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[56]

## References Cited

### UNITED STATES PATENTS

3,309,960	3/1967	Deplanque .....	226/94X
3,325,709	6/1967	Anderson .....	226/94X
3,462,909	8/1969	Anderson .....	226/94X

### FOREIGN PATENTS

675,233	12/1963	Canada .....	226/94
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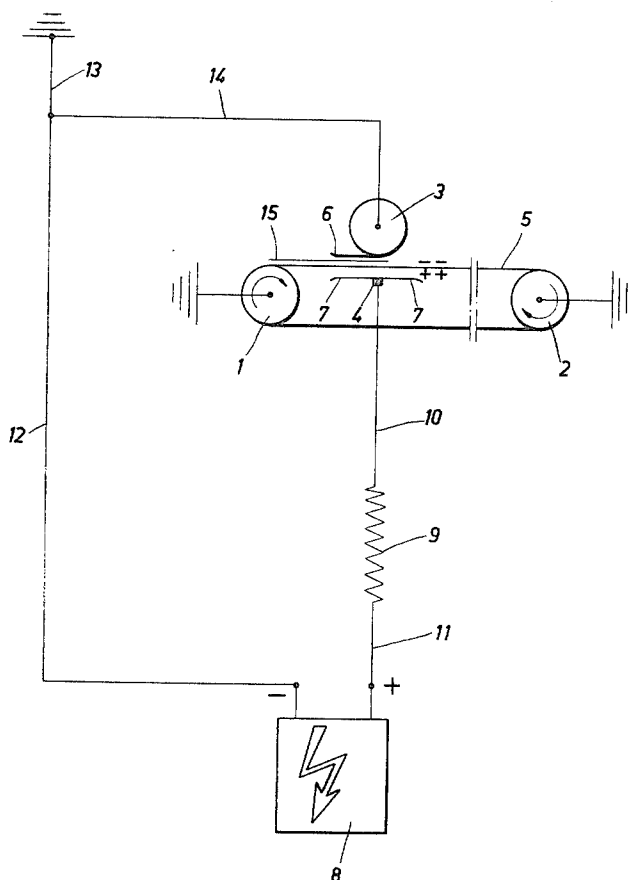
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[54] **TRANSPORT SYSTEM FOR SINGLE SHEETS OF  
 PHOTOSENSITIVE MATERIAL**  
**2 Claims, 1 Drawing Fig.**

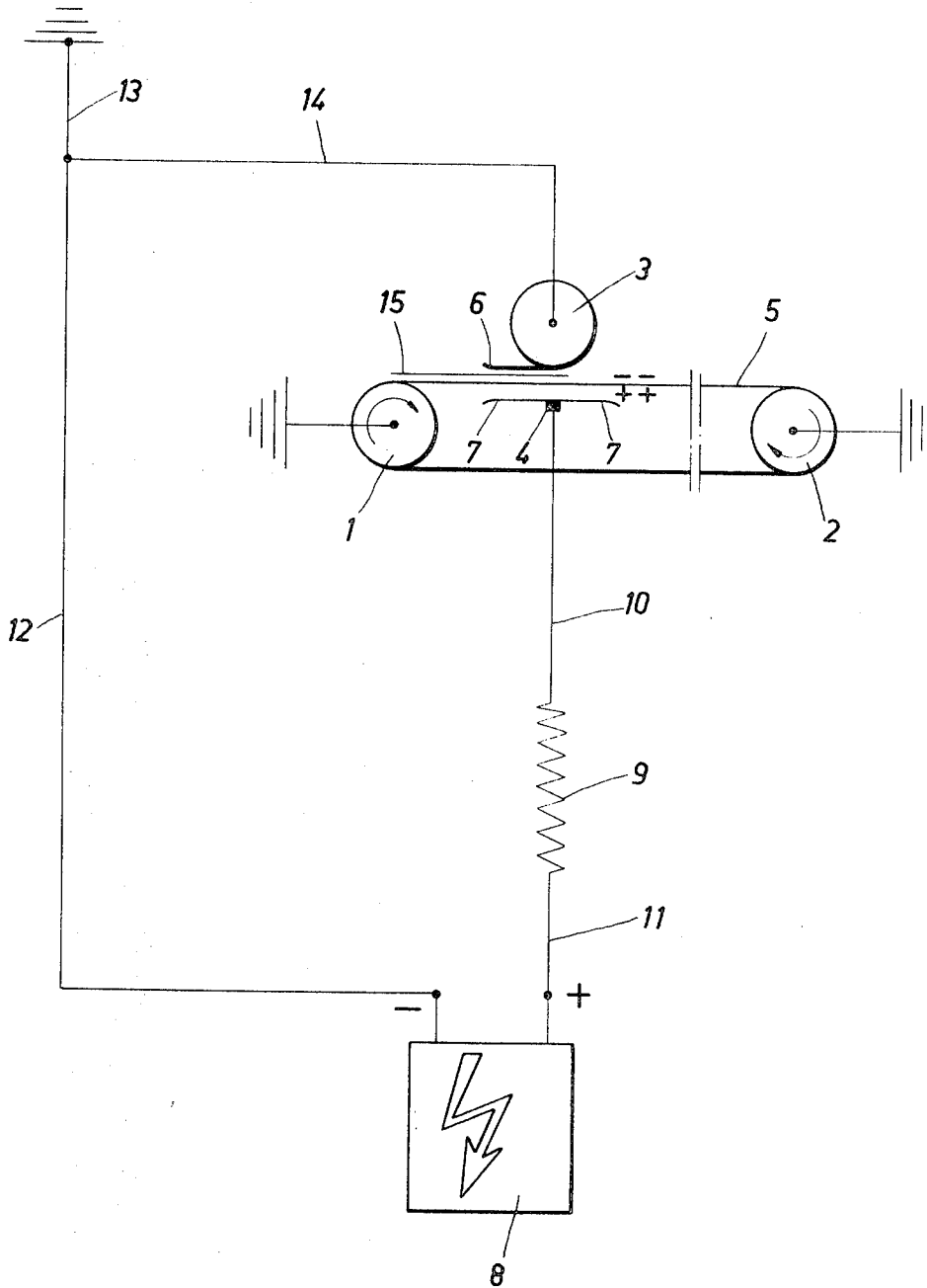
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**ABSTRACT:** A conveyor belt transporting apparatus for photosensitive sheet material, which belt attracts the sheets electrostatically, the electrostatic charge being applied to the belt from a DC voltage source by an electrode which extends transversely of the belt, a load resistor being connected between the electrode and the DC voltage source for automatically adjusting the potential at the electrode to the value required by air humidity.



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# TRANSPORT SYSTEM FOR SINGLE SHEETS OF PHOTSENSITIVE MATERIAL

The invention relates to a system for transporting single sheets of photosensitive material in a given plane, more particularly xerographic or photographic copying material into and out of the exposure position in the focal plane of the copying machine.

In a known system of said kind an endless conveyor belt is tensioned between drive and reversal rollers and consists of electrostatically chargeable material. The operative run of said belt is moved in a given plane, and an electrostatic charge is transmitted to the conveyor belt by a stationary electrode mounted close to the oncoming operative run of the conveyor belt. The electrostatic charge causes the transported sheet to be attracted to said belt.

The known system is satisfactory under normal working conditions, i.e. with average relative air humidity. However, in case of low relative air humidity and consequent resistance of the electric path running from the electrode to the closest point of earth potential, the DC voltage source is unable to transmit a sufficient electrostatic charge to the operative run of the conveyor belt, so that the paper sheet is unsufficiently attracted. On the other hand, the voltage of the DC voltage source cannot be made higher, as then in case of higher humidity sparkovers (breakdowns) would occur between the electrode and the earth potential.

To obviate this disadvantage and render the transport system independent of air humidity, according to the invention, a load resistor of predetermined resistance is connected between the DC voltage source and the electrode, which resistor controls, with the DC voltage remaining constant, the voltage applied to the electrode in dependence upon the current flow through the electrode, said flow being determined by the value of the transfer resistance between the electrode and the closest point of earth potential.

If the relative humidity of the air is low with consequent high transfer resistance at the electrode, the electrostatic voltage is automatically controlled to a higher value by the load resistor because of the decrease of voltage across the load resistor on account of the lower rate of current flow, which rate is in turn dependent upon the transfer resistance at the electrode.

On the other hand, breakdowns of the charging voltage are avoided, since in case of increasing air humidity the transfer resistance at the electrode decreases, whereby the current flow rate increases causing a higher voltage drop across the load resistor. Thus, with increased air humidity the electrostatic voltage at the electrode is lower as it is in case of lower air humidity, thereby sufficiently charging the conveyor belt under all circumstances, at the same time avoiding sparkovers on account of too high voltage.

Preferably, an earthed roller is provided at the side of the operative run of the conveyor belt opposite to the electrode.

In order that the invention may be well understood there will now be described one embodiment thereof, given by way

of example only, reference being had to the accompanying drawing which diagrammatically shows a cross section through the transport system and a block diagram of the electrostatic voltage supply and its automatic control according to the invention.

The upper operative run of the conveyor belt 5, consisting for example of tetrafluoroethylene (trade mark "Teflon") runs over a reversing roller 1 and a drive roller 2 (the drive being not shown). The upper surface of the operative run of belt 5 moves in a definite plane, in which the transported paper sheet is exposed by means which are also not shown.

Below the operative run of the conveyor belt 5 a stationary electrode 4 is disposed, which electrode is connected to a plate 7 that extends transversely to the direction of movement of the belt and also acts as a guiding means for the operative run of said belt. The electrode 4 is connected, via line 10, to a load resistor 9, which in turn is connected to the positive terminal of the charging unit 8 constituting the DC voltage source. The negative terminal of the charging unit 8 is earthed via lines 12 and 13.

On the other side of the operative run of the conveyor belt 5, opposite to the electrode 4, an earthed roller 3 is mounted which provides earthed potential relatively close to the electrode 4, and which simultaneously urges a to be transported paper sheet 15 on to the operative run of belt 5. Thus, the electrostatic charge transmitted to belt 5 has only to retain said paper sheet 15 in its position relative to the belt. The earthed roller 3 is provided with a guiding bar 6 for guiding the paper sheet 15 and is earthed via line 14.

What I claim is:

1. A system for transporting single sheets of photosensitive material in a given plane, more particularly xerographic or photographic copy material into and out of the exposure position in the focal plane of a copy machine, said system comprising; an electrostatically chargeable endless conveyor belt which is tensioned between drive and reversal rollers, an outer surface of said conveyor belt being movable in said given plane; a voltage source for producing a continuous direct current voltage without polarity reversal; an electrode electrically connected to said voltage source, extending transversely of the direction of movement of said belt and positioned in the region of said given plane for producing an electrostatic voltage sufficient to electrostatically charge said belt for attracting said sheets to said belt; means providing ground potential on the opposite side of said belt in opposition to said electrode, and a fixed resistor electrically connected intermediate said electrode and said voltage source for varying the current through said electrode in accordance with the relative humidity at said electrode whereupon said electrostatic voltage is varied in accordance with said relative humidity and said electrostatic charge on said belt is continuously maintained at a sufficient level for attracting said sheets.

2. A system according to claim 1, characterized in that the ground potential means comprises a roller having a grounded electrode connected thereto is provided adjacent said conveyor belt on a side opposite to the electrode.

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