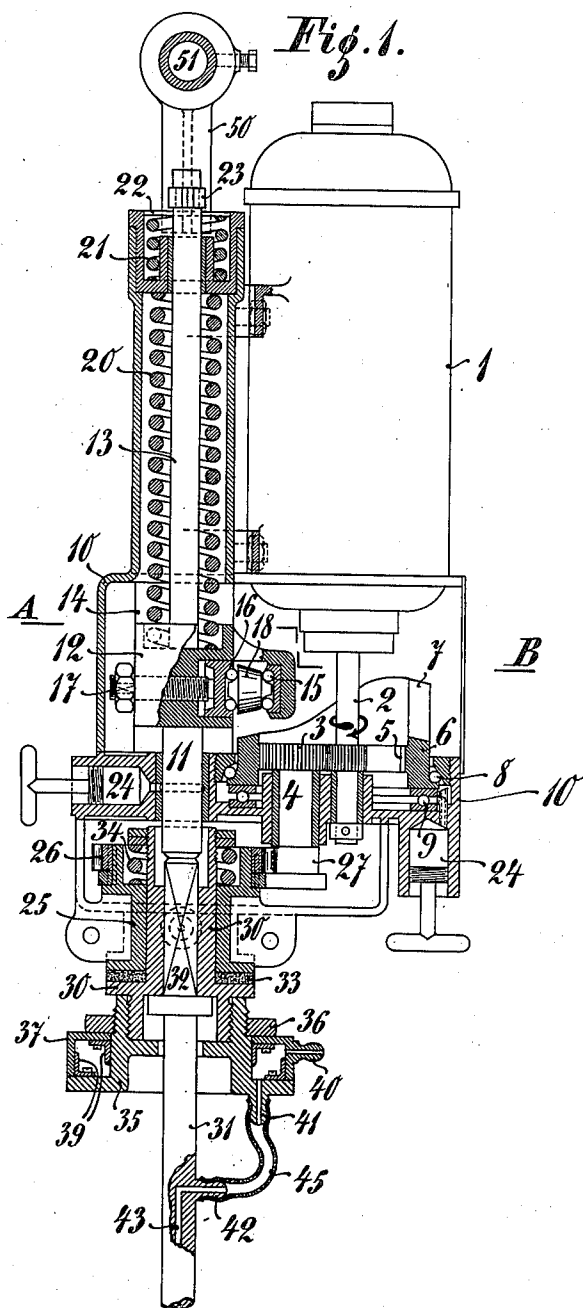


P. LANGE.
 ROCK DRILLING MACHINE.
 APPLICATION FILED FEB. 16, 1909.

1,044,790.

Patented Nov. 19, 1912.

2 SHEETS—SHEET 1.



WITNESSES

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Ray T. Ernst.

INVENTOR

Paul Lange

by *Ernst & Ernst*
 Attys

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2 SHEETS—SHEET 2.

Fig. 2.

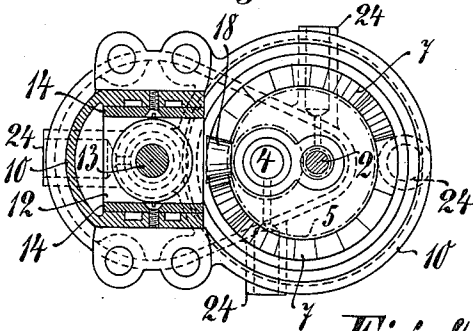


Fig. 3.

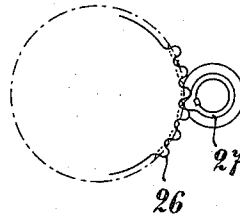


Fig. 4.

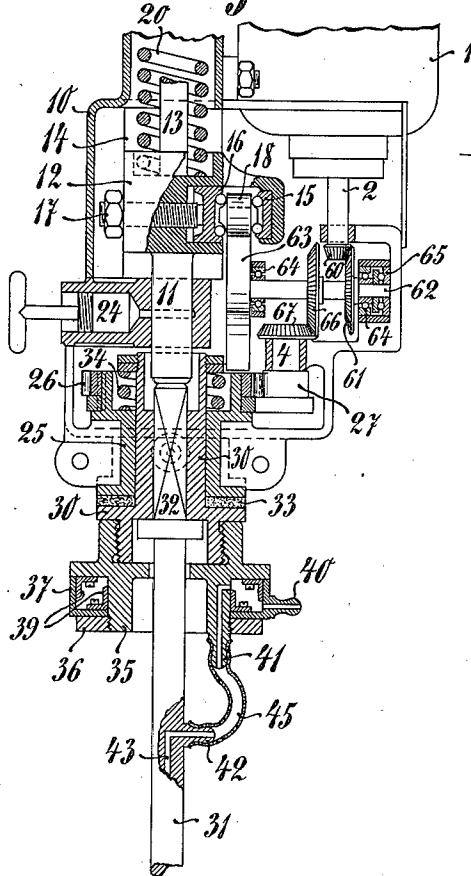


Fig. 5.



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UNITED STATES PATENT OFFICE.

PAUL LANGE, OF BRIEG, NEAR BRESLAU, GERMANY.

ROCK-DRILLING MACHINE.

1,044,790.

Specification of Letters Patent.

Patented Nov. 19, 1912.

Application filed February 16, 1909. Serial No. 478,196.

To all whom it may concern:

Be it known that I, PAUL LANGE, of Brieg, near Breslau, Prussia, Germany, a subject of the King of Prussia, and whose post-office address is Brieg, near Breslau, Prussia, German Empire, have invented new and useful Improvements in or Relating to Rock-Drilling Machines, of which the following is a specification.

10 This invention relates to improvements in rock-drilling machines, more particularly to one in which a hammer is caused to strike against a drill or boring chisel.

According to this invention a cam disk 15 rotated by any suitable driving medium such as an electric motor, compressed air, or other means, is caused to engage a roller mounted on the hammer so as to impart an up and down motion to the spring-controlled hammer which delivers a succession of blows to a drill or chisel, the holder of which is intermittently rotated by means of suitable gearing from the motor spindle.

The invention also comprises a device for 25 preventing the breakage of any part of the machine should the drill or chisel become jammed, and further the construction of the drill-holder head for admitting air or water under pressure for the purpose of clearing 30 away the chips caused by the operation of the machine. The hammer, the driving motor, and the drill holder are arranged together on one case which is either held by means of a handle by the workman, or can 35 be secured in any well-known manner to a suitable frame.

In the accompanying drawing:—Figure 1 is a longitudinal section of one construction of the machine with the motor in elevation; 40 Fig. 2 is a cross-section on line A—B of Fig. 1; Fig. 3 a detail view of the driving gear for the intermittent rotary movement of the drill-holder; Fig. 4 a longitudinal section through the bottom portion of a modified construction of the machine, and Fig. 5 45 shows the cam used in the construction illustrated in Fig. 4.

In the casing 1 is arranged a motor which imparts quick rotary motion to the spindle 50 2. The motor itself can be any desired suitable motor, for instance an electric motor or a compressed air motor. The spindle 2 drives by means of a toothed wheel mounted on an intermediate spindle 4, a cam disk 6 55 provided with internal teeth 5 and carrying one, two or more cam surfaces 7. The cam

disk 6 is mounted at the top and at the bottom in the machine frame 10, by means of ball bearings 8 and 9. In the same machine frame 10 is mounted in a sliding manner the hammer 11 provided with a square block 12 60 and a guide rod 13. The block 12 is guided in sliding guides 14 and is provided with a roller 18 which is mounted by means of fixed ball bearings 15 and ball bearings 16 which 65 are adjustable by means of screws 17. The roller 18 engages with the cam surfaces 7 of the cam disk 6 during the rotation of the latter and is raised and released by them. A spring 20 presses the hammer 11 downward, 70 and a second spring 21 acts as a buffer spring, elastically supporting the hammer by means of a pin 22 and a ring 23 secured to the hammer rod 13. Lubricating cups 24 are provided for lubricating the movable 75 parts.

Around the hammer 11 is rotatably mounted a sleeve 25 to which is keyed a toothed rim 26. With the latter engages a single tooth pinion 27 on the intermediate spindle 80 4. The pinion in question is arranged in such manner relatively to the cam disk 6 that, when the hammer 11 is raised by means of the cam 7 and roller 18, the sleeve 25 is turned to the extent of one tooth of its 85 toothed rim 26, while during the fall of the hammer it remains standing still. In the sleeve 25 is rotatably mounted a holder 30 for the drill or boring chisel 31. The latter is mounted in the holder in a longitudinal 90 adjustably adjustable manner by means of a square portion 32. Between the flanges of the sleeve 25 and the holder 30 is inserted a disk 33 of suitable material such as rubber, leather, or the like, and a spring 34 95 presses the flanges against the disk in such manner that a friction clutch is produced, which prevents any breaking of the gear when the edge of the drill 31 gets jammed. 100 A cap 35 screwed on the sleeve 25, prevents the drill 31 from falling out. A ring 37 of an angle-shaped cross-section is rotatably mounted between the bottom flange of the cap 35 and a lock ring 36, and packing rings 39 close the interior in a tight manner. 105 On the ring 37 is mounted a hose union 40, and a similar hose union 41 is mounted on the flange of the cap 35. Another branch or union 42 is formed on or secured to the drill 31. The drill is provided 110 with a central perforation 43 extending from the branch 42 to its edge, which

is not shown. A hose pipe 45 connects the branches 41 and 42 while to the branch 40 is connected the supply pipe for the rinsing medium which may be water under
5 pressure or compressed air. Thus the cap 35 is formed into a rinsing head with a tight joint. The machine frame 10 carries a holder 50, through which can be introduced, a pipe 51 which forms a handle when
10 the machine is to be held by the workman during the drilling, or the machine could be secured by means of the same in well known manner to a suitable frame or the like.

In the construction shown in Fig. 2, the
15 driving gear is modified in such manner that the spindle 2 drives by means of bevel wheels 60, 61, a horizontal spindle 62 with a vertical cam disk 63. Two ball bearings 64, and a step ball bearing 65, are used for
20 supporting the spindle 62. The intermediate spindle 4 is in that case driven by bevel wheels 66, 67. The rinsing head is modified by arranging the lock ring 36 at the bottom of the cap 35.

What I claim, and desire to secure by 25 Letters Patent of the United States, is:—

In a rock drilling machine the combination of a hammer and means for lifting same, said hammer having a head, a shaft and a square guiding block interposed be- 30 tween said two latter elements, said block being suitably shaped to form a casing, a roller adapted to cooperate with said lifting means and having one of its bearings slid- 35 ingly disposed in said casing, an extension bracket integral with said block and adapted to form the fixed support for the other roller bearing and a screw threaded into said block for adjusting the movable bearing disposed
40 in said casing.

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

PAUL LANGE.

Witnesses:

ERNST KATZ,
ERNST BLEIZOH.