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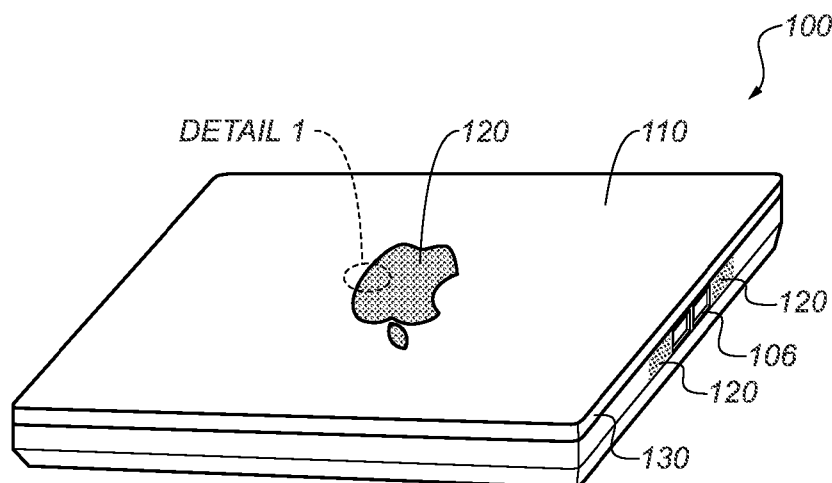


FIG. 1A

(57) Abstract: Embodiments are directed to laser-based processes for forming features on the surface of a part. The feature may include a geometric element, a color element, and/or a surface finish element. In some cases, the laser-formed features are formed as a pattern of textured features that produce an aesthetic and/or tactile effect on the surface of the part. In some cases, the texture features may be sufficiently small that they may not be discerned by the unaided human eye. Also, in some cases, a multiple laser-based processes are combined to form a single feature or a finished part having a specific aesthetic and/or tactile effect.



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AMENDED CLAIMS

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We claim:

1. A device having at least one feature formed into a surface of the device, the feature comprising:
 - a geometric element formed into the surface, the geometric element being formed using a first laser-based process; and
 - 5 a color element formed into the geometric element, the color element being formed using a second laser-based process.
2. The device of claim 1, the feature further comprising:
 - a surface finish element formed into one of the surface or the geometric element, the surface finish element being formed using a third laser-based process.
3. The device of claim 1, wherein the geometric element is formed using a laser ablation process and the color element is formed using one of a black-marking or white-marking process.
4. A method for forming a feature on a surface of a part, the method comprising:
 - machining an initial shape of the surface of the part;
 - polishing the surface of the part;
 - anodizing the surface of the part to form an anodized layer;
 - 5 forming a texture feature on the part using a first laser-based process; and
 - forming a color feature on the part using a second laser-based process.
5. The method of claim 4, wherein:
 - the texture is formed on the part after the anodized layer has been formed,
 - the color feature is formed on the part after the anodized layer has been formed, and
 - the color feature is formed by focusing a laser beam into the part below the anodized
 - 5 layer.
6. A device having a surface with a pattern of texture features formed into the surface, the surface comprising:
 - a pattern of full-shape texture features on the surface of the device, the full-shape surfaces being formed using a laser;

5 a pattern of partial-shape texture features on the surface of the device adjacent to the pattern of full-shape features, the partial-shape texture features being formed using the laser and having a partial shape that is less than the full-shape texture feature; and
 a non-patterned portion of the surface.

7. The device of claim 6, wherein the pattern of partial-shape texture features are formed over a region that surrounds the pattern of full-shape texture features, and wherein the non-patterned portion of the surface surrounds the pattern of partial-shape texture features.

8. The device of claim 6, wherein the pattern of partial-shape texture features are formed in a transition region that is located adjacent to the pattern of full-shape texture features and also to the non-patterned portion of the surface.

9. The device of claim 6, further comprising a button feature and wherein the pattern of full-shape texture features surround the button feature, the pattern of partial-shape texture features surround the pattern of full-shape texture features, and the non-patterned portion surrounds the pattern of partial-shape texture features.

10. The device of claim 6, wherein the pattern of partial-shape texture features are formed over an edge region near the boundary between the pattern of full-shape texture features and the non-patterned portion of the surface.

11. The device of claim 6, wherein the pattern of partial-shape texture features do not extend beyond a border of a pattern shape.

12. The device of claim 6, wherein the pattern of partial-shape texture features are formed over an edge region that is adjacent to the pattern of full-shape texture features and along the edge of the surface.

13. The device of claim 12, wherein the pattern of partial-shape texture features do not break the edge of the surface.

14. The device of claim 6, wherein the full-shape texture feature is a formed from a diamond shape and the partial-shape texture feature is formed from a partial-diamond
5 shape.

15. The device of claim 6, wherein the full-shape texture feature is a formed from a circle shape and the partial-shape texture feature is formed from a semi-circle shape.

16. A surface, comprising:
a patterned region; and
a non-patterned region adjacent the patterned region, wherein the patterned region comprises:
- 5 a plurality of texture features cooperating to define an inner portion of the patterned region;
at least one partial texture feature defining a portion of a border between the patterned region and the non-patterned region; and
the plurality of texture features and the at least one partial texture feature are
- 10 laser-formed.
17. The surface of claim 16, wherein the patterned region reflects light differently than the non-patterned region.
18. The surface of claim 17, wherein the plurality of texture features are indiscernible to the human eye.
19. A device having a laser-formed feature comprising:
a circular hub feature that is raised with respect to a surface of the device;
an array of rib features arranged around the circular hub feature, wherein each rib feature includes an arcuate surface that extends from the hub feature to the surface of the
- 5 device; and
an array of groove features that separate the rib features, wherein:
each groove feature has a back wall that connects to two side walls,
the back wall and the two side walls connect at a sharp corner, and
the back wall and two side walls are formed using a laser.
20. The device of claim 19, wherein the arcuate surfaces of the array of ribs are formed using a laser.
21. A laser-formed dial comprising:
a circular hub feature that is offset from a lower portion of the dial;
an array of rib features arranged around the circular hub feature, wherein each rib feature includes an arcuate surface that extends from the hub feature to the lower portion of
- 5 the dial; and
an array of groove features that separate the rib features, wherein:

each groove feature has a back wall that connects to two side walls,
the back wall and the two side walls connect at a sharp corner, and
the back wall and two side walls are formed using a laser.

22. The dial of claim 21, wherein the arcuate surfaces of the array of ribs are formed using a laser.

23. The dial of claim 21, further comprising a raised rib having a raised arcuate surface that is higher than the arcuate surfaces of the array of rib features.

24. The dial of claim 21, further comprising:
an index feature that is formed into the arcuate surface of one of the rib features; and
a lozenge-shaped plug that is inserted into the index feature.

25. A method for forming a texture feature on a surface, the method comprising:
forming, using a laser, a pattern of full-shape texture features on the surface of a device;

forming, using the laser, a pattern of partial-shape texture features on the surface of
5 the device, wherein the partial-shape texture features include a partial shape that is less than
the full-shape texture feature, and wherein the surface also includes a non-patterned portion
of the surface.