Sept. 11, 1951 F. H. WALDEN 2,567,414

IMPLEMENT GUIDING APPARATUS

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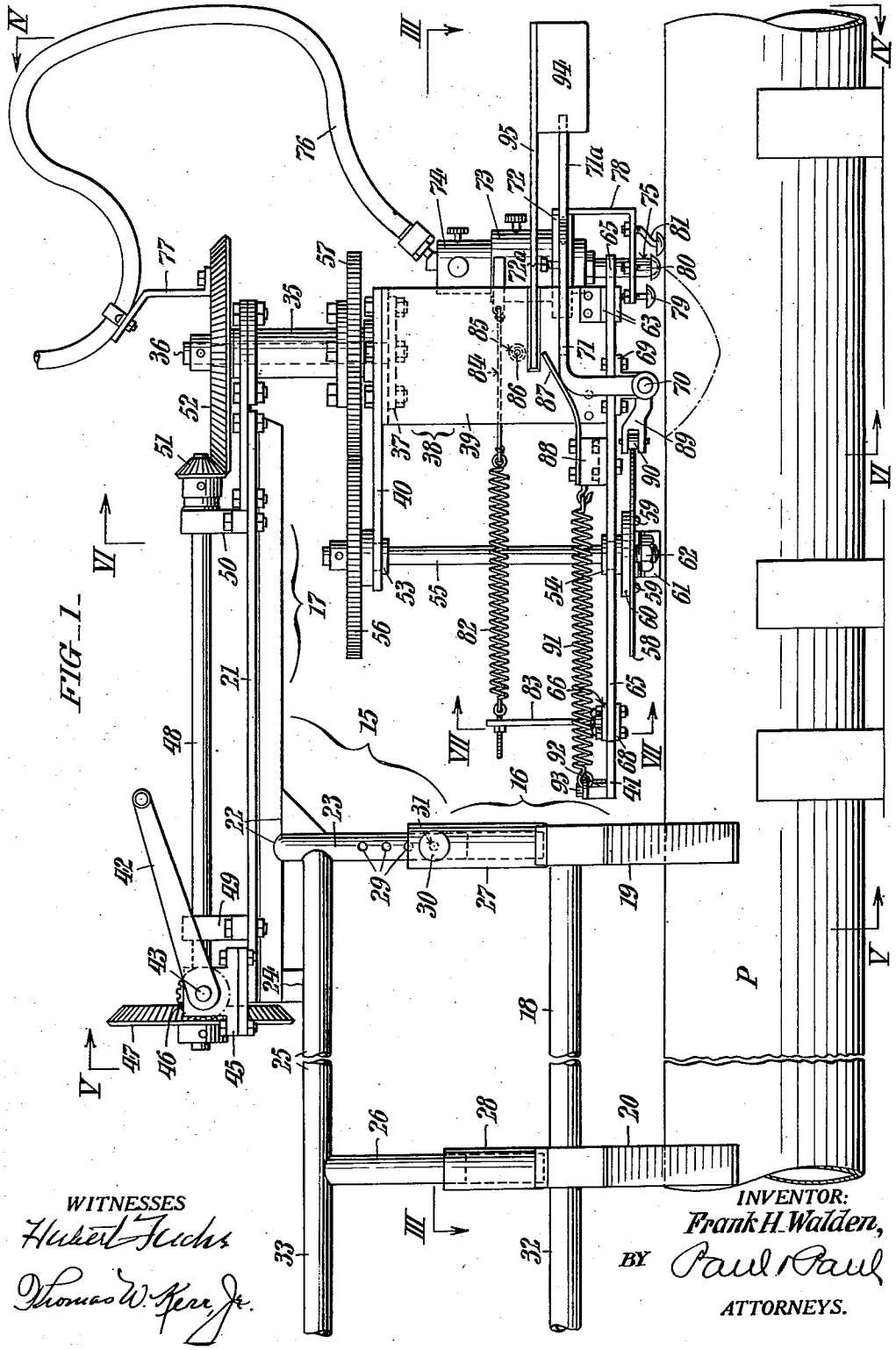


FIG. 1.

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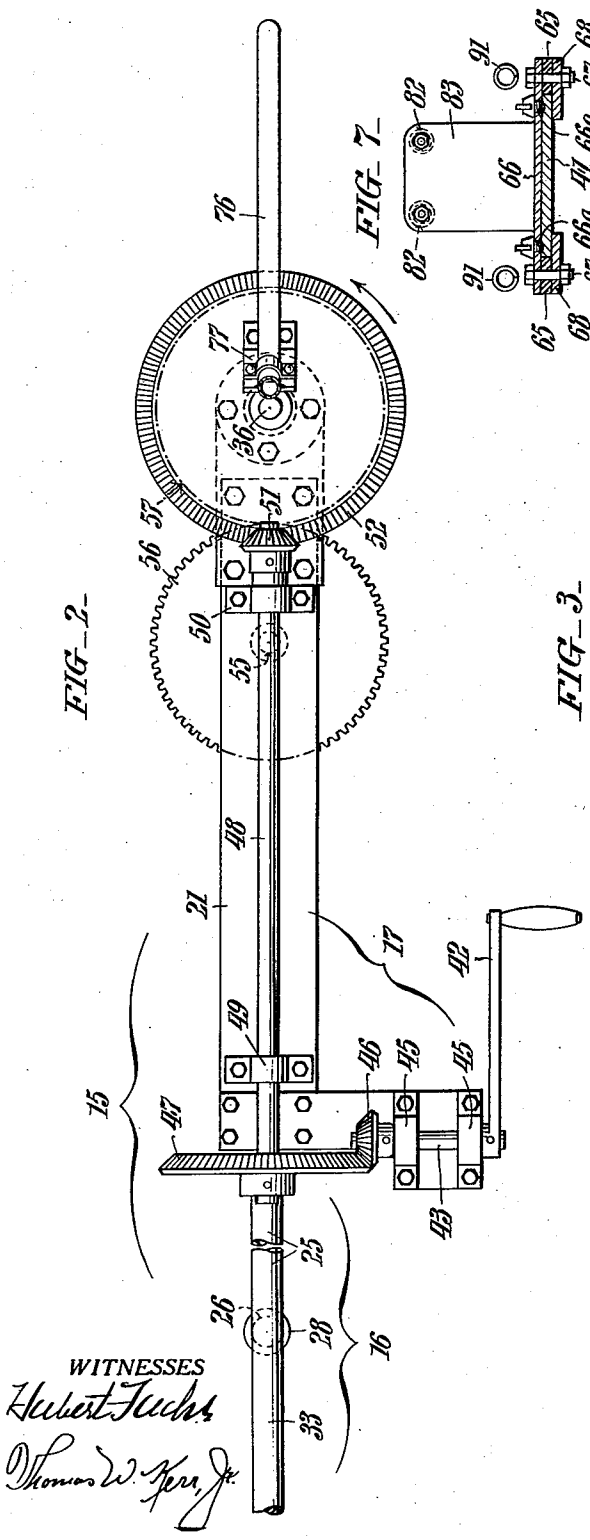


FIG. 2.

FIG. 7.

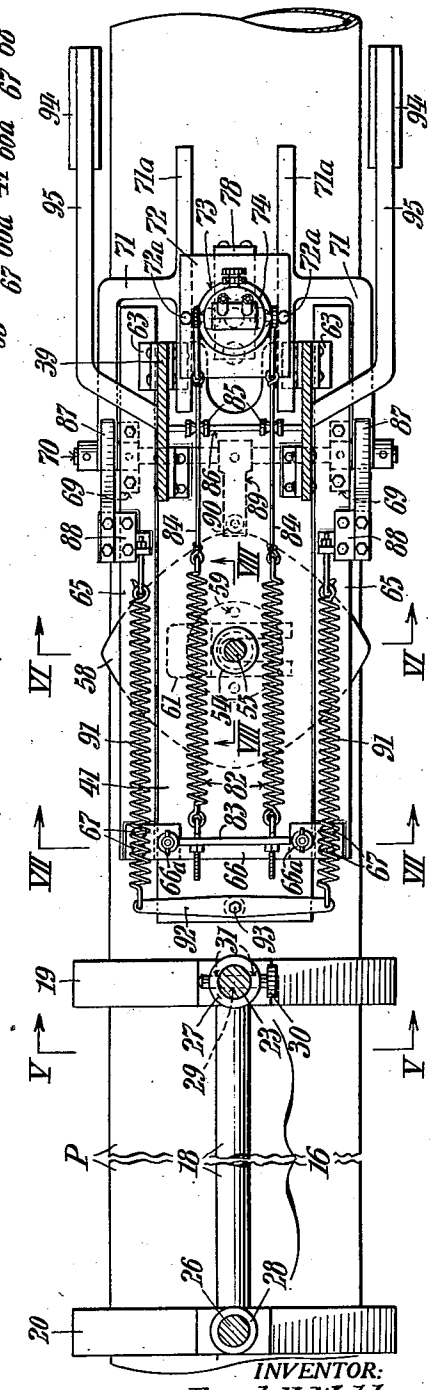


FIG. 3.

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FIG. 4

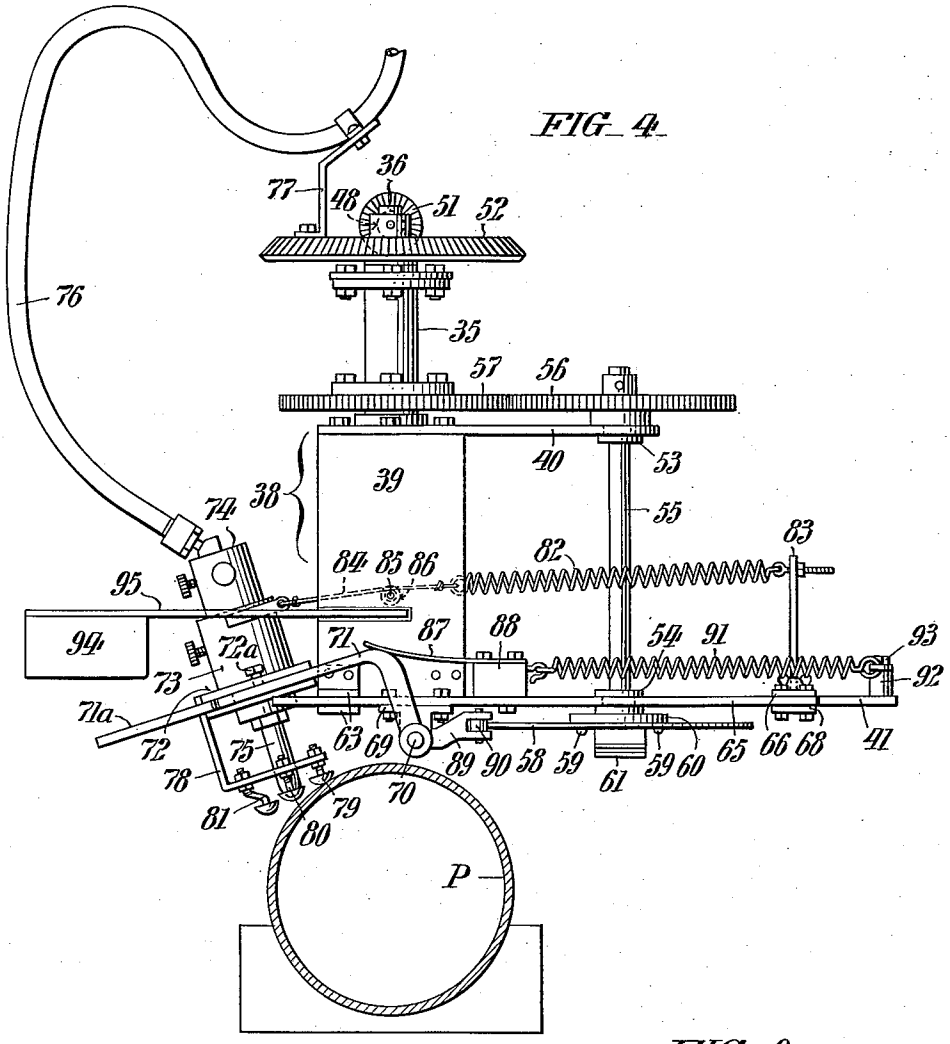


FIG. 8

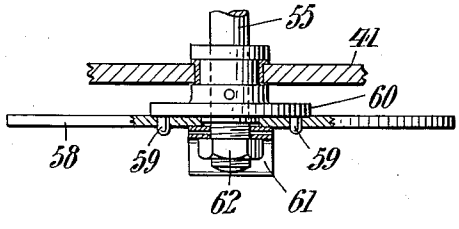
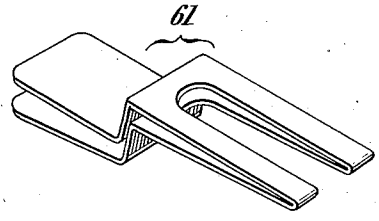


FIG. 9



WITNESSES

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IMPLEMENT GUIDING APPARATUS

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FIG. 5

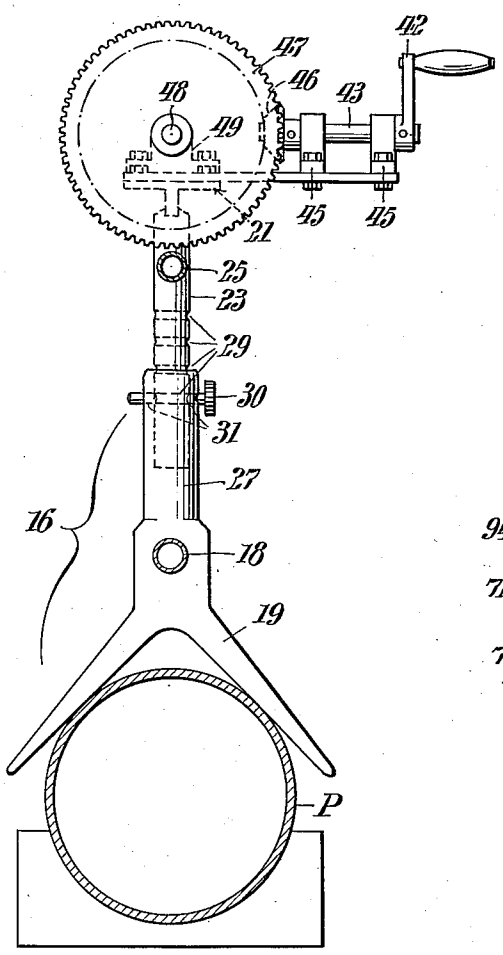


FIG. 6

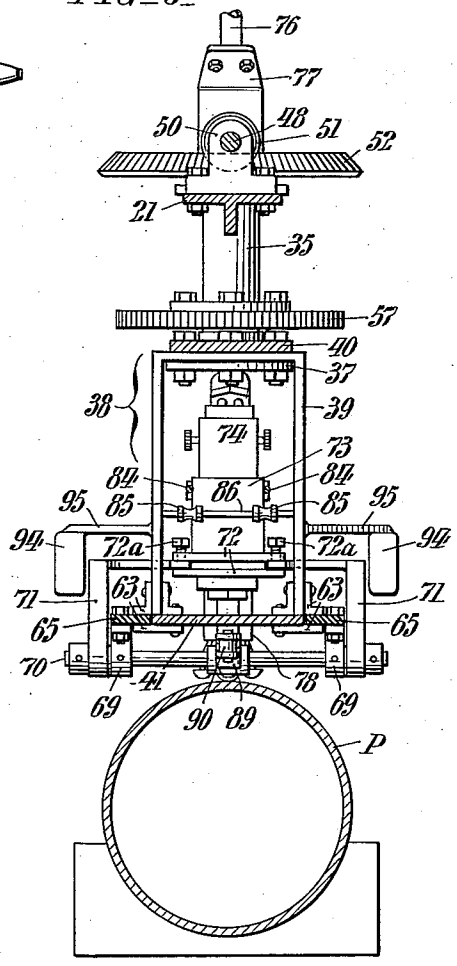


FIG. 11

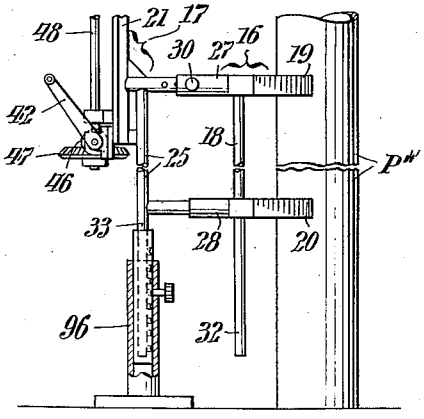
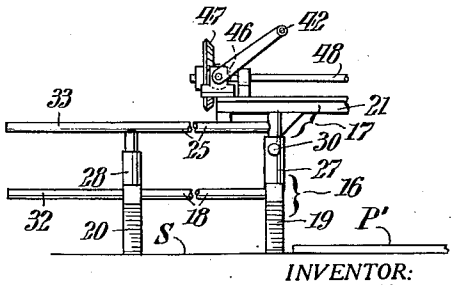


FIG. 10



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UNITED STATES PATENT OFFICE

2,567,414

IMPLEMENT GUIDING APPARATUS

Frank H. Walden, Philadelphia, Pa.

Application January 15, 1946, Serial No. 641,266

5 Claims. (Cl. 33—21)

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This invention relates to implement guiding apparatus, i. e., apparatus useful in guiding a scriber or a torch in inscribing outlines for holes or in cutting holes into the sides of pipes or into plates as may be required for connection of meeting pipes at various angles, or for passage of pipes, rods and the like through them, and for other purposes.

The chief aim of my invention is to enable such operations to be carried out expeditiously and at a minimum cost for labor, through provision of a simple and relatively inexpensive portable apparatus which is easily applied to the work; which is readily adaptable to pipes of different diameters; which is capable of marking out figures or cutting holes of different shapes and sizes, as well as circles or circular holes of different diameters; and which can be used with equal facility for operation on either horizontally positioned or upright positioned pipes and plates.

Other objects and attendant advantages will appear from the following detailed description of the attached drawings, wherein Fig. 1 is a view in side elevation of my improved implement guiding apparatus.

Fig. 2 shows the apparatus in top plan.

Fig. 3 is a horizontal section taken as indicated by the angled arrows III—III in Fig. 1.

Fig. 4 is an end view looking as indicated by the angled arrows IV—IV in Fig. 1, showing a certain stage in the operation of the apparatus.

Figs. 5, 6 and 7 are cross sectional views taken as indicated by the angled arrows V—V, VI—VI and VII—VII in Figs. 1 and 3.

Fig. 8 is a fragmentary detail cross sectional view taken as indicated by the angled arrows VIII—VIII in Fig. 3.

Fig. 9 is a perspective view of one of the elements of the apparatus which will be more particularly referred to hereinafter; and

Figs. 10 and 11 are views showing other conditions of use of the apparatus.

As herein illustrated, the apparatus comprises a vertically adjustable frame which is comprehensively designated 15 and which is composed of two sections 16 and 17 both built up of structural metal parts permanently united by welding. The frame component 16 is designed to serve as a main or base support and has a tie rod 18 connecting a pair of spaced angularly configured saddles 19 and 20 adapted to rest on or against the pipe P which is to be operated upon, as shown in Fig. 5. The other component 17 has the form of a bracket with an outboard arm 21 constituted by a T-section bar whereto is secured at 22,

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a leg 23, and at 24, a parallel horizontal tie bar 25 which connects said leg with a second leg 26. From Fig. 1 it will be noted that the legs 23 and 26 slidingly fit respectively into sockets 27 and 28 centrally of the tops of the saddles 19 and 20 of frame component 16, the leg 23 being provided at intervals with holes 29 for selective engagement by a retractible pin 30 passed through a transverse aperture 31 in the socket 27. As shown the tie rods 18 and 25 are extended to equal distances beyond the saddle 20 and the leg 26 respectively as at 32 and 33.

To the outer end of the bar arm 21 of the frame component 17 is bolted a bearing 35 for a vertical shaft 36 with a flange collar 37 at its lower end whereto is fixedly screwed a head 38. This head 38 is constructed from stout sheet metal parts including an inverted U-shaped center element 39 whereto is bolted at the top a plate 40, and at the bottom a plate 41, said plates extending laterally beyond said element 39 in one direction. Rotary movement is imparted to the head 38 by means of a hand crank 42 at one end of a short transverse shaft 43 which is journaled in bearings 45 at the inner end of the bar arm 21 of frame component 17, and which carries a bevel pinion 46 that meshes with a bevel gear 47 at the inner end of the longitudinal shaft 48 rotatively supported in fixed bearing blocks 49 and 50 adjacent the opposite ends of said bar arm. Affixed to the outer end of the shaft 48 is a bevel pinion 51 which meshes with a bevel gear 52 pinned to the top end of the vertical shaft 36 whereto the head 38 is secured. Rotative in bearings 53 and 54 on the laterally projecting portions of the top and bottom plates 40 and 41 of the head 38 is a vertical shaft 55 with an affixed spur wheel 56 at its upper end in mesh with a mating stationary spur gear wheel 57 bolted to the bearing 35. Adjacent the bottom end of the shaft 55 is removably attached a profile cam disk 58, which as presently explained, determines the shape of the marking or cut to be made on or in the pipe P. From Figs. 1 and 8 it will be observed that the profile disk 58 has a pair of diametrical perforations to engage pendent studs 59 on the flanged abutment collar 60 pinned to the shaft 55, the disk being held to said collar by a bifurcated spring clip 61 (Fig. 9) which is interposed between said disk and a nut 62 on the threaded protruding lower end of said shaft. This construction facilitates removal of the cam disk 58 and the substitution of others of different size or contour.

Engaged in guides 63 at opposite sides of the member 39 of the head 38 are horizontal slide

bars 65 whereof the outer ends are rigidly connected by a cross bar 66 which is secured by bolts 67 (Fig. 7) and which extends over the top of the plate 41. Lug pieces 68 secured to the slide bars 65 at the ends by the same bolts 67, underlap the side edges of the plate 41 and assist in the guidance of said bars. In carrying out certain operations with the machine it is desirable to prevent relative movement between the slide bars 65 and the bottom plate 41 of the head 38. I have accordingly provided for this purpose clamp screws 66a which are threadedly engaged in the cross piece 66 and which clamp against the top of plate 41.

Extending transversely beneath the bottom plate 41 of the head 38 and non-rotatively supported in clamp blocks 69 pendent from said plate is a shaft 70 whereon are fulcrumed a pair of angular arms 71. At their outer ends these arms 71 provide parallel guide tracks 71a for a slide carriage 72 which is fixable in adjusted positions by clamp screws 72a. As shown the carriage 72 affords a tubular holder 73 for an implement which is exemplified as a vertically arranged torch 74 having a pendent nozzle 75. Gas is conducted to the torch 74 by flexible hosing 76 held in a clamp 77 which is fixed on a radius to the top of the bevel gear wheel 52. Fixed in an angular bracket 78 on the carriage 72 are studs 79, 80 and 81 which in riding on the curved surface of the pipe P maintain the torch nozzle 75 always at a definite distance from the pipe surface during the operation of the apparatus. It is to be noted that, the studs 79—81 are adjustable to different lengths so as to function properly on pipes of different diameters. Clockwise movement of the arm 71 about the shaft 70 is resisted by a pair of helical tension springs 82. At one end each of these springs 82 is connected to an upstanding projection 83 on the cross member 66, and at the other end, through interposition of a coupling wire 84, with the torch holder 73. At certain times during the operation of the apparatus, the coupling wires 84 engage grooved rollers 85, as shown in Fig. 4, these rollers being free to revolve on a rod 86 extending crosswise between the sides of the member 39 of head 38. The arms 71 are biased toward the pipe P as shown in Fig. 1 by leaf springs 87 anchored on blocks 88 bolt-secured to the slide bars 65. An arm 89 affixed to the non-rotating shaft 70 at the center has a follower roller 90 at its end which roller is held to the edge of the cam disk 58 through the influence, upon the slide bars 65 of a pair of helical springs 91 respectively in tension between the blocks 88 and a medially fulcrumed lever 92 with its center 93 at the outer end of the bottom plate 41 of head 38. Weights 94 at the end of arms 95 extending laterally from the head 39 are relied upon to balance the weight of the parts supported by the extended portions of the top and bottom plates 40 and 41 of said head.

Operation

With the apparatus positioned as in Figs. 1, 5 and 6 and with the torch 74 burning, the crank handle 42 is turned and the head 38 thereby rotated about the vertical axis 36 in the direction indicated by the arrow in Fig. 2. As the head 38 revolves the slide bars 65 on which the torch carrying arms 71 are fulcrumed are moved horizontally through coaction of the roller 90 with the cam disk 58 whereof the shaft 55 is concurrently rotated by rolling of the spur gear 56 around the stationary spur gear 57, said cam disk thus determining the shape of the hole cut by the torch 75. During the cutting, the arms 71 will be depressed by the leaf springs 87 and one or another of the studs 79—81 contact with the pipe in a manner readily understood from Fig. 4 to maintain the torch nozzle 75 at the desired distance from the pipe surface throughout the operation, the helical springs 82 acting in the meanwhile to counterbalance the weight of the torch.

For cutting of circular holes, the profile disk may be dispensed with. In such cases, the clamp screws 66a are tightened to prevent movement of the slide bars 65 relative to the bottom plate 41 of the head 38. The torch 74 is thus kept at a fixed distance from the axis of the head 38, this distance being determined by adjustment of the torch carriage 72 along the track extensions 71a of the arms 71.

In Fig. 10 I have shown how the apparatus may be set up to operate upon a plate P' supported horizontally. Here, the saddles 19 and 20 are simply rested on the sustaining surface S and the frame section 17 adjusted relative to the section 16 as may be required to properly position the torch nozzle 75 with respect to the plate P'.

In Fig. 11, the apparatus is arranged for operation upon a vertically disposed pipe P'', with the rod 33 of its frame 15 engaged, with capacity for up and down adjustment, in a socket post 96, and the saddles 19 and 20 resting against said pipe in the manner as described above in connection with Fig. 1.

Obviously, by substituting a scriber in place of the torch 74, the apparatus can be utilized to inscribe markings of different configurations or sizes with equal facility on pipes or plates in either horizontal or vertical position. The apparatus may moreover be employed for welding purposes if desired in a manner deemed apparent from the foregoing disclosure without necessitating separate description.

Having thus described my invention, I claim:

1. In apparatus for guiding an implement or tool to mark or cut holes into a surface; a support; a member rotatable on the support about an axis perpendicular to the surface to be marked or cut; a slide guided by the member for movement radially of said axis and carrying the implement or tool; means for moving the slide including a shaft with rotative bearing in the member in parallel relation to the axis of the latter, a rotary cam on the shaft, a projection on the slide engaging the cam, a gear wheel secured to the shaft and a mating gear wheel fixed on the support concentrically with the axis of said member.

2. The invention according to claim 1, wherein the implement or tool is secured in an arm pivoted for movement about a transverse axis on the slide, and spring means influential upon the arm to yieldingly urge the implement or tool toward the surface to be marked or cut.

3. In apparatus for guiding an implement or tool to mark or to cut holes into the side of a pipe or the like, a support constructed and arranged to bear laterally upon the pipe; a member rotatable on the support about an axis perpendicular to the pipe; a slide guided by the member for movement radially of said axis; means for moving the slide including a shaft with rotative bearing on the member in parallel relation to the axis of the latter, a rotary cam on the shaft, a projection on the slide engaging the cam, a gear wheel secured to the shaft, and a mating gear wheel

concentric with the axis of the member but fixed to the support; a carrying arm for the implement pivoted for movement about a transverse axis on the slide; and spring means influential upon the arm to yieldingly urge the implement toward the pipe surface.

4. The invention according to claim 3, further including means on the arm adapted to ride the pipe surface as the member is rotated, for maintenance of the implement or tool at a definite distance from the pipe surface.

5. The invention according to claim 3 further including a plurality of studs of different lengths on the arm adapted to ride the pipe surface as the member is rotated, for maintenance of the implement or tool at a definite distance from the pipe surface.

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