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(54) **GLOVE CONSTRUCTION**

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(57) **ABSTRACT**

A work glove having a unique design on the palm piece that is particularly adaptable for use in the construction industry. The palm design incorporates a plurality of spaced tetrahedral (four-sided) pyramid shaped protrusions in a predetermined pattern, or cell, on a molded rubber piece secured to the glove palm. The pyramids are preferably arranged so that each pyramid cell is orientated along a line that is substantially perpendicular to axis of the user's glove hand.

The glove is longer lived since the pyramidal shape, in which the base of the pyramid is larger than the top, ensures that the exposed surface area becomes larger as the pyramid wears down.

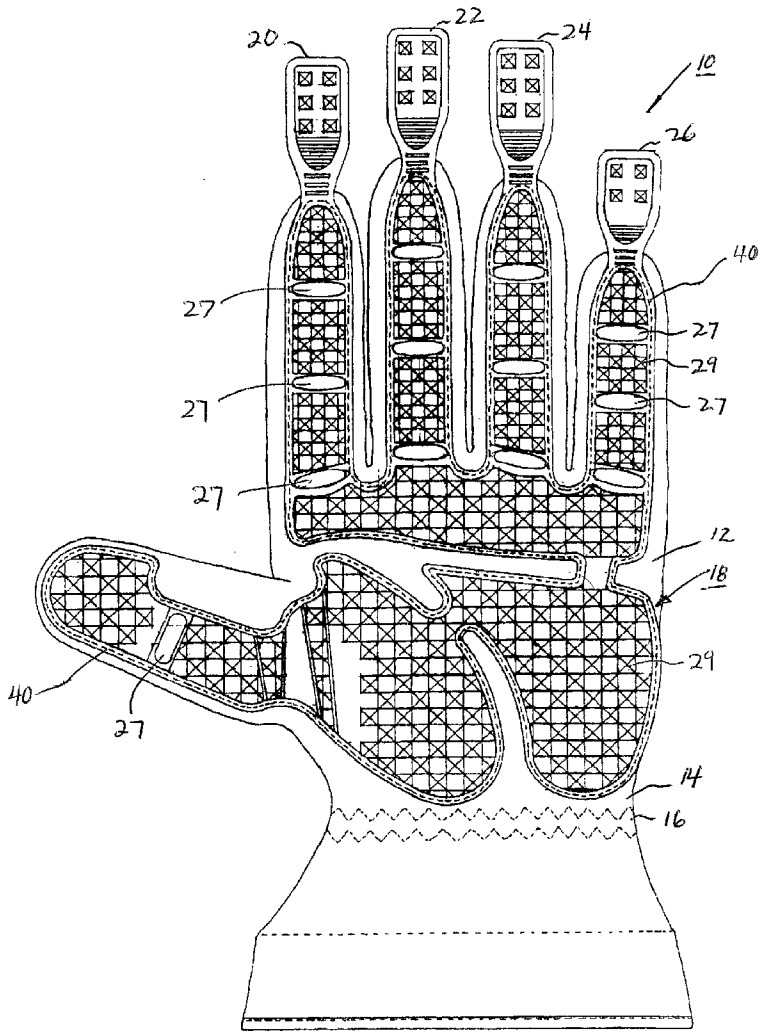
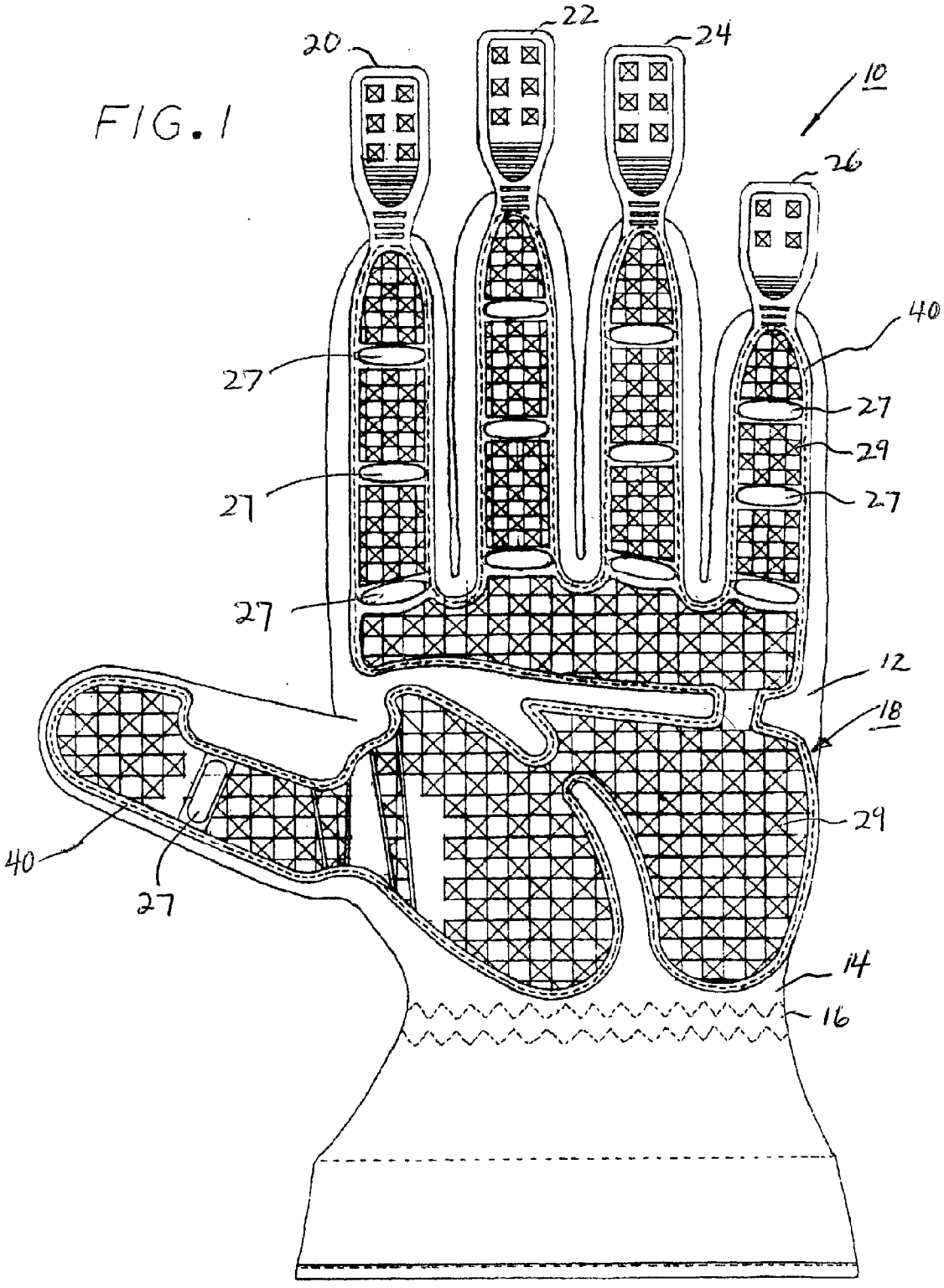


FIG. 1



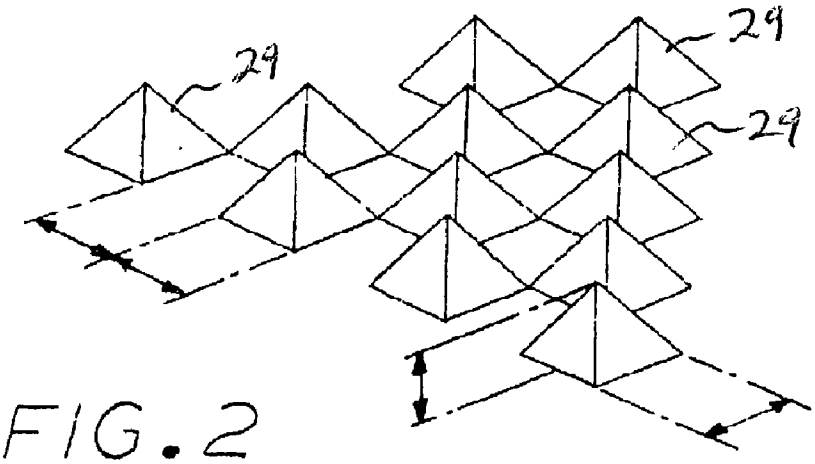


FIG. 2

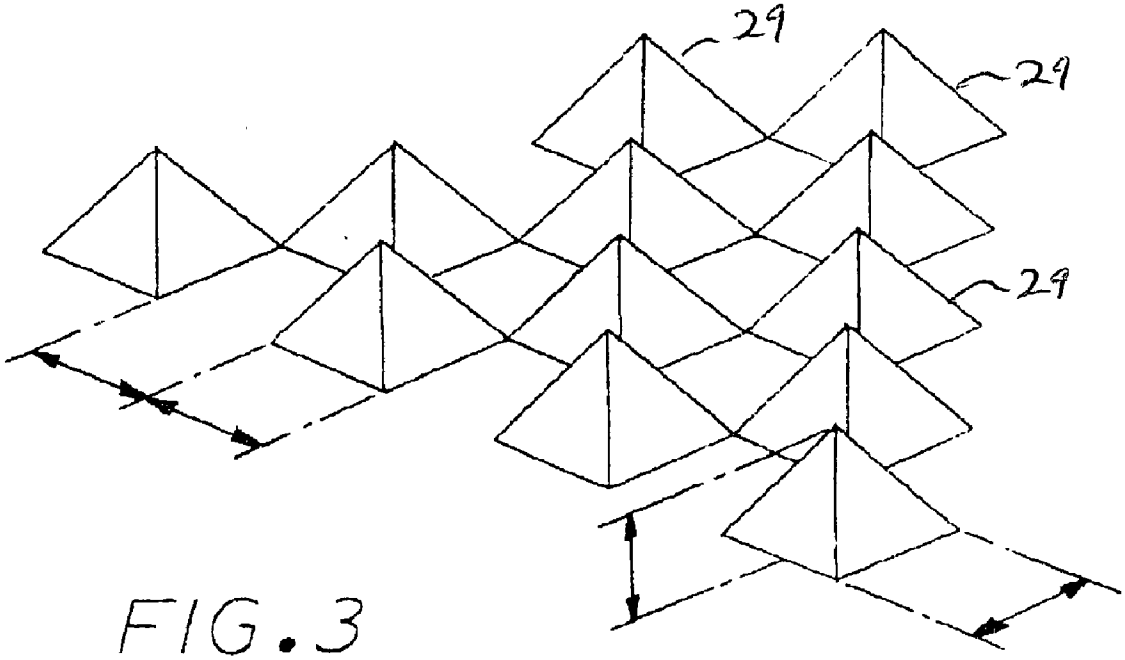


FIG. 3

FIG. 4

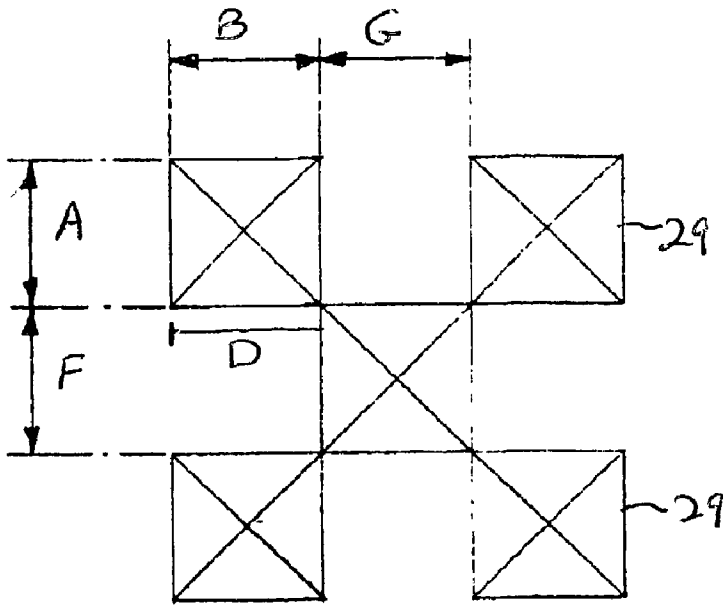
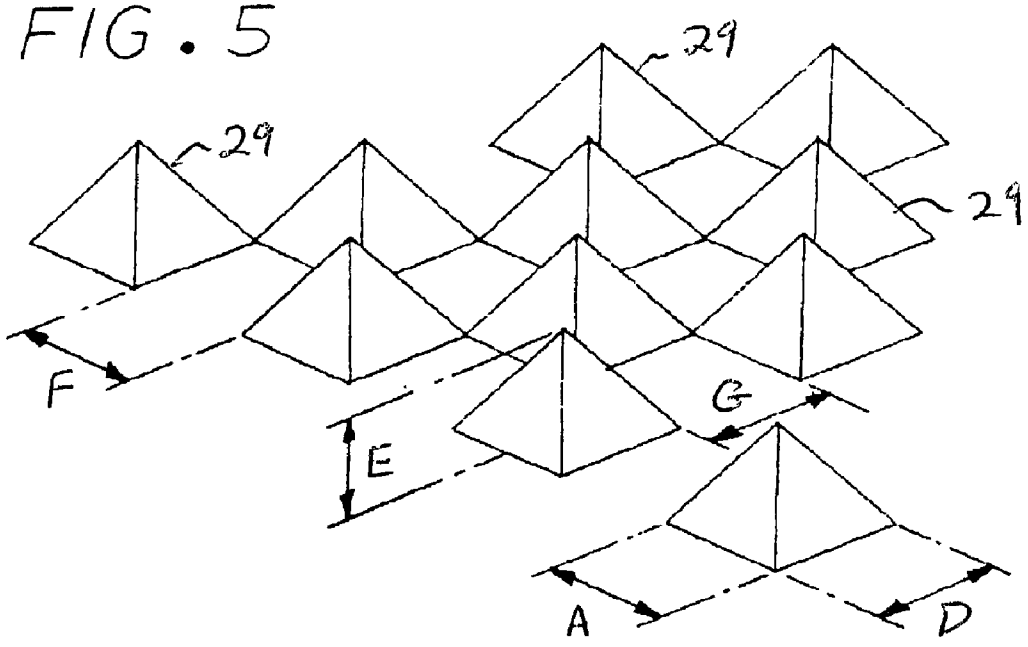


FIG. 5



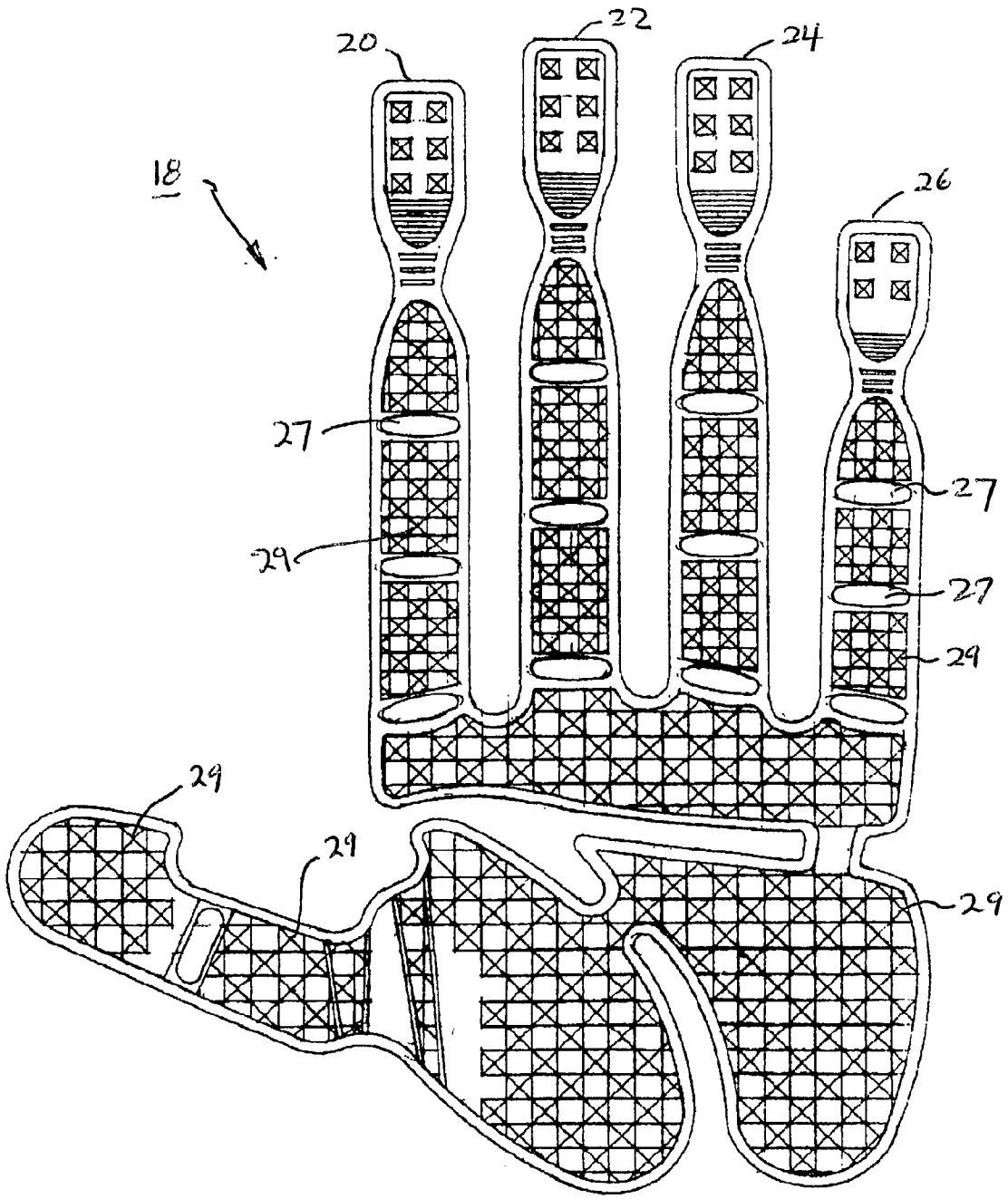
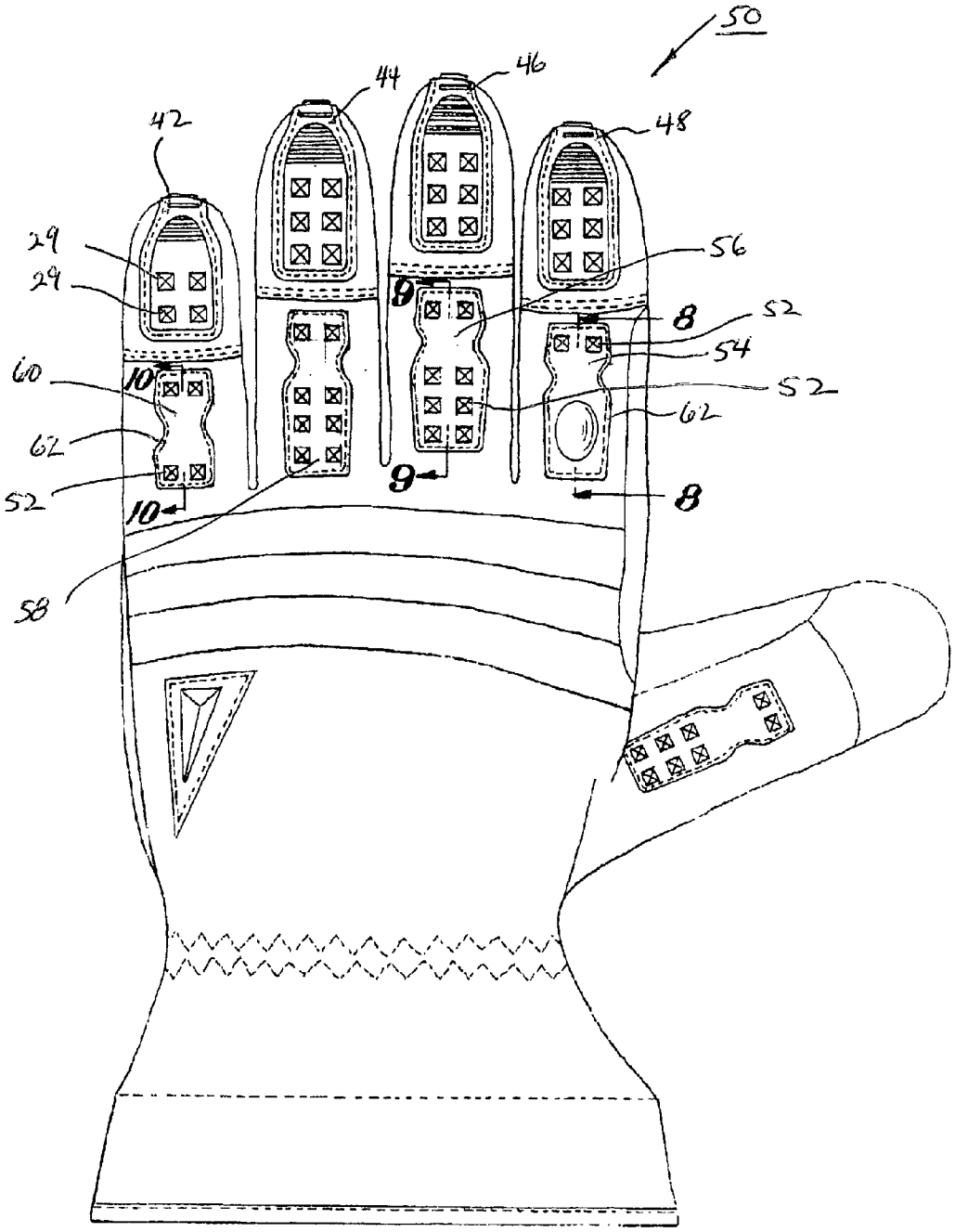


FIG. 6

FIG. 7



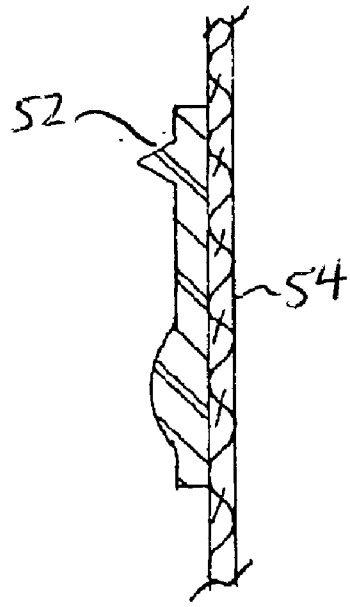


FIG. 8

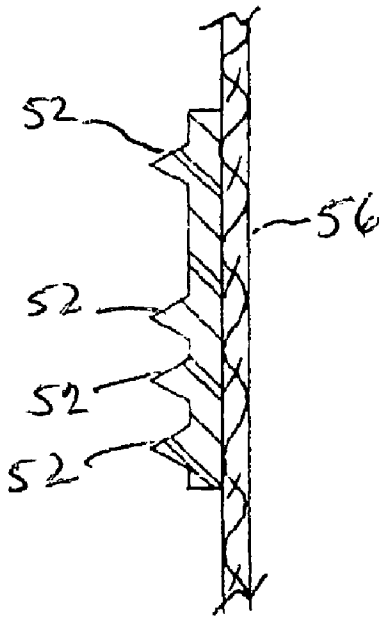


FIG. 9

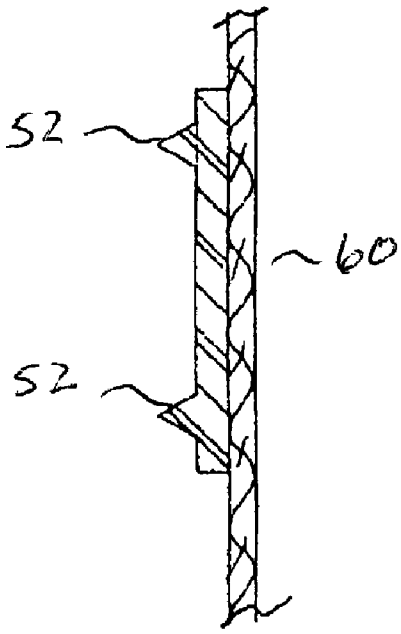


FIG. 10

GLOVE CONSTRUCTION

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention provides a glove having a palm piece with a plurality of tetrahedral elements extending from the surface of the palm piece.

[0003] 2. Description of the Prior Art

[0004] Gloves have been developed in many styles for use in a variety of applications, while being manufactured using an assortment of construction techniques. Gloves have been used to protect the hands of the wearer and have been designed for protection from the elements. A whole class of specialized gloves have also been developed for use in work environments, such as in construction jobs. Other gloves have been developed for use in various sporting activities, such as bicycling, auto racing, etc.

[0005] In general, a glove usually consists of a number of parts, including; a palm piece, a back piece and a thumb piece. In practice it is necessary to join, or otherwise seal, the parts around their circumference, including the parts which made up the sides of the hand as well as each of the fingers, in order to complete construction of the glove. A number of techniques have been designed and implemented to accomplish this as described in U.S. Pat. No. 5,490,290 to Gold. The most widely used technique is the Fourchette Pattern Techmique. In this case, the back and palm parts of the glove are coupled with three fourchetts, or 'forks', provided between and fingers to form the sides of fingers two and three, three and four and four and five.

[0006] A work glove now being marketed by the assignee of the present invention has a palm piece comprising a synthetic suede material having predetermined patterns of rubber material sewed thereon.

[0007] Although the gloves currently being marketed by the assignee of the present invention have been commercially successful, a need has arisen to provide a glove that is particularly adaptable for use in certain construction related industries, such as in the demolition and masonry trades, which are rugged and long lived.

SUMMARY OF THE PRESENT INVENTION

[0008] The present invention provides a work glove having a unique design on the palm piece that is particularly adaptable for use in the construction industry. The palm design incorporates a plurality of spaced tetrahedral (four-sided) pyramid shaped protrusions in a predetermined pattern, or cell, on a molded rubber piece secured to the glove palm. The non-parallel design of the pyramid walls prevent particulate from becoming trapped between adjacent pyramids. Cleaning of the glove is also simplified because of the non-parallel pyramid wall design. The pyramids are preferably arranged so that each pyramid cell is orientated along a line that is substantially perpendicular to axis of the user's glove hand.

[0009] The glove is longer lived since the pyramidal shape, in which the base of the pyramid is larger than the top, ensures that the exposed surface area becomes larger as the pyramid wears down.

[0010] As the glove flexes during use, the distance between adjacent pyramids decreases in certain areas, allowing for maximum grasping along the edge of objects that have different dimensions. The pyramids also protect the sewing thread used to sew the rubber mold onto the synthetic suede from failure caused by abrasion. Finally, the palm pattern of the present invention allows for maximum grip in both the vertical and horizontal plane at all points of the pattern.

DESCRIPTION OF THE DRAWING

[0011] For a better understanding of the present invention as well as other objects and further features thereof, reference is made to the following description which is to be read in conjunction with the accompanying drawing therein:

[0012] **FIG. 1** is a front view of the glove construction of the present invention;

[0013] **FIG. 2** is a simplified view of the pyramid shapes on the finger areas of the glove;

[0014] **FIG. 3** is a simplified view of the pyramid shape on the thumb and palm areas of the glove;

[0015] **FIGS. 4 and 5** illustrate the dimensions of the pyramid cell design;

[0016] **FIG. 6** is a detail of the molded rubber member sewn to the palm piece;

[0017] **FIG. 7** is a detail of the back piece of the glove construction of the present invention; and

[0018] FIGS. **8-10** are side views illustrating the distal phalynx protection features on the glove back piece.

DESCRIPTION OF THE INVENTION

[0019] **FIG. 1** is a front view of glove **10** of the present invention illustrating in detail the palm piece **12** portion of the glove. Palm piece **12** comprises palm material **14**, preferably made from synthetic leather, double stitched elastic cinch **16**, and molded rubber piece **18** comprising a plurality of defined pattern portions. In accordance with the teachings of the present invention, a plurality of protrusions **29**, preferably of a pyramid shape, are formed on the surface of molded rubber piece **18**. Molded rubber piece **18** is preferably glued, heat pressed and sewn onto synthetic leather portion **14**. Although molded rubber piece **18** preferably comprises a single, integral piece as illustrated, multiple pieces can be utilized. **FIG. 1** illustrates the roll-over fingertip portions **20**, **22**, **24** and **26** which extend along the glove backpiece past the first finger joint as shown in **FIG. 7**. A glove using a molded rubber piece with a portion of the rubber piece rolling over the fingertips is disclosed in copending application Ser. No. _____, filed Aug. _____, 2002 and entitled "Glove Having Molded Rubber Palm Pattern With a Portion that Rolls Over the Fingertips" by Eduard A. Jaeger, assigned to the assignee of the present invention, the teachings of which necessary for an understanding of the present invention being incorporated herein by reference. The pattern of the rubber mold is such that rubber is omitted from the joint or flex areas **27** of the palm and fingers as illustrated.

[0020] **FIG. 2** illustrates the design of the pyramids **29** on the fingers of the molded rubber piece **18** and the dimensions

thereof; **FIG. 3** illustrates the design of the pyramids **29** on the thumb and palm pieces of the molded rubber piece **18** and the dimensions thereof. In **FIG. 2**, the height of each pyramid **29** is approximately 3 mm, the base approximately 3 mm wide and the separation between pyramids **29** approximately 3 mm. In **FIG. 3**, the height of each pyramid **29** is approximately 4.5 mm; the base is approximately 4.5 mm; and the separation between pyramids is also 4.5 mm.

[**0021**] As shown in **FIGS. 4 and 5**, pyramids **29** each have five different dimensions, A, B, C, D and E. Dimensions A, B, C and D are the sides of the pyramids, while dimension E is the height. In the preferred embodiment, dimensions A, B, C, and D are equal for a given pyramid **29** as set forth hereinabove with regards to **FIGS. 2 and 3**. Dimensions F and G represent the spacing between pyramids **29**. In the preferred embodiment, these dimensions are equal to dimensions A, B, C, and D (in a given section of the glove). Dimensions A, B, C, D, E, F and G range from 0.5 to 10 mm, with either pointed tops (as shown in the preferred embodiment) or flat tops. **FIG. 4** illustrates another arrangement of the pyramids **29**. It should be noted that other arrangements of the pyramids **29** can be used; similarly, dimensions other than those set forth hereinabove can be implemented to provide the features of the present invention.

[**0022**] In the preferred embodiment, the entire rubber piece is made of the same rubber. However, variations can include different durometer values and color rubbers in different portions of the mold. Examples include the following: lower durometer rubber in the finger sections, higher durometer rubber in the palm and thumb areas; lower durometer rubber in the backing sheet of the mold, higher durometer and different color rubber in the pyramids **29**; low durometer rubber in the backing sheet of the mold, rubber blended with Kevlar or carbon fiber (for increased strength or heat resistance) in the pyramids **29**.

[**0023**] The pyramids, or protrusions, **29** are spaced apart such that the distance between adjacent pyramids in the vertical plane will decrease as the hand is flexed inwards. In effect, two pyramids come closer together as the glove user's hand is closed in a grip. In the preferred embodiment, the pyramids **29** are arranged such that the surface, or faces of the pyramids **29** are aligned parallel and perpendicular to the axis of the user's wrist.

[**0024**] **FIG. 6** illustrates the rubber piece **18** preferably formed as a single piece to increase production efficiency; a single recessed sewing channel **40** is preferably utilized around the palm piece edges as illustrated (the recessed channel minimizes abrasions to the thread). The pyramids **29** are smaller on the finger portion and larger sized pyramids **29** are formed on the thumb, heal and lower finger portions.

[**0025**] The molded rubber piece **18** has oval portions **27** at the joint locations. Alternately, thinner rubber portions at the joint locations can be used.

[**0026**] **FIG. 7** illustrates the back glove portion **50** and includes portions from the rollover molded rubber piece **18**. The molded rubber palm piece **18** has portions **42**, **44**, **46** and **48** extending onto the top of the glove fingers, providing protection to the distal phalanx and past the joint between the distal and middle phalanxes. This protection arrangement is preferable although shorter or longer molded rubber extensions can be used. Additional protection is provided by distal protection portions **54**, **56**, **58** and **60** having low profile, flat-top soft rubber protrusions **52** (shown in more detail in the FIGS. **8-10** side views). Protrusions **52** are similar in overall design to protrusions **29** described with reference to rubber molded piece **18**. Each of the distal protection portions **54**, **56**, **58** and **60** have a deep sewing channel **62** to enable these portions to be secured to the underlying glove material and provide the anti-abrasion features noted hereinabove.

[**0027**] **FIGS. 8, 9** and **10** are side views showing the variations of the distal protection portions shown in **FIG. 7** (since distal protection portions **56** and **58** are identical, only portion **56** has been illustrated). In particular, **FIG. 8** shows the index finger distal protection portion **54** has two pyramids (only a single pyramid is illustrated) in a single row formed thereon. **FIG. 9** shows the middle fingers protection portion **56** and has eight pyramids (only four are illustrated), two in each of four rows, and **FIG. 10** shows the pinky finger protection portion **60** and has four pyramids (only two are illustrated) in each of two rows.

[**0028**] The four faces of each pyramid provide for gripping in all directions (left, right, up and down) at all points of the glove palm piece. This provides for a superior grip when a user is lifting an object vertically, or holding an object in the horizontal position.

[**0029**] Although the pyramid shape described hereinabove is preferred, after protrusion shapes can be used. For example, alternate shapes include cones, cylinders, partial spheres, rectangles, polyhedrals, etc. They can be flat, or pointed or rounded on the top (the rounded top can have a concave or convex surface).

[**0030**] The present invention thus provides a glove construction which is designed to be used in construction trades which require a strong, protective, long lived glove.

[**0031**] While the invention has been described with reference to its preferred embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the true spirit and scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from its essential teachings.

What is claimed is:

1. A glove construction comprising:

glove back means formed in the shape of a human hand for forming a portion of the back of the glove;

glove palm means formed in the shape of a human hand for forming a portion of the palm of the glove; said glove back means and said glove palm means forming a portion of the glove when joined together, said glove portion having fingers associated therewith; and

a molded rubber member being secured to predetermined areas of said glove palm means, a plurality of protrusions being formed in a predetermined pattern, said protrusions extending from the surface of said rubber molded member.

2. The glove of claim 1 wherein said protrusions are pyramidal in shape.

3. The glove of claim 2 wherein the top of each of said pyramids are pointed.

4. The glove of claim 2 wherein the top of each of said pyramids are flat.

5. The glove of claim 2 wherein said pyramids comprise four sides, each side having an edge at the bottom of said pyramids.

6. The glove of claim 5 wherein said glove is positioned on the hand of a human, at least one bottom edge of each pyramid being substantially parallel to the axis of the user's wrist.

7. The glove of claim 6 wherein at least one of the bottom edges of said pyramid is substantially perpendicular to the axis of the user's wrist.

8. The glove of claim 1 wherein the spacing between said protrusions vary depending upon their location on the surface of said glove palm means.

9. The glove of claim 1 wherein the height of said protrusions vary depending upon their location on the surface of said glove palm means.

* * * * *