Claims

[Claim 1] A grinder device for making a hole, slot and/or depression in a needle proximal to its tip, said grinder device comprising:
a strip securing in parallel alignment plurality of catheter needle tubes exposing the tips of the needles;
holding means assembly for the said strip comprising at least two holding plates for clamping therebetween the said strip;
a grinder wheel assembly having a grinding wheel with grinding surface positioned adjacent said holding means assembly;
a movable table operably mounted on the grinder device configured to move the said holding means assembly therealong for changing the position of the needle tubes supported in the said strip by said holding means assembly.

[Claim 2] The grinder device according to claim 1, wherein said holding means assembly comprises support angle block means for changing the position and thereby the angle at which the tubes supported by said strip extend toward grinding surface of the grinder wheel.

[Claim 3] The grinder device according claim 1, wherein said holding means assembly comprises space adjusting means for separating said two holding plates by an adjustable predetermined distance, to thereby enable the holding means assembly to accommodate needle tubes of varying diameter.

[Claim 4] The grinder device according to claim 1, wherein said holding means assembly comprises space adjuster means for determining the changes between the position of the needle tubes arranged in the said strip to a pre-determined value for grinding ahole, slot and/or depression in the tip of the needle.

[Claim 5] The grinder device according to claim 1, wherein said holding means assembly comprises means for clamping the said strip.

[Claim 6] The grinder device according to claim 1, wherein said holding means assembly comprises at least one pneumatic cylinder.

[Claim 7] The grinder device according to claim 1, wherein portions of said holding means assembly which contact the said strip are provided with friction resistance rubber surface cover elements.

[Claim 8] The grinder device according to claim 1, wherein the holding means assembly comprises needle holding top plate and needle holding bottom plate for securing the said strip in-between.

[Claim 9] The grinder device according to anyone of the preceding claims, further comprising grinding control means for controlling the sequence of operation of the above-mentioned said means.

[Claim 10] A method for making a hole, slot and/or depression in a needle proximal to its tip, the method comprising the steps of:
positioning plurality of needle tubes in parallel alignment in a strip;
clamping the said strip between the holding means assembly comprising at least two holding plates;
mounting the said holding means assembly on the movable table of the grinder device;
positioning the grinding wheel assembly adjacent to the said holding means assembly;
bringing in contact the strip exposing the needle tip to the grinding surface of the said grinding wheel assembly;
grinding ahole, slot and/or depression in a needle proximal to its tip as per a pre-determined specification; and
extracting, washing and drying the needle tubes.

[Claim 11] The method according to claim 10, wherein said strip is clamped as such in between the holding means assembly that the needle-point tip is exposed generally within a perpendicular area projected by the remainder of needle tube being clamped un-exposed in-between the said holding plates.

CLAIMS:

1. A grinder device (10) for making a hole, slot and/or depression (34) in a needle tube (20) proximal to its tip (32), said grinder device (10) comprising:

a strip (22) securing in parallel alignment a plurality of needle tubes (20) exposing the tips (32) of the needle tubes (20);

a needle holding means assembly (12) for the said strip (22) comprising at least two needle holding plates (16, 18) for clamping there between the said strip (22); wherein said needle holding means assembly (12) comprises space adjusting means for separating said two needle holding plates (16, 18) by an adjustable predetermined distance, to thereby enable the needle holding means assembly (12) to accommodate needle tubes (20) of varying diameter;

a grinding wheel assembly (28) having a grinding wheel (40) with grinding surface (30) positioned adjacent said needle holding means assembly (12);

a movable table (14) operably mounted on the grinder device (10) configured to move the said needle holding means assembly (12) there along for changing the position of the needle tubes (20) supported in the said strip (22) by said needle holding means assembly (12).

2. The grinder device (10) according to claim 1, wherein said needle holding means assembly (12) comprises angle support block means (36) for changing the position and thereby the angle at which the needle tubes (20) supported by said strip (22) extend toward grinding surface (30) of the grinding wheel (40).

3 The grinder device(10) according to claim 1, wherein said needle holding means assembly (12) comprises space adjuster means for determining the changes between the position of the needle tubes (20) arranged in the said strip (22) to a pre-determined value for grinding a hole, slot and/or depression (34) in the tip (32) of the needle tube (20).

4. The grinder device (10) according to claim 1, wherein said needle holding means assembly (12) comprises means for clamping the said strip (22).

5. The grinder device (10) according to claim 1, wherein said needle holding means assembly (12) comprises at least one pneumatic cylinder (26).

6. The grinder device(10) according to claim 1, wherein portions of said needle holding means assembly (12) which contact the said strip (22) are provided with friction resistance rubber surface cover elements.

7. The grinder device (10) according to claim 1, wherein the needle holding means assembly (12) comprises needle holding top plate (16) and needle holding bottom plate (18) for securing the said strip (22) in-between.

8. The grinder device (10) according to any one of the preceding claims, further comprising grinding control means for controlling the sequence of operation of the above-mentioned said means.

9. A method for making a hole, slot and/or depression (34) in a needle tube (20) proximal to its tip (32), the method comprising the steps of:

positioning a plurality of needle tubes (20) in parallel alignment in a strip (22);

clamping the said strip between a needle holding means assembly (12) comprising at least two needle holding plates (16,18); wherein said needle holding means assembly (12) comprises space adjusting means for separating said two needle holding plates (16,18) by an adjustable predetermined distance, to thereby enable the needle holding means assembly (12) to accommodate needle tubes (20) of varying diameter,

mounting the said needle holding means assembly (12) on the movable table (14) of the grinder device;

positioning the grinding wheel assembly (28) adjacent to the said needle holding means assembly(12);

bringing in contact the strip (22) exposing the needle tips (32) of the plurality of needle tubes (20)to the grinding surface (30) of the said grinding wheel assembly (28);

grinding a hole, slot and/or depression (34) in the needle tips (32) at the proximal end as per a pre-determined specification; and

extracting, washing and drying the needle tubes (20).

10. The method as claimed in claim 9, wherein said strip (22) is clamped in between the needle holding means assembly (12) such that the needle-tip (32) is exposed generally within a perpendicular area projected by the remainder of needle tube (20) being clamped un-exposed in-between the said needle holding plates (16,18).