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2,988,838

PROCESS OF PREPARING PROTOTYPES OF EMBOSSED SHEETS

Filed Jan. 29, 1958

2 Sheets-Sheet 1

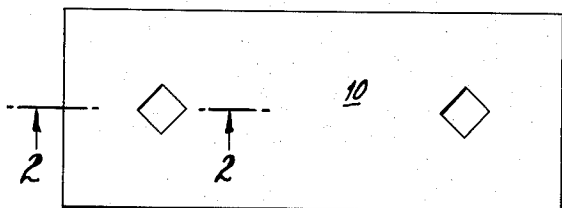


Fig. 1

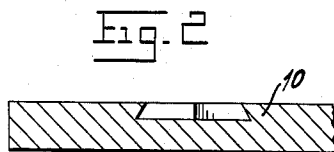


Fig. 2

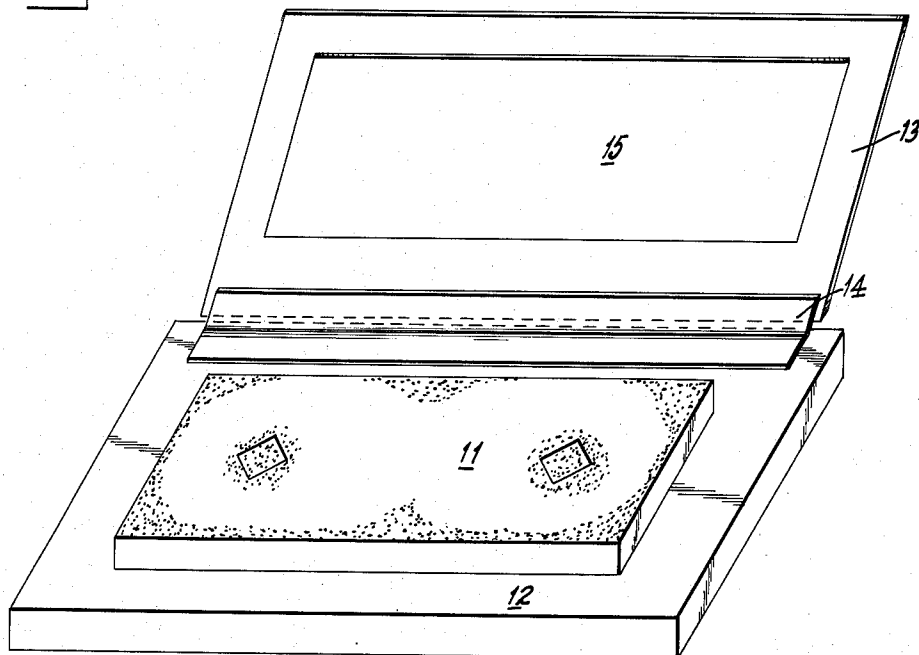


Fig. 4

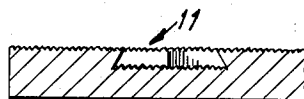


Fig. 3

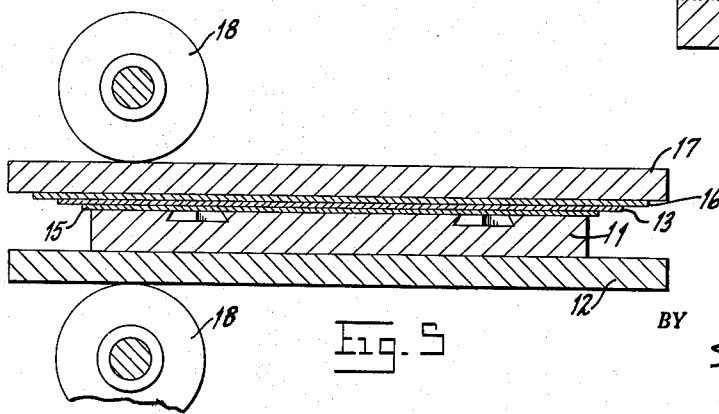


Fig. 5

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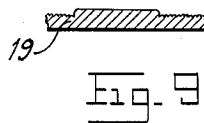
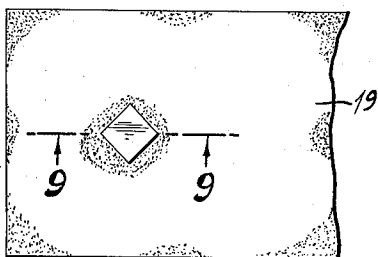
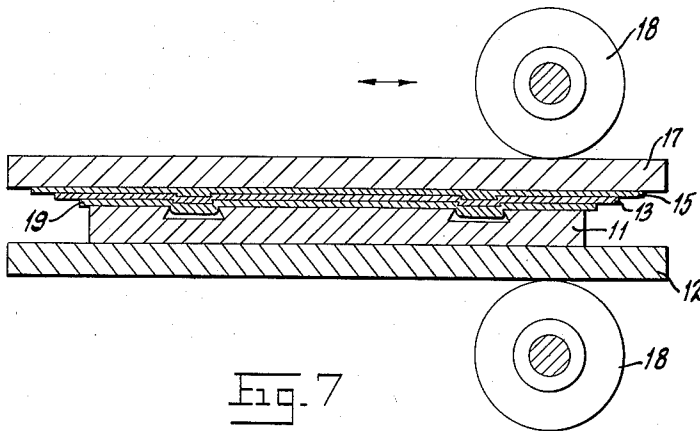
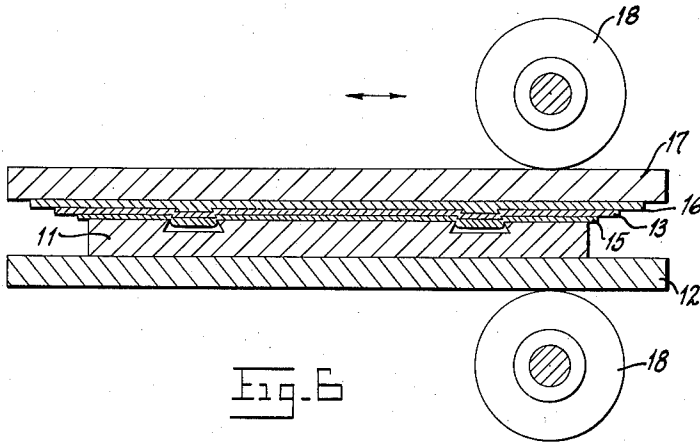
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PROCESS OF PREPARING PROTOTYPES OF EMBOSSED SHEETS

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2 Sheets-Sheet 2



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2,988,838

PROCESS OF PREPARING PROTOTYPES OF EMBOSSSED SHEETS

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3 Claims. (Cl. 41—24)

This invention relates to an inexpensive method of obtaining embossed, debossed or coined sheet material.

Preparation of samples of embossed, debossed or coined material, prior to the building of expensive embossing steel rolls, is a highly desired objective of present day practice. However, up to now there was no method of obtaining and seeing what the finished third dimensional sheet material would look like in the absence of preparing the mated rolls used to obtain both the samples and the finished product.

This invention produces a plurality of samples of substantially the exact qualities that the finished commercially produced product possesses, without the need to produce a pair of mated embossing rolls.

This invention is described herein in conjunction with an accompanying drawing in which:

FIG. 1 is a top plan view of a metal master plate having an etched design therein,

FIG. 2 is an enlarged sectional view taken on line 2—2 of FIG. 1 and showing the undercut edges of the etched design,

FIG. 3 is a section view similar to FIG. 2 but showing an overall surface etching on the master plate.

FIG. 4 is a perspective view of the surface etched master plate disposed upon a bottom backing plate, and showing further a sheet of kraft-paper hingedly secured to the backing plate, said kraft paper having secured adhesively thereto a strip of draftsman's masking tape,

FIG. 5 is a schematic longitudinal section view showing the manner of embossing the tape and a blank metal sheet disposed upon the kraft paper with a top backing plate disposed upon the blank aluminum sheet,

FIG. 6 is a schematic section view similar to FIG. 5 and showing the various sheet materials forced into the etched design of the master plate,

FIG. 7 shows in section view similar to FIG. 6 a metal prototype embossed by the masking tape,

FIG. 8 is a view of the prototype sample sheet and

FIG. 9 is a transverse view taken on line 9—9 of FIG. 8 and showing the design as smooth flat unetched areas on an etched prototype background.

Turning to the drawing a conventionally photoengraved plate 10 is for simplicity provided with photoengraved diamond design.

The surface of plate 10 is roller coated with an acid resistant composition without deposition of the composition within the design itself. The coated sheet is then immersed in a conventional suitable etching solution until a suitable depth is given to the design.

After removal of the roller coated composition by use of solvent, for example benzene, the plate 10 with its design may be spray painted to give a mottled surface with 50 percent of the over-all area covered with paint. In short, the spray painting leaves about 50 percent of the surface area unpainted. The spray paint used is a conventional acid resistant paint, for example the rubber or latex based paints.

The spray painted sheet 10 is then etched in conventional etching solution, for example ferric chloride or nitric acid solution, to give an over-all surface etched sheet 11 (FIG. 3).

If desired the surfaced etched sheet 11 may be cleaned of paint and then may again be spray painted with acid

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resistant paint followed by a second etching step in order to produce an etched surface of unique qualities.

Finishes other than the spray finish described above may be applied to the surface of plate 10 by means of grinding, sanding, milling or engraving each method producing additional surfaces of unique qualities.

The over-all etched, ground, sanded, milled or engraved surface plate 11 is then placed securely as by welding upon a suitably thick backing plate 12 of steel or aluminum of about one-fourth inch thickness.

A sheet of light sheet metal, plastic or strong paper for example kraft paper 13 is secured longitudinally and hingedly to plate 12 by means of adhesive tape 14.

A suitable sheet of masking tape 15 is adhesively secured to the inside surface of kraft paper 13 so that folding over of hinge 14 causes masking tape 15 to be laid upon the etched master plate 11.

As shown in FIG. 5, a blank sheet 16, for example an aluminum sheet of 32 mil thickness is placed upon the kraft paper 13 and a top backing metal plate 17 of similar thickness as bottom backing plate 12 is placed upon the aluminum sheet 16.

The laminate of sheet material is then passed through a pair of suitably spaced apart steel rollers 18, said spacing being equal to the thickness of the metal sheets 11, 12, 16 and 17. It is thus seen that the space between the rollers 18 does not allow for the thickness of the masking tape 15 and the kraft paper 13.

Turning now to FIG. 6, there is shown the sheet material embossed by passing through rollers 18, namely the masking tape 15, the kraft paper 13 and the aluminum sheet 16.

The embossed aluminum sheet 16 is now removed and another smooth aluminum sample sheet 19 of 32 mil thickness is placed upon the master plate 11, which may be made of steel or magnesium, and the laminate of sheets 11, 12, 19, 13, 15 and 17 is passed through rollers 18 set for the thickness only of the metal sheets 11, 12, 19 and 17.

Passage of laminate including the sample of prototype sheet 19 of aluminum through the predetermined setting between rollers 18 causes sheet 19 to be embossed.

As shown in FIG. 6, the pressure employed by the rollers 18 does not force the masking tape 15 (FIG. 6) to engage the horizontal base areas of the etched design. Therefore the masking tape 15 areas forced into these design areas is smooth surfaced, whereas all other surface areas of the masking tape 15 are embossed with the surface etching of master plate 11.

Similarly when sheet 19 is embossed by masking tape 15 and the kraft paper 13, the sheet 19 is forced into the design areas without touching the bottom wall or base of the design (FIG. 7).

The result is that the sample sheet 19 of 32 mil thick aluminum has an etched background surface area upon which there is a raised design having smooth top areas. In short the design is smooth, unetched and highly light reflecting and is in raised relationship to an etched background area.

In obtaining the design on master plate 10 a conventional screen or stencil having the desired design may be used. Preferably plate 10 is made of steel or magnesium. The surface etching, grinding, sanding, milling and engraving is preferably of a depth of 0.5 to 1.5 mils whereas the design depth having undercut edges is preferably of 10 to 15 mils.

The material prototype of sample sheet 19 may be of any suitable sheet material for example, aluminum, steel, aluminum foil, or foil coated paper, paper, plastic, etc. Also in place of masking tape, one can use conventional surgical tape of a textile fabric base or even conventional pressure sensitive tape such as Scotch tape.

Also while the master plate 11 is shown in the drawing secured to a flat backing plate 12, it is obvious that the plate 11 being of a flexible thickness, for example 40 mils, may be secured to a roller, preferably to one-half the circumference of a roller of suitable diameter. Similarly the embossed masking tape 13 and its kraft backing paper may be secured to one-half the circumference of a mating roller of like diameter.

Clearly this invention is of generic concept and includes embodiments other than those shown and described herein. I claim:

1. The process of preparing prototype embossed metal sheets having limited use for making reproductions comprising preparing a composite of a master metal plate having a cavitated design, a sheet of laminate consisting of paper and a pressure sensitive tape placed upon said metal plate with the tape contacting said design thereon, and an embossable metal sheet of aluminum deposited upon said paper, placing said composite between a pair of non-deformable end metal plates, passing said composite and pair of end plates between a pair of metal press rollers having an opening between rollers equal to the thickness of the composite and the end plates less the thickness of the paper and the tape, removing the now embossed aluminum sheet; placing a prototype aluminum sheet between said master plate and said tape on said paper, said prototype sheet having a thickness equal to that of said embossable aluminum sheet, and pressing the prototype sheet between said rollers as previously set without allowance for the thickness of the tape and paper, to thereby emboss said prototype with a sharp design having raised smooth area elevations due to the absence of contact with the cavity bottom walls.

2. The process of preparing prototypes of embossed sheets, comprising the steps of photoengraving a desired design on a master metal plate, placing a laminate sheet of adhesive masking tape bonded to kraft paper upon the photoengraved design, placing an embossable filler sheet

on top of the laminate sheet, pressing said assembly of superposed sheets and the master plate together between a pair of backing plates to emboss the design onto the laminate and the filler sheet, removing the filler sheet, placing between the embossed laminate and the master plate an embossable sheet intended to become a prototype, and pressing the last-mentioned assembly of superposed sheets and the master plate together between the pair of backing plates to emboss the prototype sheet.

3. The process of preparing prototypes of embossed sheets, comprising the steps of engraving a desired design on a master metal plate, placing an emboss-retaining laminate sheet of embossable sheet material adhesively bonded to a second sheet of embossable material upon the engraved master plate design, placing an embossable filler sheet on top of the laminate sheet, pressing said assembly of superposed sheets and the master plate together between a pair of backing plates to emboss the design onto the laminate and the filler sheets, removing the filler sheet, placing between the embossed laminate sheet and the master plate a prototype embossable sheet intended to become a prototype, and pressing the last-mentioned assembly of superposed sheets including the embossed laminate sheet and prototype embossable sheet and the master plate together between the pair of backing plates to emboss the prototype sheet with the engraved design.

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