CLAIMS

1. A method of friction stir channelling comprising rotating a probe of a friction stir channelling tool, wherein the friction stir channelling tool comprises the probe for inserting into a workpiece, the probe extending from, and being rotatably mounted in, a bore of a shoulder, a surface of the probe being formed so as to cause plasticised workpiece material to be moved towards the shoulder and into the bore of the shoulder upon rotation of the probe while the shoulder is in contact with the workpiece, and wherein the shoulder has at least one vent extending from outside the shoulder to the bore whereby the plasticised material can exit the bore through the vent, and wherein the method further comprises causing the rotating probe to enter the workpiece and bringing the shoulder of the tool into contact with the workpiece, the shoulder, or at least the radially outer portion of the shoulder in the case where the shoulder has radially inner and outer portions, not rotating relative to the workpiece, whereby rotation of the probe causes material of the workpiece around the probe to be plasticised and be drawn up the probe to enter the bore of the shoulder and exit through the vent or one of the vents in the shoulder; and traversing the tool along the workpiece under working conditions such that a channel is formed inside the workpiece.

2. The method according to claim 1, wherein the tool is traversed along a curved, typically serpentine, path.

3. The method according to claim 1 or claim 2, wherein the material exiting the or each vent is wound onto a reel.

4. The method according to any one of claims 1 to 3, wherein the workpiece has a curved surface and the shoulder has a correspondingly curved surface to engage the workpiece.

5. The method according to any one of claims 1 to 4, wherein the probe is retractable at least partially into the bore of the shoulder, and wherein at

the start of the process the probe is axially moved, while rotating outwardly from the bore, to contact the workpiece, and thereafter the shoulder is brought into contact with the workpiece, while at the end of the process the probe is retracted into the bore.

6. The method according to any one of claims 1 to 4, wherein the probe is retractable at least partially into the bore of the shoulder, and wherein at the start of the process the shoulder is brought into contact with the workpiece, and thereafter the probe is axially moved, while rotating outwardly from the bore, to contact the workpiece.

7. The method according to any one of claims 1 to 6, wherein the workpiece is a single monolithic workpiece or multiple workpieces in a butt, lap or corner or other configuration.

8. The method according to any one of claims 1 to 7, wherein the workpiece material is selected from metals including aluminium, magnesium, copper, lead or high temperature metals such as iron, titanium, nickel, or polymers such as PVC and acrylic.