Oct. 1, 1929. R. MIEHLE 1,730,229

MAKE READY FOR PLURAL PRINTING AND METHOD OF MAKING THE SAME

Original Filed June 15, 1923 4 Sheets-Sheet 1

Fig. 1

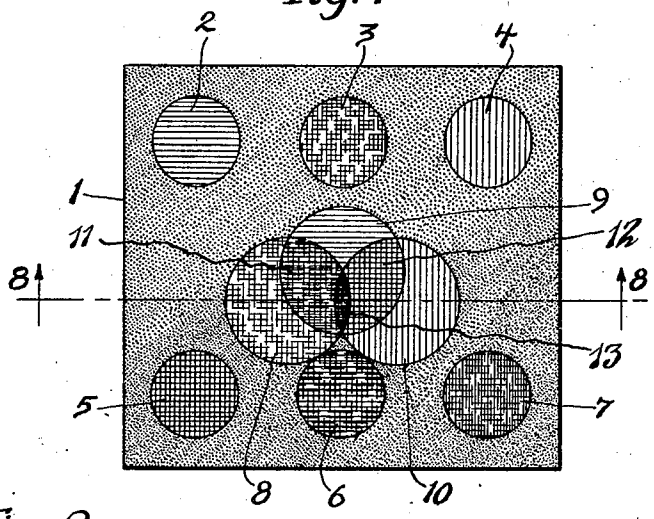


Fig. 2

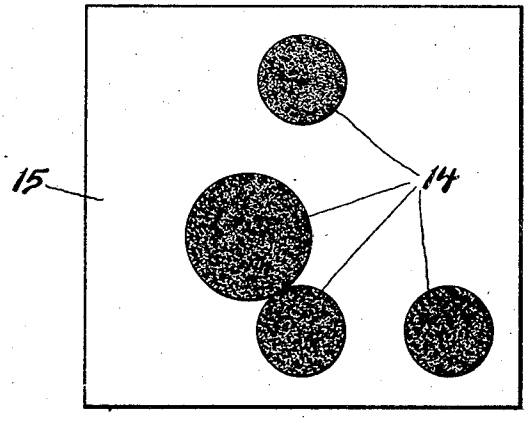
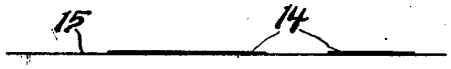


Fig. 3



INVENTOR.
Robert Miehle
BY Miehle & Miehle,
ATTORNEYS.

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Fig. 4

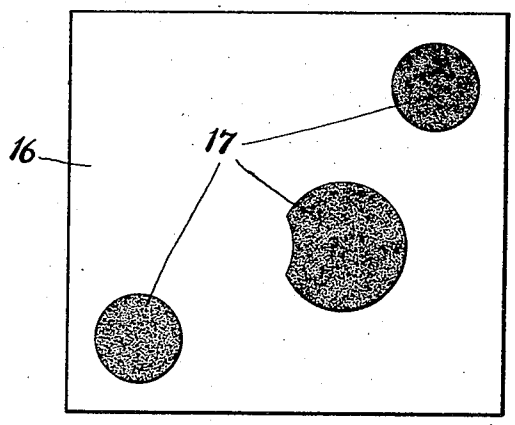


Fig. 5

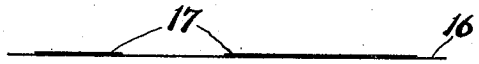


Fig. 6

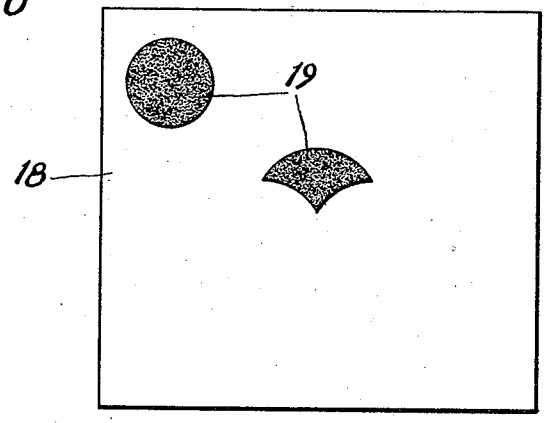
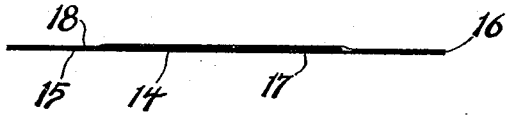


Fig. 7



Fig. 8



INVENTOR.
Robert Miehle
BY Miehle & Miehle,
ATTORNEYS.

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MAKE READY FOR PLURAL PRINTING AND METHOD OF MAKING THE SAME

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Fig. 9

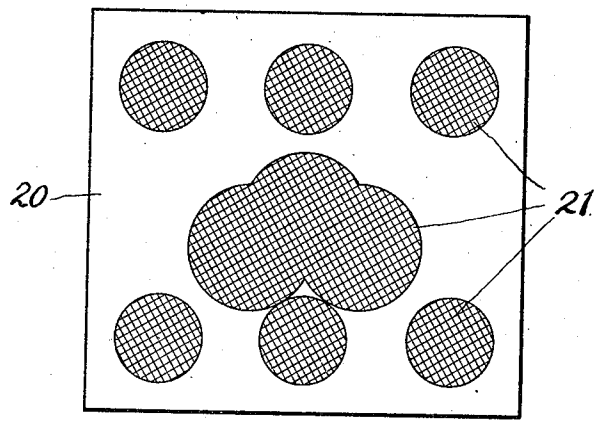


Fig. 10

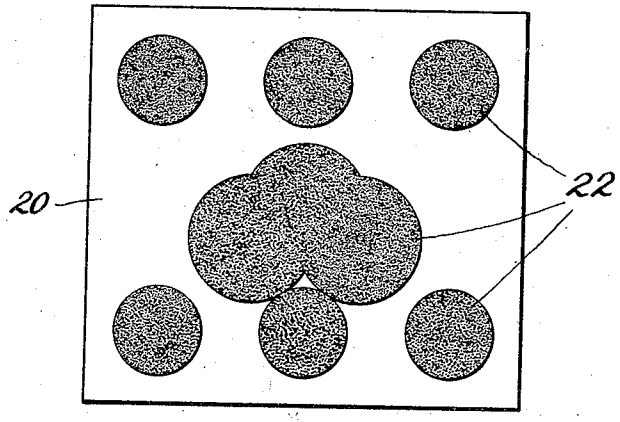


Fig. 11



INVENTOR.
Robert Miehle
BY Miehle & Miehle
ATTORNEYS.

Oct. 1, 1929. R. MIEHLE 1,730,229

MAKE READY FOR PLURAL PRINTING AND METHOD OF MAKING THE SAME

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Fig. 12

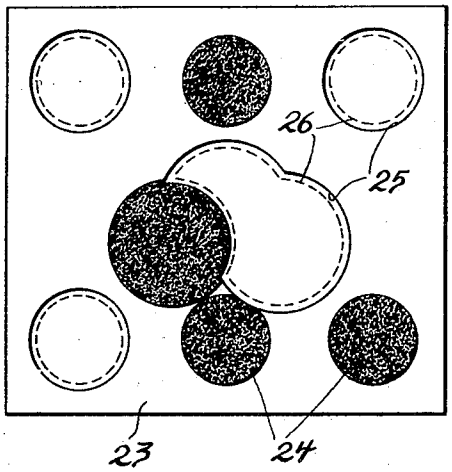


Fig. 13

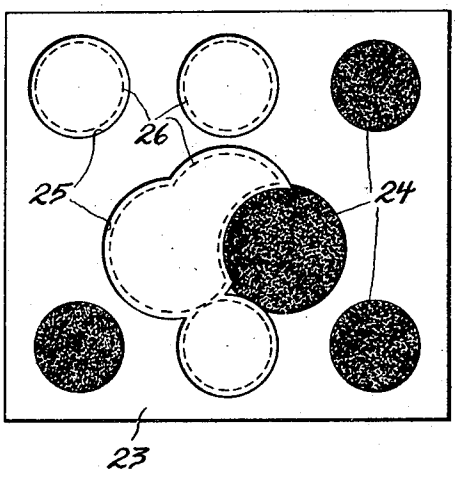
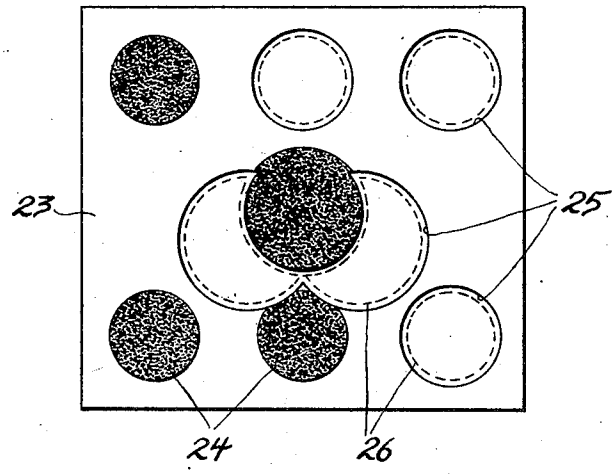


Fig. 14



INVENTOR.
Robert Miehle
BY Miehle & Miehle
ATTORNEYS.

Patented Oct. 1, 1929 1,730,229

UNITED STATES PATENT OFFICE

ROBERT MIEHLE, OF CHICAGO, ILLINOIS

MAKE-READY FOR PLURAL PRINTING AND METHOD OF MAKING THE SAME

Application filed June 15, 1923, Serial No. 645,658. Renewed March 8, 1929.

My invention relates to make ready for plural plate printing, and may be used to advantage in making ready in many ways.

One of the objects of the invention resides in the provision by novel, desirable, and effective methods of novel, desirable, and effective overlays for plural plate printing with a view toward facilitating and improving the make ready of the plates.

Another object of the invention resides in the provision of a novel, desirable, and effective make ready for plural plate printing which involves the use of the aforementioned overlays.

It is customary in the making ready of plates for plural plate printing to treat the plates to raise portions of the printing faces thereof with a view toward obtaining the desired impression therefrom. This treatment of the plates is extensively used in plural plate printing with one tympan. My invention obviates the necessity of so treating the plates, and attains similar results.

My invention involves the mechanical overlay and underlay processes with their advantages and adapts the same in the practise thereof.

The invention will be more readily understood by description referring to the accompanying drawings, in which—

Figure 1 is a face view of a printed sheet illustrating a typical multi-plate design printed thereon.

Figures 2, 4, and 6 are face views of the several overlay sheets involved in one method of making my composite overlay.

Figures 3, 5, and 7 are edge views of the sheets of Figs. 2, 4, and 6 respectively.

Figure 8 is a section of the composite overlay formed of the sheets shown in Figures 2, 4, and 6, and taken on a line corresponding with line 8—8 of Fig. 1.

Figure 9 is a face view of another overlay sheet in process of making my composite overlay upon one sheet.

Figure 10 is a face view of the sheet of Fig. 9 completed.

Figure 11 is an edge view of the sheet of Fig. 10.

Figures 12, 13, and 14 are face views of underlays for respective plates used in the printing of the design shown in Fig. 1.

Like characters of reference indicate like parts in the several views.

The main feature of the invention consists broadly in a mechanical overlay of the composite impression of the plates in registry and in mechanically overlaying the composite impression of the plates in registry.

Referring to Figure 1, 1 designates a sheet upon which is printed a half-tone multi-color design comprising disks 2, 3, and 4 densely printed respectively with blue, yellow, and red, disks 5, 6, and 7 densely printed respectively with blue and red, blue and yellow, and red and yellow, disks 8, 9, and 10 densely printed respectively with yellow, blue, and red and arranged in partial superposed relation with a portion 11 densely printed with yellow and blue, a portion 12 densely printed with red and blue, and a portion 13 densely printed with yellow, blue, and red, the remainder of the printed area being the high light area and being printed lightly with all the colors. Each of the colors are of course printed with a separate plate. Differences in the density of the printing with half-tone plates are effected by the variation in the size of the dots forming the printing surface of the plates, and gradations in the density of the printing are effected by corresponding gradations of the size of the dots. This gradation of the dots effects the printed design as is well known. It is customary in printing, not only with half-tone plates but with other plates as well, to increase the impression pressure at portions of the printing area to insure the proper printing contact throughout the printing area of the plate. Thus in printing with half-tone plates the impression pressure would be graded corresponding with the gradation of the size of the dots forming the printing surfaces thereof. This gradation of the impression pressure is accomplished by overlaying, underlaying, or making ready the plates by treating them to vary the level of the faces thereof in accordance with the designs thereon. It is obvious that in plural plate printing the proper gradations of the impression pres-

sure of the several plates do not correspond, and that the superposing of overlays of each plate would result in abnormal thickness thereof at certain portions of the printing area which would abnormally increase the impression pressure at such portions and reduce the impression pressure at others. My invention obviates this abnormal thickness.

Referring to Figs. 2 to 8 inclusive, illustrating one method of making my overlay, a mechanical overlay 14 of one plate, in this case the yellow plate, is made on an overlay sheet 15, see Figs. 2 and 3, in a usual manner of making such overlays. Preferably an additional mechanical overlay of this plate and a mechanical overlay of each of the other plates is made in a usual manner before any further steps are taken in the making of the composite overlay. Following this a second plate, in this case the red plate, is inked for overlay impression. One or more impressions are then taken from this second plate upon a sheet with one or more of the previously made overlays of the first or yellow plate under the sheet and in registry with the second plate, such as by feeding this sheet to the guides of a printing press in which the second plate is mounted with one or more of the previously made overlays of the yellow plate under the sheet in such relation as to register with the second plate in the making of the impression. This sheet blots or takes off ink from the second plate in accordance with the overlay or overlays of the yellow plate in an obvious manner, and the sheet is then discarded as it is of no further use. After this operation and without re-inking the second plate an ink overlay impression is taken therefrom upon another overlay sheet 16 under proper impression conditions, such as by feeding the sheet 16 to the guides of the printing press with a sufficient number of packing sheets, substituted for the overlay or overlays used in blotting or taking off ink which have been removed, thereunder to effect a proper impression. A mechanical overlay 17 is then completed from the ink impression upon the sheet 16 in a usual manner which forms a composite overlay unit of the second or red plate, see Figs. 4 and 5. Preferably an additional composite overlay unit of the second plate is made in the same manner. Following this the third plate, in this case the blue plate, is inked for overlay impression. One or more impressions are then taken from this third plate upon a sheet with one or more overlays of the first or yellow plate and one or more composite overlay units of the second or red plate under the sheet and in registry with the third plate, such as by feeding this sheet to the guides of a printing press in which the third plate is mounted with one or more overlays of the first plate and one or more composite overlay units of the second plate under the sheet in such relation as to register with the third plate in the making of the impression. This sheet blots or takes off ink from the plate in accordance with the overlay or overlays of the first plate and the composite overlay unit or units of the second plate in an obvious manner, and the sheet is then discarded as it is of no further use. After this operation and without re-inking the third plate an ink overlay impression is taken therefrom upon another overlay sheet 18 under proper impression conditions, such as by feeding the sheet 18 to the guides of the printing press in which the third plate is mounted with a sufficient number of packing sheets, substituted for the overlay or overlays and composite overlay unit or units used in blotting or taking off ink which have been removed, thereunder to effect a proper impression. A mechanical overlay 19 is then completed from the ink impression upon the sheet 18 in a usual manner which forms a composite overlay unit of the third or blue plate, see Figs. 6 and 7. Composite overlay units of any additional plate in a set may be made in the same manner as is obvious.

Finally an overlay of the yellow plate, a composite overlay unit of the red plate, a composite overlay unit of the blue plate, and a composite overlay unit of any additional plate are superposed in registry to form the composite mechanical overlay of the composite impression of the plates, see Fig. 8, and these may be permanently glued together. If desired more than one overlay of the first plate and composite overlay unit of each of the remaining plates may be used in the making of the composite overlay. It will be observed that such portions of one or more of the overlays forming the composite overlay are omitted as would abnormally increase the thickness of the composite overlay.

The above described method of making my composite overlay is the subject matter of my co-pending application, Serial No. 163,937, filed January 27, 1927, for improvement in composite overlay for plural plate printing which is a division of this application.

The use of more than one of each overlay or composite overlay unit in the blotting or taking off of ink from a plate preparatory to taking an ink overlay impression thereof for the respective composite overlay unit serves to accentuate the gradations of the overlays and composite overlay units and to remove the ink correspondingly with a view toward a more thorough removal of ink at portions where the overlays and composite overlay units are high, though in some instances this is unnecessary. The blotting or taking off of ink may also be repeated with the same object in view.

Referring to Figs. 9, 10, and 11, illustrating another manner of making the composite

overlay, preferably a mechanical overlay of each plate is first prepared in a usual manner of making such overlays. Ink overlay impressions of the plates are taken in succession and in registry upon an overlay sheet 20, see Fig. 9, forming a composite ink overlay impression 21 thereon. The ink overlay impression of each plate is preferably made on the sheet 20 with the previously made overlay of the plate under the sheet and registered with the plate, such as by feeding the sheet to the guides of a printing press in which the plate is mounted with the overlay thereunder in such relation as to register with the plate in the making of the impression. This serves to accentuate the graduations of the printing surfaces of the plates and to deposit the ink more lightly if at all at the light portions of the plates with a view toward not unduly increasing the deposit of ink at such portions in the successive impressions on the sheet. A mechanical overlay 22, see Figs. 10 and 11, is then completed from the composite ink overlay impression 21 on the sheet 20 in a usual manner and forms a composite overlay of the plates.

Any mechanical overlay process may be utilized in the practice of my invention, such as powder overlays, the zinc overlay, or the chalk overlay, and the usual practises relating thereto may be employed, such as the making of a plurality of impressions on the overlay sheets to effect a more thorough transfer of ink upon the overlay sheets, and the squeezing of the powder deposits before baking in the case of the powder overlays.

The making of the impressions from the plates in the practise of the invention should, of course, be made under proper conditions and without excess pressure. The impression pressure can be controlled by providing tympan packing of the proper thickness to obtain the desired impression contact.

It is obvious that the invention may be practised with any number of plates, and that it may be practised with a less number of plates than the complete set thereof, such as where two of the plates are used on one printing press and the remainder of the plates used on another press.

Thus it will be observed that a composite mechanical overlay of the plates is provided, and that the methods provided for making the same are practical and not difficult.

The make ready of my invention for plural plate printing is particularly adapted for half-tone plates and consists broadly in a mechanical overlay of the composite impression of the plates, hereinabove described, and an underlay of each plate for underlaying respective plates. These underlays are preferably mechanical underlays made in a usual manner, and such portions of the underlays are preferably reduced as underlie the light portions of the respective plates and correspond with thick portions of the composite overlay to relieve the impression pressure that would otherwise obtain by reason of the thickness of corresponding portions of the composite overlay so that too much pressure is not exerted upon the corresponding portions of the respective plates in printing. This reduction of the underlays is preferably additionally extended beyond such portions of the underlays to a small extent so that the stiffness of the plates do not overrun the impression pressure on surrounding portions of the plates into the light portions of respective plates as correspond with thick portions of the composite overlay. These underlays are preferably the previously made mechanical overlays of the plates used as underlays.

Referring to Figs. 12, 13, and 14, illustrating the underlays respectively of the yellow, red, and blue plates, the underlay sheets are designated at 23, and the thick portions are designated at 24 which correspond with respective plates. Ordinarily in the making of powder overlays and underlays no appreciable powder deposits are made on the overlay or underlay sheets at the portions corresponding with the light portions of the respective plates, and to effect the aforementioned reduction the portions of the underlay sheets 23 themselves as underlie the light portions of the respective plates and correspond with thick portions of the composite are removed, as designated at 25. In the Figs. 12, 13, and 14, the size of these thick portions of the composite overlay, which correspond with light portions of the respective plates, are indicated at 26 by dotted lines which also indicate the extended size of the reduced portions of the underlays as aforementioned.

In the use of the aforementioned make ready the combined effect of the composite overlay and the underlays of respective plates is to vary the impression pressure substantially in accordance with the printing surface of the respective plates, the thick portions of the underlays cooperating with the corresponding thick portions of the composite overlay to effect a relatively great amount of impression pressure at the corresponding portions of respective plates, the reduced portions of the underlays relieving the pressure at corresponding portions of respective plates which would otherwise obtain by reason of the corresponding thick portions of the composite overlay, the relief so afforded substantially equalizing the pressure throughout the light portions of the respective plates.

Thus is provided a make ready which is practical and not difficult to make, which does not require special apparatus for the making thereof, and which obviates the necessity for treatment of the plates to grade the height of the printing surfaces thereof

in accordance with the designs of the printing faces thereof.

Attention is directed to the fact that, while I have herein illustrated and described my invention as applied to half-tone plates embodying but two tones for purposes of brevity and clarity, the great majority of half-tone plates have more than two tones, and that my invention is applicable to half-tone plates having more than two tones. Therefore, in the use of the terms "dense" and "light" and corresponding terms I accordingly refer to such characteristics only in a relative sense except where another construction is obvious. Thus in the making of the make ready the reduction of the aforementioned portions of the underlays may be made in a graded manner corresponding with the gradations of the different lighter and darker portions of respective plates and corresponding portions of the composite overlay, though it is necessary in most cases to reduce only the portions of the underlays as underlie the lightest portions of respective plates and correspond with thick, i. e., relatively thick, portions of the composite overlay, the purpose of said reductions being only to relieve the impression pressure on corresponding portions of respective plates as cannot be relieved to a sufficient extent by the mechanical underlays as made by reason of the thickness of the corresponding portions of the composite overlay, whereby to effect the desired pressure throughout the light portions of respective plates.

It is obvious that the composite overlay and make ready may be supplemented by additional overlaying and underlaying, and that the usual hand made overlays, such as "spot sheets," and underlays may be used in conjunction with the aforementioned composite overlay and the underlays to effect the desired impression, and instead of reducing the aforementioned mechanical underlays themselves additional sheets may be underlaid therewith having portions removed to effect the aforementioned relief in pressure. The grading to meet the various conditions in the relief of the pressure may be readily effected by using a plurality of sheets and removing portions from one or more to effect the grading.

While I have herein described and shown one embodiment of my invention I do not wish to be limited to the precise details thereof as changes may readily be made without departing from the spirit of my invention but having thus described my invention I claim as new and desire to secure by Letters Patent the following.

Claims:

1. The method of making a composite overlay for plural plate printing consisting in mechanically overlaying the composite impression of the plates in registry.

2. The method of making a composite overlay for plural plate printing consisting in mechanically overlaying the composite impression of the plates by making a composite ink overlay impression of the plates in registry and then completing a mechanical overlay therefrom.

3. The method of making a composite overlay for plural plate printing consisting in mechanically overlaying the composite impression of the plates by making ink overlay impressions of the plates in registry on a sheet and then completing a mechanical overlay from the composite ink impression so made.

4. The method of making a composite overlay for plural plate printing consisting in mechanically overlaying the composite impression of the plates by making registered ink overlay impressions of the plates on a sheet with a mechanical overlay of the respective plate under the sheet when the impression of each respective plate is made and then completing a mechanical overlay from the composite ink impression so made.

5. An overlay for plural plate printing comprising a mechanical overlay of the composite impression of the plates in registry.

6. A make ready for plural plate printing including a mechanical overlay of the composite impression of the plates and an underlay of each plate for underlaying respective plates.

7. A make ready for plural plate printing including a mechanical overlay of the composite impression of the plates and a mechanical underlay of each plate for underlaying respective plates.

8. A make ready for plural plate printing including a mechanical overlay of the composite impression of the plates and a mechanical underlay of each plate for underlaying respective plates, said underlays having portions thereof reduced as underlie the light portions of respective plates and correspond with thick portions of the composite overlay.

9. A make ready for plural plate printing including a mechanical overlay of the composite impression of the plates and a mechanical underlay of each plate for underlaying respective plates, said underlays having portions thereof reduced as underlie the light portions of respective plates and correspond with thick portions of the composite overlay, and said reduced portions of the underlays being additionally extended beyond such portions of the underlays to a small extent.

In witness whereof I hereunto affix my signature this thirteenth day of June, 1923.

ROBERT MIEHLE.