

PATENT SPECIFICATION

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(54) IMPROVEMENTS IN AND RELATING TO ELECTROSTATIC COPYING APPARATUS

(71) We, AGFA-GEVAERT AKTIENGESELLSCHAFT, a body corporate organised according to the laws of the Federal Republic of Germany of Leverkusen, Federal Republic of Germany, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

The invention relates to electrostatic copying apparatus.

The invention provides electrostatic copying apparatus which comprises means for producing a toner image on an image carrier and means for fixing the toner image by fusion, which fixing means comprises an elongate electrical resistance heating element and a pair of supporting means extending in spaced apart relation, the heating element having a plurality of windings extending from one to the other of the supporting means, and each of the supporting means comprising a guide rail and a plurality of ceramic bodies mounted on the guide rail the recess is closed by a along it, each of the ceramic bodies having a recess so arranged that when the body is adjacent to another of the ceramic bodies on the guide rail the recess is closely by a face of the adjacent ceramic body, and the heating element can extend through the space defined by the recess and the adjacent ceramic body and be held therein.

With this arrangement, in order to assemble the fixing means, all that is necessary is to wind loops of the heating element through the recesses in the ceramic bodies. The ceramic bodies can be mounted on the guide rails individually and moved along the guide rails until they are adjacent to one another and the windings of the heating element are prevented from slipping out of the recesses. This arrangement enables production to be sim-

plified and labour expenditure reduced.

The guide rails are advantageously arranged to extend perpendicularly to the direction of travel of the toner images in operation.

Advantageously, the apparatus comprises resilient means arranged to urge the supporting means away from each other. An especially simple and stable arrangement of the fixing apparatus according to the invention can be obtained if the apparatus comprises two bars extending parallel to the direction of travel of the toner images, in operation, and on which one of the guide rails is mounted together with one or more rocking levers which support the other guide rail, the resilient means being arranged to act on the rocking lever or levers.

Electrostatic copying apparatus constructed in accordance with the invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a view of fixing apparatus of the copying apparatus of the invention; and

Figure 2 shows a section through the apparatus taken along the line II-II in Figure 1.

Referring to the accompanying drawings, two flat bars 2 and 3 disposed parallel both to one another and to the direction of transport A of a copy support (not shown) bearing a toner image which is to be fixed, are connected by a guide rail 10 running perpendicularly to the direction of transport A. The guide rail 10 is secured in each case by means of screws 13 and 14 to an upturned flange 2c and 3c, respectively, of the flat bars 2 and 3, respectively. A shaft 4 is also inserted through the flat bars 2 and 3, its ends 4a and 4b projecting through the flat bars, and a rocking lever 5

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kept in position by means of a snap ring 7 being mounted on each of these ends. The rocking levers 5 have upturned flanges 5a, to which another guide rail 9, running perpendicular to the transport direction A, is secured by means of screws 11 and 12.

Each of the rocking levers 5 has an arm 5f (only one of which is shown) formed with a recess 5d. A tension spring 25 is hooked round the recess 5d and also hooked round a recess 2d of an arm 2e of the flat bar 2. The tension spring 25 urges the lever 5 in a clockwise direction and the guide rail 9 in the direction of arrow B. This tension spring causes an elongate electrical resistance heating element stretched (in a manner described in more detail hereinafter) between the rails 9 and 10 to take on a uniform tension which is essentially independent of the temperature of the element and ensures that it does not hang down in its heated state and thus come into contact with the copy support being transported beneath it.

There are arranged on each of the two guide rails 9 and 10 ceramic bodies 15 which each have a shaped hook 15a providing a laterally open recess 15b. Into each of these recesses 15b, one winding of the heating element which is in the form of an electrical resistance heating strip 16 is hooked. Each of the windings is prevented from slipping out of its respective recess 15b by the lateral face of the adjacent ceramic body 15 (the ceramic bodies being arranged adjacent to one another when the apparatus has been assembled ready for use) this lateral face closing the laterally open recess 15b.

To assemble the heating strip 16, the hooks 15a of the ceramic bodies 15 are merely hooked into each winding of the strip 16, which is pre-shaped approximately in the form shown, and the respective ceramic bodies 15 are threaded onto the rails 9 and 10 in succession. As soon as all the ceramic bodies 15 have been threaded on, the rails 9 and 10 are secured by means of the screws 11 to 14 on the flat bars 2 and 3 and on the rocking levers 5. Once the rails 9 and 10 are screwed down, upturned flanges 2c and 3c or 5a of the flat bars 2 and 3 or the rocking lever 5, respectively, which are adjacent to the outermost ceramic bodies, prevent the ceramic bodies from moving apart and thus releasing the windings of the strip 16.

Finally the ends 16a and 16b of the strip 16 are connected to metal clips 19 and 22

which are pushed over one of the ceramic bodies, and which are connected to the electrical leads 20, 21, and 23, 24.

In operation, a toner image produced on a copy support in the copying apparatus is moved past the fixing apparatus in the direction A and the toner image is fused onto the copy support.

WHAT WE CLAIM IS:—

1. Electrostatic copying apparatus which comprises means for producing a toner image on an image carrier and means for fixing the toner image by fusion, which fixing means comprises an elongate electrical resistance heating element and a pair of supporting means extending in spaced apart relation, the heating element having a plurality of windings extending from one to the other of the supporting means, and each of the supporting means comprising a guide rail and a plurality of ceramic bodies mounted on the guide rail so as to be movable along it, each of the ceramic bodies having a recess so arranged that when the body is adjacent to another of the ceramic bodies on the guide rail the recess is closed by a face of the adjacent ceramic body, and the heating element can extend through the space defined by the recess and the adjacent ceramic body and be held therein.

2. Electrostatic copying apparatus as claimed in claim 1, wherein the guide rails are arranged to extend perpendicularly to the direction of travel of the toner images in operation.

3. Electrostatic copying apparatus as claimed in claim 1 or claim 2, which comprises resilient means arranged to urge the supporting means away from each other.

4. Electrostatic copying apparatus as claimed in claim 3 when dependent on claim 2, which comprises two bars extending parallel to the direction of travel of the toner images, in operation, and on which one of the guide rails is mounted together with one or more rocking levers which support the other guide rail, the resilient means being arranged to act on the rocking lever or levers.

5. Electrostatic copying apparatus substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

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