Oct. 27, 1931. W. A. O'BANNON 1,828,938

COMBINATION SUCKER ROD SOCKET

Original Filed March 6, 1928 2 Sheets-Sheet 1

Fig. 1

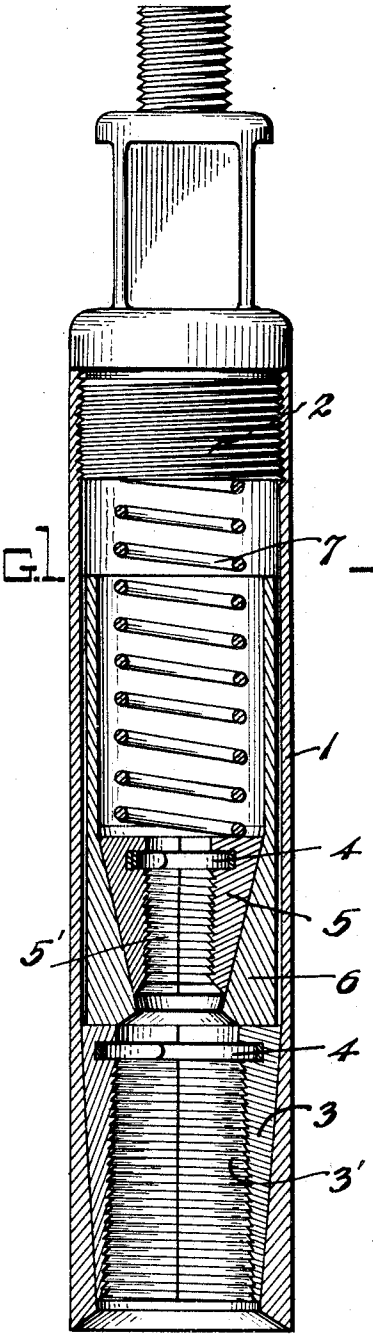
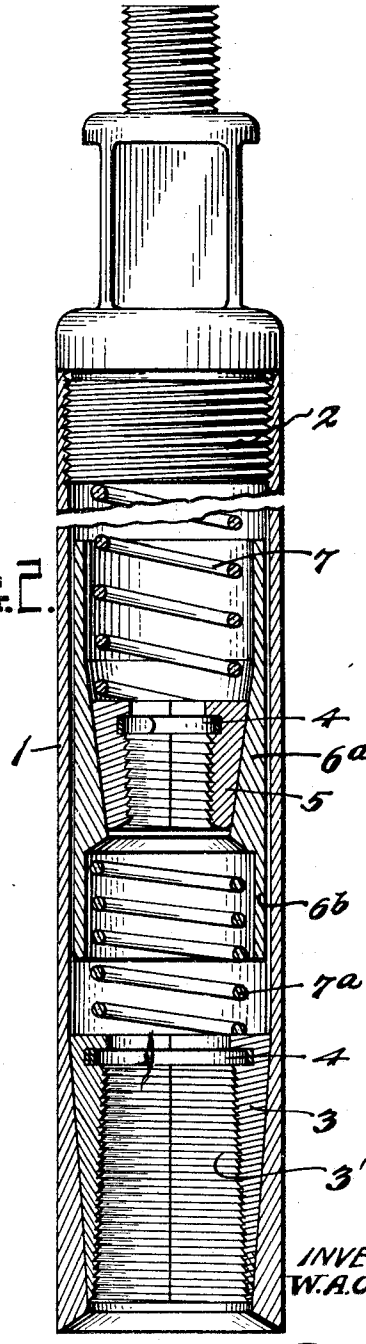


Fig. 2.



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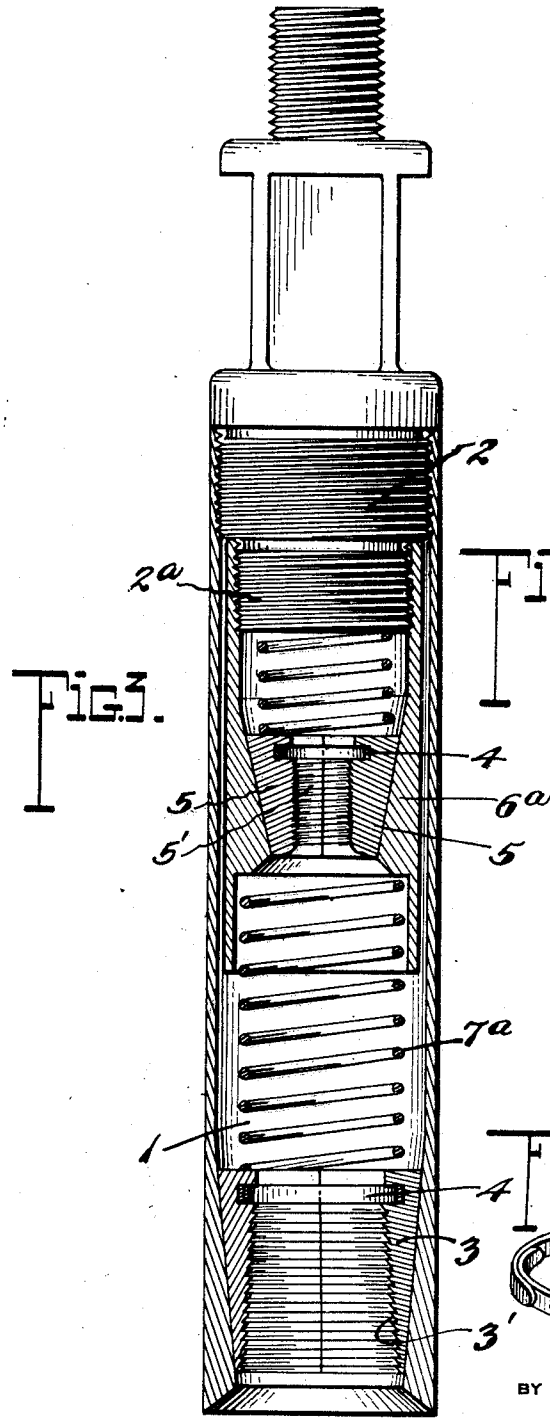


Fig. 3.

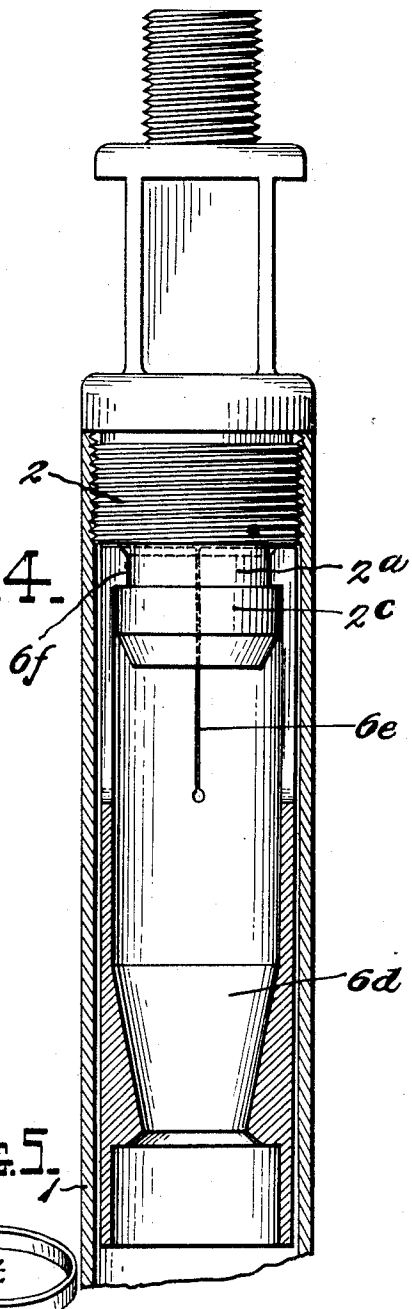


Fig. 4.

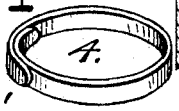


Fig. 5.

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UNITED STATES PATENT OFFICE

WALTER A. O'BANNON, OF TULSA, OKLAHOMA, ASSIGNOR TO WALTER O'BANNON CO., A CORPORATION OF OKLAHOMA

COMBINATION SUCKER ROD SOCKET

Original application filed March 6, 1928, Serial No. 259,544. Divided and this application filed May 23, 1929. Serial No. 365,396.

Known fishing tools of the sucker rod type commonly embody one or more slip units, each composed of complemental sections which are held in their cooperative relation, if at all, by some element which merely acts to prevent displacement of one section relative to another axially of their support while permitting of their expansion or opening action only incident to movement of the sucker rod passing into the unit.

I have found it advantageous to maintain the slip unit in expanded condition against the walls of the socket barrel, as this insures at all times the maximum opening of the slips and proper engagement with the sucker rod or its joint. One of the main objects of the present invention is to provide a slip construction embodying novel resilient means which not only serves to maintain the slip sections properly disposed or aligned, but also tends to expand said sections and cause them to follow the wall of the barrel, in which they are seated, as the slips move upwardly, this application constituting a division of my copending application filed March 6, 1928, Serial No. 259,544.

Another object of the invention is to provide a multiple slip socket in which primary and secondary slips are arranged in independent relation to each other, so that one set may function separately in respect to the other, or more specifically speaking, move longitudinally of the barrel toward or from each other, as the case may be.

It is a further object of this invention to provide means for sustaining one of the slip units in such a way as to prevent the application of pressure to the other unit which would tend to cause the last mentioned unit to be unduly tightly wedged into its seat. To this end I support the upper or secondary slip unit from the barrel, or, more strictly speaking, from the connector head of the barrel, so that in making rod catches the weight imposed upon the upper unit is directly transmitted to the socket body.

Other and further objects and advantages of the invention will be hereinafter set forth and the novel features thereof defined by the appended claims.

Referring to the drawings:

Fig. 1 is a longitudinal sectional view of the multiple slip type wherein the upper slip unit and its holder are movable longitudinally of the barrel relative to the lower slip unit;

Fig. 2 is a similar section of a slightly modified form wherein the upper slip is normally held in spaced relation to the lower slip unit by an intermediate spring means;

Fig. 3 is a longitudinal section of another form in which the upper slip holder is held stationary by a threaded connection with the head of the socket;

Fig. 4 is a fragmentary sectional view of a modification of the form shown in Fig. 3 in which the holder for the upper slip unit is connected to the head by spring fingers; and

Fig. 5 is a detail view of the expander used in connection with the different forms of the invention.

Like reference characters designate corresponding parts through the several figures of the drawings.

In all of the forms of the socket hereinafter described, there is provided the usual barrel 1 internally threaded in its upper end to receive the threaded head extension 2. At its lower end the bore of the barrel is tapered and within this tapered portion is seated the main or primary slip unit 3 which is tapered externally to conform to the shape of the barrel taper. The slip unit is preferably formed with a tapered bore having the customary wickers 3′. At the top of this bore an internal groove is provided to receive a spring ring 4, more clearly seen in Fig. 5 and composed preferably of flat metal, having its ends overlapping. This spring exerts outward pressure upon the sections of the slip unit and at the same time prevents the displacement of one of the sections relative to the other in a direction longitudinally of the barrel.

Above this unit, a secondary slip unit 5 is arranged corresponding to the primary unit, except as to its size and the form of its bore, which preferably is a straight bore having the usual gripping wickers 5′. This unit is designed for gripping the rod, while the pri-

mary unit takes the joint or box thereof, the engagement of one or the other depending upon where the break occurs in the length of the sucker rod. The secondary slips are seated within a sleeve-like holder 6 which is internally tapered at its lower end so as to form a seat to receive the upper slip units and to form a constricted passage communicating with the lower unit. The sleeve 6 is of sufficient length to permit a limited amount of movement of the slip elements upwardly in the socket barrel, such movement being restricted by contact of the upper end of the sleeve or holder with the threaded extension 2 of the head. The slip members are held in their seated positions by a suitable spring 7 which is interposed between the head and the upper or secondary set of slips. Owing to the fact that the holder 6 rests upon the primary slips, the pressure exerted by the spring 7 upon the upper slips enables the spring to transmit its pressure to the primary slips in an obvious manner.

It will be apparent that when the sucker rod socket is lowered into contact with the rod which it is desired to fish out of the well, said rod will pass into the lower slips until it comes into contact with the latter or with the secondary set of slips, depending upon the point of break in the rod. This causes the slip unit or units to move upwardly in the socket barrel until said movement is stopped by contact with the head of the socket. Thereupon the socket is raised and the slip units which were permitted to expand by movement into the larger portion of the barrel or the holder, as the case may be, will then contract by virtue of cooperation of the slips with their respective tapered seats, the wickers biting into the metal sufficiently to provide a positive gripping action upon the rod, enabling the latter to be elevated in the usual manner.

Passing now to the form of socket device which is shown in Fig. 2, I have modified that form disclosed in Fig. 1 in two essential respects. In the first place the sleeve-like holder 6*a* is formed with an extension 6*b* at its lower end, and in the second place a second spring 7*a* is disposed between the holder and the primary slips, seating at its lower end upon the primary slips and at its upper end within the extension 6*b* just mentioned. Otherwise the construction and operation of the device is the same as described in connection with Fig. 1. The primary difference resides in the fact that the upper set of slips and its holder is held in spaced relation to the primary set of slips normally, but in both of said constructions these slip units are independent and may move relative to each other. The advantage of such a construction will be apparent in that a gripping action may be obtained on both the rod and the box or joint, as contact of these parts is made with the respective units. The extension 6*b*, like the extension on the other end of the holder, serves to prevent crushing of the spring between the holder and the lower slip unit. The forms of the device shown in Figs. 1 and 2 serve adequately to perform their desired fishing function, but where the "catch" is a rod rather than a box catch, there is a tendency to cause the primary slips to be wedged into their tapered seat, rendering it difficult at times to displace them without injury. For this reason I prefer to make my socket device in the form or forms now to be described.

Referring to the preferred form of socket shown in Fig. 3, I have modified that construction disclosed in Fig. 2 above described, by providing the head with a second threaded extension 2*a* with which the holder 6*c* has threaded connection, so that in this instance the holder is held stationary and functions merely to support the secondary slips in spaced relation to the primary slips while preventing in operation any weight being transmitted to the primary slips when the secondary slips are making the catch. In this form, as in the preceding one, the spring 7*a* is interposed between the holder and the primary slips and acts to hold the latter normally in seated position at the lower end of the barrel.

Referring to the form of device shown in Fig. 4, I have modified the sleeve holder in this form designated 6*d* and construction of the head, the latter being provided with an extension 2*c* having an annular groove 2*d* to receive the upper end of the holder member. This holder member is split longitudinally one or more times, as indicated at 6*e*, so that a series of fingers is provided, each of which is formed with a head 6*f* to engage in the groove 2*d*. In assembling the socket the secondary slips are disposed in the holder 6*d* and said holder is then pushed onto the supporting extension 2*c* of the head, whereupon the lower slips and the barrel are screwed in place upon the head. The slips are omitted from the drawing in Fig. 4 since it will be understood that they are employed in a corresponding manner to that described with reference to the other forms of the device.

It will be understood that slight changes may be made in details of construction of these various forms, especially with reference to the type of bore of the slips and the diameter of the same so that I do not wish to be confined to the types specifically illustrated in the drawings.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. A sucker rod socket comprising a barrel, having a slip seat at one end thereof, a slip unit mounted in said barrel and cooperating with said seat, a second slip unit disposed

over the first unit, each of said units being composed of complemental sections, and means cooperating with the sections tending to hold them in expanded positions.

2. A sucker rod socket comprising a barrel having a slip seat at one end thereof, a slip unit mounted in said barrel and cooperating with said seat, a second slip unit disposed over the first unit, a holder depending within the barrel for sustaining the second unit, and spring means intermediate said holder and the first unit tending to hold the first unit in its seat.

3. A sucker rod socket comprising a barrel having a slip seat at one end thereof, a slip unit mounted in said barrel and cooperating with said seat, a second slip unit disposed over the first unit, a holder for sustaining the second unit, and spring means intermediate said holder and the first unit tending to hold the first unit in its seat, said holder including means for preventing the crushing of the spring means aforesaid.

4. A sucker rod socket comprising a barrel having a tapered slip seat at one end thereof, a slip unit mounted in said barrel and cooperating with said seat, a second slip unit disposed over the first unit, and separate stationary means coacting with one of said units for limiting the movement of the other unit to prevent complete removal from the tapered seat of the barrel.

5. A sucker rod socket comprising a barrel, a plurality of slip units mounted therein, and means separate from said units and barrel but functioning common to said slip units for limiting the movement thereof longitudinally of the barrel.

6. A sucker rod socket comprising a barrel, a plurality of independently movable slip units mounted therein, and means common to said slip units for limiting the movement thereof longitudinally of the barrel, said means constituting a holder for one of said slip units whereby to hold said slip unit in spaced relation to the other unit.

7. A multiple slip socket comprising a barrel, a head therefor, upper and lower slips in said barrel having bores of different diameters, and means separate from the barrel for supporting the upper slips from the head.

8. A socket comprising a barrel, a set of slips mounted in the barrel, a second barrel suspendedly fixed within the first-named barrel, a set of slips in the second-named barrel, and means for retaining the sets of slips in functional position within their respective barrels.

9. A socket comprising a barrel, a cap on the barrel, a set of expansible slips retained in the barrel, a second barrel fixed to the cap, a supplemental set of expansible slips in the second-named barrel, and yielding means for retaining the slips in contracted position.

10. A socket comprising a barrel having a tapered bore, a set of slips retained in the bore, a barrel suspended within the first-named barrel having a tapered bore, a set of supplemental slips retained in said last-named bore, and yielding means for independently retaining the sets of slips in their respective bores.

11. A socket comprising an outer barrel, expansible slips retained in the barrel, an inner barrel spaced from the walls of the outer barrel, and expansible slips retained in the inner barrel and operable independently of the first-named slips.

12. A socket comprising an outer barrel, a set of slips retained in the barrel, an inner barrel mounted within the outer barrel, a coil spring bearing against the slips to retain the slips in functional position, a supplemental set of slips retained in the inner barrel, and a second coiled spring contained within the inner barrel and bearing against the supplemental slips.

13. A socket of the character described including a single elongated outer barrel interiorly tapered at the lower end, a set of exteriorly tapered slips operable within the lower end of the barrel, a second barrel suspended within the upper end of the outer barrel, spaced from the wall of the outer barrel and having an interiorly tapered lower end, a set of exteriorly tapered slips operable within the lower end of the inner barrel, a cap for the outer barrel, a spring engaging the lower set of slips and a spring in the inner barrel engaging the upper slips for the purpose set forth.

In testimony whereof I affix my signature.

WALTER A. O'BANNON.