

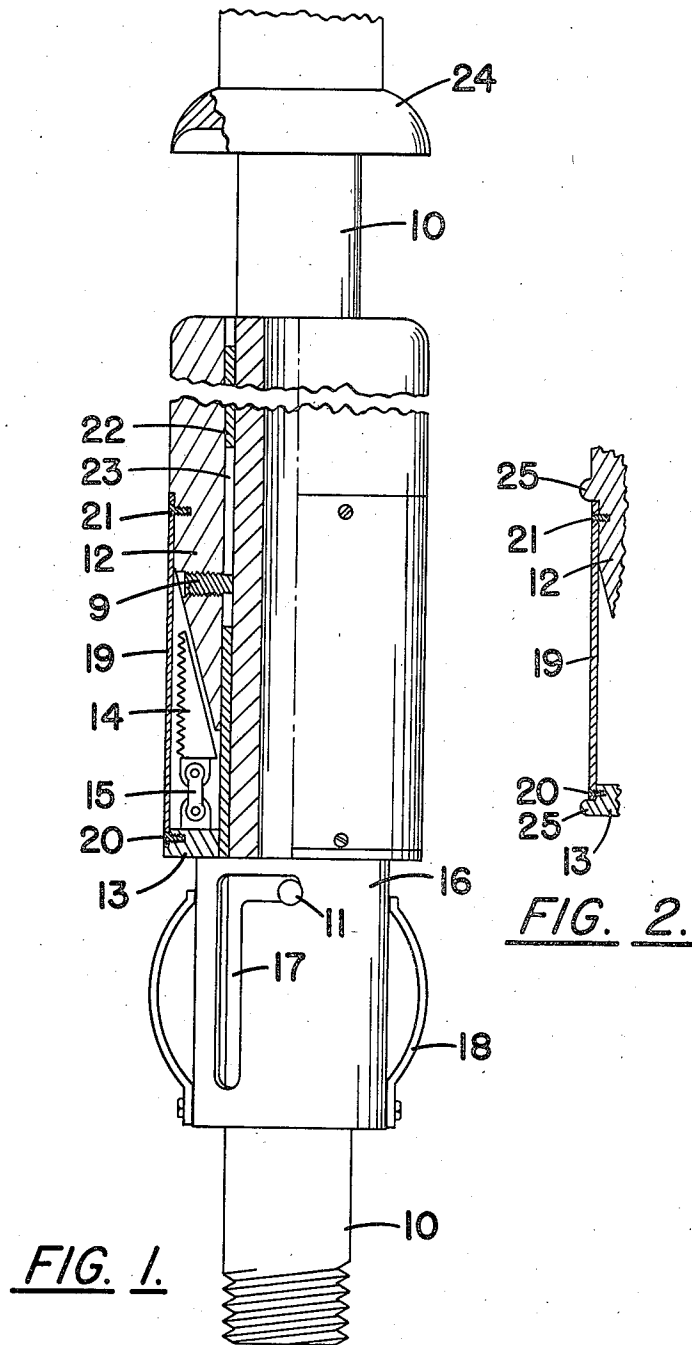
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J. E. ECKEL

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PROTECTIVE SLEEVE FOR SLIPS

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John E. Eckel INVENTOR.
BY P. J. Whelan
ATTORNEY

UNITED STATES PATENT OFFICE

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PROTECTIVE SLEEVE FOR SLIPS

John E. Eckel, Houston, Tex., assignor to Standard Oil Development Company, a corporation of Delaware

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1 Claim. (Cl. 166—1)

The present invention is directed to a means for protecting slips before they are placed in operative position.

In many operations connected with the production of bore holes it is usual to employ slips to hold tools and various portions of the equipment in position. As a specific example, hook wall packers commonly employed in cementing for securing strainers in position and for packing off wells at desired points are secured to the casing or tubing by means of slips. Other types of tools used in other operations are also commonly secured in position by slips.

When slips are to be lowered into a drill hole before they are set, there has heretofore been a danger of foreign material entering and jamming them. For example, shale particles produced by the drilling operations or rubber pieces accidentally removed from packers clog the slips while they are in an inoperative position and prevent their proper operation.

It is an object of the present invention to provide slips with means capable of preventing the entry of foreign material into the slips as long as they are in an inoperative position.

More specifically, it is an object of the present invention to provide a protective sleeve for slips which will prevent the entry of foreign material into the slips and allow them to operate without being hampered by such particles.

Other objects and advantages of the present invention may be seen from a reading of the following description taken with the drawing in which

Fig. 1 is an elevation, partly in cross section, showing one embodiment of the present invention, and

Fig. 2 is a fragmentary view illustrating a slight modification of the device indicated in Fig. 1.

Referring specifically to Fig. 1, packer mandrel 10 is slidably arranged within an assembly comprising ring 13, sleeve 16, and sleeve 22. Ring 13 and the two sleeves are all secured together to move as a single unit. Slidably arranged about sleeve 22 is slip cage 12 which is provided with key pin 9 projecting into longitudinal slot 23 of sleeve 22. Pin 9 and slot 23 are arranged so that there can be no relative rotative movement between slip cage 12 and the assembly of which sleeve 22 forms a part, but only a longitudinal movement is possible between these two bodies. Slips 14 are secured to ring 13 through link 15. Sleeve 16 is provided with a J-slot 17 and with wipers or springs 18. The

upper end of mandrel 10 is provided with bushing 24 adapted to cooperate with the upper portion of slip cage 12 in setting the slips, and attached to a lower part is laterally projecting pin 11 arranged to cooperate with J-slot 17.

The assembly thus far described is generally old to the art and its use is well known. The slips may be set at a desired position in a conduit by attaching the mandrel 10 to a string of tubing and lowering the assembly to the desired depth. The wipers or springs 18 are constructed so that they bear against the conduit with an appreciable tension. When the slips have been lowered to the desired position, the mandrel is rotated to move pin 11 out of the transverse portion of J-slot 17, and when this rotative movement has been completed, the mandrel is moved downwardly until bushing 24 comes in contact with the upper end of slip cage 12. Additional downward movement of the mandrel carries the slip cage along with it and since the slips are held stationary by reason of the tension of springs 18, the downward movement of the slip cage causes the slips to move outwardly until they come into engagement with the wall of the conduit and secure the assembly to the wall of the conduit at this point.

The device specifically discussed above and its use are old to the art. In accordance with the present invention, however, a sheet of soft, readily cuttable material 19 is suitably arranged around the slips. In attaching them to the specific modification shown in the drawing, the sheet of material is attached to ring 13 by means of bolts 20 and to slip cage 12 by means of screws 21. In other words, in the application shown sheet 19 is of tubular shape secured at both its ends to the complete assembly so that it is impossible for foreign material to come in contact with the slip mechanism to jam it.

In the embodiment illustrated in Fig. 1 the pin 9 and slot 23 prevent relative rotative movement between the ends of sheet 19. The upper end of this sheet is secured to slip cage 12 and the lower end to ring 20, and as previously explained, pin 9 fitting into groove 23 limits these two parts to a relative longitudinal movement only. This is a desirable feature, but it will be apparent that it is not absolutely necessary in practicing the invention and that the parts preventing relative rotative movement between the members secured to the ends of the sheet may be omitted, if desired.

In Fig. 2 a modification is shown in which corresponding parts are given like numerals as in

Fig. 1. In the apparatus illustrated slip cage 12 and ring 13 are provided with circumferential projections 25—25 which are slightly larger in diameter than sheet 19, thus protecting the latter from destructive friction against the casing walls.

When the device has been lowered into the bore hole to the desired depth and the assembly manipulated in order to set the slip, the sharp teeth of the slips readily cut through sheet 19 and come in contact with the wall of the conduit to securely fasten the slips thereto.

It is preferred to make sleeve 19 out of soft, thin and readily cuttable material. It has been found that thin rubber sheet is a suitable material of which to construct the protective means of the present invention, but other materials, such as sheet lead, are also suitable.

For the purpose of illustrating the invention the protective device is shown applied to a particular embodiment of hook wall slips. Such slips are conventionally secured to packers on other bore hole tools. A showing of a specific tool secured to the slips has been omitted in order to simplify the description of the invention. It will be manifest, moreover, that the application of the protective device is not limited to the specific hook wall illustrated, but may be applied to any slips which are to be operated after they have

been placed in position and particularly to slips suitable for use with various bore hole tools which must be lowered into bore holes before being operated.

Moreover, while specific examples of suitable construction material have been given and a specific means for attaching the protective device to slips has been disclosed, other materials of construction and other methods of attaching such materials as known to the art, may obviously be used without departing from the scope of the present invention.

Having thus described and illustrated the present invention, what is claimed as new and useful and is desired to be secured by Letters Patent is:

A protective device for a slip assembly comprising, in combination, a slip assembly including slips arranged to move said slips into operative and inoperative positions, a protective device comprising a thin sheet of readily cuttable material secured to said slip assembly arranged to cover the cutting edges of said slips and to prevent the entry of articles of foreign materials between said sheet and said assembly, projections arranged on said slip assembly above and below the sheet whereby the sheet is protected from destructive friction against bore hole walls.

JOHN E. ECKEL.