CLAIMS

1. A method for sorting balls to separate those having a sphericity defect from spherical balls, comprising:

- depositing the balls to be sorted on a support ~~(1)~~ having a conical surface ~~(11)~~, the axis ~~(11a)~~ of said cone being vertical;
- applying radial vibrations to said support ~~(1)~~ so as to cause the non-spherical balls to follow an upward trajectory on the conical surface ~~(11)~~, whilst the spherical balls roll downwards on said surface;
- evacuating the balls having a sphericity defect via an orifice ~~(13)~~ arranged in the upper part of the support;
- evacuating the spherical balls via an orifice ~~(14)~~ arranged in the lower part of the support.

2. The method according to claim 1, characterized in that the balls to be sorted are deposited in a region of the upper half of the conical surface ~~(11)~~.

3. The method according to one of claims 1 or 2, characterized in that said conical surface ~~(11)~~ has a line of steeper slope ~~(11b)~~ moving upward from the periphery of the support towards its centre.

4. The method according to claim 3, characterized in that the vibrations are applied so as to cause narrowing of the trajectory of the balls having a sphericity defect on the surface of the conical support.

5. The method according to claim 4, characterized in that the vibrations are applied so as to cause a circular trajectory of the balls having a sphericity defect.

6. The method according to claim 3, characterized in that the vibrations are applied so that the trajectory of the balls having a sphericity defect follows the line of the conical surface ~~(11)~~ having the steepest slope.

7. The method according to one of claims 1 or 2, characterized in that said conical surface has a slope moving downwards from the periphery of the support towards its centre.

8. The method according to claim 7, characterized in that the vibrations are applied so as to cause widening of the trajectory of the non-spherical balls on the conical surface.

9. The method according to one of claims 1 to 8, characterized in that the vibrations are applied by means of a vibrator comprising two eccentric weights secured to one same vertical shaft and in that the offset between said eccentric weights is adjusted to impose a determined trajectory upon the balls having a sphericity defect.

10. The method according to one of claims 1 to 9, characterized in that the balls to be sorted are solder balls.

11. The method according to one of claims 1 to 10, characterized in that the mean diameter of the balls to be sorted is between 20 and 200 µm.

12. The method according to one of claims 1 to 11, characterized in that the non-spherical balls are double balls.

13. A device for sorting balls including spherical balls and balls having a sphericity defect, characterized in that it comprises:

- a support ~~(1)~~ having a conical surface ~~(11)~~, the axis ~~(11a)~~ of said cone being vertical;
- a ball feed device arranged to deposit said balls to be sorted on the conical surface;
- a vibrator secured to said support, said vibrator being adapted to generate <u>radial</u> vibrations of said support ~~(1)~~;

said device being further characterized in that said conical support has:

- an orifice ~~(13)~~ to evacuate the non-spherical balls, arranged in the upper part of the support; and
- an orifice ~~(14)~~ to evacuate the spherical balls, arranged in the lower part of the support.

14. The device according to claim 13, characterized in that the vibrator comprises an upper eccentric weight and a lower eccentric weight secured to a vertical shaft, the lower eccentric weight being offset at an angle from the upper eccentric weight.

15. The device according to one of claims 13 or 14, characterized in that said conical surface ~~(1)~~ has a slope ~~(11)~~ moving upward from the periphery ~~(10)~~ of the support towards its centre ~~(12)~~.

16. The device according to claim 15, characterized in that the orifice ~~(13)~~ to evacuate the balls having a sphericity defect is arranged in the centre of the conical support ~~(1)~~, and in that the orifice ~~(14)~~ to evacuate the spherical balls is arranged in a peripheral region of said conical support.

17. The device according to one of claims 15 or 16, characterized in that the conical support ~~(1)~~ comprises a chute ~~(14a)~~ to collect the spherical balls, extending towards the centre of the support from the evacuation orifice ~~(14)~~ of said balls.

18. The device according to one of claims 13 or 14, characterized in that said conical surface has a slope moving downward from the periphery of the support towards its centre.

19. The device according to claim 18, characterized in that the orifice to evacuate the non-spherical balls is arranged in a peripheral region of the support, and in that the orifice to evacuate the spherical balls is arranged in the centre of said support.

20. The device according to one of claims 13 to 19, characterized in that the feed device is arranged so as to deposit the balls to be sorted on the upper half of the conical surface.

21. The device according to one of claims 13 to 20, characterized in that the slope of the conical surface has an angle of between 1 and 20° from the horizontal.