

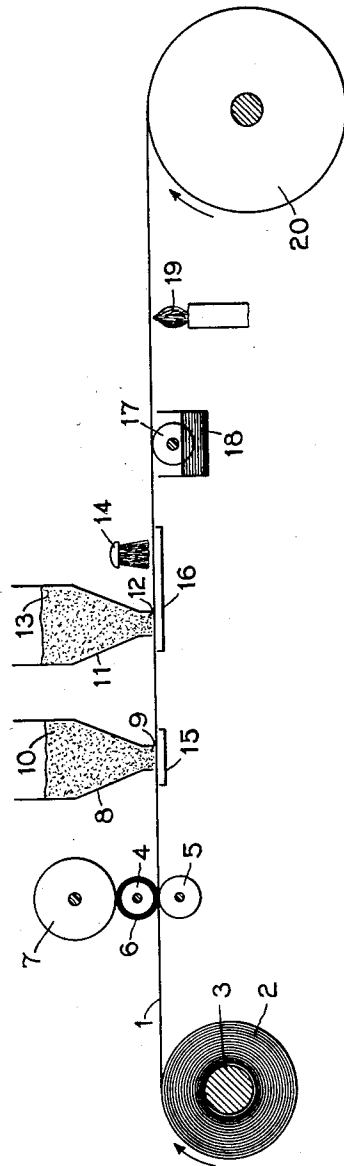
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METHOD OF AND MEANS FOR ETCHING METALS

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METHOD OF AND MEANS FOR ETCHING
METALS

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6 Claims. (Cl. 41—43)

My invention relates to etching and more particularly to a process of and means for etching a metal strip of relatively great length, herein-after termed a "continuous" strip of metal.

In the present day commercial exploitation of machines and other articles of manufacture it is the custom to attach thereto a metal nameplate bearing insignia denoting the source of manufacture, power rating, instructions, guarantee, etc. Such nameplates are usually required in relatively large number, and it has been found practicable to etch the insignia thereon. If desired, the etched portions of the plate may be coated with a lacquer or paint for decorative purposes and the whole coated with a protective clear varnish.

Heretofore, however, the processes of etching employed in the preparation of nameplates and similar articles required in large numbers has involved the handling of a large number of sheets of metal of relatively small size. In the lithographic process, for example, a lithographic plate is first prepared having thereon, in lithographic ink, the proper design which ordinarily comprises a limited number of repetitions of the design of the nameplate or similar article desired. The lithographic plate is then moistened and coated with a suitable printer's ink or ink resist and a rubber covered roller is passed thereover and over a suitably dimensioned plate of the metal to be etched. Subsequently, the plate of metal to be etched, with the desired design indicated thereon in a suitable resist, is immersed in a bath of the proper acid and the design is etched thereon.

It will be apparent that when it is desired to produce a large number of nameplates or similar articles by the etching processes now in use, the time expended and labor involved in handling the required large number of separate sheets of metal, not only in the etching process itself, but in the subsequent lacquering, scraping and cutting thereof into individual nameplates, tends to entail a labor cost in excess of the economic value of the nameplates to the eventual user.

The processes of and means for etching metals now in use are furthermore not adapted to readily handle metal plates or strips in excess of a few feet in length. In some industrial applications use can be found for either long strips of metal or irregular lengths of metal strip having thereon a suitable decorative design. Heretofore it has not been found either economical or practical to employ an etching process in the preparation of metal strip for such purposes, mainly for the reason that the etching processes

now available can at the best produce only etched strips having a relatively short maximum length.

In accordance with my invention I print the desired design upon a surface of a continuous strip of the metal to be etched, the length of which may be as great as desired. The printing is done either in an ink resist or in an ink which may later be converted into an acid resist, and the reverse side of the metal strip is also provided with an acid resisting coating. For applying the design to the metal I employ a cylinder or roll having a surface of rubber or other similar material, upon the circumferential surface of which the desired design has been formed or impressed or imprinted. A suitable ink is applied to the surface of the roll and the metal strip is moved past the roll in contact with the surface thereof. After the required design has been applied to the metal in resist, the metal strip may be reeled on a suitable drum in such a manner as to leave the surface thereof exposed, and the drum may be immersed in a suitable acid bath; or the strip may be continuously passed through an acid bath, to etch the design therein.

A better understanding of my invention and of its advantages will be had from a consideration of the following particular description thereof and the accompanying drawing. The features of my invention which I believe to be new and patentable are pointed out with particularity in the claims appended hereto.

The single figure of the drawing is a schematic representation of an apparatus in accordance with my invention.

Referring to the drawing, I have represented at 1 a strip of metal which is drawn from the coil 2 mounted on the spindle 3. The strip 1 may be of any of the metals commonly employed, such as aluminum, brass, zinc, nickel silver, or stainless steel, and is first passed between a printing roll 4 and a pressure roll 5 mounted in adjustable relation in a suitable frame (not shown).

The printing roll 4 comprises preferably a metal cylinder having a rubber printing plate 6 mounted thereon, the plate 6 being formed with the required design in its outer surface, and being secured firmly to the metal cylinder 4 by a suitable cement. The use of a rubber printing plate mounted on a metal roll is not essential but is desirable from the point of view of economy since the metal roll 4 must be accurately machined in its support for satisfactory results. Alternatively any of the well known continuous printing mechanisms might be used, as for example an

offset printing mechanism employing a roll having the required design impressed or imprinted on the circumferential surface thereof.

The pressure roll 5 which is mounted in the same frame vertically below roll 4, is ordinarily made adjustable vertically with respect thereto, and is preferably so adjusted that the metal strip 1 in passing between rolls 4 and 5 just contacts the outer surface of the printing plate 6 on roll 4. This adjustment has been found to be essential in order to secure an accurate transfer of the design on plate 6 to the metal strip 1.

The surface of roll 4 or of plate 6 is provided with a coating of ink by means of the inking roll 7 mounted vertically above the roll 4. The ink employed may be merely a printer's ink such as that known as commercial "G" ink containing a proportion of asphaltum, or it may be any of the well known ink resists employed in etching processes. The ink is applied to the raised portions of the design on the surface of roll 4 or plate 6 and, as the strip 1 moves between the rolls 4 and 5 is transferred to the upper surface of strip 1. In the process illustrated in the drawing, the ink employed is a commercial printer's ink containing a proportion of asphaltum, which, in itself, is not an acid resist, and subsequent steps in the process are required for applying a suitable acid resist to the inked parts of the design thus registered on the upper surface of strip 1.

After passing under the roll 4, the strip 1 bearing the required inked design is passed beneath a hopper 8 having an opening 9 and containing a quantity of a powdered material 10. The powdered material 10 requires the properties of having an affinity for the ink used, and of being convertible to an acid resist in conformity with the inked design on the surface of strip 1. When commercial "G" ink is used powdered asphaltum is a suitable material.

After passing beneath the hopper 8 the strip 1 is passed beneath a similar hopper 11 having an opening 12 and containing a quantity of powdered talc 13. The talc serves to dry up the ink and aids in completely removing the powdered asphaltum from the clean metal of strip 1 and the excess powdered talc and asphaltum are removed by the soft brush 14. Suitable trays 15 and 16 may be provided to catch the powdered asphaltum and talc spilled from the hoppers 8 and 11 respectively.

The strip 1 is then given an acid resistant coating on the reverse side thereof, as for example a coating of an asphaltum varnish solution applied by the roller 17 dipping into the solution 18, and the strip is then heated by the flame 19 to convert the powdered asphaltum into an acid resist conforming to the inked design registered on the upper surface of strip 1. When this has been done, the strip is ready for immersion in an acid bath.

In the drawing I have illustrated the reel 20 on which the strip may be wound. Preferably the reel 20 is moved axially as it rotates so that the strip 1 is wound helically thereon in order to leave the upper surface thereof exposed to the etching liquid. Alternatively, the strip 1 may be slowly passed through a suitably arranged bath and subsequently after etching wound into a coil for convenient handling. Suitable means either manual or automatic (not shown) are provided for rotating the reel 20 in the direction of the arrow, in order to draw the strip 1 from the coil 2 and past the roll 4, hoppers 8 and 11, roll 17 and flame 19. In the alternative above suggested suitable means will also be provided for driving the strip 1.

Ordinarily after etching it is desirable to coat the etched portions of the metal with a suitable decorative lacquer or paint. This may be conveniently done by first spraying the whole strip after which the strip is passed beneath a fiber scraper. The scraper touches only the high spots of the design, i. e. the spots which were coated with resist, and the lacquer and resist on these spots is readily removed.

From the above description it will be apparent that the process of my invention affords many advantages not found in the processes of etching metals now in use. Not only does the process of my invention eliminate the individual handling of a large number of metal pieces, but it also permits the use of automatic machinery with attendant savings in production cost. Furthermore, the process of my invention permits the application of etching processes to the ornamentation of metal articles not heretofore readily adapted to such processes, and consequently opens up a new field of application for the etching art.

While I have shown and described above, in accordance with the patent statutes, a specific embodiment of my invention, it will be apparent to those skilled in the art that many modifications thereof may be made, and I aim in the claims appended hereto, to cover all such modifications and variations falling within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. The process of producing an etched metal strip of greatly extended length which comprises moving a continuous strip of metal in a longitudinal direction and in the course of the movement repeatedly applying an ink design to a surface of said strip, applying to said ink design a powdered material capable of forming a resist when heated, applying a resist coating to the reverse surface of said strip, heating said strip, all of said steps being performed during the movement of said strip and subsequently subjecting said strip to an etching treatment.

2. The process of producing an etched metal strip of greatly extended length which comprises moving a continuous strip of metal in a longitudinal direction and in the course of the movement repeatedly applying an ink design to a surface of said strip, dusting said inked surface with a powdered material capable of forming a resist when heated, removing the excess powdered material, and heating said strip whereby said ink design is converted into a resist design, all of said steps being performed during the movement of said strip and subsequently subjecting said surface to an etching treatment.

3. The process of producing an etched metal strip of greatly extended length which comprises moving a continuous strip of metal in a longitudinal direction and in the course of the movement applying a coating of printer's ink to portions of a surface of said strip in conformity with a design, dusting said surface with powdered asphaltum and talc, removing the excess asphaltum and talc, and heating said strip whereby said asphaltum is melted to form an acid resistant coating conforming to said design, and subsequently subjecting said surface to an etching treatment.

4. A method of etching comprising moving a continuous metal strip in a longitudinal direc-

tion, applying an ink design to a surface of the strip, applying asphaltum powder to the inked surface, applying talc powder to said surface, removing excess powder from said surface, heating
5 said strip to convert the asphaltum powder into an acid resist, all of said steps being performed during the movement of said strip, and subsequently subjecting said surface to an etching treatment.

10 5. A method of etching comprising moving a continuous metal strip in a longitudinal direction, applying an ink design to one surface of the strip, applying asphaltum powder to the inked surface, applying talc powder to said surface, removing excess powder from said surface, applying
15 an asphaltum varnish coating to the reverse surface of the strip, heating said strip to convert the asphaltum powder into an acid resist, all of

said steps being performed during the movement of said strip, and subsequently subjecting said strip to an etching treatment.

6. A method of etching comprising moving a continuous metal strip in a longitudinal direction, applying an ink design to one surface of the strip, applying asphaltum powder to the inked surface, applying talc powder to said surface, removing excess powder from said surface, applying
5 an asphaltum varnish coating to the reverse surface of the strip, heating said strip to convert the asphaltum powder into an acid resist, all of said steps being performed during the movement of said strip, winding the strip into a helix with the inked surface exposed outermost, and subjecting
10 said helix to an etching treatment. 15

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