

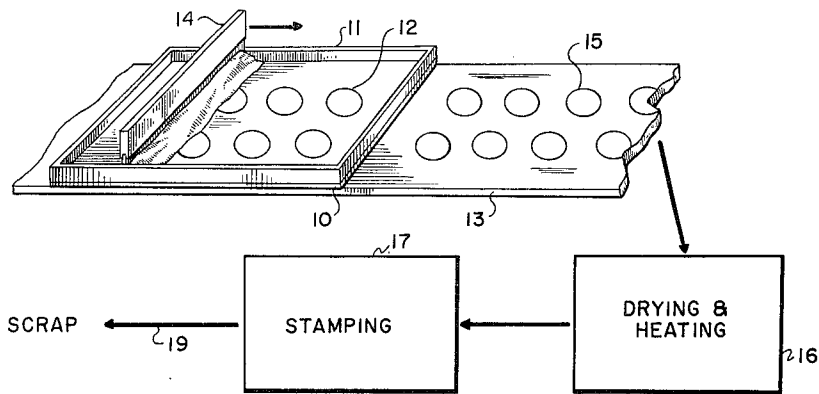
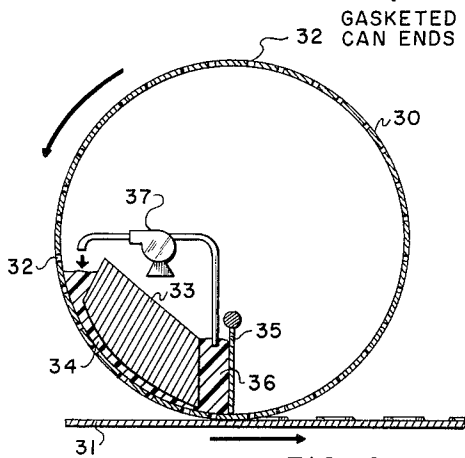
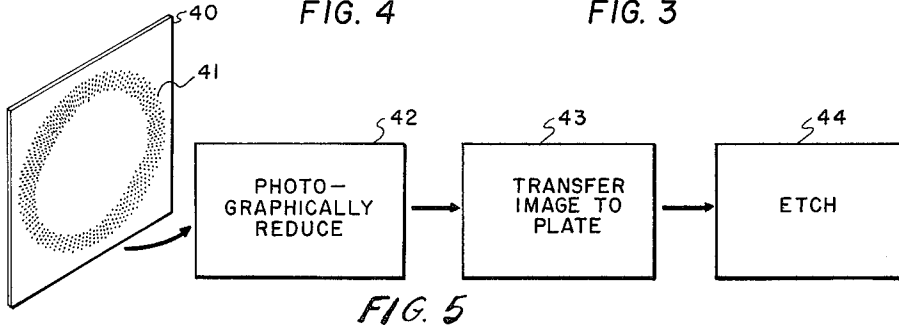
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PRINTING OF CONTAINER CLOSURE GASKETS

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PRINTING OF CONTAINER CLOSURE GASKETS
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This invention pertains to a method and apparatus for applying sealing or gasketing compound during the manufacture of container closures and the like. More particularly, it is directed to a method of forming can end, crown closure and similar gaskets on flat stock from which gasketed container closures can then be fabricated.

Can end gaskets have been formed on punched can ends by nozzle lining. Nozzle lining involves applying a fluid gasket-forming compound through a nozzle to the edge of a can end, usually while spinning the can end if it is round. This method is mechanically complex and is not well suited to the lining of irregular shaped ends such as rectangular or oval shapes. The compound application mechanism for irregular ends is usually based on the more complex and less reliable pantograph or die lining techniques.

More recently, it has been proposed to form container gaskets by a method akin to silk screen printing. The gaskets are formed in this method on flat metal sheet by forcing a fluid compound through a printing screen or stencil which carries the desired design, and closures with the gaskets are subsequently stamped from the metal sheet after setting the compound to its solid elastomeric form. See United States Patent No. 2,516,647.

The traditional screen printing method is inherently intermittent because the metal sheet must be stationary when printed. The improvements of the silk screen method that have been suggested in the past for making the method continuous are usually complex and generally unsatisfactory. Also, experimental work has shown that the uniform gasket thicknesses and weights which are required for container closures are difficult to achieve by this method for such reasons as screen flexibility or distortion, squeegee wear and poor separation between the screen and metal sheet.

In brief compass, the method of this invention comprises the printing of a fluid gasket-forming composition of the shape desired onto a metal sheet. The printing is accomplished by forcing the composition through a rigid, dimensionally stable, stencil or plate which is finely perforated in the area where the composition is to be transferred. The printing is essentially "on contact" printing. This permits good definition to be obtained and facilities and securing of the requisite uniform film weights. The printing steps is followed by conversion of the composition so printed to form-stable gaskets. The metal sheet is thereafter cut or stamped into can ends, crown closures, lug caps and the like in a conventional manner.

The essence of this invention resides in effecting the printing through the use of a fairly rigid, dimensionally or form-stable plate having the desired design or gasket shape defined therein by minute perforations. The design is composed of a multiplicity of small independent holes or perforations surrounded by a continuous lattice-work of the plate material. The printing plate is sufficiently rigid and so mounted as to be substantially inflexible under the conditions of use.

The perforation may be formed by any convenient method such as drilling or engraving, but it is much preferred to prepare the perforated design in the printing plate by etching because of the number of holes involved and their minute size.

A more specific and preferred embodiment of this invention is concerned with the use of curvilinear perforated plates in the printing step which permits "line-contact" printing. This materially improves the separation between the printing plate and the metal sheet and greatly reduces variations in the film weights of the gaskets.

Dry film thicknesses in the order of 0.025 to 1 millimeter are generally required for the types of container sealing gaskets contemplated. The present invention is particularly suited to the making of gaskets of 0.050 to 0.250 millimeter thickness, which thickness encompasses the majority of the can sealing applications. It has been established that the process of this invention is capable of depositing films of this thickness in a single step. The individual band widths for conventional can gaskets will usually be in the range of 2 to 8 millimeters. The method of this invention is particularly suited to the printing of gaskets which have two or more bands. It permits placement of dual or multi-band gaskets with a precision that is difficult to achieve by other methods.

Usually the perforated plate used in the printing of a gasket-forming compound will contain a plurality of the desired container closure gasket designs arranged in a uniform pattern. The use of a rigid perforated printing plate in the manner of this invention permits a high degree of uniformity to be achieved even after several hundred or thousand cycles of printing. Dry weight variations in any one design and between designs are normally less than ± 5 percent and are usually within ± 2 percent. This precision is secured while printing or laying down relatively large amounts of material, generally over 1 milligram per square centimeter of the gasket band (dry film weight). This precision is highly desirable because inadequate film weights in one or more areas result in gasket or closure failures and excessive weights result in waste of the compound besides creating other difficulties.

While this invention is particularly directed to the manufacture of can end gaskets, it will be appreciated by those skilled in the art that the present invention can be usefully applied in any situation where it is desired to place a repeating pattern of a fluid polymer-containing system, such as a dispersion, solution, melt or emulsion, on a receptive form-stable substratum. Thus crown closures can be made by the method of this invention as well as pregasketed electrical conduit junction box covers. Masonite panels decorated with a relatively thick design of an elastomer and useful in the manufacture of glass top tables can also be made.

The nature and scope of this invention will become clear from the following discussion and examples made with reference to the drawings attached to and forming a part of the specification.

In the drawings:

FIGURE 1 illustrates the present process applied to the fabrication of gasketed can ends. The printing in this instance is carried out with a planar perforated plate using a flexible squeegee to force compound through the perforations, in a manner similar to silk screen printing;

FIGURE 2 shows in enlarged detail a segment of one of the perforated gasket designs in the printing plate;

FIGURE 3 shows in cross-section an oscillating curvilinear printing plate;

FIGURE 4 illustrates a continuous rotary printing method; and

FIGURE 5 schematically illustrates one method of placing the perforated gasket designs in the printing plate.

Referring to FIGURE 1, the printing plate 10 of this invention is attached to a suitable rigid framework 11.

The printing plate contains a plurality of can end designs 12. The plate is placed with its obverse side on the strip or sheet of metal 13 which is to receive the gaskets. The compound to be printed is placed on one end of the reverse side of plate 10 and is forced into the perforations by a rubber squeegee 14 which is pulled along the length of the plate. The frame is then lifted up, strip 13 is moved forward to the next position, the frame is again placed down on the strip and the cycle is repeated. The still fluid can end gaskets from the proceeding cycle are illustrated at 15.

The fluid composition thus transferred to sheet 13 is converted to a solid elastomeric or deformable plastic form in a conventional manner, as in a drying and heating oven 16. The sheet with the form-stable shapes is then transferred to a punching machine 17 that stamps the gasketed can ends from the sheet. The can ends are removed at 18 and the perforated scrap at 19.

FIGURE 2 shows in enlarged detail a plan view of a segment of one of the perforated designs 12 in the printing plate. The design consists of a multiplicity of small independent perforations or holes 20, usually arranged in a uniform geometric pattern. While round holes are illustrated, they may have any shape desired such as triangular, square, hexagonal, ovoid and the like.

The composition transferred to the metal sheet in the manner of this invention is initially in the form of small individual liquid dots which, depending on the rheology of the composition, may immediately flow together or may be made to flow together thereafter as by heating to form a continuous film. Generally speaking, it is preferred to have the mesh of the perforated design, i.e. the number of holes per unit area, so fine that coalescence is not a problem. In some application, of course, it may not be necessary for the individual dots to coalesce.

The printing plate can have a thickness in the range of 0.100 to 0.500 millimeter. It has been found that if the plate is too thin, the amount of compound transferred is insufficient for most gasket applications, and if the plate has a thickness over about 0.500 millimeter, the perforations do not completely empty or drain with each cycle, with the hole sizes and compound rheologies customarily used. A fair amount of rigidity in the printing plate is desired so that it will not stretch or distort during use and will continue to give clean separations after several thousand cycles.

The perforated design contains, or has a mesh, in the range of 250 to 2500, preferably 550 to 1500, holes per square centimeter. The surface area encompassed by the open end of a single perforation is in the range of 0.015 to 0.235 square millimeter. The open or free area of the holes preferably falls within the range of 40 to 75 percent of the total area encompassed by the design. The pull-off resistance, or energy required to separate the printing plate from the metal sheet, decreases as the mesh of the design becomes finer. For the same percentage open area in the design, the finer meshes print with better definition.

In this connection, it is desirable in some instances to recess or form a channel in the obverse or printing side of the design, preferably in the order of 0.0025 to 0.0110 millimeter deep, in order to permit some underflow or spreading out of the compound around each hole. An unduly coarse mesh may give some cumulative smearing when used with a undercut channel. The reverse side of the plate is maintained smooth, i.e. the lattice work about the perforations is on level with the background of the design on the reverse surface of the printing plate. This permits a better doctoring or squeegeeing action and so supports the blade as to prevent wear and flexing of the blade into the holes. Usually the hole size and spacing is uniform throughout the perforated design, but it may be desirable to have some gradation in some gasket applications.

The composition or chemical constituents of the gasket-forming compounds being printed is not too important, nor is the rheology of the compounds too material. Some

trouble is experienced with viscosities below about 10,000 centipoises (Brookfield Model LVF5X No. 4 Spindle, 60 r.p.m., 27° C.). Viscosities as high as 200,000 centipoises can be handled. It is preferred to use relatively plastic or pseudo-plastic compounds to avoid run out or flow of the compound after printing. This may be more precisely defined by saying that it is preferred to use compounds whose PIRV¹ slope falls in the range of 0.3 to 0.6.

The Precision Interchemical Rotary Viscometer determines the flow properties of a compound over a range of shear stresses. The PIRV slope is the logarithmic rate of change of the shear stress with the shear rate as determined by plotting on log-log paper the shear stress in dynes per square centimeter against the shear rate in reciprocal seconds.

From the standpoint of obtaining the relatively heavy film weights desired for can sealing applications, it is preferred that the solids content, i.e. the dry film weight to the wet film weight ratio, of the compounds be in the range of 50 to 100 percent. The compound should wet the surface of the plate being printed, i.e. a 3 to 6 millimeter drop of compound on the surface should have no tendency for withdrawal. A slight enlargement of the drop is preferred. The wettability of the surface being printed can be improved by suitable means such as coating it with a thin adhesive or lacquer.

Generally speaking, compound is not forced through the holes onto the sheet being printed, but is forced into the holes slightly in advance of and at the time the plate is in contact with the sheet. The fluid compound is then removed or pulled from the holes because of its adherence to the sheet. There may be a slight amount of force applied to the compound by the squeegee as separation begins but it is not significant, nor is it desirable because it causes variable flow out and loss of definition.

The rate of separation of the printing plate from the sheet influences, with a great deal of variability, the relative amount of compound that is retained by the plate and the amount which adheres and transfers to the sheet because differences in separation rates result in different shear stresses on the compound being printed, which is usually a non-Newtonian fluid. It is desirable to have a linear line of separation across the width of the printing plate with no or little fluctuation in the shear force along the line in order to obtain uniform film weights. This linear line of separation is obtained with a rigid plate, as opposed to the customary woven and flexible screens that are used in silk screen printing. A woven screen, sometimes initially, but usually after some wear, sags or distorts in the middle of the frame and results in different "snap-off" rates along the line of separation across the width of the screen. Also, it can be appreciated that the problem of obtaining uniform separations makes the use of curvilinear printing plates preferable.

The printing plate is designed to be essentially in contact with the metal sheet at the time transfer of the compound begins. It is desirable not to separate or shim the plate by more than 0.03 millimeter, with a precision of ± 0.003 millimeter with reference to the background of the plate over the line of contact. This on-contact printing is necessary to assure that compound in the perforations has an opportunity to wet and adhere to the sheet. No reliance is placed on the forcing of the plate against the sheet by the squeegee as is the case with flexible screens. Also, off contact printing results in poor definition and non-uniform transfer of the compound across the width of the sheet.

On-contact printing also permits sufficient hydrostatic force to be placed on the compound along the length of the plate by the roller or squeegee spreading it to assure

¹ Precision Interchemical Rotary Viscometer, see: "Precision Scientific Co. Instruction Manual, Catalogue No. 64945," W. B. Barrish, issued June 14, 1955, Precision Scientific Co., 3737 W. Cortland St., Chicago 47, Ill.

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that each hole and design is properly filled prior to separation of the printing plate from the metal sheet. It has been found that the hydrostatic force on the compound, created by moving the squeegee over the plate, varies considerably because of non-uniform squeegeeing velocity, squeegee angle and shape, compound rheology and the like. It is desirable, therefore, to provide for the creation of a considerable excess hydrostatic force on the compound to assure spreading of the compound and filling of the holes, and to prevent overfilling by maintaining the obverse side of the holes in contact with the metal sheet or substantially so in the area of squeegee contact.

The following table gives the physical properties of gasket-forming compounds that can be printed successfully by the technique of this invention.

Compound.....	A	B	C	D
PIRV slope.....	0.37	.59	.55	.49
Total solids, percent.....	85	65	70	100
Brookfield viscosity, centipoises (Model LVF5X, No. 4 Spindle, 25° C.):.....				
6 r.p.m.....	100,000	60,000	85,000	90,000
60 r.p.m.....	21,000	17,000	16,500	12,000

Compound A is a butadiene-styrene-acrylonitrile terpolymer dispersion carried in a paraffinic solvent, with a clay filler added.

Compound B is a SBR rubber (70 weight percent butadiene, 30 weight percent styrene) dispersed in an aromatic solvent, with a small amount of clay filler added.

Compound C is an alcohol dispersion of a low molecular weight liquid neoprene.

Compound D is a polyvinyl chloride plastisol.

The use of a curvilinear perforated printing plate is illustrated in FIGURE 3. The curvilinear design is preferred because it gives clean separation between the printing plate and the sheet being printed. As illustrated (in cross-section) the printing plate 21 is attached to a frame 22 which is shaped to form part of an arc of a cylinder. The radius of curvature when using a curvilinear plate is preferably in the range of 0.05 to 1.5 meters. The obverse face of plate 21 is placed against the surface of the metal sheet 23 which is to receive the gasket shapes. Plate 21 is perforated by holes 24 in the areas where it is desired to print. The squeegee blade 25 is initially placed at one end of the frame on the reverse side of the plate, and that end portion of the plate is placed in contact with sheet 23. Compound 26 to be printed is placed in front of the squeegee blade. The screen and frame is then oscillated or rocked in the direction indicated. The squeegee is activated in such a manner by conventional means (not shown) that it moves synchronously in the direction indicated with the rocking of the printing plate, and is kept just about at the point of tangency between the plate and sheet 23. The printing cycle is repeated by slightly lifting frame 22 and plate 21 up, advancing sheet 23 while oscillating the frame back to the starting position and correspondingly moving the squeegee, and then again bringing the plate in contact with sheet 23.

In FIGURE 4, a printing plate 30 is fabricated into a full cylinder which permits continuous rotary printing and avoids the intermittent step-wise printing methods illustrated in FIGURES 1 and 3. The printing plate 30 is so mounted as to be able to rotate continuously while in contact with the sheet 31 which receives the gaskets. Sheet 31 is continuously advancing in the direction indicated. The printing cylinder is shown in cross-section and contains holes or perforations 32 in the periphery thereof through which compound is transferred to the plate in the pattern desired. Hollow cylinder 30 contains a shoe 33 which operates on the principle of a journal-bearing to develop a hydraulic pressure on the

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compound 34 trapped in the channel between the shoe and the perforated cylinder 30. The radius of the face of the shoe is less than the radius of the roller and is more closely spaced to the cylinder at the bottom. As the compound passes down the channel between the roller and the shoe, it is put under hydraulic pressure, and this pressure forces it into the holes 32 to the obverse side of the perforated cylinder 30. As rotation of cylinder 30 continues, the compound in holes 32 is brought into contact with the surface of sheet 31 and is transferred thereto as previously described. Excess compound, in the particular embodiment illustrated, is scraped off the inner surface of cylinder 30 by doctor blade 35 into area 36 between the doctor blade and the shoe. From there it is transferred by a pump 37 to the upper portion of the channel between the shoe and cylinder 30. Compound can be admitted into the cylinder as needed in any convenient manner such as by an external pump operating through an inlet line in the axis of the cylinder. The picking up of excess compound by doctor blade 35 and transfer thereof by internal pump 37 may not be necessary. The compound can be allowed to stay on the inner surface of cylinder 30 and make a full revolution around the cylinder and be returned to the channel between the shoe and cylinder 30 in this manner.

The plate 30 in this instance has a thickness of 0.185 millimeter and an internal diameter of 92.5 centimeters. The shoe 33 has a radius of curvature on its outer face of 30.8 centimeters and is spaced 38.1 millimeters from the inner surface of the cylinder at its upper point and 0.062 millimeter at its lowest point. Its lowest point is about 0.095 millimeter in advance of the line of tangency between the cylinder and sheet 31.

FIGURE 5 illustrates a method of preparing and placing the etchable design on the metal surface. The design comprises a multiplicity of small independent etchable areas. The etchable areas may be undersize with respect to the finished size of the etched areas to be produced. This depends on the type and thickness of the metal plate being used. The etchable areas are surrounded by a continuous lattice-work of non-etchable areas.

In one method, an enlarged design 40 of the mesh pattern is prepared. It comprises a suitable supporting member having the desired mesh pattern, i.e. a multiplicity of small dots 41 in greatly enlarged detail. The mesh pattern can be prepared, for example, by hand inking or can be taken from an available mesh pattern. By using an enlargement, any errors in the precision of the small etchable areas are greatly reduced when the design is reduced to its finished size. Even so it is preferred that the surface area of the enlarged dots have a precision within ± 5 percent. As noted previously, these dots may be relatively undersized with respect to the final area of the holes to be etched if they were drawn on the same scale. The gasket band design may or may not be superposed on the mesh pattern at this point. As illustrated, the enlarged mesh pattern has been drawn to include the gasket band pattern. However, the band pattern can be placed on the mesh pattern by using a suitable overlay prior to or at the point where the negative master is photographed to produce the positives used to develop the resist on the metal surface.

The enlarged master so prepared is then photographically reduced preferably at least 5 times by conventional methods to produce a positive in step 42 with care being taken to avoid distortion. The positive so obtained is developed and is used in step 43 to develop a resist on the metal surface to be etched. The resist is developed in a conventional manner to give etchable areas corresponding to the original dots 41 of the master.

The technique of preparing a positive print from an enlarged master is useful when an existing mesh design or pattern with sufficient precision cannot be found. Positives have been prepared from suitable mesh patterns

such as a woven screen by directly photographing the pattern without reduction.

It has been found to be particularly advantageous to etch both sides of the plate simultaneously. In order to do this it is necessary to have the minute etchable areas on both sides of the plate in exact registration. This can be done by coating both sides of the plate with a resist, placing the plate between two photographically produced positives which are exact duplicates, with suitable registration marks being present on the positives, and exposing the resist. Exact registration of the mesh design can be assured by photographing a negative master that has suitable registration marks using two films placed together in the camera, and then developing the simultaneously exposed films.

The holes are etched in the plate or roll in step 44, again in a conventional manner. Electrolytic, acid etching and the like may be used. Care has to be taken in the layout of the design and in control of the etching conditions to avoid undercutting and loss of the design or portions thereof before complete perforation of the plate is obtained. It is preferred to so design the etchable areas as to obtain complete through penetration of the etchable areas before full development of the width of each hole has been obtained. This permits the holes to be brought out to size gradually without running into breakthrough between the cavities. The etching action is facilitated by having the edges of the etchable areas about 0.8 to 1.2 millimeters undersize for each millimeter of depth that is to be etched.

Example

A 307 can end gasket design was prepared in the manner illustrated in FIGURE 5. The number 307 refers to a can end that has an outside diameter of $3\frac{7}{16}$ inches after double seaming on a standard American Number 2 can body. The gasket design on the printing plate had an internal diameter of 88 millimeters and an outside diameter of 96 millimeters. The design was composed of a regular pattern of square holes. The width of each of the perforated holes, after etching, was 0.225 millimeter ± 0.015 millimeter, as measured on the surface. There were 990 holes used per square centimeter of the band width, with there being about 13 rows of holes across the width of the band. The perforations created about a 50 percent free open area within the gasket design area.

The master of this design had an internal diameter of 88 millimeters and an outside diameter of 96 millimeters. Each square dot in the master had a width of about 0.200 millimeter ± 0.015 millimeter.

The master was prepared by overlaying 80 mesh bolt-cloth (Tyler) with a negative of the gasket band design. This master, with registration marks thereon, was photographically reproduced with there being two films (Kronar type) in the camera. The simultaneously exposed films were developed to give two positives. The positives were placed on either side of a 6 x 12 x 0.250 millimeter copper plate coated on both sides with a resist (Kodak Photo Resist—Eastman Kodak Company, Catalogue C, 1959), using carbon arc light. Care was taken to assure exact registration of the areas to be etched on both sides of the plate.

It was not necessary here to have the etchable areas appreciably undersize with respect to the final size of the perforations because there is negligible side ways etching with such thin copper sheet and with the thread uniformity offered by the bolting cloth.

The images in the resist were developed to give etchable areas on the metal. The etchable areas were then incrementally etched in a conventional manner using an iron perchlorate solution until the desired hole diameters are reached.

The copper plate so prepared with this 307 can end gasket design in it, along with others of varied hole sizes and patterns, was attached to a supporting frame having

a radius of curvature of 91.5 centimeters. This arrangement was used to print 90 pound tin plate (0.250 millimeter thick) with 307 can end gaskets. The compound used was compound *a* identified in the table, supra. Copper plates cannot be used with some compounds because copper will affect the stability of some compounds. A square edged rubber squeegee was used to force compound into the perforations, and transfer to the sheet was secured by rocking the perforated plate as described in connection with FIGURE 3.

The total wet film weight of the 307 gasket was 119 milligrams and the dry film weight was 85 milligrams. The composition was set to an elastomeric solid by heating at 185° C. for 3 minutes. Gasketed 307 can ends were then stamped from the pattern on the tin plate and were conventionally double seamed onto can end bodies without difficulty.

Number 307 can end gasket designs were also prepared in the following manner, which is preferred because of the precision and simplicity it offers.

A punched metal sheet conventionally used as a filter support was used to obtain the mesh pattern. The punched holes had diameters of 2.97 millimeters and were located on 3.90 millimeters triangular centers. This punched sheet was photographically reproduced to give a positive of the same scale. This positive was then reduced in size seven times to give a negative of the mesh pattern with the white dots thereon corresponding to the areas to be etched having a diameter of 0.420 millimeter ± 0.015 millimeter. This negative was overlaid with a negative of the gasket band design and the composite was used as a master to simultaneously prepare two positives with registration marks as previously described.

The positives were placed on either side of a 0.200 millimeter thick 302 stainless steel sheet coated with a resist, with there being exact registration between the mesh patterns on each side of the metal sheet. The resist coatings were then developed, and the plate was etched on each side to develop the perforations.

The final diameters of the holes after etching was 0.516 millimeter, ± 0.015 millimeter, as measured on the surface. There was 275 holes per square centimeter of the band width of the gasket design, with there being about 6 to 7 rows of holes across the width of the band. The perforations created about a 60 percent free open area within the band area. The band had an internal diameter of 88 millimeters, and an external diameter of 96 millimeters.

Having described this invention, what is sought to be protected by Letters Patent is succinctly set forth in the following claims.

What is claimed is:

1. In a method of fabricating container closure gaskets by transferring a fluid gasket-forming composition through a stencil onto a sheet, said stencil having a permeable area of the desired gasket shape, and subsequently setting the composition so transferred to a deformable solid, the improvement comprising the use of a rigid form-stable sheet as said stencil, the gasket design in the sheet being composed of a multiplicity of small independent perforations with the surrounding continuous lattice-work on the reverse side of the sheet being substantially on a level with the remaining background of the sheet, said sheet having a thickness in the range of 0.100 to 0.500 millimeter, and said design having in the range of 250 to 2500 perforations per square centimeter wherein the perforations occupy 40 to 75% of the total area encompassed by the design.

2. A plate for the printing of container closure gaskets comprising a form-stable sheet having a perforated area of the gasket design desired to be printed, said perforated area consisting of a multiplicity of independent small holes defined by a continuous surrounding lattice-work, said sheet having a thickness in the range of 0.100 to 0.500 millimeter, and said design having in the range of 250 to 2500 perforations per square centimeter wherein

the perforations occupy 40 to 75% of the total area encompassed by the design.

3. The plate of claim 2 when curvilinear.

4. A method of forming a can end gasket on metal sheet comprising placing the obverse face of a form-stable printing plate in contact with the top surface of a metal sheet to receive said gasket, said plate having a can end gasket design therein consisting of a multiplicity of independent small holes, defined by a continuous surrounding lattice-work, placing a fluid gasket-forming composition on the reverse side of said perforated plate, forcing said composition through said holes and into contact with said surface, separating said plate from said sheet and leaving a predetermined amount of compound on said surface, and converting the compound so transferred to a form-stable shape, said sheet having a thickness in the range of 0.100 to 0.500 millimeter, and said design having in the of 250 to 2500 perforations per square centimeter wherein the perforations occupy 40 to 75% of the total area encompassed by the design.

5. The method of claim 4 wherein said fluid gasket-forming composition has a PIRV slope in the range of 0.3 to 0.6.

6. The method of claim 4 wherein said plate is curvilinear and forms essentially a line contact with said metal sheet.

7. The method of claim 6 wherein said compound is forced through said holes from a channel between said

reverse side and a curved member, wherein the compound is subjected to hydraulic pressure.

8. The method of claim 6 wherein said plate forms a full cylinder, and is continuously rotating during the transfer of said compound.

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