

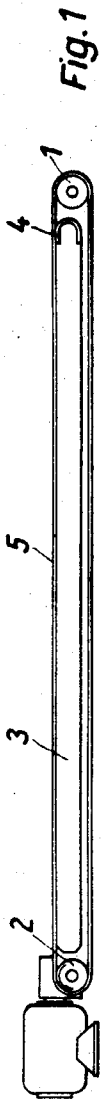
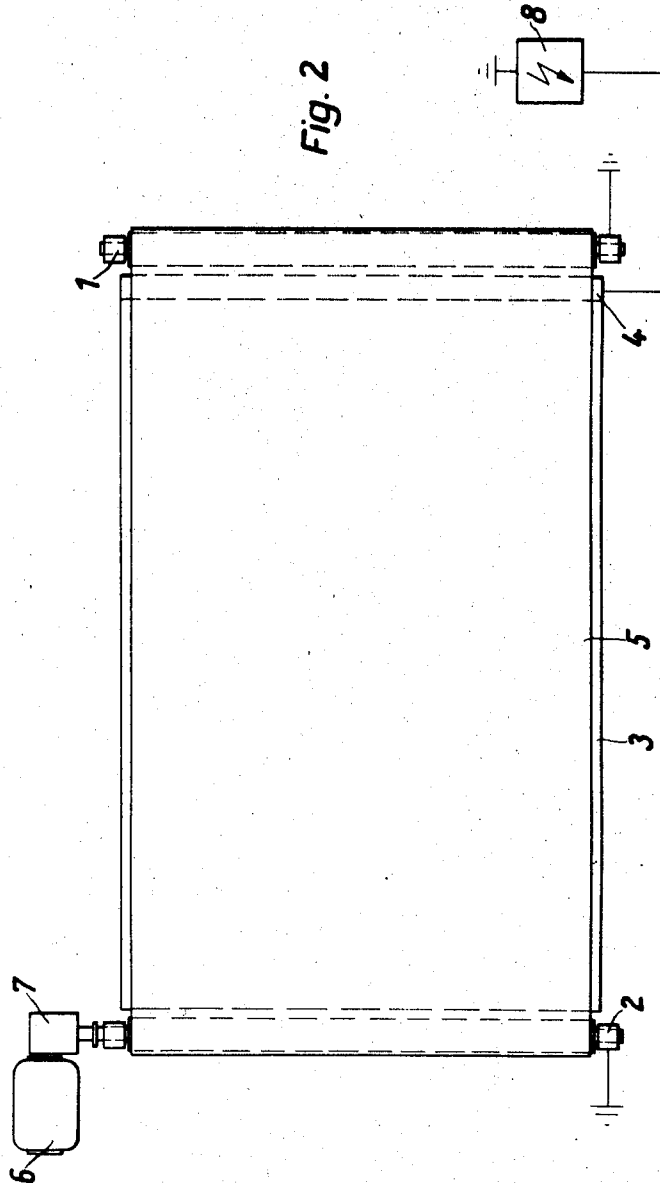
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TRANSPORT SYSTEM FOR SINGLE SHEETS OF PHOTOSENSITIVE MATERIAL

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1

2

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TRANSPORT SYSTEM FOR SINGLE SHEETS OF PHOTSENSITIVE MATERIAL

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5 Claims

ABSTRACT OF THE DISCLOSURE

A conveyor belt transporting apparatus for photosensitive sheet material, which belt attracts the sheets electrostatically, the electrostatic charge being applied to the belt by a potential carrying metal strip which extends transversely of the belt and contacts its underside, thus allowing for controlled application of electric charge onto the belt.

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.

Such a system has been proposed comprising an endless conveyor belt which is tensioned between drive and reversal rollers, consists of electrostatically chargeable material, and the operative run of which has its underside sliding over a plate in the region of the said given plane, an electrostatic charge being transmitted to the conveyor belt to cause the transported sheet to be attracted to said belt.

The advantage of such a system is that the sheet which is to be transported is not subjected to any suction forces of the kind which are exerted substantially non-uniformly in known vacuum-chamber transport systems. The vacuum-producing means required with the latter type of system also making the same expensive. The electrostatic attraction of the sheet to the conveyor belt eliminates the need for edge clamping means and also ensures that each single sheet occupies a perfectly flat position, this of course being important in the exposure of photosensitive material.

In a particular such proposed electrostatic attraction system, the plate intended to ensure that the conveyor belt and hence the sheet retained thereon move in a given plane, and the conveyor belt itself, consist of material which is a poor electrical conductor, e.g. a plastic material, so that the electrostatic charge required to attract the transported sheet is produced directly by the friction of the conveyor belt on the plate during the transport movement. Although this arrangement has the advantage of a simple construction, it has been found a disadvantage that the static electricity is not constant so that incorrect transport frequently occurs, the sheet occupying a crooked position on the conveyor belt. This may, for example, be owing to the fact that the charge produced by friction is greatly dependent upon the relative humidity, and the charging process is also dependent upon the time during which the apparatus has been in operation. At the start of operation, e.g. after the copier containing the system has been switched on, the static electricity is frequently inadequate to ensure reliable transport, whereas after a relatively long period of operation the electrostatic charge is frequently so great that not only does the

sheet adhere to the belt, but after a certain standstill time the belt will tend to adhere to the plastics plate.

To obviate this disadvantage and render the transport system independent of static electricity, according to the invention, a metal strip extending transversely of the direction of movement of the belt is provided in front of that edge of the plate on to which the conveyor belt runs, and means are provided for applying a D.C. voltage of high potential with respect to earth to said strip. In this way the conveyor belt always has the charge suitable for the transport of a particular copying medium. Moreover, this state of charge exists where it is required to ensure satisfactory transport.

In the system according to the invention the plate need not necessarily consist of an electrostatically chargeable material, e.g. a plastics material, but it must not discharge the charge transmitted to the conveyor belt. If a plastics plate or the like is used for this reason, its surface in contact with the underside of the operative run of the conveyor belt is roughened to ensure that there cannot be any additional charge due to friction and no electrostatic adhesion.

It has been found very advantageous to form the metal strip from a foil which engages around the plate end side adjacent the oncoming conveyor belt, or a wire disposed at or near said end edge. An arrangement of this kind will be used when the photosensitive sheet has been transported only through the exposure position, i.e. in just one plane and over just a relatively short distance. If transport is over a longer distance and possibly a deflected path, the metal strip supplying the electrostatic charge may be disposed separately of the plate, and more particularly at a place where the sheet is passed to the conveyor belt.

In xerographic copiers the D.C. voltage fed to the metal strip will be derived preferably from the corona discharge voltage. This obviates the need for a separate charging unit.

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 made to the accompanying drawing, in which:

FIGURE 1 is a side view of a sheet transport embodying the invention; and

FIGURE 2 is a plan view of the same system.

A conveyor belt 5, consisting for example of tetrafluoro-ethylene (trademark "Teflon") runs over a reversing roller 1 and a drive roller 2. An electric motor 6 operably connected to a bevel gear 7 drives the drive roller 2 in the direction of the arrow shown in FIGURE 1.

The top operative run of the conveyor belt 15 runs over a plate 3, of which the edge adjacent the conveyor belt in contact therewith is enclosed in a strip of metal foil 4. This strip is electrically connected to the charging unit 8, which is indicated diagrammatically and which delivers a relatively high D.C. voltage. When the system is used in a xerographic copier, the charging unit may be the charging unit provided in the copier to produce the corona discharge. The rollers 1 and 2 (and the charging unit 8) are advantageously earthed.

What we claim is:

1. In a system for electrostatically adhering a sheet of photosensitive material to a bight of an endless conveyor belt made of electrostatically chargeable material, drive and reversal rollers for said conveyor belt, a stationary support plate, means for driving said drive roller in one rotary direction to move said bight in contact with one face of said plate from one edge to an opposite edge of

3

the plate, a metal strip extending transversely of the direction of movement of said bight at said one edge of the plate, and means for applying to said metal strip a D.C. current of high potential with respect to ground.

2. A system as set forth in claim 1, in which said metal strip comprises a foil folded about said one edge of said plate.

3. A system as set forth in claim 1, in which said metal strip comprises a metal wire.

4. A system as set forth in claim 1 for a xerographic copier, in which said D.C. voltage is derived from the corona discharge voltage.

5. A system as set forth in claim 1, in which said drive and reversal rollers are grounded.

4

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