

June 21, 1927.

1,633,216

W. R. LAKEMAN

MACHINE FOR CLEANING ELECTROTYPE PLATES

Filed March 23, 1922

4 Sheets-Sheet 1

FIG. 1

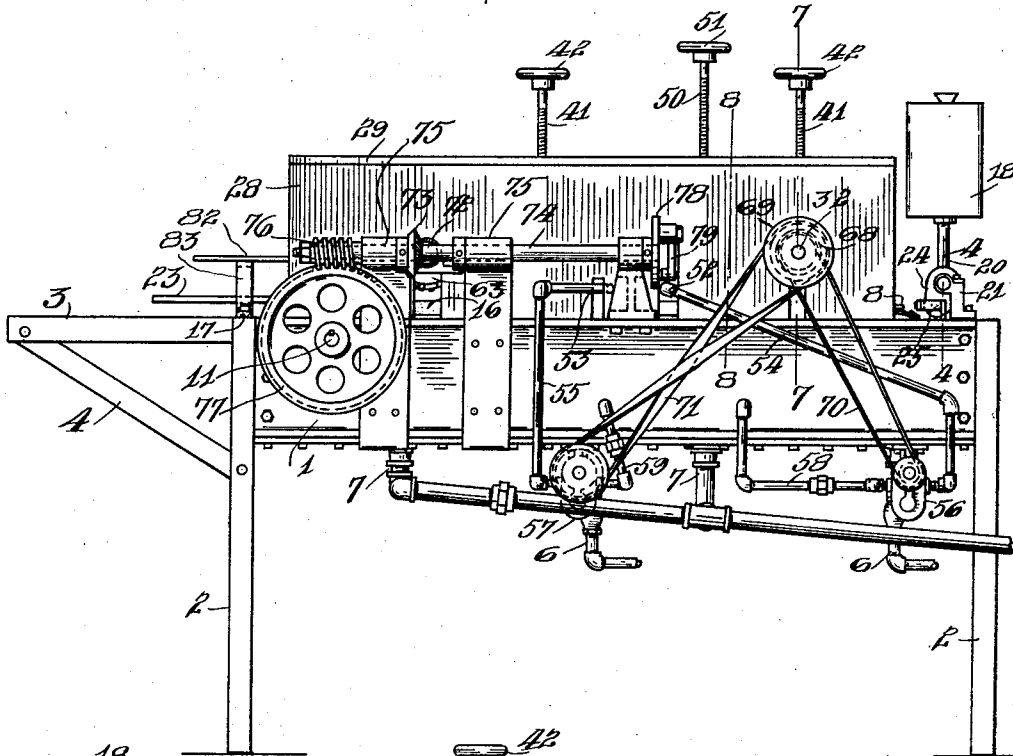
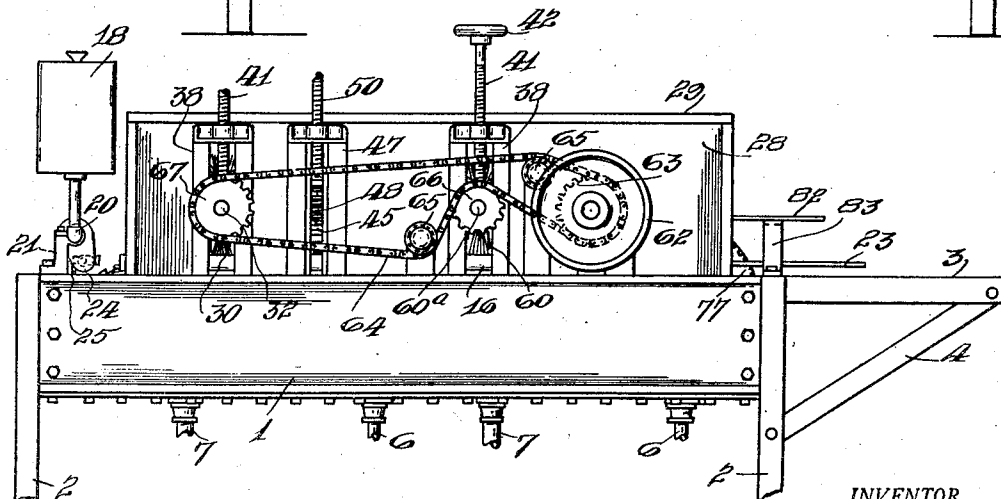


FIG. 2

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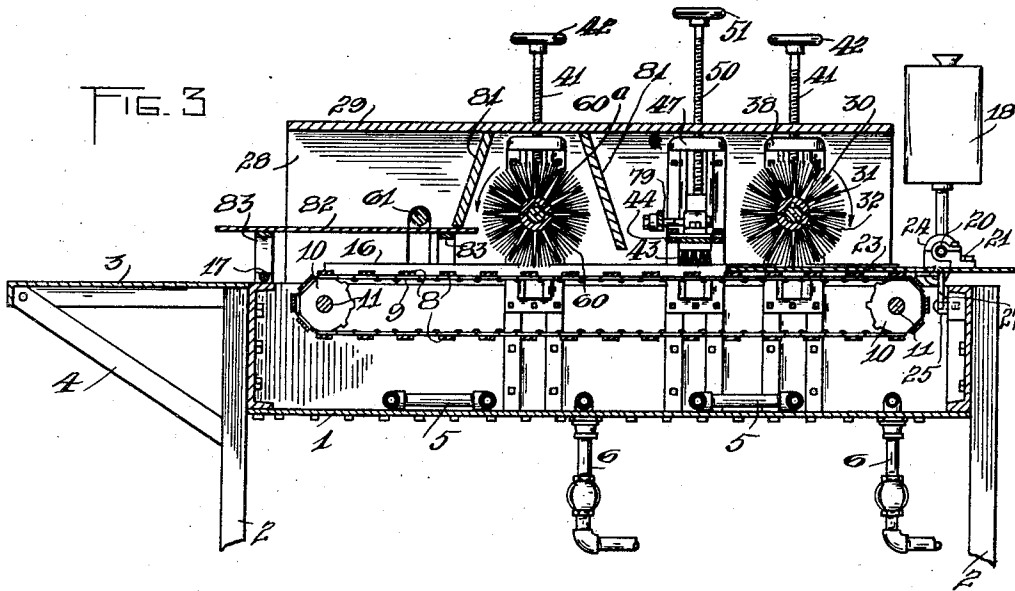
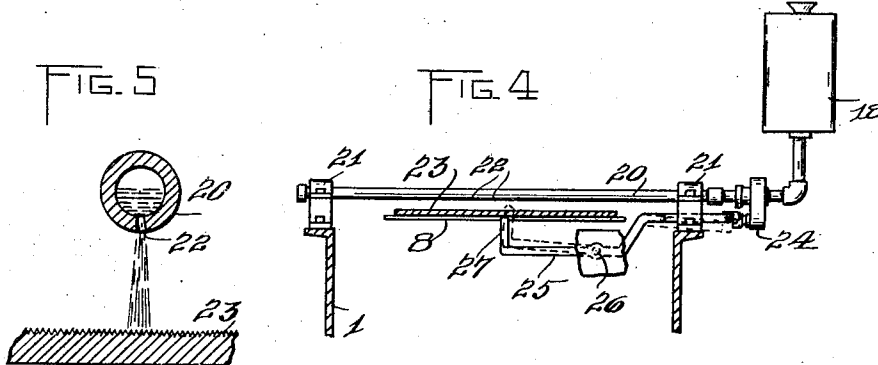
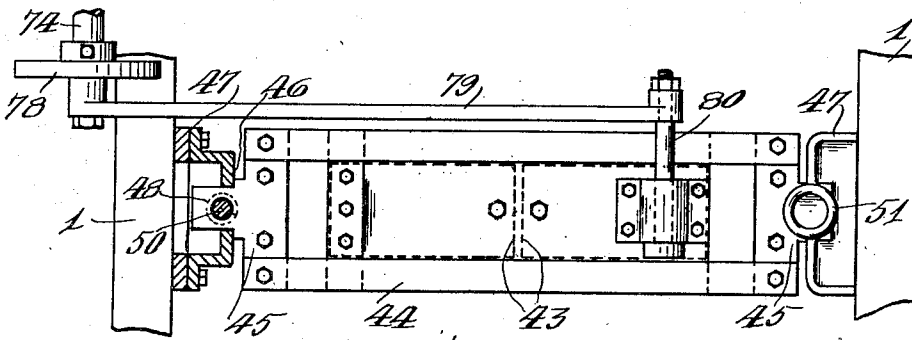
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MACHINE FOR CLEANING ELECTROTYPE PLATES

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4 Sheets-Sheet 2



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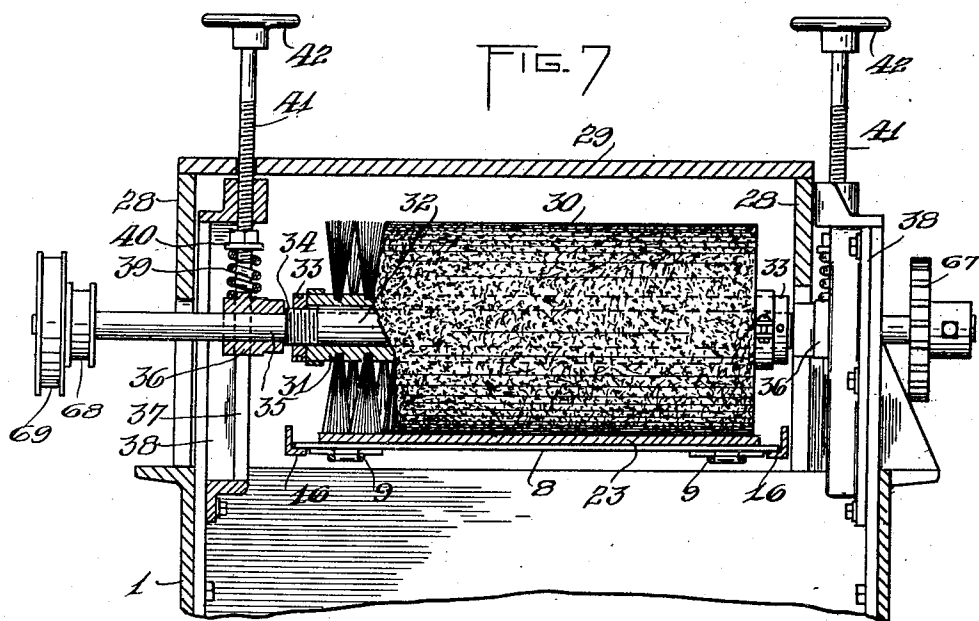
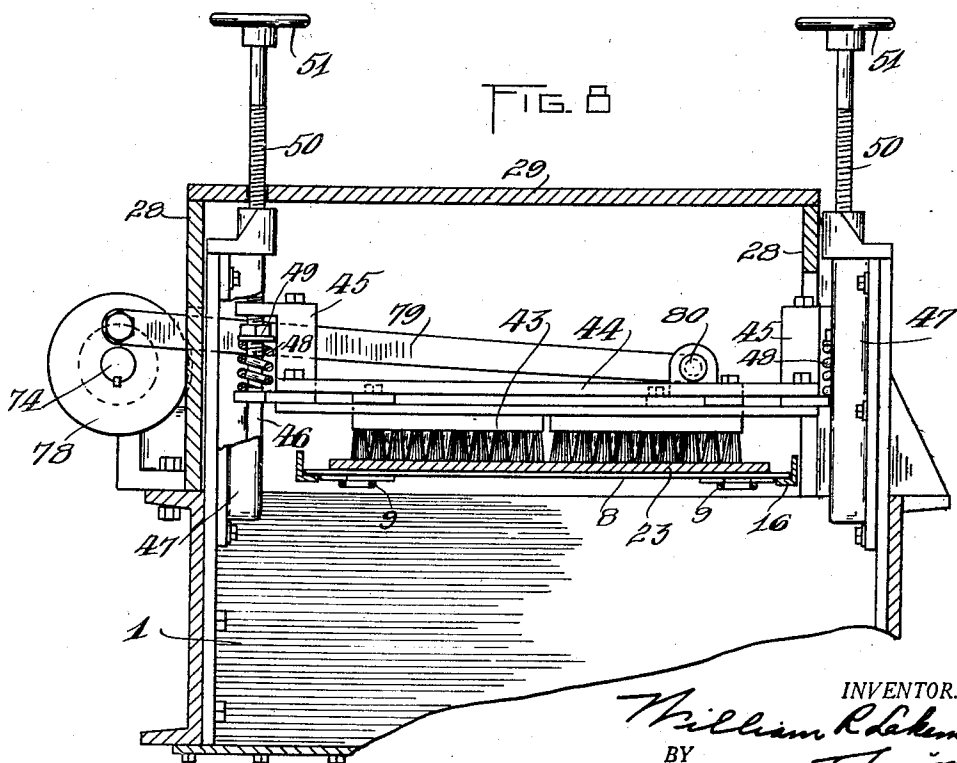
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MACHINE FOR CLEANING ELECTROTYPE PLATES

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4 Sheets-Sheet 3



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MACHINE FOR CLEANING ELECTROTYPE PLATES

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4 Sheets-Sheet 4

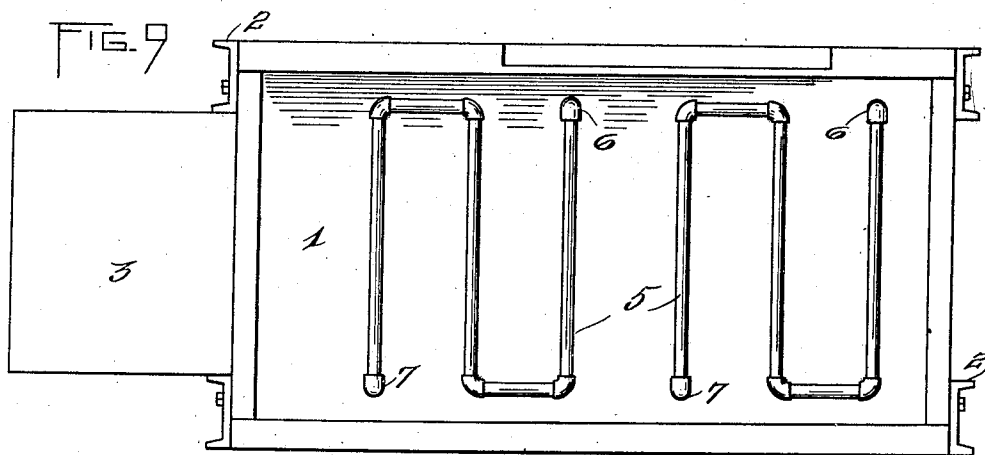
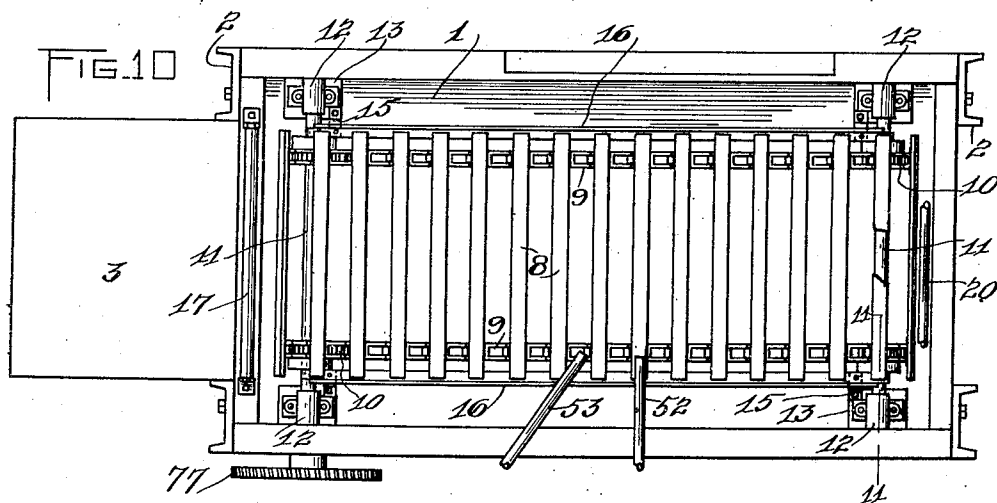
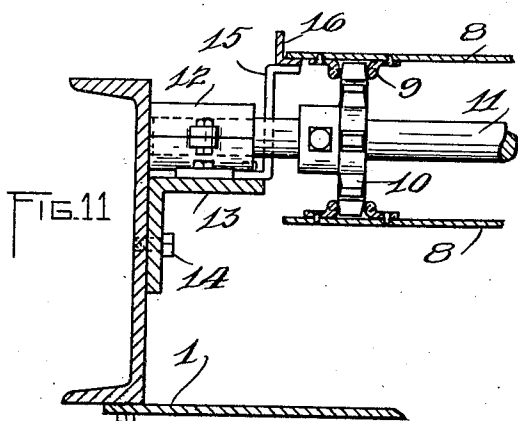
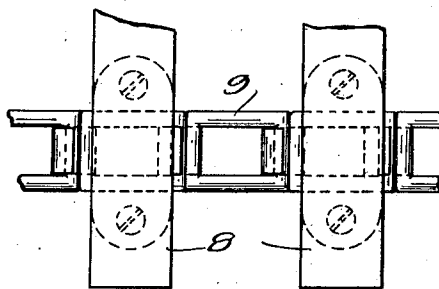


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Patented June 21, 1927.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR CLEANING ELECTROTYPE PLATES.

Application filed March 23, 1922. Serial No. 546,202.

The present invention relates to a machine for cleaning electrotype plates. An object of the invention is to provide a simple construction which will effectively clean and dry electrotype plates in a minimum space of time. Another object of the invention is to provide a cleaning machine, of the class described, which will reduce to a minimum the amount of oil or kerosene required for cutting the wax on the plates.

To these and other ends, the invention consists of certain parts and combinations of parts, all of which will be hereinafter described: the novel features being pointed out in the appended claims.

In the drawings:

Fig. 1 is a side view of a machine constructed in accordance with this invention;

Fig. 2 is a side view of the opposite side of the machine, parts being broken away;

Fig. 3 is a longitudinal section through the machine;

Fig. 4 is a fragmentary section on the line 4-4, Fig. 1;

Fig. 5 is a detail view showing the manner in which the oil is delivered to the plates;

Fig. 6 is a detail top view of the reciprocating cleaning brush;

Fig. 7 is an enlarged fragmentary sectional view on the line 7-7, Fig. 1;

Fig. 8 is an enlarged fragmentary sectional view on the line 8-8, Fig. 1;

Fig. 9 is a view of the inside of the tank with the parts supported on the tank removed;

Fig. 10 is a view of the conveyor supported in the tank;

Fig. 11 is an enlarged section on the line 11-11, Fig. 10; and

Fig. 12 is a detail view of the conveyor.

In the illustrated embodiment of the invention, there is employed a tank 1, supported in any suitable manner as by legs or standards 2, there being provided at one end of the tank a receiving table 3 on which plates are delivered, this table being supported through brackets 4 from the legs 2 at the delivery end of the tank. The tank contains water which is heated in any suitable manner, as by steam pipes 5, to which steam may be delivered through pipes 6 passing through the bottom of the tank and from which heating pipes or coils the steam is discharged by way of pipes 7 also leading through the bottom of the tank.

Operating within the tank is a conveyor preferably of endless construction, its uppermost lap operating in a plane slightly above the upper edge of the tank 1. In this instance, this conveyor comprises a number of transverse strips 8 secured to two endless sprocket chains 9 which pass about sprocket wheels 10 arranged in pairs on two parallel shafts 11 journaled in bearings 12 supported on brackets 13 which are bolted at 14 to the inner faces of the side walls of the tank 1. These brackets 13 also carry brackets 15 which on each side of the tank are connected by angle irons 16, serving as guides for the upper lap of the conveyor, seen more clearly in Fig. 11. The conveyor extends horizontally from one end of the tank to the other and discharges the plates onto a roller 17, journaled on the upper edge of the end of the tank adjacent the delivery table 3.

The plates 23 are received in a very hot condition, from the casting pan with the usual wax thereon, and are deposited upon the receiving end of the belt or endless conveyor. At this point a spray of kerosene is delivered to the hot plate and permeates the wax which is in a soft hot condition. This kerosene is preferably contained in a container 18 from which leads a piping 20 which is arranged horizontally in spaced relation to the plane of the upper lap of the conveyor at the receiving end of the latter in advance thereof but over the tank 1, being supported in position by brackets 21 on the side walls of the tank. This horizontal pipe is provided with perforations 22 on its under side through which the kerosene flows on the plate, indicated at 23, thus acting as a spraying device. In order that the kerosene will not flow when the plate is not arranged beneath the spraying device 20, a reciprocating valve 24 may be provided between the spraying device and the tank, this valve having a controlling means controlled by a plate 23 passing under the spraying device. The controlling means, in this instance, embodies a lever 25 pivoted at 26 to the tank and having one arm connected to the valve 24 while the other arm has an upwardly turned end 27 adapted to be engaged by the plate on being presented to the conveyor, cooperating with the under surface of said plate until the latter passes from a position beneath the spraying device.

With the end in view of confining the heat within the tank and within the hot plate against rapid escape, a hood may be provided over the tank. In this instance, this hood embodies two side walls or plates 28 resting on the side walls of the tank 1 and a top wall 29 connected to the side plates 28, the ends of the hood being open. After the wax has been permeated by the kerosene, it is subjected to a primary scrubbing or abrading element which, in this instance, is in the form of a rotary brush 30, having its periphery moving in the same direction as the upper lap of the belt, but at a greater speed than said belt, so as to produce an abrading action longitudinally of the belt or conveyor. In this instance, the brush has a hollow central tubular portion 31 of two sections fitted on the central portion of a shaft 32 and held in position thereon by nuts 33 which engage screw threaded portions 34 at opposite ends of the brush. Beyond the portions 34, the shaft is provided with bearing portions 35 which turn in bearings or carriers 36, the bearings 36 being vertically movable on ways 37 formed on brackets 38 secured to the side walls of the tank 1 and projecting upwardly above the tank. With the end in view of holding the brush with adjustable yielding pressure toward the conveyor, each bearing or carrier 36 is engaged from above by a helical spring 39, the other end of the spring seating against an abutment 40 on an adjusting screw 41 operating in the bracket 38 at the top of the way 37, this adjusting screw being controlled in any suitable manner as by a hand wheel 42.

With the end in view of producing a scrubbing action transversely of the conveyor, a reciprocating scrubbing or abrading element 43 may be provided operable transversely of the conveyor and preferably movable on a guide member or carrier 44 which is also held with yielding pressure toward the conveyor. To this end the guide member has its ends 45 guided in ways 46 formed on brackets 47 projected upwardly from the sides of the tank 1. Each end of the guide member 44 may be acted upon by a spring 48, which abuts at its upper end an abutment 49 on a screw 50, which is journaled in a bracket 47 on the way 46 and is operable through a hand wheel 51, it being apparent that the pressure on each spring 48 may be varied by turning its corresponding hand wheel.

While the plate is being subjected to the transverse scrubbing action, hot water from the tank 1 containing also the kerosene, which drips from the plates into the tank is supplied to the plate adjacent the transversely operating brushes. This is effected preferably through two nozzles 52 and 53, each connecting by pipes 54 and 55

with rotary pumps 56 and 57, respectively,

said pumps connecting, respectively, through pipings 58 and 59 with the tank.

From the transversely operating scrubbing device the plate is carried by the conveyor to a scrubbing device 60 in the form of a rotary brush which is secured to its shaft 60^a in the same manner as the brush 30 and is also held with yielding pressure toward the endless conveyor in the same manner as the brush 30. This brush 60 has its periphery rotating in the direction opposed to the direction of movement of the endless conveyor. After the plate leaves the transversely operating scrubbing means, the wax is either removed or loosened so that the scrubbing element 60 displaces any remaining loose portions on the plate and also acts to clear the plate of the liquid.

The machine is operated in any suitable manner as through a drive shaft 61 extending transversely of the machine and above the endless conveyor and in the rear of the rotary brush 60. On this drive shaft a pulley 62 is arranged. Also arranged on the shaft is a gear 63 over which a sprocket chain 64 passes. This sprocket chain passes about idlers 65 and also about two sprockets 66 and 67 arranged respectively, on the shafts 60^a and 32, thus causing the turning of the shafts 60^a and 32 in opposite directions. On the shaft 32 at the opposite side of the machine two pulleys 68 and 69 are mounted, connected, respectively, to the pumps 56 and 57 through belts 70 and 71. Also arranged on the shaft 61 is a bevelled pinion 72, which meshes with a bevelled pinion 73 on a shaft 74 supported on that side of the machine opposite the pulley 62 by brackets 75. This shaft 74 has at one end thereof, a worm 76 which meshes with the worm wheel 77 on the shaft 11 of the endless conveyor, so as to drive such endless conveyor. Also mounted on the shaft 74 is a crank disk 78 which by a pitman 79 connects with a pivot pin 80 on the sliding scrubbing device 43, so that the latter is reciprocated during the operation of the other parts of the machine.

The brush 60 may have disposed on opposite sides thereof two fender plates 81, which have their lower edges in spaced relation to the endless conveyor by connection to the opposite sides of the hood. The rearmost fender plate 81 lies close to the fender plate 82 which is supported horizontally by brackets 83 above the rear end of the tank 1. The rearmost fender plate 81 with the fender plate 82 acts with the hood to confine the heat in close proximity to the electrototype plate after the latter passes from the brush 60, there being a residual heat in the electrototype plate which with the heat rising from the tank effectively dries the plate.

The operation of the invention may be un-

derstood from the foregoing but it may be summarized as follows: The plate is taken immediately from the casting pan and while in a hot condition is presented to the endless conveyor and beneath the spray tube 20 which extends transversely of the length of the conveyor. As the plate passes beneath the spray tube it engages with the controlling lever 25 of the valve 24 and permits kerosene to flow into the spraying device or tube 20 and on the plate in an amount sufficient to cut the hot wax. The plate advances under the action of the conveyor to the primary scrubbing element which operates on the plate at a greater speed than the travel of the conveyor and in the direction of the travel of the conveyor. The transversely moving scrubbing means, thereafter, operates on the plate and at the same time, the plate is supplied with hot water which holds the wax hot and carries off the particles removed from the plate by both scrubbing devices. After the plate leaves the transversely moving scrubbing device, it has all of the wax loosened so that, when the plate reaches the final scrubbing device 60, the latter which has its periphery rotating in the direction opposed to the direction of movement of the plate cleans all the loosened particles and water from the plate and dries the latter. The plate, while still in a hot condition, passes over the tank after leaving the brush 60 under the fender 82 which holds the heat rising from the tank in close proximity to the hot plate, thus effecting drying of the plate before it is discharged onto the delivery table 3.

What I claim as my invention and desire to secure by Letters Patent is:

1. In combination with means for moving an electrotpe plate, three scrubbing elements, one movable transversely of the line of movement of the plate, and the other two operating longitudinally of the line of movement on opposite sides of the first named scrubbing element, the one nearest the intake of the machine operating in the direction of the line of movement of the plate and at a greater speed than the plate, the other of said last two mentioned scrubbing elements operating in a direction opposed to the line of movement of the plate.

2. In combination with means for moving an electrotpe plate, scrubbing means operating on a plate on the moving means, means for supplying a wax cutting liquid to a plate moved by the moving means, and means controlled by a plate presented to a machine for controlling the supply of wax cutting liquid to the plate.

3. In combination with means for moving an electrotpe plate, scrubbing means operating on said plate moved by said means, a spraying device under which said plate is moved by said moving means, a valve

for controlling the supply of a wax cutting liquid to the spraying device, and controlling means for said valve engaged by said plate while passing under said spraying means to cause the cutting liquid to be discharged on said plate.

4. In combination with a tank, an endless conveyor movable in said tank, a spraying device for a wax cutting liquid arranged above the tank adjacent the receiving end of said conveyor, means for controlling the supply of liquid to said conveyor controlled by a plate presented on the conveyor, and brushing means operating on a plate on the conveyor.

5. In combination with a tank, an endless conveyor movable in said tank, a spraying device for a wax cutting liquid arranged above the tank adjacent the receiving end of said conveyor, means for controlling the supply of liquid to said conveyor controlled by a plate presented on the conveyor, brushing means operating on a plate on the conveyor, means for heating a liquid in the tank, and means for removing heated liquid from the tank and supplying it to plates on the conveyor.

6. In combination with a tank, means for moving a plate above the tank, means for supplying a wax cutting liquid to the plate on the moving means, while the plate is over the tank so that the wax cutting liquid runs into the tank from the plate, brushing means for operating upon the plate after the wax cutting means has been supplied thereto, means for heating the liquid in the tank, means for removing the heated liquid from the tank and supplying it to the plate on the moving means after the plate has passed said brushing means, and a brushing means acting on the plate on the moving means after the heated liquid with the wax cutting material therein has been supplied to the plate.

7. In combination with a tank, means for moving an electrotpe plate above the tank, means for supplying a wax cutting liquid to the plate on the plate moving means while the plate is over the tank so that the wax cutting liquid flows from the plate to the tank, means for scrubbing the plate after it has been supplied with the wax cutting liquid, means for flushing the plate with the liquid from the tank containing such wax cutting material, and means for scrubbing the plate after it has been flushed with the heated tank liquid with the wax cutting material therein.

8. A machine for cleaning electrotpe plates comprising a liquid containing tank, means forming a chamber above said tank to retain the heat above the tank, means for conveying the plates through the chamber above the liquid in the tank, means for supplying a wax cutting liquid to the plates

- on the conveying means, so that the wax cutting liquid falls in the tank, brushing means acting on the plates after they are subjected to the wax cutting liquid, means
5 for heating the liquid in the tank to maintain the chamber above the tank in a heated condition, and means for flushing the plates on the moving means with the liquid from the tank after such brushing operation.
- 10 9. A machine for cleaning electrotypes plates comprising a liquid containing tank, means forming a chamber above said tank to retain the heat above the tank, means for conveying the plates through the chamber
15 above the liquid in the tank, means for supplying a wax cutting liquid to the plates on the conveying means, so that the wax cutting liquid falls in the tank, brushing means acting on the plates after they are
20 subjected to the wax cutting liquid, means for heating the liquid in the tank to maintain the chamber above the tank in a heated condition, means for flushing the plates on the moving means with the liquid from the tank after such brushing operation, and
25 means for brushing the plates after such flushing operation.
10. A machine for cleaning electrotypes plates comprising a liquid tank, means for heating the liquid of the tank, means for
30 moving the plates above the liquid in the tank, means for supplying a wax cutting liquid to the plates while they are above the tank to permit such liquid to fall into the tank, means arranged above the plates to
35 provide an area heated by the liquid in the tank through which the plates travel in moving above the tank, means for flushing the plates with the heated liquid in the tank, and means for scrubbing the plates as they
40 pass above the tank.

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