(No Model.) 2 Sheets—Sheet 1.

W. H. H. STEVENSON.

CAN TESTING MACHINE.

No. 445,706. Patented Feb. 3, 1891.

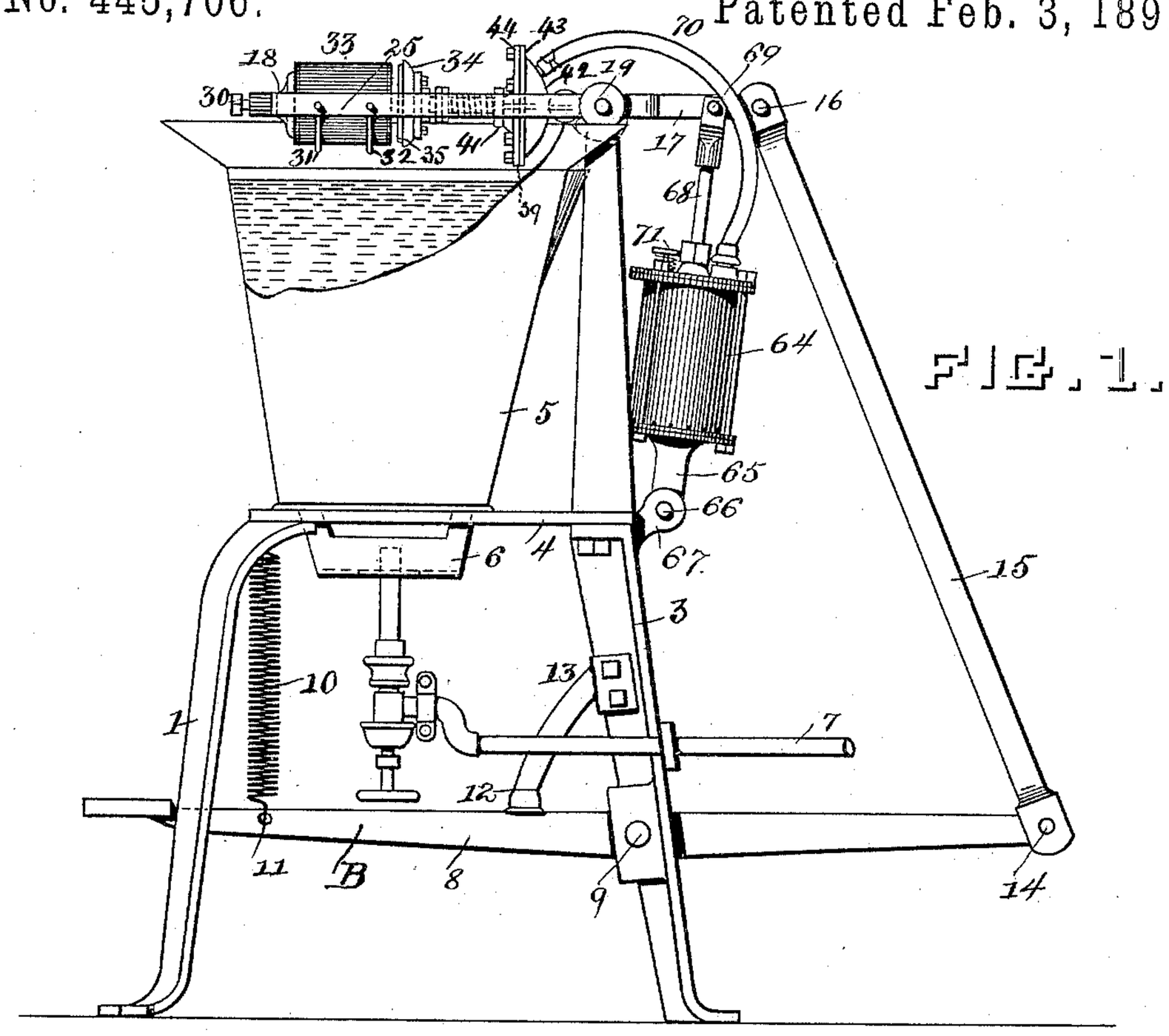

FIG. 1.

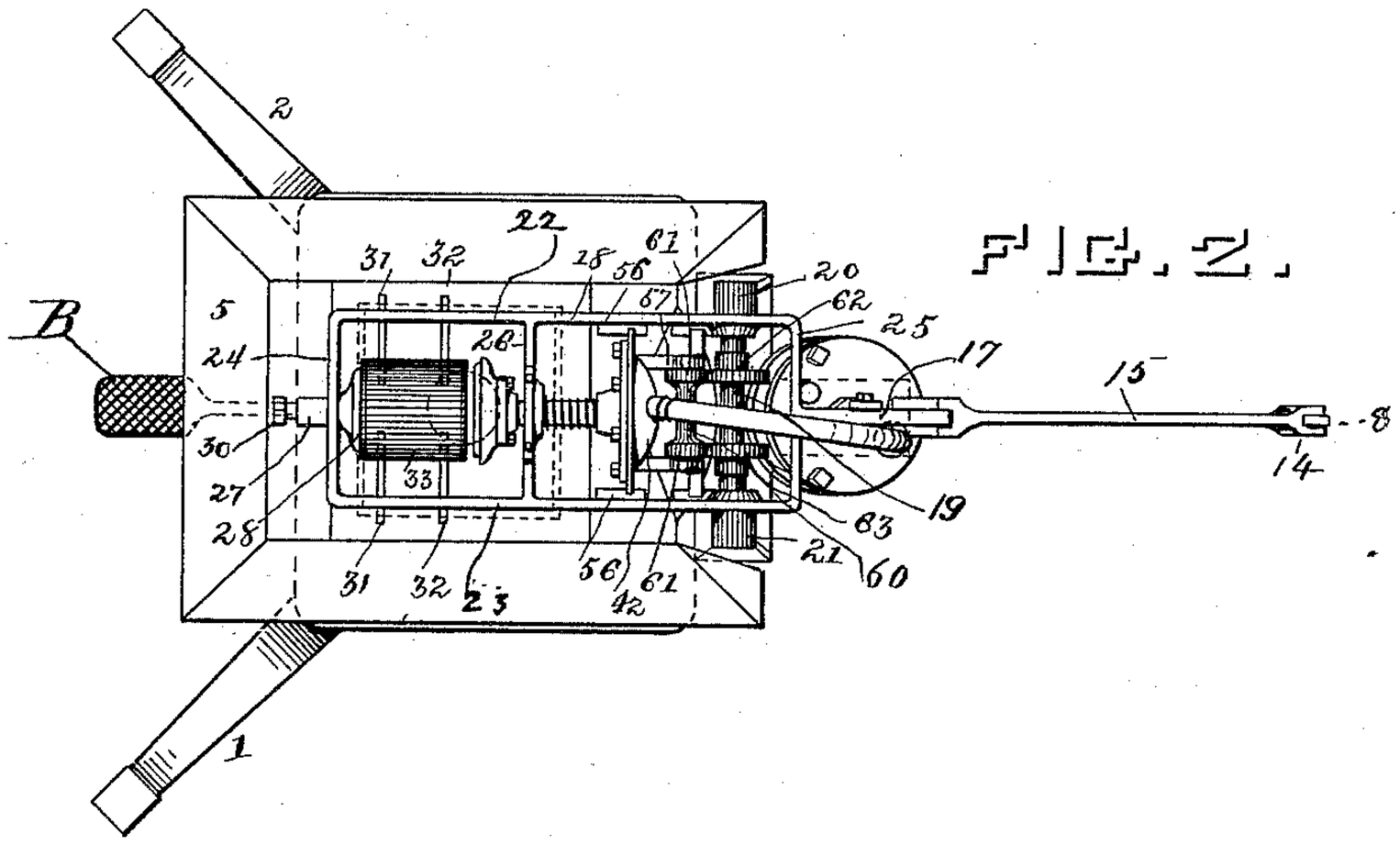

FIG. 2.

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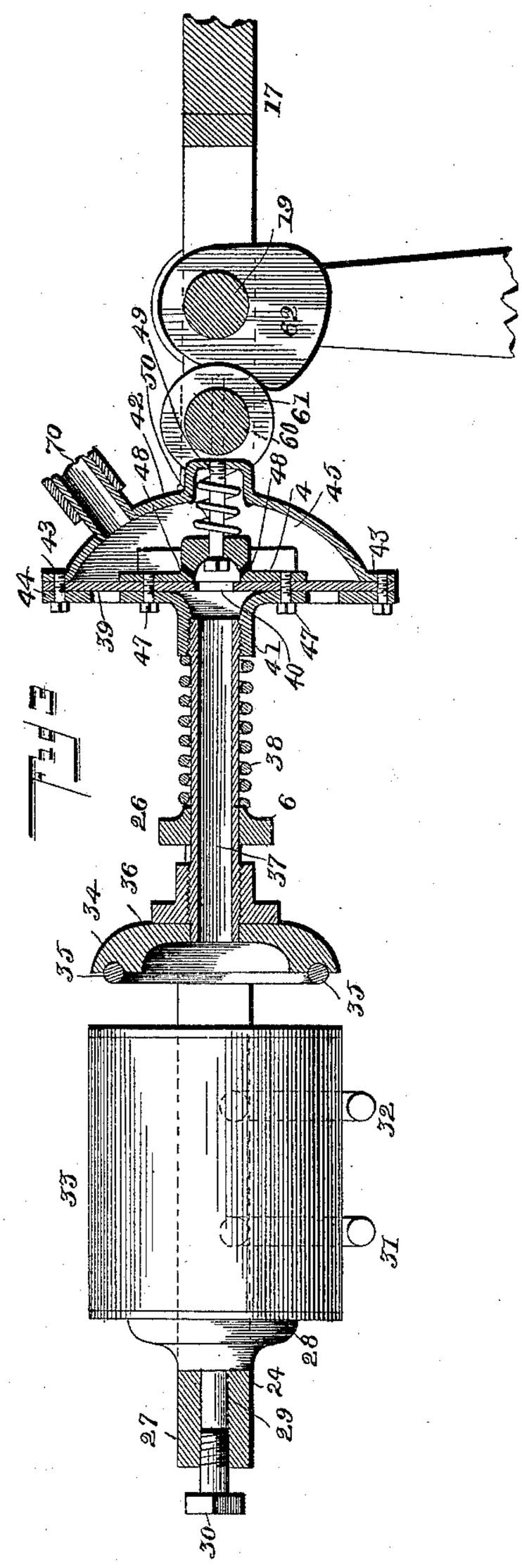

Fig. 5.

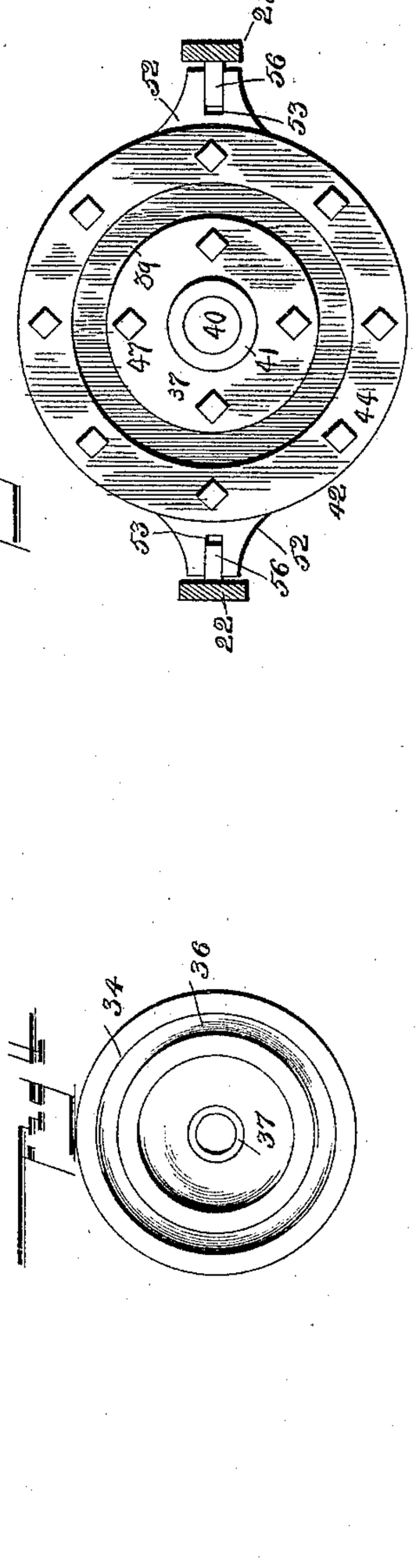

Fig. 6.

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UNITED STATES PATENT OFFICE.

WILLIAM H. H. STEVENSON, OF MOUNT WASHINGTON, MARYLAND.

CAN-TESTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 445,706, dated February 3, 1891.

Application filed February 10, 1890. Serial No. 339,954. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. H. STEVENSON, a citizen of the United States, residing at Mount Washington, in the county of Baltimore and State of Maryland, have invented certain new and useful Improvements in Can-Testing Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention is in the nature of a machine for testing cans by immersing them in water while air is forced into them, and has for its object to furnish a machine of this class which shall be cheap, simple, and effective, in which the single operation of manipulating a lever (in this instance depressing a treadle) clamps the can, operates the pump to force air into its interior, and immerses the can in water.

With this object in view my invention consists in the improved construction, arrangement, and combination of parts hereinafter fully described, and afterward specifically pointed out in the subjoined claims.

In the accompanying drawings, Figure 1 is a view showing my improved can-testing machine in side elevation, a portion of the water-tank being broken away to more plainly show the operative parts. Fig. 2 is a view showing such machine in plan. Fig. 3 is a detail view showing the can-carrying frame in vertical longitudinal section and the can therein in side elevation. Fig. 4 is a view in elevation of the front of the movable can-clamping head. Fig. 5 is a detail view showing in elevation the diaphragm and its clamping-plates removed from the machine.

Referring to the drawings by numerals of reference, 1, 2, and 3 are the legs, and 4 the top, of a frame or table, upon which the operative parts of my machine are supported, the legs 1 and 2 being located at the front and leg 3 at the rear thereof. The top 4 is made with an opening in it, over which rests a tank 5 for containing the water into which the can is to be immersed.

6 is a burner located below said opening for the purpose of heating the water contained therein, and 7 is a pipe through which gas, gasoline, or other fluid fuel is brought to the burner from any suitable supply.

8 is a treadle pivoted at 9 to the rear leg 3 of the stand and extending beyond both the front and rear legs. It is held with its foot-piece normally in its upward position and its rear end in its lowermost position by means of a helical or other spring 10, secured to it at 11 and to the stand above it. The normal position might be secured in any well-known manner—as, for instance, by making the rear sufficiently heavy to dispense with the spring. The foot-piece is prevented from rising above the proper position by a stop 12, bolted or otherwise secured to leg 3, as shown at 13.

At 14, the rear end of the treadle-lever, is pivoted a bar 15, which at its upper end is connected by pivot 16 to an arm 17, projecting rearward from the can-carrying frame 18, said frame being pivoted on a transverse bar 19, secured to the frame-work of the machine, and held against lateral displacement on said rod by means of collars for nuts 20 and 21.

The can-carrying frame is rectangular in form, consisting of side bars 22 23 and end bars 24 25. The arm 17 before referred to projects rearwardly from about the center of end bar 25 and is rigid therewith, being either secured thereto or formed integral therewith. By preference the side bars 22 23, end bars 24 25, arm 17, and a cross-bar 26, connecting the side bars at or near their center, forming the complete frame, are cast in a single piece.

On the front of the end bar 24 is a perforated boss or hub 27. A head 28 for clamping one end of the can has a central pin 29, which is passed into this boss from the inside of the frame and secured in position and adjusted in relation to the can longitudinally by means of a screw-bolt 30, entering the threaded outer end of the bore of said boss. By turning this bolt the proper adjustment of the head is attained, and such adjusted position may be maintained by placing a locking-nut on the bolt to be turned up against the end of the boss. By means of the screw 30 the pin 29, and consequently the head 28, can be mounted rearward toward the opposite head, so that the former head, while adjustable, can be held by the screw and nut in

the desired fixed position, and consequently may be called a "fixed head." Secured in each side bar and projecting inward and downward are two or more rods or fingers 31 32, which serve as a bed or seat upon which to lay the can 33 while feeding the machine.

34 is a movable clamping-head. It is provided on its face with an elastic packing or ring 35, of a size larger than the opening in the head of the can, so that it will when brought up against the can always impinge upon the rim around said opening and form a tight joint therewith. This head 34 is slightly cup-shaped, as at 36, and has projecting rearwardly from its center a tube 37, which passes through a hole in the cross-bar 26 to the clamp-pressure regulator, the latter being rigidly secured to the tube 37 at its rear end. The spring 38, which surrounds the tube 37 in part and bears against the cross-bar 26, serves to keep the head 34 and all connected parts normally in their rearmost position, so as not to interfere with the operator in feeding the cans to the machine, and when the operator's foot is raised from the treadle releases the can from between the head.

The clamp-pressure regulator consists, primarily, of a yielding diaphragm 39. It has a central perforation 40, which registers with the bore of the tube 37 when the parts are in operative position, as shown in Fig. 3. This position with relation to the tube 37 is maintained by having secured to the tube and diaphragm a flanged hub 41. The diaphragm 39 is clamped at its circumference to the outer edge flange 43 of a cup-shaped plate 42 by bolts passing through the flange 43, the diaphragm, and a clamping-ring 44, thus forming a chamber 45. Within this chamber and opposite the flanged hub 41 is a somewhat similarly-shaped flanged hub 46, the diaphragm being clamped between these two flanged hubs by means of bolts 47.

The hub 46 has openings 48, affording communication between the chamber 45 and tube 37. It has also a central bore, through which is passed a bolt 49, whose rear end is threaded into the central part of the cup-plate 42, and between hub 46 and plate 42 is a spring 50, which serves to limit the extent of the motion of the diaphragm and keep it pressed forward, as hereinafter explained.

The plate 42 has upon its side projecting ears 52, slotted at 53 to fit over guide-flanges 56 on the inner sides of the said bars 22 23 of the can-carrying frame, (see Fig. 5,) and to the rear of this plate is secured a sliding frame 57, having similar slotted ears engaging similar guide-flanges. On this frame are two upwardly-projecting flanges, in which is journaled a shaft 60, provided with collars or anti-friction rollers 61. Coinciding in position and having engagement therewith are two cams 62 63, rigidly secured to or forming part of the shaft upon which the can-carrying frame is pivoted.

64 is a cylinder of an air-pump, having rigidly secured to its lower head a projecting arm 65, which at 66 is pivoted to ears 67, projecting from the frame of the machine, whereby the cylinder is permitted to oscillate.

68 is the piston of the air-pump, connected by a pivot 69 at its upper end to the arm 17 of the tilting frame 18.

70 is a tube connecting the cylinder with the air-chamber 45 through the cup-plate 42.

71 is a valve in the top of the cylinder 64, of any well-known construction, the requisites being that it shall open inwardly and close automatically when pressure is exerted upon it from within the cylinder, it being desirable to prevent accidents and that it be held normally open by a light spring. The specific construction of the valve may be changed at will so long as these conditions are fulfilled.

The operation of my invention may be described as follows: The machine being in a condition of rest, the burner 6 is lighted until the water is heated to about 160° Fahrenheit and regulated to maintain approximately this temperature, the object being to slightly heat the immersed can to cause it to dry quickly when removed. A can is now laid upon the fingers 31 32, with its bottom resting against the stationary head 28, said head having been previously adjusted to a position to suit the length of the cans to be tested. The treadle is now depressed, raising the rear end, and consequently, through the medium of bar 15, causing the rear projecting arm 17 of frame 18 to be raised and the main body of the carrier-frame to be depressed. This motion carries up the piston-rod 68 of the air-pump, thus closing valve 71 and forcing the air from above the piston in the cylinder 64 through tube 70 and through chamber 45 and tube 37 into the open head of the can, which has been clamped by the same action. As the frame 18 tilts downward, friction-rollers 61 pass partially around the cams 62 63, thus causing the frame 57 to slide forward in the carrier-frame 18, carrying the cup-plate 42 with it. This forces the circumference of the diaphragm 39 forward, which, by its connections with the tube 37 and head 34, causes said head 34 to move forward with a yielding pressure until it reaches the packing-ring 35 and comes in contact with the head of can 33 around the opening therein, thus clamping the can and establishing a continuous conduit thereto for the air from the pump. The diaphragm 39 is limited in its forward movement by the bolt 40 and in its backward movement by the re-enforcing spring 50, the forward motion being toward the operator. The diaphragm 39 and the cup-shaped plate 42 together form an air-chamber, and the diaphragm being pressed forward with the cup-shaped plate carries the movable clamp-head forward with a yielding pressure, so that its packing-ring 35 impinges on the can-head, making an air-tight joint. Should this pressure alone be brought to bear, there might be danger of crushing the can; but this is obviated by the pressure outward of the air in the

can, so that while the movable head of the clamp is forced with great power against the can-head the can-head is supported by the compressed air in the can and all danger of crushing avoided. In setting up the machine the diaphragm is so placed that the hub 46 will set slightly off the bolt-head 40 to allow for any slight variation in the length of cans to be tested. It will of course be understood that the tilting of the carrier-frame will be to a sufficient depth to fully immerse in the tank 5 the can 33, clamped, as before described, so that while it is so immersed and hermetically sealed, except as to its connection with the pump, any leaks in it will permit air to escape and be discovered by perceiving bubbles arise to the surface of the water. The can having been tested, the treadle will be released and will rise, thus reversing all of the motions. The movement of the piston down into the cylinder upon this return movement would naturally tend to create a vacuum in the interior of the can and cause it to adhere to the movable head as it is withdrawn. This is prevented by the valve 71, which, as soon as the piston starts down, will automatically open inward, thus admitting air into the cylinder and removing all tendency to such vacuum forming.

It will be seen from the foregoing description that the three operations of clamping the can, immersing it in water, and forcing air into it are simultaneously performed by simply pressing down upon the treadle and the machine brought into position for reuse by releasing the treadle.

I may sometimes disconnect the pump from the lever 17, especially where an air pump or fan is at hand, run by power, and connect tube 70 with such power-pump. In such case the air will be admitted at each operation by opening a valve in such tube either by connection with the treadle or by hand.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In combination, a tank, a can-clamp, a carrier therefor, an air-pump, said pump being connected with and operated by said carrier, and a flexible tube connecting said pump with the can-clamp, whereby a can carried by said clamp may be simultaneously immersed in liquid in the tank and supplied with air under pressure, as set forth.

2. In combination, a tank, a can-clamp, a carrier in which said clamp is mounted, an air-pump, a tube connecting it with the clamp, and its piston-rod connecting it with the carrier, whereby the movement of the carrier to immerse the can and clamp in the tank simultaneously operates the air pump to supply air under pressure to the interior of the can, as set forth.

3. In combination, a tank, a can-clamp, a carrier for the same pivoted to the frame of the machine, a treadle, and a lever connecting the treadle to the can-carrier, as set forth.

4. In combination, a can-clamp, a pivoted carrier in which said clamp is mounted, a treadle connected to the carrier, an air-pump pivoted to the frame, having its piston connected to said pivoted carrier, and a flexible tube connecting the pump with the can-clamp, as set forth.

5. In combination, a tank, a can-carrier pivoted on the frame of the machine, a can-clamp carried thereby, an air-pump connected with said pivoted carrier, and an inward-opening valve in said pump, whereby the movement of the carrier to immerse the can in the tank forces air into the can and the return of the carrier opens said valve to admit air into the pump, as set forth.

6. A clamp consisting of a stationary head, a movable head, and a flexible elastic diaphragm through which pressure is applied to said movable head, as set forth.

7. The combination, with the main frame and water-tank supported thereby, of the rectangular clamp-carrier frame having a rear extension and pivoted to the main frame, the treadle-lever pivoted to the main frame, the rod or lever connecting the rear arm of the treadle-lever and the rear extension of the carrier-frame, the clamp within the carrier, having a movable head, the cams mounted on the pivoted shaft of the carrier-frame, and the anti-friction rollers mounted on a shaft in said frame bearing on said cams and operating to close up the movable head on the can simultaneously with the depression of the carrier-frame in the tank, as set forth.

8. The combination, with the main frame, treadle-lever, rectangular can-carrier frame pivoted to the main frame, the rod connecting the rear arm of the treadle-lever and rear extension of the carrier-frame, and the tank supported by the main frame below the carrier-frame, of the can-clamp having a rear movable head, the cams on the pivotal shaft of the carrier-frame, the anti-friction rollers bearing on the said cams and operating to move forward the movable head of the clamp when the carrier-frame is depressed, and the air-pump pivoted at its lower end to the main frame, connected by its piston-rod to the rear extension of the carrier-frame and by a flexible tube to the clamp, by means of which mechanism a single depression of the treadle clamps the can, tilts the carrier-frame in the tank, and drives compressed air in the can, as set forth.

9. The combination of the pivoted carrier-frame, the clamp having a fixed adjustable head and a movable head, the cup-shaped plate movable in ways on the main frame, the diaphragm secured to the front of said plate and forming a chamber therein to receive air from a suitable pump, the tube connecting the diaphragm and movable clamp-head, the spring surrounding said tube and bearing against the main frame to open the clamp, the anti-friction rollers bearing on the cup-shaped plate, and the cams mounted on the

pivotal shaft of the carrier-frame and bearing on said rollers, as set forth.

10. The combination, with the carrier-frame, of a fixed clamp-head, a movable clamp-head, the cup-shaped plate and diaphragm forming an air-chamber, the tube connecting the said movable head and diaphragm, the spring surrounding said tube to open the clamp, and the bolt and spring within the air-chamber to limit the front motion of the diaphragm, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. H. STEVENSON.

Witnesses:
SHIPLEY BRASHEARS,
JAMES DALY.