A device for transferring a film is provided. The device includes a roller transferring a film; a balancing unit connected to the roller by fixed supporters, the fixed supporters being disposed on both sides of the roller; and springs disposed on both sides of the balancing unit, wherein, if the film is out of balance, the balancing unit restores balance to the film by vibrating the both sides of the balancing unit. That is, if a film becomes out of balance during the transfer of the film, the device may restore balance to the film with the aid of the balancing unit which can vibrate on both sides of the balancing unit due to the springs.
DEVICE FOR TRANSFERRING FILM

TECHNICAL FIELD

[0001] The present invention relates to a device for transferring a film, and more particularly, to a device for transferring a film, in which, if a film becomes out of balance during the transfer of the film, balance can be restored to the film with the aid of a pair of springs that are respectively disposed on both sides of a balancing unit.

BACKGROUND ART

[0002] Flexible copper clad laminate (FCCL) films, which are one of the most important materials of flexible printed circuit boards (FPCBs), are generally fabricated by depositing, electroplating or electro-less-plating a conductive metal on an insulation film.

[0003] Polyester films, polyimide films, liquid crystal polymer films, or fluorine resin films may be used as insulation films of FCCL films. Polyimide films have been most widely used in the manufacture of FCCL films because of their excellent heat resistance, dimensional stability, and solder-ability properties. Conductive metal films of FCCL films may include a highly conductive metal such as gold or copper. Copper has been more widely used than gold as the material of conductive metal films of flexible films because of its high cost effectiveness.

[0004] Insulation films may be supplied into a device for fabricating a FCCL film using a transfer device. In order to smoothly supply flexible films into a device for fabricating a FCCL film, a transfer device equipped with transfer rollers may be used. More specifically, in order to maintain the balance of an insulation film during the transfer of the insulation film, a transfer device with a plurality of transfer rollers evenly spaced therein may be used.

[0005] However, even if a plurality of transfer rollers in a transfer device are evenly spaced, the transfer device may not be able to restore balance to a film which is out of balance if the transfer rollers are all fixed onto a supporting plate.

DISCLOSURE OF INVENTION

Technical Problem

[0006] The present invention provides a device for transferring a film, which includes a balancing unit capable of restoring balance to a film if the film becomes out of balance during the transfer of the film.

Technical Solution

[0007] According to an aspect of the present invention, there is provided a device for transferring a film, the device including a roller transferring a film; a balancing unit connected to the roller by fixed supports, the fixed supports being disposed on both sides of the roller; and springs disposed on both sides of the balancing unit, wherein, if the film is out of balance, the balancing unit restores balance to the film by vibrating the both sides of the balancing unit.

ADVANTAGEOUS EFFECTS

[0008] It is possible to easily maintain the balance of a film during the transfer of the film. In addition, the device for transferring a film according to the present invention compensates for the imbalance of a film simply using springs without a requirement of additional equipment or additional power consumption, thereby reducing the manufacturing cost.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The above and other features and advantages of the present invention will become more apparent by describing in detail preferred embodiments thereof with reference to the attached drawings in which:

[0010] FIG. 1 illustrates an exploded perspective view of a device for transferring a film according to an embodiment of the present invention;

[0011] FIG. 2 illustrates a perspective view of the device;

[0012] FIG. 3 illustrates a front view of the device;

[0013] FIG. 4 illustrates a side view of the device; and

[0014] FIG. 5 illustrates an operation of the device.

BEST MODE FOR CARRYING OUT THE INVENTION

[0015] The present invention will hereinafter be described in detail with reference to the accompanying drawings in which exemplary embodiments of the invention are shown.

[0016] FIG. 1 illustrates a perspective view of a device 1 for transferring a film. Referring to FIG. 1, the device 1 includes a transfer roller 2 which transfers a film; a pair of fixed supporter 3 which are respectively disposed on both sides of the transfer roller 2 and are connected to the transfer roller 2 by a pair of spindles 4; and a balancing unit 10 which is connected to the fixed supports 3.

[0017] The balancing unit 10 includes a compensation bar 11 which is attached to the fixed supports 3, a fixed bar 20 which is connected to the compensation bar 11 so that the compensation bar 11 can vibrate on both sides thereof, and a pair of springs 29 which are disposed between the compensation bar 11 and the fixed bar 20.

[0018] The transfer roller 2 is cylindrical, and is connected to the fixed supports 3 by the spindles 4 so as to be able to rotate. A film is placed in contact with the surface of the transfer roller 2 and is moved toward a desired direction upon rotation of the transfer roller 2.

[0019] If a film transferred by the transfer roller 2 is out of balance, the balancing unit 10 restores balance to the film. A middle portion of the compensation bar 11 is connected to a middle portion of the fixed bar 20 by a spindle 4, and both sides of the compensation bar 11 are respectively connected to both sides of the fixed bar 20 by the springs 29. Thus, the compensation bar 11 can vibrate on the both sides thereof. Therefore, when the film transferred by the transfer roller 2 is out of balance, balance can be restored to the film by the compensation bar 11 which vibrates on the both sides of the transfer roller 2 due to the springs 29.

[0020] A pair of rolling axial members 12 and 21 is respectively coupled to the middle portions of the compensation bar 11 and the fixed bar 20 by bolts 14. When the rolling axial members 12 and 21 are coupled together, a bearing 25 and an axde 26 are inserted into a groove 21-1 of the rolling axial member 21 so that the compensation bar 11 can be fixed to the fixed bar 20, and that the compensation bar 11 can vibrate on the both sides thereof while the middle portion of the compensation bar 11 is fixed by the rolling axial members 12 and 21.

[0021] A pair of spring connectors 16 is formed on the compensation bar 11, and a pair of spring connectors 27 are
formed on the fixed bar 20. The spring connectors 16 and the spring connectors 27 may be used to connect the springs 29 on the compensation bar 11 and the fixed bar 20. The spring connectors 16 may be coupled to the compensation bar 11 by a pair of bolts 15, and the spring connectors 27 may be coupled to the fixed bar 20 by a pair of bolts 28. The springs 29 may be disposed between the spring connectors 16 and the respective spring connectors 27, and thus, the both sides of the compensation bar 11 may be respectively connected to the both sides of the fixed bar 20.

[0022] FIG. 2 illustrates a perspective view of the device 1. Referring to FIG. 2, the device 1 includes a transfer roller 2 which transfers a film; a compensation bar 11 which is connected to the transfer roller 2 by a pair of fixed supports 3; a fixed bar 20; and a pair of springs 29 which are disposed between the compensation bar 11 and the fixed bar 20 and maintain the balance of the transfer roller 2. A middle portion of the compensation bar 11 is connected to a middle portion of the fixed bar 20 by an axle 26 so that the compensation bar 11 can vibrate on both sides thereof.

[0023] The transfer roller 2 transfers a film. According to an embodiment of the present invention, a plurality of devices 1 are fixed in a conveyer device frame, and a film may be transferred toward a desired direction by alternately passing the film through a plurality of transfer rollers 2 of the devices 1.

[0024] If a film to be transferred by the device 1 is too long, the film may easily become out of balance. If a film is out of balance, the device 1 may restore balance to the film with the aid of the compensation bar 11 which keeps vibrating on both sides of the transfer roller 2.

[0025] FIGS. 3 and 4 illustrate a front view and a side view, respectively, of the device 1. Referring to FIG. 3, a rotation axis 4 of the transfer roller 2 may not be aligned with the longitudinal axis of the compensation bar 11. Referring to FIG. 4, the rotation axis 4 of the transfer roller 2 may deviate from the central axis of a spring 29 by a distance d.

[0026] By deviating the rotation axis of the transfer roller 4 from the central axis of a spring 29 by the distance d, it is possible to attenuate the force applied to the device 1 by a film during the transfer of the film. Therefore, it is possible to improve the balance restoration capability of the device 1 by strengthening the supporting force of the device 1.

[0027] FIG. 5 illustrates an operation of the device 1. Referring to FIG. 5, when a sheet-type film is mounted on the device 1, the device 1 transfers the film using the rotation force of the transfer roller 2. If the film is too long, it is necessary to maintain the balance of the film during the transfer of the film. The film may be deflected and become out of balance while being transferred by the device 1, due to an imbalance in the force applied to the film.

[0028] Once the film is out of balance, the transfer roller 2 is tilted to a first side of the transfer roller 2, for example, to the left or the right, by a predetermined degree in accordance with a direction in which a strong force is applied to the film. As a result, whichever of the springs 29 is disposed on the first side of the transfer roller 2 compresses and generates a repulsive force due to its elasticity. Then, the transfer roller 2, which is connected to the compensation bar 11, returns to its original position due to the repulsive force.

[0029] If the repulsive force is too strong to tilt the transfer roller 2 to a second side of the transfer roller 2, whichever of the springs 29 is disposed on the second side of the transfer roller 2 compresses and generates a repulsive force so that the transfer roller 2 can return to its original position. In this manner, if a film becomes out of balance during the transfer of the film, balance may be restored to the film by the transfer roller 2 which vibrates along with the compensation bar 11 due to a repulsive force generated upon the compression of the springs 29.

[0030] The device 1 may be used to fabricate a flexible copper clad laminate (FCCL) film. More specifically, the device 1 may be installed in a device for fabricating an FCCL film using a conveyer belt system. In this case, it is possible to improve the reliability of a flexible printed circuit board (FPCB) using an FCCL film by smoothly transferring an insulation film supplied into the device for fabricating an FCCL film and maintaining the balance of the insulation film.

INDUSTRIAL APPLICABILITY

[0031] As described above, the device for transferring a film according to the present invention includes a balancing unit which includes springs disposed below a transfer roller and is thus capable of restoring balance to a film using the springs if the film becomes out of balance during the transfer of the film. Thus, it is possible to easily maintain the balance of a film during the transfer of the film. In addition, the device for transferring a film according to the present invention compensates for the imbalance of a film simply using springs without a requirement of additional equipment or additional power consumption, thereby reducing the manufacturing cost.

[0032] While the present invention has been particularly shown and described with reference to exemplary embodiments thereof, it will be understood by those of ordinary skill in the art that various changes in form and details may be made therein without departing from the spirit and scope of the present invention as defined by the following claims.

1. A device of transporting a film, the device comprising:
   a roller transporting a film;
   a balance unit connected with the roller by fixed supports installed at both sides of the roller; and
   springs installed at both sides of the balance unit,
   wherein the balance unit compensates a balance of the film by oscillating the both sides of the balance unit up and down when the film is out of balance.

2. The device of claim 1, wherein the balance unit comprises:
   a compensating bar connected with the fixed support; and
   a fixed bar connected with a lower part of the compensating bar by a spindle,
   wherein both sides of the fixed bar is connected with both sides of the compensating bar by the springs, and the both sides of the compensating bar oscillates up and down.

3. The device of claim 2, wherein the spindle comprises:
   a bearing; and
   an axle connecting the compensating bar to the fixed bar through the bearing.

4. The device of claim 2, wherein the fixed bar is connected with a middle lower part of the compensating bar by the spindle.

5. The device of claim 1, further comprising,
   a spindle connecting the roller to the fixed supports, wherein the spindle is spaced a predetermined distance apart from a central axis of each of the springs.

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