C. P. CLAYTON.

WELL PACKER.

APPLICATION FILED MAY 9, 1913.

1,104,877. Patented July 28, 1914.

Fig. 1.

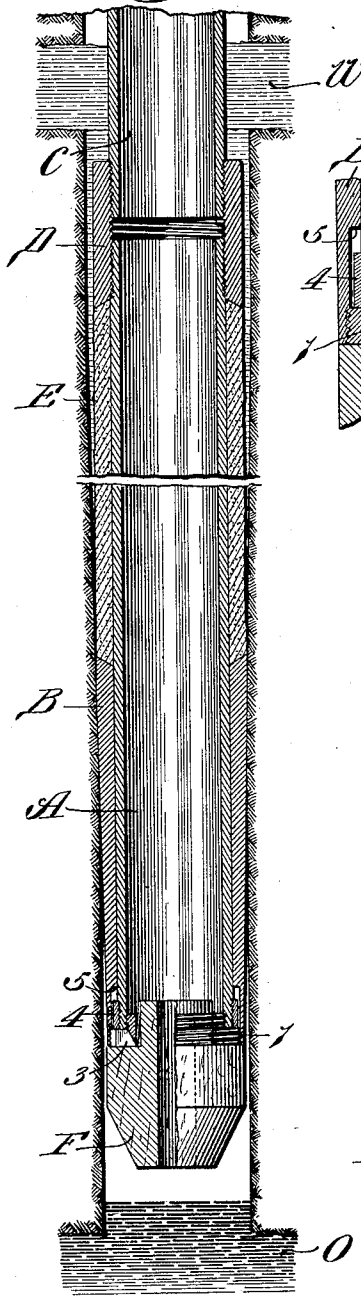


Fig. 3.

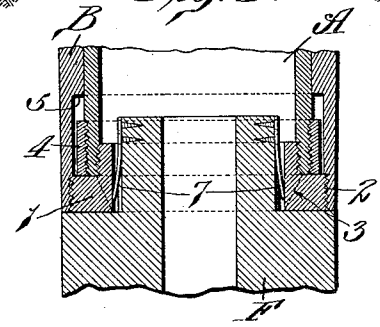


Fig. 4.

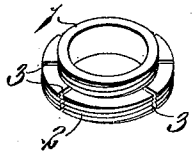


Fig. 5.

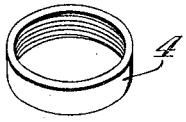


Fig. 6.

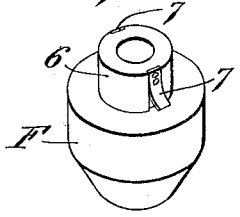
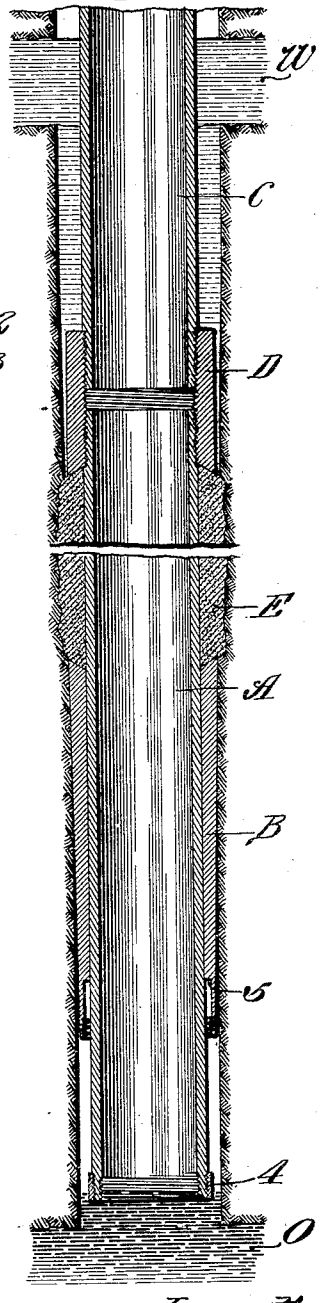


Fig. 2.



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by Bakewell & Church Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES P. CLAYTON, OF SHREVEPORT, LOUISIANA.

WELL-PACKER.

1,104,877. Specification of Letters Patent. Patented July 28, 1914.

Application filed May 9, 1913. Serial No. 766,497.

To all whom it may concern:

Be it known that I, CHARLES P. CLAYTON, a citizen of the United States, residing at Shreveport, Louisiana, have invented a certain new and useful Improvement in Well-Packers, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to well packers such as are used in oil wells to prevent water from leaking down around the "set-shoe" at the lower end of the casing and becoming mixed with the oil.

In drilling an oil well a stratum or vein of water is frequently encountered just before the oil is reached, and in order to prevent said water from flowing down around the set-shoe at the lower end of the casing and mingling with the oil, it has heretofore been the usual practice to cement the well, namely, introduce cement between the casing and the wall of the well at a point below the vein of water so as to block off the water or prevent it from flowing downwardly around the set-shoe and leaking under the lower end of the set-shoe which forms the bottom section of the casing of the well. Cementing a well is a costly operation in some instances on account of the labor and material required but the principal objection or drawback is the great delay in waiting for the cement to set. Very often, an entire week is consumed in cementing a well, and as the well is out of commission during this period the loss to the oil producer is very great.

The main object of my invention is to provide a well-packer of simple construction that enables a well to be packed quickly and without the aid of cement or a similar material.

Another object is to provide a practicable and efficient well-packer that can be installed and removed easily. And still another object is to provide a combined set-shoe and packer comprising a tapered member that is adapted to be wedged tightly in operative position at the lower end of the well, a tubular-shaped member telescoped inside of said tapered member and adapted to serve as the bottom section of the well-casing and an expansible member which is adapted to be forced snugly into engagement with the wall of the well preferably at a point above said tapered member so as to prevent water from leaking down around said tubular-shaped member and becoming mixed with the oil that flows from the well.

Other objects and desirable features of my invention will be hereinafter pointed out.

Figure 1 of the drawings is a vertical sectional view of a combined set-shoe and packer constructed in accordance with my invention, showing it arranged in operative position in a well preparatory to forcing the expansible member or part of the device into snug engagement with the wall of the well; Fig. 2 is a similar view showing the device ready for use after said expansible member or portion has been expanded laterally into engagement with the wall of the well; Fig. 3 is an enlarged vertical sectional view of the lower part of the device and illustrates the ring or collar that I prefer to use for holding the two telescoped members of the device and the end plug or stopper in operative position when the device is being installed in the well; Fig. 4 is a perspective view of said ring or collar; Fig. 5 is a perspective view of the reinforcing ring on the lower end of the tubular-shaped member of the device that forms the lower section of the well-casing; and Fig. 6 is a perspective view of the end plug or stopper that is inserted in the lower end of said tubular-shaped member when the device is being installed.

Referring to the drawings which illustrate the preferred form of my invention, A designates a tubular-shaped member that is telescoped inside of a tubular-shaped member B whose outer surface is preferably tapered slightly so that it will wedge tightly against the side of the well and thus form a rigid abutment for an expansible member or medium that is forced into snug engagement with the wall of the well when it is compressed.

The inner tubular-shaped member A is preferably of approximately the same diameter as the well-casing C, and is connected to said casing by an internally screw-threaded sleeve D which is screwed onto the lower end of the well-casing and onto the upper end of the member A prior to the operation of introducing the casing into the well. The tapered member B is shorter than the inner tubular-shaped member A, and an expansible member or medium E is arranged outside of the member A at a point between the upper end of the member B and the lower edge of the sleeve D which connects the device to the well-casing. The member E can

be formed from any suitable material that will serve as a packing but I prefer to form said member E from bagging, burlap, or other suitable material, that is wrapped around the upper portion of the tubular-shaped member A, as I have found in practice that such materials form a very efficient packing through which water can not penetrate after the material has been compressed tightly.

When the device is first installed in the well the members A and B occupy the positions shown in Fig. 1, but after the tapered member B has become wedged tightly against the side of the well the inner tubular-shaped member A is moved downwardly with relation to the member B so as to compress the member E and force it laterally into snug engagement with the wall of the well, the connecting collar D that laps over the upper end of the expansible member E exerting downward pressure on said member E, and the tapered member B that is arranged below the member E serving as an abutment or stop that resists the downward movement of said expansible member. In other words, the packing material E that lies between the upper end of the tapered member B of the device and the connecting sleeve D is compressed to such a degree when the casing C and member A are forced downwardly that it will be impossible for water to leak through or past said packing material and thus become mixed with the oil that flows out of the well through the casing.

Any suitable means may be used for retaining the members A and B in the position shown in Fig. 1 when the device is first inserted in the well but I prefer to connect said members together by means of a device which can be broken easily after the member A has become wedged tightly against the side of the well. The device herein shown for this purpose consists of a ring 1 screwed into the lower end of the tubular-shaped member A and provided with a laterally projecting externally screw-threaded flange 2 that is screwed into the lower end of the tapered abutment member B, as shown in Figs. 1 and 3, said flange 2 being preferably provided with slots or kerfs 3, as shown in Fig. 4, so that it can be broken easily when it is desired to move the inner member A downwardly so as to compress the packing material. A ring 4 that is mounted on the outside of the member A at the lower end of same reinforces and strengthens said member and also forms a shoulder or abutment which strikes against an annular shoulder 5 on the member B and thus dislodges or unseats said member B when the device is being withdrawn from the well. I have herein shown the ring 4 as being screwed onto the lower end of the member A but it will, of course, be understood that said ring could be connected to said member in any other suitable manner without departing from the spirit of my invention.

In order to protect the lower ends of the members A and B and prevent the member A from becoming clogged when the device is being inserted in the well, I have equipped the device with an end plug or stopper F which preferably consists of a cone-shaped plug of wood provided with a shank 6 that projects upwardly into the ring 1, said shank having one or more leaf-springs 7 or other suitable devices that exert sufficient frictional pressure on the ring 1 to hold the plug in operative position.

After the well has been drilled my combined set-shoe and packer is connected to the lower end of the well-casing C by means of the collar D. The casing is thereafter introduced into the well and is forced downwardly until the tapered member B becomes wedged tightly against the side of the well, as shown in Fig. 1, at a point a trifle above the oil O. Thereafter, a drill is introduced into the casing and into the tubular-shaped member A so as to destroy or break the ring 1 and the wooden end plug F. After the ring 1 has been broken the casing C and tubular-shaped member A are moved downwardly with relation to the tapered abutment member B that is wedged tightly against the wall of the well, and this downward movement of the casing and member A causes the packing material E to be compressed to such a degree that it expands laterally into snug engagement with the side of the well, as shown in Fig. 2, the weight or downward pressure that the casing C exerts on the packing material F causing said material to become compressed so tightly that it is impossible for water to penetrate through said material and mingle with the oil at the bottom of the well. I prefer to bevel the upper end of the abutment member B and the lower edge of the sleeve D in opposite directions, as shown in Fig. 2, so as to tend to force the packing material tightly against the outer surface of the tubular-shaped member A when said packing material is being compressed. When the casing is removed from the well the reinforcing collar 4 on the lower end of the member A strikes against the annular shoulder on the abutment member B and thus causes said member B to move upwardly with the member A that is connected to the casing.

From the foregoing it will be seen that my combined set-shoe and packer effectively prevents a vein of water W, located above the oil, from flowing downwardly around the casing and mingling with the cil.

The device can be installed and removed

quickly and easily; it is of such simple construction that it can be manufactured at a low cost; and the packing material can be renewed at a small cost owing to the fact that burlap or bagging is preferably used to form the expansible member E of the device.

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

1. A well-packer comprising a tubular-shaped member that is adapted to be connected to a well-casing so as to form the bottom section of the casing, a packing member or medium surrounding said tubular-shaped member, means for expanding said packing member laterally into snug engagement with the wall of the well so as to prevent water from flowing downwardly around said tubular-shaped member, and a temporary closure for the lower end of said member for preventing said member from becoming clogged when the device is being inserted in the well, said closure being adapted to be removed after the device has been positioned.

2. A combined set-shoe and well-packer comprising a tubular-shaped member that is adapted to be connected to the lower end of a well-casing, an abutment member surrounding said tubular-shaped member and tapered inwardly from its upper toward its lower end, and means consisting of a frangible ring screwed into the lower end portions of said members for preventing said tubular-shaped member and said abutment member from moving longitudinally with relation to each other during the operation of wedging said abutment member in the well.

3. A combined set-shoe and well-packer comprising a tubular-shaped member that is adapted to be connected to the lower end of a well-casing, an abutment member surrounding said tubular-shaped member and tapered inwardly from its upper toward its lower end, means consisting of a frangible ring screwed into the lower end portions of said members for preventing said tubular-shaped member and said abutment member from moving longitudinally with relation to each other during the operation of wedging said abutment member in the well, and a temporary plug or closure for the lower end of said tubular-shaped member that is adapted to be destroyed after the device has been positioned properly.

4. A combined set-shoe and well-packer comprising a tubular-shaped member that is adapted to be connected to the lower end of a well-casing, an abutment member surrounding said tubular-shaped member and adapted to be wedged tightly against the wall of the well, a connecting device for fastening said tubular-shaped member and abutment member together when the device is being installed in the well, said device being adapted to be broken so as to release said tubular-shaped member after said abutment member has been seated in the well, a packing member or medium surrounding said tubular-shaped member above said abutment member, means coöperating with said abutment member to compress said packing medium when the tubular-shaped member is forced downwardly with relation to the abutment member, and means for dislodging or unseating said abutment member when said tubular-shaped member is withdrawn from the well.

5. A combined set-shoe and well-packer comprising a tubular-shaped member that is adapted to be connected to the lower end of a well-casing, an abutment member surrounding said tubular-shaped member and adapted to be wedged tightly against the wall of the well, a connecting device for fastening said tubular-shaped member and abutment member together when the device is being installed in the well, said device being adapted to be broken so as to release said tubular-shaped member after said abutment member has been seated in the well, a packing member or medium surrounding said tubular-shaped member above said abutment member, means coöperating with said abutment member to compress said packing medium when the tubular-shaped member is forced downwardly with relation to the abutment member, and a reinforcing device on the lower end of said tubular-shaped member that strikes against a shoulder said abutment member and thus dislodges or unseats said member when the tubular-shaped member is being withdrawn from the well.

6. A combined set-shoe and well-packer comprising a tubular-shaped member, an abutment member surrounding said tubular-shaped member, a ring screwed into the lower end of said tubular-shaped member and provided with a laterally projecting flange that is screwed into the lower end of said abutment member, said ring being adapted to be destroyed during the operation of installing the device in operative position, a packing member or medium surrounding said tubular-shaped member at a point above said abutment member, and means that coöperates with said abutment member for compressing said packing medium.

7. A combined set-shoe and well-packer comprising a tubular-shaped member, an abutment member surrounding said tubular-shaped member, a ring screwed into the lower end of said tubular-shaped member and provided with a laterally projecting flange that is screwed into the lower end of said abutment member, said ring being

adapted to be destroyed during the operation of installing the device in operative position, a packing member or medium surrounding said tubular-shaped member at a point above said abutment member, and means that coöperates with said abutment member for compressing said packing medium, the laterally projecting flange on said ring being provided with slots or kerfs so as to facilitate the destruction of said ring.

8. A combined set-shoe and well-packer comprising a tubular-shaped member, an abutment member surrounding said tubular-shaped member, a ring screwed into the lower end of said tubular-shaped member and provided with a laterally projecting flange that is screwed into the lower end of said abutment member, said ring being adapted to be destroyed during the operation of installing the device in operative position, a packing member or medium surrounding said tubular-shaped member at a point above said abutment member, means that coöperates with said abutment member for compressing said packing medium, the laterally projecting flange on said ring being provided with slots or kerfs so as to facilitate the destruction of said ring, and means for preventing said tubular-shaped member from becoming clogged when the device is being forced downwardly into the well.

9. A combined set-shoe and well-packer comprising a tubular-shaped member, an abutment member surrounding said tubular-shaped member, a ring screwed into the lower end of said tubular-shaped member and provided with a laterally projecting flange that is screwed into the lower end of said abutment member, said ring being adapted to be destroyed during the operation of installing the device in operative position, a packing member or medium surrounding said tubular-shaped member at a point above said abutment member, means that coöperates with said abutment member for compressing said packing medium, and a reinforcing device on the lower end of said tubular-shaped member that strikes against an annular shoulder on said abutment member when the device is being removed from the well.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this 26th day of April 1913.

CHARLES P. CLAYTON.

Witnesses:
E. AUXTER,
R. C. STEWART.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

Correction in Letters Patent No. 1,104,877.

It is hereby certified that in Letters Patent No. 1,104,877, granted July 28, 1914, upon the application of Charles P. Clayton, of Shreveport, Louisiana, for an improvement in "Well-Packers," an error appears in the printed specification requiring correction as follows: Page 3, line 103, before the word "said" insert the word *on;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 25th day of August, A. D., 1914.

[SEAL.]

J. T. NEWTON,

Acting Commissioner of Patents.