

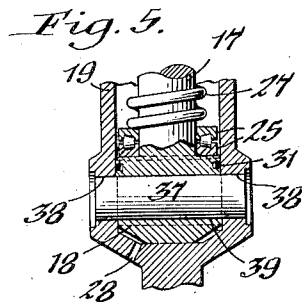
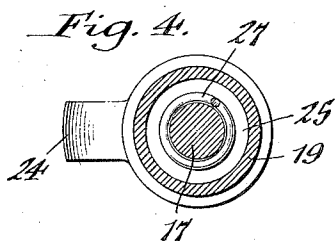
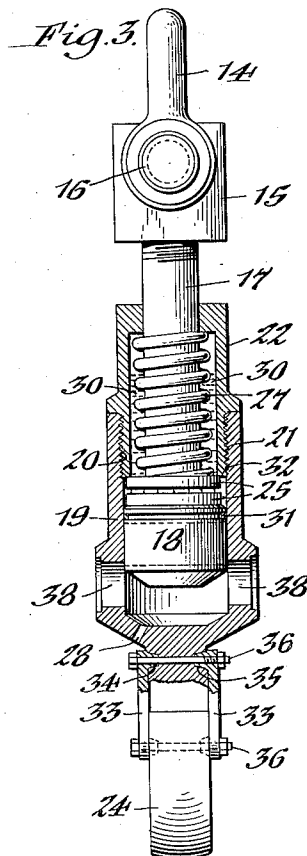
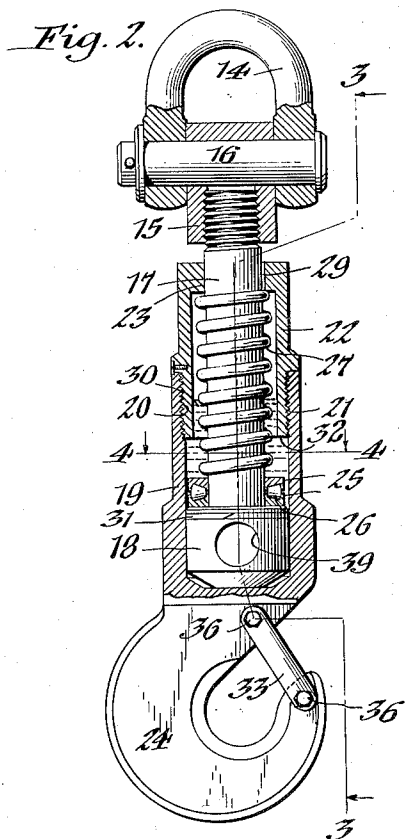
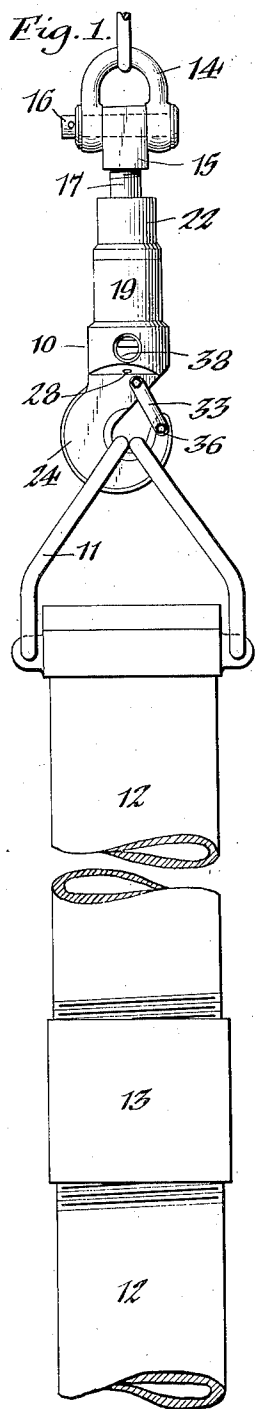
May 5, 1925.

1,536,617

G. A. MONTGOMERY
CASING HOOK FOR DRILLING APPARATUS

Filed July 23, 1923

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 6.

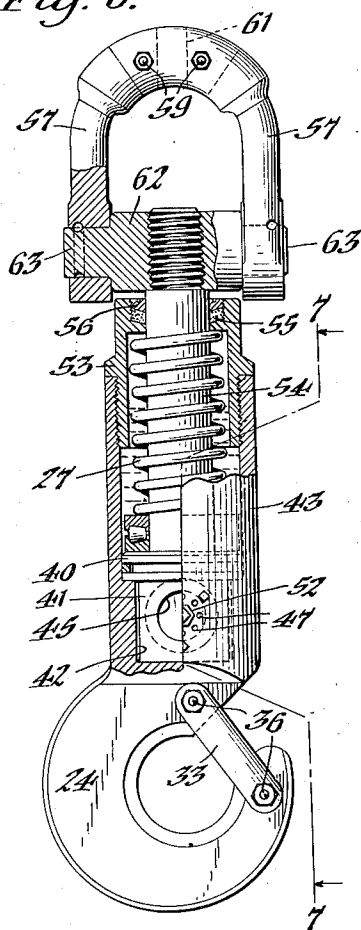


Fig. 7.

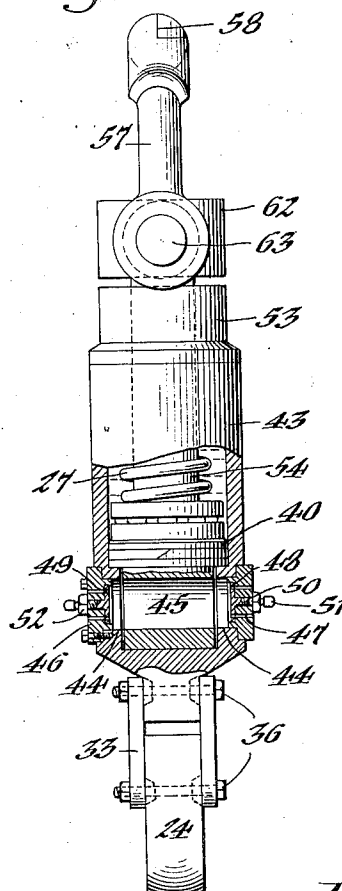


Fig. 8.

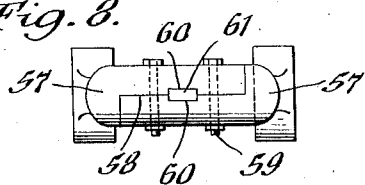


Fig. 9.

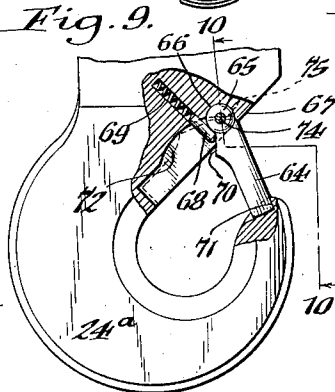
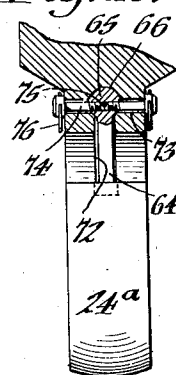


Fig. 10.



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UNITED STATES PATENT OFFICE.

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CASING HOOK FOR DRILLING APPARATUS.

Application filed July 23, 1923. Serial No. 653,064.

To all whom it may concern:

Be it known that I, GUSTAVUS A. MONTGOMERY, a citizen of Finland, residing at Titusville, in the county of Crawford and State of Pennsylvania, have invented new and useful Improvements in Casing Hooks for Drilling Apparatus, of which the following is a specification.

This invention relates to the casing hooks employed for handling the casings or drill stems of drilling apparatus.

Its principal object is to provide an improved resilient hook of this character which will effectively prevent undue wear or injury to the threaded ends of the casing or drill stems when screwing and unscrewing the coupling joints thereof.

Another object of the invention is to provide a swivel casing hook in which its center of gravity is below the point of suspension.

A further object is to provide the hook with novel mechanism for regulating its resilient or cushioning action.

A still further object of the invention is the provision of means for locking or throwing the resilient mechanism out of action, whereby the hook may be used in connection with rotary water swivel tools and the like.

Other features of the invention consists in the arrangement and construction of parts hereinafter more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a side elevation of the improved hook connected to the well casing. Figure 2 is an enlarged vertical section thereof, showing the hook in its normal elevated position. Figure 3 is a vertical section on line 3—3, Fig. 2, showing the hook in its extended operative position. Figure 4 is a horizontal section on line 4—4, Fig. 2. Figure 5 is a sectional detail view showing the means for locking the relatively movable parts of the hook together. Figure 6 is a sectional side elevation of a modified form of the improvement. Figure 7 is a vertical section thereof on line 7—7, Fig. 6. Figure 8 is a top plan view of the bail or clevis shown in Figs. 6 and 7. Figure 9 is a fragmentary sectional side elevation of the casing hook, showing a modified form of safety latch. Figure 10 is a transverse vertical section on line 10—10, Fig. 9.

Similar characters of reference indicate corresponding parts throughout the several views.

In the embodiment of the invention shown in Figs. 1-5, inclusive, the numeral 10 indicates generally the casing hook from which is suspended the customary elevator 11 attached to the upper end of the sectional well casing 12, two of such sections being shown in the drawings which are joined by the usual threaded coupling 13.

The improved casing hook is adapted to be supported from the derrick, not shown, and for this purpose is provided at its upper end with a detachable bail or clevis 14 connected to a cross-head 15 by a pin 16 from which the casing hook is pivotally suspended. Attached to and depending from the cross-head is a supporting or suspension member in the form of a guide stem or rod 17 which is provided at its lower end with a piston 18 preferably somewhat larger in cross section than said rod. A swiveling hook member or cylinder 19 is fitted or telescoped over the guide stem and piston for a limited yielding movement lengthwise thereof. The upper end of this cylinder is provided with an internal screw-thread 20 for receiving the externally-threaded end 21 of a hollow head or cap 22 having an opening 23 in its top through which the guide stem 17 extends. At its closed lower end said cylinder terminates in a suspension hook 24. Fitted over the lower end of the guide stem and resting on the upper side of its piston 18 is a roller bearing preferably consisting of upper and lower bearing rings 25 containing bearing rolls 26, the purpose of this bearing being to permit a free swiveling action of the hook member relatively to the suspension rod. A compression spring 27 is applied to the suspension rod and bears at its lower end against the roller bearing and at its upper end against the end of the cap 22, it being the function of this spring to resist movement of the hook member out of its normal elevated position, shown in Fig. 2, and form a yielding connection between said hook member 19 and the suspension rod 17 and thereby relieve the strain on the threaded joint of the casing sections in the act of unscrewing the coupling 13. It will be of course understood, that the expansion force

exerted by this spring is sufficient to overcome the weight of the well casing.

For the purpose of permitting the device to function properly and also to expel any 5 air which might be present in the cylinder 19, vents 28, 29 are provided in the bottom of said cylinder and in the cap 22 thereof, respectively.

In addition to the resilient action of the 10 hook afforded by the spring 27 and the air column in the cylinder, the latter is partially filled with a resistance fluid 30, such as oil or glycerine, for retarding or cushioning the action of said spring. To prevent 15 leakage of the oil past the piston 18 into the lower end of the cylinder, the former is provided with packing rings 31.

The downward movement of the hook member 19 is limited by the upper bearing 20 ring 25 abutting against a downwardly-facing shoulder 32 formed by the end of the cylinder-cap 22, thereby protecting the spring 27 against breakage.

By this construction and arrangement, a 25 resilient casing hook is provided in which its center of gravity is arranged below the suspension pin 16, none of the operative parts of the hook extending above this point.

Means are preferably provided for 30 strengthening the hook 24 and for preventing accidental displacement of the elevator 11 therefrom. To this end, substantially upright reinforcing straps or tie bars 33 are employed which are located at opposite 35 sides of the hook and extend across its open end. As shown in Figs. 2 and 3, these straps may be provided at their ends with projections 34 which engage corresponding sockets 35 in the opposite sides of the hook, bolts 40 36 serving to fasten said straps thereto.

The application of the hook for suspending the well casing is shown in Fig. 1, the weight of the casing causing the compression of the spring 27 and the combined column of air and oil serving to retard and 45 cushion the downward movement of the hook member relative to the suspension rod. The downward movement of said hook member is arrested by the lower end of the cap 22 thereof abutting against the upper 50 bearing ring 25, which, together with the supporting rod 17 and piston 18 sustains the weight of the well casing at a point below the pin 15, that is, the suspension point of the hook. When one of the couplings 55 13 of the casing 12 is unscrewed, the spring 27 exerts the necessary expansion force to relieve the screw threads of the load imposed thereon to permit of disconnecting the casing-section without undue wear or damage 60 to the threads; the roller bearings 26 allowing the free rotation of the hook and casing.

This casing hook is readily applicable for 65 use with rotary water swivel tools and the

like, which do not necessitate the use of a spring suspension. For this purpose, means are provided for detachably locking the hook-cylinder 19 with the suspension rod 17. As shown in Fig. 5 of the drawings, 70 this means preferably consists of a transverse locking pin 37 adapted to engage alining openings 38, 39 formed in the sides of said cylinder and in the piston 18, respectively. These openings are so located, that, 75 in the normally elevated position of the hook-cylinder shown in Figs. 2 and 5, they are in proper register to permit of the insertion or removal of the locking pin. By 80 this arrangement, the load is removed from the bearing 25, 26, and borne by the suspension rod and piston.

In attaching this casing hook to the sheave-block of the derrick, the use of the 85 well-known C-hook is eliminated, inasmuch as the clevis 14 of the hook is detachable therefrom by removing the pin 16, after which said clevis may be connected to the corresponding clevis of the sheave-block 90 and the parts again assembled.

In the embodiment of the invention shown in Figs. 6-8, inclusive, means are included 95 for regulating the venting of the cylinder and the construction of the hook-clevis is somewhat modified. The piston 40 is provided with a reduced skirt 41 which fits loosely in a reduced bore 42 formed in the lower end of the cylinder 43, the latter and 100 said piston being provided with alining openings 44, 45; respectively. Removably seated in the cylinder openings 44 are plugs 46, each containing an annular row of vent ports 47 regulated by an adjustable disk-valve 48 having a corresponding row of ports 49 adapted to 105 register more or less with said vent ports for controlling the admission and expulsion of air to and from the lower portion of the cylinder. Each valve disk is provided with 110 a threaded stem 50 having a head 51 for turning it and a nut 52 for locking it in a set position. The venting of the upper end of the cylinder is effected by providing that 115 portion of the cylinder cap 53 through which the connecting rod 54 extends with a packing 55 and an adjustable packing nut 56.

The hook clevis, in this instance, is constructed of two symmetrical half sections 57 120 each mortised out at its upper end, as shown at 58, to provide a lap joint, the same being detachably connected by bolts 59 or similar fastenings. The meeting faces of the upper portions of these sections may be 125 provided with recesses 60 forming a slot for receiving a centering key 61. The cross head 62, to which the rod 54 is connected, is provided at its ends with trunnions 63 with which the lower ends of the clevis-sections are adapted to removably engage.

This construction of clevis also eliminates the use of the customary C-hook, it being only necessary to separate the clevis-sections and remove one of them from the respective cross head trunnions to effect its attachment to the sheave-block clevis.

In Figs. 9 and 10 is shown a modified form of retaining strap or safety latch for preventing accidental displacement of the elevator 11 from the hook 24^a. This safety latch, designated generally by the numeral 64, is preferably in the form of a vertically-swinging link provided at its upper end with a spherical head or knuckle 65 arranged in a socket 66 formed in the face 67 of the hook. Said latch is normally held in its closed position, shown by full lines in Fig. 9, by a spring-pressed plunger 68 guided in an opening 69 in the hook-body and adapted to bear at its front end against the heel portion 70 of the latch, the lower end of the latter abutting against an inwardly-facing shoulder 71 located adjacent the open end of the hook. In its open position, shown by dotted lines in Fig. 9, the latch is adapted to disappear into the body of the hook, and for this purpose, the latter is provided with a forwardly-facing recess or pocket 72 to receive it. Extending freely through openings 73 in the hook and in threaded engagement with the latch-knuckle 65 are oppositely-disposed transverse pivot bolts 74 whose ends abut against each other and are locked to said knuckle by a pin 75 or similar fastening. The heads of the bolts may be provided with handles 76 by means of which the latch may be conveniently swung out of its closed position.

I claim as my invention:

1. A casing hook of the character described, comprising a pair of relatively movable members, one being formed with a piston and the other in the form of a cylinder engaging said piston, a casing hook carried by one of said members and capable of swiveling relatively to the other member, yieldable means for resisting movement of said members out of their normal contracted position, and anti-friction devices interposed between the opposing ends of said relatively movable members and applied to one of the latter, said devices being operative in the expanded position of said members to permit a free swiveling action of one member on the other.

2. A casing hook of the character described, comprising a pivotally-suspended guide stem terminating at its lower end in a piston, a movable cylinder for said piston provided at its lower end with a hook, a compression spring applied to said guide

stem between said piston and the head of said cylinder, and a resistance medium contained in the latter for retarding the action of the spring and for restraining the movement of the cylinder relative to the guide-stem and its piston.

3. A casing hook of the character described, comprising a pendant supporting member having a piston, a revolving hook-carrying member including a cylinder guided on said supporting member and the piston of said cylinder having a part arranged to engage the upper side of said bearing in its extended position to permit a free swiveling action of the hook-carrying member relative to the supporting member, for movement relative thereto, an anti-friction bearing supported by said piston, and a compression spring applied to the supporting member and bearing at its ends against said bearing and the head of said cylinder.

4. A casing hook of the character described, comprising a pendant supporting member having a piston, a revolving hook-carrying member including a cylinder guided on said supporting member and its piston for movement relative thereto, a removable head for said cylinder, an anti-friction bearing supported by said piston, said head having a downwardly-facing stop shoulder adapted to abut against said bearing and permit free rotary movement of the hook-carrying member in its extended position, and a compression spring applied to said supporting member between said bearing and the cylinder-head.

5. A casing hook of the character described, comprising a pendant supporting member, a hook-carrying member guided on said supporting member for movement relative thereto, resilient means interposed between said members, respectively, for resisting movement of the hook-carrying member out of its normally elevated position, and means for locking said members together as a unit, whereby said resilient means is rendered inoperative.

6. A casing hook of the character described, comprising a pendant supporting member, a hook-carrying member guided on said supporting member for movement relative thereto, resilient means interposed between said members, respectively, for resisting movement of the hook-carrying member out of its normally elevated position, said members having openings arranged to register with each other in such normally elevated position, and a locking pin arranged for engagement with said openings.

GUSTAVUS A. MONTGOMERY.

Certificate of Correction.

It is hereby certified that in Letters Patent No. 1,536,617, granted May 5, 1925, upon the application of Gustavus A. Montgomery, of Titusville, Pennsylvania, for an improvement in "Casing Hooks and Drilling Apparatus," errors appear in the printed specification requiring correction as follows: Page 3, claim 3, line 73, commencing with the word "of" strike out all to and including the word and comma "member,"; in line 78, and line 79, after the word "piston" insert the clause *said cylinder having a part arranged to engage the upper side of said bearing in its extended position to permit a free swiveling action of the hook carrying member relative to the supporting member,*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 2d day of June, A. D. 1925.

[SEAL.]

KARL FENNING,
Acting Commissioner of Patents.