US 20040194342A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2004/0194342 A1**

Steinberg (43) **Pub. Date: Oct. 7, 2004**

(54) **SANDALS AND FLIP-FLOPS WITH NON-SLIP FOOT SURFACE**

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(21) Appl. No.: **10/804,396**

(22) Filed: **Mar. 19, 2004**

Related U.S. Application Data

(60) Provisional application No. 60/455,951, filed on Mar. 19, 2003. Provisional application No. 60/518,121, filed on Nov. 7, 2003.

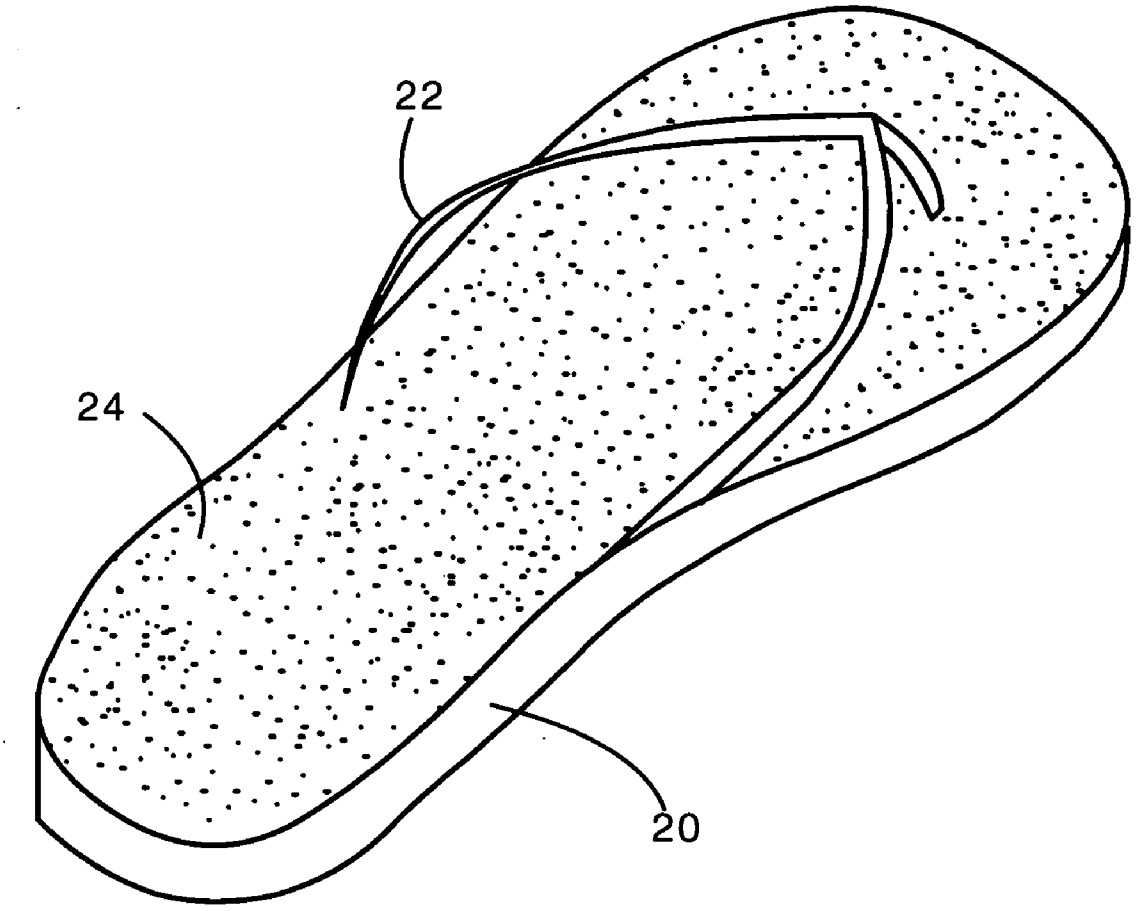
Publication Classification

(51) **Int. Cl.**[7] **A43B 3/12**; A43C 11/00; A43B 3/10; A43B 15/00

(52) **U.S. Cl.** **36/11.5**; 36/7.6

(57) **ABSTRACT**

Granules bonded to a sandal sole provide a high traction surface, even when wet. The granules are bonded to an upper surface of the sandal sole. The granules can be embedded in the sole or bonded to the sole with adhesive. The granules can be made of crushed rock or other hard materials. The granules can be present in selected weight-bearing areas of the sandal, such as the area supporting the foot ball, toes or heel. The granules may be present only in an area under the foot ball. The present sandal sole prevents the foot from slipping against the sandal sole, and thereby prevents damage to the sandal and prevents injury from falling.



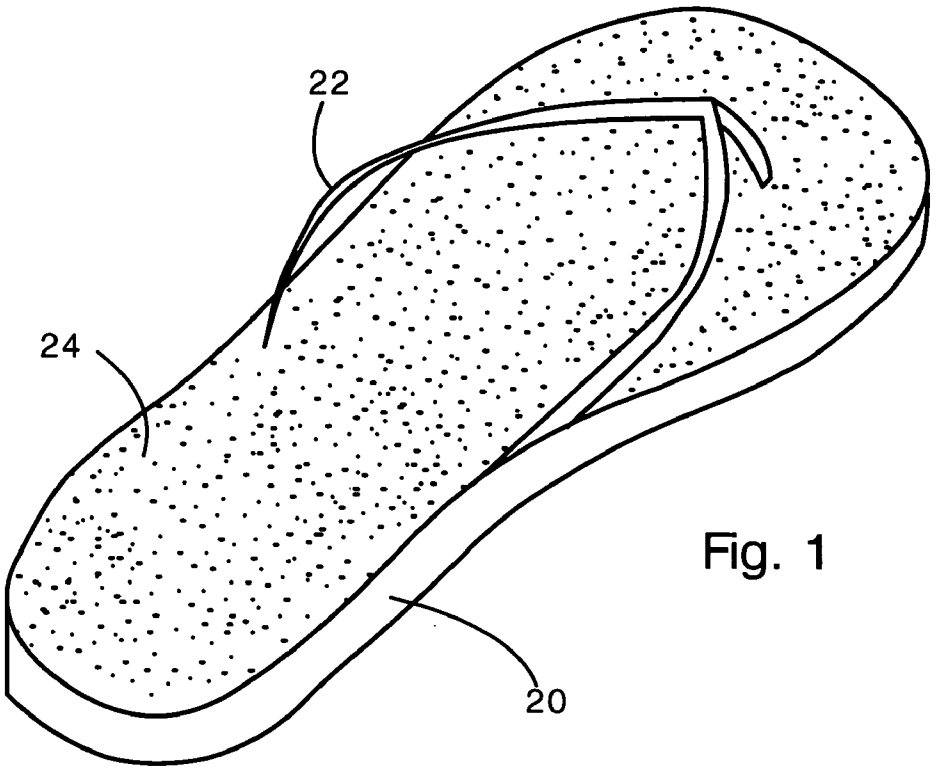


Fig. 1

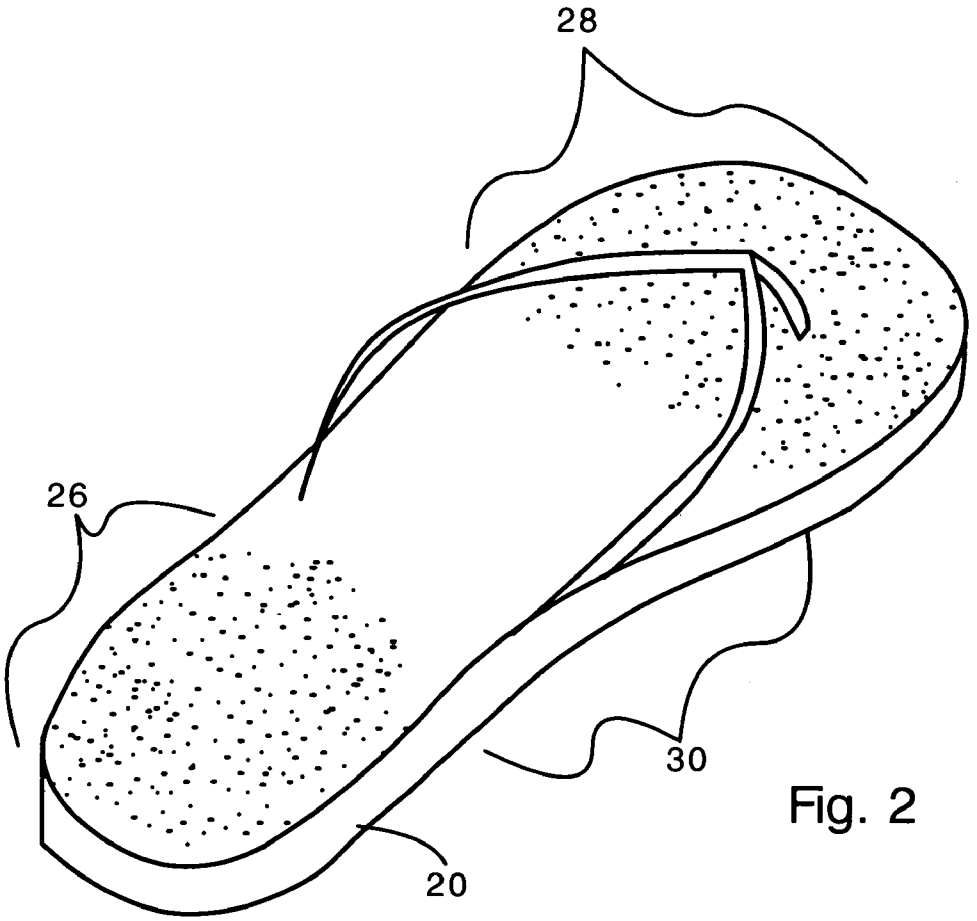


Fig. 2

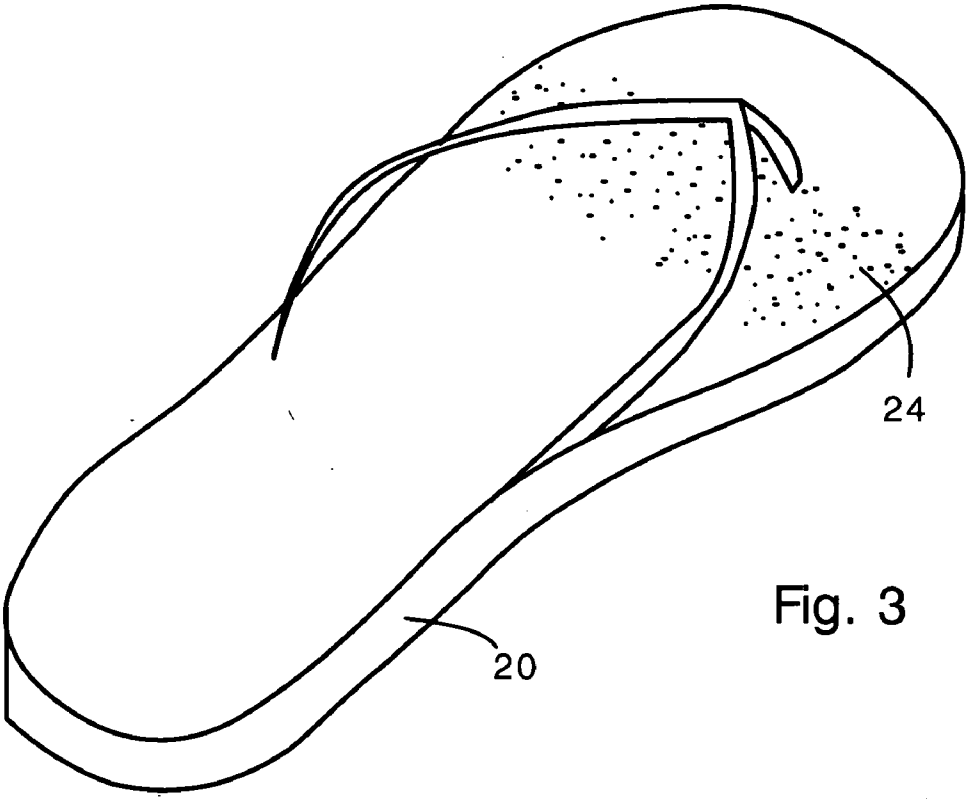


Fig. 3

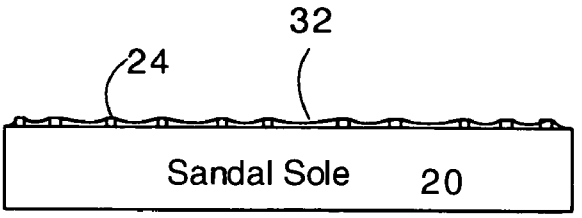


Fig. 4

Fig. 5a

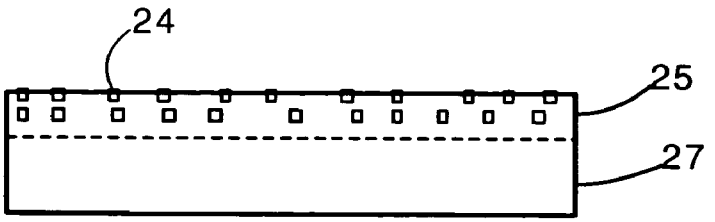
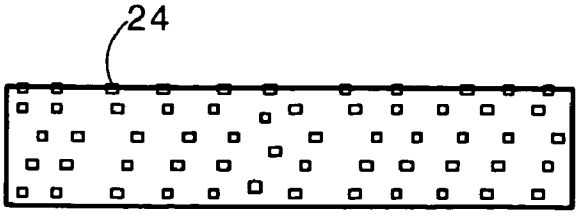


Fig. 5b



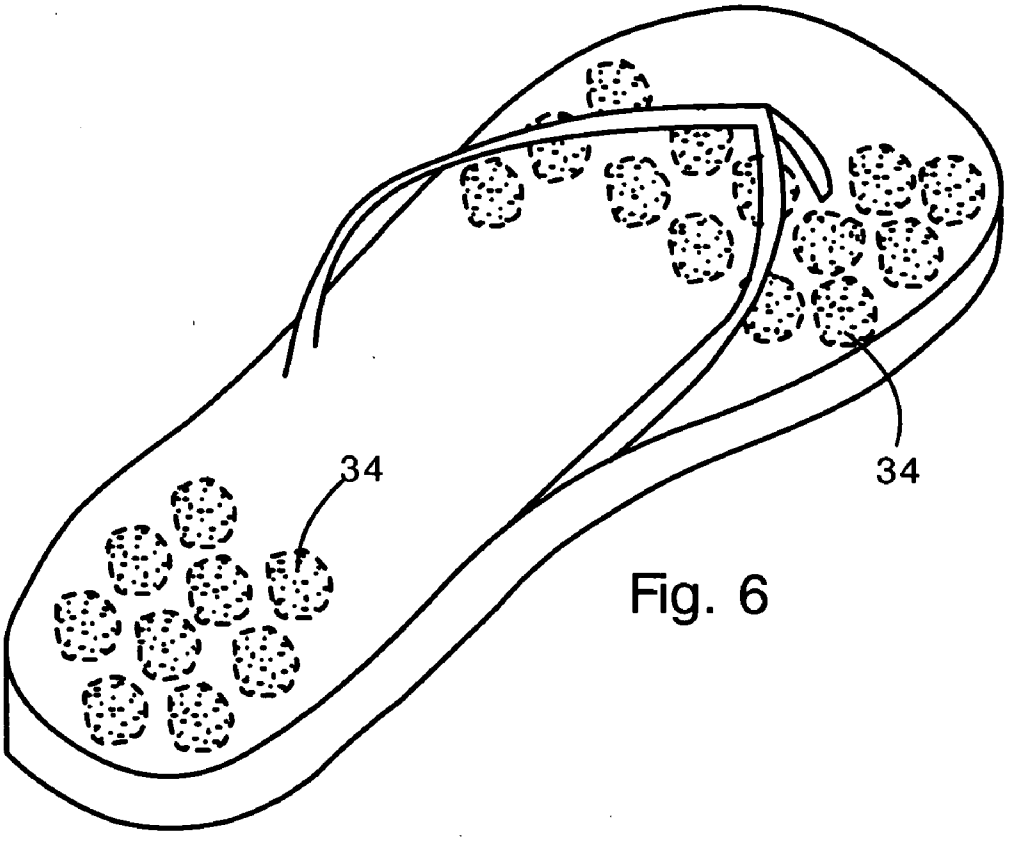


Fig. 6

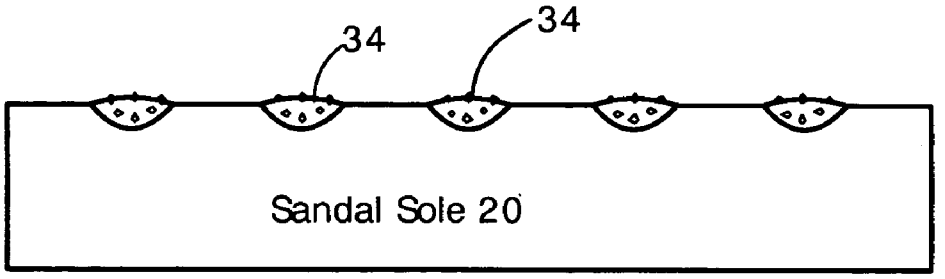


Fig. 7

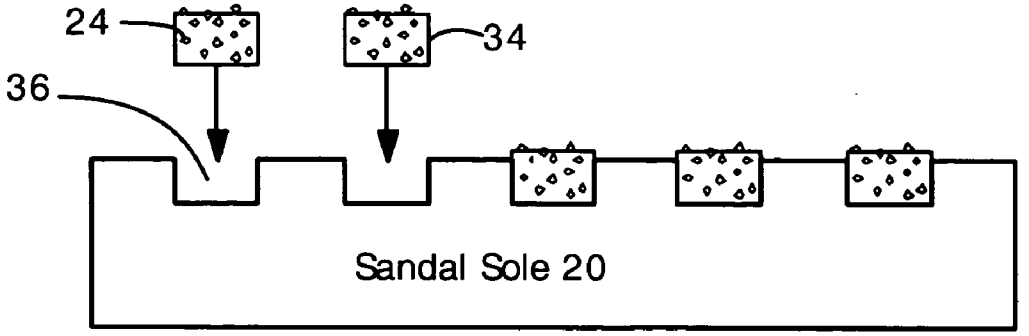


Fig. 8

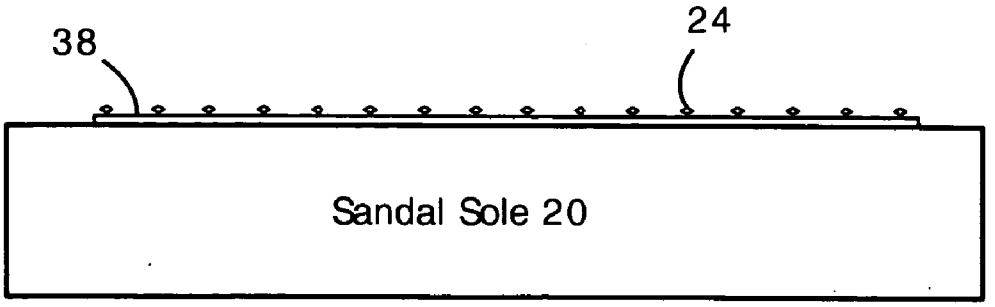


Fig. 9

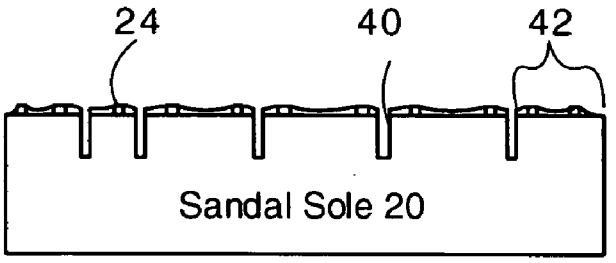


Fig. 10

SANDALS AND FLIP-FLOPS WITH NON-SLIP FOOT SURFACE

RELATED APPLICATIONS

[0001] The present application claims the benefit of priority from copending provisional application 60/455,951, filed on Mar. 19, 2003, and 60/518,121, filed on Nov. 7, 2003.

FIELD OF THE INVENTION

[0002] The present invention relates generally to open toed sandals. More particularly, it relates to sandals having a foot surface with granules (e.g. sand) that provide high traction. The granules are disposed in regions that contact the ball of the foot, toes and heel.

BACKGROUND OF THE INVENTION

[0003] Open-toed sandals such as strap sandals with webbing (e.g. the well-known original TEVA sandals) or flip-flops typically have a plastic or foam upper sole for contact with the bottom of a foot. Sandals often become wet at the beach or when walking through wet grass or hiking. A problem with such sandals is that the upper surface of the sole becomes very slippery when wet. The slippery surface can cause the wearer to slip and fall, or cause the foot to slide against the strap, ripping the sandal. Strap sandals are commonly used in and around water in watersports, such as rafting and the like. The upper surface of these sandals is therefore commonly wet and slippery.

[0004] A sandal with a surface that does not become slippery when wet is needed.

SUMMARY

[0005] The present invention includes a sandal having a upper surface with a coating of high-traction granules, adhered to the sandal. The granules can range in size from 50 microns to 2 millimeters, for example. The granules can comprise sand (e.g. silicates, limestone, granite, crushed rock or ceramic) pumice (a preferred embodiment), phenolic compounds or other relatively hard materials that provide high traction. The granules can be adhered to the sandal with many adhesives including urethanes, epoxies or phenolics. Also, the granules can be incorporated into the sandal material (typically foam or rubber).

[0006] The granules are preferably mixed with the adhesive and then applied as a layer. The granules can be sprinkled onto a layer of adhesive applied to the sandals.

[0007] Preferably, the granules and adhesive (traction material) are applied in areas of the sandal corresponding to the foot ball, toes and heel. These areas of the foot support most of the weight. The traction material can be applied in large continuous areas, or in small patches. The traction material can comprise a surface layer, or can be recessed into the sandal.

[0008] The sandal can be made of foam rubber or other soft materials conventionally used for open toed water-resistant sandals.

[0009] When worn, the traction material contacts the feet where the greatest weight is applied. The foot does not slip against the sandal, even when the sandal is wet.

DESCRIPTION OF THE FIGURES

[0010] **FIG. 1** shows an embodiment of the invention where the sandal has traction material (granules and adhesive) applied over the entire sandal.

[0011] **FIG. 2** shows a sandal having high traction granules on heel, foot ball, and toe portions.

[0012] **FIG. 3** shows a sandal having traction granues only on a foot ball portion of the sandal.

[0013] **FIG. 4** shows a cross sectional view of a sandal with granules bonded with an adhesive.

[0014] **FIGS. 5***a* and **5***b* show cross sectional views of embodiments with granules embedded in the sandal sole.

[0015] **FIG. 6** shows a sandal with the traction granules present in patches.

[0016] **FIG. 7** shows a cross sectional view of an embodiment where the patches are recessed in the sandal sole.

[0017] **FIG. 8** shows a cross sectional view of an embodiment where the patches are plugs that insert into recesses of the sandal sole.

[0018] **FIG. 9** shows a cross sectional view of an embodiment where the granules are bonded to a strip of fabric. The fabric may be removable from the sandal sole (e.g. by hook and loop fastener).

[0019] **FIG. 10** shows another embodiment where cuts in the sandal sole divide the sole into separately flexible zones.

DETAILED DESCRIPTION

[0020] The present invention provides a sandal with high traction material on the supper surface of the sandal sole. The traction material comprises granules of hard material such as crushed rock, ceramic or hard polymers (e.g. phenolic). The traction material can be distributed over the entire sandal, or can be located only in weight-bearing areas of the sandal (e.g. under the foot ball, toes and heel). The traction material can be absent from the instep area (central portion) of the sandal. The granules can be incorporated (embedded) into the material of the sandal sole (e.g. incorporated into a foam rubber sandal sole), or can be adhered to the sandal sole with an adhesive (e.g. urethane, rubber or epoxy), or can be adhered to a patch (e.g. fabric or plastic) that is bonded (may be removable or nonremovable) to the sandal sole. The traction surface grips the foot, even when wet. In this way, slipping is prevented, and damage to the sandal and personal injuries are avoided.

[0021] **FIG. 1** shows a flip-flop sandal according to the present invention. The sandal has a sole **20** with straps **22**. The straps **22** hold the sandal on a wearers foot. The sandal includes granules **24** disposed over the surface of the sandal sole **20**. The granules are hard and small (preferably smaller than 3 mm diameter or so) and provide a high traction surface that does not become slippery when wet.

[0022] The granules **24** can be made of many different materials including crushed rock, silicates, limestone, pumice, phenolics or other materials. The granules should be made of a material that is harder than the sole. For example, the granules can be made of relatively hard rubber particles. In this case, the granules should have a relatively high

coefficient of friction when wet. The granules can have a wide size range, for example in the range of about 50-2000 microns.

[0023] The granules are preferably adhered to the sole **20** with an adhesive such as urethane, epoxy or the like. Rubber or latex adhesives can also be used. The adhesive can be solvent based or a curable adhesive or any other asdhesive. The granules can be mixed in the adhesive to form a slurry before being applied to the sandal. Alternatively, the sandal is coated with adhesive material, and then the granules are sprinkled onto the coated sandal.

[0024] **FIG. 2** shows an alternative embodiment of the invention in which the granules are present only in a heel portion **26** and a front portion **28**. The front portion **28** is in contact with the ball of the foot and toes when the sandal is worn. A central portion **30** (under the foot arch) is not coated with granules. The central portion **30** is generally not weight bearing. Absence of granules in the central portion **30** is preferred because granules can tend to irritate the arch of the foot, which does not have thick, tough skin.

[0025] **FIG. 3** shows another embodiment in which the granules **24** are only provided on a portion of the sole aligned with the ball of the foot. In many cases, providing granules only in the region of the foot ball will provide adequate traction between the foot and sandal.

[0026] **FIG. 4** shows a cross-sectional view of the present sandal. The granules **24** are adhered to the sole **20** with an adhesive **32**. The granules **24** project from the adhesive to provide a high traction surface. The adhesive may be applied as a thin layer.

[0027] **FIGS. 5***a* and **5***b* show embodiments in which the granules **24** are incorporated into the material of the sole **20**. Sandal soles **20** are typically made of foam rubber or similar materials and are typically made by molding. In the embodiment of **FIG. 5***a*, the granules **24** are embedded in an upper layer **25** of the sole. The upper layer **25** containing granules is bonded (e.g. by adhesive) to a lower layer **27** that does not contain granules **24**. The top layer **25** may be 1-5 millimeters thick, for example. In **FIG. 5***b* the sole has granules embedded throughout its entire volume.

[0028] **FIG. 6** shows an embodiment where patches **34** on the sandal contain the granules **24**.

[0029] In a preferred embodiment, the patches **34** are recessed in the sole. **FIG. 7** shows a cross-sectional view. The top surface of the patches may be raised slightly above the top surface of the sole **20**. This will provide better contact between the foot and the granules **24**.

[0030] **FIG. 8** illustrates a method for making a sandal with patches **34**. In this method, the sandal sole **20** has recesses **36** for receiving the patches **34**. The patches **34** in this case are pre-molded discs or plugs with embedded granules **24**. The patches **34** are sized to fit within the recesses and are glued into the recesses. The patches **34** may be molded from urethanes, rubber or other polymers. Preferably, the patches **34** are made from a material that is harder than the sandal sole.

[0031] **FIG. 9** shows another aspect of the invention, the sandal includes a length of webbing **38** or strip of fabric with granules **24** bonded thereon. The strip **38** may be permanently bonded to the sandal, or may be removable, for example by hook-and-loop fasteners. In this way, the granules **24** can be removed from the sandal when they are not desired.

[0032] **FIG. 10** shows another aspect of the invention in which cuts or trenches **40** divide the sandal sole **20** into separately flexible zones or columns **42**. With the columns **42** separately flexible, the sandal sole **20** can conform to the foot, even if the granules **24** and associated adhesive create a relatively rigid surface.

[0033] Although the present invention has been illustrated with sandals having a flip-flop or 'thong' type strap, the present invention includes any open-toe sandal, including sandals having straps made of webbing. The present invention is particularly applicable to sandals designed for use in and around water.

[0034] It will be clear to one skilled in the art that the above embodiment may be altered in many ways without departing from the scope of the invention. Accordingly, the scope of the invention should be determined by the following claims and their legal equivalents.

What is claimed is:

1. An open-toed sandal, comprising:

a) a sandal sole;

b) granules providing a high-traction surface bonded to an upper surface of the sandal.

2. The sandal of claim 1 wherein the granules are absent from a central portion of the sandal sole.

3. The sandal of claim 1 wherein the granules are present in a foot ball portion only.

4. The sandal of claim 1 wherein the granules are present in patches.

5. The sandal of claim 1 wherein the granules are bonded to the sandal sole with an adhesive.

6. The sandal of claim 1 wherein the granules are embedded in the sandal sole.

7. The sandal of claim 1 wherein the granules are embedded in plugs disposed in recesses in the sandal sole.

8. The sandal of claim 1 wherein the granules are bonded to a fabric patch adhered to the sandal sole.

9. The sandal of claim 8 wherein the fabric patch is detachable from the sandal.

10. The sandal of claim 1 wherein the granules are made of crushed rock.

11. the sandal of claim 1 wherein cuts in the sandal sole divide the sole into separately flexible zones.

12. An open-toed sandal, comprising:

a) a sandal sole;

b) granules providing a high-traction surface bonded to an upper surface of the sandal in a foot ball portion;

c) at least one strap for holding the sandal sole on a foot.

13. The sandal of claim 12 wherein the granules are present in patches.

14. The sandal of claim 12 wherein the granules are bonded to the sandal sole with an adhesive.

15. The sandal of claim 12 wherein the granules are embedded in the sandal sole.

16. The sandal of claim 12 wherein the granules are embedded in plugs disposed in recesses in the sandal sole.

17. The sandal of claim 12 wherein the granules are bonded to a fabric strip adhered to the sandal sole.

18. The sandal of claim 17 wherein the fabric strip is detachable from the sandal.

19. An open-toed sandal, comprising:

a) a sandal sole;

b) granules providing a high-traction surface bonded to an upper surface of the sandal in a foot ball portion, wherein a central portion of the sandal does not have the granules.

20. The sandal of claim 19 wherein the granules are embedded in plugs disposed in recesses in the sandal sole.

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