L. E. ROBINSON.

RETAINING MEMBER FOR WELL PACKERS.

APPLICATION FILED MAY 26, 1913.

**1,094,020.**

Patented Apr. 21, 1914.

3 SHEETS—SHEET 1.

Fig. 1.

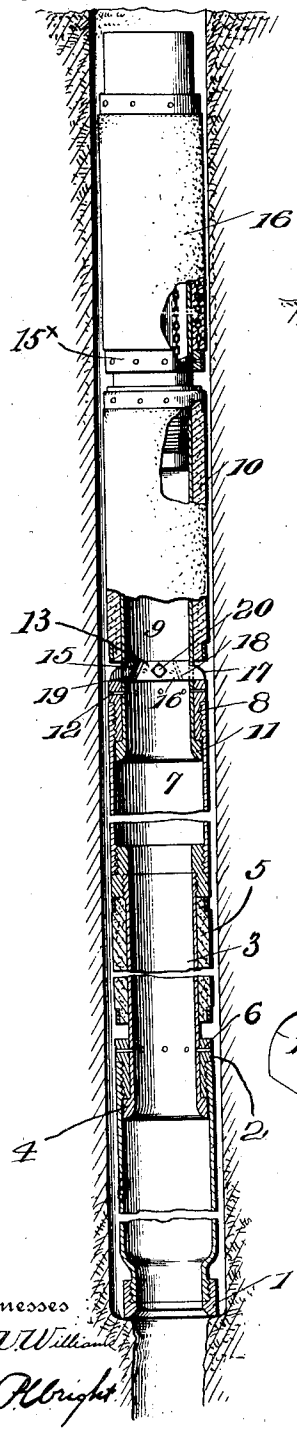



Fig. 3.

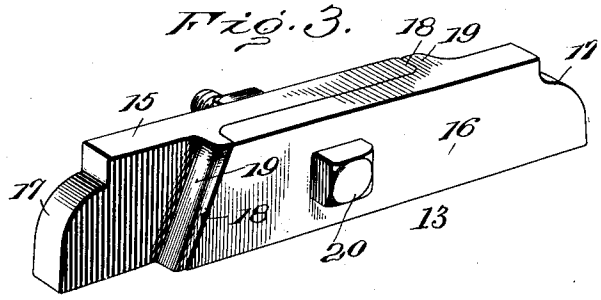



Fig. 2.

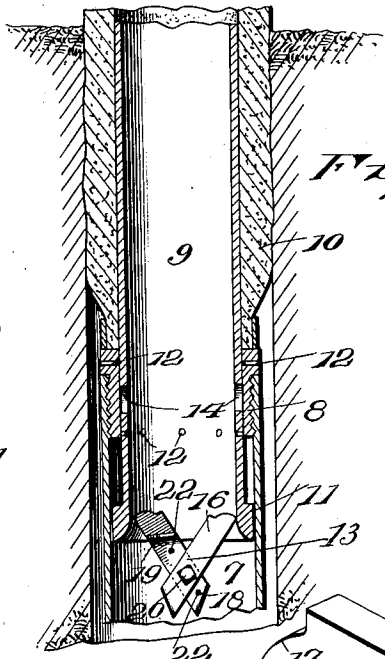
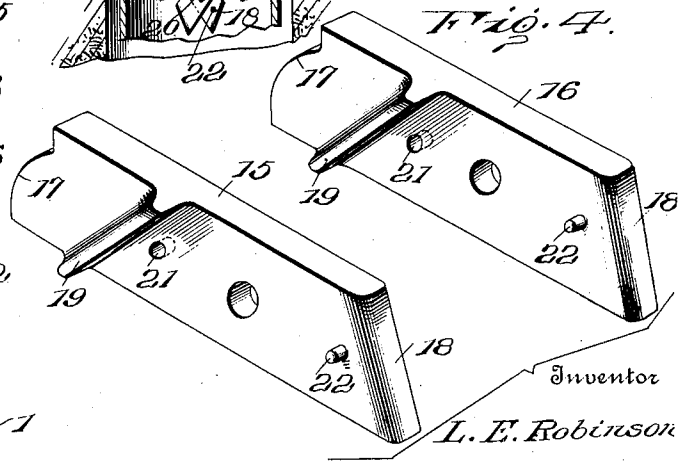



Fig. 4.




Witnesses

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3 SHEETS—SHEET 2.

Fig. 5.

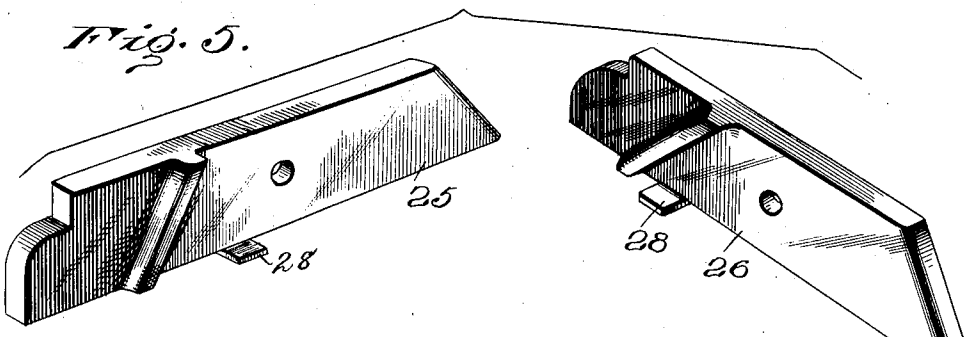



Fig. 6.

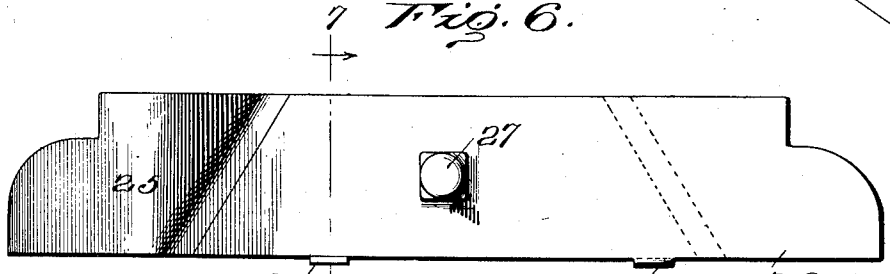



Fig. 7.

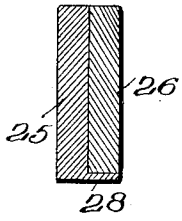



Fig. 8.

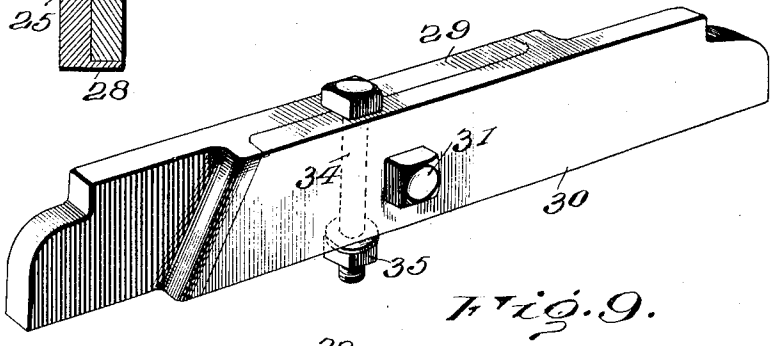
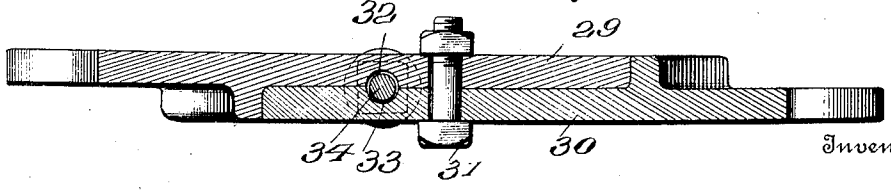



Fig. 9.




Witnesses

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3 SHEETS—SHEET 3.

Fig. 10.

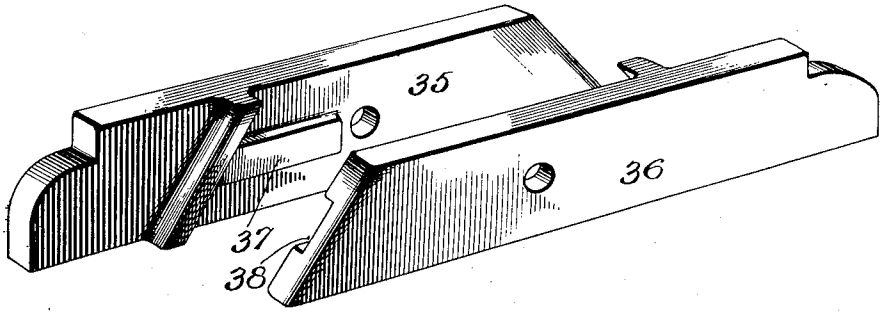



Fig. 11.

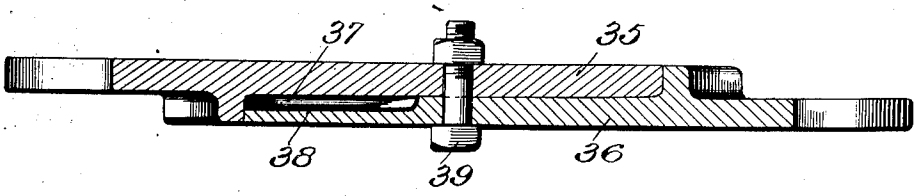



Fig. 12.

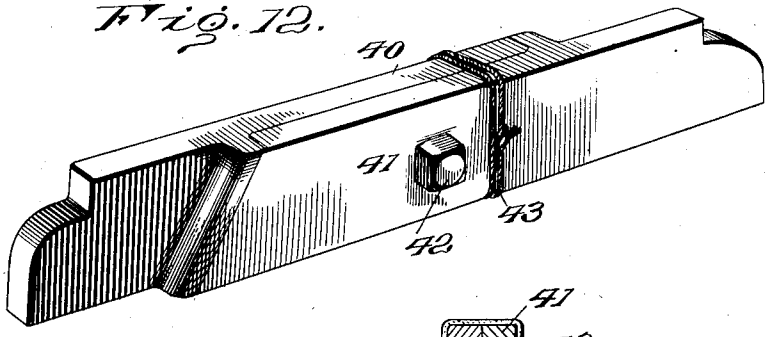
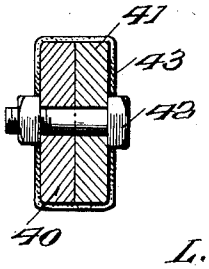



Fig. 13.




Witnesses

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# UNITED STATES PATENT OFFICE.

LAWRENCE E. ROBINSON, OF COFFEYVILLE, KANSAS.

## RETAINING MEMBER FOR WELL-PACKERS.

1,094,020. Specification of Letters Patent. Patented Apr. 21, 1914.

Application filed May 26, 1913. Serial No. 770,041.

*To all whom it may concern:*

Be it known that I, LAWRENCE E. ROBINSON, 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 Retaining Members for Well-Packers, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to certain new and useful improvements in well-packers and more particularly to the retaining member for holding the telescoping sections apart in order to prevent the packing from expanding before it has reached the desired depth.

Another object of the invention is to provide a retaining member which is so constructed that it is impossible for the same to be displaced by foreign matter being forced through the well casing by gas pressure; the member being formed of two sections interlocked together in such a manner that it is necessary to displace the member by lowering into the well, a sinker bar or bailer to exert a downward pressure upon the member.

A further object of the invention is to provide a retaining member which is formed of sections which are pivotally connected together and held by frangible means in such a manner that an exceedingly strong and durable member is formed which will resist all gas pressure and any other foreign matter which is forced up through the casing; said means being broken by the impact of the bailer or sinker bar.

In placing a well casing in exceedingly deep wells, rivets are now employed for holding the telescoping sections carrying the packing sleeve and in some cases when an obstruction is in the path of the casing, the rivets are sheared allowing the sections to telescope and set the packing, thereby making it necessary to remove the casing or shred the packing from the casing by the excess downward pressure, and I have found that by employing a retaining member in connection with the rivets that a double lock is formed for the telescoping sections which prevents all danger of the packing being set until the desired depth is reached. I have also found that various forms of retaining members have been constructed and employed in connection with well packers, where a pair of telescoping sections are employed, one section carrying a packing sleeve, but in each instance, the retaining member was so constructed that it would not resist an upward pressure caused by foreign matter being forced up through the casing by the gas pressure. In setting the casings in exceptionally deep wells, it is often necessary to employ a number of packers between different strata containing oil and water and where such packers are necessary, I use a common rivet-retaining member at the lower packer; a pivoted-retaining member in the central packing and a screw packer at the upper section, which is clearly shown and illustrated in the accompanying drawings.

Of course it is understood that it is necessary to provide a member which is so constructed that the drilling tool can pass the same and in some cases, the tool breaks the retaining members and if this is the only means employed for preventing the packing from being set, the packing would be set prematurely and therefore, it will be seen that a great advantage is obtained by employing two retaining means for holding the telescoping sections in their proper positions in order to prevent the packing from being set until both retaining means are displaced.

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 section of a well showing three forms of packer in position; the central form illustrating my improved invention; Fig. 2, is an enlarged section through a well showing the packer set and the retaining member displaced; Fig. 3, is a perspective of my improved construction of retaining member; Fig. 4, is a perspective of the same showing the duplicate members thereof separated; Fig. 5, is a perspective of another form of retaining member, showing the sections thereof separated; Fig. 6, is a side elevation of the same; Fig. 7, is a section taken on the line 7—7 of Fig. 6; Fig. 8, is a perspective of another form of retaining member; Fig. 9, is a longitudinal horizontal section through the same; Fig. 10, is a perspective view of still another form of retaining member showing the sec-

tions separated; Fig. 11 is a longitudinal horizontal section through the same; Fig. 12, is a perspective of still another form of retaining member; and Fig. 13, is a transverse section through the same.

Like numerals of reference refer to like parts in the several figures of the drawings.

In Fig. 1 of the drawings, I illustrate a well casing; the lower section thereof being provided with a shoe 1 which is adapted to rest upon the bottom of the well and the upper end of the section is provided with a plug 2 in which the adjacent section 3 is slidably mounted; said section having a shoulder 4 at its lower end and carrying a packing sleeve 5 which is adapted to be expanded by the telescoping of the section within the lower section as clearly shown; rivets 6 being employed for preventing the section from telescoping, said rivets being sheared off by downward pressure when the packer has reached the desired depth. The intermediate section 7 is similarly constructed, and is provided with a tubular plug 8 through which extends the adjacent section 9 carrying a packing sleeve 10; the lower end of said section being provided with an annular shoulder 11 for limiting the upward movement between the sections. The section 9 is held in its proper position when being lowered in the well, by rivets 12, and my improved retaining member 13 which extends transversely across the casing and is seated upon the plug 8 in slots 14 formed in the section 9. The section 9 is connected to the upper section $15^{x}$ by a screw thread, and said upper section carries a packing sleeve $16^{x}$ which is set in the ordinary manner of packers now in use.

The arrangement of packers as disclosed in Fig. 1, is employed where it is desired to use a number of packers in deep wells in order to cut off the water or gas between the bottom and intermediate packers or water or gas between the intermediate and top packers, and I have found that by arranging the combination of packers as shown, a great advantage is obtained in passing through strata of various soils.

My improved retaining member 13 is preferably formed of a pair of duplicate members 15 and 16; each member being provided at its end with a reduced rounded portion 17 which is adapted to extend into the slot formed in the section carrying the packing sleeve, as clearly shown in Fig. 1; and it will be seen that by reducing and rounding the ends in this manner, when the sections are united as shown in Fig. 3, and a downward pressure is exerted thereon, they will ride out of the slots in order to allow the section carrying the packing sleeve to telescope into the adjacent section, causing the packing sleeve carried thereby, to be expanded.

By providing the sections of the retaining members with reduced rounded ends, shoulders are formed in order to prevent the sections from working through the slots 14 formed in the section 9 which enables the sleeves to be both formed of the same size and the retaining member is so mounted that it is impossible for the same to become wedged in over the slots when the same is broken by the bailer.

The inner ends of the sections 15 and 16 of the retaining member are cut off obliquely as shown at 18 and are adapted to abut against obliquely arranged shoulders or stops formed by the rib 19 upon each section, in order to prevent the sections from moving upwardly, as will be later described.

While I have shown and described the sections being provided with ribs to form the shoulders, it is of course understood that by reducing the sections, oblique shoulders can be formed to accomplish the same result. Each section is provided with a registering transverse opening through which a connecting bolt 20 passes in order to pivotally connect the sections together, and it will be seen that when the sections are pivotally connected together as shown in Fig. 3, it will be impossible to move either of the sections by exerting an up-pressure upon the same, as the oblique ends abut against the shoulders and prevent the sections from moving whereby a rigid member is formed to resist any up-pressure from the well. When the sections are in this position, they are free to move in respect to each other by a downward pressure such as the impact of a sinker bar or bailer.

To insure the interlocking of the sections, so as to resist any excess pressure, I provide each section with a recess 21 and with a projection 22, the projection of one section fitting within the recess of another section so as to interlock the sections together and these sections are preferably formed of cast iron so that when a sinker bar or a bailer is dropped into the casing, so as to strike the upper edges of the sections, the retaining member will be broken or the sections will move in respect to each other so as to shear off the projections 22 and allow the members to move in respect to each other, whereby the retaining member will be forced out of position in the slots and by the pressure of the casing above the packing, the packing will be set. These interlocking projections prevent the packer from being set by the impact of the drilling cable making it necessary to drop a sinker bar or bailer into the well before setting the packer. It will be noted that I employ rivets also for holding the telescoping sections in connection with the retaining member, thereby making it necessary to shear off the rivets in order to set the packer; but, it is

of course understood that my improved form of retaining member may be employed with or without rivets or in connection with any other form of packer, where two telescoping sections are employed and means is employed for retaining the sections in order to prevent the packer from being set.

In the form of retaining member shown in Figs. 5, 6 and 7, the members 25 and 26 are substantially the same shape as disclosed in the preferred form of the invention and are pivotally connected together by a bolt 27 and provided with oblique stops for limiting the movement of the sections in one direction. In order to retard the movement in the other direction until it is desired to separate the sections to dislodge them from the pipe section, I provide each of the members with a laterally extending frangible projection 28 which is adapted to co-act with the adjacent section so as to prevent the sections from moving until the projections 28 have been sheared off or broken, as the case may be.

In the form shown in Figs. 8 and 9, the members 29 and 30 are pivotally connected together by a transverse bolt 31 and are provided with means for preventing movement in one direction, by forming the same with shoulders in substantially the same manner as disclosed in the previously described fiugres. The abutting faces of the members 29 and 30 are provided with registering substantially semi-circular grooves 32 and 33 forming a bore in which is arranged a bolt 34 carrying a nut 35 which retards the sections in their movement in one direction, but the bolt is formed frangible in order to allow the same to part when an excess pressure is brought to bear upon the sections in such a manner that the bolt will be stripped of its thread or the head broken off in order to allow these sections to move in respect to each other and this construction is especially adapted to be used when it is desired to provide a retaining member which will not separate until an excessive blow has been brought to bear upon the same. When the sections start to move upon their pivot by the impact of a blow, the bolt will be twisted and it will be seen that I have shown the same arranged in a bore formed by the grooves with a slight play and if desired, an elongated opening or slot can be formed to receive this bolt, but I have found that by experimenting, in arranging the bolt as shown, pressure is brought to bear upon the members and the bolt will be broken in order to allow the sections to pivot.

In the modification shown in Figs. 10 and 11, the members 35 and 36 are provided with shoulders for preventing movement in one direction and one member is provided with a projection 37 which fits in a groove or recess 38 formed in the other member and as shown in the drawing, the member 35 is provided with the projection and the member 36 with the groove or recess. These sections are pivotally connected together by a bolt 39 and when in the position shown in Fig. 11 the projection extends into the recess 38 in order to prevent the sections from moving until the projection, which is preferably formed frangible has been sheared off or broken off by the movement of the sections in respect to each other; it of course being understood that the material from which the frangible means is formed, is such that the same will break or be sheared off when the sections are moved in respect to each other.

In the form shown in Figs. 12 and 13, the retaining member is formed of sections 40 and 41, the overlapping faces of which are formed smooth and each section is provided with a shoulder co-acting with the abutting section in order to prevent movement in one direction; said sections being pivotally connected by a bolt 42. In this form, instead of providing the sections of the member with projections for preventing movement in one direction, I wrap the overlapping sections with a frangible cord 43 which is adapted to be broken by the movement of the sections when pressure is brought to bear thereon, which is especially adapted to be used in forming a retaining member which can be used a number of times.

From the foregoing description it will be seen that I have provided a retaining member formed of two sections pivotally connected together in such a manner that the sections are prevented from moving in respect to each other in one direction and are held from moving in respect to each other in the opposite direction by frangible means, whereby a retaining member for well packers is formed which cannot be thrown out of position by an upward pressure, but is free to be disengaged from the pipe section by a down pressure.

I claim:

1. A sectional retaining member for well packers having frangible means for preventing movement in one direction.

2. A sectional retaining member for well packers having means for preventing movement in one direction, and frangible means for preventing movement in the opposite direction.

3. A sectional retaining member for well packers, formed of two overlapping sections movably mounted in respect to each other in one direction, and frangible means for preventing movement in said direction.

4. A sectional retaining member for well packers formed of a pair of pivotally connected members having means for preventing movement in one direction, and a frangi-

ble projection on one of said members for preventing movement of said sections in the opposite direction.

5. A retaining member for well packers formed of two sections pivotally connected together having infrangible means for preventing movement in one direction, and frangible means for preventing movement in the opposite direction.

6. A sectional well packer retaining member, formed of two overlapping elongated sections having reduced free ends, said sections being pivotally connected together and provided with projections, the inner end of each section abutting against the projection of the adjacent section, and frangible means for preventing movement in one direction.

7. A retaining member for well packers comprising a pair of pivotally connected duplicate members, each member being provided with an oblique end and an oblique rib for preventing movement in one direction.

8. A retaining member for well packers comprising a pair of pivotally connected members having frangible interlocking members.

9. A retaining member for well packers comprising a pair of members pivotally connected together, each member being provided with a recess and a lug to receive the lug of the adjacent member.

10. A retaining member for well packers formed of two sections interlocked together for preventing movement in one direction.

11. A retaining member for well packers comprising a pair of duplicate members pivotally connected together, each member being provided with a reduced rounded outer end and an oblique end, said members being provided with shoulders engaging the oblique end thereof, and lugs carried by the adjacent faces of said members fitting in recesses formed therein.

12. A retaining member for well packers comprising a pair of duplicate members pivotally connected together, each member being provided with an obliquely arranged rib forming a shoulder engaged by the inner end of the sections, the overlapping faces of said sections being provided with interlocking lugs.

13. A retaining member for well packers, comprising a pair of duplicate members, each member being provided with a recess and a lug, the lug of one member fitting within the recess of the adjacent member for retarding the movement of said members in one direction, and means for preventing the movement of said members in opposite directions.

14. A retaining member for well packers formed of two sections pivotally connected together having means for preventing movement in one direction, and retarding means for preventing movement in an opposite direction.

15. A sectional retaining member for well packers, comprising a pair of members movably mounted in respect to each other, and frangible means for preventing movement of said sections in respect to each other.

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

LAWRENCE E. ROBINSON.

Witnesses:
ELLIOTT IRVIN,
BUS BOWERMAN.