

Feb. 28, 1939.

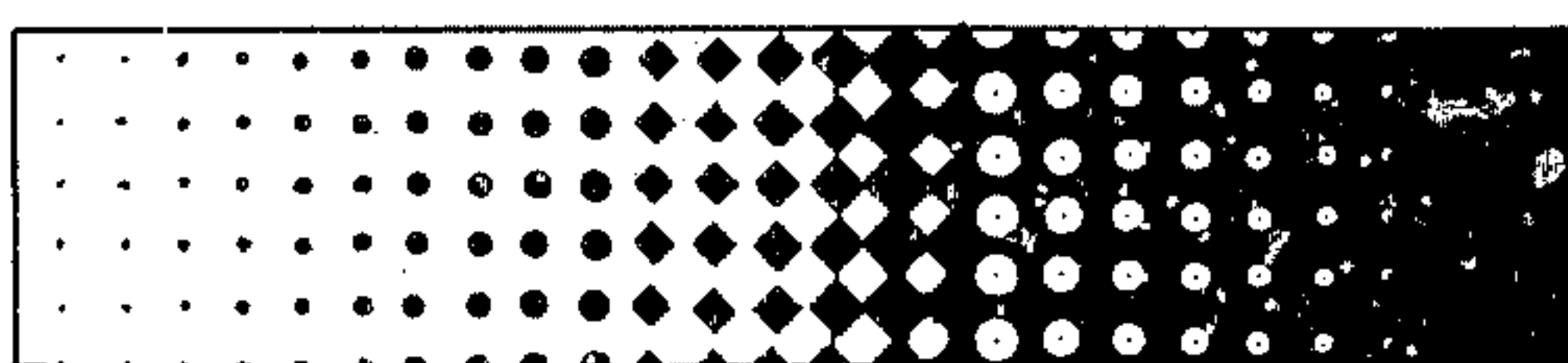
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2,148,519

PROCESS OF MAKING PRINTING PLATES

Filed Aug. 19, 1937

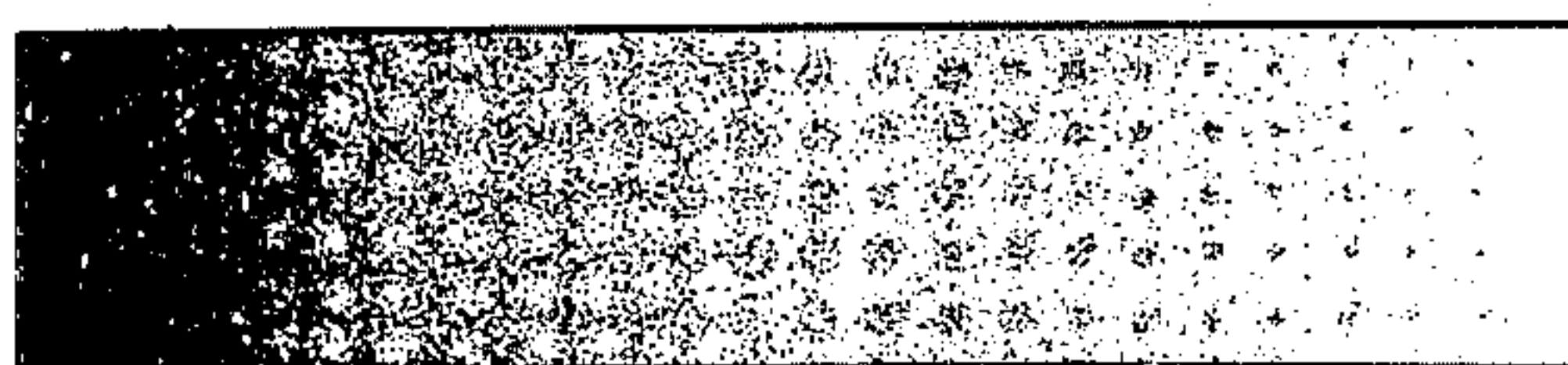
Fig. 1.



HALF-TONE POSITIVE



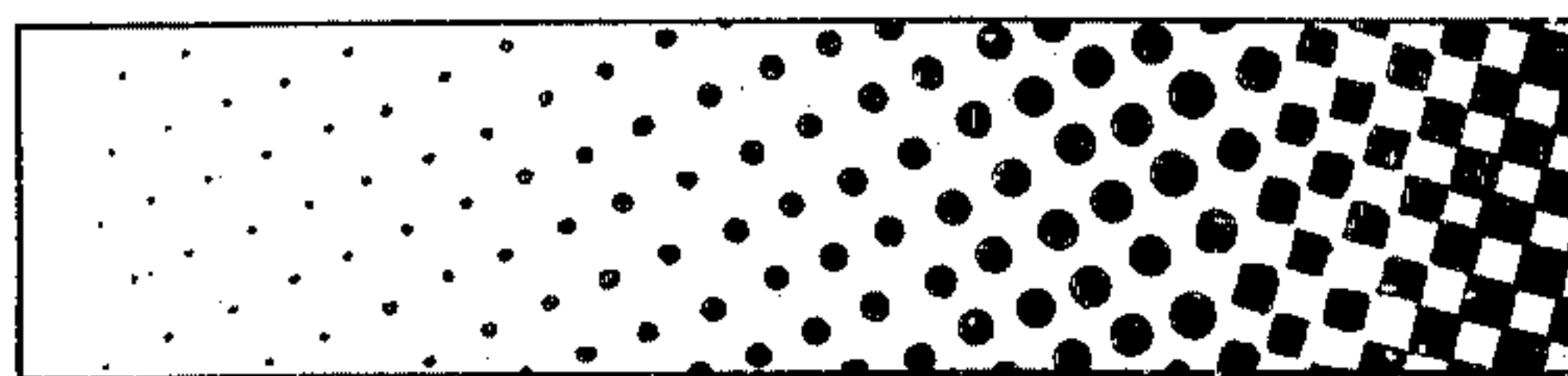
Fig. 2.



*BLURRED-DOT NEGATIVE MADE FROM
HALF-TONE POSITIVE*



Fig. 3.



*HEMI-TONE POSITIVE-TRANSPARENCY
MADE FROM BLURRED-DOT NEGATIVE*

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UNITED STATES PATENT OFFICE

2,148,519

PROCESS OF MAKING PRINTING PLATES

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facturing Company, Chicago, Ill., a corpora-
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Application August 19, 1937, Serial No. 159,895

24 Claims. (Cl. 95—5.7)

The present invention relates to the prepara-
tion of intaglio-plates for gravure-printing, and
it pertains more particularly to the making of
intaglio printing-plates in the surfaces of which
the various tones of the subject are represented
by ink-wells of different or graduated sizes or
areas and of approximately the same depth, the
invention concerning especially the making of the
positive-transparencies from which such print-
ing-plates are produced.

More specifically, the invention provides a novel
process for the creation of a positive-transpar-
ency, a printing-plate, and a print, having ink-
well or dot formation, as the case may be, of the
kind mentioned above, from a conventional half-
tone screen print or printing-plate of the char-
acter adapted for use in relief-printing as dis-
tinguished from gravure-printing.

It is common practice among advertisers to
prepare identical copies for illustration advertise-
ments to appear in a plurality of different peri-
odicals, and, when the advertisement is to be dis-
played in more than one color, sets of half-tone
printing-plates, corresponding to the different
colors to be printed, are prepared in sizes suitable
for use in the various periodicals and one such set
is sent, together with a group of progressive color
proofs, to each publication and is used in its press
for relief-printing of the advertisement.

Inasmuch as the completed printing-plates are
furnished to the periodicals, it is only necessary
for each publisher to match the individual colors
shown on the progressive proofs to assure uni-
form reproduction of the original in all of the sev-
eral publications.

This usual custom, however, places a publisher
using a gravure printing-press at a distinct dis-
advantage by reason of the fact that the half-
tone screen printing-plates are not suitable for
gravure-printing; nor are half-tone screen prints
made from such plates adapted for use in the pro-
duction of intaglio printing-plates, because of the
dot-formations required for relief-printing, as
contrasted with those essential in intaglio or
gravure-printing.

In gravure-printing, the ink-wells of the print-
ing-plate, including those of the deepest shadows
or solids, must be practically separated from one
another to provide sufficient surface on the plate
to support the ink-wiping doctor-blade ade-
quately to prevent its extraction of the ink from
the wells, whereas ordinary half-tone screen dot-
formations with interconnected or blended dots in
the solids do not comply with this essential need.

It was, accordingly, necessary, prior to this

invention, for such gravure-press user to obtain
a set of color-separation negatives or to make the
same from the original picture.

It is ordinarily impractical to obtain the orig-
inal picture, and even if it could be secured, it
would be difficult to make and to correct the
color-separation negatives in such a manner as to
produce the original accurately and to obtain re-
sults comparable with those produced by the set
of half-tone screen plates.

On the other hand, a set of half-tone screen
printing-plates or half-tone screen prints made
therefrom is usually available, and, if they could
be employed as the copy from which to produce
intaglio printing-plates, many of the difficulties
would be eliminated.

Accordingly, it is a prime object of this pres-
ent invention to provide a procedure for making
positive-transparencies, for the production of
intaglio printing-plates for gravure printing, from
half-tone screen printing-plates or from half-
tone screen prints made therefrom.

Another aim of the invention is to produce
intaglio printing-plates which will correctly rep-
resent the characteristics of the original subject
without requiring individual correction.

A further design of the invention is to supply
a novel procedure whereby the gravure printing-
plate produced from an ordinary half-tone screen
plate or half-tone screen print will have a new
dot-formation different from that of such plate
or print.

An additional characteristic of the invention
resides in the provision of a cheap, simple and
dependable method of accomplishing the stated
aims and objects of the invention.

A feature of the invention consists in making
a half-tone screen print from a printing-plate
having the usual half-tone screen dot-formation
with interconnected dots in the solids, or the
plate itself may be used instead of the print,
provided the plate is properly coated with a suit-
able substance; making a photographic-negative
from such half-tone screen print or plate and in
which negative the dots are diffused or blurred
and obliterated to as great an extent as possible
but not to such a degree as to materially reduce
the sharpness of the image; making a photo-
graphic positive-transparency of such negative
using a screen in a manner to produce the dot-
formation required for the gravure or intaglio
plate, with the screen so disposed with respect
to the negative as to substantially block out the
remaining features of the original screen-forma-
tion without producing an irregular appearance,

such as a moiré pattern; and making from such transparency the intaglio printing-plate photographically and by etching.

In the case of color-printing, the positive-
5 transparency representing each color is produced in this manner and a set of intaglio printing-plates is made from the final positive-transparencies.

Any type-matter, or similar printed matter,
10 appearing with the original picture may be treated separately because it appears in continuous-tone on the plate or print and does not contain any half-tone screen dots which require obliteration prior to the production of the gravure
15 dot-formation.

Other features of the invention consist of the various details of operation and combination of steps hereinafter set forth.

Although the various novel items, which are
20 believed to be characteristic of this invention, will be particularly pointed out in the claims appended hereto, the invention itself, as to its objects and advantages and the manner of its operation, may be better understood by refer-
25 ence to the following detailed description taken in connection with the accompanying more or less diagrammatic drawing forming a part thereof in which:

Figure 1 illustrates an ordinary, half-tone,
30 screen printing-plate or print having a dot-formation adapted for, or characteristic of, relief-printing and which comprises the copy to be employed in performing the new and improved process;

Figure 2 shows a negative, made from the plate
35 or print of Figure 1, in which the half-tone screen dots have been somewhat blurred or obliterated; and

Figure 3 illustrates a hemi-tone, screen, re-
40 duced-tone-value positive-transparency, produced by the present process from the blurred negative shown in Figure 2, having the desired different or new dot-formation adapted for intaglio printing.

In this specification and in the appended claims
45 specific terms have been used for convenience in referring to various details of the invention, but these terms are to be given as broad an interpretation as the prior art will permit.

According to one method of practicing the
50 present invention, which may be applied, for example, to a set for four-color, separation, half-tone, screen printing-plates of the kind usually supplied for relief-printing and representing four
55 selected colors, such as yellow, red, blue and black, a proof is made of each plate in black ink on a good quality coated paper, it being desirable that these proofs be of the best grade and they are, therefore, preferably made on an engraver's
60 proofing-press.

Each of these black proofs constitutes a half-
tone, screen, color-separation print of the original picture to be reproduced, and each has a dot-formation of the species used in relief-printing,
65 as illustrated in Figure 1, as comprising, except in the darkest tone or solid, rows of dots differing in size according to the tones to be reproduced, each dot being relatively sharp and distinct, the dots being progressively larger as the tones be-
70 come darker and, in the blacks or solids, merging into one another to form a continuous-tone.

For purposes of illustration, it has been as-
sumed that each such proof was made from a plate produced with a half-tone screen having
75 lines crossed at right-angles to one another and

extending at an angle of 45° to the horizontal, which will be referred to herein as a 45° screen-position, this being the position commonly used for black plates.

If the original printing-plates are not available, 5
a set of electro-type plates made therefrom may be used for the same purpose.

Obviously, if the material is supplied from a central advertising agency, the original set of printing-plates may be dispensed with and a good, 10
half-tone, screen print of each plate may be substituted therefor, in which case the above step would be eliminated and the half-tone screen prints would be utilized for the subsequent steps of the process, thereby saving the expense of mak- 15
ing a separate set of plates for each periodical.

The sets of half-tone screen prints, as will be readily understood, could be made from a single set of printing-plates and one set of such prints submitted to each periodical together with a set 20
of progressive color proofs, it being understood, that the prints need not be the exact size required for printing in the periodical as they may be enlarged or reduced as is desired during the subse-
quent steps of the process.

Each of the above-mentioned, black, half-tone,
screen proofs is now placed, in turn, before a camera and focused to the desired size, the focus being set in such a manner that the sharpness of the image is retained while the individual half- 30
tone dots are rendered indistinct or blurred to as great a degree as possible, whereby the original dot-formation is largely or substantially-en-
tirely lost or obliterated and a continuous-tone more or less approached, this condition being ob- 35
tained by adjusting the lens sufficiently out-of-focus to blur the minute half-tone dots but not sufficiently out-of-focus to affect the sharpness of the image itself.

With the parts arranged as specified, a negative 40
of each black, half-tone, screen proof is made in the camera by photographing the proof on a dry-plate or a wet-plate as may be preferred, such negative then being opaqued, if required, in any convenient manner, where the proof indicates 45
pure white, such a negative being illustrated in Figure 2 of the drawing.

This photographic-negative represents a con-
dition in which the original dot-formation of the proof has been largely destroyed in the negative 50
and in the latter there is an approximation to a continuous-tone although the sharpness of the image remains.

The original dot effect in this negative is re-
duced to such a degree that it can be substan- 55
tially eliminated in the following step and it does not interfere with the production of the new dot-formation required for the gravure plates.

In some instances, it is even difficult to perceive any dot appearance in the negative, whereas, in 60
other cases, no such difficulty is experienced, but, of course, what dots are seen under magnification are materially blurred all without loss of sharpness of definition of the image.

Register-marks are placed on each negative 65
corresponding exactly with each other for color-printing, a set of positive-transparencies is made in a camera from these negatives through a half-tone or other appropriate screen adapted to pro-
duce the desired new dot-formation, preferably, 70
but not necessarily, by the wet-plate process, and if the negatives are not of the correct size for the printing-plates, they may be reduced or enlarged as required in this step of the process.

Such half-tone screen may be the same as, or 75

different from, the screen ruling used in the production of the half-tone original, but for intaglio-printing of the kind herein contemplated, a 150-line screen is at present preferred, although such screen ruling may be changed if desired.

When the negative is in position and the screen is in place in the camera, the screen may be turned from the original screen-position to a different screen-angle, such that the original screen-effect is substantially blocked out or obliterated and all irregularities, such as moiré effects, are eliminated.

The angle of change required to efface or extinguish the original screen-effect differs somewhat according to the change in screen size and the color represented by the separation-negative.

In color-printing, it is customary to make the separation-negatives with screens at different angles to the horizontal and, as a specific example, the angles may be as follows:—yellow 90°, red 15°, blue 75°, and black 45°.

A screen at 45° produces half-tone dots that appear in vertical rows as illustrated in Figure 1, and, for the various other angles, the rows of dots are inclined in the degree indicated.

The screen is preferably displaced angularly equally with respect to the original screen position in each print, so that the relative angles remain the same, this in effect transposing the screen-angle of the red, blue and black prints, while yellow takes a new angle not originally used; for example, the new angles may be as follows: yellow 30°, red 45°, blue 15°, black 75°.

It is to be noted that, in each of these cases, the screen-angle has been shifted 30°, that is, the half-tone screen in the camera has been turned 30° with respect to the original screen-position.

The above is given as an example only, but it will be readily understood, that the angles may be varied as required in any particular instance, and, obviously, if a different number of plates are used, the angles for the several plates may be set in the same manner.

In addition to setting the screen at the proper angular-position as indicated above, the screen-distance from the light-sensitive plate to form the positive-transparency from the dot-blurred negative, the size of the screen-openings, the camera-extension, the stop and the exposure are made such that the photographic positive-transparency shows a dot-formation in which the dots representing the blacks or solids are substantially or approximately entirely disconnected, as shown in Figure 3, except possibly in the very deepest solids or blacks where they may be connected at their corners, but are not so large as to form a continuous tone, and in which the dots graduate in size from the solids to the lightest tones and are either entirely absent from the whites or are so minute thereon that they can be readily removed by a suitable reducing-agent.

Each such positive-transparency, which has all of the tones of the same color of the original half-tone print at materially reduced value, that is, about one-half, as is clearly depicted in such Figure 3, has been aptly characterized as a "hemi-tone" positive-transparency, because it is practically a true half-tone, to distinguish it from an ordinary half-tone (see Figure 1), which is more or less of a misnomer in that such half-tone is of much more than one-half tone-value.

Stated somewhat differently, a special or unconventional, hemi-tone positive-transparency is made from each dot-blurred negative of the original matter for use in forming the intaglio print-

ing-plate with which the printing is to be accomplished.

In making this exceptional or peculiar positive-transparency, an ordinary half-tone or similar screen is so associated with, or placed at such a distance in front of, the light-sensitive plate or film on which the positive-transparency is to be made and through which screen the light is projected onto the plate or film, that the darkest parts or solids of the original subject, such as deep shadows, appear in this positive-transparency merely as intermediate, checkerboard or middle tones and the remainder of the positive-transparency is comprised of all lesser tones graduating properly down to practically an absence of dots.

This uncommon or unusual, hemi-tone positive-transparency, therefore, does not represent the originally-photographed half-tone subject correctly as to tone-values, since it is much flatter in appearance, because it incorporates only about one-half of the intensity or contrast of the original.

This positive-transparency is unique in that, although it represents the entire range of tone-values of that color of the original subject, all such values are actually present in the positive-transparency at about one-half intensity of the original, except pure whites, which are approximately the same in each.

This peculiar positive-transparency is made by placing the screen in front of the light-sensitive plate at the correct distance, differing somewhat from its true focal-distance, to produce the indicated results.

The spacing of the screen in front of the photographic-plate and the period of exposure of such plate are both less than would be used to produce an ordinary, half-tone positive-transparency with all other conditions the same.

Even the making of half-tone plates as ordinarily practiced today is, in a measure, a matter of trial due to the fact that the original subjects vary greatly, and, heretofore, there has been no satisfactory way of preliminarily evaluating them which would render precise predetermined procedure always feasible or possible.

If, in making the new, specified, hemi-tone positive-transparency, the contrast therein is found to be too great to meet the conditions hereinbefore set forth, then the screen-distance should be somewhat decreased, whereas, if such positive-transparency has too little contrast to comply with the specification, then a somewhat greater screen-distance should be tried.

Under usual conditions such screen-distance may be about three-fourths that which would be used for the production of an ordinary half-tone and the exposure may be in the neighborhood of approximately one-third that which could be satisfactorily employed for the making of a half-tone; but, it is to be understood, that these factors are variable depending upon other features, such as the characteristics of the original subject, the intensity of the light, the speed of the emulsion, etc.

One skilled in the art, however, will experience no substantial difficulty in producing a hemi-tone positive-transparency having the properties referred to.

Where the term "tone-value" or its equivalent has been used in reference to the original half-tone subject, it is intended to mean the relative position of the tone of any particular color in a scale which represents the full range of the color

in question; when employed in relation to the blurred-dot negative, it signifies the value of the density or opaqueness of the tone; when used in reference to the hemi-tone positive-transparency, it specifies the relation between the total area of the opaque dots to the area of the transparent surface in a unit area of the tone under consideration of the positive, it being borne in mind that all dots in the positive-transparency are of equal density regardless of size; and when employed in reference to the hemi-tone gravure printing-plate, hereinafter referred to in more detail, it means the relation between the area of the ink-wells to the area of the non-printing surface in a unit area of the tone under consideration in the printing-plate.

These positive-transparencies are now used for the production of the intaglio-printing-plates in any convenient manner; for example, the positive-transparencies may be printed in the usual way on carbon-tissues which are transferred to plates, such as copper, stripped of their backings and developed, and the plates etched with an etching-solution of, for instance, 40° Baumé perchloride of iron; or these positive-transparencies may be printed by contact on metal plates or rollers previously coated with a bichromated solution of shellac or glue which, after development, may be etched in a manner well known in the art.

The etching process is preferably so conducted as to reproduce the dots as entirely disconnected wells in the plates, except possibly in the darkest areas or solids where they may be connected in minor degree, although the dividing walls between the wells should not be broken down to an extent such that the remaining metal is incapable of properly supporting the doctor-blade during the gravure printing operation.

To compensate for the stated absence of adequate and full-tone amplitude in this extraordinary hemi-tone positive-transparency, the etching of the intaglio-printing-plates is carried out long enough to assure that the many practically-independent etched wells in the surface of the plates are deep enough to accommodate sufficient ink so that when the printing is done, there will be enough ink applied to the print by all wells to permit a proper spreading thereof whereby to give the print a full range of tone gradations from the darkest shadows or solids to the brightest high-lights; this ink enlargement or spread of the dots on the print making good or overcoming the lack of full intensity of the positive-transparency, such spreading of the ink on the print taking place in more or less degree for all printed dots.

One main reason for making and using such a singular or unexampled, hemi-tone positive-transparency is this:—If the positive-transparency were made with tones of the exact values in the original half-tone subject, the ink-wells in the darkest portions of the etched metallic printing-plate would either be run together into excessively-large wells from which the ink-removing doctor-blade would extract their ink, or their walls would be so thin that they would wear out unduly quickly with practically the same result.

Another, and perhaps preferable, mode of practicing the invention, which procedure is not however essential, but which has certain advantages of affording more leeway or greater latitude in the time of light exposure in making the positive-transparency and of the production of sharper and more clearly defined dots and which may be

accomplished by a slight change in the indicated distance between the screen and the film which is to form the positive-transparency, or by a slightly longer exposure, or both, comprises making a positive-transparency under conditions such that the whites of the subject are represented therein by extremely-fine dots which the capable of being entirely removed by an ordinary reducing operation, and, in eliminating these by such reduction, all of the remaining dots of the positive will be reduced a certain uniform extent, the specified reduction being controlled so as to remove the dots on the whites without entirely eradicating the dots representing the next darker shade, and in this way, all of the tone values of the picture are preserved, although the positive-transparency, when viewed by itself, as stated above, shows less contrast and appears flatter than the original subject.

It will be noted that when the color-separation printing-plates, such as yellow, red, blue and black are made as above described and printed in register, the picture produced thereby will closely approximate the finished proof of the original plates, and in printing, it is only necessary to match the individual colors of the inks.

Color correction is unnecessary because this has already been accomplished in producing the original, half-tone, screen printing-plates, and, accordingly, the process is much simpler and cheaper than producing intaglio printing-plates directly from the original and more accurate and uniform reproductions of the original proof is assured.

It is to be observed that, in the above-stated process, the original dot-formation is destroyed in the negative by first photographing with the dots out-of-focus, whereby a blurred or fuzzy appearance is obtained while retaining the sharp characteristics of the image, and then photographing the negative thus obtained through the screen, which is so disposed as to substantially remove the residual effect of the original dot-formation, and to substitute the new dot formation therefor.

The process has been described as particularly applied to four-color printing, but it is apparent that it is also applicable to one-color printing and may be used in any instance where it is required to change the dot-formation.

It has been assumed above that the image constitutes a picture or the like which is represented in ordinary half-tone dots, but, if type or other printed matter is included with the picture, the type may be treated separately inasmuch as it appears in full tone and does not contain half-tone dots which must be obliterated.

For example, a separate negative is made of the type-matter in which the focus has been brought to perfect sharpness, and from this negative a hemi-tone positive-transparency is made through a half-tone screen under conditions such that the dots barely touch each other or are entirely disconnected, so that, when the printing-plate is made therefrom, they will produce practically-disconnected wells as above mentioned.

This positive-transparency of the type may be assembled with the positive-transparency of the black-plate or of a plate representing the color in which the printing is to appear, as by a photo-composing machine, and the composite material may be etched on the metal plate in any desired manner.

The hemi-tone positive-transparencies, instead of being produced in a camera, may be made from

the blurred negatives by the direct contact method by the employment of dry-plates instead of wet-plates and a 150-line screen may be used for this purpose, under which circumstances, it has been found that an appropriate distance between the screen and the light-sensitive plate undergoing exposure may be approximately .190 inch.

When such positive-transparency is made in the camera, however, the operator adjusts the screen manually to secure a correct position thereof to produce a positive-transparency having the stated characteristics, but this does not mean that the hemi-tone positive-transparency will be like what the operator sees on the ground-glass of the camera.

If the darkest tones of the half-tone subject are represented by quite small areas in the intaglio printing-plate, it is not essential that their ink-wells, in all instances, be entirely disconnected, the principal aim being to provide an intaglio printing-plate on which the ink-removing doctor-blade will have proper support at all times so that it may effectively perform its functions without withdrawing an undue quantity of ink from any of the wells.

From what precedes, it should be clear that in the hemi-tone positive-transparencies the solids of the subject are represented by dots arranged in approximate checkerboard design and it may be mentioned that, when such dots are etched in the metal printing-plates, the action of the etching-agent may round out the sides of the corresponding ink-wells somewhat but still retaining the general or approximate checkerboard feature in the printing-plates.

In some cases, as where the positive-transparency is to be smaller than the negative, the screen used in front of it may be in the same angular position as that of the original half-tone subject.

Again, this patentee's disposition or system of hemi-tone ink-wells in the printing-plates, since they are all of approximately the same depth, conforms to the generally-accepted, ordinary, half-tone formation, which is known to render a true tone gradation from solid to white and this does not apply to the commonplace, gravure, ink-well arrangement.

Particular attention is directed to the fact that by following the stated procedure, the positive-transparencies and the printing-plates made therefrom are capable of representing all tones of the subject from white to the darkest although at reduced values, no tones being precluded from proper representation therein by any steps in the process.

If preferred, instead of using carbon-tissue, the metal-plate may be coated with a light-sensitive, so-called cold-enamel, which is subjected to the action of light through the positive-transparency, this coating being capable after development of remaining substantially unimpaired during and after etching of the plate through dot-like apertures therethrough, this permitting a proof to be taken while the coating is intact on the plate to determine if the etching has proceeded to the desired extent, a single-strength etching-fluid only being used.

Although a particular procedure in accordance with the invention has been described in detail for purposes of illustration, it is manifest that various changes and substitutions may be made therein without departing from the scope of the invention which is to be limited only in accord-

ance with the appended claims when interpreted in view of the prior art.

For example, when a gravure print is available and it is desired to produce half-tone prints therefrom, the applicability of this novel process to the accomplishment of that result will be obvious.

This patent is a continuation in part of my pending patent application Serial No. 15,860, filed April 11, 1935.

I claim:

1. In the method of making, from a screened subject in which the solids, if any, are represented by interconnected dots, a positive-transparency having a dot-formation different from that of the subject and adapted for use in making an intaglio printing-plate therefrom for gravure printing, the steps of making a photographic-negative of said subject and in the making of such negative blurring the dots of the subject in the negative but retaining the sharp characteristics of the subject-image therein, and of making a practically non-interconnected dot-formation photographic-positive transparency from said negative through a screen and in the making thereof converting the set of blurred dots of the negative into a different set of comparatively-sharp dots of substantially-equal density in the transparency with the dots representing the solids, if any, in the positive-transparency practically out-of-contact with one another and the dots representing all lesser tones of the subject separated from one another and of graduated areas.

2. In the method of making, from a screened subject in which the solids, if any, are represented by interconnected dots, a positive-transparency having a dot-formation different from that of the subject and adapted for use in making an intaglio printing-plate therefrom for gravure printing, the steps of making a photographic-negative of said subject through a camera-lens focused to retain the sharp characteristics of the subject-image in the negative but sufficiently out-of-focus to blur the image-dots therein, and of making a practically non-interconnected dot-formation photographic-positive transparency from said negative through a screen and in the making thereof converting the set of blurred dots of the negative into a different set of comparatively-sharp dots of substantially-equal density in the transparency with the dots representing the solids, if any, in the positive-transparency practically out-of-contact with one another and the dots representing all lesser tones of the subject separated from one another and of graduated areas.

3. In the method of making, from a screened subject in which the solids, if any, are represented by interconnected dots, a positive-transparency having a dot-formation different from that of the subject and adapted for use in making an intaglio printing-plate therefrom for gravure printing, the steps of making a photographic-negative of said subject and in the making of such negative blurring the dots of the subject in the negative but retaining the sharp characteristics of the subject-image therein, and of making from said negative through a screen a practically non-interconnected dot-formation hemi-tone photographic-positive transparency in which all tones of the subject are represented at approximately one-half value and in the making thereof converting the set of blurred dots of the negative into a different set of compara-

tively-sharp dots of substantially-equal density in the transparency with the dots representing the solids, if any, in the positive-transparency practically out-of-contact with one another and the dots representing all lesser tones of the subject separated from one another and of graduated areas.

4. In the method of making, from a screened subject in which the solids, if any, are represented by interconnected dots, a positive-transparency having a dot-formation different from that of the subject and adapted for use in making an intaglio printing-plate therefrom for gravure printing, the steps of making a photographic-negative of said subject through a camera-lens focused to retain the sharp characteristics of the subject-image in the negative but sufficiently out-of-focus to blur the image-dots, and of making from said negative through a screen a practically non-interconnected dot-formation hemi-tone photographic-positive transparency in which all tones of the subject are represented at approximately one-half value and in the making thereof converting the set of blurred dots of the negative into a different set of comparatively-sharp dots of substantially-equal density in the transparency with the dots representing the solids, if any, in the positive-transparency practically out-of-contact with one another and the dots representing all lesser tones of the subject separated from one another and of graduated areas.

5. In the method of making from a screened subject in which the solids, if any, are represented by interconnected dots, a positive-transparency having a dot-formation different from that of the subject and adapted for use in making an intaglio printing-plate therefrom for gravure printing, the steps of making a photographic-negative of said subject and in the making of such negative blurring the dots of the subject in the negative but retaining the sharp characteristics of the subject-image therein, and of making from said negative through a screen a practically non-interconnected dot-formation hemi-tone photographic-positive transparency in which all tones of the subject are represented at approximately one-half value and in the making thereof converting the set of blurred dots of the negative into a different set of comparatively-sharp dots of substantially-equal density in the transparency with the dots representing the solids, if any, of the subject in approximate checkerboard-design and the dots representing all lesser tones of the subject separated from one another and of graduated areas.

6. In the method of making, from a screened subject in which the solids, if any, are represented by interconnected dots, a positive-transparency having a dot-formation different from that of the subject and adapted for use in making an intaglio printing-plate therefrom for gravure printing, the steps of making a photographic-negative of said subject through a camera-lens focused to retain the sharp characteristics of the subject-image in the negative but sufficiently out-of-focus to blur the image-dots therein, and of making from said negative through a screen a practically non-interconnected dot-formation hemi-tone photographic-positive transparency in which all tones of the subject are represented at approximately one-half value and in the making thereof converting the set of blurred dots of the negative into a different set of comparatively-sharp dots of substantially equal density in

the transparency with the dots representing the solids, if any, of the subject in approximate checkerboard-design and the dots representing all lesser tones of the subject separated from one another and of graduated areas.

7. In the method of making, from a screened subject in which the solids, if any, are represented by interconnected dots, a positive-transparency having a dot-formation different from that of the subject and adapted for use in making an intaglio printing-plate therefrom for gravure printing, the steps of making a photographic-negative of said subject and in the making of such negative blurring the dots of the subject in the negative but retaining the sharp characteristics of the subject-image therein, and of making from said negative a practically non-interconnected dot-formation photographic-positive transparency through a screen with the screen-distance and exposure both sufficiently less than would produce a conventional half-tone with all other conditions the same that in the positive-transparency all tones of the subject are represented at approximately one-half value and in the making of said positive-transparency converting the set of blurred dots of the negative into a different set of comparatively-sharp dots of substantially-equal density in the transparency with the dots representing the solids, if any, of the subject in the positive-transparency practically out-of-contact with one another and the dots representing all lesser tones of the subject separated from one another and of graduated areas.

8. In the method of making, from a screened subject in which the solids, if any, are represented by interconnected dots, a positive-transparency having a dot-formation different from that of the subject and adapted for use in making an intaglio printing-plate therefrom for gravure printing, the steps of making a photographic-negative of said subject through a camera-lens focused to retain the sharp characteristics of the subject-image in the negative but sufficiently out-of-focus to blur the image-dots therein, and of making from said negative a practically non-interconnected dot-formation photographic-positive transparency through a screen with the screen-distance and exposure both sufficiently less than would produce a conventional half-tone with all other conditions the same that in the positive-transparency all tones of the subject are represented at approximately one-half value and in the making of said positive-transparency converting the set of blurred dots of the negative into a different set of comparatively-sharp dots of substantially-equal density in the transparency with the dots representing the solids, if any, of the subject in the positive-transparency practically out-of-contact with one another and the dots representing all lesser tones of the subject separated from one another and of graduated areas.

9. In the method of making, from a screened subject in which the solids, if any, are represented by interconnected dots, a positive-transparency having a dot-formation different from that of the subject and adapted for use in making an intaglio printing-plate therefrom for gravure printing, the steps of making a photographic-negative of said subject and in the making of such negative blurring the dots of the subject in the negative but retaining the sharp characteristics of the subject-image therein, and of making from said negative a practically non-

interconnected dot-formation hemi-tone photographic-positive transparency through a screen with the screen-distance and exposure both sufficiently less than would produce a conventional half-tone with all other conditions the same that in the positive-transparency all tones of the subject are represented at approximately one-half value and in the making of said positive-transparency converting the set of blurred dots of the negative into a different set of comparatively-sharp dots of substantially-equal density in the transparency with the dots representing the solids, if any, of the subject in approximate checkerboard-design and the dots representing all lesser tones of the subject separated from one another and of graduated areas.

10. In the method of making, from a screened subject in which the solids, if any, are represented by interconnected dots, a positive-transparency having a dot-formation different from that of the subject and adapted for use in making an intaglio printing-plate therefrom for gravure printing, the steps of making a photographic-negative of said subject through a camera-lens focused to retain the sharp characteristics of the subject-image in the negative but sufficiently out-of-focus to blur the image-dots therein, and of making from said negative a practically non-interconnected dot-formation hemi-tone photographic-positive transparency through a screen with the screen-distance and exposure both sufficiently less than would produce a conventional half-tone with all other conditions the same that in the positive-transparency all tones of the subject are represented at approximately one-half value and in the making of said positive-transparency converting the set of blurred dots of the negative into comparatively-sharp dots of substantially-equal density in the transparency with the dots representing the solids, if any, of the subject in approximate checkerboard-design and the dots representing all lesser tones of the subject separated from one another and of graduated areas.

11. In the method of making, from a screened subject in which the solids, if any, are represented by interconnected dots, a positive-transparency having a dot-formation different from that of the subject and adapted for use in making an intaglio printing-plate therefrom for gravure printing, the steps of making a photographic-negative of said subject and in the making of such negative blurring the dots of the subject in the negative but retaining the sharp characteristics of the subject-image therein, and of making from said negative a practically non-interconnected dot-formation photographic-positive transparency through a screen disposed at an angle different from the screen-position of the original screened subject and with the screen-distance and exposure both sufficiently less than would produce a conventional half-tone with all other conditions the same that in the positive-transparency all tones of the subject are represented at approximately one-half value and in the making of said positive-transparency converting the set of blurred dots of the negative into a different set of comparatively-sharp dots of substantially-equal density in the transparency with the dots representing the solids, if any, of the subject in the positive-transparency practically out-of-contact with one another and the dots representing all lesser tones of the subject separated from one another and of graduated areas.

12. In the method of making, from a screened

subject in which the solids, if any, are represented by interconnected dots a positive-transparency having a dot-formation different from that of the subject and adapted for use in making an intaglio printing-plate therefrom for gravure printing, the steps of making a photographic-negative of said subject through a camera-lens focused to retain the sharp characteristics of the subject-image in the negative but sufficiently out-of-focus to blur the image-dots therein, and of making from said negative a practically non-interconnected dot-formation hemi-tone photographic-positive transparency through a screen disposed at an angle different from the screen-position of the original screened subject and with the screen-distance and exposure both sufficiently less than would produce a conventional half-tone with all other conditions the same that in said positive-transparency all tones of the subject are represented at approximately one-half value and in the making of said positive-transparency converting the set of blurred dots of the negative into a different set of comparatively-sharp dots of substantially-equal density in the transparency with the dots representing the solids, if any, of the subject in an approximate checkerboard-design and the dots representing all lesser tones of the subject separated from one another and of graduated areas.

13. The method presented in claim 12 in which said positive-transparency is made through a screen disposed at an angle approximately thirty degrees different from the screen-position of said original screened subject.

14. The method presented in claim 7 in which said screen-distance is about three-fourths that, and in which said exposure is about one-third that, which would ordinarily be used to make a conventional half-tone with all other conditions the same.

15. The method presented in claim 8 in which said screen-distance is about three-fourths that, and in which said exposure is about one-third that, which would ordinarily be used to make a conventional half-tone with all other conditions the same.

16. In the method of making a set of color-separation positive-transparencies from a set of color-separation screened reproductions of an original subject having the characteristics incident to their production through screens disposed at different angles and in which reproductions the solids, if any, of the subject are represented by interconnected dots, said positive-transparencies having dot-formations different from those of the corresponding screened reproductions and adapted for use in making a set of color intaglio printing-plates therefrom for gravure printing, the steps of making a photographic-negative from each such reproduction and in the making of such negative blurring the dots of the reproduction in the negative but retaining the sharp characteristics of the image of the reproduction therein, and making from each of said blurred negatives a new dot-formation photographic-positive transparency through a screen with the screen-distance and exposure such that the solids, if any, of the corresponding reproduction are represented in each such transparency by dots practically out-of-contact with one another and all lesser tones of the reproduction by separated dots of correspondingly graduated areas, the use of such screen substantially obliterating the residual dot-formation, if any, in the

negative and substituting the new dot-formation therefor in the positive-transparency.

17. The method set forth in claim 16 in which the screen-position used for producing each of said positive-transparencies is employed at an angle different from that of the corresponding screened reproduction.

18. The method set forth in claim 16 in which the making of each of said negatives is through a camera-lens focused to retain substantially the sharpness of the subject-image in the negative but sufficiently out-of-focus to blur the image-dots therein.

19. The method set forth in claim 16 in which the screen-distance and the exposure in making each of said photographic-positive transparencies are both such that the positive-transparency represents all of the tones of the subject at substantially one-half value with the solids, if any, of the subject represented by dots in approximate checkerboard-design.

20. The method set forth in claim 16 in which the screen-distance and exposure in the making of each of said positive-transparencies are both such that in the positive-transparency all of the tones of the reproduction are at approximately one-half of their value in such reproduction, and in which the screen-angles employed for the several positive-transparencies are transposed with respect to those of the original reproductions while the relative original screen-angles are retained, although each positive-transparency has a changed screen-angle.

21. In the method of making a set of color-separation intaglio printing-plates, from a set of color-separation half-tone printing-plates having the characteristics incident to their production through screens disposed at different angles, the steps of making a black-proof from each of said half-tone printing-plates, making from each of said proofs a photographic-negative and in the making of such negatives blurring the dots of the proofs but retaining the sharp characteristics of the subject-image therein, making a photographic-positive transparency from each of said blurred-dot negatives through a screen disposed at an angle different from that of the screen-angle of the corresponding proof with the screen-distance and exposure such, and both less than would produce a conventional half-tone, that the transparency represents all tones of the proof at substantially one-half value and in the making of the transparency converting the set of blurred dots of the negative into a different set of comparatively-sharp dots of substantially-equal density in the transparency with the dots representing the solids, if any, in approximate checkerboard-design and the dots representing all lesser tones of the proof separated from one another and of graduated areas, making an intaglio printing-plate from each of said transparencies by exposing the coated surface of a metal-plate

having a light-sensitive cold-enamel coating, capable of remaining substantially-unimpaired after development and during etching of the plate through apertures therethrough, to light through the positive-transparency, developing said exposed coating thereby removing the unexposed dot-portions thereof, etching the bare areas of the plate through the dot openings in said developed coating by a single-strength etching-agent to form the intaglio printing-plate, and removing the coating from said printing plate.

22. In the method of making an intaglio printing-plate for gravure printing from a screened subject accompanied by continuous-tone typematter, in which subject the solids, if any, are represented by interconnected dots, the steps of making a photographic-negative of said screened subject and in the making of said negative blurring the dots of the subject therein without sacrificing the sharp characteristics of the subject-image, making a new dot-formation photographic-positive transparency from said negative through a screen, the solids, if any, of the subject in such positive being represented by dots practically out-of-contact with one another and all lesser tones of the subject by separated dots of correspondingly graduated areas, making a sharp photographic-negative of the typematter, making a positive-transparency from said typematter-negative through a screen positioned to represent such typematter by practically-disconnected dots, composing said positive-transparencies, and making an intaglio printing-plate from said composite positive-transparencies photographically and by etching.

23. The method of making a photographic-transparency from a screened subject and in the making thereof blurring the dots of the subject in the transparency but retaining the sharp characteristics of the subject-image therein and making a second photographic-transparency from said first transparency through a screen and in the making thereof converting the set of blurred dots of the first transparency into a set of comparatively sharp dots in the second transparency different from those of the original screened subject and at the same time preserving the sharp definition of the subject-image in the second transparency.

24. The method of making a photograph of a screened subject and in the making thereof blurring the dots of the subject in the photograph but retaining the sharp characteristics of the subject-image and making a photographic-transparency from said photograph through a screen and in the making thereof converting the set of blurred dots of the photograph into a set of comparatively-sharp dots in the transparency different from those of the original screened subject and at the same time preserving the sharp definition of the subject-image in the transparency.

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