

[54] OPTICALLY INSPECTING THE POSITION
AND SIZE OF MAGNETIC STRIPES ON A
MOVABLE WEB

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[56]

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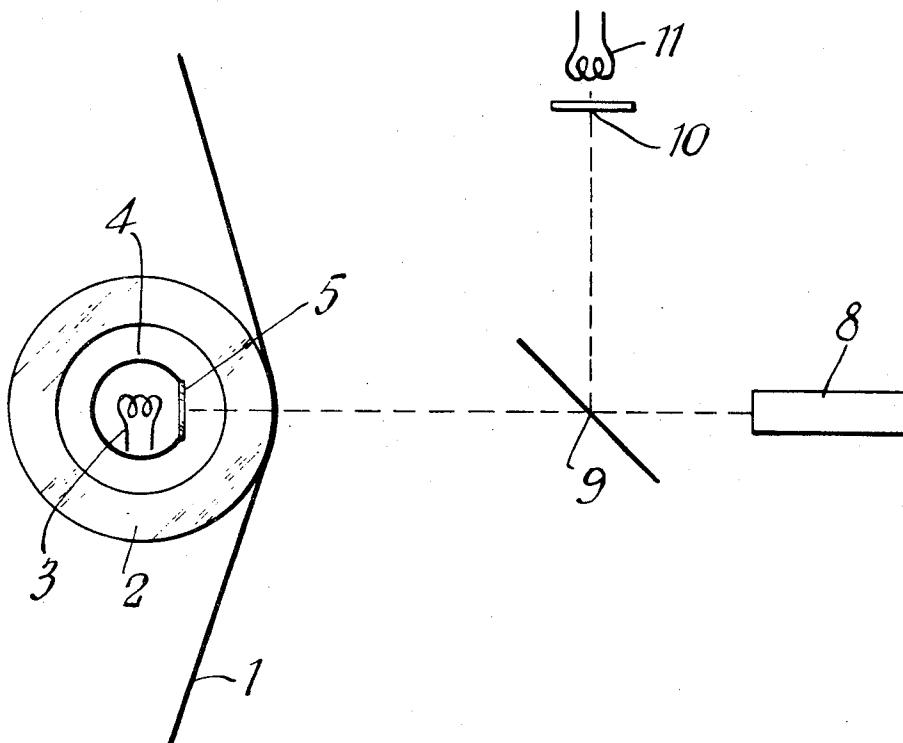
Attorney—E. F. Wenderoth et al.

[57]

ABSTRACT

This invention relates to an device for inspecting the location of marks on a travelling web. The web passes over a translucent rotatable roller having in the centre a light source. On the other side of the web a microscope is so located that an enlarged view of a portion of the web is observable. The location of the marks is determined with reference to a reticle viewed through the microscope.

10 Claims, 2 Drawing Figures



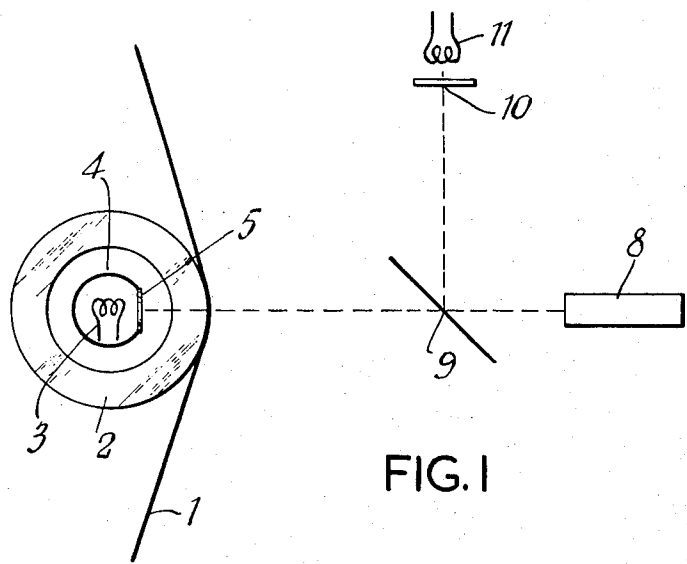
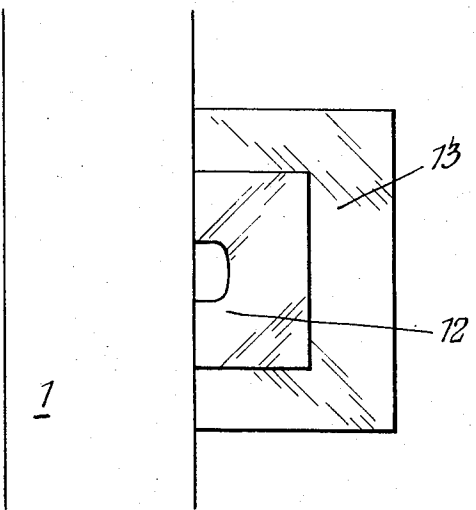


FIG. 2



OPTICALLY INSPECTING THE POSITION AND SIZE OF MAGNETIC STRIPES ON A MOVABLE WEB

According to the present invention there is provided an inspection device for inspecting the location of applied marks or magnetic stripes on a travelling transparent photosensitive web which device comprises a translucent rotatable roller over which the travelling web passes, the said rotatable roller having axially positioned in the centre thereof a source of non-actinic light appropriate to the photosensitive web, there being positioned on the other side of the travelling web opposite the source of light a microscope so located that an enlarged view of a portion of the travelling web is observable in the eye-piece of the microscope.

"By a source of non-actinic light appropriate to the photosensitive web" is meant a source of light which produces visible light of a wavelength or wavelengths to which the photosensitive web is not sensitive. For example the source of light may comprise an ordinary white-light tungsten filament bulb covered by a light-opaque cover which comprises a filter which allows only light of wavelengths to which the photosensitive is not sensitive to pass the filter being so located that the filtered light is able to pass from the source through the transparent web to the microscope. Alternatively if the photosensitive web is sensitive only to the blue region of the visible spectrum the source of light may consist a sodium lamp. In another embodiment a specially selected light-emitting diode is used; the diode being selected so that the light emitted therefrom is non-actinic in regard to the photosensitive web.

The inspection device of the present invention is most commonly used to inspect magnetic stripes which have been coated on the reverse surface of a film web which carries on the front surface a photosensitive coating, e.g. a silver halide emulsion layer. However the magnetic stripes or markings may have been applied to the side of the web which carries the photosensitive layer. Another form of marked or striped photosensitive web which may be inspected by the device of the present invention is a web which is itself photosensitive as it comprises in the web material photosensitive compounds, the marks or magnetic stripes having been applied to one or both sides of the web.

Preferably the microscope is movable laterally in regard to the travelling web so that various portions of the travelling web can be viewed.

In one embodiment of the invention which is of particular use when the device of the present invention is used to observe the path of magnetic stripes coated on to the travelling film, there is also observable in the eye piece of the microscope a graticule which delineates the path along which the magnetic stripes should have been laid. In this embodiment of the invention there may be, for example, located between the travelling web and the microscope a semi-reflecting mirror set at 45°, there being present a graticule which is illuminated by a light source and which is so located in relation to the mirror that the lines of the graticule are superimposed on the image obtained in the microscope by viewing the travelling web.

Preferred materials for the light translucent roller are polyacetals and polytetrafluoroethylene. When the inspection device of the present invention is used in conjunction with a graticule as described above it is preferred

that at least one edge of the web is guided very accurately as it passes the microscope. This may be accomplished by providing a flange on the translucent roller. Preferably, however, this is accomplished by providing a straight-edge positioned so that one edge of the travelling web may be biased against it. Because of the cutting action of the edge of travelling web it is necessary that the said straight-edge is composed of very hard material, e.g. aluminium oxide ceramic. Preferably the straight-edge employed is of such a shape that the edge of the web can be viewed in the microscope without any light scatter due to reflection from the straight-edge.

The accompanying drawings will serve to illustrate the invention.

FIG. 1 is a diagrammatic view of the inspection device according to the present invention.

FIG. 2 shows the straight edge guide for the film.

In FIG. 1 a transparent film web 1 is coated on one side with a layer of blue-light-sensitive emulsion which is not sensitive to light over 450 nm, and on the other side with a plurality of magnetic stripes. The web is caused to pass over a rotatable acetal resin roller 2. This roller is translucent and has located in the centre thereof, a fixed light source 3. This light source is covered by light opaque material 4 except for one side thereof which is covered by a glass filter 5. This glass filter permits only light of a wavelength greater than 500 nm to pass therethrough. Located on the other side of the film web 1 from the roller 2 is a microscope 8. This microscope is so positioned that the image of the film web is observable in its eye piece. The microscope 8 is movable at right angles to the path of the travelling web 1, i.e., across the path of the travelling web.

Light from the source 3 having passed through the filter 5 then passes into the objective of the microscope 8. The path of the light is indicated by a dotted line through a semi aluminized mirror 9. Located above the mirror 9 is a glass graticule 10 having engraved lines thereon and located above the graticule 10 is a light source 11. Light from the light source 11 passes through the graticule and is reflected by the angled mirror 9 into the microscope 8. Thus the engraved lines on the graticule 10 are superimposed on the image on the film web which is observed in the eye piece of the microscope 8.

The graticule is moveable laterally so that it can be zeroed on the image of the edge of the film.

In FIG. 2 the transparent film web 1 is biased by means of a guiding roller (not shown) against a ceramic straight-edge 12 mounted on a block 13. The ceramic straight-edge 12 is shaped so that a portion is cut out of its middle; this portion corresponding to the image area viewable in the microscope. This shape of straight-edge enables the edge of the film 1 which is biased against the straight-edge 12 to be clearly seen in the microscope without any image distortion due to light being reflected from the straight-edge.

One use of the present invention is to observe magnetic stripes as they are coated on to a film web and to determine by use of the graticule 10 that they are being coated exactly in the right place across the width of the web. It is usual to arrange for correction means to be present in conjunction with the striping means, which correction means can effect a rapid correction of the placement of the magnetic stripes.

What we claim is:

1. An inspection device for inspecting the location of applied marks or magnetic stripes on a travelling transparent photosensitive web which device comprises a translucent rotatable roller over which the travelling web passes, the said rotatable roller having axially positioned in the centre thereof a source of non-actinic light appropriate to the photosensitive web, there being positioned on the other side of the travelling web opposite the source of light a microscope so located that an enlarged view of a portion of the travelling web is observable in the eye-piece of the microscope.

2. An inspection device according to claim 1 wherein the source of light comprises a white-light tungsten filament bulb covered by a light-opaque cover which comprises a filter which allows only light of wavelengths to which the photosensitive is not sensitive to pass the filter being so located that the filtered light is able to pass from the source through the transparent web to the microscope.

3. An inspection device according to claim 1 wherein the photosensitive web is sensitive only to the blue region of the visible spectrum and the light source consists of a sodium lamp.

4. An inspection device according to claim 1 wherein the light source is a selected light-emitting diode; the diode being selected so that the light emitted therefrom is non-actinic in regard to the photosensitive web.

5. An inspection device according to claim 1 wherein the microscope is moveable laterally in regard to the path of the travelling web so that various portions of the travelling web can be viewed.

6. An inspection device according to claim 1 which further comprises a semi-reflecting mirror located between the travelling web and the microscope and set at 45° to the path of the light therebetween, there being present an illuminated graticule which is so located in relation to the mirror that the lines on the graticule are superimposed on the image obtained in the microscope by viewing the travelling web.

7. An inspection device according to claim 1 wherein the light translucent roller is made of polytetrafluorethylene or a polyacetol.

8. An inspection device according to claim 1 wherein means are provided for guiding at least one edge of the travelling web as it passes the microscope.

9. An inspection device according to claim 8 wherein the guiding means comprises a flange on the translucent roller.

10. An inspection device according to claim 8 wherein the guiding means comprises a straight-edge positioned so that one edge of the travelling web is biased against it.

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