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W. SÄUBERLICH
PROCESS FOR THE PRODUCTION OF SHAPED INKING ROLLERS
FOR STEEL ENGRAVING OR INTAGLIO PRINTING
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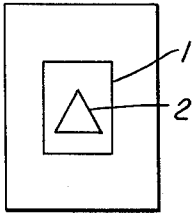


Fig. 1

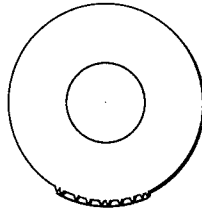


Fig. 2

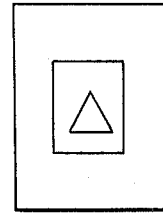


Fig. 3

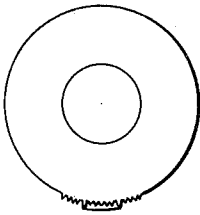


Fig. 4

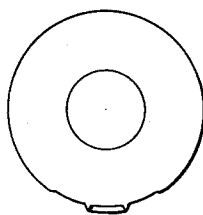


Fig. 5

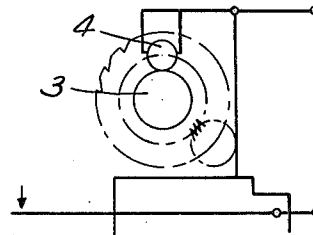


Fig. 6

INVENTOR

Willy Sauberlich

BY
Watson, Cole, Grindle + Watson
ATTORNEYS

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PROCESS FOR THE PRODUCTION OF SHAPED INKING ROLLERS FOR STEEL ENGRAVING OR INTAGLIO PRINTING

Willy Säuberlich, Darmstadt-Eberstadt, Germany, assignor to Maschinenfabrik Goebel G.m.b.H., Darmstadt, Germany

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5 Claims. (Cl. 101—211)

For the production of multicolor prints by means of steel engraving or intaglio printing, one can use, instead of one grooved cylinder for each color, a common grooved or plate cylinder for all colors; this grooved or plate cylinder being inked in the places intended for each color by a number of inking rollers that corresponds to the number of varying colors. The object of this invention consists in processes for the production of the surface of these inking rollers whose profile in the places provided for the inking is raised with respect to the other parts of the roller.

Various processes are known for the production of such inking rollers for this purpose. One of these processes consists in the following steps. The shaped or grooved cylinder is inked in the places intended for inking and these inked places are transferred to the various inking rollers by successive hobbing. In this manner, the places on these inking rollers, which are higher than the rest of the surface, are inked and the depression of the surface in places that do not give off ink is then accomplished by cutting the appropriate material away. This process is greatly dependent on skill and is difficult to use when the mold contains a multitude of identical multicolored units. This applies especially to stamps and similar printing products, where a very large number of identical units appears on one printing block.

In another process, one starts from the limiting lines of the individual colors, which are drawn on a special film, which are then reproduced in accordance with the number of units, and which are copied on a plate from which the individual inking rollers are printed after the etching of the limiting lines. After this comparatively complicated procedure, the individual inking rollers are cut in accordance with the printed limiting lines in the manner indicated above, but here again the result depends to a great extent on skill.

This invention is based on simplifying the process of making the inking rollers involved and the task of modifying the process so that the subjective factor will be eliminated as much as possible. According to the invention, this can be done by making a transfer roll from the original gravure (engraved) plate and from this transfer roll, another plate is stamped deep enough so that the stamping will reveal the position of the limiting lines which must subsequently be engraved by hand. These limiting lines are transferred in the form of raised lines by stamping on one transfer roll for each color, after the plate has been hardened. Of these lines, only the lines corresponding to a certain color remain on each transfer roll while the other lines are removed by a mechanical process, but if necessary, the remaining surfaces of the transfer roll can also be cut deeper by means of subsequent reworking. After the hardening of each transfer roll, these remaining lines serve as cutters for the

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shaping of the inking roller assigned to the particular color.

The transfer rolls, which have been made in this manner and which serve as cutter rollers, are then rolled off in a transfer machine together with the inking rollers which have an elastic or plastic cover, whereby the cover of the inking rollers is cut in accordance with the profile of the inking surfaces. The shaping of the inking rollers can be facilitated after the cutting by providing these rollers with an exterior elastic or plastic layer whose interior surface is separated from a harder base layer by an intermediate layer which makes it possible to remove the exterior layer from the base layer at the cut surfaces without any trouble.

If, in the inking process, two color surfaces are to adjoin each other, it is often practical to engrave separate limiting lines for each of the two colors and these limiting lines consist of two lines running parallel at a small interval from each other, and thus each color then has its own limiting line. A similar effect can be obtained by reworking the cutters located on the transfer rolls somewhat, so that the cutters for both colors are shifted into the area of the other color by a fraction of a millimeter. This causes the edges of the two colors to overlap a small amount, but this overlapping must be so minute as to be invisible to the naked eye. In case of flaws between the individual colors, this overlapping prevents the development of an unprinted strip along the limiting lines, which always has a disturbing effect.

The invention will be further explained with the aid of the attached drawings in which:

FIGURE 1 is a plan view diagrammatically showing an engraved plate,

FIGURE 2 is an end view of a transfer roll,

FIGURE 3 is a plan view of a plate showing deeper limit lines,

FIGURE 4 is an end view diagrammatically showing a transfer roll,

FIGURE 5 is an end view of the roller of FIGURE 4 showing a deeper cutting, and

FIGURE 6 is a diagrammatic view of a transfer machine for making the inking rollers.

FIGURE 1 shows an engraved plate, such as is normally used for the production of grooved or shaped cylinders, especially in the steel engraving printing process wherein the transfer rolls are made from these gravure plates in the usual manner and these transfer rolls roll off on the steel engraved cylinder in a transfer machine. As a result, the circumference of this cylinder receives the picture or pictures corresponding to the engravings.

In the production of the rollers used for inking the colors onto the steel engraving cylinder, one starts, according to the invention, from the same engraved plate as in FIGURE 1. It is assumed that the plate is engraved only within the limiting lines designated by 1 and that the picture contained in this engraving is to be printed in two different colors. One of these colors, for instance red, is to extend throughout the interior triangle whose surface is designated by 2. Outside of this triangular surface 2, the picture is to be given another color, for example, blue, whereby the outer edge of the blue color surface is limited by the rectangle formed by lines 1.

A transfer roll is made from the engraved plate in the usual manner and this transfer roll is used for impressing

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the steel engraving cylinder. In addition, the same transfer roll, which is indicated in FIGURE 2, is used to stamp a plate which is shown diagrammatically in FIGURE 3 and which is essentially like the engraving plate of FIGURE 1. The stamping of the second plate as per FIGURE 3 need not be so deep as to correspond completely to the engraved plate as in FIGURE 1. It suffices to make the engraving lines discernible to the extent that one can determine with precision where the limiting lines of the two surfaces must be located. These limiting lines, which for the red color of course again form a triangle and which for the blue color form the same triangle at the inside and a rectangle at the outside, are retraced by hand and reworked in a manner rendering them as deep as required for the rolling-off of a further transfer roll on this plate. The limiting lines on this plate thus are deeper, according to FIGURE 3, than the normal engraving lines and the difference here is about 0.1 mm. or a little more.

After the limiting lines have been given the required depth, the second plate is hardened. From this hardened plate, at least one transfer roll is to be stamped for each color that is to be printed. The limiting lines engraved into the plate appear at the circumference of the transfer rolls as knife-like elevations. Since each of these transfer rolls is intended only for the production of an inking roller for a certain color, only those knife-like elevations remain standing which are assigned to this particular color. For example for the production of the inking roller for the red color, only the triangular limiting lines for the red color remain. The other limiting lines and any possible markings of the engraving lines present on the transfer roll are removed and all surfaces inside and outside the mentioned limiting lines are placed deeper. The elevations on the circumference of the transfer roll therefore are comparatively low after the stamping of the plate according to FIGURE 3. This has been indicated diagrammatically in the transfer roll in FIGURE 4. If the transfer roll is then reworked in the described manner by deeper cutting, as shown in FIGURE 5, the transfer roll can be used as a cutter roller immediately after hardening.

Another transfer roll is made for the blue color in the same manner. This transfer roll contains the same internal triangular limiting line, since the red color is not supposed to overlap the blue color during printing. Furthermore, the limiting lines corresponding to lines 1 may remain on this transfer roll, in so far as the blue color need be applied only within these limits. The outer limitation of the blue color is however not absolutely required, because there are no engraving lines outside the limiting lines 1, so that the color applied outside the limiting lines is wiped off the steel engraved cylinder and is therefore not printed. As indicated, it is advisable to have the colors overlap each other a little along their limiting lines. For this reason, the outer limiting line of the red color must deviate slightly from the inner limiting line of the blue color in a manner causing both colors to overlap slightly. This can be done either by engraving two closely parallel limiting lines into the plate, in FIGURE 3, or by reworking the knife-like elevations so that the cutters of one of the transfer rolls will be worked off slightly toward the one side, while the cutters of the other transfer roll are worked off slightly toward the other side.

The transfer rolls worked in this manner are first hardened and then are placed in a transfer machine and this has been indicated diagrammatically in FIGURE 6. The roller, which is securely mounted in the machine and which is to be shaped, is designated by 3 and the transfer roll 4 is pressed against roller 3 and serves as a cutting roller in the described manner. The cutting or stamping of roller 3 by the cutters of roller 4 is accomplished by having the two rollers roll off against each other in the same manner as in the stamping of a steel engraved cylinder. The transmission ratios of the gear wheels can

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be so fixed inside the transfer machine that they will correspond to the transmission ratio between the steel engraving cylinder and the inking roller. This makes it possible to use the same index rim in both cases, so that the graduation of the inking roller will exactly agree with the graduation of the steel engraved cylinder onto which the color is to be transferred.

Once the transfer roll has cut into the surface of roller 3 by rolling off against it, these cuts correspond exactly to the limiting lines of the color which is to be applied to the steel engraved cylinder by the roller that has been cut in this manner. After the cutting, it is therefore necessary to remove only those parts of the roller surface which, depending on the position of the color in the picture, are located outside or inside the cut limiting lines.

The removal of those parts of the roller surface which are not to transmit any color can be facilitated considerably by having the roller coating or cover consist of several layers. If the outer layer consists of an elastic or plastic material and if it is separated from a harder layer below it by means of an intermediate layer which makes it possible to remove the outer layer from the base layer without any trouble, then all the parts of the roller circumference, which are located either outside or inside the cut limiting lines, can very easily be removed. In this manner, any shaping of the outside circumference of the inking rollers required for color application can be produced in a very short time.

I claim as my invention:

1. A process for shaping and profiling inking rollers for the application of several colors on limited partial surfaces of an intaglio or steel engraved grooved cylinder of a printing machine, comprising the steps of making a transfer roll from an original engraved plate, producing a further plate from said transfer roll by stamping so deep that the stamping will reveal the position of the limiting lines, engraving said limiting lines by hand, hardening said further plate and then transferring the limiting lines by stamping onto one transfer roll for each color in the form of raised lines, removing from the transfer rolls for the respective colors the limiting lines not corresponding to the certain color assigned to each of said transfer rolls while cutting deeper through reworking all surfaces inside and outside the remaining limiting lines on said transfer rolls, hardening said transfer rolls, and using said transfer rolls as cutters for shaping and profiling the inking rollers assigned to the respective colors.

2. A process according to claim 1, in which the boundaries of the two directly adjacent colors are shifted into the area of the other color by engraving two parallel lines a slight distance from each other so that the edges of both colors overlap by a fraction of a millimeter.

3. A process according to claim 1, in which the inking rollers are provided with an elastic coating and roll off in a transfer machine together with the corresponding transfer rolls, whereby the lines are cut by said transfer rolls according to the profile of the color surfaces.

4. A process according to claim 1, in which the boundaries of the two directly adjacent colors are shifted into the area of the other color by reworking the cutters so that the edges of both colors overlap by a fraction of a millimeter.

5. A process for shaping and profiling inking rollers for the application of several colors on limited partial surfaces of an intaglio or steel engraved cylinder of a printing machine, comprising the steps of making a transfer roll from an original engraved plate, producing a further plate from said transfer roll by stamping so deep that the stamping will reveal the position of the limiting lines, engraving said limiting lines by hand, hardening said further plate and then transferring the limiting lines by stamping onto one transfer roll for each color in the form of raised lines, removing from the transfer rolls for the respective colors the limiting lines not correspond-

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ing to the certain color assigned to each of said transfer rolls, hardening said transfer rolls, and using said transfer rolls as cutters for shaping and profiling the inking rollers assigned to the respective colors.

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