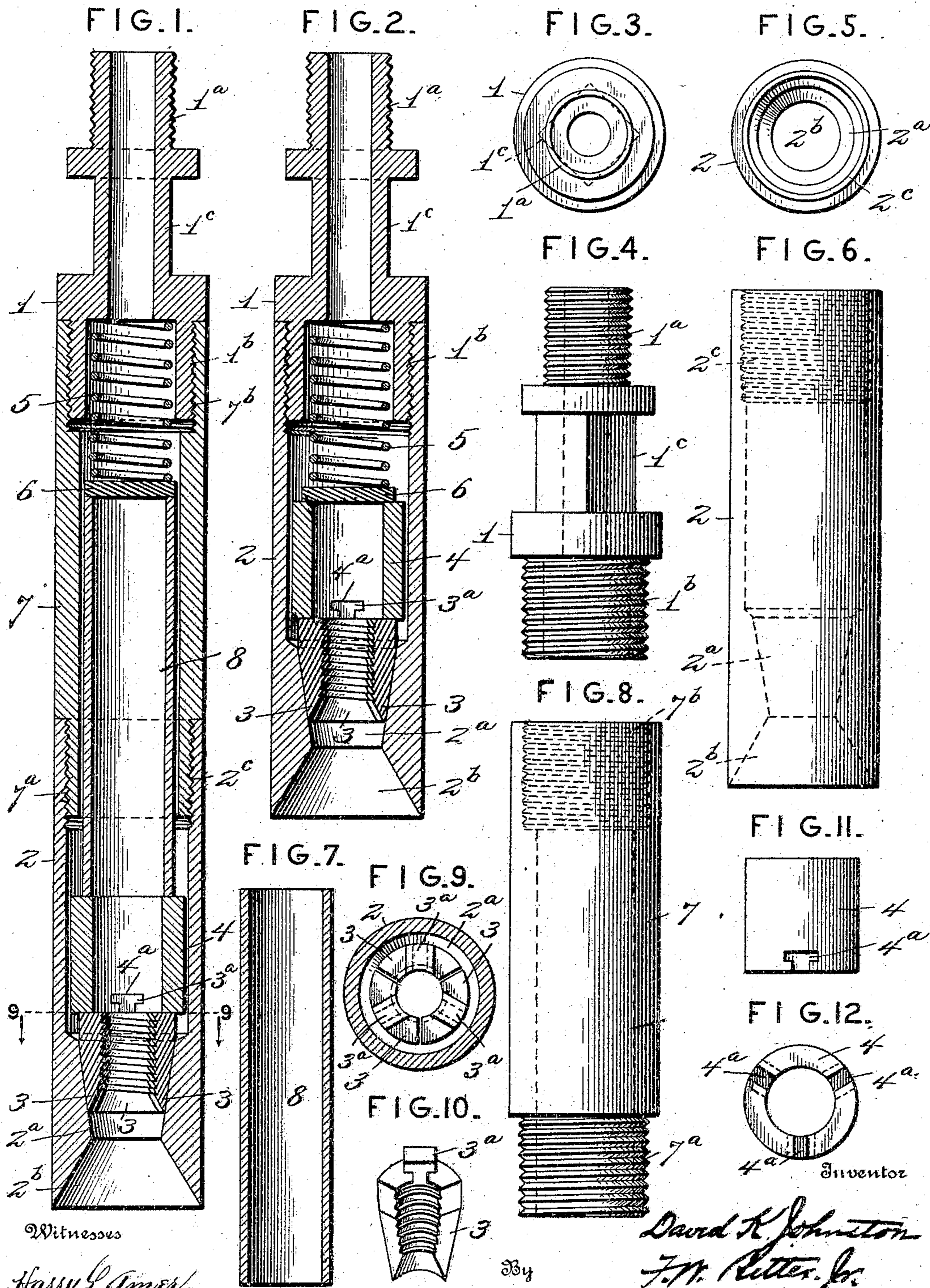


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PATENTED MAR. 21, 1905.

D. K. JOHNSTON.  
SLIP SOCKET.

APPLICATION FILED DEC. 7, 1904.



Witnesses

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## SLIP-SOCKET.

SPECIFICATION forming part of Letters Patent No. 785,105, dated March 21, 1905.

Application filed December 7, 1904. Serial No. 235,883.

*To all whom it may concern:*

Be it known that I, DAVID K. JOHNSTON, a citizen of the United States, residing at Oil City, in the county of Venango, State of Pennsylvania, have invented certain new and useful Improvements in Slip-Sockets; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, wherein—

Figure 1 is a longitudinal central section of a slip-socket embodying my invention and in connection therewith the extension-sleeve and extension-section whereby the socket may be lengthened when desired. Fig. 2 is a longitudinal central section of the slip-socket shown in Fig. 1, the extension-sleeve and extension-section omitted. Fig. 3 is a top plan view of the upper or pin member of the slip-socket. Fig. 4 is a side elevation of the upper or pin member of the slip-socket. Fig. 5 is a top view of the box member of the slip-socket. Fig. 6 is a side elevation of the box member of the slip-socket. Fig. 7 is a sectional view of the extension-sleeve of the slip-socket. Fig. 8 is a side elevation of the extension-section of the slip-socket. Fig. 9 is a transverse section of the box member, taken on the line 9 9, Fig. 1, showing the slips in position. Fig. 10 is a detached view of one of the slips or wickers. Fig. 11 is a side elevation of the check member, and Fig. 12 is a bottom plan view of the check member.

Like symbols refer to like parts wherever they occur.

My invention relates to that class of fishing-tools commonly termed "slip-sockets" employed for removing broken sucker-rods and similar obstructions from oil or Artesian wells.

Slip-sockets in general may be said to comprise in combination a pin member, a box member or socket member, included slips or wicker members, and a spring which bears upon the slips or wicker members and which yieldingly supports the slips or wicker members and permits them to adjust themselves to the object to be seized and withdrawn from the well. As commonly constructed the slips

or wickers have no interdependency of movement. Consequently the slips or wickers frequently recede or advance individually and unequally, which often results in the obtaining of a limited and insecure hold on the article to be withdrawn from the well or the displacement and escape of a slip or wicker from the socket or such an unequal application of the strain to the slips or wickers as results in a slip being pulled through the bottom of the socket, giving rise to serious "fishing" jobs for the removal of the slip from the well, with the attendant loss of time and the loss of the use of the tool until such time as the lost slip is replaced. Furthermore, where, as is frequently the case with sucker-rods, a long slanting break of the rod has occurred slip-sockets of the usual constructions will not so accommodate the broken section of the rod as to permit of the slips or wickers properly seizing the rod with an efficient hold. To overcome these several objections to slip-sockets as at present constructed is the object of the present invention.

To this end I combine with a suitable socket a series of interdependent slips or wickers and means for maintaining a parallel relation of the slips or wickers throughout their movement, and such a construction embodies one feature of my invention.

I preferably employ for the purpose of inducing the interdependency of movement of the slips means slidable in the slip-socket and which interlock with the slips or wickers, so as to permit a radial sliding movement of the slips to and from the axial line of the socket and at the same time prevent any escape thereof from the socket, and such a construction embodies a further feature of my invention.

There are other minor features of invention dependent upon the particular elemental construction and special combinations of the co-acting elements, all as will hereinafter more fully appear.

I will now proceed to describe my invention more fully, so that others skilled in the art to which it appertains may apply the same.

In the drawings, 1 indicates the upper or

pin member of the socket, which may be of tubular form, threaded, as at 1<sup>a</sup>, for connection with the rod or pipe or equivalent means whereby the slip-socket is lowered into the well, and also threaded, as at 1<sup>b</sup>, for connection with the box member 2 of the socket or with an intermediate extension-section 7, as circumstances may require. Intermediate of the threaded portions 1<sup>a</sup> 1<sup>b</sup> the pin member is of polygonal form, as at 1<sup>c</sup>, to form a wrench-seat, whereby a wrench may be used in separating the socket from its connections or the members of the socket from each other.

2 indicates the lower or box member of the slip-socket, said member being of tubular form, coned out, as at 2<sup>a</sup>, for the reception of the slips or wickers 3 3 3 and provided with a bell-mouth 2<sup>b</sup> to facilitate the entrance into the socket and between the slips or wickers of the obstruction which is to be seized and withdrawn from the well. The upper end of this box member 2 is internally threaded, as at 2<sup>c</sup>, for the reception of the threaded lower end of the pin member 1 or the lower end of extension-section 7, as the case may be.

3 3 3 indicate a series of separate slips or wickers of general wedge shape, constituting when taken as a whole an internally-threaded hollow truncated cone somewhat less in dimensions than the interior cone chamber 2<sup>a</sup> of the socket 2, so as to permit the separate sections 3 3 3 to move radially to and from the axial center of the socket to seize or release an included object. Upon the upper end of each slip 3 is a projection 3<sup>a</sup> of T or other suitable shape adapted to interlock with and slide in a radially-disposed slot or way 4<sup>a</sup> in the lower end of a sleeve or check member 4, which occupies the interior of the box member 2 of the socket just over the slips or wickers.

4 indicates the check member slidable in the slip-socket and preferably in the form of an annulus or sleeve, provided on its lower end with a series of radially-disposed T slots or ways 4<sup>a</sup> for the reception of the T-heads 3<sup>a</sup> on the upper ends of the slips or wickers 3 3 3.

The several elements hereinbefore set forth when taken in conjunction with a spring 5 and a disk 6, interposed between the spring and the sleeve 4 or check member and duly assembled as indicated in Fig. 2 of the drawings, will constitute an efficient slip-socket for ordinary service. In cases where the length of the bore of such a socket is not sufficient to accommodate the broken end of a sucker-rod or other obstruction which is to be withdrawn from the well I provide an extension-section 7, threaded externally, as at 7<sup>a</sup>, for connection with the box member 2, and internally, as at 7<sup>b</sup>, for reception of the pin member 1 of the socket, and in connection therewith I provide a loose extension-sleeve 8 of sufficient length, which may be inserted within the extension-section 7 and which will be interposed between the disk 6 and the sleeve or

check member 4, the whole when assembled constituting the extensible slip-socket. (Illustrated in Fig. 1 of the drawings.)

The several elements being constructed and combined substantially as hereinbefore pointed out, will operate as follows: The slip-socket being lowered into the well in the usual manner until it encounters the obstruction to be removed, said obstruction will enter the bell-mouth 2<sup>b</sup> of the socket axially and encounter the slips or wickers 3 3 3, which slips or wickers being yieldingly supported by the spring 5 will recede or rise in the socket and at the same time open or move out radially to permit the entrance of the obstruction. As the several slips or wickers are each connected to or interlocked with the sleeve or check member 4, there is an interdependency of movement which causes the slips or wickers to rise uniformly in the socket, and as the radial movement of the slips or wickers 3 3 3 is controlled by the sliding of the interlocking parts of the slips and check member and confined or restricted laterally by the inclined inner walls of the cone-shaped slip-chamber 2<sup>a</sup> the slips or wickers will recede uniformly from the axial line of the slip-socket. The obstruction to be withdrawn from the well having entered sufficiently far within the socket and having lifted and engaged the slips or wickers 3 3, the socket is raised in the well, which upward movement of the socket, by reason of the coned interior of said socket, causes the slips or wickers to move uniformly toward the axial center of the socket, and thus effectively seize and hold the obstruction, which will be withdrawn from the well with the socket. If the entering portion of the obstruction exceeds in length the bore of the slip-socket below the disk 6, it will strike and lift the disk without injury to either the spring 5 or the slips or wickers, and in such a case the pin member 1 of the socket is unscrewed from the box member 2 and the extension-section 7 and extension-sleeve 8 interposed between the members 1 and 2, the spring 5 and disk 6 being located between the pin member 1 and the extension-sleeve 8, so as to effectively lengthen the bore of the socket between the slips and spring and protect the spring, as hereinbefore noted.

Among the advantages incident to the construction hereinbefore set forth are that the slips or wickers being rendered interdependent and their movements simultaneous and similar their position with relation to and their grip upon the article to be withdrawn from the well will be uniform and equal, and there will be no liability of one of the slips being subjected to the entire strain and being drawn down and stripped from the socket, as frequently occurs in slip-sockets of the present construction. Furthermore, the slips are, in effect, anchored to the check member and in the socket at all times, so that there is no

liability of the loss of a slip under any condition of service.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination in a slip-socket of a check member slidable in the slip-socket, and a plurality of slips or wickers connected with and slidable on the check member, substantially as and for the purposes specified.

2. The combination in a slip-socket of an annular check member slidable in the slip-socket, and a plurality of slips or wickers connected with and slidable on the check member, substantially as and for the purposes specified.

3. The combination in a slip-socket, of a plurality of slips or wickers, and a check member slidable in the slip-socket, said member and slips provided with interlocking slidable connections, substantially as and for the purposes specified.

4. The combination in a slip-socket, of a check member slidable in the slip-socket said check member having radial slots or ways, and a plurality of slips or wickers having parts adapted to traverse the slots or ways of the check member, substantially as and for the purposes specified.

5. The combination in a slip-socket, of a check member slidable in the slip-socket and provided with radially-disposed T-slots, and a plurality of slips or wickers provided with T-heads, substantially as and for the purposes specified.

6. The combination in a slip-socket, of a check member, a plurality of slips or wickers connected to and movable radially on said check member, and means for yieldingly supporting said check member, substantially as and for the purposes specified.

7. The combination in a slip-socket, of a check member, a plurality of slips or wickers connected to said member and movable there-

with and thereon, and a spring for yieldingly supporting said check member, substantially as and for the purposes specified. 45

8. The combination in a slip-socket, of a check member, a plurality of slips or wickers connected to said member and movable there- with and thereon, a spring for yieldingly sup- 50 porting said member, and a disk interposed between the spring and check member, substantially as and for the purposes specified.

9. The combination in a slip-socket, of a pin member, a box member, an interposed ex- 55 tension-section, a plurality of slips or wickers, a spring, and an extension-sleeve interposed between the slips or wickers and the spring, substantially as and for the purposes specified.

10. The combination in a slip-socket, of a 60 pin member, a box member, an interposed extension-section, a plurality of slips or wickers, a check member, a spring, and an extension-sleeve interposed between the spring and the check member, substantially as and for the 65 purposes specified.

11. The combination in a slip-socket, of a plurality of yieldingly-supported wickers, and means for permitting a movement of the wickers to and from the axis of the socket and 70 for maintaining the parallel relation of the wickers throughout their movement, substantially as and for the purposes specified.

12. In a slip-socket, the combination with a yieldingly-supported check member slidable 75 in the socket, of a plurality of wickers slidably connected with the check member, substantially as and for the purposes specified.

In testimony whereof I affix my signature, in presence of two witnesses, this 5th day of 80 December, 1904.

DAVID K. JOHNSTON.

Witnesses:

MABEL BOYER,  
J. D. TRAX.