April 29, 1924. 1,492,535

L. RASCH

ROTATING HAMMER FOR ROCK DRILLS OR THE LIKE

Filed Nov. 15. 1922 3 Sheets-Sheet 1

Fig. 1

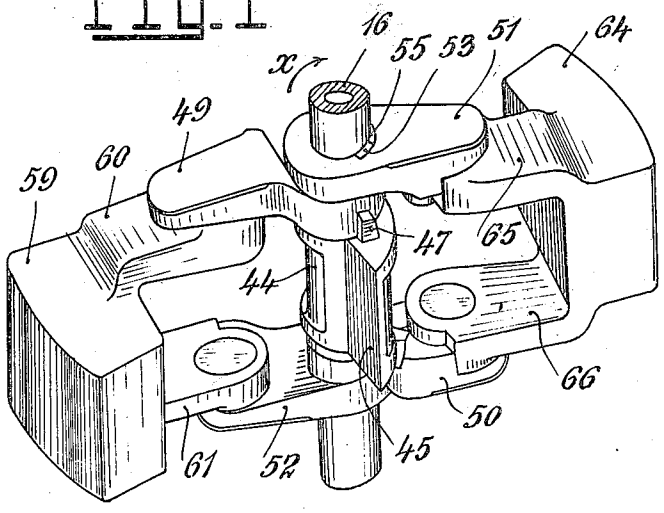
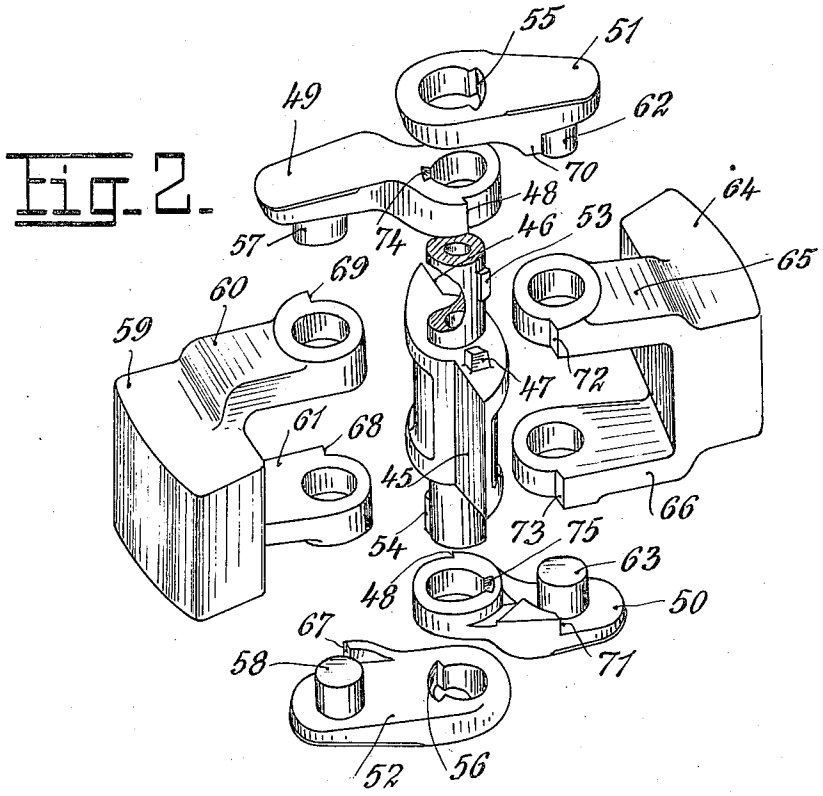


Fig. 2.



Inventor.
Ludwik Rasch.
By B. Singer. Atty.

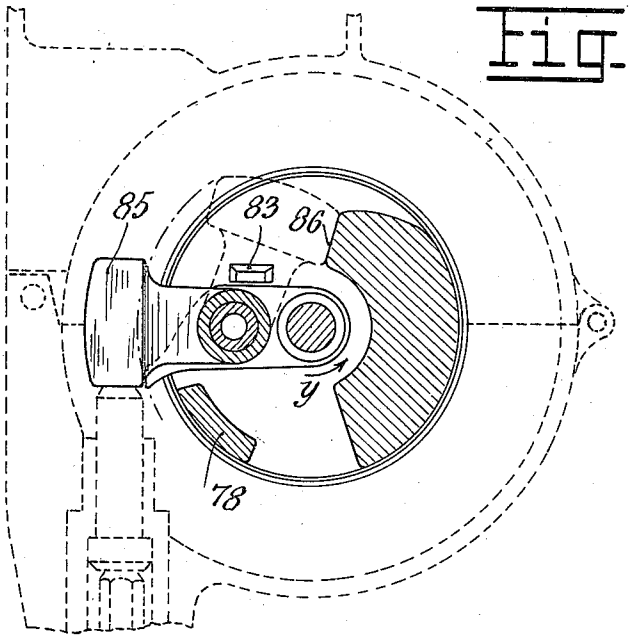
April 29, 1924. 1,492,535

L. RASCH

ROTATING HAMMER FOR ROCK DRILLS OR THE LIKE

Filed Nov. 15. 1922 3 Sheets-Sheet 2

Fig. 3.



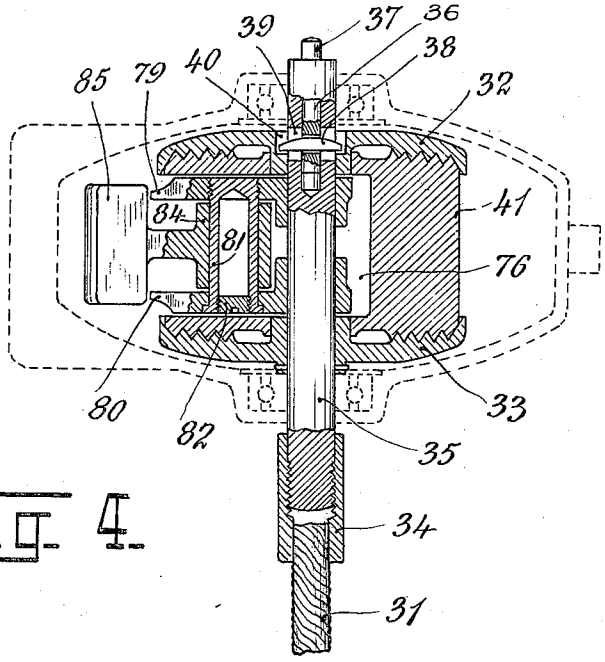


Fig. 4.

Inventor-
Ludvik Rasch.
By. B. Singer. Atty

April 29, 1924. 1,492,535

L. RASCH

ROTATING HAMMER FOR ROCK DRILLS OR THE LIKE

Filed Nov. 15, 1922 3 Sheets-Sheet 3

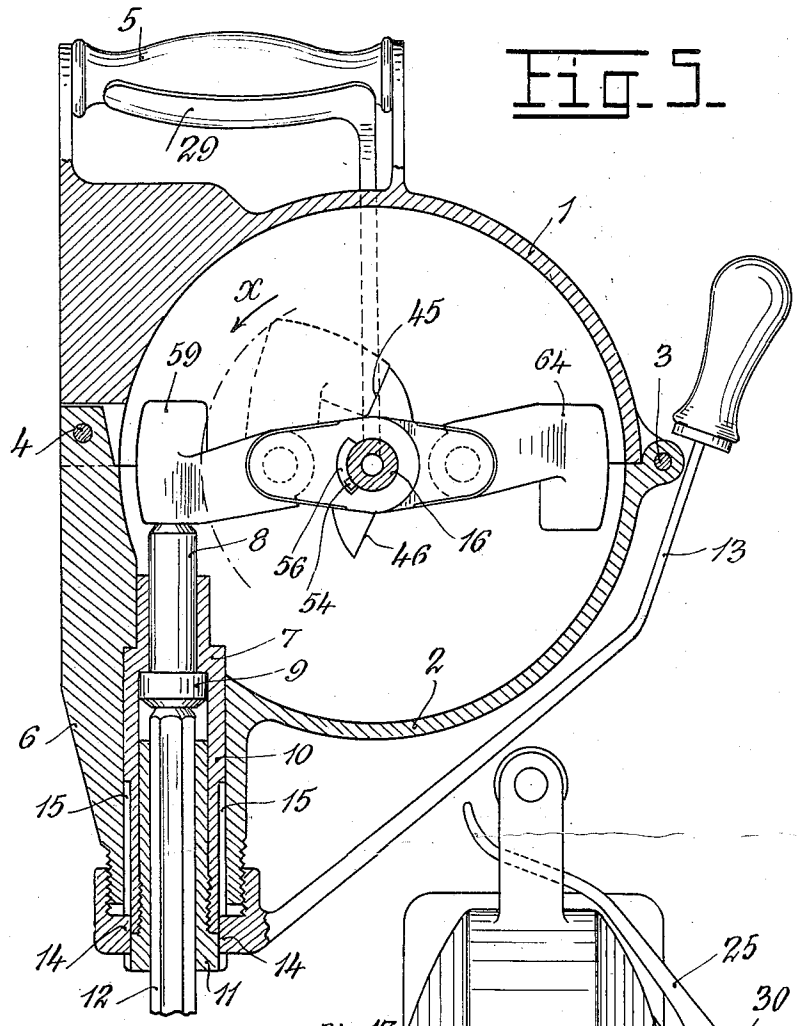


Fig. 5.

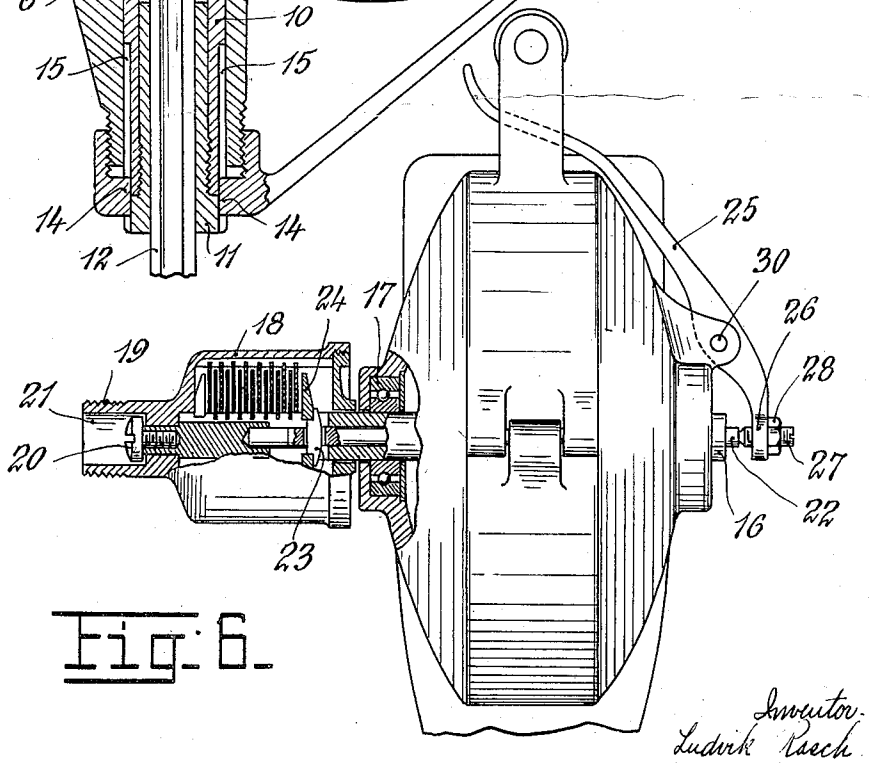


Fig. 6.

Inventor.
Ludvik Rasch.
By- B. Singer. Atty.

Patented Apr. 29, 1924. 1,492,535

UNITED STATES PATENT OFFICE.

LUDVIK RASCH, OF CHRISTIANIA, NORWAY, ASSIGNOR TO A/S FJELDBOR, OF DRAMMEN, NORWAY.

ROTATING HAMMER FOR ROCK DRILLS OR THE LIKE.

Application filed November 15, 1922. Serial No. 601,125.

To all whom it may concern:

Be it known that I, LUDVIK RASCH, a subject of the King of Norway, residing at Magnusgate 7, Christiania, Norway, have invented new and useful Improvements in Rotating Hammers for Rock Drills or the like (for which I have filed application in Norway, September 2, 1921, and in Germany, November 14, 1921), of which the following is a specification.

The present invention relates to a machine rotating hammer having rotatable heads for driving in rock drills or similar implements by striking action of the said heads against a suitable anvil so that the force is transferred to the drill or other implement which should be driven in.

The hammerheads suitably are connected to the driving shaft by means of a jointed coupling and arranged so as to pass the anvil freely after striking against the same. Thereupon the hammerheads will again take up a position so as to act again against the anvil.

The hammerheads are placed in a suitable casing which may be provided with handles for the purpose of carrying and operating the machine during its use. The machine may be driven by means of a flexible shaft connected to a coupling which may be operated by means of a handle so that the action may be controlled at any time.

In order to neutralize shocks in the casing owing to the striking action counter-weights may be arranged so as to obtain a dynamical balancing. These counter-weights may be constructed so that the hammerheads may strike against the same when moving backwards.

The motion of the hammerheads is limited so that they do not tend to touch the anvil when passing the same.

Further it may be remarked that the ideal action is only obtained when the speed corresponds to the moment of inertia and the natural time of oscillation of the hammerheads.

In the drawing:

Fig. 1 shows a perspective view of a rotating hammer having two striking-heads.

Fig. 2 shows the same after removal of the several parts from each other, the parts however being shown in the same relative position to each other as in Fig. 1.

Fig. 3 shows a side view of a rotating hammer having a single hammerhead, some parts being shown sectionally. The casing, anvil and the upper end are shown in dotted lines.

Fig. 4 is a partially sectional plan view, showing a suitable construction of a frictional coupling between the driving shaft and the hammerhead.

Fig. 5 is a sectional view showing a complete rotating hammer according to Figs. 1 and 2. The figure further shows a suitable arrangement for turning the drill when the machine is used for driving in a rock-drill. The head of the drill is shown in side view.

Fig. 6 is a side view and partially a section of a hammer according to Fig. 5. According to this figure the hammer is provided with a laminated coupling placed on the side of the hammer-casing.

The rotating hammer contains a casing (see Figs. 5 and 6) which may suitably consist of two parts 1 and 2 connected to each other by means of a hinge 3 and a lock joint 4 which may be easily released for the purpose of opening the casing. The upper part 1 of the casing is provided with a handle 5 for carrying the hammer and operating the same when being used. The lower part 2 of the casing is furnished with a socket 6 for a sleeve 7 in which the anvil 8 is guided. The anvil has at its lower end a head 9 which is guided in a wide part 10 of the sleeve 7. In the lower part of the sleeve is screwed a socket 11 taking up the drill 12 or other implement. The drill suitably is polygonal so as to be turned by means of the socket 11 which has a corresponding recess. The socket 11 is turned by means of a handle 13 which is screwed on the socket 6 and provided with lugs 14 entering a corresponding longitudinal groove 15 in the sleeve 7 and the socket 11.

The striking mechanism is driven by means of a hollow shaft 16 which may be suitably mounted in ball bearings 17 in the casing. The shaft 16 is connected to one set of coupling plates in a laminated coupling, the opposite set being connected to a casing 18 which may be driven by means of a suitable flexible shaft which is connected to the casing by means of threads 19. The casing 18 is maintained in its place on the shaft by means of a screw 20 screwed into the end of the shaft 16 in an axial recess 21 in the casing. The coupling is op-

erated by means of a pin 22 extending through an axial hole in the shaft 16 and provided with a lug 23 which is connected to the clamping-disc 24 of the laminated coupling, that is to say when the pin 22 is moved to the left in Fig. 6 the coupling plates are compressed and the driven casing 18 then will take the shaft 16 along with it during its rotation. The axial motion of the pin 22 is caused by means of a lever 25 which has at one end a head in which a pin 27 is screwed in, the pin being fastened by means of a counter nut 28. At the opposite end the lever 25 has a handle 29 which is arranged along the handle 5 so as to be easily operated by the same hand by means of which the machine is carried so that the other hand may be free for operating the handle 13. The lever 25 is pivoted to the casing half 1 at 30. As will be understood the driving position of the lever may be regulated by screwing the pin 27 more or less into the head 26.

According to Fig. 4 the driving coupling consists of side discs 32, 33 on both sides of the striking mechanism, the disc 33 being by means of a key fastened to the shaft 35. The machine is driven by means of a flexible shaft 31 which is by means of a socket 34 connected to the driving shaft 35. The latter has at its opposite end an axial hole 36 in which is placed a pin 37 which may be controlled by means of a lever similar to the lever 25 in Figs. 5 and 6. The pin 37 is provided with a lug 38 which may pass through 39 in the shaft and engage grooves 40 in the clamp disc 32. When the pin 37 is pushed inwards the clamp disc 32 will engage the body 41 which in its turn will engage the disc 33 which is by means of a key fastened to the shaft 35 so that a double side driving of the said body 41 is caused.

According to Figs. 3 and 4 the striking mechanism consists of a bearing and a contact part 41 arranged so as to be coupled to the shaft 35 by means of clamp discs 32, 33. In a suitable recess 76 in the part 41 arms 79, 80 may be rotated on the shaft 35 the arms being connected to each other by means of a pivot 81, which is as an example threaded into the arm 79 and provided with a flange countersunk in the arm 80. The pivot is according to Figs. 3 and 4 hollow owing to the inertia and is at its one end closed by means of a screw cap 82. The arms 79, 80 coact with lugs 83 placed opposite to each other in the recess 76 so that the arms will be taken along during the rotation of the part 41. On the pivot 81 is placed a hammerhead 85 by means of the hub. When the shaft 34 is moved in the direction of the arrow y and the clamp claws 32, 33 are in clamping position the part 41 will be moved in the same direction and the hammer body will by means of the lugs 83 and the arms 79, 80 be rotated. Owing to the centrifugal force the hammer body will move into striking position as indicated in full lines in Fig. 3. After striking against the anvil 8 the hammer will be driven back again as indicated in dotted lines in Fig. 3 and will strike against a contact part 86 on the body 41. In this position the hammer will pass the anvil and will thereupon partly owing to the blow against the contact part 86 and partly owing to the centrifugal force turn again outwards in a position ready for the next striking motion.

A cross piece 78 integral with the body 41 serves for the purpose of stiffening the side walls of the recess 76.

For the purpose of dynamically balancing the hammer during the striking action the body 41 in Figures 3 and 4 has a relatively great mass placed opposite the hammer body. In this way only weak shocks are transferred to the casing and the handle during the use of the machine.

A suitable construction of a machine having two hammers is shown in Figs. 1 and 2. To the hollow shaft 16 is fastened a contact piece 44 having contact parts 45, 46. On the sides of the contact piece is arranged a set of lugs 47 opposite to each other so as to engage shoulders 48 on the arms 49, 50 which may turn on the shaft 16 (only one lug shown in the drawing). On the side of the arms 49, 50 are placed arms 51, 52 coacting with keys 53, 54 on the shaft, the arms adapted to be moved to a certain degree relatively to the same. For this purpose the arms have segment-shaped recesses 55, 56 in which the keys may enter. The arms 49, 52 are provided with pivots 57, 58 on which the hammerhead 59 with its arms 60, 61 is placed whereas the hammerhead 64 with its arms 65, 66 is placed on pivots 62, 63. The arms 49, 52 are provided with cams 67 coacting with lugs 68, 69 on the arms 60, 61 and the arms 50, 51 with cams 70, 71 coacting with lugs 72, 73 on the arms 65, 66.

The shaft 16 is driven in the direction of the arrow x. Hereby the lugs 47 on the contact piece will bear against the shoulders 48 and drive the arms 49, 50 whereas the keys 53, 54 will engage with the front edges of the segment shaped recesses 55, 56, and thereby drive the arms 51, 52. When rotating the hammerheads 59, 64 will by means of the centrifugal force swing outwards on the pivots 57, 58, 62, 63 respectively the outward motion being limited by contact of the shoulders 68, 69 against the cams 67, respectively and by contact of the shoulders 72, 73 against the cams 70, 71. When the hammerheads 59, 64 strike against the anvil 8 (Fig. 5) they will be thrown backwards as indicated in dotted lines in Fig. 5 until the

hammerhead strikes against the corresponding contact part 45. In this position the anvil will be passed whereupon the hammerhead will again partly owing to the blow and partly owing to the centrifugal force be driven into a position adapted for the next stroke as indicated in Fig. 5.

In order that the arms 49, 50 may be moved back on the shaft 16 they must pass the keys 54, 55. For this purpose the hubs of the arms may be provided with corresponding grooves 74, 75.

It will be understood that the invention is not limited to the shown and described details. Several alterations may be done without departing from the spirit of the invention.

As an example the hammerbody may be arranged so as to have a certain dead motion relatively to the parts upon which the same is placed.

The hammerbody may be suitably placed on an eccentrical sleeve upon the journal. Lubricating means may enter through a channel in one of the pivots 42, 43 to a sleeve having lubricating grooves and taking up the hammerbody (not shown).

Having now particularly described and ascertained the nature of my said invention in what manner the same is to be performed I declare that what I claim is:

1. Hammer mechanism for rock drills, of the class in which the hammer bodies are rotatable about a shaft to strike the drill and to be rebounded thereby, and moving past the drill after having been rebounded; and comprising a revoluble shaft, arms extending radially from said shaft and connected thereto for partial rotation independently thereof, and a centrifugal hammer having arms extending from the inner side thereof and pivotally connected to the first named arms.

2. Hammer mechanism for rock drills, of the class in which the hammer bodies are rotatable about a shaft to strike the drill and to be rebounded thereby, and moving past the drill after having been rebounded; and comprising a revoluble shaft, arms extending radially from said shaft and connected thereto for partial rotation independently thereof, and a centrifugal hammer having arms extending from the inner side thereof and pivotally connected to the first named arms, a casing in which said shaft and hammers are mounted, means to rotate said shaft, controlling means for said shaft, an anvil mounted in said casing for longitudinal movement and arranged with its inner end in the path of rotation of said hammers, and means for holding a drill for operation thereon by said anvil.

3. Hammer mechanism for rock drills, of the class in which the hammer bodies are rotatable about a shaft to strike the drill and to be rebounded thereby, and moving past the drill after having been rebounded; and comprising a revoluble shaft, clamping devices mounted on said shaft, means to lock said clamping devices to said shaft at will, a body held by said clamping devices, radial arms mounted on said shaft, said body having means to permit partial rotation of said arms independently of said shaft, and a centrifugal hammer having an inwardly extending arm pivotally mounted between said radial arms, said hammer being arranged to rebound against one side of said body.

In witness whereof I affix my signature.

LUDVIK RASCH.