COUNTERBORE CUTTER FOR BOLTHOLES IN CONCRETE

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This invention relates to a rotary cutter mounted on a shaft journal in sliding bearing blocks in positioning discs and provided with means for actuating the bearing block to shift the axis of the shaft and thereby adjust the position of the cutter whereby with the shaft having the cutter thereon positioned in a bolt hole in a concrete wall or foundation the axis of the shaft is moved from the center toward one side of the hole so that the cutter cuts an enlarged annular recess or counterbore in the wall of the bolt hole.

The purpose of this invention is to provide means for forming an enlarged area in previously drilled holes for anchor bolts in concrete walls, foundations, and the like whereby an anchor bolt may be positively secured in the hole.

In the conventional method of setting machinery on concrete foundations and also in attaching elements to concrete walls round bolt holes are drilled into the concrete and expansion bolts are expanded therein. By this method a gripping element of the expansion bolt bears against the inner peripheral surface of the bolt hole and with continuous vibration anchor bolts set in this manner work loose. With this thought in mind this invention contemplates a tool for forming a continuous annular recess or enlarged opening in the inner part of a bolt hole formed in preset concrete and the like.

The object of this invention is to provide means for mounting a rotary cutter in a bolt hole whereby the cutter is moved from the center of the hole in order to cut a counterbore of recess in the material around the hole.

Another object of the invention is to provide a bolt hole counterbore forming tool that may be actuated by a conventional portable drill or the like.

A further object of the invention is to provide a bolt hole counterbore forming tool which is of a simple and economical construction.

With these and other objects and advantages in view the invention embodies a rotary cutter of the type suitable for cutting concrete, mounted on a shaft with bearings on the shaft sidewise mounted in discs and with the outer end of the shaft mounted in a bearing having positioning means thereon and also having actuating means therein for shifting the axis of the shaft and cutter in the mounting discs.

Other features and advantages of the invention will appear from the following description taken in connection with the drawings wherein:

Figure 1 is a side elevational view of the counterbore cutter showing the device installed in a bolt hole with the concrete slab in which the hole is positioned shown in section.

Figure 2 is a similar view showing the mounting elements of the shaft in section and with the shaft and cutter positioned in the center of the hole.

Figure 3 is a similar view showing the shaft and cutter actuated to one side of the center in which position the rotary cutter cuts the counterbore in the hole.

Figure 4 is a sectional plan taken on line 4—4 of Figure 3 looking downwardly upon the end of the device.

Figure 5 is a cross section through one of the mounting discs with the parts in the position shown in Figures 1 and 2.

Figure 6 is a similar section taken on line 6—6 of Figure 3 showing the parts offset with the cutter in the cutting position.

Figure 7 is a vertical section through one of the mounting discs taken on line 7—7 of Figure 5.

Referring now to the drawings wherein like reference characters denote corresponding parts of the bolt hole counterboring machine of this invention includes a shaft 10 having a cutter 11 secured on the end thereof by a nut 12 and having a collar 13 on the upper end whereby a portable drill or other similar device may be attached to the shaft for rotating the same.

The shaft 10 is journaled in bearing blocks 14 and 15 that are slidably mounted in sections 16 and 17 of positioning discs, and the discs are provided with caps 18 and 19, respectively. The caps are secured to the sections 16 and 17 of the discs by bolts 20 and the cap 18 is provided with a chamber 21 having a cylindrical opening 22 in the inner side thereof with a similar chamber 23 in the cap 19 and the chamber 23 is also provided with a cylindrical opening 24.

The bearing 14 is slidably mounted in slots 25 and 26 in the disc 16 and the bearing is provided with a cylindrical stem 27 that extends into the cylindrical opening 22, providing a piston whereby fluid under pressure in the chamber 21 forces the piston and the bearing from which it extends to the opposite end of the opening 28 in which the bearing block is slidably mounted, thereby compressing the spring 29 in the recess 30.

The bearing block 15 which is slidably mounted in similar slots 31 and 32 in the disc 17 is also provided with a stem 33 that extends into the cylindrical opening 24 providing a piston and pressure in the chamber 23 forces the piston and block 15 forward to the position shown in Figure 6 with the spring 34 in the opening 35 compressed.

The chambers 21 and 23 of the caps 18 and 19 are connected by a tubular stem 36 and the upper end 37 of the stem extends to the lower end of a cylindrical guide 38 in which a cylinder 39 with a piston 40 is positioned. The piston extends upwardly through a packing gland 42 and a handle 43 is provided on the outer end by which the piston may be
3 reciprocated to pump fluid under pressure through the tubes 27 and 36 to the chambers 21 and 23, respectively. By forcing the piston 46 downwardly by the handle 43 the pressure of fluid in the chambers 21 and 23 is increased whereby the pistons 27 and 33 move the bearing blocks 14 and 16 to the position shown in Figure 6 wherein the cutter 11 is held in the position shown in Figure 3 so that as the shaft or pin is rotated the cutter is actuated to form a counterbore in the wall 44 of a bolt hole or opening 45.

The cylindrical guide 38 is provided with an elongated slot 48 through which the shaft 10 extends, as shown in Figure 4 and the guide may be provided with an arm 47 through which the shaft and mounting disc may be rotated in the bolt holes to carry the cutter around through an angle of 360 degrees.

The arm 47 of the guide 38 is provided with an indexing finger 48 that may be set by a set screw 45 to position the cutter 11 in the bolt hole.

It will be understood that modifications may be made in the design and arrangement of the parts without departing from the spirit of the invention.

What is claimed is:

1. A counterbore forming tool comprising a rotary cutter, a shaft on which the rotary cutter is mounted, bearing blocks positioned around the shaft and in which the shaft is journaled, mounting discs positioned in planes perpendicular to the axis of the shaft and in which the bearing blocks are slidable mounted, means shifting the position of the bearing blocks in the mounting discs whereby the centers of the bearing blocks are eccentrically positioned in relation to the discs, and means rotating the said mounting discs.

2. A counterbore forming tool comprising a rotary cutter, a shaft on which the rotary cutter is mounted, bearing blocks positioned around the shaft and in which the shaft is journaled, mounting discs positioned in planes perpendicular to the axis of the shaft and in which the bearing blocks are slidable mounted, a guide cylinder aligned with the mounting disc and through which the shaft extends, positioning means on the guide cylinder, means incorporated in the guide cylinder for shifting the bearing blocks in the discs whereby the centers of the bearing blocks are eccentrically positioned in relation to the discs, and means connecting the operating means of the guide cylinder to the discs.

3. In a counterbore forming tool for expansion bolt holes in concrete, the combination which comprises a rotary cutter, a shaft on which the rotary cutter is mounted, bearing blocks positioned around the shaft and in which the shaft is journaled, mounting discs positioned in planes perpendicular to the axis of the shaft and having hydraulic cylinders therein in which the bearing blocks are slidable mounted, said bearing blocks having cylindrical elements on the ends providing pistons and said pistons positioned in the cylinders of the discs, a guide cylinder having an elongated slot therein through which the shaft extends, said guide cylinder having a hydraulic cylinder with a plunger therein positioned in one side thereof, means connecting the hydraulic cylinder of the guide cylinder to the cylinders of the discs whereby fluid under pressure is supplied to the cylinders in the discs for moving the shaft to eccentrically position the shaft in the discs, and positioning means carried by the said guide cylinder.

4. In a counterbore forming tool for expansion bolt holes in concrete, the combination which comprises a rotary cutter, a shaft on which the rotary cutter is mounted, bearing blocks positioned around the shaft and in which the shaft is journaled, mounting discs positioned in planes perpendicular to the axis of the shaft and having hydraulic cylinders therein in which the bearing blocks are slidable mounted, said bearing blocks having cylindrical elements on the ends providing pistons and said pistons positioned in the cylinders of the discs, a guide cylinder having an elongated slot therein through which the shaft extends, said guide cylinder having a hydraulic cylinder with a plunger therein positioned in one side thereof, means connecting the hydraulic cylinder of the guide cylinder to the cylinders of the discs whereby fluid under pressure is supplied to the cylinders in the discs for moving the shaft to eccentrically position the shaft in the discs, and positioning means carried by the said guide cylinder.

5. In a counterbore forming tool for expansion bolt holes in concrete, the combination which comprises a rotary cutter, a shaft on which the rotary cutter is mounted, bearing blocks positioned around the shaft and in which the shaft is journaled, mounting discs positioned in planes perpendicular to the axis of the shaft and having hydraulic cylinders therein in which the bearing blocks are slidable mounted, said bearing blocks having cylindrical elements on the ends providing pistons and said pistons positioned in the cylinders of the discs, a guide cylinder having an elongated slot therein through which the shaft extends, said guide cylinder having a hydraulic cylinder with a plunger therein positioned in one side thereof, means connecting the hydraulic cylinder of the guide cylinder to the cylinders of the discs whereby fluid under pressure is supplied to the cylinders in the discs for moving the shaft to eccentrically position the shaft in the discs, and positioning means carried by the said guide cylinder.

6. In a counterbore forming tool for expansion bolt holes in concrete, the combination which comprises a rotary cutter, a shaft on which the rotary cutter is mounted, bearing blocks positioned around the shaft and in which the shaft is journaled, mounting discs positioned in planes perpendicular to the axis of the shaft and having hydraulic cylinders therein in which the bearing blocks are slidable mounted, said bearing blocks having cylindrical elements on the ends providing pistons and said pistons positioned in the cylinders of the discs, a guide cylinder having an elongated slot therein through which the shaft extends, said guide cylinder having a hydraulic cylinder with a plunger therein positioned in one side thereof, means connecting the hydraulic cylinder of the guide cylinder to the cylinders of the discs whereby fluid under pressure is supplied to the cylinders in the discs for moving the shaft to eccentrically position the shaft in the discs, and positioning means carried by the said guide cylinder.

7. In a counterbore forming tool for expansion bolt holes in concrete, the combination which comprises a rotary cutter, a shaft on which the rotary cutter is mounted, bearing blocks positioned around the shaft and in which the shaft is journaled, mounting discs positioned in planes perpendicular to the axis of the shaft and having hydraulic cylinders therein in which the bearing blocks are slidable mounted, said bearing blocks having cylindrical elements on the ends providing pistons and said pistons positioned in the cylinders of the discs, a guide cylinder having an elongated slot therein through which the shaft extends, said guide cylinder having a hydraulic cylinder with a plunger therein positioned in one side thereof, means connecting the hydraulic cylinder of the guide cylinder to the cylinders of the discs whereby fluid under pressure is supplied to the cylinders in the discs for moving the shaft to eccentrically position the shaft in the discs, and positioning means carried by the said guide cylinder.

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