No. 661,798. Patented Nov. 13, 1900.

G. GLOSSOP.

APPARATUS FOR MAKING AND SHARPENING ROCK DRILLS.

(Application filed May 22, 1900.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 3.

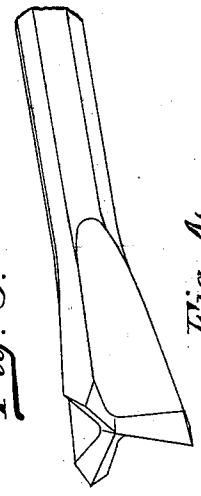
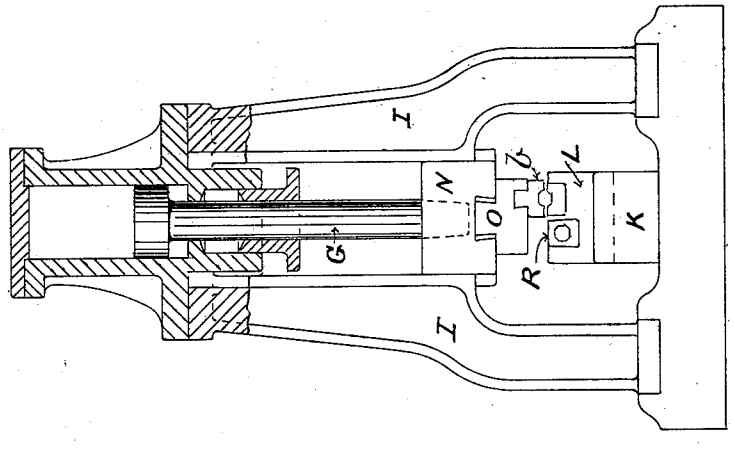


Fig. 4.



Fig. 1.

Fig. 2.



WITNESSES.

J. Clark Jefferson
Jno. A. Tinker

INVENTOR.

Gilbert Glossop

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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G. GLOSSOP.

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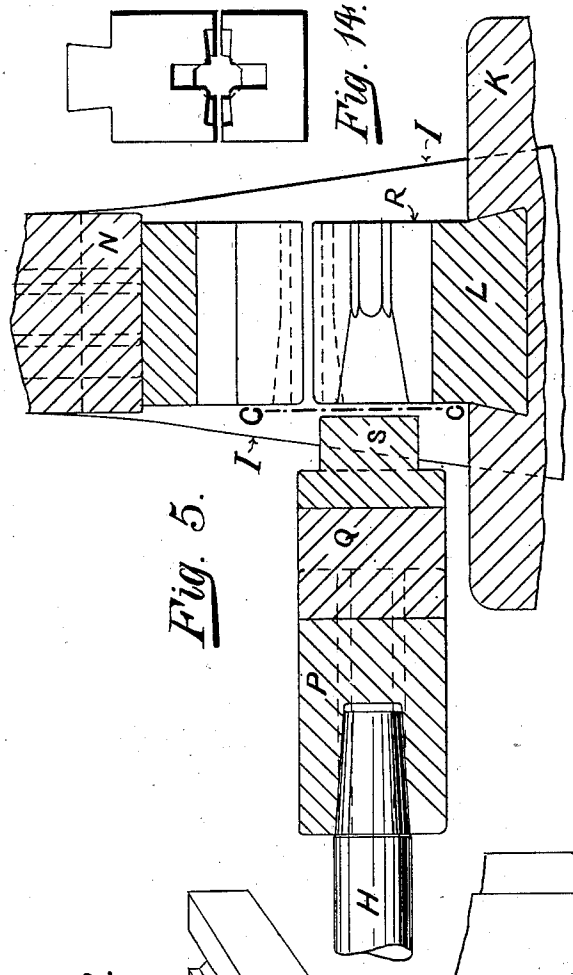
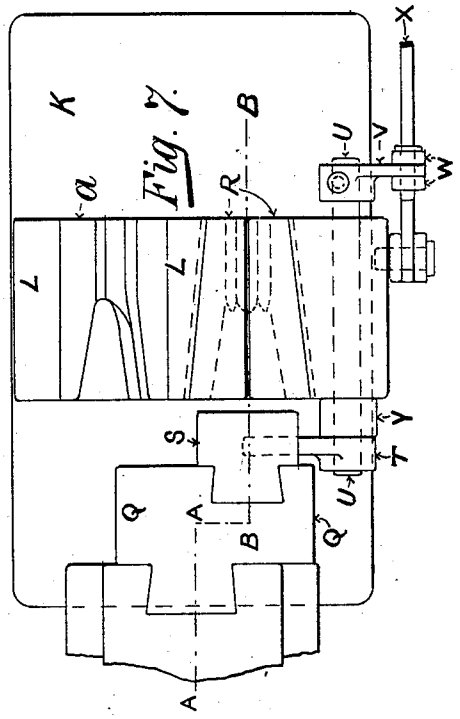


Fig. 5.



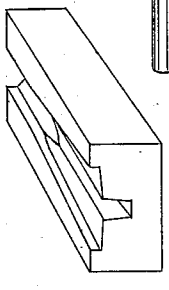
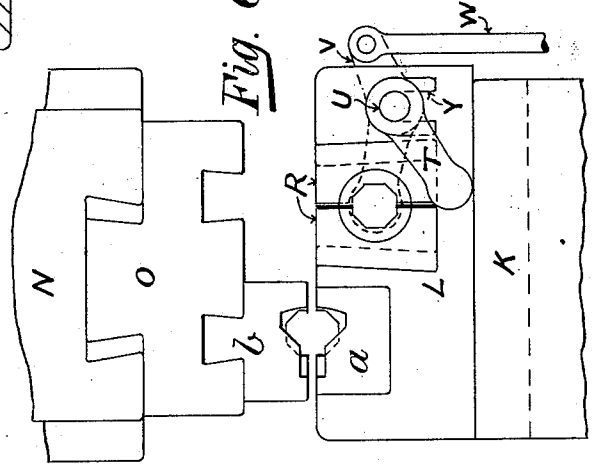


Fig. 8.



J. Clark Jefferson
Jno. A. Tinker. } WITNESSES.

INVENTOR.
Gilbert. Glossop Jr

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C

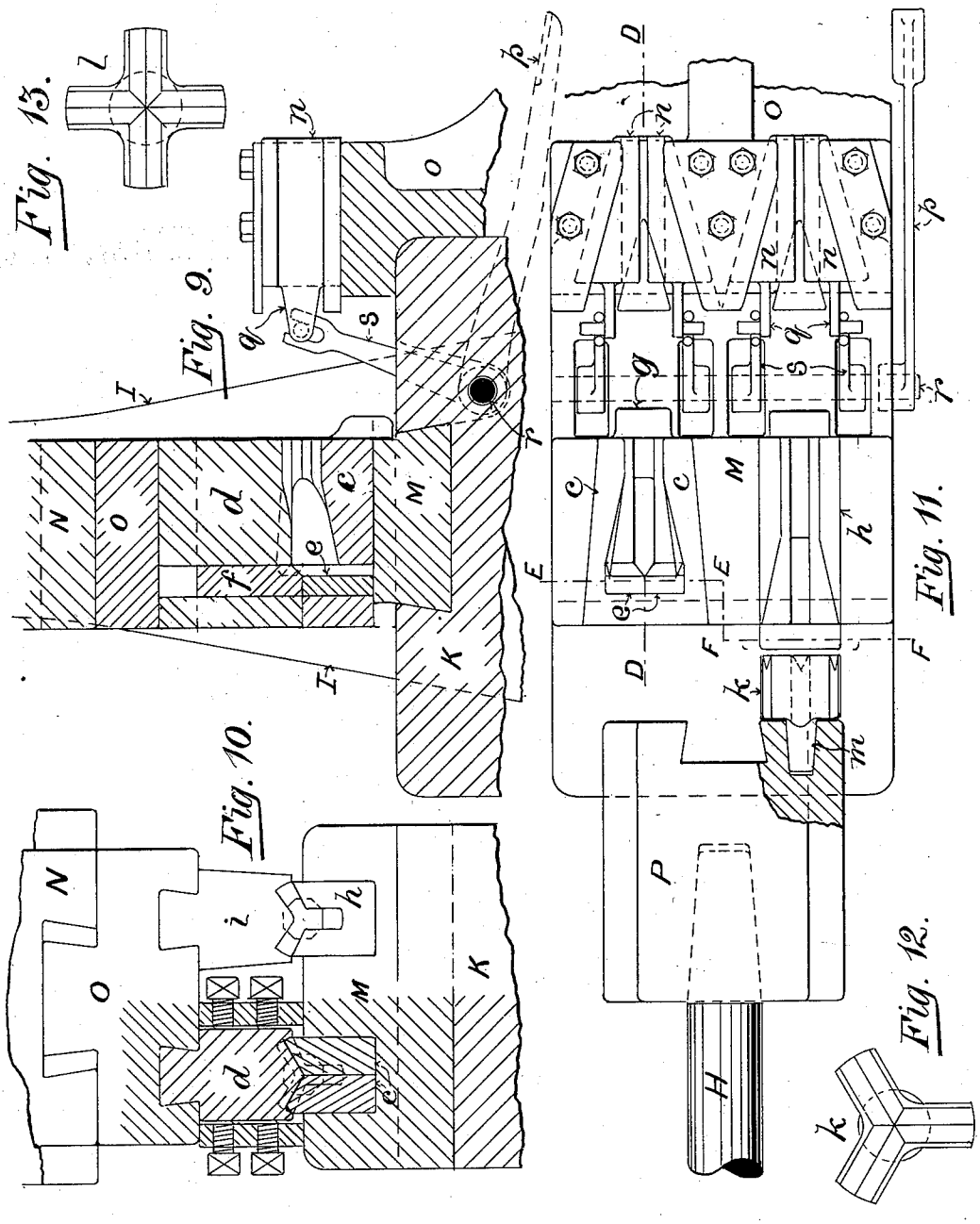
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J. Clark Jefferson
Jno. A. Tinker. } WITNESSES.

INVENTOR
Gilbert Glossop

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GILBERT GLOSSOP, OF LEEDS, ENGLAND.

APPARATUS FOR MAKING AND SHARPENING ROCK-DRILLS.

SPECIFICATION forming part of Letters Patent No. 661,798, dated November 13, 1900.

Application filed May 22, 1900. Serial No. 17,582. (No model.)

To all whom it may concern:

Be it known that I, GILBERT GLOSSOP, a subject of the Queen of Great Britain and Ireland, residing at the city of Leeds, England, have invented certain new and useful Improvements in Machinery or Apparatus for Making and Sharpening Rock-Boring Drills, (for which I have applied for Letters Patent in Great Britain and Ireland, No. 17,702, bearing date September 1, 1899,) of which the following is a specification.

The object of this invention is to provide machinery or apparatus whereby the making and sharpening of rock-boring drills having three or four chisel-pointed wings may be readily and accurately effected even by unskilled labor, and comprises a vertical and a horizontal steam or compressed-air driven hammer with anvil-block and dies or tools fitted to the anvil-block and to the heads of the horizontal and vertical hammers for, first, jumping or swelling up the end of the steel drill-bar, which is usually octagonal in section, by means of the horizontal hammer, so as to form a conical head containing sufficient metal to form the wings; second, drawing and forming the conical head by means of the vertical hammer to a shape intermediate between the cone and the finished wings; third, forming the wings to proper size and shape by means of the vertical hammer, and, fourth and lastly, sharpening the chisel-shaped ends of the wings by means of the horizontal hammer. The first two operations are intended to be performed at one heat and the last two operations at a second heat, these last two operations only being required in the case of drills sent from the mine to be resharpened.

In the following description reference is had to the accompanying drawings, of which—

Figure 1 is a longitudinal section, and Fig. 2 an end elevation, with the cylinder in section, showing the general arrangement of the vertical and horizontal hammers and anvil, omitting details which do not form part of the invention claimed. Figs. 3 and 4 are perspective views of a three-winged and a four-winged rock-boring drill, respectively, as proposed to be made and sharpened by the machinery or apparatus herein described. Fig. 5 is a longitudinal vertical section on line A A B B of Fig. 7. Fig. 6 is an elevation on line C C of Fig. 5, and Fig. 7 is a plan showing the dies or tools in position on the hammer-heads and anvil for jumping up the steel bar to form a conical head and afterward forming the conical head to the intermediate shape for a three-winged rock-drill. Fig. 8 is a perspective view of the die or tool for drawing and forming the conical head to the intermediate shape for a four-winged rock-drill. Fig. 9 is a longitudinal vertical section on line D D of Fig. 11; Fig. 10, a vertical section on line E E F F of Fig. 9, and Fig. 11 is a plan of the dies or tools in position on the hammer-heads and anvil for forming the wings to the finished shape and for sharpening the chisel ends and includes, also, means for assisting in holding the bar securely while these operations are being performed. Fig. 12 is a front view of the sharpening die or tool for a three-winged drill, and Fig. 13 of the sharpening tool or die for a four-winged drill. Fig. 14 is a front elevation of the forming dies or tools and of the holding dies or tools for a four-winged rock-drill.

In all the figures the same reference-letter refers to the same or corresponding part.

G indicates the piston-rod of the vertical hammer, and H that of the horizontal hammer, while I indicates the side standards of the vertical hammer.

K is the main anvil-block, formed with a dovetailed groove to receive the die or tool blocks L and M, which contain the dies or tools for performing the above-mentioned operations.

N is the head of the vertical hammer, likewise provided with a dovetailed groove to receive the die or tool block O, while P is the head of the horizontal hammer, also provided with a dovetailed groove to receive the die or tool block Q.

R, Figs. 5, 6, and 7, is the anvil die or tool for forming the conical head and is made in two halves, which fit in a groove in the tool-block L, dovetailed or tapered both vertically and horizontally, so that the two halves of the die grip the steel bar during the upsetting operation or the forming of the conical head with a force proportioned to the blow of the horizontal hammer, the head of which latter carries a round or square upsetting-tool S, which is dovetailed into the tool-block Q.

T is a stop-lever, hinged on the rod U, which by means of the lever V, link-rod W, and foot-lever X can be raised in front of the conical opening in the tool or die R and serves to fix the position of the steel bar in the tool or die R, so as to leave the necessary length projecting to provide sufficient metal to form the conical head. By using a thinner or thicker U-shaped sleeve Y and adjusting the position of the lever V on the rod U by means of the set-screw the amount by which the end of the steel bar is made to project through the die R can be adjusted as required.

a is the lower and *b* the upper die for forming the cone to the intermediate shape. These are fitted, respectively, in the die-blocks L and O, the former in a rectangular and the latter in a dovetailed groove.

c is the bottom and *d* is the top tool or die for forming the wings on the end of the steel bar to the proper shape and are fitted, respectively, in the die or tool blocks M and O. They are both provided with a rectangular slot at the front end to receive the beveled steel plates *e* and *f*, respectively, which serve to form the chisel-shaped ends of the wings. The steel plate *e* may be formed in two halves, as shown, or in one piece. The bottom tool or die *c* is formed tapered to fit a taper groove in the tool-block M and with a projecting lug *g* at the back fitting against the back of the block M to prevent any tendency of the tool or die *c* to move horizontally under the forming operation. The top tool or die *d* is dovetailed in the die or tool block O.

h and *i* are holding tools or dies fitted, respectively, in the die-blocks M and O and serve to hold the drill with the chisel ends projecting, so as to be acted upon by the sharpening-tool *k* for three-winged drills and *l* for four-winged drills, which fit by means of a conical stem *m* in a conical socket in the head P of the horizontal hammer.

The two wing-spaces left by the juxtaposition of the bottom and top dies or tools *c* and *d* are narrower at the root or center than at the outside, so that the finished drill leaves a comparatively large space for the passage of debris from the end of the drill-hole during the drilling operation in the mine. As the lower wing has to be moved vertically when the drill is inserted or removed from the tool or die *c*, the lower vertical wing-groove is made the same width from top to bottom, and during the forming operation the drill-bar is several times rotated through one hundred and twenty degrees to insure that all the three wings are made thinner near the root or center than at the outside. This applies also to the holding die or tool *h*.

To assist in holding the drill during the last two operations, the gripping device shown in Figs. 9 and 11 is employed and bolted to the anvil-bed behind the anvil-block K. The device consists of a pair of split gripping-dies *n*, fitted in the tapered slides formed in the casting *o*, so that as they are drawn out they move apart and as they are pushed back they come together, in this latter case gripping the drill-bar tightly between them. The dies are moved forward and backward from the foot-lever *p* by means of the lugs *q*, shaft *r*, and rocking levers *s*.

The apparatus is used as follows: The heated end of the drill-bar is pushed through the cone-forming die or tool R, Figs. 5 to 7, against the stop-lever T, which is momentarily raised to fix the position of the drill-bar with the proper length projecting. The stop-lever T is then dropped and the horizontal hammer started and kept working until the upsetting die or tool S has caused the metal to fill the cone hollow of the die or tool R. The hammer-head P is then drawn back and the two halves of the die or tool R pushed forward until they gape sufficiently to allow the drill-bar to be lifted out, when the drill-bar is immediately placed with the cone-head over the front part of the adjoining tool or die *a*. The vertical hammer is then set to work and kept working until the cone end is drawn and formed by the dies or tools *a* and *b* to the intermediate shape. This operation is repeated with as many drill-bars as are required. In the case of four-winged rock-drills being required the die or tool illustrated in Fig. 8 is substituted for the die *a* with a similar top die or tool. The die or tool block L is then replaced by the die or tool block M, Figs. 9 to 11, fitted with the dies or tools *c* and *h*. The die or tool *b*, Fig. 6, is removed from the die or tool block O, and the dies or tools *d* and *i*, Fig. 10, are attached thereto. The die or tool block Q is removed from the horizontal hammer-head P, and the sharpening die or tool *k*, Figs. 11 and 12, is then fitted in the socket-hole *m* in the hammer-head P. The drill-bars from the last of the above-described operations or the blunted drills from the mine are heated, and the heated end of each drill-bar is first placed resting on the die or tool *c* and the vertical hammer then started working, during which the drill-bar is occasionally rotated through one hundred and twenty degrees, as otherwise the bottom wing on the drill instead of being narrower nearer the center would be of the same width throughout. The solid parts of the die or tool *c* and *d* form the bodies of the wings, while the beveled plates *e* and *f* point or form the chisel ends of the wings. When the wings are thus brought to the proper shape, or in the case of blunted drills from the mine have thus been drawn out to their original length and the chisel ends pointed, the wing end of the drill is then placed resting on the holding die or tool *h*, while the vertical hammer-head is brought down with the holding-die *i* on the top of the wings to assist in holding the drill, while the horizontal hamner is set to work and the sharpening tool or die *k* brings the chisel ends up to the proper degree of sharpness. The pointing or shaping of the chisel ends under the vertical hammer and the sharpening by

the horizontal hammer subsequently and at a consequently comparatively lower temperature overcome the difficulty often experienced when the chisel ends are formed or pointed in the first instance by a percussive action in the direction of the length of the drill, in that in the latter case the wings are usually jumped up or thickened instead of the metal being drawn out to a chisel-point.

In the case of four-winged drills the forming dies or tools *c* and *d* and the holding dies or tools *h* and *i* are replaced by others. (Shown in front elevation in Fig. 14.)

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of an anvil-block and vertical and horizontal dies fitted into the same with a vertically-acting die-carrying hammer and a horizontally-acting die-carrying hammer, the said hammers being adapted to be used either for drill-forming or drill-sharpening and the dies of the said anvil being interchangeable to allow its use for either of the said purposes, substantially as set forth.

2. In machinery or apparatus for mending and sharpening blunted and worn rock-drills the combination of a vertical and a horizontal hammer and an anvil, the hammer-head *n* of the vertical hammer having a wing drawing, forming and pointing die or tool *d* and a holding-die *i*, the hammer-head *p* of the horizontal hammer having a wing-sharpening tool or die *k*, while the anvil-block is provided with a wing pointing, forming and drawing die *c* and a holding-die *h* all substantially as herein set forth.

3. In machinery or apparatus for mending and sharpening blunted and worn rock-drills the combination of a vertical hammer, a horizontal hammer, an anvil, the hammer-head N of the vertical hammer having a wing drawing and pointing die or tool *d* and a holding-die *i*, the hammer-head *p* of the horizontal hammer having a wing-sharpening tool or die *k*, and the anvil-block being provided with a wing pointing, forming and drawing die *c* and a holding-die *h*, and of the double gripping device consisting of two hollow split taper gripping-blocks *n*, tapered guides or slides connecting lugs *q*, rocking levers *s*, shaft *r* and foot-lever *p* all substantially as herein set forth.

4. In machinery for making and sharpening rock-drills the combination on one anvil-block of a bottom wing forming and pointing die *c* and a wing-holding die *h*, a horizontally-acting die and upper, vertically-acting dies adapted to coöperate with the dies on said anvil, substantially as herein set forth.

5. In wing forming and pointing dies or tools for making and sharpening rock-drills the combination of block-dies *c* and *d* having recesses to form the wings of beveled drawing and pointing steel plates *e* and *f* fitted in recesses formed toward the front of the blocks to receive it, substantially as herein set forth.

GILBERT GLOSSOP.

Witnesses:
J. CLARK JEFFERSON,
JNO. A. TINKER.