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HOSE PARING TOOL

This invention relates to a tool which is suitable for use in paring the outer wall of a hose and, thus, for reducing the diameter of an end portion of the hose.

The invention has particular but non-exclusive application in the paring of the outer casing of a
5 wire-reinforced synthetic rubber hose of a type which is used for carrying high pressure fluids, and the invention is herein described in the context of a paring tool for use in such application. However, it
10 is to be understood that the paring tool may have application in the paring of other types of hoses and, indeed, in the paring of objects other than hoses.

Wire-reinforced hoses are usually terminated by a so-called end fitting which has a stem member which
15 locates within the hose bore and a ferrule member which locates about the outer wall of the hose. The stem and ferrule members are interconnected, either by a screwed connection or by swaging the ferrule member into locking engagement with the stem member. In either
20 case, the wall of the hose is clamped between the stem and ferrule members and is thereby held captive to the assembled end fitting.

When clamping the hose end between the stem and ferrule members, it is desirable in at least some cases

that a metal-to-metal connection be made and, to achieve this objective, the outer covering and/or the inner wall of the hose is/are pared to expose the wire reinforcement for a predetermined length at the end of the hose. When the outer covering is pared, the desired metal-to-metal contact is made between the hose reinforcement and the ferrule member, and when the inner wall is pared such metal-to-metal contact is made between the hose reinforcement and the stem member.

The paring tool in accordance with the present invention has been developed for paring the outer covering (i.e., the outer wall) of a hose, so as to expose the wire reinforcement for a predetermined extent along the length of the hose.

A paring tool which previously has been employed for paring the outer casing of a hose end is disclosed in Australian Patent Specification No.406,353 (2929/66). The tool disclosed in the earlier specification comprises a mandrel which locates in the bore of a hose, a cutter carried by a shank which extends parallel to the mandrel, and an outrigger arm which supports the shank and locates it at a fixed radial distance from the mandrel. In use of the paring tool, the mandrel is pushed into the bore of a hose end, whilst the hose or the paring tool is rotated about the axis of the mandrel, and the mandrel is advanced in an axial direction into the bore of the hose. The cutter engages with the outer covering of the hose end and, as a result of the rotational and linear movement of the hose relative to the mandrel, the cutter functions to skive a helical swath from the outer covering of the end of the hose.

The above described paring tool has been used extensively and successfully over the years but, as a consequence of its construction, it has been necessary to provide a separate such tool for paring each of the

many differently sized hoses to which end fittings must be secured. Thus, the paring tool has been manufactured, in effect, as an integral unit, with the mandrel being sized to fit the bore of given hose and a cutter being spaced a fixed radial distance from the axis of the mandrel.

The present invention seeks to provide a paring tool of the above described type but which has greater flexibility of use and which may be employed for paring the outer casing of a range of differently sized hoses.

Thus, the present invention provides a paring tool which comprises a mandrel support body, and a mandrel which is removeably connected to the support body. The mandrel has a stem portion which is located in the bore of a hose and an end portion (preferably shouldered) which locates adjacent the support body when the mandrel is connected to the support body. A radially projecting outrigger arm is located between the support body and the end portion of the mandrel. A shank is carried by the outrigger arm and is disposed parallel to the mandrel stem portion, and a cutter is carried by the shank and disposed radially outwardly of the mandrel. The outrigger arm is moveable in a radial direction whereby the cutter may be positioned at a selected radial distance from the mandrel, and the outrigger arm is clamped in a selected fixed position between the support body and the mandrel when the mandrel is connected to the support body.

The mandrel preferably is provided with a screw threaded projection which is engageable in a threaded bore in the mandrel support, whereby the mandrel and mandrel support may be connected together. However, a reverse connection may be made, with the mandrel support being provided with a threaded projection and the mandrel being formed with a complementary threaded bore. In either case, the outrigger arm preferably is formed with an elongated slot which permits radial

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movement of the arm and through which the threaded projection extends.

5 A single sub-assembly of the support body, outrigger arm, shank and cutter is employed in conjunction with a range of mandrels which are interchangeable and which are dimensioned to suit a range of differently sized hoses. Thus, the outer casing of differently sized hoses may be pared simply by changing the mandrel as required to suit the hose size and by adjusting the radial position of the outrigger arm. With this arrangement, a factory, workshop or field service organisation will not be required to stock a range of different (complete) paring tools but, rather, it will be sufficient that a range of differently sized mandrels be held for use with the sub-assembly of common parts for paring differently sized hoses.

20 The invention will be more fully understood from the following description of a preferred embodiment of a paring tool which is illustrated in the accompanying drawings wherein:

Figure 1 shows an exploded side elevation view of the paring tool.

25 Figure 2 shows an end elevation view of a portion of the tool as viewed in the direction of section plane 2-2 shown in Figure 1.

Figure 3 shows a side elevation view similar to that of Figure 1 but with the various component parts of the tool in fully assembled condition, and

30 Figure 4 shows an enlarged end view of a cutter portion of the tool, as viewed in the direction of section plane 4-4 shown in Figure 1.

35 As illustrated, the paring tool includes a mandrel support body 10, a mandrel 11 which is removeably and interchangeably connected with the body 10, an outrigger arm 12, a shank 13 in the form of a stub axle mounted to the arm 12, and a cutter 14 mounted to the

shank 13. The tool is constructed in a manner such that the shank 13 lies parallel to the axis of the mandrel 11 and the cutter 14 is positioned adjacent but radially outward of the mandrel 11. The support body 10 is formed from hexagonal steel bar and it has a blind threaded hole 15 tapped into one of its ends. The mandrel 11 is turned from hexagonal steel bar and it includes a stem portion 16, a shouldered end portion 17, a spigot 18 and a threaded projection 19 formed as an extension of the spigot. The projection 19 is threaded so that it may be screwed into the threaded hole 15 in the support body 10 and to permit the mandrel to be connected to the support body.

The arm 12 is formed with an open ended slot 20 which locates about the spigot 18 and, thus, the arm may be moved in a radial direction as indicated by the arrows 21 in Figure 3 prior to clamping of the arm between the support body 10 and the mandrel 11. The mandrel spigot 18 has an axial length which is less than the combined thickness of the arm 12 and a thrust washer 22, in order that the arm 12 may be clamped tightly between the body 10 and the mandrel shoulder 17. The mandrel shoulder includes a hexagonal portion 23 so that it may be gripped by a spanner and be tightened against the support body 10.

The shank 13 is formed as a tubular element having a turned end portion 23 which locates within a recessed embossment 24 of the cutter 14. Also, the end portion 23 of the shank is provided with a key 25 which can be located in any one of four keyways 26 in the cutter embossment 24. Thus, the cutter 14 is precluded from rotating relative to the axis of the shank 13.

A square hole (not shown) is broached into the arm 12 and the shank 13 has an end portion which locates within the hole to prevent the shank from rotating about its own axis.

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An allen head screw 27 projects through the cutter 14, the shank 13 and the arm 12, and a nut 28 is threaded onto the screw. The cutter itself is formed with four cutter elements 29 and, when one of the
5 cutter elements has been rendered blunt by excessive use, the screw 27 may be slackened and the cutter 14 be rotated through 90° so that an unworn cutter element 29 may be presented to the mandrel.

Although only one mandrel 11 is shown in the
10 drawings, a series of differently sized mandrels would normally be provided for the purpose of paring the outer covering 30 from the end of variously sized wire reinforced hoses 31. Thus, in use of the paring tool, a mandrel 11 is first selected to suit the size of the
15 bore of a hose 31 to be pared. Then, the selected mandrel 11 is screw connected to the support block 10 and, prior to tightening the mandrel into the support block, the arm 12 is positioned in a radial direction so that the cutter 14 is located at a required radial
20 distance from the mandrel stem portion 16. The radial distance at which the cutter 14 is located is determined by the wall thickness of the outer covering 30 to be pared from the hose end, and the distance must be selected so that, when the outer covering is pared,
25 the wire reinforcement 32 in the hose wall is only just exposed.

Gauge blocks (not shown) may be provided for setting the distance of the cutter 14 from the mandrel 11 for various sized hoses.

30 Having positioned the cutter 14 at the required distance from the mandrel 11, the mandrel is tightened against the support block 10 so that the arm 12 is clamped firmly in position. The paring tool is then ready for use.

35 In use of the paring tool, the hose 31 is pushed onto the mandrel 11 in the axial direction indicated by the arrow 33 shown in Figure 3 and, at the same time,

the hose is rotated relative to the tool. The relative rotation may be effected by holding the tool in a fixed position and rotating the hose about its own axis, or by holding the hose in a fixed position and rotating the paring tool about the longitudinal axis of the mandrel. In either case, the combined (relative) rotary and longitudinal movement of the hose end results in the paring of a helical swath from the outer covering of the hose.

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CLAIMS:

1. A paring tool comprising a mandrel support body, a mandrel which is removeably connected to the support body, the mandrel having a stem portion which is locatable in the bore of a hose and an end portion which locates adjacent the support body when the mandrel is connected to the support body, a radially projecting outrigger arm located between the support body and the end portion of the mandrel, a shank carried by the outrigger arm and disposed parallel to the mandrel stem portion, and a cutter carried by the shank and disposed radially outwardly of the mandrel stem portion, the outrigger arm being moveable in a radial direction whereby the cutter may be positioned at a selected radial distance from the mandrel stem portion and the outrigger arm being clamped in a selected fixed position between the support body and the end portion of the mandrel when the mandrel is connected to the support body.
2. The paring tool as claimed in claim 1 wherein said end portion of the mandrel is provided with a shoulder which is disposed outwardly of the stem portion.
3. The paring tool as claimed in claim 1 or claim 2 wherein the mandrel is provided with a screw threaded projection which is engageable in a threaded bore in the mandrel support, whereby the mandrel and mandrel support can be connected together.
4. The paring tool as claimed in claim 1 or claim 2 wherein the mandrel support is provided with a screw threaded projection which is engageable in a threaded bore in the mandrel whereby the mandrel and mandrel support may be connected together.
5. The paring tool as claimed in claim 3 or claim 4 wherein the outrigger arm is formed with an elongated slot which permits radial movement of the arm relative to the mandrel and through which the threaded projection extends.



6. The paring tool as claimed in any one of claims 1 to 5 wherein the support body is shaped such that it may be gripped by a spanner.

7. The paring tool as claimed in claim 2 wherein the
5 shoulder is shaped such that it may be gripped by a spanner.

8. The paring tool substantially as shown in the accompanying drawings and substantially as hereinbefore described with reference thereto.

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