April 16, 1963 R. J. REID 3,085,877

METHOD OF PRODUCING ANIMATED MOTION PICTURES

Filed June 10, 1959 2 Sheets-Sheet 1

Fig. 4

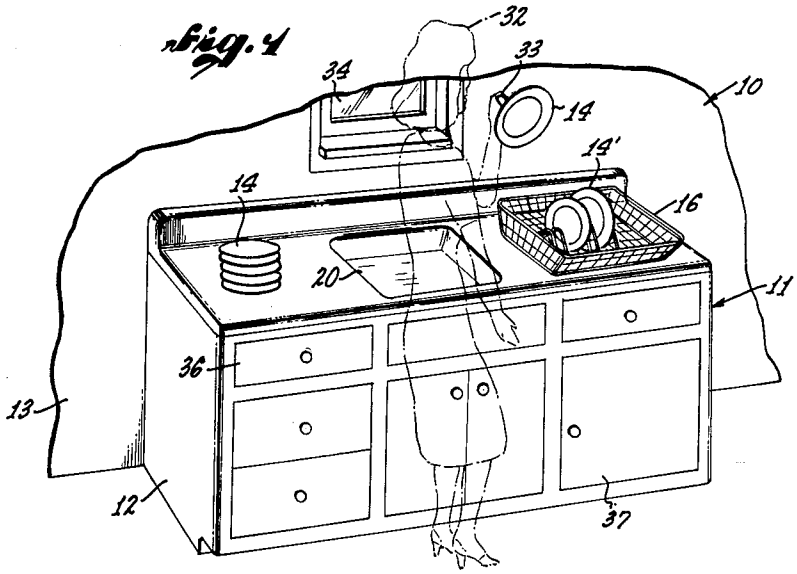


Fig. 2

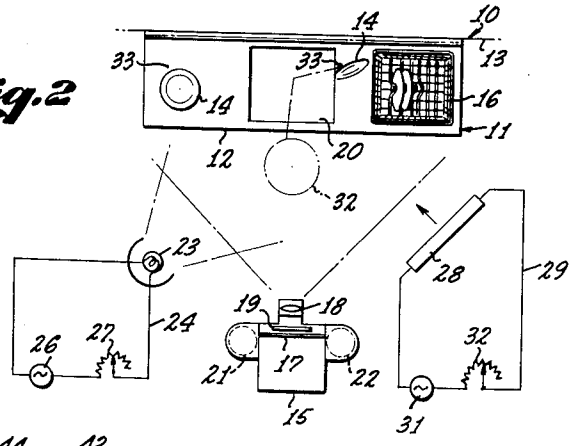
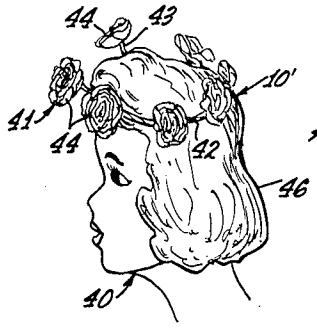


Fig. 3



ROBERT J. REID,
Inventor.

BY HERZIG & JESSUP,
Attorneys.

Albert M. Herzig

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METHOD OF PRODUCING ANIMATED MOTION PICTURES

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Fig. 4

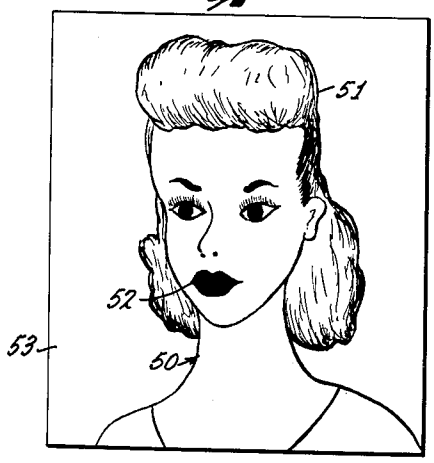


Fig. 5

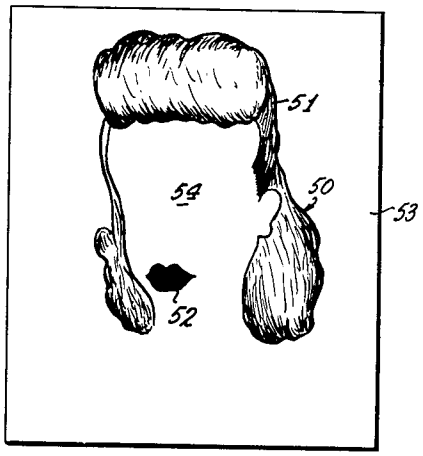


Fig. 6

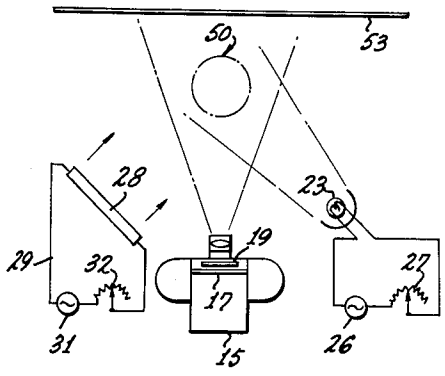
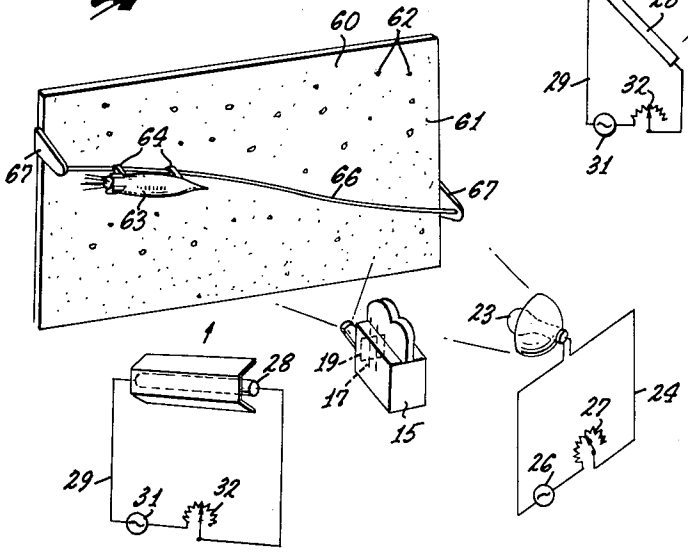


Fig. 7



ROBERT J. REID,
Inventor.
HERZIG & JESSUP,
Attorneys.

BY

Albert M. Herzig

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3,085,877 METHOD OF PRODUCING ANIMATED MOTION PICTURES

Robert J. Reid, 8727 Shoreham Drive, Los Angeles, Calif.

Filed June 10, 1959, Ser. No. 819,426
2 Claims. (Cl. 96—27)

This invention relates to a method of photographing and more particularly to a method of imposing images on a film by which special effects may be achieved, such as images appearing, disappearing and moving or being suspended without any visible means of support, and although usable for still photography, it is more specifically intended for use in cinematography.

Heretofore weird and unusual effects in photography, and especially in cinematography, such as having objects appearing, disappearing, moving without visible support, wherein inanimate objects are animated, and highlighting of features of a subject have been very difficult, time-consuming and expensive to achieve. The methods heretofore employed to accomplish such effects have been by frame-by-frame exposure cuts, laboratory superimposing and matting procedures. Such methods are very time-consuming and expensive and therefore impractical for extensive use.

As an example of the presently used methods of photographing, realistic and unrealistic scenes, such ultra-modern action as a space ship flying to the moon, requires, by one method hundreds of separate pictures of the action of the space ship, which are photographed frame-by-frame. Even when the drawings are replaced by scale model miniatures, the same time-consuming, expensive process of filming them one frame at a time is still employed to create motion. A fantastic amount of time is necessary to animate objects which are inanimate and therefore costs of such special effects have been too prohibitive to make extensive use thereof.

A matting process, which is extensively used for special effects, is also very difficult, expensive and time-consuming to accomplish, inasmuch as the action must be in part photographed on a strip of film, then the action desired to be superimposed on the film is photographed on a separate film, using expensive mats to enclose the object being animated, after which the films must be superimposed in a laboratory by tedious hand methods which require a relatively long period of time to achieve at a great expense.

By the method of the instant invention, on the other hand, various special effects may be created on a single film with a single or a double exposure of the film in a fraction of the time and cost heretofore required to achieve such effect and providing an advantageously improved life-like appearance of the animation. As described hereinafter, such special effects, as having an object selectively appear and disappear in the scene objects floating through the air in a realistic manner without any visible means of support, life-like action is simulated by scale models of actual objects and portions of objects are made to be highlighted or exaggerated at will or caused to disappear, and other numerous effects heretofore considered impractical and impossible to achieve are easily and readily achieved. This method of photographing can be accomplished on black and white film, color film, videotape or any desired type of film, and does not necessitate a film of any particular exposure speed, ordinary film now being used being very satisfactory and practical to use. A most important feature of this invention is the possibility by the instant method of producing a film having the fantastic, but realistic special effect in a period of days as compared to a period of several weeks required by present methods and at a fraction of the cost of such present methods.

The present invention provides a method of photographing a scene or a subject in which a source of visible radiant energy and a source of invisible radiant energy is directed on the subject to be photographed, a luminescent material is applied on the outer surface of selected subjects or portions thereof, and photographed to impose and/or superimpose a desired image or images on all or selected portions of the film while eliminating one of the sources of radiant energy and selectively filtering out selective wave lengths of emitted light from the subjects to be photographed, whereupon the film is processed in an ordinary manner for use in obtaining either positive images of the film or positive transparencies for projection.

By the present method, many unusual and startling effects can be achieved which have either been heretofore impossible to achieve or impractical because of the time and cost involved. By this process, effects, such as a space ship flying through space is realistically achieved by photographing a scale model travelling on a support means in the form of a track or guide wire without the support means being visible in the image produced on the film. Considerable saving in cost and time is achieved by using a scale model travelling on such a support in a continuous motion and even having exhaust therefrom clearly visible and imposed on the film, in contrast to previous methods by which the toy would necessarily be inched along its path and photographed by stop motion, frame-by-frame to achieve the result, a method which is time-consuming and expensive.

In another example, a girl's face may float through space with only portions of the face, such as the hair, lips or face being visible while the background is invisible or optionally visible. Not only can these effects be achieved in cinematography, but they can be achieved as well in visual commercials which are popularly being shown on television. By this effect the hair alone may be optionally highlighted or caused to be singly visible, or lips may be visible alone and moving as in describing the coiffeur being highlighted.

Inanimate objects may be caused to be animated, such as furniture walking about unaided, pictures jumping off walls, dinner cooking itself, dishes washing themselves and other such weird effects which have been heretofore impossible or impractical to achieve.

As a comparison to the cost of such effects achieved by other methods, a one minute commercial prepared by usual methods of animation requires up to three months to complete and costs hundreds of dollars per foot, whereas by the present method the effect can be produced in a matter of days at a fraction of the cost.

The method of the present invention provides for photographing a subject in still shots or in cinema to impose an image on the film of selectively the entire subject, or parts thereof, or optionally causing the subject or parts thereof to selectively appear and reappear in view. The method anticipates use of luminescent and non-luminescent surfaces on the subject to which visible and/or invisible radiant energy is directed. While the subject is being photographed under visible radiant energy, known as white light, the entire subject can be photographed whereas, when a black light or invisible radiant energy is directed on the subject, only selected portions of the subject having a luminescent surface, excitable by the black light is photographed on the film. The film may be exposed in one run to impose an image o fthe entire subject on the film and re-run to impose only an image of the luminescent material excited by the invisible radiant energy, whereby such weird and supernatural effects or natural effects not obtainable or not practical by other methods can be quickly and easily achieved in less time and at less cost than previously possible. The invention further anticipates the use of a filtering means interposed

between the subject and the film to block or quench selected waves of emitted visible light from reaching the film, thereby imposing only an image of the desired luminescent surfaces on the film.

The visible radiant energy may comprise any of the conventional forms available including incandescent, arc, or other types of energy, known as a white light, which is extensively used to produce photoluminescence which is a light emission induced by visible light. The invisible radiant energy is produced by either an ultra-violet radiation of suitable wave lengths, or an infra-red radiation, or combinations thereof to produce the desired effect. The ultra-violet radiation being used for selected material within the luminescent category of fluorescent material, while the infra-red radiation is most useful and effective with phosphorescent material in which the light emission excited in the material persists after the exciting radiation has been removed, causing an afterglow. Therefore by choice of luminescent materials, and exciting radiant agent in the form of an invisible radiant energy, a filtering means to control exposure of the film by blocking or quenching unwanted visible light, and a conventional lens system in a conventional camera, the method of the instant invention may be applied to any of the conventional films now available to produce the desired result as will be hereinafter described in detail.

It is therefore and object of this invention to provide a new and improved method of photographing whereby selected subjects of a group of subjects may be photographed.

It is another object of this invention to provide a new and improved method of photography in which the subject selected to be photographed may be supported and/or transported by means which is not photographed on the film, while the selected subject is photographed.

A further object of this invention is to provide a new and improved method of photography in which subjects treated wholly or in part by a selective visible or invisible material may be exposed to a film to photograph either the subject, without the applied material showing, or the applied material without the normal appearance showing, or both showing, or in various degrees of visual effect.

A still further object of this invention is to provide a method of photography herein described which provides means for filtering or quenching undesired images from being imposed on the film during photography of the subject.

Yet another object of this invention is to provide a new and improved method of photography whereby such effects as described above can be achieved by a single run of a film.

Still another object of this invention it to provide a new and improved method of photography of the character described whereby such effects can be achieved by successive exposures of the same film.

A general and very important object of this invention is to provide a new and improved method of photography which overcomes disadvantages of prior methods heretofore intended to accomplish generally the same purposes.

These and other objects of this invention will be more apparent from the following drawings, detailed description and appended claims.

In the drawings:

FIGURE 1 is a perspective view, in elevation, illustrating an effect achieved by the method of the instant invention;

FIGURE 2 is a diagrammatic view illustrating more clearly one embodiment of the method of the invention;

FIGURE 3 is a perspective view, in elevation, of another effect resulting from the method of this invention;

FIGURE 4 is a view, in elevation, illustrating the method of the present invention as is seen by direction of one type of radiant energy to the subject;

FIGURE 5 is a view similar to FIGURE 4, showing the effect achieved when another type of radiant energy is directed towards the subject;

FIGURE 6 is a diagrammatic view illustrating more clearly the method employed to achieve the effects of FIGURES 4 and 5; and

FIGURE 7 is a diagrammatic view of still another embodiment of the method of this invention.

In reference to the drawings, although the method for performing or producing the various special effects is basically the same, the method can be for the purpose of better understanding, basically divided into two embodiments and is so illustrated in the drawings. The first embodiment can be classified as a double exposure of a film upon which discrete images are superimposed, i.e., imposing an image on a piece or strip of film, rolling back the film and then re-exposing the film to superimpose another image on the film. This embodiment is best illustrated in FIGURES 1, 2 and 3 in which FIGURE 3 shows a variation thereof. The second basic embodiment of the method is a single exposure or run of the film whereby selective images are imposed thereon during the run and is best illustrated in FIGURES 4–7. It is to be understood, however, that due to the variety of effects made possible by the instant method, the figures are not to be confined to a single or double run, but may be interchanged as will be hereinafter described to produce desired effects.

Referring particularly to FIGURES 1 and 2, the first embodiment of the instant method is illustrated, wherein an inanimate object, a part of a subject, is animated to produce the illusion or phenomenon of animation.

As an example, in FIGURE 1, a subject to be photographed, generally designated by the numeral **10**, includes a background generally designated by the numeral **11** consisting of a sink cabinet **12**, a wall **13**, a stack of dishes **14** and a drying basket **16**, each object having generally a photoluminescent surface, that is, a surface capable of reflecting or emitting when a source of visible radiant energy, commonly known as white light, is directed thereagainst, whereby an exposure is made of the subject **10** to impose an image of the subject, as a background on the film. The film referred to in the application and indicated at **17** in FIGURE 2 may be either a singular piece of film for still photography, or a strip of film for use in cinematography, as desired, but will be most commonly regarded as a strip of film as used in the latter to gain the fullest advantage of an instant method.

The herein present method is capable of practically using a wide range of film emulsion, the film speed not being critical. This method has been applied to various films having comparatively slow speeds, which are normally and conventionally used in present cinematography, with highly satisfactory results and using both black and white emulsions, color emulsions and videotape.

In reference to the photographic equipment required for the present method, it is believed sufficient to state that any present camera equipment can be used with this process, having a normal lens system **18** and capable of receiving a filtering means, such as indicated schematically at **19** in FIGURE 2, and wherein the film **17** is payed out from a reel **21** and taken up as on a reel **22**. It is preferred, however, that the camera be of a type in which the film **17** may be rolled back, as desired, for re-exposure of a film through the same lens system **18**. Optionally the film **17** may be manually rolled back for re-exposure.

A source of visible radiant energy, i.e., white light, is indicated at **23** and is schematically shown as connected to a circuit **24**, including a source of electrical energy **26** and a control for the light **23** as by a rheostat or potentiometer indicated at **27**, whereby the intensity of the energy of a lamp **23** may be varied, or the source **23** completely eliminated for a purpose which will be hereinafter described.

An invisible radiant energy, i.e., a black light, is indicated at 28 in the same figure and is illustrated as being connected to a circuit 29, having a source of electrical energy 31 and a potentiometer 32 for control of the intensity thereof, or for the elimination of the source 28.

The visible radiant energy 23 may be provided in any of the numerous types of white light including incandescent, arc, and other forms, to produce a white light conventionally used to illuminate photoluminescent surfaces. The invisible radiant energy 28 may be provided in the form of an ultraviolet radiation, having wave lengths within the ultraviolet spectrum for exciting luminescent surfaces having fluorescence, or optionally, an infra-red radiation for exciting luminescent surfaces having phosphorescence. Also, the invisible radiant energy may consist of a combination of ultraviolet energy and infrared energy for desired selective results to be described. The radiant energy sources 23 and 28 are merely schematically indicated in FIGURE 2 and may be provided in any quantity and practical arrangement for illuminating or exciting surfaces of the subject 10.

In the phenomenon of the instant method of photographing the subject 10 the outer surfaces of selective objects or portions of the subject are treated by applying a luminescent material on the outer surface of the object for excitation by the invisible radiant energy 28. In the example chosen and illustrated, FIGURES 1 and 2, the dishes 14 of a stack of dishes are coated on their outer surfaces by a luminescent material, by spraying, brushing or the like.

In the first step of the method, the white light 23 is directed on the subject 10 with the dishes 14 stacked as illustrated therein to illuminate the subject. The strip of film 17 is exposed to the subject through the lens system 18 of the camera 15 whereby a background image showing the entire object 10, including the cabinet 12, the wall 13, stack of dishes 14 and wire basket 16 is imposed on the strip of film 17. After a pre-determined run of the strip of film 17, the film 17 is rolled back to the supply reel like 21 for re-exposure of the film 17 in the following manner.

The white light 23 is extinguished or appreciably decreased, and the black light 28 is directed on the subject 10 to excite the luminescent surface of the stack of dishes 14 to cause the luminescent surface to emit a visible light, which, by re-exposure on the film 17, is superimposed on the film 17 as another image.

The filtering means 19 is interposed between the subject 10 and the film 17 during re-run of the film 17 to block or quench any undesired visible rays of light being emitted from the subject. As an example, if the cabinet 12 is a highly reflective surface, visible light rays may be reflected or emitted therefrom in response to the excitation by the black light 28, and a suitably colored filter is interposed to block such undesired light, but at the same time not blocking the visible light emitted from the plates 14.

As an example, to expose a black and white film, an effective combination of filters commercially known as K–2 and CCI 10, or an X–1 has been satisfactorily used. For color photography depending on hues desired, combination of the above plus one or more of the following commercially known as: B58, B57, 85B, 2B, CC05–50, 83 Series 8, CC15, CC05RH83, Aero 35 D-C and Blue Filters 38, 39, 40, 41, 45, 46 and 47 have been effectively used.

Now, in order to produce a realistic action of a plate 14 rising into the air, dipping into solution contained in the sink and exiting therefrom and into the drying basket 16 for drying—to produce the effect of a dish washing itself without human aid, by the present process, a person, indicated in broken lines at 32 in FIGURES 1 and 2 having a non-reflective and non-luminescent outer surface, may enter the scene of the subject 10, pick up a dish 14, dip the dish in the solution in the sink 20 and then transport the dish to the drying rack 16 as indicated at 14' to superimpose an image of the plate on successive frames of the film to produce the phenomenon of motion of the plate while no image of the person 32 is superimposed on the film. The outer surface of the person, being non-luminescent, is not excited by the energy of the invisible radiation source 28 and is thereby invisible to the camera.

To facilitate handling of the plate like 14, or other objects caused to magically fly through the air, a handle or tab 33 may be secured in an obscure position, as on the back side of the plate 14, whereby the plate may be handled without obstructing visible light emitted from the plate 14 to the camera 15. It is to be understood that many objects may be handled from a position which does not obstruct or block the emitted light of the object itself without the necessity of rigging such as 33. As an example, a cup having its own handle could be easily carried by the handle and turned in such a position so that no portion of the exposed surface to the camera is blocked by fingers of the person transporting the cup. Within the exemplified subject 10 various other effects could be accomplished by the person 32 without having the image of the person 32 imposed on the film during re-exposing thereof, such as opening or closing of the window indicated at 34, or opening or closing of a drawer 36 or a door 37, there being no limitation to the movement possible by the present method to achieve the weird and fantastic phenomenon of animation of an inanimate object.

The luminescent material applied to the object, such as the plate 14, may be of any of the many types of material which are fluorescent or phosphorescent material being preferable in instances where an afterglow is undesired and a phosphorescent material being usable where an afterglow is desired or not objectionable. As an example, if it is desired to cause an image of the person 32 to appear magically in the resultant strip of film 17, the white light 24 may be turned on during the re-run to illuminate the entire scene and cause the person 32 to appear within the picture having a translucent appearance on the film. However, in the method described for FIGURES 1 and 2, the desired objective is to personify the inanimate object 14 whereby the object moves in a very realistic manner, as though it were being actually handled by a person, but the person is not visible in the picture, that is the resultant superimposed picture on the film strip 17. If there are some luminescent spots or areas on the person 32, excitation of such areas may be blocked or quenched from imposition on the film 17 by choice of suitable filters 19 of suitable colors which block the emitting visible light from the film 17. A very effective way to avoid imposition of an image of the person 32 is to shield the person with a black, non-luminescent robe or dress, and perhaps even a hood over the head, inasmuch as most skin surfaces and many cosmetics are excitable to a degree by an invisible radiant energy such as ultra-violet or infra-red energy to emit a visible light.

It will now be more clearly seen than an effect heretofore impossible or impractical to achieve is easily and readily achieved by the use of this present method, wherein it is now possible by this method to have a visible background imaged on the film along with greatly improved, realistic animation of an inanimate object without the use of the heretofore expensive, time-consuming and awkward methods consisting of single-frame exposures, stop-frame exposures, matting and animation by cartoons.

By the present improved method, the film 17 may be exposed to impose the image of the subject 10 to form the background thereon for a pre-determined length of film, the length of film corresponding to the length of film it will be necessary to impose the action and time length required to provide the desired animation, such as the washing of the plate 14 described above, whereby there is a background during the entire animation of the

plate 14 to add realism to the scene. The objects to be animated, such as the plates 14, may be photographed by the white light in its stacked condition, as illustrated in FIGURE 1 during the initial run of the film 17 through the camera 15, inasmuch as luminescent material appears normal during exposure to white light, whereupon extinguishing of the white light and direction of the black light, causes only the surfaces of the object having luminescent material coated thereon to photograph in the ensuing re-exposure of the film 17. It is to be understood that objects having a natural luminescence need not be coated with a luminescent material, such objects possibly emitting sufficient visible light for imposition on the film 17, or if insufficient in itself to emit sufficient visible light, may be intensified by the application thereon of a luminescent material having a higher degree of excitability.

In reference to FIGURE 3, another effect is illustrated which is made possible by the instant method. The subject 10' as illustrated in this figure may be placed against any normal desired scene or background, plain or otherwise, to produce an effect for use as an advertisement. In the FIGURE 3, the head 40 of a person to be photographed is shown as having supported thereon, a wreath 41 consisting of a band 42, encircling the top of the head, and upstanding stems 43, extending therefrom on which objects such as flowers 44 are secured. Several effects may be accomplished depending on the requirement of the advertisement.

As an example, if it is desired to create the phenomenon of a halo of the flowers 44 seemingly spaced from the hair 4 of the head of the subject 10' an image of the head 46 is imposed on the strip of film 17 and given any desired action, such as turning to best display the coiffure 46, after which the film 17 is backed up and re-exposed to the subject 10', as through the lens system 18, to superimpose an image of only the flowers 44 repeating the entire action of the movement of the head previously imposed on the film. The rerun is made under an invisible radiant energy, such as ultra-violet light, to excite luminescent material applied to only the flowers, 44 as an example, whereby only images of the flowers 44 are superimposed on the strip of film 17. The head 40 repeats the exact action previously recorded on the film, but during the re-run is invisible to the camera and not excitable by the source of invisible radiant energy to emit visible light rays.

If desired, the stems 43 may be likewise coated with a luminescent material for excitation by the ultra-violet energy to the image which would be superimposed during the re-run of the film 17, thereby hiding the band 42 completely, yet having the hair or coiffure 46 visible because of imposition thereof during the first run of the film 17. The degree of opaqueness of the image of the flowers 44 may be controlled by proper selection of filters and by control of the sources of radiant energy in the instant method, whereby the image of the flowers 44, may be imposed as opaque, or translucent, to provide ethereal effects. It is possible also by the present method to cause the flowers 44 to appear magically upon the picture and gradually or suddenly fade therefrom and disappear during the second run of the film 17 to superimpose the image of the flowers. The invisible radiant energy is turned on or intensified at a desired timing, causing the image of the flowers 44 to be imposed on the film 17 at selected times, and by elimination of the exciting source of energy 28, may cause the cessation of the image of the flowers 44 on the film, whereby in the final result of the film, while the head 40 is turning, the flowers 44 appear on the coiffure, turning with the head, and subsequently disappear before the movement is completed.

Any desired combination of effects may be achieved by this method. For example, if it is desired to highlight the coiffure 46 and eliminate the distraction of a face, this is easily and quickly achieved by the present method more clearly illustrated in FIGURES 4–6. Portions of the subject are coated with an application of luminescent material, as for an example in FIGURES 4 and 5, the coiffure 51 of a human head 50 and perhaps additionally, the lips 52 thereof, the subject 50 being illustrated in broken lines in the schematic diagram of the method in FIGURE 6. In the diagram of FIGURE 6, like parts of the previous embodiment of the instant method are referred to by like numbers.

In the instant embodiment of the invention, the subject 50, as an example, may be subjected to both white light 23 and black light 28 and the selected portions 51 and 52, coated with a luminescent material, being excitable by the source of black light 28, whereupon, as the film 17 is being exposed, the intensity of the white light 23 may be decreased or eliminated as by the use of the potentiometer 32 leaving the black light 28 dominant. The effect of FIGURE 5 is thereby achieved, wherein the coiffure 51 and the lips 52 are selectively prominently imaged on the film 17 or singularly imposed on the film 17 with the remaining portions of the head 40 and body of the subject 50 being invisible. The subject 50 may continue to animate with any desired movement, such as turning the head to display the coiffure to best advantage, and the face of the person is invisible and therefore not distracting to the coiffure. Also, if desired, the lips 52 may have their own motion, as an example, describing the merits of the product used for the coiffure wherein the movement of the lips without any image of the remainder of the face, provides a startling phenomenon.

If desired, white lights 23 may be re-introduced on the subject 50 to cause an image of the face and body of the subject 50 to reappear as seen in FIGURE 4. Again, as in the previous embodiment of a method, filtering means 19 is interposed between the subject 50 and the film 17 to block or quench undesired visible light from the subject 50. It is to be noted by this present method, only one run of the film 17 is required unless it is desired to keep the background 53 in continual visibility in the scene. The background 53 may be likewise treated by application of a luminescent material, if it is desired to cause the background to be selectively visible in the scene, depending upon the effect desired to be achieved. As an example, if the background is to be constant within the film within the resultant image, whereby the background can be seen through portions of the subject not having luminescent material, as the blank space 54 within the coiffure 51 of FIGURE 5, the background could be imposed on the film 17 by an initial run during exposure to a white light 23 as described in connection with the FIGURES 1 and 2. Likewise, the background 53 may have a non-luminescent photoluminescent outer surface, or luminescent in varying degrees, to achieve a desired effect.

It will be appreciated and more clearly understood at this point that by this method the effects achieved are limitless. Selective surfaces of subjects can be made to appear, disappear, be high-lighted or caused to change. By the use of applications of luminescent material to surfaces like the background 53 which are excitable only by the black light and not by the white light, selective omission of one of the lights causes only corresponding surfaces of the background to appear. In this manner, invisible writing on a wall may be caused to mysteriously appear merely by changing from a white light to a black light during exposure of the film, or optionally, by re-exposing the exposed film, having the photo-luminescent material imaged thereon, to the background having luminescent material invisible to white light, wherein exposure under the black light causes the luminescent material to mysteriously appear and disappear.

Another example of a single-run application of film to provide animation heretofore unobtainable, is illustrated in FIGURE 7 wherein like parts of previous embodiments

are referred to by like numbers. In FIGURE 7 there is shown a background **60** having thereon, as an example, a coating **61** of luminescent material to provide an image of a sky and a plurality of areas of decreased size indicated as **62** and perhaps of varying size and varying intensity of luminescent material to provide images of stars and planets. A rocket indicated at **63**, comprising a scale model in miniature scale, is movably supported on a wire or track indicated at **66** by support means comprising brackets or rigging **64** secured to the rocket **63** and out of the line of sight of a camera **15**. The track **66** is supported at its ends as by brackets **67**. The track **66** and brackets **64** have a nonluminescent outer surface, such as a dull black non-reflecting, non-fluorescent and non-phosphorescent surface which is not excitable by a source of invisible radiant energy or black light **28**. The rocket **63**, having a coating of luminescent material, fluorescent or phosphorescent, applied thereto, when moved and exposed to the film **17** through the filtering means **19**, imposes an image of the rocket on the film **17**. Such an imposition can be achieved by a single run of the film **17**, the track **66** being invisible in the resultant scene on the film **17**, thereby creating the effect of animation to the rocket **63**.

If desired, the support means may take human form, as previously described, wherein the human would support the rocket **63** as by a bracket like **64** to create motion of the rocket **63**, yet the person being invisible and not excitable by the source of black light. If desired also, the background **60** may comprise a non-luminescent, photo-luminescent surface emitting visible light when exposed to a white light **23**, on the first run of the film **17**, after which the film may be backed up and re-exposed after the track **66** is supported on the background **60** by means of the brackets **67**, whereupon re-exposure of the film will superimpose the image of the rocket **63** alone when the white light **23** is eliminated and the black light **28** is directed on the scene. The track **66**, having a non-luminescent outer surface, is not excitable by the black light **28** and therefore invisible in the final superimposed scene. Again, as in the previous embodiments, various effects of translucency may be achieved by control of the white and black light sources **23** and **28** respectively, and by the use of potentiometers **27** and **32** respectively.

It will now be more clearly understood that countless effects may be achieved, by the control of the exposure of visible and invisible radiant energy to a subject or in any varying degree thereof, to achieve realistic or ethereal and fantastic effects. It is possible by this method, as a further example, to apply a luminescent material, invisible to white light and emitting visible light when exposed to a black light, on a subject to cause an entire change in appearance of the subject when the source of radiant energy is changed from an invisible to a visible radiant energy source or vice versa.

While it has been found most practical to use an ultra-violet radiation source for exciting fluorescent and phosphorescent materials, it is likewise within the scope of this invention to use an infra-red energy radiated upon excitable phosphorescent materials to achieve the above-described effects, with the addition of use of a film having an infra-red sensitive emulsion. In the use of the invisible radiant energy with humans, it is preferable to use an invisible radiant energy having longer waves to which a human being may be exposed for a longer period of time without danger of any injurious effect from the energy, whereas with inanimate objects, the invisible radiant energy is unlimited in intensity or wave-length.

As previously mentioned, a wide variety of luminescent material is naturally available for use in the present method. However, it has been found most practical for facilitating application thereof to mix a variety of materials with a fluorescent oil. In general, the oil is mixed with various paints, powders and chalks, tempera paints being preferable for use on the skin of a human or other live object, to avoid injury or contamination of the tissues of the object. The solids or liquids may be mixed with the fluorescent oil in full strength or in any varying strength and have been mixed with solids such as talcum and cosmetics and with liquids, such as water, quinine water and seltzer water. Whereas many of these objects used, such as soap, quinine water and cosmetics, have inherent excitability to an invisible radiant energy, such excitability can be intensified by the addition of more intense luminescent materials. Many variations of intensities can be used to effect different phenomena whereby the treated subject may be either pale or bright, prominent or unobtrusive, opaque, translucent, or transparent, depending on the intensity of luminescence of the material used.

Different actions of different effects require various techniques in actual operation. As a general rule, it may be stated that whatever method is used to produce animation, it is clearly visible to the naked eye, even though it may be concealed by dark cloth, flat paint and/or other materials. The means of operation can be achieved by any sort of special rigging, by wire, rod, string or track, such as the rigging indicated at **66** in FIGURE 7, or where a more realistic and complicated movement is required, a human, such as **32** in FIGURE 1, having a non-luminescent outer surface, is fully capable of achieving the movement while being invisible in the final result of enclosure or superimposure.

Besides direct photography, as previously described, this method provides also for making possible several separate depth superimposures on one piece of film within the camera **15**. This is accomplished by first filming the required background, then rolling back the film within the camera before each successive superimposure as additional subjects are filmed, each at a pre-calculated range closer to the camera so that no transparency occurs.

For example, to produce a scene with a group of space ships operating at greatly varied distances from a space platform, the background of stars is first imposed on the film in deep space. Then, after rolling back the film, the space platform could be placed against a background having a non-reflective and non-luminescent background at a mathematically prescribed distance and superimpose it on the film. This same procedure is repeated until each space ship required by the script has appeared in the proper place and action. This particular action is not fully illustrated here, but can be interpreted by the illustration on FIGURE 7.

The same method may be applied against a normally lit motion picture set with the exception that no invisible radiant energy or black light is used in photographing the initial background or set. The same procedure can be used to create transparent creatures within a normal or supernatural setting by changing the type and intensity of make-ups and material used. Still another effect is the complete and instantaneous transformation of a person before the camera. In olher words, an actor wearing invisible make-up of luminescent material can appear on a normally lighted scene and without stopping the action be changed into whatever creature the script calls for. This is achieved by means of the addition of a predirected battery of black lights on a normally lit set. On cue the potentiometer blends out the necessary amount of white light allowing activation of the previously invisible black light, as the light sources are simultaneously brought into full effect. These and many other effects, as now will be more clearly seen, can now be accomplished.

While I have herein shown and described my invention in what I have conceived to be the most practical and preferred embodiments, it is recognized that departures may be made therefrom within the scope of my invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims

so as to embrace any and all equivalent devices and methods.

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

1. A method of producing animated motion pictures, comprising the steps of: arranging a set of objects to be photographed; treating certain of said objects to emit visible light when subjected to an invisible radiation while the remaining objects are dark in said invisible radiation; illuminating said set with visible light and photographing the same on a strip of moving picture film sensitive only to visible light; extinguishing said visible light; illuminating said set with said invisible radiation; and rephotographing said set on said same strip of film while moving said certain objects about said set by means which are dark in said invisible radiation whereby, in the finished film strip said certain objects appear to move unaided about said set under visible illumination.

2. The method of claim 1 including the step of changing the intensity of said invisible radiation whereby to selectively cause the photo image of said certain objects to disappear or to appear in the finished film strip.

References Cited in the file of this patent

UNITED STATES PATENTS

656,769	Hunter	Aug. 28, 1900
1,375,918	Lederer	Apr. 26, 1921
2,191,939	Marx	Feb. 27, 1940
2,395,985	Berry	Mar. 5, 1946
2,395,986	Berry	Mar. 5, 1946