

Oct. 9, 1945.

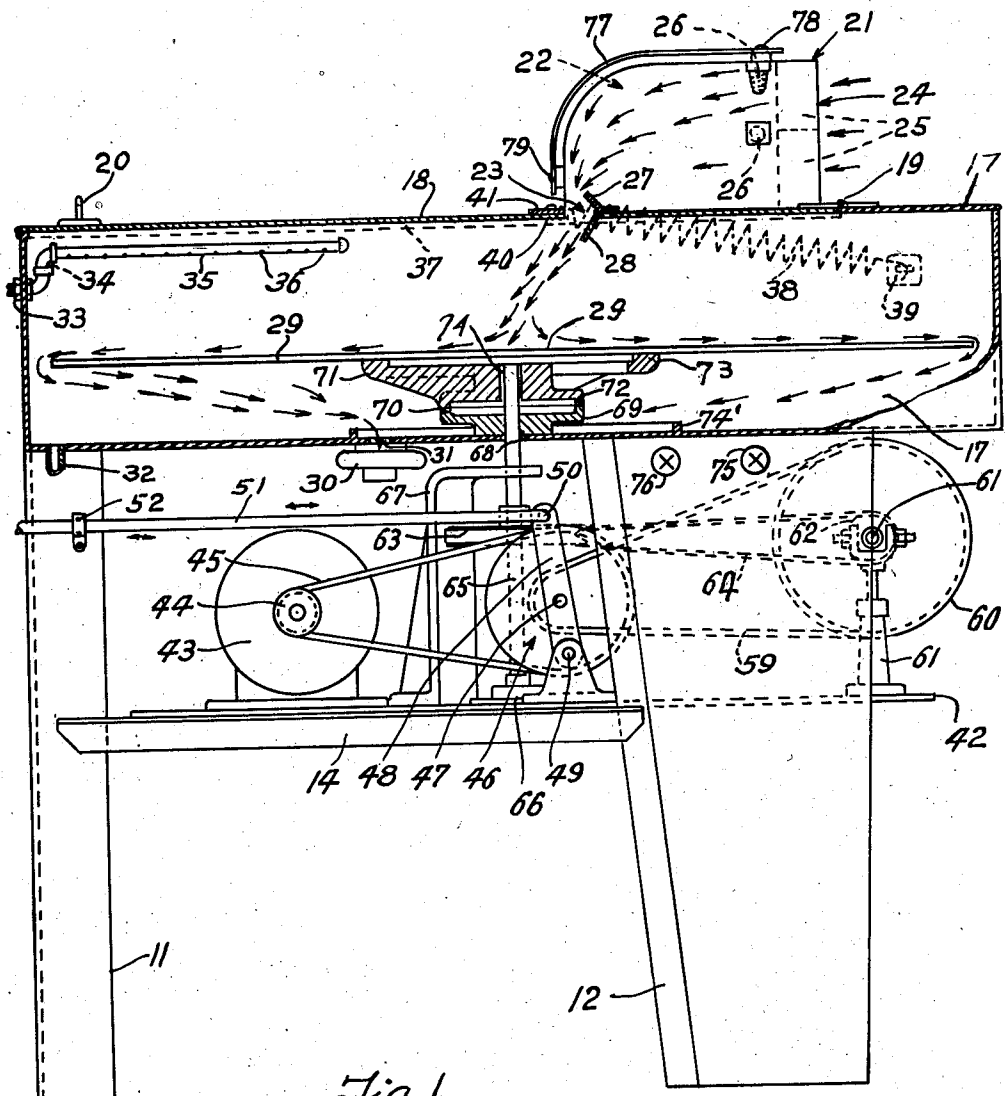
J. T. CAMPBELL

2,386,591

PLATE WHIRLER

Filed March 22, 1944

2 Sheets-Sheet 1



INVENTOR.
JAMES T. CAMPBELL.

BY

Robert A. Sloman
ATTORNEY.

Oct. 9, 1945.

J. T. CAMPBELL

2,386,591

PLATE WHIRLER

Filed March 22, 1944

2 Sheets-Sheet 2

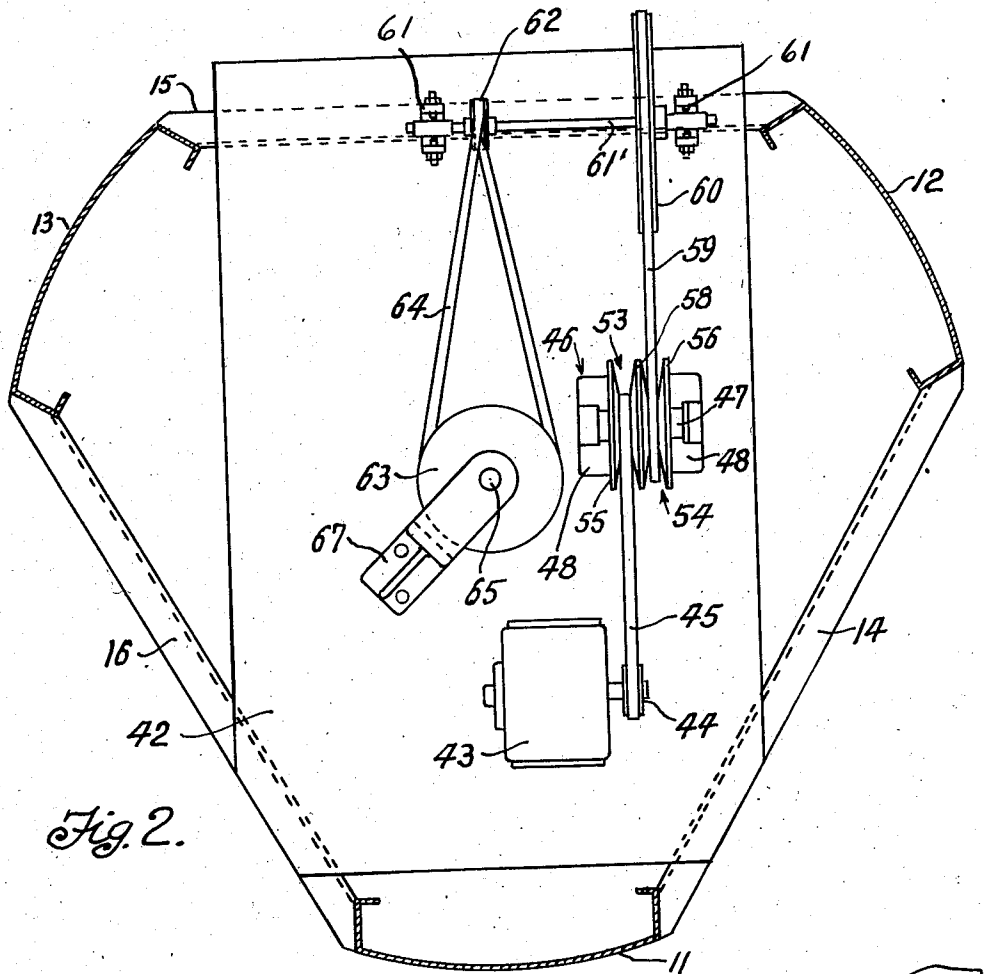


Fig. 2.

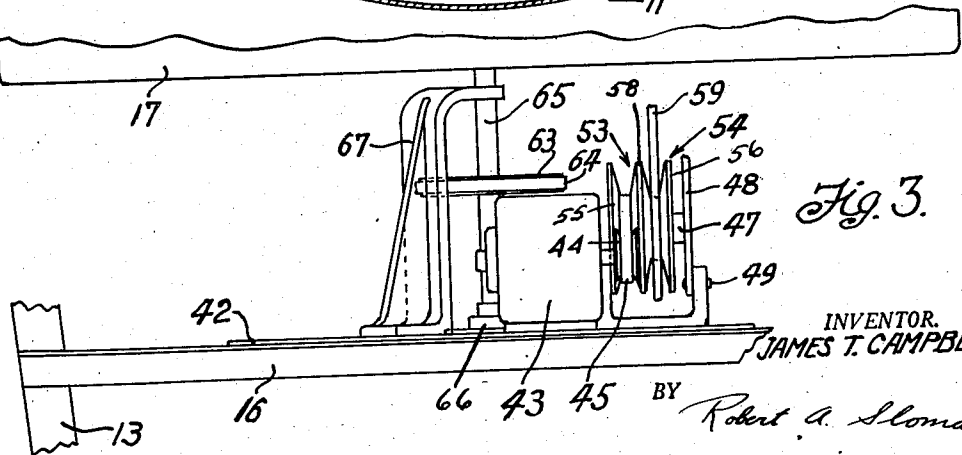


Fig. 3.

INVENTOR.
JAMES T. CAMPBELL

BY Robert A. Sloman

ATTORNEY.

UNITED STATES PATENT OFFICE

2,386,591

PLATE WHIRLER

James T. Campbell, Detroit, Mich.

Application March 22, 1944, Serial No. 527,593

6 Claims. (Cl. 91—42)

This invention relates to photo mechanical plate whirlers and more particularly to a device for rotating a photo mechanical or printing plate upon which a light sensitive coating or emulsion is evenly distributed and dried before imposing thereon the image for the purpose of reproduction and for performing this operation under proper conditions by mechanical means.

Albumen, glue, or shellac, when mixed with chromic salt and dried are affected by the action of light. All the above materials and many others react in a more or less similar manner and are used for one or another of the various photo-reproduction processes.

This reaction, which in some ways resembles the tanning of leather, is observed when a suitable surface is coated with one of the above solutions mixed with ammonium bichromate. On exposure to a suitable light source the coating rapidly undergoes a change. It becomes tanned, loses much of its capacity for swelling and absorbing water, and becomes totally or partially insoluble in water.

Although the change is fairly rapid, it is not sudden but progressive in character and it may require several minutes exposure under suitable light, depending on thickness of coating and bichromate content before the maximum effect is reached. The same effect however takes place in total darkness and is due to spontaneous reaction which takes place in the absence of light, but now becomes a matter of hours before a state of complete insolubility is reached. Should partial exposure even to weak light occur before imposing of image the reaction will continue slowly to completion in total darkness, but more rapidly than in the previous instance when the coating was not exposed to light. This previous reaction is the direct cause of difficult development and imperfect prints.

If handled properly any of the bichromated solutions should develop out quickly and clean. But they should not be exposed, even for a short time, to ordinary light or to any light emitting ultra-violet or blue rays when preparing and handling.

Most lithograph plate whirlers are equipped with electric space heaters installed directly in the chamber, without means of dissipating the damp air from the chamber. In this case, regardless of the amount of heat generated, the air in the chamber retains a very high percentage of humidity, owing to the continual dampness within the chamber and this humidity is detrimental to the proper processing of the coated plate.

In whirling plates for photo-enlarging, most whirlers are now designed to whirl the plate face down and over an exposed gas or open electric heater. Both of these heat sources emit sufficient effective light rays to partly tan the entire bichromated surface during the whirling process making it difficult to remove the unexposed portions when developing.

By using the present device none of these difficulties is experienced as the electric heat source is baffled so that no light rays can reach the plate. The air is pulled through the air filter over the heating elements and down on to the center and across the plate in all directions, and back under and out the bottom of the whirler. As the clean dry air is at all times moving across the plate it is quickly and evenly dried and moisture is eliminated inside the whirler. The plate is totally enclosed during the whirling process.

As the plate is whirled face up it may be coated in the whirler at slow speed and when completely covered the speed is increased for drying. This effects a saving of the solution over the conventional method now used for coating plates.

It is the further object of this invention to provide a closed light-tight cylindrical container for the plate whirler in order to prevent a pre-exposure of the sensitized plate obtained therein.

It is the further object of this invention to provide means for supplying a flow of filtered pre-heated air through the plate whirler for obtaining a substantially low humidity therein, as an aid in drying the sensitized whirled plate, and further as an aid in preventing premature action of the sensitized surface.

It is the further object of this invention to provide suitable means for housing the filtering and air heating mechanism together with baffle means for preventing any light from said heating means reaching the sensitized surface.

It is the further object of this invention to provide operative mechanism for rotating the whirler for a given time, together with means for actuating the heater as desired.

These and other objects will be seen from the following specification and claims which disclose the invention and its various combinations of elements as illustrated in the accompanying drawings of which—

Fig. 1 is a partially sectioned elevational view of the photographic plate whirler.

Fig. 2 is a top plan view thereof with the cylindrical whirler housing removed.

Fig. 3 is a fragmentary elevational view of Fig. 2.

It will be understood that the above drawings illustrate merely a preferable embodiment of the invention and that other embodiments are contemplated within the scope thereof as hereafter set out.

In the drawings the plate whirler consists of the supporting mechanism substantially triangular in shape including the three vertical legs 11, 12 and 13, interconnected respectively by the cross beams 14, 15 and 16.

The hollow plate whirler housing 17, cylindrical in shape, is provisioned upon said supporting mechanism and suitably secured thereto. Said housing has hingedly secured thereto at 19 the manually pivotal cover 18, with a suitable handle 20 provided for raising and lowering said cover as shown in Fig. 1.

Hood 21, substantially rectangular in shape, is provisioned upon cover 18 with the interior space 22 in communication with the interior of the whirler housing through opening 23 formed within cover 18. The outer open end 24 of said hood has provisioned therein suitable filters 25 through which air is drawn to the interior 22 of hood 21 and the interior of the plate whirler housing 17.

Electrical heating elements 26 are provisioned within hood 21 depending from the top interior surface thereof, as well as oppositely extending laterally inward from the sides of said hood. The upwardly angularly arranged baffle 27 secured to cover 18 within hood 21 extends partially over air opening 23, acting as a shield in preventing light or illumination from heating elements 26 from entering the interior of the plate whirler housing.

A secondary baffle 28 forming a part of cover 18 is angularly bent downwardly therefrom for projecting heated air currents upon the top surface of the rotatable photographic plate 29 upon which a light sensitive liquid has been placed to be evenly distributed and dried thereon. A suitable suction blower 30 is provisioned upon the under surface of container 17 registering with air opening 31 therein for drawing the air down through hood 21, air opening 23, upon rotatable photographic plate 29, and around the same, finally withdrawing the air through opening 31 in the bottom of container 17. Thus it is seen that pre-heated filtered air is drawn into the cylindrical chamber 17, directed upon the photographic plate, projected outward radially over its entire surface and thence withdrawn from the container through air opening 31, thereby providing a continuous stream of evenly distributed air over the photographic surface to be dried.

The excess bi-chromated or other solution drops from the plate 29 as it is rotated and accumulates within the bottom of container 17. A suitable drain 32 is positioned within the bottom thereof for subsequent disposal of such accumulated fluids.

The water inlet connection is shown at 33 on plate whirler container 17, with a swivel water control valve 34 connected thereto for supplying fluid to the arcuate pipe 35. Said pipe is perforated at spaced intervals 36 in the bottom thereof for supplying an even spray of fluid either upon the top surface of the photographic plate, or for washing down the interior sides of container 17. Water is turned on merely by outwardly manually pivoting pipe 35 about its pivotal control valve 34.

It will be noted that cover 18 has downwardly depending sides 37 which extend, when the cover is closed, over the vertical side edges of container 17, so that when closed, all light is eliminated from the interior of the whirler chamber for the purposes hereinabove set out.

Cover 18 is resiliently maintained closed by the coiled springs 38 on opposite sides thereof with one of their ends anchored at 39 to the whirler housing 17 and with the other of their ends secured at 40 to the opposite extending ends of cross bar 41 secured on cover 18. As shown in Fig. 1, in closed position of cover 18 the line of spring 38 between points 39 and 40 is to one side of the hinged connection 19 of the cover so that said spring acts as an aid in closing and maintaining the same closed.

On opening cover 18, as soon as the line between points 39 and 40 crosses the hinged connection 19 said spring aids in opening cover 18 and maintaining the same in open position permitting access to the interior of whirler housing 17 for inserting or removing photographic plate 29 or pouring thereon the light sensitized solution to be distributed and dried thereon.

As shown in the drawings, the platform 42 is supported by cross beams 14, 15 and 16, upon which is housed and supported the operative mechanism for the plate whirler. Electric motor 43 with drive pulley 44 is joined by belt 45 to the variable speed pulley transmission 46 which is rotatably journaled at 47 upon the movable frame 48.

Said frame is itself adjustably and pivotally supported and joined at its lower ends at 49 to the platform 42. The upper end of frame 48 is pivotally joined at 50 to the manually reciprocable shaft 51 the outer end of which is slidably supported by stirrup 52 on leg 11. Thus manual adjustment horizontally of shaft 51 will result in different angular positions of the transmission frame 48.

As shown in Figs. 2 and 3 said transmission carries rotatably thereon the two pulleys 53 and 54, which consists of the two outer pulley wheels 55 and 56 journaled on adjustable shaft 47, and the single pulley wheel 58 rotatably provisioned on said shaft but adapted to sliding movement thereon relative to the outer pulleys 55 and 56. Thus it is seen that movement to the left of pulley 58 will increase the operative diameter of pulley 53 at the same time decreasing the operative diameter of pulley 54. On the other hand movement to the right of pulley 58 will increase the operative diameter of pulley 54, at the same time decrease the operative diameter of pulley 53.

In operation, with shaft 51 manually moved to the left the frame 48 for the transmission is translated downwardly in Fig. 2 necessarily decreasing the operative diameter of pulley 54, causing pulley wheel 58 to move to the left which effects an increase in the operative diameter of pulley 53 which is joined by belt 45. By this adjustment a decrease in speed of movement is obtained in pulley 53 resulting in a decrease of speed of belt 59 joined to pulley 54.

On the other hand a manual translation of shaft 51 to the right effects a clockwise pivotal movement of transmission frame 48 to the right in Fig. 1, and upwardly in Fig. 2. This results in decreasing the operative diameter of pulley 53 and increasing the operative diameter of pulley 54, in turn increasing translatory movement of belt 59.

A power transmitting pulley 60 carried by shaft

61' on standards 61 on platform 42 is rotated by belt 59 from pulley 54 on variable speed transmission 46. Pulley 60 rotatably journaled on shaft 61' carries therewith the smaller rotatable pulley 62 which interconnects the horizontal power drive pulley 53 by a belt 64.

Vertical rotatable shaft 65 joined to pulley 63 and rotated thereby has an end bearing support 66 provisioned upon platform 42 with the upper end of shaft 65 projecting through a corresponding opening within the vertical upright standard 67 also carried on platform 42. Said rotatable shaft extending upwardly through opening 68 in the bottom of container 17 has secured thereto the rotatable driving clutch member 69 annularly flanged at 70.

A corresponding idler clutch member 71 oppositely annularly flanged at 72 is carried upon the clutch drive member 69 with the oppositely provisioned annular flanges 70 and 72 slidably and frictionally engaging each other. Idler clutch member 71 annularly flanged at 73 is adapted to rotatably carry photographic plate 29 which is to be whirled for evenly spreading and drying thereon the light sensitive solution centrally applied thereto. Said clutch has a central transverse opening 74 within which rotatable shaft 65 is provisioned loosely, thereby providing a loose journal for idler 71, and at the same time maintaining its annular operative flanged portion 72 in sliding engagement with the upwardly extending annularly flanged portion 70 of rotatable clutch 69.

Inasmuch as it is desirable that plate 29 be started and stopped gradually to effect an even distribution of the light sensitive fluid substance over its top surface, it is necessary that its supporting idler clutch be free moving and adapted to rotation independent of the moment of starting or stopping of clutch 69. Consequently in the first instance clutch 69 will begin rotation with the friction built up between flanges 70 and 72 gradually effecting movement of idler clutch 71 until after a short period both clutch members are rotating at the same speed. Likewise when clutch 69 is stopped by stopping of motor 43, idler clutch 71 will continue to rotate with plate 29 thereon gradually slowing down until it stops by virtue of the friction between the opposed flanged members 70 and 72.

An annular flanged member 74' is provisioned upon the bottom of whirler chamber 17 for withholding fluid which accumulates within the bottom of said chamber so that fluid cannot escape through openings 31 or 68 to drop down upon the operative mechanism above described. Thus it is seen that the fluid retaining portion within the bottom of container 17 is circular with an annular opening at its central portion.

A timer switch is indicated at 75 inserted within leg 12 for regulating and setting the interval of rotation desired for the photographic plate 29. A heater switch 76 carried also on leg 12 is electrically connected to timer 75 as well as electric heating elements 26 within hood 21. Said timer switch is adapted to automatically actuate said electrical heaters for a limited interval of rotation of plate 29 or on the other hand said heaters may be actuated separately by switch 76.

As shown in Fig. 1 a curved auxiliary cover 77 is provided upon and in spaced relation to hood 21 being secured thereto at points 78 and 79, thereby providing insulating means in the event that the hood itself becomes hot from the operation of the electrical heaters therein. From the

above description it is seen that air is drawn into hood 21 through filters 25, by means of the suction blower 30 at the bottom of housing 17, preheated by heaters 26 and directed through opening 23 in cover 18 to the central top portion of the photographic plate 29.

By virtue of the rotation of plate 29 said air on engaging the same is directed radially in all directions over the entire surface of the photographic plate for evenly drying the solution which is evenly distributed over the surface thereof by virtue of the uniform rotation of idler clutch 71. Said air swirls over the surface of plate 29, traveling around the outer periphery thereof and thence below said plate into the annular retainer 74' and through air opening 31 which joins suction blower 30.

Not only is an even distribution of air effected within plate whirler housing 17 but also the humidity therein is minimized, which is advantageous in preserving the sensitivity of the coated photographic plate. The plate is further protected from outside light by virtue of the sealing arrangement of cover 18, as well as by baffle member 27 within hood 21 which prevents any illumination whatever from heaters 26, from reaching the light sensitive surface of the rotatable photographic plate 29.

Having described my invention reference should now be had to the claims which follow for determining the scope thereof.

I claim:

1. A plate whirler comprising a hollow closeable housing, a freely rotatable plate holder journaled therein having an annular flange on the bottom thereof, rotatable means extending into said housing and loosely into said holder providing a journal therefor, and clutch means on said rotatable means having a corresponding annular flange frictionally engageable with said first annular flange.

2. A plate whirler comprising a hollow closeable housing, a freely rotatable plate holder journaled therein having an annular flange on the bottom thereof, rotatable means extending into said housing and into said holder, and clutch means on said rotatable means having a corresponding annular flange frictionally engageable with said first annular flange, said rotatable means extending above said clutch means to act as a loose journal for said plate holder.

3. A photographic plate whirler comprising a hollow closeable housing, a freely rotatable plate holder journaled therein having an annular flange on the bottom thereof, rotatable means extending into said housing and loosely into said holder providing a journal therefor, clutch means on said rotatable means having a corresponding annular flange frictionally engageable with said first annular flange, air intake means on said housing communicating with the interior thereof, suction means below said housing communicating with the interior thereof, air preheating means provisioned within said intake means, baffle means in said intake means intermediate said heating means and the interior of said housing, air filtering means in said intake means, and water springling means provisioned within the top portion of said housing.

4. A plate whirler comprising a hollow closeable housing, a freely rotatable plate holder journaled therein having an annular flange on the bottom thereof, rotatable means extending into said housing and loosely into said holder provid-

ing a journal therefor, clutch means on said rotatable means having a corresponding annular flange frictionally engageable with said first annular flange, and a rotatable power source joined to said rotatable means.

5. A plate whirler comprising a hollow closeable housing, a freely rotatable plate holder journaled therein having an annular flange on the bottom thereof, rotatable means extending into said housing and loosely into said holder providing a journal therefor, clutch means on said rotatable means having a corresponding annular flange frictionally engageable with said first annular flange, a rotatable power source joined to said rotatable means, and a manually operable speed control transmission interconnected between said rotatable means and said power source.

6. A photographic plate whirler comprising a hollow closeable housing, a freely rotatable plate holder journaled therein having an annular flange on the bottom thereof, rotatable means extending into said housing and loosely into said holder providing a journal therefor, clutch means on said rotatable means having a corresponding annular flange frictionally engageable with said first annular flange, air intake means on said housing communicating with the interior thereof, suction means below said housing communicating with the interior thereof, air preheating means provisioned within said intake means, baffle means in said intake means intermediate said heating means and the interior of said housing, and air filtering means in said intake means.

JAMES T. CAMPBELL.