hole 68 penetrates the intermediate part 54 in the X direction (that is, in the direction orthogonal to both the axial direction of the ultrasonic horn 50 and the axial direction of the capillary 18) so as to pass through both side surfaces of the intermediate part 54 in the base end side end portion thereof. The penetrating direction of the spiral hole 68 changes so as to approach the Z direction as it advances toward the tip end side in the axial direction. Then, the spiral hole 68 penetrates the intermediate part 54 in the Z direction so as to pass through the upper surface and the bottom surface of the intermediate part 54 in the tip end side end portion thereof. In other words, the penetrating direction of the spiral hole 68 is rotated by 1/4 in the circumferential direction in the process of advancing from the base end side end portion to the tip end side end portion. From another point of view, the spiral hole 68 is shaped like a flat plate twisted 90 degrees.

[0024] Such a spiral hole 68 can be formed by, for example, wire electric discharge machining. FIG. 5 is a schematic view showing the states of forming and machining the spiral hole 68. In FIG. 5, the ultrasonic horn 50 is shown as a cylinder for the sake of simplicity. When forming the spiral hole 68, a discharge wire 70 is disposed through in the radial direction as shown in FIG. 5. In that state, the ultrasonic horn 50 is relatively moved in the axial direction A and the circumferential direction W with respect to a discharge wire 70 while electric discharge machining is performed. Thus, a spiral through hole is formed in the ultrasonic horn 50. As a matter of course, the spiral hole 68 is not necessarily formed by wire electric discharge machining, and may be formed by other machining techniques such as laser machining.

[0025] Here, as is clear from the above description, the spiral hole 68 is a single hole and penetrates the intermediate part 54 in the radial direction. With such a configuration, longitudinal vibration can be efficiently converted into torsional vibration, and a variation in vibration characteristics for each individual can be suppressed. This will be described in comparison with a comparative example.

[0026] FIG. 7 is a schematic view of an ultrasonic horn 50* of a comparative example. In the