

"AN ASSEMBLY IN WHICH A PRINT HEAD IS RELEASABLY
MOUNTED ON A CARRIAGE"

The present invention relates to an assembly in which a print head is releasably mounted on a carriage member, and, although the invention is not so restricted, it relates more particularly to a print head which needs
5 to be removed during assembly, and upon the occurrence of any malfunction, and at the end of its life, from a carriage on which it is mounted.

According to the present invention, there is provided an assembly comprising a print head which is releasably
10 mounted on a carriage by means of an engagement device, the carriage having at least one positioning member which releasably locates the print head in a predetermined position on the carriage, the engagement device having at least one lever portion, which releasably engages
15 the print head, and at least one spring portion which engages the carriage and which also engages or is integral with the respective lever portion or portions so as to urge the latter into engagement with the print head, the print head being provided, for the or each lever portion,
20 with an abutment portion which is engageable with the respective lever portion so as to resist movement of the latter into a position in which the print head may be removed from the carriage.

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5 Preferably, the or each lever portion may be moved, by the force of its spring portion, into a stable position in which it engages the carriage and in which it is spaced from the print head so as to permit removal of the latter from the carriage.

Thus the or each lever portion may have a flat surface portion which engages a flat surface portion of the carriage when the parts are in the said stable position.

10 Preferably there are two lever portions which are respectively disposed on opposite sides of the print head.

15 Preferably there is a single spring portion a central portion of which engages the carriage and opposite end portions of which respectively engage or are integral with the lever portions.

The said central portion of the spring portion may pass through an opening or openings on the carriage.

The said end portions may respectively engage in recesses in the lever portions.

20 The or each positioning member may comprise a pin which is releasably located in a hole in the print head.

The or each lever portion may have an manually operable gripping portion which projects therefrom.

5 The or each lever portion may engage an outwardly projecting portion of the print head. The or each lever portion may, moreover, have a flat surface portion which engages a flat surface portion of the print head.

The invention also comprises a printer provided with an assembly as set forth above.

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

Figure 1 is a front elevational view, partially cut-away, of a first embodiment of an assembly according to the present invention, in which Figure 1(a) shows the positions of the parts when a print head is secured in position, and Figure 1(b) shows the positions of the parts when the print head is removable;

15 Figure 2 is a perspective view of the embodiment shown in Figure 1 with levers and a leaf spring thereof omitted for clarity:

Figure 3 is a perspective view corresponding to that of Figure 2 but wherein the print head is removed from a head mount;

Figure 4 is a front elevational view showing a second embodiment of an assembly according to the present invention, and

Figure 5 is a plan view showing an example of a known assembly.

Terms such as "upwardly" and "downwardly", as used in the description below, are to be understood to refer to directions as seen in the accompanying drawings.

In Figure 5 there is shown a plan view of a known way of mounting a print head on the carriage of a printer. A print head 31 is secured to a carriage 32, which acts as a mount for the print head, by means of a plurality of screws 33a and 33b. The print head 31 needs to be removed, replaced and remounted, during the assembly operation of a printing apparatus which includes the print head, upon the occurrence of such troubles as paper jamming, and at the end of the life of the print head 31.

Whenever any of these circumstances occurs, the print head 31 has to be removed from and remounted on the carriage 32 by rotating the screws 33a and 33b with a special tool such as a screwdriver. Such a known way of mounting the print head has the disadvantage that, in order to remove

and remount the print head 31, an operator needs a special tool such as a screwdriver and is forced not only to perform complicated actions but also to spend a considerable time doing so.

5 The object of the present invention is therefore to provide a construction wherein the print head can be removed from and remounted on the head mount positively and in a short time without any need for a special tool.

10 In Figure 1(a) there is therefore shown a first embodiment of an assembly according to the present invention with its parts arranged so that a print head 1 is secured by levers 3, 4 to a head mount constituted by a carriage 2. Figure 1(b) shows the position of the parts wherein the levers 3, 4 are disengaged and the print head 15 1 is removable from the head mount. Figure 2 is a perspective view of the embodiment shown in Figure 1 with the levers 3, 4 and a leaf spring 6, which acts on the levers 3, 4, omitted. Figure 3 shows a perspective view corresponding to that of Figure 2, but with the print 20 head 1 removed from the head mount.

 The print head 1, which effects printing by utilizing the impact of print wires 9, has a nose portion 1a, with substantially flat planar portions 1b, 1c extending on opposite sides of the nose portion 1a, and with convex 25 projections 1d, 1e formed on the outer end portions of the

flat planar portions 1b, 1c respectively. The print head
 1 is supported on flat planar portions 2a, 2b of the
 carriage 2 which, as indicated above, acts as a mount
 for the print head 1. A single pin 8 (Figures 2 and 3)
 5 is provided on each of the flat, planar portions 2a,
2b. A hole 7 (Figure 2) is formed in each of the flat
 planar portions 1b, 1c of the print head 1, the pins 8
 being engageable in the holes 7 so as to determine the
 relative position of the carriage 2 with respect to the print
 10 head 1. The levers 3, 4 which are respectively disposed
 on opposite sides of the print head 1, are of the same shape
 and are respectively provided with abutment portions 3a,
4a for applying pressure to the flat, planar portions
1b, 1c of the print head 1. The levers 3, 4 have spring
 15 engagement recesses 3b, 4b which are respectively engageable
 with opposite ends of the leaf spring 6. The levers 3, 4
 also have manually operable gripping portions 3c, 4c
 respectively which project therefrom for operating the
 levers 3, 4. In addition, the levers 3, 4 are respectively
 20 provided with flat engagement surfaces 3d, 4d which are
 arranged to come into surface contact with flat surface
 portions 2c, 2d of the carriage 2 when each lever 3, 4 is
 inclined 45 degrees from its head holding position at the
 time of removal of the print head 1. The leaf spring 6 is
 25 bent in such a manner that its opposite ends are engaged

in the spring engagement recesses 3b, 4b of the levers 3 and 4.

The central portion of the leaf spring 6 passes through openings 5a, 5b which are formed in upstanding portions of the carriage 2, the outer ends of the leaf spring 6 being always deflected upwardly by the levers 3, 4.

The operation of the print head 1 described above will now be explained.

When the parts are in the positions shown in Figure 1(a) in which the print head 1 is secured to the carriage 2, a downward force is applied to the levers 3, 4 by the leaf spring 6 on the upper portions 5a-1, 5b-1 of the openings 5a, 5b which respectively act as fulcrums. The abutment portions 3a, 4a of the levers 3, 4 press the flat planar portions 1b, 1c of the print head 1 against the flat planar portions 2a, 2b of the carriage 2, respectively, by virtue of the resilience of the leaf spring 6, whereby the print head 1 is secured to the carriage 2. In this case, although the levers 3, 4 are subjected to a reaction force which acts to incline them in the directions of arrows A, the convex projections 1d, 1e of the print head 1 exert a force with respect to each lever which acts to overcome the reaction force, so that the levers 3 and 4 are held stably in position. Thus the convex projections 1d, 1e are engageable with the levers 3, 4 so as to resist movement of the latter into positions in which the print head 1 may

be removed from the carriage 2.

When, however, the print head 1 is to be removed from the carriage 2, the gripping portions 3c, 4c of the levers 3, 4 are pressed in the directions of the arrows A by applying, with the aid of a finger, a pencil or the like, a force sufficient to cause the levers 3, 4 to pass over the convex projections ld, le, and the levers 3, 4 are thereby rotated about the spring engagement recesses 3b, 4b which are engaged with the leaf spring 6 and which act as fulcrums. When the levers 3, 4 rotate through 45 degrees, the flat engagement surfaces 3d, 4d of the levers 3, 4 respectively, which are spaced from the flat surface portions 2c, 2d of the carriage 2 when the parts are positioned as shown in Figure 1, come into surface contact with the flat surface portions 2c, 2d of the carriage 2, the levers 3, 4 being spaced from the print head 1. At this time, in spite of the fact that the degree of deflection of the leaf spring 6 is smaller than that which exists when the print head 1 is secured to the carriage 2, since the spring 6 is still deflected upwardly, the levers 3, 4 are pressed downwardly and are held in a stable state due to the effect of the surface engagement surfaces 3d, 4d. In this state, since the print head 1 is held in position on the carriage 2 only by its own weight it can easily be removed by being picked up vertically.

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In order to remount the print head 1, the flat planar portions 1b, 1c are mounted on the flat planar portions 2a, 2b in such a way that the pins 8 pass through the holes 7. The levers 3, 4 are then operated in the directions opposite to those described above. That is to say, forces sufficient to cause the levers 3, 4 to pass over the convex projections 1d, 1e in the directions opposite to the arrows A are applied to the gripping portions 3c, 4c with the aid of a finger, a pencil or the like, and thereby the print head 1 is secured again to the carriage 2.

Figure 4 is a front elevational view of a second embodiment of the present invention which differs from the first embodiment in that it has lever portions 13, 14 which are integral with a leaf spring portion 16, the portions 13, 14, 16 being arranged to act as a single mounting member 10 for the print head. It is possible, by giving the resilience of a spring to the mounting member 10, to remove the print head 1 from the head mount 2 and to remount the print head on the head mount 2 with one touch of a finger in the same manner as the first embodiment.

It is to be noted that the print head 1 may be replaced with an impact print head of a wire dot type, a thermal print head, a matrix type print head or any other

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5 head. Also, the rotational angle of each of the
levers 3, 4 can be changed by altering the angle at which
the flat engagement surfaces 3d, 4d are formed from the
45 degrees described above to some other desired angle,
whereby the levers 3, 4 can be rotated until they stop
at the desired angle.

10 In the constructions described above, the pair of
levers 3, 4 or lever portions 13, 14 have only to be
rotated with the aid of finger, a pencil or the like in
order to positively and easily remove and remount the print
head 1 by a quick operation without any need for a special
tool such as a screwdriver.

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C L A I M S

1. An assembly comprising a print head which is releasably mounted on a carriage by means of an engagement device, the carriage having at least one positioning member which releasably locates the print head in a predetermined position on the carriage, the engagement device having at least one lever portion, which releasably engages the print head, and at least one spring portion which engages the carriage and which also engages or is integral with the respective lever portion or portions so as to urge the latter into engagement with the print head, the print head being provided, for the or each lever portion, with an abutment portion which is engageable with the respective lever portion so as to resist movement of the latter into a position in which the print head may be removed from the carriage.
2. An assembly as claimed in claim 1 in which the or each lever portion may be moved, by the force of its spring portion, into a stable position in which it engages the carriage and in which it is spaced from the print head so as to permit removal of the latter from the carriage.
3. An assembly as claimed in claim 2 in which the or each lever portion has a flat surface portion which engages a flat surface portion of the carriage when the parts are in the said stable position.



* C L M S *

4. An assembly as claimed in any preceding claim in which there are two lever portions which are respectively disposed on opposite sides of the print head.

5. An assembly as claimed in claim 4 in which there is a single spring portion a central portion of which engages the carriage and opposite end portions of which respectively engage or are integral with the lever portions.

6. An assembly as claimed in claim 5 in which the said central portion of the spring portion passes through an opening or openings in the carriage.

7. An assembly as claimed in claim 5 or 6 in which the said end portions respectively engage in recesses in the lever portions.

8. An assembly as claimed in any preceding claim in which the or each positioning member comprises a pin which is releasably located in a hole in the print head.

9. An assembly as claimed in any preceding claim in which the or each lever portion has a manually operable gripping portion which projects therefrom.

10. An assembly as claimed in any preceding claim in which the or each lever portion engages an outwardly projecting portion of the print head.

11. An assembly as claimed in any preceding claim in which the or each lever portion has a flat surface portion which engages a flat surface portion of the print head.



12. An assembly substantially as hereinbefore described with reference to and as shown in Figures 1-3 or in Figure 4 of the accompanying drawings.

5 13. A printer provided with an assembly as claimed in any preceding claim.

10 14. A mounting mechanism for a print head comprising: a pair of levers which are respectively located on the two sides of a print head and a pressing portion for pressing said print head; a spring member which rotatably supports said levers on both ends and urges said levers in one direction only; a head mount having an opening into which said spring member is inserted in such a manner as to support said print head and a positioning member for said print head: and said print head being provided with an engagement
15 portion for engaging with said positioning member; a flat portion which is pressed by said levers; and a convex portion which acts to prevent the rotation of said levers.

