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(54) Method and apparaus for forming words of printed characters.

(57) A method and apparatus are disclosed for use in forming words on tape, useful e.g. as labels, from sheets bearing printed, transferable characters, e.g. a set of printed alphabets.

A tape dispenser (32) containing a roll of a transparent adhesive tape (34) includes a frame (40) defining a rectangular window (42) which can be positioned horizontally and vertically at any place over the character sheet (20). When it is desired to transfer a selected letter to the tape, the user presses the selected area of the tape against the letter. Because of the tacky adhesive on the tape, when pressure is removed, the selected letter is lifted from the indicia sheet and transferred to the tape. The process is repeated as often as necessary to form the desired word. The strip of tape on which the word has been formed is then severed from the roll and adhered to any desired receiving surface by means of the tacky adhesive on the tape.

Accurate base-line adjustment of the characters forming the word is provided by means of an indexing mechanism which enables the tape dispenser (32) to move vertically within a slide (18) to fixed positions exactly correlating to the rows of printed characters on the sheet (20).

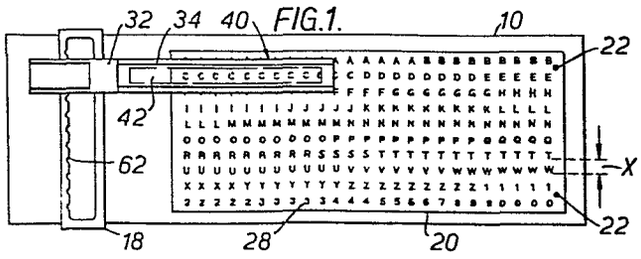

FIG.1.

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Method and apparatus for forming words of printed characters

This invention relates to a method and apparatus for forming words of printed characters on strips of tape.

The invention of the dry transfer lettering sheet in the late 1950's provided an inexpensive way to obtain high quality printing for virtually any purpose. Typically, a dry transfer sheet comprises a light-transmitting carrier sheet on which a font of letters is printed (e.g. by screen printing). The carrier sheet has high release qualities and the printed surface is coated with a low-tack adhesive. When it is desired to use the sheet, the adhesive surface is placed on a receiving surface and its position adjusted until a selected letter overlies a desired area of the receiving surface. The back of the sheet at the selected letter is then burnished with a stylus or the like. The burnishing action functions to release the letter from the carrier sheet and simultaneously activate the low-tack adhesive, causing the letter to adhere to the receiving surface. The letter is printed in reverse on the carrier sheet and, therefore, is viewed directly on the receiving surface. (See Mackenzie U.S. Patent Specifications Nos. 3,131,106 and 3,212,913).

Formal training is not required to achieve excellent results using dry transfer lettering sheets.

However, some degree of judgement is necessary to ensure proper spacing and base-line alignment of the letters.

In an effort to minimise even this relatively modest level of skill, Kroy Industries, Inc. has introduced a lettering machine which enables the user to form a word on the non-adhesive surface of a transparent adhesive tape which can then be adhered in its entirety to a receiving surface, for example, an advertising layout, blueprint, or the like. (A machine of this general type is shown in U.S. Patent Specification No. 3,834,507.) The baseline alignment and spacing between letters is controlled automatically.

The Kroy machine is relatively expensive and somewhat cumbersome (about the size of a small typewriter) but is very easy to use, requiring virtually no skill. However, although automatic base-line alignment is desirable, better results are generally obtained if the user has some control over letter spacing. Moreover, the machine provides only a relatively limited number of typefaces and type sizes, and the definition of the typed letters is inferior to that of dry transfer lettering. In addition, because the Kroy machine involves a carbon paper type transfer which appears on the exposed (upper) surface of the tape, the images tend to smudge when the tapes are handled.

French Patent Specification No.1,214,051 discloses a transfer system including a transparent or translucent adhesive coated receptor sheet which can be used to pick letters sequentially from a release-surfaced sheet on which those letters are printed. The system there described, however, is cumbersome and has never been commercialised. No apparatus for use with such a system is disclosed in Specification No. 1,214,051. British Patent Specification No. 906,935 discloses such apparatus, but it is cumbersome to use and has never been commercially available.

The problem underlying the invention is to provide a device for use in forming words or other legends on tape which is inexpensive and easy to operate, and wherein the definition of the individual letters is comparable to that of a printed image. A further object of the invention is to provide a device which overcomes or at least lessens the above-mentioned drawbacks of the Kroy machine and the apparatus of Specification No. 906,935 and which is no more difficult or time-consuming to operate, and which can be used easily and quickly to form transferred legends on labels which can then be applied where desired.

In accordance with the invention, a novel tape dispensing device is used in conjunction with a character sheet containing letters or other characters printed on a carrier sheet having high release characteristics. The dispenser contains a roll of a pellucid adhesive tape (e.g. "Scotch" brand tape) which can be dispensed e.g. through an opening in the dispenser, and brought to lie on a frame extending from the dispenser adjacent the opening. The frame includes an elongated window, the width of which is less than the width of the tape. In use, a strip of tape is pulled from the dispenser and adhered to the frame overlying the window. The user then places a selected area of the strip of tape overlying the window above a selected character on the carrier sheet and applies pressure to the back of the tape. This forces the tacky (adhesive) surface of the tape into contact with the selected character only so that when pressure is removed, return of the tape to its original position lifts the selected character from the carrier sheet, thus causing the printed character to be transferred from the character sheet to a selected area of the tape. The procedure is repeated until the desired word is formed on the strip of tape within the window. The piece of tape

bearing the word can then be severed from the roll to form a label which can then be adhered to a receiving surface with the transparent tape overlying the word as a protective film.

Typically, the method of the invention is used to form the labels with words, the letters being sequentially transferred from sheets of printed letters. However, the process is not limited to lettering, and as used herein, the term "character" is intended to include any type of indicia such as letters, numerals or symbols. The term "word" as used herein thus means any assemblage of characters.

In accordance with a further feature of the invention, the tape dispenser may be part of an apparatus which provides base-line alignment of the transferred letters. In this respect, a base is provided on which the character sheet is secured. A slide is mounted on the base for horizontal movement relative to the sheet and the tape dispenser is mounted on the slide so that the tape dispenser can move vertically. Hence, any portion of the tape overlying the window can be positioned over any selected letter to effect transfer of that letter. The letters are printed on the indicia sheet in rows with a preselected distance between adjacent rows, and the tape dispenser and slide include cooperating indexing means so that the window is indexed to the same base-line position relative to each of the rows.

The invention is illustrated in more detail and by way of example with reference to the accompanying drawings, in which

Figure 1 is a plan view of apparatus embodying the invention;

Figure 2 is a front view showing the apparatus of Figure 1;

Figure 2A is a magnified cross-sectional view of

the character sheet and adhesive tape which can be used with the invention;

Figure 3 is an exploded perspective view of the tape dispenser device and movable slide;

Figure 4 is a top view of the slide showing the indexing mechanism;

Figure 5 is a sectional view along the line 5-5 of Figure 3; and

Figure 6 shows how application of pressure flexes the frame defining the window.

Figures 1 to 6 show features of apparatus constituting a preferred embodiment of the invention. The apparatus includes a rectangular base 10 having parallel elongated tracks 14 in its two long sides. A slide 18 formed as shown in Figure 3 bridges the base 10 and slides horizontally (for example) within tracks 14. A character sheet 20 is accurately aligned on the top surface of base 10 by means of alignment pins 22 which pass through precisely located alignment holes (not numbered) within the sheet 20.

The character sheet 20 in the illustrated embodiment includes rows of letters of a selected size and typeface. Structurally, as shown in Figure 2A, the character sheet 20 comprises a carrier sheet 26 (not necessarily light-transmitting) having at least one surface of high release properties on which letters 28 are printed. The opposite (rear) surface of the carrier sheet 26 may be coated with an adhesive 30 so that the sheet will adhere tightly to the upper surface of the base 10 for reasons which will become apparent. Conversely, the base may be coated with an adhesive, or mechanical means may be used to hold the character sheet against the base 10 so that the individual letters may be pulled from character sheet 20 as explained below.

Any of many different known materials may be used

in conventional fashion to make the character sheet 20. As one example, the carrier sheet 26 may be polyethylene, the characters 28 may be screen printed using a nitrocellulose based ink, and the adhesive 30 may be an acrylic adhesive coated (e.g. by screen printing an area of adhesive) on the back of the polyethylene carrier.

A tape dispenser 32 contains a roll of pellucid, adhesive tape 34. Tape 34 preferably comprises a transparent plastic backing 35 coated with an agressively tacky adhesive 37 (Figure 2A). Numerous types of commercially available transparent or translucent adhesive tape may be used as tape 34.

The roll of tape 34 is rotatably mounted within dispenser 32 in conventional fashion. The tape (viewed in Figure 2) rotates in a clockwise direction so that the tape may be pulled through an opening 36 at the base of dispenser 32. In accordance with the invention, an elongated rectangular frame 40 extends from the dispenser 32 adjacent the opening 36. The frame 40 includes a similarly shaped window 42, the short dimension of which is less than the width of the tape 34 so that the edges of the tape can be adhered to the upper surface of the frame defining the window 42. A cutting edge 46 is provided at the end of frame 40 opposite opening 36 to sever strips of tape from the roll 34.

As shown in Figure 5, the frame 40 is channel-shaped in cross section with two short downwardly depending rims 50 supporting the surface which defines window 42 slightly above the printed character sheet 20. The distance between the rims 50 is such that the frame straddles a row of letters on character sheet 20 when the frame 40 is aligned for transfer.

The slide 18 includes a central generally rectangular opening 60 having a series of detents 62 along one edge. These detents are spaced apart a distance equal

to the distance X (Figure 1), which is the distance between the base-lines of adjacent rows of printed letters on the character sheet 20.

The tape dispenser 32 and the attached frame 40 are mounted on a dispenser carriage which comprises an upper generally U-shaped bracket 64 and a stepped block 66 secured together by screws 68. The stepped block 66 includes an upper portion 70 and a lower portion 72 so that when the bracket 64 and block 66 are secured together, the upper portion 70 slides within the opening 60, with the lower portion 72 and the carriage 64 preventing removal of the carriage from the opening.

An indexing mechanism includes two steel balls 76 and coil springs 78 in channels (not numbered) within the upper portion 70 of block 66. The balls 76 can be biased by springs 78 into pairs of detents 62 to enable the user to position the carriage (and thus the tape dispenser mechanism) in exact alignment with any of the printed rows of letters on the indicia sheet 20. Figure 4 illustrates the manner in which the steel balls 76 nest within detents 62 to index carriage 64 so that the window 42 will be positioned in the same relative position with the letters of each row. This provides automatic base-line alignment of the letters transferred to the tape.

As shown in Figure 3, the bracket 64 is shaped to form a channel that can receive a complementary T-shaped mounting block 80 secured to the bottom of the tape dispenser 32.

The apparatus is used by pulling a length of the tape from dispenser 32 across the frame 40 and applying light pressure to the tape causing it to adhere to the top surface of frame 40 with a substantial part of the tape overlying the window 42. The tape dispenser is then moved vertically and horizontally until a selected letter appears in the window at the desired location.

Pressure is then applied to the rear surface of the tape strip 34 directly above the selected letter. This may be done as shown in Figure 6 by means of a blunt instrument 90 having a rubber tip 92 which will cause only the area of the tape strip adjacent the selected letter to contact only the selected letter.

A beneficial feature of the invention resides in the flexibility of the frame 40. Thus, as shown in Figure 6, when pressure is applied to the rear surface of the tape strip within the window 42, the upper edges of the frame 40 tend to flex downwardly, enabling the tape to contact the selected letter 28. When pressure is released, the elasticity of the frame causes the tape to lift off of the surface of the indicia sheet 20. Because the tape includes relatively tacky adhesive and since the carrier sheet 26 has high release properties, the effect is to transfer the letter or other character 28 from the carrier sheet 26 to the adhesive tape 34.

In the same fashion the entire word is composed by transferring successive letters, with the tape dispenser being moved appropriately to select and transfer the desired letters with proper spacing therebetween. Because of the detent mechanism, the base-lines of the letters will be automatically aligned; however, the user can adjust the spacing between adjacent letters by moving the slide 18.

After the desired word has been formed on the tape, the tape is lifted from the frame 40 and pulled from the dispenser. The tape strip bearing the formed word can then be severed from the tape roll by means of the knife edge 46 leaving a second blank strip of tape in position over the window 42. The severed tape strip containing the desired word may then be adhered to any desired receiving surface using the tacky adhesive. Since the letters are on the same side of the tape as

the adhesive, the clear backing serves as a protective film after the tape has been adhered to a receiving surface.

It is contemplated that character sheets containing characters of different sizes will be used. For large differences in size, it may be desirable to have interchangeable dispensers (and frames) of different widths.

CLAIMS

1. A device for use in forming preselected words from sheets (20) bearing printed, transferable characters (28), comprising a tape dispenser (32) having a roll of pellucid tape (34) rotatably supported therein, and characterised by an elongated frame (40) extending from the tape dispenser and including an elongate window (42) the width of which is less than the width of the tape, whereby the tape can be supported on top of the frame (40) overlying the window (42) so that a selected area of the tape can be pushed into contact with a selected one of the characters (28) through the window (42).

2. Apparatus according to claim 1, wherein the tape (34) bears a tacky adhesive (37) on the surface contacting the frame (40).

3. Apparatus according to claim 2, wherein the frame (40) includes a cutting edge (46) at its end remote from the dispenser (32).

4. Apparatus according to any one of claims 1 to 3, wherein the frame (40) is flexible and U-shaped in cross section, whereby application of pressure to the tape (34) flexes the edges of the frame (40).

5. Apparatus for use in assembling preselected words from sheets (20) bearing printed, transferable characters (28), comprising

a base (10) having means for supporting at least one such sheet (20) with the characters (28) facing up,

a slide (18) mounted on the base (10) for movement in a first direction relative to the sheet (20), and

tape dispenser means (32) mounted on the slide

(18) for movement in a second direction transverse to the first direction, the tape dispenser means (32) having a roll of adhesive pellucid tape (34) rotatably supported therein, and an elongated frame (40) extending from the tape dispenser (32), the frame (40) including an elongated window (42) the width of which is less than the width of the tape (34), whereby the tape (34) can be supported on top of the frame (40) overlying the window (42) so that a selected area of the tape can be pushed into contact with a selected one of the characters (28) on the sheet (20) supported on the base (10) through the window (42).

6. Apparatus according to claim 5, wherein the frame (40) includes a cutting edge (46) at its end remote from the dispenser means (32).

7. Apparatus according to claim 5 or 6, wherein the characters (28) are printed on the sheets (20) in rows equally spaced apart, and wherein the slide (18) and tape dispenser means (32) include indexing means (62) for fixing the position of the window (42) relative to each of the rows.

8. Apparatus according to any one of claims 5 to 7, wherein the frame (40) is flexible and U-shaped in cross section, whereby application of pressure to the tape (34) flexes the edges of the frame (40).

9. A method of assembling a word from a sheet containing characters printed on a release surface comprising

placing the tacky surface of a strip of a pellucid adhesive tape over a window and causing the tape to adhere to the window frame,

placing the window and tape over the sheet so that a selected character on the sheet appears beneath a

selected area of the tape spaced just above it by the thickness of the frame,

applying pressure to the rear surface of the selected area to cause the tacky surface of the tape in the selected area only to contact the selected character,

releasing the tape to cause the tape with the selected image to spring back from the carrier sheet thereby transferring the selected character from the carrier sheet to the tape, and

repeating the aforesaid steps until a word has been formed on the tacky surface of the tape.

10. A method according to claim 9, wherein the strip of tape containing the formed word is adhered to a receiving surface by the tacky surface.

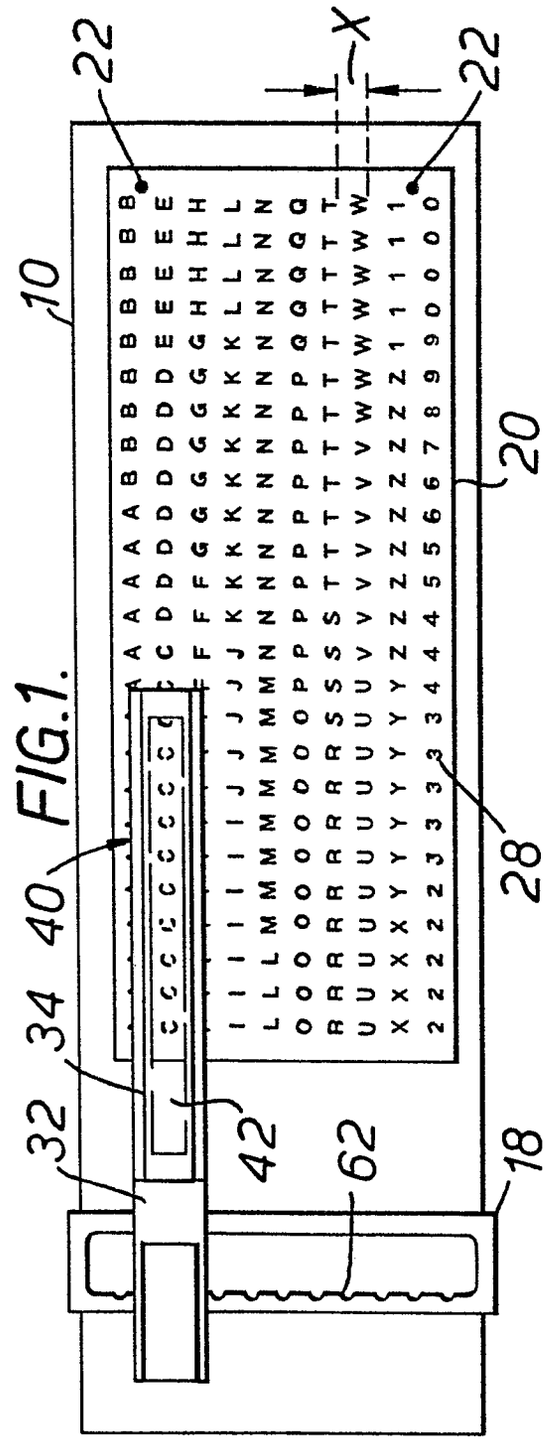

FIG.1.

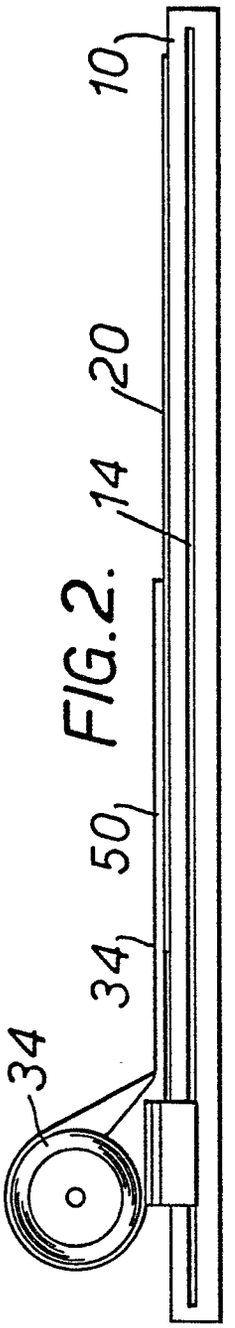

FIG.2.

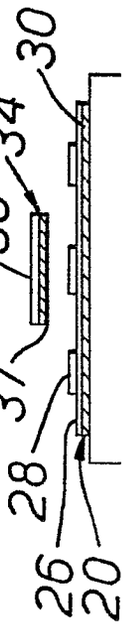

FIG.2A.

FIG. 3.

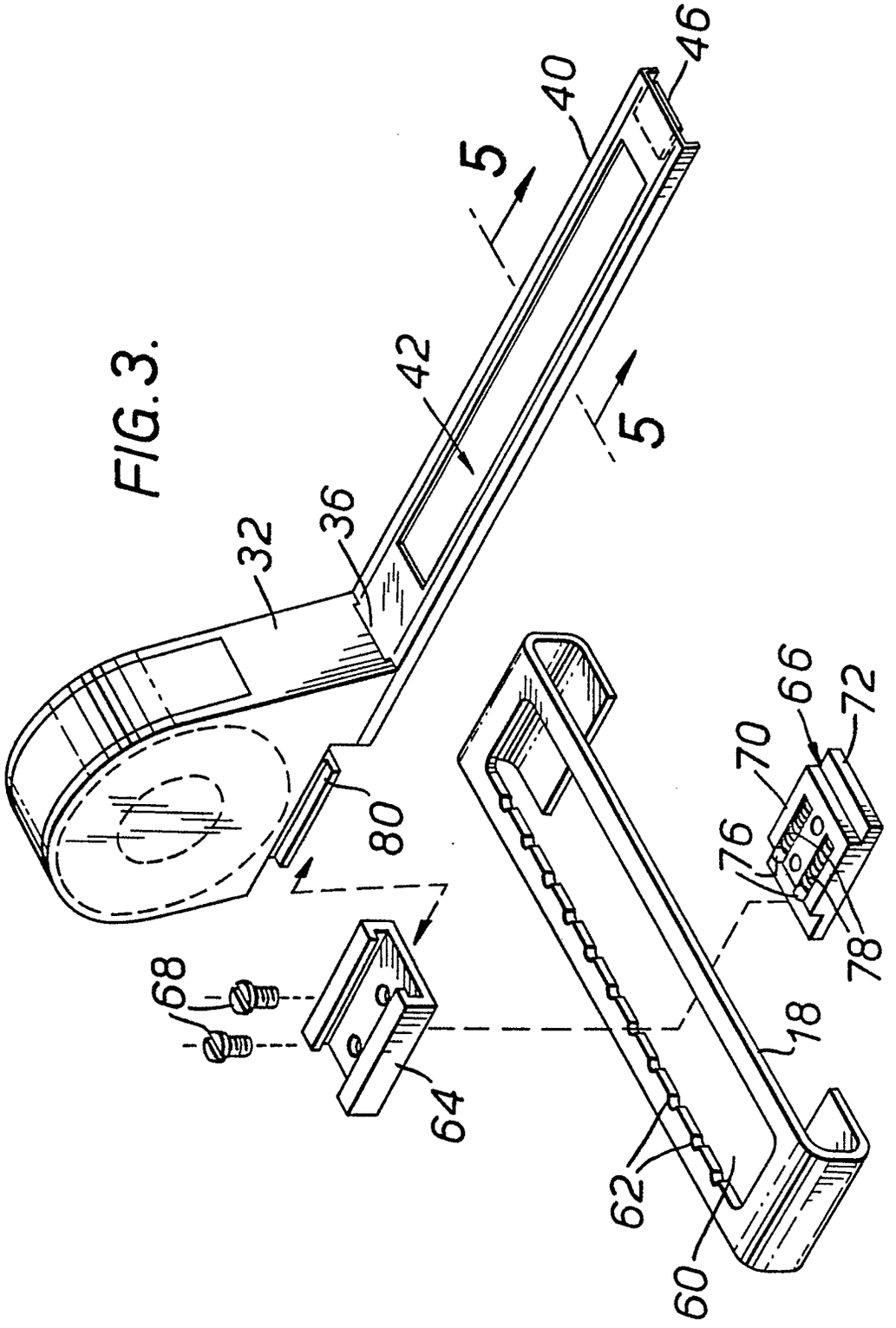

FIG. 4.

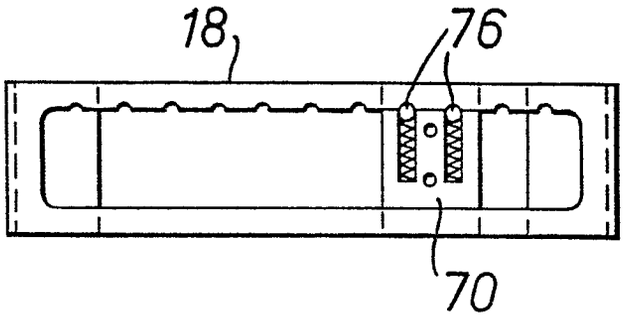

FIG. 5.

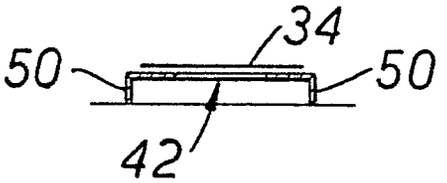

FIG. 6.