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FILTERING PROCESS
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Fig. 1.

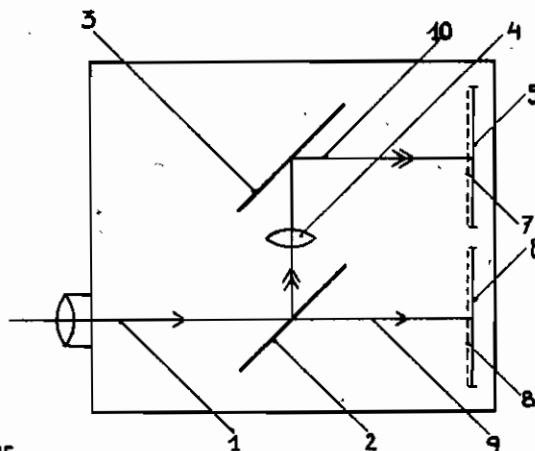


Fig. 2.

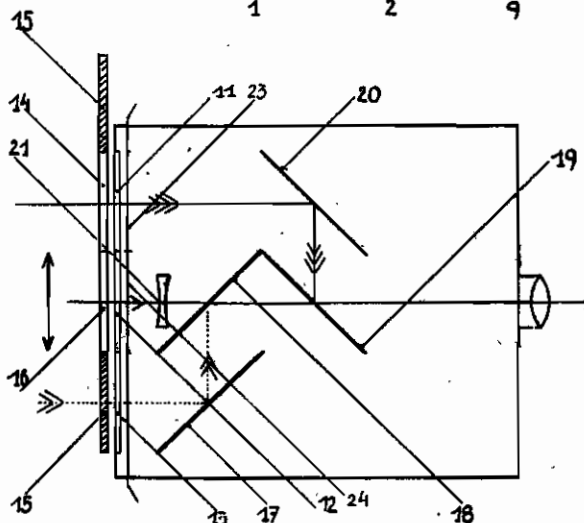
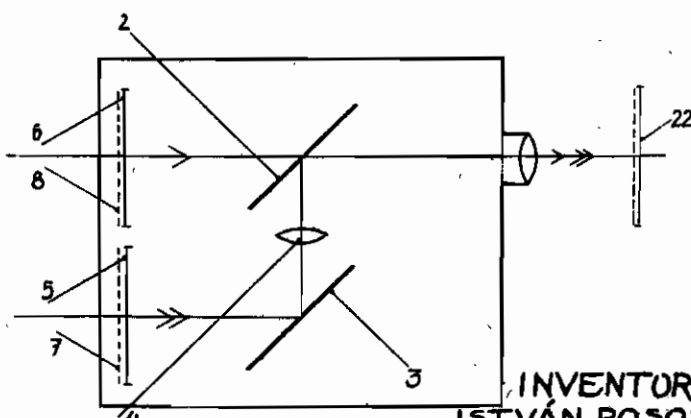


Fig. 3.



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ALIEN PROPERTY CUSTODIAN

FILTERING PROCESS

István Rosos, Budapest, Hungary; vested in the
Alien Property Custodian

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Processes of colour photography have already been disclosed, according to which pictures or part pictures decomposed into basic colours were taken and these were united in different ways, i. e. it was the joint totality of these part pictures that constituted the coloured picture to be prepared. A striking disadvantage presenting itself in the case of those processes in which the part pictures obtained by decomposition into different colours are placed alongside each other, i. e. in the case of the so-called additive processes, is that the production of prints from the pictures obtained in this manner is a very complicated and very expensive matter and demands a substantially increased length of time of exposure. On the other hand, those processes in which the part pictures obtained by decomposition according to colours are placed one behind the other, i. e. the so-called subtractive processes, are disadvantageous owing to the fact that their colours are not true to nature, the production of prints from them is very cumbersome and expensive, although the loss of light presenting itself in the case of these processes is not as substantial as in the case of additive processes mentioned above. Common drawbacks of both types of processes are their extraordinary complication, their false colours and the high expense with which their employment is connected. A further drawback of these systems is their high sensitivity as to length of time of exposure, and thus with these processes a picture of which at least some shaded details are not incorrectly exposed and therefore also falsely coloured represents a rare occurrence. Processes are also known in which, in accordance with the decomposition into colours, a number of photographs is produced simultaneously; these processes also are imperfect, their colouring is false, the projection of the various pictures as moving pictures is a most complicated business.

The invention eliminates all these drawbacks and its great advantage is that by its means any number of coloured prints can be prepared easily, the colours of the pictures produced by its means are natural; incorrect exposure does not falsify the pictures, and the production of the pictures is most simple and inexpensive. A further advantage of the invention is that by its means it is possible to produce diapositives or prints of such a kind as can be projected by means of any kind of projecting apparatus of the usual type without having to alter such apparatus in any way. By

means of this process it is also possible to improve existing processes.

Notably, the invention consists, substantially, in a process for the production of such pictures or moving pictures of natural colour in which the diapositives or positive prints of two or more simultaneous complementary photographs, i. e. photographs filtered by means of filters for groups of complementary colours, are mutually united, or prepared on each other, respectively, in such a manner that the light rays passing through or reflected from, or projected on, the united picture are filtered by means of a colour filter corresponding to the part picture of one colour group only, whereas through the corresponding part picture or pictures of the other complementary colour group or groups of the united picture the light ray are passing through or are being reflected without any colour filtering, i. e. these last-named rays are white rays of light.

According to one mode of carrying the process according to the invention into effect the photograph is taken on photo-sensitive material through a colour screen composed of the screen elements of two complementary colour group—e. g. reddish orange and blueish green—and a positive print of this negative picture filtered in two colour groups is prepared on a photo-sensitive material of such a kind as contains two photo-sensitive layers, of which layers one is photo-sensitive only towards the colours of one of the colour groups, whilst the other is photo-sensitive only towards the colours of the second complementary colour group, following which it is only the silver of one layer of the positive print thus prepared that is dyed to the colours of the colour group corresponding to its colour sensitivity, that is to say, e. g., the silver of the layer sensitive towards reddish orange is dyed to a reddish orange colour, following which normal white light is projected through this print, or on this print, in consequence whereof the rays of white light filtered by means of the colour screen of the one colour group will, together with the rays passing through the other parts of the picture, show a picture coloured in natural colours true to life.

According to the invention it is also possible to proceed in such a manner that the photograph prepared on material photo-sensitive to colours is prepared through a colour screen composed of the screen elements of two complementary colour groups (e. g. reddish orange and blueish green), i. e. the negative picture filtered in the two colour groups is prepared as a diapositive by means

of a reversing bath, and provision is also made for ensuring that it should only be the filtering elements of one of the colour groups, e. g. those of the reddish orange colour group, that should remain unchanged during the process of production of the picture, whereas the screen elements of the complementary colour group, e. g. of the blueish green colour group, should become decolourized, following which the diapositive is viewed or projected in the normal manner by means of white light projected through or on the diapositive, in which case, notwithstanding the fact that the white light has only been dyed with the colours of one colour group, e. g. with those of the reddish orange colour group, i. e. filtered through a colour screen of this kind, a projected or lighted picture coloured true to nature is nevertheless obtained.

The process according to the invention utilizes the phenomenon that rays of light passing through a part picture dyed, e. g. by means of reddish orange screen elements, will, together with the white rays of light of various shades or intensities passing through the part picture belonging thereto create the impression of a picture coloured true to nature. A great part is played in this phenomenon also by the relative sensitivity to light or to colour, respectively, of the human eye. It is beyond doubt that the colours of the coloured pictures and moving pictures prepared by means of the process according to the invention are, in all the shades of the spectrum, so true to life as to surpass by far all such kinds of coloured pictures or moving pictures, respectively, as have been known up to now.

According to the invention, the photograph may also be prepared on such a photo-sensitive material as is fitted with the colour screen of a single colour group, e. g. of reddish orange, only, and which contains, behind this colour screen, two photo-sensitive layers of which the first is photo-sensitive towards the colours of this colour screen only, whereas the other layer is photo-sensitive only toward the colours of the complementary colour group. Accordingly, the light will, passing through the colour screen, first reach the layer possessing the colour sensitivity corresponding to it, and in this layer only the colours of the colour screen will leave any trace, whilst following this the light will reach the material colour-sensitive towards the colours of the complementary colour group, and in this only the colours of the complementary colour group will leave any trace. The negative thus produced is developed as a diapositive by means of a reversing bath, and this diapositive, projected by means of white light with the aid of a normal projecting apparatus, will give a picture in true natural colours. It is of course also possible to develop the negative picture and dye the silver of the complementary colour group to the colours of this colour group, and from this negative it will be possible to prepare subsequently, by means of the process described above, such prints as can be projected in colours.

For the purpose of producing prints it is also possible to prepare, according to the invention, a photosensitive material of such a kind as contains two colour-sensitized layers and a coloured filtering layer separating these two layers from each other, the said separating filtering layer being decolourized in the course of the production of the picture.

It is also possible to divide the rays reaching

the photographic camera by means of mirrors or prisms into two groups and to balance the differences of length of travel of the various groups of rays by means of collecting or dispersing lenses, respectively, following which one of the groups of rays is filtered by means of the colour by one colour group, whereas the other group of rays is passed through the colour filter of the complementary colour group on the layer photo-sensitive towards the colours, whilst at the same time the rays are guided in such a manner that the pictures produced simultaneously by the two groups of rays should become placed in space below each other or alongside each other on the same strip of film. The two correlated negative pictures thus obtained are projected on each other through the colour filters of the complementary colour group employed when taking the picture and there is exposed to them such a material photosensitive to colours the colour screen whereof contains the colours of both colour groups and which is prepared in such a manner that of the screen elements only the colours of one screen element should remain, whereas the screen elements of the complementary colour group are becoming decolourized during the production of the picture; it is, however, also possible to employ any of the printing processes already described above, following which the diapositive or film, respectively, thus prepared is projected, by illuminating it with white light, by means of the usual kind of projecting apparatus, a picture in true natural colours being thus obtained.

It is not absolutely necessary that the two correlated negative pictures should in the manner described in the preceding paragraph be projected on each other and that the method of printing according to the invention described above should be employed, it being also possible to proceed according to the invention in such a manner that black-and-white diapositives are prepared from the negative photographs by means of ordinary printing, and these diapositives are then projected in colours on the projecting apparatus of a special type of design according to the invention. Projection is effected in such a manner that of the two correlated photographs only one is projected through the colour screen employed when taking the photograph, whilst the other photograph is projected by means of white light without any colour filter on the picture projected through the colour filter. In this case a picture in true natural colours is indeed obtained, but the projecting apparatus would have to continue to run with two correlated photographs. This is eliminated by the invention in such a manner that a gate corresponding to three picture squares is employed in the projecting apparatus and the lower part of this gate is covered, in a height corresponding to one picture square, by a screen, whereas its upper part is covered in the same height by a colour filter, or vice versa, whilst during the pull forwarding the film by one picture square the colour filter and the covering screen will change over to the corresponding part picture. Projection of one picture on the other is performed according to the invention in such a manner that the photographs are projected on each other by means of mirrors or prisms capable of being adjusted at an angle of practically 45° relatively to the picture squares, and the pictures projected on each other are projected by means of a single projecting lens, the differences of length of travel from the pro-

jecting lens of the various pictures being balanced by means of dispersing or collecting lenses, respectively. In order to ensure the fine adjustment of the mirrors, projection is effected at a scale greater than necessary, e. g. by provisionally screwing-in a corresponding projecting lens, it being only after adjustment that the normal projecting lens necessary for projection is employed.

According to the invention, the mirrors are arranged at an angle of 45° relatively to the two picture squares at the two ends in such a manner as to ensure that the said mirrors should project the image of the said picture squares in the direction of the central picture square, whereas at the central picture squares two partly translucent mirrors are arranged under an angle of 45° , these mirrors being parallel to the mirrors arranged near the picture squares at the two ends, and being therefore inclined towards each other and allowing the image of the central picture square to pass through them, whilst the image projected on them by the mirrors of the picture squares at the two ends are reprojected by them in the direction of the projecting lens.

In the process according to the invention described above pictures were taken through the colour screens of two complementary colour groups and these pictures were printed on a material which is photo-sensitive towards the colours of both colour groups. According to one variant of the invention, the process can be rendered less expensive by projecting the photograph prepared by means of reddish orange and greenish blue colour filters on such a material which is only colour-sensitive towards the reddish orange and blue colours, and reddish orange and blue colour filters are employed in the process of projection, whilst the production of the picture is effected in such a manner as to ensure that only the reddish orange screen elements should remain, whereas the blue screen elements should become decolorized. By illuminating this picture with white light it can be projected as a coloured picture.

If it is desired to prepare, by means of printing from the negative pictures prepared through the colour filters of two complementary colour groups by means of the process described above, further negative pictures, the print is prepared according to the invention from the negative to be copied on such a photo-sensitive material which contains two layers colour-sensitive towards the colours of the complementary colour group of the picture, these layers being prepared preliminarily in such a manner that in the course of the production of the picture the screen-like silver picture of the various layers should become dyed in accordance with the colours of the colour group belonging to them, following which any desired number of negative prints can be prepared from the picture thus produced.

No matter by means of which of the processes described above the photograph has been taken, it is also possible to proceed in the process of printing in such a manner, that neither of the colour screens of the photo-sensitive material fitted with two or more colour-sensitive layers is decolorized when preparing the picture, that is to say the silver dyed in a screen-like manner of the said layers is retained also after the production of the picture. In those cases when two correlated photographs to be projected on each other are available, the print or the positive picture may also be prepared on such a photo-sensitive material as possesses only a single colour-sensitive layer, and the silver dyed in a screen-like manner of this layer is left coloured also after the production of the picture.

From photographs prepared by any of the processes according to the invention, the coloured printed picture is prepared according to the invention in such a manner that of each of the separated pictures prepared by means of two complementary colour groups a printing block or transfer is prepared so that on one of the printing blocks there shoulder for instance come to be placed only the constituent elements of the orange-red picture part, whilst on the other printing block the elements of the picture part filtered in a screen-like manner in the greenish blue colour are placed, following which one of the printing blocks is printed in black-and-white on the surface forming the base of the picture, whilst the other printing block with the colour group corresponding to it is printed on this same picture by a displacement of the screening element, following which the pictures thus printed on each other are, if illuminated by normal white light, giving a picture coloured true to nature.

In what precedes we have already described a projecting apparatus suitable for the combined projection of two correlated positive pictures. According to the invention it is also possible to construct, on the basis of similar principles, a printing machine which projects two correlated negatives on each other and forwards the positive film by a distance corresponding to a single picture size, and forwards the negative film by a distance corresponding to two correlated part pictures, whilst its source of light can be adjusted to different strengths for the colour filters of the negative pictures. In the case of this copying machine the arrangement of the mirrors is effected according to similar principles as in the case of the projecting apparatus, but here the mirrors belonging to the third picture square are dispensed with. The balancing of the differences of length of travel, likewise, is effected in the same manner as already described in connection with the projecting apparatus.

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