D. G. MORGAN.

DRILL SHARPENER.

APPLICATION FILED MAR. 2, 1909.

949,040.

Patented Feb. 15, 1910.

2 SHEETS—SHEET 1.

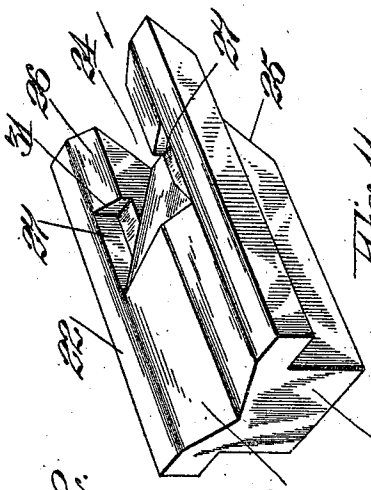

Fig. 2.

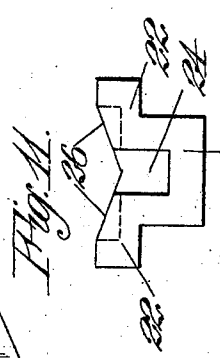

Fig. 6.

Fig. 1.

Fig. 5.

Fig. 4.

Witnesses.
Steinberg.
R. F. Berry.

Inventor.
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his Atty.

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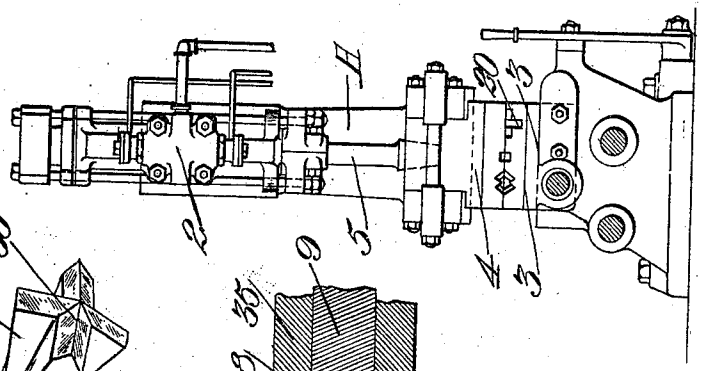

Fig. 5.

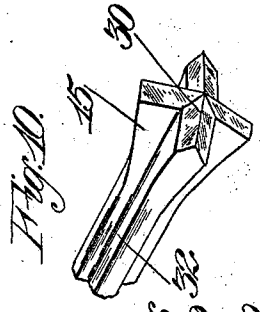

Fig. 10.

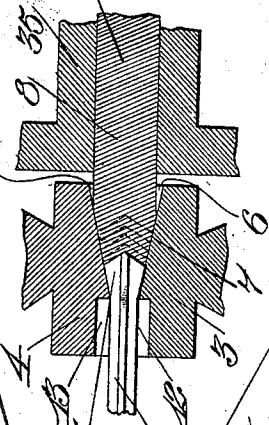

Fig. 6.

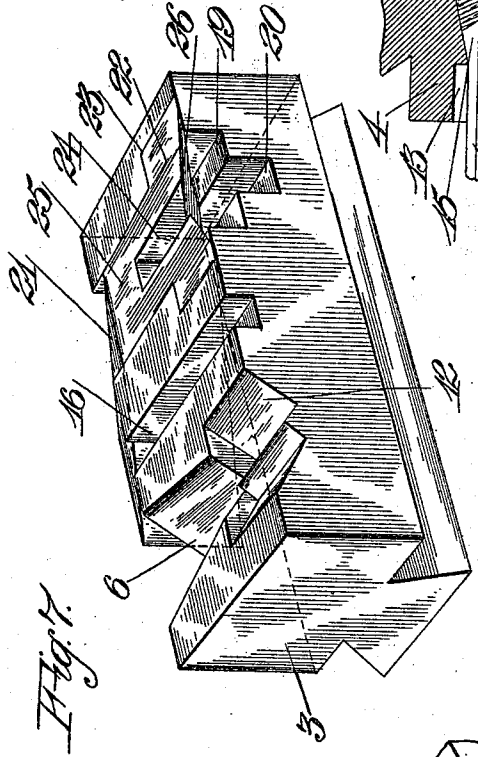

Fig. 7.

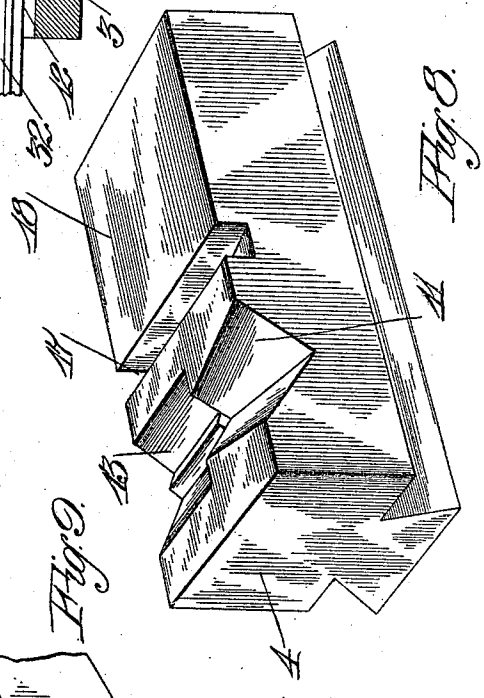

Fig. 8.

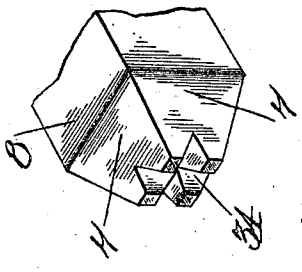

Fig. 9.

Witnesses.
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R. L. Berry.

Inventor.
David G. Morgan.
by Geo. H. Strong
his Atty.

UNITED STATES PATENT OFFICE.

DAVID G. MORGAN, OF JAMESTOWN, CALIFORNIA.

DRILL-SHARPENER.

949,040. Specification of Letters Patent. Patented Feb. 15, 1910.

Application filed March 2, 1909. Serial No. 480,856.

To all whom it may concern:

Be it known that I, DAVID G. MORGAN, citizen of the United States, residing at Jamestown, in the county of Tuolumne and State of California, have invented new and useful Improvements in Drill-Sharpeners, of which the following is a specification.

My invention relates to drill-forming and drill-sharpening machines, and pertains especially to machines for shaping and sharpening cruciform drill bits. Its object is to provide a machine having means for dollying the blank to upset the metal to the required gage, to full the corners, to cut and shape the centers, and to finally shape and sharpen the cutting edges; also to provide means for dollying and sharpening in the same machine, drills of different gage, from three-fourths of an inch to three and a half inches or more.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a side elevation of a machine suitable for practicing my invention. Fig. 2 is a perspective of the sliding fuller plate turned over. Fig. 3 is a transverse section through the fuller plate and stationary die block. Fig. 4 is a section on X—X of Fig. 3. Fig. 5 is an end view of the machine of Fig. 1. Fig. 6 is a section through the upper and lower dies and dolly, showing the mode of operation of the dolly and the use of dollies of different sizes. Fig. 7 is a perspective of the lower die block. Fig. 8 is a perspective of the upper die block inverted. Fig. 9 is a perspective of the end of the dolly. Fig. 10 is a perspective of the end of a drill bit fashioned by this machine. Fig. 11 is a front or top end view of the fuller plate, viewed in the direction of the arrow, Fig. 2.

A represents a machine in the form of a power press of any suitable description and supporting the various details and parts constituting the invention.

Suitably fixed in the machine and in line with the power cylinder 2 is a stationary die block 3 which has a series of grooves and die recesses in it, each having a peculiar function, and all conducing toward the production of the finished drill.

Coacting with the stationary die block 3 is a movable die block and plunger 4, here shown as carried by the piston 5 of the actuating engine 2. In one end of the die block 3, and extending transversely of the block from one side thereof, is a V-shaped groove 6 which is widest and deepest at its outer end, being flared correspondingly with two end walls 7 of the horizontally disposed dolly 8, which latter is shown as carried by a piston-rod 9 operating by fluid pressure in the cylinder or engine 10. The upper and movable die block 4 has a corresponding transverse V-shaped tapered groove 11, forming the complement of the groove 6 and adapted when the blocks 3—4 are moved toward each other, to inclose the four sides of the pyramid-shaped end of the dolly 8. On the opposite sides of blocks 3 and 4 from the respective notches 6—11, and practically in continuation with said notches, are respective recesses 12—13 which are substantially W-shaped corresponding with the cross-section of a drill bit, which latter is represented in perspective in Fig. 10. The grooves 6—11, are the dollying grooves to accommodate the dolly, as 8, and the grooves 12—13 are for the purpose of shaping the angles formed by the junction of the wings 15 of the drill; and the action of shaping the sides of the drill bit by means of these W-shaped die recesses 12 is known as cutting the center of the drill, after the same has been thickened by the dolly. The adjacent surfaces of the two blocks 3 and 4 have also two respective transverse grooves 16—17, which recesses have parallel sides, and with the bottoms of these recesses oppositely inclined corresponding with the flare of the outer edges of the opposed wings 15 of the bit.

In order to full the bit and fill out the corners, either after the drill has become dulled, or in the original shaping of a drill from a blank, I provide the following means carried by block 3 and operated on by the smooth plunger surface 18 of the upper die 4: The top of the block 3 has a T-shaped recess forming a rest for the drill bit, with this recess having side wings 19, on which two of the wings 15 of the drill to be fulled are laid horizontally, with the other wing depending into the channel 20 of this T-shaped recess. The fulling action is done mainly by a diagonally sliding block 21, shown in perspective as viewed from its under side in Fig. 2. This fuller block 21

has side wing guides 22 slidable in suitable guide channels 23 formed in block 3. The upper end of this fuller block 21 has a longitudinal notch 24 in the plane of the notch 20, and is designed to accommodate the upper vertical wing 15 of the drill when the latter is put in position for the fulling operation, as shown in section in Fig. 3. The top of the block is cut off square so that its upper surface 25 is parallel with the surface 18 of the vertically acting plunger block 4. The under side of the block 21 is inclined, as at 26, inwardly and upwardly toward the notch 24, as shown by the end view, Fig. 11. Back of these lateral inclinations 26 which run into the slot 24 is a transverse depression 27 or pocket formed in each side of the recess 24, and beyond these recesses 27 the under side of the block is concaved to form a flattened V-shaped channel 28. The purpose of these several convergent inclined planes 26—28 and pockets 27 is to draw the metal out at an angle of approximately 45°, catching only the metal at the rounded corners of the wings and drawing that down so as to full out the wedge-shaped cutting edges 30 of the finished drill; the shoulders 31 of the notches 27 catching the top of the wings and drawing the corners outward in the desired fashion. If it were not for the inclines 26—28, the ends of the wings would be also engaged near the axis of the drill, and a fulling action would take place where it was not needed.

In operation, if a drill is to be made from a blank, a piece of metal, as 32, which is substantially cruciform in cross-section is heated at one end, and this heated end placed in between the die blocks 3—4 with the heated end projecting into the recess inclosed by the walls of the grooves 6—11, power then being applied to close the die block 4 down on the block 3 and grip the drill. Then the deadman 33 is moved up against the outer end of the drill shank 32, and a dolly 8 of suitable size placed in position in its rest 35 in the machine and in line with a hammer 36 of the piston 9, and power applied to exert a hammering action on the end of the drill blank by the dolly; it being understood that the dolly has its end which fits into the recesses 6—11 formed with suitable V-shaped cruciform grooves 34. One of the important features of this invention is that by the construction described I can use any desired number of dollies 8 of different size, as represented, for instance, by the dotted lines, Fig. 6; a dolly of wider face being employed for making drill bits of larger diameter, and, naturally, a dolly of smaller face being employed to make a drill bit of smaller diameter. The dollies are held in a suitable fixed guide 35 and acted on by the hammer 36 on the piston 9. By this arrangement I am able to make or sharpen drills varying in size from three-fourths of an inch to three and a half inches or more in diameter. Having upset the metal by means of the dolly, to the desired gage, the drill is then moved to groove 16 and acted on by the upper die 4 and its corresponding groove 17, to shape the wings and knock them down to the desired thickness and width. Thirdly, the drill is placed in the notches 19—20 of the die block 3 and with the upper wing accommodated in the slot 24 of the block 21, the latter being suitably lifted for the purpose. Any appropriate means may be employed to raise or hold the block 21 in retracted lifted position. As here shown, I employ a hand lever 37 which connects with a crank-arm 38, which latter engages underneath the toe of block 21; it being found preferable to operate this fuller block 21 manually, although manifestly springs or various other means could be employed. With the drill in position, and two of its side wings accommodated on the ledges 19, and the two vertical wings accommodated in the slots 20—24, power is applied to the die block 4 to cause the plunger surface 18 to impinge upon the upper surface 25 of the fuller block, resulting in the latter striking a glancing blow on the end of the inserted drill, which latter may be held securely to its work by suitably adjusting the deadman 33. As the sliding block 21 descends diagonally, the corners 31 catch the ends of the horizontal wings of the bit and draw and full them out in the desired fashion. When the fulling operation on the four wings has been completed, the drill is taken out and again placed in position in the slots 6—11 and clamped by bringing down the die block 4 on top of the drill and holding it there while the final dollying action which sharpens and gives final shape to the cutting edges of the bit takes place.

For sharpening drills which have previously been shaped, or have become dulled at the corners, the operation is practically the same; and in either case, if it is necessary to shape the angles between the wings, or to cut the centers, as it is called, the drill bit is inserted into the W-shaped recess 12, and the die block 4 made to strike a sufficiently heavy blow, so that its W-shaped recess 13 will coöperate with the recess 12 to give the desired cross-sectional appearance to the bit.

The important feature of this invention is that by means of practically a single set of die blocks, and a corresponding series of dollies 8, drills of all sizes can be shaped and sharpened.

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

1. In a drill-sharpening apparatus, a pair of opposed coöperating die blocks, said die blocks having opposed, coacting, V-shaped,

oppositely-tapered grooves to receive a drill bit, and in which the drill bit may be clamped, said blocks having each in line with its aforesaid tapered groove, a corresponding groove which is substantially W-shaped in cross-section, the central upraise of each of these W-shaped grooves forming a center cutter for the drill.

2. In a drill-sharpening machine, a pair of opposed die blocks, each of which is similarly grooved, to-wit, each block having a transversely extending, V-shaped, tapered groove, a W-shaped groove, and a transversely extending slot with straight sides and tapered bottom, the grooves in one block registering with the grooves in the other block.

3. In a drill-sharpening machine, a die member comprising a block having a substantially T-shaped slot, and a coöperating, diagonally sliding die plate having a slot at one end corresponding to the vertical portion of said T-shaped slot, and fulling means carried by said diagonally sliding member.

4. In a drill-sharpening machine, a die member comprising a block having a substantially T-shaped slot, and a coöperating, diagonally sliding die plate having a slot at one end corresponding to the vertical portion of said T-shaped slot, fulling means carried by said diagonally sliding member, said diagonally sliding member carried by the said die block, and means acting on the die plate for moving it to effect the fulling action.

5. In a drill-sharpening machine, a die member having a slot to receive the drill, and a diagonally sliding die plate carried by the die block and coöperating therewith, and having means for giving a fulling action to the drill corners.

6. In a drill-sharpening device, a die member having means for supporting the drill to be fulled, and a fuller plate mounted on the die block and sliding in a plane inclined to the end of the drill, the under side of said die plate which comes in contact with the drill having means for fulling the corners of the drill.

7. In a drill-sharpening machine, a die block having a substantially T-shaped slot to support the drill, a fuller plate slidable in the block and diagonally of said slot, said plate having a vertical end slot in the plane of the vertical portion of said T-slot, the under side of said plate being transversely concaved, and fulling edges on the under side of the plate and on each side of its slot.

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

DAVID G. MORGAN.

Witnesses:
H. R. MAUGER,
DANIEL ROBERTS.