CLAIMS

1. An apparatus for forming barbed sutures, the apparatus comprising:

a suture frame configured for presenting a plurality of lengths of suture on which barbs are to be formed;

a bending mechanism configured to bend the plurality of lengths of suture to present a bent part of each length of suture for cutting;

a cutting assembly configured to cut into a convex surface of the bent part of each length of suture to form a barb on the bent part of each length of suture; and

an indexing block configured to support the suture frame and the cutting assembly, the indexing block comprising an indexing mechanism configured to lock the suture frame and the cutting assembly in a cutting position and to effect relative stepwise movement between the suture frame and the cutting assembly to allow a plurality of barbs to be formed at intervals apart on each length of suture;

wherein the suture frame, the indexing block and the indexing mechanism are configured to allow the suture frame to be assembled with the indexing block in a flipped configuration without removing the plurality of lengths of suture from the suture frame, so as to present a second side of each of the plurality of lengths of suture to be cut into, thereby allowing barbs to be formed on two diametrically opposite sides of each of the plurality of lengths of suture.

2. The apparatus of claim 1, wherein the bending mechanism comprises

a press rod configured to downwardly displace the plurality of lengths of suture in the suture frame; and

a ridge provided below the plurality of lengths of suture in the suture frame and configured to contact and support the plurality of lengths of suture such that each length of suture is bent about the ridge when the plurality of lengths of suture have been displaced by the press rod.

3. The apparatus of claim 2, wherein the press rod is provided on the cutting assembly below a cutting blade provided on the cutting assembly, and the ridge is provided on the indexing block.

4. The apparatus of claim 3, wherein the ridge is provided on a suture support of the indexing block, the suture support further having a suture holding surface configured for holding a held part of each length of suture thereagainst by the press rod.

5. The apparatus of claim 4, wherein the suture support is configured such that a portion of each length of suture between the bent part and the held part does not contact any surface during displacement of the plurality of lengths of suture by the press rod.

6. The apparatus of any preceding claim, wherein the cutting assembly is configured to cut into the convex surface of the bent part of each length of suture in a direction parallel to a surface of each length of suture.

7. The apparatus of any preceding claim, wherein the suture frame comprises opposing side bars and opposing end bars that are connected to define a space therewithin, and wherein dowel pins are provided on each of the opposing end bars such that the plurality of lengths of suture can be provided in the space by winding a single length of suture in a zig-zag manner from one end bar to the other end bar about successive dowel pins.

8. The apparatus of any preceding claim, wherein the indexing mechanism comprises

a forward-lock cam provided on the indexing block, the forward-lock cam configured to move the suture frame one step forward with each rotation of the forward-lock cam, and

a toothed section provided on the suture frame and a tooth catch provided on the indexing block, wherein the toothed section and tooth catch are configured such that the tooth catch engages a tooth of the toothed sections to prevent movement of the suture frame in a backward direction when the suture frame is in the cutting position.

9. The apparatus of claim 8, wherein the indexing mechanism further comprises a raise-lower cam provided on a same shaft as the forward-lock cam, the raise-lower cam is configured to raise the cutting assembly during forward movement of the suture frame and to lower the cutting assembly to the cutting position when the raise-lower cam is rotated in a reverse direction, and the forward-lock cam is further configured to lock the cutting assembly in the cutting position when the forward-lock cam is rotated in a reverse direction.

10. The apparatus of claim 1, wherein the suture frame is configured such that a plurality of barbs formed on the second side of each length of suture when the suture frame is assembled with the indexing block in the flipped configuration is staggered from a

plurality of barbs already formed on a first side of each length of suture.

11. A method of forming barbed sutures, the method comprising the steps of:
    a) bending a plurality of lengths of sutures to present a bent part of each length of suture for cutting;
    b) cutting with a cutting assembly into a convex surface of the bent part of each length of suture to form a barb on the bent part of each length of suture;
    c) effecting a relative stepwise movement between the plurality of lengths of suture and the cutting assembly in a direction parallel to the plurality of lengths of suture;
    d) repeating steps a) to c) to form a plurality of barbs that are intervals apart on each length of suture;
    e) flipping the plurality of lengths of suture over to present a diametrically opposite side of the plurality of lengths of suture to be cut into; and
    f) repeating steps a) to c).

12. The method of claim 11, further comprising, prior to step a), mounting the plurality of lengths of sutures on a suture frame, the suture frame comprising opposing side bars and opposing end bars that are connected to define a space therewithin, wherein the mounting comprises winding a single length of suture in a zig-zag manner from one of the end bars to the other of the end bars about successive dowel pins provided on the opposing end bars such that the plurality of lengths of suture are provided in the space.

13. The method of claim 11 when dependent on claim 12, further comprising
    g) cutting each of the plurality of lengths of suture away from the suture frame.

14. The method of claim 13, wherein step g) comprises cutting across the plurality of lengths of suture along one of the end bars.

15. The method of any of claims 11 to 14, wherein the cutting in step b) is in a direction parallel to a surface of each length of suture.