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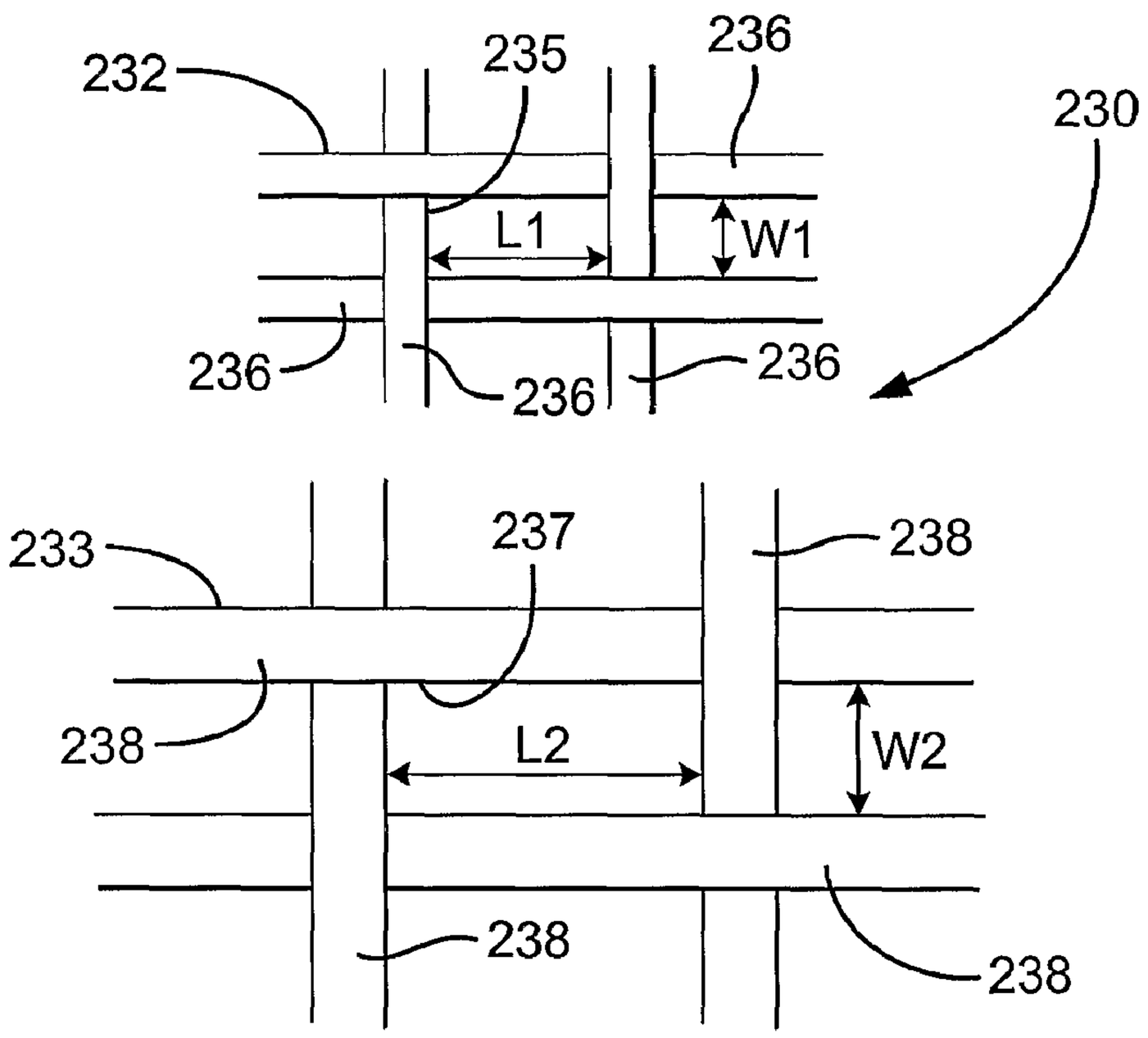
(54) Titre : ENSEMBLE TAMIS POUR SEPARATEUR VIBRANT
(54) Title: A SCREEN ASSEMBLY FOR A VIBRATORY SEPARATOR



(57) Abrégé/Abstract:
A screen assembly for use in a vibratory separator, the screen assembly comprising first and second layers of screening material, said first layer having screen mesh (232) with oblong openings, each of the oblong openings having a width (W1) and a length (L1), the ratio of the length to the width (W1) ranging between 1.55 and 2.00. Preferably, the second layer has screen mesh (233) with oblong openings, each of the oblong openings having a width (W2) and a length (L2), the ratio of the length (L2) to the width ranging between 1.55 and 2.00. Advantageously, the ratio of the length (L1) of the oblong openings of the first layer to the width (W2) of the oblong openings of the second layer ranges between 0.95 and 1.05.

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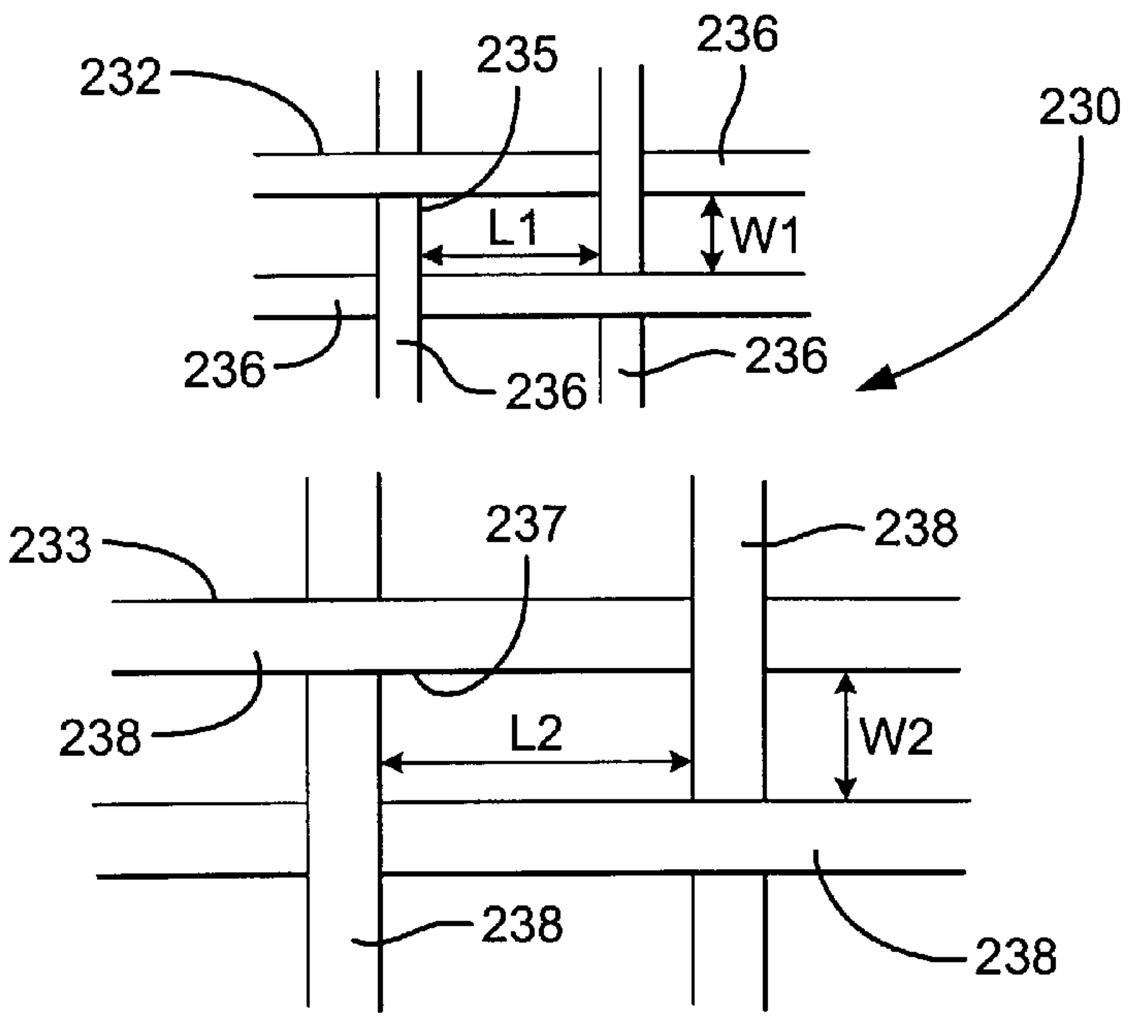
[Continued on next page]

(54) Title: A SCREEN ASSEMBLY FOR A VIBRATORY SEPARATOR



(57) Abstract: A screen assembly for use in a vibratory separator, the screen assembly comprising first and second layers of screening material, said first layer having screen mesh (232) with oblong openings, each of the oblong openings having a width (W1) and a length (L1), the ratio of the length to the width (W1) ranging between 1.55 and 2.00. Preferably, the second layer has screen mesh (233) with oblong openings, each of the oblong openings having a width (W2) and a length (L2), the ratio of the length (L2) to the width ranging between 1.55 and 2.00. Advantageously, the ratio of the length (L1) of the oblong openings of the first layer to the width (W2) of the oblong openings of the second layer ranges between 0.95 and 1.05.

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CLAIMS:

1. A method for separating fluid and fibrous lost-circulation material from a mixture of fluid, fibrous lost-circulation material and particles, the method comprising the steps of introducing the mixture onto a screen assembly in a vibratory separator, the screen assembly having at least one layer of screening material having mesh oblong openings and at least a second layer of screening material having oblong openings beneath the first layer of screening material.

2. A method as claimed in claim 1, wherein the second layer of screening material comprises openings greater in size than the openings in the first layer of screening material.

3. A method as claimed in claim 1 or 2, wherein the first layer is bonded to the second layer.

4. A method as claimed in claim 1, 2 or 3, wherein the first layer is mechanically connected to the second layer.

5. A method as claimed in any one of claims 1 to 4, the screen assembly further comprising a third layer of screening material connected to at least one of the first and second layers.

6. A method as claimed in claim 5, wherein the third screening material layer comprises coarse mesh screening material.

7. A method as claimed in any one of claims 1 to 6, wherein the lengths of the oblong openings in the first layer are parallel to lengths of the oblong openings in the second layer.

8. A method as claimed in any one of claims 1 to 6, wherein the lengths of the oblong openings in the first layer are at right angles or at any desired angle to the oblong openings in the second layer.

9. A method as claimed in any one of claims 1 to 8, the

screen assembly further comprising a screen support.

10. A method as claimed in claim 9, wherein at least one of the first and second layers is bonded to the screen support.

11. A method as claimed in claim 9 or 10, wherein the screen support includes a series of spaced-apart strips.

12. A method as claimed in claim 9, 10 or 11, wherein the screen support includes a perforated plate.

13. A method as claimed in any one of claims 9 to 12, wherein the screen support includes a frame.

14. A method as claimed in claim 13, wherein the frame includes two pairs of parallel spaced-apart sides forming a four-sided outer frame member and a plurality of spaced-apart crossmembers, each crossmember extending from one side of one of the pairs of parallel spaced-apart sides of the outer frame member to an opposing parallel side thereof.

15. A method as claimed in any one of claims 9 to 14, wherein at least one of the first and second layers is mechanically connected to the screen support.

16. A method as claimed in any one of claims 1 to 15, wherein the largest dimension of the oblong openings is in the same general direction as the flow of the mixture.

17. A method as claimed in any one of claims 1 to 16, wherein the largest dimension of the oblong openings is substantially perpendicular to the direction of flow of the mixture.

18. A method as claimed in any one of claims 1 to 17, wherein the ratio of the length to the width of the oblong opening in the first layer ranging between 1.55 and 2.00.

19. A method as claimed in any one of claims 1 to 18, wherein the ratio of the length to the width of the oblong opening in the second layer ranging between 1.55 and 2.00.

20. A method as claimed in any one of claims 1 to 19, wherein the ratio of the length of the oblong openings of the first layer to the width of the oblong openings of the second layer ranges between 0.95 and 1.05.

21. A method as claimed in any one of claims 1 to 20, wherein said particles are cuttings from a drill bit in a wellbore.

22. A screen assembly for a vibratory separator for separating components of a mixture of fluid and fibrous lost circulation material, the fibrous lost circulation material comprising a multiplicity of fibers, the screen assembly comprising:

a plurality of screens one on top of the other and including at least a first screen and a second screen, the first screen comprising a screen mesh woven with first non-square openings as viewed from above;

the second screen comprising a screen mesh woven with second non-square openings as viewed from above;

the first non-square openings generally rectangular and the second non-square openings generally rectangular and, as viewed from above, lengths of the first non-square openings transverse to lengths of the second non-square openings; and

at least one fiber of the fibers of fibrous lost circulation material caught on screen mesh of the first or second screen.

23. The screen assembly of claim 22, wherein the at least one fiber is a plurality of fibers.

24. The screen assembly of claim 23, wherein the at least one fiber bridges a non-square opening of the first or second screen.

25. The screen assembly of claim 23, wherein the at least one fiber is a plurality of fibers each of which bridges a non-square opening of the first or second screen.

26. The screen assembly of claim 22, wherein the first

non-square openings are larger in area as viewed from the above than the second non-square openings.

27. The screen assembly of claim 22, wherein the screen assembly has a screen support.

28. The screen assembly of claim 27, wherein the screen support is from the group consisting of spaced-apart strips, perforated plates, and frames.

29. The screen assembly of claim 27, wherein the mesh of the first screen is bonded to the mesh of the second screen.

30. The screen assembly of claim 22, wherein the mesh of the first screen is mechanically connected to the mesh of the second screen.

31. The screen assembly of claim 27, wherein at least one of the first screen and second screen is bonded to the screen support.

32. The screen assembly of claim 27, wherein at least one of the first screen and second screen is mechanically connected to the screen support.

33. The screen assembly of claim 22, wherein the first non-square openings have a length and a width and the fluid is flowable on the screen in a direction generally parallel to the length of the first non-square openings.

34. The screen assembly of claim 22, wherein the second non-square openings have a length and a width and the fluid flows on the screen in a direction generally parallel to the length of the second non-square openings.

35. The screen assembly of claim 22, wherein the screen assembly includes at least one screen with at least a portion thereof comprising interlinked screening material.

36. The screen assembly of claim 22, wherein the screen assembly includes a third screen connected to at least one of the first and second screen.

37. A screen assembly for a vibratory separator for

separating components of a mixture of fluid and fibrous lost circulation material, the fibrous lost circulation material comprising a multiplicity of fibers, the screen assembly comprising:

a plurality of screens one on top of the other and including at least a first screen and a second screen, the first screen comprising a screen mesh woven with first non-square openings as viewed from above;

the second screen comprising a screen mesh woven with second non-square openings as viewed from above;

the first non-square openings generally rectangular and the second non-square openings generally rectangular and, as viewed from above, lengths of the first non-square openings parallel to lengths of the second non-square openings; and

at least one fiber of the fibers of fibrous lost circulation material caught on screen mesh of the first or second screen.

38. The screen assembly of claim 37, wherein the at least one fiber is a plurality of fibers.

39. The screen assembly of claim 38, wherein the at least one fiber bridges a non-square opening of the first or second screen.

40. The screen assembly of claim 39, wherein the at least one fiber is a plurality of fibers each of which bridges a non-square opening of the first or second screen.

41. The screen assembly of claim 37, wherein the first non-square openings are larger in area as viewed from above than the second non-square openings.

42. The screen assembly of claim 37, wherein the screen assembly has a screen support from the group consisting of spaced-apart strips, perforated plates, and frames.

43. The screen assembly of claim 37, wherein the mesh of the first screen is bonded to the mesh of the second screen.

44. The screen assembly of claim 37, wherein the mesh of the first screen is mechanically connected to the mesh of the second screen.

45. The screen assembly of claim 42, wherein at least one of the first screen and second screen is bonded to the screen support.

46. The screen assembly of claim 42, wherein at least one of the first screen and second screen is mechanically connected to the screen support.

47. A screen assembly for use in a vibratory separator apparatus, the screen assembly comprising:

at least two layers of screening material one on top of the other and including at least a first layer over a second layer, each layer having screen mesh with rectangular openings as viewed from above;

the first layer having first rectangular openings, and the second layer having second rectangular openings;

each of the first rectangular openings having a first width and a first length, and each of the second rectangular openings having a second width and a second length;

the ratio of the first length to the first width ranging between 1.55 and 2.00;

the ratio of the second length to the second width ranging between 1.55 and 2.00; and

the ratio of the first length to the second width ranging between 0.95 and 1.05.

48. The screen assembly of claim 47, wherein the ratio of the first length to the first width is about 1.6, the ratio of the second length to the second width is about 1.7, and the ratio of the first length to the second width is about 1.0 and the lengths of the first rectangular openings are parallel to lengths of the second rectangular openings.

49. The screen assembly of claim 47, further comprising a

screen support beneath the at least two layers of screening material.

50. The screen assembly of claim 49, wherein the screen support includes a series of spaced-apart strips.

51. The screen assembly of claim 49, wherein the screen support includes a perforated plate.

52. The screen assembly of claim 49, wherein the screen support includes a frame.

53. The screen assembly of claim 52, wherein the frame includes two pairs of parallel spaced-apart sides forming a four-sided outer frame member and a plurality of spaced-apart crossmembers, each crossmember extending from one side of one of the pairs of parallel spaced-apart sides of the outer frame member to an opposing parallel side thereof.

54. The screen assembly of claim 47, wherein the mesh of the first layer is bonded to the mesh of the second layer.

55. The screen assembly of claim 47, wherein the mesh of the first layer is mechanically connected to the mesh of the second layer.

56. The screen assembly of claim 49, wherein at least one of the first and second layers is bonded to the screen support.

57. The screen assembly of claim 49, wherein at least one of the first screen and second layers is mechanically connected to the screen support.

58. The screen assembly of claim 47, wherein the screen assembly includes a third screening material layer connected to at least one of the first and second layers.

59. The screen assembly of claim 58, wherein the third screening material layer comprises coarse mesh screening material.

60. A screen assembly for use on a vibratory separator apparatus, the screen assembly comprising:

at least two layers of screening material one on top of the other and including at least a first layer and a second layer, the first layer having screen mesh with rectangular openings as viewed from above;

the first layer having first rectangular openings, and the second layer having second openings;

each of the first rectangular openings having a first width and a first length, and each of the second openings having a second width and a second length;

the ratio of the first length to the first width ranging between 1.55 and 2.00;

the ratio of the second length to the second width ranging between 1.55 and 2.00; and

the ratio of the first length to the second width ranging between 0.95 and 1.05.

CLAIMS:

1. A method for separating fluid and fibrous lost-circulation material from a mixture of fluid, fibrous lost-circulation material and particles, the method comprising the steps of introducing the mixture onto a screen assembly in a vibratory separator, the screen assembly having at least one layer of screening material having mesh oblong openings and at least a second layer of screening material having oblong openings beneath the first layer of screening material.

2. A method as claimed in claim 1, wherein the second layer of screening material comprises openings greater in size than the openings in the first layer of screening material.

3. A method as claimed in claim 1 or 2, wherein the first layer is bonded to the second layer.

4. A method as claimed in claim 1, 2 or 3, wherein the first layer is mechanically connected to the second layer.

5. A method as claimed in any one of claims 1 to 4, the screen assembly further comprising a third layer of screening material connected to at least one of the first and second layers.

6. A method as claimed in claim 5, wherein the third screening material layer comprises coarse mesh screening material.

7. A method as claimed in any one of claims 1 to 6, wherein the lengths of the oblong openings in the first layer are parallel to lengths of the oblong openings in the second layer.

8. A method as claimed in any one of claims 1 to 6, wherein the lengths of the oblong openings in the first layer are at right angles or at any desired angle to the oblong openings in the second layer.

9. A method as claimed in any one of claims 1 to 8, the

screen assembly further comprising a screen support.

10. A method as claimed in claim 9, wherein at least one of the first and second layers is bonded to the screen support.

11. A method as claimed in claim 9 or 10, wherein the screen support includes a series of spaced-apart strips.

12. A method as claimed in claim 9, 10 or 11, wherein the screen support includes a perforated plate.

13. A method as claimed in any one of claims 9 to 12, wherein the screen support includes a frame.

14. A method as claimed in claim 13, wherein the frame includes two pairs of parallel spaced-apart sides forming a four-sided outer frame member and a plurality of spaced-apart crossmembers, each crossmember extending from one side of one of the pairs of parallel spaced-apart sides of the outer frame member to an opposing parallel side thereof.

15. A method as claimed in any one of claims 9 to 14, wherein at least one of the first and second layers is mechanically connected to the screen support.

16. A method as claimed in any one of claims 1 to 15, wherein the largest dimension of the oblong openings is in the same general direction as the flow of the mixture.

17. A method as claimed in any one of claims 1 to 16, wherein the largest dimension of the oblong openings is substantially perpendicular to the direction of flow of the mixture.

18. A method as claimed in any one of claims 1 to 17, wherein the ratio of the length to the width of the oblong opening in the first layer ranging between 1.55 and 2.00.

19. A method as claimed in any one of claims 1 to 18, wherein the ratio of the length to the width of the oblong opening in the second layer ranging between 1.55 and 2.00.

20. A method as claimed in any one of claims 1 to 19, wherein the ratio of the length of the oblong openings of the first layer to the width of the oblong openings of the second layer ranges between 0.95 and 1.05.

21. A method as claimed in any one of claims 1 to 20, wherein said particles are cuttings from a drill bit in a wellbore.

22. A screen assembly for a vibratory separator for separating components of a mixture of fluid and fibrous lost circulation material, the fibrous lost circulation material comprising a multiplicity of fibers, the screen assembly comprising:

a plurality of screens one on top of the other and including at least a first screen and a second screen, the first screen comprising a screen mesh woven with first non-square openings as viewed from above;

the second screen comprising a screen mesh woven with second non-square openings as viewed from above;

the first non-square openings generally rectangular and the second non-square openings generally rectangular and, as viewed from above, lengths of the first non-square openings transverse to lengths of the second non-square openings; and

at least one fiber of the fibers of fibrous lost circulation material caught on screen mesh of the first or second screen.

23. The screen assembly of claim 22, wherein the at least one fiber is a plurality of fibers.

24. The screen assembly of claim 23, wherein the at least one fiber bridges a non-square opening of the first or second screen.

25. The screen assembly of claim 23, wherein the at least one fiber is a plurality of fibers each of which bridges a non-square opening of the first or second screen.

26. The screen assembly of claim 22, wherein the first

non-square openings are larger in area as viewed from the above than the second non-square openings.

27. The screen assembly of claim 22, wherein the screen assembly has a screen support.

28. The screen assembly of claim 24, wherein the screen support is from the group consisting of spaced-apart strips, perforated plates, and frames.

29. The screen assembly of claim 27, wherein the mesh of the first screen is bonded to the mesh of the second screen.

30. The screen assembly of claim 22, wherein the mesh of the first screen is mechanically connected to the mesh of the second screen.

31. The screen assembly of claim 27, wherein at least one of the first screen and second screen is bonded to the screen support.

32. The screen assembly of claim 27, wherein at least one of the first screen and second screen is mechanically connected to the screen support.

33. The screen assembly of claim 22, wherein the first non-square openings have a length and a width and the fluid is flowable on the screen in a direction generally parallel to the length of the first non-square openings.

34. The screen assembly of claim 22, wherein the second non-square openings have a length and a width and the fluid flows on the screen in a direction generally parallel to the length of the second non-square openings.

35. The screen assembly of claim 22, wherein the screen assembly includes at least one screen with at least a portion thereof comprising interlinked screening material.

36. The screen assembly of claim 22, wherein the screen assembly includes a third screen connected to at least one of the first and second screen.

37. A screen assembly for a vibratory separator for

separating components of a mixture of fluid and fibrous lost circulation material, the fibrous lost circulation material comprising a multiplicity of fibers, the screen assembly comprising:

a plurality of screens one on top of the other and including at least a first screen and a second screen, the first screen comprising a screen mesh woven with first non-square openings as viewed from above;

the second screen comprising a screen mesh woven with second non-square openings as viewed from above;

the first non-square openings generally rectangular and the second non-square openings generally rectangular and, as viewed from above, lengths of the first non-square openings parallel to lengths of the second non-square openings; and

at least one fiber of the fibers of fibrous lost circulation material caught on screen mesh of the first or second screen.

38. The screen assembly of claim 37, wherein the at least one fiber is a plurality of fibers.

39. The screen assembly of claim 38, wherein the at least one fiber bridges a non-square opening of the first or second screen.

40. The screen assembly of claim 39, wherein the at least one fiber is a plurality of fibers each of which bridges a non-square opening of the first or second screen.

41. The screen assembly of claim 37, wherein the first non-square openings are larger in area as viewed from above than the second non-square openings.

42. The screen assembly of claim 37, wherein the screen assembly has a screen support from the group consisting of spaced-apart strips, perforated plates, and frames.

43. The screen assembly of claim 37, wherein the mesh of the first screen is bonded to the mesh of the second screen.

44. The screen assembly of claim 37, wherein the mesh of the first screen is mechanically connected to the mesh of the second screen.

45. The screen assembly of claim 42, wherein at least one of the first screen and second screen is bonded to the screen support.

46. The screen assembly of claim 42, wherein at least one of the first screen and second screen is mechanically connected to the screen support.

47. A screen assembly for use in a vibratory separator apparatus, the screen assembly comprising:

at least two layers of screening material one on top of the other and including at least a first layer over a second layer, each layer having screen mesh with rectangular openings as viewed from above;

the first layer having first rectangular openings, and the second layer having second rectangular openings;

each of the first rectangular openings having a first width and a first length, and each of the second rectangular openings having a second width and a second length;

the ratio of the first length to the first width ranging between 1.55 and 2.00;

the ratio of the second length to the second width ranging between 1.55 and 2.00; and

the ratio of the first length to the second width ranging between 0.95 and 1.05.

48. The screen assembly of claim 47, wherein the ratio of the first length to the first width is about 1.6, the ratio of the second length to the second width is about 1.7, and the ratio of the first length to the second width is about 1.0 and the lengths of the first rectangular openings are parallel to lengths of the second rectangular openings.

49. The screen assembly of claim 47, further comprising a

screen support beneath the at least two layers of screening material.

50. The screen assembly of claim 49, wherein the screen support includes a series of spaced-apart strips.

51. The screen assembly of claim 49, wherein the screen support includes a perforated plate.

52. The screen assembly of claim 49, wherein the screen support includes a frame.

53. The screen assembly of claim 52, wherein the frame includes two pairs of parallel spaced-apart sides forming a four-sided outer frame member and a plurality of spaced-apart crossmembers, each crossmember extending from one side of one of the pairs of parallel spaced-apart sides of the outer frame member to an opposing parallel side thereof.

54. The screen assembly of claim 47, wherein the mesh of the first layer is bonded to the mesh of the second layer.

55. The screen assembly of claim 47, wherein the mesh of the first layer is mechanically connected to the mesh of the second layer.

56. The screen assembly of claim 49, wherein at least one of the first and second layers is bonded to the screen support.

57. The screen assembly of claim 49, wherein at least one of the first screen and second layers is mechanically connected to the screen support.

58. The screen assembly of claim 47, wherein the screen assembly includes a third screening material layer connected to at least one of the first and second layers.

59. The screen assembly of claim 58, wherein the third screening material layer comprises coarse mesh screening material.

60. A screen assembly for use on a vibratory separator apparatus, the screen assembly comprising:

at least two layers of screening material one on top of the other and including at least a first layer and a second layer, the first layer having screen mesh with rectangular openings as viewed from above;

the first layer having first rectangular openings, and the second layer having second openings;

each of the first rectangular openings having a first width and a first length, and each of the second openings having a second width and a second length;

the ratio of the first length to the first width ranging between 1.55 and 2.00;

the ratio of the second length to the second width ranging between 1.55 and 2.00; and

the ratio of the first length to the second width ranging between 0.95 and 1.05.

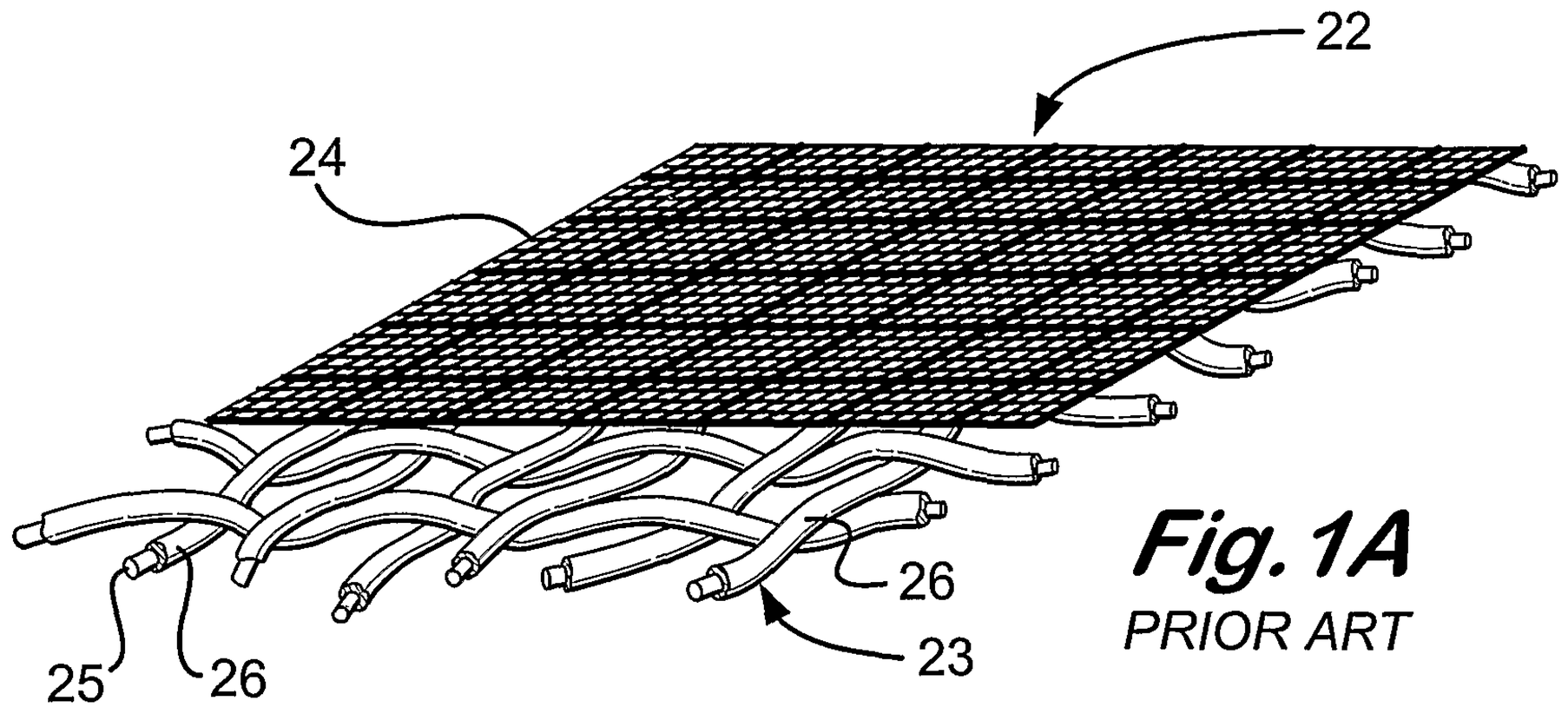


Fig. 1A
PRIOR ART

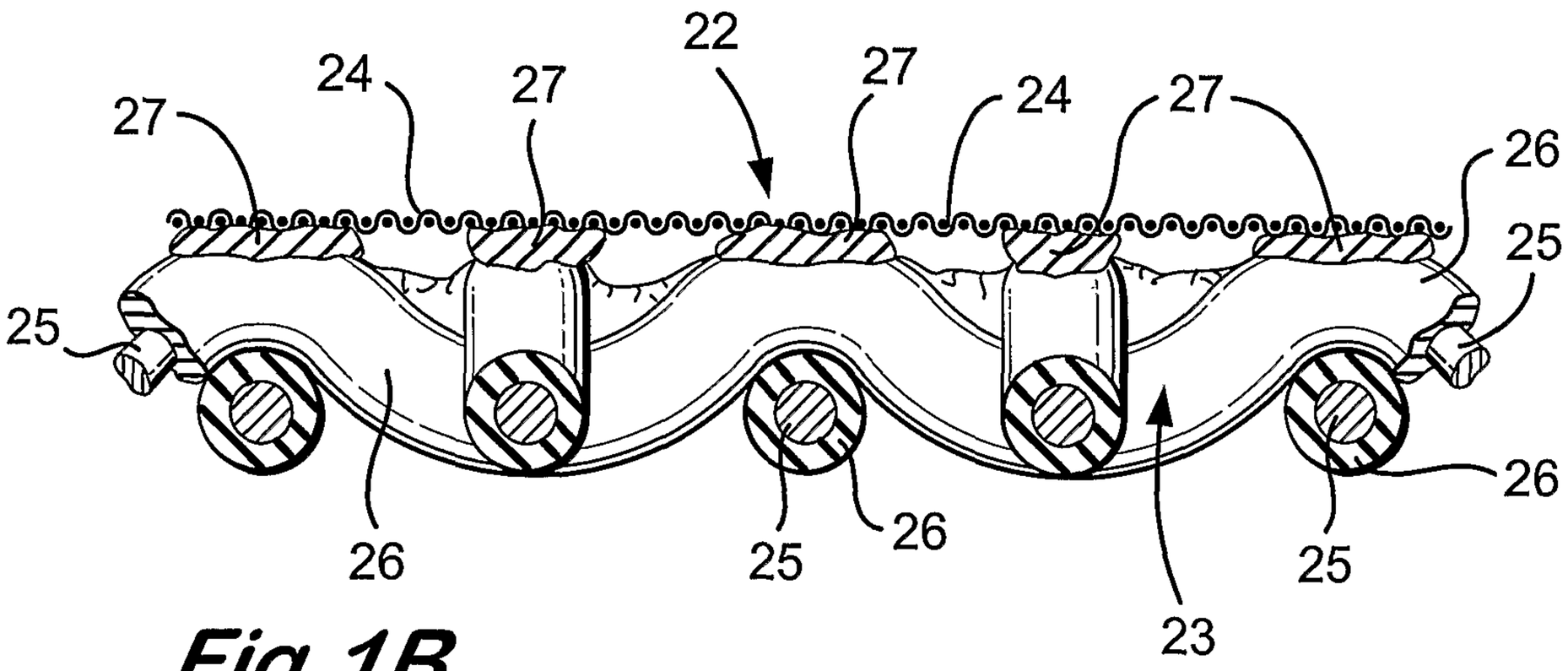


Fig. 1B
PRIOR ART

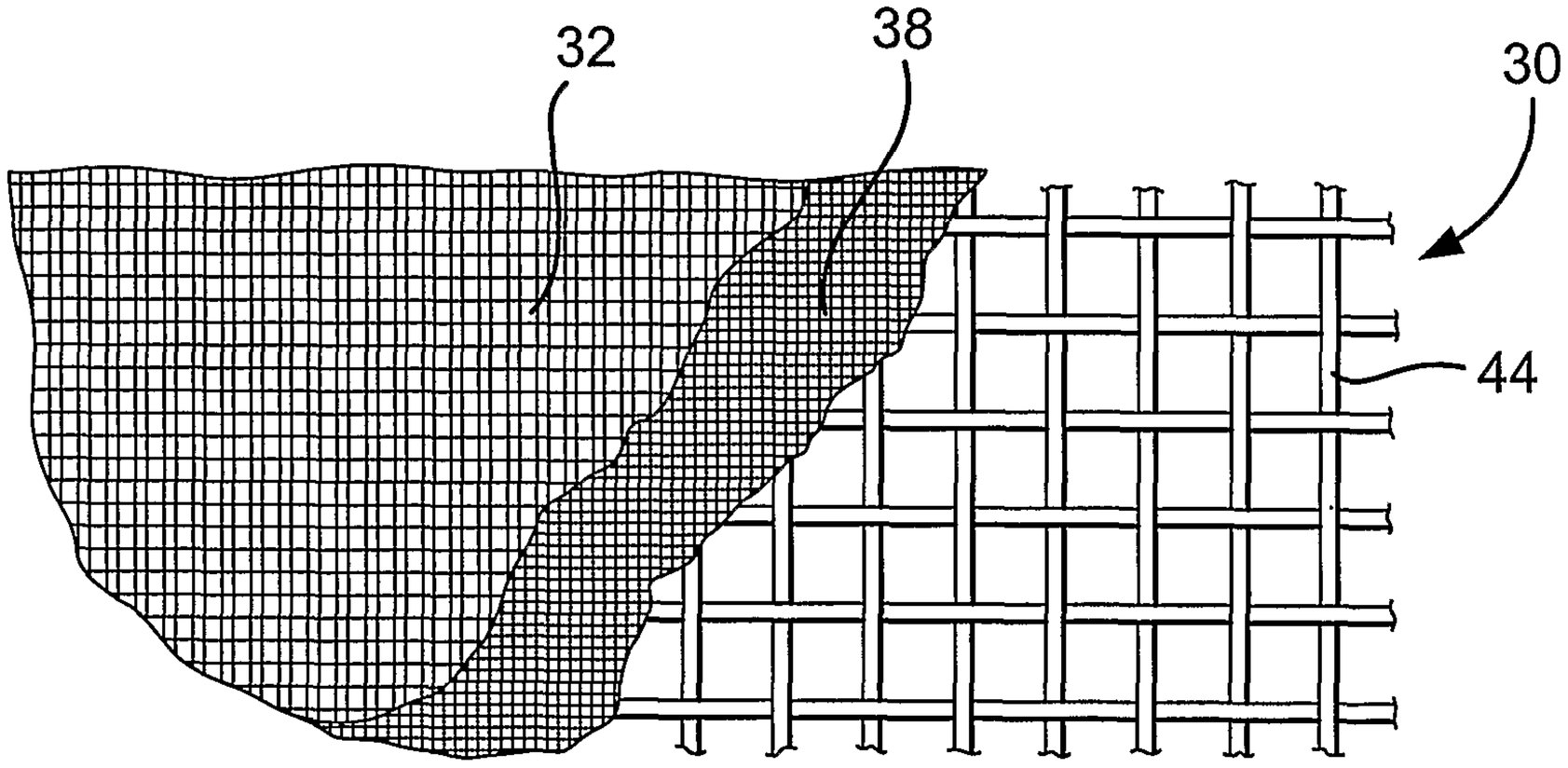


Fig. 2A
PRIOR ART

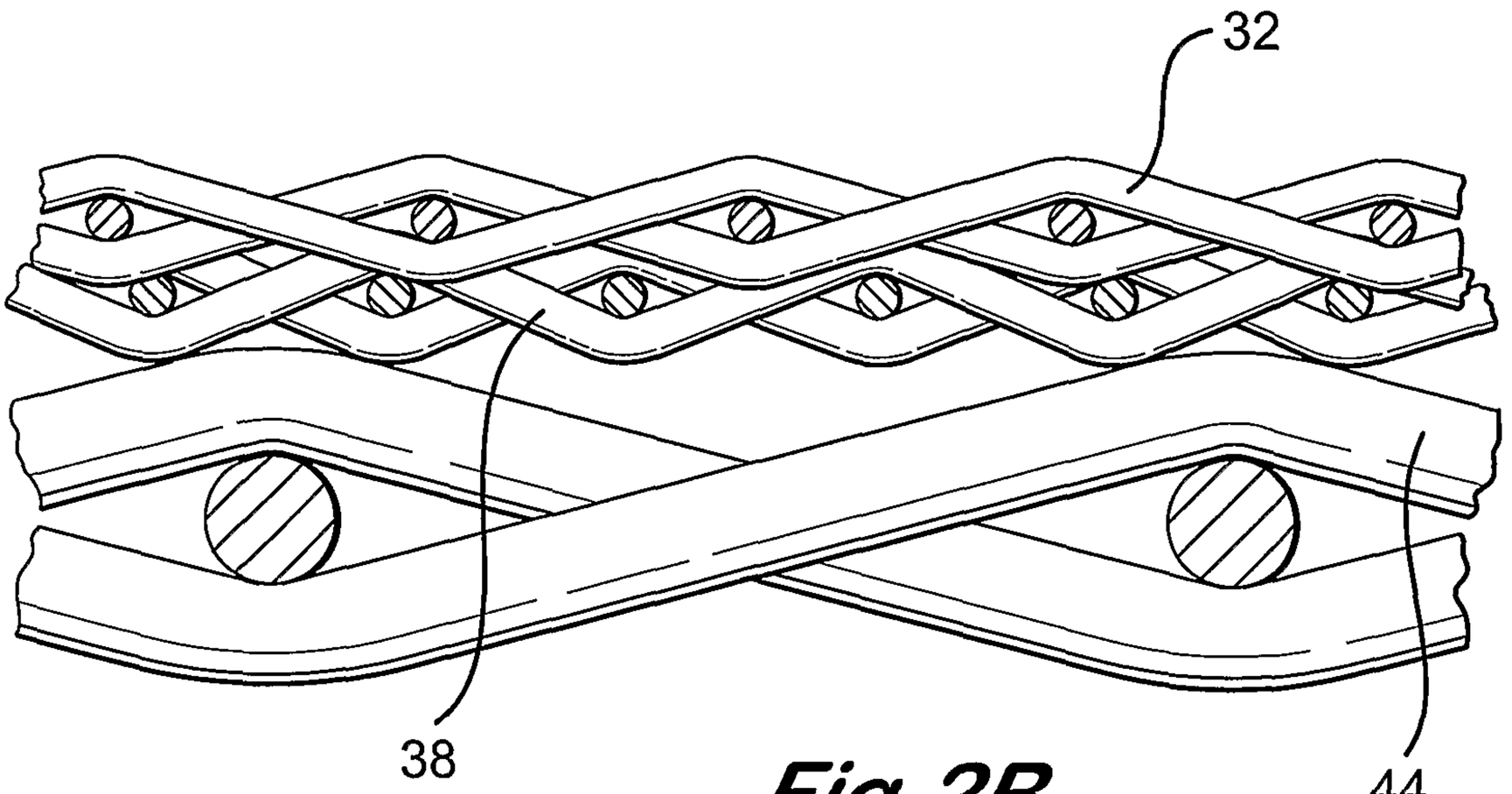


Fig.2B
PRIOR ART

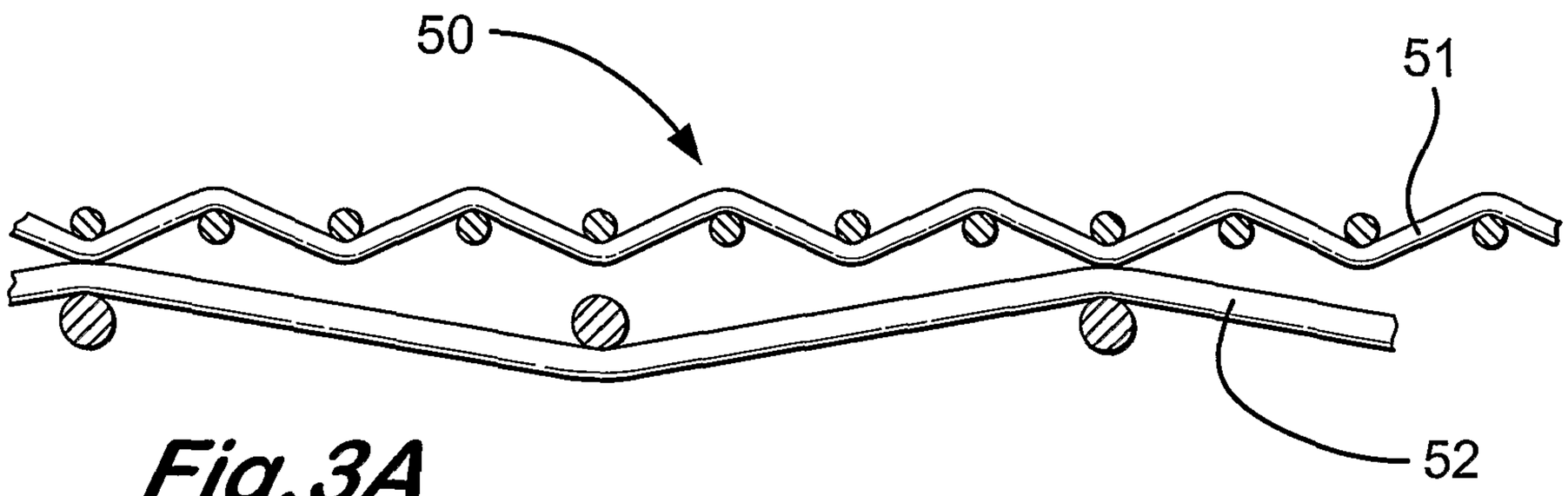


Fig.3A
PRIOR ART

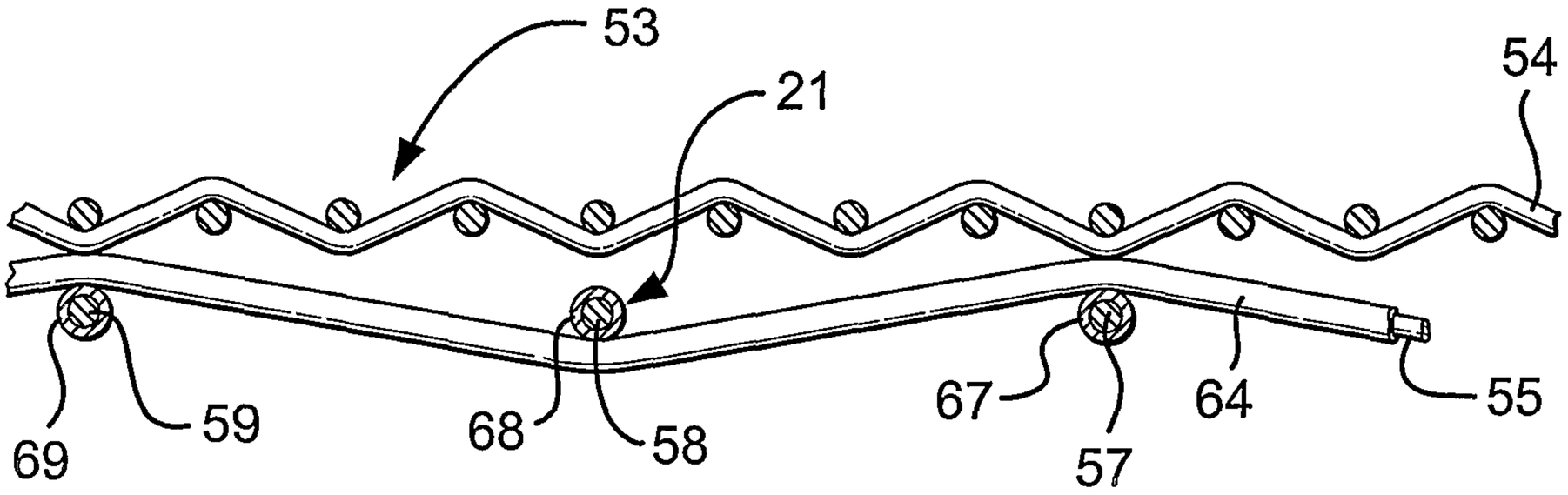


Fig.3B
PRIOR ART

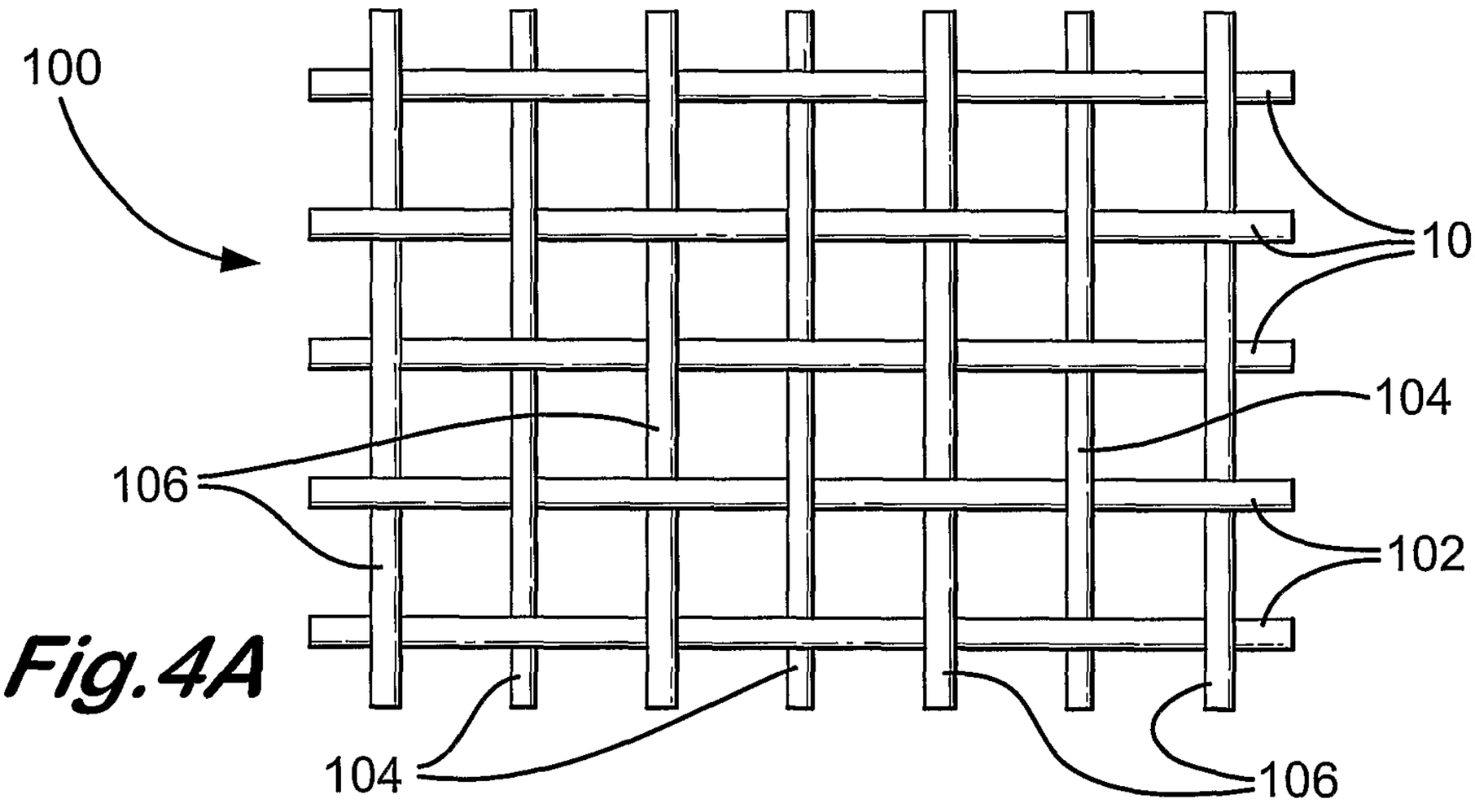


Fig.4A

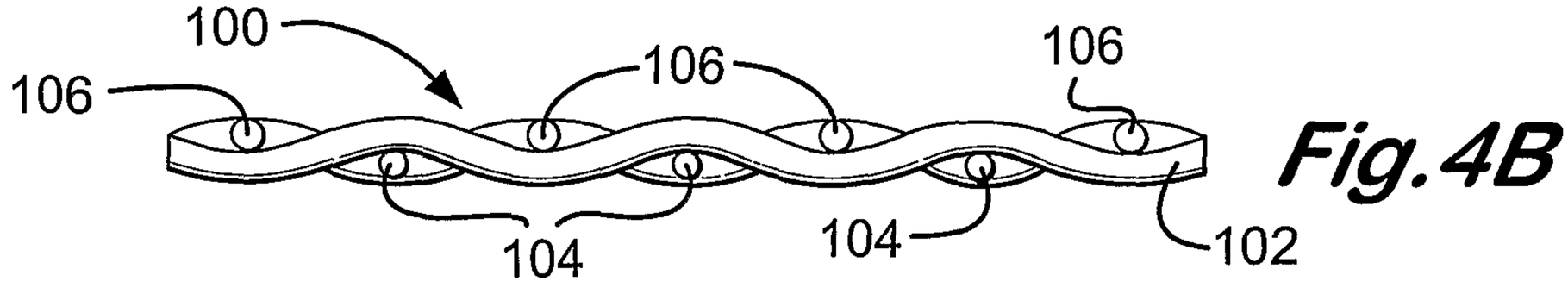


Fig.4B

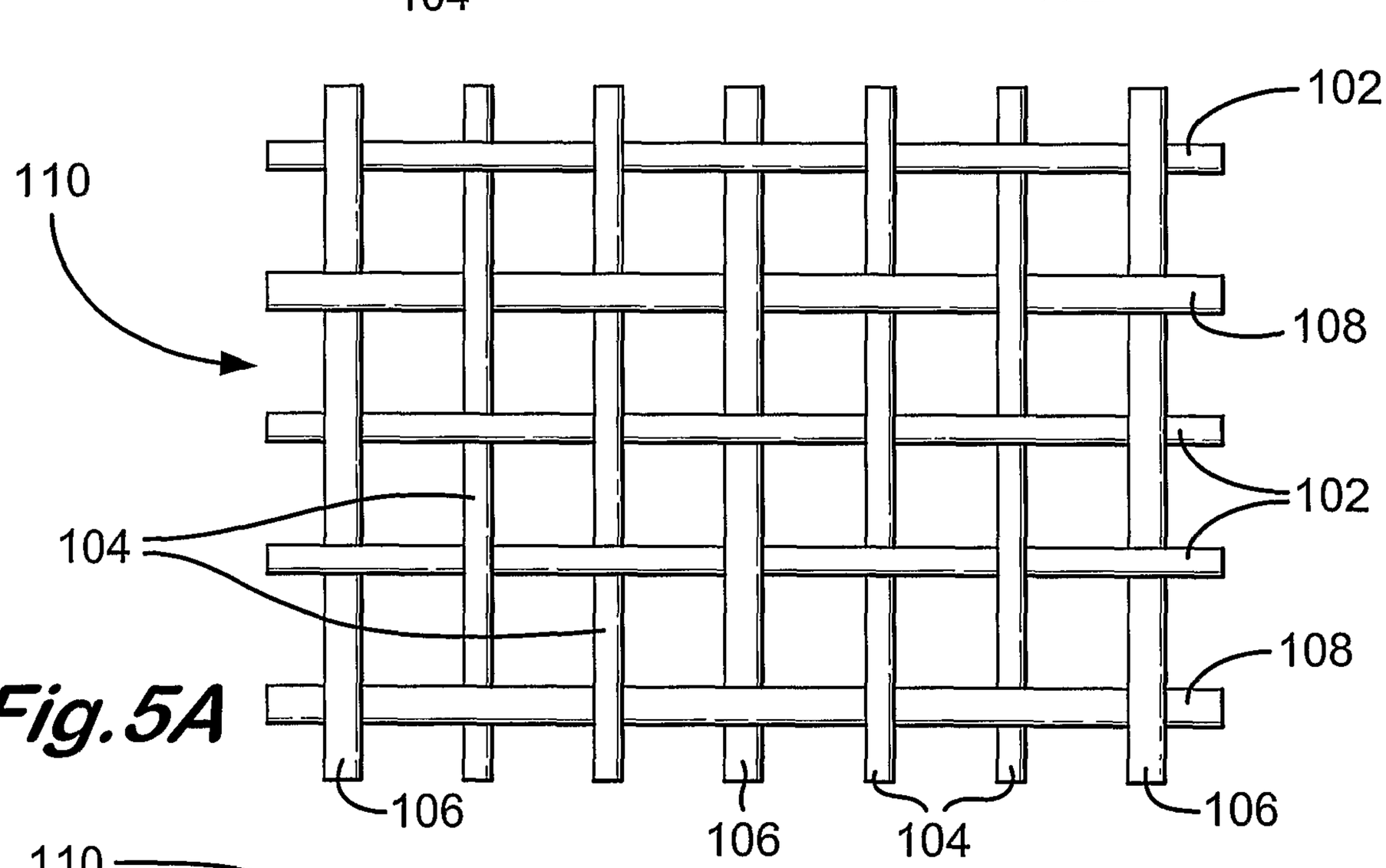


Fig.5A

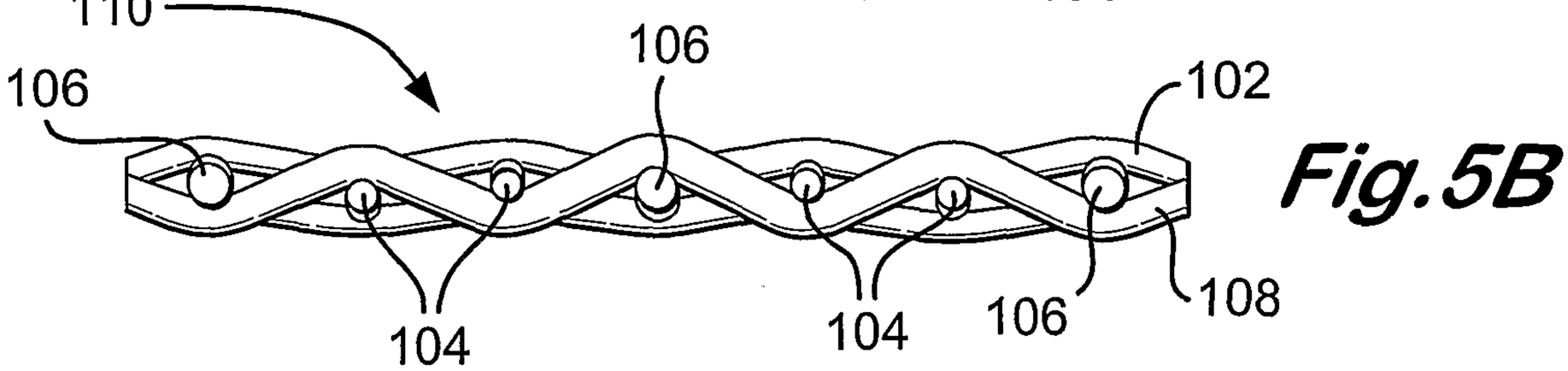


Fig.5B

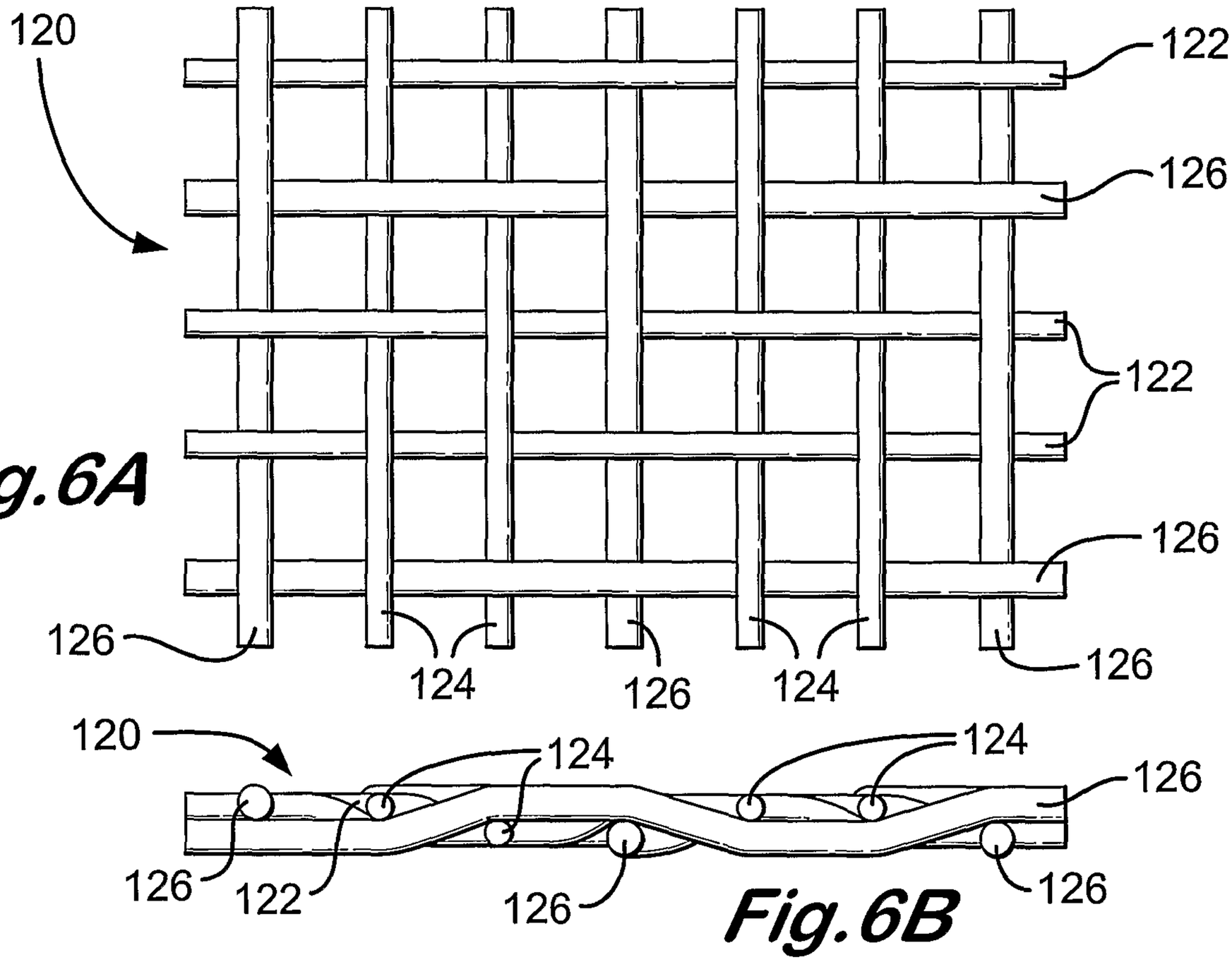


Fig.6A

Fig.6B

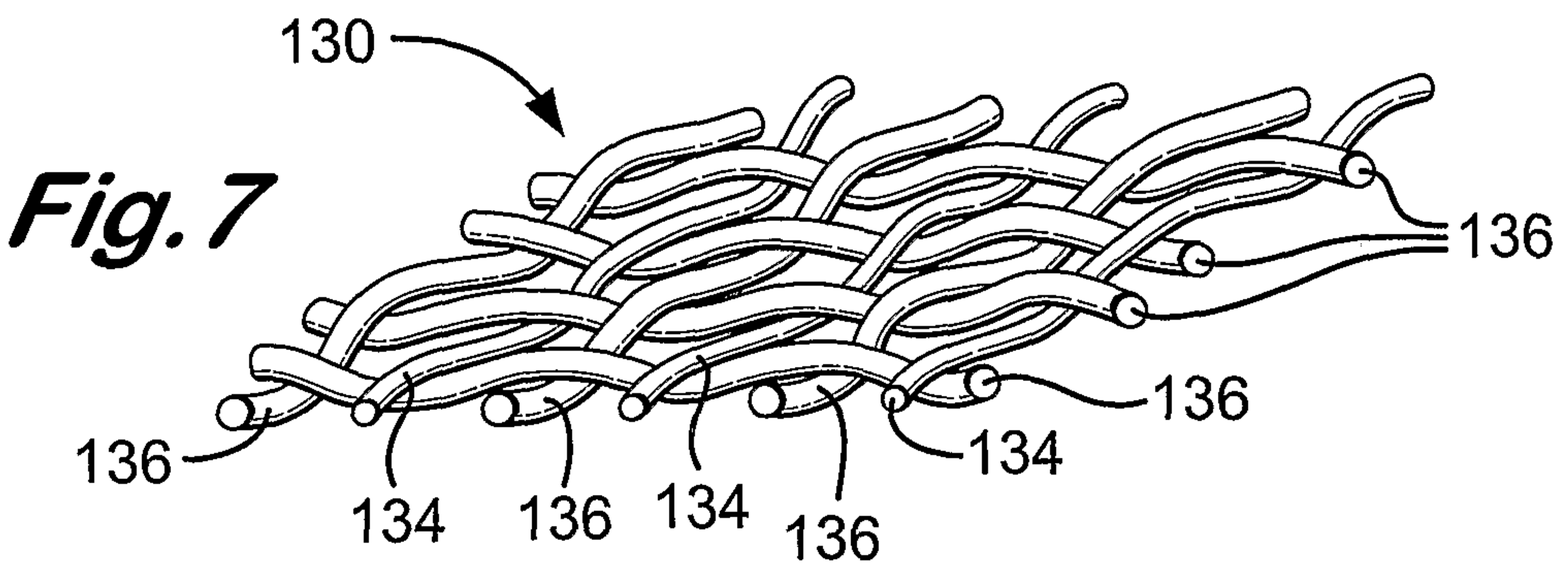


Fig.7

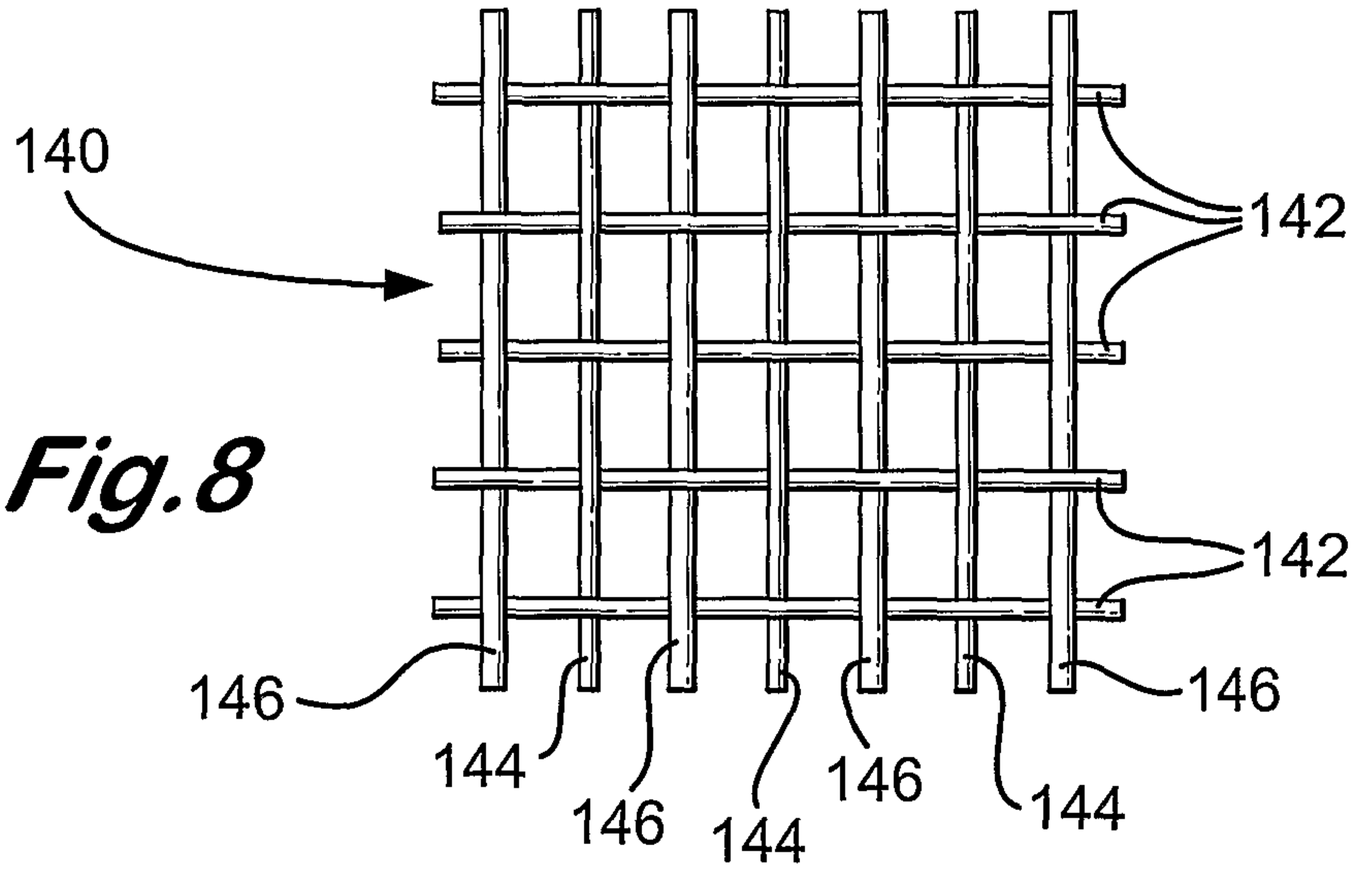


Fig.8

Fig.9

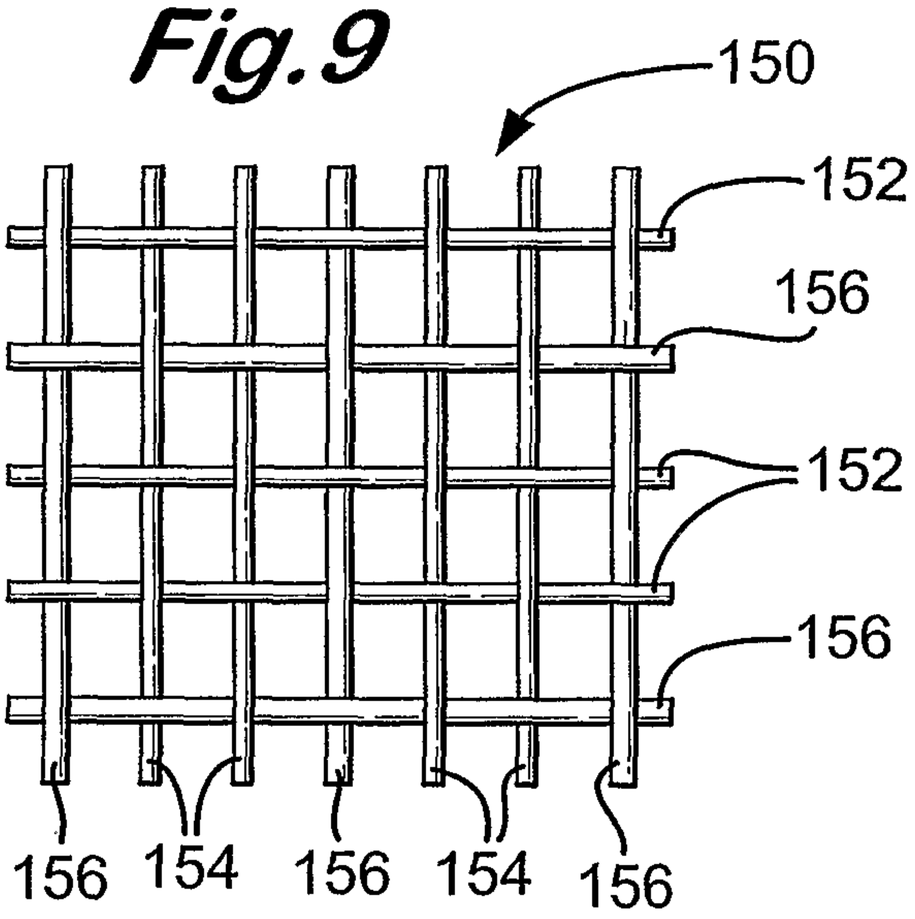
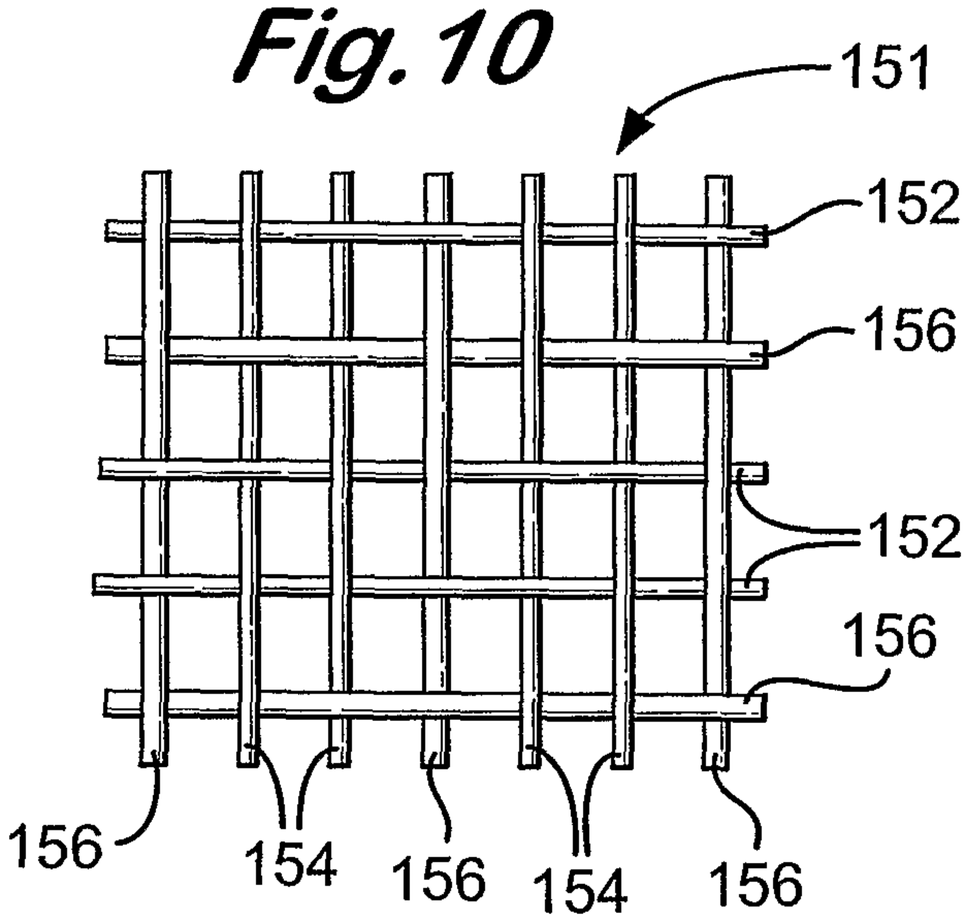


Fig.10



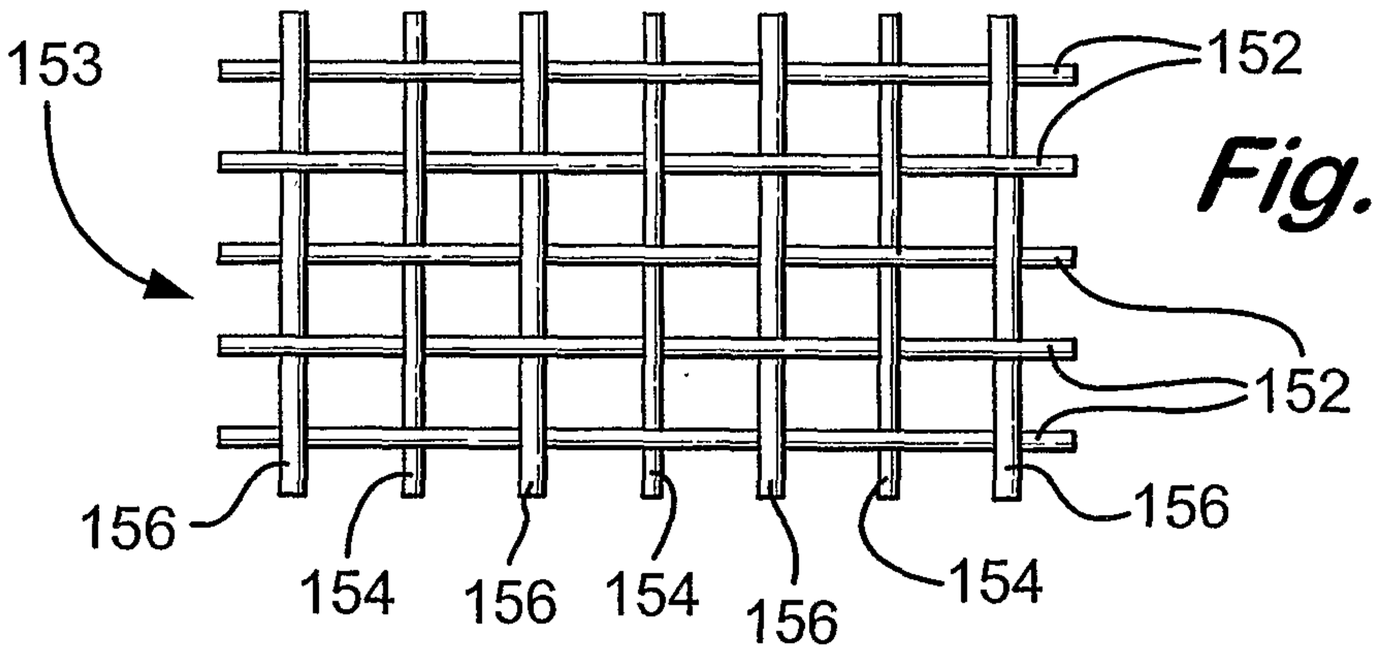


Fig.11

Fig.12

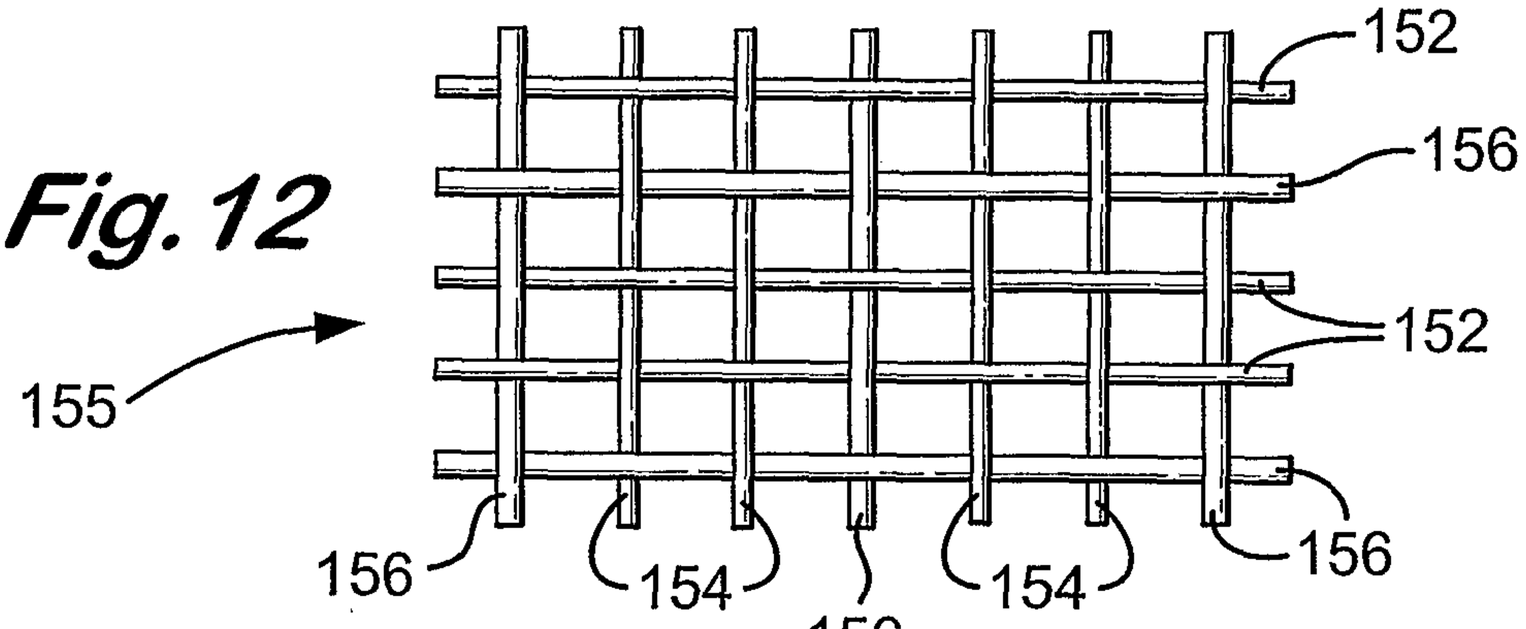
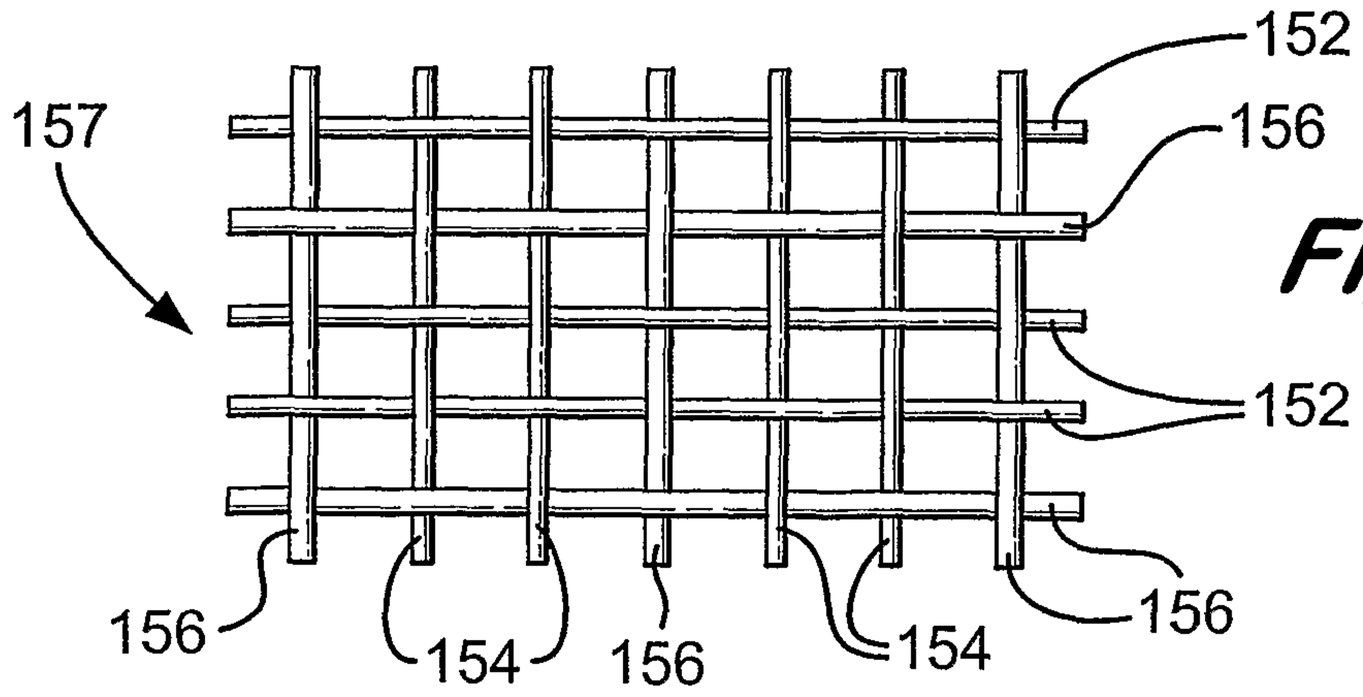


Fig.13



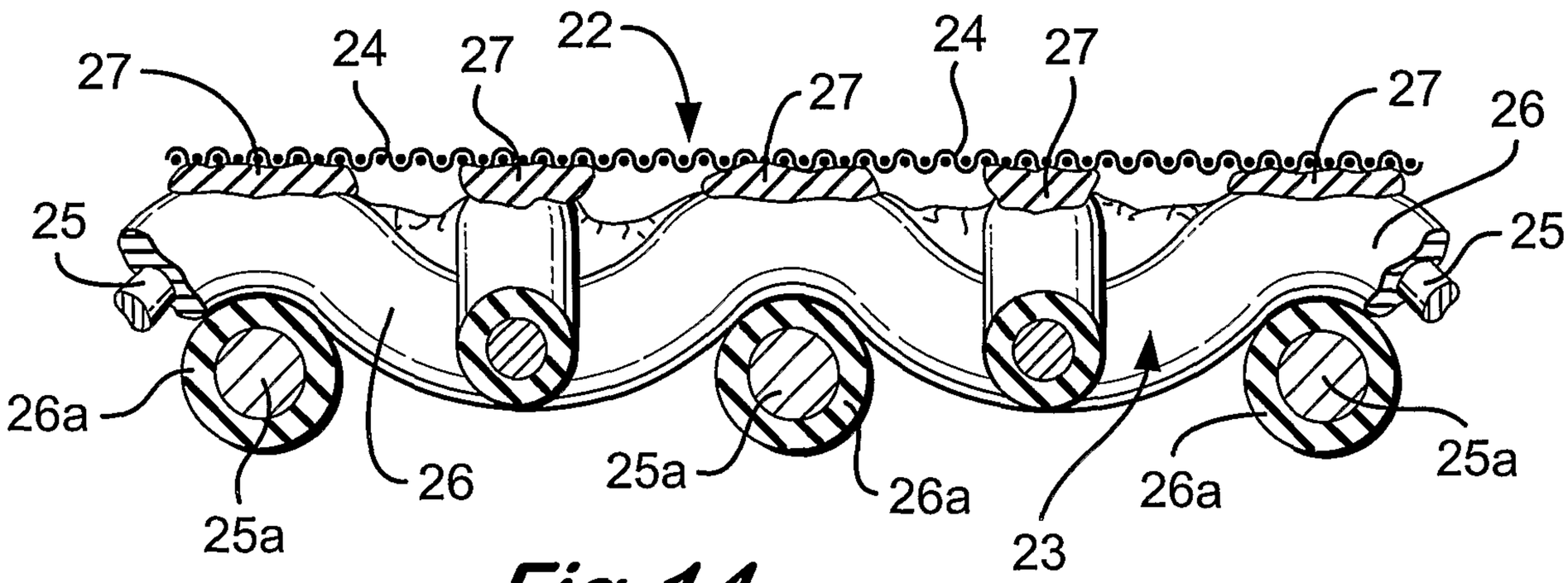


Fig. 14

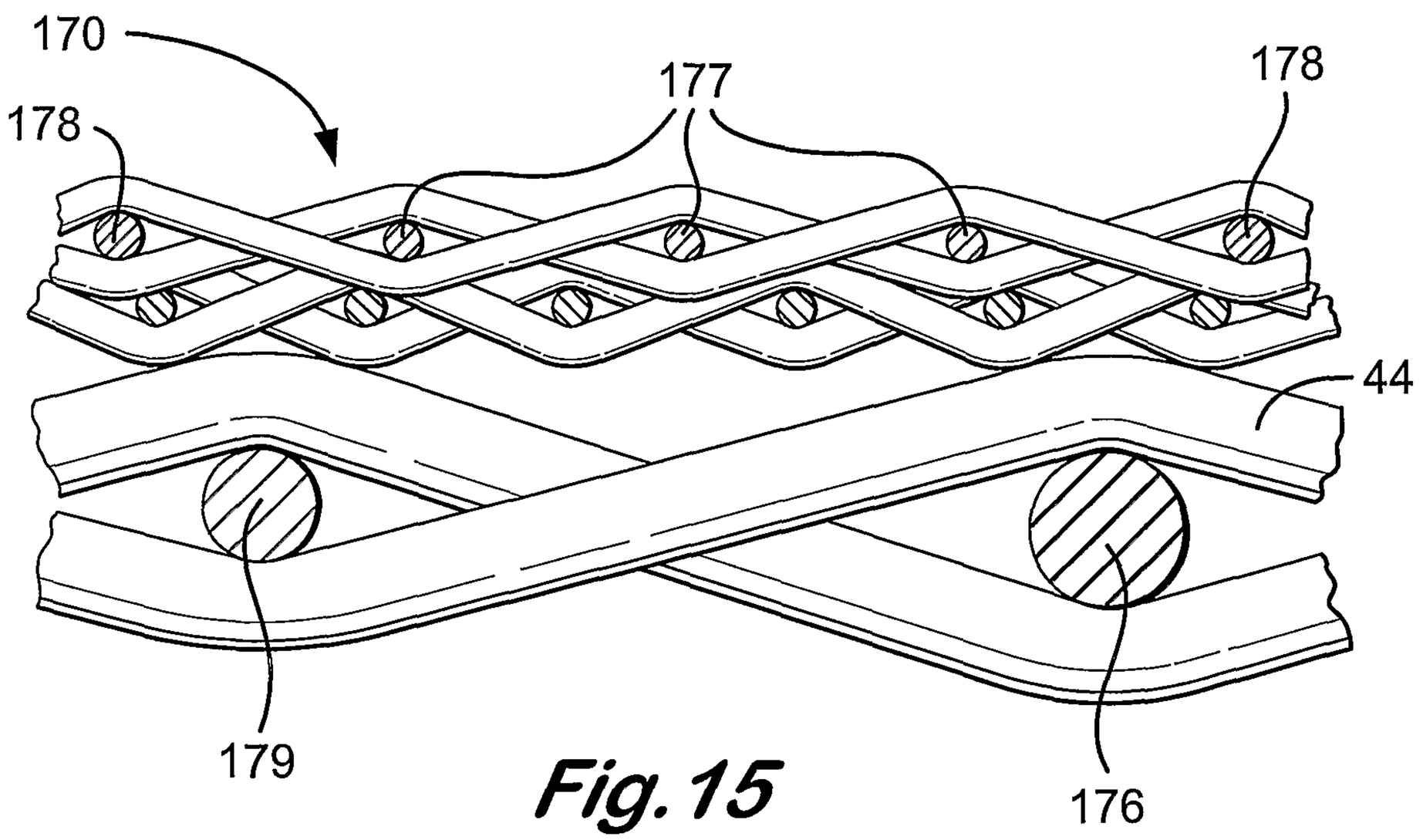


Fig. 15

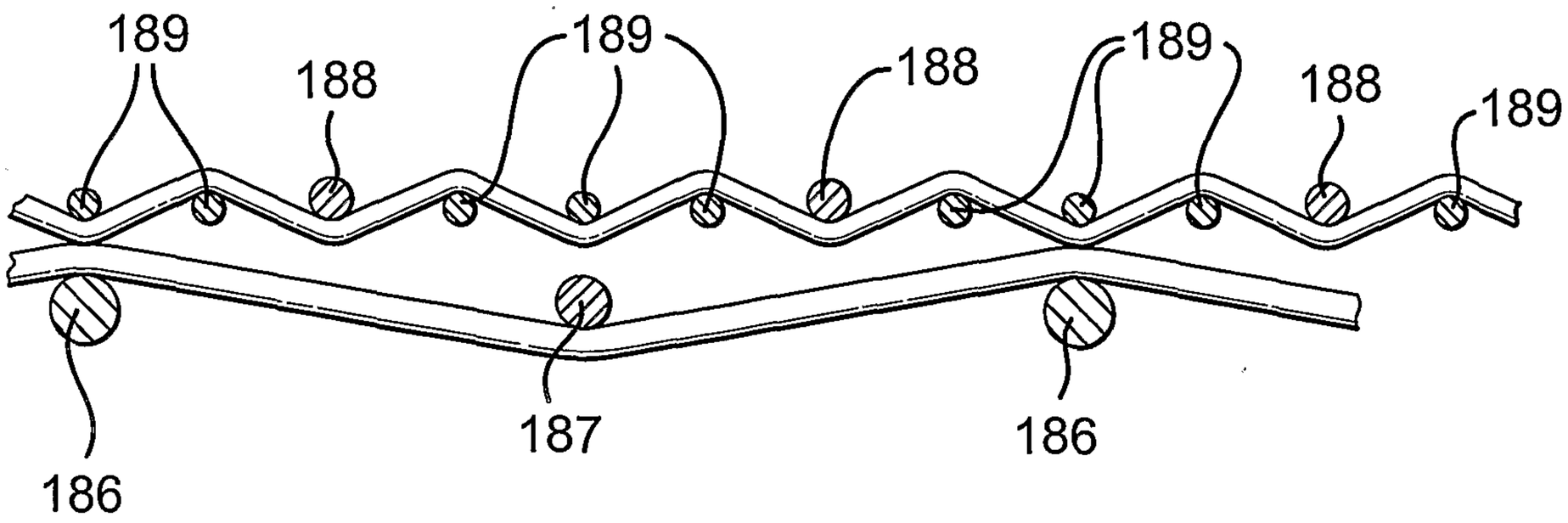


Fig. 16

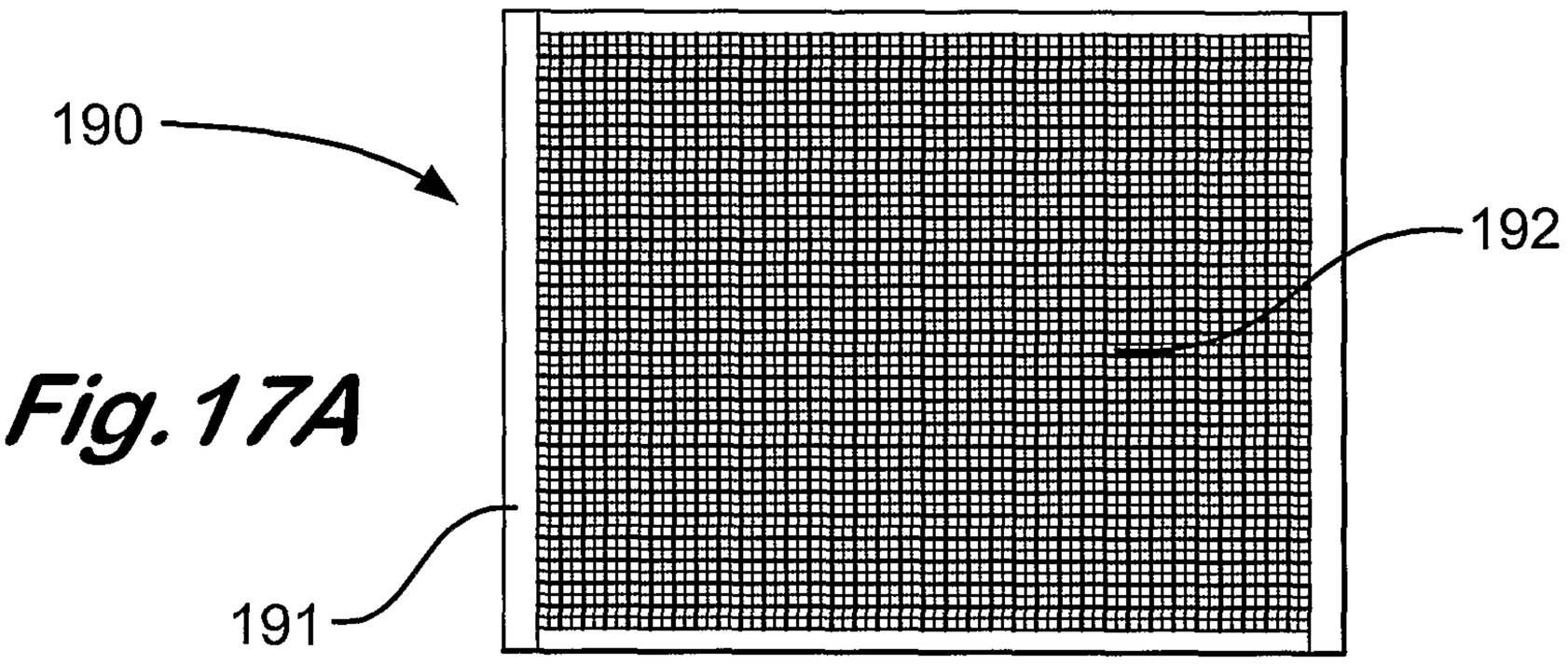


Fig.17A

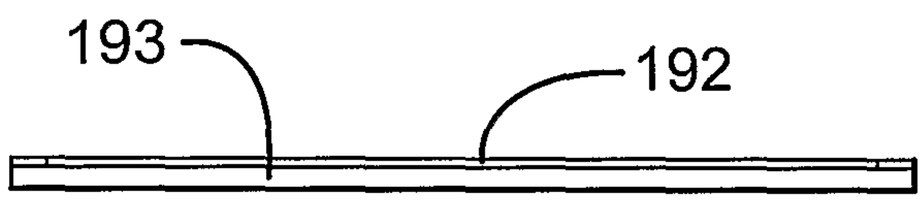


Fig.17B

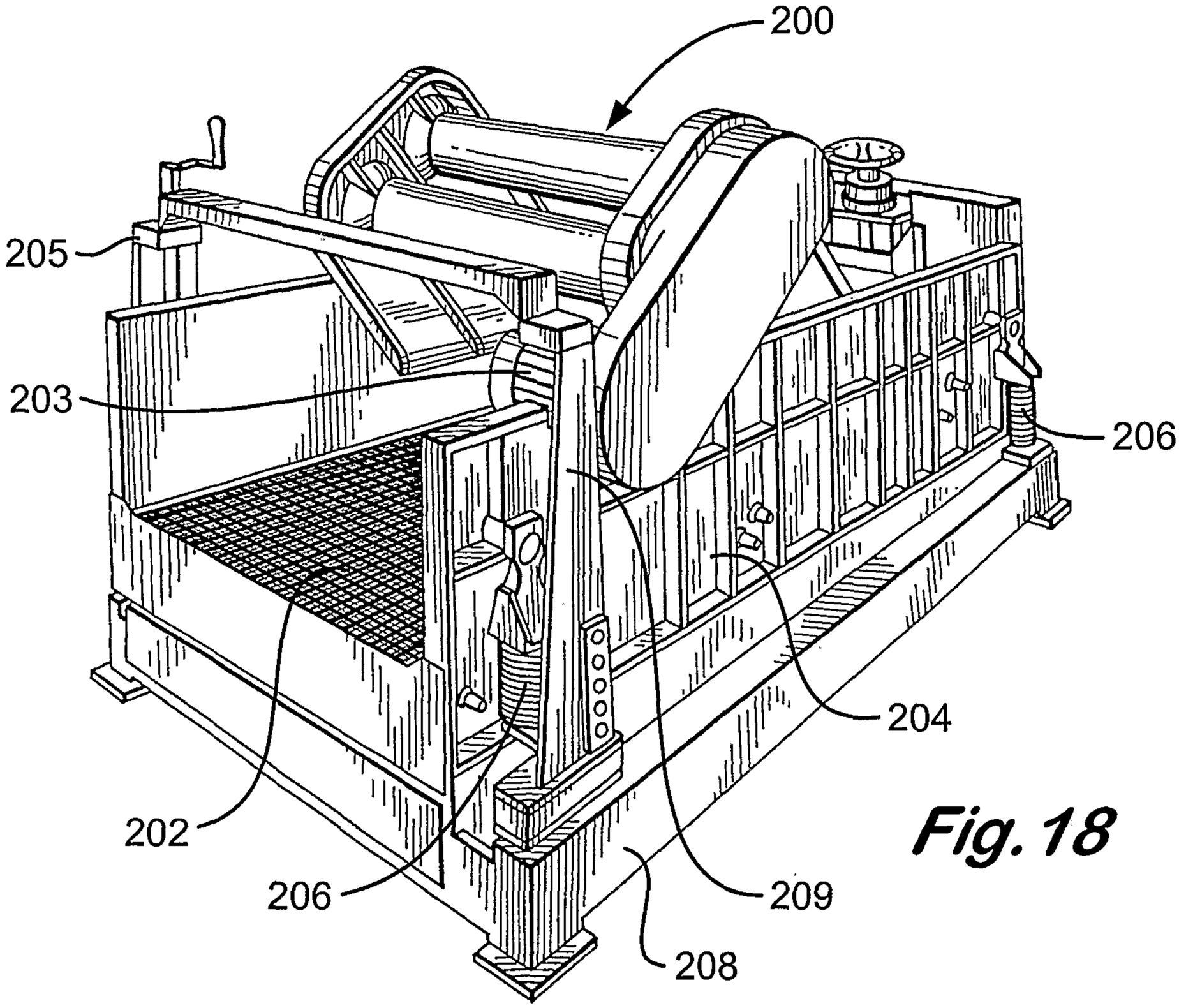


Fig.18

Fig.19A

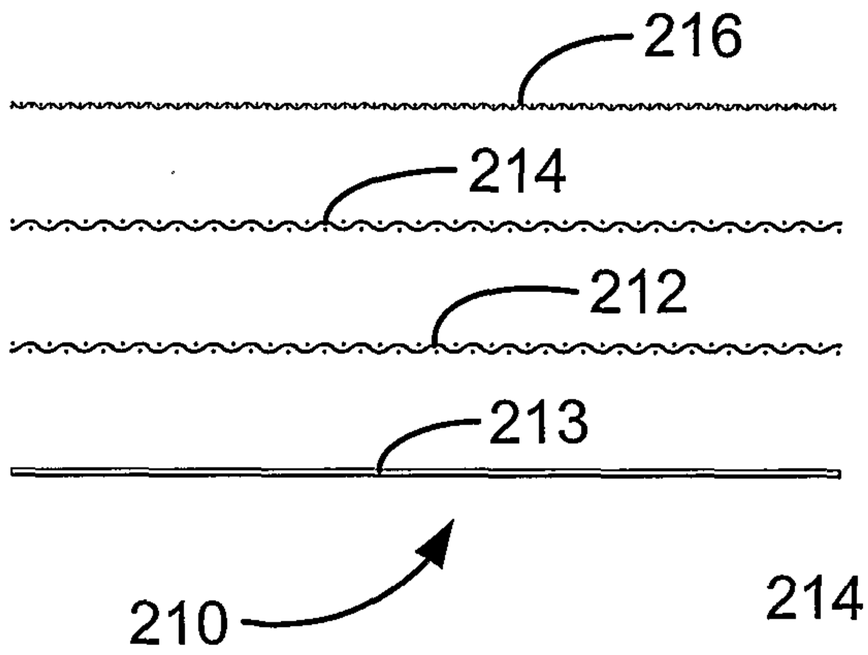


Fig.19B

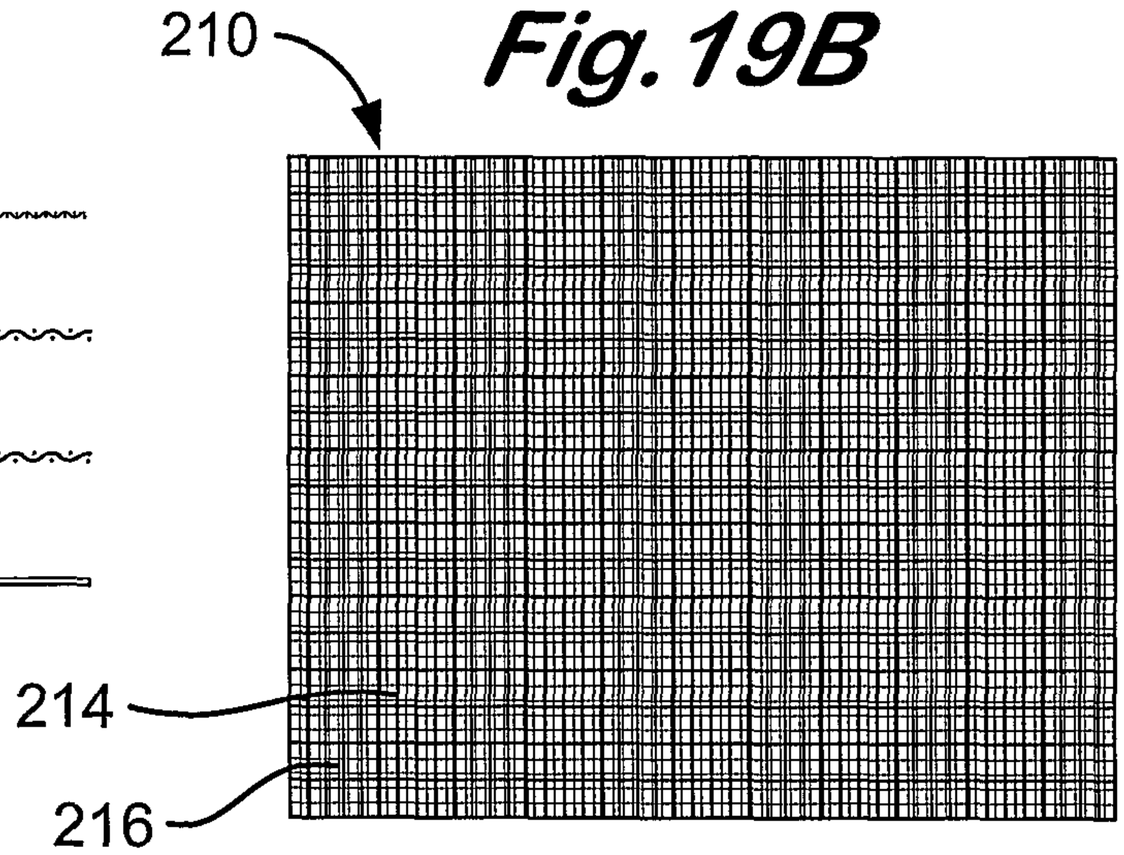


Fig.19C

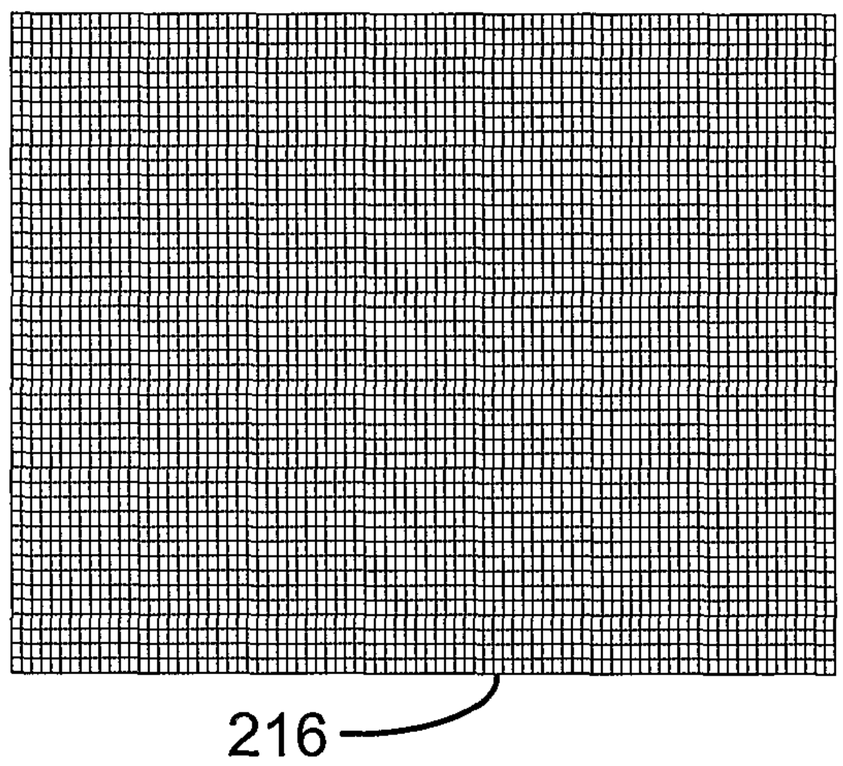


Fig.19D

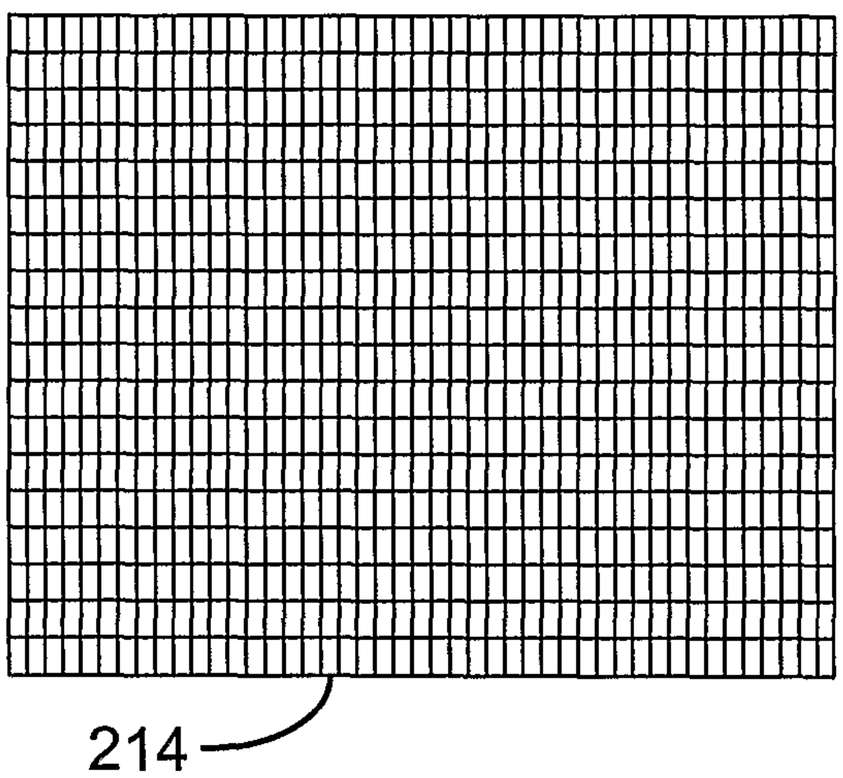
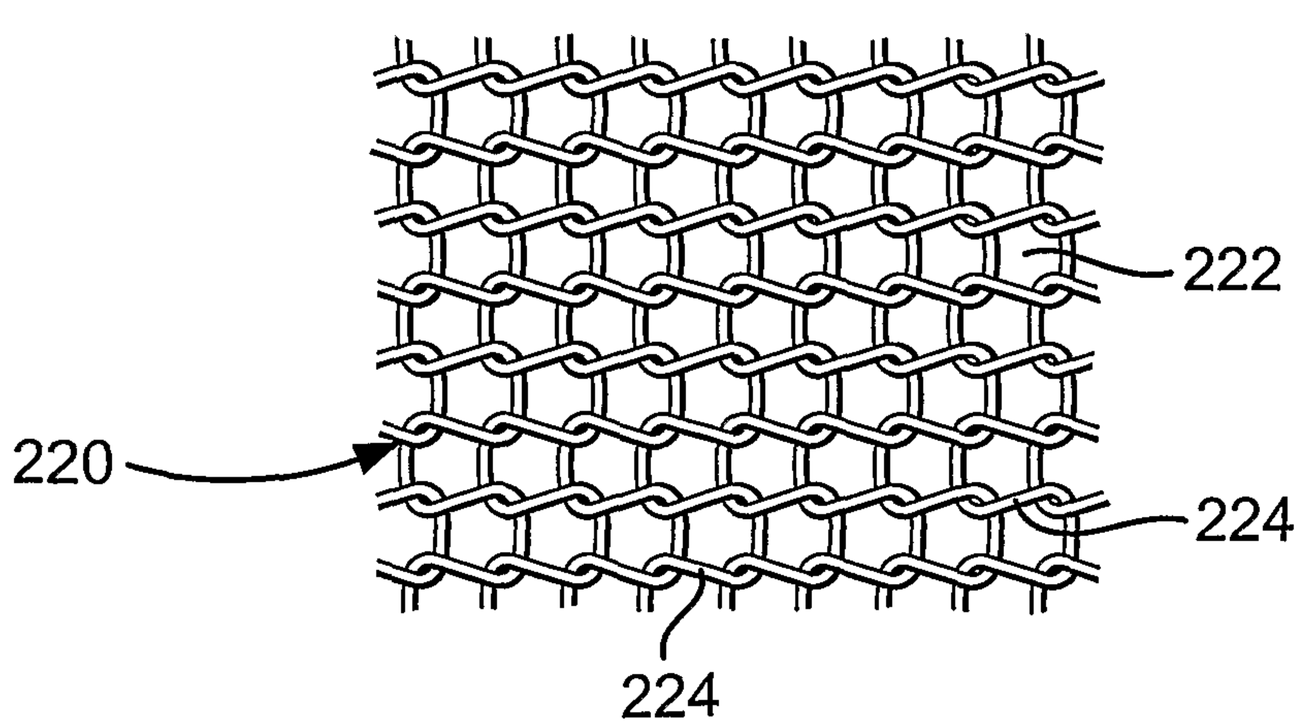


Fig.20



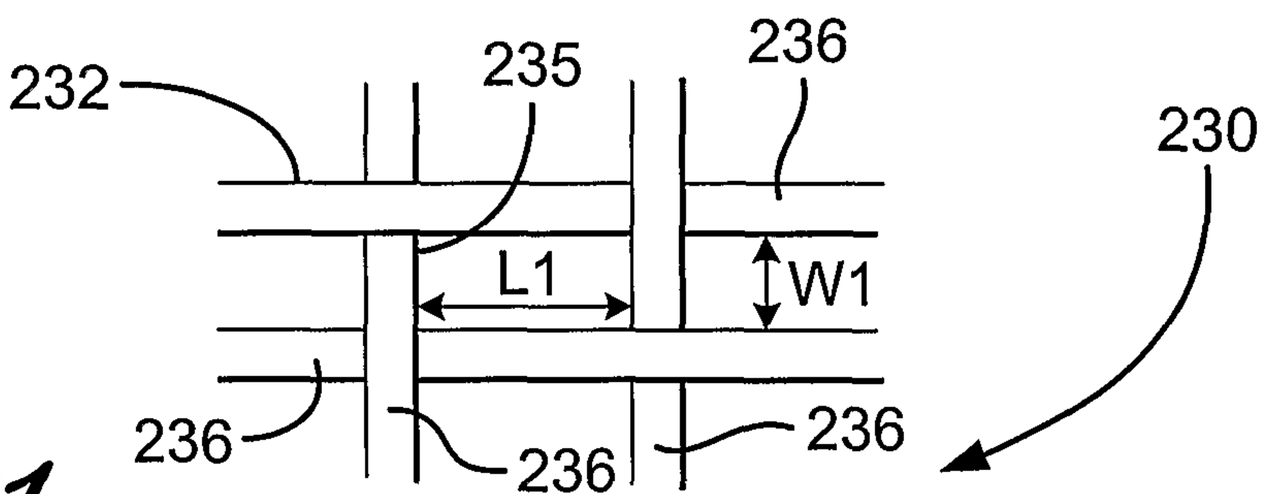


Fig.21

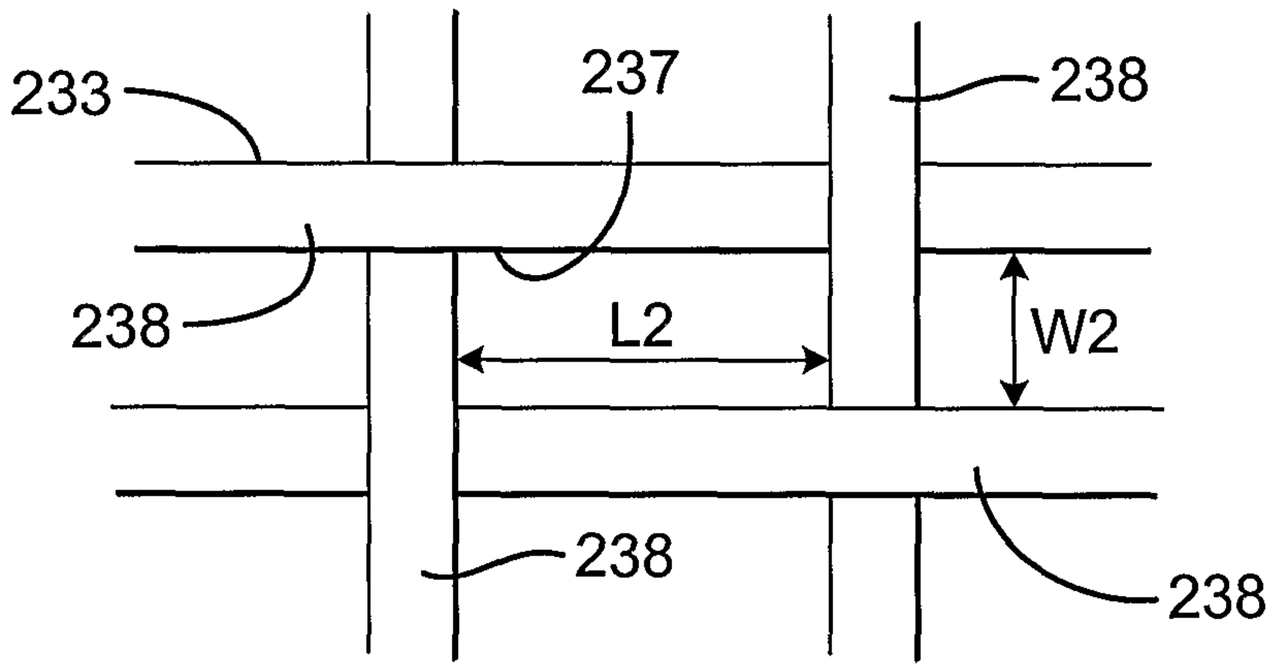


Fig.22

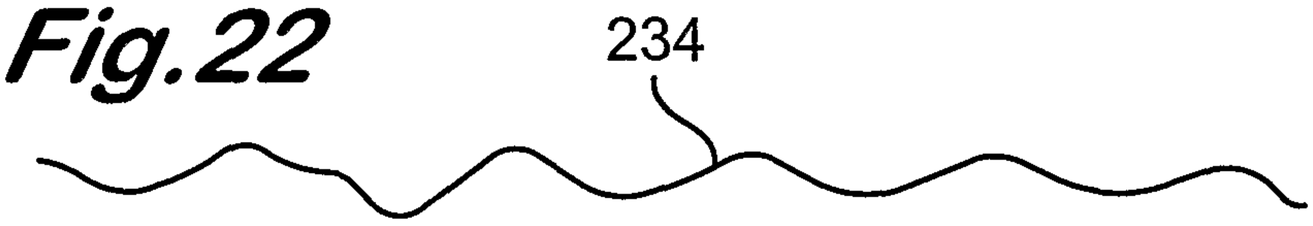
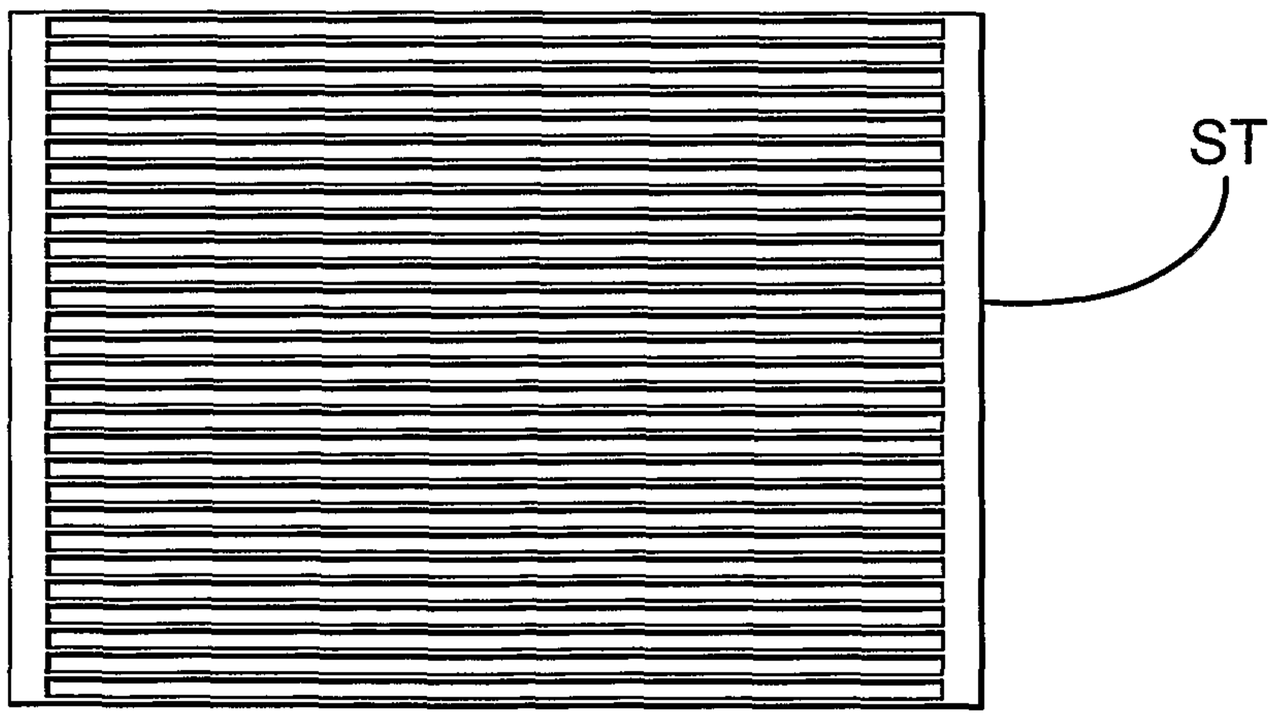


Fig.23



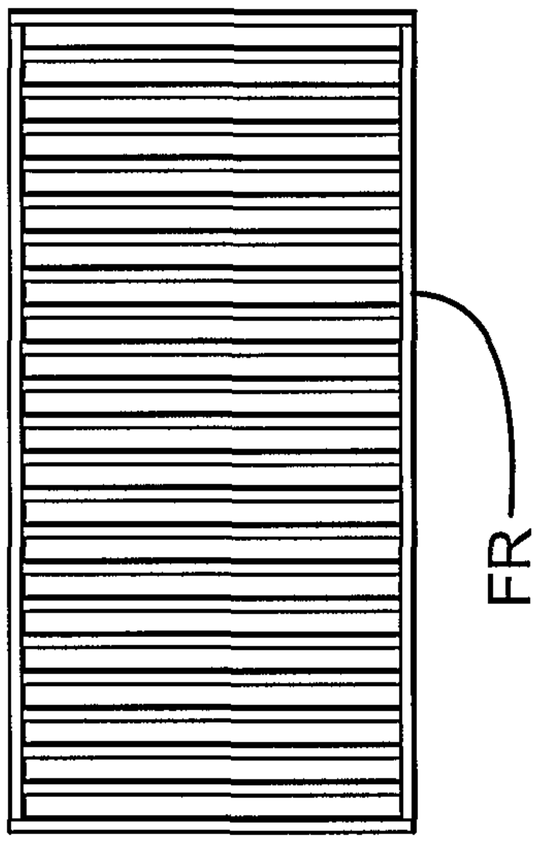
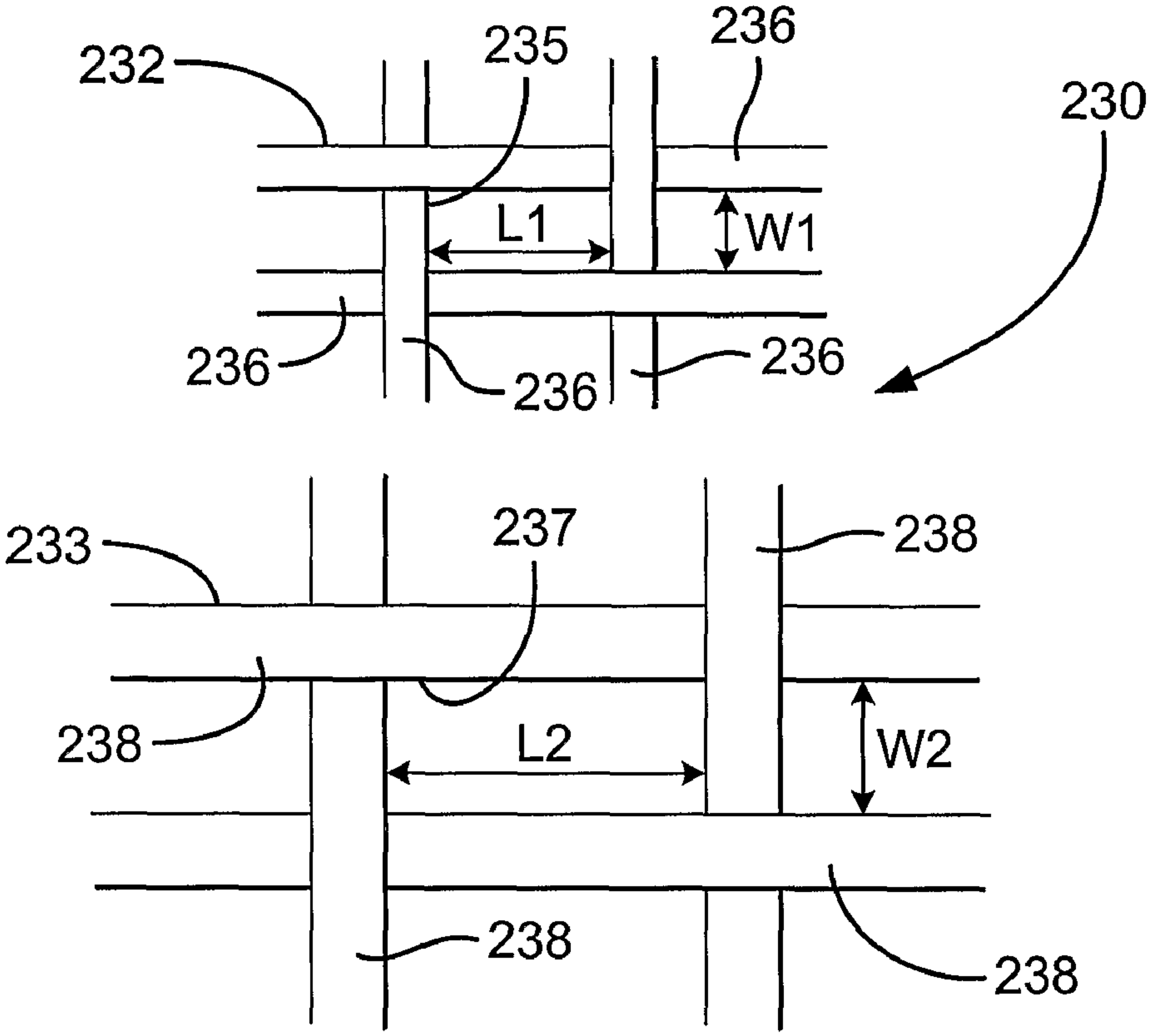


Fig.23C

Fig.23B

Fig.23D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