Sept. 15, 1970 J. L. JEANNERET 3,528,328

HYDRAULICALLY CONTROLLED TURRET

Filed Feb. 9, 1968

Fig: 1

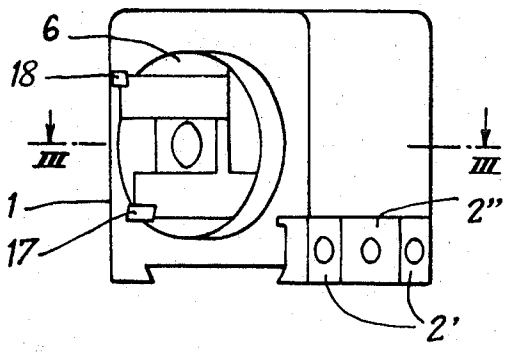


Fig: 2

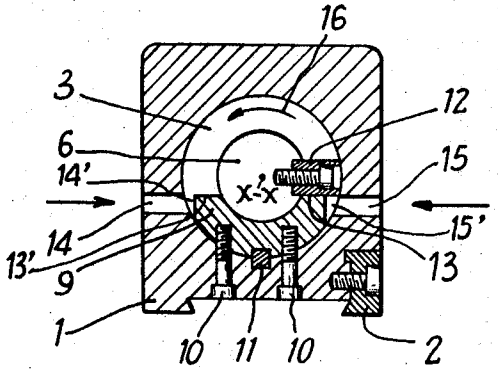
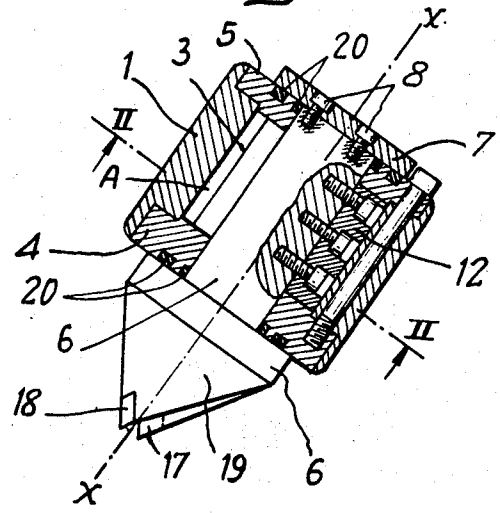


Fig: 3



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HYDRAULICALLY CONTROLLED TURRET

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ABSTRACT OF THE DISCLOSURE

In a lathe, a turret carrying two tools to be brought selectively into an operative position with reference to the work on the lathe as provided by the angular movement of a revolvable part rigid with said tools and shifted between two extreme positions for which the corresponding tool enters its operative position. Said tool-carrying part revolves inside a cylindrical chamber in which an arcuate bearing is provided for said part, the substantially radial terminal surfaces of which form abutment surfaces for a radial blade carried by the revolvable part and urged selectively by a hydraulic fluid towards said surfaces defining the corresponding extreme positions of the revolvable part.

My invention has for its object a turret carrying two tools adapted to be selectively brought into engagement with the work to be cut on a lathe, said tools being constituted by roughing out, finishing, truing or the like tools.

According to my invention, said tools are carried by the turret with the interposition of a rotary part adapted to be angularly shifted between two positions corresponding to the operative positions of said tools respectively, said turret being held in the position occupied by it by the pressure of a fluid acting on said part. In a preferred embodiment, said part carries inside a closed annular chamber a radial blade adapted to engage for each of said positions of the rotary part which are at 180° apart, corresponding stationary abutment surfaces in registry with each of which it is possible to subject the radial blade to a hydraulic pressure urging the latter towards the other abutment surface.

I have illustrated by way of example in the accompanying drawings said embodiment of the invention. In said drawings:

FIG. 1 is an elevational view of the turret seen at an angle of about 35°.

FIG. 2 is a vertical cross-section through line II—II of FIG. 3.

FIG. 3 is a horizontal axial cross-section of the turret through line III—III of FIG. 1.

As illustrated, the turret includes a shoe or block **1** the lower surface of which is provided with a dove-tail along which the turret is fitted as a whole on the slideway of a copying lathe, for instance through the agency of the corner clamp **2''** and lateral clamps **2'**.

Said shoe or block is also provided with a horizontal bore **3** the ends of which are closed by flanges **4** and **5** which are themselves provided with bores of a diameter less than that of the bore **3** in the block **3**. Inside said bores provided in the flanges coaxially with the bore **3** is revolvably fitted the part **6** the outer broader head of which extends over the flange **4** which carries removably the tool holder **19**. The tool holder illustrated carries two tools **17** and **18** in diametrically opposed relationship. Suitably positioned screws secure the flanges **4** and **5** on the block **1**. A washer or disc **7** is secured over the flange **5** by the screws **7** and forms a bearing surface for the end of the part **6** opposed to the tool holder. By reason of the difference in diameter between the bore **3** in the block and the outer periphery of the portion of the part **6** extending between the two flanges, said portion of the part **6** is surrounded by an annular chamber A the fluidtightness of which is ensured by packings **20** fitted on the one hand between the flange **4** and the head **6'** of the part **6** and the flange **5** and disc **7** on the other hand.

Two hydraulic pipes **14** and **15** open at two substantially diametrically opposed points of the chamber A so as to exert alternatingly a thrust on the blade **12** screwed radially to the other periphery of the part **6** extending throughout the axial length of the chamber A and engaging fluidtightly the wall of the bore **3** inside the block **1**. The angular shifting in either direction applied to the blade **12** and consequently to the part **6** is limited to 180° by abutment surfaces **13, 13'** constituted by the ends of a semi-annular insert **9** fitted inside the corresponding section of the annular chamber A and held therein by a key **11** engaging the inner periphery of the block **1** to which it is secured by the screws **20** illustrated in FIG. 2.

The abutment surfaces **13** and **13'** at the transverse ends of the insert **9** are illustrated in FIG. 2 as at substantially 180° with reference to each other. They are in fact coplanar in a plane parallel with a diametrical plane of the chamber A and extending slightly beyond a plane tangent to the hydraulic pipes **14** and **15** on the side facing the axis XX' of the turret block and nearer XX'. The transverse ends of the insert **9** are cut off adjacent their outer edges at **14'** and **15'** that is along the portion of the surface of the insert facing the wall of the bore **3** in registry with the outlets of the hydraulic pipes **14** and **15**. The latter open thus freely into the chamber A along the cut off edges **14'** and **15'** as soon as the closing blade **12** has disengaged the corresponding abutment **13'** or **13**.

A distributor controlled manually, electrically or otherwise is adapted to reverse the direction of the hydraulic circuit feeding the pipes **14** and **15**. Assuming the blade **12** is in the position illustrated in FIG. 2, which implies that one of the tools carried in a predetermined angular position by the part **6** with the interposition of the tool holder **19** is in its operative position, it is sufficient to make the hydraulic pressure act at **15–15'** so as to urge the blade away from the abutment surface **13** and to shift it in the direction of the arrow **16** until it engages the other abutment surface **13'** through its side facing away from the first-mentioned abutment surface. It should be remarked that the thickness of the blade **12** is equal to twice the distance separating the plane defined by the abutment surfaces **13–13'** from the axis XX' of the block **1** whereby the blade is constrained, as illustrated, to execute an angular shifting through accurately 180° at each operation. When the blade **12** has executed an angular movement through 180°, it is stopped by the opposite abutment surface **13'**, whereby the second tool is brought into its operative position and replaces the tool precedingly in said position. During this angular movement, the blade delivers the hydraulic liquid back towards the distributor along the cut off edge **13'** and through the pipe **14**.

The first tool can be brought again into its operative position now occupied by the second tool and to this end the fluid pressure is reversed so as to make the hydraulic fluid enter the annular chamber A through the pipe **14** so as to make the blade disengage the abutment surface **13'** and to return it into the position illustrated in FIG. 2.

It is thus apparent that the blade when held fast in either of its extreme positions by the mass of fluid delivered into the chamber A defines accurately the location of the cutting edges of the tools **17** and **18** secured to the removable tool holder **19**.

Obviously, the structural details described may be modified as desired within the scope of the accompanying claims. In particular, the relative position of the abut-

ment surfaces and of the hydraulic pipes depends on the relative position of the tools on the tool holder.

What I claim is:

1. In a lathe turret, the combination of a carrier block provided with a cylindrical chamber open at both ends, a part annular cylindrical insert rigidly secured coaxially in said chamber along a portion of the inner periphery thereof extending between the longitudinal edges of said insert, annular flanges secured over the transverse ends of the chamber and of the insert therein, a cylindrical member revolvably and coaxially carried by said part annular insert leaving a part annular gap between it and the inner surface of the chamber along its peripheral area extending between the longitudinal edges of the insert, a tool holder rigid with said cylindrical member and engaging the outer surface of one of said flanges, two tools carried by the tool holder and facing away from said one flange, a plate removably secured to the end of the cylindrical member opposed to the tool holder and engaging the outer surface of the other flange to prevent the cylindrical member and tool holder from moving longitudinally, an abutment rigid with the cylindrical member, along a generating line thereof dividing the part annular gap defined by the latter into two compartments and the opposite sides of which are adapted to enter selectively two terminal positions cooperating with the corresponding longitudinal edges of the insert to thereby define two angular positions for said cylindrical part, each of said angular positions defining the operative position of the corresponding tool, and a hydraulic circuit including two channels extending through the block and opening at points registering with the opposite ends of the part annular gap facing the longitudinal edges of the insert to allow a hydraulic liquid to be fed selectively into one channel and out of the other to impinge against the abutment when the latter is in its position engaging the longitudinal edge of the insert cooperating with said one channel to thereby urge said abutment away into its other position.

2. In a lathe turret, the combination claimed in claim 1 wherein the longitudinal edges of the insert lie substantially in a diametrical plane of the chamber.

3. In a lathe turret, the combination claimed in claim 1 wherein the hydraulic circuit channels open into the part annular gap through cut off sections of the outer periphery of the longitudinal edges of the insert.

4. In a lathe turret, the combination claimed in claim 1 wherein the abutment is desgined so that its radial plane of symmetry is shifted by 180° when it passes out of engagement with one longitudinal edge of the insert into engagement with the other longitudinal edge.

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