

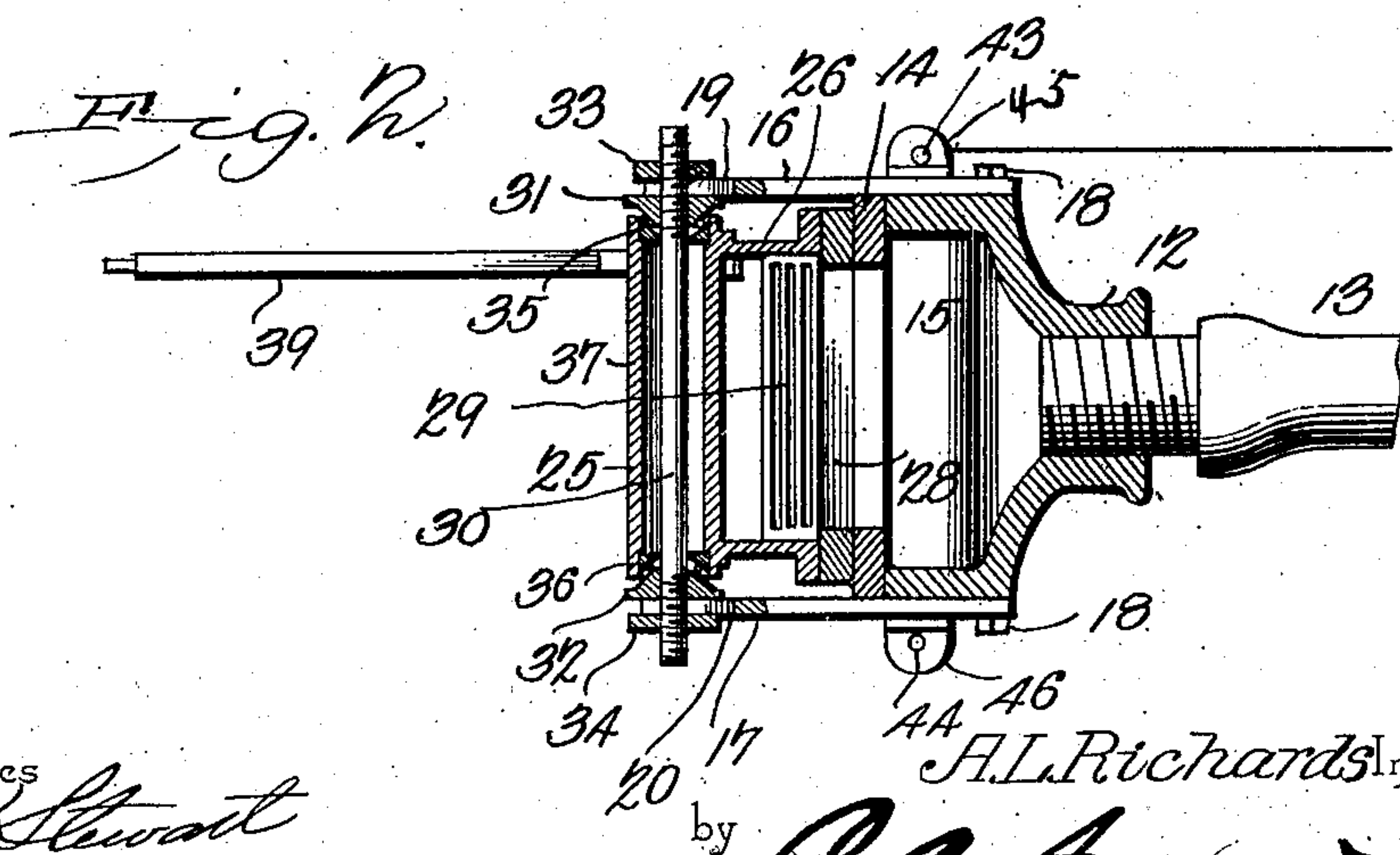
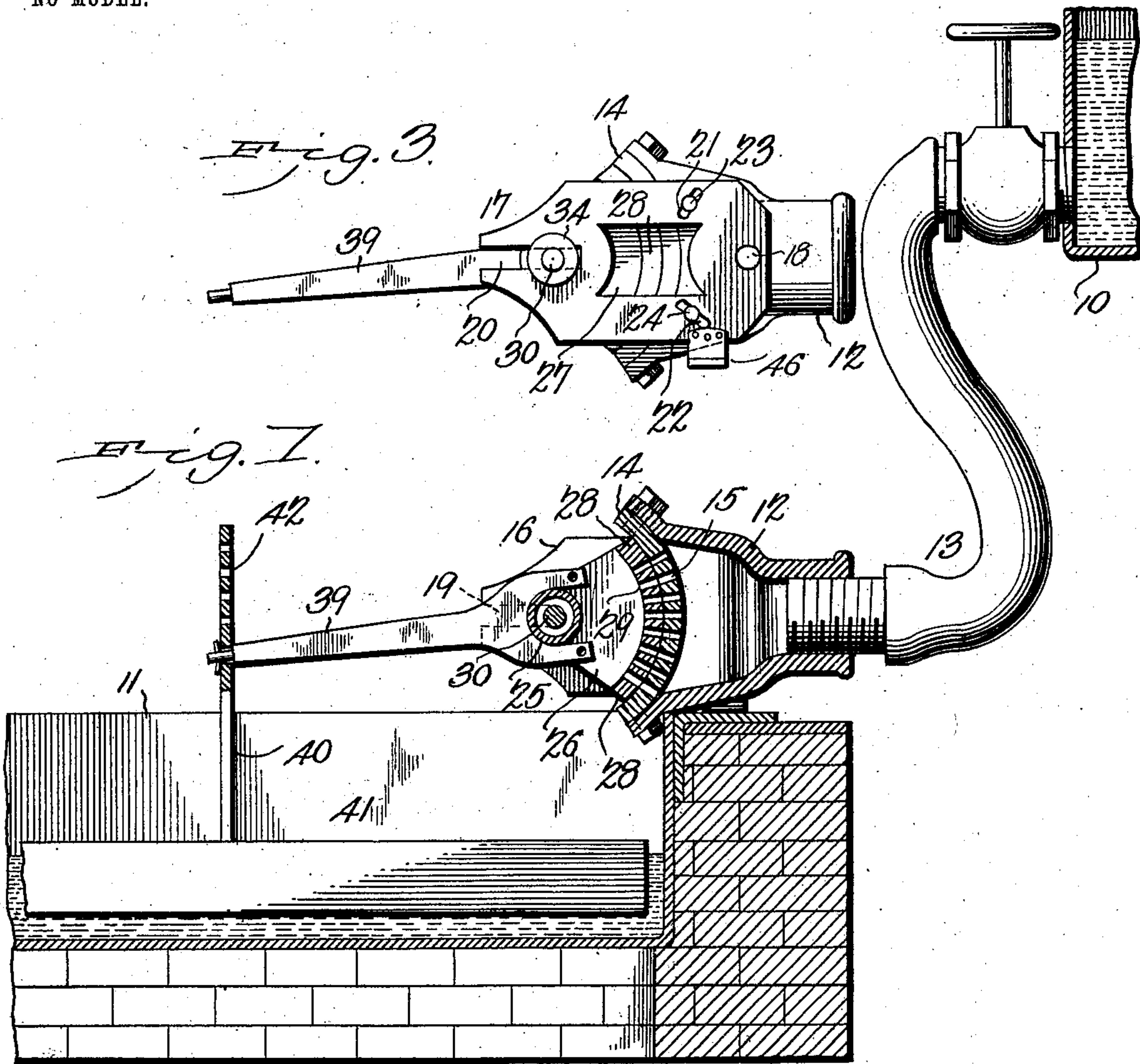
No. 747,769.

PATENTED DEC. 22, 1903.

A. L. RICHARDS.
AUTOMATIC VALVE.

APPLICATION FILED JUNE 22, 1903.

NO MODEL.



Witnesses
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UNITED STATES PATENT OFFICE.

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AUTOMATIC VALVE.

SPECIFICATION forming part of Letters Patent No. 747,769, dated December 22, 1903.

Application filed June 22, 1903. Serial No. 162,664. (No model.)

To all whom it may concern:

Be it known that I, ALANSON L. RICHARDS, a citizen of the United States, residing at Auburn, in the county of Geauga and State of Ohio, have invented a new and useful Automatic Valve, of which the following is a specification.

This invention relates to valves adapted for automatic operation, more particularly to valves controlled by floats; and the object of the invention is to produce a device of this character of improved construction which will be adapted for employment where a quickly-responsive movement is required. Valves of this character are required in connection with evaporating apparatus of various kinds, but may be employed for other purposes and in connection with other forms of apparatus requiring valves of similar construction and arrangement. Hence I do not desire to be limited in any manner to the use of the valve for any specific purpose or in connection with any particular form of apparatus, but reserve the right to its use for any purpose or in connection with any apparatus to which it is adapted.

The means for controlling the action of valves of the character to which this invention relates must be so constructed that a very small movement of the controlling means will effect an immediate response in the action of the valve in order to prevent visible variations in the level of the material upon which the float rests, and the valves must operate with a minimum of friction and be unaffected by changes in pressure from the "head" of material in the reservoir.

The device herein shown and described accomplishes all of the above-enumerated results and others which will appear in the annexed description and be specified in the claims following.

The improved device may be applied to any of the various forms of evaporating and similar apparatus wherein it is requisite to maintain the material being treated at a constant depth, but for the purpose of illustration is shown applied to an ordinary apparatus of this character—such, for instance, as are employed in the manufacture of maple sugar and syrups, to which it is especially applicable.

In the drawings illustrative of the invention, in which corresponding parts are denoted by like designating characters, Figure 1 is a longitudinal sectional view of the device applied. Fig. 2 is a horizontal sectional view. Fig. 3 is a side elevation.

The supply tank or reservoir is indicated at 10 and the evaporating-pan at 11, which may be of any of the usual or ordinary forms, and as such devices are of well-known construction and as the automatic valve may be applied to all the various forms of reservoir and evaporating-pan manufactured it is not deemed necessary to illustrate them in detail.

The automatic valve comprises a valve-casing 12, having means at one end, such as an internal thread, for connecting with a pipe or hose 13, leading to the reservoir 10, and provided with a segmental valve-seat 14 at the other end. The valve-casing is expanded toward the seat end, so that the seat 14 will possess a relatively large area, as shown. The valve-casing 12 will generally be of malleable or cast iron, and the seat 14 will be of brass or other suitable metal upon which a "ground" valve-face may be readily produced and will be so attached to the casing that it may be readily renewed when worn. The valve-seat is provided with a plurality of elongated apertures 15, parallel to the axial line of the valve, the apertures being spaced apart uniformly, and thus forming alternating "lands" and "ports."

Attached to apposite sides of the casing 12 are arms or bearing-plates 16 17, pivotally connected, as at 18, to the casing and longitudinally slotted at their free ends, as at 19 20, and likewise provided with curved slots 21 22, through which clamp-screws 23 24 are tapped into the casing 12, as shown in Fig. 3. By this means the free ends of the arms may be adjusted laterally to correspondingly adjust the valve, as hereinafter shown.

The valve-frame consists of a tubular member or stock 25, from which segmental arms 26 27 extend, and to the outer ends of the arms the valve-face 28 is attached, the valve-face being the segment of a circle with the same radius as the seat 14, so that when the two parts 14 28 are engaged they closely correspond. The member 28 is provided with a plurality of spaced ports 29, corresponding

to the ports 15 in the seat 14, so that when the two parts 14 28 are placed in a certain position the two sets of ports will coincide and provide a free passage for the material 5 through the valve, and then when the lands between the ports 29 are moved over the ports 15 the latter will be "cut off," as will be obvious.

Disposed within the opposite slots 19 20 10 of the arms 16 17 is a rod 30, threaded at the ends and secured adjustably in the slots by cone-nuts 31 32 and jam-nuts 33 34. The cone-nuts 31 32 engage antifriction-balls 35 36, which operate against bearing-rings 37 15 38, supported by shoulders in the ends of the tubular member 25, whereby a "ball-bearing" is provided for the oscillating valve, which is adjustable in the slots 19 20.

Attached to one of the segmental arms 26 20 27 is a lever-arm 39 and extending therefrom to any required distance and attached by a rod 40 to a float member 41, resting on the liquid in the pan 11, as shown. By this arrangement it will be obvious that the rising 25 and falling of the float will correspondingly oscillate the valve upon the seat, and thereby regulate the flow through the valve.

The rod 40 is provided with a plurality of apertures 42 for the lever-arm 39, so that the 30 relative position of the float and valve may be altered when required to provide for a predetermined stage at which the liquid will be maintained in the evaporator-pan.

Any suitable means may be employed for 35 supporting the valve-casing upon the evaporating-pan; but for the purpose of illustration an approved means for supporting it is shown consisting of spaced pins 43 44, extending upward from the edge of the pan 11 40 and through perforated plates 45 46, extending laterally from the sides of the casing. This holds the valve-casing with sufficient firmness and steadiness, while permitting it to be quickly detached when required. By this 45 simple arrangement a very slight downward movement of the float will simultaneously open very slightly all the corresponding ports 15 29 and permit the passage of sufficient quantity of the liquid from the reservoir to 50 compensate for the loss in the evaporator, and when this inflow elevates the float again the supply will be cut off, thus by the coaction of the float and valve automatically controlling the supply and maintaining it at a 55 constant level in the pan 11.

The ball-bearing feature of the valve-journal is an important one, insuring the prompt and sensitive action of the float upon the valve and obviating any danger of the "sticking" 60 of the parts, and thus preventing a ready response to the changes of level in the pan.

One of the marked advantages of the construction and arrangement of the valve herein disclosed is that the pressure of the 65 head in the reservoir has very little effect upon the movement of the valve, so little, in fact, that any change in the quantity of the

liquid in the reservoir will not perceptibly affect the action of the valve, as all the pressure being at all times in a direct radial line 70 through bearing of the valve, no lateral leverage strains can occur to move the valve side-wise, and by the arrangement of the ball-bearing feature the slight change of pressure between a full or empty reservoir will 75 not be noticeable in its effect upon a valve constructed as shown. Another great advantage of this construction is that if for any reason the material in the pan 11 fall below the normal stage, which may be caused, for 80 instance, by the removal of a "finished" batch of syrup, the relatively large combined area of the plurality of ports 15 29, which would be thereby fully opened by the falling float, would very quickly resupply the pan 85 without loss of time and also obviate any tendency to "burn" the pan or the contents. This quick replenishing of the pan is especially important in handling maple-sap, which is very easily injured by overheating. 90 Then, again, if for any reason an abnormal increase in the heat of the fire should occur and correspondingly increase the evaporation the quick and sensitive response of the valve would prevent any detrimental effects 95 from this cause, as will be obvious. By this arrangement of parts the depth of the liquid in the pan is automatically maintained at a uniform depth and a very uniform product thereby insured. 100

While I have shown in the foregoing description the preferred form of construction and embodiment of the invention, it is not necessarily limited thereto, as modifications may be made therein without departing from 105 the principle of the invention or sacrificing any of the advantages.

Having thus described the invention, what I claim is—

1. In a device of the character described, 110 a valve-casing having a segmental valve-seat provided with a plurality of spaced ports, spaced arms extending from said valve-casing, a segmental valve having ports corresponding to the ports in said valve-casing 115 and mounted for oscillation in said arms, means for adjusting said arms relative to said casing, and means for adjusting said valve relative to said arms.

2. In a device of the character described, a 120 valve-casing having a segmental valve-seat provided with a plurality of spaced ports, spaced arms extending from said valve-casing, a segmental valve having ports corresponding to the ports in said valve-casing 125 and mounted for oscillation in said arms, means for adjusting said arms relative to said casing, means for adjusting said valve relative to said arms, and a float connected to operate said valve. 130

3. In a device of the character described, a valve-casing, a segmental valve-seat connected detachably to said casing and provided with a plurality of spaced ports, a valve-frame

having a segmental valve-face connected detachably thereto and provided with ports corresponding to the ports in said valve-seat, and means for movably mounting said valve relative to said valve casing and seat.

4. In a device of the character described, a valve-casing having a segmental valve-seat provided with a plurality of spaced ports, spaced arms pivotally connected to said casing and extending in advance of said valve-seat and having longitudinal slots in their free ends, means for adjusting said arms upon said pivots, a segmental valve having spaced ports corresponding to the ports in said valve-seat and with bearings adjustably engaging said slots, means for adjusting said bearings in said slots, and means for oscillating said valve upon its bearings.

5. In a device of the character described, a valve-casing having a segmental valve-seat provided with a plurality of spaced ports, spaced arms extending from said casing and having longitudinal slots in their free ends, a segmental valve having bearings engaging said slots and with spaced ports corresponding to the ports in said valve-seat, and means for adjusting said bearings in said slots.

6. In a device of the character described, a valve-casing having a segmental valve-seat provided with a plurality of spaced ports, spaced arms extending from said casing and

having longitudinal slots in their free ends, a segmental valve having ports corresponding to the ports in said valve-seat and with a tubular supporting member concentric thereto, a shaft having ends extending through said slots and disposed longitudinally of said tubular member, and adjustable bearings between said shaft and tubular member.

7. In a device of the character described, a valve-casing having a segmental valve-seat provided with a plurality of spaced ports, spaced arms extending from said casing and having longitudinal slots in their free ends, a segmental valve having ports corresponding to the ports in said valve-seat and with a tubular supporting member concentric thereto, a shaft having threaded ends and extending through said tubular member and likewise through said slotted arms, conical nuts engaging said threaded ends and adjustable thereon relative to said tubular member, and spaced arms bearing rings between said cone-nuts and said tubular member, and antifriction-balls between said bearing-rings and cone-nuts.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ALANSON L. RICHARDS.

Witnesses:

S. L. WADSWORTH,
M. E. COLEMAN.