No. 890,808. PATENTED JUNE 16, 1908.

W. L. SMITH.

ROD PACKING FOR ROCK DRILLS.

APPLICATION FILED JUNE 8, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

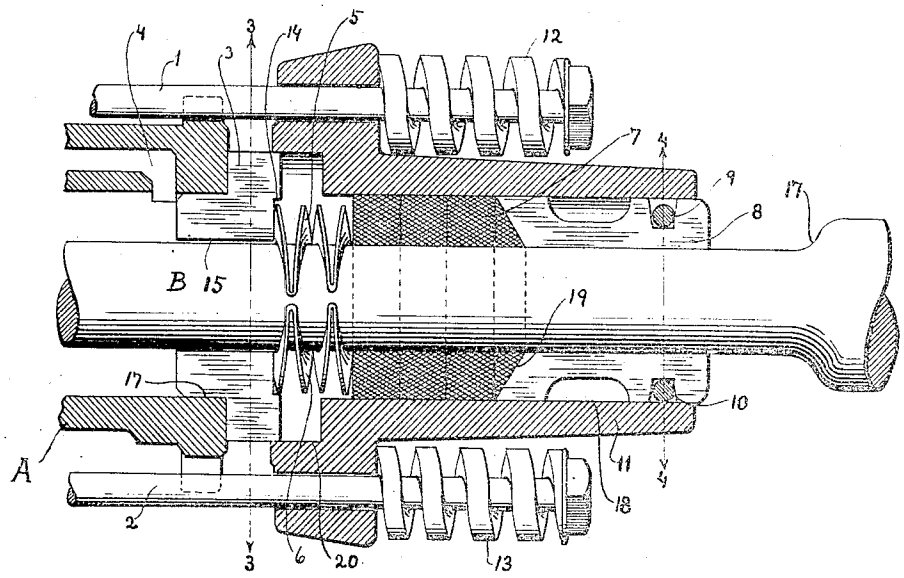


Fig. 8.

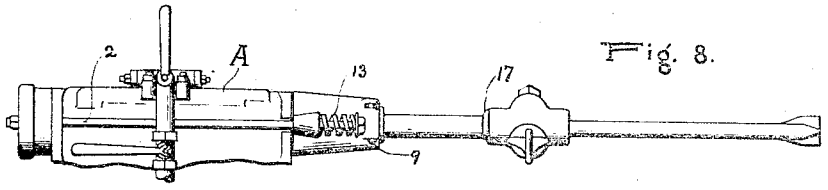
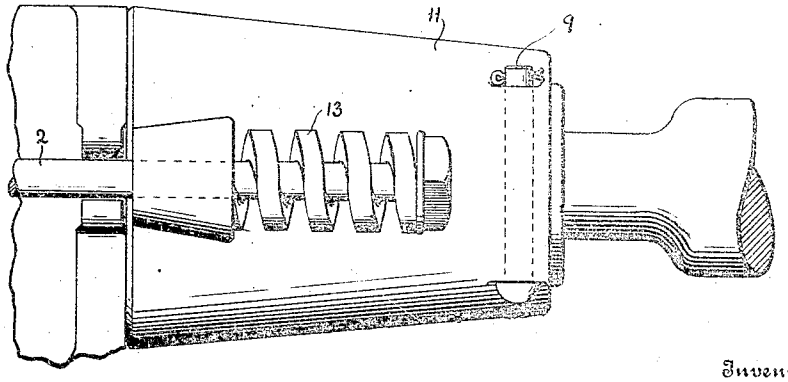


Fig. 2.



Witnesses

Stuart Hilder.

N. Curtis Lammond

Inventor

William L. Smith

By H. H. Vaughan

His Attorney

No. 890,808. PATENTED JUNE 16, 1908.

W. L. SMITH.

ROD PACKING FOR ROCK DRILLS.

APPLICATION FILED JUNE 8, 1906.

2 SHEETS—SHEET 2.

Fig. 3.

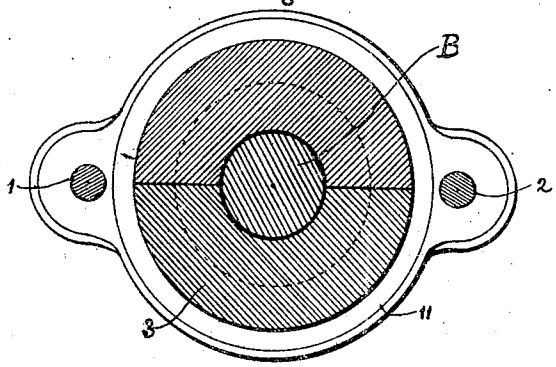


Fig. 4.

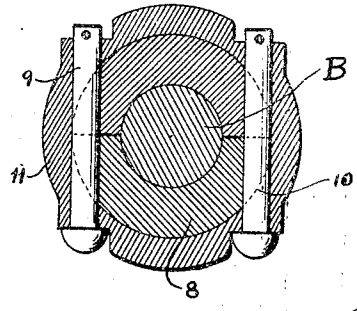


Fig. 6.

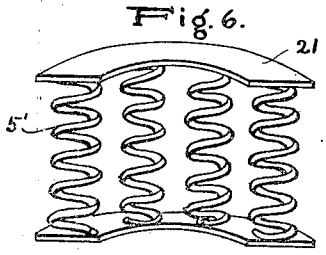


Fig. 5.

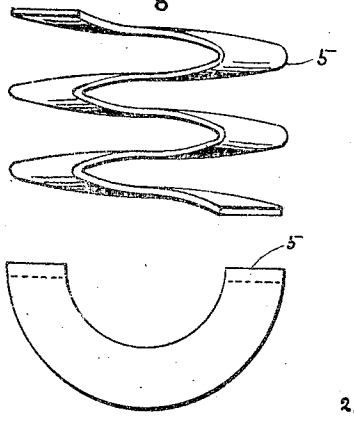
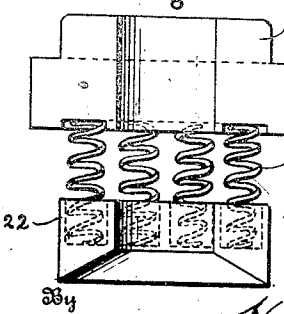


Fig. 7.



Witnesses

Stuart Hilder.

A. Curtis Lammond

Inventor

William L. Smith

By

H. H. Bliss

Its Attorney

UNITED STATES PATENT OFFICE.

WILLIAM L. SMITH, OF COLUMBUS, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE JEFFREY MANUFACTURING COMPANY, A CORPORATION OF OHIO.

ROD-PACKING FOR ROCK-DRILLS.

No. 890,808. Specification of Letters Patent. Patented June 16, 1908.

Application filed June 8, 1906. Serial No. 320,815.

To all whom it may concern:

Be it known that I, WILLIAM L. SMITH, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Rod-Packing for Rock-Drills and Like Apparatus, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention has for its object to produce an improved rod packing, and is designed especially for use in connection with rock drills of the reciprocating type, though it is not limited in its useful applications to combination with apparatus of this type.

In the accompanying drawings, Figure 1 is a longitudinal sectional view of a rod packing embodying my improvements, applied to the front end of a rock drill. Fig. 2 is a side elevation of the same. Fig. 3 is a cross-sectional view taken on line 3, 3, of Fig. 1. Fig. 4 is a cross-sectional view taken on line 4, 4, of Fig. 1. Fig. 5 represents in elevation and in plan, one of the springs 5, shown in Fig. 1. Fig. 6 is a perspective view of a spring of different form from that shown in Fig. 5. Fig. 7 is an elevation representing the spring shown in Fig. 6, combined with the parts with which it is immediately associated. Fig. 8 is a side elevation of a rock drill embodying my improved construction.

In the drawings, A represents the cylinder of the drill, and B the reciprocating rod mounted therein, arranged at its forward end to carry the drill tool. It is understood that these parts may be of any usual or approved construction, being here represented merely for the purpose of a better understanding of the invention. The drill-rod should be provided, as usual, with a piston on which the motor fluid acts, and which causes its rapid reciprocations.

To the front end of the cylinder is secured the front head-piece 11, which is connected therewith by bolts 1 and 2. I prefer that springs 12 and 13 should be interposed between the heads of these bolts and the lugs of the head-piece through which the bolts pass, in order that it be held in place with a yielding or spring pressure. Into the opening at the front end of the cylinder A is inserted a closure in the form of a plug or head washer 3, this being preferably formed of two similar parts to facilitate its application to the rod B, which is usually expanded or enlarged near either end, making it possible to slide the washer or plug 3 onto the rod from the end. The plug or washer 3 is provided with a central aperture 15, through which the rod B passes, the diameter of this aperture being slightly greater than that of the rod, for a purpose that will be described. The plug is rabbeted or shouldered, as indicated at 17, so as to fit tightly the end of the cylinder A. Its outer face is counterbored or recessed to constitute a seat 14 for the spring 5. The front head-piece 11 is formed with a central longitudinal bore 18, through which the rod B passes, and which is considerably larger in diameter than the rod. The outer end of this bore or opening is closed by a gland which preferably comprises two segmental pieces 8, shaped to closely fit the rod B, and also the interior surface of the head-piece 11. The gland pieces 8 are formed with notches 9, in which are seated retaining pins 10 that are mounted in suitable seats or bearings in the head-piece 11. These pins maintain the gland in position, preventing it from both longitudinal and rotary movements.

The space surrounding the rod B and between the inner end of the gland and the end of the bore 18 is filled with packing 7, a compressible fibrous packing being suitable for this purpose, and such being represented in the drawings. The inner end of the gland may be inclined, as represented at 19, and the end section of the packing correspondingly shaped to fit against such inclined face or end, if found desirable. A spring 5, which may be formed of two counterpart sections, as indicated in Fig. 5, to facilitate its application to the rod B when constructed as described, is interposed between the plug or washer 3 and the packing 7, its inner end being seated in the recess or counterbore 14. The inner end of the head-piece 11 is bored out to fit closely over the plug or washer 3.

With this description of parts, the manner of applying and using my invention may be

understood. If the rods 1 and 2 be loosened, the front head-piece 11 may be slipped along the rod B sufficiently far to open the space 18 and allow the placing of the packing 7 from the inner end or side of the said head-piece, it being unnecessary to remove or disturb the gland 8 for this purpose. After the packing has been placed the parts are brought to the position represented in Fig. 1. The screw-rods 1 and 2 are then tightened, compressing the springs 12 and 13, and forcing the head-piece 11 toward the end of the cylinder A, taking up the space between these parts, indicated at 16. This compresses the spring 5 and puts the packing under a desirable degree of tension or pressure. When the drill is in operation, it is necessary that the rod B should be tightly packed upon its back stroke only, for then the motor fluid enters through the port 4 and is acting against that face of the piston which is toward the front end of the cylinder. On the other stroke of the rod, when there is no pressure of the motor fluid upon the side toward the packing 7, it is not necessary that the latter should be under severe compression, and indeed it is better that it should not be. The tension of the spring 5 is only sufficient to properly hold the packing in place and maintain it on the forward strokes of the rod. When the motor fluid is admitted through the port 4, it not only enters and fills the cylinder chamber, but also flows through the annular passage 15 in the washer or plug 3, surrounding the piston rod B, and enters the chamber 6 in the front head-piece 11, where it acts directly upon the packing, compressing it.

It will be understood that it would be unnecessary to divide the plug 3 and the gland 8 if the rod was so formed that an integral plug or gland might be slipped into place over the end of the rod.

In Figs. 6 and 7, I have represented a different form of spring from that shown in Figs. 1 and 5. Here, instead of each section of the spring being of a single piece, it is formed of a plurality of spiral springs 5′, connected at their opposite ends by segmental plates 21, the upper plate resting in the recess 14 and the lower against the packing 7, or should it be preferred, against a follower that is arranged to rest upon the inner section of the packing. From this it will be seen that the construction and arrangement of the spring 5 is subject to variation and modification.

It has heretofore been customary in providing for the packing of piston rods to so construct and arrange the coöperating parts as to make it necessary to insert the packing from the front or outer end, and to have it rest against a fixed bearing or abutment at its inner end, the packing being unyielding, except for its own elasticity. This arrangement of packing is subject to certain serious objections when applied to the reciprocating rod of a rock drill. If too much packing be inserted into the head 11 the gland 8 is forced so far out that there is danger of the fillet 17, which is usually formed upon the rod near its outer end, striking the gland and breaking it or the head-piece 11, or both. Again, the severe shocks and jars to which a rock drill is subjected when in operation is liable to loosen the gland and cause it to work forward, with the disastrous results just stated. These objections are entirely overcome by the arrangement I have devised and herein described, wherein the gland 8 is fixed in position at all times, and the packing is put in plac from the rear and is held in position by a spring or equivalent device. The spring operates to advantage not only as a means for compressing the packing, but also constitutes a yielding abutment or support for the washer or plug 3, allowing the latter to yield should it be struck by the piston on its forward movement, thus reducing wear upon the drill by preventing those severe and disastrous shocks which result from the piston striking the closing end of the cylinder. The advantages incident to utilizing the motor fluid for compressing the packing on the backward stroke of the piston and its rod have already been pointed out. By thus utilizing the motor fluid a relatively light spring 5 can be employed.

What I claim is:—

1. In combination, a cylinder, a rod movable therein and projecting through the end thereof, a head-piece secured to said cylinder end and surrounding the rod, a removable gland rigidly secured against longitudinal movement in the outer end of the head-piece, a packing for the rod insertible into the head-piece through the inner end thereof, a spring abutment carried by the cylinder, and a spring interposed between the abutment and the packing, said packing being exposed to the fluid pressure within the cylinder.

2. The combination with the cylinder and a rod movable therein and extending beyond one end thereof, of a head-piece secured to the end of the cylinder, a packing for the rod insertible into the head-piece from its inner end without removing the head-piece from the rod, a packing gland in the outer end of the head-piece, and the retaining pins for holding the gland rigidly against longitudinal movement.

3. The combination with the cylinder and a rod movable therein and extending beyond one end thereof, of a head-piece secured to the end of the cylinder, a packing for the rod insertible into the head-piece from its inner end without removing the head-piece from

the rod, a packing gland in the outer end of the head-piece, and the retaining pins for holding the gland rigidly against longitudinal and rotary movements.

4. In a rod packing, the combination of the box, the gland, the packing, a spring abutment, and between the abutment and packing a plurality of springs each in arcuate form and consisting of a series of reversed spirals.

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

WILLIAM L. SMITH.

Witnesses:
S. J. WHITE,
H. S. RANSOM.