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(54) **White board eraser**

(57) The invention under scrutiny focuses on a white board eraser (1), which comprises a central core (2) and a stack of eraser sheets (3) arranged together with the central core (2). The central core (2) has been made into the shape of a rectangular piece, which has two ends (2p1, 2p2) and four sides (2s1-2s4). The surface area

of the ends (2p1, 2p2) does not in principle exceed that of the sides (2s1-2s2). The central core (2) of the white board eraser (1) has been made into a boxlike structure. The said stack of eraser sheets (3) has been wrapped round the central core (2) covering at least three of the sides (2s1-2s4).

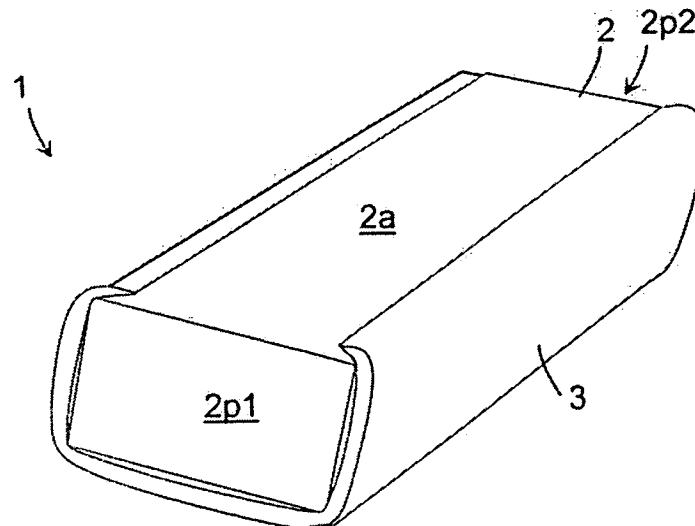


Fig. 2

Description

[0001] The present invention relates to a white board eraser, which consists of a central core shaped to a basically rectangular configuration with two end and two side panels, the size of the end panels preferably exceeding the size of the side panels, and of a stack of eraser sheets arranged to fit the central core.

[0002] To wipe away marks on the white board, a woven fabric is used, which is wrapped around a suitable piece. When the fabric becomes dirty, it is replaced by another one. As an alternative, there are also white board erasers where several eraser sheets have been grouped around the central core. Thus the topmost eraser sheet is used to wipe the white board. When the top eraser sheet becomes dirty, it is removed, and a new, clean eraser sheet is applied. This type of white board eraser has been introduced for example in the USA patent publication 6,367,115. Figure 1 shows a white board eraser exhibited in the publication. The central core of the eraser comprises a rectangular piece made of hard material, round which a cardboard sheet and a stack of eraser sheets have been placed. The stack of eraser sheets has been stapled to the hard central core, and the cardboard sheet has been wrapped in such a way that on the stapled side the cardboard sheet is on top of the eraser sheets, and correspondingly on the opposite side of the stapled side the cardboard sheet has been placed between the core and the stack of eraser sheets. Consequently the surface on the opposite side of the stapled side, where the stack of eraser sheets is topmost, is used as the eraser surface. There is a tab at the other end of the eraser sheet stack, and by pulling it, the dirty top eraser sheet can be removed. This is done by pulling the tab when the eraser sheet will tear off round the staple and become free from the white board eraser. The central core of the white board eraser consists of an elongated, diagonally basically rectangular, relatively hard and closed piece. The eraser sheets have been shaped in the way that they are elongated and wrap round the core lengthwise. When using this kind of elongated white board eraser, it is natural to pick it up so that the fingers take hold of the white board eraser on the opposing long sides. The wiping movement is basically at right angles to the length of the central core. This direction is transverse when compared how the eraser sheets have been wrapped round the central core. In this way the eraser sheets underneath the topmost eraser sheet will become dirty mainly at their edges, and may to some extent get torn by the friction caused by the eraser movement focusing on the eraser sheets in a transverse direction to their lengthwise direction. Furthermore, relatively great strength is needed to pull out the topmost eraser sheet, as this is done by tearing it round the fastening staples.

[0003] One of the purposes of this invention is to raise the technical level in the field and to create an improved white board eraser. The invention is based on the idea, that the stack of the eraser sheets is connected to the central core in the way that the direction of rotation around the core has been implemented in accordance with the smaller transversal section. To put it more clearly, the essential feature of this white board eraser invention is the fact, that the central core is given a boxlike form, and that the said stack of eraser sheets is wrapped around a minimum of three sides of the core.

[0004] In one of the more advanced operational modes the eraser sheets have been equipped with perforation to facilitate the removal of the eraser sheet after the sheet has been soiled.

[0005] The now exhibited invention of the white board eraser has considerable advantages when compared to the solutions of this well known technique. In the white board eraser of this invention the other eraser sheets except the topmost one do not easily get soiled when wiping the white board. Furthermore, the edges of the eraser sheets are not as likely to get frayed as in the white board erasers of the established technique. Also the white board eraser of this invention makes it possible to create three eraser surfaces of reasonable size, which prolongs the life span of each eraser sheet. In addition, in one of the operational modes of the invention, where the eraser sheets are perforated, it makes it a great deal easier to detach the eraser sheets after they have become dirty than in the traditional white board erasers, where the eraser sheets have been stapled, and the detachment of the eraser sheet is done by tearing it around the staple. The production of the white boards eraser of the invention is relatively cost effective and fast. Environmentally friendly materials can be used in the manufacturing.

[0006] The invention is explained here in detail with references to the enclosed drawings, where

Figure 1	shows a white board eraser based on prior art technique
Figure 2	shows a white board eraser of the invention in a perspective view,
Figures 3a and 3b	show different parts of a white board eraser of the invention,
Figures 4a and 4b	show some examples of plate panels used in the creation of the central core of the white board eraser of the invention,
Figure 5	illustrates the successful movement direction of a white board eraser of the invention on the surface to be wiped, and
Figure 6	shows some alternatives used in the perforation of eraser sheets

[0007] To clarify things, some of the terms used in this explanation are defined as follows, referring simultaneously to Figure 2, which shows the white board eraser 1 according to the invention fully assembled, and to Figures 3a and 3b, which show different parts of the white board eraser 2. The white board eraser 1 comprises the central core 2 and

a stack of eraser sheets 3 combined to it. The shape of the central core 2 when assembled is preferably a basically rectangular, boxlike piece. As is well known, a rectangular, boxlike piece has three different cross-sectional directions, and the cross-sectional shapes are basically either squares or rectangles. Such pieces have therefore six surfaces, where opposing surfaces are basically identical in shape and size. The two opposing sides are called end surfaces (ends of the piece), and the other surfaces are called side surfaces (sides of the piece). Side surfaces are those surfaces, whose longest side is the longest side of the boxlike piece. It is clear, that in some special cases at least two, or all the four sides can also be squares. In that case the piece is a cube, and all the sides are basically of the same size and shape. The central core 2 of the white board eraser 1 of the invention is best shaped in the way, that the crosscut of the central core 2 differs from a square. In that case the rectangular shape is longer in one direction than in the other. The end surfaces of the central core 2 are those surfaces, whose areas are smaller than or basically similar with the area of the other surfaces. In Figure 3 these end surfaces are marked as 2p1, 2p2 and the side surfaces are similarly marked as 2s1-2s4.

[0008] The eraser sheets 3 have been wrapped round the central core 2 in the way, that the direction is in accordance with the above mentioned smaller transverse section. In that case the length of the eraser sheets is at least of a similar size, in practice somewhat larger than the circumference of the transverse section, i.e. the circumference of the end surfaces 2p1, 2p2. Equally, the width of the eraser sheets 3 is preferably basically the same as the length of the central core 2 at right angles to the direction of the rotation, in other words, the same as the distance between the ends 2p1, 2p2.

[0009] The central core 2 is basically a hollow, assembled box. Therefore the inside of the central core 2 can be used for example to store the marker pens and similar things. The inside of the central core 2 can also be used to store the storage container of the cleaning material of the white board, such as a bottle of cleaning liquid or similar. In this way the cleaning material is easily accessible, e.g. in cases when the cleaning of the white board needs special attention. The inside of the central core 2 can also be used to store the eraser stack 3.

[0010] In the white board eraser 1 as shown in Figure 2 the eraser sheet stack has for example been fastened with staples 7, or with other suitable fasteners to the support panel 4 at both ends. Therefore the central core 2 can be slipped inside the tube-like embodiment consisting of the eraser sheet stack 3 and support panel 4. Then the cover 2a of the central core 2 can be closed by pushing it so that support panel 4 and the end parts of the eraser sheet stack 3 fastened to it will remain underneath the cover 2a. The rest of the eraser sheet stack 3 will remain outside the central core 2. This leaves three eraser surfaces 5a, 5b, 5c. These eraser surfaces are situated on the three sides 2s1, 2s2, 2s3 of the central core. The cover 2a makes up the fourth side 2s4 in this embodiment.

[0011] The white board eraser 1 of the invention can be used for example by taking hold of the white board eraser by the first 5a and the third 5c eraser surfaces. Thus e.g. the thumb 10 in Figure 5 is for example on the eraser surface 5a, and one or more fingers 11 on the third eraser surface 5c. The eraser surface to be used in this position is the second eraser surface 5c, in other words the opposite side to the cover part 2a of the central core 2. If the first eraser surface 5a, or the third one 5b will be used, the central core will be gripped on the side of the cover part 2a of the central core as well as on the side of the second eraser surface 5b. All these positions have the advantage when compared to traditional white board erasers, that the natural eraser movement direction follows basically the direction of the rotation direction of the eraser sheets 3 around the central core 2. In the erasers using well-known technique the most natural movement direction when compared to this direction is basically at right angles, in other words the movement focuses on the free pages of the eraser sheets in a vertical direction, which results in fraying of these sides, and also in soiling of other than the top page on these sides.

[0012] When the top eraser sheet must be removed, it can be easily done by tearing the eraser sheet at the perforation, or if no perforation 6 has been made, the top sheet can be torn off as in traditional practices by tearing the eraser sheet around the staples 7. After the top eraser sheet 3 has been removed, the next eraser sheet is used. As in the white board eraser of this invention only the top sheet will become mainly dirty, the new eraser sheet will be relatively clean, which gives a longer life span to the eraser sheet stack 3 of the white board 1.

[0013] The rotation direction of the eraser sheets used in the white board eraser of this invention results among other things in the fact, that the friction power F caused by the erasion movement between the eraser sheet 3 and the surface 8 to be erased (Figure 5) focuses on the so-called fold lines of the eraser sheets basically at right angles, as in the solutions of the known traditional technique, where the strength mainly concentrates on the fold lines. The fold lines here are the folds (angles) between the sides. So if the eraser surface used is the second surface 2b, the fold 2t1 is between the first page 2s1 and second 2s2 and between the second 2s2 and the third page 2s3 the fold is 2t2. In practice, this fold line is not a very narrow line but a narrow, oblong strip.

[0014] Next we shall examine the sheet billet 9 used in the preparation of the central core 2 of the white board eraser 1 representing a useful embodiment of the invention shown in Figure 4a. This practical sheet billet 9 is made of paperboard or cardboard, creating a fairly light central core 2, but a rigid enough structure. It should be mentioned that the shapes of the sheet billets 9 in Figures 4a and 4b are not strictly limited examples, but with this invention other sheet billet types can also be used. In Figure 4a different kind of folds have been marked with scored lines, so that by bending the sheet billet 9 at the folds inwards, i.e. towards the second page 2a2, the sheet billet can be shaped into

a basically rectangular box. When assembling the white board eraser 1, the sheet billet is folded in the way, that the sides 2s1, 2s1, 2s3 and ends . 2p1, 2p2 of the central core are assembled with the cover part remaining still open. The outside tabs 2s1. 1, 2s3. 1 on the long sides 2s2, 2s3 of the central core are folded inwards. After that the eraser sheet stack 3, which has been stapled to the support plate 4, can be placed either inside the box formed by the central core 2 during transport, and then the cover 2a is closed. Another alternative is to push the central core 2 box inside the tube shaped structure created by the eraser sheet stack 3 and the support plate 4, and to close the cover after that. In the latter alternative the white board eraser 1 is ready to use. You can then stick on the surface of the cover 2a for example advertisements, trade marks, etc. The side tabs 2s4.1, 2s4.2 of the cover 2a press the end parts of the eraser sheets 3 and possible support plates downwards, towards the bottom of the core, i.e. towards the inside surface of the side 2s2. It follows that the eraser sheets tighten to some extent around the central core 2.

[0015] Figure 4b shows sheet billet 9 used in the preparation of the central core 2 of the white board eraser 1 representing another useful embodiment of the invention. This sheet billet 9 resembles to a large extent the sheet billet 9 in Figure 4a, but in this operational mode the support plate is also fastened to the sheet billet, either to the outside tab of the first side 2s.1 or of the third side tab 2s3.1. The support plate 4 can be detached from the sheet billet 9, for example at perforation 11, or the support plate 4 can be left fixed to the sheet billet 9, while the eraser sheet stack is fastened to support part 4 when the central core 2 is being assembled. During the assembly the support part 4 sinks to the bottom of the central core 2 or near it.

[0016] To make the assembly of the central core 2 easier, a smaller auxiliary plate (not shown) can be used during the assembly, which is placed inside the box that makes the central core in such a way that the auxiliary plate will press the tabs 2s1.1, 2s3.1 of the sides outwards, facilitating the fastening of the support plate 4 and the attached eraser sheets 3 to the central core 2.

[0017] The sheet billet 9 used in the preparation of the white board eraser can be made by punching. During the punching operation both the central core 2 and if necessary the support plate 4 can be created.

[0018] The white board eraser 1 of the invention can also be constructed by fastening the eraser sheet stack 3 directly to the central core 2 without the support plate 4. Then the sheet billet of the central core 2 has tabs or similar, where the eraser sheet stack 3 can be fastened, for example with staples. In this operational mode the central core 2 must be renewed by the time all the eraser sheets of the eraser sheet stack 3 have been used. This white board eraser invention of the first economical operational mode makes it possible to replace the eraser sheet stack 3 by a new eraser sheet stack connected to the central core 2, when one eraser sheet stack 3 has been fully utilized, a new eraser sheet stack can be installed, and connected to the central core 2. It is possible to place at least two eraser sheet stacks 3 with the central core 2 at the preparation stage, by placing one inside the hollow of the box, the other one wrapped round the central core being ready for use.

[0019] It is obvious that the construction of the above described invention of the white board eraser 1 can deviate from the above. For example, the shape of the cross-section can be square instead of rectangular in one direction, primarily at the ends. However, it is useful that at least the shape of the second 2s2 and the forth 2s4 side is basically rectangular, which will facilitate the use of the white board eraser 1, and will give a better grip of the white board eraser 1. In other words, the cover part 2a and the bottom section opposite it are of rectangular shape, and the other cross-sections can be either rectangular or square.

[0020] If necessary, a magnet can be fastened to the central core 2, for example with a two-sided tape either to the hollow inside the central core, or to the outside surface, e.g. to the cover 2a, or a magnetic tape may also be used. With the magnet the white board eraser 1 can easily be fastened to a base, for example to the white board, if it comprises metal or similar substance, where the magnet can adhere.

[0021] Figure 6 shows some other perforation types, which can be used with the eraser sheets of the white board eraser 1 of the invention under scrutiny. Perforation 6 can be in a suitable place, e.g. near the support plate 4. Furthermore, it is possible to have more than one perforation 6. The perforation has been created at right angles towards the rotation direction of the eraser sheets. The perforation 6 reaches from edge to edge of the eraser sheet 3 or close to the edges.

[0022] In addition to the above-mentioned three eraser surfaces 5a, 5b, 5c the folds 2t1, 2t2 between these surfaces may also be used. An even greater force can be applied to these folds, when it is easier to clear the more imbedded marks of the marker pens or those otherwise more difficult to shift, as well as other possible stains in the white board.

[0023] The white board eraser of the invention is also environmentally friendly, as it can be made from materials, which can be disposed of by burning or recycled via paper or cardboard recycling.

[0024] It is obvious that the invention under scrutiny is not limited only to the operational modes described here, but it can be varied within the patent claims.

Claims

1. White board eraser (1), which comprises:

a central core (2), which has been made into the shape of a basically rectangular piece, which has two ends (2p1, 2p2) and four sides (2s1-2s4), and the area of the ends (2p1, 2p2) does not in principle exceed that of the sides (2s1-2s4), and

a stack of eraser sheets (3) arranged adjacent to the central core (2), **characterized in that** the central core (2) has been shaped into a boxlike structure, and that the said stack of eraser sheets (3) has been wrapped round the central core (2) covering at least three sides (2s1-2s4).

2. White board eraser (1) according to patent claim 1, **characterized in that** of the said four sides (2s1-2s4) at least two have been made into rectangular shapes in the way that the longer side of the rectangle is the side joining the ends (2p1, 2p2).

3. White board eraser (1) according to patent claim 1 or 2, **characterized in that** at least one perforation has been made in the eraser sheets (3) to facilitate the removal of the eraser sheets (3) from the central core (2).

4. White board eraser (1) according to patent claim 1, 2 or 3, **characterized in that** the central core is basically hollow.

5. White board eraser (1) according to patent claim 4, **characterized in that** at least one stack of eraser sheets (3) has been placed inside the central core (2).

6. White board eraser (1) according to any of patent claims 1-4, **characterized in that** the central core (2) comprises a cover part (2a), which makes one of the said four sides (2s1-2s4), and that the said stack of eraser sheets (3) is arranged to be fastened to the said cover section (2a).

7. White board eraser (1) according to any of patent claims 1-4, **characterized in that** it also comprises a support plate (4) and that the said stack of eraser sheets (3) has been fastened to the said support plate (4), and that the central core (2) has been arranged to be placed at least partially inside the structure consisting of the support plate (4) and the stack of eraser sheets (3) fastened to it in the way that the said stack of eraser sheets (3) covers the central core (2) at least on three sides (2s1-2s4).

8. White board eraser (1) according to patent claim 7, **characterized in that**, that the central core (2) comprises a cover section (2a), and that the said support plate (4) has been arranged to fit underneath the cover part (2a).

9. White board eraser (1) according to patent claim 7 or 8, **characterized in that** the said support plate (4) has been created as a part of the central core (2).

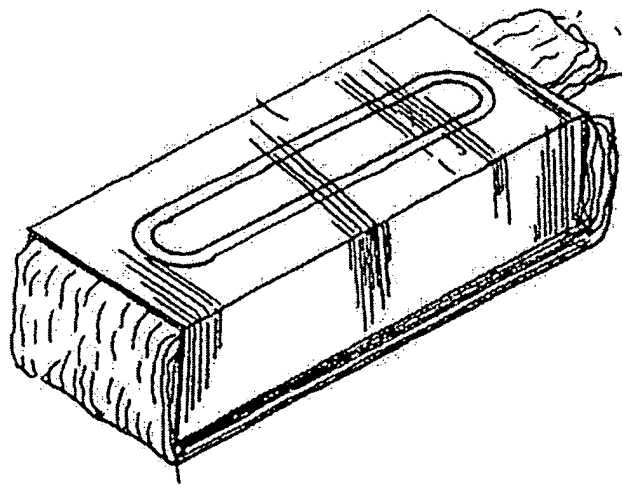


Fig. 1

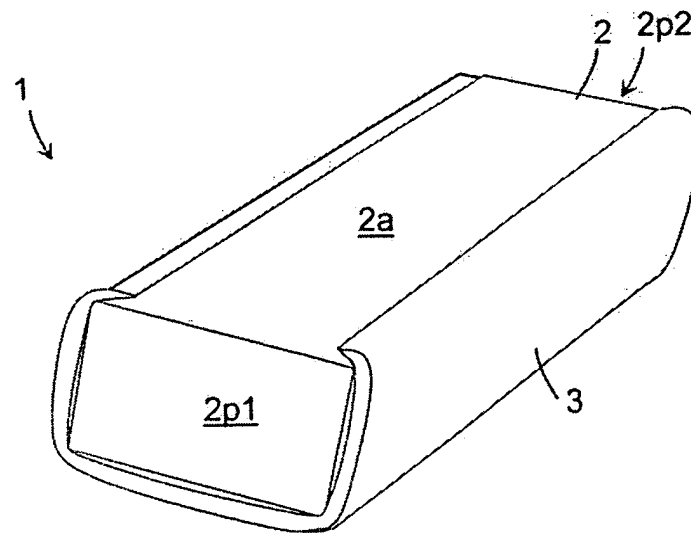


Fig. 2

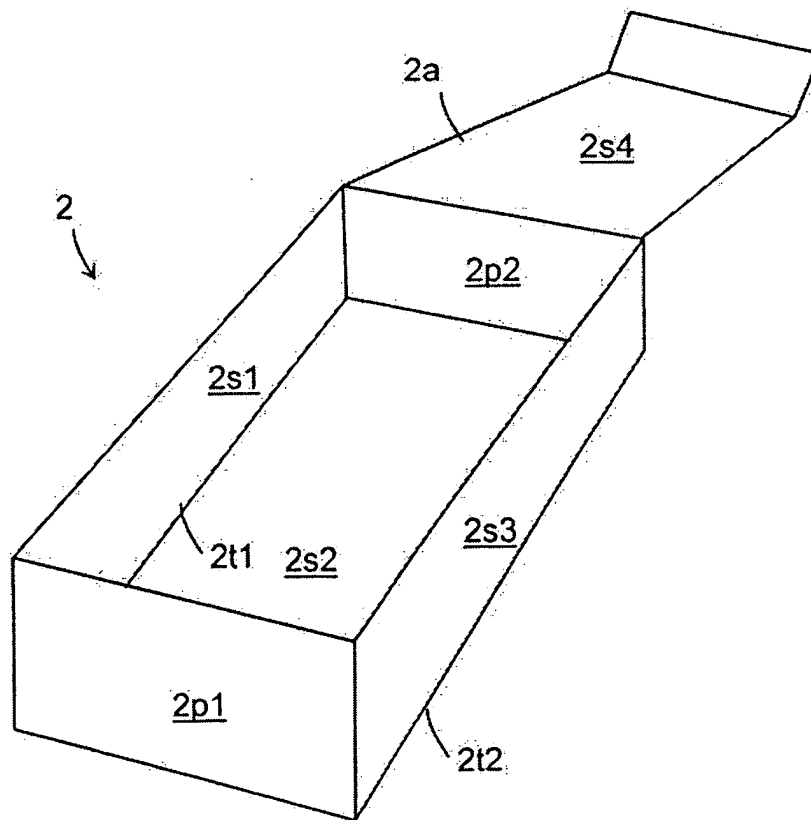


Fig. 3a

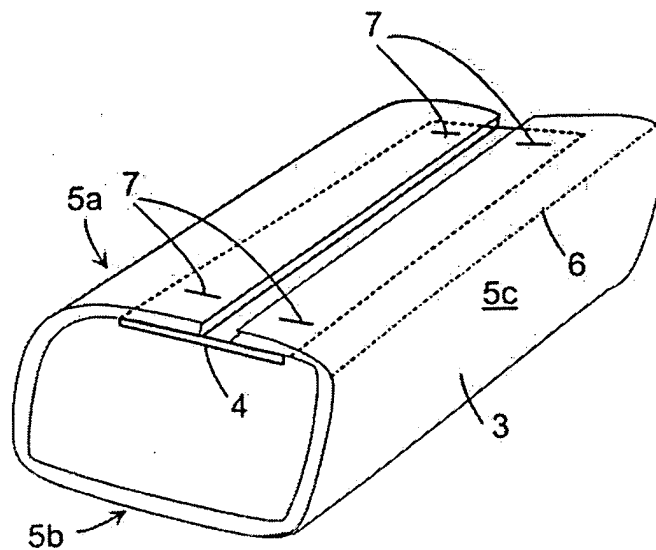


Fig. 3b

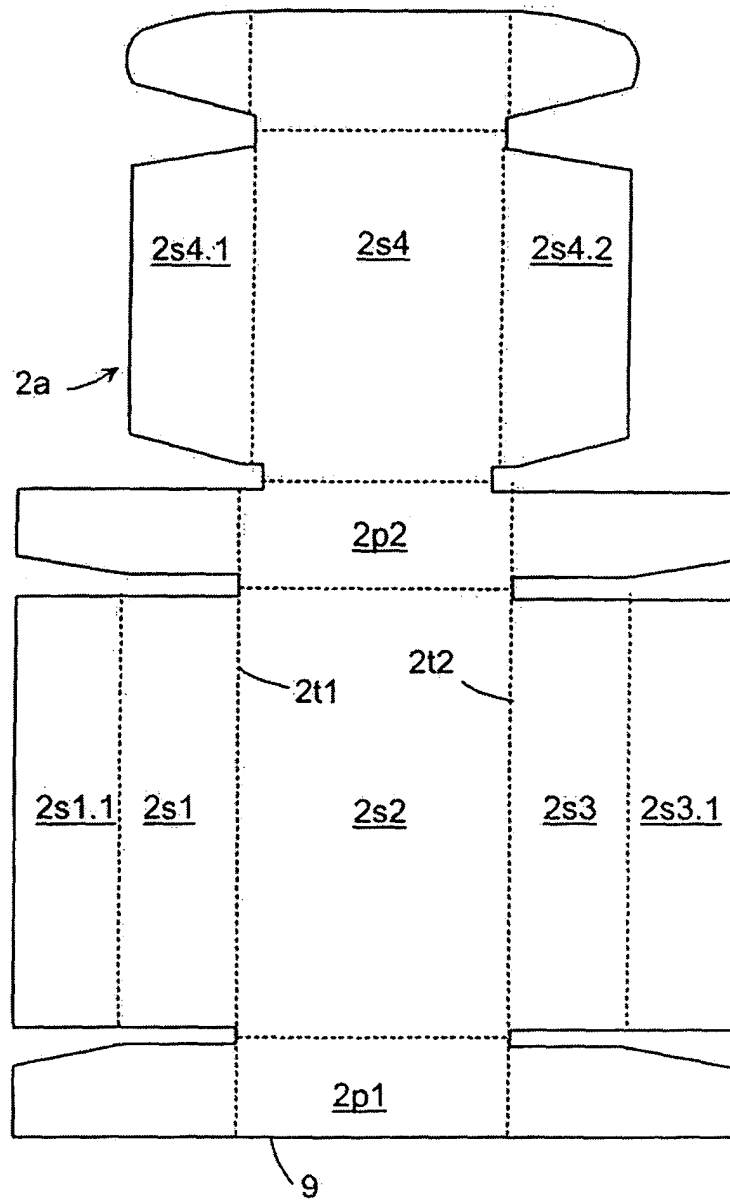


Fig. 4a

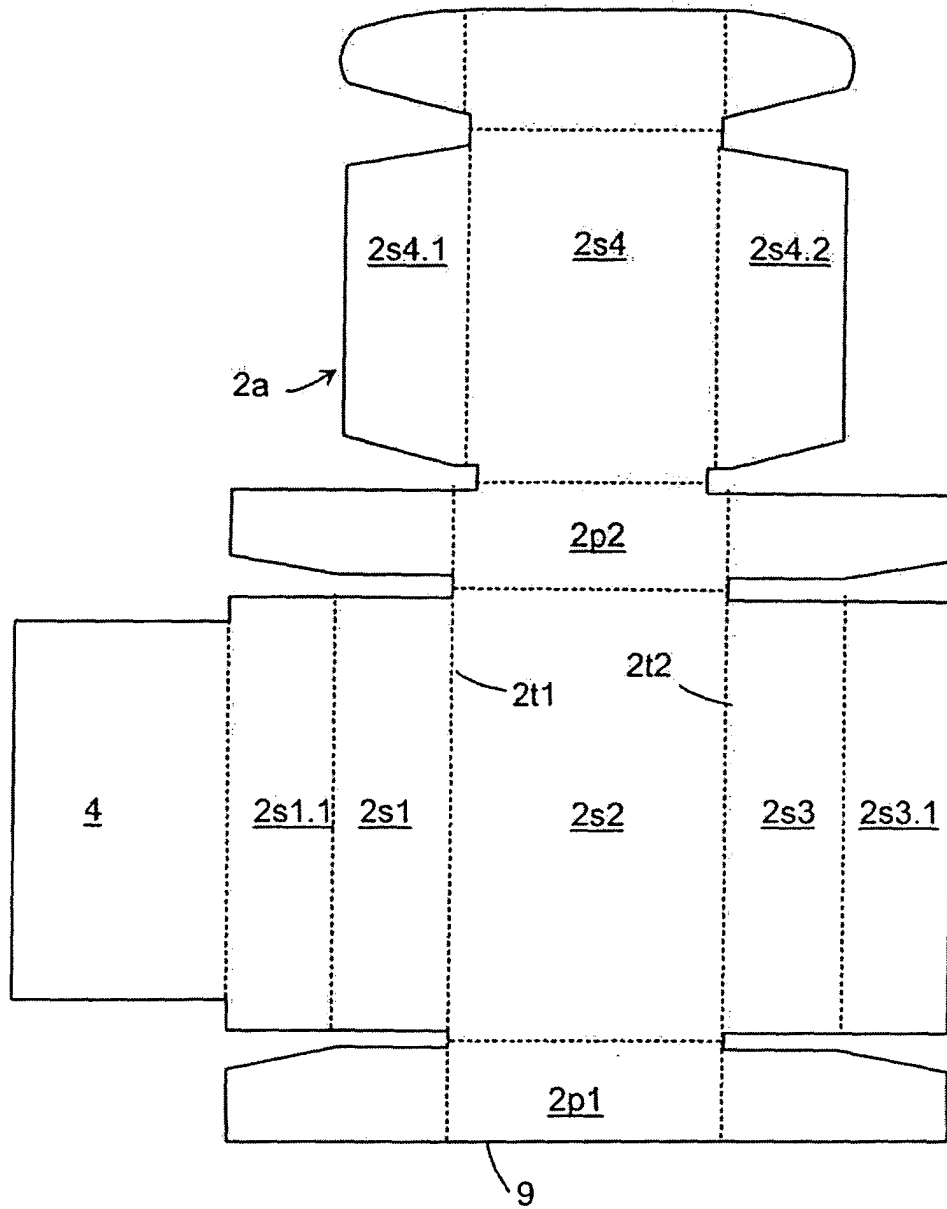


Fig. 4b

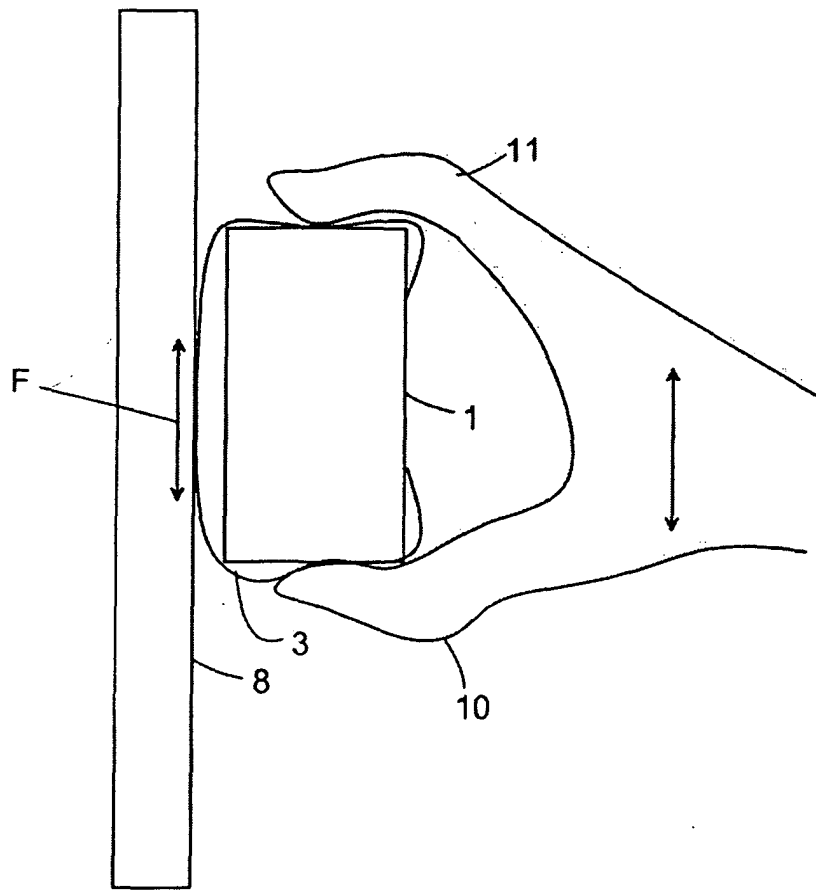


Fig. 5

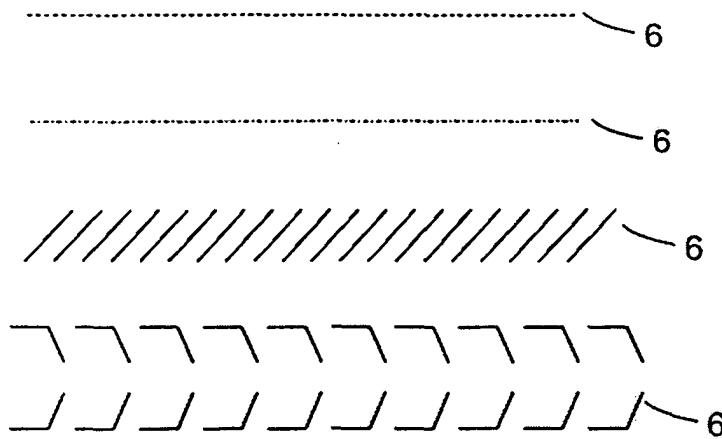


Fig. 6