

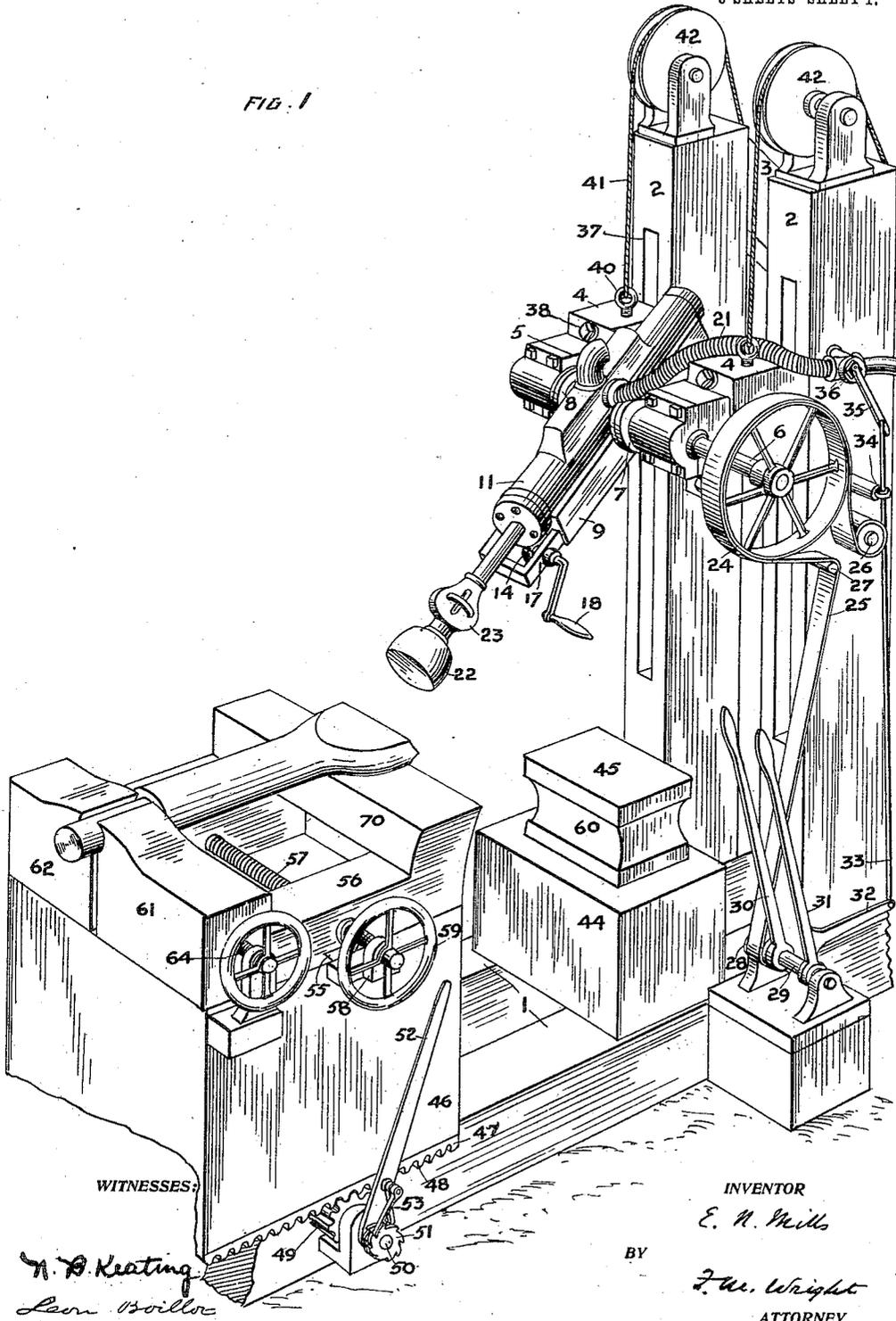
E. N. MILLS.  
 MACHINE FOR SHAPING HEAVY TOOLS.  
 APPLICATION FILED AUG. 30, 1909.

971,208.

Patented Sept. 27, 1910.

3 SHEETS—SHEET 1.

FIG. 1



WITNESSES:

*N. D. Keating*  
*Leon Boillo*

INVENTOR

*E. N. Mills*

BY

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 ATTORNEY

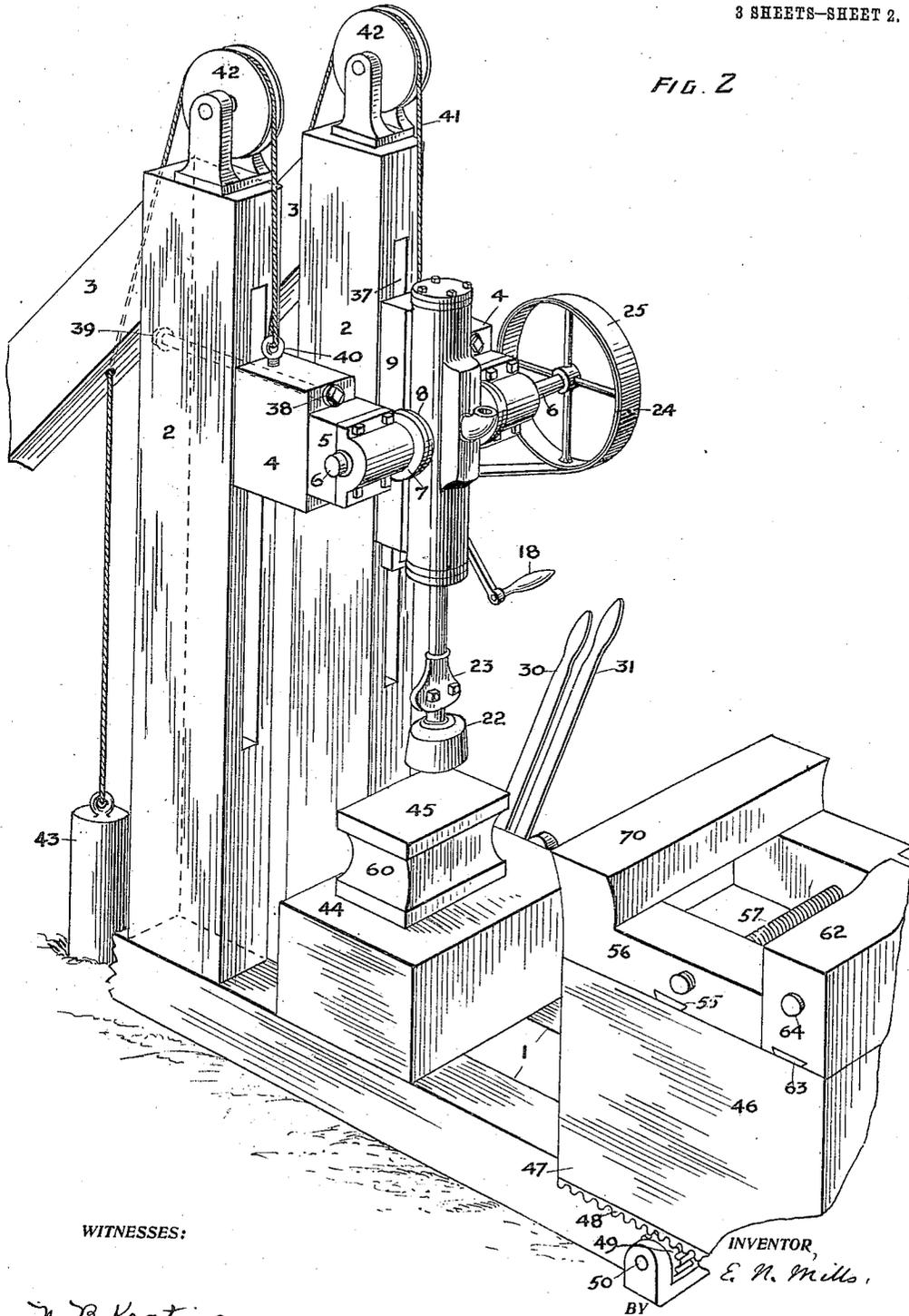
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3 SHEETS—SHEET 2.

FIG. 2



WITNESSES:

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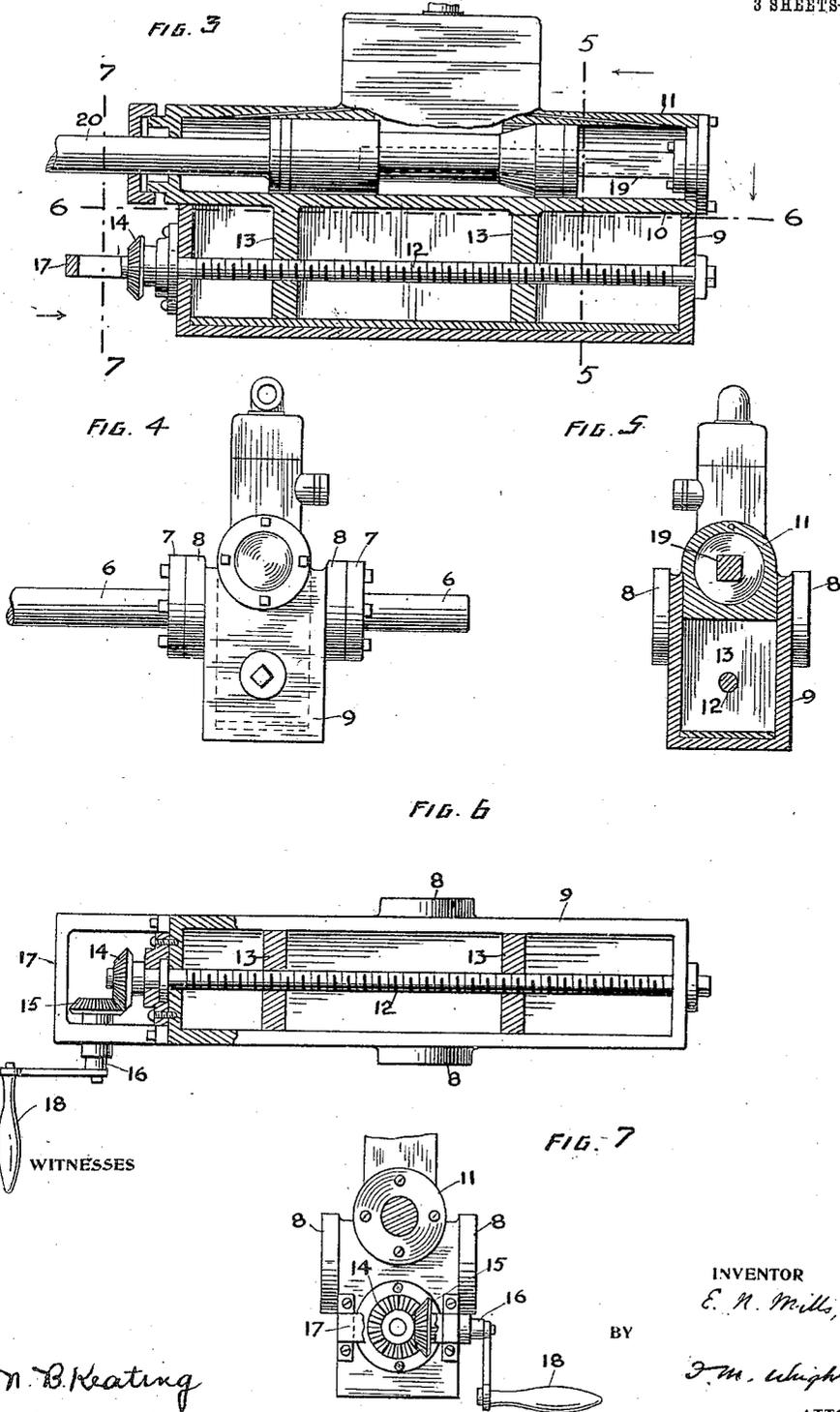
*J. W. Wright,*  
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3 SHEETS—SHEET 3.



*N. B. Keating*  
*Leon Boller*

INVENTOR  
*E. N. Mills,*  
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# UNITED STATES PATENT OFFICE.

EDWARD N. MILLS, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-THIRD TO C. E. HAILSTONE AND ONE-THIRD TO F. M. GRAHAM, OF SAN FRANCISCO, CALIFORNIA.

MACHINE FOR SHAPING HEAVY TOOLS.

971,208.

Specification of Letters Patent. Patented Sept. 27, 1910.

Application filed August 30, 1909. Serial No. 515,191.

*To all whom it may concern:*

Be it known that I, EDWARD N. MILLS, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in Machines for Shaping Heavy Tools, of which the following is a specification.

The present invention relates to improvements in machinery for shaping, cutting or drilling edges of oil well tools, so that this operation can be effected more expeditiously, conveniently, and economically than heretofore.

In the accompanying drawing, Figure 1 is a perspective view of the machine; Fig. 2 is a similar view of the same showing the hammer in a vertical position; Fig. 3 is a vertical section through the hammer cylinder and the adjusting means therefor, the valve chest being shown in side elevation; Fig. 4 is an end view of the same; Fig. 5 is a vertical section on the line 5—5 of Fig. 3; Fig. 6 is a horizontal section through the adjusting means; Fig. 7 is a section on the line 7—7 of Fig. 3.

Referring to the drawings, 1 indicates longitudinal beams upon which are erected two frame posts 2 supported by suitable oblique struts 3. Said posts 2 are slotted longitudinally, as shown at 37, and through said slots can pass screws 38 secured to blocks 4 which rest against the front faces of said posts. On the rear ends of said screws are screwed nuts 39 whereby said blocks 4 can be clamped to said posts. To said blocks 4 are secured eye-bolts 40 to which are attached cables 41 which pass around sheaves 42 at the top of the posts and carry counterweights 43. By this means the height of the blocks can be readily varied as desired. On the front faces of said blocks are secured journal boxes 5 in which are journaled trunnions 6 having heads 7 secured to the sides 8 of a rectangular guideway 9. In said guideway 9 can slide a supporting frame 10 of a cylinder 11. In the ends of said guideway is journaled a screw 12, which screws through vertical plates 13 of the frame 10. The front or lower end of the screw 12 pro-

jects through the corresponding end of the guideway 9 and carries a bevel gear 14 which meshes with a bevel gear 15 on a short transverse shaft 16 having its bearing in a bearing 17 secured upon said end of the guideway. The outer end of said shaft 16 is made square so that it can be received in a corresponding shaped socket in a crank handle 18, whereby said short shaft, and therefore also the screw 12 can be turned. The turning of the screw moves the supporting frame 10 and therefore also the cylinder 11, along the guideway so as to adjust its position or height as may be desired. Said cylinder is of the same construction as that which is commonly used in rock drills, and in said cylinder reciprocates the piston of a piston rod 20, which is reciprocated by either steam or compressed air admitted to said cylinder by a flexible pipe 21 leading from any suitable source. A hammer 22 is removably secured by a gib 23 on the end of the piston rod. Said rod 20 is prevented turning by a fixed square guide rod 19. One of said trunnions 6 extends at a considerable distance outside its bearing and carries on its end a brake wheel 24 around which passes a brake band 25, one end of which is secured to a pin 26 driven into one of the posts 2, and the other passes around a pin 27 and then around a roller 28, loosely supported upon a shaft 29. Secured to said roller is a lever 30 for turning the roller. By turning said roller by said lever 30 the brake band can be loosened from off said brake wheel 24, so that the cylinder 11 and its supporting guideway 9 can be turned on its trunnions by hand to any desired position; then the brake band is tightened around the brake wheel by operating the lever 30, and the cylinder 11 is then secured in the desired position. Upon said shaft 29 is bolted an operating lever 31 having an arm 32 extending therefrom which is connected to a rod 33 which passes through a guideway 34, the upper end of said rod being connected to a valve lever 35, which, by the turning of the operating lever 31, turns a valve 36 to admit steam or other pressure fluid to the cylinder 11 to actuate the hammer.

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Upon the longitudinal beams 1 is supported a block 44, upon which is loosely supported an anvil 45 directly under the axis of the trunnions upon which the cylinder 11 and its supporting guideway can turn. Upon said anvil can be placed any tool which it is desired to shape or forge. Said anvil 45 is formed with sides having grooves 60 of different curvatures, any one of which may be used to round the stem of the bit, or to produce any rounded effect upon any part of the tool by using the anvil 45 so that said grooved side is uppermost. Also upon said beams 1 can slide a block 46 having downwardly extending flanges 47 which engage the sides of the beams 1 to guide the block upon the beams, said flanges being formed at their lower edges with gear teeth 48 which mesh with the teeth of two gear wheels 49 mounted upon a shaft 50 passed transversely through said beams. On one end of said shaft is secured a ratchet wheel 51 and, loosely mounted upon said shaft adjacent to said ratchet wheel, is a lever 52, having pivoted thereto a dog 53 which can engage said ratchet wheel, so that, by the oscillation of the lever, the ratchet wheel 51 can be rotated thereby moving the block 44 longitudinally upon the beams. Guided transversely by an undercut guide 55 on said block 44 is an anvil 56, which is moved transversely by means of a screw 57 screwed through said anvil and passing through a bearing 58 secured upon the block and having at its end a hand wheel 59 by which the screw may be turned. Said anvil comprises a front raised portion 70, and two rear raised jaws 61, 62, formed at their opposing surfaces with concavities adapted to clamp the rear end of the bit or other tool to be operated upon. The jaw 61 is formed integral with the anvil 56, and the other 62 slides thereon on a guideway 63. In order to slide said jaw, to clamp between the two jaws the instrument which is to be operated upon, there is provided a screw 64 which turns through the stationary jaw without screwing and is screwed through the movable jaw, so that, by the movement of said screw, the jaw can be moved to or from the former.

The utility of the invention will be best understood by describing its mode of operation in sharpening an oil well tool. For this purpose the tool having been heated in the forge is placed upon the anvil so that its shank is clamped by the jaws and the bit is presented to the hammer. It is adjusted to an exact position in front of the hammer by means of the lateral adjusting screw 57. The bit is then shaped by the blows of the hammer, and, after thus sharpening one beveled face of the edge of the bit the clamping jaws are slackened and the tool is turned

over so as to present the other face to the hammer. The block 46 is from time to time moved forward toward the hammer, and the cylinder 11 is raised upon its supporting guideway 9 by means of the adjusting screw 12 and the cylinder may be retained at any desired angle of inclination by means of the brake band 25. As the block 46 is thus moved closer and closer to the vertical line through the trunnions of the cylinder and the position of the cylinder becomes more and more nearly vertical, the plane of the action of the hammer upon the bit makes an angle more and more nearly in horizontal, that is to say, the face of the bit becomes sharpened. After the bit has thus been shaped, it is removed and is placed upon the anvil 45, and the ends of the cutting edge, which have been spread out in hammering the faces of said cutting edge, are then hammered down so as to reduce said edge to its proper length. If necessary, the hammer may be removed from the piston rod and a hammer of a different form, as one having a concave striking face may be substituted.

I claim:—

1. The combination of a cylinder provided with means for supplying pressure fluid thereto, a piston in said cylinder, a hammer secured upon the end of the piston, trunnions secured to said cylinder, a frame in which said trunnions are pivotally mounted, a brake wheel upon one of the trunnions, a brake band on said wheel, one end of the brake band being fixedly secured, a roller upon which the other terminal portion is rolled, and means for controlling the pressure of said band on said wheel, substantially as described.

2. The combination of a cylinder, means for admitting pressure fluid thereto, a piston in said cylinder, a hammer connected to said piston, a support for said cylinder, means for longitudinally moving said cylinder on said support, a shaft secured to said support, a bearing for said shaft, a brake wheel on said shaft, a brake band around said brake wheel, a lever for adjusting said brake band, an anvil for supporting an instrument to be operated upon, and means for adjustably moving said anvil to and from the vertical plane through said shaft, substantially as described.

3. The combination of a cylinder, means for admitting pressure fluid thereto, a piston in said cylinder, a hammer connected to said piston, a support for said cylinder, means for longitudinally moving said cylinder on said support, a shaft secured to said support, a bearing for said shaft, a brake wheel on said shaft, a brake band around said brake wheel, a lever for adjusting said

brake band, an anvil for supporting an instrument to be operated upon, means for adjustably moving said anvil to and from the vertical plane through said shaft, a part adjustable transversely on said anvil and provided with clamping devices, and means for clamping thereby the instrument to be operated upon, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses. 10

EDWARD N. MILLS.

Witnesses:

FRANCIS M. WRIGHT,  
D. B. RICHARDS.