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54 **Print wheel mounting.**

57 An impact printer, of the type wherein a print wheel (1) is rotated to a print position by a motor (11), and printing is caused by impacting a particular character (47) on the print wheel by a print hammer (41), has the print wheel drive means (25) and the print hammer mechanism located on opposite faces of the print wheel, which greatly facilitates insertion of print wheels in the printer, and removal therefrom.

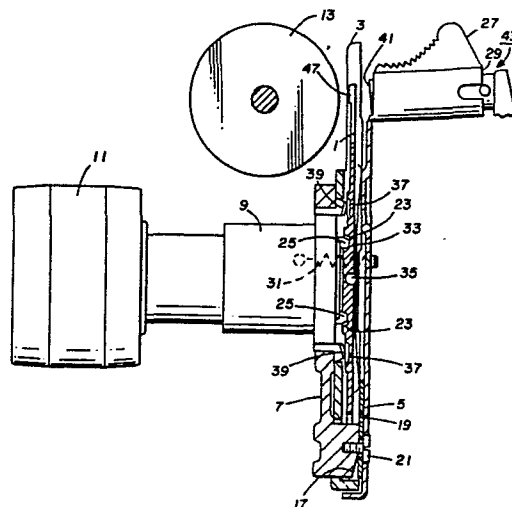


FIG. 2

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PRINT WHEEL MOUNTING

On current impact printers utilizing a rotatable print wheel, such as the Xerox 800, a motor, hammer mechanism and ribbon cartridge are all supported on a frame, which frame is pivotally mounted on a moving carriage. The frame must be pivoted from a print position in order to replace the print wheel. Further, due to interfering structure, the ribbon cartridge must be removed to allow pivoting of the frame. It is desirable to replace the print wheel in the printer using as simple a mechanism as possible.

The invention as claimed is intended to provide such a simplified mechanism. It solves the problem of how to provide a print wheel that can be easily inserted into a printer and further allow the use of stiffer, more durable print wheels that need not be contained in a print wheel cartridge.

The advantages offered by the invention are that not only is the print wheel easy to load, but the mechanism for receiving the print wheel cartridge also automatically aligns the print wheel in the print wheel drive position. These benefits arise mainly from the drive motor for the print wheel being located on the face of the print wheel, opposite the face of the print wheel on which the print hammer mechanism operates.

One way of carrying out the invention is described in detail below with reference to the drawing, which illustrates only one specific embodiment, in which:

Figure 1 is a plan view of a print wheel, print wheel cartridge and cartridge gate in accordance with this invention showing the print wheel drive face of the print wheel.

Figure 2 is a partial side view of a motor, drive shaft, print wheel drive element and connection thereof to a cartridge gate, the cartridge gate, print wheel and print wheel cartridge being shown in partial section as indicated by lines 2-2 in Figure 1.

Figure 3 is similar to Figure 2 but showing the print wheel, print wheel cartridge and gate in the print wheel removal and insertion positions.

Figure 4 is a plan view of the cartridge gate in accordance with this invention, which shows the spring plate bias member for the gate.

Figure 5 shows a gate that can be used to accommodate a print wheel not contained in a cartridge with the location of the print wheel indicated by the broken line circle.

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Figure 6 shows a side view of the gate of Figure 5 with the print wheel located in the gate in the print wheel drive position.

In each of the various Figures, the same parts are given the same reference numerals for ease in understanding.

Referring now to Figures 1-4, there is seen a print wheel generally designated as 1 having print or type characters 47 thereon. Print wheel 1 is contained in print wheel cartridge generally designated 3. The print wheel 1 and print wheel cartridge 3 are a self-contained unit, which unit can be readily removed from and inserted into a print wheel gate generally designated 5. Print wheel gate 5 is pivotally mounted on print wheel drive motor flange generally designated as 7. Flange 7 is a part of drive shaft housing 9, which, in turn, is a part of print wheel drive motor 11. Print wheel drive motor 11 is mounted to a frame (not shown), which frame is mounted for axial movement relative to printer platen 13. A typical frame mounting is shown in U.S. Patent 4,124,312, issued November 7, 1978, to the assignee of this invention. The frame 12 is mounted on rails 10 for movement axial to platen 108 as shown in that patent.

Print wheel gate 5 can be mounted for pivoting on flange 7 by means, for example, of flexible rubber-type bushings. Here, however, a spring steel plate 15 is attached to the inside of print wheel gate 5. Flange 7 has a beveled edge 17, which allows spring plate 15 to flex as shown in Figure 3. Eyes 19 of spring plate 15 are held firmly against fixed alignment means by screws 21. Gate 5 is allowed to pivot by the flexing of spring plate 15. As gate 5 moves from the print wheel removal position of Figure 3 to the print wheel drive position of Figure 2, print wheel drive teeth 23 mesh with print wheel drive shaft teeth 25 mounted on the drive shaft (not shown) of motor 11. A grooved handle 27 is mounted on the hammer guide 29, which, in turn, is mounted on print wheel gate 5 for ease in pulling gate 5 away from the print wheel drive shaft teeth 25. Spring 31 clamps the print wheel cartridge 3 between the flange 7 and the gate 5. Spring mounting means 45 are provided on the print wheel gate 5 and on flange 7. Print wheel spring plate 33 pressing against ball 35 provides the pivot point around which print wheel 1 freely rotates.

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When it is desired to print a character, print wheel drive shaft teeth 25 are pulled out of contact with print wheel teeth 23. Spring 33 acting against ball 35 urges print wheel registration teeth 37 into contact with fixed fine-alignment teeth 39. Hammer 41 is then driven by a hammer mechanism, shown generally as 43, into contact with a type ribbon and paper (not shown) placed between print wheel 1 and platen 13.

It can be seen that, when print wheel gate 5 is in the print wheel removal position shown in Figure 3, the print wheel cartridge 3 can be pulled straight out without concern for contacting any interfering structure. The advantages of this invention occur as a result of positioning print wheel drive motor 11 and drive shaft and drive shaft housing 9 on the side of print wheel 1, opposite the hammer mechanism 43. It is accordingly not necessary to pivot or move the print wheel drive apparatus with the print wheel to effect removal and insertion of a print wheel.

Referring now to Figures 5 and 6, it can be seen that, because of the axial displacement of the print wheel 1 towards platen 13 when engaging the fine-alignment teeth 39, the print wheel 1 can be positioned closer to platen 13, allowing shorter, stiffer, hence more durable print wheels to be used. It is thus possible to provide print wheels that need not be protected by print wheel cartridges. The gate 5 shown in Figures 5 and 6 provides the functions of the gate 5 shown in Figures 3 and 4 and of the print wheel cartridge 3. Gate 5 in Figures 5 and 6 has two guides 36 that support the print wheel 1, shown as the broken circle 1 in Figure 5, when the print wheel 1 is dropped into the gate 5, while gate 5 is open in the position shown in Figure 5. As the gate is closed, spring 33 on gate 5 urges, through pivot ball 35, print wheel teeth 23 into contact with drive shaft teeth 25. Print wheel 1 is thereby centered so that it can rotate freely within the gate 5 as shown in Figure 6. Slot 34 allows movement of spring 33 when drive shaft teeth 25 (not shown) are pushed against print wheel drive teeth 23 to drive print wheel 1 to a typing position. Also ribbon guide members 50 are provided on the gate 5. Gate 5 is mounted for pivoting on spring steel plate 15 as described in connection with Figures 1-4.

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Claims:

1. An impact printer wherein a print wheel (1) is rotated to a print position by a print wheel drive means (25), and printing is caused by a character (47) on the print wheel (1) being impacted by a print hammer (41) characterised in that the print wheel drive means (25) and the print hammer mechanism (41) are positioned on opposing faces of said print wheel (1).
2. The impact printer of claim 1 characterised in that said print wheel (1) is contained in a print wheel cartridge (3).
3. The impact printer of claim 1 or 2, characterised by a pivotally-mounted gate (5) for receipt of said print wheel (1) or cartridge (3) therein and for urging said print wheel (1) into contact with said print wheel drive means (25).
4. The impact printer of claim 3, characterised in that said hammer mechanism (41) is mounted on said gate (5).
5. The impact printer of claim 4, characterised by the hammer mechanism (41) having a projection (27) by which leverage can be applied to tilt the gate (5) away from the position in which the print wheel (1) engages the drive means therefor (25).

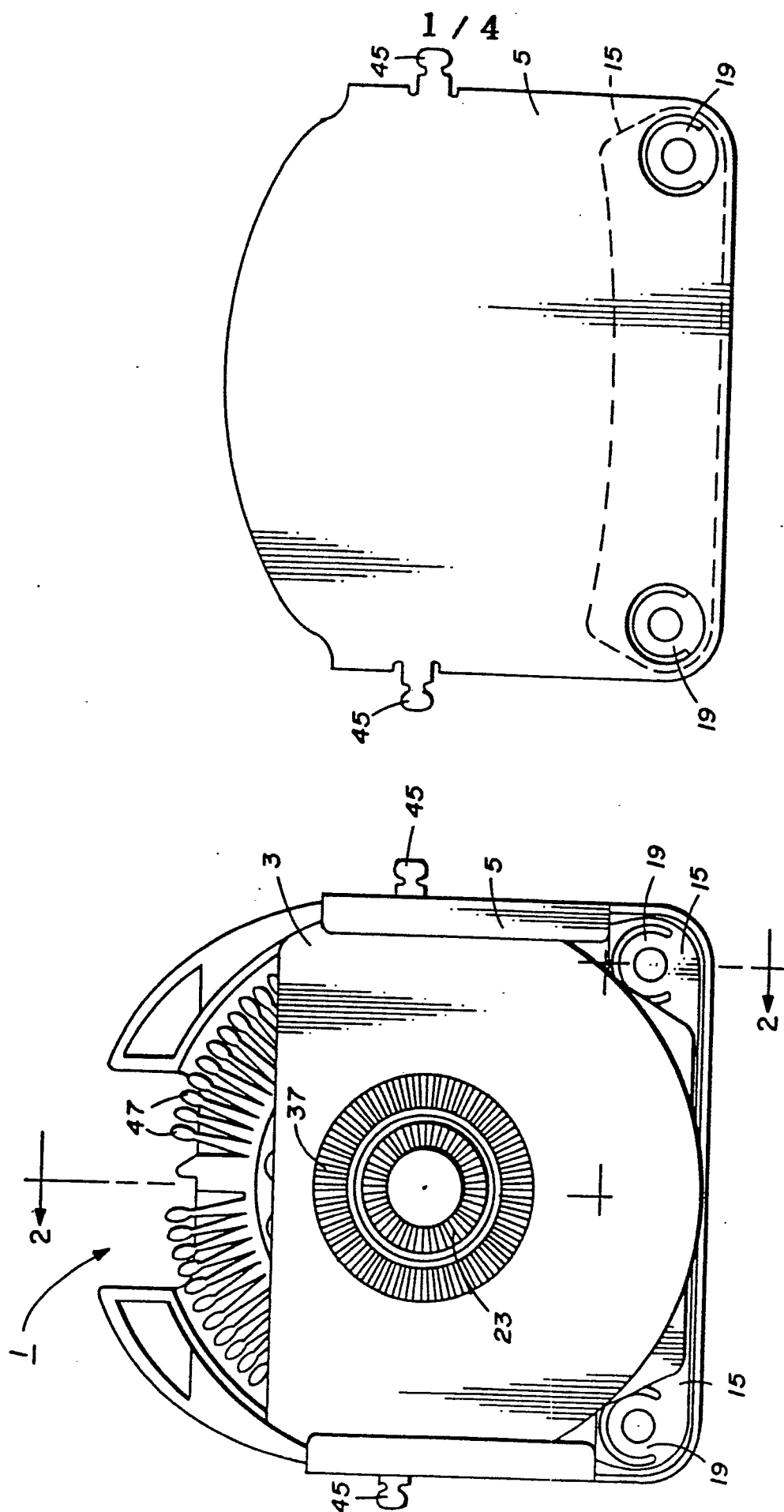


FIG. 4

FIG. 1

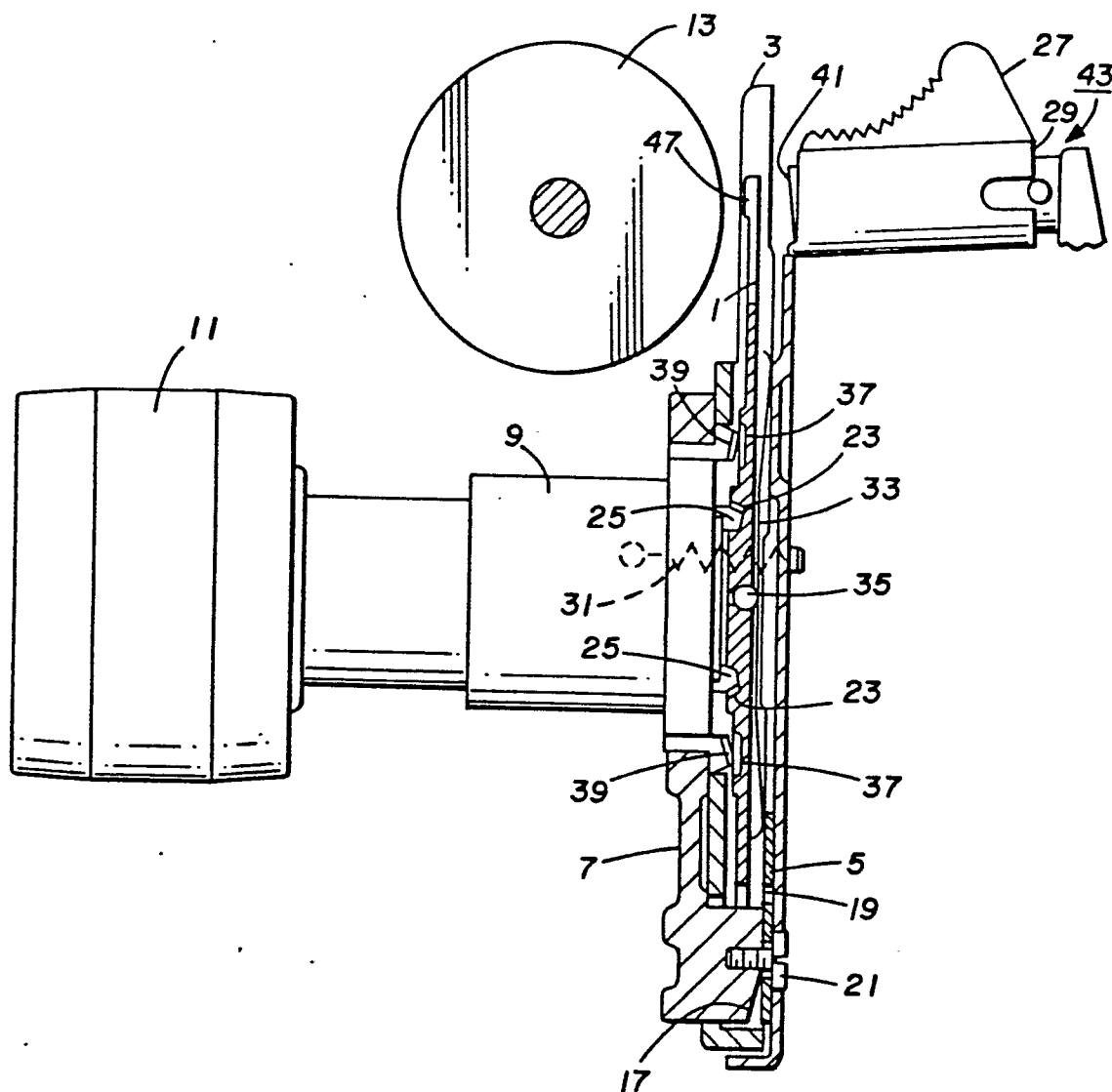


FIG. 2

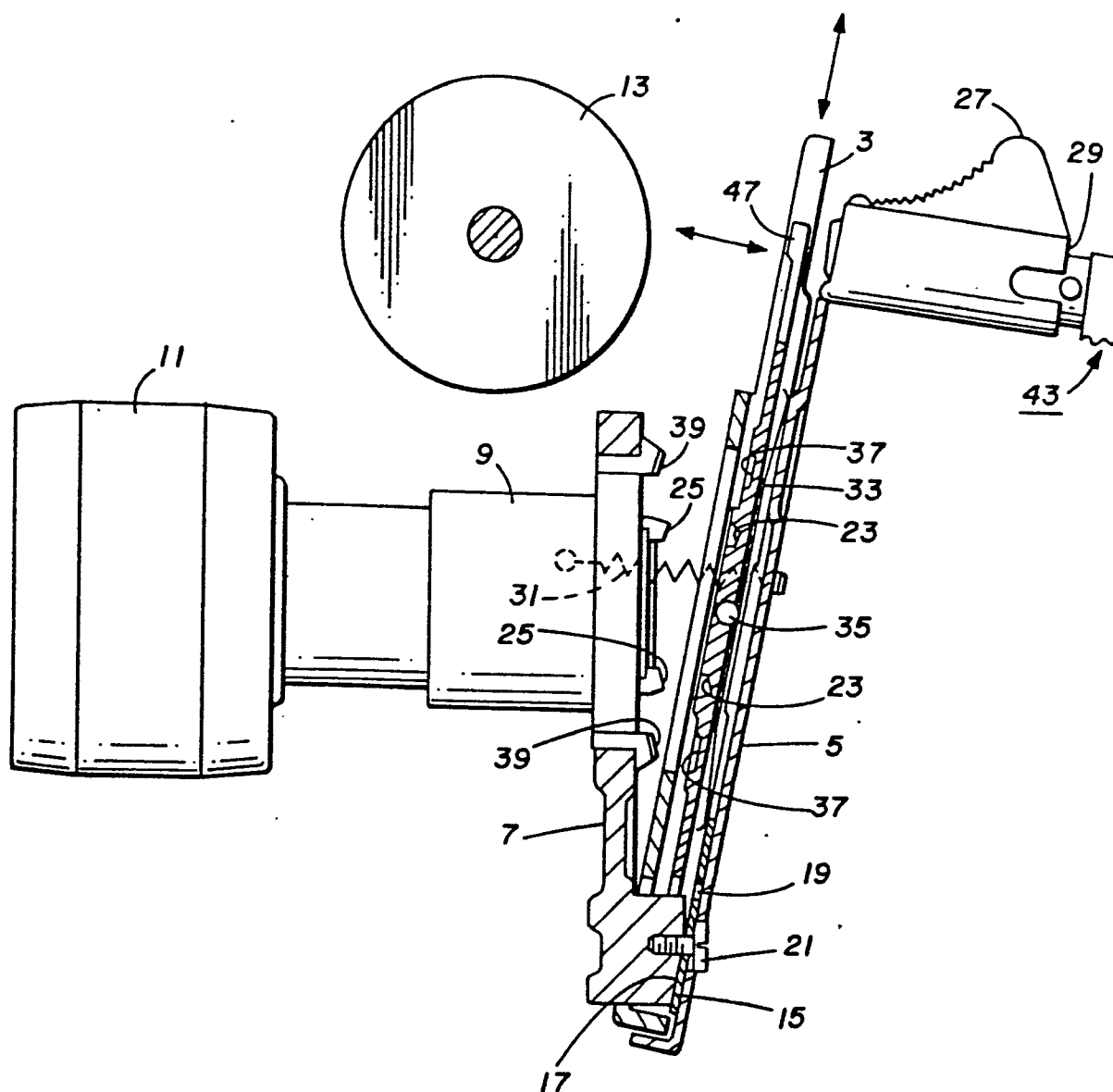


FIG. 3

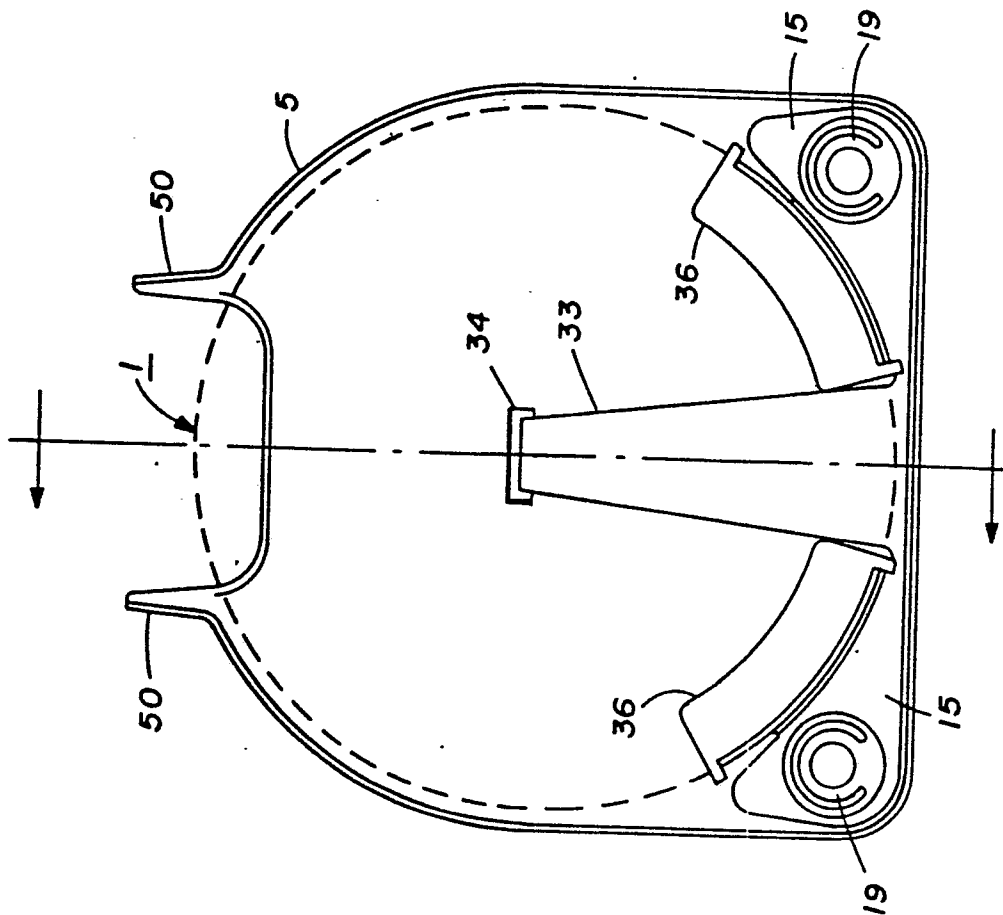


FIG. 5

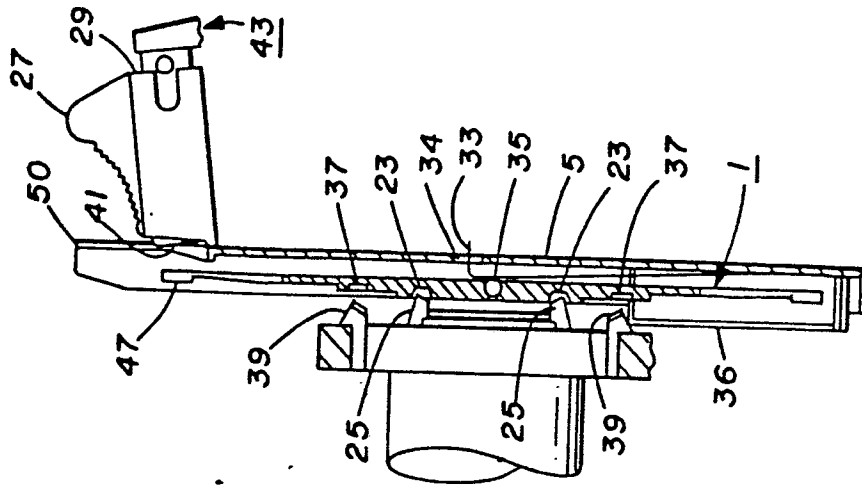


FIG. 6

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