

PARING TOOL

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

5 The invention has particular but non-exclusive application in the paring of the bore of a 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
10 tool for use in such application. However, it 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
15 so-called end fitting which has a stem member which 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
20 engagement with the stem member. In either 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
25 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 inner wall, (i.e. the bore) of a hose, so as to expose the wire-reinforcement within the bore for a predetermined extent along the length of the bore.

Paring tools which currently are available for paring the bore of a hose have a mandrel which is sized to fit the unpared bore diameter of the hose and a knife-type cutter projecting radially outwardly from the mandrel. The mandrel is advanced into the hose bore and is simultaneously rotated, so that the cutter is advanced in a helical direction and functions to skive the bore of the hose to the depth of the reinforcement.

The present invention provides a paring tool which is different from the known prior art tools in that it comprises a head portion, which has an axis of rotation, and at least one cutter element which projects forwardly of the head portion in a direction parallel to the axis of rotation. The or each cutter element has an arcuate configuration in cross-section and has at least one marginal cutting edge which extends parallel to the axis of rotation.

When the paring tool is employed to enlarge the bore of a hose, the tool is rotated relative to the hose and the cutter element is advanced into the hose bore. Alternatively, if a short length of hose is to have its bore pared, the paring tool may be fixed and

the hose itself may be rotated about the axis of the bore. The axis of rotation of the paring tool is positioned so as to be coincident with the axis of the hose.

5 The axis of rotation of the paring tool may be held coincident with the axis of the hose in various ways. For example, the hose end may be held captive so that its axis is held in alignment with the axis of rotation of the paring tool. Alternatively, the paring tool may
10 be fitted with a surrounding sleeve which locates about the outer casing of the hose and thereby retains the paring tool axis coincident with the hose axis. However, the paring tool is preferably formed with at
15 least two equi-angularly disposed cutter elements so that, as the paring tool is advanced into the hose bore, the paring tool is automatically centered with respect to the bore of the hose.

In order to facilitate the self-centering effect and to provide a lead-in for the paring tool, the forward
20 end of each cutter element is preferably formed with a tapered nose portion and/or the paring tool may be provided with a forwardly projecting mandrel for location in the bore of the hose. The mandrel, when provided, may be formed as an integral extension of the
25 cutter elements or be carried by a forwardly projecting lead screw.

The invention will be more fully understood from the following description of illustrative embodiments of paring tools which are suitable for use in enlarging the
30 bore of a hose. The description is given with reference to the accompanying drawings wherein:

Figure 1 shows a perspective view of a first type of paring tool.

Figure 2 shows a side elevation view of the paring
35 tool of Figure 1 when used in conjunction with a lead screw and mandrel.

Figure 3 illustrates a sectional elevation view of the paring tool as viewed in the direction of section

plane 3-3 as shown in Figure 2.

Figure 4 illustrates a plan view of the paring tool as viewed in the direction of arrow 4 as shown in Figure 3.

5 Figure 5 shows a perspective view of a second type of paring tool, having a forwardly projecting integrally formed mandrel.

Figure 6 shows a side elevation view of the paring tool of Figure 5.

10 Figure 7 illustrates an end view of the paring tool as viewed in the direction of arrow 7 shown in Figure 6.

Figure 8 illustrates a sectional elevation view of the paring tool as viewed in the direction of section plane 8-8 as shown in Figure 6, and

15 Figure 9 illustrates a plan view of the paring tool as viewed in the direction of arrow 9 shown in Figure 7.

As illustrated in Figures 1 to 4, the paring tool comprises a cylindrical head portion 10, which has a central axis (i.e. an axis of rotation) 11 and two diametrically disposed cutter elements 12. The cutter elements 12 are formed integrally with the head portion 10 and they project forwardly of the head portion in a direction parallel to the axis 11.

20 The tool is formed from steel and is heat treated to a hardness of 57-60 R.C.

Each cutter element 12 has an arcuate cross-section and may be considered as a segmental portion of a cylinder having the diameter which is indicated by the chain-dotted circle 13 in Figure 3. Thus, the outer peripheral surface of each cutter element 12 has a radius of curvature r which is common to the two elements and which is centered on the axis 11. The inner surface 15 of each of the cutter elements is planar or, if required, it may be formed with a slight concavity.

35 With the cutter elements so shaped, a sharp

cutting edge 16 is formed along each margin of each cutter element 12. The cutting edges 16 are disposed parallel to each other and to the axis 11 for a major portion of their length.

5 The forwardmost end of each cutter element 12 is formed with a tapered (i.e. a chamfered) nose portion 17.

The radius r of the cutter elements 12 corresponds with the full radial depth of paring required to be performed by the tool, and the spacing d between the
10 cutter elements is slightly smaller than the inside diameter of a hose end which is to be enlarged by paring.

The paring tool described thus far may be used manually or may be coupled to a mechanical drive. In the latter case, the tool might be mounted to a
15 rotatable shaft which is coupled to a motor by way of reduction gearing, or it might be held captive in a lathe-type chuck for rotation with the chuck.

When used manually, the paring tool may be adapted in the manner shown in Figure 2. As so shown, the
20 paring tool is fitted with a pair of radially extending handles 18 and is fixed to a coaxial lead screw 19. The lead screw 19 projects forwardly of the body portion of the tool and it mates in screw threaded engagement with a mandrel 20 so that, when the mandrel 20 is clamped in
25 a fixed position and the paring tool is rotated in one direction or the other relative to the mandrel, the paring tool will advance toward or away from the mandrel.

Thus, as is shown in Figure 2 of the drawings, when it is required that the bore of a hose 21 be pared back
30 to the hose reinforcement 22, the mandrel 20 is pushed into the bore of the hose and the outer wall of the hose is clamped in a manner such that the mandrel is held captive in the bore. Then, the paring tool is rotated so that the lead screw 19 advances into and through the
35 mandrel 20 and the cutter elements 12 .

progressively pare the inner wall of the hose end. The tool is rotated and advanced until paring has been effected along a required length of the bore and, thereafter, the tool is backed-off, the clamping force on the mandrel is relieved, and the lead screw is withdrawn from the bore together with the mandrel.

Reference is now made to the paring tool which is illustrated in Figures 5 to 9, it being similar to that shown in Figures 1 to 4 but incorporating an integrally formed forwardly projecting mandrel.

As illustrated in Figures 5 to 9, the paring tool comprises a cylindrical head portion 25, having a central axis of rotation 26, two diametrically disposed cutter elements 27 and a forwardly projecting cylindrical mandrel 28. An axial bore 29 extends right through the tool.

The mandrel 28 has a diameter smaller than that of the remaining portion of the tool, and a tapered shoulder or chamfer 30 joins the cutter elements 27 to the mandrel. Also, diametrically disposed elongated slots 31 are formed in the wall of the tool and serve to provide the cutter elements 27 with sharp marginal cutting edges 32.

Due to the inclusion of the central bore 29 and the diametrically disposed slots 31, the cutter elements 27 have an arcuate cross section (as best seen from Figure 8) and each cutter element 27 may be considered as a segmental forward projection of the head portion 25. Thus, although different forming techniques may be employed in producing the respective types of tools shown in the drawings, it can be seen from a comparison of Figures 2 and 8 that the same end result is achieved in terms of shaping the cutter elements.

The paring tool as shown in Figures 5 to 9 may be coupled to a mechanical drive (e.g., be mounted in a lathe chuck) or be used manually. So that it may be used manually, an aperture 33 provided in the head

portion for receiving a handle of the type shown in Figure 2.

The mandrel 28 has a diameter which is slightly smaller than the (unpared) bore size of a hose which is to be pared and the mandrel acts as a pilot when advancing the tool into the hose bore. The cutter elements have an outside diameter equal to the required pared diameter of the hose.

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**CLAIMS**

1. A paring tool comprising a head portion having a longitudinally extending axis of rotation and at least one cutter element; characterised in that the or each
5 cutter element projects forwardly of the head portion in a direction parallel to the axis of rotation, the or each cutter element has an arcuate configuration in cross-section and the or each cutter element has at least one marginal cutting edge which extends parallel
10 to the axis of rotation.
2. The paring tool as claimed in claim 1 wherein two said cutter elements project forwardly of the head portion, the elements being diametrically disposed.
3. The paring tool as claimed in claim 2 wherein each
15 of the cutter elements comprises a segmental portion of a common cylinder.
4. The paring tool as claimed in claim 3, wherein the outer, arcuate, surface of each cutter element has a radial dimension equal to or less than a radial
20 dimension of the head portion.
5. The paring tool as claimed in any one of claims 2 to 4 wherein the forward end of each cutter element is formed with a tapered nose portion.
6. The paring tool as claimed in any one of claims 1 to
25 5 wherein an inner surface of the or each cutter element is planar.
7. The paring tool as claimed in any one of claims 2 to 5 wherein a forwardly projecting cylindrical mandrel is disposed about the axis of rotation and located ahead of
30 the cutter elements.
8. The paring tool as claimed in claim 7 wherein the mandrel is formed with an axial threaded bore and is carried by a lead screw which projects forwardly of the
35 cutter elements.



9. The paring tool as claimed in claim 7 wherein the mandrel is formed as an integral extension of the cutter elements but has an outside diameter smaller than the outside diameter of the cutter elements.

5 10. A paring tool substantially as shown in Figure 1 to 4 or 5 to 9 of the accompanying drawings and substantially as hereinbefore described with reference thereto.