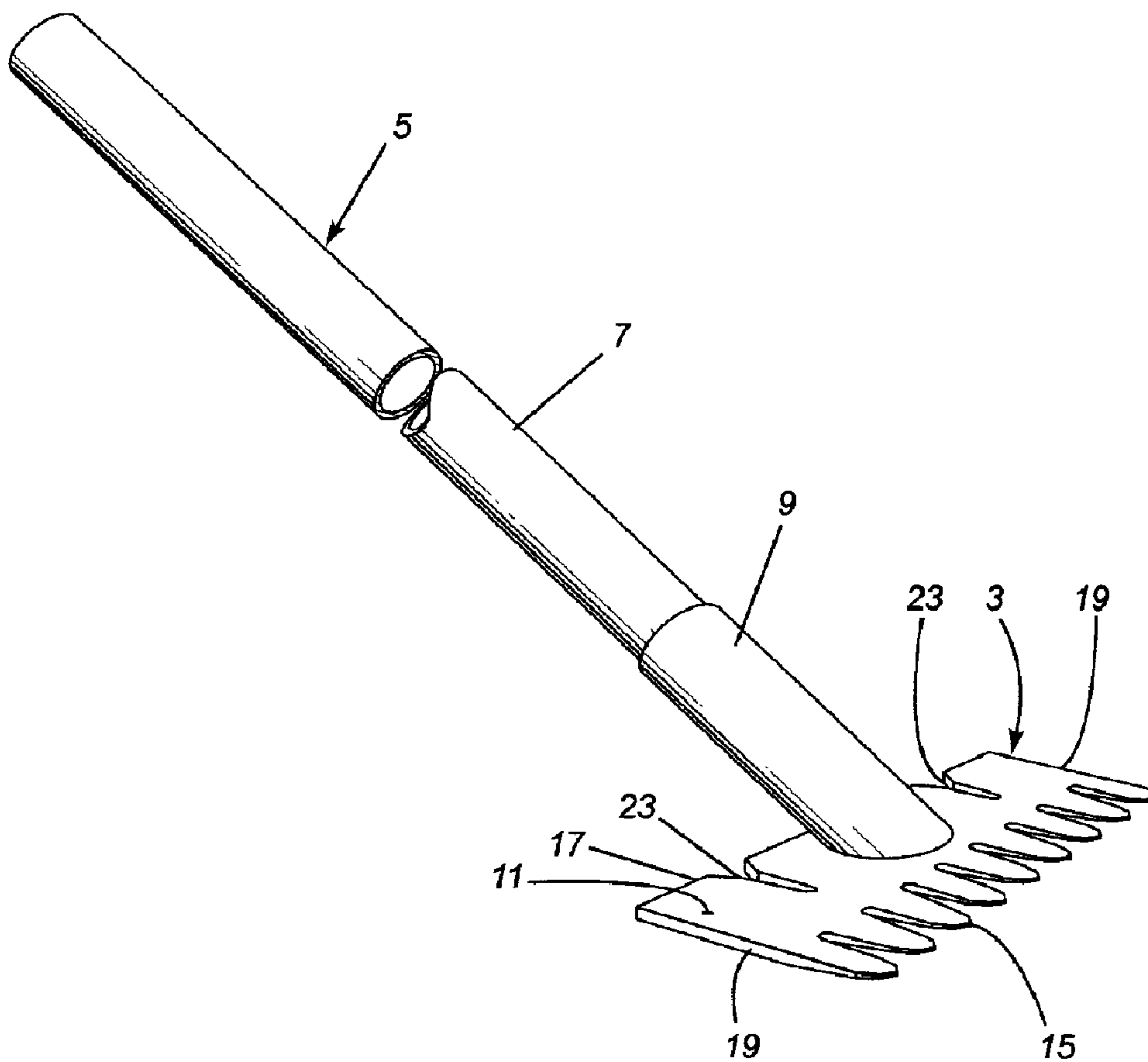




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(54) Titre : OUTIL D'ENLEVEMENT DE MATERIAU
(54) Title: MATERIAL REMOVING TOOL



(57) Abrégé/Abstract:

A manually operated material lifting tool primarily used for lifting roofing material. The tool has a tool blade, the blade having a front edge and rear edge, the front and rear edges joined by side edges. The blade is wider than it is longer and has slots extending

(57) **Abrégé(suite)/Abstract(continued):**

inwardly from the front edge toward the back edge forming teeth between the slots. A handle is attached to the top of the blade approximately midway between the side edges, the bottom, front of the handle located behind, but adjacent the closed end of the nearest slot, and the bottom, rear of the handle adjacent the rear edge of the blade. The handle extends rearwardly and upwardly from the top of the blade at an angle ranging between 30° and 50°.

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ABSTRACT

A manually operated material lifting tool primarily used for lifting roofing material. The tool has a tool blade, the blade having a front edge and rear edge, the front and rear edges joined by side edges. The blade is wider than it is longer and has slots extending inwardly from the front edge toward the back edge forming teeth between the slots. A handle is attached to the top of the blade approximately midway between the side edges, the bottom, front of the handle located behind, but adjacent the closed end of the nearest slot, and the bottom, rear of the handle adjacent the rear edge of the blade. The handle extends rearwardly and upwardly from the top of the blade at an angle ranging between 30° and 50°.

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MATERIAL REMOVING TOOL

TECHNICAL FIELD

[1000] This invention is directed toward a manually operated tool for use in removing material. The invention is more particularly directed toward a roofing tool for use in manually separating roofing material from roofs in the repair of roofs. The invention is also directed toward a blade for use in the roofing tool.

BACKGROUND ART

[1001] Most manually operated roofing tools employ a thin, relatively long, blade with a handle extending upwardly and rearwardly from the top, rear of the blade. The blade is generally longer than it is wider, the long blade thought to be desirable to be able to lift more of the shingles during each lift. The front of the blade can be tapered and is provided with slots that extend rearwardly a relatively short distance from the front edge toward the rear edge of the blade. The slots are used to capture the shanks of roofing nails encountered by the blade during operation of the tool, the blade being manipulated by the handle to lift the captured nails from the roof. Most of the known manual roofing tools use leverage to be able to lift the nails and the shingles away from the roofs. The handle of the tool is used to slide the blade, while all, or at least the front part of the blade, is flat on the roof, under the shingles. The handle can then be manipulated to pivot the blade about its back edge to raise the front edge of the blade under the shingles to lift them. The blade often has a fulcrum under the blade at its rear end. By pivoting the handle about the fulcrum while the fulcrum rests on the roof, the fulcrum aids in lifting the front of the blade, and any shingles on the blade. The handle is normally located close to the back edge and/or the fulcrum, well spaced from the slots, to allow the blade to move forward under the shingles for a considerable distance before lifting the shingles.

[1002] It has been found however that the relatively long blade makes for a

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heavy tool which is tiring to use and thus inefficient. Further, it has been found that the long blade makes the tool less efficient in lifting the shingles since the moment arm from the back pivot edge of the blade to the front edge is relatively long. The longer the blade, the more effort that must be expended to use the tool.

BRIEF DESCRIPTION OF THE INVENTION

[1003] Applicant has discovered that a much more efficient and lighter tool can be effectively employed in lifting shingles by using a very short blade with the handle of the tool, extending from the blade, located between and adjacent both the rear edge of the blade and the end of the slots in the front of the blade. The blade is obviously lighter and obviously more efficient since there is a very short lever arm between the rear edge of the blade and the front edge making it much easier to lift the shingles up. While the tool does not extend nearly as far under the shingles to lift them, as do the prior art tools, it has been unexpectedly found that the new tool can lift a given area of shingles quicker with less effort than the time needed to lift the same area of shingles using tools with a long blade. Applicant's tool loosens and partly lifts the shingles with the short front of the blade and then continues lifting the shingles with the handle as the blade is pushed forward to loosen more of the shingles. Much less effort is required to loosen and partly lift the shingles since applicant's tool blade is so short and the leverage is so great. What is unexpected is that the shingles can be easily completely lifted in short forward and lifting movements using the tool handle as well as the blade. While the operator must use more forward and lifting movements, the lighter tool and the more efficient lifting action more than compensates for the increased tool activity.

[1004] The invention is particularly directed toward a manually operated material

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lifting tool having a blade, the blade having front and rear edges, the front and rear edges joined by side edges, the front and rear edges being longer than the side edges to make the blade wider than it is longer. The blade has slots extending inwardly from the front edge toward the back edge forming tapered teeth. A handle is attached to the top of the blade approximately midway between the side edges, the handle located between, and closely adjacent to, the rear edge and the end of the nearest slot. The handle extends rearwardly and upwardly from the top of the blade.

[1005] The invention is also directed toward a tool blade for a manually operated material lifting tool, the tool blade having a front edge and a rear edge, the front and rear edges joined by side edges, the front and rear edges being longer than the side edges to make the blade wider than it is longer. The blade has slots extending inwardly from the front edge toward the back edge forming teeth between the slots. A hosel is attached to the top of the blade approximately midway between the side edges, the hosel located between, and closely adjacent to, the rear edge and the end of the nearest slot. The hosel extends rearwardly and upwardly from the top of the blade, the hosel adapted to receive a handle member by means of which the tool is manually operated.

BRIEF DESCRIPTION OF THE FIGURES IN THE DRAWINGS

[1006] Fig. 1 is a perspective view of the tool;

[1007] Fig. 2 is a side view of the tool head;

[1008] Fig. 3 is a detail plan view of the teeth on the tool blade;

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[1009] Fig. 4 is a cross-section view taken along line 4-4 in Fig. 3;

[1010] Fig. 5 is a schematic view of the tool pulling up a nail;

[1011] Fig. 6 is a detail side view of another embodiment of the tool blade;

[1012] Fig. 7 is a detail side view of a further embodiment of the tool blade;

[1013] Fig. 8 is a side view of another embodiment of the tool head;

[1014] Fig. 9 is detail plan view of another embodiment of the tool blade; and

[1015] Fig. 10 is a detail perspective view of another embodiment of the tool handle.

DETAILED DESCRIPTION OF THE INVENTION

[1016] The tool 1, as shown in Figs. 1 and 2, has a blade 3 with a handle 5 extending upwardly and rearwardly from the blade. The handle 5 comprises a separate handle member 7, made from a wooden rod or a metal tube, attached directly to a metal hosel 9 extending upwardly and rearwardly from the top 11 of the blade.

[1017] The blade 3 is generally of a quadratic shape, having a front edge 15 and a rear edge 17. The front and rear edges 15, 17 are normally straight and parallel but could be slightly curved, or be at a slight angle, to each other. The front and rear edges 15, 17 are joined by side edges 19. The front and rear edges 15, 17 are longer than the side edges 19 providing a blade that is substantially wider than it is long. The length to width ratio of the blade is

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between about 2 to 3 and about 1 to 2. A preferred blade is about four inches long and about seven inches wide. The blade is usually made from a steel plate of uniform thickness, the thickness being about one eighth of an inch.

[1018] The blade 3 has teeth 21 formed in the front edge 15 as more clearly shown in Fig. 3. The teeth 21 are separated by slots 23 extending inwardly from the front edge 15 toward the back edge 17. The slots 23 normally have a wide entry mouth 25 with straight sides 27 that taper down to an elongated slot extension 29. The slot extension 29 can have straight sides 31 that angle slightly toward each other toward the closed end 33 of the slot extension 29 so that the slot extension tapers toward the end 33. The tapered slot extension 29 allows the tool to remove nails having different shank diameters. The slots 23 are normally equally spaced apart and shape the teeth 21 to each have a tapered front portion 35 ending in a rounded front end 37. The tapered front portion 35 is formed by the wide entry mouth 25 of the slots 23. The rounded front ends 37 of the teeth are aligned and define the front edge 15 of the blade shown by a broken line in Fig. 3. The tapered front portion 35 connects to a main body portion 39 that is slightly tapered toward the tapered front portion 35. The main body portion 39 is defined by the straight sides 31 of adjacent slots 23. The main body portion 39 is normally about one and a half times as long as the tapered front portion 35. it follows that the slot extension 29 is normally about one and a half times as long as the entry mouth 25.

[1019] The teeth 21 can also taper in thickness toward their front end 37, the bottom 41 of the teeth ground down from the bottom 43 of the blade so that the front end 37 is generally aligned with the top 11 of the blade 3 as shown in Fig. 4. The teeth are approximately one and a half inches long. The blade is normally one eighth of an inch thick with the teeth tapering in thickness to about one

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sixteenth of an inch at the front end 37.

[1020] The slots 23 receive the shanks of any roofing material nails encountered in the roof during removal of the roofing material and direct the shanks into, and to, the closed end 33 of the narrow, extension portion 29 of the slots with the head of the nails, wider than the extension portion 29 of the slots, resting on the top of the teeth. The nails can be easily levered up and out of the roof by first pivoting the blade 3 up about its front edge 15 using the handle 5, and then about its back edge 17, if required. The teeth are relatively long to provide sufficient leverage to be able to loosen and at least partly lift the nails from the roof using the front edge 15 of the blade as a pivot.

[1021] A preferred form of slots and teeth has been described. Others forms of slots and teeth can be employed. For example, the teeth 21 can be made more rounded with the connection between the straight sides 27, 31 of the slots being slightly rounded instead of angular and with the rounded end 37 being wider and flatter than shown. In a further embodiment, the slot extension 29 of the slots can have its sides parallel rather than slightly angled to each other. In another variation, the slot extension 29 can be shorter than one and a half times the length of the entry mouth 25. The slot extension can even be shorter than the entry mouth 25. At least one slot 23, and preferably two, one on each side of the handle 5, can be provided in the rear edge 17 of the blade as well to help remove nails.

[1022] The handle 5 is attached to the top 11 of the blade 3, centered between the side edges 19 of the blade via the hosel 13. The handle 5 is attached to the blade 3 to have its leading or front, bottom, side 47, adjacent the end 33 or ends 33 of the nearest slot 23 or slots 23. The blade is made only as long as needed

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in order to be able to attach the entire bottom of the handle to the top of the blade. The trailing or rear, bottom, side 49 of the handle 5, is adjacent the rear edge 17 of the blade 3. The handle 5 extends upwardly and rearwardly from the top 11 of the blade 3 at an angle \emptyset ranging from between 30° and 50° and preferably around 40° . If the tool is used primarily to remove roofing material working down from the ridge of a roof, the handle can extend from the blade at a high pitch angle ranging preferably between 40° and 45° . If the tool is used primarily to remove roofing material working up toward the ridge of a roof, the handle can extend from the blade at a low pitch angle ranging preferably between 35° and 40° . The angle of the handle is a compromise between having the handle low enough to more easily push the blade 3 under shingles and having the handle high enough to be able to work without having to bend too far over. The lower the handle is, the easier the loosened material will slide up the front of the handle. The handle 5 is also somewhat longer than normal, about forty inches instead of a normal thirty four-thirty six inches, to make it easier to work without having to bend too far over. The longer handle also increases the mechanical advantage of the tool in levering up the material. However the tool can be effectively used with a short handle, one ranging between twenty four and thirty inches, as well.

[1023] Locating the handle 5 of the tool adjacent the ends 33 of the slots 23 in the blade 3 and adjacent the back edge 17 of the blade provides a tool 1 that generates a powerful torque to be used in lifting nails and material. A lifting force F_1 applied at the end of the lever arm L_1 provided by the long forty inch handle 5, about the rear edge 17 of the blade 3, provides a very strong lifting force F_2 to a nail N at the end 33 of the slots 23 due to the short lever arm L_2 of about two inches between the rear edge 17 and the end 33 of the slots as shown in Fig. 5. The lifting force F_2 obtained is about twenty times the lifting force F_1

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applied. In the tools presently used, with a blade between six and eight inches long, the lifting force F2 obtained is only about a half or a third of the lifting force F2 obtained by applicant's blade. The difference is substantial in the effort needed to remove the roofing material.

[1024] Using a substantially shorter blade than normal, unexpectedly does not affect the efficiency of the short blade in removing the roofing material. The handle guides the material lifted and loosened by the blade upwardly on the handle as the blade is moved further and further under the material still attached to the roof. The loosened and raised material riding up the handle can be torn or cut away when it gets too long and/or in the way. The shorter blade allows the tool to be more easily and quickly manipulated to lift the roofing material using much less energy. More manipulation of the tool is required with the shorter blade than when using a longer blade to properly position the blade for lifting, but much less effort is required to lift thus making it more efficient to remove the roofing material. A worker spends much less energy in removing the roofing material using the tool of this invention with its short, and thus light blade, than when using a tool with a long, heavier blade and thus can work harder for a longer period of time.

[1025] While the teeth 21 have been said to be ground down from the bottom 43 of the blade to taper the teeth in thickness, the teeth can instead be ground down from the top 11 to taper the teeth in thickness, the tip 37 of the teeth in this case generally aligned with the bottom surface 43 of the blade as shown in Fig. 6. The blade 3 can, if desired, be provided with a strengthening ridge 51 extending across the base of the teeth 21, adjacent the inner end 33 of the slots 23, as shown in Fig. 7. The ridge 51 extends across the width of the blade between its sides 19, is slightly raised, and serves to strengthen the blade. The

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ridge 51 also initiates movement of the loosened roofing material upwardly onto the front side 47 of the handle. The ridge 51 could also be located between the ends 33 of the slots and the front side 47 of the handle 5. The use of a ridge 51 in this location will slightly reduce the efficiency of the blade since the blade is now slightly longer. The use of a ridge in this location would add about three-quarters of an inch to the length of the blade.

[1026] The blade 3 has been shown as being of substantially uniform thickness except for the taper in thickness of the teeth. The blade 3A could however be tapered over its entire length reducing in thickness from about one quarter of an inch at its back edge 17A to about one sixteenth of an inch at its front edge 15A as shown in Fig. 8. The tapered shape of the blade 3A allows the blade to continue lifting, including on either side of the handle 5A, as the blade is pushed under the shingles.

[1027] The side edges 19 of the blade 3 have been shown in Fig. 1 as being perpendicular to the front and rear edges 15, 17. The blade 3B could however have the side edges 19B angle away from each other slightly in moving from the front edge 15B to the rear edge 17B so that the rear edge 17B is wider than the front edge 15B as shown in Fig. 9. This shape of the blade makes it easier to manipulate the blade under the shingles.

[1028] The handle 5 has been shown as a wooden shaft 7 attached to a hosel 9 on the blade 3. However, the handle 5C could also be a metal tube 55 attached directly to the top 11C of the blade 3C as shown in Fig. 10. The tool has been primarily described as being used to help lift and remove roofing material. It could however also be used to help lift and remove other materials such as ice on sidewalks, or flooring materials in a building.

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I Claim:

1. A manually operated material lifting tool having: a tool blade, the blade having front and rear edges, the front and rear edges joined by side edges, the front and rear edges being longer than the side edges to make the blade wider than it is longer; the blade having slots extending inwardly from the front edge toward the back edge forming teeth between the slots; a handle attached to the top of the blade approximately midway between the side edges, the bottom of the handle located between, and closely adjacent to, the rear edge of the blade and the end of the nearest slot; the handle extending rearwardly and upwardly from the top of the blade.
2. A tool as claimed in claim 1 wherein the ratio of the length to the width of the tool blade is between about 2 to 3 and about 1 to 2.
3. A tool as claimed in claim 1 wherein the handle extends directly upwardly from the top of the blade at an angle ranging between 30° and 50°.
4. A tool as claimed in claim 2 wherein the handle extends directly upwardly from the top of the blade at an angle ranging between 30° and 50°.
5. A tool as claimed in claim 1 wherein each slot has a wide, generally short, inwardly tapering entry mouth, and a narrow, elongated extension extending rearwardly from the entry mouth to a closed end, the extension longer than the entry mouth and slightly inwardly tapering towards its end.
6. A tool as claimed in claim 4 wherein each slot has a wide, generally short, inwardly tapering entry mouth, and a narrow, elongated extension extending rearwardly from the entry mouth to a closed end, the extension longer than the

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entry mouth and slightly inwardly tapering towards its end.

7. A tool as claimed in claim 1 wherein the tool blade has a raised strengthening ridge extending across the width of the blade between its side edges, the ridge parallel to the front edge and located adjacent the front of the handle.

8. A tool as claimed in claim 4 wherein the tool blade has a raised strengthening ridge extending across the width of the blade between its side edges, the ridge parallel to the front edge and located adjacent the front of the handle.

9. A tool as claimed in claim 7 wherein the ridge extends across the inner ends of the teeth.

10. A tool as claimed in claim 8 wherein the ridge extends across the inner ends of the teeth.

11. A tool as claimed in claim 1 wherein the side edges of the blade angle away from each other toward the rear of the blade to make the rear edge longer than the front edge.

12. A tool as claimed in claim 1 wherein the blade tapers in thickness from its rear edge to its front edge.

13. A tool blade for a manually operated material lifting tool, the tool blade having a front edge and a rear edge, the front and rear edges joined by side edges, the front and rear edges being longer than the side edges to make the

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blade wider than it is longer; the blade having slots extending inwardly from the front edge toward the back edge forming teeth between the slots; a hosel attached to the top of the blade approximately midway between the side edges, the bottom, front of the hosel behind and adjacent the closed end of the nearest slot, the bottom, rear of the hosel adjacent the rear edge of the blade, the hosel extending rearwardly and upwardly from the top of the blade, the hosel adapted to receive a handle member by means of which the tool is manually operated.

14. A tool blade as claimed in claim 13 wherein the ratio of the length to the width of the tool blade is between about 2 to 3 and 1 to 2.

15. A tool as claimed in claim 13 wherein the hosel extends upwardly from the blade at an angle ranging between 30° and 50°.

16. A tool as claimed in claim 14 wherein the hosel extends upwardly from the blade at an angle ranging between 30° and 50°.

17. A tool blade as claimed in claim 13 wherein each slot has a wide, generally short, inwardly tapering entry mouth, and a narrow, elongated extension extending rearwardly from the entry mouth to a closed end, the extension longer than the entry mouth and slightly inwardly tapering towards its end.

18. A tool blade as claimed in claim 16 wherein each slot has a wide, generally short, inwardly tapering entry mouth, and a narrow, elongated extension extending rearwardly from the entry mouth to a closed end, the extension longer than the entry mouth and slightly inwardly tapering towards its end.

19. A tool blade as claimed in claim 13 wherein the tool blade has a raised

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strengthening ridge extending across the width of the blade between its side edges, the ridge parallel to the front edge and located adjacent the front of the hoesel.

20. A tool blade as claimed in claim 16 wherein the tool blade has a raised strengthening ridge extending across the width of the blade between its side edges, the ridge parallel to the front edge and located between the front of the hoesel.

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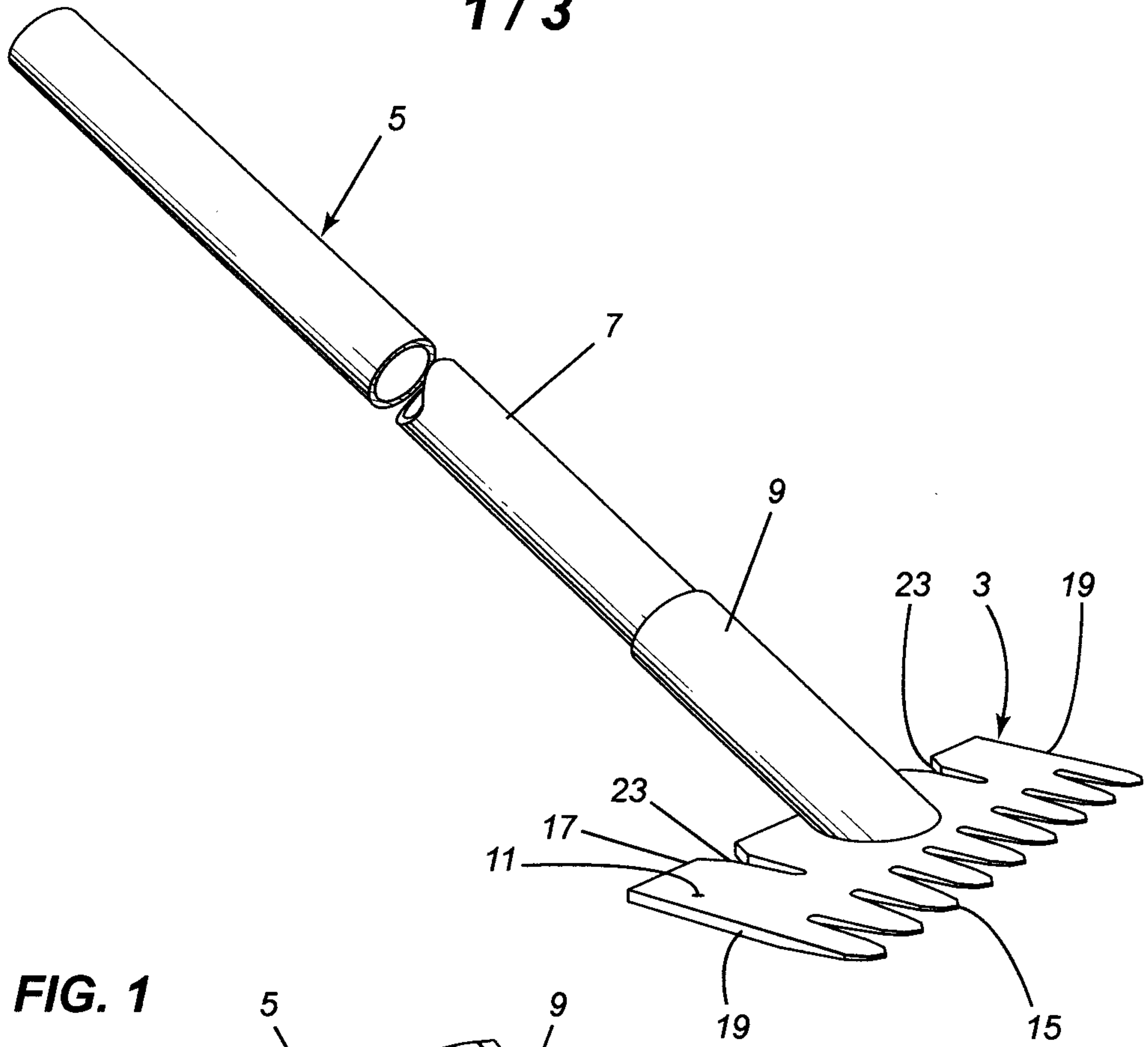


FIG. 1

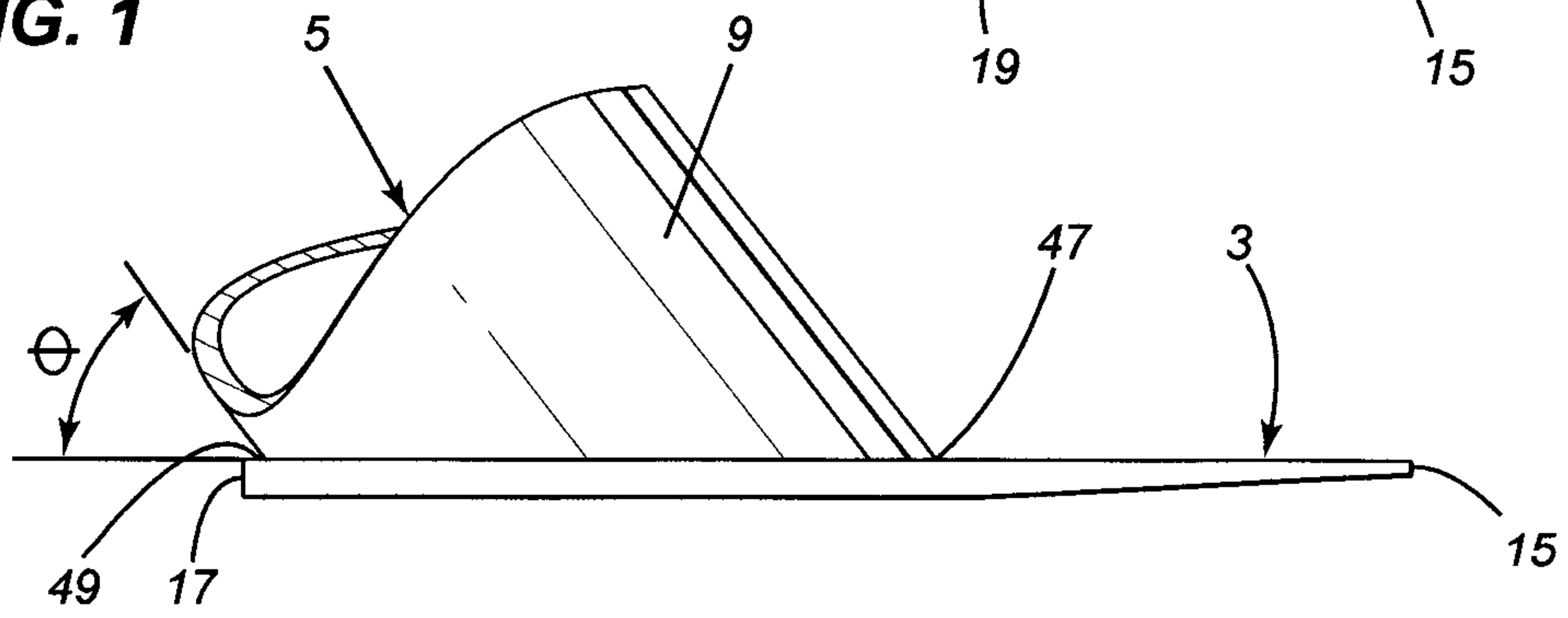


FIG. 2

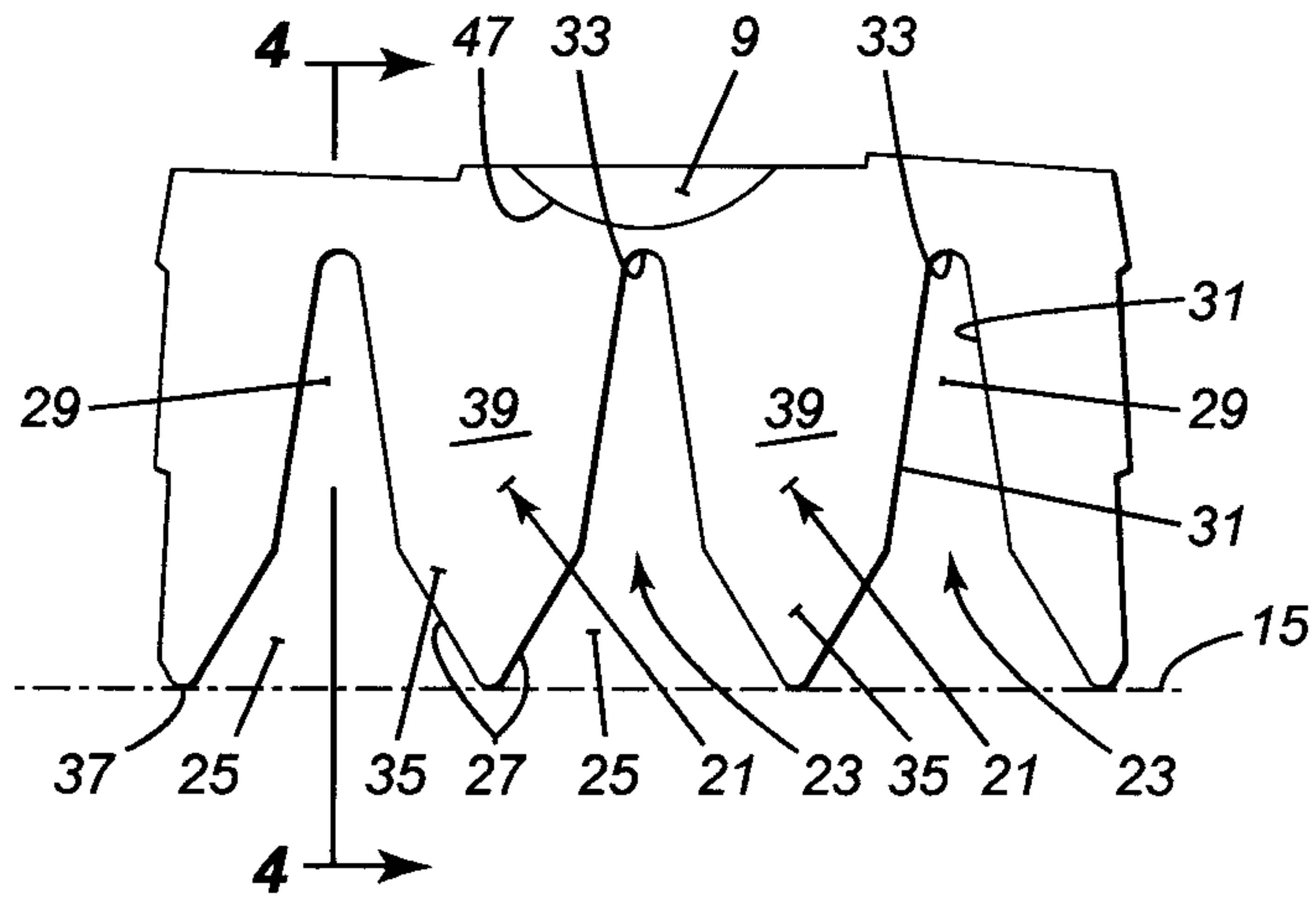


FIG. 3

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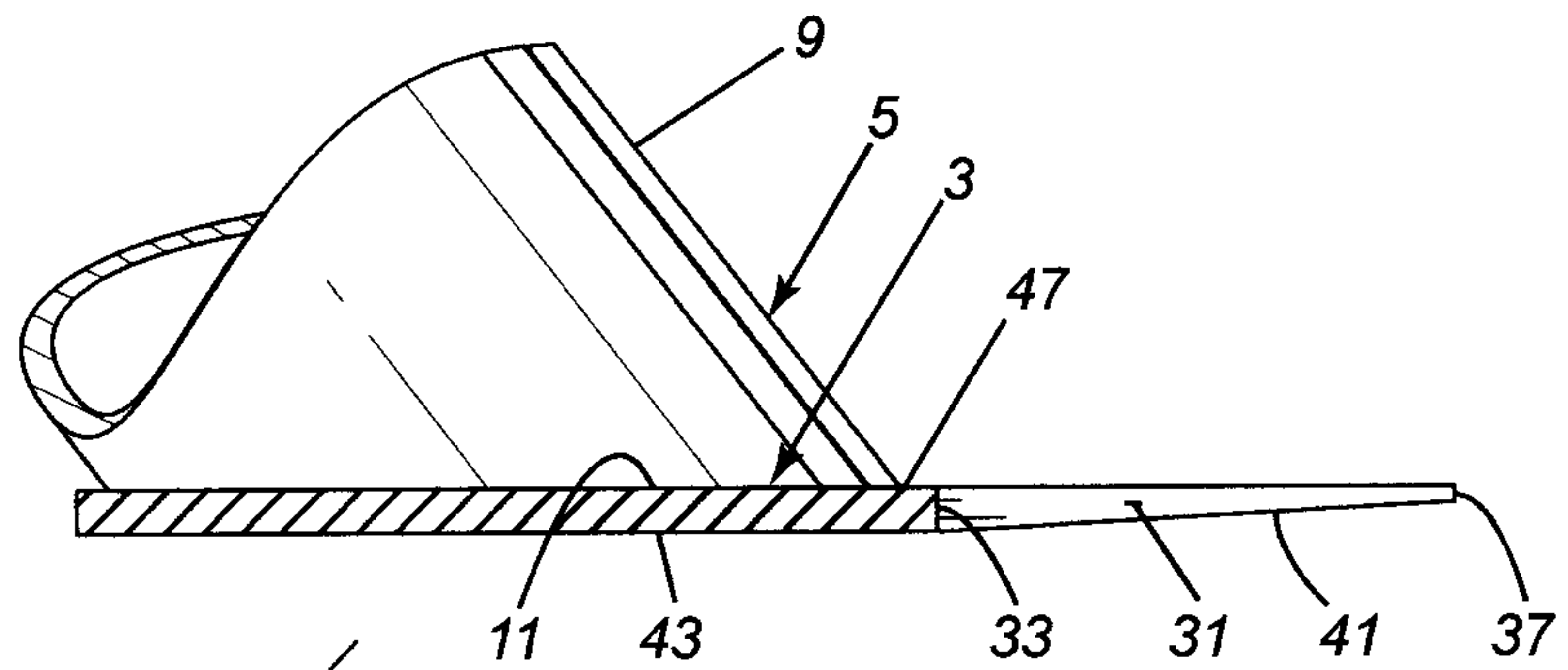


FIG. 4

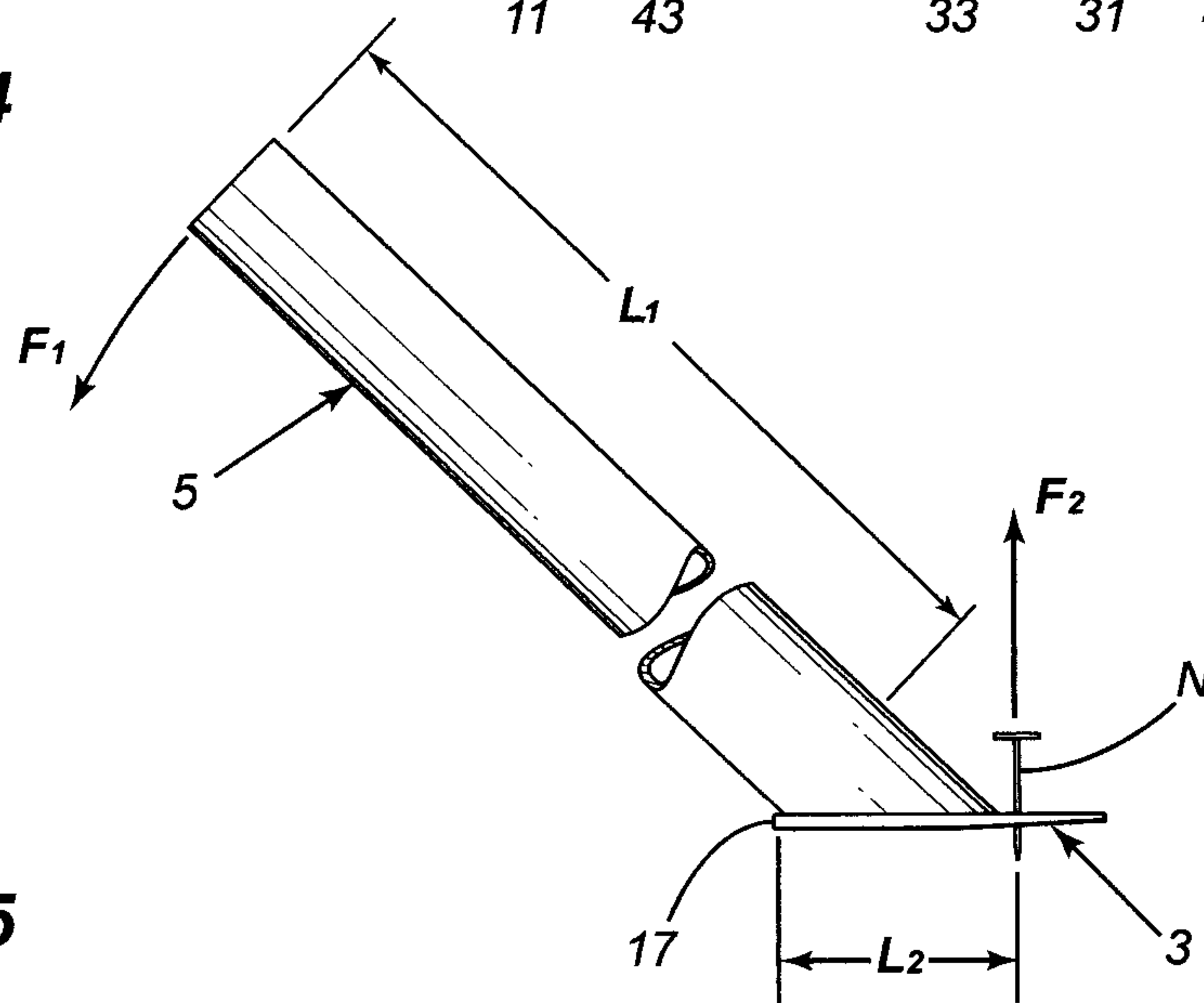


FIG. 5

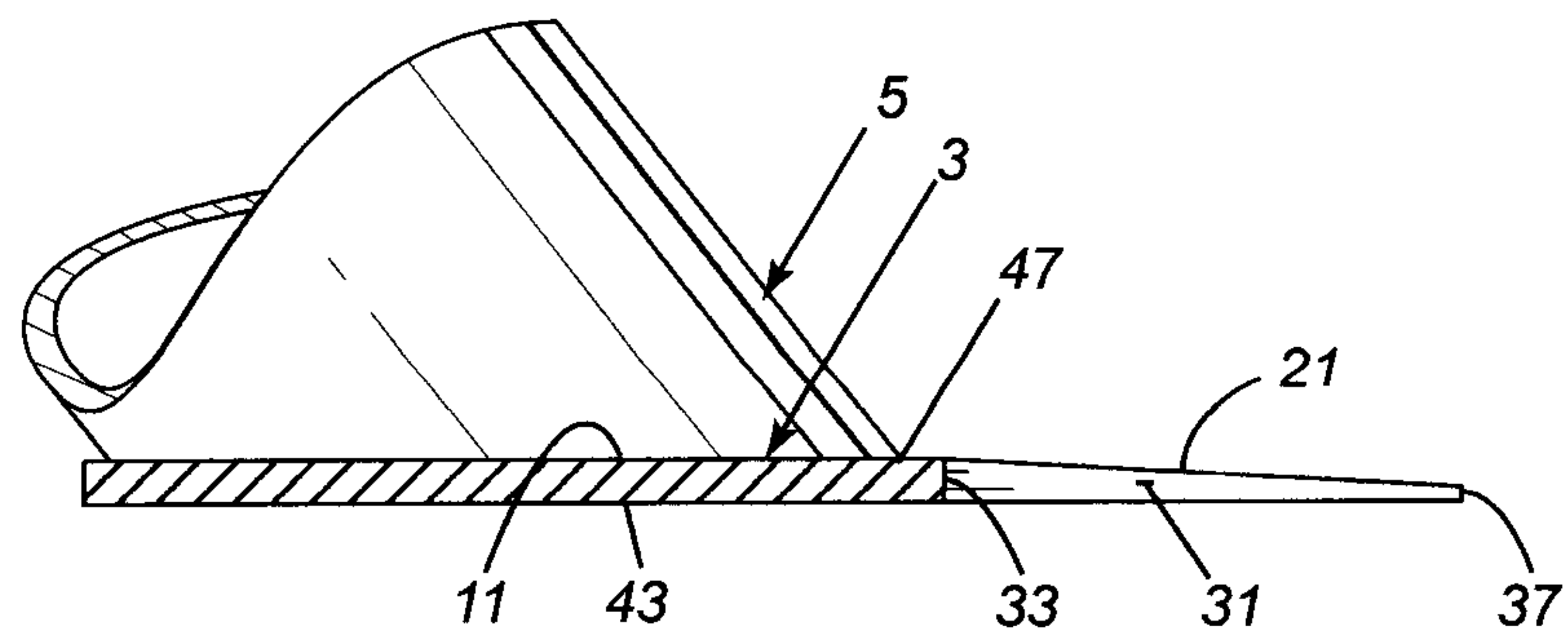


FIG. 6

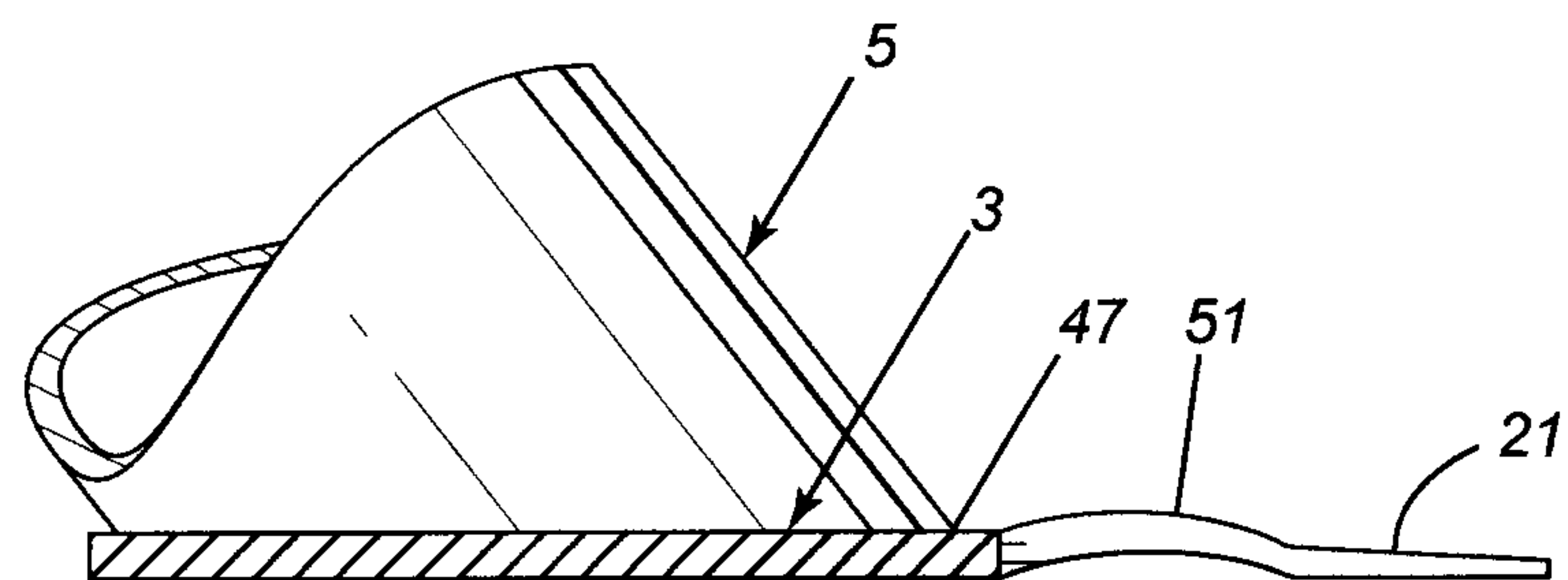


FIG. 7

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FIG. 8

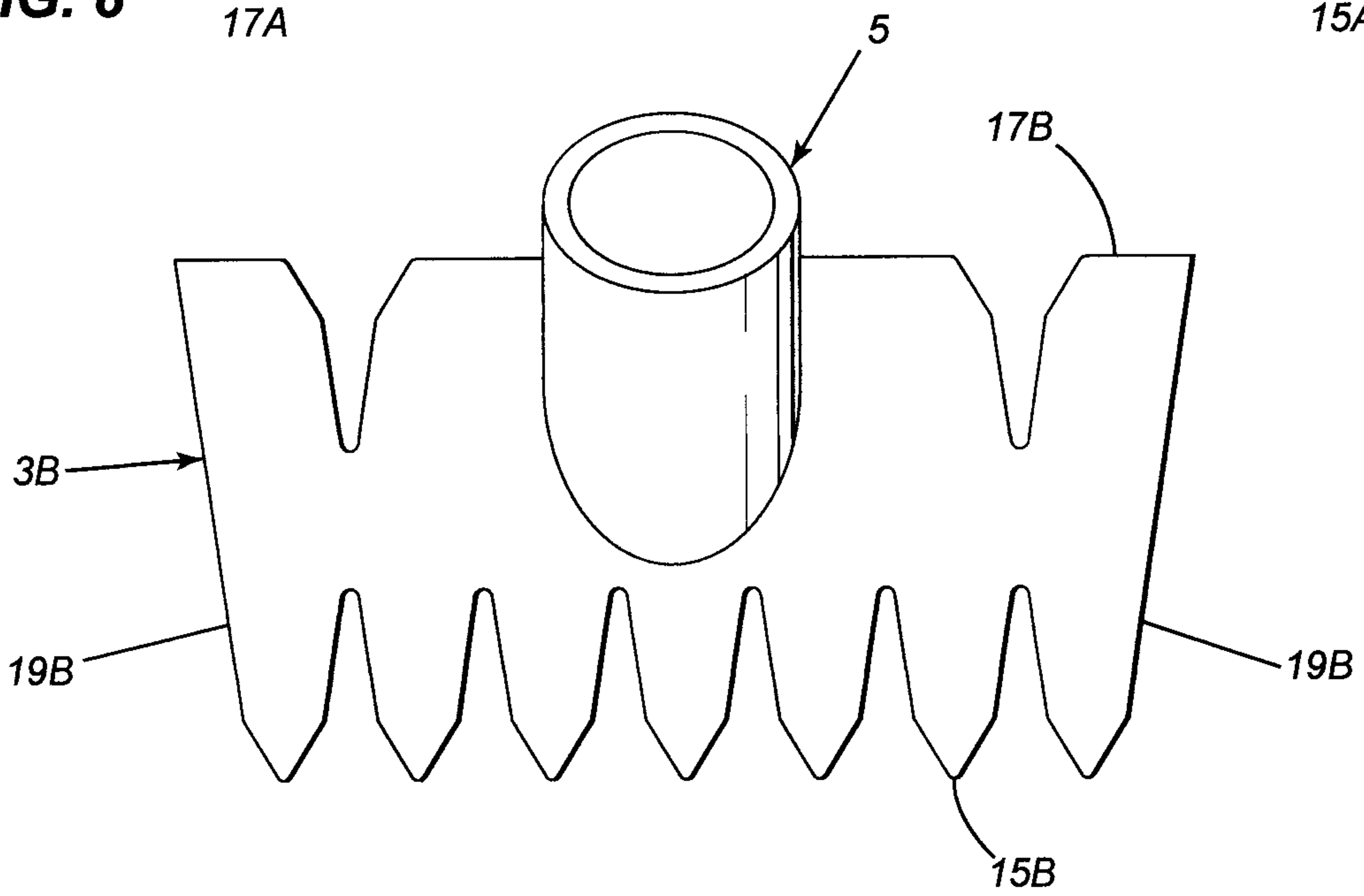
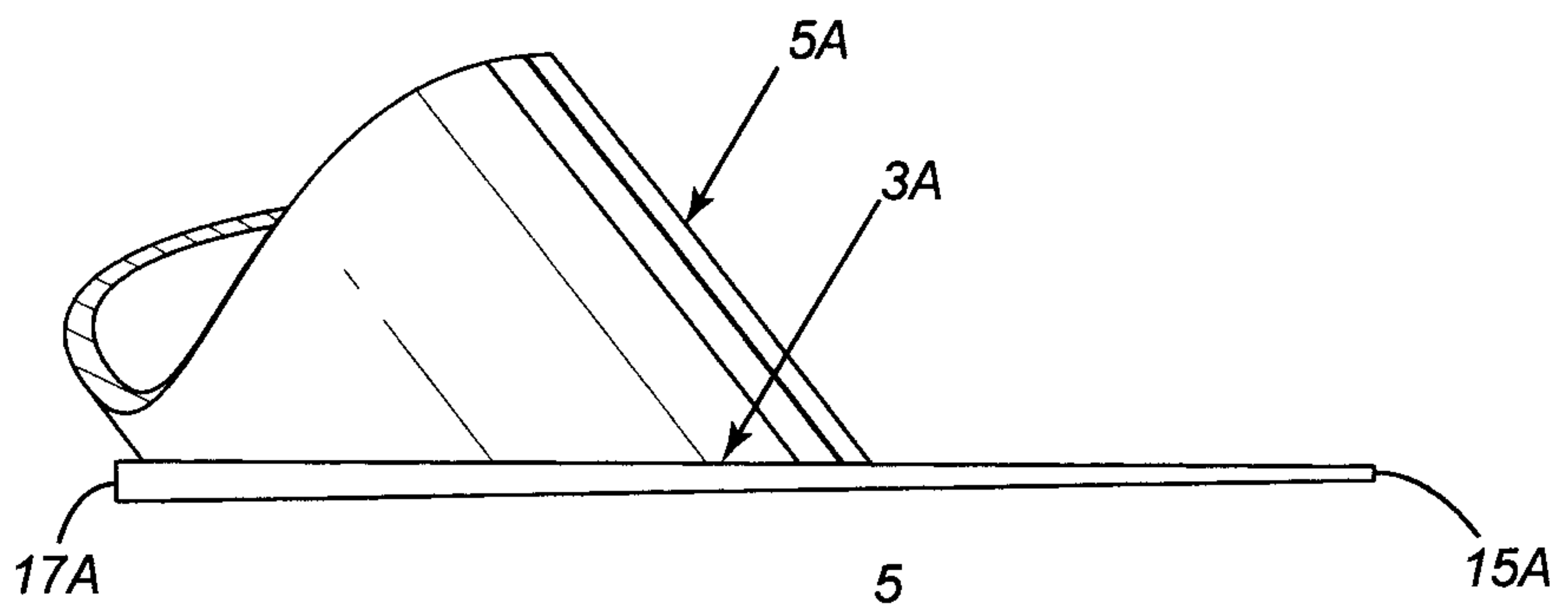


FIG. 9

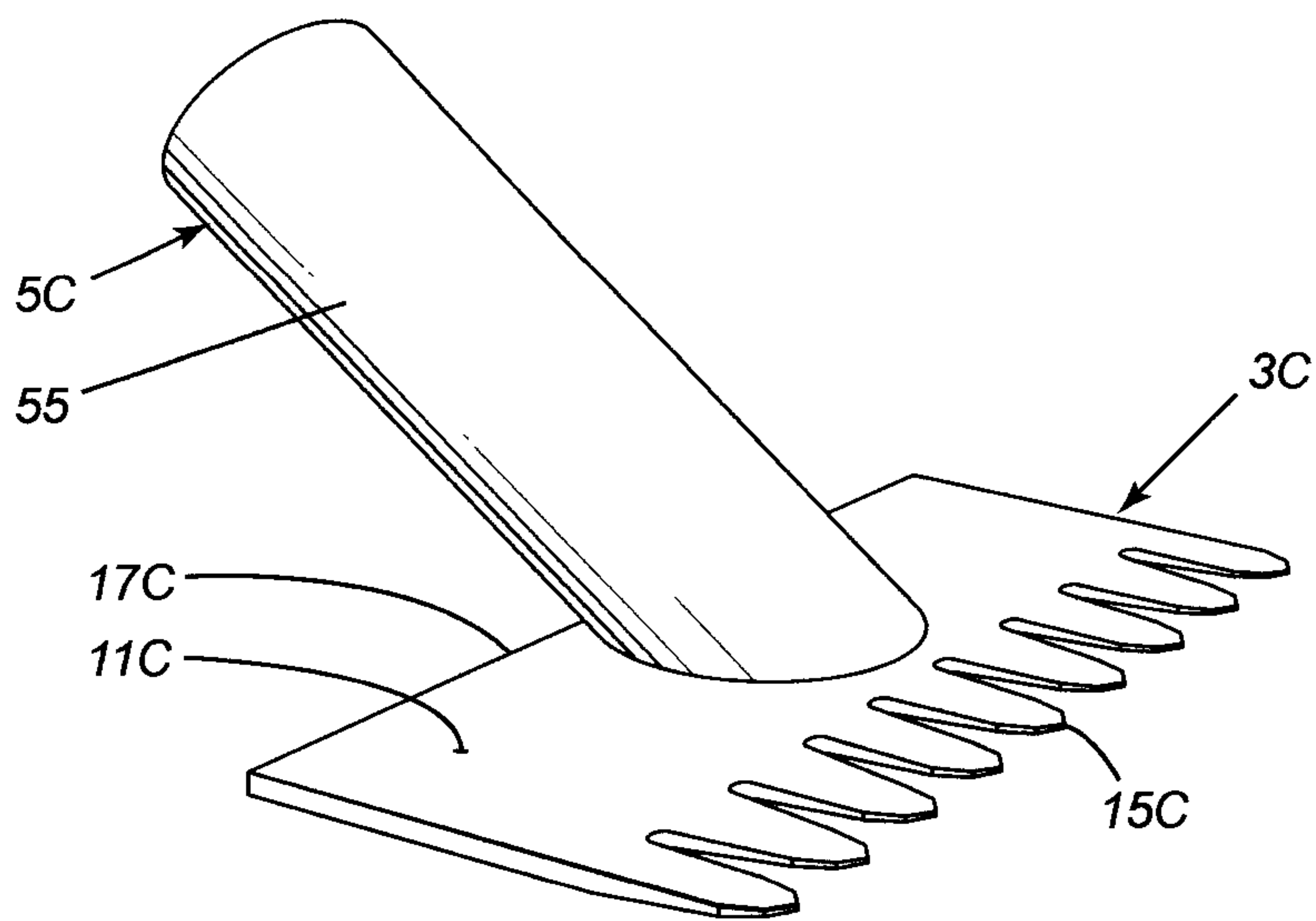


FIG. 10

