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PATENTED APR. 9, 1907.

E. M. WESTON.

ATTACHMENT FOR SUPPLYING WATER TO ROCK DRILLS.

APPLICATION FILED AUG. 1, 1905.

2 SHEETS—SHEET 1.

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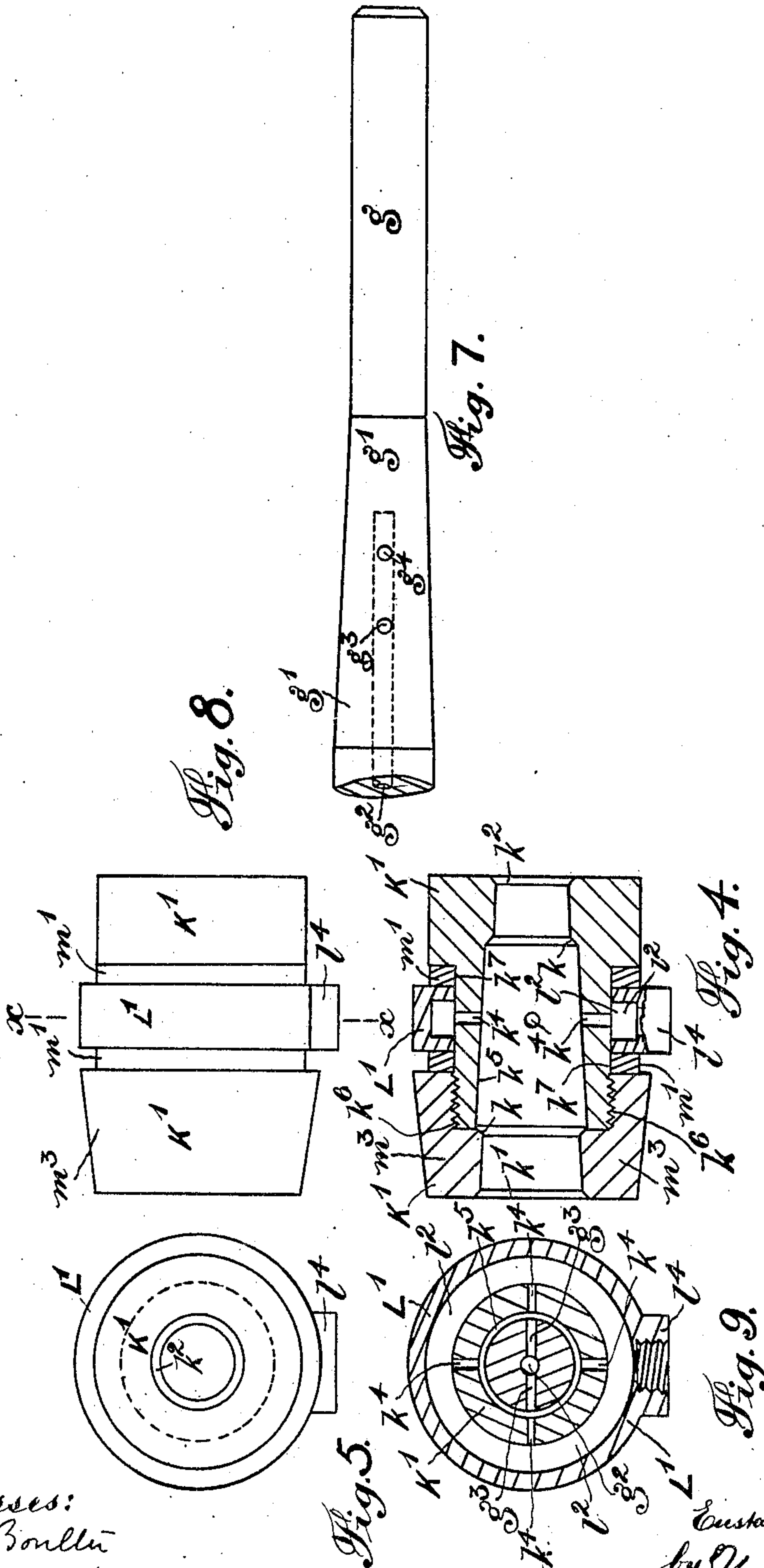
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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ATTACHMENT FOR SUPPLYING WATER TO ROCK-DRILLS.

No. 849,445.

Specification of Letters Patent.

Patented April 9, 1907.

Application filed August 1, 1905. Serial No. 272,205.

To all whom it may concern:

Be it known that I, EUSTACE MORIARTY WESTON, a subject of the King of Great Britain, residing at Johannesburg, Transvaal, have invented certain new and useful Improvements in Attachments for Supplying Water to Rock-Drills, of which the following is a specification.

This invention appertains to apparatus or devices for use with rock-drills or rock-drilling machines for providing either a continuous or intermittent supply of water to the holes as they are being drilled. It may be employed to the best advantage in the drilling of "upper" or upwardly-directed holes, as it enables a jet of water to be continuously injected into such holes and delivered at or in the vicinity of the cutting edges of the drilling bit or tool. The object of providing such a jet of water is to prevent dust being formed and to keep the hole clear of the detached particles of rock.

In some of the arrangements heretofore employed for the above purpose the water-supply has been conducted through the machine or certain parts thereof from which it has passed into and along the bit or tool to the bottom of the hole. In other cases water jets or sprays produced by the machine or independent contrivances have been directed around the exterior of the hole. In other arrangements the shank of the drill-bit has been constructed with projections or grooves around or in which swiveling devices have been arranged for conducting the water directly into a hole formed lengthwise of and at the center of the bit or tool. With the last-mentioned construction the operation of renewing the bits or tools has considerably lengthened the time required for changing the drills, which is undesirable. None of the arrangements above mentioned have proved satisfactory in practice.

By my invention I obviate the necessity for the passing of the water through any part of the machine proper and I provide simple and reliable devices for the purpose which are arranged on the shank or rear end of the bit or tool. The invention may be applied or used in conjunction with any of the existing types of machines. The device or attachment is so constructed as to be readily detachable from the bit, so as not to delay the operation of removing and renewing the same as may be required in the operation of the machine.

To facilitate a fuller description of my invention, I append a sheet of explanatory drawings marked with letters of reference corresponding with the following description thereof.

Figure 1 of the drawings shows the front portion of a rock-drill of well-known construction with my invention applied thereto. Fig. 2 is a view of a portion of Fig. 1 as seen from the under side, showing more particularly the slotted spring-bar J. Fig. 3 is an end elevation of the cylinder K, which is carried on the shank end of the bit or tool, and showing the water-ring L fitted round said cylinder. Fig. 4 is a section of the cylinder and water-ring constructed and arranged according to one form of the invention. Fig. 5 is an end elevation of Fig. 4. Fig. 6 is a longitudinal section of the cylinder shown in Fig. 1. Fig. 7 is a longitudinal elevation of the shank end of the drilling-bit. Fig. 8 is a side elevation of the cylinder and solid water-ring, and Fig. 9 is a section of Fig. 8 on line *x x*.

In Figs. 1 and 2, A represents the front head of the rock-drill; B, the front head-ring; CC', the stay-rods or longitudinal bolts which pass through the front head-ring B and by drawing the latter in a rearward direction secure the two parts of the front head A. D is the piston-rod, and E the bush fitted in the front head A. F is the chuck fashioned on the forward extremity of the piston-rod; F', the chuck-bush into which the shank or rear end *g* of the drill bit or tool projects and in which it is secured by means of the ordinary chuck-bolt G and pad. (Not shown.) On the forward ends of the rods or bolts CC' and at the rear of the front head-ring B is arranged a yoke or semicircular or approximately semicircular band H. This yoke H has attached to it at the center a spring-bar J. The bar J at its end is preferably rounded and constructed with a screw-thread. It projects through a hole in the yoke H and is secured therein by means of a nut *j*. The spring-bar J projects forward and is preferably shaped, as shown in Fig. 1, so as not to come into contact with or interfere with the rotation of the chuck F. The forward end of this spring-bar J is constructed with a longitudinal slot *j'*, (see Fig. 2,) the function of which is hereinafter described.

The shank or rear end of the drill-bit in front of the parallel part *g*, which fits into the bush F' of the chuck F, is tapered, as seen in

Fig. 7. The bit or tool is constructed with a longitudinal central hole g^2 , terminating at the front end at or in the vicinity of the cutting end thereof and at the other end terminating at or about the center of the tapered part g' . Two (more or less) transverse holes g^3 g^4 are formed in the tapered portion g' of the shank of the drill-bit, which transverse holes intersect or communicate with the longitudinal hole g^2 . The transverse hole or holes g^3 g^4 form the conduits or channels by which the water enters the longitudinal hole g^2 , along which it flows to or in the vicinity of the cutting end of the drill-bit. The transverse hole or holes g^3 g^4 may be made of smaller diameter than the longitudinal hole g^2 , so that any solid matter contained in the water entering said transverse holes g^3 g^4 may pass freely through the longitudinal hole g^2 and not choke it.

Referring first to the arrangement shown in Figs. 1, 3, and 6, the shank end of the drill or bit is surrounded by a hollow cylindrical piece K, the bore of which corresponds to the tapered part g' of the shank of the drill-bit, so that it makes a close fit around it. By making the hole or bore of the cylinder K taper and the part g' of the bit-shank of corresponding taper it will be understood that the cylinder tends to bind round the shank by the repeated blows of the bit or tool on the rock at the bottom of the hole. The ends of the bore of the cylinder K are beveled or rounded off, as is indicated at k , to prevent their being burred up. The cylinder K is formed on the inside with an annular water-space k^5 , surrounding the tapered portion g' of the shank and communicating, through the transverse holes g^3 g^4 in the latter, with the longitudinal hole g^2 . It will be perceived that when the cylinder K is arranged on the tapered part g' of the shank a tight fit is made between the shank and the ends or parts k' k^2 of the bore. The cylinder K is constructed on the outside with an annular recess k^3 , in the bottom of which are formed a number of holes k^4 , leading into the annular water-space k^5 . Round the external annular recess k^3 in the cylinder K is arranged a two-part water-ring L, in which the cylinder K is free to revolve. The ring L is constructed with the lugs l , through which holes are formed to receive bolts l' for bolting the two parts of the water-ring L together in the external annular recess k^3 . (See more particularly Figs. 1 and 3.) The ring L is also constructed with an inner annular groove l^2 , (shown in connection with Fig. 4,) which communicates, through the holes k^4 in the bottom of the recess k^3 , with the annular water-space k^5 inside the cylinder K. In the external recess k^3 at the sides of the water-ring L are fitted rubber or other suitable packing-rings l^3 to prevent the escape of the water between the ring L and cylinder K. One-half of the water-

ring L is constructed with a boss l^4 , which is tapped to receive a spud l^5 for attaching thereto the hose or other flexible water-supply pipe, which communicates with a source of supply of water under pressure. To prevent the rotation of the water-ring L with the cylinder K, the spud l^5 is shown constructed with a number of lugs l^6 , in which are formed holes l^7 for attaching a chain or its equivalent l^8 . The other end of the chain or cord l^8 is shown connected to the spring-bar J by means of a ring l^9 , which is adapted to traverse the slot j' as the drilling-bit reciprocates.

In the slightly-modified form of the arrangement shown in Figs. 4 and 5 the cylinder K' is constructed in two parts screwed together at k^6 . In this case the water-ring L' is made solid or in one piece. The packings m' are placed in the recess k^7 at the sides of the water-ring L'. In all other respects the water-ring and cylinder are similar to the arrangement shown in Figs. 1, 3, and 6.

What I claim as my invention, and desire to protect by Letters Patent, is—

1. In an apparatus of the character described, in combination a drill bit or tool, the shank of which has a tapered portion and provided with a longitudinal hole and a transverse hole, a cylinder having a tapered bore corresponding to the tapered portion of the bit-shank, the said tapered portion fitting in the said tapered bore, and a portion of said bore being enlarged to form a water-space surrounding the tapered portion of the bit-shank, and said cylinder being provided with an exterior circumferential recess and apertures leading from said recess to the said water-space, a water-ring seated within the said exterior recess of the cylinder and in which said cylinder is free to revolve and means for supplying water to the water-ring.

2. In apparatus of the character described, in combination, a drill-bit constructed with a longitudinal hole and with a transverse hole in communication therewith; a cylindrical piece non-rotatably carried by said bit, said cylindrical piece being formed with an annular internal recess in communication with the transverse hole and with holes in communication with said annular recess, a water-ring rotatably carried by said cylinder, which is in communication with the annular recess in the cylinder and the transverse and longitudinal holes in the bit, and means for supplying water to the water-ring.

3. In apparatus of the character described, in combination, a drill-bit having a longitudinal hole and a transverse hole in communication therewith and made taper for a portion of its length, a hollow cylindrical piece of corresponding taper non-rotatably carried on the tapered portion of the bit, said cylindrical piece being formed with an internal recess forming a water-space in communication

with the transverse hole in the bit and with a hole communicating with said annular recess, a water-ring rotatably mounted on the cylinder in communication through the hole in the cylinder with the internal recess and through the latter with the transverse and longitudinal holes in the bit, and means for conducting water to the water-ring.

4. In apparatus of the character described, in combination, a drill-bit made taper for a portion of its length and provided with a longitudinal hole and with a transverse hole in said tapered portion in communication with the longitudinal hole, a cylindrical piece constructed with a bore of corresponding taper to the bit upon which it is non-rotatably carried, said cylindrical piece being constructed with an internal annular recess forming a water-space round the tapered portion of the bit and in communication through the transverse hole with the longitudinal hole, said cylindrical piece being also constructed with an external recess and with a port placing said external recess in communication with the internal recess or water-space, a water-ring rotatably carried in said external recess, said water-ring being constructed with an internal recess in communication through the hole in the cylindrical piece with the internal recess or water-space and through the latter with the transverse and longitudinal holes in the bit, and means for conducting water to the water-ring.

5. In apparatus of the character described, in combination, a drill-bit made taper for a portion of its length and provided with a longitudinal hole and with a transverse hole through said tapered portion communicating with said longitudinal hole, a cylindrical piece formed with a tapered bore to fit the tapered portion of the bit on which it is non-rotatably carried, said cylindrical piece being constructed with an internal annular recess forming a water-space round the bit and in communication with the transverse hole, and with an external annular recess and a hole placing said external annular recess in communication with the water-space, a water-ring rotatably positioned in said external annular recess, said water-ring being constructed with an internal recess in communication with the water-space and transverse and longitudinal holes in the bit, means for conducting water to the water-ring, and means for preventing the rotation of the water-ring round the cylinder while permitting the cylinder to rotate in the water-ring.

6. In apparatus of the character described, in combination, a drill-bit made taper for a portion of its length and provided with a longitudinal hole and with transverse holes through said taper portion communicating

with said longitudinal hole, a cylindrical piece formed with a tapered bore to fit the tapered portion of the bit on which it is non-rotatably carried, said cylindrical piece being constructed with an internal annular recess forming a water-space round the bit and in communication with the transverse holes and with an external annular recess and holes placing said external annular recess in communication with the water-space, a water-ring rotatably positioned in said external annular recess, said water-ring being constructed with an internal recess in communication with the water-space and transverse and longitudinal holes in the bit, means for conducting water to the water-ring, packings located in the recess in the cylinder at the sides of the water-ring, and means for preventing the rotation of the water-ring round the cylinder while permitting the cylinder to rotate in the water-ring, substantially as described.

7. In apparatus of the character described, in combination, a drill-bit made taper for a portion of its length and provided with a longitudinal hole and with transverse holes through said tapered portion communicating with said longitudinal hole, a cylindrical piece formed with a tapered bore to fit the tapered portion of the bit on which it is non-rotatably carried, said cylindrical piece being constructed with an internal annular recess forming a water-space round the bit and in communication with the transverse holes and with an external annular recess and holes placing said external annular recess in communication with the water-space, a water-ring rotatably positioned in said external annular recess, said water-ring being constructed with an internal recess in communication with the water-space and transverse and longitudinal holes in the bit, means for conducting water to the water-ring, packings located in the recess in the cylinder at the sides of the water-ring, and means for preventing the rotation of the water-ring round the cylinder while permitting the cylinder to rotate in the water-ring, said means comprising a spring-bar fixed to a non-rotating portion of the machine at one end and constructed with a longitudinal slot at the other end and a ring adapted to traverse said slot and a flexible connection between said ring and the water-ring, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

EUSTACE MORIARTY WESTON.

Witnesses:

JAS. STEED,
SAML. SIMS.