

F. E. IVES.
 COLOR PHOTOGRAPHY.
 APPLICATION FILED MAR. 9, 1912.

1,106,816.

Patented Aug. 11, 1914.
 3 SHEETS—SHEET 1.

Fig. 1



Fig. 3

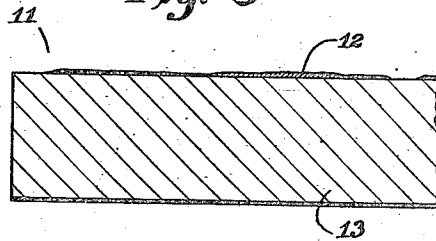


Fig. 2



Fig. 4

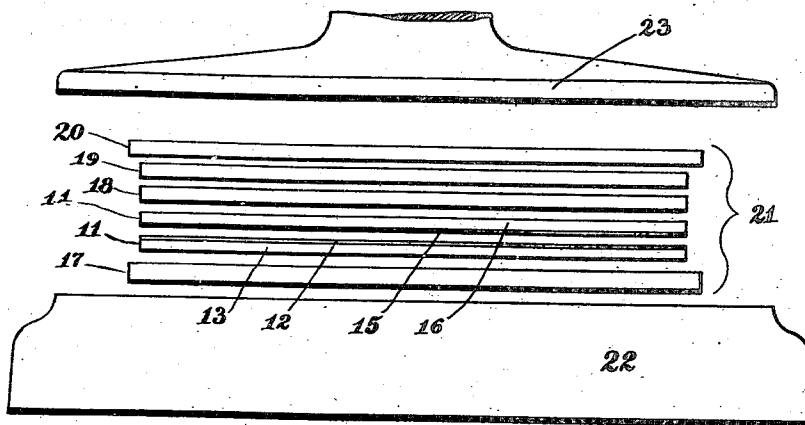
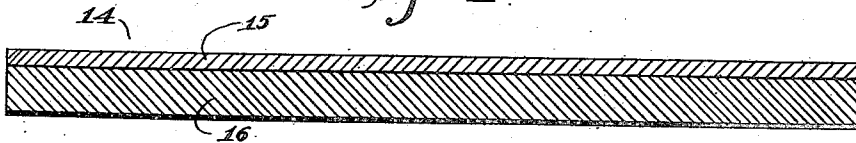


Fig. 5

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2 SHEETS—SHEET 2.

Fig. 6

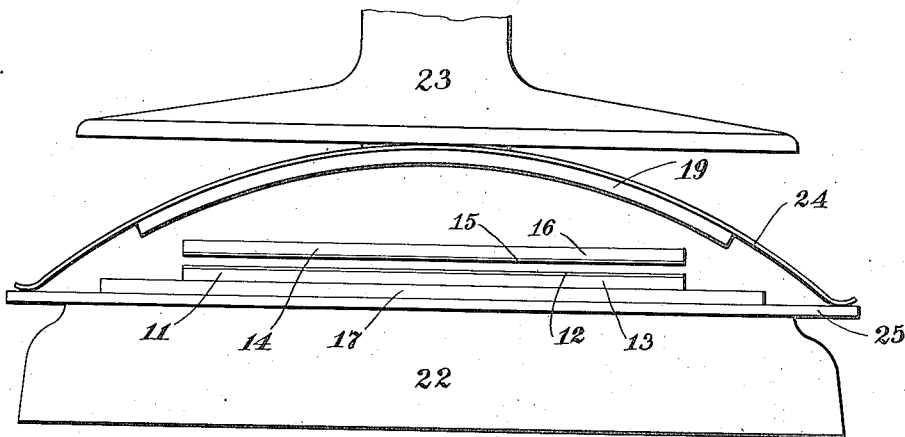
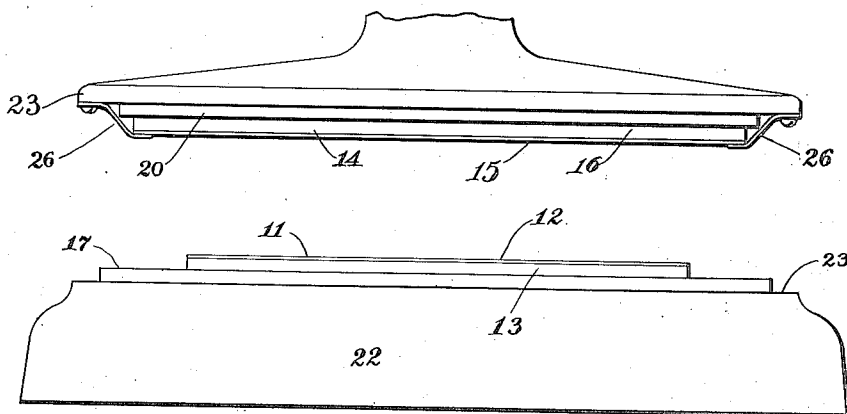


Fig. 7



WITNESSES
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UNITED STATES PATENT OFFICE.

FREDERIC EUGENE IVES, OF WOODCLIFF-ON-HUDSON, NEW JERSEY.

COLOR PHOTOGRAPHY.

1,106,816.

Specification of Letters Patent.

Patented Aug. 11, 1914.

Application filed March 9, 1912. Serial No. 682,774.

To all whom it may concern:

Be it known that I, FREDERIC E. IVES, a citizen of the United States, residing at Woodcliff-on-Hudson, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Color Photography, of which the following is a specification.

The present invention relates to the art of color photography, that is to say the production of pictures in natural colors through the principles of photography.

For illustration, the three-color system will be hereinafter referred to as convenient for explaining the present improvements, although obviously the novel features or some of them would be applicable to a two-color or four-color system.

Stated completely, the art of color photography or a process for practising that art, comprises the steps which result in the production of a plurality of color-selection negatives, and the steps by which from those negatives the finished picture or photograph is produced. The present improvement has to do more particularly with the portion of the complete process subsequent to the making of the negatives, and it will be assumed that the three or other plural number of negatives have been prepared in any suitable manner, as for example in accordance with copending applications and issued patents of mine.

The principles of the present improvement are peculiarly useful in the art of color photography and were evolved by me in working out solutions to problems existing in such art never heretofore satisfactorily solved.

As covered and claimed herein, the present improvement is strictly one relating to color photography or to the making of multi-color photographic pictures wherein three or other plural number of color images in the production of which the action of light is an essential factor, are to be combined into a multi-color print.

While multi-color transparencies have heretofore been obtained, for example as in my prior Patent No. 980,962, there has never yet, through years of unsuccessful attempt and research, been made known a color photography process for successfully and commercially producing multicolor prints upon paper in the flexible form of, and analogous to, ordinary photographs. All

sorts of expedients and selections have been tried, but without any practical results attractive enough either to the amateur or to the professional to survive. I have herein adopted a certain general plan of procedure and have so adapted and improved it as to make it practically and commercially satisfactory. The general plan comprises the production from the color-selection negatives, by photographic processes, of a corresponding set of vehicles or dye members embodying the image, and causing the respective dye images to be transferred successively by imbibition, usually to a piece of paper upon which the final picture is to appear.

The details of adaptation and improvement will be more particularly described in the hereinafter following specification of the preferred mode of carrying out the present improvement.

Hereinafter I will refer to the preferred mode of producing the dye members from the negatives, and also the combining of the dye images to constitute a single print. Incidentally in describing the making of the print it will be necessary to describe the making of a monochrome print, since a multi-color picture must commence with a monochrome.

In causing the transfers of images by imbibition to the print member, I have adopted the novel principle of employing a substantial face pressure maintained between the mutually contacting members, applied at or before the commencement of imbibition, that is, not later than the access of the dye and moisture to the receiving surface of the print. In making a superposition of a dye image upon a previous image, I employ the novel principle of first securing accurate registration and then allowing imbibition to commence.

If in printing by imbibition we start with the print in a moist condition and apply the dye member in face contact with it, afterward squeegeeing the two together, diffusion will occur in the gelatin and paper of the print which will make the image flat and unsatisfactory; besides which the act of bringing the two into face contact is likely to cause unintended spread of dye by absorption at otherwise than the exact intended points. The same difficulty will occur if we start with a wet dye member or with both dye member and print wet, followed by the pressure of the squeegee. Moreover with

either such procedure the print must be surfaced with a species of gelatin which is soft so as to absorb the dye, and this is objectionable because the great affinity of the soft gelatin for the dye will frequently or invariably cause the high-lights to become tinted. The softness of the gelatin also accentuates the objection previously noted. My invention is contrary to all of these procedures and entirely avoids the objections noted, besides possessing other advantages which will appear in the following detailed description, or which will be obvious to those skilled in the art. Heretofore, the production of photographic prints by imbibition has been little more than experimental in nature and indulged in principally by amateurs fond of experiment and not critical of technical quality.

As the dye member and print are the important elements dealt with by my invention, I will first describe each of those elements separately as to its nature and requirements, after which I will set forth the steps of my process.

Description of dye member.—The function of this member, whatever may be the particular principle on which it operates, is to absorb dye from a dye bath selectively, that is, in varying quantities over its surface according to the design or picture, and in that way to take and carry a dye image until afterward the image is transferred from the dye member to the print. I prefer a dye member in the nature of a bichromated gelatin relief which will absorb dye over its area in proportion to the thickness of the relief, thus producing a dye image. Starting with a photographic negative, a relief may be made upon a bichromated gelatin film on a celluloid base, or the equivalent thereof, by exposing the same with the celluloid side next to the photographic negative, and subsequently developing in hot water. This relief member may be substantially as described by me in a paper published in the *Journal of the Camera Club*, London 1894, page 63, excepting that I prefer to render the relief tenuous, as by the process of my Patent No. 980,962 of January 10, 1911, namely by the incorporation of a non-actinic dye in the gelatin to retard the penetration of light. After exposure the unaffected gelatin will be washed away by development in water at about 100° F., the portions affected by the light being rendered insoluble and remaining to constitute the relief.

Description of print member.—Generally speaking, any surface capable of imbibing dye from the dye-member may be employed. Specifically, the print should be pervious or penetrable by moisture to fully carry out the advantages of the present improvement. For example, the print may comprise a sheet

of ordinary or special paper, and I prefer that this shall be coated on the side which is to receive the image with a hardened gelatin surface, the hardness of the gelatin being of such degree as to render it insoluble in boiling water. As an example of a coated paper that will serve the purposes hereof, I may mention a paper now on the market known as "glossy velox", with, however, its sensitive elements removed, but I prefer a somewhat thicker coating of gelatin than this paper possesses. In order to insure the best results I further harden and mordant the gelatin by treatment with a strong solution of chrome alum.

Having now described the dye member and the prepared paper or print, my preferred process of imbibition printing is as follows: The dye member is first supplied with dye, and this will ordinarily be done simply by immersing the member in a dye solution, with of course proper precautions for the control of the depth of the dyeing. An overdyed relief may be reduced simply by immersion in water. The dye member takes up the dye by selective absorption, the amount of the dye absorbed at different parts of the surface being controlled by the nature of the dye member, namely its thickness at that point. In this step a dye image is produced, the dye member serving as a carrier thereof, retaining the dye image until afterward transferred to a print.

In my preferred operation both the dye member and the print are to be in a dry condition before being brought into contact, although within my broad invention this may sometimes be obviated. Assuming the dye member to be in dry condition, the procedure may be continued as follows. The dye member and print are assembled or brought into contact together with certain other desirable elements prior to their being operated upon by powerful pressure. For example we may start with a sheet of rubber upon which the dry dye member will be placed face upward, and upon the dye member the print paper in dry condition with prepared surface downward. Moisture I prefer to apply not from the front but from the back of the print, and to this end a wetted element may be included in the assemblage. At the same time for reasons that will appear, it is desirable to delay the access of moisture to the contacting dye member and print. I therefore place a single sheet of dry paper or a blotter upon the back of the inverted print paper, and then upon that a sheet of water-saturated blotting paper. Finally there may be a second sheet of rubber. These assembled elements may be considered as a "pack". They may be assembled in any convenient place and held or secured together until pressure is applied, and of course aids may be used to aid and

assist the process of assemblage. Care should be taken that the water in the blotter contains no chemical that will soften the gelatin of the print, and if not strictly neutral it should be slightly acid rather than alkaline. Promptly upon assemblage pressure is to be applied and maintained. As distinguished from the pressure of a squeegee or roller, I employ plate or flat pressure such as is afforded by a bed-and-platen press, screw or toggle operated or otherwise. The pack being assembled on or placed upon the press bed, the platen is then brought down and powerful pressure applied, which will be maintained for a period of, say, ten minutes or more. The described operation should be so timed that the moisture may not penetrate the intermediate sheet or blotter before the full pressure is acting upon the pack. During the maintenance of the pressure, moisture is forced through the back of the print and passes through the print to the dye member, both members thereby becoming moist. In this condition the dye image transfers to or is imbibed by the print. In practice I find a very definite advantage is gained by giving five minutes' powerful pressure on the pack as described, then opening the pack and re-wetting the two blotters, after which the pack is again subjected to pressure for another five minutes. After the pressure has operated for the designated time, the parts may be disassembled at once so that the dye member may be returned to the dye bath and the print may be dried, but I prefer to let the dye member and the attached print dry out in contact, and pull them apart when quite dry, thus insuring against shrinking of the print in drying. If the print is stripped from the dye member while wet, it should be laid upon a glass plate and clamped all around the edges while drying out, if shrinking is to be avoided.

By the above-described process involving dry contact under pressure between the member carrying the dye image and the pervious print with hardened gelatin surface, water being afterward introduced by absorption through the back of the paper, the objections before noted are overcome and many further advantages are attained.

Expansion, contraction, buckling and all relative shifting of the dye member and the print are absolutely prevented by the fact that they are closely confined by the very heavy plate pressure before any moisture reaches the contacting members through the intermediate dry layer.

The dyed relief member and the print when of the character previously described, would have, if of equal thickness of gelatin, approximately equal affinities for the dye, so that half of the dye would remain in the relief member. By making the gelatin coat

much thicker upon the print paper, it in due time will absorb more than half of the dye. It is easily ascertained how far to dye the relief member to secure proper depth of color in the print. In any case it is found that the dye is taken up quantitatively, practically speaking, and that gradations are very perfectly preserved.

It is desirable that the dye shall not penetrate the gelatin coating so far as to pass into the paper where it is likely to spread and to prevent obtaining the clearest and most brilliant images. The hardness of the gelatin coating is important in preventing this in my process, and it is also an aid to have the gelatin as before stated fairly thick and further hardened and mordanted by treatment with chrome alum. The harder the gelatin, however, the better the image will be kept in the surface and away from the paper, and in some cases this fact will enable the reduction of the gelatin's thickness.

The results obtained by following the steps above set forth are found to be very perfect in definition, gradation and brilliancy, so as to render the process entirely satisfactory for making both monochrome and multi-color pictures, and the process enables the employment of a great variety of colors since a large range of dye-stuffs is available, and the proper dyes for the three-color system may therefore be selected.

The process as above described may be modified where desired by not assembling the wet member or blotter with the other members as described, but on the contrary attaching it to the face of the moving platen so that in effect we have a moist platen able to simultaneously cause pressure and apply moisture upon the assembled dye member and print. This modification to some extent simplifies the process and may obviate the employment of the intermediate pervious sheet or blotter.

A more extensive modification may be adopted under certain circumstances as follows: One or both of the members, the dye member and the print, may be actually moist at the time of contacting, one of them being preliminarily carried by or secured to the bed of the press, the other being carried by or secured to the platen. Precautions would have to be taken to secure proper registry of the two. Upon throwing down the platen into pressing position, two things occur simultaneously, namely the contact of the two members and the heavy plate pressure squeezing them into the same intimate contact as in the first-described process. While possessing disadvantages, this modified process may secure some of the advantages of my invention.

In order to produce multi-color print by the present invention we proceed as follows,

assuming the three-color system. From the three color-selection negatives one or more, and preferably three, relief members or dye carriers will be produced. These are intended to be dyed in three different dyes for example yellow, peacock blue and magenta; and subsequently in combining the three color images it is preferred that they be applied in the order just recited. This being so the process will be initiated by commencing with the yellow colored dye member which will be brought into contact in dry condition with the prepared print. These two will then be assembled with a moist member and pressure promptly applied so as to cause transference of the color image by imbibition just as hereinabove described for producing a monochrome. At this point in fact we have a yellow colored monochrome. After the print has dried the procedure will be continued until the final three-color print is attained. The second and third colors may be added to the print in any desired way; for example the dyed reliefs might be bodily mounted upon the print in accordance with either of my prior Patents Nos. 960,939 or 980,962.

Another mode of applying the second and third color images is to continue according to the principles of the present invention. After the yellow image has been duly transferred to the print, the latter in a dry condition will be brought into contact with the second dye carrying member, say the peacock-blue member. The peacock-blue relief is of course transparent because having a base of transparent celluloid, and therefore the registry of the partly made print and the magenta relief member is easily and accurately effected. This is very important as registry by eye is a most satisfactory manner of registry. Both of the members being dry the registry may be deliberately performed, and thus accuracy depends only upon the correctness of the operator's judgment. In addition to this advantage in registry, it will also be observed that in the process of sliding the two members into registry no smearing or premature transference of color is possible, the two members being not yet moistened, and imbibition not having commenced. As before, the mutually contacting dye member and print will next be assembled with a moist member, the whole being promptly put into the bed-and-platen press and heavy pressure immediately applied and maintained.

The great utility of my invention in carrying out this process will now be seen. Two images having been superposed, one of them to be imbibed upon the print that already carries the other, any distortion whatsoever, contraction, buckling, etc., as between the print and dye member, would destroy the registry. Perfect registry has been

obtained while the members are dry and then the heavy plate pressure comes and clamps the members securely together against any possible distortion or movement. It is during the maintenance of this pressure that the imbibition takes place. Therefore there is bound to be perfect superposition of the images. At no time in the procedure is there any opportunity for error in the transfer.

It will be noted that owing to the mordanted and hardened character of the receiving gelatin, the color first applied is fixed, and this practically prevents appreciable reverse flow of the first color back into the second dye member. After the requisite time of pressure, the parts will be carefully disassembled. After this again the steps will be repeated for superimposing the third and final color image upon the print already bearing two colors. This completes the print. Operations can be expedited by preparing a plurality of sets of dyed relief members, or by operating at the same time in different colors on several prints; and a number of presses or a large press may be employed to this end.

Consonant with all of the above described processes are many possible applications and variations, for example it is obvious that artists may locally dye or retouch the work. This is easily permitted to be done during the different stages of the operation since each of the dye carrying members may be brushed with dye at points where desired, and the process otherwise will be unaltered. An entire dye member may be dyed more or less deeply as the artist may desire, and the shade of color may be varied to suit any special objects of the artist.

Another possible application of my invention is one permitting a subdivision of each color image and transferring portions only of it to the print. For example, the area of the picture may be cross-lined and the color image applied only at periodic strips or other subdivided areas minute or otherwise. And when there are three color images, portions of them respectively may be applied in rotation in such strips or subdivisions, and in this way a three-color print might be produced without actual superposition of images.

Many other variations and applications of my invention are obviously possible, and therefore I desire not to be limited to the precise procedure above set forth, nor to be limited in any respect beyond the underlying principles of the present improvement excepting as set forth in the appended claims.

Substantially in one sense my improvement involves the novel method of making multi-color pictures by imbibition from a set of photographically prepared dye members by bringing a print member into con-

tact with each of such dye members and subjecting the two to plate pressure in the presence of moisture, especially when the pressure is begun not after both the print member and moisture reach or have access to the dye member. Thus, as already made clear, the two members sometimes will be contacted before pressure, in which case they will be dry and the moisture allowed access only upon or after application of pressure; whereas sometimes the contact and pressure take place simultaneously, in which case either or both members might be previously moist. The principle is the same in both cases, since dye transference is possible only during the time of sustained plate pressure. The plate pressure contemplated by me is to be such heavy pressure as is obtainable by a screw operated press or the like.

Taking into account the necessity of registration as between the partly made print containing an image and the dye member for applying a second image thereon, the present improvement may be said to involve a method whereby the second image is combined with the print containing the first image by first accurately registering the print member with a dye member before imbibition commences, and thereupon causing imbibition of the color image from the dye member into the print member; this being preferably done, as before stated, by effecting registration while the members are in dry contact, and thereafter applying the necessary moisture and the intimate contact afforded by the plate pressure.

A part of the hereinabove description refers to particular materials and apparatus capable of illustration. Drawings, therefore, are appended hereto in which for convenience thin dimensions are exaggerated.

In said drawings, which are merely illustrative of materials and apparatus that may be employed in carrying out the present invention, Figure 1 is a face view of a carrier bearing a dye image. Fig. 2 is an enlarged section on the plane 2, 2, of Fig. 1. Fig. 3 is a further enlarged section showing substantially the relative thickness of the celluloid base and gelatin relief. Fig. 4 is a section of the print member. Fig. 5 illustrates the first method of causing imbibition after registration. Fig. 6 shows another way of doing the same. Fig. 7 shows the second method.

The dye carrier 11 has the relief 12 at its face, and the transparent backing 13. The color image is constituted by the dye absorbed into the relief 12, which varies in thickness. The print 14 consists of the colloid coating 15 on the paper backing 16. Assuming the members 11 and 14 are dry, they may be assembled as in Fig. 5:

With a rubber sheet 17 at the bottom, the

dye carrier 11 will be placed thereon face up, and the print 14 face down on top of that. Above the dry blotter 18 is the wet blotter 19, and a second rubber sheet 20. These assembled elements 21 may then be placed in a press consisting of a bed 22, and a descending platen 23. The platen causes pressure, and, as already explained, the moisture from the wet blotter permeates the members 11 and 14, causing imbibition. The wet blotter 19 may be secured to the platen 23 as in Fig. 6, by a flexible brass plate 24. This flattens out, as the platen descends, by contact with rigid plate 25. Thereby moisture is excluded from the print until after the members have been properly registered and the pressure applied. The print 14, might be secured to the platen 23 as in Fig. 7 by means of clips 26. Thereby the print may successively be brought down upon the different dye carriers 11, successively positioned upon the bed 22. Whichever of the illustrated methods is adopted, it is understood that the three color images from the three dye carriers 11, 11, 11, are successively imbibed into the gelatin coating of the print 14, whereupon the entire picture, complete in all its colors is reproduced.

The novel product or color-photography print whose characteristics have been pointed out in the hereinabove description is not made the subject of claim herein but is claimed in copending application Serial No. 849,007, filed July 3, 1914.

What I claim and desire to secure by Letters Patent is:

1. In the art of color-photography the method of making multi-color prints from a set of color-selection negatives comprising the following steps: photographically preparing dye members from at least one of said negatives, dyeing such members to produce color images therein, placing each such dye member and a print member in mutual face contact, and maintaining between said two members in the presence of moisture a substantial plate pressure applied before imbibition has substantially commenced.

2. In the art of color-photography the method of making multi-color prints from a set of color-selection negatives comprising the following steps: photographically preparing from at least one of said negatives dye members consisting of tenuous reliefs in bichromated gelatin, dyeing such members to produce color images by selective absorption therein, placing each such dye member and a print member in mutual face contact, and maintaining between said two members in the presence of moisture a substantial plate pressure applied before imbibition has substantially commenced.

3. In the art of color-photography the method of making multi-color prints from a set of color-selection negatives compris-

ing the following steps: photographically preparing dye members from at least one of said negatives, dyeing such members to produce color images therein, placing each such dye member in mutual face contact with a print member consisting of paper coated with hardened mordanted gelatin, and maintaining between said two members in the presence of moisture a substantial plate pressure applied before imbibition has substantially commenced.

4. In the art of color-photography the method of making multi-color prints from a set of color-selection negatives comprising the following steps: photographically preparing from at least one of said negatives dye members consisting of tenuous reliefs in bichromated gelatin, dyeing such members to produce color images by selective absorption therein, placing each such dye member in mutual face contact with a print member consisting of paper coated with hardened mordanted gelatin, and maintaining between said two members in the presence of moisture a substantial plate pressure applied before imbibition has substantially commenced.

5. In the art of color-photography the method of making multi-color prints from a set of color-selection negatives comprising the following steps: photographically preparing dye members from at least one of said negatives, dyeing such members to produce color images therein, placing each such dye member and a print member in mutual face contact while both are substantially dry, and then subjecting them to sustained plate pressure and to moisture.

6. In the art of color-photography the method of making multi-color prints from a set of color-selection negatives comprising the following steps: photographically preparing dye members from at least one of said negatives, dyeing such members to produce color images therein, placing each such dye member and a colloid coated pervious print member in mutual face contact while both are substantially dry, and then subjecting them to sustained plate pressure and to moisture applied through the back of the pervious print member.

7. In the art of color-photography the method of making multi-color prints from a set of color-selection negatives comprising the following steps: photographically preparing dye members from at least one of said negatives, dyeing such members to produce color images therein, placing each such dye member and a colloid coated pervious print member in mutual face contact while both are substantially dry, and then subjecting them to sustain plate pressure and to moisture applied through the back of the pervious print member by a separate moist sheet there located during pressure.

8. In the art of color-photography the method of making multi-color prints from a set of color-selection negatives comprising the following steps: photographically preparing a plurality of dye members from said negatives, dyeing such members with suitable different colors to produce color images therein, and then successively transferring such images in registry to a single print member by placing each such dye member in turn in face contact with such print member, and maintaining between said two members in the presence of moisture a substantial plate pressure applied before imbibition has substantially commenced.

9. In the art of color-photography the method of making multi-color prints from a set of color-selection negatives comprising the following steps: photographically preparing a plurality of dye members from said negatives, dyeing such members with suitable different colors to produce color images therein, and then successively transferring such images in registry to a single print member consisting of paper coated with hardened mordanted gelatin, by placing each such dye member in turn in face contact with such print member, and maintaining between said two members in the presence of moisture a substantial plate pressure applied before imbibition has substantially commenced.

10. In the art of color-photography the method of making multi-color prints from a set of color-selection negatives comprising the following steps: photographically preparing a plurality of dye members from said negatives, each such dye member consisting of a tenuous relief in bichromated gelatin, dyeing such members with suitable different colors to produce color images therein by selective absorption, and then successively transferring such images in registry to a single print member consisting of paper coated with hardened mordanted gelatin, by placing each such dye member in turn in face contact with such print member, and maintaining between said two members in the presence of moisture a substantial plate pressure applied before imbibition has substantially commenced.

11. In the art of color-photography the method of making multi-color prints from a set of color-selection negatives comprising the following steps: photographically preparing a plurality of dye members from said negatives, dyeing such members with suitable different colors to produce color images therein, and then successively transferring such images in registry to a single print member by placing each such dye member in turn in face contact with such print member while both are substantially dry, and then subjecting them to sustained plate pressure and to moisture.

12. In the art of color-photography the method of making multi-color prints from a set of color-selection negatives comprising the following steps: photographically preparing a plurality of dye members from said negatives, dyeing such members with suitable different colors to produce color images therein, and then successively transferring such images in registry to a single pervious backed print member by placing each such dye member in turn in face contact with such print member while both are substantially dry, and then subjecting them to sustained plate pressure and to moisture applied through the back of the print member.

13. In the art of color-photography the method of making multi-color prints from a set of color-selection negatives comprising the following steps: photographically preparing a plurality of dye members from said negatives, dyeing such members with suitable different colors to produce color images therein, and then successively transferring such images by imbibition to a single print member, each transfer accomplished by the dry superposition of the print member and a dye member and the application of moisture and of sustained plate pressure thereto during imbibition.

14. In the art of color-photography the method of making multi-color prints from a set of color-selection negatives comprising the following steps: photographically preparing a plurality of dye members from said negatives, dyeing such members with suitable different colors to produce color images therein, and then successively transferring such images by imbibition to a single print member consisting of paper coated with hardened mordanted gelatin, each transfer accomplished by the dry superposition of the print member and a dye member and the application of moisture and of sustained plate pressure thereto during imbibition.

15. In the art of color-photography the method of making multi-color prints from a set of color-selection negatives comprising the following steps: photographically preparing a plurality of dye members from said negatives, dyeing such members with suitable different colors to produce color images therein, and then successively transferring such images by imbibition to a single print member consisting of paper coated with hardened mordanted gelatin, each transfer accomplished by the dry superposition of the print member and a dye member and the application of moisture and of sustained plate pressure thereto during imbibition, the moisture being applied through the back of the print member.

16. In the art of color-photography the method of making multi-color prints from a set of color-selection negatives comprising

the following steps: photographically preparing a plurality of dye members from said negatives, each consisting of a transparent colloid photographic relief, dyeing such members with suitable different colors to produce color images therein, and then successively transferring such images by imbibition to a single print member consisting of paper coated with hardened mordanted gelatin, each transfer accomplished by the dry superposition of the print member and a dye member and the application of moisture and of sustained plate pressure thereto during imbibition.

17. In the art of color-photography the method of making multi-color prints from a set of color-selection negatives comprising the following steps: photographically preparing a transparent dye member from one of said negatives, dyeing such member to produce a color image therein, and then placing in registry and face-to-face with said dye member a print member having a different color image, followed by wetting to cause imbibition, and the maintenance of plate pressure during the period of imbibition, whereby the two images are combined in the print.

18. In the art of color-photography the method of making multi-color prints from a set of color selection negatives comprising the following steps: photographically preparing dye members from at least one of said negatives, dyeing such members to produce color images therein, preparing a monochrome print in one of the printing colors, and combining a second color image with such monochrome by first accurately registering the print member with a dye member while in dry contact; and thereupon causing imbibition of the color image from the dye member to the print member, through moisture and pressure.

19. In the art of color-photography the method of making multi-color prints from a set of color-selection negatives comprising the following steps: producing a monochrome image from one of such negatives in the corresponding one of the printing colors upon a suitable paper or other print-member, photographically preparing from another of such negatives a dye member adapted to selectively absorb and carry dye, dyeing such dye member by wetting with a dye of the corresponding printing color to thereby produce a color image, thereafter effecting the accurate registration of said dye member with said print member while preventing imbibition, and thereafter causing transfer by imbibition of the color image from said dye member into said print member by maintaining the two previously registered members in intimate moist contact while preventing any relative movement between the two members, whereby the images

are accurately and perfectly combined into a single picture with clean outlines and without overlapping or blurring of colors.

20. In the art of color-photography the
 5 method of making multi-color prints from a
 set of color-selection negatives comprising
 the following steps: producing a hardened-
 and -mordanted -gelatin coated print from
 one of such negatives in the corresponding
 10 one of the printing colors upon a suitable
 paper or other print-member, photographi-
 cally preparing from another of such nega-
 tives a transparent colloid-relief dye member
 adapted to selectively absorb and carry dye,
 15 dyeing such dye member by wetting with a
 dye of the corresponding printing color to
 thereby produce a color image, thereafter
 effecting the accurate registration of said
 dye member with said print member while
 20 preventing imbibition, and thereafter caus-
 ing transfer by imbibition of the color im-
 age from said dye member into said print
 member by maintaining the two previously
 registered members in intimate moist con-
 25 tact while preventing any relative movement
 between the two members, whereby the im-
 ages are accurately and perfectly combined
 into a single picture with clean outlines and
 without overlapping or blurring of colors.
 30 21. In the art of color-photography the

method of making multi-color prints from a
 set of color-selection negatives comprising
 the following steps: producing a hardened-
 and -mordanted -gelatin coated print from
 one of such negatives in the corresponding 35
 one of the printing colors upon a suitable
 paper or other print-member, photographi-
 cally preparing from another of such nega-
 tives a transparent colloid-relief dye mem-
 ber adapted to selectively absorb and carry 40
 dye, dyeing such dye member by wetting
 with a dye of the corresponding printing
 color to thereby produce a color image,
 thereafter effecting the accurate registration
 of said dye member in contact with said 45
 print member while both are face-dry, and
 thereafter causing moisture to penetrate to
 the contacting faces of the members to pro-
 duce imbibition while preventing any rela-
 tive movement between the two previously 50
 registered members, whereby the images are
 accurately and perfectly combined into a
 single picture with clean outlines and with-
 out overlapping or blurring of colors.
 In testimony whereof I affix my signature 55
 in presence of two witnesses.

FREDERIC EUGENE IVES.

Witnesses:

DONALD CAMPBELL,
 LESTER C. TAYLOR.