Dec. 10, 1940. R. B. PEALER 2,224,691

PIPE WORKING MACHINE

Filed Oct. 5, 1939 3 Sheets-Sheet 1

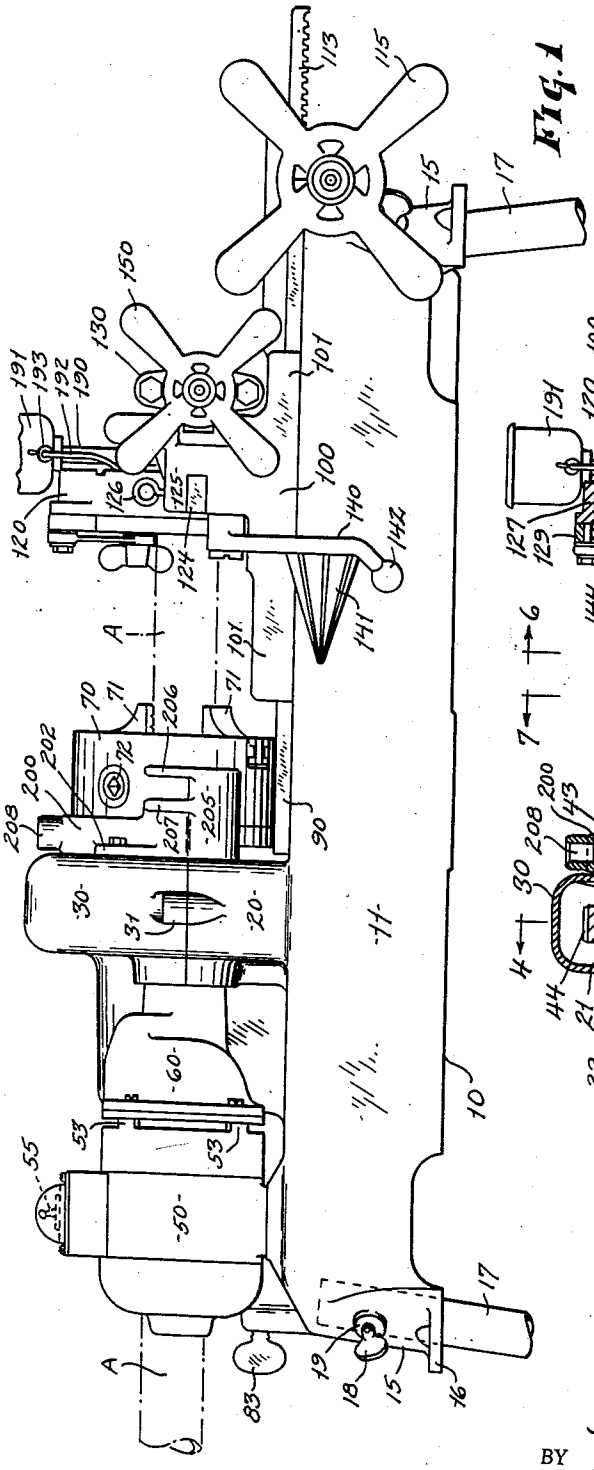


Fig. 1

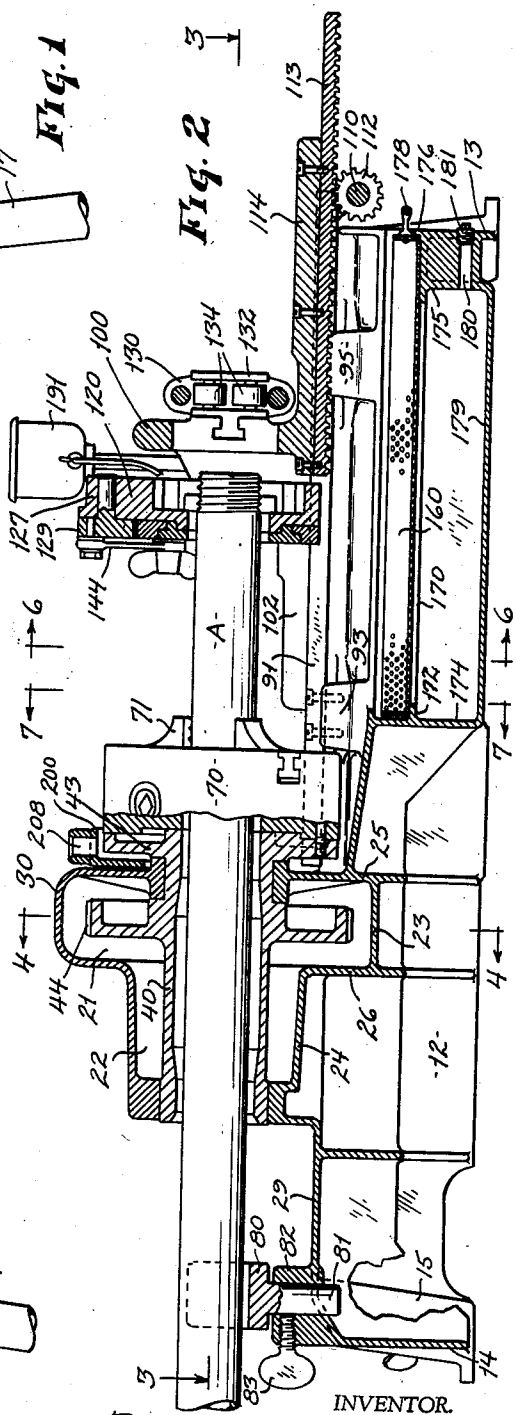


Fig. 2

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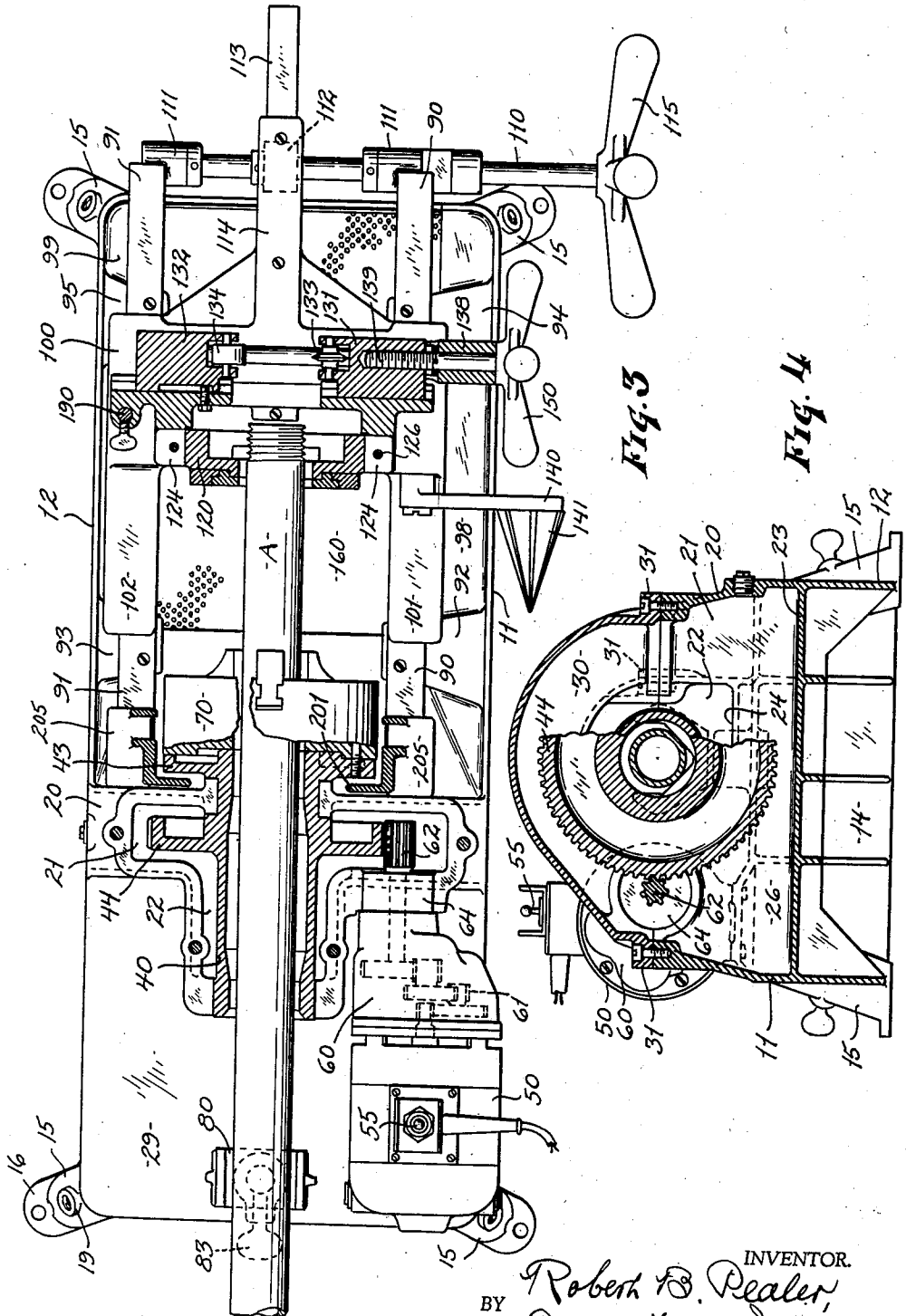


Fig. 3

Fig. 4

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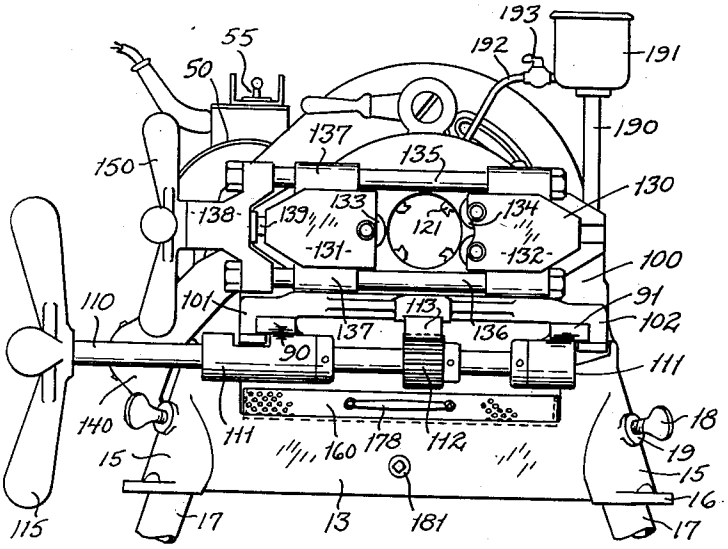


FIG. 5

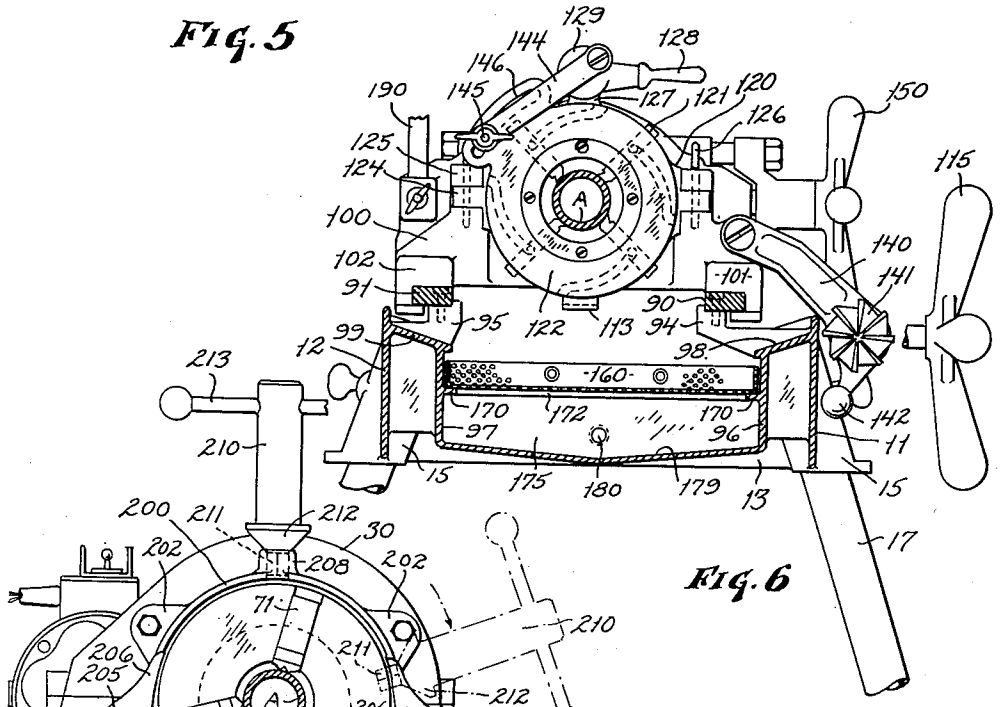


FIG. 6

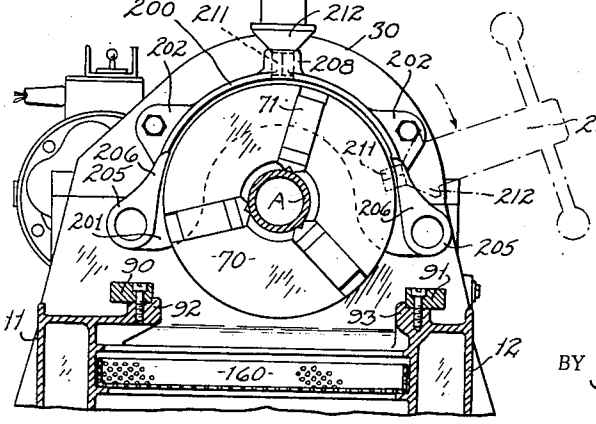


FIG. 7

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2,224,691

UNITED STATES PATENT OFFICE

2,224,691

PIPE WORKING MACHINE

Robert B. Pealer, Parkman, Ohio, assignor to Beaver Pipe Tools, Inc., Warren, Ohio, a corporation of Ohio

Application October 5, 1939, Serial No. 297,982

12 Claims. (Cl. 10—89)

This invention relates to a power machine enabling the performance of operations on pipes such as threading and cutting. The machine is of the type wherein there is a rotary chuck adapted to be driven by a motor through reduction gearing, and there is a slidable carriage on which the tools, such as a threader, a cutter, or a reamer, are mounted in position to coact with a pipe in the chuck.

The general object of the invention is to provide such a machine in a very simple form, which may be constructed comparatively cheaply, and will be efficient in performing the operations desired.

Among the features of my invention, I may mention a single continuous bed of low height carrying the chuck, with its power drive and motor on one side of the chuck, and ways for the carriage on the other side. This bed is preferably a single integral casing having continuous side and end skirts from the bottom to the general top plane of the bed, providing depth for strength, enabling the interior web portion of the bed to be of lighter construction, and also resulting in cleanliness as well as giving a very neat appearance.

Another feature of my machine relates to the open top of the bed beneath the carriage and a removable perforated tray below such open top, the side portion of the bed being arranged to shed the chips from the threader or cutter directly into the tray. As a result the oil on the chips, or dropping from the tools, will reach the tray and drain through the perforated bottom into a reservoir within the bed, from which the oil may be readily retrieved.

Another feature of my bed is that I provide hollow legs at the corners thereon forming abutments for the side and end skirts of the bed, these legs being adapted to stand on a bench and support the machine, or receive outwardly inclined pipe extensions supporting the bed at an elevation. These legs brace the side and end skirts, and these skirts brace the legs.

Still another feature of the invention relates to the provision of a wrench extractor so arranged as to form a protective guard over the chuck head and the adjacent bearing, the extractor operating to remove automatically a chuck wrench if the same is inadvertently left in the chuck when its rotation starts in either direction.

The features above mentioned, and others contributing to the efficiency of the machine, will become more apparent from the following detailed description of a preferred embodiment of the invention, illustrated in the drawings.

In the drawings, Fig. 1 is a side elevation of my machine; Fig. 2 is a vertical longitudinal section thereof, along the chuck axis; Fig. 3 is a sectional plan of the machine, taken along the chuck axis; Fig. 4 is a vertical transverse section through the main driving gear of the chuck, as indicated by the line 4—4 on Fig. 2; Fig. 5 is an end view of the machine, looking from the right hand end of Figs. 1, 2 and 3; Fig. 6 is a vertical cross-section taken on the line 6—6 on Fig. 2 and looking toward the right; Fig. 7 is a vertical cross-section on the line 7—7 of Fig. 2, looking toward the left.

As shown in the various figures, the bed of my machine, designated 10, is an elongated hollow casting having substantially vertical side skirts 11 and 12, end skirts 13 and 14, and various floor portions and connecting webs. On the four corners of the base, merging with the side and end skirts, are tubular legs 15, each of which inclines slightly laterally and longitudinally. Each leg has a flange 16 at its lower edge, which makes an effective foot for supporting the bed. Each leg is formed as the terminus of both the side and end skirt, as illustrated, for instance, by Figures 2 and 6, showing cross-sections of the skirts abutting the cylindrical wall of the legs. By this construction the skirts brace the legs and the legs brace the skirts.

Each corner leg is made with a tubular cylindrical bore, as illustrated by dotted lines in Fig. 1, to receive, whenever desired, an extension leg in the form of a pipe 17, the upper portion of which may occupy the leg and be held thereto by a set screw 18 threaded into a boss 19, formed on the outer face of the leg.

Extending upwardly from an intermediate region of the base is a hollow portion 20 integral with the base, providing a housing with a transverse chamber 21, and a communicating narrow chamber 22. The bottoms of these chambers are made by transverse floor members 23 and 24 (Fig. 2) of the bed. The upright walls are continuations of vertical webs 25 and 26 within the lower portion of the bed.

All of these floor members and webs, it will be understood, are parts of a single integral base casing. The walls of the housing come to a horizontal top plane (Fig. 3) in which the chuck axis lies. Above this axis is a closing cap 30 with a horizontal contour corresponding to that of the housing. This cap being secured to the housing by suitable screws mounted in bosses 31 formed

on the cap, and corresponding bosses on the housing, as illustrated in Figs. 1 and 4.

The housing **20** and the cap **30** provide the bearings for the chuck barrel, and a portion of the reduction gearing. As shown in Figs. 2 and 3, the chuck barrel **40** is journalled in bearings formed, half and half, on the front and rear walls of the housing and cap. The head plate for the chuck, designated **43**, is formed on the outer portion of the barrel, and the main driving gear **44** on the barrel is spaced from the head a distance proper to accommodate the bearing carried by the front walls of the housing and cap. The rear end of the chuck barrel has its bearings in the rear walls of the housing and cap, as illustrated in Fig. 2. Accordingly, when the chuck barrel has been mounted in the housing, and the cap put in place, the housing and cap not only journal the chuck barrel but also prevent longitudinal shifting of the chuck barrel.

The driving motor **50** is formed as a unit with the housing **60** for the reduction gearing, which connects the armature shaft with the chuck gear **44**. The motor has its field frame resting on a head formed on the top of the outside floor portion **29** of the base frame. The field frame may be secured in place by screws (not shown) extending upwardly from beneath the base into the field frame.

The field frame may terminate at its front end in spaced lugs **53** to which is bolted the reduction gear casing **60**, the spaces between the lugs providing for ventilation of the motor. The reduction gear casing **60** contains suitable reduction gearing **61** (Fig. 3) leading from the armature shaft to a final shaft carrying a pinion **62**. The gear casing has a cylindrical portion **64** adapted to occupy a circular opening of the combined base and cap frame and be clamped in position thereby. In this manner the motor and reduction gearing are held in definite position with the armature axis and the final gear shaft parallel to the chuck barrel axis, and with the pinion **62** meshing with the chuck barrel gear **44**.

It will be seen that the construction described provides a simple, self-contained motor and reduction gearing, the reduction casing being held effectively in place by the housing and cap. The chuck proper **70** is secured to the head **43** of the chuck barrel. There is thus provided an effective power means for rotating the chuck. By employing a high-speed motor and a gearing of large reduction, I obtain the desired power in the chuck with a comparatively small motor. It will be understood that the switch **55** on the motor **50** may connect the motor for rotating the chuck barrel in either direction as desired.

The chuck **70** as illustrated in Figs. 1, 2 and 3, has the usual jaws **71** operated in and out radially by a rotary socket member **72**. Figs. 1 and 2 indicate the chuck as carrying a pipe A, the forward end of which has just been threaded. The rear portion of the pipe may rest on the tool rest **80**, shown as a V-shaped head having a vertical shank **81** extending downwardly into a tubular boss **82** on the bed, the shank being clamped by a set screw **83** threaded in the bed.

To support the carriage in cooperation with the chuck, the bed is extended unitarily from beneath the chuck and power mechanism to the right a considerable distance, as shown in Figs. 1, 2 and 3. On this right-hand portion of the frame are the carriageways, comprising a horizontal bar **90**, bolted to two rigid brackets **92** and **94** near the front of the bed, and a horizontal bar **91** bolted to brackets **93** and **95** at the rear of the bed.

It will be seen from Figure 6 that a short distance back of the front skirt **11** is a vertical web **96**, and a short distance in front of the rear side skirt **12** is a corresponding web **97**. The webs **96** and **97** are connected to the front and rear side skirts by inclined roof portions **98** and **99**. The front brackets **92** and **94** lead rearwardly and upwardly from the front inclined web **98**, while the rear brackets **93** and **95** lead forwardly and upwardly from the inclined web **99** as shown in Fig. 6. This provides for the effective support of the carriage guides **90** and **91**, at a comparatively low height and inwardly of the side skirts of the machine. The double walls as **11** and **96**, and the corresponding web as **98**, provide a very effective rigid base for the guide brackets, as **92** and **94**.

The carriage designated **100** has longitudinally extending foot portions **101** and **102** resting on the guide bars **90** and **91**, and has an intermediate upright transverse portion which carries the tools for operating on the pipe, as the threader **120**, the cutter **130** and the reamer **140**, hereinafter described. To move the carriage, I have shown a transverse shaft **110** mounted in ears **111** on the end of the frame, and having between its bearings a gear **112** meshing with a rack **113** secured to the underside of the extension **114** of the carriage. A hand wheel **115** on the end of the shaft furnishes means to rotate it to shift the carriage toward or from the chuck.

Referring to the threading device illustrated, I have mounted on the left hand face of the carriage a threading die **120**, and on the right hand face the pipe cutting device **130**. The threading device **120** may be of the form shown in my prior Patent No. 1,947,874. As there shown, this threading device comprises a ring having lateral passageways to carry chasers **121**, and a scroll or cam plate **122**, and means for positioning the cam plate. The ring **120** is shown as having ears **124** on its diametrically opposite sides, which enter bifurcated lugs **125** on the carriage, the ears being locked in these lugs by pins **126**.

As shown, the ring **120** is provided with an ear **127**, in which is mounted a shaft carrying an operating lever **128**. On this shaft is a disc crank **129** the pin of which is connected by a link **144**, with the cam plate **122**. The connection is made by means of a bolt **145** occupying an arcuate slot **146** in an extension of the cam plate, the bolt having a wing nut by which it may be tightened. Upon the loosening of this wing nut, the cam plate may be readily shifted to shift the chasers in or out, and position them as desired. To open the threading unit and allow the free passage of the pipe, it is only necessary for the operator to grasp the handle **128** and throw it to the rear, thereby swinging the cam plate to withdraw the chasers.

Reference is made to the prior Patent No. 1,644,143, of my assignee, Beaver Pipe Tools, Inc., for claims on the threading device described.

The pipe cutter illustrated in Figs. 1, 2 and 5 hereof, is not claimed herein, but in my prior Patent No. 2,055,908. The cutting mechanism comprises a self-contained cutting device of the wheel-cutter type, transversely shiftable on the carriage so that it may adapt itself to any irregularities of the pipe. Briefly, the cutter as shown comprises a pair of blocks **131** and **132**,

each slidably mounted in grooves in the face on the carriage on opposite sides of the pipe axis. One of these blocks, as 131, being provided with a roller cutting knife 133, and the other with a pair of cylindrical bearing rollers 134. The block 132 rigidly carries a pair of rods 135 and 136, which extend freely through ears 137 on the block 131 and are connected beyond that block by a cross-head 138. A screw 139 threaded in the block 131 has a cylindrical shank rotatably mounted in the head 138. Beyond that head the screw carries an operating hand wheel 150. This hand wheel furnishes means for causing the wheel knife and bearing rollers to approach each other, or recede, while the whole cutter as a unit may shift laterally on the frame.

I may also provide a reamer on the carriage, which device is indicated in Figs. 1 and 6, by the lever 140, pivoted to the carriage, and having a fluted cone 141 the same distance from the pivot of the lever as the pivot is from the pipe axis. Accordingly, by turning the lever over (as by means of a handle 142) the cone may be brought into axial alignment with the pipe, so that it may readily ream a pipe by simply moving the carriage with the positioned cone toward the chuck as the pipe rotates.

The space beneath the threading tool and the cutting tool is open, so that resulting chips and oil from the tools will readily drop. To retrieve such oil, separated from the chips, I provide the perforated tray 160 illustrated in Figs. 2, 3, 5, 6 and 7, with an oil reservoir formed by the bed beneath it.

The tray 160 is a rectangular member, and may be made entirely of perforated metal, as illustrated, or the base only may be perforated. In any case, the tray normally rests on ledges 170 formed on the inner side of the vertical webs 96 and 97. There is also a ledge 172 for the rear end of the tray, this ledge being formed on the vertical web 174, which also stands beneath and braces the brackets 92 and 93. Near the front end of the tray it rests on an inwardly spaced end portion 175 of the bed, behind a retaining bead 176. The tray is provided at the extreme end with a suitable pull handle 178. The space beneath the tray, bounded by the front and rear walls 96 and 97, the inner wall 174, and the outer wall 175, and over the closed bottom 179, provides an oil reservoir readily accessible at the front or rear of the carriage after the tray has been removed. There may be a draining opening 180 normally closed by a plug 181 (Fig. 2).

In the operation of the device, the oil and chips drop from the threading and cutting tools, either directly into the tray or onto the roofs 98 and 99, and thence slide down into the tray. The oil then passes through the tray into the reservoir beneath it. Whenever desired, the outer end of the tray may be slightly lifted by the hand hold 178 to clear the retaining bead 176, and the tray then withdrawn endwise of the machine, and its contents dumped out. When the tray has been withdrawn, ample space is available at the right or left of the carriage for the operator to dip a suitable vessel into the reservoir and scoop up a quantity of oil.

As shown at the rear of the machine, the carriage carries a post 190 having at its top an oil receptacle 191 from which I have shown a pipe 192 leading to the threading tools under the control of a cock 193. Oil scooped up from the reservoir may readily be transferred from time to time to the receptacle, as required. If desired, a motor-operated pump could be provided for pumping oil from the reservoir to the receptacle, but this is omitted in the interest of simplicity.

As heretofore mentioned, the protective guard over the chuck also acts as a wrench extractor. This is illustrated in Figs. 1, 2 and 7. It comprises a curved, approximately semicircular, guard plate 200, having an arcuate flange 201 adapted to extend between the chuck barrel head 43 and the cap 30. This guard has also projecting ears 202 by which it may be secured by cap screws to the cap 30. When so secured the guard lies snugly over the rear end of the chuck close to it, as illustrated in Fig. 7, and prevents dirt or grit passing down between the head 43 and the cap 30 and working into the chuck barrel bearing.

At its lower portion, the guard 200 has longitudinally extending enlargements 205 (preferably made hollow for lightness) from which two ears 206 and 207 extend upwardly. The ear 206 is at the extreme end of the guard, while the ear 207 stands a suitable distance back of it and merges at its end with the guard plate 200. The recess between the two ears is in the same transverse plane as the chuck rotary socket 72 for operating the jaws. The construction just described, of the guard ears, is the same at the front and rear of the machine.

The chuck wrench indicated at 210 comprises a shank having an angular portion 211 at its inner end, formed to occupy the socket opening of the rotatable socket member 72. A short distance from the angular end 211 is a flaring or conical portion 212 and at the outer end is a transverse handle 213.

If such a wrench as described is inadvertently left in the chuck, and the machine started, as soon as the wrench is carried around into the fork provided by the ears 206 and 207, the conical head on the wrench engages these ears with the result that the wrench is cammed out of the chuck and falls down idly clear of the machine. Fig. 7, indicates, in broken lines, the wrench as it is being automatically extracted at the rear of the machine, the operation being the same either at the rear or the front according to the direction of rotation of the chuck. The result is that nothing is jammed or broken if the machine is started in either direction with the wrench left in the chuck.

I may also utilize the guard 200 as a carrier for the chuck wrench when idle. To this end, I form at the topmost region of the guard an upwardly-extending hollow boss 208, formed to receive the angular end of the chuck wrench whereby such wrench is supported in a convenient position above the chuck, as indicated in Fig. 7.

It will be seen that my machine is quite simple. The chuck barrel carrying the chuck is held in place by the housing of the frame and its cap, and these same parts retain the reduction gearing in engagement with the chuck barrel gear, while the motor is directly mounted on the bed. The carriage rests on ways directly mounted on the bed and may be readily shifted toward and from the chuck by approved means. The chips and oil and the dirt coming from the operation drop first into the tray, whereby the refuse may be readily discharged, while the oil is retrieved from the bottom reservoir for subsequent use.

I claim:

1. A pipe working machine having a low height continuous bed with upright side skirts forming beams of considerable depth, transverse webs connected to the skirt and substantially horizontal floor portions connected to the skirts and

webs, whereby a rigid but light structure is provided, a hollow housing rising from the bed in an intermediate location, a chuck barrel mounted between said housing and a removable cap therefor, a motor supported on the floor portion of the bed on one side of the housing, a reduction gearing between the motor and the gear on the chuck barrel, carriage ways mounted on the bed at the other side of the housing, a carriage on said bed, and means for moving it toward and from a chuck on the chuck barrel.

2. In a pipe working machine, a bed having side skirts and intermediate vertical walls connected with the side skirts respectively, at the front and rear of the machine, by top portions inclining downwardly and inwardly, carriage ways on the bed spaced apart with an open space between them beneath the carriage, a removable perforated drawer mounted between said vertical walls in the bed beneath the carriage, and an oil reservoir in the bed between said walls and below the drawer.

3. In a pipe working machine, the combination of a bed formed at the front and rear with side skirts and with inner upright walls spaced from the side skirts and connected therewith by top portions inclined downwardly toward an intermediate region of the bed, a removable tray carried on ledges formed on the inner faces of such upright walls, carriage ways supported by the bed higher than the inclined top webs mentioned, a carriage on said ways, and a rotary chuck supported by the bed in position to coact with the carriage.

4. In a pipe working machine, the combination of a bed formed at the front and rear with side skirts and with inner walls spaced from the side skirts and connected therewith by top portions inclined downwardly toward an intermediate region of the bed, a removable perforated tray carried on ledges formed on the inner faces of such upright walls, an oil reservoir formed by the lower portion of said walls and end walls and a bottom plate, brackets on said inclined top portions, carriage ways mounted on said brackets, a carriage on said ways, a rotary chuck supported by the bed in position to coact with the carriage, and means for rotating the chuck.

5. In a pipe working machine, the combination of a bed comprising a casting having side and end skirts extending in a generally vertical direction, and top portions and tubular legs at the four corners of the bed positioned so that the side and end skirt at a corner abut the outer curved surface of the leg, internal webs bracing these skirts and top portion of the bed, a motor carried by the top portion, a housing rising from an intermediate region of the bed, a chuck barrel mounted in the housing, a chuck on the chuck barrel, ways on the bed on an opposite side of the housing from the motor, and a carriage on said ways coacting with the chuck.

6. In a pipe working machine, the combination of a bed, a standard thereon, a chuck barrel journalled in the standard having a head, a chuck mounted on the head, and a protecting device mounted on the standard and having a curved plate overlying the head to protect the bearing of the chuck barrel and a jaw carried by said protecting device and adapted to coact with a chuck wrench left in the chuck whereby such chuck wrench is automatically extracted from the chuck as the latter rotates.

7. In a pipe working machine, the combination of a bed, a standard thereon, a chuck barrel in the standard, means for driving the chuck barrel, said barrel having a head outside of the standard, a chuck mounted on the head, and a combined protecting device and wrench extractor mounted on the standard comprising a plate portion extending between the head and skirt, and a curved portion projecting over the head and a pair of jaws in front of and behind the chuck respectively, in position to coact with a wrench left in the chuck socket and carried around by the chuck.

8. In a pipe working machine, the combination of a standard, a chuck barrel journalled therein having a head outside of the standard, a chuck mounted on the head, and a combined protecting device and wrench extractor mounted on the standard and having a curved guard projecting over the head, an upwardly facing jaw on the lower end of the guard, in position to coact with a wrench left in the chuck, and a socket carried by said device at the top thereof adapted to support an idle chuck wrench.

9. In a pipe working machine, the combination of a single continuous bed formed with a hollow housing rising from an intermediate region of the bed, a chuck barrel mounted on said housing, a motor on the bed on one side of the housing, reduction gearing between the motor and chuck barrel, two pairs of longitudinally spaced brackets formed on the bed on the other side of the housing, one pair at the front and one pair at the rear of the pipe axis respectively, bars mounted directly on said brackets and bridging laterally open spaces between them, and a carriage slidable on said bars and cooperating with a chuck on the chuck barrel.

10. In a pipe working machine, the combination of a bed, a chuck carried thereby, said bed having side skirts and intermediate vertical walls connected with the side skirts by top portions inclined downwardly and inwardly, spaced brackets rising at opposite ends of said top portions, horizontal rods carried by said brackets and bridging the spaces between them and constituting carriageways, and a tray in the space between said vertical walls in position to receive material passing down the downwardly inclined top portions.

11. In a pipe working machine, the combination of a single continuous bed, an intermediately located upstanding housing for a chuck barrel, a chuck journalled between said housing and a cap mounted thereon, said bed on one side of the housing being provided with carriage ways, a carriage on said ways, a motor mounted on the bed on the other side of the housing, a casing attached at one end to the motor frame and at the other end mounted in and positioned by a recess formed in part by the housing and part by the cap and reduction gearing between said motor and the chuck barrel, said reduction gearing being journalled in the casing.

12. In a pipe working machine, the combination of a bed formed with two stiffening braces at the front and rear respectively, each brace comprising an outer skirt and an inner upright wall spaced from the skirt and connected therewith, a bottom plate connected at the front and rear with said upright walls, end members connected with said upright walls and bottom plate to form therewith an oil receptacle and a perforated tray removably mounted between the walls above the receptacle.

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