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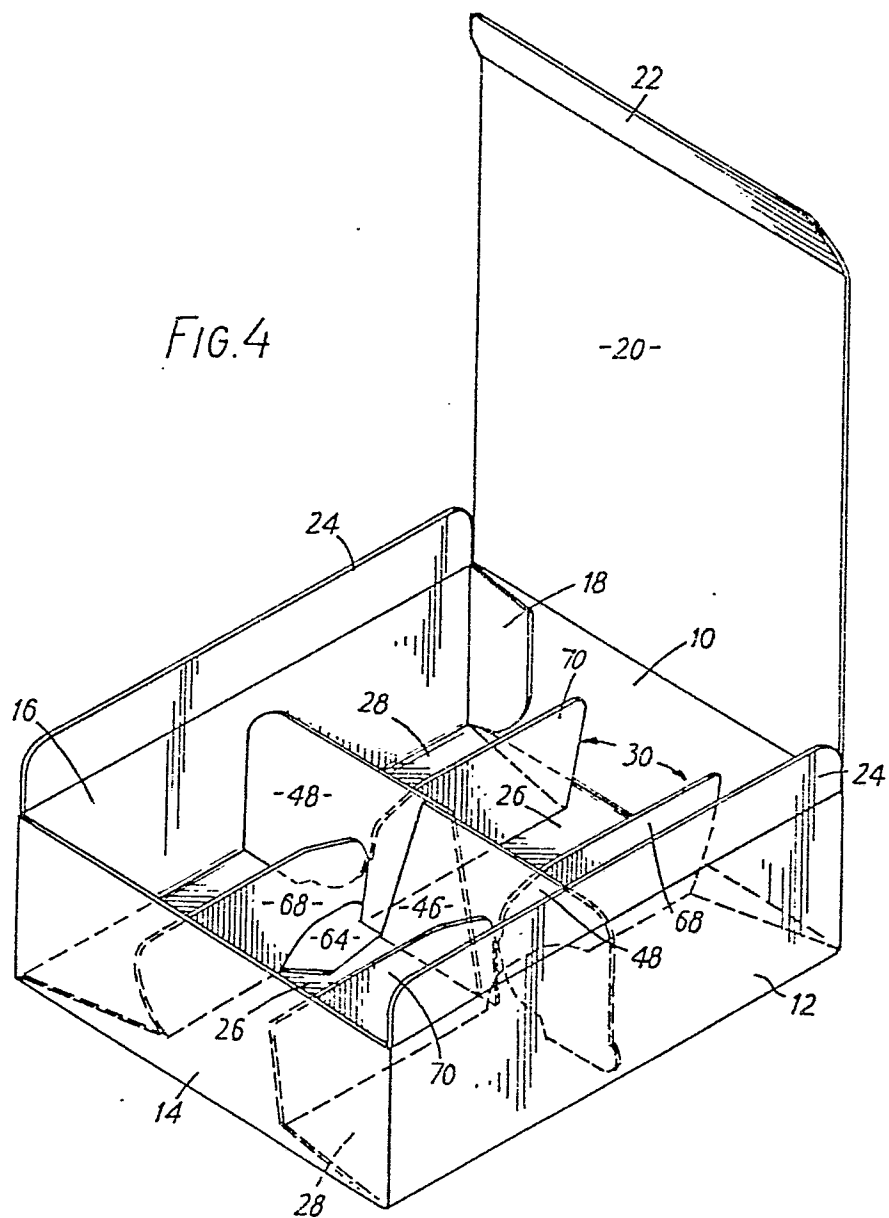
(54) **Crash-bottom carton and blank therefor.**

(57) A crash-bottom carton is erected from a flattened tubular condition to a generally rectangular condition. At the same time, bottom-forming panels (26, 28) hinged to its wall-forming panels (10, 12, 14, 16) are automatically brought down into a co-planar configuration at the bottom of the carton, and a pair of first partition-forming panels' (46, 82) pass over a pair of second partition-forming panels (30, 72). The partition-forming panels have co-operating slots or notches (56, 50, 76, 90) which enable them to receive each other in a crosswise configuration after they have passed over each other; this happens automatically as the carton is brought into the rectangular configuration.

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FIG. 4



1.

CRASH-BOTTOM CARTON AND BLANK THEREFOR

This invention relates to crash-bottom cartons and blanks therefor.

5 Crash-bottom cartons comprise an array of four wall panels hinged one to the next, the ends of the array being joined together to form a flattenable tubular arrangement of the wall panels with two panels on one side and two panels on the opposite side of the
10 flattened tube, bottom-forming panels being hinged to the wall panels and arranged so that when the wall panels are moved from the flattened configuration to the rectangular tubular configuration the bottom-forming panels automatically move into a co-planar configuration
15 at the bottom of the erected carton. It is known to provide subsidiary panels on the edges of the bottom-forming panels, which subsidiary panels provide partitions within the carton. With previously known crash-bottom cartons, it has only been possible to
20 provide square compartments by such partitions, if the carton is to be erectable from its flattened condition automatically. Cartons are known in which rectangular compartments are provided, but such cartons cannot easily be erected by machine. Cartons according to the
25 present invention may have rectangular compartments and are easier to erect.

2.

According to the present invention there is provided a crash-bottom carton in which first and second bottom-forming panels have hinged thereto respectively first and second partition-forming panels, at least one of the partition-forming panels being shaped to provide a notch or slot to receive the other crosswise on erection of the carton from the flattened condition, the first partition-forming panel having a portion which on erection passes over that edge of the second partition-forming panel which is remote from its bottom-forming panel to bring the partition-forming panels in the crosswise configuration.

In one form, the distance from the hinge between the second wall-forming panel and the second bottom-forming panel to said edge of the second partition-forming panel is preferably less than or equal to the distance from the corresponding hinge of the first bottom-forming panel to the closest edge of said portion of the first partition-forming panel, which passes over said edge of the second partition-forming panel. In other form, said portion is hingeable to enable it to pass over said edge. Preferably each partition-forming panel has a notch or slot, the notches or slots co-operating with each other. Preferably the said edges of the two partition-forming panels have lead-in portions to the slots which are shaped to direct the partition-forming panels into the crosswise configuration.

The invention also encompasses a blank of foldable sheet material for such a carton.

Two preferred embodiments of the invention will now be described by way of example, with reference to the accompanying drawings, wherein:

Fig.1 is a plan of a blank for forming a first carton,

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Fig. 2 shows the carton in a flattened condition prior to erection,

Fig.3 is a view of part of the interior of the carton during erection,

5 Fig.4 shows the erected carton,

Fig.5 is a plan of a blank for forming a second carton,

Fig.6 shows the second carton in a flattened condition prior to erection,

10 Fig.7 is a view of part of the interior of the second carton during erection, and

Fig. 8 shows the second carton when erected

Referring firstly to Fig.1, the blank for first carton is cut and scored from foldable board material and has four side wall-forming panels 10,12,14,16. These panels are arranged in a longitudinal row. At one end of the row, the panel 16 has a tab 18 which, on forming the carton into the flattened condition shown in Fig.2, is adhered to the panel 10 at the other end of the row, so that the flattened carton of Fig.2 is essentially tubular. All the panels 10,12,14,16 are rectangular, being hinged together by their shorter edges. The panel 10 has a lid-forming panel 20 hinged to one of its longer edges, the panel 20 having a tuck-in flap 22 hinged to its edge opposite the panel 10. The panels 12,16 also have flaps 24 hinged to their longer edges on the same side as the lid 20.

On their longer edges opposite the lid 20 and flaps 24, each of the panels 10,12,14,16 has a bottom-forming panel 26,28. The panels 28 hinged to the side wall-forming panels 12,16 are roughly rectangular, and to their edges remote from the side wall-forming panels are hinged respective partition-forming panels 30. The bottom-forming panels 26 are hinged at 40 to the side wall-forming panels 10,14 and



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are of approximately the same depth (measured away from the hinge 40) as the panels 28 and 30 taken together. One edge 32 of the panel 26 tapers diagonally, and in the carton when erected this edge 32 lies on a diagonal of one of the rectangular compartments. The opposite edge of the panel 26 has a flap 34 connected thereto by a hinge line 36 which is at 45° to the hinge line between the panels 26 and 10 or 14. This hinge line 36 is scored and perforated such
17 that the flap 34 hinges downwardly from the panel 26 (that is, in the opposite sense to all the other hinge and fold lines of the blank). At the outer end of the hinge line 36, the edge 38 of the panel 26 is nearly perpendicular to the hinge line 40. The edge 38
19 extends as a small cut 42 in the blank between the flap 34 and panel 26, to meet the hinge line 36.

At its edge 44 remote from the hinge 40, each panel 26 is hinged to a partition-forming panel 46. The panel 46 has a laterally extending portion 48, and
20 a notch 50 is formed which partially divides the portion 48 from the rest of the panel 46. The notch 50 extends from the edge 52 of the portion 48 which is closest to the hinge 40. The edge 52 has a cam-shaped recess 54 which provides a lead-in to the notch 50.

25 Each partition-forming panel 30 has a notch 56 which co-operates with the notch 50 when the carton is erected. The panel 30 has an upper edge which is cam-shaped at 58 to lead in to the notch 56. Each panel 30 also has a C-shaped cut 60 leading into the
30 panel 30 from the hinge 62 between the panels 30 and 28, to form a ledge 64 extending out of the panel 28. There is also a line of weakening 66 extending at an angle between the notch 56 and the cut 60 so that one half 68 of the panel 30 can flex to a limited extent
35 with respect to the other half 70.

5.

The blank is folded into the collapsed, flat carton of Fig.2 by folding the bottom-forming panels 26,28 over their respective wall-forming panels 10,12,14,16, folding back the flaps 34, folding
5 the panels 10 and 16 (with their associated panels) over the panels 12 and 14, and adhering the tab 18 to the inside of the panel 10 and the flaps 34 to the undersides of the panels 28.

The flattened collapsed carton shown in Fig.2 can then be erected, for example by a machine of the type disclosed in our German OLS No.2807968. The carton is erected by pushing the two ends 72,74 towards each other. This causes the side walls 10,12,14,16 to assume a rectangular configuration,
15 and as this happens the bottom-forming panels 26,28 are pulled downwardly to form the bottom of the carton by the flaps 34 which are hinged about their 45° hinge lines 30,36 and adhered to the panels 28. As the panels 26,28 are pulled downwardly, the
20 partition-forming panels 30,46 are taken inwardly, and the recess 54 meets the upper edge 59 of the half 70 of the panel 30. The cam shapes of the recess 54 and edge 59 guide the two notches 50,56 into engagement with the partitions crosswise. This is seen particularly
25 ly in Fig.3, and the finally erected carton is seen in Fig.4. As the recess 54 follows the cam shape 58 of one partition-forming panel, the edge 38 causes the half 68 of the other partition-forming panel to flex. Obviously, if the halves 70 flexed with the halves 68
30 they would hinder the proper engagement of the partitions. It is for this reason that the line of weakening 66 is provided so that the half 70 does not tend to flex with the half 68.

When the carton is completely erected, the
35 edge 38 of the panel 26 rests on the ledge 64 of the



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panel 28. In addition, the ledge 64 slots into the cut 42 as the panels 26,28 are being pulled downwardly. These two features give strength to the bottom of the carton when erected so that it can bear the weight of goods contained in the carton, as does also the fact that part of each panel 26,28 overlies part of one of its neighbours. In their fully erected positions, the notches 50,56 engage each other securely, thus maintaining the carton in its erect condition.

The erected carton thus has partitions defining six (i.e. 2 x 3) rectangular compartments into which goods can be packed. By suitable design of the blank, the compartments can be almost any rectangular shape, and for example could be square if desired. The carton could have a different number of compartments if desired; for example a carton with four compartments (2 x 2) could be made by providing only one each of the panels 30 and 46. In the carton just described, the partitions 46 are higher than the partitions 30. This is not essential, though it is desirable that the depth of the panel 26 (measured from the hinge 40) is approximately the same as or greater than the corresponding depth of the panels 28 and 30 taken together, since this helps to ensure that the edge 52 passes over the edge 59 so that the notches 50,56 are brought into engagement.

Referring now to Figs. 5 to 8; the second carton works on the same principle as the first, and in the drawings similar parts have like reference numbers, although their dimensions may be a little different. The flaps 24 have been separately identified as 24a and 24b. The major differences between the first carton and the second arise in the partition-forming panels. The second carton when

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erected has partitions which form compartments which are more nearly square than in the carton of Figs. 1 to 4; in fact the compartments of the second carton are only a few millimetres out of square.

Instead of partition-forming panels 30, the bottom-forming panels 28 have partition-forming panels 72. The panels 72 have an upper edge 74 having a notch 76. The notch 76 is barb-like and has an abutment edge 78 and a lead-in edge 80. The lead-in edge 80 is cam-shaped, like the cam-shaped edge 58 in Figs. 1 to 4 and functioning in a similar manner. The cut 60 and line of weakening 66 of Figs. 1 to 4 are not provided in the present embodiment.

The bottom-forming panels 26 have partition-forming panels 82 in place of the partition-forming panels 46 of Figs. 1 to 4. These panels 82 have laterally extending portions 84, and the portions 84 are provided with flaps 86 which are hinged to the portions 84 about hinge lines 88 which are generally parallel to the hinge lines 40. The flap 86 is on that side of the line 88 closest to the hinge line 40. The flap 86 defines a notch or slot 90 with the edge 92 of the panel 82. The opposite edge 94 of the panel 82 has a projecting portion 96.

The flaps 86 have laterally extending tabs 98, 100 respectively, the function of which will be described later. The tab 100 is flexible in relation to its flap 86, by reason of a line of weakening 102. These tabs 98, 100 and their function are novel in themselves, and may have application in other cartons than crash-bottom cartons.

The carton is erected from the blank of Fig. 5 to the flattened condition shown in Fig. 6 in the same

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manner as before, the flaps 34 being adhered to the bottom-forming panels 28 as before. In addition, the tab 98 is flicked so that it lies on the other side of the panel 24a. Similarly, the tab 100 lies behind the flap 24b, but there is no need for a special flicking operation to achieve this since the tab 100 will already be in place under the flap 24b when the tab 18 is adhered to the side wall-forming panel 10.

The carton is erected from the flattened condition in the same way as the carton of Figs.1 to 4. It will be appreciated that initially the tabs 98,100 are caught behind the flaps 24a,24b as the side walls 10,12,14,16 begin to assume a rectangular configuration. The purpose of this is to ensure that each flap 86 catches behind the edge of the corresponding panel 72, since otherwise the carton would tend not to erect properly. This is particularly true of the tab 98, since the corresponding panel 72 necessarily has a cut out portion 104 (see Fig.5) corresponding to the tab 98. However, because the tab 100 occurs at the end of the blank there is no such cut out portion on the other panel 72. It follows that it is not strictly necessary for the tab 100 to be hooked behind the flap 24b, but it is easier to make the carton into the flattened condition of Fig.6 if this is so. The line of weakening 102 assists in disengaging the tab 100 from behind the flap 24b, this being more necessary than in the case of the tab 98 because of the presence of the adjacent lid panel 20.

It will be seen from Fig.6 that each notch 76 is close to a corresponding projecting portion 96. As seen in Fig.7, when the side wall panels 10,12,14,16 are brought into their rectangular configuration, each projecting portion 96 catches in its notch 76, and the

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abutment edge 78 bears against the projecting portion 96. This ensures that the panel 82 is pushed so that the flap 86 hinges upwardly and passes over the opposite panel 72. The flaps 86
5 are thus pushed over the upper edge 74 of the panel 72, down the cam shaped edge 80, and finally the flap 86 drops over the panel 72 to lock the partitions in place in the configuration seen in Fig.8. In this erected configuration, the slot
10 or notch 90 engages with the notch 76, and because the partitions are locked the entire carton is strong and secure.

In use, cartons are supplied in the flat condition shown in Fig.2 or Fig.6 to the packer,
15 who erects the carton (which only requires one stroke and can be done automatically by a machine such as that described in our German OLS No. 2807968). He then inserts the goods (e.g. glasses, which can go on their sides and are
20 therefore presented in a more attractive display) into the compartments. The flaps 24 or 24a and 24b are then folded in, and the lid closed by tucking the flap 22 into the carton next to the side wall 14. Where glasses are being packed, preferably the
25 partitions 30 or 72 are a little higher than half the diameter of a glass.

10.

CLAIMS:

1. A crash-bottom carton comprising an array of four wall panels hinged one to the next, the ends of the array being joined together to form a flattenable tubular arrangement of the wall panels with two panels on one side and two panels on the opposite side of the flattened tube, bottom-forming panels being hinged to the wall panels and arranged so that when the wall panels are moved from the flattened configuration to the rectangular tubular configuration the bottom-forming panels automatically move into a co-planar configuration at the bottom of the erected carton, first and second said bottom-forming panels having hinged thereto respectively first and second partition-forming panels, characterised in that at least one of the partition-forming panels (30,46,72,82) is shaped to provide a notch or slot (56,50,76,90) to receive the other crosswise on erection of the carton from the flattened condition, the first partition-forming panel (46,82) having a portion (48,84,86) which on erection passes over that edge (59,74) of the second partition-forming panel which is remote from its bottom-forming panel (28) to bring the partition-forming panels into the crosswise configuration.

2. A crash-bottom carton according to claim 1 characterised in that each partition-forming panel (30,46,72,82) has a notch or slot (56,50,76,90) the notches or slots being in an upper edge (59,74) of the second partition-forming panel (30,72) and a lower edge (52) of the first partition-forming panel (46,82) and co-operating with each other when the partition-forming panels are in the crosswise configuration.

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3. A crash-bottom carton according to claim 1 or claim 2 characterised in that an edge (58,54,80) of at least one of the partition-forming panels having a said notch or slot tapers into the notch
5 or slot, the tapered edge being shaped to direct the partition-forming panels into the crosswise configuration.

4. A crash-bottom carton according to any one of the preceding claims characterised in that the
10 distance from the hinge joining the second bottom-forming panel (28) and its adjacent wall-forming panel (12,16) to said edge (59) of the second partition-forming panel is less than or equal to the distance from the corresponding hinge 40 of the
15 first bottom-forming panel to the closest edge (52) of said portion (48) of the first partition-forming panel (46) which passes over the said edge of the second partition-forming panel.

5. A crash-bottom carton according to claim 4
20 characterised in that said closest edge (52) of said portion (48) has a recess (54) leading into the notch or slot (50).

6. A crash-bottom carton according to any one of claims 1 to 3 characterised in that said portion
25 (84,86) which passes over said edge (74) of the second partition-forming panel (72) has a hinge line (88) which defines a flap (86) which is hingeable to allow the portion (84,86) to pass over said edge (74).

7. A crash-bottom carton according to claim 6
30 characterised in that said hinge line (88) extends laterally from a said notch or slot (90), the flap (86) depending below the remainder (84) of said portion.

8. A crash-bottom carton according to claim 6 or
35 claim 7 characterised in that the first partition-forming panel (82) has a laterally projecting

12.

portion (96) opposite the portion (84,86) which passes over said edge (74) of the second partition-forming panel, the laterally projecting portion (96) catching in the notch or slot (76) of a further said
5 second partition-forming panel (72) during erection of the carton.

9. A crash-bottom carton according to any one of claims 6,7 or 8 characterised in that the portion (84,86) of the first partition-forming
10 panel which passes over said edge (74) of the second partition-forming panel has a laterally projecting tab (98,100) which engages behind the second partition-forming panel during erection to ensure that said portion (84,86) passes over said edge (74).

15 10. A crash-bottom carton according to claim 9 characterised in that as the carton is erected from the flattened tubular condition, said tab (98,100) is first engaged behind a portion (24a, 24b) of the carton other than the partition-forming panels to
20 cause it then to engage behind the second partition-forming panel.

11. A crash-bottom carton according to claim 10 characterised in that said tab (100) has a line of weakening (102) to enable it to disengage from behind
25 said other portion (24a,24b) during erection.

12. A crash-bottom carton according to any one of the preceding claims characterised in that one of the bottom-forming panels (28) has a portion extending beyond the hinge line (62) with the corresponding
30 partition-forming panel (30) to form a ledge (64), which ledge supports another of the bottom-forming panels (26) when the carton is in the erected condition.

13. A blank for forming a crash-bottom carton comprising an array of four wall panels hinged one to
35 the next, means for joining the ends of the array

13.

together to form a flattenable tubular arrangement of the wall panels with two panels on one side and two panels on the opposite side of the flattened tube, bottom-forming panels being hinged to the

5 wall panels and being attachable to each other so that when the wall panels are moved from the flattened configuration to the rectangular tubular configuration the bottom-forming panels automatically move into a

10 co-planar configuration at the bottom of the erected carton, first and second said bottom-forming panels having hinged thereto respectively first and second partition-forming panels, characterised in that at least one of the partition-forming panels (30,46,72, 82) is shaped to provide a notch or slot (56,50,76,90)

15 to receive the other crosswise on erection of the carton from the flattened condition, the first partition-forming panel (46,82) having a portion (48,84,86) which on erection passes over that edge (59,74) of the second partition-forming panel which is

20 remote from its bottom-forming panel (28) to bring the partition-forming panels into the crosswise configuration.

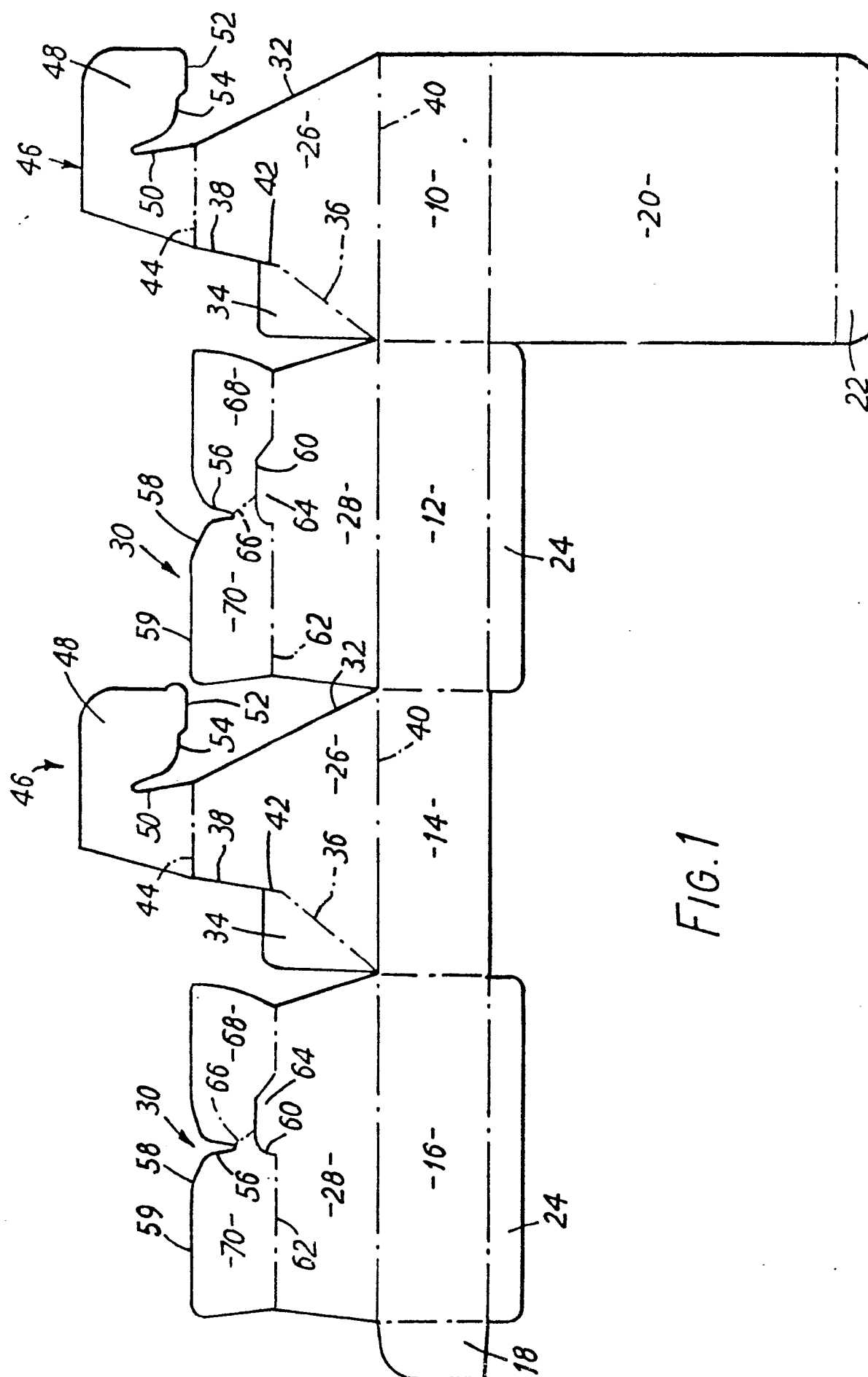


FIG. 1

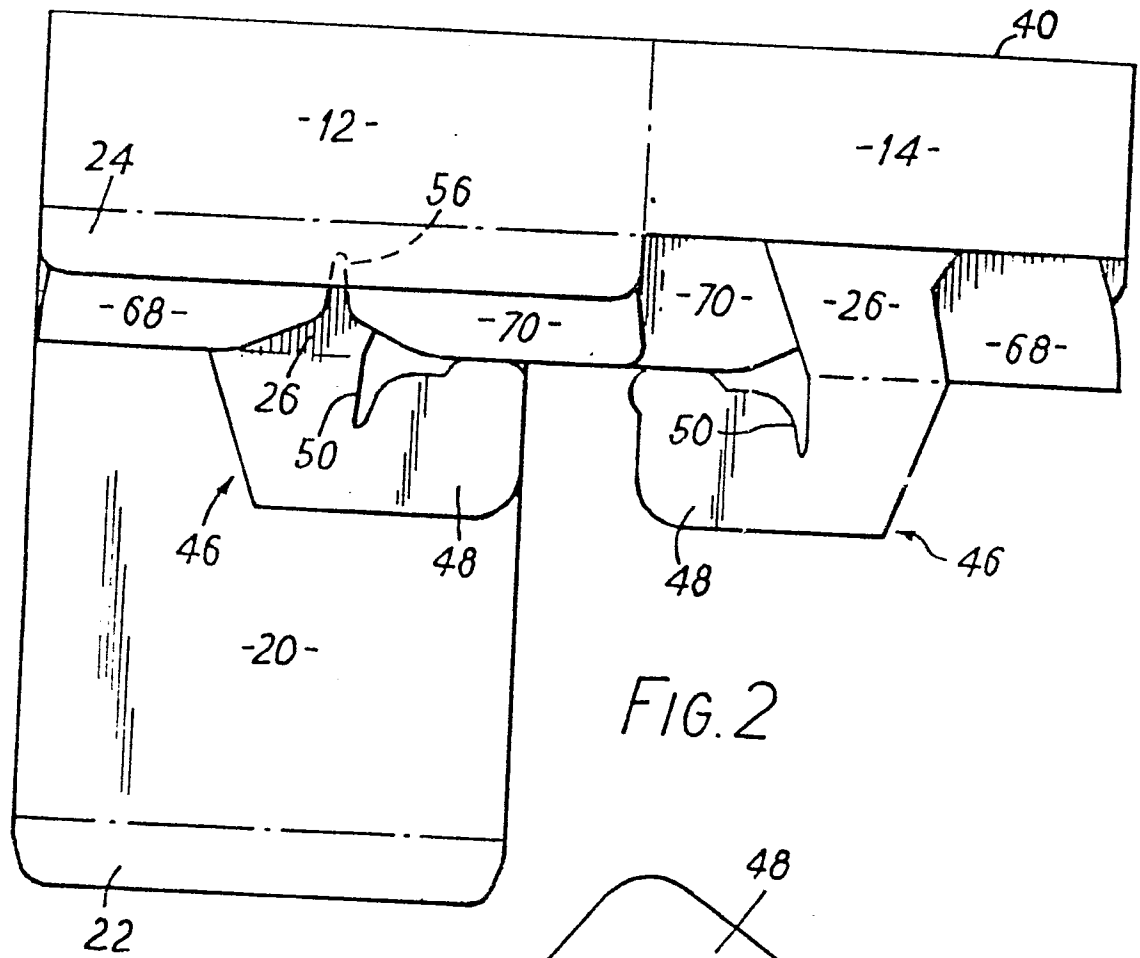


FIG. 2

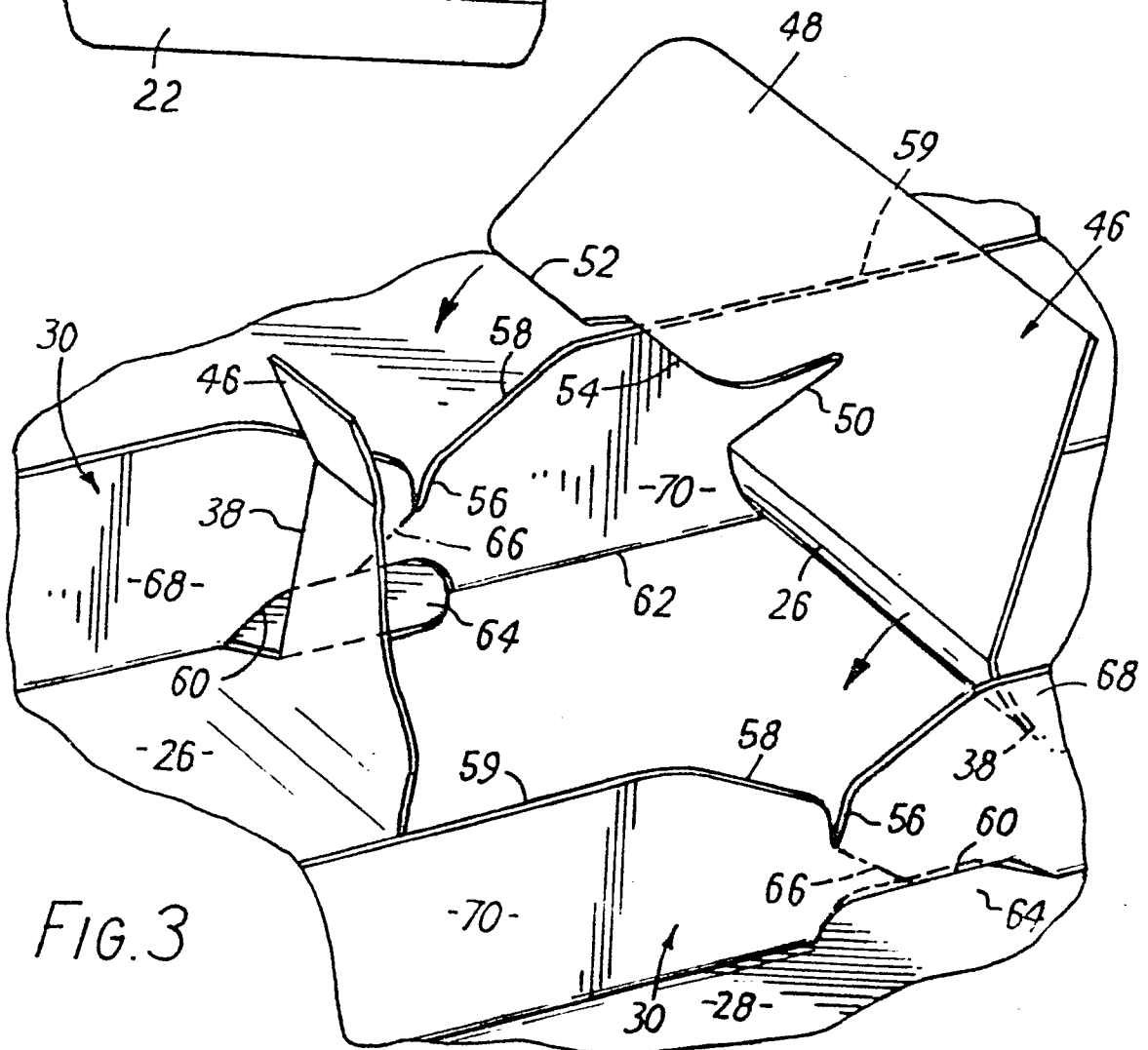
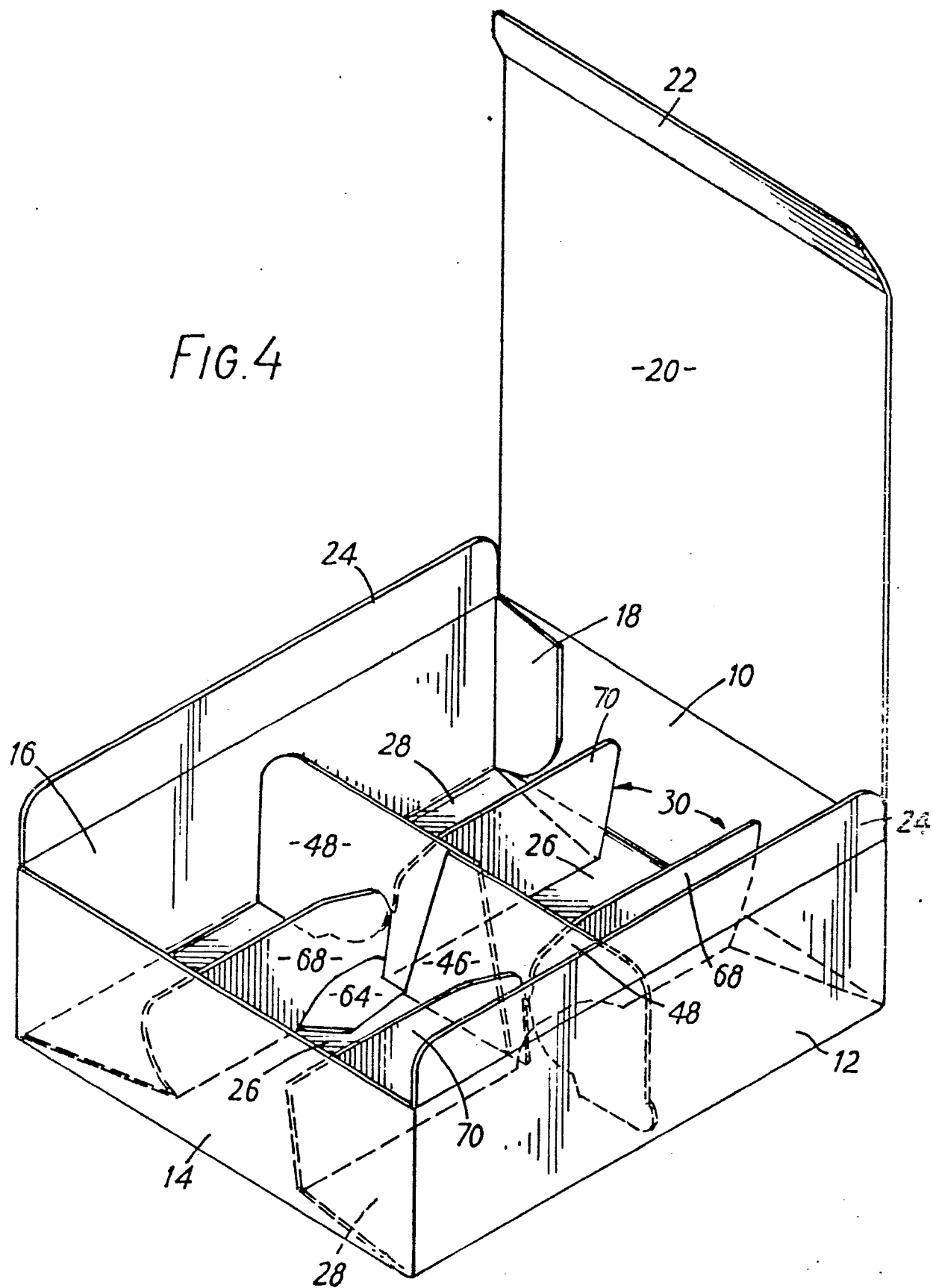


FIG. 3

FIG. 4



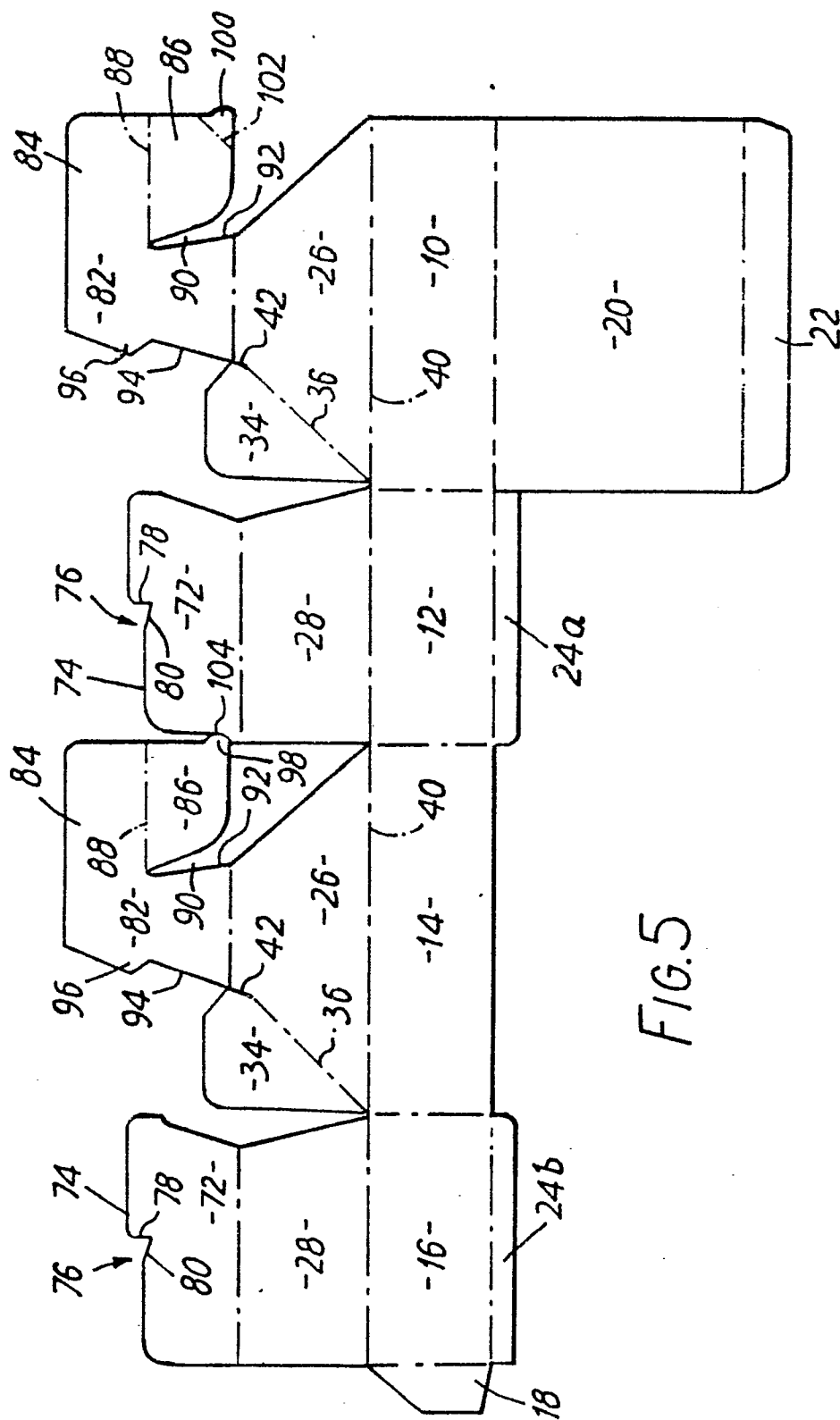


FIG. 5

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FIG. 6

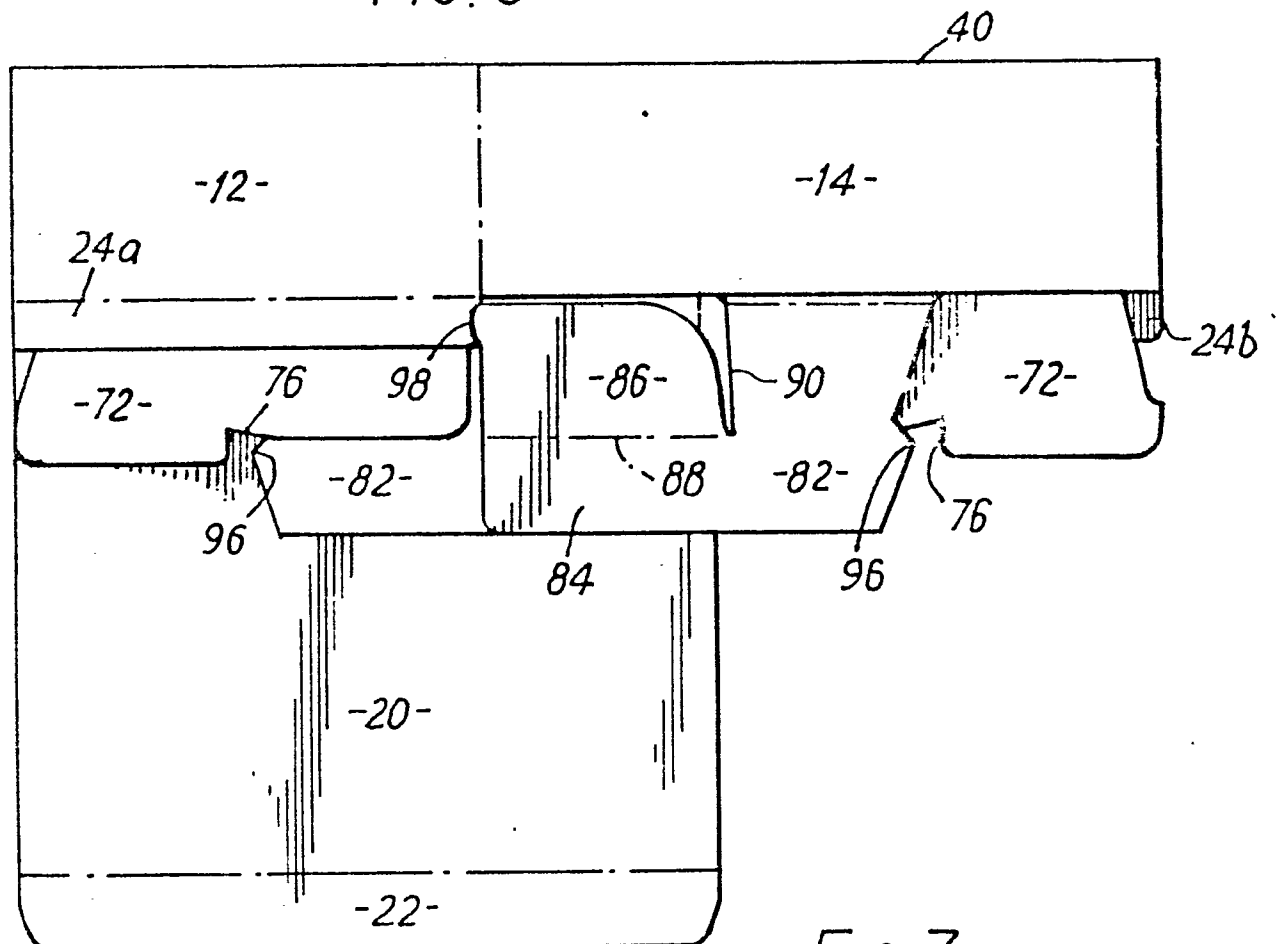


FIG. 7

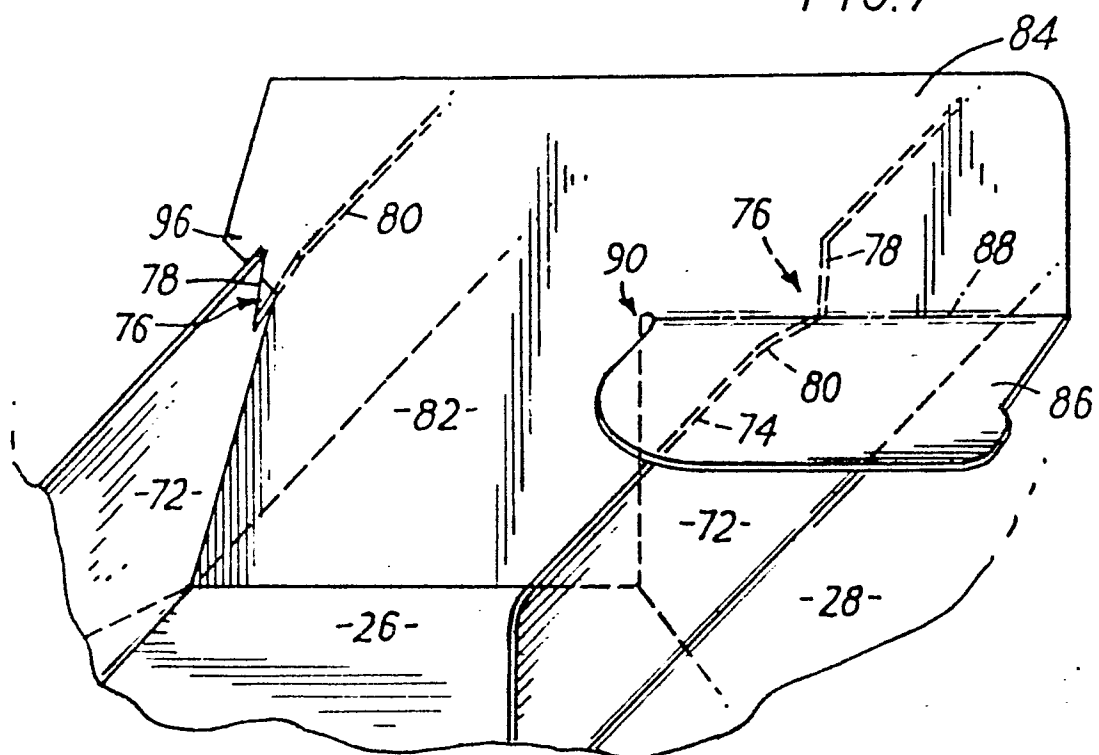
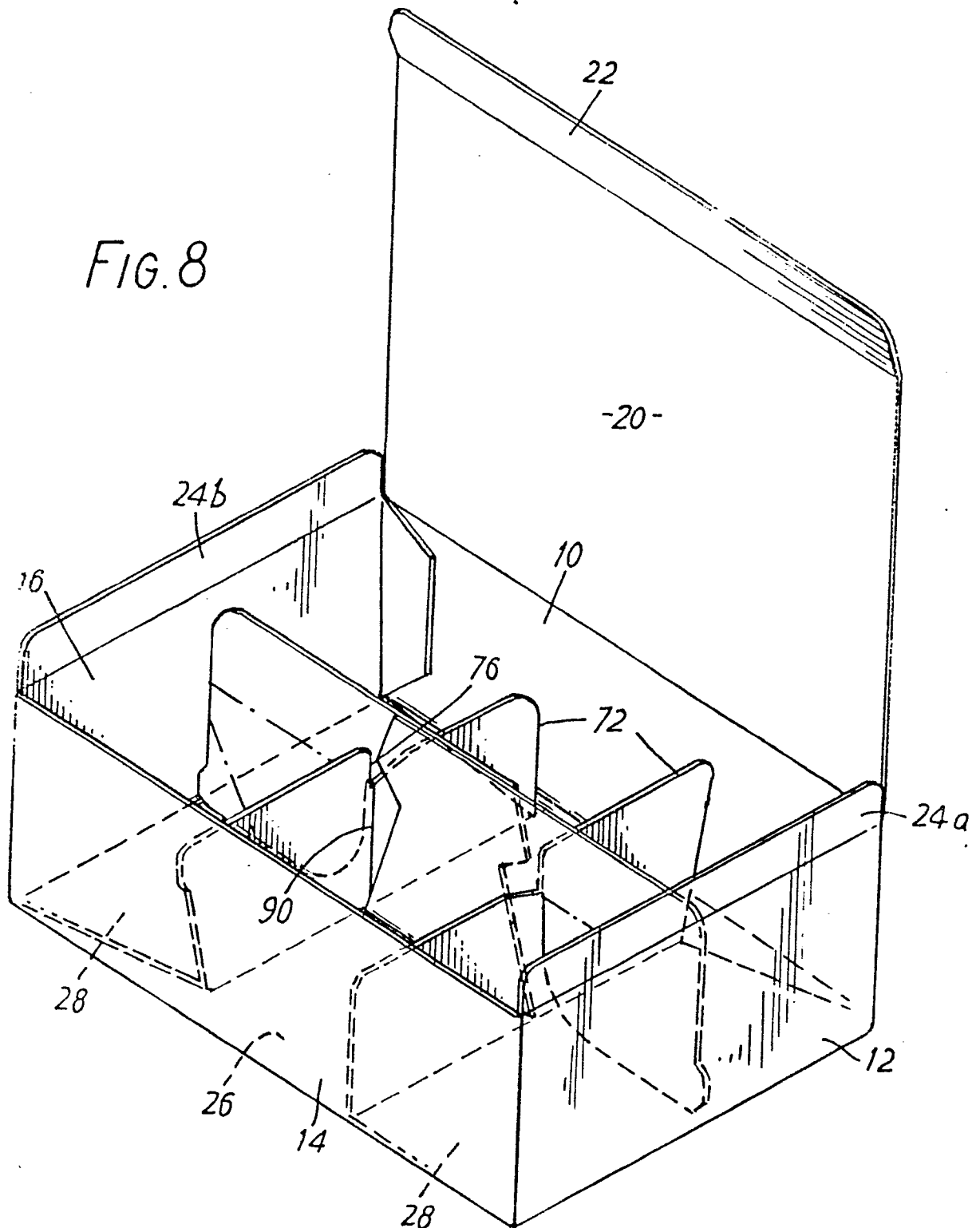


FIG. 8





European Patent
Office

EUROPEAN SEARCH REPORT

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Application number

EP 78 30 0754

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. ²)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	<u>CA - A - 987 270</u> (CONTINENTAL CAN.) * Whole *	1-3,5 13	B 65 D 5/48

	<u>FR - A - 2 147 843</u> (GODARD) * Whole *	1,3,5 13	TECHNICAL FIELDS SEARCHED (Int.Cl. ²)

	<u>FR - A - 2 245 530</u> (LA ROCHETTE-CENPA) * Whole *	1,12, 13	B 65 D

	<u>US - A - 3 963 168</u> (CONSOLIDATED) * Whole *	1-3,5 13	

			CATEGORY OF CITED DOCUMENTS
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The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
The Hague	28-02-1979	MARTIN	