May 14, 1940. B. F. WALKER 2,200,314

STENCIL

Filed May 23, 1938

Fig. 6

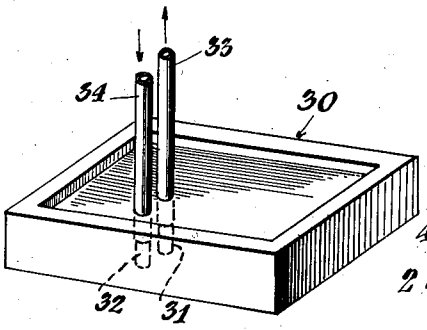


Fig. 1

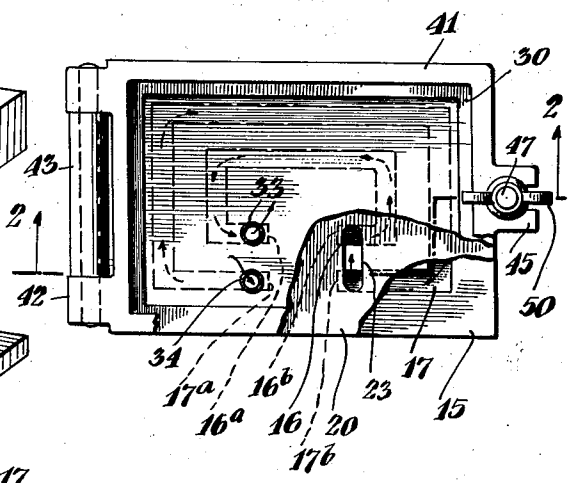


Fig. 5

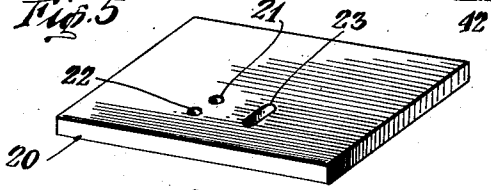


Fig. 4

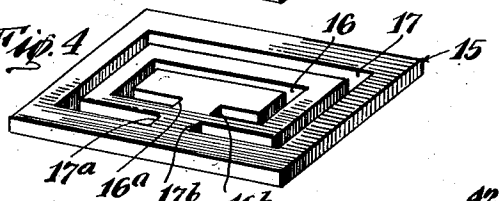


Fig. 2

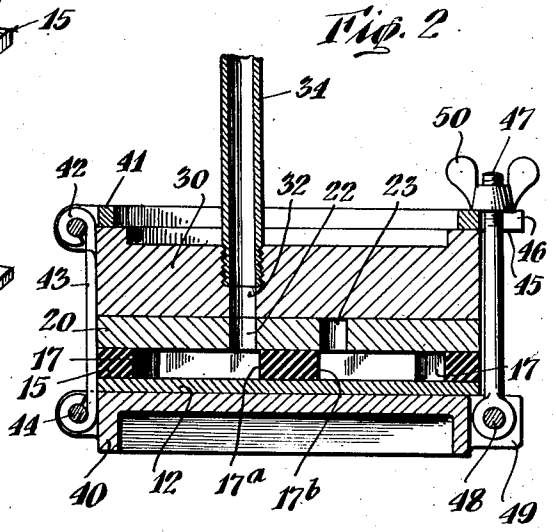
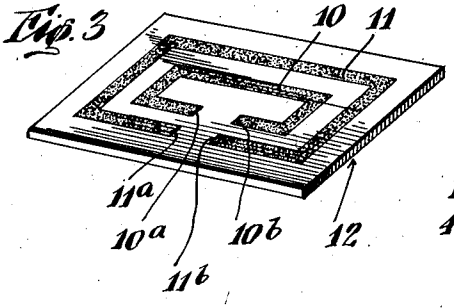


Fig. 3



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STENCIL

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Application May 23, 1938, Serial No. 209,524

5 Claims. (Cl. 101—127)

This invention relates to a method and apparatus for treating the surface of materials and more particularly to a novel and improved stencil adapted for the treatment of rigid materials, such as metal or plastic compositions.

An object of the invention is to provide a novel and improved stencil of the type above mentioned.

Another object is to provide a stencil which may be usd for applying a design to rigid materials.

Another object is to provide a stencil which requires a minimum quantity of treating fluid for its action.

Another object is to provide a stencil which is so arranged and constructed that the treating fluid is caused to flow serially over the various parts to be treated.

Various other objects and advantages will be apparent as the nature of the invention is more fully disclosed. Although the novel features which are believed to be characteristic of this invention will be more particularly pointed out in the claims appended hereto, the invention itself may be better understood by referring to the following description taken in connection with the accompanying drawing in which a particular embodiment thereof has been set forth for purposes of illustration.

In the drawing:

Fig. 1 is a top plan view with parts broken away of an assembled stencil embodying the present invention;

Fig. 2 is a section taken on the line 2—2 of Fig. 1;

Fig. 3 is a detail view of an object showing the completed design stenciled on the surface thereof;

Fig. 4 is a perspective view of the stencil base;

Fig. 5 is a perspective view of the stencil cover; and

Fig. 6 is a perspective view of the top plate used for completing the assembly.

In the following description and in the claims certain specific terms are used for convenience in referring to various details of the invention. These terms are to be given as broad an interpretation as the state of the art will permit.

Referring to the drawing more in detail, the invention is shown as applied to an apparatus for producing a design, comprising a pair of concentric rectangles 10 and 11 on the surface of a sheet 12 of rigid material, such as metal, plastic compositions or the like. In the embodiment shown the concentric rectangles 10 and 11 are broken to form ends 10*a*, 10*b*, 11*a* and 11*b*, respectively. The stencil base 15, as shown in detail in Fig. 4, is provided with a pair of broken concentric rectangular openings 16 and 17, corresponding in shape to the design of the rectangles 10 and 11 of Fig. 3. This stencil base 15 is adapted to be superimposed on the sheet 12 when the entire stencil is assembled. It will be noted that the openings 16 and 17 are discontinuous and are provided with ends 16*a*, 16*b* and 17*a* and 17*b*, corresponding to the ends 10*a*, 10*b*, 11*a* and 11*b* of the rectangles 10 and 11 to be formed on the sheet 12. The stencil base is formed of some resilient, soft material such as rubber so that it is adapted to be pressed into firm engagement with all parts of the sheet 12 whereby contact of the treating fluid with the sheet 12 is confined to the portion registering with the openings 16 and 17 of the stencil base.

A stencil cover 20, as shown in detail in Fig. 5, is adapted to be superimposed over the stencil base 15. This stencil cover is provided with a pair of apertures 21 and 22 which are adapted to register with the ends 16*a* and 17*a*, respectively, of the openings 16 and 17 in the stencil base 15 and with a slot 23, which is adapted to span the ends 16*b* and 17*b* of said openings so as to form a connection therebetween for the purpose to be described.

The stencil cover 20 may be formed of any suitable material. It may, for example, be made of rubber or other soft material similar to the stencil base 15, or it may be made of a hard material and be adapted to be pressed into firm engagement with the soft material of the stencil base 15.

A top plate 30 is provided, as shown in detail in Fig. 6, which is adapted to engage the entire surface of the stencil cover 20. This top plate 30 may be provided with a pair of openings 31 and 32 which are adapted to register with the openings 21 and 22 in the stencil cover 20 and may be threaded or otherwise adapted to receive the ends of pipes 33 and 34 through which the treating liquid is to be circulated.

The assembly is shown more in detail in Fig. 2 as comprising a base plate 40 on which the sheet 12 is positioned. The stencil base 15, stencil cover 20 and top plate 30 are placed in superimposed relationship on the sheet 12 and the assembly is held under pressure by suitable clamping means. In the embodiment shown this clamping means comprises a frame 41 which is hinged as at 42 to a bracket 43 attached to the base plate 40 in any suitable manner as by a

hinge 44. The frame 41 is provided with a pair of ears 45 having a slot 46 therebetween through which a rod 47 extends. The rod 47 is hinged as at 48 to a suitable ear 49 on the base plate 40 and carries a wing nut 50 which engages the ears 45 for exerting clamping pressure on the frame 41. The arrangement is such that sufficient pressure may be applied to the frame 41 to hold the various parts of the stencil in fluid tight relationship. It is to be understood, of course, that the bracket 43 may be replaced by a rod similar to the rod 47 to permit suitable clamping pressure to be applied at both sides of the frame or other clamping means may be substituted therefor. A convenient and compact embodiment has been shown for purposes of illustration.

In the operation of this stencil the parts are first assembled in the manner indicated in Fig. 2. The treating fluid may then be applied through, for example, pipe 34. The fluid thus applied passes through the opening 22 in the stencil cover and to the end 17*a* of the opening 17 in the stencil base 15. The fluid then passes around the rectangular opening 17 to the end 17*b* thereof and thence it passes through the opening 23 of the stencil cover 20 to the end 16*b* of the opening 16 in the stencil base 15. The fluid then flows around the opening 16 to the end 16*a* thereof, thence upwardly through the opening 21 in the stencil cover 20 and out through the pipe 33. It will be noted that the fluid thus flows serially throughout the entire stencil. It is to be understood, of course, that the stencil may be provided with any suitable design and that by a suitable arrangement of the openings 21, 22 and 23 of the stencil cover, the fluid may be caused to flow serially throughout the stencil regardless of the shape or arrangement of the design therein.

It will be noted that only sufficient liquid is required to completely fill the stencil openings. Furthermore, circulation may be obtained by continuously applying liquid through the pipe 34 and removing the same through the pipe 33. Recirculation can be obtained for conserving the liquid if desired. Furthermore, the liquid may be held under any suitable pressure during its passage through the stencil openings. This continuous circulation of the liquid is desirable in various types of treatment, for example, when using a mixture or a suspension the circulation prevents undesired settling or separation of the materials. The stencil is also adapted for use with articles having a disagreeable odor or emitting a poisonous vapor inasmuch as it is completely closed and there is no danger of the operator coming in contact with either the liquid itself or with the vapors therefrom. The stencil may be used for electroplating by making the plate 20 of the anode metal and making suitable electrical contact with the base material 12.

The stencil base 15 is preferably made of soft, resilient material when it is to be used with a hard or rigid sheet 12 in order to ensure that the stencil conform to the surface of the sheet 12 and maintain a liquid tight contact throughout its area. It is to be understood of course that a metallic or other rigid stencil could be used if the sheet 12 is made of flexible material.

When the stencil is to be used to apply a design to a plastic composition, the stencil base 15, stencil cover 20 and top plate 30 may be made of non-metallic materials. In that event no metal will come in contact with the treating liquid. This is an important feature when certain treating liquids, such as an acid or other substances which readily attack metal are to be used.

Although a particular embodiment of the invention has been shown for purposes of illustration, it is to be understood that various changes and modifications may be made therein as will readily appear to a person skilled in the art. The invention itself is only to be limited in accordance with the following claims when interpreted in view of the prior art.

What is claimed is:

1. A stencil for applying a design to a surface, comprising a stencil base having disconnected openings therein corresponding to said design, a stencil cover having openings through which liquid is applied to selected portions of the openings in said base and having additional openings spanning other parts of the openings in said base to form a continous channel in which the liquid is caused to flow serially.

2. A stencil for applying a design to a surface, comprising a stencil base having a set of disconnected openings therein forming said design, a stencil cover having a pair of openings through which liquid is applied to and removed from said openings, said stencil cover having one or more additional openings adapted to span the openings in said stencil base so as to form a serial connection thereof to permit the liquid to flow serially through the various openings in said stencil base.

3. A closed stencil, comprising a stencil base having openings therein corresponding to a design to be stenciled, a cover therefor closing the openings in said base, said cover having openings therein forming connecting channels between said first openings to permit the liquid to flow serially therethrough and a top plate closing said last openings in said stencil cover and having a pair of openings through which the liquid is applied to and removed from the openings in said stencil base.

4. A stencil for treating the surface of a plastic composition with a fluid which is corrosive to metal, said stencil comprising a sheet of rubber having openings therein corresponding to the design to be applied to said surface, a second sheet of rubber adapted to cover said openings, said second sheet having openings formed therein adapted to span the openings in said first sheet so as to form a continuous channel for the passage of said liquid, and a non-metallic top plate covering said second sheet and having therein a pair of openings for applying said liquid to and removing said liquid from the openings in said first sheet.

5. A stencil for applying a design to a surface, said stencil having disconnected channels conforming in shape to said design and open to said surface, and connecting passages out of contact with said surface, each connecting passage joining the ends of a pair of said disconnected channels to form with said channels a continuous closed passage of which said disconnected channels conform to said design, and being adapted to cause the treating liquid to flow serially through said channels over the exposed parts of said surface for forming said design.

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