June 20, 1939. H. F. RIESENKÖNIG 2,163,062

PRINT REPRODUCING TABLE

Filed May 11, 1938 2 Sheets-Sheet 1

Fig. 1.

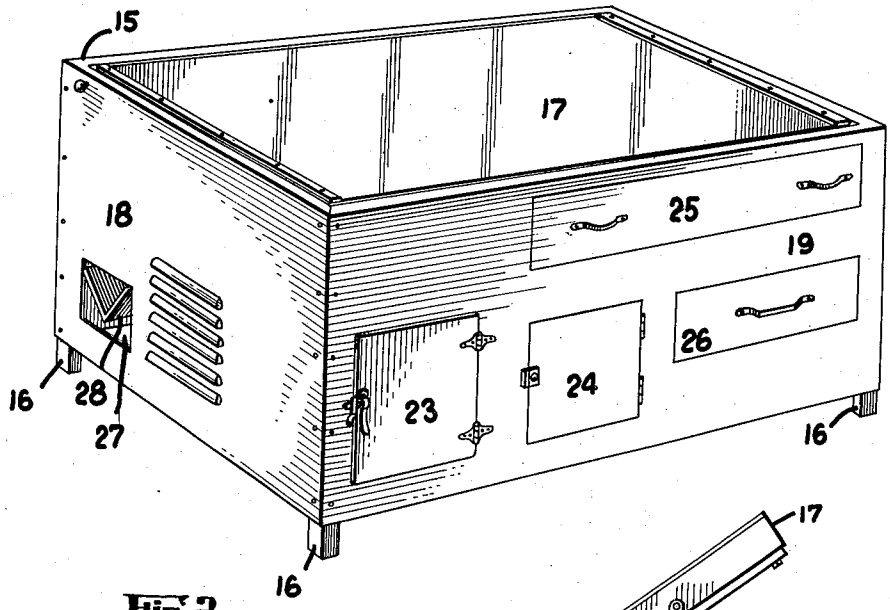
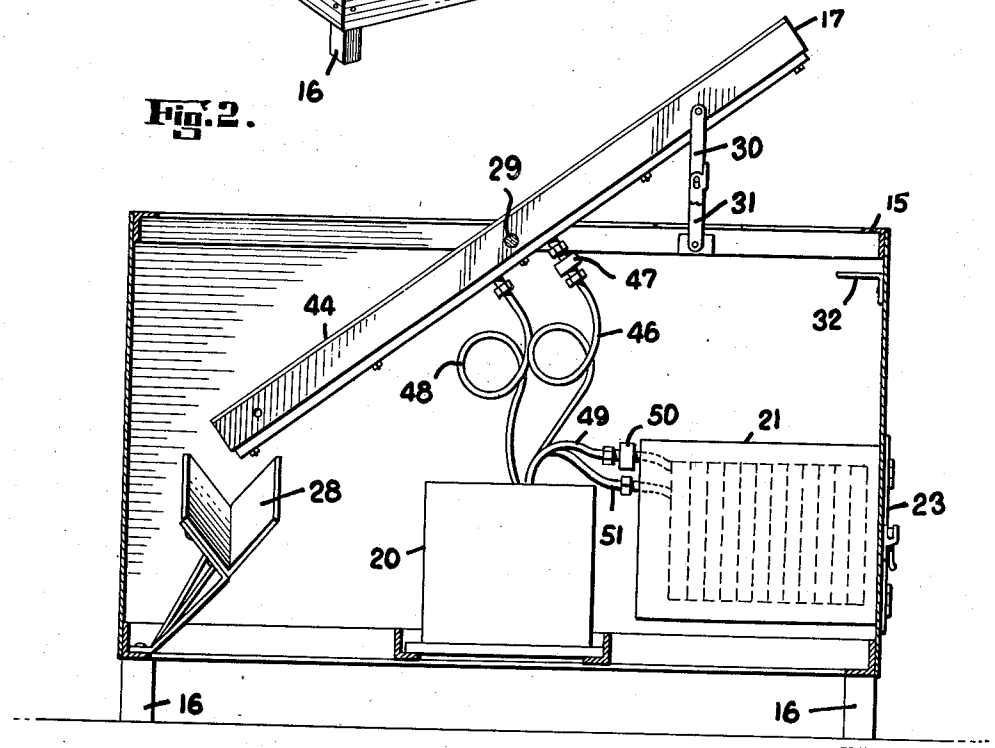


Fig. 2.



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Fig. 3.

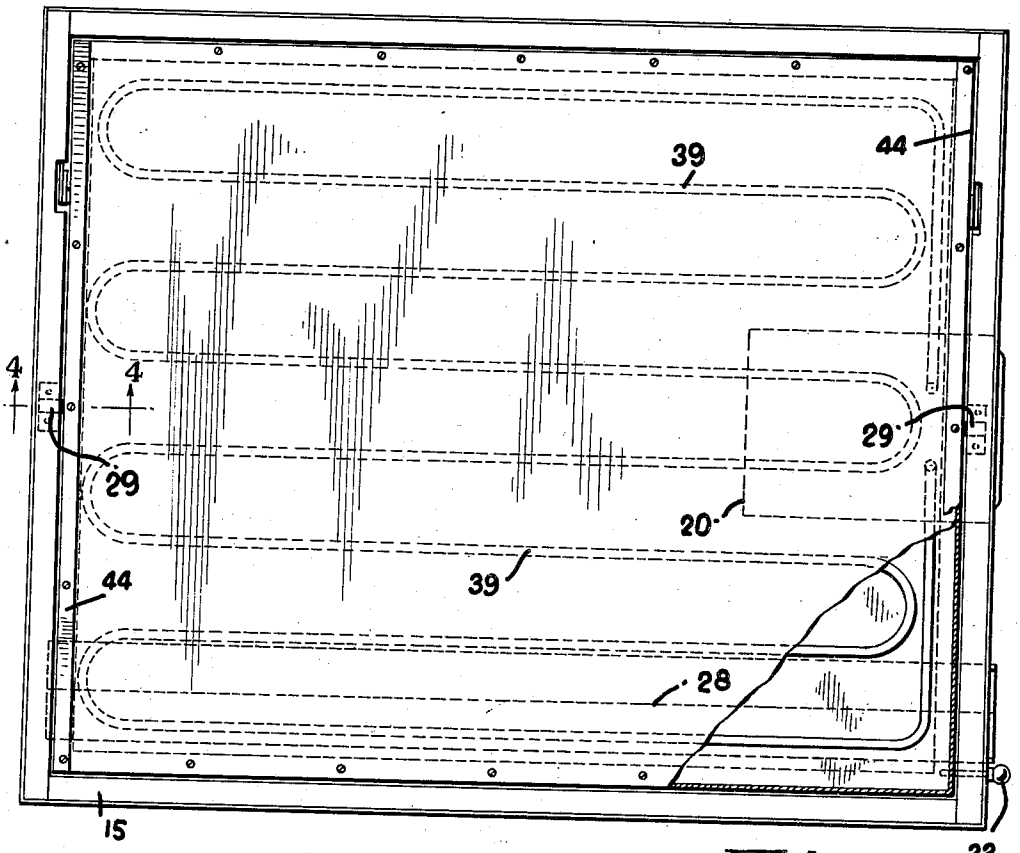


Fig. 5.

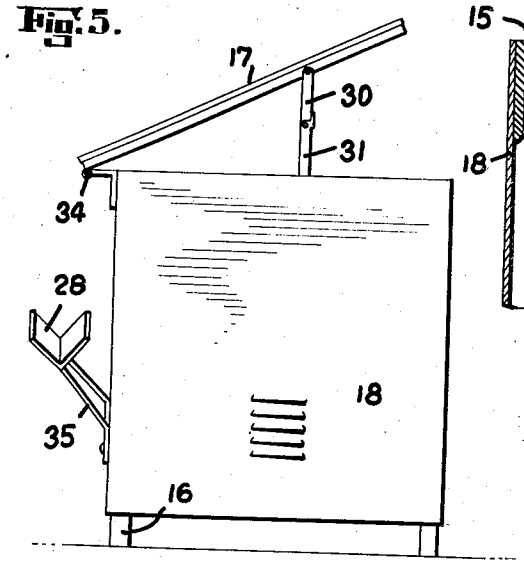
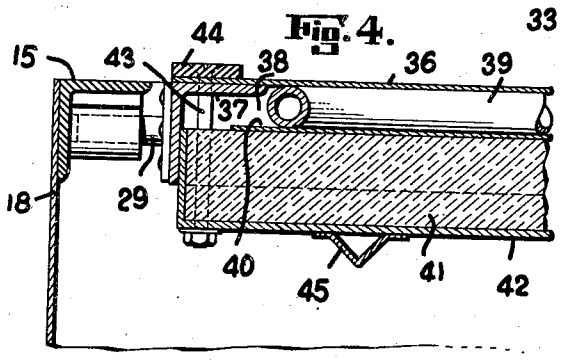


Fig. 4.



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PRINT REPRODUCING TABLE

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Application May 11, 1938, Serial No. 207,242

7 Claims. (Cl. 101—131)

This invention relates to a novel apparatus for making prints and the like. More particularly the invention relates to an improved, relatively small, self-contained unit for reproducing prints, drawings, maps, and the like from tracings and other copy.

The invention especially pertains to an improved apparatus for making lithoprints by what is generally known as the gelatine process. Such a process includes employing a gelatine containing chemicals, which is cooled to solidify and then it receives an imprint from a tracing or drawing through the intermediary of a transfer print. After the imprint is inked a large number of duplicate reproductions are made.

These lithoprints are in direct competition with blue prints and with other prints made by low cost processes; therefore it will be noted that efficiency and improved apparatus in producing lithoprints are very desirable. By this lithoprinting process very satisfactory ink prints are obtained on tracing cloth, paper, and other materials, and the lines therein are clear cut. Such prints are always easy to read and they do not deteriorate in aging because they are made with printer's ink.

One of the features of this invention is to provide an improved, self-contained, print-reproducing apparatus particularly adapted for the gelatine process work and to have the size of this apparatus such that it will take care of about 75 to 90 per cent of the normal print reproduction work of a manufacturing company. Such a self-contained apparatus is to be installed at the plant, and preferably is readily portable.

Another feature of this invention is to provide, in the lithoprinting apparatus, an improved operating or work table top having its temperature automatically controlled for maintaining the temperature of the gelatine film within a desired range.

Still another feature of the invention is to provide an improved type of table top construction which materially reduces or substantially eliminates refrigeration losses, and which has simplicity of construction with great strength so that the inking step and the reproducing step may be quickly and readily carried out.

Another feature of the improved invention is to provide a fully self-contained unit having the desired refrigeration means mounted within the table itself and having a cold storage compartment for some of the supplies, and providing drawers or special compartments for other supplies, and having a table top that is adapted for quick and easy application of the selected gelatine material.

In print reproduction work, especially prints of contour maps, sectional view of machines, perspective views of machines and of various completed products, it has heretofore been very difficult when making reproductions by using gelatine, to carry on this work economically so as to produce satisfactory, clear-cut and acceptable prints that will stand the test of time without deterioration.

Heretofore, in the production of lithoprints, various means have been provided for applying a gelatine to a work top and then cooling the same, and then making the imprints in the gelatine, and after inking, obtaining satisfactory prints therefrom. Several types of table tops have been employed and several cooling means have been employed but practically all of them have been found to be uneconomical, usually due to size and structure of top and due to inefficient "make shift" cooling apparatus and procedure. It has been possible to carry on some of this work in a room maintained at a low enough temperature to keep the gelatine from getting soft. The health of operators has been impaired when working continuously under such circumstances.

The large types of table tops are not economically employed except for very large prints. Unless a company is very large and has a great deal of reproduction work of this nature, it would be uneconomical to install and maintain one of the large operating tables. If such an installation is not made, then prints must be mailed or sent outside of the company with attendant losses and misunderstandings as to instructions and the like.

It is desirable, therefore, to provide a relatively small, self-contained print reproducing apparatus which is low in cost and which may be transported about a building or plant. This type of relatively small, self-contained unit is especially desirable as it is possible to handle approximately 75 to 90 per cent of the reproduction work of a company. By the use of this improved apparatus, reproduction work may be completed within the building or plant proper, and the drawings or tracings, except in exceptionally large size, would not leave the plant.

The invention herein therefore provides an improved, self-contained unit for the purposes indicated and also provides improved and efficient operating apparatus that gives low-cost operation, quickness, and flexibility of operation, and

maintains all of the supplies in the most efficient form and condition.

Other features and objects of the invention will be noted during a detailed reading of the following description taken in connection with the drawings, wherein

Fig. 1 is a perspective view of an improved self-contained print-reproducing apparatus;

Fig. 2 is an end view, partly in section, illustrating some of the interior of the apparatus and showing the work table tipped in position for receiving the gelatine;

Fig. 3 is a top plan view of the table having one corner of the work top partially broken away to indicate the refrigeration means;

Fig. 4 is a sectional view of an improved table top taken on the line 4—4 of Fig. 3, illustrating the working top, a pipe conduit for the cooling medium, a heat-reflection means, and a heat-insulating means; and

Fig. 5 is illustrative of a modified form of table whereby the top is pivoted at one end instead of being trunnioned in the center like the table top shown in Fig. 3.

Referring now to the drawings the self-contained table is shown in Fig. 1 wherein there is provided a supporting frame 15 with feet 16, and a work top 17. The frame is enclosed with a suitable enclosure such as sheets 18 and 19 which are preferably of sheet metal but which may be of wood or other material. The table is provided with a refrigerator 20 and a cooled compartment 21, as will be noted in Fig. 2. A satisfactory tight door 23 closes the cooled compartment. There is also provided a storage compartment noted by door 24 for inks, ink rollers and the like, while drawers 25 and 26 store transfer paper, tracing cloth, and the like. The side 18 is cut away at 27 so that a trough 28 for catching the over-flow gelatine may have its end pulled through the opening 27 a short distance to allow a pail to be put thereunder. The trough 28 may be held in an operating position, i. e., extending outside of the table a short distance, or it may be held in a storage position inside of the table. Suitable cleats or other holding means for engaging the trough support, or engaging the siding 18 of the table may be provided so that the trough may be suitably positioned as desired.

The table top, or work top 17 may be of any suitable structure so that it serves as a satisfactory working top and is provided with a suitable means for cooling gelatine received on the work surface. In the particular example herein it is desired to incorporate in the work top satisfactory insulation means for preventing heat from reaching the lower part of the cooling medium which is flowed near the working surface.

In Fig. 2 the preferred type of table top is shown as being provided with trunnioned ends 29 so that this work top may be tipped in the middle as illustrated and allow gelatine to be poured along the upper edge to flow down across the table, allowing the excess gelatine to flow into trough 28. A suitable type of holding joint is made up of arms 30 and 31 to provide foldable holding means for the work top in its tipped position. The structure of this joint is such that it will not break until definite movement of the top has been made to release the joint from its extended position. When the table top has been returned substantially to its horizontal position, one end of the top engages the bracket 32, and, if desired, pin 33 (Fig. 3) may be inserted in the frame and into the work top to firmly hold the top in its work position.

In Fig. 5 work top 17 is shown as being pivoted at 34 and being provided with holding arms 30 and 31. Either form of pivoting of the table top may be employed as desired. In Fig. 5 the trough 28 is held by supports 35 on the exterior of the table.

In reproducing lithoprints in one of the most satisfactory manners, it has been found that a suitable composition such as a gelatine composition may be employed and passed on to the work surface of the work top. It is then desirable to provide a suitable type of cooling medium for solidifying the hot gelatine composition after it has been poured and for maintaining this composition in relatively hard form so that it will properly receive imprints and will allow the inking operation to be carried out followed by the printing step.

The work surface or operating top may be of suitable material, preferably in sheet form. In this particular example there is provided a zinc plate 36 (see Fig. 4) which is supported by angle irons 37 carried by the trunnions 29.

In providing this suitable form of work top it will be understood that satisfactory sheets of aluminum composition, or of stainless steel, or of copper or the like, may be employed in place of the zinc plate.

It is desired in making lithoprints to have the cooling medium maintain the zinc plate or working surface 36 at desired temperatures. The passing of a cooling medium near the zinc plate 36 may be accomplished in any suitable manner, and allow the cooling medium to properly cool the work plate by conduction or by convection. It is, therefore, desirable to provide a space 38 beneath the work plate. In the example herein illustrated, this space is occupied by the pipe 39 which is a conduit for the cooling medium. It will be noted in Fig. 3 that this piping or conduit 39 is bent back and forth on itself throughout substantially the whole area of the work top. In this particular instance this conduit 39 is soldered or welded to the zinc plate 36 and thereby provides cooling of plate 36 by conduction.

It is desired to operate this self-contained lithoprinting table with the lowest refrigeration loss possible and to accomplish that purpose a double type of heat insulation is employed. It is preferred to place next to the pipe 39 a polished metal sheet 40 which is particularly adapted to reflect heat. Aluminum sheets have been used for heat-reflecting purposes and such a sheet may be here employed. The second portion of the insulating means is preferably a composition 41 usually of cork, or a mixture of cork or other materials. By the employment of this double type of insulation which prevents thermal transfer, the heat of the surounding air, or any heat within the table, does not reach the lower part of conduit 39. Thus, by means of plate 31 and insulation 41 the cooling medium passing from conduit 39, or passing freely in space 38 is exceptionally efficient in maintaining the work plate 36 in its most satisfactory condition. The insulation means 41 is preferably carried by a suitable container 42 held by bolt 43 which passes through guide pieces 44 mounted on the end edges of the surface of the work top. The main function of these guides 44 keep the gelatine or composition from flowing off from the sides of the work top. Reinforcing angles 45 on the bottom of container 42 add to the strength of the work top. It will be understood that after an

imprint has been made in the gelatine, the gelatine is inked by passing inked rubber or gelatine composition rollers over the imprinted portion and considerable pressure is applied to the rollers.

The refrigerator **20** may produce any type of suitable refrigerant which may be conducted to suitably cool the work top **17**. In this illustration **20** represents the exterior of a refrigerating means which usually comprises the compressor, the condenser, and the receiver, and a motor for operating the same. The refrigerant passes from the receiver through flexible piping **46** to automatic control expansion valve **47** which allows the refrigerant to expand and pass through pipe conduit **39**. The return refrigerant passes through flexible tubing or piping **48** back to the refrigerator. The cooling effect on the work plate **36** can be automatically controlled by the valve **47** so that a definite rate of low temperature may be provided on the under side of the work plate **36**. Instead of having the valve responsive to heat conditions, a suitable thermostat may be positioned in contact with work plate **36** and operate to control the valve **37**, or to control a motor (not shown) for the compressor of the refrigerator.

While the particular example herein has disclosed the cooling of the work plate **36** by conduction, it will be understood that there will be a certain amount of cooling of portions of this plate by convection as there will be cooling developed between the turns of the pipe **39** and this cooling will pass to the portions of the work plate **36** which are not in direct contact with the conduit **39**.

It will be understood that the construction of the work top shown in Fig. 4 may be readily modified to allow the conduit **39** to be positioned a short distance below the work plate **36** and allow the cooling medium passing through conduit **39** to cool the plate **39** by convection through the air which is confined within the space **38**, underneath the work plate **36**.

It will be understood that while the conduit is shown as a single continuous conduit, it may be divided into sections and the cooling medium pass through the conduits in parallel instead of series or unit-flow direction.

Referring now to Fig. 2 it will be noted that in this example cold storage compartment **21** has its separate cooling by receiving refrigerant from the refrigerator through conduit **49** and providing in that conduit an expansion valve **50**. The returning refrigerant passes through conduit **51**. It will be understood, however, that this cold storage compartment **21**, for the storage of gelatine and the like, may be satisfactorily cooled by having the conduit **48**, which receives the returning refrigerant from the work top connected to the piping in compartment **21**, and then allows the refrigerant to flow around the compartment and back to the refrigerator, thereby properly cooling the compartment.

It will be noted from the example herein that the work top is directly cooled by having the refrigerant itself pass through a conduit in close association with the work top. Heretofore, in apparatus of this nature the refrigerant itself cools a brine or treated water and then pumps the brine or treated water through conduits near the work plate. There is a very considerable saving in the provision of the type of direct refrigeration as described.

It will be noted from the description herein that a very satisfactory, self-contained lithoprinting unit table is provided whereby the cooling of the work top is accomplished at high efficiency and by direct refrigeration operation. This self-contained printing unit is provided with its own refrigerating operation which is automatic by controlling the expansion or by controlling the operation of the refrigerating means. There is also provided a most satisfactory heat insulating means so that there is substantially no heat loss on the under side of the work top and the desired cooling is carried on with extremely low refrigerating loss. The complete table has been made of a relatively small size for transportation and has been designed to make a full and complete working unit, and to provide cold storage for part of the supplies, and to provide several compartments for the storage of other supplies.

Various modifications and changes may be made in the disclosures herein, but such modifications and changes are considered to be within the scope of this invention, as outlined in the following claims.

I claim:

1. In an apparatus of the class described, a self-contained lithoprinting table comprising an enclosed supporting frame, a work top mounted on said frame and adapted to be tipped to receive gelatine material and to be positioned substantially horizontal during print reproduction, a conduit associated with the under side of said work top for receiving a cooling medium, insulating means associated with said work top and positioned away from the under side of said top to allow the cooling medium to keep said work top at a low temperature; means mounted in said self-contained table for producing the cooling medium and for flowing the same through said conduit to one surface of said work top, and a second heat insulation means for maintaining the cooling medium in association with said work top and without substantial loss by heat transfer.

2. In an apparatus of the class described, being a self-contained lithographing table, the combination of a supporting frame, a work top for receiving gelatine, a conduit for a cooling medium positioned close to said work top, a refrigerating means mounted in said table for producing a compressed refrigerant, piping connections from said refrigerating producing means leading to said conduit, an expansion valve mounted in association with said conduit and carried by said table top to control the effective cooling of said table.

3. In an apparatus of the class described being a self-contained lithographing table, the combination of a supporting frame, a work top for receiving gelatine, a conduit for a cooling medium positioned close to said work top, a refrigerating means mounted in said table for producing a compressed refrigerant, piping connections from said refrigerating producing means leading to said conduit, an expansion valve mounted in association with said conduit and carried by said table top to control the effective cooling of said table top, and insulating means on the side of said conduit opposite to said table top for substantially eliminating heat transfer to said table top.

4. In an apparatus of the class described, a self-contained lithoprinting apparatus comprising a supporting frame, a work top pivotally mounted on said frame and adapted to be tipped to receive a gelatine and to be firmly held in a substantially horizontal position while prints are being made, a conduit associated with the upper part of said work top for receiving a cooling medium, a refrigerator mounted on said supporting frame for producing a compressed re-

frigerant, piping means between said refrigerator and said conduit, an expansion valve carried by said work top for allowing said refrigerant to expand and flow through said piping means, insulating means carried by said work top and positioned below said conduit for preventing substantially any flow of heat to said work top, and a cold storage compartment mounted in said supporting frame, and a second conduit associated with said cold storage compartment and connected to the first conduit for receiving expanding refrigerant to thereby cool said cold storage compartment.

5. In a self-contained lithoprinting table, the combination of a supporting frame, enclosing side pieces, a work top mounted in said frame and adapted to be tipped to receive gelatine and to be fastened in a substantially horizontal position during print reproduction, said work top including a zinc plate for receiving the gelatine, a series of bent conduits affixed to said zinc plate, a self-contained refrigerator for producing a compressed refrigerant, said refrigerator being mounted on said supporting frame, flexible piping means between said refrigerant and said conduits for conducting the refrigerant, an expansion valve in said piping means carried by said work top to control the expansion of said refrigerant through the conduits next to said zinc plate for cooling the same, a polished metal sheet positioned on the opposite sides of said conduits from said zinc plate for reflecting heat, a cork composition insulating means positioned adjacent to said polished metal plate for preventing the flow of heat to said zinc plate from the under side of said work top, and a cold storage compartment mounted in said supporting frame and connected with said refrigerator and receiving refrigerant for maintaining said compartment at low temperature, and a series of storage spaces provided in said enclosed table.

6. In a lithoprint table, the combination of a supporting frame, a table top mounted in said frame to be tipped to receive a gelatine coating and to be held in a fixed position during print reproduction on said coating, conduit means carried by said top for receiving a refrigerant and to allow the refrigerant to expand therein to cool said gelatine, said conduit means being assembled in said top in effective heat absorbing relation to the gelatine receiving surface, a self-contained refrigerator unit mounted in said frame, piping means having a flexible part therein for conducting a refrigerant to said conduit means from said refrigerator, and a heat responsive valve in the refrigerating system for automatically controlling the amount of refrigeration of said gelatine during print reproduction.

7. In a lithoprint table, the combination of a supporting frame, a table top mounted in said frame to be tipped to receive a gelatine coating and to be held in a fixed position during print reproduction on said coating, conduit means carried by said top for receiving a refrigerant and to allow the refrigerant to expand therein to cool said gelatine, said conduit means being assembled in said top in effective heat absorbing relation to the gelatine receiving surface, a self-contained refrigerator unit mounted in said frame, piping means having a flexible part therein for conducting a refrigerant to said conduit means from said refrigerator, a heat responsive valve in the refrigerating system for automatically controlling the amount of refrigeration of said gelatine during print reproduction, and heat insulating means of different insulating values associated with said conduit means opposite to the gelatine receiving surface and acting to prevent outside heat from reaching said conduit means.

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