PATENT SPECIFICATION

Convention Date (United States): July 28, 1930. 376,514

Application Date (in United Kingdom): July 28, 1931. No. 21,539/31.

Complete Accepted: July 14, 1932.

COMPLETE SPECIFICATION.

Improvements in or relating to the Production of Colored Talking Picture Films.

We, MULTICOLOR, LTD., a corporation duly organized under the laws of the State of California, of 7000, Romaine Street, Los Angeles, State of California, United States of America, 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:—

Our invention relates to the production of sound motion pictures in color and relates particularly to a method and apparatus for placing a sound record on a colored motion picture film. The invention has its principal utility in the making of negatives and subsequent preparation of positive motion picture films having differently colored images on the opposite sides thereof and a sound record strip alongside one edge. In this preferred process with which our invention is especially useful, a pair of unexposed motion picture negative films are carried in superimposed or face-to-face relationship through the picture photographing mechanism of a camera, one of these films being known as the red-sensitive film and the other being known as the blue-sensitive film for the reason that respectively they receive the yellow-red and blue-green color value images but themselves are not colored. After these films are exposed and are light-impressed with their respective color values, they are developed and then employed to print opposite sides of a double-coated film, the two sides of the film then being colored so that they will co-operate to give a complete colored image when light is projected there-through and onto a screen. By the use of our present method and apparatus we are able to form a sound record directly on a color-sensitive film during the photographing of a scene or action in such satisfactory manner that the sound record may be subsequently employed in the rendering of a sound program in conjunction with the exhibiting of the colored motion picture.

It is an object of our invention to provide a method of obtaining a direct sound record in the production of a colored sound motion picture by recording the sound on one of the color-sensitive films at the time an action or scene is photographed in color, and it is a further object of the invention to provide a camera having means therein for forming a light-produced sound record on one of the films, preferably on the red sensitive film, on which the color value picture images are photographically recorded.

The invention comprises a method of recording sound on color picture films. It includes the steps of conducting a pair of negative color films in contact through a camera for simultaneous exposure over the same area portions to the picture to be recorded and also producing a photographic sound record on one only of said films while passing through the camera. The films are, therefore, separated during their travel through the camera and during this separation the sound record is produced on one of the films. Then the films are again united preparatory to removal from the camera and then wound up. The color images are impressed on the films over a sufficiently reduced width of the same to leave an unexposed strip on the edge of each of the films and on this edge the graphic sound record is then applied. In the development of the two films the marginal sound record is then developed in the ordinary way and the other film will show along the corresponding margin a transparent strip or zone on which no sound record has been photographed. The invention also relates to a camera for producing a sound record on color films and this camera is provided with means for moving a pair of films through a photographic mechanism in face to face contact. The photographic mechanism is adapted to leave unexposed strips along registering edges of the color film conducted through the mechanism and the camera furthermore has means for separating the films after they have left the photographic mechanism. In the interior the camera is provided with means for applying the sound record in graphic form on the unexposed strip of one of the films.

[Price 1/-]

The apparatus is adapted to separate the films after they have left the photographic mechanism and it contains means for applying the sound record in graphic form on the unexposed strip of one film. For this purpose the films after having left the photographic mechanisms, are separated from each other, and one of the films is conducted away from the other film in the form of a loop which is then again directed against the other film. The sound record applying means are located within the loop in the camera.

Referring now to the accompanying drawing, which is for illustrative purposes only, and in which,

Figure 1 is a simple elevational view showing a camera, embodying our invention, this camera being shown with the side cover removed, the standard mechanism thereof shown diagrammatically, and the new parts which our invention contributes shown in sufficient detail to enable one skilled in the art to apply them to a standard camera, and

Fig. 2 is an enlarged sectional view taken substantially on a plane indicated by the line 2—2 of Fig. 1, showing the relative positions of the color-sensitive film which is to receive the sound record and the light gate through which a variable density or variable area sound recording light is projected onto the edge of the negative.

In Fig. 1 we show a camera 11 having a main casing 12 on which a film magazine 13 is mounted. The casing 12 is open on one side so as to give access to the interior mechanism in threading a film through the camera, the side opening of the camera being fitted with a light-proof cover or door which may be closed so as to protect the film from any external exposure other than the photographic picture exposure which is accomplished by means of a photographing mechanism 14 situated at the forward end of the main casing 12. Mounted on the back wall 15 of the casing 12 and extending rearwardly therefrom is a loop housing 16 which communicates with the interior of the main casing 12 through openings 18 and 20 in the back wall 15. The housing 16 is also open on the left side so that a film may be threaded therethrough, and this opening is fitted with a light-proof cover which is secured in place during the photographing of a motion picture production, action, or scene. Situated within the main casing 12 is a feed and take-off sprocket 21 which is driven at constant speed and is adapted to receive a pair of flexible color-sensitive negative film strips 22 and 23 from the magazine 13 and to feed these sensitive film strips to the picture photographing mechanism 14, which in the customary manner is equipped with intermittent means for moving the negatives and also with registering pins for holding the negatives in perfectly aligned or superimposed position during the time the shutter of the camera admits a photographic image. It is preferable, although not absolutely necessary, that the emulsion coatings of the films be adjacent to each other or in contact. In view of the fact that moving picture photographing mechanisms are well known to the art, it is not necessary to herein disclose the details of construction of the photographing mechanism 14 other than to mention its well known function.

In the method which we prefer to employ in the practice of our invention, the blue-sensitive negative strip or film 22, in passing through the photographing mechanism 14, is in front of the red sensitive film or negative 23, in order that the light rays will first pass through the blue-sensitive negative 22. Within the housing 16 means for forming a loop of one of the films is provided in the form of rollers or guides 26 and 27, and above and to the right of the sprocket 21 is a secondary sprocket 28 which is driven continuously. After leaving the photographing mechanism 14, as indicated at 30, the red and blue-sensitive negatives 23 and 22 respectively are carried to the lower portion of the sprocket 21, where they are held in engagement with the sprocket by guide or hold-down rollers 31 and 32 in accordance with standard practice. The red-sensitive film 23 is carried upwardly around the right-hand portion of the sprocket 21, over a tautening sprocket 21a in such a manner as to at all times maintain the film taut while passing from the sprocket 21, and then is extended upwardly through a frame structure 33 surrounding an opening communicating with the magazine 13, passing adjacent to a guide roller 34. From the lower portion of the sprocket 21 and from the roller 32 the blue-sensitive film 22 is carried to the roller 26, up across the back wall 35 of the housing 16, over the roller 27, and leftwardly or forwardly to the sprocket 28, from which it is carried upwardly over the roller 34 and in contact with the red-sensitive film 23. In this manner the negatives 22 and 23 are separated, and within the housing 16 of the camera structure the negative 22 is formed into a loop 36 which defines a space 37 adjacent to and rightward of that portion of the red-sensitive film 23 which extends upwardly around the

rightward part of the sprocket 21. Within the loop 36 formed by the blue-sensitive film 22 and in the space 37 we place a photographic recording means 38 consisting of a light tube 40 mounted in the rear wall 15 of the casing 12 and having therein a fluctuable light producing means preferably consisting of an aeo light or glow discharge lamp 41 mounted in a socket 42 which is longitudinally adjustable for focusing purposes. The light tube 40 is of light-proof construction and in its leftward or front wall 43 a quartz disc 44 is placed, this quartz disc 44 having its leftward or outer face cylindrically concave to correspond to the curvature of the film 23 as it passes around the sprocket 21. The rightward or inner face of the quartz disc 44 is coated with a layer of silver 45, and in this layer of silver a horizontal scratch 46 is made .10 inches long and .0006 inches wide, this scratch being at right angles to the travel of the film and forming an aperture through which the fluctuating or variable density light emitted by the aeo tube is directed against the rightward edge of the red-sensitive film 23. From the rearward end of the tube 40 and the socket 42 a cable 47 is carried out through the housing 16 for connection with the electrical or amplifying equipment of a sound receiving device, such as used in the recording of sound with motion pictures.

In accordance with standard practice, the photographic aperture or gate of the photographic equipment 14 is reduced in width so that, as indicated in Fig. 2, an unexposed strip 50 is left adjacent to the frames 51 photographed on the color-sensitive films 22 and 23. As further shown in Fig. 2, the recording means 38 is placed in such position that the scratch or light aperture 46 thereof will coincide with the unexposed strip on the rightward edge of the red-sensitive film 23. As the red-sensitive film 23 passes the light aperture 46, the unexposed sensitized emulsion forming the strip 50 of the red-sensitive film 23 will be exposed in proportion to the density of the light admitted by the aeo light 41. The strip 50 on the edge of the blue-sensitive film 22 remains unexposed so that when the color-sensitive films are subsequently developed, the edge strip of the blue-sensitive film 22 will be clear or completely transparent, whereas the edge strip of the red-sensitive film 23 will contain a photographic record representing the sounds from which the aeo light was modulated during the taking of the color value negatives. When these cooperative blue and red color-negatives or films 22 and 23 are subsequently employed for the printing of a color positive, the sound record will appear on the edge of only one emulsion coating of a double emulsion film.

In the preferred practice of the invention the forming of the sound record on the edge of the red-sensitive negative 23 results in forming the sound record on the blue side of the color-positive. On the red side of this color-positive the edge strip corresponding in position to the sound track of the blue side is not exposed and therefore is transparent after the color-positive is developed, and colored or dyed.

Although we have herein shown and described a simple and practical embodiment of our invention, it is recognized that certain parts or elements thereof are representative of other parts, elements, or mechanisms which may be employed in substantially the same manner to accomplish substantially the same results; therefore, it is to be understood that the invention is not to be limited to the details disclosed herein but is to be accorded the full scope of the following claims.

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. A method of recording sound on color picture films, including the steps of conducting a pair of negative color films in contact through a camera for simultaneous exposure over the same area portions to the picture to be recorded and also producing a photographic sound record on one only of said films while passing through the camera.

2. A method of recording sound on color films, as set forth in claim 1, including the step of separating the films while passing through the camera and producing the sound record on one of the films while it is separated from the other.

3. A method of recording sound on color films, as set forth in claims 1 and 2, including the step of uniting the two films after the recording of sound on one of them and winding the united films preparatory to removal from the camera.

4. A method of recording sound on color films, as set forth in claim 1, including the step of impressing the color images on the films over a sufficiently reduced width of the films to leave an unexposed strip on the edge of each of the films and applying the graphic sound record on the unexposed strip of one of the films.

5. A method of recording sound on

color films, as set forth in claims 1 and 4, wherein the films are subsequently developed, including the step of developing the films so as to leave the sound record on the margin of one of said films and a transparent strip on the edge of the other of said films on which no sound record had been photographed.

6. A method of recording sound on color films, as set forth in claims 1 and 5, including the step of printing the films subsequently to development on the opposite sides of a double emulsion positive while keeping the developed image portions of the two developed films in registry with each other, whereby on the margin of the printed film the sound record is applied from one of the developed negative films, the margin of the other negative film being transparent, leaving no impression on said positive film.

7. A method of recording sound on color films, as set forth in claim 1, wherein the films passing in contact with each other through the picture exposure mechanism are a red sensitive film and a blue sensitive film, the sound record being applied by means of a fluctuating light beam on the red sensitive film.

8. A method of recording sound on color films, as set forth in claims 1 and 6, wherein the red sensitive film and blue sensitive film are conducted in face to face contact through a prescribed path containing the picture exposure mechanisms, including the step of separating the films and recording the sound on an unexposed marginal portion of the red sensitive film while said films are separated from each other.

9. A method of recording sound on color films, as set forth in claims 1, 2 and 5, including the step of separating the films by drawing one of said films in a loop away from the other film and then again towards said other film, whereby said films continue to travel after the separation in contact with each other, the means for graphically recording the sound on one of the films being located within the loop formed by one film.

10. A method of recording sound on color films, as set forth in claim 9, including the step of applying the sound record on that film which is not formed into a loop upon separation of the films from each other.

11. A camera for producing a sound track on color films by the method set forth in claim 1, including means for moving the pair of films through a photographic mechanism in face to face contact, the photographic mechanism being adapted to leave unexposed strips along registering edges of the color films conducted through the mechanism, means for separating the films after they have left the photographic mechanism and means within the camera for applying the sound record in graphic form on the unexposed strip of one of the films.

12. A camera for producing a sound track on color films, as set forth in claim 11, wherein the means for separating the films after they have left the photographic mechanisms are formed by rollers placed so as to separate the films by conducting one of the films in a form of a loop away from and again towards the other film, the sound record applying means being located within the loop in the camera.

13. A camera for producing a sound track on color films, as set forth in claim 11, including a main casing in which the photographic mechanism is located and a loop housing extending rearward from said main casing, the loop housing containing the means for separating the two films to produce a loop on one of said films and said loop housing also containing a light receptacle for directing a beam of light against the other film travelling through the main casing.

14. A method of recording sound on color films, substantially as described and for the purpose set forth.

15. A camera for producing a sound track on color films, substantially as described and shown and for the purpose set forth.

Dated this 28th day of July, 1931.

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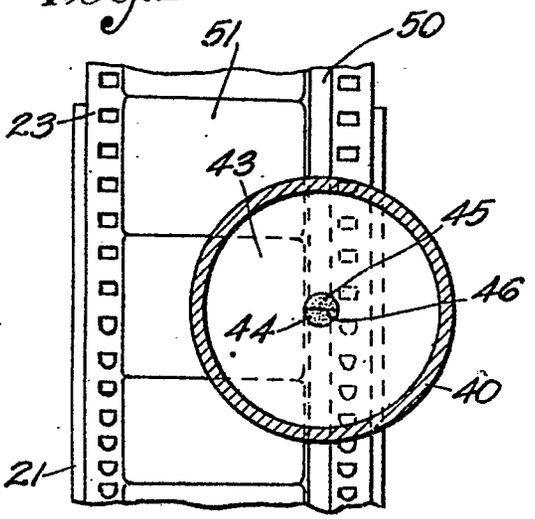
Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1932.

Fig. 2.



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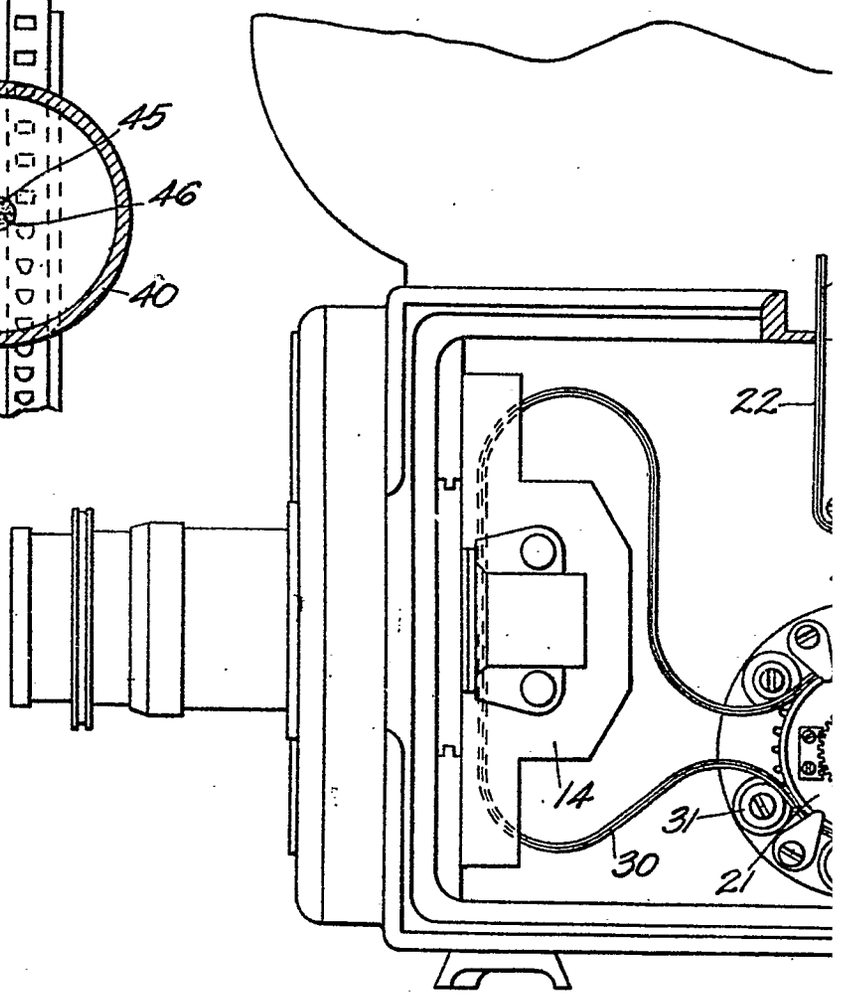

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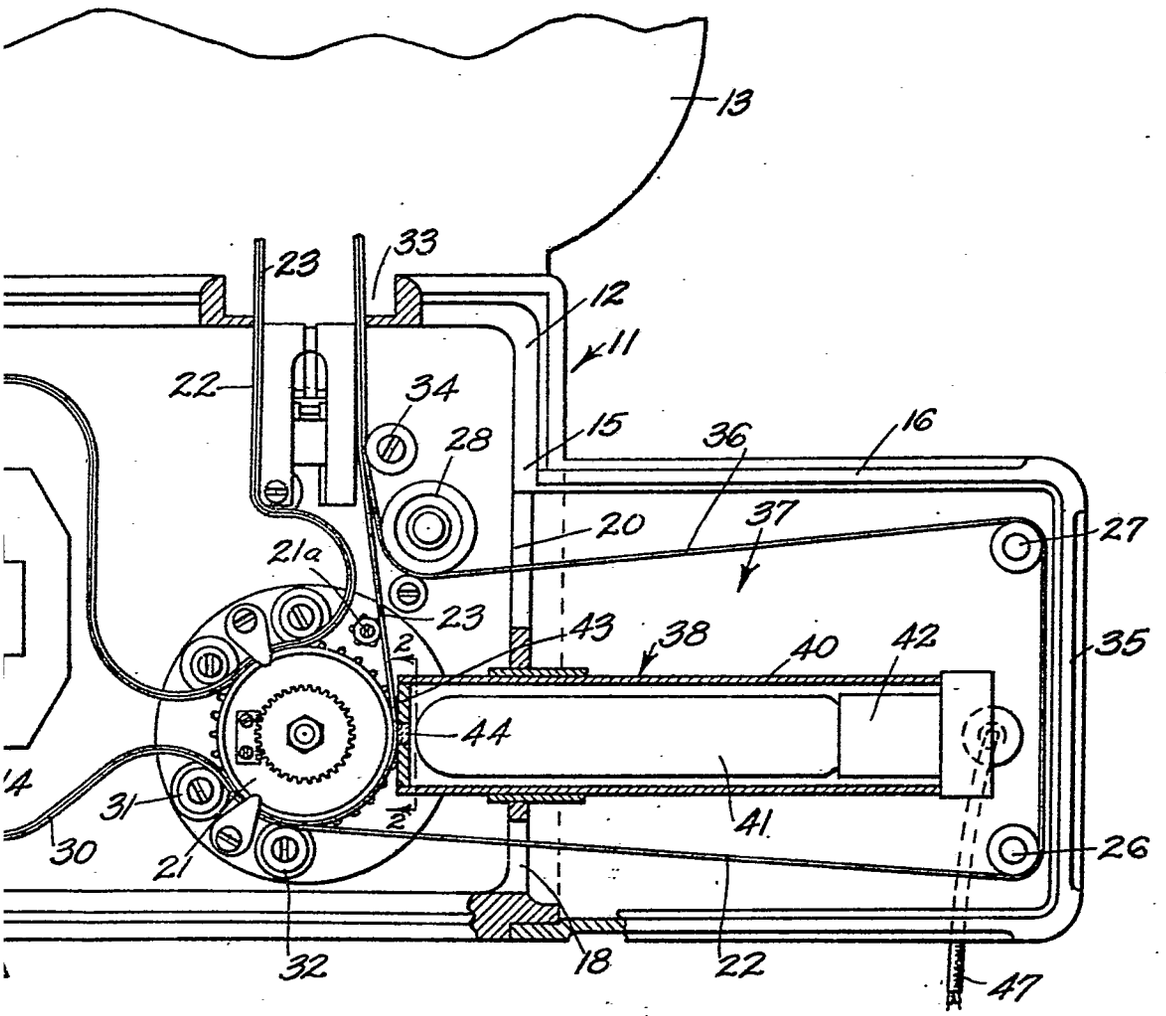

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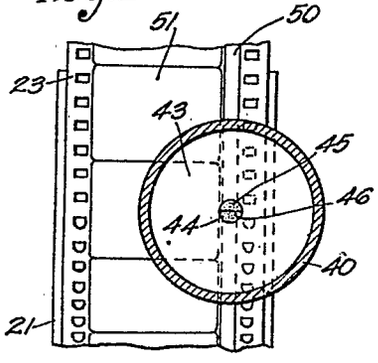
Fig. 2.



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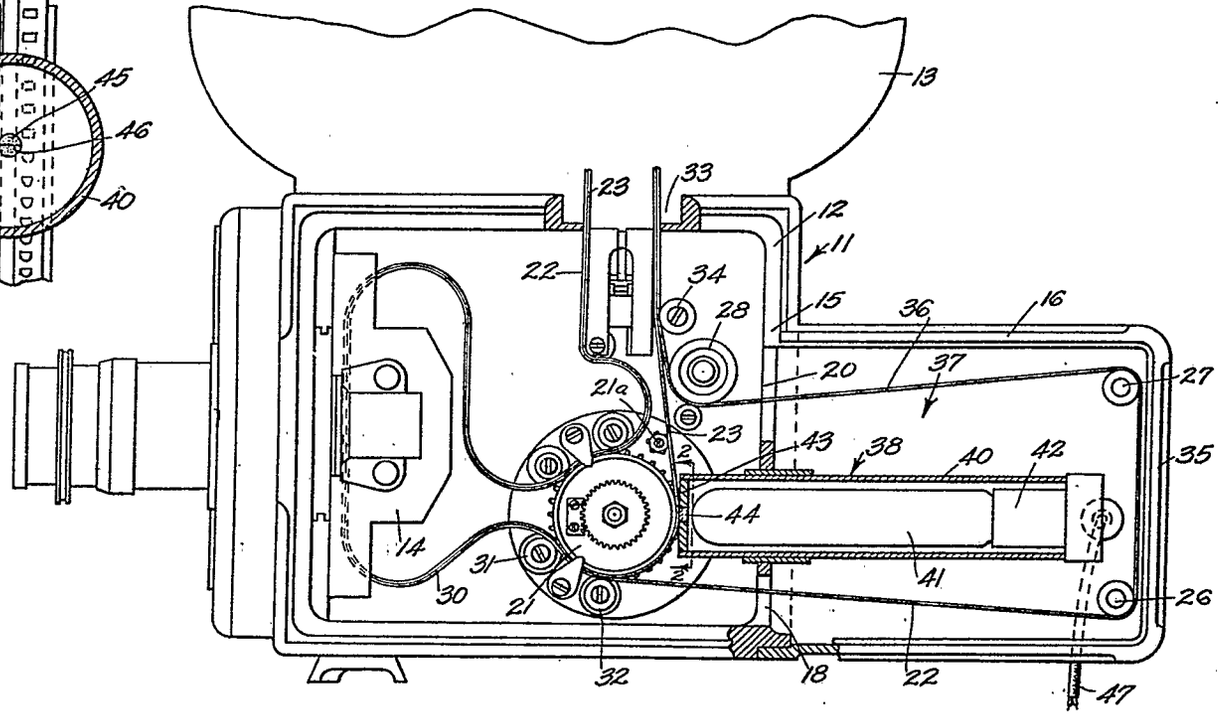

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