Feb. 15, 1927. 1,617,776

R. TAYLOR

SWIVEL

Filed Oct. 12, 1925

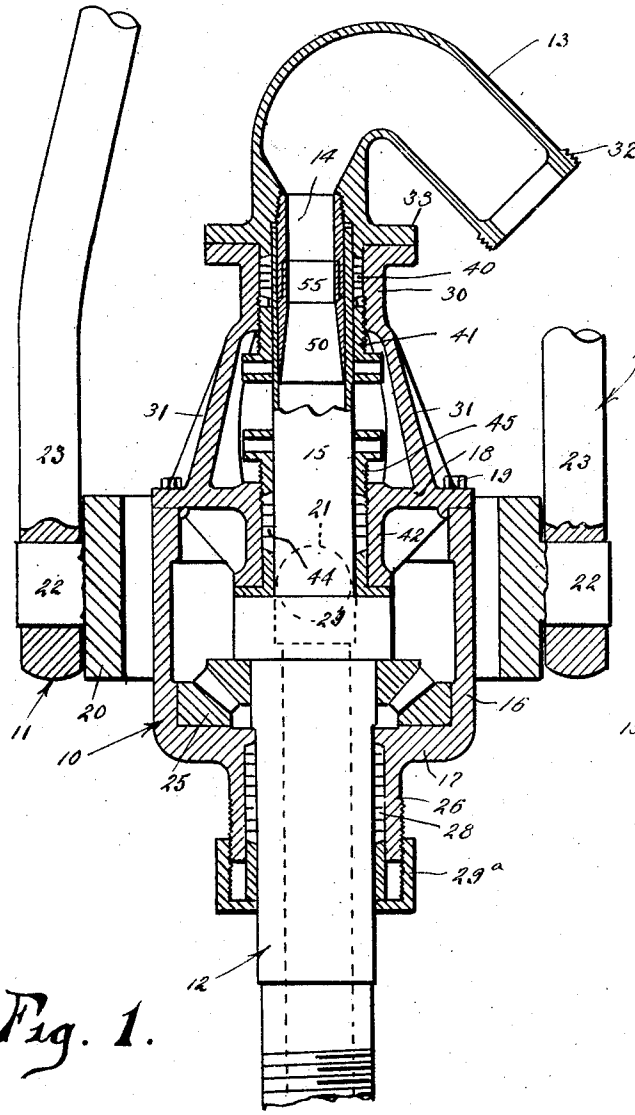
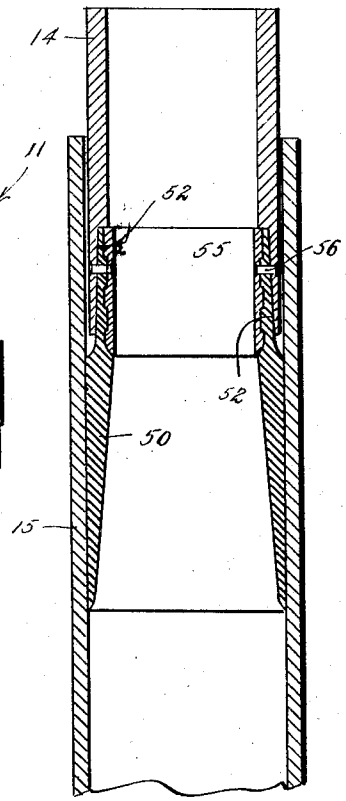


Fig. 1.

Fig. 2.



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Patented Feb. 15, 1927. 1,617,776

UNITED STATES PATENT OFFICE.

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SWIVEL.

Application filed October 12, 1925. Serial No. 62,069.

This invention has to do with a hydraulic swivel for use in connection with well drilling rigs and it is a general object of this invention to provide a simple, effective and improved device of this character.

It is an object of this invention to provide an effective, improved packing means for the wash pipe of a swivel.

Another object of this invention is to provide a simple and improved arrangement of packing means in a swivel.

It is a further object of this invention to provide a very simple, inexpensive and effective packing element useful in devices such as hydraulic swivels.

Another object of this invention is to provide an arrangement and construction of parts whereby the packing of a swivel is located at advantageous points and is readily accessible.

The various objects and features of my invention will be best and more fully understood from the following detailed description of a typical preferred form of the invention throughout which description reference is had to the accompanying drawings, in which:

Fig. 1 is a vertical detailed sectional view of a swivel embodying the present invention, and

Fig. 2 is an enlarged sectional view of certain parts of the swivel embodying the present invention.

This invention has particular reference to packing means and is particularly applicable to hydraulic swivels such as are used in well drilling rigs. I will therefore proceed with a description of the invention applied to a hydraulic swivel designed particularly for use in a well drilling rig.

The swivel shown in the drawings includes, generally, a main part, or trunnion block 10, supporting means 11 for the trunnion block, a swivel stem 12 carried by the trunnion block, a goose-neck 13 carried by the trunnion block, inner and outer wash pipes 14 and 15, respectively, and suitable packing means and other features, the details of which will be hereinafter described.

The trunnion block 10 includes a cylindrical body 16, a bottom 17 closing the lower end of the body and a cover 18 closing the upper end of the body. The bottom 17 is formed integral with the body, the cover 18 being detachably secured to the body by cap screws 19. The supporting means 11 illustrated in the drawings includes a ring 20 which freely surrounds the body of the trunnion block and has openings at diametrically opposed sides which rotatably carry trunnions 21 projecting from the sides of the body at diametrically opposite points. The ring 20, has trunnions 22 at diametrically opposite points, the axis of the trunnions 22 being at right angles to that of the trunnions 21; the usual bail 23 is applied to the trunnions 22 in the manner shown in the drawings. With this construction the trunnion block 10 is swivelly mounted within the bail 23. The swivel stem 12 extends into the body 16 of the trunnion block through the bottom 17 thereof and is supported by a suitable bearing 25 in the trunnion block. The bottom 17 has a part 26 extending downwardly around the swivel stem to carry packing 28. The packing 28 is compressed by a compression ring 29^a screw-threaded to the part 26 in the manner shown in Fig. 1 of the drawings. The bearing 25 through which the swivel stem is mounted in the trunnion block may be a suitable anti-friction bearing, for instance, a roller bearing, mounted in the body 16 between an enlargement or head 29 on the swivel stem and the bottom 17. The particular bearing shown in the drawings is a combination radial and thrust-bearing.

The goose-neck 13 is mounted on a tubular or cylindrical carrier 30 carried above the cover 18 on spaced supports 31. The goose-neck 13 may be shaped and proportioned in the manner common to swivels and may be provided with means, for instance, screw threads 32 whereby a suitable hose, or the like, may be connected to it. The goose-neck is firmly mounted on the upper end of the part 30 through a suitable flange connection 33.

The inner wash pipe 14, extends or projects downwardly from the goose-neck through the tubular part 30 while the outer wash pipe 15 extends upwardly from the head 29 of the swivel stem through the cover 18 and between the inner wash pipe and tubular part 30; the outer wash pipe is connected, for instance, screw-threaded into the head 29 of the swivel stem so that it rotates with the swivel stem. The inner wash pipe may be screw-threaded into the goose-neck to be stationary therewith. The parts are

arranged and proportioned so that there is a substantial space between the outer wash pipe and tubular part 30 to carry packing 40. A suitable packing compression ring 41 surrounds the outer wash pipe and screw-threads into the lower end of the tubular part 30 to compress the packing 40.

In the preferred construction the cover 18 is provided with a central projection 42 which surrounds the outer wash pipe to carry packing 44. A ring 45 surrounds the outer wash pipe and screw-threads into the cover 18 or extension 42 to operate the packing 44. With this arrangement and construction the rings 41 and 45 which operate the packing surrounding the wash pipe 15 are readily operable by means or tools inserted between the space supports 31.

In accordance with my present invention the inner wash pipe which is stationary, extends into the upper end of the outer wash pipe with working clearance and a packing sleeve 50 is mounted on or carried by the lower part of the inner wash pipe to pack the wash pipes so that there is no leakage of fluid between them. In the particular form of the invention shown in the drawings the expansive packing is in the form of a tubular body of rubber the upper end of which extends into a socket or recess 52 formed in the lower end of the inner wash pipe while the lower end projects freely from the inner wash pipe to engage the outer wash pipe. The upper end of the rubber sleeve may be held or retained in the socket in the wash pipe 14 by a suitable clamping or retaining ring 55 as clearly shown in Fig. 2 of the drawings. The surface of the ring 55 which engages the rubber may be made irregular as shown in Fig. 2 so that it is effective in holding the rubber. The retaining ring 55 may be held in place with reference to the rubber and inner wash pipe by means of rivets 56, or the like. The rubber sleeve preferably extends freely below the inner wash pipe a substantial distance and is shaped so that its outer surface has a working fit in the outer wash pipe. In the preferred form, the sleeve decreases in thickness from the wash pipe 14, to its lower end making its lower portion readily expansible into pressure engagement with the outer wash pipe. When the device is in operation, and, fluid under pressure is circulated through the goose-neck and from the inner wash pipe to the outer wash pipe, the fluid pressure operating on the inside of the packing sleeve expands it into pressure engagement with the outer wash pipe making a fluid-tight connection between the two wash pipes.

With the arrangement provided by my invention any fluid that does leak past the packing sleeve 50 must also leak past the packing 14 before it can escape. The packing sleeve 50 being carried by the inner wash pipe, and the inner wash pipe being carried by the goose-neck, the sleeve can be renewed or replaced upon removal of the goose-neck.

Having described only a typical preferred form of my invention I do not wish to limit myself to the specific details set forth, but wish to reserve to myself any changes or variations that may appear to those skilled in the art and fall within the scope of the following claims.

Having described my invention, I claim:

1. In a swivel connection two pipes one extending into the other and one revolving relative to the other, and an expansible packing sleeve extending from the inner end of the inner pipe to engage the interior of the outer pipe.

2. In a hydraulic swivel, a swivel stem, an outer wash pipe extending upwardly from the stem, a detachable goose neck, an inner wash pipe carried by and extending downwardly from the goose neck into the outer wash pipe, the inner and outer wash pipes being adapted for relative rotation, and a packing sleeve on the lower end of the inner wash pipe engaging the outer wash pipe.

3. In a hydraulic swivel two wash pipes adapted for relative rotation and one extending into the other, and a rubber packing sleeve extending from the inner end of the inner pipe to engage the interior of the outer pipe.

4. In a hydraulic swivel two wash pipes adapted for relative rotation and one extending into the other, the inner pipe having a socket in its inner end and an expansible packing sleeve carried in the socket and projecting from the end of the inner pipe.

5. In a hydraulic swivel two wash pipes adapted for relative rotation and one extending into the other, and a rubber packing sleeve extending from the inner end of the inner pipe to engage the interior of the outer pipe, the sleeve decreasing in thickness from the pipe to its free end.

In witness that I claim the foregoing I have hereunto subscribed my name this 16th day of September, 1925.

ROY TAYLOR.