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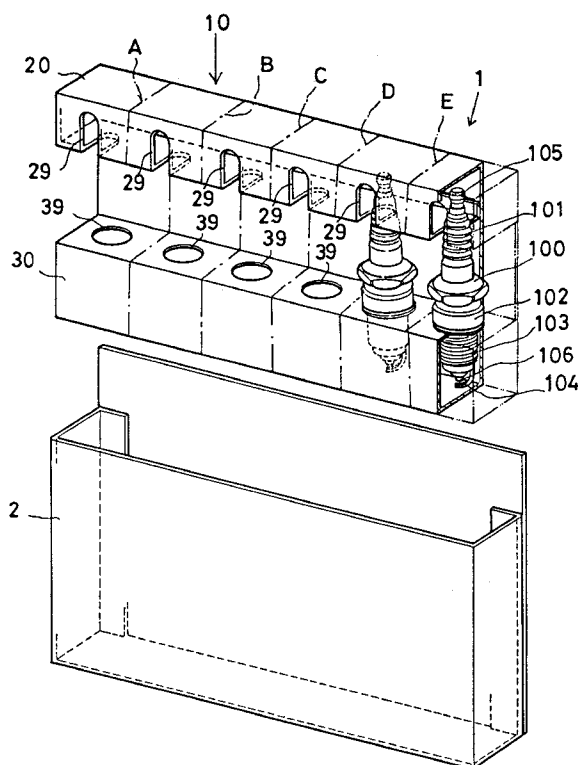
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(54) A package box for a spark plug

(57) In a package box (1) for a spark plug (100), a paper tray (10) includes an array of compartment portions provided to accommodate a lower portion of a spark plug to protect a spark gap against dimensional

alteration, and an array of retainer portions provided to retain an upper portion of the spark plug in position, a casing package (2) is provided to accommodate the paper tray.

Fig. 1



Description

This invention relates to a package box in which a plurality of spark plugs are accommodated.

By way of illustration, as shown in Figure 6 of the accompanying drawings, upon packing or crating a plurality of spark plugs to prepare a delivery, a spacer ring (protector cap) 110 has been used to cover an outer electrode 104 of each spark plug 100 so as to protect a spark gap against dimensional alteration. Then, the spark plugs are individually encased in corresponding caskets 200 which are packed all together by a carton 300.

Otherwise, a plurality of spark plugs are placed on a plastic tray which is preformed to correspond to each of the spark plugs. Then, the spark plugs and the plastic tray are packed all together by a package case.

However, in the former package in which the spark plugs are packed twice by the casket 200 and the carton 300, it takes time in packing or crating the spark plug. Upon opening the package to take out the spark plug, it is troublesome because each of the individual caskets 200 must be repeatedly unpacked after opening the carton 300.

In the latter package in which the plastic tray is used, once the plastic tray is withdrawn from the package case, to take out the specified ones, the rest of the spark plugs are likely to be isolated. It is troublesome to manage the spark plugs thus isolated.

Therefore, it is one of the objects of the invention to provide a package box with sufficient strength which is capable of readily packing or crating a plurality of spark plugs while protecting their spark gap against dimensional alteration and easily taking out the spark plug upon unpacking while easily managing the spark plugs left in the package box.

According to the present invention, there is provided a package box for a spark plug comprising: a paper tray including an array of compartment portions provided to accommodate a lower portion of a spark plug to protect a spark gap, and an array of retainer portions provided to place an upper portion of the spark plug in position; and a casing package provided to accommodate the paper tray.

According to another aspect of the present invention, each of compartments portions has an accommodation hole to admit a thread portion of the spark plug to accommodate the thread portion and an outer electrode, and each of the retainer portions includes a compartment portion having a retainer hole to admit an insulator of the spark plug so that the tray accommodates the spark plug with its insulator portion exposed between the array of the compartment portions and the array of the retainer portions.

According to other aspect of the present invention, a streak of perforation is provided on the tray so as to be separable between the neighboring spark plugs.

According to still other aspect of the present inven-

tion, the casing package is made of a transparent material directly encircling around the tray.

According to still another aspect of the present invention, a mount board having a hanging hole is provided on an underside of the tray.

Due to the fact that a plurality of spark plugs already accommodated by the tray is further enclosed by the casing package upon packing or crating the spark plugs, it is possible to eliminate the necessity of encasing the individually packed spark plugs so as to substantially facilitate the packing operation since the pluralistic spark plugs are all together accommodated by the tray.

Upon using the spark plugs, the spark plugs appears with the tray only by opening the casing package. This makes it possible to readily take out any of the spark plugs with ease.

With the compartment portions provided to accommodate the lower portion of the individual spark plugs, it is possible to effectively protect their spark gap against accidental damage while handling them roughly.

With the thread portion and the outer electrode accommodated by the compartment portion, while the insulator accommodated by the retainer portion in a manner that the insulator is at least partly exposed outside between the compartment portion and the retainer portion, it is possible to visually confirm the presence or absence of all the spark plugs at the corresponding locations, and thus avoiding of disarranging the spark plugs so as to readily manage them after opening the casing package.

With the perforation provided on the tray, it is possible to individually handle the spark plugs by separating the tray along the perforation. Even after the tray is separated, the spark plug is protected against inadvertent damage because the compartment and retainer portions accommodate the lower and upper ends of the spark plug respectively.

With the casing package made of the transparent material, it is possible to visually confirm the insulator outside of the casing package so as to distinguish a type of the spark plug.

With the mount board provided on the back of the tray, it is possible to conveniently hang the tray on a wall by way of the hanging hole once the casing package is opened.

The invention will be further described by way of example, with reference to the accompanying drawings, in which:-

Figure 1 is an exploded perspective view of a package box for a spark plug according to a first embodiment of the invention;

Figure 2 is a development view of the package box for the spark plug;

Figures 3a and 3b are partial perspective views of the tray shown to explain how the spark plug is ac-

commodated and taken out;

Figure 4 is a perspective view of a package box for a spark plug according to a second embodiment of the invention;

Figure 5 is a perspective view of a package box for a spark plug according to a third embodiment of the invention; and

Figure 6 is a perspective view of a prior art package box for a spark plug.

Referring to Figure 1 which a package box 1 for a plural (e.g. six) of spark plugs 100 according to a first embodiment of the invention. The package box 1 includes a paper tray 10 and a casing package 2 which accommodate the tray 10.

The tray 10 is made of a sheet of thin corrugated cardboard or a pasteboard to have an upper cellular box 20 and a lower cellular box 30 which in turn serves as a retainer portion and a compartment portion. Before making the tray 10, a development is depicted on a cutting board 10A as shown in Figure 2.

The cutting board 10A has a main divisional area 11 including a vertical dimension greater than a lengthwise dimension of the spark plug 100, while at the same time, including a lateral dimension greater than a total width of the six spark plugs combined. An upper part of the main divisional area 11 has sections 21, 22 and 23 for making the upper cellular box 20, while a lower part of the main divisional area 11 has sections 31, 32 and 33 for making the lower cellular box 30. Each of the sections 23, 33 has a margin to paste up as designated by numerals 24, 34.

With right and left ends of the section 21, there is provided a reinforce section for strengthen the cellular box 20 as designated by numerals 25, 26. With right and left ends of the section 31, there is provided a reinforce section for physically strengthening the cellular box 30 as designated by numerals 35, 36. Around each of the reinforce sections 25, 26, 35 and 36, there is provided a margin to paste up as designated by numerals 27, 28, 37 and 38. In this instance, these reinforce sections 25, 26, 35 and 36 may be omitted when it is not necessary to strengthen the cellular boxes 20, 30.

On the sections 22, 23 for making the upper cellular box 20, there is provided an array of six elliptic holes 29 straddling a boundary between the sections 22, 23 to admit the insulator 101 of the corresponding spark plugs 100.

On the section 33 for making the lower cellular box 30, there is provided an array of six accommodation holes 39 to admit a thread portion 103 formed on a metallic shell 102 of the corresponding spark plugs 100. It is observed that the reinforce sections 25, 26, 35 and 36 may be consecutively extended from the main divisional area 11 or other sections 22, 23, 32 and 33 in-

stead of extending them from the sections 21, 31. The paste-up margins 27, 28, 37 and 38 may be provided other area than the reinforce sections 25, 26, 35 and 36. The number of the paste-up margins may be altered as desired.

Upon making the tray 10 as shown in Fig. 1, the cutting board 10A is folded along crease lines (CR) with the margins 27, 28, 37 and 38 pasted up.

After folding the cutting board 10A into the tray 10, the tray 10 is folded to have the lower cellular box 30 to accommodate the thread portion 103 and the outer electrode 104 of the metallic shell 102, and at the same time, having the upper cellular box 20 to accommodate a terminal 105 and an upper part of the insulator 101. As shown by dot-dash lines A ~ E in Fig. 2, five streaks of perforations are provided on the cutting board 10A to discretely separate any of the spark plugs as desired.

The casing package 2 is made dimensionally greater than the tray 10 so as to tightly accommodate the tray 10. When the tray 10 is accommodated into the casing package 2, an entire strength becomes sufficient to hold the spark plugs in it by the double layer of tray 10 and the casing package 2.

Upon packing or crating the spark plugs 100 into the package box 1 in which the tray 10 is accommodated into the casing package 2, the thread portion 103 of the metallic shell 102 is firstly brought to go through the accommodation hole 39 of the lower cellular box 30, and then the upper part of insulator 101 is admitted into the retainer hole 29 of the upper cellular box 20 as shown in Fig. 3a. After accommodating the six spark plugs into the tray 10, the tray 10 is encased into the casing package 2 so as to complete the packing operation. As a result, the outer electrode 104 is protected by the lower cellular box 30 so that no influence is given on the spark gap between a center and outer electrodes 106, 105. The spark plugs 100 are doubly protected by the tray 10 and the casing package 2 which accommodates the tray 10, the package box 1 positively protects the spark plugs 100 against the damage caused by the exterior force while roughly handling the package box 1.

When taking out any of the spark plugs 100, the cellular box 20 is turned along a direction of arrow (AR) to expose the terminal 105 with the tray 10 withdrawn from the casing package 2 as shown in Fig. 3b. Then, the desired spark plug is taken out by grabbing the metallic shell 102 of any of the spark plugs 100.

As apparent from the foregoing description, the spark plugs are readily packaged in the package box 1, while easily taken out when in use. Once the spark plugs are packaged, the outer electrode 104 is accommodated by the lower cellular box 30, and at the same time, the package box 1 is physically strengthened by the double structure of the tray 10 and the casing package 2, thus protecting the spark gap against mechanically adverse influence since the package box 1 is unlikely to be easily squelched. Since it is possible to visually confirm the presence or absence of any of the spark plugs

only by pulling out the tray 10 from the package box 1, the number of the spark plugs left on the tray 10 is readily confirmed.

Fig. 4 shows a second embodiment of the invention in which a transparent wrapper 3 is used to pack the tray 10 instead of the casing package 2. In this instance, the spark plugs 100 are visually confirmed from outside through the transparent wrapper 3 which is made from a thin sheet of plastic material. This makes it possible to further confirm a type of the spark plugs 100 accommodated by the package box 1.

Fig. 5 shows a third embodiment of the invention in which a mount board 5 having a hanging hole 4 is fixedly provided on the underside of the tray 10. The tray 10 is encircled by a transparent wrapper 6 which substantially holds a J-shaped configuration. In this instance, any of the spark plugs 100 are readily taken out from the tray 10 in use and the rest of the spark plugs are kept by hanging the tray 10 on an appropriate wall even after the transparent wrapper 6 is removed from the tray 10.

As understood from the embodiments of the invention thus far described, the tray is made from a piece of paper so that the tray 10 is readily put into automatic assembling. The thread portion 103 and the outer electrode 104 are accommodated by the lower cellular box 30 so that the spark gap is effectively protected against damage. Upon taking out any of the spark plugs by opening the upper cellular box 20, the spark plugs are readily grabbed since the spark plugs are visually confirmed. With the perforations A - E provided on the tray 10, the spark plugs are individually handled by separating the tray 10 along the perforations A - E.

It is noted that the tray 10 and casing package 2 may be made from a sheet of synthetic resin or fibre-reinforced plastic material instead of the pasteboard or the corrugated cardboard. When the sheet of synthetic resin is selected as a material of the casing package 2, portions are omitted which respectively correspond to the margins to paste up.

It is also noted that the casing package 2 may be provided in addition to the transparent wrapper 3 upon putting the package box into a practical use.

While the invention has been described with reference to the specific embodiments, it is understood that this description is not to be construed in a limiting sense inasmuch as various modifications and additions to the specific embodiments may be made by skilled artisans without departing from the scope of the invention as defined by the claims.

Claims

1. A package box (1) for a spark plug (100) comprising:

a paper tray (10) including an array of compartment portions (30) provided to accommodate a

lower portion of a spark plug (100) to protect a spark gap, and an array of retainer portions (20) provided to retain an upper portion of the spark plug (100) in position; and

a casing package (2,3,6) provided to accommodate the paper tray (10).

2. A package box (1) for a spark plug (100) according to claim 1, wherein each of the compartment portions (30) has an accommodation hole (39) to admit a thread portion (103) of the spark plug (100) to accommodate the thread portion (103) and an outer electrode (104), and each of the retainer portions (20) includes a compartment having a retainer hole (29) to admit an insulator (101) of the spark plug (100) so that the tray (10) accommodates the spark plug (100) with its insulator portion (101) exposed between the array of the compartment portions (30) and the array of the retainer portions (20).
3. A package box for a spark plug according to claim 1 or 2, wherein a streak of perforation (A-E) is provided on the tray (10) so that the tray is separable between the neighbouring spark plugs (100).
4. A package box for a spark plug according to claim 1, 2 or 3, wherein the casing package is made of a transparent material (3) directly encircling around the tray (10).
5. A package box for a spark plug according to claim 1, 2, 3 or 4, wherein a mount board (5) having a hanging hole (4) is provided on an underside of the tray (10).
6. A package box for a spark plug (100) according to claim 1, 2 or 3, wherein the tray (10) and the casing package (2) are made of a piece of corrugated cardboard or paperboard.
7. A package box for a spark plug (100) according to claim 1, wherein the tray (10) and the casing package (2) are made of a piece of synthetic resin.

Fig. 1

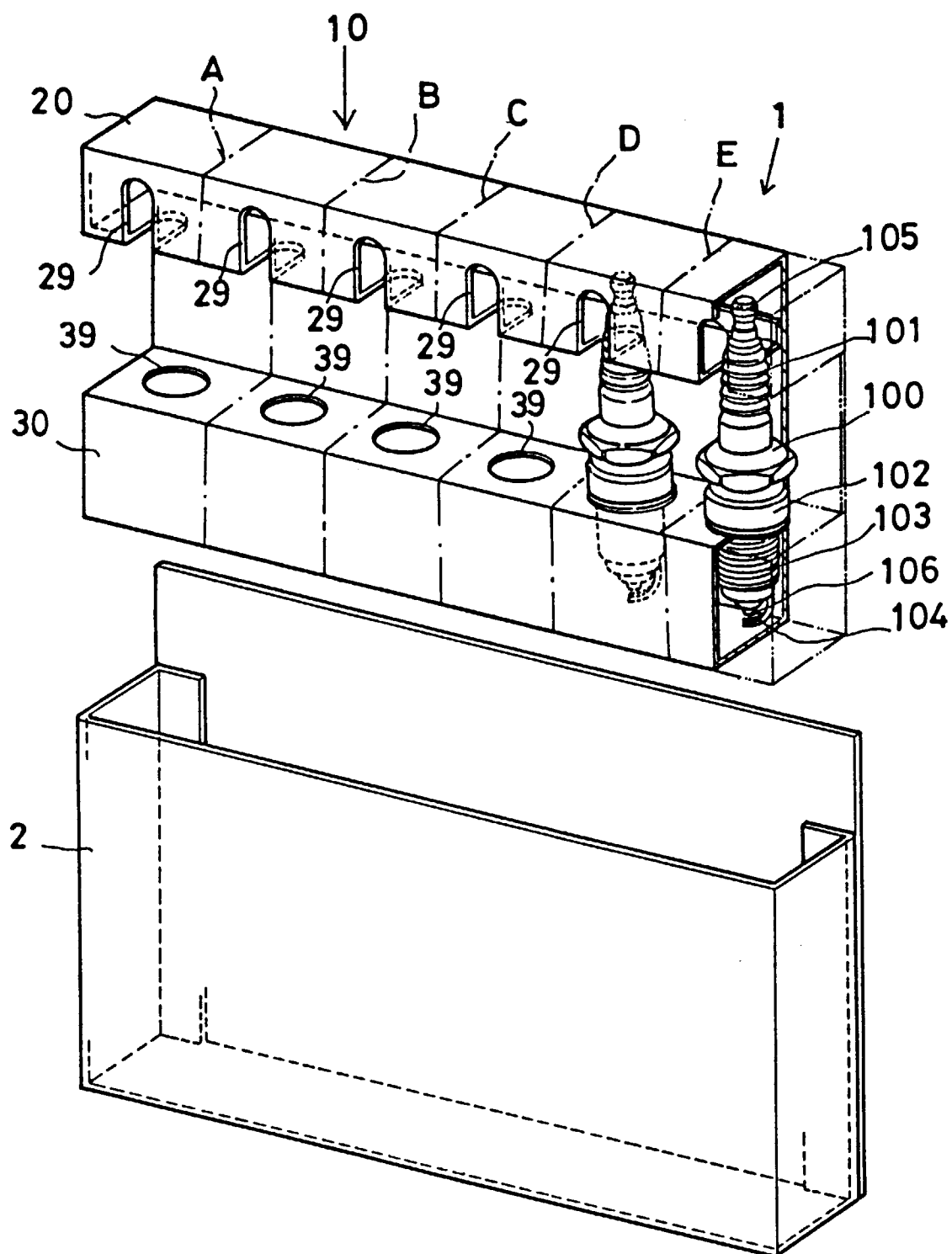


Fig. 2

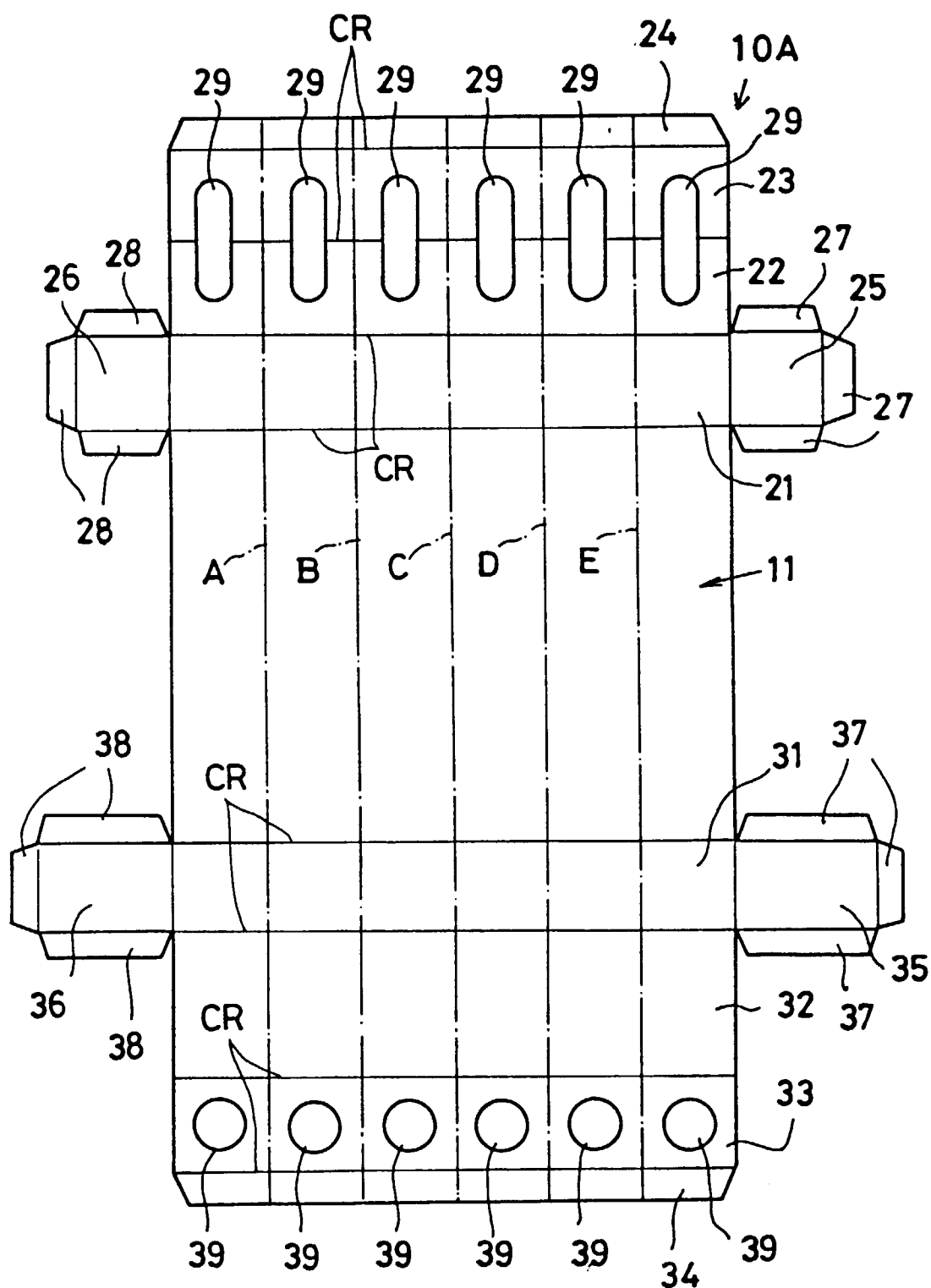


Fig. 3a

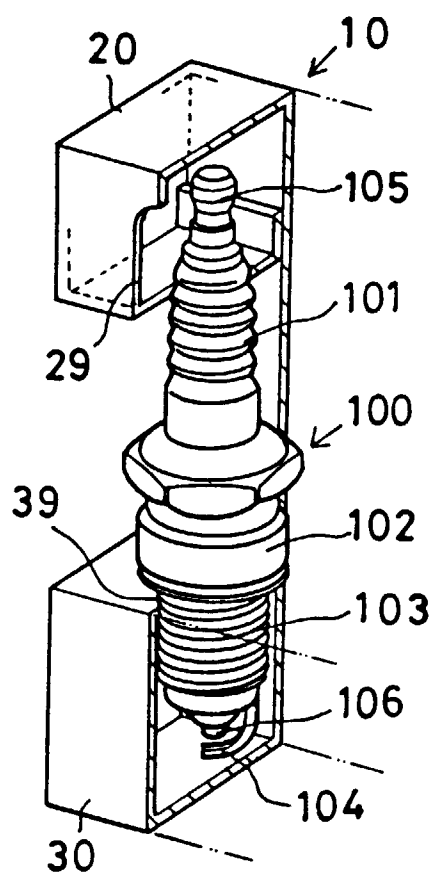


Fig. 3b

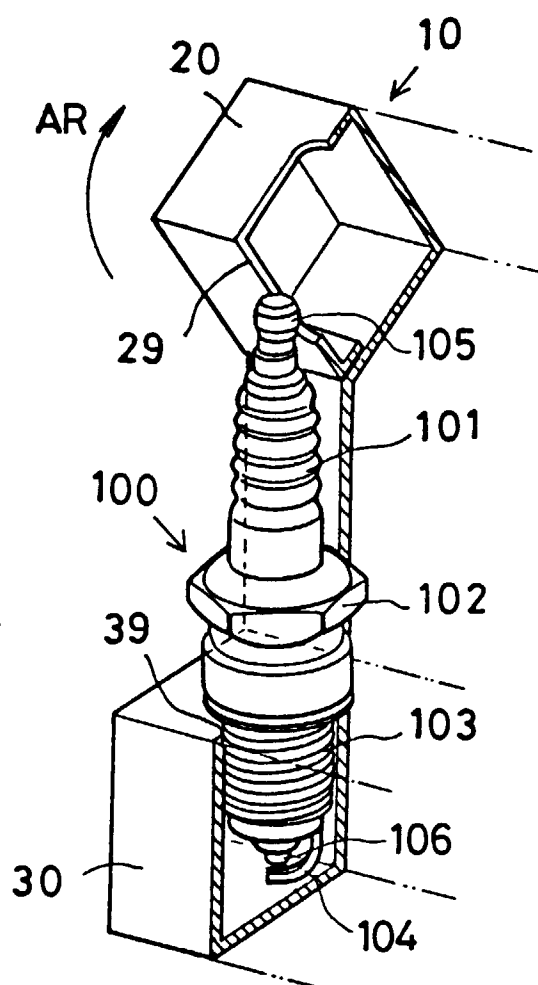


Fig. 4

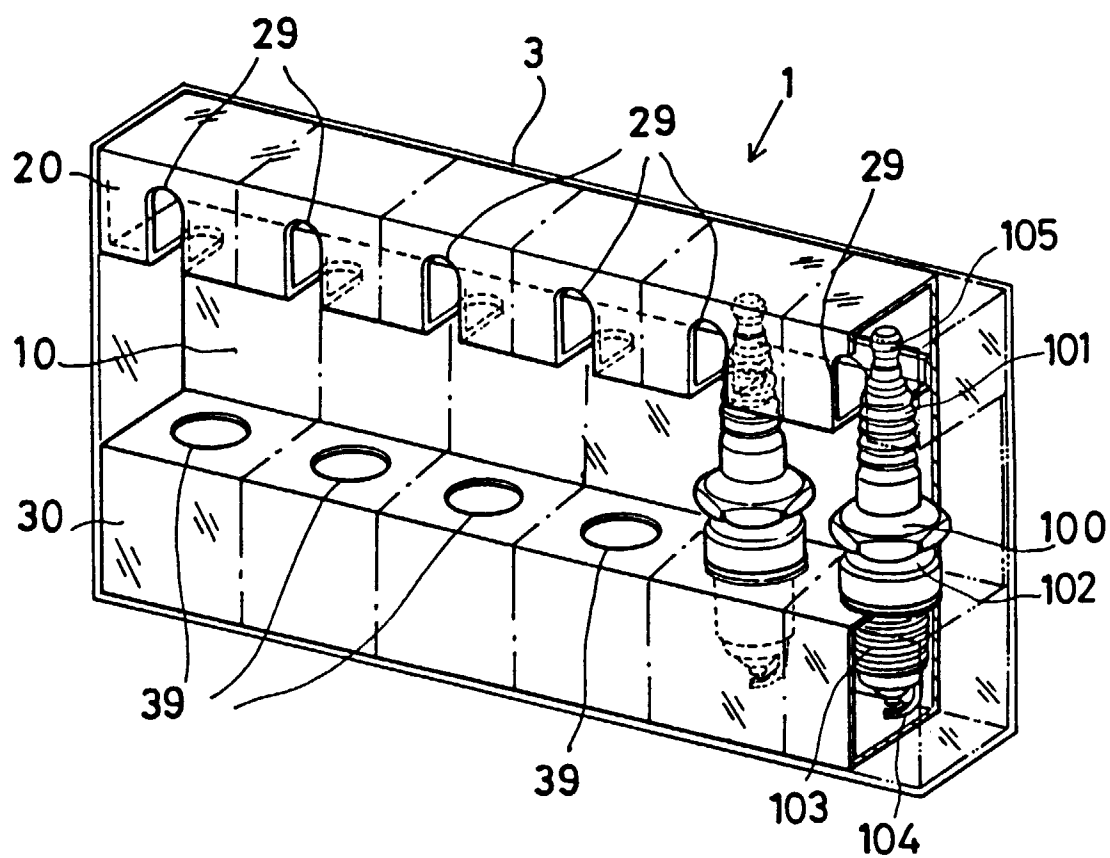
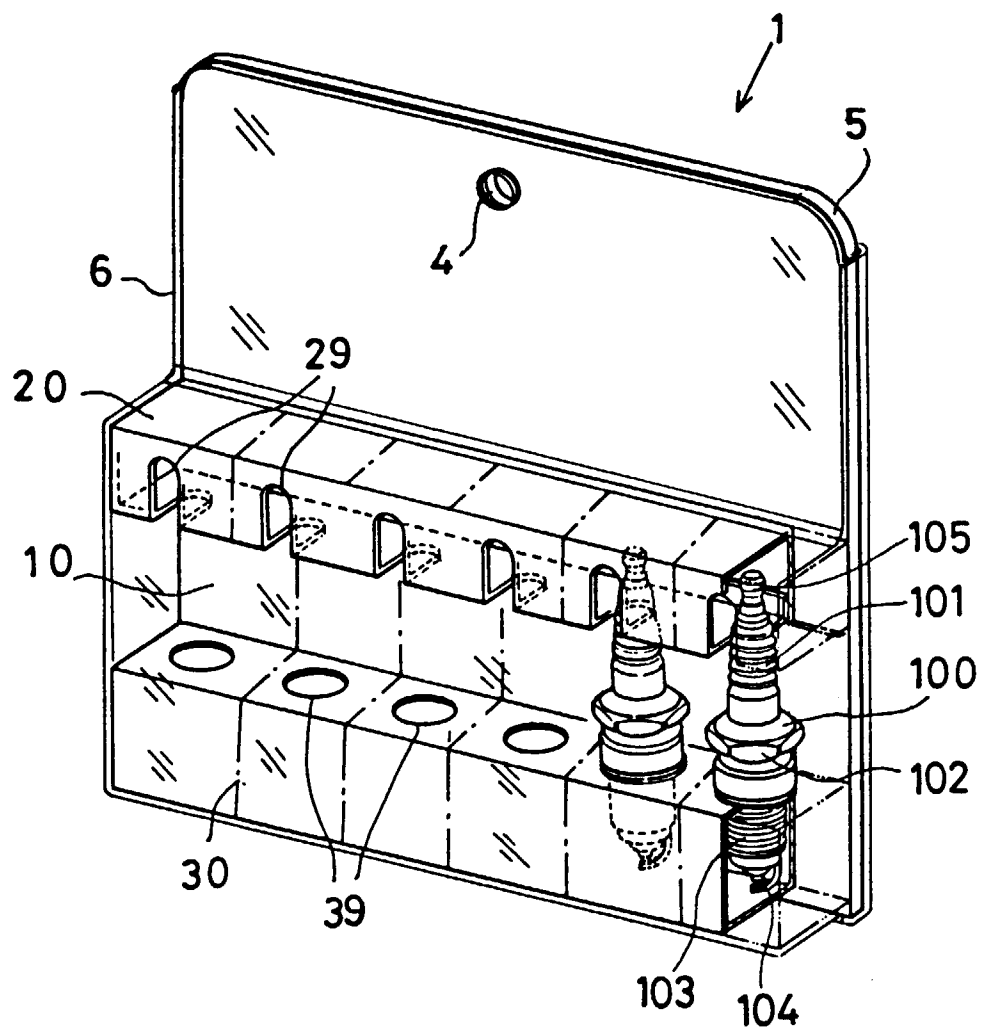
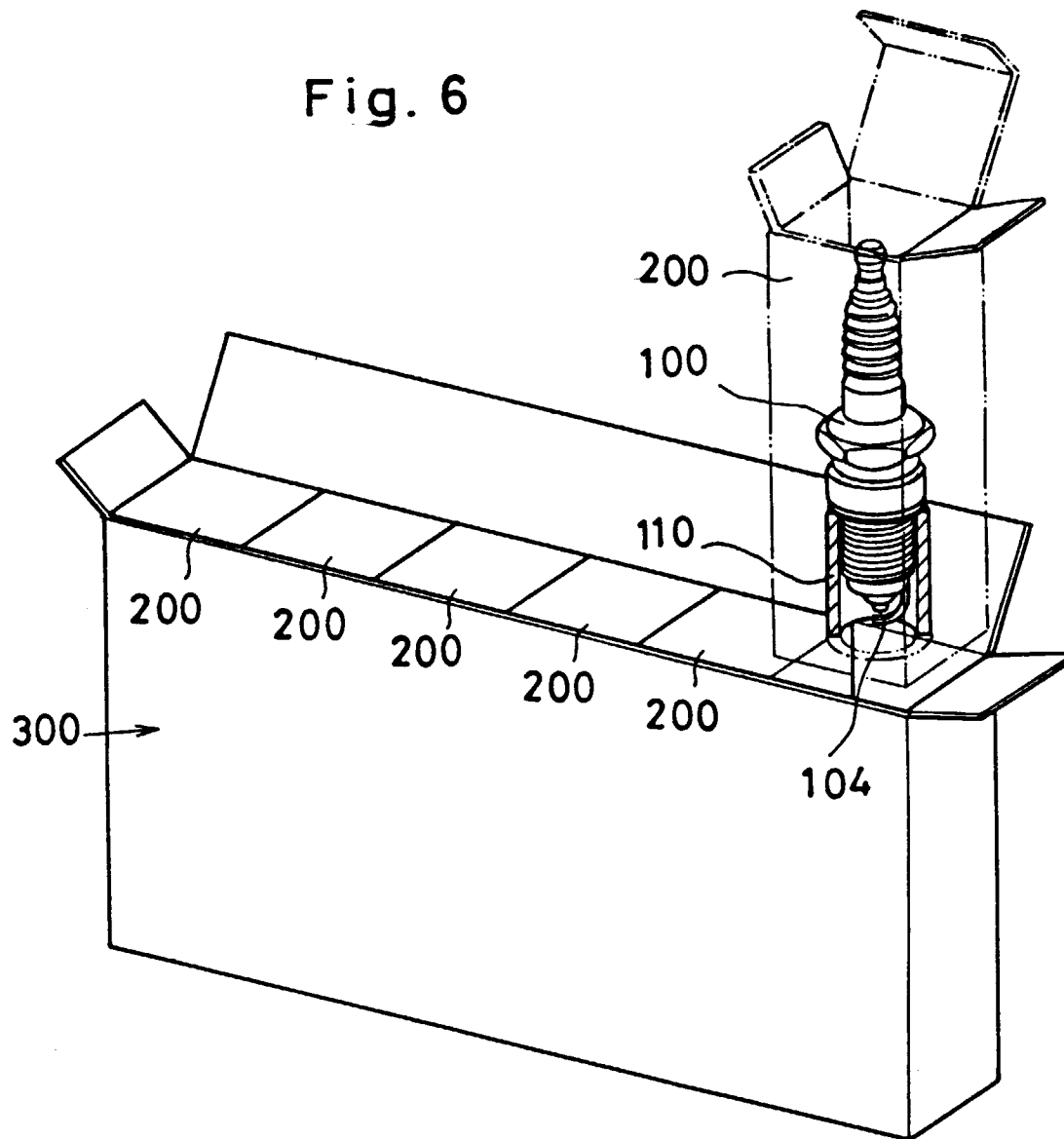


Fig. 5



PRIOR ART

Fig. 6





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EUROPEAN SEARCH REPORT

Application Number
EP 96 30 2214

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US-A-2 339 555 (GLASS)	1-3,6	B65D5/50
Y	* the whole document *	4,5,7	

Y	US-A-4 058 207 (KOLTZ) * abstract * * column 9, line 22 - line 64; figures 17,18 * -----	4,5,7	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 29 July 1996	Examiner Leong, C
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