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E. J. BROBERG

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CAVE PACKER

Filed May 15, 1923

2 Sheets-Sheet 2

FIG. 3.

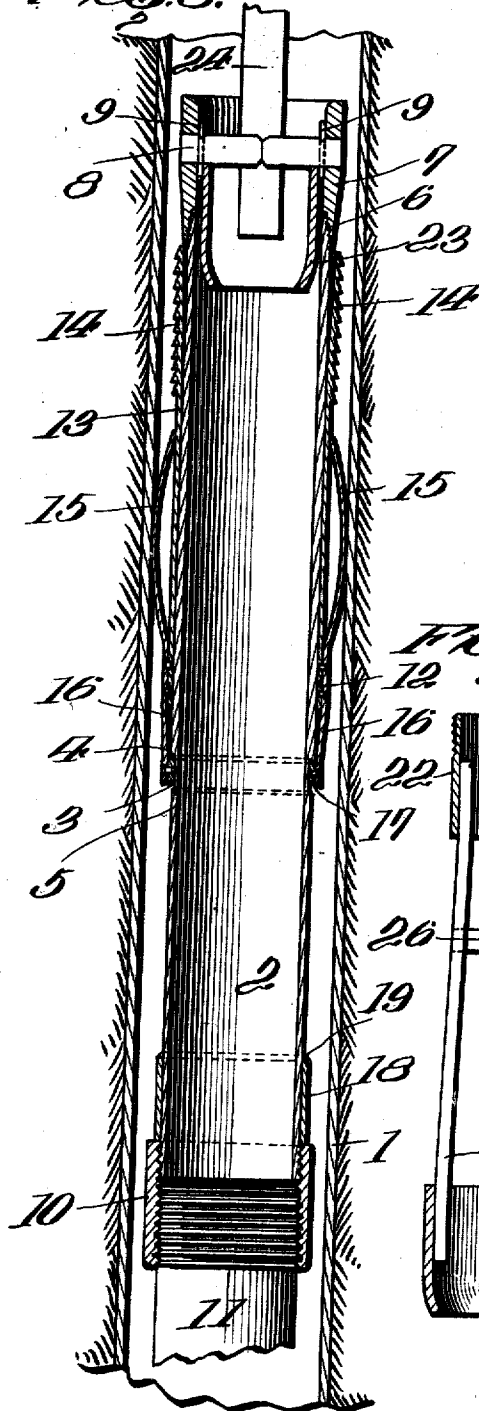


FIG. 4.

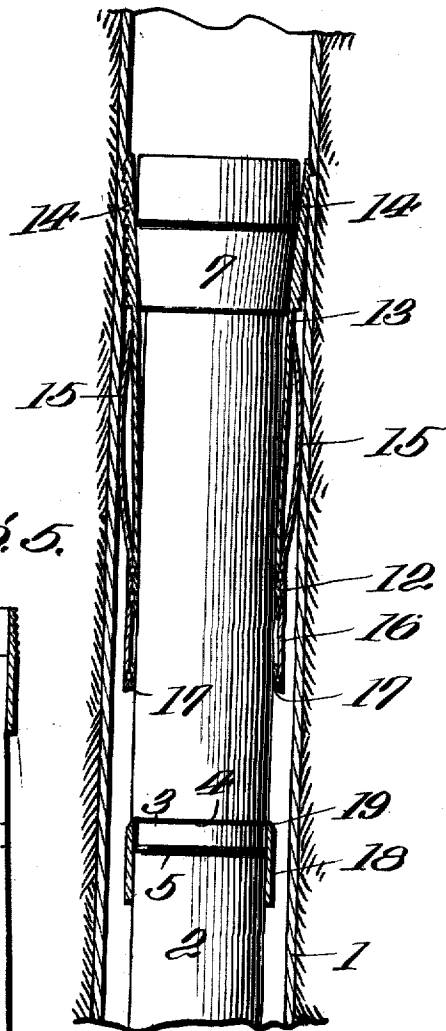
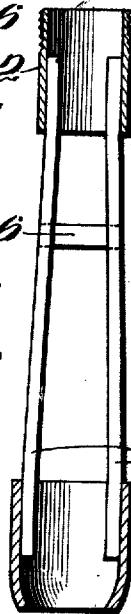


FIG. 5.



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By

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## UNITED STATES PATENT OFFICE.

EARL JOHN BROBERG, OF COFFEYVILLE, KANSAS.

## CAVE PACKER.

Application filed May 15, 1923. Serial No. 639,112.

*To all whom it may concern:*

Be it known that I, EARL JOHN BROBERG, a citizen of the United States, residing at Coffeyville, in the county of Montgomery and State of Kansas, have invented certain new and useful Improvements in Cave Packers, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in cave packers especially adapted to be used in connection with oil wells, the object being to provide a packer which can be set by the common disc tools, thereby overcoming the difficulties existing in setting cave packers.

Another and further object of the invention is to provide a packer in which the slips are so mounted that the body of the packer is allowed a vertical movement within the casing of the well so as to position the packer, means being provided for releasing the slips so as to allow the same to ride up on the conical portion of the body to set the slips so as to lock the packer in its desired position.

Another and further object of the invention is to provide novel means for supporting the packer by a letting-in tool attached to a sub on the tools and so mounted within the packer that the packer can be moved up and down within the well and yet be detached when desired by simply jarring down, allowing the letting-in tool to drop which breaks the fragile disc means.

A still further object of the invention is to provide a packer which is exceedingly simple and cheap in construction and one in which the parts are so arranged and connected together that a very strong durable packer is formed and one which can be readily set and reset to block off the cave-in portion of the well.

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

In the drawings,

Figure 1 is a vertical section through a portion of a well and casing showing my improved construction of packer attached to the letting-in tool;

Figure 2 is a similar section showing the body of the packer raised to disengage the

dogs in order to allow the slips to ride up on the conical head.

Figure 3 is a vertical section through the packer showing the same in position before being set;

Figure 4 is a vertical section through the packer showing the same set; and

Figure 5 is a vertical section through the bumper.

In the drawing 1 indicates a well casing which may be the initial casing in an oil well and is herein shown only for the purpose of illustrating my improved construction of packer which is capable of being set within the casing or against the wall of the hole bored through the strata of rock or earth, as the case may be.

My improved construction of packer comprises a cylindrical body 2 having an annular groove 3, the upper wall of which is undercut as shown at 4 and the lower wall beveled as shown at 5 for the purpose hereinafter fully described. The portion of the cylindrical body above the groove 3 is enlarged and is provided with a reduced threaded upper end 6 on which is arranged a conical head 7 having oppositely disposed openings to receive a fragile disc 8, which is preferably held in position by pins 9.

The lower end of the cylindrical body 2 is externally threaded to receive a coupling 10 connecting the pipe or liner 11 thereto, which may be of the ordinary construction of liner now in use.

Slidably mounted on the enlarged portion of the cylindrical body 2 is a ring 12 having integral upwardly extending arms 13 terminating in serrated jaws or slips 14, which are adapted to cooperate with the conical head 7 for expanding the slips into engagement with the wall of the well for locking the packer in its adjusted position as will be hereinafter fully described.

Secured to the ring 12, preferably by rivets as clearly shown, are bowed springs 15 provided with depending end portions 16 provided with dogs 17 corresponding in shape to the walls of the groove 3 and adapted to be normally held into the groove so as to lock the slips in the position shown in Figure 1.

Slidably mounted on the body 2 between the groove 3 and coupling 10 is a sleeve 18 which is provided with a beveled upper

edge 19 adapted to ride under the beveled edges of the dogs 17 for the purpose of disengaging the dogs from the groove in order to allow the slips to be expanded as will be hereinafter fully described.

In order to provide means for detachably connecting the packer to the letting-in tool, I provide the sub of the tool 20 with a coupling 21 to which is connected a bumper composed of sleeves 22 and 23 connected together by arms 24, the sleeve 22 being adapted to be connected to the coupling 21 and the sleeve 23 to fit within the head of the packer as clearly shown in Figure 3. The arms 24 are connected together by a bar 26 which is adapted to engage the fragile disc 8 and break the same when it is desired to detach the letting-in tool from the packer, when the packer has been set in its desired position.

In connecting the letting-in tool to the packer, the lower sleeve 23 is dropped into the head of the packer and the disc 8 is then placed in position so that a connection is formed between the letting-in tool and packer.

In setting the packer, the tools carrying the packer and liner are lowered into the hole by means of a wire drill line attached to the tools. Upon reaching the desired point to set the packer, the tools are raised a slight distance and then lowered easily until the wire drill line begins to show a slack, which indicates that the weight is off the wire line and that the slips are in engagement with the wall of the well. If, for any reason, the packer is not set low enough, the tools are raised about eighteen inches and the packer and liner lowered. If too low, the packer is raised as one skilled in the art soon is able to position the packer at the cave-in or desired point of setting and then easily lowered until wire line again shows slack indicating packer has set.

When the packer has been properly positioned, the body of the packer is raised vertically by drawing up on the drilling line and through its connection with the packer by means of the letting-in tool, the body is raised until the sleeve 18 rides under the dogs, as the sleeve assembly, composed of the slips, springs and dogs, is held stationary by the frictional contact of the springs against the wall of the well.

The sleeve 18 is then held by frictional contact with the dogs so that when the body of the packer is lowered, the dogs are carried over the groove by the sleeve and by the weight of the liner, the packer is drawn downwardly so as to allow the slips to ride over the conical head and be expanded against the wall of the well, as shown in Figure 4, to lock the packer in its adjusted position. The packer having thus been set, the letting-in tool is allowed to drop so as

to bring the cross bar 26 into engagement with the fragile disc, which breaks the disc so as to allow the bumper to become detached from the packer and the bumper is drawn out of the well with the letting-in tool. The slidably mounted sleeve 18 drops back into its original position by gravity as soon as it has allowed the dogs to pass over the annular shoulder of the packer body and in Figure 4 I have shown the sleeve in its utmost position just before it starts to move downwardly by its own weight.

I am aware that prior to my invention a packer has been set by a letting-in tool but with my improved construction, novel means is provided for locking the slip assembly to the body of the packer so as to allow the body to move independently of the slip assembly in order to disengage the slip assembly and locking means and I have found in practice that a packer constructed in accordance with my invention has many advantages over prior devices of this kind.

From the foregoing description it will be seen that I have provided a cave packer especially adapted to be used for oil, gas and water wells in which the parts are so mounted that the packer can be cheaply constructed and quickly set by tools.

What I claim is:—

1. A cave packer for oil, gas or water wells comprising a body having a conical head, a slip assembly mounted on said body provided with springs for frictional engagement with the wall of the well, means carried by said slip assembly for locking said slip assembly in a predetermined position on said body in respect to the conical head thereof and a sleeve slidably mounted upon said body and adapted to disengage said locking means when said body is moved independently of said slip assembly.

2. A cave packer for oil, gas and water wells comprising a cylindrical body having an enlarged upper portion provided with a conical head, said body having an annular groove, a slip assembly slidably mounted upon said body provided with bowed springs having depending ends carrying dogs adapted to engage said groove and a sleeve loosely mounted on said body adapted to be engaged by said dogs for allowing said slip assembly to move on said body to be expanded by said conical head.

3. A cave packer comprising a body having a conical head and a slip assembly slidably mounted upon said body adapted to cooperate with said head, bowed springs carried by said slip assembly having means for locking said slip assembly in a predetermined position upon said body and means carried by said body for disengaging said locking means to allow said slip assembly to ride over said conical head for setting said slips.

4. A cave packer comprising a cylindrical body having an annular groove provided with a beveled lower edge, of a ring slidably mounted on said body provided with arms carrying slips, bowed springs carried by said ring provided with depending ends carrying dogs cooperating with said groove, said dogs being adapted to ride out of said groove on the upward movement of said body, a member slidably mounted on the body between the coupling and the sleeve arranged in the path of travel of said dogs and engaged thereby for allowing said dogs to ride over said annular groove and a conical head carried by said body adapted to be engaged by the slips of said assembly.

5. A cave packer comprising a body having a conical head, a slip assembly mounted thereon provided with means for locking said slip assembly in a predetermined position on said body, bowed springs carried by said slip assembly for frictional engagement with the wall of the well, a letting-in tool adapted to be carried by the tools detachably connected to said body and a sleeve loosely mounted on said body cooperating

with said locking means for allowing said slip assembly to move into engagement with the conical head.

6. A cave packer for oil, gas and water wells comprising a cylindrical body having a reduced lower end, a conical head carried by the upper end of said body, a slip assembly slidably mounted on the enlarged portion of said body, said body at the junction of the enlarged portion being provided with an annular groove having a beveled lower wall, frictional bowed springs carried by said slip assembly provided with depending ends carrying dogs adapted to extend into said groove for locking said slips in a predetermined position in respect to said conical head, said dogs being capable of being disengaged from said groove by the upward movement of said body in respect to said slip assembly and means carried by the lower end of said body cooperating with said dogs for allowing said body to move independently of said slip assembly.

In testimony whereof I hereunto affix my signature.

EARL JOHN BROBERG.