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"PRINTER HOUSING"

This invention relates to a printer housing and to a printer, e.g. an impact printer, provided with such an housing.

A known printer which makes a considerable amount of noise during the printing operation, is provided with an housing having an aperture through which recording paper is loaded into the housing and unloaded therefrom. This aperture is an outlet for the greater part of the noise. If the aperture is narrowed, it is possible to reduce the transmission therethrough of the noise to some extent, but in this case it is difficult to set the recording paper in the correct position.

It is, therefore, an object of this invention to provide an housing for a printer which can drastically reduce the transmission of the noise of the printing operation without making it difficult to set the paper in position.

According to the present invention, there is provided a printer housing which is adapted to contain a printer and which has spaced apart parts which define an aperture through which material to be printed may be moved into and out of the housing, and an aperture blocking member at least one portion of which is adapted to partially block the aperture, the aperture blocking member and the spaced apart parts being relatively movable between an inoperative position, in which

at least a portion of the aperture blocking member is relatively widely spaced from the spaced apart parts to facilitate the introduction of the said material into the housing through the said aperture and its withdrawal therethrough with the said material passing to and from the aperture on opposite sides of the aperture blocking member, and an operative position in which the aperture blocking member is relatively narrowly spaced from the spaced apart parts so as to permit the said introduction and withdrawal of the said material through the said aperture adjacent opposite sides respectively of the aperture blocking member while reducing the transmission of printing noise from the interior of the housing to the exterior thereof through said aperture.

Preferably, the blocking member and/or at least one of the said spaced apart parts is provided with at least one projection across which the material in operation passes. Thus the blocking member and at least one of the said spaced apart parts may be respectively provided with projections which overlap each other in the said operative position.

The housing preferably comprises a case body having an opening therein and a cover for closing said opening, the cover and a part of said case body constituting the said spaced apart parts.

The aperture blocking member is preferably rotatably

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mounted so as to be rotatable between said operative and inoperative positions.

5 The aperture blocking member is preferably removable from the housing. Thus the said aperture blocking member may be provided at said one end thereof with a tubular portion supported rotatably on a shaft, said tubular portion being removable from said shaft. The shaft is preferably substantially rectangular, the tubular portion having a slit whose width is slightly
10 greater than that of the shaft.

 The housing may comprise a cover which is removable from a case body.

 The invention also comprises a printer mounted in said housing, the printer preferably having an impact printing
15 head.

 The printer is preferably provided with a platen and with guide means for guiding the material from the aperture to the platen.

 There may be a pin wheel having pins engageable in
20 apertures in the said material, the pin wheel being rotatable to entrain the material over the platen.

 A printer provided with the printer housing of the present invention may advantageously be installed in an office or like

place in which silence is greatly desired, since the housing effectively reduces the leakage of the noise produced during the printing operation. The housing is simple in construction and inexpensive to manufacture.

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

Figure 1 is a sectional view of a printer provided with a printer housing according to the present invention, the parts being shown in an operative position;

10 Figure 2 is a view similar to Figure 1, but showing a case of the printer housing in an open or inoperative position which enables recording paper to be set in place therein;

15 Figure 3 is a broken-away sectional view taken along the line III-III of Figure 1;

Figure 4 is an enlarged broken-away sectional view taken along the line IV-IV of Figure 1, and

Figure 5 is a broken-away sectional view similar to a portion of Figure 1, but showing a modified structure.

20 Terms such as "lower", "upper", "above", "below", "left" and "top", as used in the description below, are to be understood to refer to directions as seen in the accompanying drawings.

25 A printer housing embodying this invention is shown in Figure 1, together with various parts of a printer. The housing comprises a case body formed by a lower case portion 1

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and an upper case portion 2. The upper case portion 2 has a top opening 2a which is normally closed by a cover 3. The upper case portion 2 has a shoulder 4 surrounding the top opening 2a. The cover 3 simply rests on the shoulder 4, as shown in Figures 1 and 3, and is removable. Alternatively, the cover 3 may be rotatably supported on the upper case portion 2 at one end, i.e. the left end thereof as viewed in Figure 1.

The case body 1, 2 is adapted to accommodate a printer comprising a pair of guide shafts 6 and 7 which extend between side plates 5. The printer also comprises a carriage 8 which carries an impact printing head 9 thereon, the printing head 9 being slidably mounted on the guide shafts 6, 7. A platen 11 faces the printing head 9, and an ink ribbon 10 lies between the printing head 9 and the platen 11. A pin wheel 12 is provided above the platen 11 for moving recording paper 13. The pin wheel 12 has pins engageable in apertures (not shown) in the paper 13, the pin wheel 12 being rotatable (by means not shown) to entrain the paper 13 over the platen 11. A top surface 2b of the upper case portion 2 is spaced below the adjacent end of the cover 3, when the latter is positioned as shown in Figure 1, there being defined therebetween an aperture 14 through which the recording paper 13 is moved into the case body 1, 2 for printing by the printing head 9, and out of the case body 1, 2 after printing. Two

5 guide members 15 and 16 are secured to the plates 5 to define
therebetween a passage 17 through which the recording paper
13 to be printed is fed into a clearance between the
printing head 9 and the platen 11. After printing has been
effected on the recording paper 13 by the printing head 9,
the printed paper portion is fed out of the case body 1, 2 by
the pin wheel 12 through the aperture 14.

10 A paper shelf 18, one end 19 of which is adapted partially
to block the aperture 14, is provided between the upper case
portion 2 and the cover 3, when the latter is in the position
shown in Figure 1, to separate the printed paper portion from
the unprinted portion. Thus the paper shelf 18 is disposed
above the top surface 2b of the upper case portion 2. The
paper shelf 18 is rotatably and removably supported at the
15 end 19 thereof in the vicinity of the aperture 14, the end
19 being spaced slightly apart from the top surface 2b and
the cover 3, when the latter is positioned as shown in Figure
1. The paper shelf 18 and the parts 2, 3 are relatively
movable between an inoperative position, shown in Figure
20 2, in which the major portion of the paper shelf 18 is
relatively widely spaced from the parts 2, 3 to facilitate
the introduction of the paper 13 into the housing through
the aperture 14 and its withdrawal therethrough with the
paper 13 passing to and from the aperture 14 on opposite
25 sides of the paper shelf 18, and an operative position, shown
in Figure 1, in which the paper shelf 18 is relatively narrowly

spaced from the parts 2, 3 so as to permit the said introduction and withdrawal of the paper 13 through the aperture 14 adjacent opposite sides respectively of the paper shelf 18 while reducing the transmission of printing noise from the interior of the housing to the exterior thereof through the aperture 14.

The end 19 of the paper shelf 18 has a substantially tubular portion 19a which is rotatably mounted on a shaft 20 which is spaced from the top surface 2b. The shaft 20 is substantially rectangular in cross section, but has a pair of opposite cross-sectional edges which are rounded to enable smooth rotation of the tubular portion 19a about the shaft 20. The tubular portion 19a has a slit 19b whose width is slightly larger than the width (i.e. the smaller cross-sectional dimension) of the shaft 20, so that the paper shelf 18 can be disconnected from the shaft 20 or reconnected thereto when it is in a substantially upright position. The end 19 of the paper shelf 18 is located inwardly of the adjacent end of the cover 3, and the cover 3 and the paper shelf 18 define therebetween only a very narrow clearance which is sufficiently wide for the paper 13 to pass therethrough.

The paper shelf 18 has a lower surface 18a facing the top surface 2b of the upper case portion 2. The top surface 2b of the upper case portion 2 has a pair of projections 21 facing the paper shelf 18 and extending transversely of the paper 13. The lower surface 18a of the paper shelf 18 has a similar projection 22 extending parallel to the projection

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21 on the case portion 2 and situated approximately midway between the projections 21, the paper 13 in operation passing across the projections 21, 22. The paper shelf 18 has a pair of lateral edges resting on shoulders 23 formed on the upper case portion 2, as shown in Figure 4. In the operative position, the projections 21, 22 overlap each other, the projections 21 on the case portion 2 being slightly spaced apart from the lower surface 18a of the paper shelf 18, while the projection 22 of the paper shelf 18 is likewise slightly spaced apart from the top surface 2b of the upper case portion 2. The projection 22 has a lower extremity which, in the operative position, lies at a level below the upper extremity of each of the projections 21, as shown in Figure 1.

The cover 3 is removable, and the paper shelf 18 is rotatable about its end 19, as shown in Figure 2, in order to enable the recording paper 13 to be set in position. Alternatively, the paper shelf 18 can be turned upright and disconnected from the shaft 20 when the paper 13 is set in position. The paper 13 is set in position so that it may extend through the aperture 14 between the upper case portion 2 and the paper shelf 18 and through the passage 17 between the guide members 15 and 16, about the platen 11 and the pin wheel 12, and through the aperture 14 between the cover 3 and the paper shelf 18, as shown in Figure 1. As the printing operation proceeds, the paper 13 is fed forward by the pin wheel 12.

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As is obvious from the foregoing description and the drawings, the paper shelf 18 and the projections 21 and 22 substantially close the aperture 14, except for the very narrow clearances provided on both sides of the enlarged end 19 of the paper shelf 18 for enabling the passage of the paper 13. The paper 13 is held in a somewhat curved shape between the projections 21 and 22 but is slidable past the projections 21, 22. Thus, the noise produced during the printing operation is virtually completely confined within the case body 1, 2 by the cooperation of the paper shelf 18, the projections 21 and 22 and the curved paper portion therebetween, and hardly any noise is transmitted externally. The friction which develops between the paper 13 and the projections 21 and 22 imparts an appropriate amount of tension to the paper 13 in the passage to prevent its vibration which has hitherto been another source of noise.

The invention has been described with reference to a preferred embodiment thereof. It is, therefore, to be understood that variations or modifications may be easily made by anybody of ordinary skill in the art without departing from the scope of this invention which is defined by the appended claims. For instance, it is possible to increase the number of the projections 21 and 22 as shown by way of example in Figure 5. Alternatively, it would sometimes be sufficient to provide each of the upper case portion 2 and

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the paper shelf 18 with only one projection. It would also be quite satisfactory if the weight of the paper shelf 18 causes the projection 22 to contact the upper case portion 2. This construction contributes to a further reduction in the amount of noise transmitted externally. Moreover, the paper shelf 18 does not necessarily need to be removable.

C L A I M S

1. A printer housing which is adapted to contain a printer and which has spaced apart parts which define an aperture through which material to be printed may be moved into and out of the housing, and an aperture blocking member at least one portion of which is adapted to partially block the aperture, the aperture blocking member and the spaced apart parts being relatively movable between an inoperative position, in which at least a portion of the aperture blocking member is relatively widely spaced from the spaced apart parts to facilitate the introduction of the said material into the housing through the said aperture and its withdrawal therethrough with the said material passing to and from the aperture on opposite sides of the aperture blocking member, and an operative position in which the aperture blocking member is relatively narrowly spaced from the spaced apart parts so as to permit the said introduction and withdrawal of the said material through the said aperture adjacent opposite sides respectively of the aperture blocking member while reducing the transmission of printing noise from the interior of the housing to the exterior thereof through said aperture.



2. A printer housing as claimed in claim 1 in which the blocking member and/or at least one of the said spaced apart parts is provided with at least one projection across which the material in operation passes.

5 3. A printer housing as claimed in claim 2 in which the blocking member and at least one of the said spaced apart parts are respectively provided with projections which overlap each other in the said operative position.

4. A printer housing as claimed in any preceding claim in which the housing comprises a case body having an opening therein and a cover for closing said opening, the cover and a part of said case body constituting the said spaced apart parts.

5. A printer housing as claimed in any preceding claim in which the aperture blocking member is rotatably mounted so as to be rotatable between said operative and inoperative positions.

6. A printer housing as claimed in any preceding claim in which said aperture blocking member is removable from the housing.

7. A printer housing as claimed in claim 6 in which said aperture blocking member is provided at said one end thereof with a tubular portion supported rotatably on a shaft, said tubular portion being removable from said shaft.



8. A printer housing as claimed in claim 7 in which the shaft is substantially rectangular, the tubular portion having a slit whose width is slightly greater than that of the shaft.

5 9. A printer housing as claimed in any preceding claim in which the housing comprises a cover which is removable from a case body.

10. A printer housing as claimed in any preceding claim in which a printer is mounted in said housing.

10 11. A printer housing as claimed in claim 10 in which the printer is provided with an impact printing head.

12. A printer housing as claimed in claim 10 or 11 in which the printer is provided with a platen and with guide means for guiding the material from the aperture to the platen.

15 13. A printer housing as claimed in claim 12 comprising a pin wheel having pins engageable in apertures in the said material, the pin wheel being rotatable to entrain the material over the platen.

20 14. A printer housing substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

