

No. 820,149.

PATENTED MAY 8, 1906.

G. A. SPANG.
PACKER.

APPLICATION FILED FEB. 17, 1906.

Fig. 1.

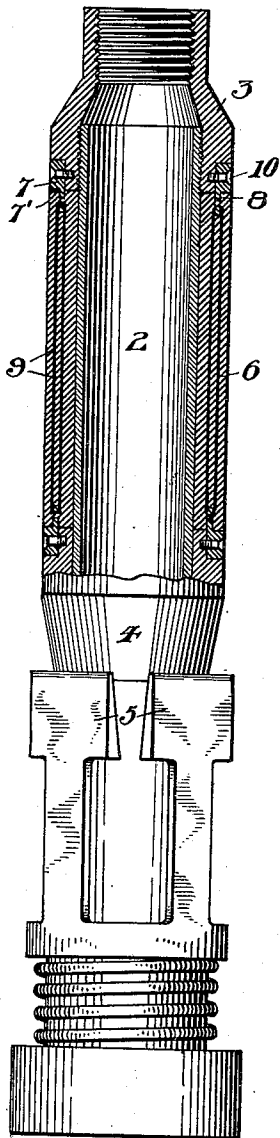


Fig. 2.

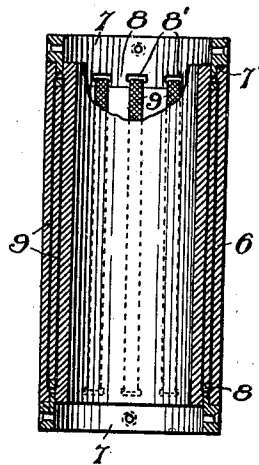


Fig. 3.

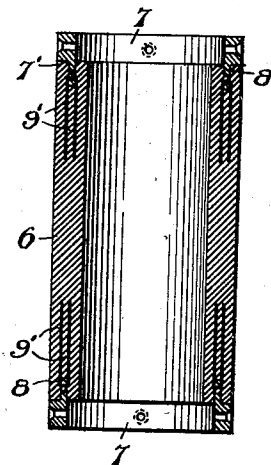
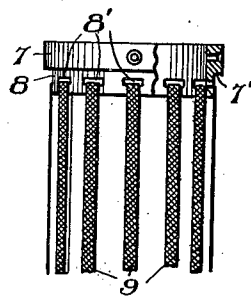


Fig. 4.



witnesses:

J. R. Appleman,
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Inventor

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34 *John Nesbit*
Att'y

UNITED STATES PATENT OFFICE.

GEORGE A. SPANG, OF BUTLER, PENNSYLVANIA.

PACKER.

No. 820,149.

Specification of Letters Patent.

Patented May 8, 1906.

Application filed February 17, 1906. Serial No. 301,586.

To all whom it may concern:

Be it known that I, GEORGE A. SPANG, a citizen of the United States, residing at Butler, in the county of Butler and State of Pennsylvania, have invented certain new and useful Improvements in Packers, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention has reference to that type of packers for oil and gas wells wherein the ends of the rubber packer-sleeve are secured to the packer-frame, the latter collapsing or folding when setting the packer, so that when
15 the collapsed frame is expanded for removing or resetting the packer the then contracted rubber sleeve is caused to straighten out into normal shape, whereby it may be raised or lowered and reset or removed from
20 the well.

The primary object of the invention is to provide a novel reinforcement for the rubber sleeve, and particularly the ends thereof, so that it is quite impossible for high-pressure
25 gas or oil to work its way behind the sleeve at the ends thereof. At the same time the sleeve ends are so strengthened and held as not to be torn or stripped off by irregularities or projections on the well-wall.

30 A further object is to so combine the end-securing means and the sleeve-reinforcement that the sleeve ends are secured to the packer-frame without danger of the rubber stripping therefrom however great the pull or pressure
35 may be, this without detracting from the expansive and packing properties of the sleeve.

In the accompanying drawings, Figure 1 is a view, partly in side elevation and partly in section, of a wall-packer of well-known type
40 equipped with my improvement. Fig. 2 is a detail view of the packer-sleeve. Fig. 3 is a sectional view of a sleeve of modified form. Fig. 4 is a detail view of one of the sleeve-end-securing devices.

45 Referring to the drawings, 2 designates the tubular body of the packer-frame, 3 the upper collar or head secured thereto, and 4 the lower collar, through which tube 2 is adapted to lower when setting the packer, as
50 is well known to those skilled in the art.

The anchor mechanism, including wedging-slips 5 for holding collar 4 against downward movement, is of usual and well-known construction and forms no part of the present
55 invention.

Encircling tube 2 between collars 3 and 4

is the rubber packer-sleeve 6, having at its opposite ends the annular or ring-like devices 7, which form end continuations of the sleeve. Each of these devices is provided
60 with a reduced inner portion 8, an annular shoulder 7' being formed at the juncture of parts 7 and 8. Extension 8 is embedded in the rubber sleeve and has a series of openings
65 8', in which the ends of flexible reinforcing-strips 9 are secured. These embedded strips, formed, preferably, of canvas, extend longitudinally through the sleeve from end to end,
70 thus connecting the opposite annular devices 7 and relieving the rubber of longitudinal strains when such strain would otherwise occur. However, the reinforcing-strips may extend only part way through the sleeve, as shown at 9', Fig. 3.

Each of heads 3 and 4 is turned off at its
75 inner end to receive rings 7, secured thereto by screws 10, the arrangement being such that the reduced extremities of the collars form abutments for the inner edge portions of the sleeve extremities, while the outer portions
80 abut against shoulders 7' of rings 7.

With the reinforcing and securing means arranged as here shown and described the rubber sleeve cannot strip or be curled off
85 even if high-pressure gas or oil should work its way between the sleeve and tube 2, though such passage of oil and gas is rendered quite impossible.

As is well known, when a packer is set the frame thereof is contracted and the hole
90 sealed by the rubber sleeve being contracted longitudinally and bulged laterally between collars 3 and 4. To remove the packer, it is drawn upward, and instead of the rubber remaining contracted and wedged between the
95 well-wall and tube 2 it is caused to straighten out or expand along with the packer-frame, the union between the sleeve and frame being such that it is quite impossible for the rubber to resist this straightening tendency. The
100 sleeve is thus restored to normal shape for re-use as may be required.

I am aware that I am not the first to secure the ends of the rubber sleeve to the packer-frame nor the first to provide a securing
105 device embedded in the sleeve end. Also it has been proposed heretofore to reinforce the sleeve by embedding therein strips of flexible material, which extend longitudinally thereof. I believe, however, that I am
110 the first to provide a packer-sleeve with an embedded ring-like or other securing device

and to connect thereto flexible reinforcements which extend still farther into the sleeve, as well as the first to positively connect the opposite end - securing devices so
 5 that when fully expanded the sleeve is relieved of all longitudinal strain. By thus combining the end-securing device with the embedded flexible reinforcement I have produced a packer-sleeve which will positively
 10 and permanently resist all tearing or stripping strains, whether caused by high-pressure oil or gas, by irregularities in the well-wall, or by the resistance which the rubber offers to straightening out when unseating
 15 the packer. I thus gain the full advantage of the packing or sealing properties of the rubber, the flexibility thereof being unretarded. At the same time the end-securing devices and reinforcement are so connected to
 20 each other and to the rubber that separation from any cause is rendered practically impossible.

I claim—

1. As an article of manufacture, a rubber
 25 packer-sleeve, a device carried by the sleeve for detachably connecting with the packer-frame, and flexible reinforcements secured to said device and embedded in the rubber sleeve.

30 2. As an article of manufacture, a rubber packer-sleeve, an annular device at the end of the sleeve for detachably connecting with the packer-frame, and flexible reinforcements secured to said device and embedded in the
 35 rubber sleeve.

3. As an article of manufacture, a rubber packer-sleeve, an annular securing device at the end of and partially embedded in the rubber sleeve, and flexible reinforcements embedded in the sleeve and secured to the embedded
 40 portion of said device.

4. As an article of manufacture, a rubber packer-sleeve, an annular device at the end of the sleeve for detachably connecting with
 45 the packer-frame, and strips of flexible material extending longitudinally of and embedded in the rubber sleeve and secured to said device.

5. As an article of manufacture, a rubber
 50 packer-sleeve, an annular device at the end of the sleeve and embedded therein, said device having a series of transverse openings, and flexible strips embedded in the rubber sleeve and secured in said openings.

55 6. As an article of manufacture, a rubber packer-sleeve, annular devices at opposite ends of the sleeve for detachably connecting

with a packer-frame, and flexible reinforcements extending longitudinally through and embedded in the sleeve and secured at their
 60 opposite ends to said annular devices.

7. The combination with a tubular packer-body, and a collar therefor, of a rubber sleeve embracing the body, an annular device at the end of the sleeve and embedded therein,
 65 means for securing the devices to said collar, and flexible reinforcements embedded in the rubber and secured to said annular device.

8. The combination with a packer-body and a collar therefor having a reduced inner
 70 end, of a rubber sleeve embracing the packer-body, an annular device secured to the end of the sleeve and fitting said reduced portion of the collar, and flexible reinforcements embedded in the rubber and secured to said annular device.
 75

9. The combination with a tubular packer-body, and a collar therefor reduced exteriorly at its inner end, a rubber sleeve embracing the tubular body, an annular device carried by the sleeve and adapted to be secured
 80 to the reduced portion of the collar, said device having a reduced inner portion embedded in the rubber, the outer portion of the edge of the sleeve abutting against the unreduced
 85 portion of said annular device and the inner portion of the edge abutting against the extremity of the collar, and flexible reinforcements embedded in the rubber sleeve and secured to the embedded reduced portion
 90 of the annular device.

10. The combination of a tubular packer-body, separated collars therefor—one movable with relation to the other, a rubber sleeve, an annular device carried by each end
 95 of the sleeve, means for securing said devices to the packer-collars, and flexible reinforcements embedded in the rubber sleeve and secured to said annular devices.

11. The combination of a tubular packer-
 100 body, collars therefor—one movable with relation to the other, a rubber sleeve, annular devices carried by opposite ends of the sleeve, means for securing said devices to the packer-collars, and flexible strips extending longitudinally of and embedded in the rubber sleeve
 105 and at their opposite ends secured to said annular devices.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE A. SPANG.

Witnesses:

L. E. ROBINSON,
 JAMES O. CAMPBELL.