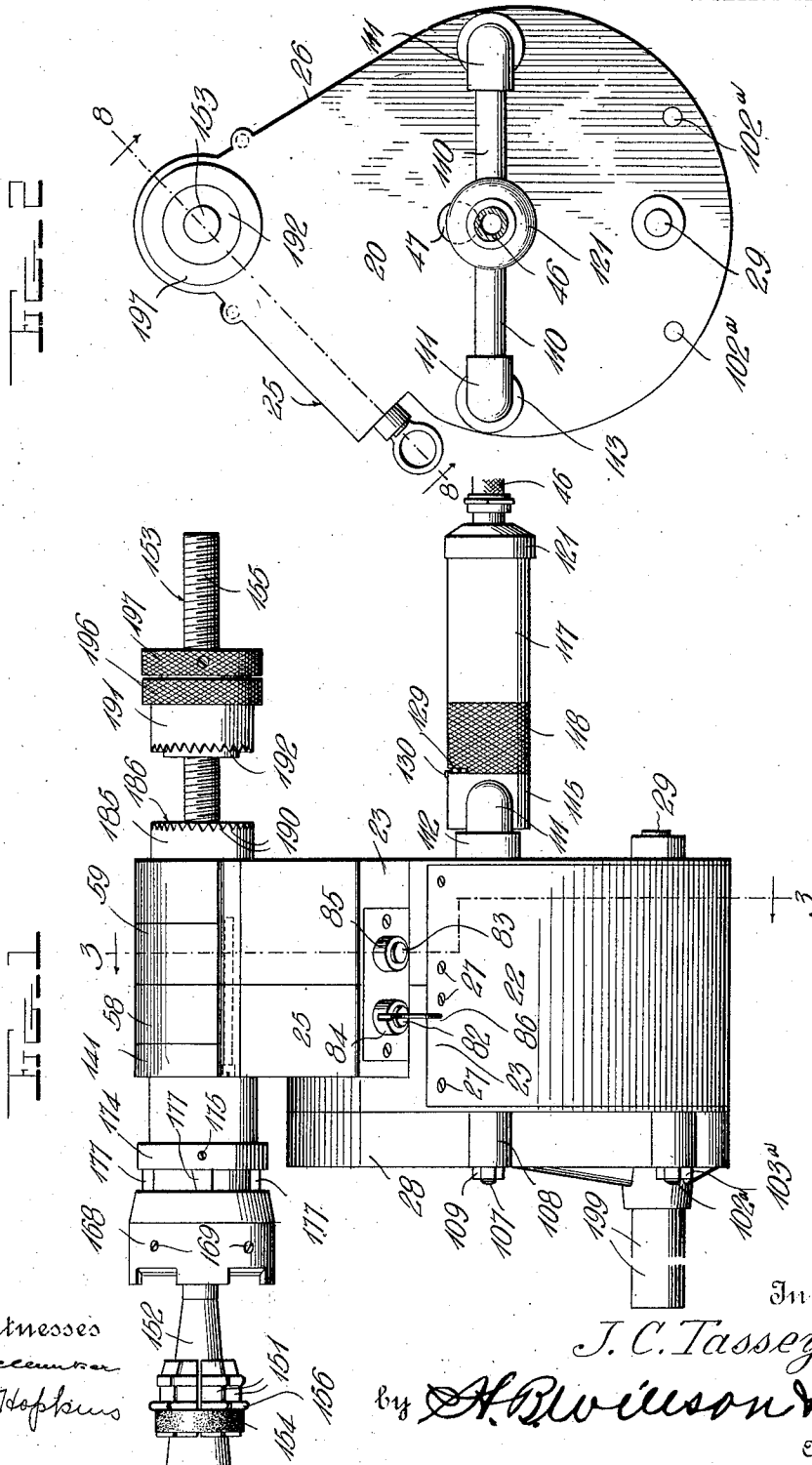


J. C. TASSEY.
TOOL STOCK DRIVING MECHANISM.
APPLICATION FILED MAY 25, 1911.

1,058,922.

Patented Apr. 15, 1913.

5 SHEETS—SHEET 1.



Witnesses

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J. C. Tasse

by A. B. Wilson & Co

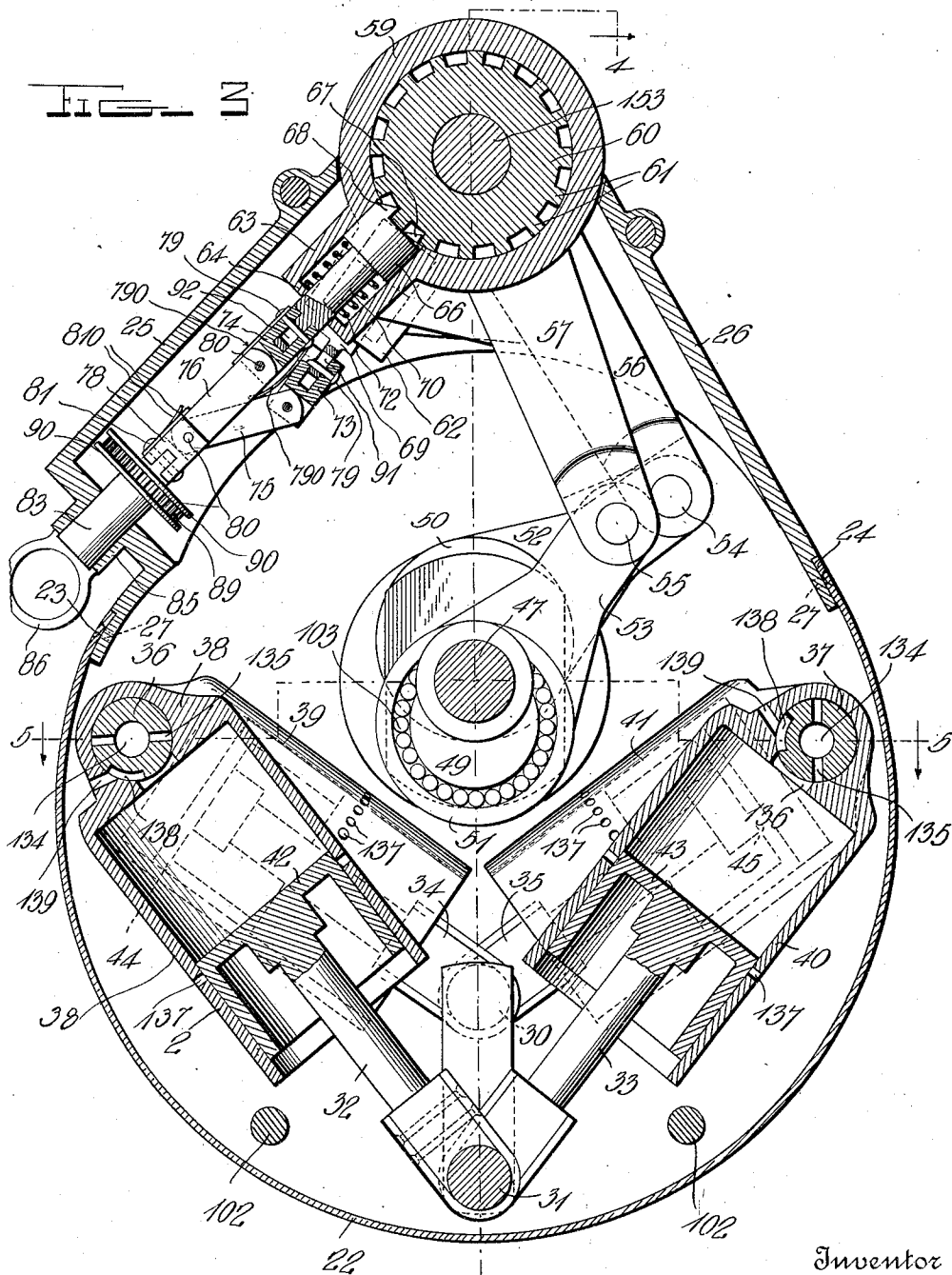
Attorneys

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5 SHEETS—SHEET 2.



Witnesses

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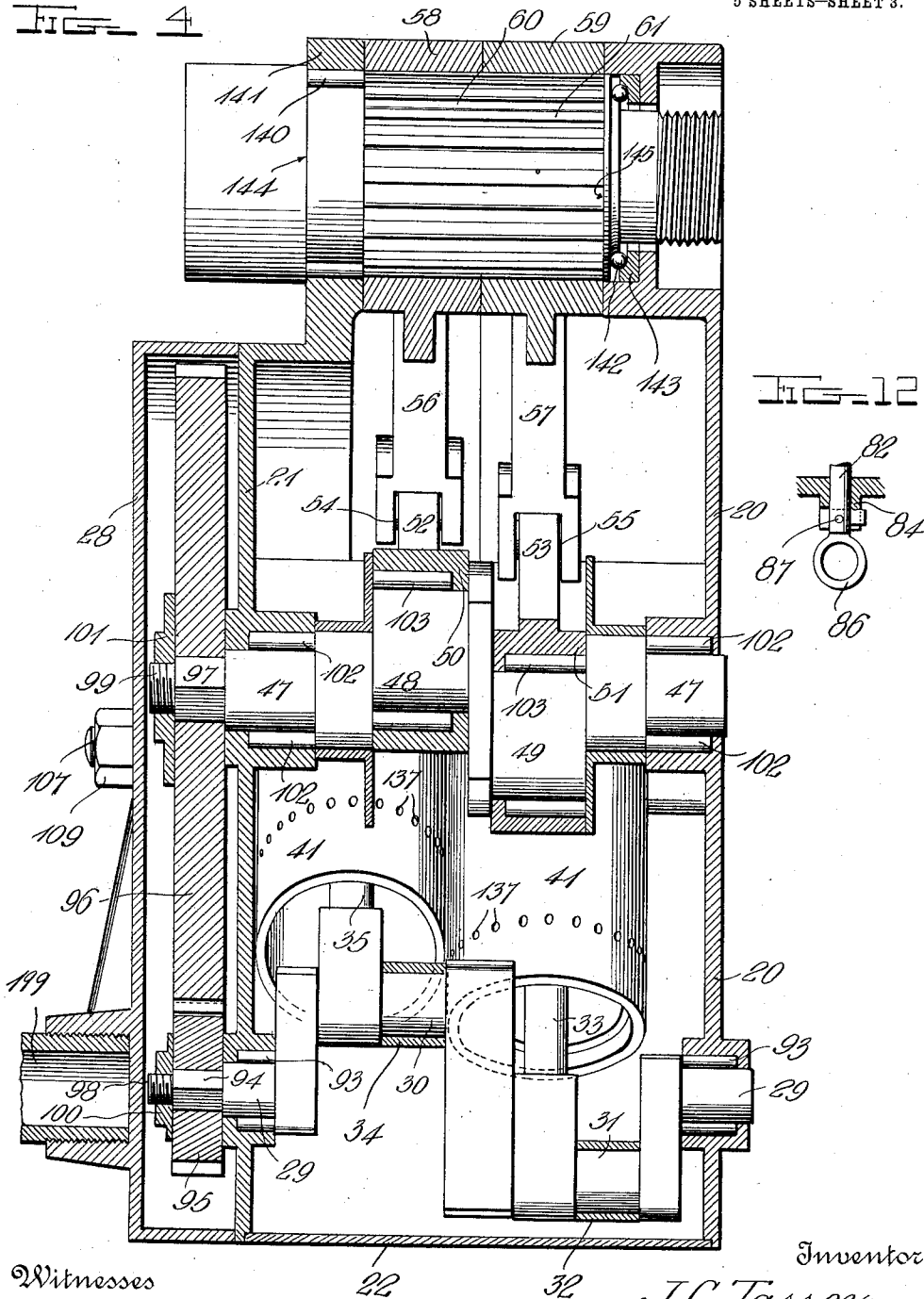
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5 SHEETS—SHEET 3.

FIG. 4



Witnesses

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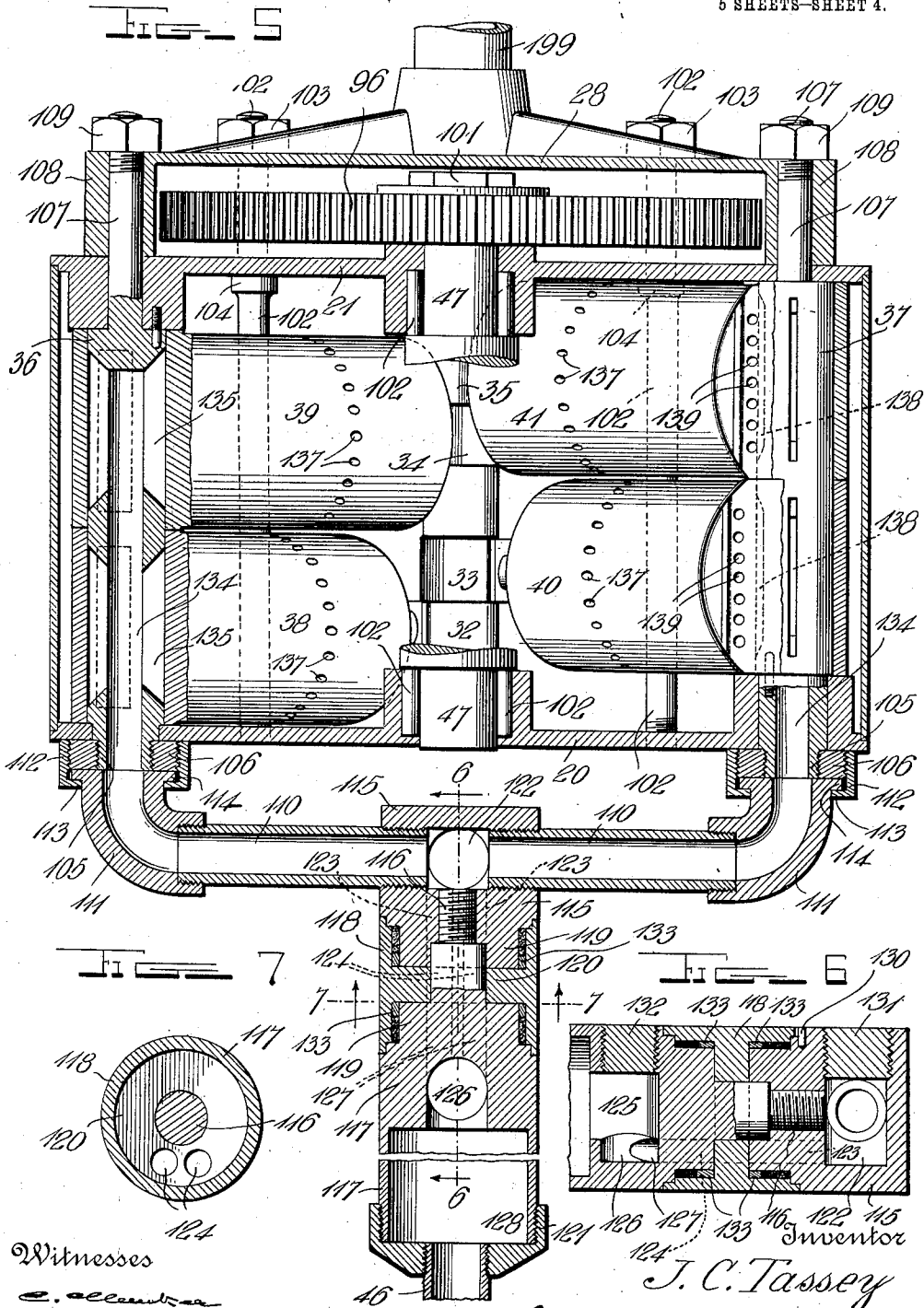
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5 SHEETS—SHEET 4.

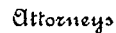


Witnesses
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1,058,922.

5 SHEETS—SHEET 5.



UNITED STATES PATENT OFFICE.

JOE CEPHAS TASSEY, OF NASHVILLE, TENNESSEE.

TOOL-STOCK-DRIVING MECHANISM.

1,058,922.

Specification of Letters Patent.

Patented Apr. 15, 1913.

Application filed May 25, 1911. Serial No. 629,483.

To all whom it may concern:

Be it known that I, JOE CEPHAS TASSEY, a citizen of the United States, residing at Nashville, in the county of Davidson and State of Tennessee, have invented certain new and useful Improvements in Tool-Stock-Driving Mechanism; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has reference to mechanism for driving rotary tools, such for instance as a flue expander or similar tool whose stock usually rotated for a time in one direction and then needs to be reversed and rotated in the other direction; and the object of the same is to improve the driving mechanism for such a tool stock, which is interposed between it and the motor.

To this end the invention consists in the improved construction, arrangement and combination of parts of machines which will be hereinafter fully described and afterward specifically claimed.

In order that the construction and operation of the invention may be readily understood, I will now proceed to fully and specifically describe one embodiment of it, which I have illustrated in the accompanying drawings, in which,

Figure 1 represents a view in side elevation of my improved device; Fig. 2 represents a view of the same in end elevation looking at the right hand end as shown in Fig. 1; Fig. 3 represents a vertical transverse sectional view taken on the plane indicated by the broken line 3—3 of Fig. 1; Fig. 4 represents a longitudinal vertical section on the plane indicated by the broken line 4—4 of Fig. 3; Fig. 5 represents a horizontal transverse sectional view on the plane indicated by the broken line 5—5 of Fig. 3; Fig. 6 represents a detail vertical sectional view through the air valve mechanism on the plane indicated by the broken line 6—6 of Fig. 5; Fig. 7 represents a detail transverse sectional view taken on the plane indicated by the broken line 7—7 of Fig. 5; Fig. 8 represents a sectional view taken on the plane indicated by the broken line 8—8 of Fig. 2; Fig. 9 represents a detail view in elevation of the expander head detached; Fig. 10 represents a front end elevation of the expander illustrated in Fig. 9; Fig. 11 represents a transverse vertical sectional

view taken on the plane indicated by the broken line 11—11 of Fig. 8; Fig. 12 represents a detail view partly in elevation and partly in section of the reversing ring or handle and connections.

Like reference characters mark the same parts wherever they appear in any of the figures of the drawings.

Referring specifically to the figures of the drawings, the casing in which the mechanism of the air motor is inclosed comprises heads 20 and 21 at the ends, and curved connecting sides and bottom 22, the latter extending from slightly above the center of the casing on one side as at 23, Figs. 1 and 3 to a corresponding position as at 24 in Fig. 3, at which points converging upper side plates 25 and 26 are secured by any suitable means, as for instance screws 27, the general outline of a transverse section through the combined motor and expander being substantially oval as indicated in Figs. 2 and 3. An additional casing indicated at 28 in Figs. 1, 4, and 5 is secured to the left hand end of the main casing as illustrated in Fig. 4 by means of and for a purpose hereinafter described.

The air motor comprises a crank shaft 29 journaled in the casing head 21 at one end and the casing head 20 at the other end, which shaft is provided with two cranks 30 and 31 diametrically opposite each other, upon each of which is pivotally mounted two piston rods, those on the crank 31 being indicated at 32 and 33 and those on the crank 30 being indicated at 34 and 35, in Fig. 3, these rods 33 and 35 being also illustrated in Fig. 4.

At suitable points indicated, shafts 36 and 37 are journaled, on the former of which are mounted to oscillate two cylinders 38 and 39, while upon the shaft 37 are similarly mounted two oscillatory cylinders 40 and 41. In each of these cylinders is mounted slidably a piston head, as best illustrated at 42 and 43 in Fig. 3 in full lines and 44 and 45 in the same figure in dotted lines, the piston head 42 being attached to the inner end of the piston rod 32, the piston head 43 being attached to the piston rod 33, the piston head 44 being attached to the piston rod 34, and the piston head 45 to the inner end of the piston rod 35. The shafts 36 and 37 have air chambers and serve as inlet pipes to supply compressed air from a suitable source through the medium of a supply pipe 46; Figs. 1 and 2, and when this air is sup-

plied and the pistons reciprocated, the crank shaft 29 is rotated and the cylinders will oscillate on the shafts 36 and 37 in a well known manner.

5 Journalled centrally in the casing heads 20 and 21 is a drive shaft 47 upon which are formed two eccentrics 48 and 49, Fig. 4, encircled by rings 50 and 51 from which project radial arms 52 and 53, which are pivotally jointed by means of pins 54 and 10 55 to radial arms 56 and 57 projecting from rings 58 and 59 surrounding the stock 60 of the tool being driven, which at this point is provided with longitudinal ribs 61.

15 Extending radially from the rings 58 and 59 are sleeves 62 and 63 having inwardly projecting annular flanges 64 at their outer ends, and having slidably mounted within them blocks 65 and 66 provided on their 20 inner ends with ratchet teeth 67 and 68 adapted to engage with the longitudinal ribs or teeth 61 of the expander stock 60. Attached to the blocks 65 and 66 are stems 69 and 70 which pass through the opening in the annular flanges 64 and are surrounded 25 by springs 71 and 72 bearing expansively upon the flanges 64 and the blocks 65 and 66, whereby the latter, with their stems, and teeth 67 and 68 are yieldingly pressed into 30 the spaces between the ribs 61 of the stock 60. The teeth 67 and 68 project beyond the ends of the blocks 65 and 66, the tooth 67 on block 65 being to the front of a plane passing longitudinally through the center 35 of the block, and the tooth 68 to the rear of a similar plane through block 66, the terms front and rear having relation to the operative direction of oscillation of the blocks.

The stems 69 and 70 are connected, by 40 means of blocks 73 and 74, links 75 and 76, blocks 77 and 78, and suitable pivot pins 79, 80, and 81 to the shafts 82 and 83 journaled in and projecting through bearings 84 and 85 in the casing, the shaft 82 being slotted 45 in its outer end to receive a handle or ring 86 secured thereto by a suitable bolt or rivet 87, said shaft being also provided with a gear wheel 88 meshing with a gear wheel 89 secured on the shaft 84, said gear wheel 50 88 engaging between flanges 90 on the sides of the gear wheel 89.

By turning the handle 86, the shafts 82 and 83, with their connections, to and including the teeth 67 and 68, will be reversed 55 in position with respect to the stock 60 of the expander, so that without changing the motion of the eccentric shaft 47 and its connections through to the sleeves which oscillate on the stock 60, the direction of motion 60 of said stock will be reversed, the tooth 67 then being in the rear of the plane passing centrally through its block and stem and the tooth 68 to the front thereof. The stems 69 and 70 are slotted as at 91, and 92, in 65 Fig. 3, at their inner ends and the pins 79

pass through said slots, whereby the stems and blocks will give slightly, compressing the springs surrounding them, when the teeth 67 and 68 are moving backwardly over the ribs 61 of the stock 60 after the manner 70 of spring ratchet teeth. Springs 790 and 810, secured to the blocks by pins 79 and 81, bear on the edges of the links 75 and 76 and tend to maintain the blocks and links in alinement.

The shaft 29, in Fig. 4, is provided with roller bearings 93 for its journals in the casing heads 20 and 21, and has a reduced angular end 94 outside of the casing head 21 upon which is mounted a gear wheel 95 80 which meshes with a gear wheel 96 similarly secured upon a reduced angular extension 97 of the shaft 47, both the shafts 29 and 47 being provided with threaded ends as at 98 and 99 beyond their respective gears, upon which ends suitable nuts 100 and 101 are threaded to properly secure the gears on the shafts. The shaft 47 is provided with suitable roller bearings 102 in its end journals and 103 for its eccentric rings.

From the foregoing it will be evident that upon the admission of air to the cylinders, the shaft 29 will be rotated and by virtue of the gearing 95 and 96, the eccentric shaft 47 will also be rotated, which in turn, will oscillate the arms 56 and 57 on the rings 58 and 59 on the stock 60 of the expander, which oscillation, through the medium of the ratchet teeth 67 and 68 and connections as described, will cause said stock 60 to be 100 rotated, and that the direction of said rotation may be reversed by turning the ring handle 86 without changing the direction of movement of any of the parts except the stock of the expander itself. The ends of the shafts 29 and 47 which project beyond the casing head 21, and the gearing 95 and 96 thereon, are incased in the supplementary casing 28 hereinbefore referred to, which casing is held in position on the main casing 110 by means of bolts 102^a which are threaded into the casing head 20, passed through the casing head 21 and are provided with suitable nuts 103^a, a shoulder 104 being provided to bear against the inner side of the 115 casing head 21 to properly position the parts when the nuts are turned tightly against the supplementary casing 28.

Referring particularly to Fig. 5, the manner of securing the hollow shafts 36 and 37 120 in the casing, and the manner in which air is admitted to the cylinders through these shafts will now be explained. It will be observed that the two shafts are located in opposite sides of the casing and are provided on reduced outer ends 105 with collars 125 106 threaded inside and outside, which bear against the outer face of the casing head 20 and these shafts are further provided with reduced ends 107 which are seated in sleeves 130

108 formed on the supplementary casing 28, said reduced ends 107 being threaded and each provided with a suitable nut 109. The shafts 36 and 37 are thus firmly secured between the casing heads 20 and 21, and are provided with chambers for the purpose of supplying air to the cylinders of the supply pipes. The air supply pipe 46 is connected thereto by means of branch pipes 110 provided with fittings 111 at their outer ends seated against the outer faces of the reduced ends 105 of the pipes of the shafts and the threaded rings 106, and held rigidly in contact therewith by means of caps 112 having inwardly projecting annular flanges 113 embracing outwardly projecting flanges 114 on said fittings. The two branch pipes 110 are threaded into a central T-fitting 115, the opening in the stem of said fitting being threaded to receive the threaded end 116 of a sleeve 117, and a knurled ring 118 being fixed upon extensions 119 of the fitting and sleeve, suitable packing rings being provided between said extensions and the knurled ring, and the latter being provided with a central inwardly projecting annular flange 120 between the adjacent ends of the fitting and the sleeve. The outer end of the sleeve 117 is threaded to receive a cap 121 in which the end of the air supply pipe 46 is secured. In the T-fitting 115 is provided a recess 122 which projects laterally from the transverse recess of the head of the fitting and which is provided, located eccentrically with relation to the stem of the fitting, with two longitudinal bores, indicated in dotted lines at 123 in Figs. 5 and 6, with which longitudinal bores 124 in the inner annular flange 120 of the knurled sleeve 118 may be brought to register in whole or in part by turning said knurled sleeve on the packing extensions of the T-fitting and the sleeve 117. The last named sleeve is also provided with a recess 125 which has a lateral extension 126 from which extend similar longitudinal bores 127 which are normally in register with the bores of the T-fitting and consequently may be brought into and out of register with the bores 124 of the knurled sleeve. This recess communicates with a recess 128 in the end of the sleeve 117 which is covered in part by the threaded cap 121 above referred to. A part of the knurled ring extending partially around its inner edge is cut away leaving a space 129, see Fig. 1, in which plays a projection 130 on the outer edge of the stem of the T-fitting 115, whereby the extent of rotation of the knurled sleeve 118 on the stem of the T-fitting is limited, an extent of rotation being permitted which will carry the bores 124 of the knurled ring entirely out of register with the bores of the T-fitting and sleeve 117 when moved to the extreme in one direction, exactly into register with said bores when moved to the extreme in the op-

posite direction, and into a variable amount of registration from one extreme to the other as the knurled ring is rotated to different points. Thus the amount of air admitted can be very minutely determined. For the purpose of rendering the recesses 122 and 125 accessible, they are closed on one side by screw plugs 131 and 132 respectively, and steel rings 133 are provided to transmit to the packing rings the compressive force of the parts when brought together, to properly seal the joints. The air admitted to the shafts 36 and 37 in the manner described will pass through the chambers 134 of said shafts, and from thence to the cylinders, through a transverse port 135 leading from the central chamber to the cylinder through a port 136 cut in the end of the cylinder, whenever the position of the cylinder on its shaft is such as to bring the port 136 into register with the port 135. This position will be attained at the end of the return stroke of the piston, which position the cylinder 40 is about to reach as illustrated in Fig. 3, said cylinder being represented as in position immediately prior to the beginning of the return stroke of its piston and as oscillating to the left. It will be observed that the least movement in that direction will bring ports 138 and 136 into register and exhaust the air formerly admitted to drive the piston forward and permit of the return stroke. The exhaustion of the compressed air from the cylinder takes place suddenly at the end of the working stroke, when the piston will pass a row of ports 137 through the wall of cylinder, opening these ports. At this time a port 138 in the periphery of the shaft has been brought into register with the port 136 and an outer exhaust port 139, and as the supply of air has at this time been cut off by the movement of the cylinder taking the port 136 out of register with the port 135, the pressure of air has at once, by the opening of ports 137, been reduced to ordinary atmospheric pressure, the piston on its return stroke will only have this pressure to oppose it and the air at such pressure can readily be exhausted through ports 136, 138, and 139 without impeding the return movement of the piston. The return stroke of the piston will first close ports 137 and during this return stroke the cylinder will gradually move on its shaft to the position indicated on the right of Fig. 3, where the cylinder is shown as having just been moved far enough to carry the port 136 out of register with the port 138 thus closing the outer exhaust port 139. At the same time, the port 136 is about to register with the port 135 to admit air to propel the cylinder on its next working stroke. The operation of each cylinder is the same as that of the others and by attaching the pistons of two of them to one crank and the other two

to the other crank diametrically opposite the first, the actions of the cylinders and pistons of one crank will be the opposite of those operated by the other crank and while two of the pistons are making their working strokes, the other two will be making their return strokes, making the impulses regular and effective.

The stock 60 of the expander is mounted in roller bearings 140 in a sleeve 141 projecting downward from casing heads 21, and ball bearings 142 held in a bearing ring or sleeve 143 projecting upward from casing heads 20, the stock being prevented from moving longitudinally by a shoulder 144 which bears against the sleeve 141 and a shoulder 145 which bears against the ball bearing 142, the ball bearing itself, being backed by an inner annular ring 146 on the inside of the bearing sleeve 143.

The oscillating rings 58 and 59 hereinbefore referred to, which carry the sleeves 62 and 63 in which the pawls operate for engaging the longitudinal ribs or teeth 61 and the stock 60, are held against longitudinal displacement on the stock 60 by means of the bearing sleeves 141 and 143, between which they are located, as clearly indicated in Fig. 8. The inner end of the stock 60 is recessed and threaded as at 147 to receive the threaded end of a sleeve 148 hereinafter referred to.

At 149 is shown a portion of the tube sheet of a boiler, inserted in which is a portion of a tube 150. Within the tube 150, see Fig. 8, is shown a series of wedges 151 having their inner faces tapered with reference to the plane of the tube sheet 149 to fit upon the tapered end 152 of the main bolt 153 of the expander, such wedges being retained in position on the tapered portion 152 of the main bolt by means of an elastic band 154. The main bolt 153 is threaded at its rear end as at 155 and is drawn into the middle of the wedges 151 to expand them by means hereinafter to be described, such expansion of the wedges causing their annularly projecting knuckle 156 to form grooves 157 in the tube just inside of the tube sheet 149. The wedges 151 are provided with suitable notches in their outer edges which, when the wedges are brought together as in Figs. 8 and 11, form an almost continuous annular groove to receive the elastic band 154 and prevent its displacement.

Mounted loosely on the tapered end 152 of the bolt 153 is a roller carrying frame comprising a ring 158 upon which are mounted radially projecting arms 159 carrying at their outer ends curved plates 160 having beveled outer edges 161, said plates being arranged in a circle and being concentric with the ring. The outer faces of the ring 158 are flat, and these flat faces, indicated at 162, in connection with the grooved

sides 163 of the arms 159, and the projecting ends 161 of the plates 160, tend to form a series of recesses, each of which is adapted to receive a roller as at 164, 165, 166, and 167, the ring 158, its radial arms 159 and the plates 160, and the rollers as specified all being inclosed within a cover, the sleeve 168, in which are seated screws 169 which project through the inner face of the cover sleeve beyond the plates 160, thereby preventing the entrance of said plates into the cover sleeve beyond a proper position.

The rollers 164, 165, 166, and 167 are all provided with peripheral grooves and ribs formed at the edges of said grooves, the rib on the end of each roller which rests against the flat outer surface of the ring 158, as indicated at 170, being of greater diameter than the outer rib 171. The ends 161 of the plates 160 project into the grooves of the rollers adjacent to the outer ribs 171 and the rollers themselves are kept in contact with the flat sides of the ring 158 by means of springs 172 seated in recesses in the outer ends of the rollers and bearing against the inside of the cover sleeve 168. The rollers 164 and 166 are beading rollers for turning the edge of the tube and the rollers 165 and 167, having grooves and ribs of slightly different contour, are for the purpose of finishing the bead after it is turned over by the beading rollers.

Shrunk or otherwise rigidly secured upon the outside of the sleeve 148 is a ring 173 which carries on its outer edge a sleeve 174 and a series of screws 175 pass radially through this sleeve into the sleeve 148, at the same time passing through an opening 176 in each of a series of lugs 177 which are thus pivotally mounted on the outer face of the sleeve 148 and which are provided with flat ends 179, rounded at opposite edges, and bearing against the ring 173 and a ring 180 which is rigidly secured within the cover sleeve 168. Around each of the screws 175 is a spring 181, one end of which bears against the ring 173 while the other end is turned into an opening in the lug 177, the tendency of this spring being to turn the lug and its axis into position to cause the flat ends thereof to jam against the rings 173 and 180, and thus prevent the turning of the ring 173 and the lugs in one direction, the rounded ends of the lugs permitting of its free turning in the opposite direction, the sleeves 174, ring 173, and the lugs and their springs, thus acting as a clutch to govern the relative rotation of the sleeve 148 and the cover sleeve 168.

The reduced outer end of the stock 61 is threaded exteriorly and receives on its thread a sleeve 182, the threads being left-handed. The sleeve 182 is provided with an outwardly projecting annular flange 183 which bears against the ring 146 and with

an inwardly extending annular flange 184 which bears against the end of the stock 60. The sleeve 182 is also provided with an exterior thread which engages a sleeve 185 provided with an inwardly extending annular flange 186 which engages a flange on a ball bearing ring 187 so that when the sleeve 185 is screwed up tight, it will maintain the parts between the ball bearings in proper running position. An opening 188 is provided in the sleeve 143 through which to insert a screw 189 to rigidly secure the stock 60, sleeve 182, and sleeve 184 against accidental displacement.

The sleeve 184 is provided on its outer end with clutch teeth 190 which are adapted to engage with similar teeth on the end of a sleeve 191, the last named sleeve being slidable longitudinally on a sleeve nut 192 threaded on the main bolt 153, but prevented from rotating therein by means of lugs 193 projecting from the sleeve nut 192 into longitudinal grooves 194 in the interior of the clutch sleeve 191.

A ring 195 is threaded in the outside of the sleeve nut 192 and carries, shrunk or otherwise rigidly secured thereto, a knurled ring 196 provided with an inwardly projecting annular flange to engage with an outwardly projecting annular flange on the clutch ring 191, whereby the travel of the ring 195 on the sleeve nut 192 caused by the turning of the knurled ring 196, will cause the longitudinal movement of the clutch ring 191 to engage or disengage its clutch teeth with the teeth 190 of the sleeve 185. Upon the end of the sleeve 192 is threaded a knurled ring 197 and a screw 198 serves to fix the knurled ring against removal therefrom. This knurled ring and sleeve nut 192 will be hereinafter referred to as the main nut.

The operation of the machine will be understood from the following description: A pipe or bar 199 is projected into a tube below the one to be expanded, and the wedges 151, on a portion of the tapered end 152 of the main bolt 153 of a size to permit of them to be passed into the tube to be expanded, are placed in position as shown in Fig. 8. The stock 60 and its connected parts are then moved inward on the main bolt until the rollers contact with the outer edge of the tube. It is to be understood that the air has not yet been turned on to rotate the stock. By pulling on the main nut, the bolt 153 will be drawn outward until the wedges engage tightly in the tube. The knurled ring 196 is turned upon the main nut until it rests against the same and until the teeth 190 have been disengaged from the teeth of the sleeve 185. By now turning the main nut on the bolt 153, the front surface of the main nut will bear against the roller bearing sleeve 187 and draw the main

bolt 153 outward, which will spread the wedges 151 and tighten them in the tube, at the same time pressing the stock 60 and all of the parts inward forcing the rollers against the edge of the tube. The knurled ring 196 is now turned upon the main nut until the teeth of the clutch sleeve 191 have been engaged with the teeth 190. By turning the knurled ring 118, the air will be turned on and the machine started so that the stock 60 will be rotated in the manner before described until the head is properly turned on the outer end of the tube. In the meantime, the rollers can be pressed against the outer end of the tube by turning up the knurled ring 197 on the main nut. When the operation has been completed, the knurled ring 196 is turned back until the teeth of the clutch sleeve 191 are clear of the teeth 190, when the machine will be held between the roller bearings at one end and the ball bearing at the other and its continuous rotation will smooth off the work. The air is now let off by again turning the knurled ring 118, the ring 196 again turned to engage the clutch teeth, the ring 86 turned to reverse the pawls 67 and 68, and the air again turned on so as to run the machine backward, which will loosen the main nut by whirling it off the end of the bolt and by tapping the end of the bolt with a soft hammer, the bolt will drop back in the wedges which will permit them to approach closely enough to each other on a smaller part of the tapered end 152, to be pulled out of the flue.

The oval shaped heads of the casing are of special importance as will appear to those skilled in the art from a careful inspection of Figs. 1 and 2. Much trouble has been encountered in operating tube expanders owing to the close and inconvenient spaces in which they are operated. With the oval shaped heads with their sharp or pointed ends upward, and the tool stock in the upper thin or smaller part of the casing, there is no part of the casing above or on either side of the end of the tube to be expanded and free space is left for the operator to manipulate the machine and to get at the end of the tube being expanded. The main body of the casing, made large enough to accommodate the mechanism of the motor, is below the stock and, while affording ample room for the required purposes, it does not interfere with or prevent free access to the work.

Having thus described my invention, what I claim as new is:

1. In a device of the character described the combination with a casing, of a tool stock journaled therein having longitudinal ribs on its periphery, sleeves surrounding the stock, means for oscillating the sleeves on the stock, radial sleeves projecting from the

aforesaid sleeves, yieldingly pressed blocks in the radiating sleeves, teeth on the blocks normally engaged with the longitudinal ribs of the stocks, and means to rotate the blocks and teeth half-way around to reverse the rotation of the tool stock without interrupting the oscillation of the sleeves thereon.

2. In a device of the character described, the combination with a rotatable tool stock having longitudinal ribs on its periphery, oscillatory sleeves surrounding the stock and provided with radiating sleeves, blocks slidably and rotatably mounted in the radiating sleeves and yieldingly impelled toward the tool stock, teeth on the blocks engaging the ribs, means for rotating the pawl blocks on their axes to reverse the position of the teeth with reference to the longitudinal ribs, and means for oscillating the sleeves surrounding the tool stock.

3. In a device of the character described, the combination with a casing, of a tool stock journaled therein and provided with longitudinal ribs, oscillatory sleeves surrounding the stock, radial sleeves projecting from the sleeves on the stock, blocks in said radiating sleeves, yieldingly pressed inward, teeth on the inner ends of the blocks contacting with the ribs, stems projecting from the pawl blocks, parallel geared shafts, means for rotating said shafts, and connections between the stems of the pawl blocks and the parallel geared shafts.

4. In a device of the character described, the combination with a casing, of a tool stock journaled therein and provided with longitudinal ribs, oscillatory sleeves surrounding the stock, radial sleeves projecting from the sleeves on the stock, blocks in said radiating sleeves, yieldingly pressed inward, teeth on the inner ends of the blocks contacting with the ribs, stems projecting from the pawl blocks, parallel geared shafts, means for rotating said shafts, and universal joint connections between the stems of the pawl blocks and the parallel geared shafts.

5. In a device of the character described, the combination with a casing, of a tool stock journaled therein and provided with longitudinal ribs, oscillatory sleeves surrounding the block, radial sleeves projecting from the sleeves on the stock, blocks in said radiating

sleeves yieldingly pressed inward, teeth on the inner ends of the blocks contacting with the ribs, stems projecting from the pawl blocks, parallel geared shafts, means for rotating said shafts, links pivoted to the stems of the pawl blocks, other links pivotally connecting the first named links with the parallel geared shafts by pivots at right angles to those between the first named links and the pawl block stems, and springs coacting with said links for the purpose set forth.

6. In a device of the character described, the combination with a casing, of a tool stock journaled therein and provided with longitudinal ribs, oscillatory sleeves surrounding the stock, radial sleeves projecting from said oscillatory sleeves, blocks in the radiating sleeves yieldingly pressed inward, teeth on the inner ends of the blocks contacting with the ribs, stems projecting from the pawl blocks and having longitudinal slots, a pair of parallel shafts in alinement with the stems, gearing connecting the parallel shafts, a link for each stem having one end pivotally connected in the longitudinal slot thereof, a link pivotally connected to each of the parallel shafts, and pins pivotally connecting the free ends of the links of each pair.

7. The combination of a tool stock provided with a ratchet member, oscillatory members, means for oscillating the same, blocks carried by said oscillatory members and coacting with the ratchet member, said blocks being mounted for movement toward and from the ratchet member and adapted to be turned to reversed position with respect to the latter, springs pressing the blocks toward the ratchet member, a pair of parallel geared shafts slidably and rotatably mounted, flexible connections between said parallel shafts and said blocks, and means for controlling one of said parallel shafts.

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

JOE CEPHAS TASSEY.

Witnesses:

J. B. BRADLEY,
JOHN DIX DOYLE.