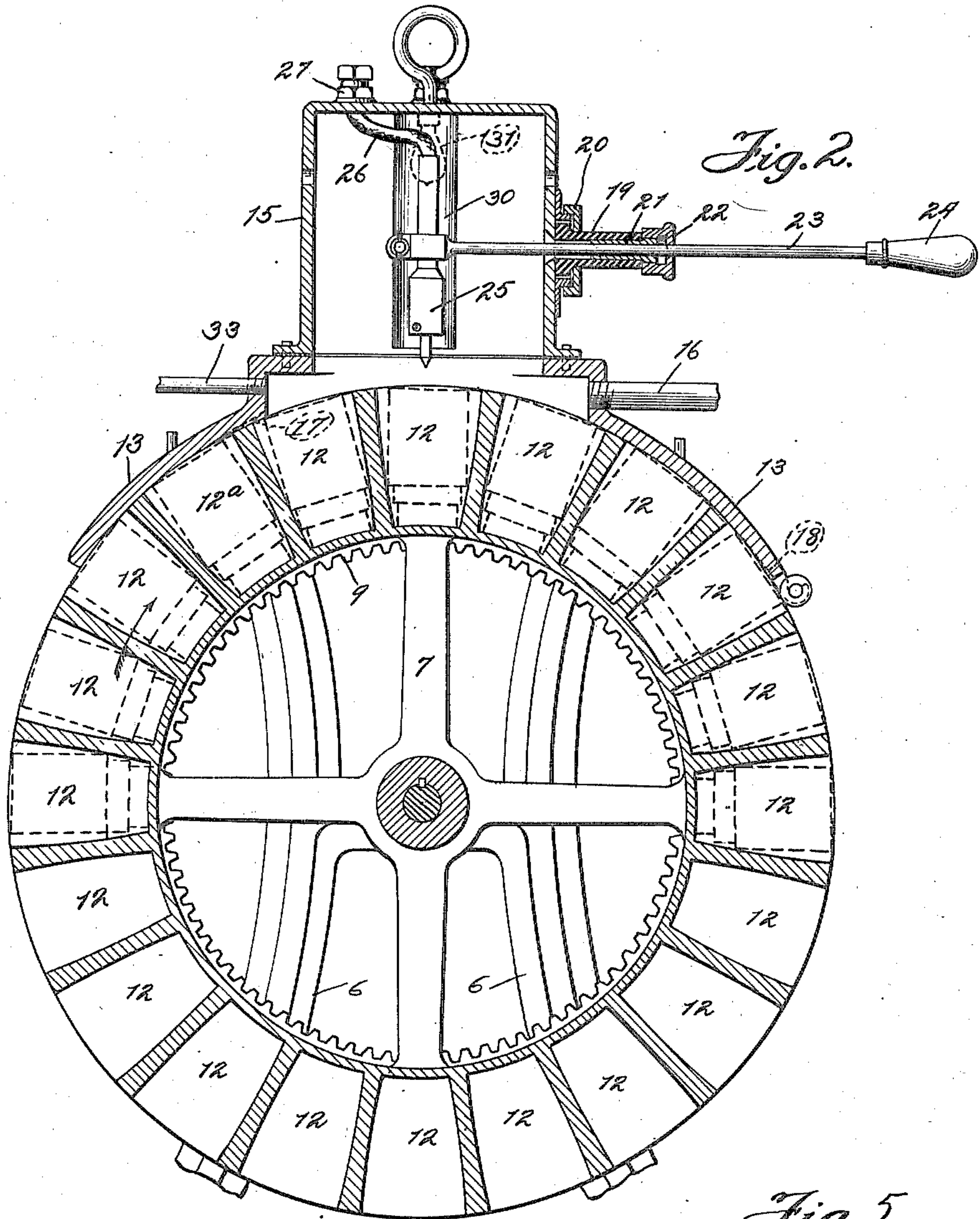
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3 SHEETS—SHEET 2.



Witnesses:

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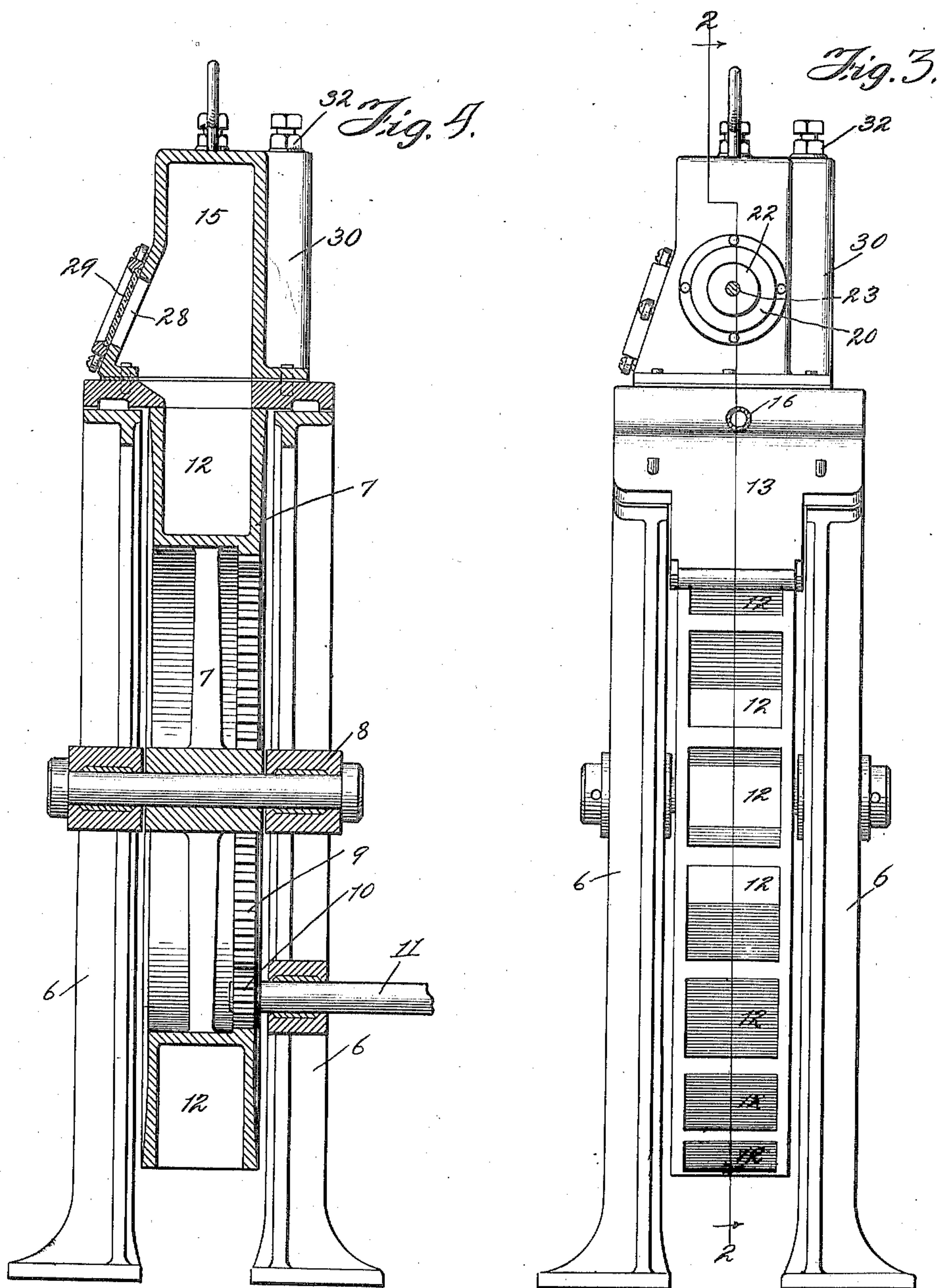
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

HOLTON EACHUS, OF CHICAGO, ILLINOIS, ASSIGNOR TO FAIRBANK CANNING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

VACUUM SOLDERING-MACHINE.

No. 817,306.

Specification of Letters Patent.

Patented April 10, 1906.

Application filed May 6, 1905. Serial No. 259,207.

To all whom it may concern:

Be it known that I, HOLTON EACHUS, a citizen of the United States, residing at Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Vacuum Soldering-Machines, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to vacuum soldering-machines, and particularly to that type of vacuum soldering-machines in which the cans having been filled and capped are placed in a carrier and subjected to the action of a vacuum to extract the air from the contents of the can through a small opening which is left in the cap for the purpose and which while still in the vacuum, is soldered by the application of a suitable soldering mechanism.

Heretofore in machines of this class the most general and effective construction has been to provide a rotary carrier revolving horizontally about a vertical axis and containing an annular-shaped chamber, which through a suitable opening was filled with the cans, the cans being filled and capped, with the small opening or vent-hole through the cap, which permits the escape of the air from the can. The cans were placed one against the other in this annular-shaped chamber, with the caps up and with one or more small globules of solder lying loose upon the tops of the cans. The opening through which the cans are introduced is then closed and the connections between the annular chamber and a suitable vacuum-chamber is opened, causing a suitable degree of vacuum in said chamber and maintaining the same therein during the process of soldering. By this means the air is exhausted from the cans through the vent-hole in the caps, and, controlled by the operator, the carrier is set in motion. The cans pass under a suitable dome provided with a glass-covered opening and containing a soldering-tool which is capable of being operated from the outside. As a can comes within reach of the soldering-tool the carrier is stopped by the operator, one of the loose globules of solder engaged by the soldering-tool, and the vent-hole in the top of the can brought under the soldering-tool, when the opening is soldered. The process is repeated until all the cans in the annular chamber have been soldered, when by suitable means

the air is given access to the chamber, the chamber opened, and the cans removed. The difficulties with this process are several. In the first place, owing to the fact that the soldering-tool has been so constructed as to allow it to swing from side to side and up and down toward and away from the can only in order to pick up the globule of solder and convey it to the vent-hole of the cap it is necessary to stop the rotary motion of the carrier for each soldering operation. Again, as the cans are all contained in one annular-shaped chamber and as it is customary to have several of these machines connected with one air-pump or vacuum-chamber the sudden connection of the entire annular-shaped chamber with the vacuum-pump causes a drop in the vacuum and a corresponding inequality in the other machines. Again, in such construction the connection with the vacuum-chamber is of such a character as to necessarily cause a practically instantaneous vacuum in the annular chamber, and the suddenness with which the pressure of the air is thus removed from the outside of the cans causes the cans to buckle. For the same reason the air having been exhausted from the cans before they are soldered the opening of the chamber causes the sudden filling of the chamber with air, which also tends to cause the cans to buckle.

It is the object of my invention to produce a machine for soldering cans in vacuum which will overcome these disadvantages. Generally speaking, I accomplish this end by having a carrier which contains a number of compartments, each adapted to contain a single can. A dome or vacuum-chamber below which this carrier revolves is so constructed as to cover only two or three of such chambers at a time and is provided with a cap or plate which extends over one or more additional chambers on each side of the dome or vacuum-chamber in such a way that its bearing-surface forms an air-tight connection with the upper edges of the carrier and can-chambers. One part of this plate or cap is provided near its opening into the dome or vacuum-chamber with grooves which widen and deepen toward the chamber, and at the end of the plate or cap at the opposite end of the dome and at its end removed from said dome similar grooves, which widen and deepen away from the chamber are provided,

to permit the gradual application of the vacuum to the compartments and the gradual letting of the air into the compartments as the carrier rotates.

5 Broadly considered, in this respect my invention consists, therefore, of a continuously-movable carrier provided with separate compartments which are adapted to successively move below the covering plate or dome and
10 be brought within the action of the vacuum as the carrier moves. As a further perfection of the invention thus broadly stated I provide a rotary carrier which rotates continuously in a vertical plane on a horizontal
15 axis and which is provided with a plurality of radial compartments which move successively under the plate or dome and are thus successively subjected to the action of the vacuum within said dome. This is the form
20 of my invention which I have illustrated in the drawings and will describe in detail and which is in a form which is adapted to contain and operate upon cans whose caps are provided with a sufficient amount of solder
25 adhering to the cap in close proximity to the vent-hole to seal the opening when subjected to the application of a soldering-tool.

I propose to file a separate application for a patent for cans so constructed and provided with solder adhering to the cap in the
30 proximity of the vent-hole and for the machine for applying the solder to the cans.

Within the dome I provide a new and improved form of soldering mechanism, which
35 is controlled from the outside by the operator and which has both a movement back and forth circumferentially of the carrier, as well as a motion from side to side across the direction of the rotation and to and away from
40 the chambers or compartments.

I accomplish these objects by means of the mechanism hereinafter described.

In the drawings, Figure 1 is a side elevation. Fig. 2 is a vertical section on the line
45 2 2 of Fig. 3. Fig. 3 is an end elevation. Fig. 4 is a cross-section on line 4 4 of Fig. 1. Fig. 5 is a detail, being a view of the cap or plate seen from the under side.

Referring to the drawings, 6 indicates a
50 frame or standard in which is mounted a rotary carrier 7. The rotary carrier 7 is journaled in suitable bearings 8 in the frame or standard 6 and is provided with an internal gear 9.

10 indicates a pinion which is driven by a
55 shaft 11, journaled in the frame 6 and driven from any suitable source of power. (Not shown.) The carrier is provided with a number of compartments 12 upon its periphery, which are closed at the bottom and sides and open at the top and are each preferably adapted to contain a single can. The outer periphery of the carrier is accurately ground, so that it may fit closely to the plate herein-
65 after described.

13 indicates a plate which is bolted or otherwise secured to the frame or standard 6 and whose under surface conforms to and fits air-tight against the peripheral surface of the carrier 7, the under side being suitably
70 ground for the purpose. The plate 13 is provided with a central opening 14, above which and supported by the plate 13 is a dome or vacuum-chamber 15.

The dome or vacuum-chamber 15 is con-
75 nected to a suitable pump or other means for producing a vacuum, which may be of any well-known character, and hence is not shown, by means of a pipe 16, which passes through a suitable shoulder in the cap or plate 13.
80 Upon one side of the plate or cap 13 and leading into the opening 14 are two grooves 17, which are widest and deepest where they open into the opening 14 and become narrower and shallower toward their inner ends
85 away from the opening. Upon the end of the cap 13 which is away from the dome 15 in the direction of the rotation of the carrier are two similar grooves 18, which are widest and deepest at the edge of the plate and become
90 narrower and shallower toward the middle of the plate. 19 indicates a flexible socket, preferably of rubber, which is secured to the outer surface of the dome 15 by means of a plate 20 or in any other suitable manner. The socket
95 19 has a longitudinal opening through it in which is placed a tubular packing 21, secured in place by a cap 22.

23 indicates a rod which is slidingly mounted in the packing 21 and passes through said
100 packing and through the socket 19, through a suitable opening into the interior of the dome 15, and is provided with a suitable handle 24 upon its outer end.

25 indicates an electric soldering-tool of
105 any approved construction which is removably supported on the inner end of the rod 23 and is connected by flexible insulated wires 26 with a plug 27 upon the top of the dome 15, by means of which it may be con-
110 nected to any suitable source of electric current. The front of the dome 15 is provided with a suitable opening 28, covered air-tight by a glass plate 29, through which the interior of the dome 15 may be observed by the
115 operator.

30 indicates an offset in the back of the dome 15, in which is hung an electric light 31, connected with a plug 32, by means of which it may be connected with any suitable source
120 of electric current.

It will be seen from the above description that the electric soldering-tool 25 may be swung from side to side across the plane of
125 the wheel and moved up and down toward and away from the compartments 12 to such amount as is necessary for bringing the point of the tool to the proper position on the cap in these respects by moving the handle 24 from side to side or up and down, the flexible
130

socket 19 permitting this motion. At the same time by sliding the rod longitudinally of itself in the socket and packing the point of the soldering-tool 25 may be moved to and fro in the direction of the movement of the cans in the compartments.

33 indicates a pipe which opens from a suitable shoulder in the cap or plate 13 and leads to a gage 34, which indicates the degree of vacuum.

The operation of my device is as follows: As the form in which I prefer to embody my invention is provided with a carrier which revolves in a vertical plane on a horizontal axis, I use cans which have previously been filled and capped, with the caps of course soldered on, having already placed in close proximity to the vent-hole in the cap sufficient amount of solder to close the opening when acted upon by the soldering-tool, the solder adhering to the cap.

The carrier being set in motion and the dome 15 connected with the vacuum-pump or other means for producing a vacuum through the tube 16, a vacuum is produced in the dome 15. The cans, previously filled and capped and having the solder secured upon the upper surface of the cap in proximity to the vent-hole therein, as above noted, are fed successively into the chambers or compartments 12 as the wheel rotates, with their capped ends toward the periphery of the wheel.

The compartments 12 are made of a size adapted to hold the largest cans ordinarily used, and in case smaller cans are to be soldered suitable blocks are placed in the bottom of the compartments, so that in any case the top of the can will reach almost to the top of the compartment containing it. As the compartment containing the can is moved under the plate 13 it is closed air-tight, and as the forward edge of each compartment reaches the groove 17 the compartment begins to be subjected to the action of the vacuum in the chamber 15, and the air is gradually exhausted, and passing farther along the air is completely exhausted from the compartment. In Fig. 2 I have shown a compartment 12^a as just coming within the reach of the groove 17. As soon as the compartment containing the can to be soldered comes below the dome 15 the operator, watching it through the glass plate 29, by sliding the rod 23 longitudinally of itself and swinging it from side to side as may be needed to bring the point of the soldering-tool 25 over the vent-hole of the can and by lifting the handle 24, brings the point of the soldering-tool down upon the can. By pulling the handle outward to the right the tool follows the motion of the can for a time necessary to melt the solder to close the opening of the cap, thus rendering it unnecessary to stop the motion of the carrier in the soldering process.

The process is repeated, of course, with each succeeding can. As the can is soldered and the compartment moves out from under the dome 15 and approaches the other end of the plate 13 the air is admitted to the compartment gradually at first, through the grooves 18, until each compartment passes out from under the plate 13, and the cans are discharged from the compartments in any suitable manner. The carrier moves, of course, at such rate that the air is exhausted from the can through the opening left in the cap, by means of the compartment containing it coming under the dome 15 before the soldering-tool is applied to close the vent.

As has been pointed out above, in the perfected form in which I have shown and described my invention the carrier is a rotary carrier in a vertical plane about a horizontal axis and provided with separate radial compartments each adapted to contain a single can and adapted to be successively moved below the plate and vacuum dome or chamber, so as to be successively subjected to the action of said vacuum-dome. The invention as thus described is adapted to operate on cans the solder for closing the opening in the caps of which is placed upon the caps beforehand, adhering thereto in sufficient amount to stop the opening when subjected to the action of the soldering-tool.

It is obvious that the carrier might be otherwise disposed or might rotate on an axis other than a horizontal one without departing from the spirit of my invention, and I therefore do not confine myself to this form of carrier, except as hereinafter specifically claimed.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a movable carrier having a plurality of compartments, and a plate adapted to cover two or more of said compartments successively as said carrier moves and having a suitable opening therein, of a vacuum-chamber covering said opening, grooves in said plate connecting with said vacuum-chamber and adapted to expose said compartments successively to the action of the vacuum as said carrier moves them under said plate, and means for soldering the vent in the caps of the cans contained in said compartments as they pass under said vacuum-chamber, substantially as described.

2. The combination with a movable carrier having a plurality of compartments, and a plate adapted to cover two or more of said compartments successively as said carrier moves and having a suitable opening therein, of a vacuum-chamber covering said opening, grooves in said plate connecting with said vacuum-chamber and adapted to expose said compartments successively to the action of the vacuum as said carrier moves them under said plate, grooves in said plate adapt-

ed to gradually admit air into said compartments successively as said carrier moves them beyond the said vacuum-chamber, and means for soldering the vent in the caps of the cans contained in said compartments as they pass under said vacuum-chamber, substantially as described.

3. The combination with a rotary carrier provided with a plurality of compartments each adapted to contain a can, of a plate adapted to cover successively two or more of said compartments as said carrier rotates and having a suitable opening, a vacuum-chamber covering said opening, grooves in said plate connected with said vacuum-chamber and adapted to gradually expose said compartments successively to the action of the vacuum in said chamber as said carrier rotates, and means for soldering the vent-holes in said cans in said compartments as they are successively moved into the action of said vacuum-chamber, substantially as described.

4. The combination with a rotary carrier provided with a plurality of compartments each adapted to contain a can, of a plate adapted to cover successively two or more of said compartments as said carrier rotates and having a suitable opening, a vacuum-chamber covering said opening, grooves in said plate connected with said vacuum-chamber and adapted to gradually expose said compartments successively to the action of the vacuum in said chamber as said carrier rotates, grooves in said plate adapted to gradually admit air into said compartments successively as said carrier rotates them beyond said vacuum-chamber, and means for soldering said cans in said compartments as they are successively moved into the influence of said vacuum-chamber, substantially as described.

5. The combination with a rotary carrier adapted to rotate in a vertical plane about a horizontal axis and being provided with a plurality of radial compartments opening upon the periphery of said carrier each compartment being adapted to contain a can, of a plate adapted to cover successively two or more of said compartments as said carrier rotates and having a suitable opening, a vacuum-chamber covering said opening, grooves in said plate connected with said vacuum-chamber and adapted to gradually expose said compartments successively to the action of the vacuum in said chamber as said carrier rotates, and means adapted to solder said cans in said compartments as they are successively moved into the influence of said vacuum-chamber, substantially as described.

6. The combination with a rotary carrier adapted to rotate in a vertical plane about a horizontal axis and being provided with a

plurality of radial compartments opening upon the periphery of said carrier each compartment being adapted to contain a can, of a plate adapted to cover successively two or more of said compartments as said carrier rotates and having a suitable opening, a vacuum-chamber covering said opening, grooves in said plate connected with said vacuum-chamber and adapted to gradually expose said compartments successively to the action of the vacuum in said chamber as said carrier rotates, grooves in said plate adapted to gradually admit air into said compartments successively as said carrier rotates them beyond said vacuum-chamber, and means adapted to solder said cans in said compartments as they are successively moved into the influence of said vacuum-chamber, substantially as described.

7. The combination with a rotary carrier adapted to rotate in a vertical plane about a horizontal axis and being provided with a plurality of radial compartments opening upon the periphery of said carrier each compartment being adapted to contain a can, of a plate adapted to cover successively two or more of said compartments as said carrier rotates and having a suitable opening, a vacuum-chamber covering said opening, grooves in said plate adapted to gradually admit air into said compartments successively as said carrier rotates them beyond said vacuum-chamber, and means adapted to solder said cans in said compartments as they are successively moved into the influence of said vacuum-chamber, substantially as described.

8. The combination with a vacuum-chamber, and a carrier provided with separate compartments and adapted to move said compartments successively under said vacuum-chamber, of a flexible socket upon the outside of said vacuum-chamber, a rod passing through said socket into said chamber and movable longitudinally of itself in said socket, and a soldering-tool within said vacuum-chamber and connected with said rod, substantially as described.

9. The combination with a vacuum-chamber and a carrier adapted to contain cans and to convey the same successively into the action of said vacuum-chamber, of a flexible socket secured to the exterior of said vacuum-chamber, a packing in said socket, means for securing said packing in said socket, a rod passing through said packing and socket into said chamber and movable longitudinally of itself through said packing and socket, and a soldering-tool within said chamber and connected with said rod.

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Witnesses:

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