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L. W. SHANNON

DEVELOPING APPARATUS

Filed April 18, 1921

3 Sheets-Sheet 1

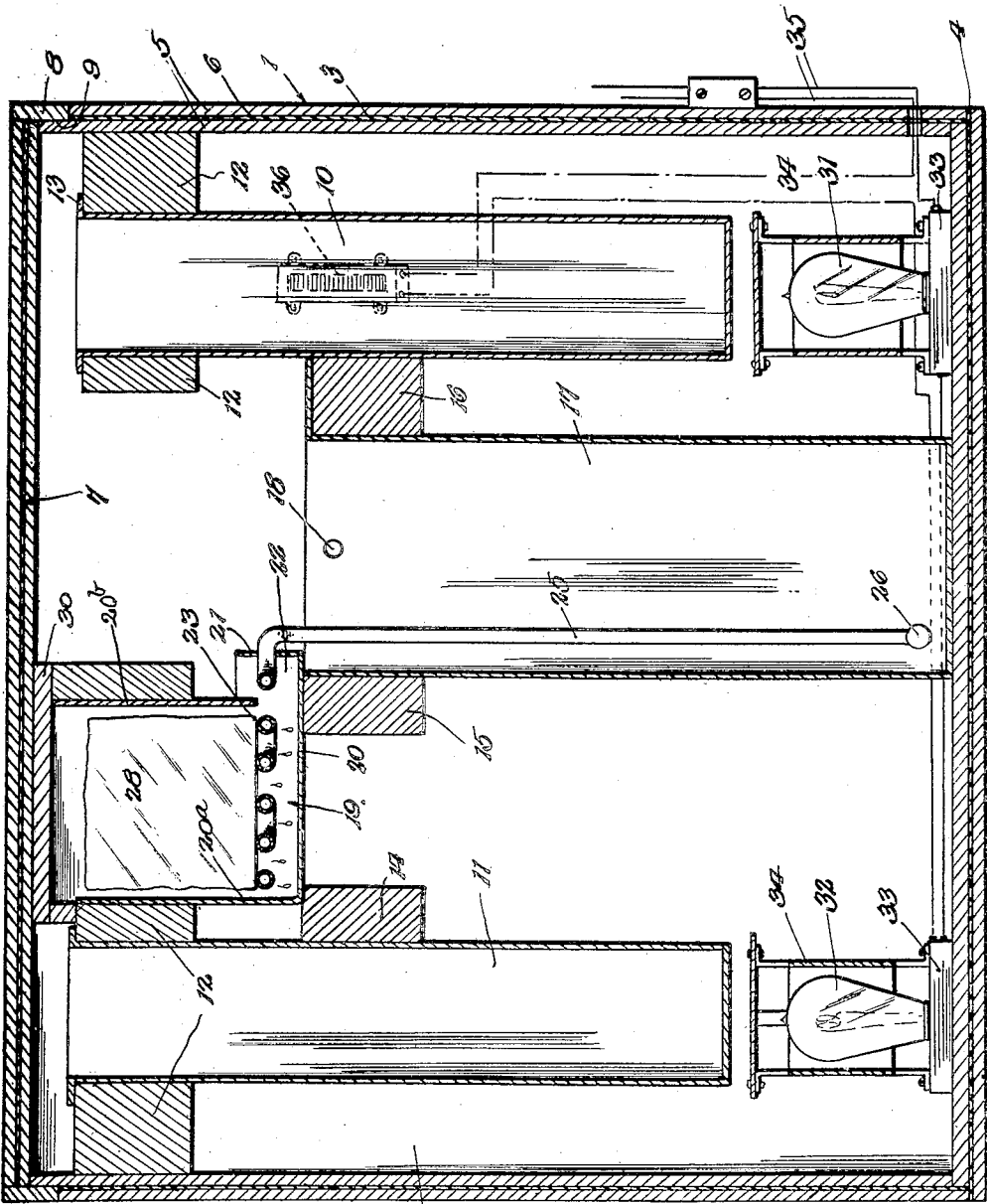


Fig. 1.

Inventor

L. W. Shannon.

By

Lacey & Lacey, Attorneys

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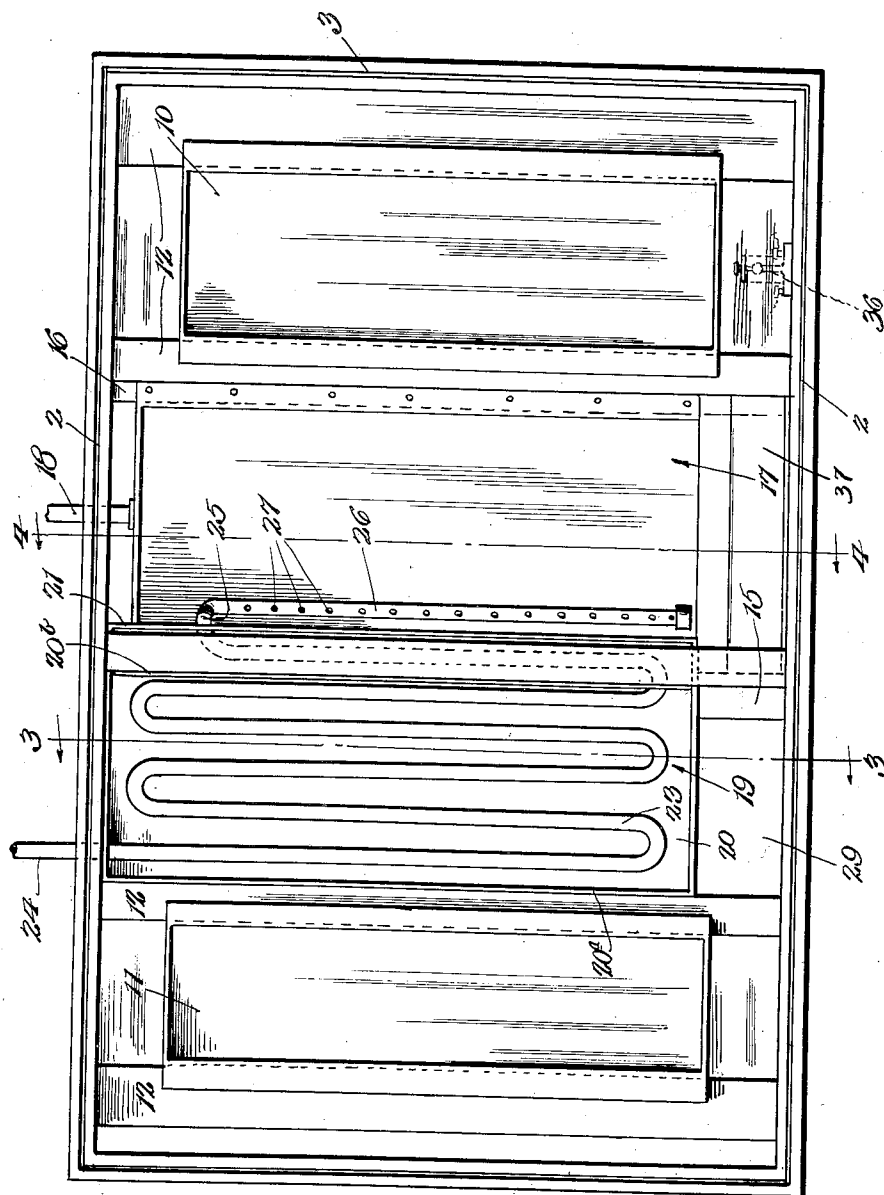
L. W. SHANNON

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3 Sheets-Sheet 2



H. G. D.

Inventor
L. W. Shannon.

By

Lacey Hacey, Attorneys

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UNITED STATES PATENT OFFICE.

LEON W. SHANNON, OF HIAWATHA, KANSAS.

DEVELOPING APPARATUS.

Application filed April 18, 1921. Serial No. 462,184.

To all whom it may concern:

Be it known that I, LEON W. SHANNON, a citizen of the United States, residing at Hiawatha, in the county of Brown and State of Kansas, have invented certain new and useful Improvements in Developing Apparatus, of which the following is a specification.

This invention relates to an improvement in apparatus such as is employed in developing X-ray plates after exposure although the principles of the invention are not limited to this particular adaptation but may also find embodiment in an apparatus for developing or otherwise treating sensitized photographic media.

In developing X-ray and photographic plates it is essential that the developing, fixing and washing baths be maintained at a predetermined uniform degree of temperature and heretofore considerable difficulty and inconvenience has been experienced in accomplishing this result, it being customary to raise or lower the temperature of the several baths by the use of heating and cooling mediums such for example as hot and cold water. It is therefore the primary object of the present invention to provide means whereby the temperature of the baths in an apparatus of this class may be automatically maintained uniform, and this I accomplish by the employment of means for automatically maintaining a constant degree of temperature in the atmosphere surrounding the tanks containing the developing and other solutions.

Another object of the invention is to provide for the maintenance of a constant degree of temperature in the developing and other baths of an apparatus of the class referred to by heating and cooling media convenient to handle and control and susceptible, as regards the heating medium, of being automatically controlled.

In the accompanying drawings:

Figure 1 is a vertical longitudinal sectional view through an apparatus embodying the invention;

Figure 2 is a top plan view of the apparatus, the lid or cover being removed;

Figure 3 is a vertical transverse sectional view on a reduced scale on the line 3—3 of Figure 2;

Figure 4 is a similar view on the line 4—4 of Figure 2.

In the drawings the numeral 1 indicates

in general a casing or housing having side walls 2, end walls 3 and a bottom wall 4, each of these walls being preferably made up of plies 5 of wood of a suitable thickness 60 and an intermediate ply 6 of asbestos or any other suitable insulating material. The casing is also provided with a lid indicated in general by the numeral 7 and constructed in a manner similar to the walls, the lid being 65 provided with a circumscribing strip or flange 8 designed to fit down over the projecting upper edges of the inner plies 5 of the side and end walls of the body of the casing as indicated by the numeral 9, the lid 70 being hinged or otherwise suitably mounted as desired.

Arranged within the opposite ends of the casing are acid proof tanks 10 and 11 designed respectively to contain the developing 75 and fixing solutions, these tanks being of any suitable construction and either being the tanks as ordinarily constructed and used or specially formed tanks, as desired. Preferably these tanks are supported each between a pair of cleats 12 extending in a front 80 to rear direction across the interior of the casing near the top thereof, the tanks having flanges 13 which rest upon the upper sides of the supporting cleats and being in this 85 manner suspended in an upright position. Other cleats 14, 15 and 16 are also arranged within the body of the casing and extend in a front to rear direction, and supported between the cleats 15 and 16 is a washing tank 90 17 to which water is supplied, preferably continuously, in a manner to be presently explained, and from which the washing water overflows through an overflow pipe 18 leading 95 from the interior of the tank 17 near the top thereof and through one of the walls 2 as best shown in Figure 2 of the drawings. The cleats 14 and 15 support an ice compartment and drip pan indicated in general by the numeral 19 and comprising a bottom 20, 100 side walls 20^a and 20^b, and an upstanding rim 21 which is spaced from the lower portion of the wall 20^b and which defines a gutter or spillway 22 slightly overhanging the upper portion of the washing tank 17 and 105 arranged to discharge into said tank. The wall 20^b terminates short of the bottom 20 and below the plane of the upper edge of the rim 21 so that water from the melting ice in the compartment will be maintained at a constant level and the compartment closed 110 by a liquid seal. The washing tank 17 is

located between the developing and fixing tanks 10 and 11 with its open upper end spaced below the open upper ends of the said tanks 10 and 11, and the drip pan 19 is
 5 located substantially in the same plane with the upper end of the tank 17. This drip pan supports or has arranged above it a pipe coil 23 which is supplied with water from a pipe 24 leading from any suitable source of supply
 10 which is controlled so as to deliver a slowly flowing stream of water through the coil 23, preferably continuously, although the supply is in any suitable manner placed entirely under the control of the operator.
 15 From the coil 23, the water is led by a pipe 25, into the tank 17, this pipe 25 leading downwardly into the tank near one side wall thereof and having a branch 26 extending along one side of the bottom of the tank and
 20 provided with a plurality of discharge openings 27.

As a cooling medium, I preferably employ a cake of ice as indicated by the numeral 28 in Figure 1 which cake is disposed upon the
 25 coil 23 and serves to cool the atmosphere within the casing and also to cool the water flowing through the said coil. The drip-pings from the ice are caught in the drip pan 19, accumulate to a depth to submerge the coil 23, and overflow, by way of the gutter 22, into the washing tank 17, it
 30 being understood however that the water flowing through the said coil will flow through the pipe 25 into the said tank and will overflow through the drain pipe 18, fresh water being in this manner continuously supplied at low temperature to the
 35 said tank.

The drip pan 19 and coil 23 are located
 40 adjacent one wall 2 of the casing and do not extend the entire width of the casing but only a portion of the said width, so that a cold air passage 29 is provided communicating with the lower portion of the casing. A
 45 cover 30 is provided upon the ice compartment.

In order that the enveloping air within the casing may be heated when required to bring the temperature of the baths to the required
 50 degree, electric heating devices of any suitable type such for example as ruby colored lamps 31 and 32, are arranged preferably respectively beneath the tanks 10 and 11
 55 upon suitable bases 33 and within suitable flues or jackets 34 mounted upon the said bases. Thus when current is flowing through the lamps 31 and 32, or whatever other type of electric heating device might be employed in lieu of said lamps, the temperature of the
 60 air within the casing will be raised and thus heat will be transferred to the solutions within the several tanks 10, 11 and 17. Wires 35 lead into the casing and are connected in circuit with the heating devices 31 and 32
 65 and in this circuit there is interposed any

suitable thermostatic regulator 36 designed to close the circuit through the lamps or other heating devices when the temperature of the air within the casing falls below a predetermined degree, and to open or break
 70 the circuit when the temperature rises above such degree.

From the foregoing it will be understood that the thermostatic regulator 36 is adjusted so that it will be operative upon variation in temperature above or below a predetermined degree which is the degree of temperature at which it is desired to maintain the solutions within the tanks 10, 11 and 17 and more especially within the tanks
 80 10 and 11. In this manner the temperature of the solutions within the tanks is maintained at a constant degree automatically and without any attention on the part of the operator.
 85

It is again stated that any electric heating means may be substituted for the lamps 31 and 32 such for example as resistance coils and that any type or kind of thermostatic circuit closer may be employed so long as
 90 capable of properly controlling the supply of current to the electric heating means.

In order to cover the air space between the front wall of the casing and the washing tank, a sheet metal bracket is provided, indicated by the numeral 37, and is formed with a horizontal lip at the lower end which rests upon the upper edge of the adjacent wall of the wash tank, the bracket including a portion extending vertically from the lip and a
 95 portion extending horizontally from the upper end of the first mentioned portion to the said wall of the casing where there is provided a second lip secured in any suitable manner to the said casing wall. In this
 100 manner the air space surrounding the developing tank is placed in communication with the cold air vent from the icebox which passes down and about the fixing tank at the opposite end of the apparatus. The open
 105 spaces at the ends of the developing and fixing tanks 10 and 11 may be closed in any suitable manner and in closing the space above the thermostat, means will be provided of such a nature as to permit of access
 110 to the thermostat when required.

Having thus described the invention, what is claimed as new is:

1. In apparatus for developing photographic plates, a casing, tanks within the casing, one of the tanks having an overflow outlet, a pan arranged in the upper part of the casing and having an overflow discharging into the top of the said tank, a water supply pipe passing through the pan into
 120 the tank and discharging at the bottom of the tank, and a coil interposed in said pipe within the pan in spaced relation to the bottom of the pan and adapted to support a cooling medium.
 130

2. In apparatus for developing photographic plates, a casing, tanks within the casing, one of the tanks having an overflow outlet, thermostatically controlled heaters
5 below the other tanks, a pan arranged in the upper part of the casing and having an overflow discharging into the top of the tank having an overflow outlet, a water supply pipe passing through the pan into the tank
10 and discharging at the bottom of the tank, and a coil interposed in said pipe within the pan in spaced relation to the bottom of the same and adapted to support a cooling medium.

15 3. In apparatus for developing photographic plates, a casing, developing, fixing and washing tanks therein, the washing tank having an overflow outlet, a water supply pipe discharging at the bottom of the wash-
20 ing tank, said pipe including a coil adapted

to support a cooling medium adjacent the top of the tank, and a thermostatically controlled heater within the casing.

4. In apparatus for developing photographic plates, a casing, developing, fixing
25 and washing tanks supported in the casing in spaced relation to the sides of the same, the top of the washing tank being below the tops of the developing and fixing tanks, a refrigerating chamber arranged between the
30 developing and fixing tanks and adjacent the top of the washing tank and spaced from one side of the casing, and a bracket resting on the top edge of one side of the washing tank and secured to the adjacent side of the
35 casing to cover the space between the tank and said side of the casing.

In testimony whereof I affix my signature.

LEON W. SHANNON. [L. s.]