July 18, 1933. L. F. BAASH ET AL 1,918,442

PACKER FOR CASING HEADS

Filed June 23, 1930

Fig. 1.

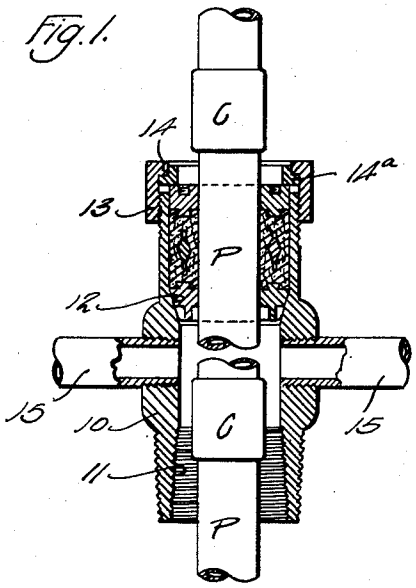


Fig. 2.

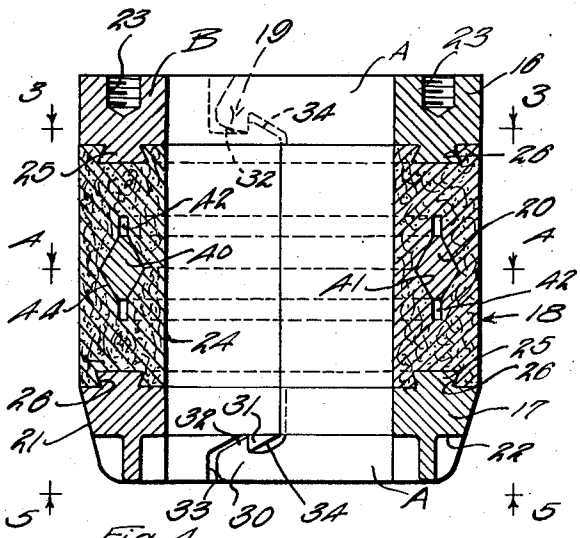


Fig. 3.

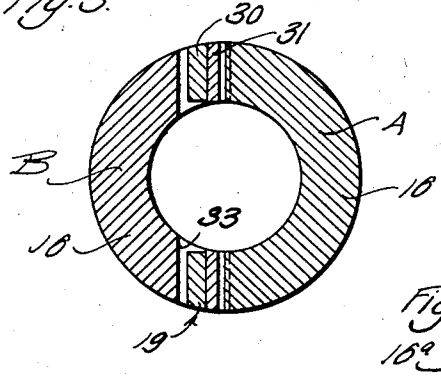


Fig. 4.

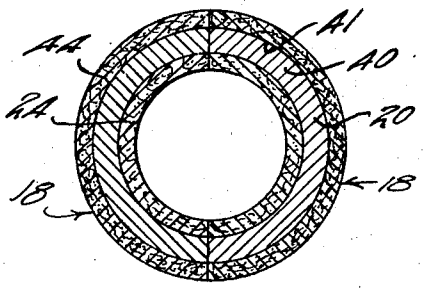


Fig. 5.

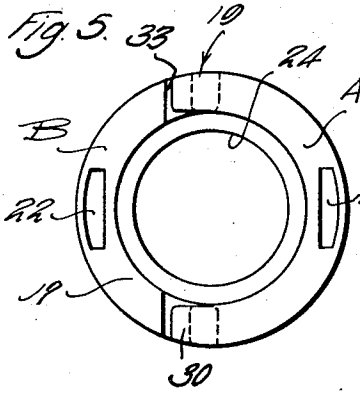
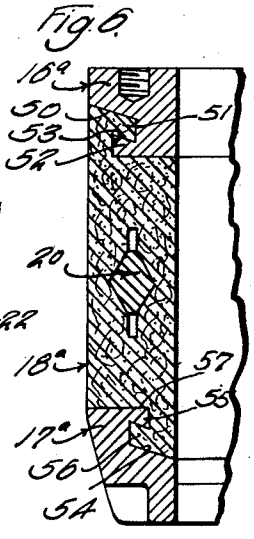


Fig. 6.



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UNITED STATES PATENT OFFICE

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PACKER FOR CASING HEADS

Application filed June 23, 1930. Serial No. 463,219.

This invention relates to a packing device and relates more particularly to a packing assembly or packer for use in a well casing head, or the like.

It is a general object of this invention to provide a packer for use in a well casing head that is particularly effective in packing off around a drill pipe, or the like, extending through the casing head to prevent the well from blowing out through the casing.

It is another object of this invention to provide a packer for a casing head that may be quickly and easily arranged in operative position around a part, such as a drill pipe, without disturbing the drill pipe.

Another object of this invention is to provide a packer for a casing head that embodies expansible packing for packing between the casing head and a part extending through the head and embodies effective means for expanding the packing.

It is another object of this invention to provide a casing head packer that is in the nature of an annular assembly of a packing ring and collars at the upper and lower sides of the packing ring that is split into two separable units adapted to be assembled together around a drill pipe, or the like. The present invention embodies an improved means for releasably locking the units of the packer together in operative position around a pipe, or the like.

It is a further object of the invention to provide a packer for a well casing head in which the various parts are held together or assembled without the use of bolts, screws, or like parts.

Other objects and features of our invention will be best and more fully understood from the following detailed description of typical forms and applications of the invention, throughout which description reference is had to the accompanying drawing, in which:

Fig. 1 is a vertical detailed sectional view of the packer provided by the present invention illustrating it in operative position in a typical well casing head and packing off around a drill pipe extending through the head. Fig. 2 is an enlarged vertical detailed sectional view of the packer. Fig. 3 is a reduced transverse detailed sectional view taken as indicated by line 3—3 on Fig. 2. Fig. 4 is a reduced transverse detailed sectional view taken as indicated by line 4—4 on Fig. 2. Fig. 5 is a reduced bottom end view of the packer, taken as indicated by line 4—4 on Fig. 2; and Fig. 6 is a vertical detailed sectional view of a portion of another form of the invention showing a modified manner of securing the various parts together.

The packing device provided by this invention is particularly adapted for use in comparatively large packing glands, or the like. For example, it is particularly well suited for use in a casing head at the upper end of a well casing to prevent the well from blowing out through the casing. The invention may be embodied in various forms for use in various types of casing heads, and the like. Throughout the following detailed disclosure the invention will be described as embodied in forms adapted to be used in typical well casing heads. It is to be understood that the invention is not to be construed as limited to the particular forms about to be described or to use in connection with the type of casing head illustrated in the drawing.

The well casing head illustrated in the drawing includes a tubular body 10 adapted to be applied to the upper end of a well casing. The body 10 of the head may be connected with the well casing in any suitable manner and the lower end of the body may be both internally and externally screw threaded for connection with suitable coupling or connecting members. The opening 11 of the body 10 is provided to pass drill pipe and various other well drilling tools and to carry a packing device for packing off the well casing. The particular type of casing head illustrated in the drawing is provided with a tapered shoulder or seat 12 in the opening 11 to support a packer in the opening. A suitable device may be provided in connection with the casing head for actuating or compressing a packer arranged in the opening. The casing head and more particularly the packing actuating means on the

head is set forth in Patent No. 1,539,236 issued to M. S. Black, May 26, 1925. A sleeve 13 is screw threaded onto the upper end of the body 10 and is provided with an inwardly projecting flange 14 for engaging a sectional or split ring 14ª adapted to be assembled in the head. In Fig. 1 of the drawing a string of drill pipe P is shown extending through the body 10 of the head. The ring 14ª is proportioned to pass a coupling C on the string of drill pipe P to permit the coupling to engage the upper end of a packer arranged in a head to actuate the packer. Openings carrying or communicating with discharge conduits 15 may be provided through the walls of the body 10.

The packing device or packer provided by the present invention is adapted to be arranged in the opening 11 of the casing head to pack off around a drill pipe P, or the like. The packer includes, generally, two units A and B formed of an upper split collar 16, a lower split collar 17, and packing 18 arranged between the collars, and includes means 19 for releasably latching the units A and B together around a pipe P, or the like, and means 20 for expanding the packing 18 upon a compression strain being put on the packer.

The upper and lower split collars 16 and 17 are arranged at the upper and lower sides of the packing 18 and are proportioned to slidably fit the opening 11 of the casing head above the tapered seat 12. The lower collar 17 is provided with a tapered exterior 21 to seat against the convergent or tapered portion 12 of the opening 11 to support the packer in the casing head. Sockets or recesses 22 may be provided in the lower side of the collar 17 to lighten the construction. The upper collar 16 is preferably provided with a flat upper side to receive the flange 14 or similar packing actuating device. Screw threaded openings 23 may be provided in the collar 16 for the reception of suitable tools for handling the units A and B. The collars 16 and 17 are longitudinally split at diametrically opposite points and are arranged so that their lines of division are in vertical or longitudinal alignment.

The packing 18 is a longitudinally split annular body of expansible packing material arranged between the collars 16 and 17. The packing 18 may be formed of rubber, rubber composition, or other suitable expansible packing material. The packing 18 is formed to slidably fit the upper portion of the opening 11 and the opening 24 of the packing is proportioned to normally freely pass the pipe P or other object which the packer is intended to pack around. The packing 18 is split at diametrically opposite points and the lines of division of the packing are in longitudinal alignment with the lines of division of the collars 16 and 17.

The present invention provides improved means for connecting or securing the sections of the collars 16 and 17 and the packing 18 together to form the two assemblies or units A and B. The sections of the collars 16 and 17 and the packing 18 are provided with intermeshing or interlocking parts which hold them assembled. In the form of the invention illustrated in Figs. 1 to 5, inclusive, of the drawing the collars 16 and 17 are provided with dovetailed tongues 25 extending into grooves 26 in the packing 18. The tongues 25 fit tightly in the grooves 26 and effectively connect the sections of the collars 16 and 17 with the sections of the packing 18. In practice the tongues 25 and the grooves 26 may be formed so that the sections of the collars 16 and 17 may be assembled onto the sections of the packing 18.

The means 19 for releasably holding the units A and B of the packer together is in the nature of a latch means and is such that the units A and B may be quickly and easily assembled together around the pipe P, or the like. The latch means 19 is preferably integral with the collars 16 and 17 and includes latch projections 30 on the collar sections of one unit to cooperate with lugs 31 on the collar sections of the other unit. In the particular case illustrated the latch projections 30 are provided on the sections of the collars 16 and 17 of the unit A to cooperate with lugs 31 on the collar sections of the unit B. The projections 30 extend from the opposite ends of the sections of the collars 16 and 17 of the unit A. The latch projections 30 are provided with tapered or inclined inner sides 32 terminating in vertical shoulders. The lugs 31 project from the bottoms or inner sides of the recesses 33 provided in the opposite end portions of the sections of the collars 16 and 17. The lugs 31 are provided with beveled outer faces 34 to cooperate with the beveled sides 32 of the latch projections 30. The latch projections 30 and the lugs 31 are related and the collars 16 and 17 are normally yieldingly held spaced apart by the packing 18 so that the units A and B may be forced together around the pipe P. When the units A and B are assembled together the beveled ends 32 of the projections 30 ride upon the beveled faces 34 of the lugs 31, and the inner end portions of the packing 18 of the units A are stretched while the inner end portions of the packing unit B are compressed, permitting the shoulders of the latch projections 31 to be brought into latching engagement with the ends of the lugs 31. In practice the latch projections 30 of one collar, say, the lower collar 17, may be initially arranged in latching engagement with the lugs 31 of that collar and the units A and B swung together so that the latch projections 30 of the upper collar 16 are forced into latching engagement with

the lugs of the upper collar. The latch projections 30 and the lugs 31 are releasably retained in latching engagement through the inherent resiliency of the packing 18. The means 19 may be released by striking a heavy blow on one of the collar sections of the unit B to compress the packing of that unit to allow the latch projections 30 to spring out of engagement with the lugs 31. In practice the packer may be dropped so that it will strike upon the section of the collar 17 of the unit B to release the latch projections 30 of that collar from the lugs 31.

The means 20 for expanding the packing 18 acts to effectively expand the packing both radially inward and radially outward upon actuation or compression of the packer. The means 20 includes a substantially rigid expanding member 40 arranged in the packing 18 of each unit A and B. The members 40 may be formed of steel or other suitable metal and are arranged in openings 41 in the packing 18. The members 40 and the openings 41 are circumferentially curved and are concentric to the central longitudinal axis of the packer. In accordance with the invention the members 40 are parallelogrammatic or of diamond shaped cross sectional configuration and the openings 41 are correspondingly shaped to effectively carry the members. The expanding members 40 are arranged so that their longest cross sectional dimensions extend longitudinally of the packer. The members 40 are preferably arranged substantially midway between the upper and lower ends of the packing 18 and substantially midway between the inner and outer sides of the packing. The members 40 may extend substantially the entire distances around the packing 18 of the sections A and B. In practice the openings 41 may be initially formed in the packing 18 and the members 40 slid into or arranged in the openings 41 from the ends of the sections of packing 18.

The upper and lower ends of the members 40 may be flattened as illustrated in the drawing. Extensions or grooves 42 are provided in the upper and lower ends of the openings 41 at the flattened ends of the members 40. The grooves 42 permit compression and expansion of the packing 18 without danger of cracking or fracturing the packing. Upon compression of the packing 18 the angular sides 44 of the members 40 cause the packing 18 to be expanded radially outward into tight engagement with the walls of the opening 11 and radially inward to pack against the pipe P.

In Fig. 6 of the drawing we have illustrated a form of the invention wherein the upper and lower collars and the packing are connected or secured together in a manner differing somewhat from that described above. In this form of the invention the upper collar 16^a, the lower collar 17^a and the packing 18^a may be similar generally to the corresponding elements or parts of the form of the invention described above. The means 20 for expanding the packing may be similiar to that of the form of the invention shown in Figs. 1 to 5. The collars 16^a and 17^a and the packing 18^a are provided with intermeshing or interlocking portions which hold them together. The collar 16^a is provided at its outer side with a circumferentially extending groove 50 receiving a tongue 51 on the packing 18^a. An outwardly projecting tongue 52 is provided at the lower side of the groove 50 to extend into a groove 53 in the packing 18^a. The upper wall of the groove 50 is tapered inwardly and downwardly and the upper side of the tongue 52 of the collar is substantially parallel with the upper wall of the groove 50. The tongue 51 of the packing seats tightly in the groove 50 and the tongue 52 of the collar fits tightly in the groove 53 so that the collar and packing are effectively held together. In practice the interlocking parts of the collar 16^a and the packing 18^a may be formed so that the collar and packing may be readily assembled.

The lower collar 17^a is provided on its inner side with a groove 54 similar to the groove 50 and with an inwardly projecting tongue 55 similar to the tongue 52. The packing ring 18^a is provided with an outwardly projecting tongue 56 arranged in the groove 54 and has a groove 57 carrying the tongue 55. The interlocking parts of the collars 16^a and 17^a and the packing 18^a are such that the collars and packing may be readily assembled and are effectively held together.

It is believed that the operation and utility of the packer provided by the present invention will be readily apparent from the foregoing detailed description. The units A and B of the packer may be readily arranged together around the pipe P in the manner described above and lowered into the upper portion of the opening 11. The tapered exterior of the lower collar 17 supports the packer on the convergent face 12 of the head. The packer may be actuated to seal with the walls of the opening 11 and the pipe P either by means of the sleeve 13 or similar device or by permitting the weight of the string of pipe P to be supported on the packer through a coupling C, or the like. Upon a compression strain being put on the packer the packing 18 is compressed against the angular sides 44 of the expanding members 40 which cause the packing to be expanded radially inward and radially outward. The packer provided by the present invention is particularly effective in packing off a well casing and may be quickly arranged in operative position in a casing head.

Having described only typical preferred forms of our invention, we do not wish to limit ourselves to the specific details set forth, but wish to reserve to ourselves any changes or variations that may appear to those skilled in the art or fall within the scope of the following claims.

Having described our invention, we claim:

1. A packing device of the character described including a body of expansible packing material, and a comparatively rigid member of substantially diamond shaped construction in an opening in the body, there being a groove extension in the opening at an edge of the member.

2. A packing device including a ring of expansible packing and means for expanding the ring radially including a member of substantially diamond shaped cross section arranged in an opening in the ring with opposite edges in axial alignment, there being groove extensions in the opening at said edges.

3. A packing device of the character described including a ring of expansible packing, collars at the ends of the ring, means holding the collars and ring assembled, the assembly of the ring and collars being longitudinally divided into separable units, means releasably holding the units together, and means for expanding the packing ring including a member of substantially diamond shaped configuration in the ring.

4. A packing device of the character described including a ring of expansible packing, collars at the ends of the ring, means holding the collars and ring assembled, the assembly of the ring and collars being longitudinally divided into separable units, means releasably holding the units together, including cooperating parts at the lines of division of the collars releasably held in cooperative engagement by the resiliency of the packing ring, and means for expanding the packing ring including a member of substantially diamond shaped configuration in the ring.

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