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SPRING COLLET

It is well known that the operative working tools of machine tools, such as drills of drilling machinery or cutting tools of lathes, shaping- and milling machines require constant cooling when working on metal workpieces. Generally the cooling is effected by feeding a coolant, such as an aqueous soap solution or oil to the said tool. Many arrangements for feeding the coolant to the working tool have been proposed, some more and some less effective, but none being fully satisfactory, in view of certain technical difficulties inherent to the respective metal working processes. Especially, in the case of working tools held in spring collet chucks (such as generally employed for precision work) the cooling of the tool presented some difficulty.

It has been suggested to provide the respective tool with a through bore or more than one such bore and to direct the liquid coolant through the chuck and the collet to the hind end of the respective tool, i.e. to the inlet port of the said bore or bores, such that the coolant is made to flow through the tool and leave at the working end of the respective tool. Such an arrangement is illustrated schematically by Figs. 1 and 1a of the annexed drawings.

Here is shown a collet chuck generally indicated by the numeral 1 in the collet portion of which is held a cutting tool 4. As is conventional, the tool 4 is secured by a nut 3 screwing on jaws 6.

Throughout the length of tool 4 extend two bores 4'. Into the chuck 1 leads, at its rear end, a central opening 7 into the hollow interior of the chuck. The bores 4' of tool 4 communicate with the hollow space within the chuck.

5 Experience has shown that even with such an arrangement the cooling effect remains far from being satisfactory, since only a small part of the coolant flows into and through bores 4', while, inefficiently, the greater part escapes, flowing along the outside of tool 4
10 and leaving at the front end of collet 2. This is illustrated by Fig. 1, the coolant C flowing to a small part into bores 4' and mainly into the open at the annular gap A around the tool 4.

 According to the present invention a spring collet
15 comprises a ring of segments which are arranged to surround and hold a tool in a chuck; and a plurality of stoppers, each of which extends radially outwards in the gap between a respective pair of adjacent segments, to seal the gaps; the stoppers being positioned at different distances from
20 an end of the collet.

 The invention will be described now with reference to Figs. 2, 2a and 2b of the attached drawings, Fig. 2 being an axial section of a tool held in a collet chuck, Fig. 2a illustrating the collet (without whatever tool held
25 therein), Fig. 2b being a diametrical, sectional view of a collet with coolant retaining stoppers in place therein.

The chuck, generally indicated by numeral 10 is of conventional design, its rear end at 10' being in communication with a source of coolant which enters the internal cavity of chuck 10 at that end. As is customary, in the forward end of the
05 chuck 10 is provided a spring collet 20 comprising a number of segments 20'. On the chuck 10 - securing the collet - screws a nut 30. In the chuck is held a tool 40 (in the case shown a drill) which has two longitudinally extending, throughgoing bores 40'. Through the interstices between individual segments 20'
10 extend radially - relative to tool 40 cylindrical, resilient stoppers 50. As can be seen in Fig. 2a, these stoppers are set at different distances from the ends of collet 20, Advantageously, and in order to securely hold the stoppers 50 small, semi-circular incisions are made in the edges of the segments 20', the two
15 incisions in the edges of two vicinal segments 20' complementing to form a circular seat for a stopper 50.

The incisions are set at different distances from the end of collet 20 so as not to weaken the collet at that level. Furthermore, due to the fact that in most such collets the direction of the slots
20 alter from side to side alternatively the consequence is that the stoppers are at different distances from one of the ends of the collet.

The coolant is indicated in Fig. 2 by broken lines, showing that the flow of coolant stops at the radially positioned stoppers, forcing the flow into bores 40' exclusively. There is no coolant
25 emission, as experience has shown, at the frontal end of the chuck.

CLAIMS

1. A spring collet comprising a ring of segments which are arranged to surround and hold a tool in a chuck; and a plurality of stoppers, each of which extends radially outwards in the gap between a respective pair of adjacent segments, to seal the gaps; the stoppers being positioned at different distances from an end of the collet.
 2. A spring collet according to claim 1, wherein the stoppers are of elastic material.
 3. A spring collet according to claim 1 or claim 2, wherein each stopper is set in a seat having a circular cross section formed by two semi-circular incisions in edges of vicinal segments of the collet.
 4. A spring collet substantially as described with reference to figures 2, 2a and 2b of the accompanying drawings.
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