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PATENT SPECIFICATION

Convention Date (Austria): May 9, 1936.

498,871

Application Date (in United Kingdom): May 10, 1937. No. 24631/38.

(Divided out of Application No. 13250/37)

Complete Specification Accepted: Jan. 10, 1939.

COMPLETE SPECIFICATION

Process of Colour Photographic Development

We, KODAK LIMITED, a Company registered under the Laws of Great Britain, of Kodak House, Kingsway, London, W.C.2, (Assignees of KARL SCHINZEL of Ottendorfergasse 12, Troppau (Silesia), Czechoslovakia, formerly residing in Vienna, Austria, a citizen of the Republic of Czechoslovakia), do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements in processes of colour photography and in particular to the production of dye images from photographic silver salt images.

It is known that coloured photographic images may be formed by using a developer which forms a coloured compound on development.

In the production of three-colour photographs using elements having three differentially colour sensitive layers on a single support there is often employed a process of coupling development in which a coupling component combines with the oxidation product of an aromatic amino developing agent. It has now been found that in three-colour reversal development and three-colour redevelopment (i.e. development of silver salt images obtained from developed silver images) the most favourable results are obtained with simple direct colour developers which are oxidised to insoluble or at least non-diffusing dye by silver halide which has been exposed or rendered developable in any other manner, e.g. by treatment with fogging agents.

According to the present invention, in a process of three-colour photography in which three colour component silver salt images on a single support are processed to different colours, a colour component silver salt image is converted into a dye image with a developing solution containing alkali, little or no sulphite and a developing agent consisting of an orthoamino phenol so substituted that a dimeric quinone imide dye is produced on development, the silver being subsequently removed without removing the dye associated therewith. Two or more colour component images may be so connected.

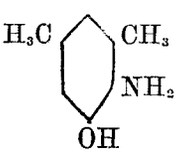
When an orthoamino phenol is so substituted that it has a free position para to either the OH or NH_2 group, two molecules link together when the silver salt is developed, giving a dimeric quinone imide dye. The expression "substituted" includes substitution by a fused-on ring.

We are aware that some orthoamino phenols have been proposed as photographic developers and that some of them have been observed to give stains, but so far as we are aware they have never been employed as colour developers for converting a colour component silver salt image in a three-colour photographic element into a dye image.

The developing solution preferably contains sufficient caustic alkali to bring the colour developing agent into solution and in addition a weak alkali such as ammonia or sodium carbonate.

Examples of developing agents which may be used according to our invention are:

1. *o*-amino-symm-*m*-xylenol



A weak aqueous solution containing sodium carbonate yields intensely yellow images.

2. The *p*-chlor and *p*-brom derivatives of No. 1 also yield lemon-yellow images. The *p*-cyano derivatives can also be used

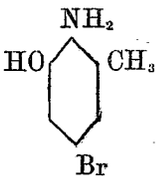
[*Price* 1/-]

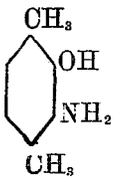
Price 4s 6d

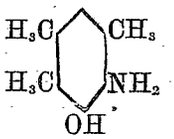
Price 25p

but develop more weakly.

The dyes formed by the above developers are stable to acids and alkalis. An alkaline 1 to 2% solution may be employed as developer. Since such solution is stable, no sulphite need be added. The rapidity of action can be increased if, in addition to the fixed alkali necessary for solution, sodium carbonate is added or if the solution is made up with excess of ammonia. A dilute alcoholic solution can be used instead of an aqueous solution.

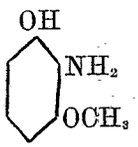
3. *o*-amino-*m*-brom-*m*-cresol  produces reddish-yellow images.

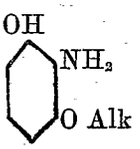
4. *o*-amino-*p*-xylenol  produces reddish-yellow images.

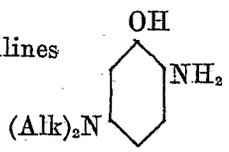
5. *o*-amino-isopseudo-cumenol (Fortschr.p. 42) 

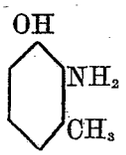
gives brilliant lemon-yellow images.

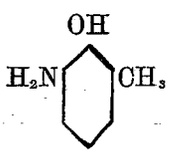
Red to purple coloured images may be obtained with different chlor- and brom- derivatives of *o*-aminophenol and other *m*-substituted-*o*-aminophenols such as

6. 3-methoxy-*o*-aminophenol 

7. *o*-amino-resorcin-monoalkyl ethers in general 

8. *m*-hydroxy-*p*-amino-dialkylanilines 

9. *o*-amino-*m*-cresol  and its bromo-derivatives (see compound No. 3).

10. 6-amino-*o*-cresol. 

11. β-amino-α-naphthol gives a violet image.

12. α-phenylamino-β-naphthol gives a gives a reddish-yellow image.

13. β-phenylamino-α-naphthol gives a purple image.

Substantially pure dyestuff images are left when the silver produced together with the colour during development, is removed by means of a silver solvent such as Farmer's solution.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In a process of three-colour photography in which three-colour component silver salt images on a single support are processed to different colours, the step which consists in converting a colour component silver salt image into a dye image with a developing solution containing alkali, little or no sulphite and a developing agent consisting of an orthoamino phenol so substituted that a dimeric quinone imide dye is produced on development, the silver being subsequently removed without removing the dye associated therewith.

2. Process as claimed in Claim 1 in which two or more colour component images are so converted into dye images.

3. Process as claimed in Claim 1 or 2, in which the developing agent is an orthoamino xylenol.

4. Process as claimed in Claim 1 or 2, in which the developing agent is an orthoamino cresol.

5. Process as claimed in Claim 1 or 2, in which the developing agent is an orthoamino naphthol.

6. Process as claimed in Claim 5, in which the developing agent is a phenylamino naphthol.

7. Process as claimed in either of the preceding claims, in which the developing solution contains sufficient caustic alkali to bring the colour developing agent into solution and in addition a weak alkali such as ammonia or sodium carbonate.

8. Colour photographic images whenever produced by the processes claimed in any of the preceding claims.

9. Process for the production of a dye image from a photographic silver salt image, substantially as hereinbefore described.

Dated this 20th day of August, 1938.

W. P. THOMPSON & CO.,
12, Church Street, Liverpool, 1,
Chartered Patent Agents.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1939.

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1.

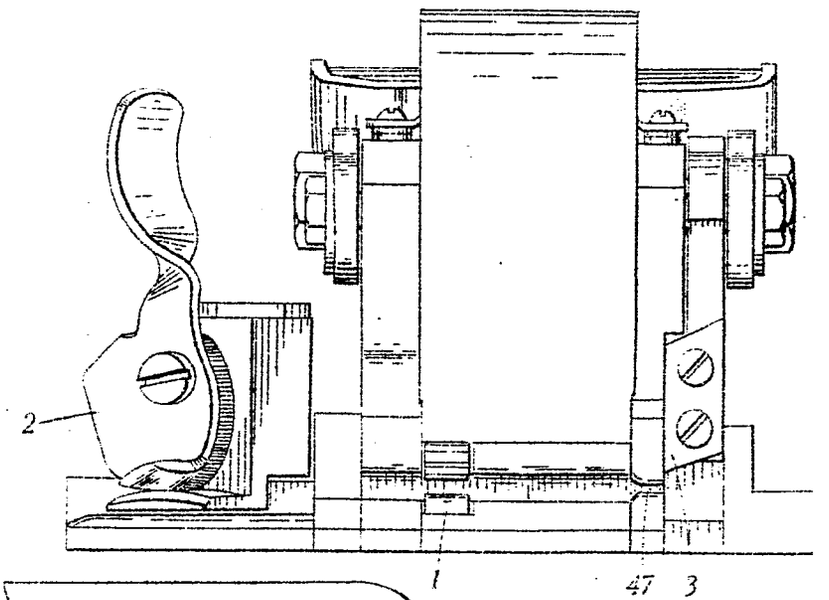


Fig. 2.

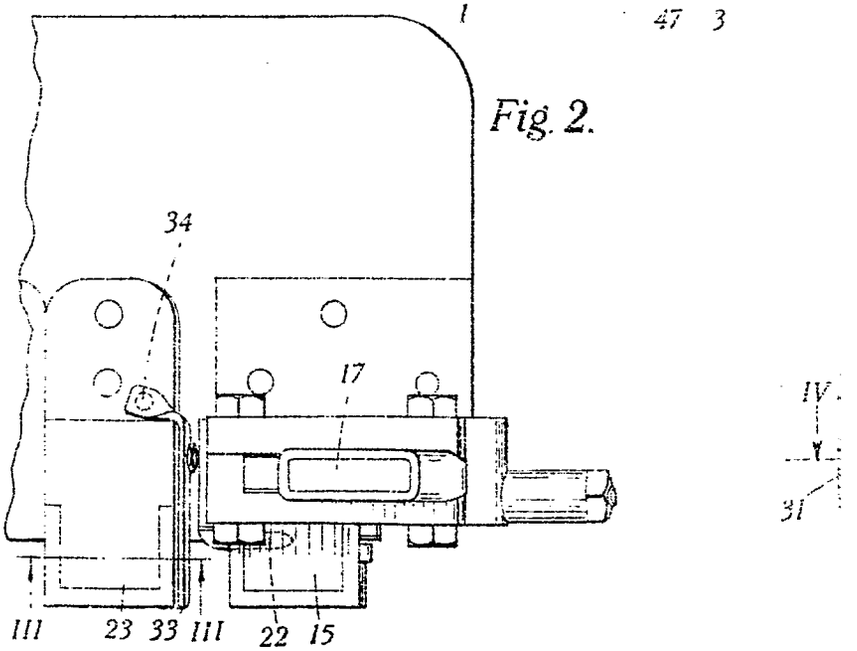


Fig. 1.

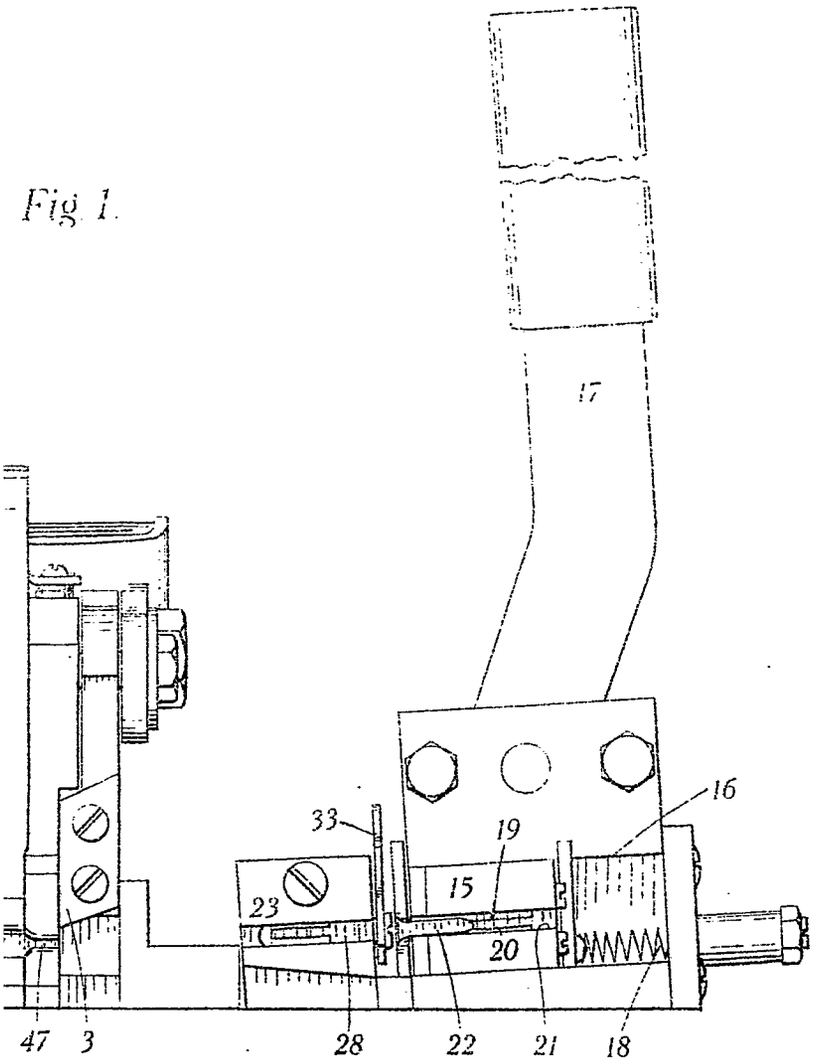


Fig. 3.

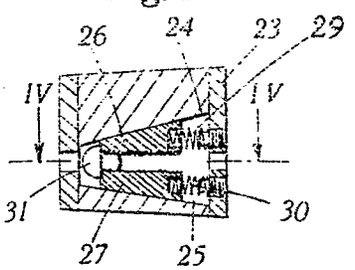
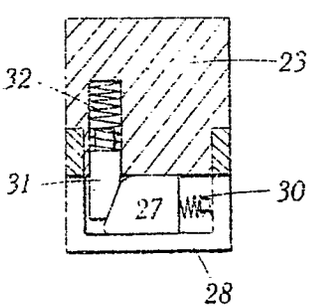


Fig. 4.



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498,873 COMPLETE SPECIFICATION

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1

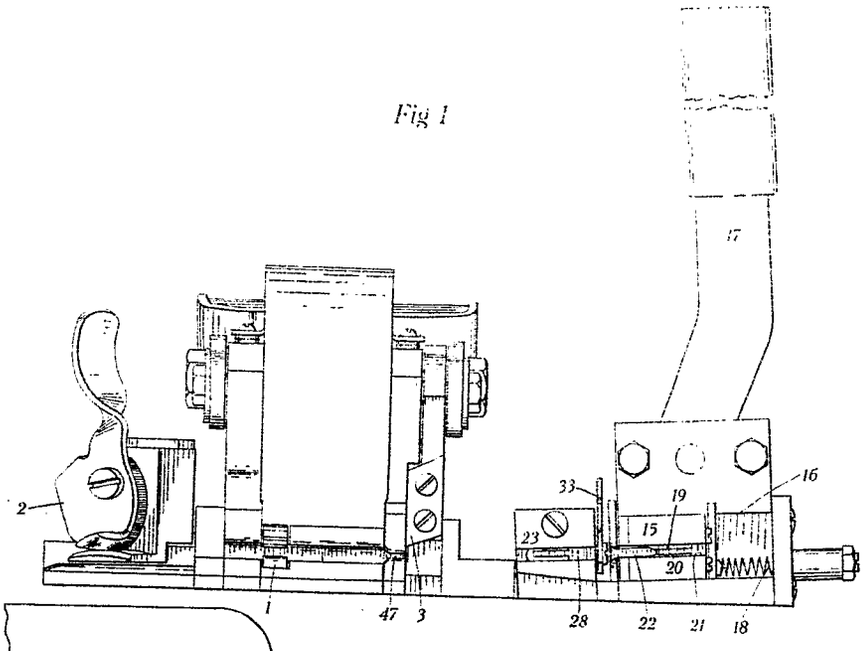


Fig. 2.

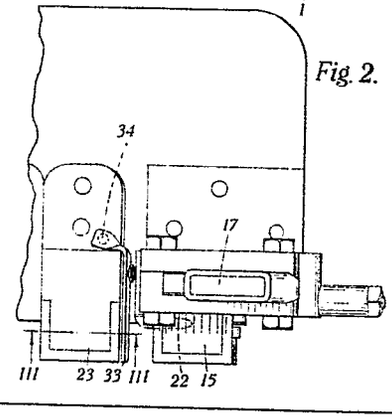


Fig. 3.

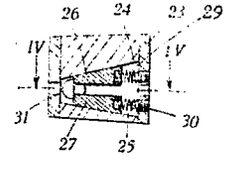
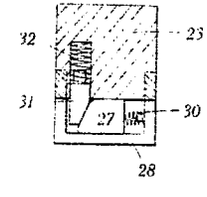


Fig. 4.



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