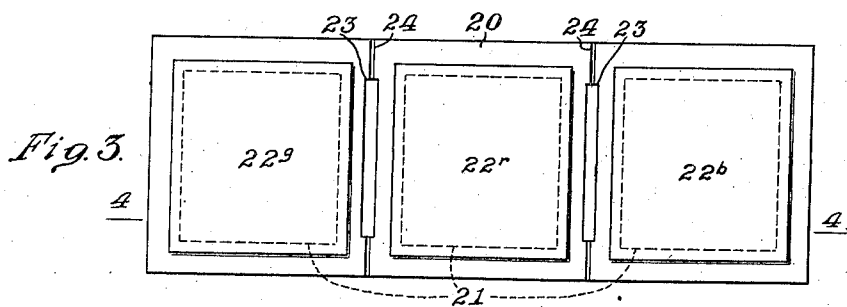
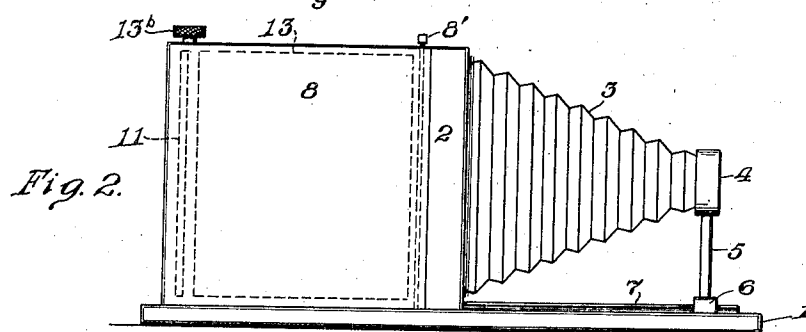
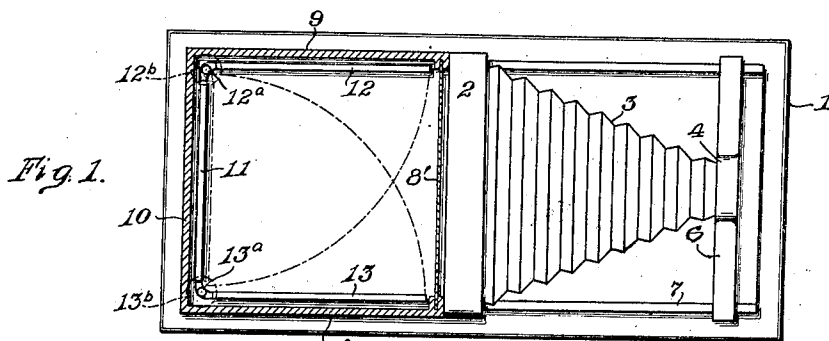


I. KITSEE.
 METHOD AND MEANS OF PRODUCING MULTICOLORED PHOTOGRAPHS.
 APPLICATION FILED DEC. 17, 1918.

1,325,992.

Patented Dec. 23, 1919.
 2 SHEETS—SHEET 1.



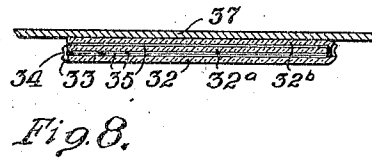
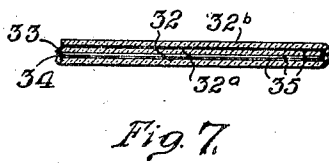
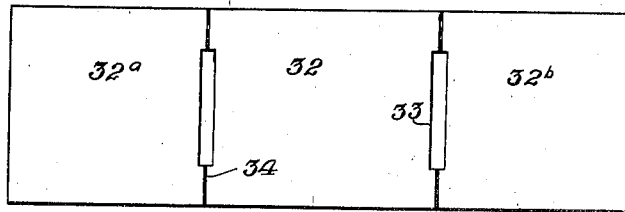
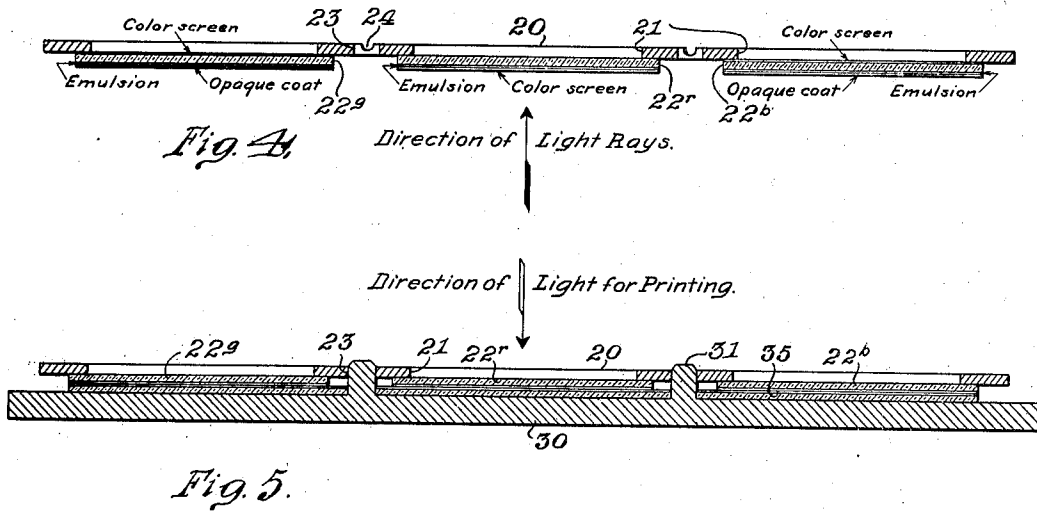
WITNESS:
Merrill T. Gummer.

INVENTOR.
Isidor Kitsee,
 BY
J. Stuart Freeman,
 ATTORNEY.

I. KITSEE.
METHOD AND MEANS OF PRODUCING MULTICOLORED PHOTOGRAPHS.
APPLICATION FILED DEC. 17, 1918.

1,325,992.

Patented Dec. 23, 1919.
2 SHEETS—SHEET 2.



WITNESS:

Merrill T. Cramer

INVENTOR.

Isidor Kitsee,

BY

Stewart Freeman,
ATTORNEY.

UNITED STATES PATENT OFFICE.

ISIDOR KITSEE, OF PHILADELPHIA, PENNSYLVANIA.

METHOD AND MEANS OF PRODUCING MULTICOLORED PHOTOGRAPHS.

1,325,992.

Specification of Letters Patent.

Patented Dec. 23, 1919.

Application filed December 17, 1918. Serial No. 267,098.

To all whom it may concern:

Be it known that I, ISIDOR KITSEE, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Methods and Means of Producing Multicolored Photographs, of which the following is a specification.

10 The object of this invention is to provide an improved method and means of producing multi-colored photographs, whereby it is possible to make a negative photograph of a given scene or object in different colors with the aid of one carrier or holder.

15 Having made a negative, another object of the invention is to provide further steps in the improved process, whereby it is possible from said negative to make as many positive prints as may be required without limit.

20 A still further object is to provide an improved product, which product may be used with but slight alteration in preference to the commonly known opaque print of a black-and-white negative, or as a transparency for lantern-slides and the like.

25 More than one method of color-photography that has been developed thus far comprises the formation of a set of monochrome transparencies, each of a fundamental color and embodying a positive photograph of that part of a given object or scene having a corresponding color. These transparencies are then superimposed one upon another until every object upon each transparency matches up as nearly as possible with the corresponding objects upon the other transparencies, or, in other words, so that each set of transparencies registers perfectly or with the least possible displacement.

30 However, all those who have made photographs by certain of the processes which are carried out along the line mentioned have experienced an almost insurmountable obstacle in their inability to exactly register the plurality of transparencies, for, while the one often in yellow is usually rather well defined, that probably in red is much less so, and the one generally tinted blue is in most instances so vaguely defined as to make it almost an absolute impossibility to find the exact position which it should bear with respect to the two first-mentioned transparencies.

35 Another object of the invention is therefore to provide means whereby the three

transparencies of the negative are positively maintained in exactly correct relation with the others; whereby the corresponding transparencies of the positive are likewise positively maintained in exactly correct relation with one another; and, consequently, whereby it is possible to superimpose the positive transparencies one upon another with substantially no possibility of error whatsoever, without having to depend upon or be influenced by the visible degree of definition of recorded details, and with the result that the said transparencies and the photographic impressions which they respectively carry bear to one another with absolute perfection the relationship which alone effects the perfect reproduction in color of the object or scene which was originally photographed.

40 Bearing these objects in mind, the invention comprises details of construction and operation hereinafter clearly described in the following specification, when read in conjunction with the accompanying drawings, in which Figure 1 is a top plan view of the principal elements of a camera such as is frequently used in a photographic studio, and showing by a horizontal section the interior of the rear portion thereof with a set of carriers sensitized to the effects of light, and together forming as a unit the photographic negative; Fig. 2 is a side elevation of the device shown in Fig. 1; Fig. 3 is a top plan view of the carrier-unit comprising the negative; Fig. 4 is a longitudinal transverse section on the line 4-4 of Fig. 3, but greatly enlarged in thickness for the purpose of showing the layers of various materials carried by the respective negative transparencies; Fig. 5 is a view of the negative transparencies after development and removal therefrom of the various color-screens and opaque coats, and in printing contact with the respective carrier transparencies forming the positive print; Fig. 6 is a plan view of the positive transparency-unit before folding together; Fig. 7 is a transverse section of the positive unit, folded to comprise a so-called transparency, such as those used as slides for lanterns; and Fig. 8 is a similar view showing the positive transparency-unit mounted as an ordinary opaque print.

45 Referring to the drawings, a camera is shown comprising a base 1, upon which is mounted the usual frame 2, from the forward open side of which projects the usual

bellows 3, provided upon its outermost restricted portion with the usual lens-holder or casing 4, said last-named casing being carried adjustably vertically by a support 5, extending upwardly from a slide 6 adapted to reciprocate for the longitudinal extension of said bellows upon a track 7. The essential difference of this camera from those commonly in use resides in the fact that the frame 2 is provided upon the rear thereof with a substantially rectangular box or chamber 8, having the length of its side walls 9—9' substantially equal to the width of the device across the rearmost wall 10.

The said inclosure 8 may, if desired, be separable from the remainder of the camera in order that the former may be readily dismounted from the latter and carried to a dark room, where it is obviously most conveniently "loaded" with a sensitive negative transparency-unit, a dark slide or trap 8' being provided to close said box when thus dismounted. As shown schematically in Fig. 1, the negative-unit comprises a central section 11 positioned parallel with respect to the wall 10, a forwardly laterally positioned section 12 parallel with respect to the wall 9, and a second and similar forwardly extending laterally positioned section 13 positioned parallel with respect to the wall 9'.

Primarily, it is to be noted that in general the present process provides for the consecutive exposure of each of the lateral and central sections of the negative-unit to the rays of light from the object to be photographed as said rays pass through the lens-holder 4. To this end, it is not of vital importance what order is employed in the exposure of these various negative-unit sections:—Thus, an exposure upon the central section may be made with the apparatus positioned exactly as shown in Fig. 1, after which the negative section 12 may be moved, by suitable means connected to the knurled wheel 12^b, about the center 12^a into the dot-and-dash position parallel with and abutting against the section 11. An exposure being made upon the section 12 in this position, said section is removed, by revolving the said wheel in the reverse direction, to its position adjacent to the said wall 9 of the device, and the negative section 13 is shifted about the center of 13^a, by means connected to the knurled wheel 13^b, into the dot-and-dash position just previously occupied by the section 12, in which position a third exposure is made, this time upon the section 13.

Preferable in practice and possibly necessitating the least number of movements during the exposure of a complete negative-unit, the box 8 is "loaded" with either of the sections 12 or 13 in the dot-and-dash position, in which position an exposure thereof is

made, after which the exposed end section of the negative-unit is shifted to one side, an exposure made of the central section of the unit, and the other end section of the unit shifted into the dot-and-dash position and exposed, this operation consuming no more than a few seconds under proper light and atmospheric conditions.

Considering now the details of the improved negative and positive print products and the improved process for obtaining the same, reference is made to Figs. 3 to 8, inclusive. A mat 20 of non-elastic material is provided, preferably with three apertures 21 therein, said apertures being but very slightly smaller than the corresponding number of pan-chromatically sensitized carrier sections 22^a, 22^r, and 22^b mounted upon said sheet and secured thereto centrally with relation to the respective apertures 21. The mat 20 is furthermore provided, centrally positioned between the neighboring apertures 21, with transversely extending elongated slots 23, from the opposite ends of which to the neighboring edges of said sheet extend score-marks 24 for a purpose hereinafter described.

Each of the carrier sections 22^a, 22^r and 22^b is coated upon one face with a pan-chromatic emulsion. The carrier sections 22^a and 22^b are furthermore provided upon the surface thus sensitized with opaque coatings as indicated, while upon their opposite faces they are respectively coated with green and blue coloring for the purpose of forming screens of those particular colors. The intermediate carrier section 22^r has a color-screen of red upon the surface of the emulsion and is without a coating of any sort upon its opposite surface. These respective color-screens and opaque coats are readily removable after exposure of the units to light, either before or during the process of developing and fixing of the emulsion layers carried by said units.

The negative unit thus formed is inserted into the box portion 8 of the camera, as shown in Fig. 1, and three closely consecutive exposures made by any of the usual methods of intermittently opening and closing the camera orifice in the lens-casing 4 and as hereinbefore described. With the negative-unit preferably in place, as described, light rays, permitted to enter the camera through the usual lens for a short period of time, pass through the color-screen and carrier of, and act upon the emulsion upon, the opposite side of the carrier section 22^a in the dot-and-dash position, but cannot continue past the opaque coating and affect the emulsion upon the carrier section 22^r, after which this first-exposed carrier section is shifted or pivotably swung out of the dot-and-dash position, immediately after which light rays are permitted to

impinge against carrier section 22^r, in this case passing through the color-screen carried thereby and acting upon the emulsion surface of the said carrier section. Similarly, after the carrier section 22^r is thus exposed, carrier section 22^b is shifted into the dot-and-dash position and exposed, light rays passing through the color-screen and transparent carrier before acting upon the emulsion carried thereby and being stopped by the opaque coating from continuing onward and affecting the emulsion of the carrier section 22^r.

The negative thus exposed either has the color-screens and opaque coatings first dissolved or otherwise removed therefrom as before mentioned, after which the emulsion coatings are developed and fixed in the usual manner and permitted to dry. It should be remembered that thus far, and in fact continuously hereafter, the negative-unit comprising the mat 20 and transparent carrier section attached thereto are at no time disunited, although they may be shifted in angular position with respect to one another by virtue of their relative pivotal connections.

To print from the negative thus produced, a frame is provided comprising a base 30, from which extend upwardly, spaced, parallel bars 31, in length, thickness and distance between centers being exactly equal to the slots 23 of the negative-mat 20. Upon this base is placed a transparent carrier 32, particularly illustrated in Figs. 5 and 6, the same being provided with spaced parallel elongated slots 33 adapted to receive the bars 31 of the printing frame, while in alignment with said slots are score-marks 34, upon which lines the carrier is later to be folded, said carrier also being provided upon its upper surface with a coating of chromated gelatin 35. Upon this positive, sensitized-carrier is placed face downward the previously exposed negative-unit hereinbefore described and as clearly shown in Fig. 6.

With the negative and chromated blank in the positions thus shown, the combination is exposed to light so that rays of the same pass through the negative and decompose the chemicals comprising the emulsion upon the chromated carrier. Removing both of these elements from the printing frame, the chromated carrier, printed on by means of the well-known process, is found to comprise three distinct photographic impressions which are complementary as to light and dark portions to those carried by the negative-mat. The printed positive is then treated in the usual manner to remove the unaffected gelatin.

It is now possible to tint or stain the three respective photographic impressions of the positive by means of colors which are re-

spectively complementary to those carried in the form of color-screens by the corresponding sections of the negative-units. Thus, positive section 32^a corresponding with (green) negative carrier section 22^g is stained red, the central positive section corresponding with (red) negative carrier section 22^r is stained blue, and the positive section 32^b corresponding with (blue) negative carrier section 22^b is stained yellow, the coloring in each of these instances adhering only to those parts of the sensitized positive surface on which the emulsion has been affected by light, and also to the extent to which said emulsion has been thus acted upon.

The resulting positive then simply folded upon the score-lines 34, so that the result as illustrated by the cross-section in Fig. 7 comprises a photograph adapted to be mounted on a suitable base such as a mat 37, which in reality may be one of the stiff papers or boards used in mounting photographic prints. Said mat has a surface possessing high reflective powers, so that the product illustrated by Fig. 8 is the equivalent of and closely resembles the usual photographic print upon white paper, except for the fact that the reproduction possesses natural colors of the original object. It is obvious that instead of printing on gelatin from the negative directly, a transparent positive may first be made from said negative, and the chromated gelatin prints may then be produced with the aid of such positive. In that case, it is suggested to tint the different sections of the gelatin prints with colors substantially the same as the filters through which the original negatives have been taken, and the complete photograph may be mounted on a suitable transparent material for lantern-slides or to be viewed as transparencies.

Having thus described my invention, what I claim and desire to protect by Letters Patent of the United States is:—

1. In color-photography, a mat having a series of spaced apertures, in combination with transparent sections of a carrier panchromatically sensitized, said sections being carried by said mat centralized with relation to the respective apertures and in number equal to said apertures.

2. In color-photography, a mat having a series of spaced apertures, in combination with transparent sections of a carrier panchromatically sensitized, said sections being carried by said mat centralized with relation to the respective apertures and in number equal to said apertures, and said mat being provided with scoring between neighboring apertures, to predetermine the relative transverse positions of said sections when folded upon one another in parallel planes.

3. In color-photography, a mat having a

- series of spaced apertures, in combination with transparent sections of a carrier pan-chromatically sensitized, said sections being carried by said mat centralized with relation to the respective apertures and in number equal to said apertures, and said mat being provided with apertures between neighboring apertures of the first set, and with scoring in alinement with said interposed apertures, to predetermine the relative transverse positions of said sections when folded upon one another in parallel planes.
4. In color-photography, the combination of a plurality of pan-chromatically sensitized sections of one carrier, with means supporting said sections with respect to one another and adapted to permit said sections being swung into parallel planes, the end sections being provided with removable means to prevent the light rays from penetrating beyond said sections when exposed.
5. In color-photography, the combination of three transparent pan-chromatically sensitized sections of a carrier, with means supporting said sections with respect to one another and adapted to permit said sections being swung into parallel planes closely positioned together to form a unit transparent except for the translucent layers of sensitive emulsion embodied therein, the end sections being provided with removable means to prevent the light rays from penetrating beyond said sections when exposed.
6. In color-photography, the combination of three transparent pan-chromatically sensitized sections of a carrier combined in one mechanical unit, and each of said sections being provided with a removable color-screen.
7. In color-photography, the combination of three transparent pan-chromatically sensitized sections of a carrier forming one mechanical unit, said sections being connected to swing with respect to one another, the central section being provided with a color-screen upon one side, and the other sections each being provided with a color-screen upon the opposite side to the first while in a common plane.
8. In color-photography, the combination of three transparent sections of one carrier, said sections being pan-chromatically sensitized upon the same side, with means supporting said sections pivotally with respect to one another, the central section being provided with a color-screen upon the emulsion side and the other sections being each provided with a color-screen upon the side opposite to that carrying the emulsion.
9. In color-photography, the combination of three transparent sections of one carrier pan-chromatically sensitized upon the same side, with means supporting said sections pivotally with respect to one another, the central section being provided with a color-screen upon the emulsion side and the other sections being each provided with a color-screen upon the side opposite to that carrying the emulsion.
10. In color-photography, a carrier comprising transparent pan-chromatically sensitized sections separated by apertures and scoring in alinement with said apertures.
11. In color-photography, a carrier comprising transparent pan-chromatically sensitized sections pivotally related to one another, and removable means operative to prevent the light rays from passing through said end sections.
12. In color-photography, a carrier of flexible material comprising properly sensitized sections pivotally related to one another and separated by apertures and scoring in alinement therewith.
13. In color-photography, a print comprising one sheet of transparent material carrying three sections, divided from each other by scoring, said sheet being folded so as to bring the sections into superimposed parallel relation, and in uniform contact with one another.
14. In color-photography, a print comprising one sheet of transparent material carrying a number of differently colored photographic sections, divided from one another by scoring and folded so as to bring the different sections into superimposed parallel relation and into uniform contact with one another.
15. In color-photography, a print comprising one sheet of a transparent material divided by scoring into a number of sectional parts, each sectional part carrying a photographic impression, and each impression being tinted differently from the others.
16. In color-photography, a print comprising a flexible transparent carrier having three sections folded to bring said sections parallel and in uniform contact with one another, each section carrying a mono-tinted photographic impression, the center section having secured thereto an opaque backing.
17. In color-photography, a print comprising a sectional transparent carrier folded to bring the sections into superimposed parallel relation and in uniform contact with one another, and an opaque backing for said superimposed sections.
18. In color-photography, a print comprising a flexible transparent carrier having three sections folded to bring said sections parallel and in uniform contact with one another, each section carrying a mono-tinted photographic impression, and an opaque backing for said superimposed sections.
19. In color-photography, the process of preparing a three-sectional transparent carrier which consists in providing said carrier with three sections, each section being pan-

chromatically sensitized upon one face, one section being provided with a removable color-screen upon its emulsion side, and each of the other sections having a removable
 5 opaque coating upon the emulsion side and a removable color-screen upon the opposite side.

20. In color-photography, the process which consists in first preparing a three-sectional transparent carrier, pan-chromatically sensitizing each section upon one face, one section with a removable color-screen upon its emulsion side, and each of the other sections with a removable opaque coating
 15 upon the emulsion side and a removable color-screen upon the opposite side, and exposing the said sections consecutively to light rays, the central section directly upon the face and the other sections through the
 20 base of the emulsion when folded over upon said central section.

21. In color-photography, the method which consists in assembling properly sensitized blanks in one holder, providing the
 25 end blanks with removable means to prevent the rays of light from penetrating beyond said blanks, folding the end blanks one at a time upon a central blank, photographing upon said end blanks when so folded, and
 30 photographing upon the central blank while said central blank is free from said end blanks, each photographic exposure being made through a filter of different color from the remaining filters.

35 22. In color-photography, the method which consists in first producing three negatives upon one continuous properly sensitized blank divided by scoring into three sections, each negative being made through
 40 a different color filter, then printing from said negatives upon one properly sensitized blank, divided by scoring into three sections, coinciding with the divisions of the original negative, tinting the exposed parts
 45 with suitable colors, and then folding and securing the end divisions upon the central division.

23. In color-photography, the process which consists in first preparing a three-sectional transparent carrier, pan-chromatically sensitizing each section upon one face,
 50 providing one section with a removable color-screen upon its emulsion side, and each of the other sections with a removable opaque coating upon the emulsion side and
 55 a removable color-screen upon the opposite side, exposing the said sections consecutively to light rays, the central section directly upon the face and the other sections
 60 through the base of the emulsion when folded over upon said central section, removing said opaque coatings and color-screens, and developing the sensitized emulsion upon said sections, then printing from said printed sections and tinting, and fold-

ing said sections upon one another in uniform contact to form a composite unit.

24. In color-photography, the process which consists in first preparing a three-sectional transparent carrier, sensitizing each
 70 section pan-chromatically upon one face, providing one section with a removable color-screen upon its emulsion side, and each of the other sections with a removable opaque coating upon the emulsion side and
 75 a removable color-screen upon the opposite side, exposing the said sections consecutively to light rays, the central section directly upon the face and the other sections through the base of the emulsion when folded over
 80 upon said central section removing said opaque coatings and color-screens, and developing the sensitized emulsion upon said sections, then printing from said sections and tinting, folding said printed sections
 85 upon one another in uniform contact to form a composite unit, and finally backing said unit with a material having a light-refractive surface.

25. In color-photography, the process
 90 which consists in producing a multi-colored photograph upon one side of a properly sensitized blank from one negative-unit, embracing a plurality of photographic sections.

26. In color-photography, the process
 95 which consists in printing simultaneously upon a properly sensitized blank, comprising a plurality of individual sections made from a one-unit negative, embracing a corresponding number of individual photographs,
 100 each photograph being taken through a differently colored filter.

27. In color-photography, the method, which consists in subjecting the different sensitized sections of one carrier, one at a
 105 time and consecutively to the action of light rays in a camera through the swinging operation of one or the other of said sections, providing a portion of said sections with color filters upon one surface and a portion
 110 of said sections upon the reverse surface of the sensitized emulsion.

28. The method of producing multi-colored photographs, which consists in first
 115 producing a negative on each of the sections of a unit carrier, each through a different color-filter, developing said negatives, printing simultaneously from all of said sections on one continuous, properly sensitized blank,
 120 tinting each section in required color, and folding the different sections upon each other, so as to form one multi-colored photograph.

In testimony whereof I have affixed my signature in presence of two witnesses.

ISIDOR KITSEE.

Witnesses:

E. E. MILLER,
 MERRILL T. CRANMER.