July 23, 1968 E. N. BAKER 3,393,618

PRINTING CONTROL

Original Filed Feb. 26, 1962 2 Sheets-Sheet 1

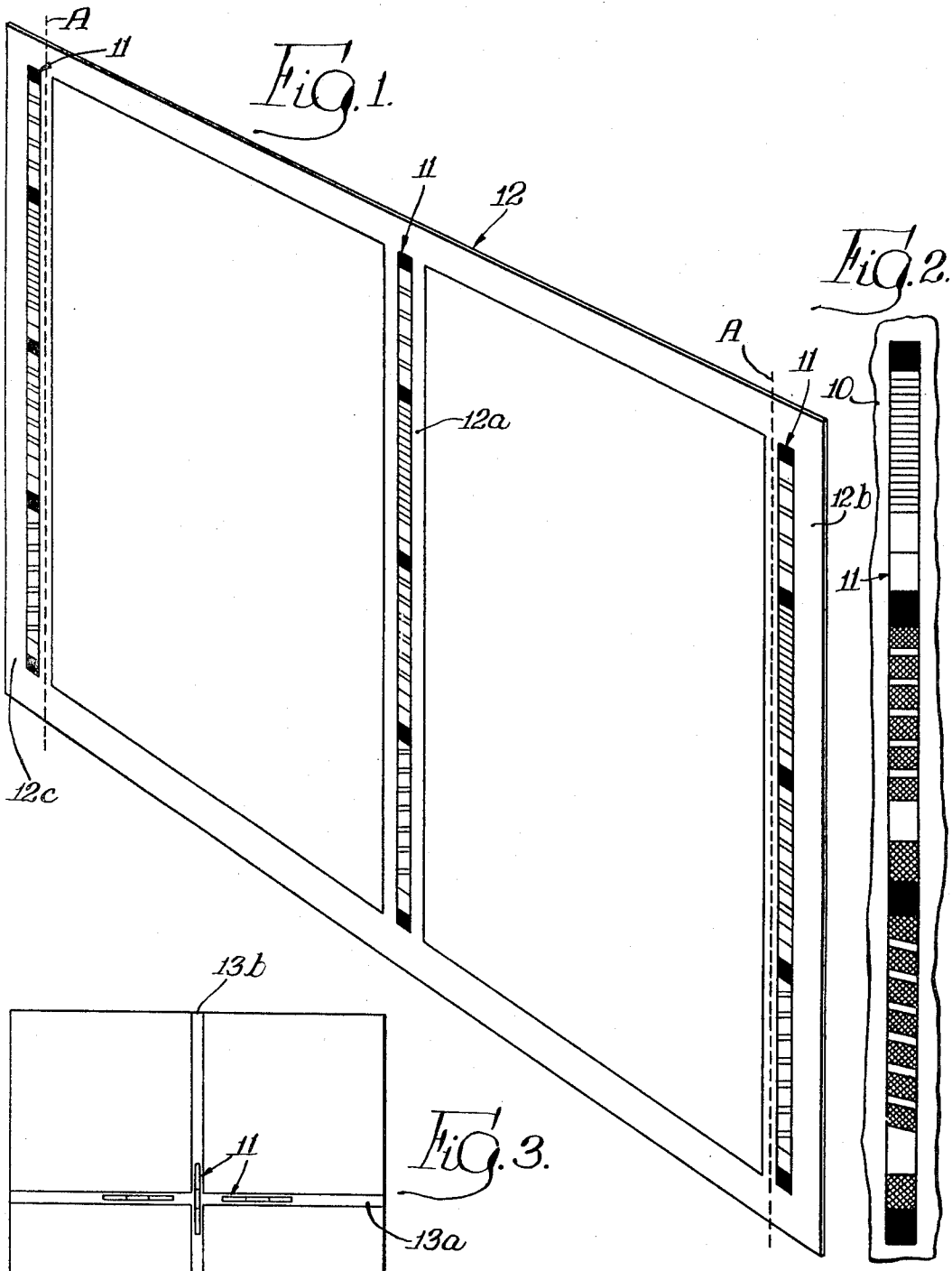


Fig. 1.

Fig. 2.

Fig. 3.

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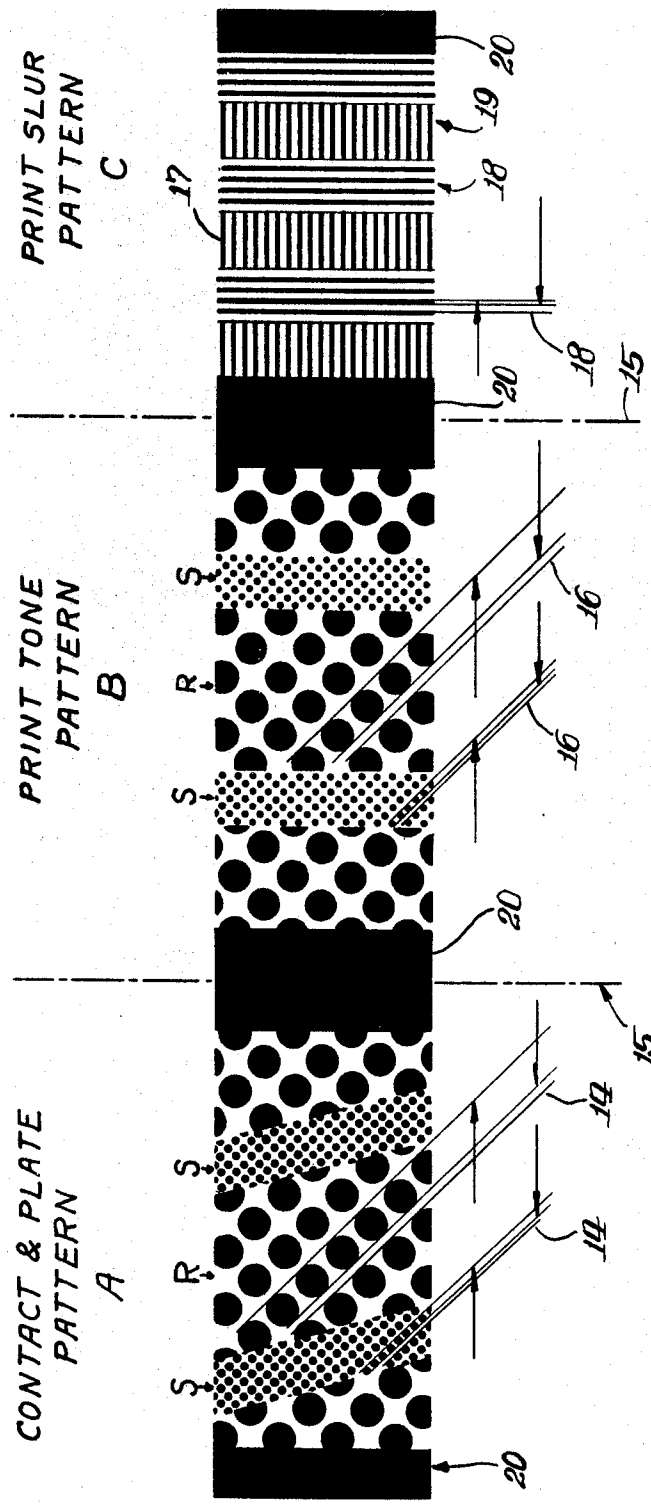


FIG. 4.

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3,393,618

PRINTING CONTROL

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Continuation of application Ser. No. 175,647, Feb. 26, 1962. This application June 30, 1967, Ser. No. 650,548
8 Claims. (Cl. 95—1)

ABSTRACT OF THE DISCLOSURE

A stencil for use in the preparation of printing plates for use in controlling the quality of the plates and prints from the plates, the stencil having a light transmitting image which provides on the plates or on the ink prints therefrom first a monotone reference indication or comparable patterns with the monotone reference indication indicating a predetermined plate or print quality while the comparable patterns indicate plate or print quality differing from the predetermined quality.

This application is a continuation of Ser. No. 175,647 filed Feb. 26, 1962, now abandoned.

This invention relates to a device for controlling printing quality and more particularly to a control strip to be used by the plate maker and press operator for determining plate condition and/or print quality.

Printers, and particularly lithographers, have never so far as I know, had a method other than the pressmen's judgment for controlling a print quality. In the printing art it is desirable, first of all, to determine whether or not the plate is properly made and to thereafter determine whether the printed work is of the proper quality. Difficulties in the former may result, for example, from under or over exposure or development of a plate. Difficulties with the latter, i.e., print quality, normally result from too much or too little ink, or from slurring.

It is therefore an object of this invention to provide the plate maker and press operator with a dependable method of control for plate and print quality.

It is an other object of this invention to provide a simple yet dependable guide for determining plate quality and print quality.

It is yet another object of this invention to provide a control strip which may be used to provide a guide on plates and on printed matter for determining their quality.

It is still a further object of this invention to provide an image bearing control strip which may be used to place a guide on a plate for determining the quality of the plate and then once the plate is on the press to be used for determining print quality.

It is yet another object of this invention to provide a control for use in printing which comprises a guide on a printing plate including means for determining plate characteristics, means for determining print tone characteristics, and means for determining print slur characteristics.

It is yet a further object of this invention to provide a means for determining print characteristics which comprises a stencil bearing image adapted to be used in conjunction with printing plates to dispose thereon a printing guide, a guide including means for determining plate characteristics, means for determining print tone characteristics and means for determining print slur characteristics.

Other objects and advantages of the invention will become apparent from the following description taken together with the accompanying drawings.

Of the drawings:

FIGURE 1 is a view in perspective of a sheet of printed work indicating the location of the control strip;

FIGURE 2 is a semi-diagrammatic view showing the image bearing control strip;

FIGURE 3 is a drawing somewhat similar to FIGURE 1 but in reduced size showing other locations of the control strip; and

FIGURE 4 is a greatly enlarged and exaggerated view of the control strip showing the make-up of the various sections.

The control strip of this invention may be used with numerous types of printing as will be apparent from the following description. However, it will be described herein as used in lithography and more particularly as used in planography.

In making the average planographic plate, whether it be a presensitized plate or one that is sensitized by the lithographer just prior to use, an image, either positive or negative is provided on the plate by means of a photographic process. Thus the surface of the unused plate has been made sensitive to light by coating thereon of a particular material having this quality. To put the printing image on the plate, a stencil is used through which the plate is exposed and thereafter developed. After development, the image is firmly located on the surface of the plate and may be either ink attracting or water attracting depending on the type of plate.

This type of plate is normally used on an offset press which has basically two rolls, i.e., the plate bearing roll and a rubber blanket roll. The image as inked on the plate bearing roll is transferred to the rubber blanket roll which then imprints it on paper.

In such a process it has always been difficult for plate makers and pressmen to tell if things are running right. It must be first determined if the plate is properly made, i.e., if it is under developed or over developed, under exposed or over exposed. Then it must be determined once the plate is on the press whether or not the print quality is proper, i.e., whether or not the proper amount of ink is being used and whether or not there is any slur. The word slur normally refers to a condition wherein the plate bearing roll and the rubber blanket bearing roll of the press are operating slightly off register so that there is a slur or moving of the plate roll against the blanket roll thus causing the image to be slurred on the paper.

The control strip of this invention substantially obviates the problems discussed above. As described, the printing image is placed on a plate by a photographic process using a stencil, either positive or negative. The control strip of this invention is likewise placed on the plate in the same manner. In other words, the control strip is in itself an image bearing item, normally a negative, and is handled by the plate maker so that the image therefrom is located on the plate in a manner designed to measure and inform the plate maker and the pressman of proper conditions.

Referring now to the drawings, and in particular, first of all, FIGURE 2, there is shown in semi-diagrammatic form a negative **10** which is made of the conventional cellulosic material and which has thereon the control strip designated generally **11**. In making the plate, the pressman locates this strip in what will be waste areas on the print, i.e., the margins and/or trim. This can be seen in FIGURES 1 and 3. FIGURE 1, for example, might be a print **12** to be used in the production of a magazine or book. It can be seen that the control strip **11** is located in the center **12***a* of the sheet which is that portion hidden on binding. Additionally, the control strip is located at the edges **12***b* and **12***c*. These are trim areas which are removed along the dotted lines A. Thus the control strip is either hidden or removed on the resulting print. In FIGURE 3 is shown a sheet **13** which might be, for example, a group of labels. The control strip here is located

in the waste areas **13***a* and **13***b* between the labels. It will be noted that in this use the control strips are located at right angles to one another, whereas in the sheet shown in FIGURE 1 they were parallel.

Referring now to FIGURE 4 which is a greatly enlarged view of the control strip of this invention, it will be seen that the control strip includes three basic portions. The first is the Contact and Plate Pattern A, the second is the Print Tone Pattern B, and the third is the Print Slur Pattern C. These titles are indicated on the drawing in FIGURE 4 for ease of description and each of these sections will be described separately.

Contact and plate pattern

This pattern is used to determine the condition of the plate itself. It will indicate a gain or loss in image and will also indicate any over or under exposure or any over or under development. The pattern consists of reference areas R and signal areas S. The reference areas R are made up of large units with low frequency per inch. The signal areas S are made up of small units with high frequency per inch. The R and S patterns are located adjacent each other. Although the units for these areas could consist of any geometric design, round dots have been selected and shown in the control strip of FIGURE 4. The geometric units in this pattern should be set in rows at about 45° to cylinder axis as indicated by the angle lines **14**, the line **15** which is substantially cylinder axis. Such location minimizes the effect of slur. Additionally, the signal bars S in this pattern are slanted so as to differentiate them from the Print Tone Pattern B.

The design areas in pattern A, i.e., the reference areas R and signal areas S are designed so as to have equal visual tone, i.e., they will appear as visually equal or a monotone on a printing plate when the image on the plate is proper. This will result since the same amount of light passes through the control strip stencil and the image stencil on exposure and the same developing procedure covers the entire plate. If any over or under exposure or development has taken place in preparing the contacts or the plate, the small signal design area S will change in visual tone proportionately more than the large reference area R, thereby producing a readily recognized pattern which informs the plate maker his plate is improper. Thus if the signal design area S appears to be lighter in tone than the reference area R, the plate maker will know that he has a sharp contact plate whereas when the signal area S is darker than the reference area R, the plate maker will know that he has heavy contact, neither of which are desirable.

Print tone pattern

Once the plate maker knows, by use of pattern A, that he has a properly exposed and developed plate, he delivers it to the pressman. The pressman then wishes to know whether or not his plate is printing properly insofar as ink amount and slur is concerned. In determining this, he uses Print Tone Pattern B and Print Slur Pattern C. Pattern B will be described first.

Pattern B also consists of adjacent large and small design areas as in pattern A. Again, they are shown here as round dots located at 45° to the cylinder axis **15** as shown by the lines **16**, though they also could be of any geometric design. The reference areas again marked R, are large units of low frequency per inch and the signal areas, again marked S, are small units of high frequency per inch. The units are located adjacent each other. The signal bars in pattern B as can be seen, are not slanted thus distinguishing them from pattern A.

The large and small design areas of pattern B are not of equal visual tone as in pattern A. Thus on the plate the areas will look different. However, this is done purposely and the difference between the visual tone of the patterns, i.e., the signal area S being made lighter than the reference area R, is just enough to compensate for the anticipated tonal gain in the print. This amount is determined by the expected tone gain. However, once the plate is run on the press, the resultant print of the control strip on the paper will be such that pattern B will appear as a monotone if the proper amount of ink is being used. If printing is over or under anticipated values, a pattern between the reference areas R and the signal areas S will be readily visible.

Thus in the case of an under print, i.e., too little ink, the signal area S will be noticeably lighter than the reference area R, whereas with an overprint, i.e., too much ink, the signal area will be much darker than the reference area.

Print slur pattern

As mentioned above, the pressman also wishes to know whether or not any slur is taking place in his print. This may be easily determined by Print Slur Pattern C. This pattern consists of signal lines **17** of high frequency per inch. The lines are grouped together in parallel groups as shown by the lines such as **18** and **19**, with the lines in each group being located substantially at 90° to each other. In order to determine slur, the control strip must be placed substantially parallel or substantially at right angles to the axis **15** of the printing cylinder. When so located any slur will broaden the lines in the group, either **18** or **19**, that parallels the cylinder axis but will not affect the design at right angles to the cylinder axis. This alters the equal visual tone, or monotone, appearance of pattern C as shown in FIGURE 4 to produce a notable visual pattern between the groups **18** and **19** and is a reliable warning for the pressman.

The control strip further includes solid areas **20** at each end and between the various patterns. These are useful to separate the patterns and also are large enough for taking density readings as is well known in the art.

Distance between images in the reference areas of patterns A and B should be great enough to avoid juncture between adjacent images within reasonable printing range. For example, a control strip having reference areas R in the A and B sections made with a 67 line to the inch screen has been found satisfactory. Signal areas S in such a control A strip may then be made satisfactorily with a 250 line to the inch screen. The lines in pattern C of such a control strip may satisfactorily be made spaced 250 to the inch.

Having thus described my invention as related to the embodiments shown in the accompanying drawings, it is my intention that the invention be not limited by any of the details of description unless otherwise specified, but rather be construed broadly within its spirit and scope as set out in the accompanying claims.

I claim:

1. A stencil for use in the preparation of printing plates by a process involving exposure to light to provide a guide on said plates for indicating plate quality or print conditions on ink prints from said plate, comprising: a base; first means on said base alternatively comprising (a) means for producing on said plates a reference indication representing a preselected plate quality, (b) means for producing on said plates a first pattern differing in a first manner from said reference indication representing a plate quality differing in one manner from the preselected plate quality, or (c) means for producing on said plates a second pattern differing in an opposite manner from said reference indication representing a plate quality differing in an opposite manner from the preselected plate quality, said first means defining an arrangement of a small number of large units and a larger number of smaller units, said smaller units showing a greater change than said large units for a given variation in plate quality; and second means adjacent said first means on said base alternatively comprising (a) means for producing on said prints a reference indication representing a preselected print condition, (b) means for producing on said prints a third pattern differing in a first manner from said reference indi-

cation representing a print condition differing in one manner from the preselected print condition, or (c) means for producing on said prints a fourth pattern differing in an opposite manner from said reference indication representing a print condition differing in an opposite manner from the preselected print condition, said second means defining an arrangement of a small number of large units and a larger number of smaller unit, said smaller units showing a greater change than said large units for a given variation in print condition.

2. The stencil of claim 1 wherein said patterns comprise a plurality of alternate reference and signal areas.

3. A stencil for use in the preparation of printing plates by a process involving exposure to light to provide a guide on said plates for indicating plate quality or print conditions on ink prints from said plate, comprising: a base; and means on said base for providing a light transmitting image producing on at least one of said plates or said prints alternatively (a) a reference indication representing a preselected plate quality or print condition, (b) a first pattern differing in a first manner from said reference indication representing a plate quality or print condition which varies in one manner from the preselected plate quality or print condition, or (c) a second pattern differing in an opposite manner from said reference indication representing a plate quality or print condition which varies in an opposite manner from the preselected plate quality or print condition, said patterns comprising a plurality of alternate reference and signal areas, and wherein one type of said reference and signal areas comprises different halftone patterns, one of said patterns having a small number of large units and the other of said patterns having a larger number of smaller units, said smaller units showing a greater change than said large units for a given variation in plate quality or print conditions, and another type of reference and signal areas comprises groups of substantially parallel lines of similar thickness, said groups of areas being arranged at an angle with respect to each other such that during slurring of a print bearing said image the lines of a signal area group thicken more than the lines of a reference area group.

4. The stencil of claim 3 wherein the lines of said reference areas are substantially perpendicular to the lines of said signal areas.

5. A stencil for use in the preparation of printing plates by a process involving exposure to light to provide a guide on said plates for indicating plate quality or print conditions, including slur, on prints from said plates, comprising: a base having light transmitting images thereon, said images comprising adjacent reference and signal areas, one type of said reference and signal areas comprising different halftone patterns, one of said patterns having a small number of large units and the other of said patterns having a larger number of smaller units, said smaller units showing a greater change than said large units for a given variation in plate quality or print conditions, and another type of said reference and signal areas comprising groups of substantially parallel lines of similar thickness, the groups of the areas being arranged at an angle with respect to each other such that during slurring of a print bearing said image the lines of a signal area group thicken more than the lines of a reference area group.

6. The stencil of claim 5 wherein said images comprise a plurality of alternate reference and signal areas.

7. The stencil of claim 5 wherein the lines of said reference area are substantially perpendicular to the lines of said signal area.

8. The stencil of claim 5 wherein said image having halftone patterns comprises a plurality of alternate reference and signal areas and some of said reference and signal areas are located at an angle with respect to the other reference and signal areas.

References Cited

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DAVID KLEIN, *Primary Examiner.*