

May 6, 1930.

J. M. FISCHBACH

1,757,363

HYDRAULIC SOCKET

Filed March 6, 1929

2 Sheets-Sheet 1

Fig. 1

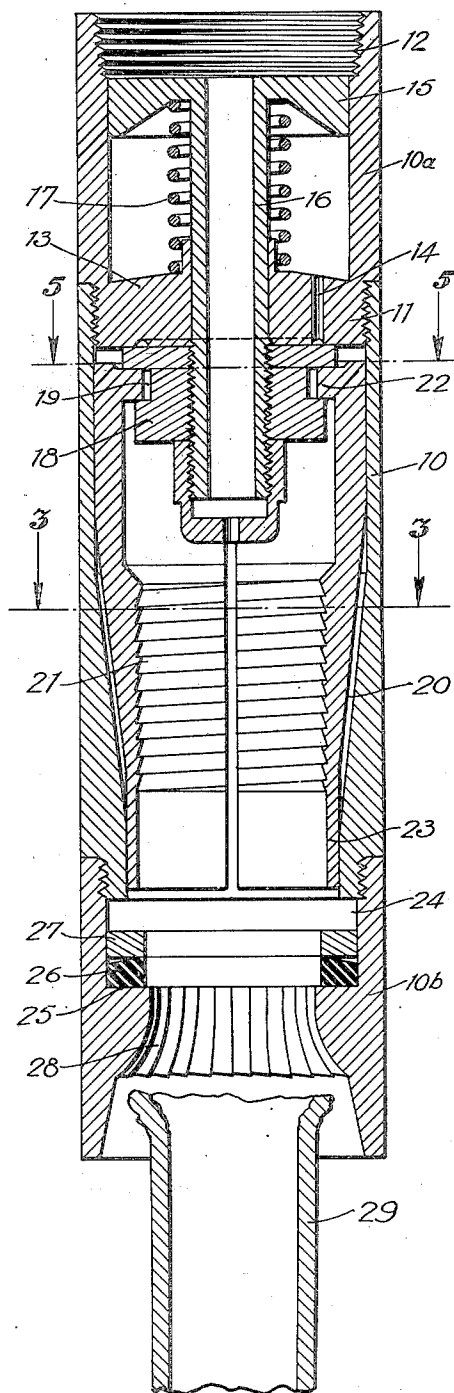
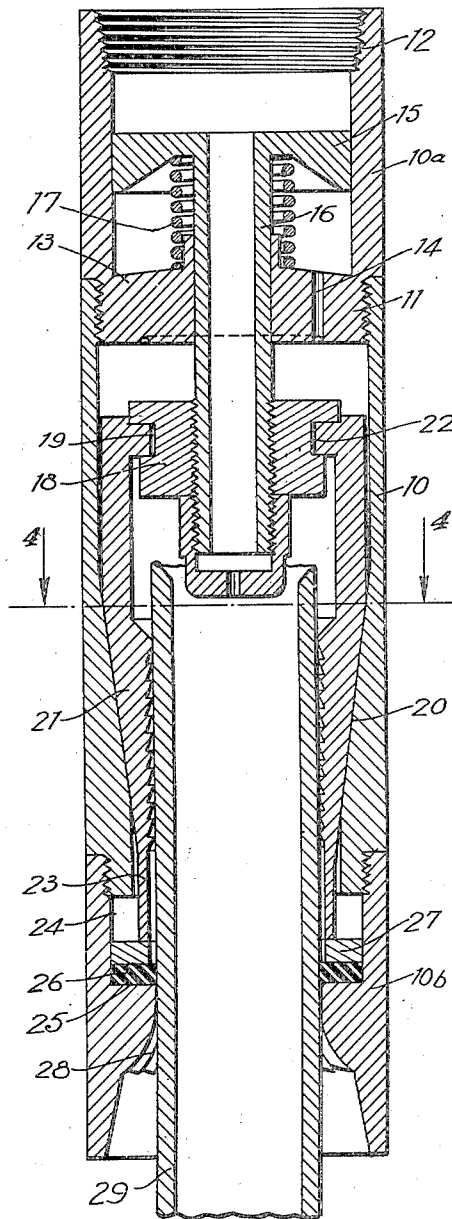


Fig. 2



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2 Sheets-Sheet 2

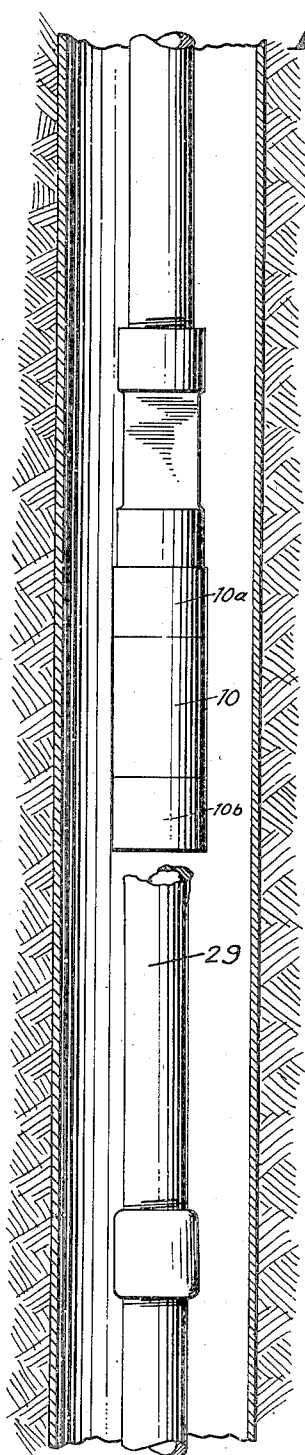


Fig. 6

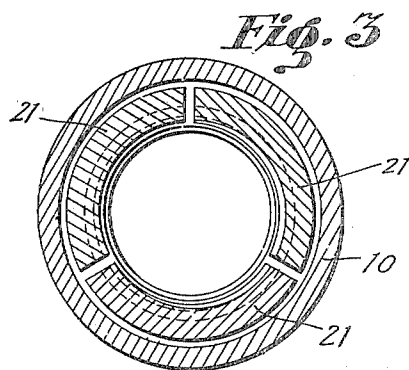


Fig. 3

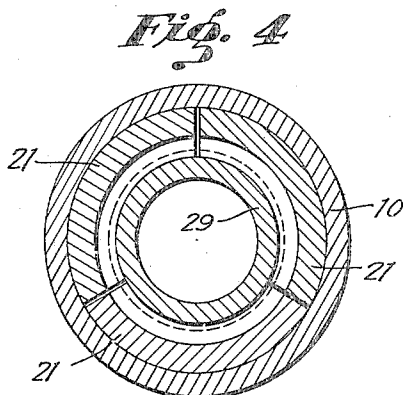


Fig. 4

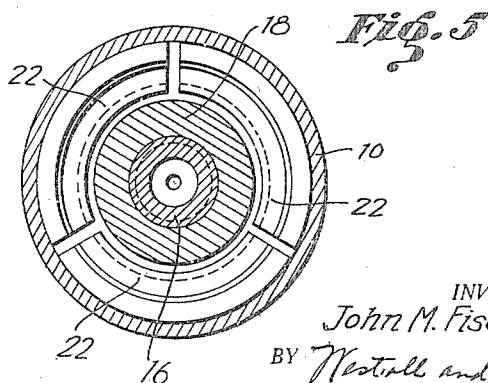


Fig. 5

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UNITED STATES PATENT OFFICE

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HYDRAULIC SOCKET

Application filed March 6, 1929. Serial No. 344,933.

This invention relates to a coupling device designed to be slipped over the end of a body to clasp the same. In well drilling, tubular members such as drill pipes often become lost in the hole as by parting of the drill string, and together with attached tools become lodged in the hole. Such lost parts are commonly termed "fish" in the art. In order to remove the fish, tools are lowered and a hold obtained on the fish. It is desirable to make a connection with the fish in such a manner that water or slush may be circulated therethrough. The hole frequently caves in or solid particles or the like in the slush settle and bind the fish causing what is termed in the art "freezing". By starting circulation, the fish may be freed and more easily removed.

The present invention relates to a tool adaptable for fishing work and having any or all of the following features:—Hydraulic means to actuate clasp devices, which means is actuable by the circulation fluid; sealing packing means which is operable hydraulically by the circulation fluid to effect a liquid type connection with a fish.

These objects together with other objects and corresponding accomplishments are obtained by means of the embodiment of my invention illustrated in the accompanying drawing, in which:—

Fig. 1 is a section through a socket showing the gripping slips and the sealing packing in expanded position; Fig. 2 is a section showing the socket engaging a section of pipe with parts in clasp position; Figs. 3, 4 and 5 are sections as seen on the lines correspondingly marked in Figs. 1 and 2; and Fig. 6 is a fragmental section through a wall hole showing a parted pipe and my improved socket in elevation and about to be slipped over the pipe.

Referring more particularly to the drawing a shell is shown herein with a slip section 10, comprising a barrel portion 10^a and a mouth portion 10^b including a miller. The barrel portion is reduced in diameter at its lower end and externally threaded to be received in the intermediate or slip portion of the shell as indicated by 11. The bore of

the barrel portion is tapped at the upper end as indicated by 12 to provide for attachment to a string of drill pipe or the like. At the lower portion of the barrel section is a wall 13 forming a barrel head and provided with a perforation 14 which serves as a relief passage. In the barrel is a piston 15 having a hollow stem 16 slidably extending through a bore in the head 13. A compression spring 17 tends to hold the piston in upper or retracted position as shown in Fig. 1. Mounted on the stem 16 and below the wall 13 is a connector disk 18 having an annular groove 19. The construction is such that circulation fluid may pass from one side of the piston to the other through the hollow stem 16.

The intermediate portion 10 of the barrel is tapered as indicated by 20 to form an inclined bearing surface for slips. The intermediate section is externally reduced in diameter and threaded to receive the miller section 10^b. Mounted in the intermediate or slip section are slips 21 having toothed gripping surfaces on their inner faces, and at the upper end of the slips are inwardly extending lugs 22 mounted in the connector 18 so that the slips will be moved with the piston and connector. The lower ends of the slips are in cylindrical form as indicated by 23 and adapted to be projected through the end of the slip section into the miller section. The slips are so arranged that on downward movement of the piston the slips are moved downwardly and contracted to grip any member disposed therebetween.

The bore of the miller section 10^b is of larger diameter than the adjoining portion of the bore of the slip section as indicated by 24 having a seat 25 to receive an expansible sealing ring 26. This sealing ring 26 may be rubber so as to be compressible. It is shown with a slidable ring 27 mounted thereon and forming a follower ring. The rings are so disposed that when the slips are moved downwardly, the follower ring 27 will be engaged to compress and expand the sealing ring 26. The section 10^b is shown with milling teeth 28 and a bellshaped mouth so that the tool may be used to slip over a tubular fish 29

and may be used to mill the top so that it may slip within the section 10^b and be embraced by the sealing ring.

The tool is connected to the lower end of a drill pipe and lowered in the hole over the fish. If necessary, the tool is rotated to mill the upper end of the fish. The tool is lowered to receive the fish between the slips 21. Circulation is now started. This causes the piston 15 to be advanced as shown in Fig. 2 moving the slips downward to grip the fish and acting upon the follower ring 27 to compress the sealing ring and form a leak tight fit about the fish. Circulation fluid passes downwardly through the stem 16 and into the slip shell and thence through the fish. Circulation is thus started and will aid in freeing fish.

It is obvious, that several sealing rings may be used instead of a single ring. The milling teeth are not essential to the inventive idea. A section may replace the sealing ring section so that the piston operates the slips only. Furthermore, members which do not constitute slips to grip the fish may be employed and the sealing ring section operated, the piston expanding the sealing ring and forming a hydraulic socket without slips. Various other modifications of the specific structure shown herein may be resorted to without departing from the invention.

What I claim is:—

1. A device of the character described comprising a shell adapted to be connected to a hydraulic line, gripping slips mounted within the bore of said shell to be movable longitudinally, there being coacting surfaces on said slips and the inner wall of said shell so that longitudinal movement of said slips causes contraction and expansion to grip or release a body disposed between said slips, a piston within said shell movable longitudinally and connected to said slips whereby hydraulic pressure exerted on said piston will cause said slips to be moved and contracted.

2. A device of the character described comprising a shell adapted to be connected to a hydraulic line, gripping slips mounted within said shell to be movable longitudinally, there being coacting surfaces on said slips and shell so that longitudinal movement of said slips will cause contraction and expansion to grip or release a body disposed between said slips, a piston within said shell movable longitudinally and connected to said slips whereby hydraulic pressure exerted on said piston will cause said slips to be moved and contracted, and resilient means tending to cause said slips to be expanded.

3. A device of the character described comprising a shell adapted to be connected to a hydraulic line, members within said shell movable longitudinally, a contractible sealing ring in said shell normally expanded and acted upon by movement of said members to

be contracted to form a seal about a body embraced by said ring, a piston within said shell movable longitudinally and connected to said members whereby hydraulic pressure exerted on said piston will cause said members to be moved longitudinally and contract said ring, said piston having a circulation opening therethrough.

4. A device of the character described comprising a shell adapted to be connected to a hydraulic line, gripping slips mounted within said shell to be movable longitudinally, there being coacting surfaces on said slips and shell so that longitudinal movement of said slips will cause contraction and expansion to grip or release a body disposed between said slips, a contractible sealing ring in said shell normally expanded and acted upon by longitudinal contraction movement of said slips to be contracted and form a seal about a body embraced thereby, a piston within said shell movable longitudinally and connected to said slips whereby hydraulic pressure exerted on said piston will cause said slips to be moved longitudinally toward contracted position of said slips and ring, there being a circulation passage to direct fluid from one side of said piston to the other.

5. A device of the character described comprising a shell adapted to be connected to a hydraulic line, gripping slips mounted within said shell to be movable longitudinally, said shell having an annular tapered surface on which said slips bear so that longitudinal movement of said slips causes contraction and expansion to grip or release a body disposed between said slips, there being a barrel within said body above said slips, a piston slidable within said barrel and having a circulation opening extending therethrough, a spring seat in said shell below said piston, a compression spring disposed between said seat and said piston tending to retract the latter, a ring ledge in said shell below said slips, a compressible and contractible sealing ring mounted on said ring seat and engaged on its upper surface by said grip whereby upon longitudinal contraction movement of said slips said sealing ring will be contracted about a body embraced thereby.

In witness that I claim the foregoing I have hereunto subscribed my name this 16th day of February, 1929.

JOHN M. FISCHBACH.