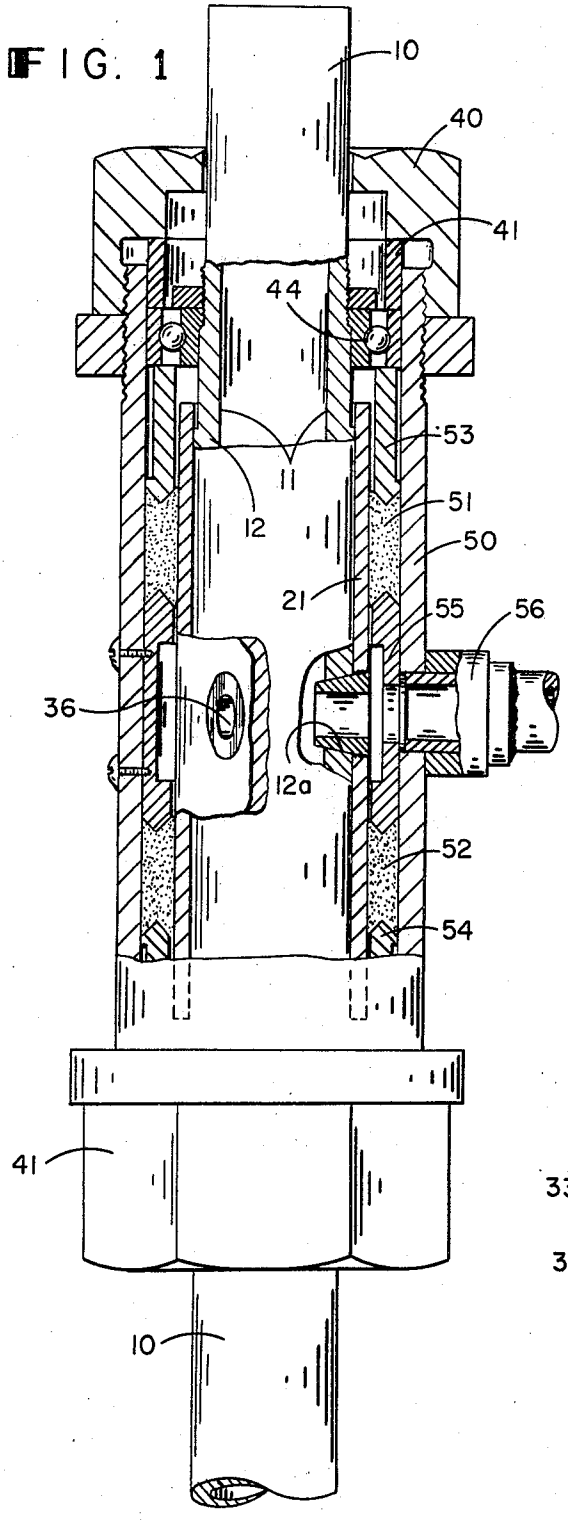
Jan. 27, 1970 T. J. HOLLAND 3,492,025

REPLACEABLE SLEEVE FOR ROTARY DRILL SWIVEL

Filed Nov. 14, 1968

FIG. 1



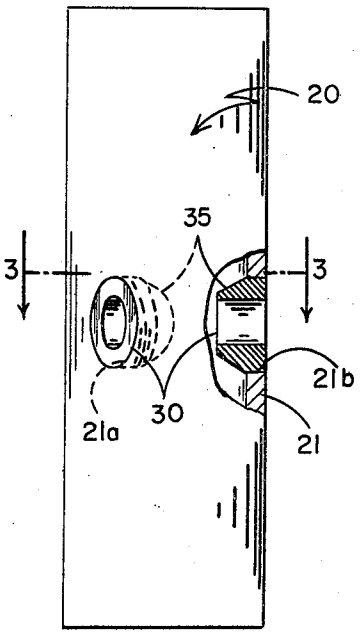


FIG. 2

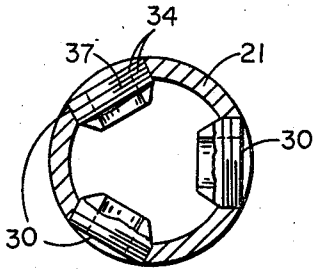


FIG. 3

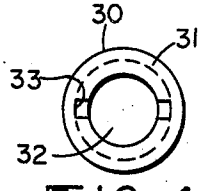


FIG. 4



FIG. 5

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REPLACEABLE SLEEVE FOR ROTARY DRILL SWIVEL

Thomas J. Holland, R.F.D. 1, E. Bare Hill Road, Harvard, Mass. 01451

Continuation-in-part of application Ser. No. 601,165, Dec. 12, 1966. This application Nov. 14, 1968, Ser. No. 775,714

Int. Cl. F16l 55/18

U.S. Cl. 285—16 2 Claims

ABSTRACT OF THE DISCLOSURE

A new type of swivel is described for a rotary drill used for test borings and in drilling for water or oil. The swivel includes an easily replaceable wearing sleeve supported on the drill pipe section by tubular plugs which conduct fluid from an exterior supply into the pipe.

This invention relates to a drill for boring a hole into the earth, as for example, to drill a deep hole for making a test boring or finding water or oil. In particular, this invention relates to a high speed rotary drill wherein drilling fluids are pumped into the drilling pipe through a swivel.

CROSS REFERENCE

This application is a continuation-in-part of application Ser. No. 601,165 filed Dec. 12, 1966, and now abandoned.

BACKGROUND OF INVENTION

High speed rotary drills have been widely used wherein the drililng pipe (a hollow shaft) is connected by a swivel to a supply of drilling fluid under pressure. Because of the great forces, abrasive contaminants in the fluids, and high speeds, the pipe section incorporating the swivel undergoes rapid deterioration and must be frequently replaced, resulting in great expense and consumption of time.

One object of this invention is to provide a rotary drill swivel capable of being operated at high speed with high pressure abrasive slurries. A further object of this invention is to provide such a swivel having an easily replaceable wearing portion.

Other objects and advantages of this invention will be aparent from the specification and claims which follow, taken together with the drawings.

SUMMARY OF INVENTION

The invention comprises in its most general sense a drilling pipe section surrounded by a co-axial wearing sleeve suported on the pipe section by tubular plugs which seat in orifices in the pipe and thread into orifices in the sleeve. The pipe section and sleeve are rotatable as a unit. Surrounding the pipe sleeve is a fixed, co-axial outer member having an orifice connecting an exterior supply of drilling fluid with the pipe sleeve orifices. Sealing is provided, preferably by perforated end caps threading onto the outer member and packing. The packing can be replaced at intervals as required. When the abrasives in the fluids have worn the sleeve so that repacking will no longer provide an adequate seal, the sleeve can then be replaced separately. It is necessary only to unscrew the end caps and replace the sleeve, and fresh packing, instead of replacing the entire assembly as done in prior devices.

The surface on which the packing rides is not commonly hardened in prior art devices. This is because the hardening process often causes distortion in the finished piece. The sleeve of the present invention can be hardened because its geometry is not complete and because the final operation of grinding can be done after hardening and the effects of distortion are minimized.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a view of the swivel mounted on the drilling pipe with partial section and cutaway.

FIG. 2 is an elevation of the replaceable sleeve of the swivel showing holding of the tapered tubular plugs.

FIG. 3 is a section along line 3—3 of FIG. 2.

FIG. 4 is a plan view of a tapered tubular plug; and

FIG. 5 is an elevation of a tapered tubular plug.

SPECIFIC EXAMPLE OF INVENTION

Referring now to the drawings, the drilling pipe or hollow driving shaft **10** has a wall **12** and an inner hole space **11**. Three tapered openings **12***a* are provided in the wall **12** to permit seating of the registering portions of tubular tapered plugs **30**, **36** and **37**. The plugs are themselves supported by being threaded into threaded orifices **21***a*, *b* and *c* in the wall **21** of the hollow cylindrical co-axial wearing sleeve **20**. Each plug has a threaded portion **34** and a tapered portion **35** to engage the orifice of wall **21** and seating in the tapered orifice of wall **12**. Each plug has ears **33** for engagement of a tool, and a hollow tubular space **32**. After the plugs are seated and threaded they are aligned with the co-axial chamber formed by co-axial member **55** spaced within the fixed co-axial outer shell **50** and has an opening connecting to the fluid inlet pipe **56**. A hose, not illustrated, connects inlet pipe **56** to a pump and supply of drilling fluid, as for example, abrasive drilling mud or slurry at 300 p.s.i.

The shaft **10** and sleeve **21**, being held together by the threaded tapered plugs **30**, **36** and **37** are rotatable as a unit within the outer shell **50**. Packing means **51** (**52**) provided between sleeve **21** and shell **50** is held in position by perforated end cap **40** (**41**) threaded onto the end of shell **50** in conjunction with annular steel compression ring **42**, bearing assembly **44**, and annular steel compression ring **53** (**54**).

I claim:

1. The unitary, rotatable combination adapted for use as a rotary drill swivel and comprising:

(a) a drilling pipe member having at least one lateral orifice; said orifice being defined by wall portions of said pipe member;

(b) a tubular, open-end member having a registering portion seated against the wall portions defining said pipe member orifice and having an outer portion with external threads;

(c) a replaceable co-axial wearing sleeve surrounding a portion of said pipe member and having wall means defining a lateral orifice therein provided with threading engaged with said external threads of said tubular member;

(d) a fixed co-axial outer member having an orifice providing connection between said tubular member and an exterior fluid supply; and

(e) sealing means between said outer member and said sleeve; said combination of pipe member, tu-

bular member and sleeev being rotatable within said outer member.

2. The device of claim 1, wherein the sealing means includes compression and packing means held in position by perforated end caps attachable to said outer member.

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REINALDO P. MACHADO, Primary Examiner

D. W. AROLA, Assistant Examiner

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