

"METHOD OF MAKING A WIRE PRINTER"

The present invention relates to a method of making a wire printer and to a wire printer made by said method.

In typical wire printers, printing wires are slidably guided via a plurality of guide members such as a front
5 guide, an intermediate guide, and a rear guide. These front, intermediate, and rear guide members are separately inserted into grooves formed on an inner surface of the interior of a head frame at a predetermined spacing from each other. Thereafter, these guide members are secured
10 to the grooves by suitable fixing means, e.g., adhesive agents. Such an arrangement is disclosed, for instance, in U.S. Patent Specification No. 3,802,543.

It should be noted that the sliding characteristics of the printing wires are essentially influenced by the
15 positional accuracy of the front, intermediate, and rear guide members with respect to each other. Specifically, the positional accuracy between the front and intermediate guide members substantially decides the sliding characteristics. In accordance with the above-described guide arrangements, when
20 the front, intermediate, and rear guide members are inserted into and then fixed in the grooves of the head frame, jigs are required to position these guide members relatively to each other with high accuracy. However, the need to use jigs for relative positioning reduces efficiency.

25 An object of the invention is therefore to provide

a method of making a wire printer by means of which slidability of the printing wires can be improved in a simple manner and the assembly of the wire printer can be made more efficient.

According to the present invention, there is provided a
5 method of making a wire printer head comprising a head frame having guide members for guiding printing wires of the printer head, the method comprising pre-assembling a wire guide assembly which comprises a front guide for slidably guiding distal end portions of the printing wires and an intermediate guide for slidably guiding
10 intermediate portions of the printing wires so as to connect both of the said guides together as an assembly, and thereafter introducing the said guide assembly into a head frame provided with a rear guide for slidably guiding rear portions of the printing wires and which is disposed to the rear of said intermediate guide.

15 The guides of the said wire guide assembly may be assembled together by introducing projections of one guide into holes of another guide.

The projections introduced into the said holes may be retained therein by adhesive or by welding.

20 Alternatively, the projections may be a force fit in the said holes.

One of the guides of the said wire guide assembly may be provided with spacer members which are brought into engagement with the other of the said guides when the wire guide assembly is
25 pre-assembled.

Preferably the wire guide assembly is introduced into the head frame in a direction perpendicular to the direction which the printing wires extend through the head frame.

5 The front guide of the wire guide assembly may have lateral edge portions slidable in grooves formed on the inner wall of the head frame and extending in the direction in which the said wire guide assembly is introduced into the head frame.

10 The front guide of the wire guide assembly may have a resilient plate integrally formed therewith extending in the same direction as that in which the said wire guide assembly is introduced into the head frame, this resilient plate having at its distal end portion a projection snap-engageable into an engagement hole in the head frame when the said wire guide assembly has been fully introduced into the head frame.

15 The intermediate guide may have at least one projection on its rear surface which engages a portion of the frame when the wire guide assembly is introduced into the head frame.

The invention also comprises a wire printer when made by the method set forth above.

20 The invention is illustrated, merely by way of example, in the accompanying drawings, in which:-

Fig. 1 is a cross-sectional view of a principal part of a wire guiding apparatus forming part of a wire printer according to a preferred embodiment of the invention;

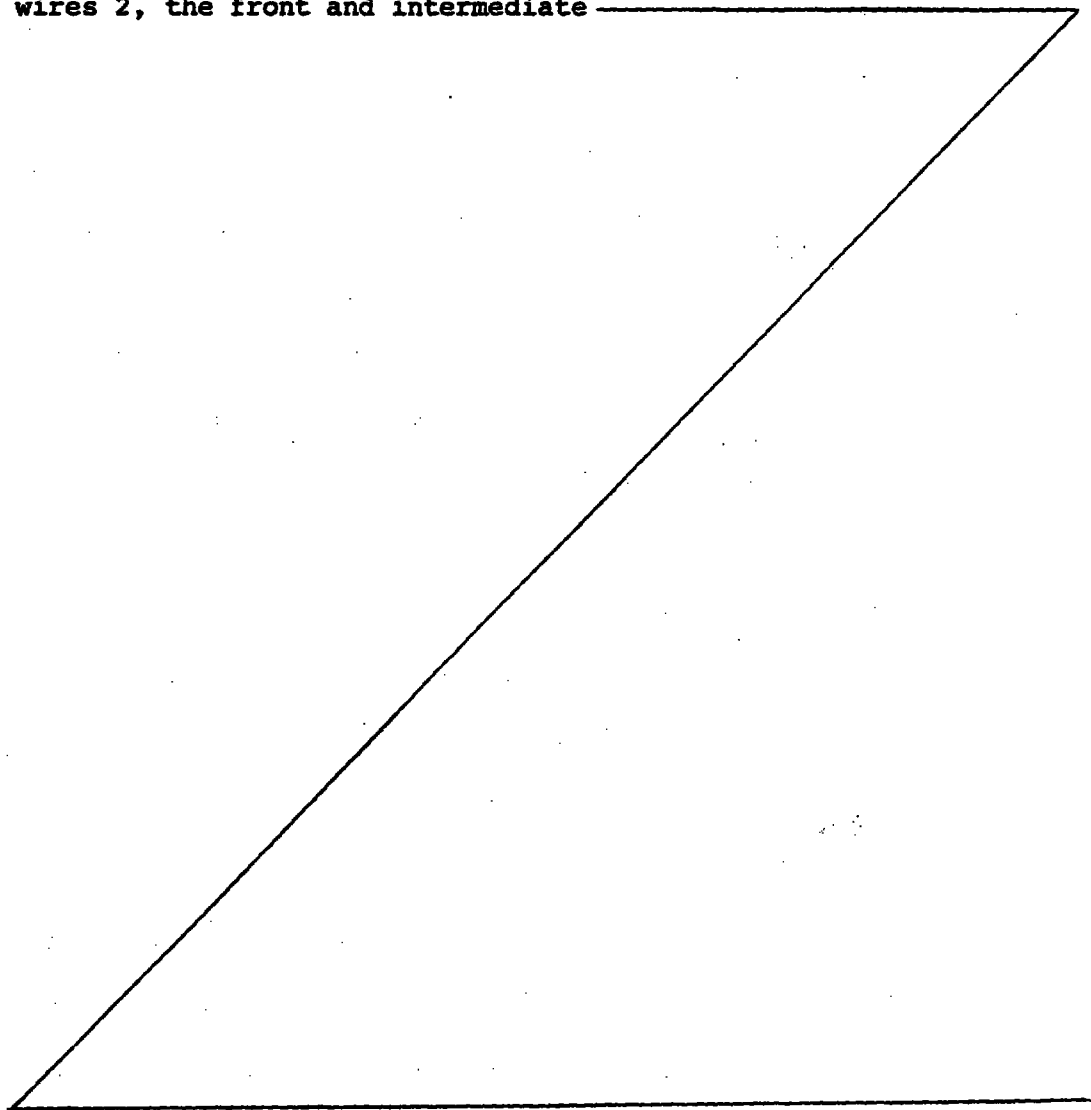
25 Fig. 2 is a side view of a guide assembly comprising front

and intermediate guides, the said guide assembly forming part of the structure shown in Fig. 1;

Fig. 3 is a rear view of the guide assembly of Fig. 2; and

Fig. 4 is a cross-sectional view of the guide assembly taken
5 along the line IV-IV shown in Fig. 2.

In Fig. 1 there is shown a wire printer having a front or distal guide 3 and an intermediate guide 4 for guiding printing wires 2, the front and intermediate



guides 3,4 being arranged in front of a head frame 1.

As will be described hereinafter, both the front and intermediate guides 3 and 4 are integrally assembled in a prior assembly step before being inserted into the head frame 1. A rear guide 5 for slidably supporting rear portions of the printing wires 2 (only one of which is illustrated in Fig. 1) is mounted on a holder unit 1a formed at a rear end of the head frame 1. A printing pin 6 is fixed to the rear end of each printing wire 2, and is biased via a recovery spring 7 rearwardly with respect to the direction in which it is moved during the printing operation. Accordingly, each printing pin 6 is in touch with the distal portion of a respective printing lever 8. The end portion of each of the printing levers 8 is pivotally supported, and is depressed against the rear end of a respective U-shaped core 10 via a respective compression spring 9.

Driving coils 11 are wound on the U-shaped cores 10. When the driving coils 11 are energised, the cores 10 are energised to effect magnetic attraction of the printing levers 8, so that the printing wires 2 can be advanced in the printing direction, i.e., towards the left as seen in Fig. 1, against the spring force exerted by the recovery springs 7. A head cover 12 is positioned to the rear of the compression springs 9, and is fixed on the head frame 1 via screws

(not shown). Pillars 1b integrally formed on the head frame 1 pass through the head cover 12. A damper 13 is provided in front of the compression springs 9 so as to absorb impact exerted by the printing levers 8 when they have been returned to their home position.

It should be understood that although only one printing wire 2 and an electromagnetic drive therefor is illustrated in Fig. 1, in practice a plurality of such printing wires and electromagnetic drives are employed in the wire printer.

Referring to Figs. 2-4, a guide assembly constructed of the front or distal guide 3 and the intermediate guide 4 will now be described in detail.

As is easily seen from the drawings, a rectangular tubular side wall 3c is formed on the front guide 3 at a rear surface of a plate 3b in which a plurality of guide holes 3a are formed for guiding the printing wires 2. On the rear surface of the side wall 3c, a plurality of projections 3d and 3e are formed for positioning the intermediate guide 4. The intermediate guide 4 has a plurality of guide holes 4a for guiding the printing wires 2 and is shaped as a plate. The intermediate guide 4 also has positioning holes 4b and 4c (Fig. 3) that are engaged with the projections 3d of the front guide 3. The intermediate guide 4 is integrally connected to the front guide 3 by fixing the projections 3d in the positioning

holes 4b and 4c by employing an adhesive agent, thermal welding or a pressure insertion technique. Even if the projections 3d are a loose fit in the positioning holes 4b and 4c, the front guide 3 may be secured to the intermediate guide 4 to which it has been so assembled by assembling the guide assembly into the head frame 1. When this has been effected, the projections 3e function as a spacer since they are in touch with the front surface of the intermediate guide 4. However a projection 3f, which is semi-circular in cross section, and semispherical projections 4d are respectively formed on the front surface of the front guide 3 and on the rear surface of the intermediate guide 4.

During the process of assembling the printing head, the guide assembly is formed by assembling together the front guide 3 and the intermediate guide 4. Then, the relative positional accuracy between the front guide 3 and the intermediate guide 4 can be maintained at a high level without utilizing jigs by respectively engaging the projections 3d in the holes 4b and 4c of the intermediate guide 4.

The guide assembly is held on the head frame 1 by employing the following construction.

As is illustrated in Fig. 1, the entire guide assembly is pushed against the front wall 1f of the head frame 1 by

inserting the side edge of the plate 3b of the front
guide 3 into holding grooves 1c formed on the inner wall
of the head frame 1. As a result, the projections 4d formed
on the rear surface of the intermediate guide 4 are engaged
5 with a wall 1d of the head frame 1. Consequently, the
entire guide assembly can be stably held within the head
frame 1 by engaging the projection 3f formed on the front
surface of the front guide 3 with a positioning hole 1g
formed on the front wall 1f. A window hole 1e is provided
10 in the front wall 1f, through which the printing wires 2
can pass.

Further, it is evident to those skilled in the art
that other modifications can be easily conceived without
departing from the scope of the present invention as defined
15 in the claims.

As has been described in detail, particular advantages
arise from the fact that the task of assembling the printing
head can be made considerably more efficient since a guide
assembly is used which includes front and intermediate
20 guides 3,4 which have been integrally formed in the preceding
step of assembling the printing head. Specifically, since
both the front and intermediate guides are assembled to
form an integral structure, sliding of the printing wires
is assisted and positional accuracy between these guides
25 can be maintained at a high level. Consequently, the

slidability required for supporting the printing wires
can be easily realized in a simple manner without utilizing
any jig.



CLAIMS

1. A method of making a wire printer head comprising a head frame having guide members for guiding printing wires of the printer head, the method comprising pre-assembling a wire guide assembly which comprises a front guide for slidably guiding distal end portions of the printing wires and an intermediate guide for slidably guiding intermediate portions of the printing wires so as to connect both of the said guides together as an assembly, and thereafter introducing the said guide assembly into a head frame provided with a rear guide for slidably guiding rear portions of the printing wires and which is disposed to the rear of said intermediate guide.
2. A method as claimed in Claim 1, in which the guides of the said wire guide assembly are assembled together by introducing projections of one guide into holes of another guide.
3. A method as claimed in Claim 2, in which the projections introduced into the said holes are retained therein by adhesive, welding or a force fit.
4. A method as claimed in any preceding Claim, in which one of the guides of the said wire guide assembly is provided with spacer members which are brought into engagement with the other of the



said guides when the wire guide assembly is pre-assembled.

5. A method as claimed in any preceding Claim, in which the said wire guide assembly is introduced into the head frame in a direction perpendicular to the direction which the printing wires extend through the head frame.

6. A method as claimed in Claim 5, in which the front guide of the said wire guide assembly has lateral edge portions slidable in grooves formed on the inner wall of the head frame and extending in the direction in which the said wire guide assembly is introduced into the head frame.

7. A method as claimed in Claim 5 or Claim 6, in which the front guide of the said wire guide assembly has a resilient plate integrally formed therewith extending in the same direction as that in which the said wire guide assembly is introduced into the head frame, this resilient plate having at its distal end portion a projection snap-engageable into an engagement hole in the head frame when the said wire guide assembly has been fully introduced into the head frame.

8. A method as claimed in any of Claims 5 to 7, in which the said intermediate guide has at least one projection on its rear surface which engages a portion of the head frame when the wire



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guide assembly is introduced into the head frame.

9. A method of making a wire printer substantially as
hereinbefore described with reference to the accompanying drawings.

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10. A wire printer head made by the method claimed in any
preceding Claim.
