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Bingham

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[54] **CUTTING UNIT FOR USE ON ROCK BORING MACHINES**

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[51] **Int. Cl.** **E21b 9/12,** E21c 13/12

[58] **Field of Search** 175/344–348, 175/361, 363, 364, 371–373; 308/8.2

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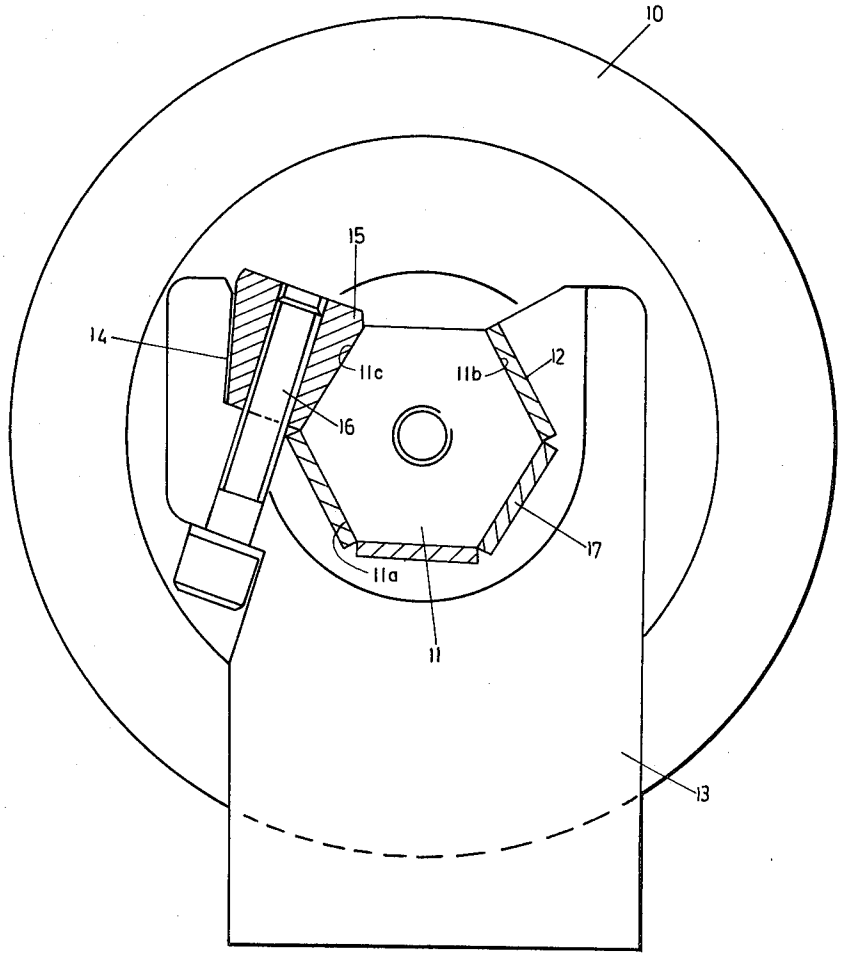
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[57] **ABSTRACT**

A rock-boring machine of the type comprising rotatable headplate having a plurality of cutting units mounted on the front face of the headplate. Each cutting unit includes a cutter journalled for rotation on a shaft. The ends of the shaft are hexagonal in cross-section and are supported in complementally-slotted saddles to prevent rotation of the shaft in the saddles. The shaft is locked in the saddles by means of a single locking member at each end of the shaft. Each locking member is secured to a saddle and is adapted to bear against one of the surfaces of the hexagonal ends of the shaft.

3 Claims, 2 Drawing Figures



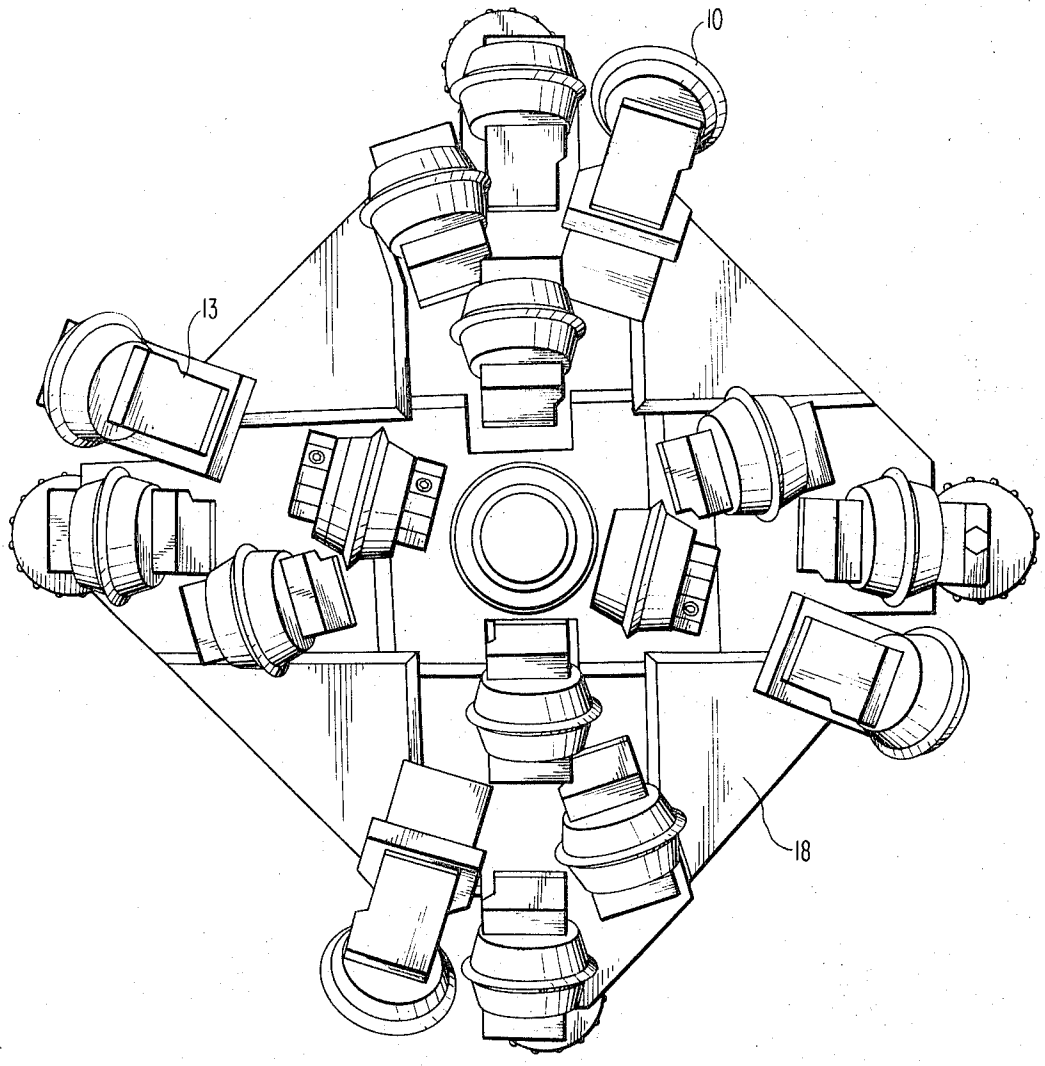


FIG. 1

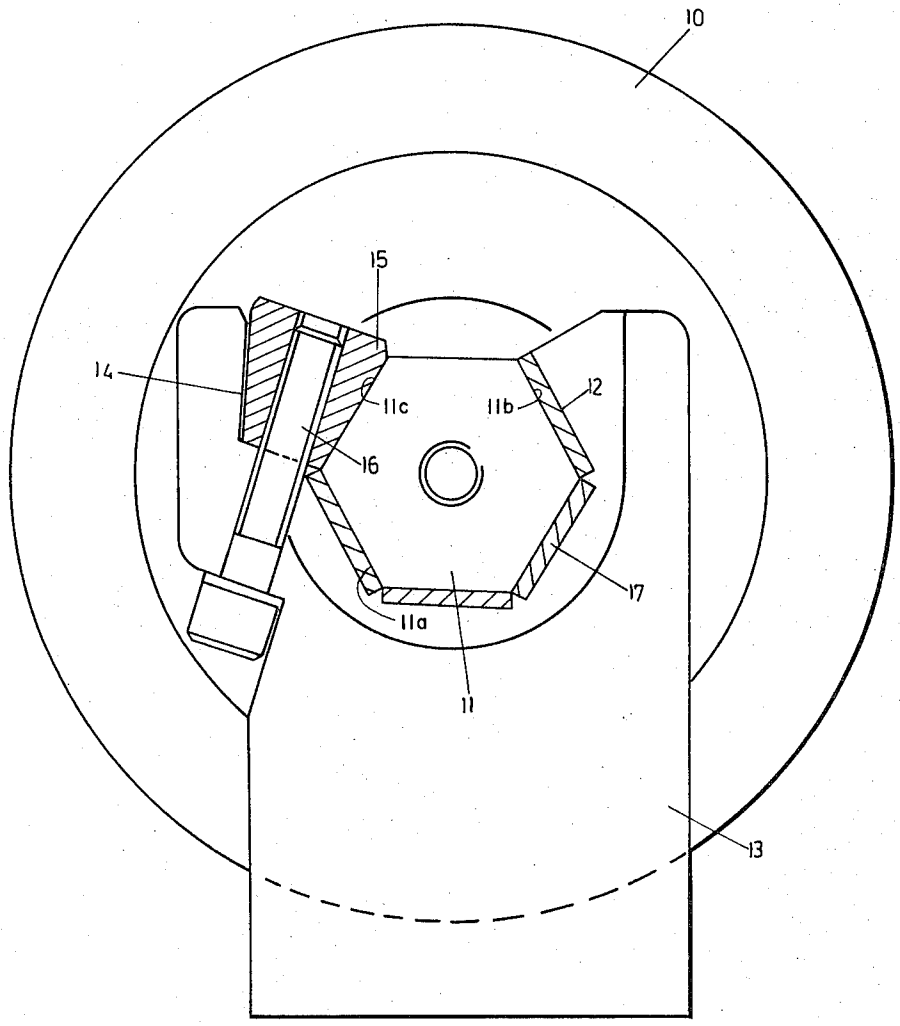


FIG. 2

CUTTING UNIT FOR USE ON ROCK BORING MACHINES

THIS invention relates broadly to rock-boring machines in which a plurality of cutting units are mounted on the front face of a rotatable headplate.

In conventional rock-boring machines each cutting unit comprises a base which is adapted to be secured to the headplate, a bearing shaft mounted on the base and a cutter journalled for rotation on the bearing shaft.

In one known form of cutting unit the bearing shaft is cylindrical and each of the ends thereof lies in an upwardly-open semi-circular saddle integral with the base. Each of the shaft ends is provided with two downwardly diverging flats which terminate immediately above the saddle. A recess is formed in the upper portion of the base on each side of each of the saddles. A clamping block is adapted to be located in each of the recesses i.e., two clamping blocks are required per saddle. The clamping blocks are provided with flat faces which are adapted to bear against the flats on the shaft ends and the sides of the recesses and thus serve to secure the shaft in the saddles. Each of the clamping blocks is adapted to be secured in position by means of a countersunk bolt which passes through the block and engages with the base. When it is required to remove the cutter from the cutting unit, the clamping blocks are simply removed and the cutter and shaft are lifted out of the saddles.

It is an object of the present invention to provide a cutting unit of the type described above in which the cutter and its shaft are mounted on the base in a new and improved manner.

According to the invention each end of each bearing shaft is provided with first and second diametrically opposed and parallel flats and a third flat adjacent the first flat and subtending therewith an obtuse angle, each saddle has a complemental cross-sectional shape for receiving an end of a bearing shaft, and each end of each bearing shaft is secured in its respective saddle by a single clamping block bearing against the third flat of that shaft end.

In a preferred form of the invention the ends of the bearing shafts are hexagonal in cross-section to provide the first, second and third flats.

To illustrate the invention en embodiment thereof is described hereunder with reference to the accompanying drawings, in which

FIG. 1 is an axial view of a rotatable headplate of a rock boring machine comprising the environment of the present invention and,

FIG. 2 is a sectional end elevation of a cutting unit according to the invention with parts sectioned.

In the drawings the cutting unit comprises a cutter **10** journalled for rotation on a bearing shaft **11** which, in turn, is supported (at each end thereof) in a saddle **12** formed in the upper section of a base **13.** A plurality of such cutting units are mounted on the front of a rotatable headplate **18** by securing the bases thereof to the headplate.

Each end of the bearing shaft **11** is hexagonal in cross-section and is arranged to lie in its saddle with two of its flats horizontal. At least a first flat **11***a* and a second flat **11***b* are diametrically opposed and parallel to each other. Each saddle **12** is complemental in cross-section to the shaft end in that it is partially hexagonally-shaped. In other words, the saddle, in cross-section, has four adjoining flats. It is open at its upper end along one of the remaining flats of the hexagon and a recess **14** is formed in the upper portion of the base adjacent the remaining flat of the hexagon. A clamping block **15** is adapted to be located in the recess **14** and secured therein by means of a bolt **16.** Bushings **17** are arranged around the inside of the saddle.

In use, the bearing shaft **11** and its associated cutter **10** are located in the saddles **12** as indicated in the drawing. A clamping block **15** is then located in each of the recesses **14** so that one flat on the clamping block rests against a third flat **11***c* of the hexagonal bearing shaft, flat **11***c* subtending an obtuse angle with flat **11***a*. The clamping blocks are then bolted to the base **13.**

It is a feature of the invention that only one clamping block is required per saddle as the complemental cross-sectional shape of the saddle also serves to hold the shaft in the saddle.

When it is required to remove the cutter and its shaft from the saddles the clamping blocks are simply removed and the shaft is lifted out of the saddles.

I claim:

1. A rock-boring machine of the type comprising a rotatable headplate, a plurality of cutting units mounted on the front face of the headplate, each cutting unit comprising a base, a bearing shaft supported in suitable saddle structures mounted on the base, and a cutter mounted for rotation on the bearing shaft characterized in that each end of each bearing shaft is provided with at least first and second diametrically opposed and parallel flats and a third flat adjacent the first flat and subtending therewith an obtuse angle, each saddle has a complemental cross-sectional shape for receiving an end of a bearing shaft, and in that each end of each bearing shaft is secured in its respect saddle by a single clamping block bearing against the third flat of that shaft end.

2. A rock-boring machine as claimed in claim **1** characterised in that each clamping block is adapted to be secured to its respective saddle.

3. A rock-boring machine as claimed in claim **1** characterised in that the ends of the bearing shafts are hexagonal in cross-section to provide the first, second and third flats.

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