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PILOT BIT

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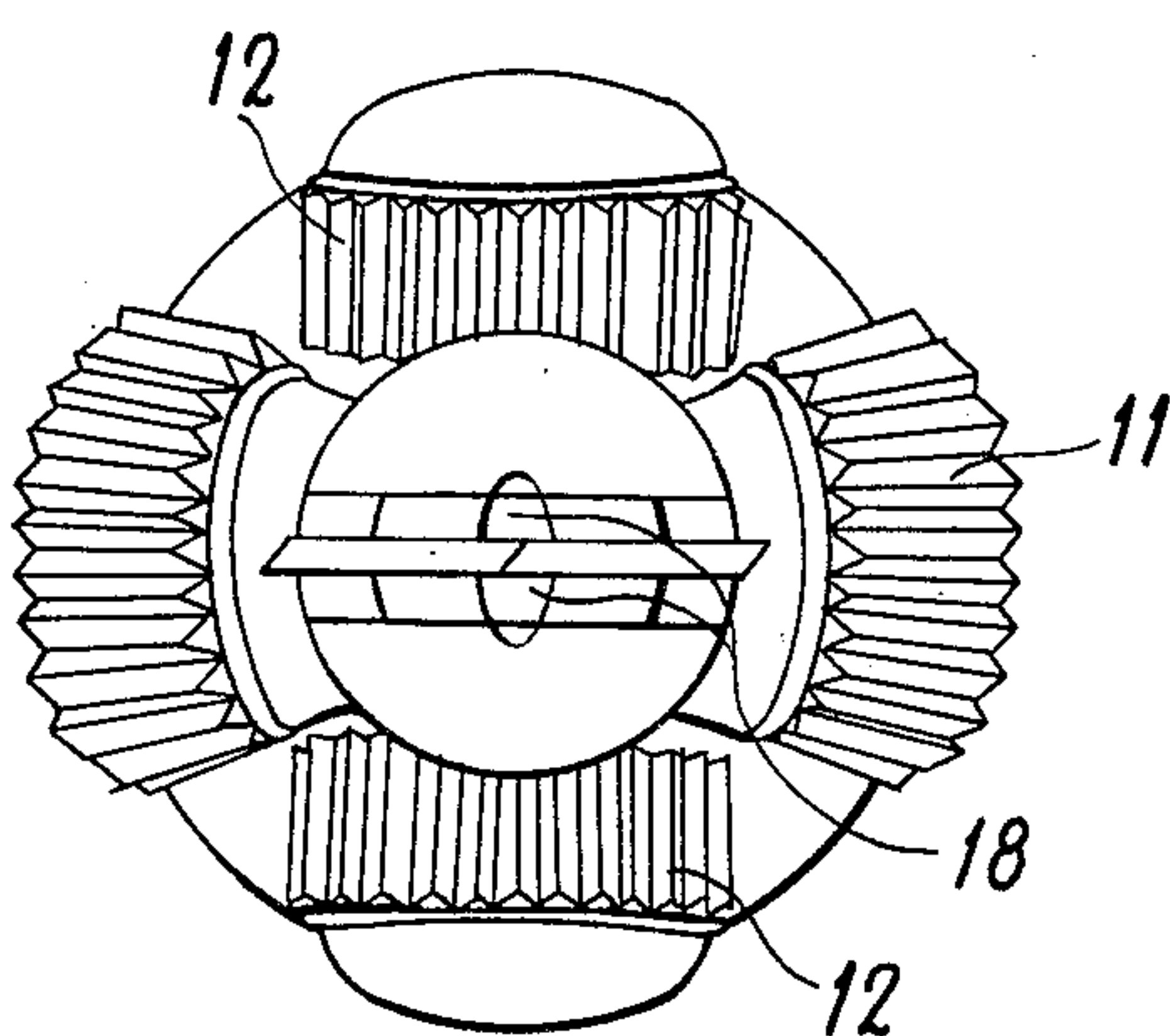


Fig. 2

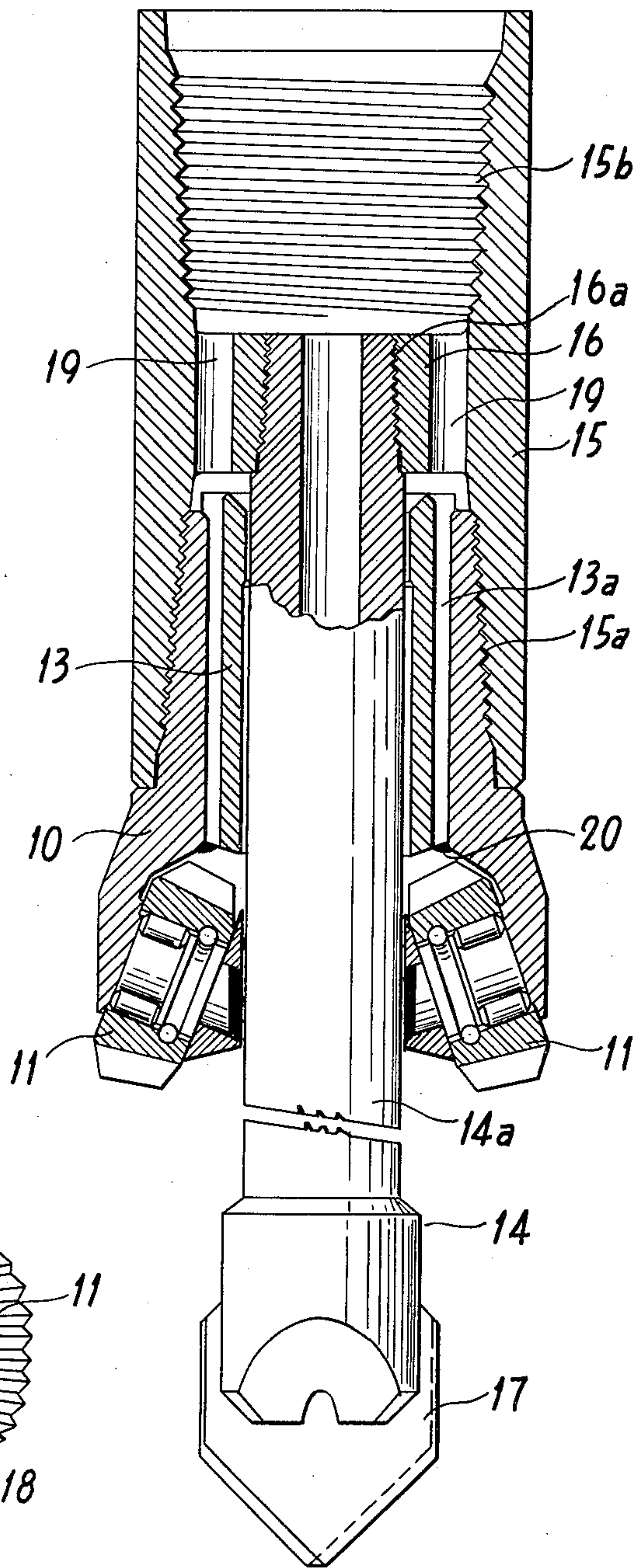


Fig. 1

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PILOT BIT

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2 Claims. (Cl. 255—72)

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This invention relates to pilot bits and refers more particularly to an adapter sub usable in mounting a stinger in operable relation with a conventional core bit to make up a pilot bit and to the bit thus formed.

In certain drilling operations, due to certain types of formations or other drilling conditions, well known to those skilled in the well drilling art, the use of a pilot bit is desirable either to facilitate drilling of a straight bore or to speed up the drilling operation. Special bits have been provided for this purpose, such as shown in United States Patent No. 1,399,863 filed December 13, 1921, but these bits are expensive and have a limited use. It is desirable to modify another conventional bit so that it is able to function as a pilot bit in addition to the function for which it was manufactured.

An object of this invention is to provide a pilot bit made up in part by a conventional core bit.

Another object is to provide an adapter sub by means of which a stinger may be mounted in operable relation with a conventional core bit.

A further object is to provide an adapter sub and stinger combination usable in conjunction with a conventional core bit to make up a pilot bit.

Yet another object is to provide an adapter sub by means of which a stinger may be mounted in operable relation with a core bit to provide a pilot bit.

Other and further objects of this invention will appear from the following description.

In the accompanying drawings which form a part of the instant specification and which are to be read in conjunction therewith and wherein like reference numerals are used to indicate like parts in the various views;

Fig. 1 is a vertical sectional view through a pilot bit embodying this invention; and

Fig. 2 is a bottom plan view of the bit shown in Fig. 1.

Referring to the drawings, the numeral 10 designates a conventional core bit of the roller cutter type. The cutters on the bit shown are arranged in two pairs, cutters 11 being disposed at an angle to cut the outside of a hole, and cutters 12 are adapted to cut about and form the core. It is to be understood that the cutter type core bit is shown by way of illustration and not by way of limitation and that a drag type core bit may be used in a similar manner. In the drawings the bit is shown with the core barrel removed from the usual guide support 13, which in normal operations supports and guides the core barrel, but

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serves in this invention as a guide support for the shank 14a of stinger 14.

A tubular coupling member or adapter sub 15 is provided as a means for mounting a stinger in operative relation with the core bit. The sub has threaded fittings 15a and 15b at its ends, respectively, and is adapted to couple the core bit to the lower end of a drill stem not shown in the drawings. Usually the threaded box 15b will receive the lower end of a drill collar, not shown, which customarily constitutes the lower end of the drill stem.

Sub 15 has formed therein a bridge 16 having a threaded central opening 16a adapted to removably receive the shank 14a of stinger 14. The stinger shank extends through the guide support 13 of the bit and axially through the bit body. The stinger is fabricated with a somewhat longer shank than heretofore to provide proper spacing of the stinger cutter 17 from the cutter elements of the core bit. Cutter 17 is shown as a blade but roller cutters may be used. The stinger shank 14 has a central passage to provide for flow of drilling fluid upon cutter blade 17, the fluid being played directly over the surface of the blade through ports 18 best shown in Fig. 2.

In order that drilling fluid may be played upon the cutter elements, roller cutters 11 and 12 in the embodiment of the drawings, flow passages 19 are provided in bridge 16 of the sub to provide for flow of drilling fluid past the bridge. The guide support 13 has grooves 13a in its outer periphery, through which drilling fluid flows and plays upon the cutters. It will be understood that the guide support is held within the bit body by abutment of the tapered shoulders at the upper end of the body and support and by welding material as shown at 20.

It is thought that the assembly of the pilot bit is apparent from its simplicity and the foregoing description. In making up a pilot bit, which operation can be performed in the field in accordance with this invention, the core barrel is first removed from a core bit and the core bit is threadedly secured to the fitting 15a of the adapter sub 15. The stinger shank 14 is then inserted axially through the bit extending through the central passage of the guide support and threaded into the central opening 16a of bridge 16. This completes the assembly of the pilot bit which may then be connected to the lower end of a drill collar or other drill stem fitting and lowered within a well bore.

When in the course of drilling a well bore it becomes desirable to use a pilot bit, a conven-

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tional core bit may be quickly and readily transformed into the pilot bit in the manner outlined above. This bit may then be lowered into the well bore on the lower end of a drill stem in accordance with usual rotary drilling operations. When the use of the bit as a pilot bit is no longer required the bit may be withdrawn from the well bore by withdrawing the drill stem according to the usual practice and the assembly including sub 15, bit 10 and the stinger may be removed from the drill stem. If it again becomes desirable to use the bit 10 in a core bit assembly, stinger shank 14a is rotated to remove the stinger from its connection with bridge 16 and the stinger is withdrawn from the assembly. Bit 10 may then be readily removed from sub 15 and a core barrel may then be inserted within guide support 13 and the reassembled core bit unit is then ready for use in conventional core drilling operations.

It will be seen that the objects of this invention have been accomplished. There has been provided a pilot bit which may be readily made up from a core bit. The means for mounting the stinger in operative relation with the core bit to provide a pilot bit is such that the operation may be carried out under field conditions. The construction is such that the pilot bit may be readily broken down and the core bit reassembled. The adapter sub which makes this possible may be economically manufactured and is of great utility in drilling operations as it makes possible a dual use of the usual core bit.

From the foregoing it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth, together with other advantages which are obvious and which are inherent to the structure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

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Having described my invention, I claim:

1. In combination a tubular sub having a fitting at one end adapted to receive the lower end of a drill stem, a core bit having cutters and also having a bore, the bit secured to the other end of the sub, a stinger guide support with a central passage therethrough extending through the bore of the bit, flow passages in the guide support radially of the central passage for playing drilling fluid upon the core bit cutters, a bridge extending across the bore of the sub adjacent the connection between the sub and bit, a stinger having its upper end threaded into the bridge and extending axially through the guide support, and passages establishing communication between the upper and lower sides of the bridge.

2. In combination, a relatively short sub adapted to be connected with a core bit and having an axial bore, a tubular guide member disposed axially within the core bit, a transverse bridge element extending across the bore of the sub and disposed in close proximity to the upper end of the bit and having an axial threaded opening, and an elongate stinger having its upper end threaded into the opening in the bridge and extending downwardly through the tubular guide member, within the bit and having its lower end projecting in a plane a considerable distance in advance of the core bit, said bridge element having passages extending therethrough for establishing communication between the area above said bridge and the area therebelow.

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