Jan. 31, 1939. A. J. PENICK ET AL 2,145,458

BLOW-OUT PREVENTER

Filed April 17, 1936

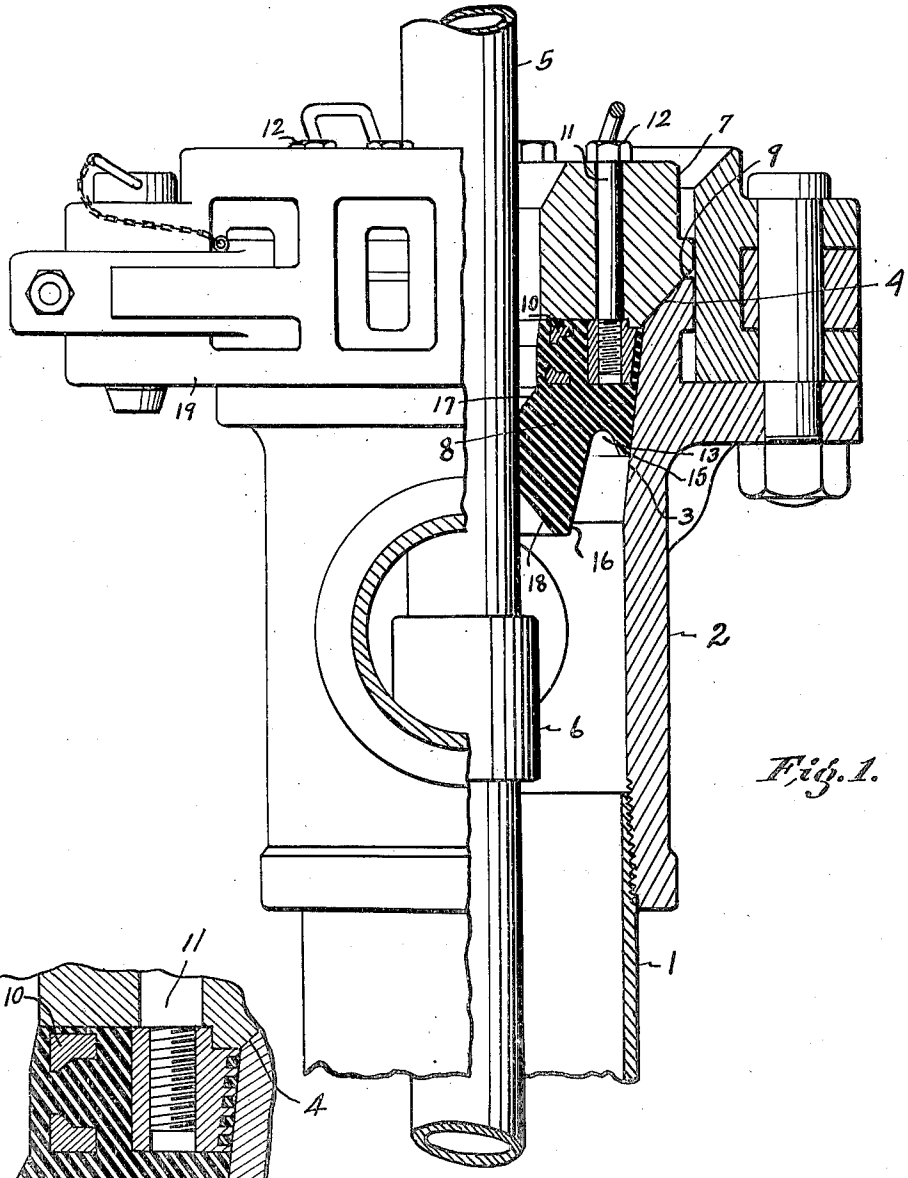


Fig. 1.

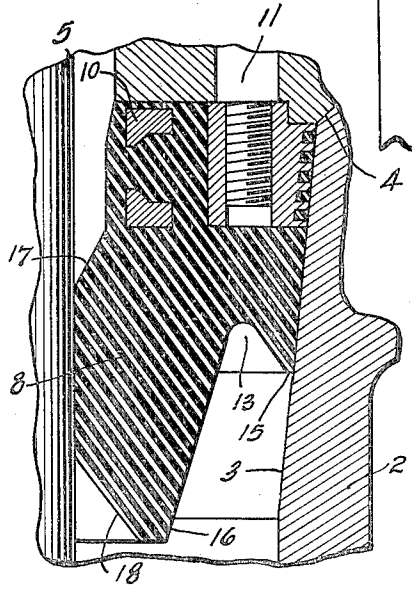


Fig. 2.

Inventors
Arthur J. Penick
Kirby T. Penick

By Hardway & Rathey
Attorneys

Patented Jan. 31, 1939 2,145,458

UNITED STATES PATENT OFFICE

2,145,458

BLOW-OUT PREVENTER

Arthur J. Penick and Kirby T. Penick,
Houston, Tex.

Application April 17, 1936, Serial No. 74,923

12 Claims. (Cl. 286—16)

This invention relates to a blowout preventer, and has particular relation to the pressure head embodied therein.

This application is a continuation of application Serial No. 24,838, filed June 4, 1935, as to common subject matter.

An object of the invention is to provide, in a blowout preventer a special type of pressure head which will permit the passage of an inner pipe and its couplings therethrough in both directions and which will at all times maintain a fluid tight seal between the pressure head and inner pipe as well as between the pressure head and the casing head on the outer pipe.

It is another object of the invention to provide a pressure head having a top wear ring and an annular yielding or resilient packing anchored in a novel manner to the wear ring.

With the above and other objects in view, the invention has particular relation to certain novel features of construction, operation and arrangement of parts, an example of which is given in this specification and illustrated in the accompanying drawing, wherein:—

Figure 1 shows a side view partly in section of the blowout preventer, showing the pressure head therein and Figure 2 shows an enlarged, fragmentary, vertical, sectional view of the pressure head.

Referring more particularly to the drawing, the numeral 1 designates a well casing having the casing head 2 secured to the upper end thereof and provided with an inside seat 3. The upper end of the casing head is outwardly flared also forming an annular seat 4.

In well drilling or well producing operations an inner pipe 5 is employed. This inner pipe may be a drill stem, or a well tubing and its sections are connected by enlarged couplings as 6. In case there is internal pressure it is necessary that a fluid tight seal be maintained between the casing head and the inner pipe. For that purpose a pressure head, hereinafter described, has been provided. This pressure head comprises a top wear ring 7 and a sleevelike packer 8 formed of rubber or similar yielding or resilient material. The wear ring 7 has an external downwardly converging annular face 9 shaped to seat against and closely fit the seat 4. The inside diameter of the wear ring 7 is slightly greater than the outside diameter of the couplings 6 so that said couplings will readily pass through said wear ring in elevating or lowering the inner pipe. Bolts 11 are fitted downwardly through suitable holes in the wear ring and their lower ends are screwed into the cage 10 with their heads 12 clamping against the upper face of said wear ring whereby the packer sleeve 8 is held firmly against the lower face of the wear ring. The lower end of the packer sleeve 8 has an annular groove 13 around forming an outer lip 15 which fits closely against the seat 3 and the inner lip 16 which extends downwardly and inwardly and fits closely about the inner pipe 5. The lip 16 is of considerable thickness and has an inside diameter somewhat less than that of the outside diameter of the seat 5, so that when said pipe is extended through the packer sleeve the material of the lip 16 will be compressed outwardly to form a very close fit against said inner pipe. The lip 16 has the inside downwardly converging face 17 to facilitate the downward passage of the coupling therethrough and also has the upwardly converging face 18 to facilitate the upward passage of the coupling 6 therethrough. The minimum inside diameter of the packing sleeve 8 is somewhat less than the inside diameter of the wear ring 7 so that the coupling 6 will readily pass through the wear ring but will be closely gripped by the inner surface of the inner lip 16. A very close contact will thus be maintained at all times between the inner lip 16 and the inner pipe 5 and its couplings while said pipe is being moved through the blowout preventer. The pressure head may be secured in place or released by means of the clamps 19 fully disclosed in our Patent No. 1,997,152, issued on the 9th day of April, 1935, on Casing head and blowout preventer. It will be noted that in accordance with this invention, and as to some of its aspects, there is a rigid cage which is internally larger than the couplings and formed externally for direct joining engagement with the casing head, and that a packer of resilient material is incorporated with the cage and has a depending annular part extending towards and axially of the pipe to engage the same, this annular part being diametrically larger than the couplings throughout its upper portion, but diametrically smaller than the couplings at its lower end, and also diametrically smaller than the casing head at its lower end whereby the pressure therein holds that part in sealing engagement with the pipe. By this construction the pressure inside of the casing head, which is extremely high in many cases, does not tend to fold the yielding packer back upwardly, but this packer will be firmly supported, and the sealing engagement between the blowout preventer structure and the casing

is maintained. By arranging the cage for attachment to the wear ring, the two can be inserted into the casing head as a unit so as to cooperate therewith.

The drawing and description disclose what is now considered to be a preferred form of the invention by way of illustration only while the broad principle of the invention will be defined by the appended claims.

What we claim is:

1. A pressure head for a blowout preventer comprising a top, metal, wear ring, an annular metal cage abutting the lower end of the wear ring and whose outer side tapers downwardly, means detachably securing the cage to the wear ring, a sleevelike packing into whose upper end the cage is moulded, the outer side of the packing being substantially flush with the outer side of the cage and the inner side of the packing covering the inner side of the cage, the lower portion of the packing being contracted inwardly and having a minimum inside diameter substantially less than that of the wear ring.

2. A pressure head for a blowout preventer comprising a top, metal, wear ring, an annular metal cage abutting the lower end of the wear ring, means detachably securing the cage to the wear ring, a sleevelike packing into whose upper end the cage is moulded, the outer sides of the cage and packing being substantially flush and the inner side of the packing extending inwardly beyond, and covering, the inner side of the cage and the lower end of the packing terminating in an inside, annular, lip whose inside diameter is appreciably less than that of the wear ring.

3. A tubular packing for a blowout preventer formed of resilient material and having an annular, openwork cage moulded into one end of said packing said cage presenting a wear resisting end face and a wear resisting external area of said packing said packing extending inwardly beyond the cage.

4. A tubular packing for a blowout preventer formed of resilient material, an annular, openwork cage moulded into the upper end of the packing, the cage being formed of wear resisting material and having its upper end and its outer side exposed to form wearing surfaces and having its inner side covered by the packing.

5. In a blowout preventer having a casing head provided with an inside seat; a pressure head shaped to fit into the casing head and onto the seat, the pressure head being tubular to receive an inside pipe therethrough and comprising a top wear ring formed of rigid material, a packing formed of resilient material, an annular openwork cage abutting the lower end of the wear ring and whose outer side is arranged to abut the casing head seat when the pressure head is located in the seat and whose inner side is spaced inwardly from the inner side of the resilient packing material, the upper end of the packing being molded into the cage.

6. In combination a casing head provided with an inside, downwardly tapering seat, a tubular pressure head shaped to fit into the casing head and onto the seat and including a packing formed of resilient material, an annular openwork cage whose top is approximately flush with the upper end of the packing and whose outer side is arranged substantially flush with the outer side of the packing to abut the casing head seat when the pressure head is located in the seat and whose inner side is spaced inwardly from the inner side of the packing, the upper end of the packing being molded into the cage.

7. A tubular packing for a blowout preventer formed of resilient material and having an annular, open-work cage molded into one end of said packing, said cage presenting a wear resisting end face and a wear resisting external face around said end of the packing, the material of the packing being molded through said end face and external face so that said wear resisting faces will be substantially flush with the corresponding end face and external face of the packing.

8. A tubular packing for a blowout preventer formed of resilient material, an annular openwork cage molded into the packing the cage being formed of wear resisting material and having its upper end and its outer side exposed, the packing having its inner side extending inwardly beyond the cage.

9. A tubular packing for a blowout preventer formed of resilient material, an annular openwork cage molded into said material, the cage being formed of wear resisting material and presenting a wear resisting, external area of the packing and an annular, upwardly directed end face, said packing extending inwardly beyond the cage.

10. A blow-out preventer for sealing a pipe having couplings, in a casing head, comprising, a rigid cage internally larger than the couplings and formed externally for direct joining engagement with the casing head, a packer of resilient material incorporated with said cage and having an annular part extending towards and axially of the pipe to engage the same, said annular part being diametrically smaller than the casing head whereby the pressure therein holds said part in sealing contact with the pipe.

11. A blow-out preventer for sealing a pipe having couplings, in a casing head, comprising, a wear ring interiorly larger than the couplings, a rigid cage attached to said ring, said cage being interiorly larger than the couplings and formed for external direct joining engagement with the casing head, a packer of resilient material incorporated with said cage and having an annular part extending towards and axially of the pipe to engage the same, said annular part being diametrically smaller than the casing head whereby the pressure therein holds said part in sealing contact with the pipe.

12. A device of the character described, comprising, a casing head adapted to receive a pipe provided with couplings, and having a seat, a rigid cage interiorly larger than the couplings and formed exteriorly for direct joining engagement with said seat, a packer of resilient material incorporated with said cage and having an annular part extending towards and axially of the pipe to engage the same, said annular part being diametrically smaller than the casing head whereby the pressure therein holds said part in sealing contact with the pipe.

ARTHUR J. PENICK.
KIRBY T. PENICK.