

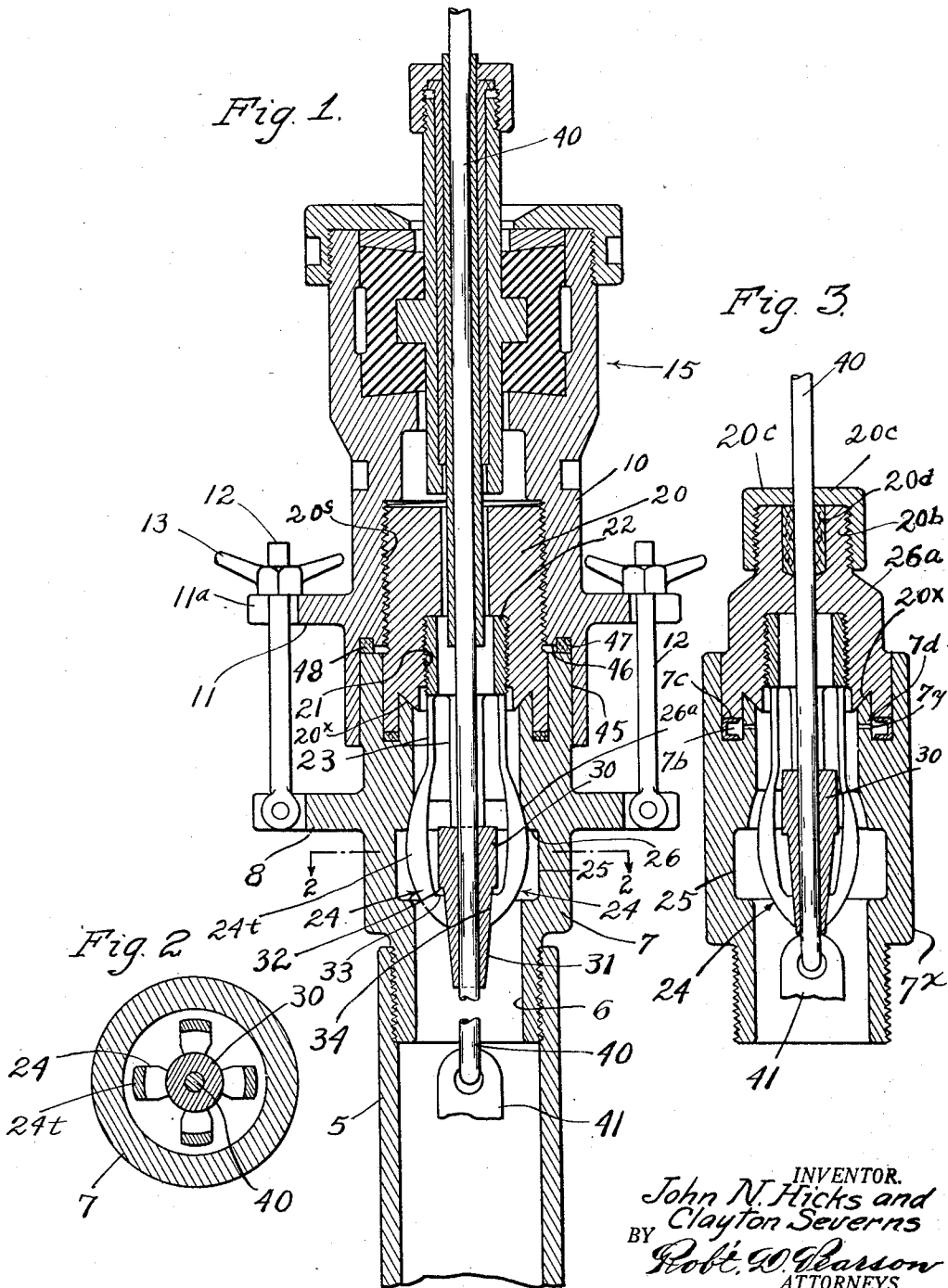
June 28, 1932.

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1,865,007

OIL SAVER

Filed June 30, 1930



UNITED STATES PATENT OFFICE

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OIL SAVER

Application filed June 30, 1930. Serial No. 464,887.

This invention relates to oil saving devices of the character used at the upper end of well tubing or casing for preventing waste of oil when the cable of the bailer or swab is being run out through the mouth of the well.

An object of the invention is to provide a more efficient, dependable and durable releasing device, which may be operated automatically, for the purpose of permitting the oil saver to be detached from the casing when necessary. It is a common fault of means used in the present practice to detachably secure the oil saver to the casing, to employ various kinds of triggers, dogs and catch devices which are not adapted to withstand the strain to which they may be subjected and which are apt to wear unduly on account of the comparatively small gripping space with which they are provided. By the present invention a large bearing surface is provided between the catch element and the part against which it operates, thus equalizing the strain and at the same time avoiding wear and reducing to a minimum danger of breaking.

A further object of the invention is to improve the general construction of devices of this kind with respect to simplicity, fewness of parts and adaptability for ready assembling and disassembling.

Other objects, advantages and features of invention may hereinafter appear.

Referring to the accompanying drawing which illustrates what is at present deemed to be a preferred embodiment of the invention,

Fig. 1 is a vertical, longitudinal mid-section through the complete device including in the view the upper portion of a well casing and showing the parts in the operative position. This view illustrates the device when made for use during drilling and swabbing operations.

Fig. 2 is a cross section on line 2—2 of Fig. 1.

Fig. 3 is a vertical mid-section of a form of the device suited for use during bailing and swabbing operations, the lower portion

of the view being broken away to contract the view.

Referring in detail to the drawing, into the top of the well casing 5 is screwed the externally threaded, reduced portion 6 of a tubular base member 7. Said base member 7 is provided with a plurality of radially extending lugs 8, two or more of which may be used as desired. Said lugs form a part of the clamping means whereby the tubular head 10 is secured in telescopic relation to said base member 7. Said tubular head 10 is provided with radially projecting external lugs 11 which correspond in number and position to the lugs 8 of the base member 7, the clamping structure being completed by means of the clamping rods 12, the lower ends of said rods being pivoted to said lugs 8, and their upper end portions being adapted to swing into and out of slots 11a of the lugs 11, and having screwed on to them, thumb nuts 13 whereby the parts are clamped into the assembled position.

The upper portion of the structure of the head 10, that is to say the packing container 15 thereof, will not be described in detail as, separately considered, it forms no part of the present invention.

Within the tubular base member 7 and tubular head 10, when assembled as shown in Fig. 1, is housed a body member or barrel 20. The lower end portion of said member 20 is provided with a screw threaded socket 21 into which screws the tubular shank 22 of the dog-carrying member, said shank being provided with a set of pendant cooperating dog-carrying arms 23 furnished at their lower ends with dogs 24. Each of said dogs is convex on its outer side and approximately straight on its inner side, as shown in Fig. 1.

The body 20 may have an externally screw threaded connection 20s with the tubular head 10 into which it extends.

The lumen of the tubular base member 7 is extended outwardly at 25 on all sides thereof, providing above the enlargement thus formed an annular shoulder or over-hanging portion 26 which is bevelled at 26a. Owing to the convex or centrally thickened construction of the dogs 24, said dogs approximately

conform to said bevel and also normally underlie to some extent and abut against said annular shoulder 26 to prevent the withdrawal of the parts connected with them from the tubular base member 7.

Within the set of dogs 24 and the arms 23 whereby said dogs are carried, is mounted a plunger 30 having a diametrically reduced tapered lower end portion 31 around the upper end of which tapered portion extends the annular shoulder 32.

Each of said dogs 24 is provided with an internal, upwardly directed shoulder 33 which is adapted to engage said annular shoulder 32 in order to keep said plunger 30 in the proper position. Said dogs 24 are also each provided with an inwardly directed face 34 which is adapted to engage the tapered portion 31 for the purpose which will later be more fully described.

The inward tension of the dogs' arms 23 is sufficient, when released by the taper 31, to allow said dogs 24 to pass up through the lumen of the base member 7, releasing the friction hold due to the outside portion of dogs 24 contacting with the annular shoulder 26.

In Fig. 1 there is shown, attached to the lower end of the cable 40, a drilling or swabbing tool 41. The plunger 30 is closely fitted around the cable 40, but the working fit between these two parts is sufficiently loose to insure that said plunger will not be lifted until the cable is sufficiently withdrawn to bring the tool 41 at the lower end of said cable against the lower end of said plunger 30. When this occurs the tapered, lower end portion 31 of the plunger 30 will be moved upwardly from between the faces 34 of the dogs 24, thus permitting the spring arms 23 of said dogs to move them inwardly whereupon continued further upward movement of the cable 40, (assuming that the clamping rods 12 have been previously released from the lugs 11) will lift free from the remaining parts of the device, not only the dogs 24 and their arms 23, but also will raise the tubular body 20, tubular head 10 and all parts connected with these members, the line of separation taking place where the tubular head 10 telescopes over the upper end of the tubular base member 7. Owing to the dogs 24 being thickened at 24 $\frac{1}{2}$ they are kept from bending in this region, and the resiliency of the members of which they form a part is confined to their arm portions 23. The dependable operation of the dogs is also insured by positioning the control member or plunger 30 between them in a position to engage the sides of the dogs which are opposite to their gripping faces and at points located not far below these faces.

The lower end portion of the tubular head 10 has the lumen thereof enlarged at 45 thus forming at the upper end of said enlargement an annular shoulder 46. Said annular

shoulder 46 is desirably provided with a groove 47 in which is seated a packing ring 48. Said ring 48 is engaged by the upper end of the tubular base member 7 when the device is assembled as shown in Fig. 1.

In the upper portion of the modification shown in Fig. 3 the tubular base member 7 α is an annular packing recess 7b in which is placed an expansible U-shaped strip of packing 7c. One or more pressure supply ducts 7d lead from the interior of the base member 7 to said recess 7b in order to provide an expansive force to said packing whenever a gas or liquid pressure occurs within said member 7.

In Fig. 3 is reproduced a portion of the structure of Fig. 1, but in said Fig. 3 the packing container 15 of Fig. 1 is omitted, and instead, the tubular member 20 α is provided with a diametrically reduced externally threaded top portion 20b on to which is screwed a cap 20c, a packing chamber 20d being provided within said reduced portion 20b. When the form shown in Fig. 3 is used, the weight of the tubular head 20 α and parts carried thereby is relied upon to keep these parts down in the operative position except when the cable 40 is withdrawn to such an extent as to lift the plunger 30 in the manner which has already been described in connection with Fig. 1. In this view the U-shaped packing 7c is positioned upon its side and pressure is supplied thereto through ducts 7y. In both the forms illustrated a tapered fit 20 α is shown between base member 7 and tubular head 20 in order to form a joint adapted to cooperate with the packing feature to prevent leakage.

It will be seen that the device is made up of lower and upper separable sections, the upper section by means of its shoulder 46 resting upon the top of the lower section. The upper section includes the parts 10 and 15 and the lower section includes the tubular base member 7 which is adapted to be screwed into the upper end of the well casing.

We claim:

1. In an oil saving device for wells, a tubular base member having a lumen therein which is provided with an enlargement extending therearound thus forming an annular shoulder around the upper portion of said enlargement, the lower end portion of said tubular base member being adapted for attachment to the upper end of a well casing, the lumen of said tubular base member being sufficiently large to permit the insertion of drilling tools therethrough into the well, means detachably secured to said tubular base member to surround a cable or tool pipe line for the purpose of preventing leakage, a circularly arranged plurality of pendant dogs carried by said means, said dogs having outwardly directed convex surfaces yieldingly held into engagement with the under

side of said annular shoulder thereby normally to lock them against upward withdrawal, a plunger adapted to move up and down within said plurality of dogs, said plunger having a tapered lower end portion engaged by said dogs and through which the cable or tool pipe line has a working fit, said plunger being adapted normally to hold said dogs out in the locked position, said plunger also being adapted to be engaged and lifted by parts to which said cable is attached when the cable is withdrawn from the well, thereby to release said dogs from said annular shoulder to permit them and the parts by which they are carried to be separated from the well casing.

2. In an oil saving device, means adapted to surround a cable or tool pipe line and having a working fit with relation thereto to prevent escape of liquid or gas from the well; said means comprising upper and lower separable sections, the lower section being adapted for attachment to the upper end of a well casing, said lower section being provided with a chamber having an inwardly directed shoulder, a set of pendant dogs connected with said upper section and adapted to swing outwardly from each other to engage said shoulder, and a control member mounted between said dogs and adapted in one position to hold said dogs extended to engage said shoulder and in another position permitting said dogs to be retracted to disengage said shoulder.

3. In an oil saving device, means adapted to surround a cable or tool pipe line and having a working fit with relation thereto to prevent escape of liquid or gas from the well; said means comprising upper and lower separable sections, the lower section being adapted for attachment to the upper end of a well casing; and means operable automatically by the withdrawal of tools from the well to lift said upper section free from said lower section, said automatically operable means comprising an annular internally projecting shoulder formed on one of said separable sections, such section being provided with an enlarged lumen around the upper portion of which said shoulder extends, a plurality of pendant dogs connected with the upper section of said separable sections, said dogs having outwardly directed convex portions to extend into said enlarged portion of said lumen, and a tapered member between said dogs and engaged by them, said dogs being resiliently supported so that when said tapered member is raised they will be disengaged from said annular shoulder.

4. In an oil saving device, means adapted to surround a cable or tool pipe line and having a working fit with relation thereto to prevent escape of liquid or gas from the well; said means comprising upper and lower separable sections, the lower section being adapt-

ed for attachment to the upper end of a well casing; and means operable automatically by the withdrawal of tools from the well to lift said upper section free from said lower section, said automatically operable means comprising an annular internally projecting shoulder formed on one of said separable sections, a plurality of pendant dogs connected with the upper section of said separable sections, said dogs having inwardly and outwardly extending surfaces, and control means around which said dogs are arranged, said control means normally holding said dogs away from each other sufficiently to cause them to form a locking engagement with said shoulder, said control member being upwardly movable to allow said dogs to approach each other and thereby recede from the locking position.

5. In an oil saving device, means adapted to surround a cable or tool pipe line and having a working fit with relation thereto to prevent escape of liquid or gas from the well; said means comprising upper and lower separable sections, the lower section being adapted for attachment to the upper end of a well casing, said lower section being provided with a chamber having an inwardly directed shoulder, a set of pendant dogs connected with said upper section and adapted to swing outwardly from each other to engage said shoulder, and a control member mounted between said dogs and adapted in one position to permit said dogs to be retracted to disengage said shoulder, and in another position maintaining said dogs extended in a position to have a locking engagement with said shoulder, said control member and said dogs having cooperating shoulders in order to support said control member in the latter position.

In testimony whereof we hereunto affix our signatures.

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