Aug. 16, 1932. L. F. BAASH ET AL 1,872,219

PACKER FOR CASING HEADS

Filed June 23, 1930

Fig. 1.

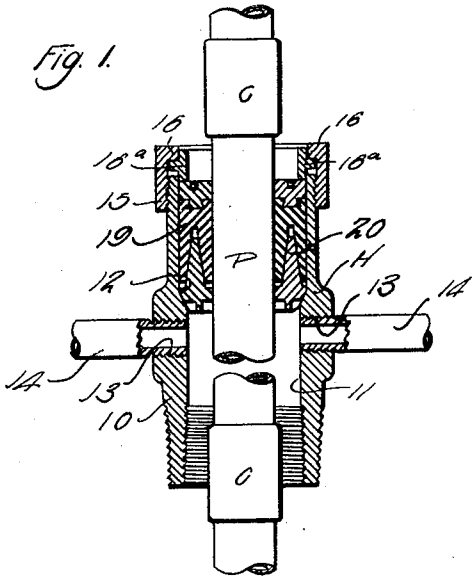


Fig. 2.

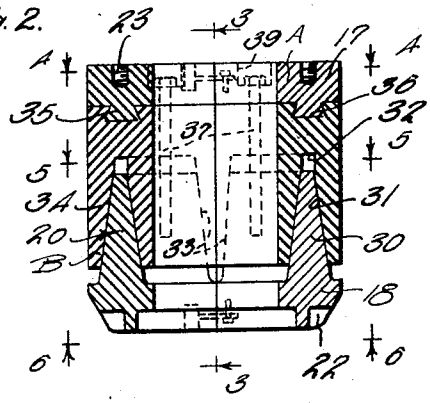


Fig. 3.

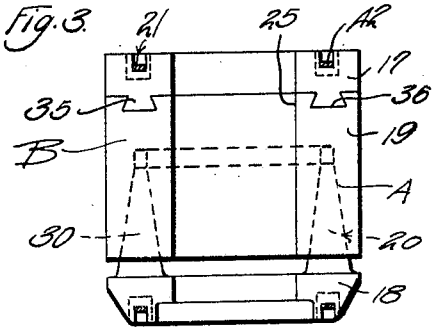


Fig. 5.

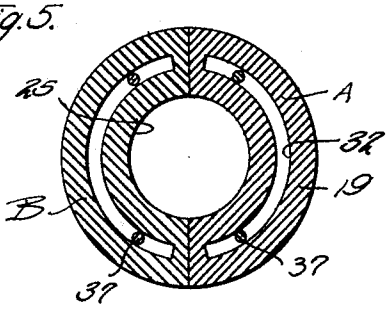


Fig. 6.

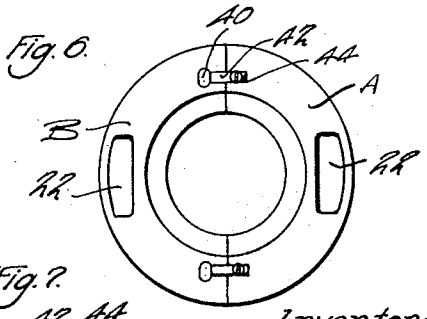


Fig. 4.

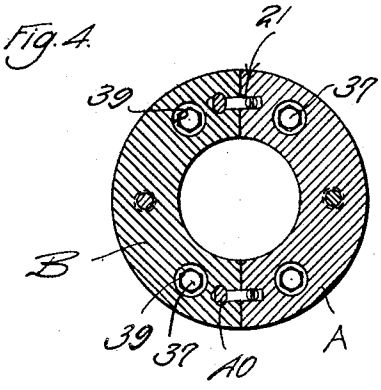
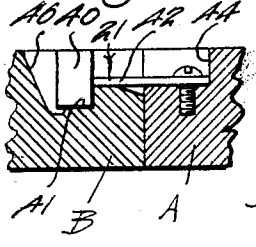


Fig. 7.



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UNITED STATES PATENT OFFICE

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PACKER FOR CASING HEADS

Application filed June 23, 1930. Serial No. 463,220.

This invention relates to a packing device and relates more particularly to a packer for use in a well casing head. It is a general object of the invention to provide a simple, practical and dependable casing head packer for preventing a well from blowing out through the casing.

It is an object of the invention to provide a packer for a well casing head that may be quickly and easily arranged in an operating position around a drill pipe, or the like, extending through a casing head.

It is another object of the invention to provide a packer or a casing head that embodies expansible packing and includes improved means for expanding the packing.

It is another object of the invention to provide a packer for a casing head that is in the nature of a longitudinally split annular structure or assembly and that embodies effective means whereby the units of the assembly may be quickly and easily assembled around an object such as a drill pipe, or the like.

It is a further object of the invention to provide a packer for a casing head that is extremely simple and inexpensive of manufacture and which embodies but few simple parts.

Other objects and features of our invention will be best and more fully understood from the following detailed description of a typical form and application 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 a casing head and assembled around a drill pipe extending through the head. Fig. 2 is an enlarged longitudinal detailed sectional view of the packer. Fig. 3 is a longitudinal detailed sectional view of the packer being a view taken as indicated by line 3—3 on Fig. 2. Figs. 4 and 5 are transverse detailed sectional views taken as indicated by lines 4—4 and 5—5 respectively on Fig. 2. Fig. 6 is a bottom elevation or plan view of the packer being a view taken as illustrated by line 6—6 on Fig. 2, and Fig. 7 is an enlarged vertical detailed sectional view illustrating a unit of the latch means included in the present invention.

The packing device provided by the present invention is adapted to be employed in the various situations and is particularly suited for embodiment in a packer for use in a well casing head to pack off around a part or tool such as a drill pipe extending through the casing head. The invention is capable of embodiment in packers for use in various types of casing heads. Throughout the following detailed description the invention will be disclosed as embodied in a form adapted for use in a typical type of well casing head and to pack off around a drill pipe extending through the head. It is to be understood, however, that the invention is not to be taken as limited to the particular form about to be described, by that it is to be taken as including any features or modifications that may fall within the scope of the claims.

The casing head H illustrated in the drawing is adapted to be applied to an upper end of a well casing. The casing head H includes a vertically disposed tubular body 10 having a central longitudinal opening 11 for passing a drill pipe and various other well drilling equipment. The body 10 may be connected with the well casing in any suitable manner and in the particular case illustrated in the drawing, the lower portion of the body 10 is internally and externally screw threaded for connection with a coupling, or the like, at the upper end of a well casing. The upper portion of the opening 11 is intended to carry the packer for packing off around the drill pipe and a beveled seat or convergent portion 12 is provided in the opening 11 for supporting the packer. Openings 13 may be provided through the walls of the body 10 to communicate with fluid discharge conduits 14. A suitable packer actuating or compressing device may be provided in connection with the casing head. The casing head H shown in the drawing, and more particularly the packer actuating means on the head is of the type set forth in Patent No. 1,539,236, issued to M. S. Black, May 26, 1925. The type of head illustrated in the drawing is provided at its

upper end with a screw threaded sleeve 15 having an inwardly projecting flange 16 for engaging a sectional or split ring 16ª adapted to be assembled in the head. The ring 16ª is proportioned to freely pass a coupling C on the drill pipe P to permit the weight of the drill pipe to be supported on the packer through the coupling C to compress or operate the packer.

The packer provided by the present invention is adapted to be arranged in the opening 11 of the casing head H and is operable to pack off between the head and the drill pipe P, or the like, to prevent the well from blowing out through the casing. The packer is an annular structure or assembly and includes generally two separable sections or units A and B formed of an upper split collar 17, a lower split collar 18 and packing 19 arranged between the collars 17 and 18, and includes means 20 for expanding the packing 19 upon a compression strain being applied to the packer and means 21 for releasably latching the units A and B together around a drill pipe P, or the like.

The split collars 17 and 18 are arranged at the upper and lower sides, respectively, of the packing 19 and are proportioned to slidably fit the upper part of the opening 11 of the head H. The collars 17 and 18 are longitudinally split at diametrically opposite points and are arranged so that their lines of division or separation are in longitudinal alignment. The lower collar 18 is shaped to seat on the convergent portion 12 of the opening 11 to support the packer in the opening. Recesses 22 may be provided in the lower side of the collar 18 for the reception of a tool or tools for handling the packer. The upper side of the upper collar 17 is preferably made flat to effectively receive the flange 16 or like compression member. Screw threaded openings 23 may be provided in the collar 17 to receive lifting or handling tools.

The packing 19 is a longitudinally split annular body of packing material arranged between the collars 17 and 18. The packing 19 may be formed of rubber, rubber composition or any other suitable compressible and expansible packing material. The packing 19 is longitudinally split at diametrically opposite points and its lines of division are in longitudinal alignment with the lines of the separation of the collars 17 and 18. The packing 19 is proportioned to normally slidably fit the opening 11 of the casing head and the central longitudinal opening 25 of the packing is adapted to normally freely pass the drill pipe P or other parts for which the packer is intended to pack around.

The means 20 for expanding the packing 19 is operable to effectively expand the packing radially outward and radially inward upon a compression strain being put on the packer. The means 20 is in the nature of a wedge means. The means 20 may be provided on either one or both of the collars 17 and 18. In the particular form of the invention illustrated in the drawing, the packing expanding means 20 is provided on the lower split collar 18 and includes an upwardly projecting expanding part or wedge projection 30 on each of the sections of the collar 18. The projections 30 extend upwardly from the upper side of the collars 18 and may be integral with the sections of the collar. The wedge projections 30 extend circumferentially of the sections of the collar 18 and have upwardly converging sides. The wedge projections 30 extend into openings or grooves 31 in the packing 19. The grooves 31 are shaped to conform to the configuration of the projections 30 and tightly receive the projections.

The wedge projections 30 may project a considerable distance upwardly from the collar 18 and seat in the grooves 31 so that the lower end of the packing 19 is normally spaced from the collar 18. The upper ends or edges of the wedge projection 30 may be flattened as clearly illustrated in the drawing. The grooves 31 are provided with extension portions 32 at or beyond the flattened upper ends of the wedge projections 30 to permit considerable upward movement of the projections into the packing without danger of cracking or fracturing the packing. The wedge projections 30 may extend circumferentially substantially the entire lengths of the sections of the collar 18 and the ends 33 of the projections 30 may be inclined or tapered upwardly and outwardly from the lines of division of the split collar 18. Upon compression of the packing 19 the convergent sides 34 of the wedge projections 30 force or expand the packing radially outward against the walls of the opening 11 and radially inward against the drill pipe P while the ends 33 of the wedge projections expand the end portions of the sections of the packing 19 into tight cooperative engagement.

The invention provides means for connecting the sections of the collars 17 and 18 and the sections of the packing 19 of the units A and B so that the units are in the form of unitary assemblies that are adapted to be easily handled. Dove-tailed tongues 35 may be provided on the lower sides of the sections of the collar 17 to fit dove-tail grooves 36 in the upper ends of the sections of the packing 19. The tongues 35 fit tightly in the grooves 36 to effectively connect the sections of the collar 17 and the sections of the packing 19. Connecting members 37 in the form of screws are provided to connect the sections of the upper collar 17 and the sections of the lower collar 18. The screws 37 may have their lower ends screw threaded in openings in the wedge projections 30 and may slid-

ably extend through openings in packing 19 and upper collar 17. The heads of the screws 37 may be counter-sunk in openings 39 in the upper sides of the sections of the collar 17. The connecting screws 37 and the tongues 35 connect the sections of the collar and packing of the units A and B so that the units A and B may be handled individually.

The means 21 for releasably latching or holding the units A and B together around the drill pipe P, or the like, is such that the units A and B may be quickly and easily assembled in operating positions around the pipe. The means 21 is in the form of a latch means and includes spring latches on one unit to cooperate with notches or sockets in the other unit. In the particular form of the invention illustrated in the drawing, latches 40 are provided on the collar sections of the unit A to cooperate with or seat in sockets 41 in the collar sections of the unit B. The latches 40 may be in the form of substantially rectangular blocks carried at outer ends of leaf springs 42 projecting from the opposite ends of the sections of the collars 17 and 18 of the unit A. The springs 42 may be countersunk in openings or recesses 44 and the latches 40 may be carried so that they are normally below or flush with upper sides of the sections of the collar 17. The latch receiving sockets 41 are provided in the bottoms or inner sides of recesses 46 in the end portions of the collar sections of the unit B.

The latches 40 and the sockets 41 are positioned and related so that the units A and B may be readily assembled together around the pipe P, or the like, in a position where the latches 40 seat in the sockets 41. In practice the latches 40 at one end, say the lower end of the unit A, may be arranged in position in the sockets 41 at the lower end of the unit B and the upper ends of the units brought together to spring the latches 40 at the upper end of the section A and the sockets 41 of the upper ends of the unit B. The springs 42 and the resiliency of the packing 19 operate to releasably retain the latch blocks 40 in retaining positions in the sockets 41. The latches 40 of one collar section may be released from the sockets 40 by imparting a blow to the collar section to compress the packing 19 of that unit to permit the latches 40 to spring out of the sockets 41. The units A and B may be quickly and easily disconnected by dropping the packer so that the lower side of the section of the collar 18 of unit A will strike the ground to compress the packing 19 of that unit and release the latch blocks 40 from the sockets 41. The packing 19 yieldingly holds the collars 17 and 18 spaced apart in a position where the latch blocks 40 are held against displacement from the sockets 41.

The latch blocks 40 may be released from the sockets 41 by compressing the packing of the unit B and at the same time striking a blow at the outer edge of one of the collar sections of the unit A or by striking a heavy blow on one of the collar sections of the unit A while retaining the unit B stationary. By manipulating the device in either of these manners, the latch blocks 40 are caused to move vertically relative to the sockets 41 so that they are released from the sockets.

It is believed that the operation of the packer provided by the present invention will be readily apparent from the foregoing detailed description. The units A and B may be readily assembled around the pipe P in the manner described above and lowered into the casing head H. When it is desired to actuate the packer to pack off around the drill pipe P, the clamping sleeve 15 or other suitable packer actuating device on the head, may be operated to engage the ring 16^a to compress the packing 19, or the weight of the string of drill pipe P may be put on the packer through a collar C to actuate the packing. Upon a compression strain being put on the packer in any manner, the packing 19 is compressed and forced downward on the wedge projections 30 which expand the packing radially outward into tight sealing engagement with the walls of the opening 11 and inwardly into effective sealing engagement with the pipe P. Further, upon compression of the packing 19, the tapered ends 33 of the projections 30 expand the end portions of the sections of packing 19 into tight compressive and sealing engagement. The groove extensions 32 permit downward movement of the packing 19 on to the projections 30 without danger of cracking the packing.

It is to be noted that the invention provides a well casing head packer that is extremely simple in construction and particularly effective in operation. The type of latch means 21 described above is easily and quickly operated to assemble or connect the units A and B together around the pipe P and may be easily released by striking or dropping the packer. The screws 37 connect the various parts of the units A and B so that they are held against separation without interfering with the effective compression and expansion of the packing 19.

Having described only a typical preferred form 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 an assembly of a ring of resilient packing, and collars at the ends of the packing ring, the assembly being longitudinally divided into two separate units, and means for releasably holding the units to-

gether including a spring on one unit, and a latch block on the spring adapted to cooperate with a socket in the other unit, the resiliency of the spring and packing operating to yieldingly retain the block in the socket.

2. A packing device of the character described including an assembly of a ring of expansible packing, and collars at the ends of the packing ring, the assembly being longitudinally divided into two separate units, means for expanding the packing ring including, a wedge projection on a collar extending into the ring, and means for releasably holding the units together including a spring on a collar part of one unit, and a latch block on the spring adapted to cooperate with a socket in a collar part of the other unit, the packing operating to yieldingly hold the said collar parts in position where the block is held in the socket.

3. A packing device of the character described including, a ring of expansible packing, collars at the ends of the ring, a tongue on one collar extending into a groove in the ring, and means for expanding the ring including a wedge projection on the other ring extending into a groove in the ring.

4. A packing device of the character described including, a ring of expansible packing, collars at the ends of the ring, a tongue on one collar extending into a groove in the ring, means connecting the collars for relative longitudinal movement, and means for expanding the ring including a wedge projection on the other ring slidably fitting a groove in the ring.

5. A packing device of the character described including a ring of expansible packing, collars at the ends of the ring, means connecting the collars for limited relative longitudinal movement, and means for expanding the ring including a projection on a collar having longitudinally convergent sides, the projection fitting a groove in the ring and normally holding the said collar spaced from the ring.

6. A packing device of the character described including a ring of expansible packing, collars at the opposite ends of the ring, a dove-tailed tongue on one collar extending into a groove in the ring, a projection on the other collar having convergent sides and extending into a groove in the ring, there being a continuation of the groove at the outer edge of the projection, and means connecting the collars for relative longitudinal movement.

7. A packing device of the character described including an assembly of collars, and yieldable expansible packing between the collars, the assembly being longitudinally divided into separate units, and means for releasably connecting the units including a spring latch on the end of one unit to cooperate with a socket in an end of the other unit, the packing normally yieldingly holding the latch in cooperation with the socket.

8. A packing device of the character described including, an assembly of a ring of expansible packing, and collars at the opposite ends of the ring, and means for expanding the packing including a wedge projection on one collar slidably fitting a groove in the ring and normally holding the said collar spaced from the end of the packing ring, the groove having an extension at its inner end adapted to receive the projection upon compression of the ring.

9. A packing device of the character described including an assembly of a ring of expansible compressible packing and collars at the opposite ends of the ring, the assembly being longitudinally split into two separate units, means for expanding the packing ring, and means for releasably connecting the two units including springs at the ends of a collar part of one unit, and blocks on the springs adapted to be arranged in sockets at the ends of the complementary collar part of the other unit upon compression of the packing of the said other unit and flexing of said springs.

10. A packing device of the character described including a ring of expansible packing, collars at the opposite ends of the ring, a dove-tailed tongue and groove connection between one collar and the ring, a projection on the other collar having convergent sides and extending into a groove in the ring and normally holding the said other collar spaced from the ring, and means connecting the collars for relative longitudinal movement.

11. A packing device of the character described including a ring of expansible packing, collars at the opposite ends of the ring, a dove-tailed tongue and groove connection between one collar and the ring, a projection on the other collar having convergent sides and extending into a groove in the ring and normally holding the said other collar spaced from the ring, and means connecting the collars for relative longitudinal movement, including a member attached to one collar and slidably carried in openings in the ring and the other collar.

In witness that we claim the foregoing, we have hereunto subscribed our names this 16th day of June, 1930.

LAWRENCE F. BAASH.
ERWIN BURNS.
GEORGE B. GARRARD.