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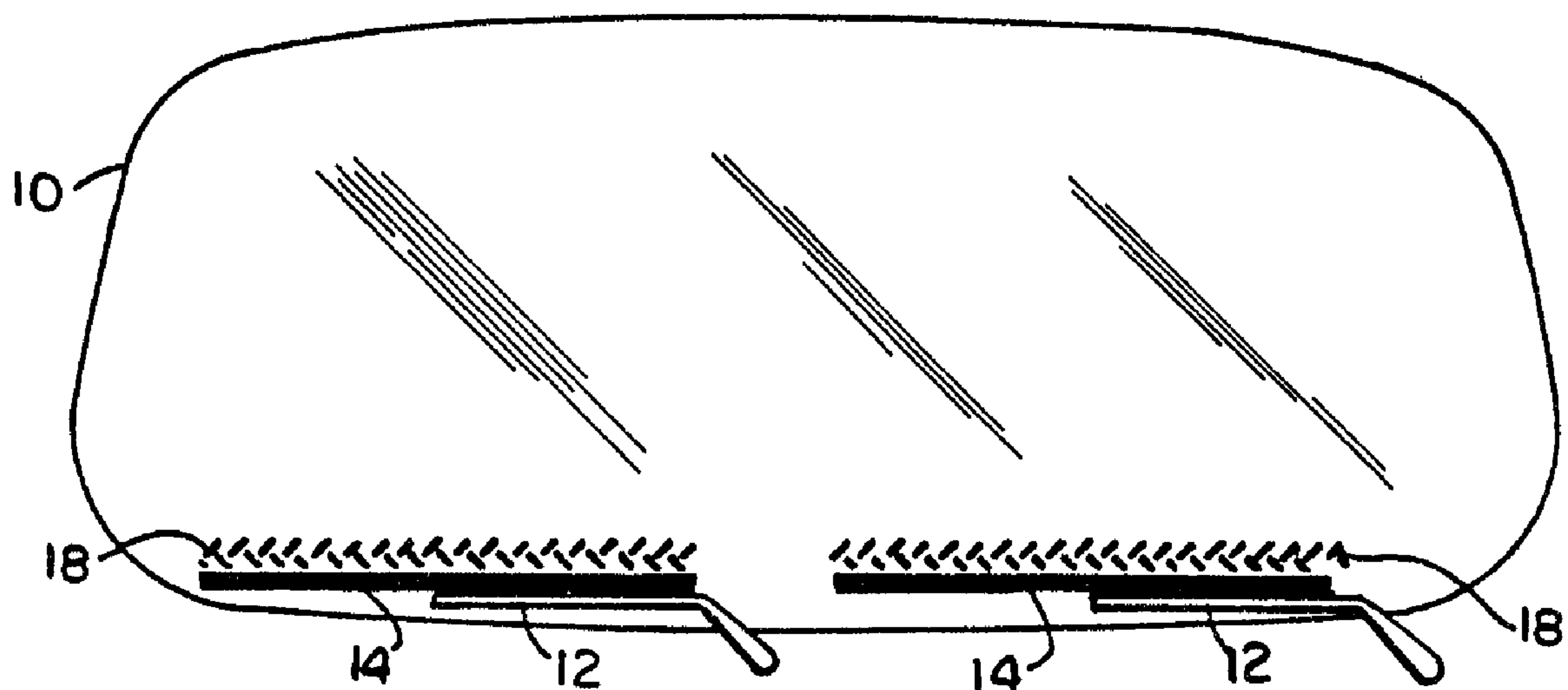
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(54) Titre : DISPOSITIF DE NETTOYAGE D'ESSUIE-GLACE
(54) Title: WIPER CLEARING DEVICE



(57) Abrégé/Abstract:

A wiper clearing device (18) for removing debris from the surface of a window wiper (14) comprises a plurality of discrete scraping elements (20, 30, 32, 40, 42, 50, 52, 54) on the window (10), the scraping elements (20, 30, 32, 40, 42, 50, 52, 54) being arranged in two or more groups (22, 24) disposed in a path in which the wiper travels to wipe the window. The device extends from a distance corresponding to the length of the wiper (14). The scraping elements (30, 40, 50, 54) of one group (22, 56, 60) are at least partly aligned with spaces between the scraping elements (32, 42, 52, 54) of the adjacent group (24, 58, 62).

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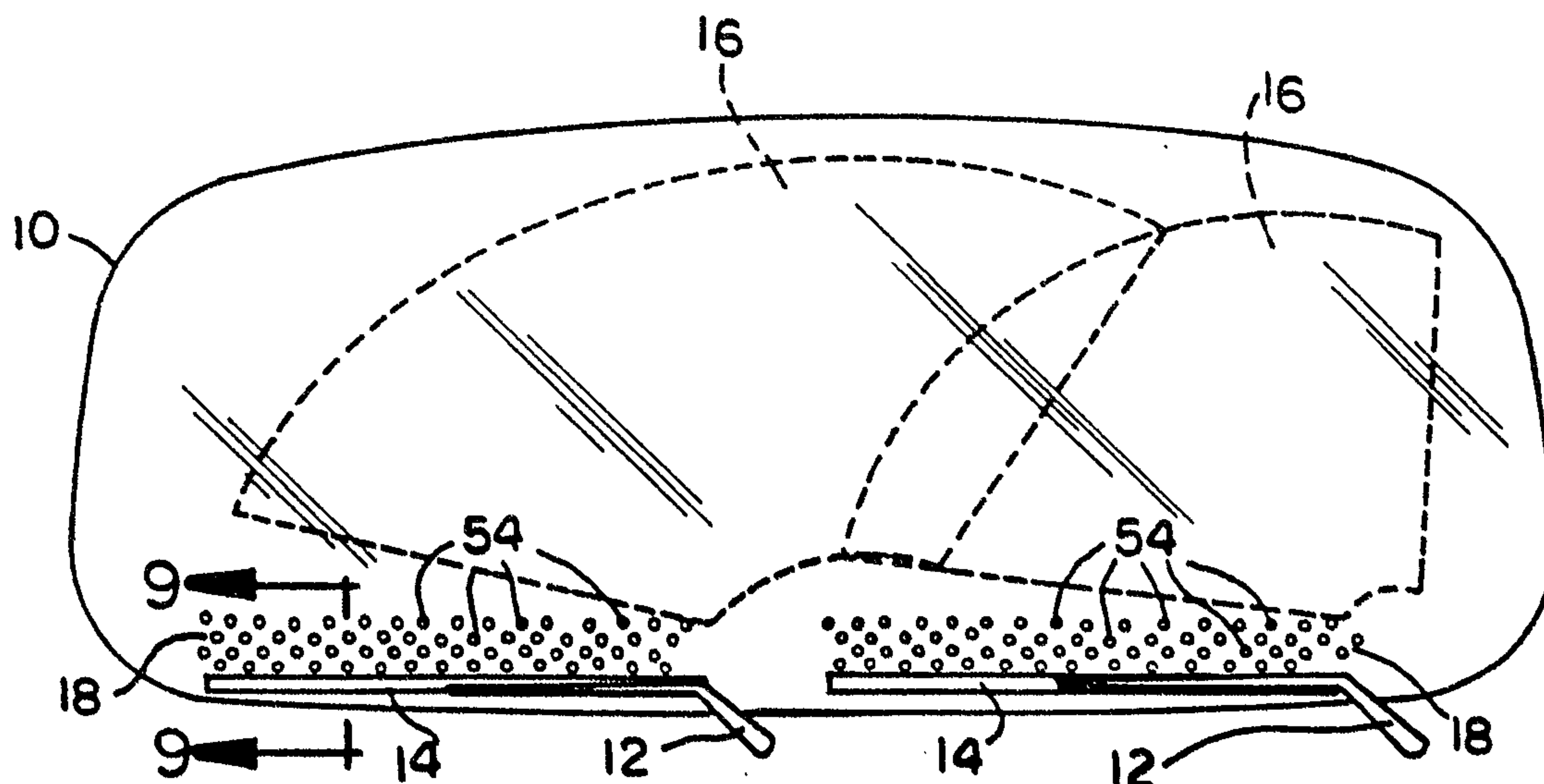
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(54) Title: WIPER CLEARING DEVICE



(57) Abstract

A wiper clearing device (18) for removing debris from the surface of a window wiper (14) comprises a plurality of discrete scraping elements (20, 30, 32, 40, 42, 50, 52, 54) on the window (10), the scraping elements (20, 30, 32, 40, 42, 50, 52, 54) being arranged in two or more groups (22, 24) disposed in a path in which the wiper travels to wipe the window. The device extends from a distance corresponding to the length of the wiper (14). The scraping elements (30, 40, 50, 54) of one group (22, 56, 60) are at least partly aligned with spaces between the scraping elements (32, 42, 52, 54) of the adjacent group (24, 58, 62).

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WIPER CLEARING DEVICE**Background of the invention****Field of the Invention**

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This invention relates to a wiper blade cleaning system for cleaning debris from window wiper blades in which the blades travel over discrete scraping elements in the form of projections or depressions formed in or added to the window to be wiped by the wiper blade. The primary use of the present invention is for windshield

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wipers for vehicles used to wipe both the front windshield and the rear window, but the system may be used in other

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environments, as well. For purposes of illustration and description only, this invention will be described with reference to windshield wipers, without limiting other uses of the invention.

5 Description of the Prior Art

The need for removing debris from wiper blades, particularly wiper blades used in automobiles, trucks, and other land, water and air vehicles, has long been recognized. This necessity is brought on by the
10 accumulation of debris such as dirt, oil, insects, leaves, ice, snow, etc. on windshield wipers. Accordingly, numerous devices for cleaning windshield wipers and keeping wipers free from such debris have been proposed.

For example, U.S. Patent No. 2,974,340 discloses
15 an attachment for cleaning windshield wipers which comprises a transparent strip which may be attached to a windshield, the transparent strip having ribs thereon which will scrape and clean the wiping edge of the windshield wiper. Similarly, U.S. Patent No. 4,685,168
20 discloses a wiper blade cleaner which is a rectangular strip made of transparent material which is either affixed to or formed integrally with the windshield. The strip is approximately the same size, i.e., length and width, of the wiper blade itself and has a non-abrasive surface.

U.S. Patent No. Re. 32,218 discloses a windshield for automobiles having at least one scraping edge in the path of a windshield wiper. The scraping edge, extending for the length of the wiper blade, has
5 either an inverted U or an inverted V shape. The scraping edge is fabricated as part of the manufacturing process of the windshield. U.S. Patent 4,616,376 discloses a means for cleaning a windshield wiper blade which is also built directly into the windshield. The cleaning means of this
10 reference comprises a groove ground into the windshield, wherein the bottom of the groove has ridges extending longitudinally within the groove.

Another example of a device for cleaning windshield wipers is U.S. Patent No. 3,908,222 which
15 discloses a windshield wiper blade cleaner which comprises a plurality of spaced, independent units which are permanently mounted on the windshield. The units are formed in a single row and have a diamond shape wherein opposite points of the diamond are pointed in the
20 direction of oscillation of the wiper blade.

However, none of these known devices have proven to be entirely successful in cleaning windshield wipers so that all of the debris, snow, ice, etc. accumulated on the wipers are effectively removed from the entire length of
25 the wiper each time the wiper passes thereover without

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causing undue wear to the wipers or scarring of the windshield. Moreover, the debris, ice, snow, etc. cleaned from the wipers may accumulate on the device, thereby adversely affecting its cleaning capabilities.

5 Accordingly, an objective of the present invention is to provide a device for clearing all types of debris from windshield wipers which, if not cleaned from the wiper, would hamper the clearing efficiency of the wiper blade. A further objective of the present invention
10 is to clean the entire wiping edge of the blade with each pass of the wiper over the clearing device. An even further objective of the present invention is to provide a configuration of the clearing device which will not allow the buildup of debris, snow, ice, etc. on the cleaning
15 device itself.

Clearing devices of the present invention which are adhesively attached to the windshield also have advantages of being applicable to glass or other smooth surfaces. They are durable and can be easily renewed and
20 are inexpensive and easy to install.

Summary of the Invention

The objectives discussed above are obtained by the present wiper clearing device for removing debris from the surface of a window wiper which comprises a plurality

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of discrete scraping elements on the window, the scraping elements being arranged in two or more groups disposed in a path in which the wiper travels to wipe the window. The groups should extend for a distance corresponding to the
5 length of the wiper. The scraping elements of one group should be at least partly aligned with the spaces between the scraping elements of the adjacent group.

Brief Description of the Drawings

For the purpose of illustrating the invention,
10 there is shown in the drawings forms which are presently preferred; it being understood, however, that this invention is not limited to the precise arrangements and instrumentalities shown.

Fig. 1 is an illustration of a prior art
15 windshield/windshield wiper system.

Fig. 2 is a view of the present device formed integrally with a windshield.

Fig. 3 is a view of the device of Fig. 2 located in a parked position below the arcuate sweep pattern of
20 the wipers when the wipers are operating, but above the windshield wipers when the wipers are in the off position.

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Fig. 4 is an enlarged illustration of the present device containing groups of elongated projections, wherein the projections are adhesively attachable to a windshield.

5 Fig. 5 is an enlarged illustration of the present device comprising elongated depressions, wherein the device comprises a planar base member.

Fig. 6 is an enlarged view of the present device comprising elongated projections, wherein the device
10 comprises a planar base member.

Fig. 7 is an elevational view of the present device looking along the bottom edge of the embodiment illustrated in Fig. 6.

Fig. 8 is an illustration of the present device
15 wherein the scraping elements are circular and located in a parked position below the arcuate sweep pattern of the wipers when the wipers are operating, but above the wipers when the wipers are in the off position.

Fig. 9 is a cross sectional view of the device
20 depicted in Fig. 8, taken along lines 9-9 of Fig. 8.

Fig. 10 is an enlarged view of the present device wherein the scraping elements are raised, circular projections which are adhesively attachable to a windshield.

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Detailed Description of the Preferred Embodiments

The present invention will be described with reference to the drawings, wherein like numerals indicate like elements throughout the several views.

5 Fig. 1 illustrates a typical vehicle windshield 10 with which the present invention may be used. Associated with the windshield is a pair of windshield wiper arms 12 carrying windshield wipers 14, including the usual rubber wiper blades. As used herein, the term
10 "wiper" refers to the wiper blades which contact the windshield, window or other surface which is wiped by the wiper. The wipers 14 are illustrated in Fig. 1 as being in a parked position below the typical arcuate sweep pattern 16 of the wipers when they are operating to wipe
15 the windshield.

Fig. 2 illustrates a preferred placement on a windshield of one embodiment of the wiper clearing device of the present invention in the form of two scraping arrays 18, each of which represents a clearing device of
20 the present invention. The scraping arrays 18 are comprised of a plurality of discrete scraping elements 20 arranged in two or more groups, two groups 22 and 24 being shown in Fig. 2 for purposes of illustration.

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The discrete scraping elements 20 of the present clearing device may be of any shape which will be effective in cleaning the wiping edge of a windshield wiper blade 12. To be effective, the scraping elements 20 should have edges which cause a scraping or wiping action, together with a flexing action, on the wiper as the wipers 14 pass over and contact the scraping elements 20. The discrete scraping elements 20 are spaced from each other by a distance such that dirt and other material can be scraped from substantially the entire length of each wiper 14 by each array 18, and such that the material so removed can channel between and be easily removed from the arrays 18. The plurality of scraping elements 20 forming the scraping arrays 18 are arranged in groups 22 and 24 wherein the scraping elements of one group, say group 22, are at least partly aligned with the spaces between the discrete scraping elements 20 of the adjacent group(s), say group 24.

It is preferred that the scraping arrays 18 forming the wiper clearing device of the present invention be positioned on the windshield 10 at a location slightly above the wipers 14 when the wipers are in the off position. This preferred embodiment is illustrated in Figs. 3 and 8. In this preferred parked position, the scraping arrays 18 are below the arcuate sweep pattern 16

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of the wipers. Further in this preferred parked position, the wipers 14 will pass over the arrays 18 when the wipers are turned both on and off, to clean the wipers prior to and at the end of each wiping session. Moreover, such an
5 embodiment allows the clearing device to be placed in a location on the windshield 10 which will not block the field of view of the driver and thereby not hamper the driver's vision. The device will also filter the sun's harmful radiation when placed in such a location.

10 Alternatively, the wiper clearing device of the present invention may be located on the windshield at any location which is within the path of the movement of a wiper, such as within the arcuate sweep pattern 16 of the wipers. In this embodiment, the discrete scraping
15 elements 20 may be transparent, since they will be in a position on the windshield 10 which will allow the wipers 14 to pass over the arrays 18 of the clearing device as the wipers move over the windshield during the normal wiping action.

20 In one preferred embodiment of the present invention, the scraping elements are arranged on a first scraping element assembly 26, illustrated in Fig. 4. The assembly 26 comprises a backing sheet 28 to which
discrete, spaced scraping elements 30, 32 are releasably
25 attached. The backing sheet 28 is coated with a release

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material, such as silicone, to release the elongated
scraping elements 30, 32 from the sheet to which they are
adhesively, but removably, attached. Another release
sheet 29 removably covers the opposite surface of the
5 scraping elements 30, 32, which surface is coated with an
adhesive to attach the elongated scraping elements to the
windshield 10 or other object to be wiped.

In use, the release sheet 29 is removed from the
assembly 26, exposing the adhesive coated scraping
10 elements 30, 32. The scraping elements are then applied
to the windshield by placing the assembly 26 in the
desired position on the windshield or other object to be
cleaned with the exposed adhesive surfaces of the scraping
elements 30, 32 in contact with the windshield which
15 should be clean to enhance adhesion.

Once the scraping elements 30, 32 are firmly
adhesively attached to the windshield, the backing sheet
28 may be removed from the scraping elements. This leaves
the scraping elements 30, 32 attached to and extending
20 from the surface of the windshield. Thus, the scraping
elements 30, 32 are elongated projections extending from
the windshield.

The elongated projections 30, 32 are arranged in
at least two groups 22 and 24. Each of the groups 22 and
25 24 comprises a series of generally parallel elongated

projections 30 and 32, respectively. The projections 30 of one of the groups (e.g., 22) are spaced and arranged in a manner so that they are oriented generally perpendicular to the projections 32 of the other group (e.g., 24). Such an arrangement provides for the effective clearing and cleaning of the wiper while simultaneously allowing for drainage and resisting the accumulation of debris, snow, ice, etc. which may form on the edge of the wiper blade.

Although the scraping elements 30, 32 may be adhesively attached to the windshield as described with respect to Fig. 4, the scraping elements 20 of the present invention can be integrally formed in the windshield during its manufacture as illustrated in Figs. 2 and 3. The integrally formed scraping elements may be of the same elongated shape and in the same alignment and orientation as described above with reference to Fig. 4.

Alternatively, in another preferred embodiment, the scraping elements 20 may be in the form of depressions in a second scraping element assembly 34, as illustrated in Fig. 5. The assembly 34 comprises a backing sheet 36 which is adhesively, but removably, attached to a scraper element sheet 38. Formed in the scraper element sheet 38 are a plurality of elongated depressions 40, 42 arranged in at least two groups 22 and 24, respectively. Each of the groups 22 and 24 and depressions 40 and 42 comprises a

series of generally parallel elongated depressions. The depressions 40 of one of the groups (e.g., 22) are spaced and arranged in such a manner that they are generally perpendicular to the depressions 42 of the other group (e.g., 24). In this embodiment, the depressions 40, 42 trap the debris from the wiper 14, thereby removing it. The perpendicular arrangement of the depressions 40 and 42, like the similar arrangement of projections 30, 32 promotes drainage and resists the accumulation of debris.

10 In use, the assembly 34 is applied to a clean windshield 10 or other clean surface to be wiped, by a simple installation process. The backing sheet 36 is removed, exposing the adhesive coated on the surface of the scraper element sheet 38 to be attached to the
15 windshield. The assembly is then carefully positioned in the desired location and attached to the windshield by pressing the assembly 34 with the adhesive surface against the windshield.

The assembly 34, once applied to the windshield,
20 also provides two additional scraping edges 39 and 41, corresponding to the top and bottom edges, respectively, of the assembly as illustrated in Fig. 5. When the wiper travels over the assembly 34, debris will thereby be

scraped and removed from the wiper by the edges of the depressions 40 and 42 and by the edges 39 and 41 of the assembly.

As with the scraping elements in the form of elongated projections 30, 32 as discussed above, the elongated depressions 40, 42 could be formed integrally within the windshield 10 during manufacture of the windshield. Alternatively, the depressions 40, 42 could be formed directly in the windshield after manufacture by etching or otherwise removing glass from the outer surface of the windshield by techniques well known to those skilled in the art.

Another preferred embodiment of the present invention is illustrated in Figs. 6 and 7 with respect to a third scraping element assembly 44. The assembly 44 comprises a backing sheet 46 releasably covering an adhesive coating 47 applied to a scraper element sheet 48. The scraper element sheet 48 has top and bottom edges 49, 51 which act as scraping edges for a wiper. When the assembly is attached to a windshield or other surface to be wiped.

Extending from one surface of the scraping element sheet 48 are a plurality of discrete scraping elements in the form of elongated projections 50, 52 arranged in two groups 22, 24, respectively. The

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arrangement and orientation of the elongated projections 50, 52 on the assembly 44 are preferably substantially the same as set forth above with respect to the projections 30, 32 on the assembly 26 illustrated in Fig. 4 for substantially the same reasons. However, the projections could take other forms and have different spacings so long as there are scraping elements 20 formed in at least two groups 22, 24, such that the scraping elements of one group are aligned with the spaces between the scraping elements of the adjacent group(s).

The assembly 44 is applied to a windshield by removing backing sheet 46 to expose the adhesive coating 47. The assembly is then positioned in the desired location on the windshield and the adhesive coating 47 is pressed against the windshield, after the windshield has been cleaned.

Another preferred embodiment of the present invention is illustrated in Figs. 8, 9 and 10. In this embodiment, the scraping elements 20 take the form of raised, circular projections 54 extending from the outer surface of the windshield and arranged in two or more rows. Preferably, in this embodiment, the wiper clearing device is grouped in at least four rows as illustrated in Figs. 8, 9 and 10, the four rows being identified as 56, 58, 60 and 62. The raised, circular projections 54 are

arranged generally in a staggered vertical alignment, wherein the projections 54 of every other group (e.g., 56 and 60, 58 and 62) are generally vertically aligned.

When the scraping elements 20 of the present invention take the form of raised circular projections 54, the projections may have any appropriate diameter sufficient to provide effective cleaning of a wiper 14. However, it is preferred that the raised circular projections 54 have a diameter of about 1.5 to about 4.5 mm, and more preferably, about 3.0 mm. Also, the raised circular projections 54 may have any appropriate thickness or height which is sufficient to provide effective cleaning of a windshield wiper blade 14. However, it is preferred that the raised circular projections 54 have a thickness in the range of about 0.15 mm to about 0.45 mm, and more preferably about 0.3 mm. With each group or row, the raised circular projections 54 preferably should have a generally horizontal spacing in the range of about 6.0 to about 9.0 mm, and more preferably, about 7.5 mm. The preferred center to center generally vertical spacing is in the range of about 4.5 to about 7.5 mm, and more preferably, about 6.0 mm.

The circular projection scraping elements 54 are preferably applied by adhesive to the windshield 10, as illustrated in Fig. 10, if they are not integrally formed

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with the windshield during its manufacture. The technique for adhesive application is substantially the same as that explained above with respect to the embodiment illustrated in Fig. 4. Thus, the scraping elements 54 are adhesively, but removably, attached to a backing sheet 64, and a release sheet (not shown) removably covers the adhesive on the opposite surface of the scraping elements. When the release sheet is removed, the adhesive is exposed. The circular projections 54 are then positioned as desired and applied to the windshield with the exposed adhesive bonding the scraping elements to the windshield. Then the backing sheet 64 is removed resulting in the pattern illustrated best in Fig. 10.

The present invention may effectively take several different embodiments as discussed above. For example, the scraping elements 20 of the present invention may be fabricated integrally with the windshield 10. This embodiment is illustrated in Figs. 2, 3 and 8. In such an embodiment, it is preferred that the scraping elements 20 be formed at the same time the windshield 10 itself is manufactured.

The scraping elements 20 of the present invention may be attached to or formed in a windshield after it has been manufactured in any appropriate manner known in the art. However, it is preferred that at least

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the scraping elements in the form of projections and scraping element assemblies containing depressions, such as assembly 34, be attached to the windshield or other surface to be wiped with a pressure sensitive adhesive.

5 In such embodiments, it is preferred that the lower surface of the base member or scraper element sheet contain a pressure sensitive adhesive so that the lower surface may be attached directly to the windshield.

Suitable pressure sensitive adhesives for use with the
10 present device are, e.g., Controltac® by 3M Company.

However, any suitable pressure sensitive adhesive which may effectively attach the scraping elements to a windshield may be used. Other appropriate adhesives which may be used in the present invention will be evident to
15 one skilled in the art based upon the present disclosure.

The present wiper clearing device may be of any appropriate size, as long as the device is of sufficient size to clean an entire wiper blade with each passage over a scraping array 18. However, preferably each wiper
20 scraping array 18 has a surface area approximately equal to the plan surface area of the windshield wiper with which the scraping array 18 is associated.

The thickness, height, depth or spacing of the scraping elements 20 from the surface of the windshield 10
25 may vary based on the desire to obtain effective removal

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and cleaning of debris from the wiper balanced against the concern regarding wear on the wiper blade. For use with typical automotive windshield wipers, the thickness of the scraping elements 20 is about the thickness of the wiper blade edge which wipes the windshield, or about 0.4 mm, within a suitable range of about 0.05 to about 0.5 mm.

The scraping elements and scraping element sheets of the wiper clearing device of the present invention may be made from any appropriate material. However, the material should be compatible with the pressure sensitive adhesive used, should be hard and durable to allow for effective cleaning of the wipers and should not degrade over time. For example, the wiper clearing device 10 may be fabricated from materials such as glass beads. It will be evident to one skilled in the art from the present disclosure that other materials may be effectively used to fabricate the wiper clearing device of the present invention.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and, accordingly, reference should be made to the appended claims, rather than to the foregoing specification, as indicating the scope of the invention.

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I claim:

1. A wiper clearing device for removing debris from the surface of a wiper of a windshield comprising a generally planar base member having an upper surface, a lower surface, and side surfaces, said lower surface of said base member having adhesive means thereon for attachment to said windshield, said upper surface having a plurality of elongated scraping projections extending therefrom adapted to remove debris from the surface of the wiper, said elongated projections being arranged in at least two groups, one of said groups having a series of generally parallel elongated projections and the other of said groups also having a series of generally parallel elongated projections, said projections of said one group being spaced from and arranged generally perpendicular to said projections of said other group so as to provide passageways for drainage.

2. The wiper clearing device of claim 1 wherein said adhesive means is pressure sensitive adhesive.

3. The wiper clearing device of claim 1 wherein the cross sectional area of said upper surface is approximately equal to the cross sectional area of the wiper.

4. The wiper clearing device of claim 1 wherein the base member and projections are made of a hard durable material.

5. The wiper clearing device of claim 1 wherein at least one edge of said base member forms a scraping edge for removing debris from said wiper.

6. The wiper clearing device of claim 1 wherein the device is attached to said windshield at a location within the sweep of the wiper.

7. The wiper clearing device of claim 1 wherein the device is located beneath the wiper when the wiper is in a parked position such that the wiper rests on the upper surface of the device.

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8. A wiper clearing device for removing debris from a wiper of a windshield comprising a generally planar base member having an upper surface, a lower surface and side surfaces, said lower surface having attached thereto adhesive means for securing said device to a windshield, said upper surface having a plurality of elongated depressions adapted to remove debris from the surface of said wiper, said elongated depressions being arranged in at least two groups, one of said groups having a series of generally parallel elongated depressions and said other group also having a series of generally parallel elongated depressions, said depressions of said one group being spaced from and generally perpendicular to said depressions of said other group.

9. The wiper clearing device of claim 8 wherein the device is made of a hard durable material.

10. The wiper clearing device of claim 8 wherein at least one side surface of said base member forms a scraping edge for said wiper.

11. The wiper clearing device of claim 8 wherein said adhesive means is pressure sensitive adhesive.

12. The wiper clearing device of claim 8 wherein the cross sectional area of said upper surface is approximately equal to the cross sectional area of said wiper.

13. The wiper device of claim 8 wherein the device is located on said windshield in a location within the sweep of the wiper.

14. The wiper clearing device of claim 13 wherein the device is located beneath said wiper when said wiper is in the parked position such that said wiper rests on the upper surface of said device.

15. A wiper clearing device for removing debris from the surface of a wiper of a windshield comprising a generally planar base member, said base member having an upper and lower surface, said upper surface having a plurality of elongated projections, said plurality of elongated

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projections being arranged in at least two groups, one of said groups containing a series of generally parallel elongated projections and the other group also containing a series of generally parallel elongated projections, said one group of projections being spaced from and generally perpendicular to said other group, wherein a lower surface of said projections has adhesive means thereon for attachment to said windshield and said base member is releasably attached to said projections.

16. The wiper clearing device of claim 15 wherein the device is made of a hard durable material.

17. The wiper clearing device of claim 15 wherein said adhesive means is pressure sensitive adhesive.

18. The wiper clearing device of claim 15 wherein the cross sectional area of said upper surface of the device is approximately equal to the cross sectional area of said wiper.

19. The wiper of claim 15 wherein the device is located on the windshield in a location within the sweep of the wiper.

20. The wiper clearing device of claim 15 wherein the device is located beneath said wiper when said wiper is in the parked position such that said wiper rests on the upper surface of said device.

21. A windshield having a front and back surfaces, said front surface having an upper and lower region, said lower region of said front surface having means for removing debris from the surface of a wiper servicing said windshield, said means including a plurality of elongated scraping projections extending outwardly from said front surface, said elongated projections being arranged in at least two groups, one of said groups having a series of generally parallel elongated projections and the other of said groups also having a series of generally parallel elongated projection, said projections of said one group being spaced from and arranged generally perpendicular to said projections of said other group so as to provide passage for drainage.

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22. A wiper cleaning system for removing debris and other foreign matter from a wiper for a surface such as a windshield serviced by a wiper, said system comprising a plurality of discrete raised elements projecting from said surface, said elements being arranged in horizontally extending rows that are vertically spaced, said rows extending for a distance corresponding to the length of the wiper, said elements being arranged in parallel horizontal alignment in each row and in generally vertical alignment in alternate rows and in staggered alignment in adjacent rows, said elements being spaced from each other by a distance such that debris and other foreign matter removed from the wiper by the system can be channelled therebetween.

23. A wiper cleaning system as in claim 22, wherein the elements are raised, circular projections extending from the surface wiped by the wiper.

24. A wiper cleaning system as in claim 22 wherein serrated, lateral wiper clearing channels are created between adjacent horizontal rows of elements.

25. A wiper cleaning system as in claim 23 wherein the circular projections have a diameter of about 1.5 to 4.5 mm, a thickness of about 0.05 to about 0.50 mm, a center to center generally horizontal spacing of about 3 to 9 mm, a center to center generally vertical spacing of about 3.0 to about 7.0 mm.

26. A wiper cleaning system as in claim 22, wherein the raised elements are formed integrally with the surface wiped by the wiper.

27. A wiper cleaning system as in claim 22, wherein the raised elements are adhesively attached to the surface wiped by the wiper.

28. A wiper cleaning system as in claim 22, wherein the system has a plan surface area equal to a plan surface area of the wiper.

29. A wiper cleaning system as in claim 22, wherein the raised elements are made of a hard durable material.

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30. A wiper cleaning system as in claim 29, wherein the material is plastic.

31. A wiper cleaning system as in claim 22, wherein a path serviced by the wiper includes an arcuate sweep pattern when the wiper is operating and a parked position below the arcuate sweep pattern when the wiper is not operating, and wherein the raised elements are located on the window within the arcuate sweep pattern.

32. A wiper cleaning system as in claim 22, wherein a path serviced by the wiper includes an arcuate sweep pattern when the wiper is operating and a parked position below the arcuate sweep pattern when the wiper is not operating, wherein the elements are located within the parked position.

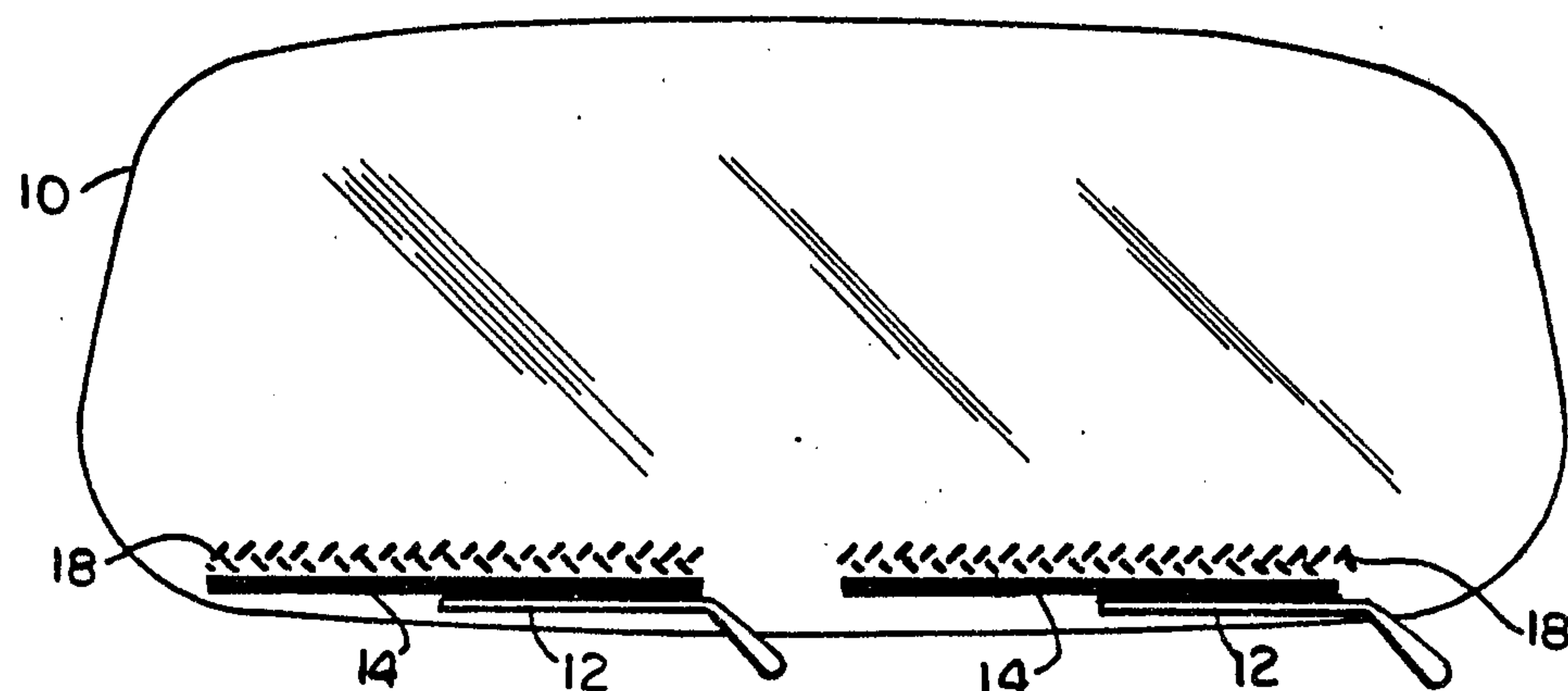
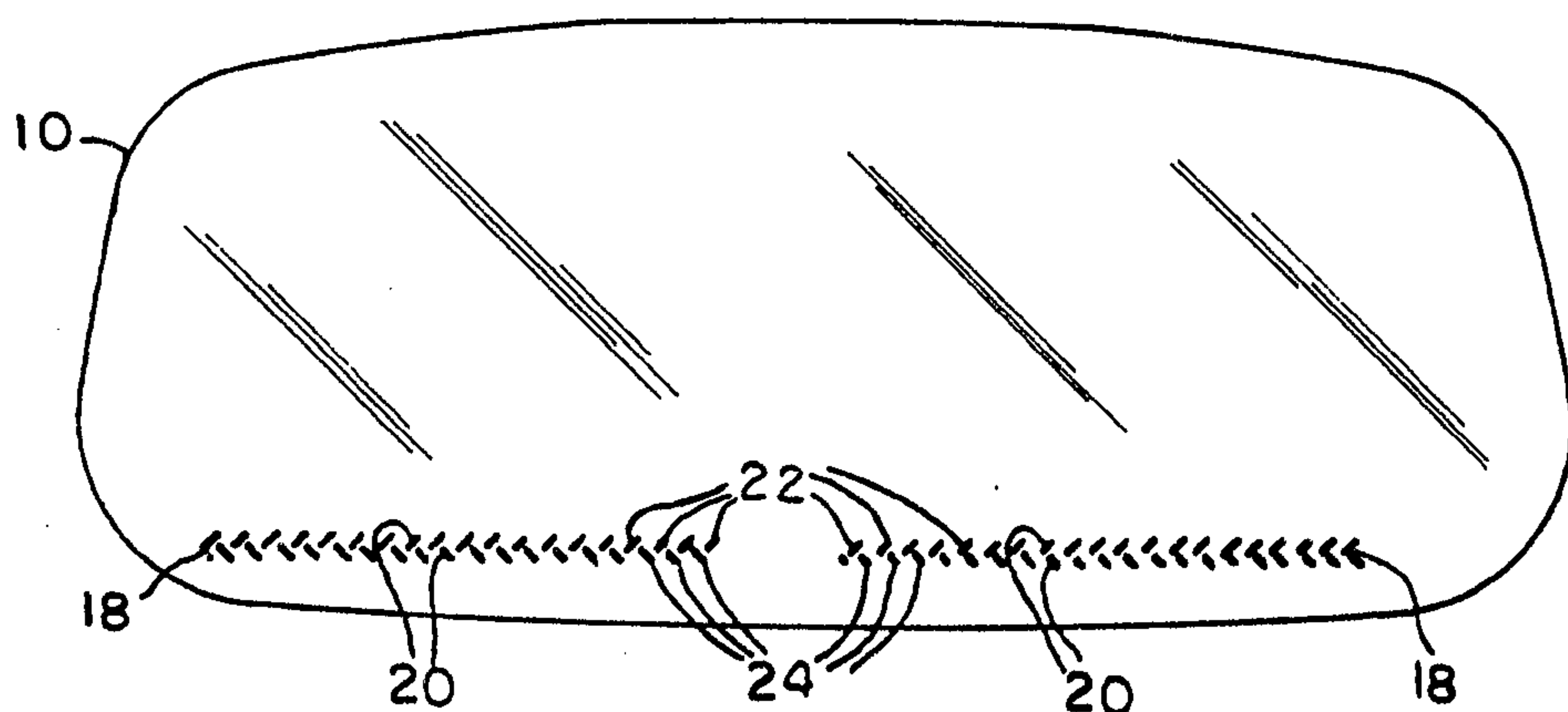
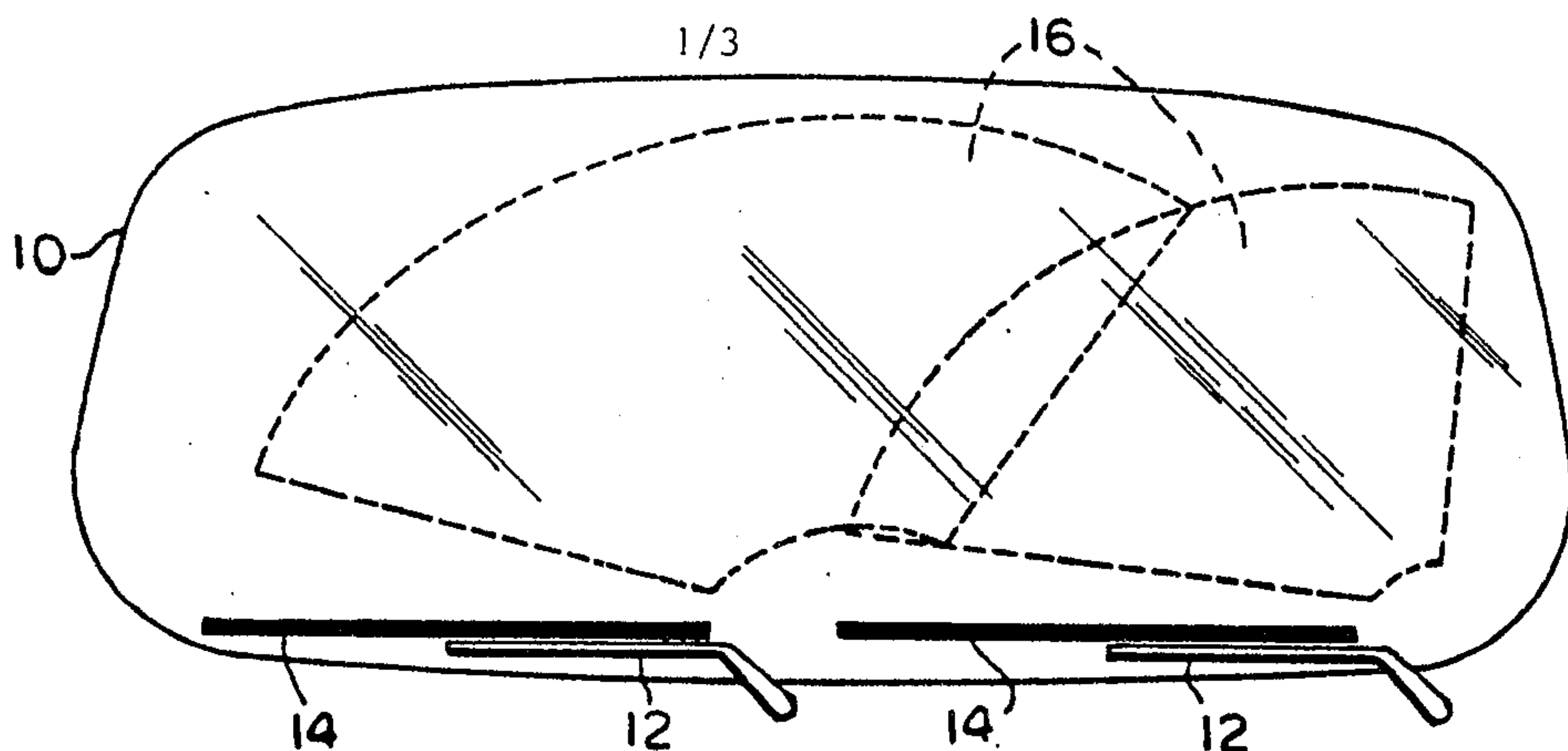
33. A wiper clearing device for removing debris from the surface of a window wiper comprising a plurality of discrete scraping elements on the window, the scraping elements being arranged in two or more groups, disposed in a path in which the wiper travels to wipe the window and extending for a distance corresponding to the length of the wiper, the scraping elements of one group being at least partly aligned with spaces between the scraping elements of the adjacent group, wherein the scraping elements comprise a plurality of elongated depressions formed within the window, one of the groups having a first series of generally parallel elongated depressions and the other of the groups having a second series of generally parallel elongated depressions, the depressions of the first series being spaced from and arranged generally perpendicular to the depressions of the second series.

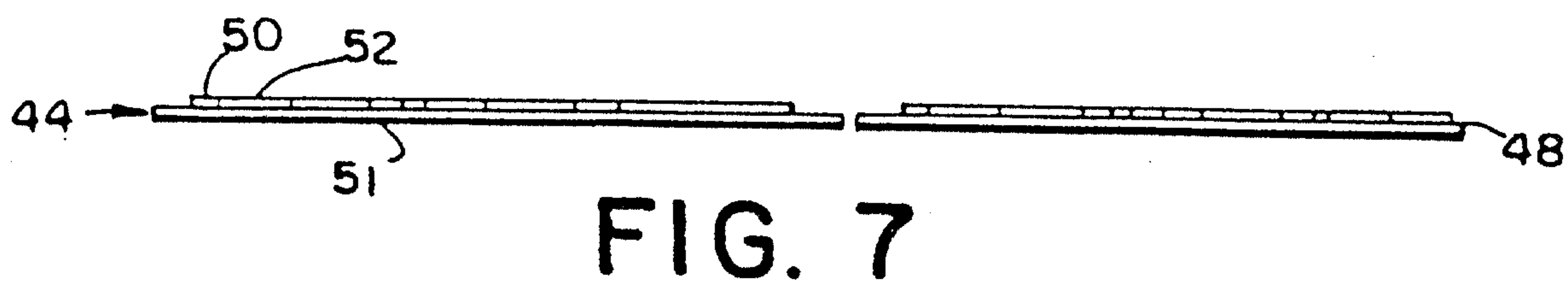
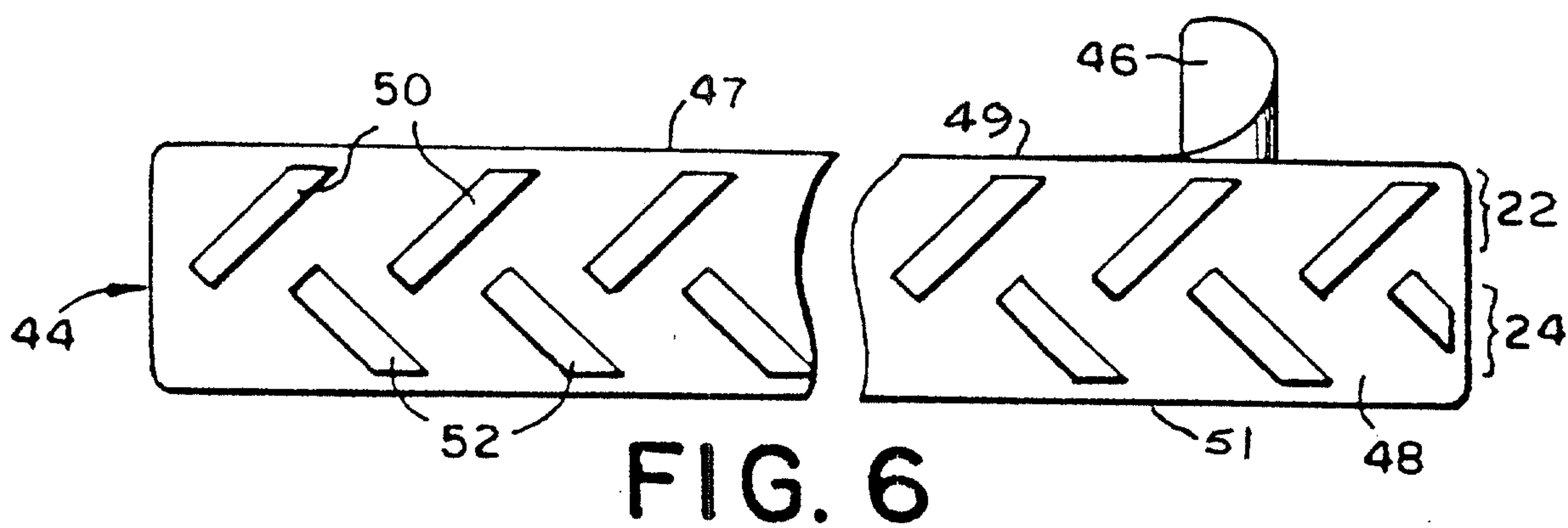
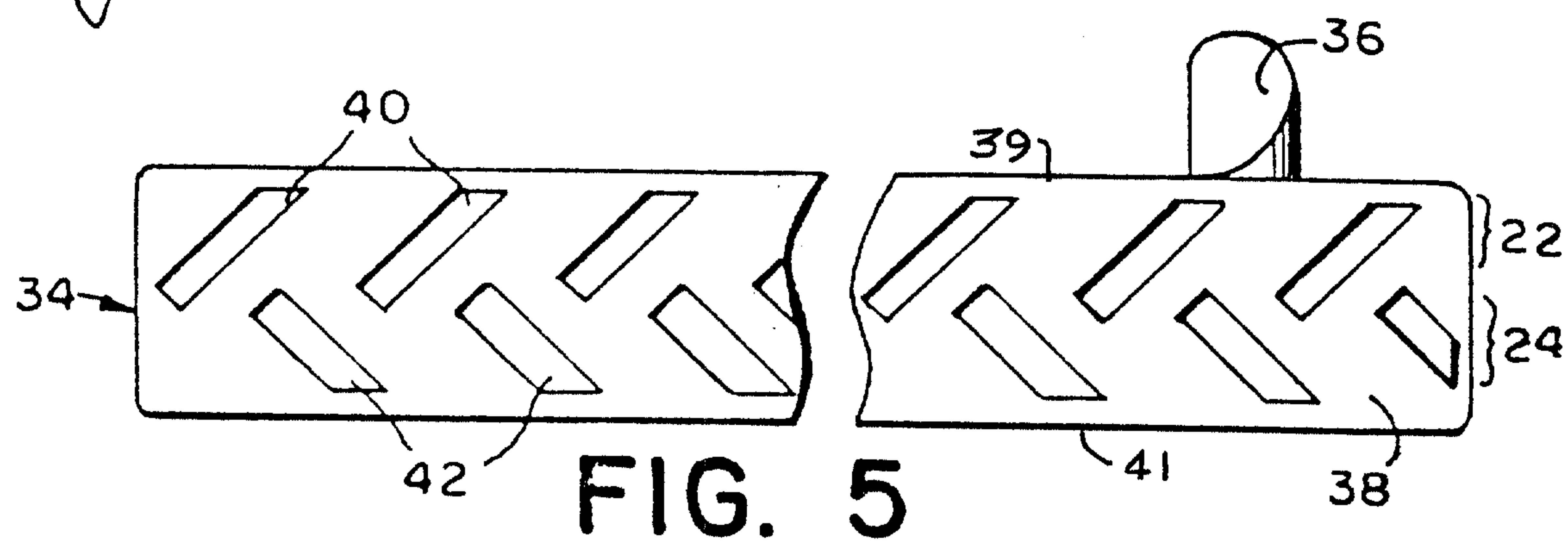
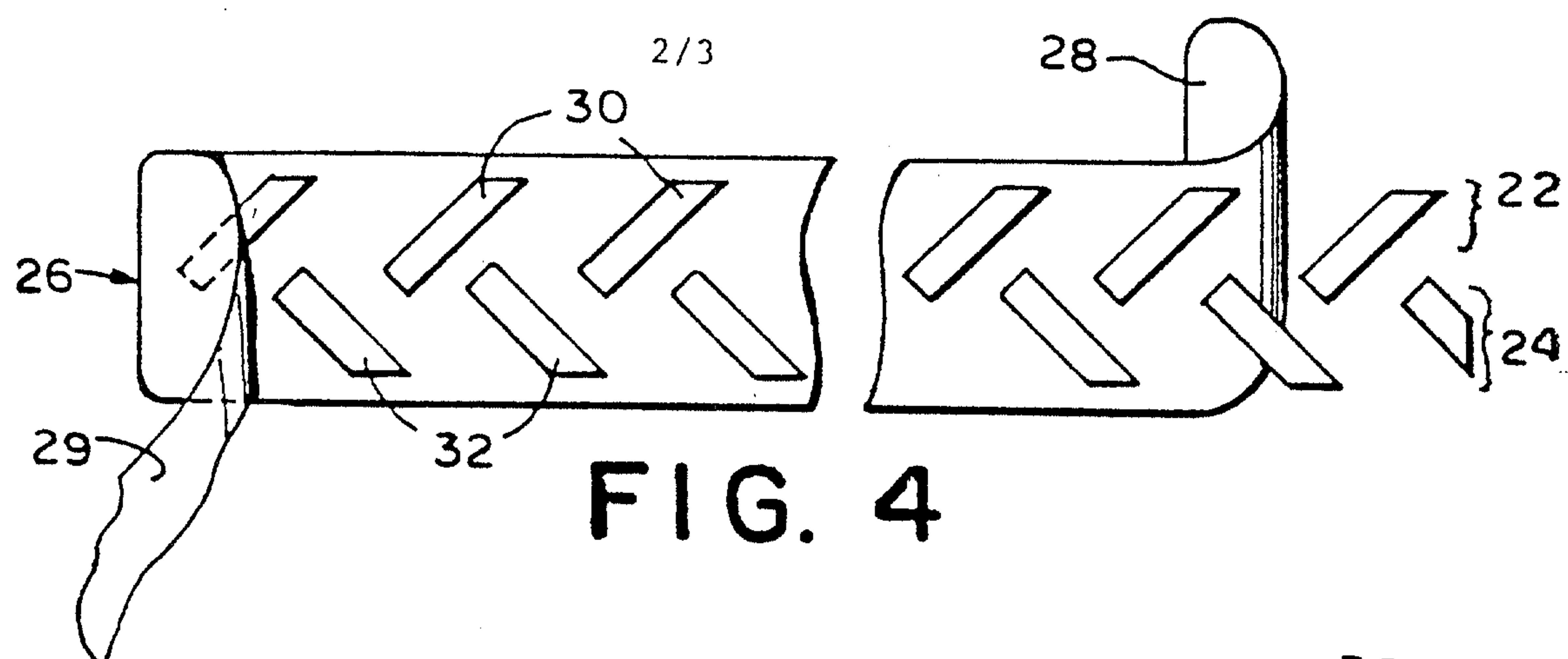
34. A wiper clearing devices for removing debris from the surface of a window wiper comprising a generally planar base member having an upper surface, a lower surface and top and bottom and side edges connecting the upper and lower surfaces; adhesive means attached to the lower surface for attaching the device to the window; the device having a plurality of discrete scraping elements, the scraping elements being arranged in two or more groups, the scraping elements of one group being at least partly aligned with spaces between the scraping elements of the adjacent group, wherein the scraping elements comprise a plurality of elongated depressions extending from the upper surface to the lower surface, one of the groups having a first series of

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generally parallel elongated depressions and the other group having a second series of generally parallel elongated depressions, the depressions of the first series being spaced from and arranged generally perpendicular to the depressions of the second series.

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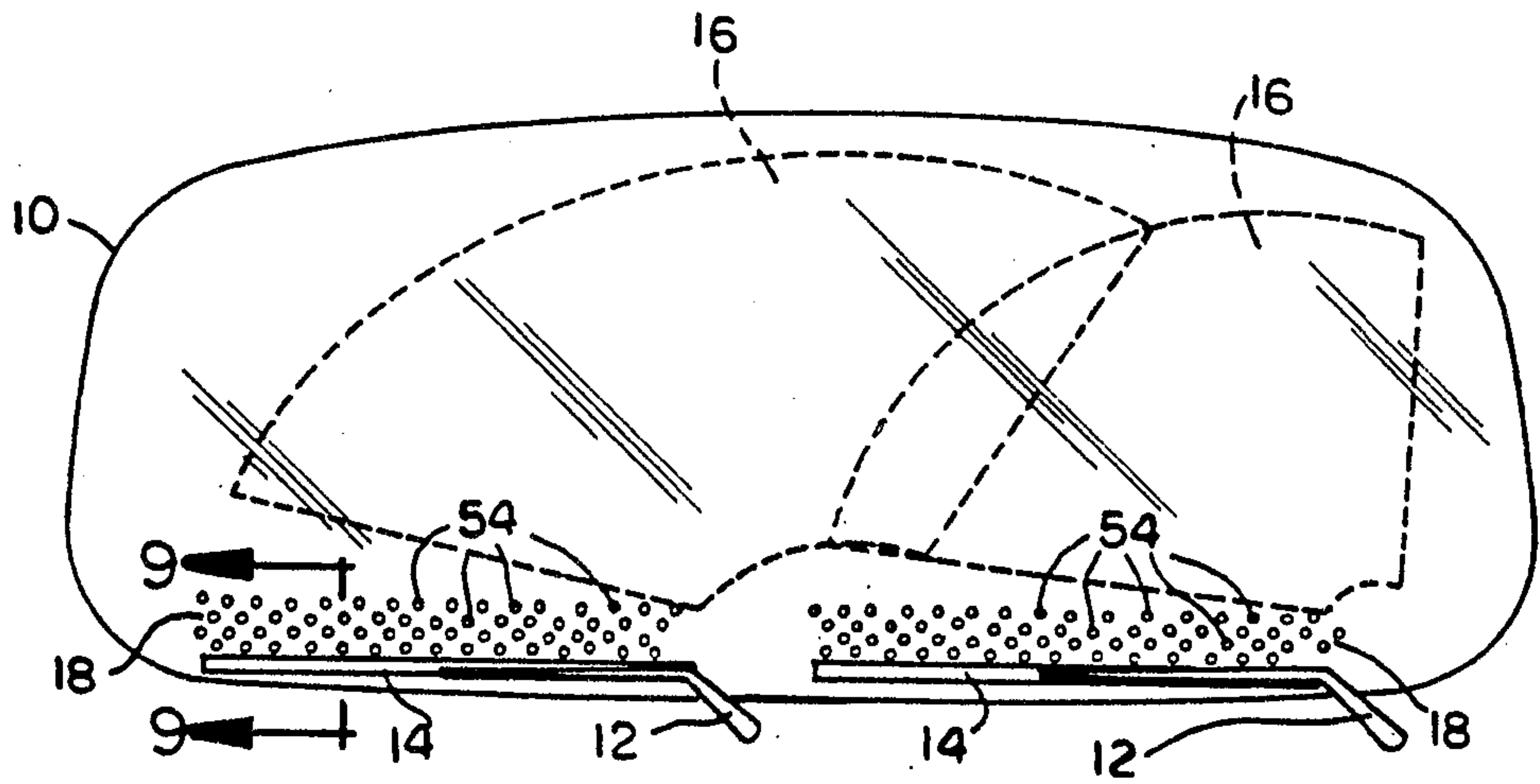


FIG. 8

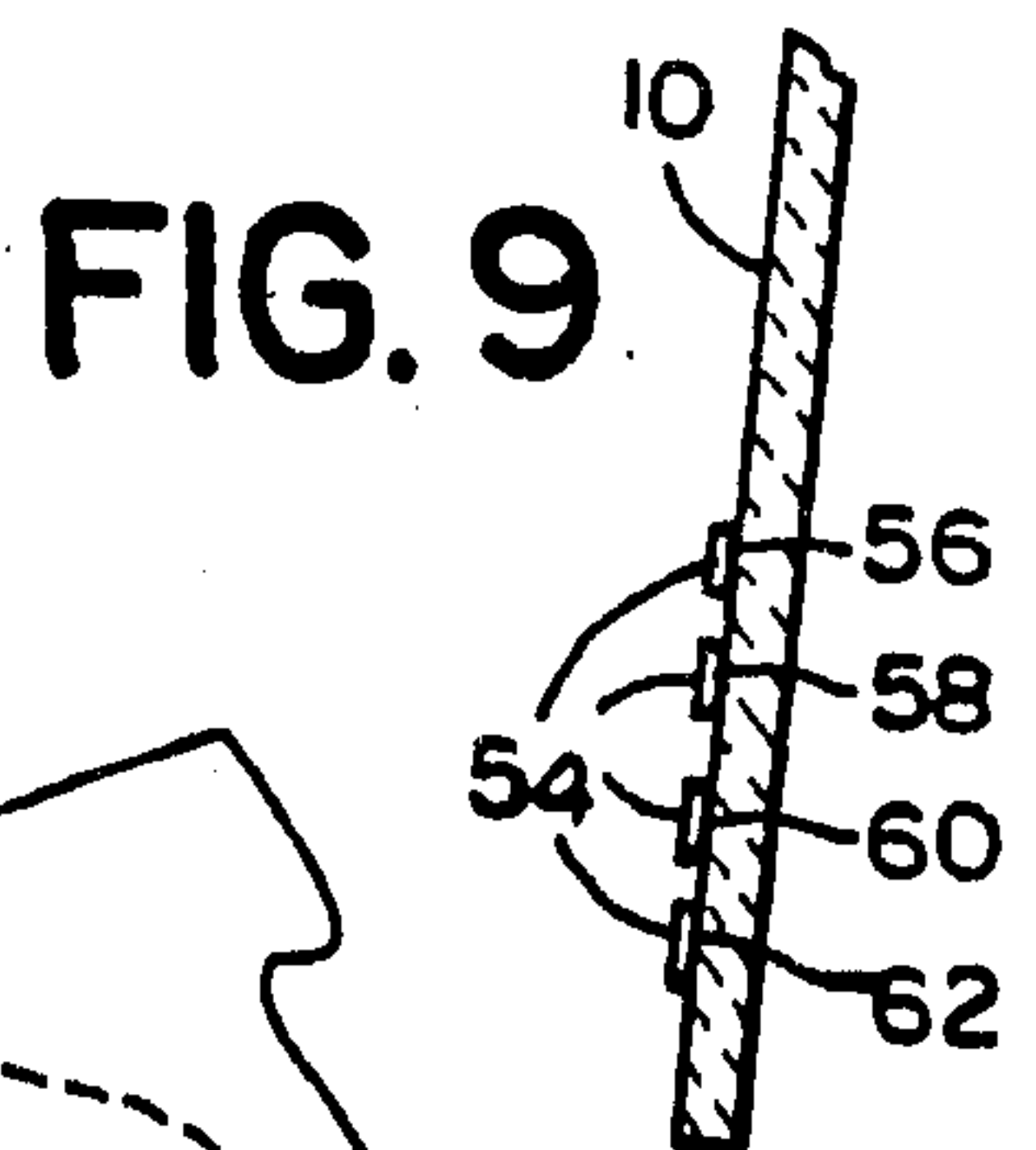


FIG. 9

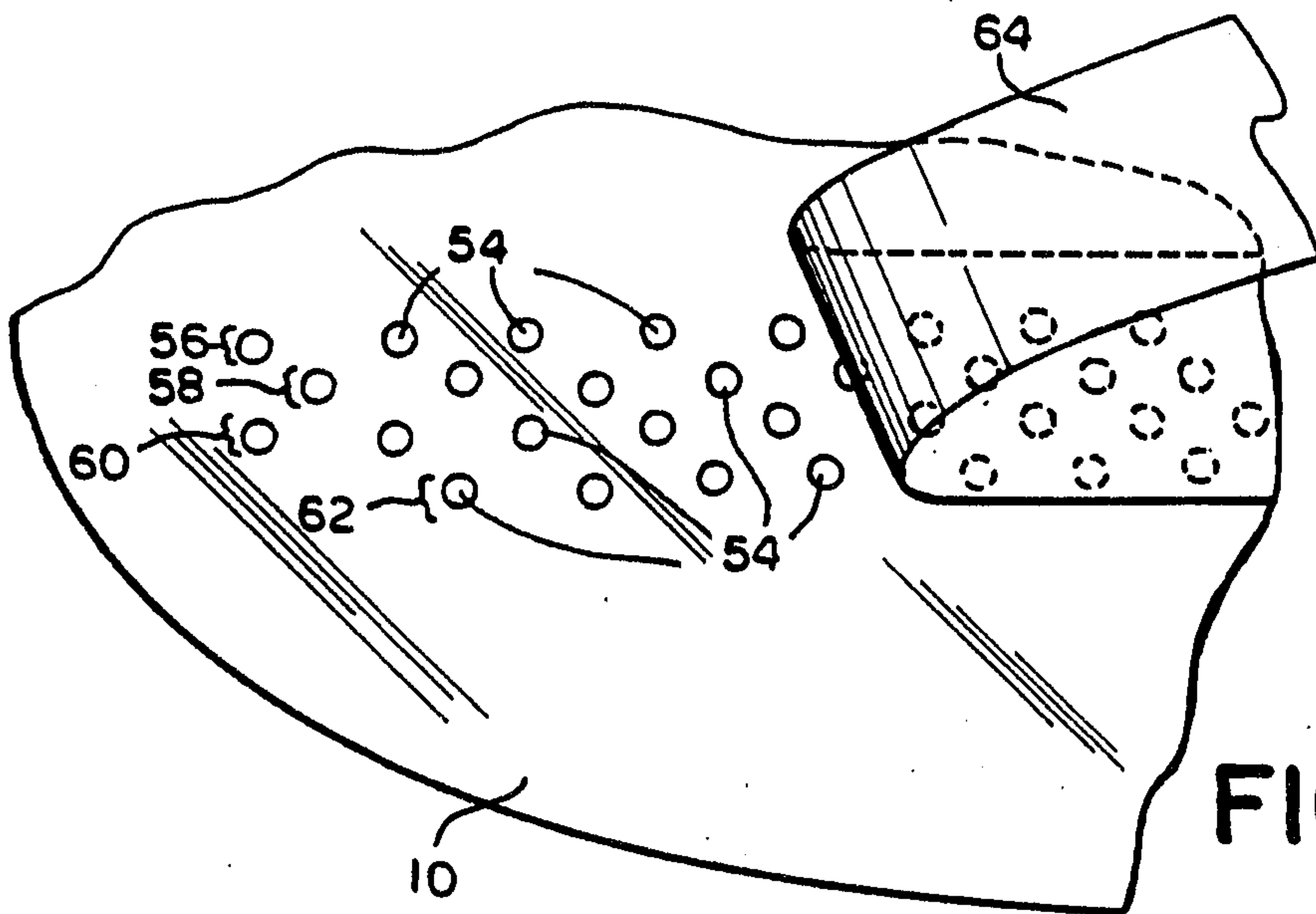


FIG. 10

