Nov. 26, 1957 M. J. PALMER ET AL 2,814,522

CONNECTOR-HOOK

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Fig. 1.

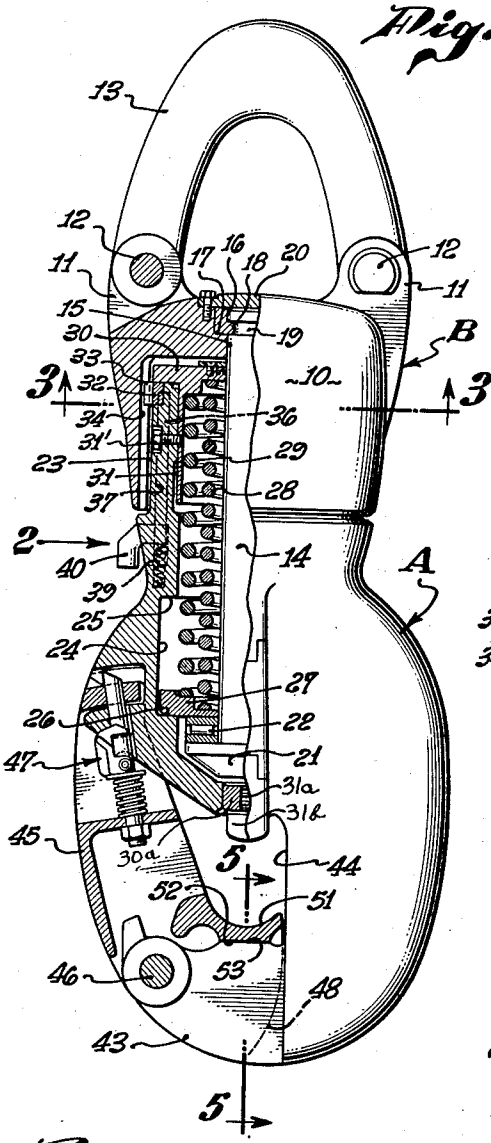


Fig. 2.

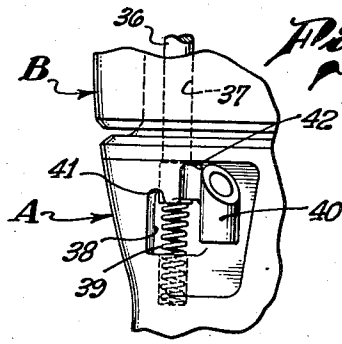


Fig. 3.

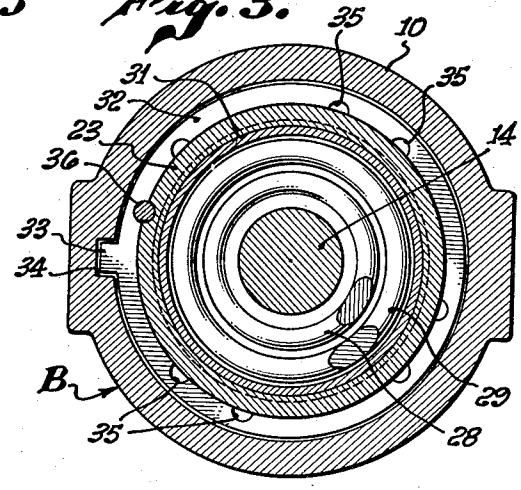


Fig. 4.

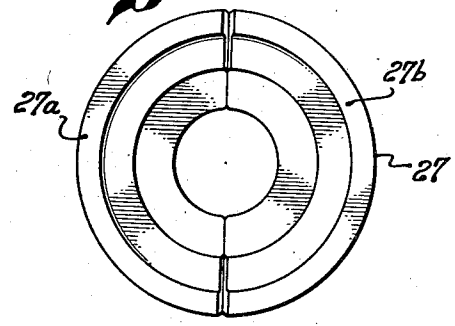
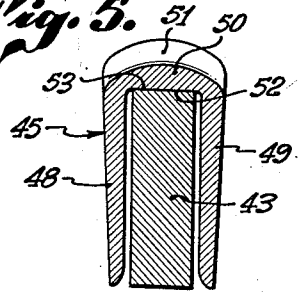


Fig. 5.



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CONNECTOR-HOOK

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Application November 12, 1952, Serial No. 320,056

8 Claims. (Cl. 294—82)

The present invention relates generally to hooks of the type utilized in the oil industry in connection with drilling operations, and is more particularly concerned with improvements in the construction of spring hooks.

It is one object of the herein described invention to provide a spring hook of improved construction, which utilizes a simplified arrangement of parts, which is compactly arranged, which is efficient in operation, and which in its broad concept has novel means for limiting the relative movements between the spring biased parts of the hook.

A further object is to provide an improved construction wherein solid integrally formed shoulders are utilized for limiting the relative reciprocable movement of the parts under load, and wherein the load is imposed directly upon the solid shoulder through an equalizer ring of split construction.

Another object is to provide improved means for interlocking relatively rotatable parts of the hook structure against movement at selective positions, such means being so constructed that it obviates the utilization of grooved or specially constructed supporting shank members.

Still another object is to provide an improved hook wherein planar surfaces are provided on the hook bill and the pivoted link arm which are adapted to engage in closed position of the arm so as to transfer load pressures directly to the hook independently of the arm pivot, and form reference areas to facilitate location of the arm pivot during fabrication.

Further objects of the invention will be brought out in the following part of the specification, wherein detailed description is for the purpose of fully disclosing the invention without placing limitations on the scope of the invention defined in the appended claims.

Referring to the accompanying drawings, which are for illustrative purposes only:

Fig. 1 is a side elevational view, partly in section, of a hook embodying the features of the present invention;

Fig. 2 is a fragmentary view in elevation of the latching means, as viewed in the direction of the arrow 2 of Fig. 1;

Fig. 3 is a transverse enlarged sectional view, taken substantially on line 3—3 of Fig. 1;

Fig. 4 is a detail plan view of the split equalizer ring; and

Fig. 5 is a cross-sectional view showing the cooperative relationship of a portion of the link arm and bill of the hook body, taken substantially on line 5—5 of Fig. 1.

For purposes of illustration, there is shown in Fig. 1 a hook embodying the features of the present invention, and in general comprising a hook body part A which is suspended from an associated connector part as generally indicated at B.

The connector part B comprises a downwardly opening cap body **10** of generally circular configuration with a pair of upwardly projecting spaced lugs **11**—**11** which are respectively connected by pins **12** to the ends of a bail member **13**.

Centrally, the cap body **10** supports a depending shank **14**. This shank has one end positioned in a central opening **15** of the cap bottom, and anchored by means of a split ring **16** supported on a shoulder **17** with an inwardly extending flange **18** seated within an end groove **19** of the shank. The ring **16** is retained by a retainer cap **20**. The opposite end of the shank **14** has a head portion **21** which forms a seat for an anti-friction thrust bearing **22**.

The hook body part A has its upper extremity fabricated so as to be of generally hollow tubular construction to receive the projecting shank **14** endwise therein, and is provided with a generally tubular extension **23** which is slidably positioned in the cap **10**.

Inwardly spaced from the extension **23**, the interior of the hook body is provided with an annular recessed portion **24** in its wall, this recessed portion defining spaced abutment shoulders **25** and **26** within which an equalizer ring **27** is positioned, this ring being rotatably supported on the thrust bearing **22** and having its peripheral edge adjacent the wall of the recessed portion **24** and its inner edge slidably engageable with the outer surface of the shank **14**, so as to form a piston acting in the recess **24** of the hollow cavity surrounding the shank **14**.

The hook body part A is spring supported from the connector part B by means of a pair of compression coiled springs **28** and **29** which are concentrically disposed about the shank **14**. These springs have their lower ends bearing against the upper surface of the equalizer ring **27**, while the upper ends of the springs **28** and **29** bear against a spring guide **30** which has a sleeve portion **31** within which the ends of the springs are seated. The spring guide is retained in assembled position by a plurality of screws **31'**.

With the parts assembled as described above, it will be seen that the shoulders **25** and **26** form solid structural abutments against which the equalizer ring **27** is adapted to strike upon relative movement of the hook body part and the equalizer ring **27** upon the application and removal of load forces. The equalizer ring **27**, it will be observed, is of greater diameter than the inside diameter of the abutment shoulder **25**. In order to enable positioning of the equalizer ring within the recessed portion **24**, this ring is split as shown in Fig. 4, so as to form the complementary sections **27***a* and **27***b*. By constructing the equalizer ring in two sections, it is possible to insert the sections through the restricted opening into the recessed portion **24** and cooperatively assemble the complete ring therein, as shown in Fig. 1, the joint between the ring sections forming slits communicating between the opposite ring faces, through which air or other fluid may flow during reciprocable movement of ring.

Referring further to Fig. 1, the hook body A is provided with a tubular bushing insert **30***a* which is positioned in axial alignment with the shank **14** and directly below its lowermost end. This bushing has an internally threaded bore for cooperatively receiving a threaded stem portion **31***a* of a drain plug **31***b*.

Referring now to Figs. 2 and 3, the latch for latching the hook body part and the connector part against rotational movement, will now be described. A swivel locking ring **32** is rotatably supported on the upper end of the extension **23**, but is retained against rotational movement with respect to the cap body **10** by a peripheral projection **33** positioned in and movable along an elongate groove **34** formed on the inner wall of the cap body **10**.

As shown in Fig. 3, the inner periphery of the swivel locking ring **32** is provided with a series of spaced notches **35** which are adapted, when aligned therewith, to receive the end of a reciprocably mounted pin **36** supported in a passage **37** formed in the wall of the extension **23**. The lowermost end of the passage **37**

communicates with a cavity or recess **38** within which there is mounted a spring **39** for biasing the pin **36** in an upward direction. The position of pin **36** is regulated by means of a manually operable member **40** which is connected to the pin **36** and may be selectively positioned in a slot **41** or slot **42**, these slots being arranged at different levels. Thus, when the member **40** is associated with slot **41**, the pin **36** is retained in a lowered position so that it will not enter any of the notches **35** contained in the swivel locking ring **32**. However, by positioning the member **40** in slot **42**, the pin **36** is free to move upwardly under the action of spring **39** and enter a notch **35** upon such notch being aligned with the associated end of the pin. The swivel locking ring is now releasably locked against relative rotational movement with respect to the extension **23**, and the hook body part A and connector part B are thus rigidly connected together and prevented from relative rotational movements, although resilient reciprocable movement under load forces is permitted.

As shown in Fig. 1, the hook body A is downwardly extended and provided with a forwardly projecting bill **43** so as to form a hook receiving notch **44**. Entrance to the receiving notch **44** is controlled by a link arm **45** which is pivotedly supported for swinging movements to opened and closed positions on a pivot pin **46** connecting the associated ends of the bill **43** and the link arm **45**. At the free end of the arm **45**, there is provided a conventional latching mechanism as generally indicated at **47** for releasably securing the link arm **45** in a position closing the entrance opening to the notch **44**.

Referring to Fig. 5, it will be seen that the lowermost end of the link arm **45** is constructed with spaced side wings **48** and **49** which are respectively disposed on opposite sides of the associated adjacent portion of the bill **43**. These wings are connected by a bridging portion **50** which has its upper surface, as shown at **51**, curved to receive a load supporting cable which may be inserted within the notch **44**.

As a feature of construction of the present invention, the bridging portion **50** has a planar under surface **52** arranged to engage an adjacent planar surface **53** on the bill **43**, when the link arm **45** is in closed position. Engagement of the surfaces **52** and **53** operates to directly transmit load forces to the bill **43**, independently of the pivot **46**, to concentrate the load forces at the axis of rotation of the hook body part A, and further act to retain the link arm against opening movement under hook loaded conditions.

Heretofore in the construction of hooks of the herein described type, it has been difficult to secure a good operating fit for the link arm **45**, due to the difficulty of locating the position at which the link arm **45** and the bill **43** should be drilled to receive the pivot pin **46**. By utilizing the planar surfaces **52** and **53**, this difficulty has been overcome, since these surfaces provide definitely fixed surface areas from which accurate measurements may be made to locate the pivot pin mounting positions.

Various modifications may suggest themselves to those skilled in the art without departing from the spirit of our invention, and, hence, we do not wish to be restricted to the specific form shown or uses mentioned, except to the extent indicated in the appended claims.

We claim:

1. A hook structure, comprising: a connector part including a depending member; a load receiving body part including a tubular extension member positionable around said depending member, the interior wall of said extension member having an annular recessed portion of enlarged diameter defining spaced abutment shoulders; a split ring of larger diameter than the inner diameter of said shoulders, said ring being insertable in sections and assembled within said recessed portion with its outer periphery adjacent the recess wall and its inner periphery adjacent the surface of said depending member; bearing means rotatably supporting said ring on said depending member; and compression spring means resiliently supporting said load receiving body part on said ring for limited relative reciprocable movement between said shoulders.

2. A hook structure, comprising a connector part including a depending member having an enlarged portion; a load receiving body part including a tubular extension member positionable around said depending member, the interior wall of said extension member being formed with an annular recessed portion of enlarged diameter provided with an inwardly projecting annular shoulder having a diameter of a size to form an opening through which said enlarged portion may be passed; a split ring supported on said enlarged portion, said ring being of larger diameter than the inner diameter of said shoulder and being insertable in sections and assembled within said recessed portion below said shoulder with its outer periphery adjacent the recess wall and its inner periphery adjacent the surface of said depending member; and compression spring means resiliently supporting said load receiving body part on said ring for relative reciprocable movement limited in one direction by engagement of said shoulder against said ring.

3. A hook structure, comprising: a connector part having a downwardly opening cap with a longitudinal groove on its inner surface; a depending shank member supported at one end in said connector centrally of the cap with its other end projecting beyond the open end of said cap; a load receviing body part having a tubular extension with a projecting end positioned in said cap; means resiliently interconnecting said projecting ends and supporting said parts for relative rotational and axial movements; a ring member supported for rotation with respect to said extension and having spaced notches therein; a projection on said ring extending into said groove for reciprocable movements therein; and a reciprocable latch pin carried by said body part having an end selectively engageable in said notches to restrict relative rotation between said parts.

4. A hook structure, comprising: a connector part having a downwardly opening cap; a depending shank member supported at one end in said connector centrally of the cap with its other end projecting beyond the open end of said cap; a load receiving body part having a tubular extension with a projecting end positioned in said cap; means resiliently interconnecting said projecting ends and supporting said parts for relative rotational and axial movements; a ring member supported for rotation with respect to said extension, and for reciprocable movement with respect to said cap; and latch means for releasably interconnecting said ring and extension against relative rotational movement.

5. A hook structure, comprising: a connector part having a downwardly opening cap; a depending shank member supported at one end in said connector centrally of the cap with its other end projecting beyond the open end of said cap; a load receiving body part having a tubular extension with a projecting end positioned in said cap; means resiliently interconnecting said projecting ends and supporting said parts for relative rotational and axial movements; and releasable latch means for interconnecting said extension and cap to oppose said rotational movement.

6. A hook structure, comprising: a connector part including a depending member; a load receiving body part including a tubular extension member positionable around said depending member, the interior wall of said extension member having an annular recessed portion of enlarged diameter defining spaced abutment shoulders; a split ring of larger diameter than the inner diameter of said shoulders, said ring being insertable in sections and assembled within said recessed portion with its outer periphery adjacent the recess wall and its inner periphery adjacent the surface of said depending member;

bearing means rotatably supporting said ring on said depending member; and compression springs each having one end connected with said load receiving body part and its other end connected with said split ring, whereby said body part, springs and split ring are supported for unitary rotational movement relative to said depending member, and said body part is reciprocable with respect to said ring.

7. A hook structure, comprising: a connector part including a depending shank member; a load receiving body part providing a hollow interior cavity portion having a closed bottom and including a cylindrical wall surrounding one end of said shank member, said wall having an annular recessed portion of enlarged diameter providing spaced abutment shoulders and each defining an opening; a split ring of larger diameter than the inner diameter of said shoulder openings, said ring being insertable in sections through one of said shoulder openings and assembled in piston relation within said recessed portion; means supporting said ring on the associated shank; and compression spring means resiliently supporting said load receiving body part on said ring for limited relative reciprocable movement between said shoulders.

8. A hook structure, comprising: a connector part including a depending shank member; a load receiving body part having a hollow interior cavity portion including a cylindrical wall surrounding one end of said shank member, said wall having an annular recessed portion of enlarged diameter providing spaced abutment shoulders and each defining an opening; a ring of larger diameter than the inner diameter of said shoulder openings supported for rotational movement on said shank and having piston like relation with said recessed wall portion, said ring being split into sections adapted to be inserted through the opening defined by one of said shoulders, and assembled into cooperative joined relationship, the joints between said sections forming communication slits between the opposite sides of said ring; and compression spring means resiliently supporting said load receiving body part on said ring for limited relative reciprocable movement between said shoulders.

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