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PIPE-BENDING MACHINE

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2 SHEETS—SHEET 1

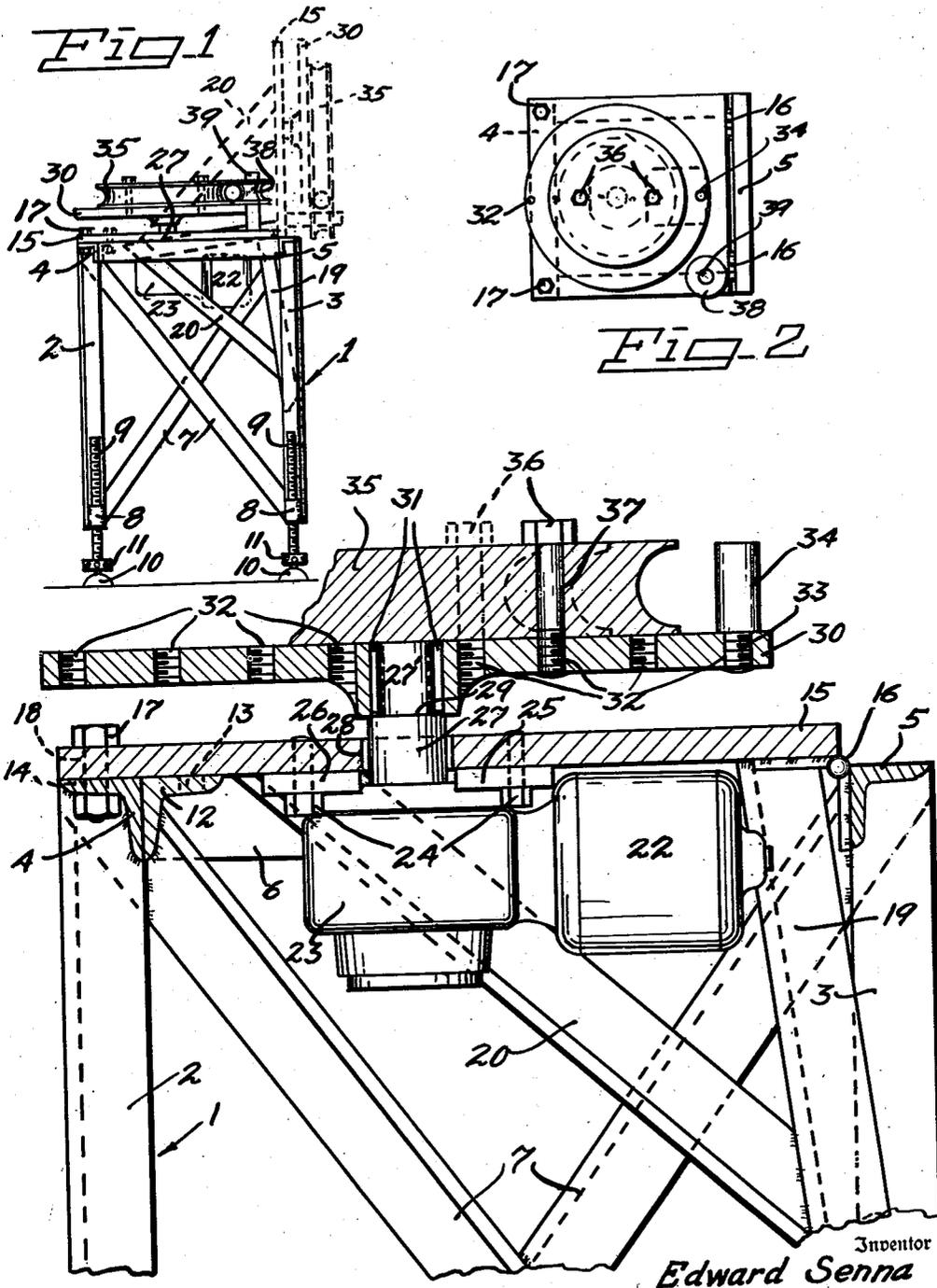


FIG. 3

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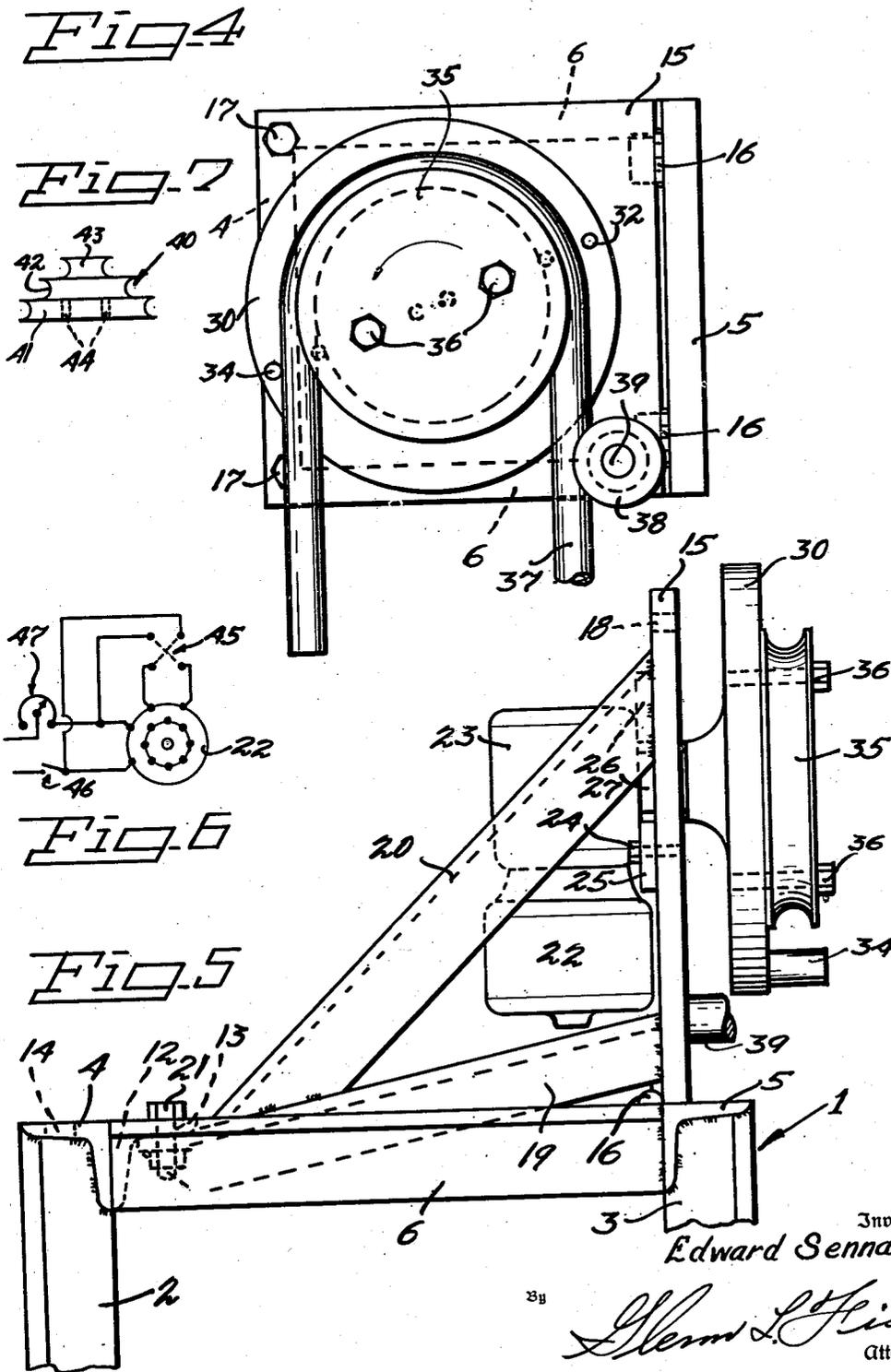
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2 SHEETS—SHEET 2



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PIPE-BENDING MACHINE

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1 Claim. (Cl. 153—40)

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This invention relates to a pipe bending machine, it being understood that while it is particularly adapted for bending pipes the machine may be used for bending metal tubes or solid bars or rods of bendable material.

One object of the invention is to provide a pipe bending machine including in its construction a circular head which is mounted upon and turns with the driven shaft of gearing which is driven from a motor, said head carrying a circular die about which a pipe is bent without being crumpled when the head and the die are turned by rotation of the shaft.

Another object of the invention is to provide a pipe bender wherein the circular head is disposed over a platform or plate to which the motor is secured, the plate also serving as a carrier for a post about which is rotatably mounted a roller for engaging a pipe and holding the pipe in contact with the peripheral edge face of the die during rotation of the die and bending of the pipe.

Another object of the invention is to provide a pipe bender having its top plate or table pivoted to a frame so that it may be tilted vertically and thus dispose the die either horizontally over the frame or vertically according to which position will be most convenient for the person operating the pipe bender.

Another object of the invention is to provide a pipe bender having the circular die so mounted upon the circular head that it may be easily removed and another substituted.

Another object of the invention is to provide a pipe bender which is simple in construction and very easy to operate.

With these and other objects in view the invention consists of a special construction and arrangement of parts illustrated in the accompanying drawings wherein:

Fig. 1 is a side elevation of the improved pipe bending machine.

Fig. 2 is a top plan view thereof.

Fig. 3 is a view upon an enlarged scale showing the improved pipe bending machine partially in side elevation and partially in section.

Fig. 4 is a view showing the improved pipe bending machine in top plan upon an enlarged scale.

Fig. 5 is a side elevation showing the platform

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tilted upwardly to a raised position in which the die and the head plate carrying the same turn about a horizontal axis.

Fig. 6 is a wiring diagram for the reversible motor by means of which the head plate and the die are turned.

Fig. 7 is a side view of a modified form of die.

This improved pipe bending machine has a frame 1 formed of metal and provided with front and rear legs 2 and 3 secured at their upper ends to opposite ends of front and rear cross bars 4 and 5. Side bars 6 extend between the front and rear legs and are welded to ends of the front and rear cross bars and in order to brace the legs there have been provided bracing strips 7 which extend diagonally in crossing relation to each other and have their ends welded to the legs. Each leg carries at its lower end a sleeve 8 which is internally threaded, and through these sleeves pass threaded rods or jack screws 9 having feet 10 swiveled to their lower ends and provided with collars 11 serving as hand holds which are of sufficient size to permit them to be readily grasped and the jack screws turned to vertically adjust them and thus allow the frame to be leveled and also raised or lowered according to the desire of the person operating the pipe bender. A cross bar 12 which serves as an abutment bar is mounted between the front legs in close contacting engagement with the rear face of the front bar 4 and the rearwardly extending flange of this abutment bar is formed near its ends with openings 13, there being similar openings 14 formed through end portions of the front cross bar.

A top plate or platform 15 which is formed of strong metal is connected with the rear cross bar 5 by hinges 16 and is of rectangular shape and of such dimensions that it will rest upon the side bars 6 and the front cross bar 4 when disposed horizontally and at rest upon the frame. When the platform or top plate is in this horizontal position it is secured by bolts 17 which are passed through openings 18 in front corner portions of the top plate and through the openings 14 with which these openings 18 register. It is necessary to limit rearward movement of the top plate when it is swung upwardly to the raised position shown in Figure 5 and support it in the raised position. In order to do so there have been

provided arms 19 which extend downwardly from rear corners of the top plate and are braced by bracing bars 20 which have their upper ends welded to the under face of the top plate near opposite side edges thereof and extend downwardly at a rearward incline with their lower ends welded to front edge portions of the arms. The length of the arms is such that when the top plate or platform is swung upwardly to the raised position free ends of the arms will engage the under face of the rearwardly extending flange of the abutment bar 12 and openings formed in the arms will then register with the openings 13 so that bolts 21 or the bolts 17 may be passed through them and firmly hold the arms against downward movement. The top plate or platform will thus be braced in its raised position and can not move out of the perpendicular position shown in Figure 5.

An electric motor 22 having a gear box 23 associated with it is disposed under the top plate where it is secured by bolts 24 passed through the ears 25 and 26 of the motor and the gear box, it being understood that the gear box contains a conventional number and arrangement of gears and that one of the gears is carried by a shaft 27 which projects upwardly from the gear box and through an opening 28 formed centrally of the top plate 15 with its upper portion 27' of reduced diameter to form a circumferentially extending shoulder 29. A disk 30 which may be termed a turntable or head fits about the upper portion of the shaft 27 at rest upon the shoulder 29 and keys 31 are applied to cause the head or disk to turn with the shaft. Since gears in the gear box are reducing gears the shaft 27 and the head 30 turn at a great deal slower speed than the speed of the motor shaft. Threaded openings 32 are formed through the disk in spaced relation to each other along a line extending diametrically of the disk and in an end one of these openings is screwed the reduced and threaded lower end portion or shank 33 of a pin 34 which projects upwardly from the disk adjacent the peripheral edge thereof. A circular die 35 having a grooved marginal edge face rests upon the upper face of the head or disk where it is secured in concentric relation thereto by screws 36 which are passed through openings 37 formed through the die in equally spaced relation to opposite sides of the center opening of the disk and into certain ones of the openings 32 formed in the disk. Three openings have been shown in Figure 3 between each end opening and the center opening of the disk or turntable and therefore provision has been made to accommodate dies of three sizes but it will be understood that additional openings 32 may be formed in the disk if a greater number of dies are to be furnished with the pipe bending machine. The marginal edge of the die is spaced from the pin or post 34 a sufficient distance to allow a pipe, tube, or bar 37 to be applied to the grooved marginal edge of the die where it is held by action of the post with a portion of the pipe in engagement with a grooved roller 38 which is rotatably carried by a standard or post 39 rising from a rear corner portion of the platform or head plate 15. This roller cooperates with the pin 34 to hold the pipe in close fitting engagement with the grooved die and when the die is turned the pipe will be gradually bent about the die to form a U-shaped bend in the pipe, as shown in Figure 4. The roller is slidable vertically upon the post 39 so that it can move to a

position in which its grooved edge is centered with respect to the grooved edge of the die and thus cause inner and outer side portions of a pipe or rod to be properly engaged in the grooves of the roller and the die and prevented from slipping out of engagement therewith. Having the roller slidable along the post will be especially advantageous if a multiple die is used instead of removing a die and substituting another of different size in place of the one already mounted upon the turntable. Such a die is shown in Figure 7 and referring to this figure it will be seen that the multiple die 40 tapers towards its upper end and is shaped to provide a lower section 41, an intermediate section 42, and an upper section 43. The lower section is of the same size as the die 35 and the sections above it progressively smaller and in concentric relation to each other, it being understood that as many sections as desired may be provided and that the said sections may be integral with each other or formed separate and suitably secured to each other. Instead of passing screws downwardly through the multiple die and into the openings in the turntable, the multiple die is formed with threaded sockets 44 leading from its bottom face and screws are passed upwardly through the openings in the turntable and screwed into these sockets. When a multiple die is used it will be necessary to use a pin 34 of sufficient length to engage a pipe or rod engaged with any one of the sections of the multiple die. The motor 22 is a reversible motor so that directional rotation of the turntable may be controlled and this motor is provided with a reversing switch 45 and a master switch 46, as shown in the wiring diagram in Figure 6, the reversing switch being only operated when it is desired to reverse the direction in which the turntable turns and the master switch being used for starting and stopping the motor.

A rheostat 47 is provided to allow for varying the speed of the motor 22 and therefore the turntable 30, as desired, by an operator.

Having thus described the invention, what is claimed is:

A pipe bending machine comprising a frame, a top plate for the frame, a motor mounted against the under face of the top plate and having associated with it a gear box including a rotary shaft projecting upwardly through the top plate, a turntable mounted upon and turning with the shaft and located above the top plate, said turntable being formed with threaded openings spaced from each other along a line extending diametrically of the turntable, a circular die removably secured upon the turntable concentric therewith by fasteners passed downwardly through the die and screwed into selected ones of the threaded openings spaced equal distances from the center of the turntable, said die having a grooved marginal edge face, a pin screwed into an end one of the threaded openings and projecting upwardly from the turntable in spaced relation to the grooved edge face of the die, a post projecting upwardly from the top plate in spaced relation to the turntable, and a roller rotatably mounted upon said post and shiftable vertically thereon, said roller having a grooved peripheral surface spaced from the edge face of the turntable and adapted to engage the outer side portion of a pipe and cooperate with the pin for holding the pipe in engagement with the

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grooved edge face of the die when turned with the turntable to bend the pipe about the die.
EDWARD SENNA.

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