March 13, 1934. J. G. MARK 1,950,684

PREPARING LITHOGRAPHIC STONES

Filed Aug. 20, 1929

Fig. 1.

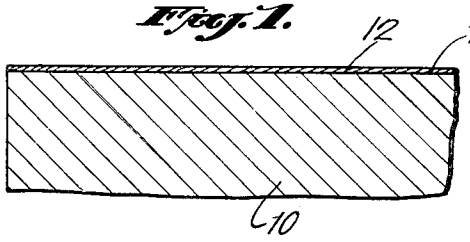


Fig. 2.

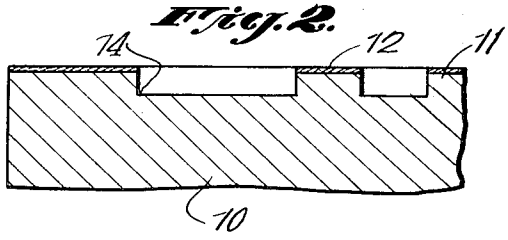


Fig. 3.

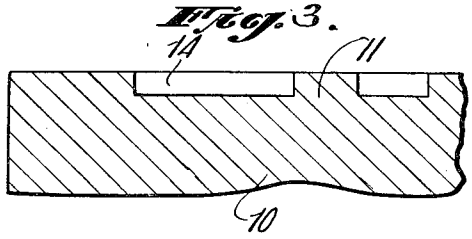


Fig. 4.

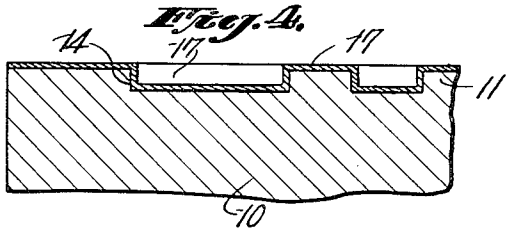


Fig. 5.

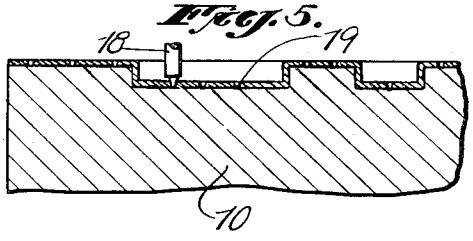


Fig. 6.

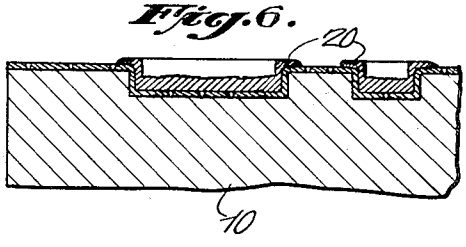


Fig. 7.

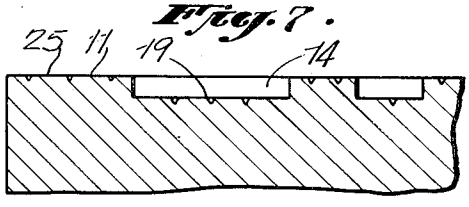




Fig. 8.

Inventor

JOHN G. MARK.

By Clarence A. O'Brien

Attorney

Patented Mar. 13, 1934

1,950,684

UNITED STATES PATENT OFFICE

1,950,684

PREPARING LITHOGRAPHIC STONES

John G. Mark, New York, N. Y.

Application August 20, 1929, Serial No. 387,270

3 Claims. (Cl. 41—41.5)

This invention relates to a process of preparing lithographic stones for printing therewith, and an important object of the invention is to provide for preparing a lithographic stone so that a single stone may be utilized to print in one operation a design having a two-tone effect.

The invention also comprises the novel printing process employing a lithographic stone prepared in accordance with the invention in a lithographic press wherein an impression is made upon the paper by conventional lithographic press methods.

It is the present custom to print checks and other negotiable instrument forms on what is known as "safety paper", which is not only expensive but affords inadequate protection against alterations and erasures of the printing or writing thereon which can be made by experts without detection. It is an important object of my invention to provide a process for preparing lithographic stones for printing on ordinary paper to provide paper for negotiable instrument forms on which alterations and erasures cannot be made without detection, thereby providing adequate protection while reducing the cost of the negotiable instrument forms.

Other objects of the invention are to provide a process of the character referred to which is extremely simple and reliable in operation and does not require much technical skill, and enables increased production and a reduction in cost.

It has heretofore been customary in lithographic work when printing two or more tones or tints to make two more impressions (printing operations) such as printing first the heavier or deeper tone and then printing the lighter tone over the first impression. As already pointed out the present invention provides for the printing in a lithographic printing process of a two-tone impression in one printing operation.

In order that the invention may be clearly understood, reference is made to the accompanying drawing and to the following description.

In the drawing illustrating the steps in the process:—

Figure 1 is a transverse vertical sectional view through a lithographic stone after polishing in the usual manner and having imposed thereon a coating of etching composition.

Figure 2 is a view similar to Figure 1 showing the stone hand-engraved.

Figure 3 shows the hand-engraved stone with the etching coating cleaned off.

Figure 4 shows the ground coating imposed on the cleaned off surface of the stone.

Figure 5 shows how the ground coating is pierced by one of the engraving points of the pantograph, the engraving point penetrating the ground coating only to a distance flush with the surface of the stone so as to avoid marking the surface of the stone.

Figure 6 shows how the protective coating is applied to protect the edges of the hand-engraving during the counter-etching operation.

Figure 7 shows the stone after the counter-etching operation and the inking in, followed by the cleaning off of the protective coating and the ground coating.

Figure 8 is an illustration of the character of the fine line printing produced by the printing process of the invention.

In preparing a lithographic stone for printing in accordance with the invention, the stone 10 is first provided with a highly polished printing surface 11. This printing surface 11 is then etched to render it ink resistant by applying thereto a coating 12 (see Figure 1) of an etching composition consisting of gum arabic and muriatic acid.

The heavy lines or marks of the design are then relatively deeply cut through the coating 12 and into the surface 11 of the stone by hand to produce the deep engravings 12 as shown in Figure 2. The etching coating 12 is then washed off with turpentine and water (see Figure 3), and when the surface 11 has dried, a ground coating 17 is applied thereto as shown in Figure 4, the coating 17 being applied so as to cover also the bottom and sides of the hand engravings 14.

The ground coating 17 is resistant to the etching action of acid baths such as a mixture of an organic and a mineral acid in the form of acetic acid and hydrochloric acid or the like, which in the present instance is composed of

Sulphuric ether	⅛ oz.
Turpentine	¼ oz.
Venetian turpentine	1/16 oz.
Pure beeswax	1 oz.
Asphaltum	¼ oz.
White dammar varnish	4 oz.

This ground coating dries very quickly and when dry is easily penetrated by the fine engraving points of the pantograph and the resulting lines cut therethrough by the engraving points will not heal or fill in but will remain clean cut.

The ground coating having dried the stone is ready for the fine-line engraving by the pantograph, which results in the lighter tones of the printed design. The fine lines will usually follow some scheme, a number of which form a background for the deeper toned portions of the design. After the scheme of the fine-line background has been selected an enlarged master plate thereof is prepared for use in the pantograph, the pantograph having a suitable number of engraving points 18, preferably diamond points, to engrave the stone with the required multiplication of the scheme on a reduced scale simultaneously. The points 18 are then applied to the stone. It is arranged that in acting upon the surface of the stone the points 18 shall pierce the ground coating 17 and penetrate completely therethrough to, but not into, the surface 11 of the stone, so as only to expose but not mark the surface 11, as shown in Figure 5.

At the places where the points 18 cut through the ground coating 17 at the edges of the hand engraving 14, the edges of the hand engraving will be exposed so that unless protective measures be taken to prevent it, the definition of the edges of the hand engravings 14 will be impaired by the next etching operation. To prevent this impairment of the hand engravings 14, there is applied over the mentioned edges and upon the floor of the hand engravings (as shown in Figure 6) a coating of some suitable material such as asphaltum, which I have found to be very satisfactory for this purpose.

The fine lines 19 produced by the points 18 are little more than scratches through the coating 17 to, but not into, the surface 11 of the stone 10 and are for this reason inadequately illustrated in the drawing by the marks used therein.

With the stone processed to the point shown in Figure 6, a counter-etching solution is applied thereto in order to eat away to a suitable depth portions of the surface 11 exposed by the cuts 19 to leave on the surface 11 slight depressions or marks corresponding to the cuts made by the pantograph points 18 through the ground 17.

At the termination of this counter-etching, the stone is inked in, the protective coatings 20 removed, and the surface then washed with turpentine to remove the coating 17, the thus completely processed stone being shown in Figure 7. The surface portion 25 of the stone remains sufficiently etched by the coating 12 to be ink resistant but the counter-etched portions of the stone, namely the hand engravings 14 and the pantograph engravings 19 readily take ink.

As the hand engravings 14 hold more ink they will print darker than the pantograph engravings 19 which hold only a small amount of ink, so that when printed the hand engravings will appear as set off by a light-toned back-ground. The lines forming the background are so fine that it is impossible to erase and replace any of them by hand without detection.

I claim:

1. A process of preparing a lithographic stone for printing simultaneously solid engraved matter and overlying fine hairline tint lines, said process comprising applying to the engraved surface of an ordinary lithographic stone, a ground coating capable of retaining without healing a multiplicity of fine linear punctures, then piercing the ground coating so as to produce therein a multiplicity of fine lines, said piercing being done to but not into the engraved surface of the stone, then counter-etching the portions of the engraved surface of the stone exposed by lines, and removing the ground coating.

2. A process of preparing a lithographic stone to print two or more tones simultaneously, said process comprising applying to the engraved surface of an engraved lithographic stone a ground coating capable upon congealing thereon of retaining the form of a multiplicity of fine linear punctures made therein, piercing said ground coating so as to produce therein a multiplicity of fine linear punctures therein through the ground coating but not into the engraved surface of the stone, then counter-etching the portions of the engraved surface of the stone exposed by the linear punctures so as to produce on the engraved surface fine lines, some of said fine lines intersecting the engraving on the engraved surface, and applying ink to the engraved and fine line equipped surface.

3. A process of preparing a lithographic stone to print two or more tones simultaneously, said process comprising applying to the engraved surface of an engraved lithographic stone a ground coating capable upon congealing thereon of retaining the form of a multiplicity of fine linear punctures made therein, piercing said ground coating so as to produce therein a multiplicity of fine linear punctures therein through the ground coating but not into the engraved surface of the stone, then counter-etching the portions of the engraved surface of the stone exposed by the linear punctures so as to produce on the engraved surface fine lines, some of said fine lines intersecting the engraving on the engraved surface, and applying ink to the engraved and fine line equipped surface, said linear punctures being continuous so as to produce continuous fine lines.

JOHN G. MARK.