Claims

1. A corrugated paperboard box made of corrugated paperboard comprising an outer linerboard (1), an inner linerboard (2), and a corrugated medium (3) provided between the outer linerboard (1) and the inner linerboard (2),

the corrugated paperboard box comprising:

a peripheral wall (41) formed by bending the corrugated paperboard into a tubular shape such that the inner linerboard (2) constitutes an inner surface of the corrugated paperboard box; and

flaps (11, 12, 13 and 14) integrally connected to one of two ends of the peripheral wall (41),

characterized in that the corrugated paperboard box is formed, at a boundary area between the peripheral wall (41) and the flaps (11, 12, 13 and 14), with a groove-shaped reverse scoreline (16) recessed on a side of the outer linerboard (1), and a pair of groove-shaped recesses (19a and 19b) recessed on a side of the inner linerboard (2), and extending in parallel to each other so as to sandwich an area in which the reverse scoreline (16) extends,

wherein the corrugated paperboard box is formed, in one (19b) of the groove-shaped recesses (19a and 19b), with a perforated line (17) along which the flaps (11, 12, 13 and 14) can be separated from the peripheral wall (41), and which comprises a plurality of cuts (31) extending to penetrate through the inner linerboard (2), the corrugated medium (3), and the outer linerboard (1), and

wherein the corrugated paperboard is configured such that the

flaps (11, 12, 13 and 14) can be bent along the perforated line (17) toward an inner surface of the peripheral wall (41).

2. The corrugated paperboard box according to claim 1, wherein each of the cuts (31) of the perforated line (17) comprises a first cut portion (31a) formed in the outer linerboard (1), and a second cut portion (31b) formed in the inner linerboard (2), and

wherein the perforated line (17) is formed such that widths of the first cut portions (31a) in an orthogonal direction to a direction in which the perforated line (17) extends are smaller than widths of the second cut portions (31b) in the orthogonal direction.

3. The corrugated paperboard box according to claim 1 or 2, wherein the perforated line (17) is formed such that each of the first cut portions (31a) on the side of the outer linerboard (1) includes a peripheral edge portion (32) having a protruding shape, and each of the second cut portions (31b) on the side of the inner linerboard (2) includes a peripheral edge portion (33) having a recessed shape.

4. A perforation forming method for perforating a corrugated paperboard sheet (55) comprising an outer linerboard (1), an inner linerboard (2), and a corrugated medium (3) provided between the outer linerboard (1) and the inner linerboard (2),

the perforation forming method comprising:

providing: a first reverse scoreline ring (67) formed on an outer periphery of the first reverse scoreline ring (67) with a groove (72), and a

pair of groove shoulders (73) arranged on two axial sides of the groove (72), respectively; and a second reverse scoreline ring (68) formed on an outer periphery of the second reverse scoreline ring (68) with a protrusion (70) opposed to the groove (72) of the first reverse scoreline ring (67) and continuously extending in a circumferential direction, and a pair of recesses (71) arranged on two axial sides of the protrusion (70), respectively;

arranging the first and second reverse scoreline rings (67 and 68) on a side of the inner linerboard (2) and on a side of the outer linerboard (1), respectively;

sandwiching, with the first and second reverse scoreline rings (67 and 68), the corrugated paperboard sheet (55), while the corrugated paperboard sheet (55) is being fed, from the side of the inner linerboard (2) and the side of the outer linerboard (1), respectively, such that a groove-shaped reverse scoreline (16) recessed on the side of the outer linerboard (1) is formed in the corrugated paperboard sheet (55) by being sandwiched between the groove (72) of the first reverse scoreline ring (67) and the protrusion (70) of the second reverse scoreline ring (68); and such that a pair of groove-shaped recesses (19a and 19b) recessed on the side of the inner linerboard (2), and extending in parallel to each other so as to sandwich an area in which the reverse scoreline (16) extends are formed in the corrugated paperboard sheet (55) by being sandwiched between the groove shoulders (73) of the first reverse scoreline ring (67) and the recesses (71) of the second reverse scoreline ring (68); and

forming a perforated line (17) in one (19b) of the groove-shaped recesses (19a and 19b) with a perforation forming knife (89) arranged on

a downstream side of the first and second reverse scoreline rings (67 and 68), the perforated line (17) comprising a plurality of cuts (31) extending to penetrate through the inner linerboard (2), the corrugated medium (3), and the outer linerboard (1).

5. The perforation forming method according to claim 4, wherein the perforation forming knife (89) is configured to cut the corrugated paperboard sheet (55) from the side of the inner linerboard (2) toward the side of the outer linerboard (1).

6. The perforation forming method according to claim 4 or 5, wherein the perforation forming knife (89) comprises a disk-shaped knife formed on an outer periphery of the disk-shaped knife with a plurality of cutting portions (96) protruding radially outwardly, and equidistantly spaced apart from each other, and

wherein each of the cutting portions (96) comprises a radially outer cutting edge (97), a front cutting edge (98) in a rotation direction of the perforation forming knife (89), and a rear cutting edge (99) in the rotation direction.

7. A perforation forming device for perforating a corrugated paperboard sheet (55) comprising an outer linerboard (1), an inner linerboard (2), and a corrugated medium (3) provided between the outer linerboard (1) and the inner linerboard (2),

the perforation forming device comprising:

a first reverse scoreline ring (67) arranged on a side of the inner

linerboard (2), and formed on an outer periphery of the first reverse scoreline ring (67) with a groove (72), and a pair of groove shoulders (73) arranged on two axial sides of the groove (72), respectively;

a second reverse scoreline ring (68) arranged on a side of the outer linerboard (1), and formed on an outer periphery of the second reverse scoreline ring (68) with a protrusion (70) opposed to the groove (72) of the first reverse scoreline ring (67), and continuously extending in a circumferential direction, and a pair of recesses (71) arranged on two axial sides of the protrusion (70), respectively, wherein the pair of first and second reverse scoreline rings (67 and 68) are configured to sandwich the corrugated paperboard sheet (55), while the corrugated paperboard sheet (55) is being fed, from the side of the inner linerboard (2) and the side of the outer linerboard (1), respectively, such that a groove-shaped reverse scoreline (16) recessed on the side of the outer linerboard (1) is formed in the corrugated paperboard sheet (55) by being sandwiched between the groove (72) of the first reverse scoreline ring (67) and the protrusion (70) of the second reverse scoreline ring (68), and such that a pair of groove-shaped recesses (19a and 19b) recessed on the side of the inner linerboard (2), and extending in parallel to each other so as to sandwich an area in which the reverse scoreline (16) extends are formed in the corrugated paperboard sheet (55) by being sandwiched between the groove shoulders (73) of the first reverse scoreline ring (67) and the recesses (71) of the second reverse scoreline ring (68); and

a perforation forming knife (89) arranged on a downstream side of the first and second reverse scoreline rings (67 and 68), and configured to form a perforated line (17) in one (19b) of the groove-shaped recesses (19a

and 19b), the perforated line (17) comprising a plurality of cuts (31) extending to penetrate through the inner linerboard (2), the corrugated medium (3), and the outer linerboard (1).

8. The perforation forming device according to claim 7, wherein the perforation forming knife (89) is configured to cut the corrugated paperboard sheet (55) from the side of the inner linerboard (2) toward the side of the outer linerboard (1).

9. The perforation forming device according to claim 7 or 8, wherein the perforation forming knife (89) comprises a disk-shaped knife formed on an outer periphery of the disk-shaped knife with a plurality of cutting portions (96) protruding radially outwardly, and equidistantly spaced apart from each other, and

wherein each of the cutting portions (96) comprises a radially outer cutting edge (97), a front cutting edge (98) in a rotation direction of the perforation forming knife (89), and a rear cutting edge (99) in the rotation direction thereof.

10. A corrugated paperboard box made of corrugated paperboard comprising: an outer linerboard (1); an inner linerboard (2); a corrugated medium (3) provided between the outer linerboard (1) and the inner linerboard (2),

the corrugated paperboard box comprising:

a peripheral wall (41) formed by bending the corrugated paperboard into a tubular shape such that the inner linerboard (2)

constitutes an inner surface of the corrugated paperboard box; and

flaps (11, 12, 13 and 14) integrally connected to one of two ends of the peripheral wall (41);

characterized in that the corrugated paperboard box is formed, at a boundary area between the peripheral wall (41) and the flaps (11, 12, 13 and 14), with a groove-shaped reverse scoreline (16) recessed on a side of the outer linerboard (1), and a perforated line (17) along which the flaps (11, 12, 13 and 14) can be separated from the peripheral wall (41), and which comprises a plurality of cuts (31) extending to penetrate through the inner linerboard (2), the corrugated medium (3), and the outer linerboard (1),

wherein the perforated line (17) is formed within the reverse scoreline (16),

wherein each of the cuts (31) of the perforated line (17) comprises a first cut portion (31a) formed in the outer linerboard (1), and a second cut portion (31b) formed in the inner linerboard (2), and

wherein the perforated line (17) is formed such that widths (W_1) of the first cut portions (31a) in an orthogonal direction to a direction in which the perforated line (17) extends are smaller than widths (W_2) of the second cut portions (31b) in the orthogonal direction.

11. The corrugated paperboard box according to claim 10, wherein the perforated line (17) is formed such that each of the first cut portions (31a) on the side of the outer linerboard (1) includes a peripheral edge portion (32) having a protruding shape, and each of the second cut portions (31b) on a side of the inner linerboard (2) includes a peripheral

edge portion (33) having a recessed shape.

12. A perforation forming method for perforating a corrugated paperboard sheet (55) comprising an outer linerboard (1), an inner linerboard (2), and a corrugated medium (3) provided between the outer linerboard (1) and the inner linerboard (2),

the perforation forming method comprising:

a reverse scoreline forming step of forming in the corrugated paperboard sheet (55) a groove-shaped reverse scoreline (16) recessed on a side of the outer linerboard (1) by sandwiching the corrugated paperboard sheet (55) from the side of the outer linerboard (1) and a side of the inner linerboard (2) with a pair of reverse scoreline rings (67 and 68); and

a perforation forming step of forming, after the reverse scoreline forming step, a perforated line (17) in the reverse scoreline (16) with a perforation forming knife (89), the perforated line (17) comprising a plurality of cuts (31) extending to penetrate through the inner linerboard (2), the corrugated medium (3), and the outer linerboard (1),

wherein the perforation forming knife (89) is configured to cut the corrugated paperboard sheet (55) from the side of the inner linerboard (2) toward the side of the outer linerboard (1).

13. The perforation forming method according to claim 12, wherein the perforation forming knife (89) comprises a disk-shaped knife formed on an outer periphery of the disk-shaped knife with a plurality of cutting portions (96) protruding radially outwardly, and spaced apart

from each other at regular intervals, and

wherein each of the cutting portions (96) comprises a radially outer cutting edge (97), a front cutting edge (98) in a rotation direction of the perforation forming knife (89), and a rear cutting edge (99) in the rotation direction thereof.

14. A perforation forming device for perforating a corrugated paperboard sheet (55) comprising: an outer linerboard (1); an inner linerboard (2); and a corrugated medium (3) provided between the outer linerboard (1) and the inner linerboard (2),

the perforation forming device comprising:

a reverse scoreline forming device (64) including a pair of reverse scoreline rings (67 and 68) configured to sandwich the corrugated paperboard sheet (55) from a side of the outer linerboard (1) and a side of the inner linerboard (2), respectively so as to form in the corrugated paperboard sheet (55) a groove-shaped reverse scoreline (16) recessed on the side of the outer linerboard (1); and

a perforation forming knife (89) arranged on a downstream side of the reverse scoreline rings (67 and 68), and configured to form a perforated line (17) in the reverse scoreline (16), the perforated line (17) comprising a plurality of cuts (31) extending to penetrate through the inner linerboard (2), the corrugated medium (3), and the outer linerboard (1),

wherein the perforation forming knife (89) is configured to cut the corrugated paperboard sheet (55) from the side of the inner linerboard (2) toward the side of the outer linerboard (1).

15. The perforation forming device according to claim 14, wherein the perforation forming knife (89) comprises a disk-shaped knife formed on an outer periphery of the disk-shaped knife with a plurality of cutting portions (96) protruding radially outwardly, and spaced apart from each other at regular intervals, and

wherein each of the cutting portions (96) comprises a radially outer cutting edge (97), a front cutting edge (98) in a rotation direction of the perforation forming knife (89), and a rear cutting edge (99) in the rotation direction thereof.

16. A corrugated paperboard box made of corrugated paperboard comprising an outer linerboard (1), an inner linerboard (2), a corrugated medium (3) provided between the outer linerboard (1) and the inner linerboard (2),

the corrugated paperboard box comprising:

a peripheral wall (41) formed by bending the corrugated paperboard into a tubular shape such that the inner linerboard (2) constitutes an inner surface of the corrugated paperboard box; and

flaps (11, 12, 13 and 14) integrally connected to one of two ends of the peripheral wall (41);

characterized in that the corrugated paperboard box is formed, between the peripheral wall (41) and the flaps (11, 12, 13 and 14), with a groove-shaped normal scoreline (29) recessed on a side of the inner linerboard (2) so that the flaps (11, 12, 13 and 14) can be bent along the normal scoreline (29) toward an inner surface of the peripheral wall (41),

wherein the corrugated paperboard box is further formed with a perforated line (17) which is located within the normal scoreline (29), and along which the flaps (11, 12, 13 and 14) can be separated from the peripheral wall (41),

wherein the corrugated paperboard box is further formed, at a position spaced apart from the normal scoreline (29) toward the flaps (11, 12, 13 and 14), with a groove-shaped reverse scoreline (16) extending in parallel to the normal scoreline (29), and recessed on a side of the outer linerboard (1) so that the flaps (11, 12, 13 and 14) can be bent along the reverse scoreline (16) toward an outer surface of the peripheral wall (41), and

wherein the reverse scoreline (16) is arranged such that a distance (B) between a center of the normal scoreline (29) and a center of the reverse scoreline (16) is set within 5 mm to 20 mm.

17. The corrugated paperboard box according to claim 16, wherein a depth (A_2) of the reverse scoreline (16) is equal to or larger than a depth (A_1) of the normal scoreline (29).