

April 6, 1965

T. A. PELTO

3,176,735

VENEER LATHE

Filed Aug. 22, 1961

5 Sheets-Sheet 1

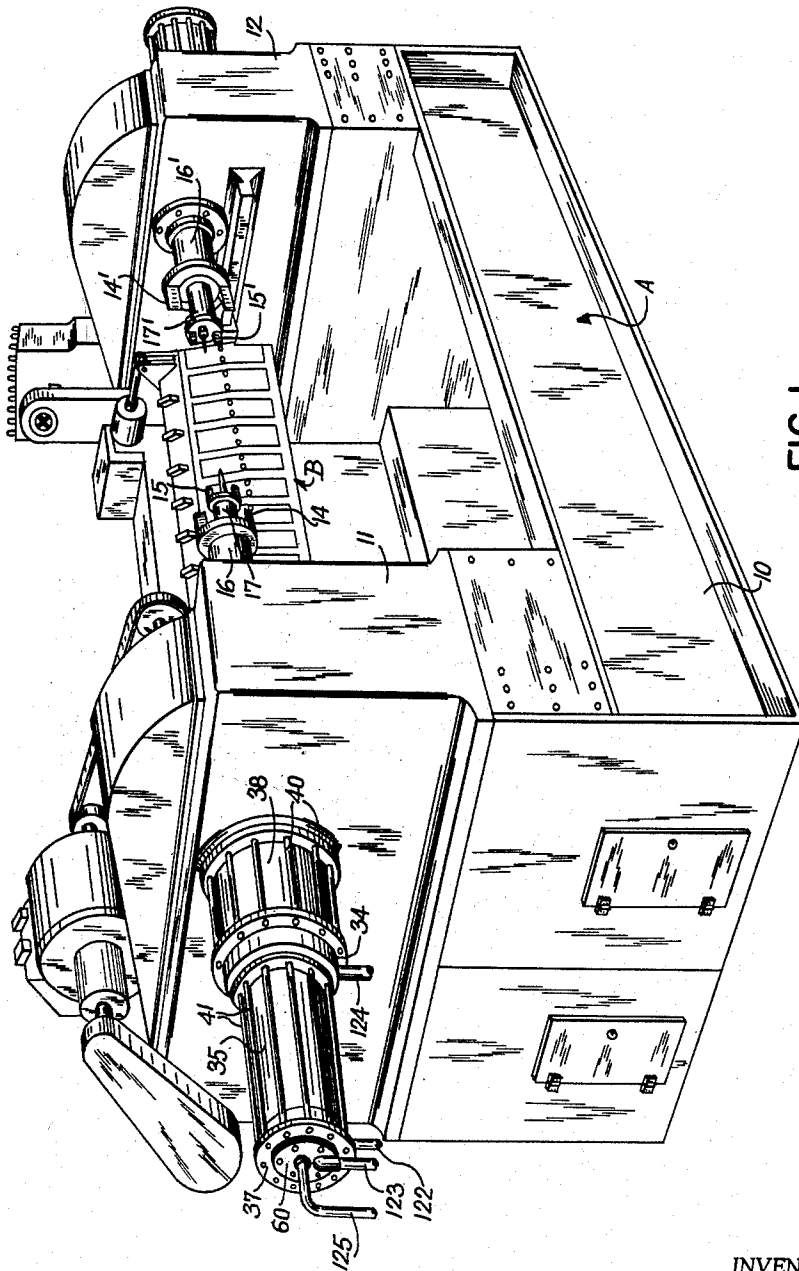


FIG. 1

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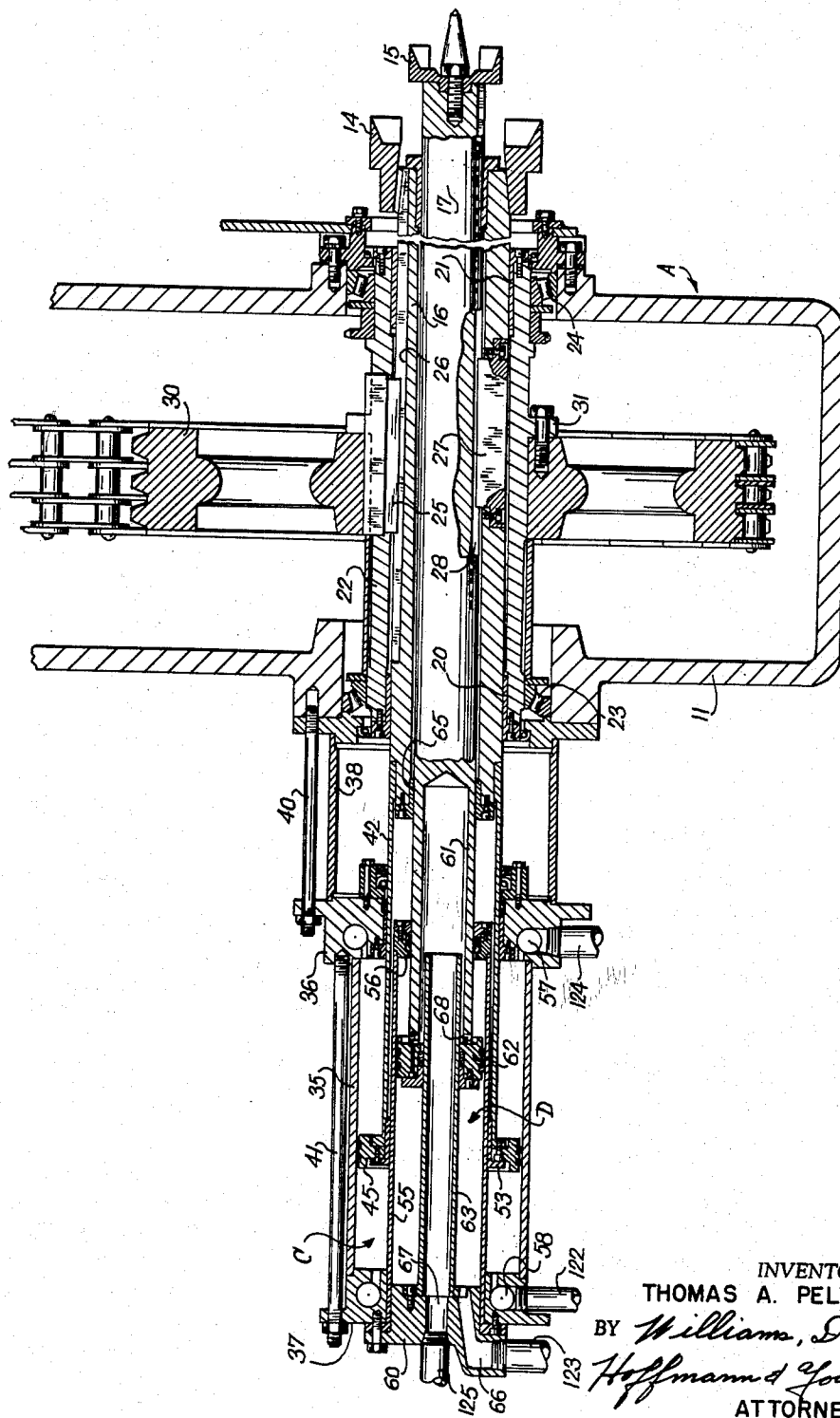


FIG. 2

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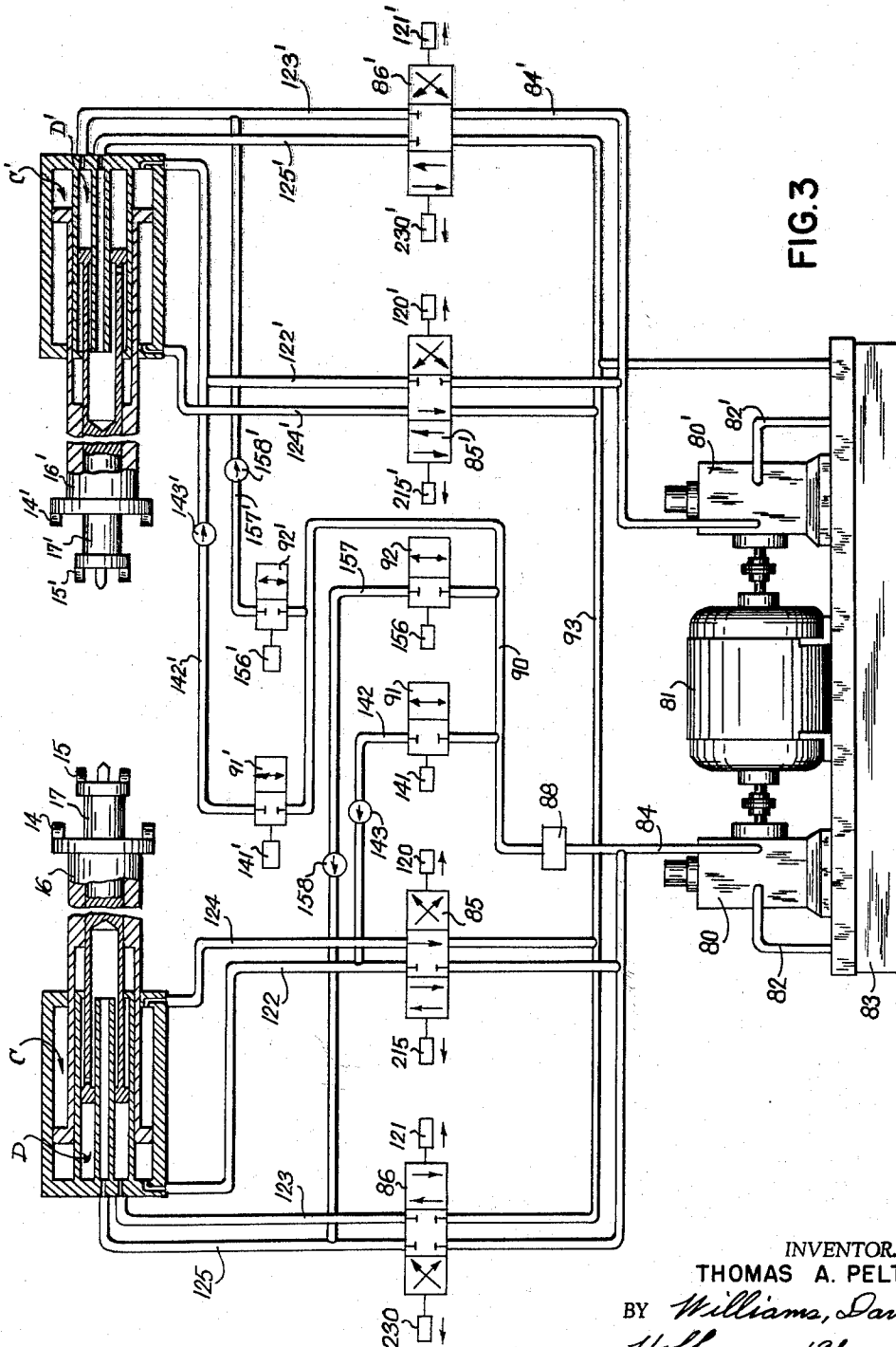
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veneer lathe

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5 Sheets-Sheet 3



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5 Sheets-Sheet 4

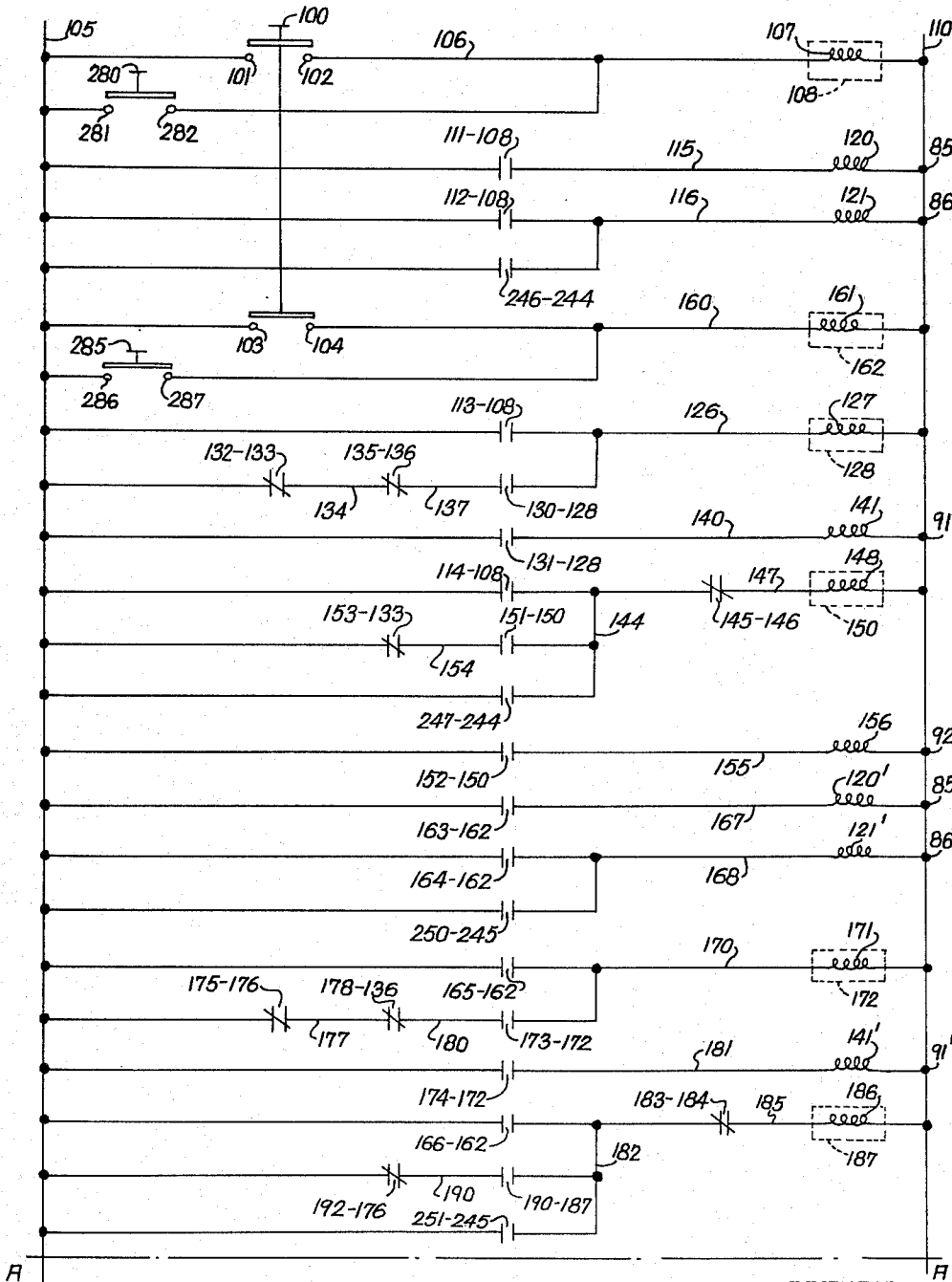


FIG. 4^a

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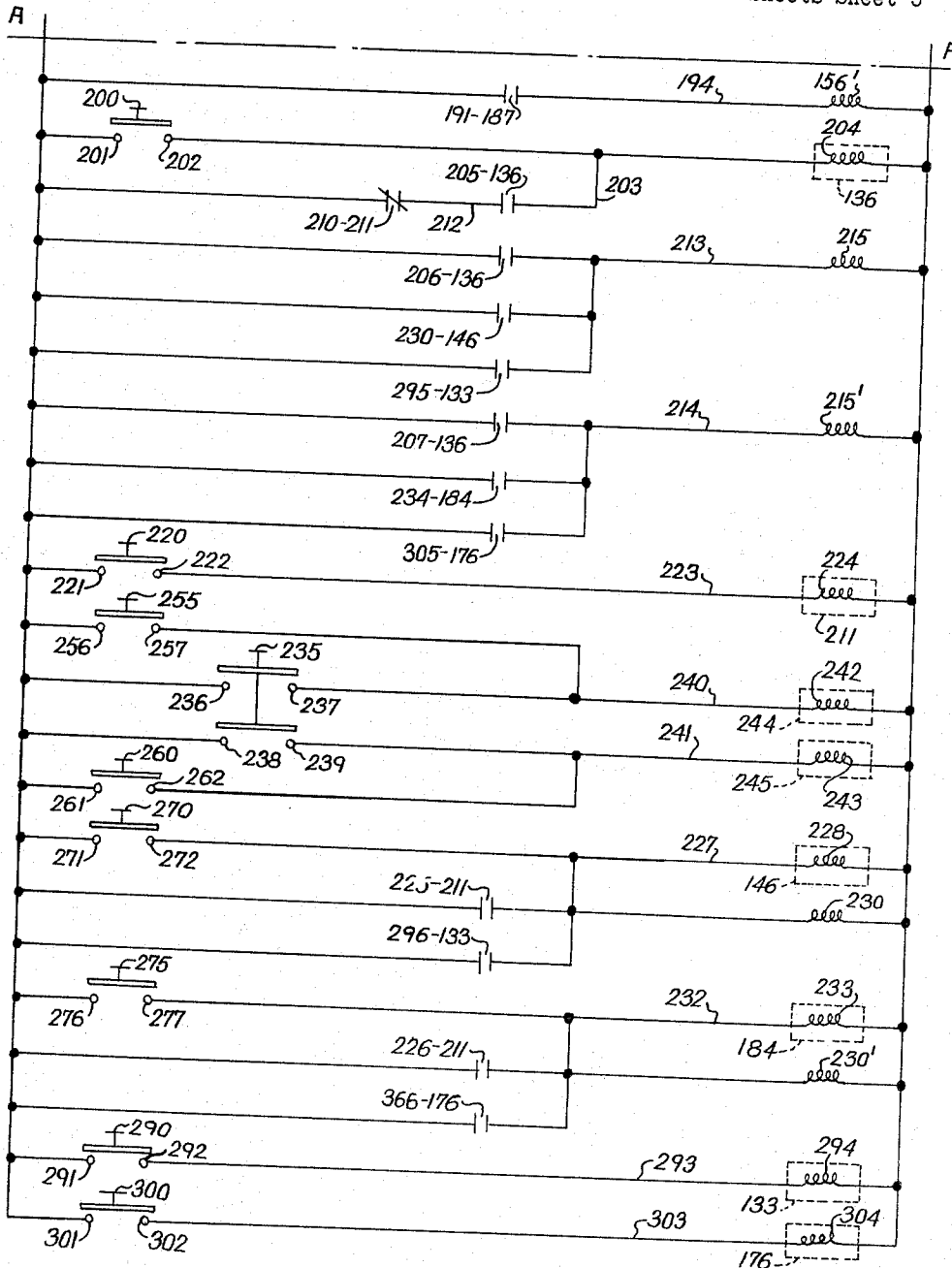


FIG. 4^b

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3,176,735

VENEER LATHE

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2 Claims. (Cl. 144-209)

The present invention relates to veneer lathes having hydraulically reciprocated dual spindles for holding a log to be cut or peeled.

One of the principal objects of the invention is the provision of a novel and improved veneer lathe comprising dual spindles having chucks of different diameter for holding a log to be cut or peeled in which the spindles at one or both ends of the lathe are reciprocated by double acting reciprocating-type fluid actuated motors having discrete fluid chambers at opposite sides of their piston elements and wherein at least a portion of one of the chambers surrounds another whereby the over-all length of the lathe is reduced.

The invention resides in certain constructions and combinations and arrangements of parts and further objects and advantages will be apparent to those skilled in the art to which it relates from the following description of the preferred embodiment described with reference to the accompanying drawings forming a part of this specification in which similar reference characters designate corresponding parts, and in which:

FIG. 1 is a perspective log side view of a veneer lathe embodying the present invention;

FIG. 2 is a fragmentary sectional view with portions in elevation taken approximately on the horizontal central plane through the left-hand spindles as the lathe is viewed in FIG. 1;

FIG. 3 is a diagrammatic view of the hydraulic system of the lathe; and

FIGS. 4a and 4b together are a wiring diagram showing the electrical control circuits for the lathe.

While the invention is susceptible of various modifications and alternate constructions, the present preferred embodiment is shown in the drawings and herein described in detail. It is to be understood, however, that there is no intention to thereby limit the invention to the specific form disclosed, but it is my intention to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

The invention is herein illustrated and described as embodied in a more or less conventional lathe and only those parts of the lathe which are necessary to an understanding of the present invention are shown in the drawings and herein described in detail. The parts of the lathe not shown and described per se form no part of the present invention and are well known in the art.

Referring to the drawings, the veneer lathe shown comprises a built-up frame assembly, designated generally by the reference character A and including a rectangular base 10 having upstanding end members 11, 12 at opposite ends thereof, the upper parts of which are separately formed and bolted to the lower parts to facilitate manufacture and assembly of the lathe. A conventional knife, knife bar and pressure bar assembly, designated generally as B, located intermediate the end members 11, 12 is movably and adjustably supported therebetween in the usual manner.

The spindles at the opposite ends of the lathe are similar in construction and are supported, reciprocated and driven in a similar manner. Because of this only the left-hand end of the lathe, which is the end shown in FIG. 2, will be described in detail. The corresponding

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parts at the right-hand or opposite end of the lathe, except where otherwise designated, are designated by the same reference characters with a prime mark affixed thereto.

The log to be peeled is supported between two pairs of chucks 14, 14' and 15, 15' detachably fixed to adjacent ends of axially aligned concentric pairs of spindles 16, 16' and 17, 17', respectively. The outer and larger spindles 16, 16' are tubular and the inner and smaller spindles 17, 17' project therethrough. The chucks 14, 14' carried by the larger tubular spindles are larger than the chucks 15, 15' carried by the smaller inner spindles 17, 17' and are so constructed that the smaller chucks 15, 15' may be retracted or drawn flush with the larger chucks 14, 14'. The spindles are adapted to be moved lengthwise to engage and disengage the chucks carried thereby with the ends of the log and the construction is such that the log may be held by both the large and small pairs of spindles and chucks or solely by the smaller pair of spindles and chucks.

The chuck ends of the inside or small spindles 17, 17' are provided with centers 18, 18'. The chuck centers, if desired, may be slidably supported therein for limited movement lengthwise of the spindle and spring biased to a position in which they project beyond the chucks carried by the respective spindle, a construction well known in the art. Such centers force the core log out of the chucks as the chucks are retracted. In the absence of these centers the core may hang onto one or the other of the chucks necessitating manual removal of the core.

The outer and larger left-hand spindle 16 is slideably supported intermediate its ends in bearing members 20, 21 fixedly secured in opposite ends of a spindle sleeve or quill 22. Opposite ends of the spindle quill 22 are rotatably supported in the end member 11 of the frame assembly A by anti-friction bearings 23, 24. The spindle 16 is keyed to the spindle sleeve or quill 22 by an elongated key 25 located in a slot or aperture in the spindle quill 22 and projecting into an elongated keyway 26 in the spindle 16. The spindle 17 is slideably keyed to the spindle 16 by an elongated key 27 fixed in an aperture or slot in the spindle 16 and projecting into an elongated keyway 28 in the spindle 17. A drive wheel 30 is fixedly secured to the spindle sleeve or quill 22 by being bolted or otherwise secured to a radial flange 31 on the spindle sleeve.

The left-hand end of the spindle 16 projects into a cylindrical bore or chamber in the frame assembly A and which is concentric with the spindle and formed by a tubular member 35 forming a part of the frame assembly and interposed between cylinder head members 36, 37. The right-hand or inner cylinder head member 36 is spaced from the left-hand end member 11 of the frame assembly A by a cylindrical member 38 and is detachably but fixedly secured to the end member by a plurality of threaded rods 40. The left-hand or outer cylinder head member 37 is spaced from the member 36 by the tubular member 35 and is detachably but fixedly connected to the member 36 and in turn the end member 11 by threaded rods 41. The sides of the head members 36, 37 facing one another are provided with flanges concentric with the spindle 16 and which retain the parts in proper alignment.

The left-hand or outer end of the spindle 16, and in the embodiment shown, an extension of the spindle proper in the form of a thin walled tubular member 42 fixedly secured to the left-hand end of the spindle proper, projects into the member 35, or the cylinder chamber formed thereby and the cylinder head members 36, 37, and has a piston assembly integral therewith. The piston assembly shown, is slideable and rotatable within the

member 35 and comprises an annular member 45 of slightly less diameter than the interior diameter of the member 35 and having counterbores in opposite sides, and a pair of annular grooves in its exterior within which a pair of piston rings are located. The piston rings are preferably made in the form of resilient split rings having overlapping ends to prevent the escape of fluid therethrough and of material which will avoid galling and abrasion of the adjoining surfaces therebetween and the members 35, 45. The member 45 is fastened as by screws to an outwardly projecting radial flange on the left-hand end of the member 42 of the spindle 16. A bearing member 53 fixed to the left-hand side of the member 45 comprises an annular portion projecting through the member 45 and into a counterbore in the adjacent end of the member 42 for slideably engaging a tubular member 55 extending between the cylinder head member 37 and an annular member 56 slideably supported on the projecting end of the inner or small spindle 16. Packing material interposed between the bottom of the counterbore in the left-hand end of the member 42 and the member 53 prevents the escape of fluid from the left-hand side of the piston assembly between the members 42 and 55. Fluid is prevented from escaping through the head member 36 where the member 42 of the spindle 16 projects therethrough by suitable packing means.

The cylinder assembly, including members 35, 36, 37, 55 and the piston assembly including the members 45, 53, form or constitute a fluid actuated reciprocating-type, double acting motor, designated generally by the reference character C, for reciprocating the outer and larger spindle 16. Fluid is adapted to be supplied to and exhausted from opposite ends of the motor C by conduits or apertures 57, 58 in the cylinder head members 36, 37, respectively.

The left-hand or outer end of the member 55 has a radial projecting flange immediately to the left of the cylinder head member 37 and fixed thereto by screws. The annular member 56 at the right-hand end of the member 55 forms the right-hand or inner cylinder head member of the fluid pressure motor, designated generally by the reference character D, for reciprocating the smaller and inner spindle 17. The other or left-hand head is formed by an annular member 60 located within the left-hand end of the member 55 and having a radially projecting flange overlying the flange on the adjoining end of the member 55 and like the flange of the member 55, secured to the head member 37 by screws. The left-hand end of the spindle 17 is counterbored as at 61 and projects through the member 56 and into the member 55. Fluid is prevented from escaping between the member 56 and the spindle 17 by suitable packing carried by the member 56.

The left-hand or outer end of the spindle 17 carries a piston assembly including an annular member 62 detachably fixed to the end of the spindle by screws. The piston assembly includes a suitable bearing member for slidably guiding the piston assembly on a tubular member 63 detachably fixed by screws to the cylinder head member 60 and projecting into the counterbore 61 in the spindle. Suitable packing prevents the escape of fluid between the piston head assembly and the member 63. The piston assembly further includes a pair of piston rings similar to the piston rings previously referred to, located in annular grooves in the piston head member 62. The reference character 65 designates a bearing member fixed to the left-hand or outer end of the spindle 16 proper for slidably supporting the inner spindle 17.

Fluid is admitted to and exhausted from the left-hand or outer end of the motor D through an aperture or conduit 66 in the head member 60 and to the right-hand or inner end by an aperture or conduit 67 also in the member 60, the interior of the tubular member 63, the counterbore 61 in the spindle 17 and one or more radial

apertures 68 in the spindle 17 adjacent to the piston head assembly carried thereby.

Pressure fluid, preferably oil, for operating the spindles at opposite ends of the lathe is preferably supplied from separate adjustable pumps 80, 80' driven by an electric motor 81 so that the spindles at opposite ends of the lathe can be operated at uniform speeds. The inlet or suction side of the pump 80 is connected by a conduit 82 to an oil reservoir or sump 83 and the discharge or pressure side of the pump is connected by a conduit 84 to solenoid operated three-position, spring centered, four-way control valves 85, 86, and through a pressure reducing regulator 88 and a conduit 90 to solenoid operated two-position, spring biased to close position, valves 91, 92 and 91', 92'. The suction side of the pump 80' is connected by a conduit 82' to the sump 83 and the discharge side of the pump is connected by a conduit 84' to solenoid operated valves 85', 86' similar to the valves 85, 86. The valves referred to are connected to the fluid pressure motors C, D, C', D', by suitable conduits and the valves 85, 86, 85', 86' to the sump 83 by a conduit 93.

Assuming that the spindles are retracted and a log to be peeled has been placed in position therebetween, both pairs of spindles and in turn the chucks carried thereby can be made to move towards the log by the operator depressing the "extend all spindles" push button switch 100 to close its normally open contacts 101-102 and 103-104. The closing of contacts 101-102 establishes a circuit from the power line 105, through wire 106 and operating solenoid 107 of relay 108 to line 110, thereby actuating the relay to close its normally open contacts 111, 112, 113, 114. Attention is called to the fact that the various relay contacts are designated on the wiring diagram by the contact number or reference character followed by the relay number or reference character for purposes of better identification of the relay contacts. The closing of the normally open contacts 111, 112 of relay 108 establishes parallel circuits from the line 105 through wires 115, 116 and operating solenoids 120, 121 of valves 85, 86, respectively, to line 110 shifting the valves to the right, as viewed in FIG. 3, connecting the pressure supply conduit 84 to conduits 122, 123 leading to the left-hand ends, that is, the outer ends of the motors C, D, respectively, and the conduits 124, 125 connected to the opposite or inner ends of the motors to sump conduit 93. This causes the pistons of the motors and in turn the spindles 16, 17 and the chucks 14, 15 to move towards the log to be cut.

The closing of the normally open contacts 113 of relay 108 establishes a circuit from the line 105 through the now closed contacts 113, wire 126 and operating solenoid 127 of relay 128 to the line 110 energizing the relay to close its normally open contacts 130, 131. The closing of contacts 130 of relay 128 establishes a holding circuit for the relay from line 105 through the normally closed contacts 132 of relay 133, wire 134, normally closed contacts 135 of relay 136, wire 137 and now closed contacts 130 to wire 126. The closing of contact 131 of relay 128 establishes a circuit from the line 105 through the now closed contacts 131, wire 140 and operating solenoid 141 of valve 91 to line 110 shifting the valve to connect the fluid supply line 84 through the pressure reducing regulator or valve 88 and the conduit 90 leading to the valve 91 to conduit 142 connected to the conduit 122 through a check valve 143. The check valve 143 prevents the flow of fluid from the conduit 122 to the conduit 140. While the push button switch 100 is held depressed, fluid is supplied to the conduit 122 at a pressure greater than the pressure in the conduit 140 but when the switch 100 is released and valve 85 returns to its neutral position valve 91 maintains a reduced pressure in conduit 122 and the left-hand end of the motor C.

The closing of the normally open contacts 114 of

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relay 108 establishes a circuit from the line 105 through the now closed contacts 114, wire 144, normally closed contacts 145 of relay 146, wire 147 and operating solenoid 148 of relay 150 to the line 110 energizing the relay closing its normally open contacts 151, 152. The closing of contacts 151 of relay 150 establishes a holding circuit for the relay from line 105 through the normally closed contacts 153 of relay 133, wire 154 and now closed contacts 151 to wire 144. The closing of contact 152 of relay 150 establishes a circuit from the line 105 through the now closed contacts 152, wire 155 and operating solenoid 156 of valve 92 to line 110 shifting the valve to connect the conduit 90 to conduit 157 connected to the conduit 125 through a check valve 158. The check valve 158 prevents the flow of fluid from the conduit 125 to the conduit 157. While the switch 100 is held depressed, fluid is supplied to the conduit 125 at a pressure greater than the pressure in conduit 157. The opening of the valve 92, therefore, performs no function, but when the switch 100 is released and valve 86 returns to its off position, valve 92 maintains a reduced pressure in conduit 125 and the left-hand end of the motor D.

The closing of the second pair of contacts 103-104 of "extend all spindles" push button switch 100 simultaneously with the closing of the contacts 101, 102 thereof established a circuit from the line 105 through wire 160 and operating solenoids 161 of relay 162 to line 110, actuating the relay to close its normally open contacts 163, 164, 165, 166. The closing of the normally open contacts 163, 164 of relay 162 establishes circuits from the line 105 through the wires 167, 168 and operating solenoids 120', 121' of valves 85', 86', respectively, to line 110 causing the valves to shift to the left connecting the pressure fluid supply conduit 84' to the conduits 122', 123', leading to the right-hand ends, that is, the outer ends of the motors C', D'. Simultaneously with the connection of the outer ends of the motors with the fluid supply, the opposite ends thereof are connected to the sump conduit 93 by the conduits 124', 125', respectively. This causes the motors to move the spindles 16', 17' and in turn the chucks 14', 15' carried thereby towards the log. The construction and arrangement of the hydraulic system including the adjustment of the pumps and the relative sizes of the various conduits is preferably such that the small spindles and chucks do not advance faster than the large spindles and chucks when both pairs of spindles at either end of the lathe are advanced simultaneously.

The closing of the normally open contacts 165 of relay 162 establishes a circuit from the line 105 through wire 170 and operating solenoid 171 of relay 172 to the line 110 actuating the relay to close its normally open contacts 173, 174. The closing of contacts 173 or relay 172 establishes a holding circuit for the relay from line 105 through the normally closed contacts 175 of relay 176, wire 177, now normally closed contacts 178 of relay 136, wire 180 and now closed contacts 173 of relay 172, to wire 170. The closing of contact 174 of relay 172 establishes a circuit from the line 105 through wire 181 and operating solenoid 141' of valve 91' to line 110 shifting the valve to connect the low pressure fluid supply line 90 to conduit 140' connected to the conduit 122' through a check valve 143'. The check valve 143' prevents the flow of fluid from the conduit 122' to the conduit 140'. While the push button switch 100 is held depressed, fluid is supplied to the conduit 122' at a pressure greater than the pressure in the conduit 140' but when the switch 100 is released and valve 85' returns to its neutral position valve 91' maintains a reduced pressure in conduit 122' and the left-hand end of the motor C'.

The closing of the normally open contacts 166 of relay 162 establishes a circuit from the line 105 through wire 182, normally closed contacts 183 of relay 184, wire 185, operating solenoid 186 of relay 187 to the line

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110. Energization of the relay 187 closes its normally open contacts 190, 191. The closing of contacts 190 of relay 187 establishes a holding circuit for the relay from line 105 through the normally closed contacts 192 of relay 176, wire 193 and now closed contacts 190 of relay 187 to wire 182. The closing of contact 191 of relay 187 establishes a circuit from the line 105 through the now closed contacts 191, wire 194 and operating solenoid 156' of valve 92' to line 110 shifting the valve to connect the low pressure fluid supply line 90 to conduit 123' connected to the conduit 157' through a check valve 158'. The check valve 158' prevents the flow of fluid from the conduit 123' to the conduit 157'. While the switch 100 is held depressed, fluid is supplied to the conduit 123' at a pressure greater than the pressure in conduit 157'. The opening of the valve 92', therefore, performs no function, but when the switch 100 is released and valve 86' returns to its off position, valve 92' maintains a reduced pressure in conduit 123' and the right-hand end of the motor D'.

After the log is chucked the spindles are rotated and the peeling operation commenced. The peeling is continued with both pairs of chucks in engagement with the log under reduced pressure until the diameter of the log closely approaches that of the larger chucks whereupon the operator depresses the "retract both large spindles" push button switch 200 to close its normally open contacts 201-202, establishing a circuit from the line 105 through wire 203 and operating solenoid 204 of relay 136 to line 110 thereby actuating the relay to open its normally closed contacts 135, 178 and close its normally open contacts 205, 206, 207.

The opening of the normally closed contacts 135, 178 of relay 136 breaks the holding circuit for relays 128, 172 allowing the normally open contacts 130, 131 of relay 128 and 173, 174 of relay 172 to reopen. The opening of the normally open contacts 130, 173 of relays 128, 172 prevents the holding circuits therefore from reclosing upon the subsequent deenergization of the relay 136. The opening of contacts 131 of relay 128 and 174 of relay 172 breaks the circuits therethrough for the solenoids 141, 141', thus allowing valves 91, 91' to return to their inoperative positions, disconnecting the motors C, C' from the high pressure fluid supply lines 84, 84'. The chucks continue in tight engagement with the log, however, because the hydraulic fluid present in the motors at the time the valves return to their neutral positions remains trapped therein.

The closing of the normally open contacts 205 of relay 136 establishes a holding circuit for the relay from the line 105 through normally closed contacts 210 of relay 211, wire 212 and now closed contacts 205 of relay 136 to wire 203. The closing of contacts 206, 207 of relay 136 establishes two parallel circuits from the line 105, through wires 213, 214 and solenoids 215, 215' of valves 85, 85', respectively shifting the valves to the left, as viewed in FIG. 3, connecting the high pressure conduits 84, 84' to conduits 124, 124' leading to the inner ends of the motors C, C', respectively, and the sump conduit 92 to the conduits 122, 122' leading to the opposite ends of the motors, causing the motors to withdraw the spindles 16, 16' into their quills and the chucks 14, 14' carried thereby from the log being cut. The holding circuit for relay 136 assures complete retraction of the large spindles and the chucks carried thereby and their retention in retracted position during the remainder of the peeling operation.

The lathe continues to operate with the log being held by the small spindles and chucks. When the knife approaches closely to these chucks the operator depresses the "retract both small spindles" push button switch 220 to close its normally open contacts 221-222, thus establishing a circuit from the line 105 through the wire 223 and operating solenoid 224 of relay 211 to line 110 actuating the relay to open its normally closed contacts 210,

and close its normally open contacts 225, 226. The closing of normally open contacts 225 of relay 211 establishes a circuit from the line 105 through wire 227, operating solenoid 228 of relay 146 to line 110. The operating solenoid 230 of valve 86 is in parallel circuit with operating solenoid 228 of relay 146 between the wire 227 and the line 110 and both solenoids are simultaneously energized. Energization of the operating solenoid 228 of relay 146 actuates the relay to open its normally closed contacts 145 and close its normally open contacts 231. The opening of contacts 145 breaks the holding circuit of relay 150 allowing its normally open contacts 151, 152 to reopen. The opening of contacts 151 prevents reenergization of the relay 150 upon the subsequent deenergization of relay 146. The opening of contacts 152 of relay 150 deenergizes the operating solenoid 156 of valve 92 allowing the valve to return to its off position. The closing of contacts 231 of relay 146 establishes a circuit from the line 105 through now closed contacts 230, wire 213 and operating solenoid 215 of valve 85 to line 110.

Energization of the operating solenoids 215, 230 of valves 85, 86, respectively, shifts the valves to the left connecting the high pressure supply conduit 84 to conduits 124, 125 leading to the inner end of motors C, D and the sump conduit 93 to conduits 122, 123 leading to the opposite or outer ends of the motors C, D. This causes the motor D to retract the left-hand small spindle 17 and the chuck 15 carried thereby to release the core log remaining in the lathe. In the event the large spindle 16 is extended at the time the operator closes switch 220, motor C will be actuated to retract the spindle. Because of this switch 220 serves to and may be designated "retract all spindles" switch.

The closing of normally open contacts 226 of relay 211 simultaneously with the closing of contacts 225 thereof establishes a circuit from the line 105 through wire 232, operating solenoid 233 of relay 184 to line 110. The operating solenoid 230' of valve 86' is in parallel circuit with operating solenoid 233 of relay 184 between the wire 232 and the line 110 and both of these solenoids are simultaneously energized. Energization of the operating solenoid 233 of relay 184 actuates the relay to open its normally closed contacts 183 and close its normally open contacts 234. The opening of contacts 183 breaks the holding circuit for relay 187 allowing its normally open contacts 190, 191 to reopen. The opening of contacts 190 prevents reenergization of the relay 187 upon the subsequent deenergization of relay 184. The opening of contacts 191 of relay 187 deenergizes the operating solenoid 156 of valve 92' allowing the valve to return to its off position. The closing of contacts 234 of relay 184 establishes a circuit from the line 105 through now closed contacts 234, wire 214, and operating solenoid 215' of valve 85' to line 110.

Energization of the operating solenoids 215', 230' of valves 85', 86' causes the valve to shift to the left connecting the high pressure supply conduit 84' to conduits 124', 125' leading to the inner end of motors C', D' and the sump conduit 93 to conduits 122', 123' leading to the opposite or outer ends of the motors C', D'. This causes the motor D' to retract the right-hand small spindle 17' and the chuck 15' carried thereby. Movement of the small spindles in the direction to retract the same continues as long as the push button switch 220 is maintained depressed or until the motor connected thereto reaches the end of its movement.

The small chucks are preferably of such a size that they cannot be retracted into the large spindles and the purpose of shifting the valve 85' with the valve 86', as just described, is to retract the large spindle 16' with the small spindle 17' in the event the operator retracts the small spindle with the large spindle extended.

Both of the small spindles can be extended independently of the large spindles by depressing the "extend both

small spindles" push button switch 235 having normally open contacts 236-237 and 238-239, the closing of which establishes two parallel circuits from the line 105 through wires 240, 241 and operating solenoids 242, 243 of relay 244, 245, respectively, to line 110. The energization of the operating solenoid 242 of relay 244 actuates the relay to close its normally open contacts 246, 247. Contacts 246 of relay 244 are in parallel circuit with contacts 112 of relay 108 between the line 105 and the wire 116 and their closing energizes the operating solenoid 121 of solenoid operated valve 86 to shift the valve to the right, as viewed in FIG. 3, to connect the high pressure fluid supply conduit 84 to the conduit 123 leading to the left or outer end of the motor D. Simultaneously, the conduit 125, connected to the opposite end of the motor D, is connected to the sump conduit 93. This causes the left-hand small spindle 17 to move towards the center of the lathe. Contacts 247 of relay 244 are in parallel circuit with contacts 114 of relay 108 between the line 105 and wire 144 and their closing energizes the operating solenoid 148 of relay 150, the operation of which in turn energizes the operating solenoid 156 of valve 92 in a manner previously described to shift the valve to the left, as viewed in FIG. 3, connecting the conduit 122 to the low pressure source of fluid pressure 90.

The energization of the operating solenoid 243 of relay 245 actuates the relay to close its normally open contacts 250, 251. Contacts 250 of relay 245 are in parallel circuit with contacts 164 of relay 162 between the line 105 and the wire 168 and their closing energizes the operating solenoid 121' of valve 86' to shift the valve to the right, as viewed in FIG. 3, to connect the high pressure fluid supply conduit 84' to the conduit 123' leading to the right or outer end of the motor D'. Simultaneously the conduit 125', connected to the opposite end of the motor is connected to the sump conduit 93. This causes the small spindle 17' at the right-hand end of the lathe to move towards the center of the lathe. Contacts 251 of relay 245 are in parallel circuit with contacts 166 of relay 162 from the line 105 to wire 182, and the closing thereof energizes operating solenoid 186 of relay 187 which in turn energizes the operating solenoid 156' of valve 92' in a manner previously described to shift the valve to the left, as viewed in FIG. 3, connecting the conduit 123' to the low pressure source of fluid pressure 90. Movement of the small spindles towards the center of the lathe continues under high pressure fluid as long as push button switch 235 is held depressed or until the motors D, D' reach the end of their movement. Thereafter fluid at reduced pressure will be supplied to the outer ends of the motors through the valves 92, 92'.

The small spindles and the chucks carried thereby can be retracted by the operator depressing the retract both small push button switch 220, as previously explained. This energizes relays 146, 184, opening the normally closed contacts 145, 183 thereof thus breaking the holding circuits for the relay 150, 187 which in turn deenergizes the operating solenoids 156, 156' of valves 92, 92', allowing the valves to return to their off position. The closing of contacts 225, 226 of relay 211 energizes the operating solenoids 215, 230, 215', 230' of valves 85, 86, 85', 86', respectively, reversing the direction of flow of fluid to the motors C, D, C', D'.

The small spindle 17, at the left-hand end of the lathe, can be extended alone by the operator depressing the "extend small left-hand spindle" push button switch 255, the contacts 256-257 of which are in parallel circuit with the contacts 236-237 of push button switch 235. The small spindle 17' at the right-hand end of the lathe can be extended by depressing the "extend small right-hand spindle" push button switch 260, the contacts 261-262 of which are in parallel circuit with the contacts 238-239 of push button switch 235. The small left-hand spindle 17 can be retracted at any time that it is extended by the operator depressing the "retract small left-hand spindle" push but-

ton switch 270 to close its normally open contacts 271-272 which are in parallel circuit with the contacts 225 of relay 211 between the line 105 and the wire 227. The small right-hand spindle 17' can be retracted at any time by the operator depressing the "retract right-hand spindle" push button switch 275 to close its normally open contacts 276-277 which are in parallel circuit with the contacts 226 of relay 211 between the line 105 and the wire 232.

With the small spindles extended, the large spindles may be subsequently extended by the operator depressing the "extend all spindles" push button switch 100. This permits chucking of the log by the small spindles and the subsequent engagement of the log with the large spindles.

If it is desired to extend simultaneously merely the two spindles at the left-hand end of the lathe without disturbing the position of the spindles at the right-hand end of the lathe the operator depresses the "extend both left-hand spindles" push button switch 280 to close its normally open contacts 281-282. These contacts are in parallel circuit with the contacts 101-102 of push button switch 100 between the line 105 and the wire 106. This causes both motors C, D to be actuated in the manner previously described to advance the spindles 16, 17 connected thereto, and in turn the chucks 14, 15 carried thereby towards the center of the lathe.

The spindles at the opposite or right-hand side of the lathe can be simultaneously extended by depressing the "extend both right-hand spindles" push button switch 285 to close its normally open contacts 286-287 which are in parallel circuit with the contacts 103-104 of push button switch 100 between the lines 105 and the wire 106. This causes both motors C', D' to be actuated in the manner previously described to advance the spindles 16', 17' connected thereto and in turn the chucks 14', 15' carried thereby towards the center of the lathe.

Both spindles 16, 17 at the left-hand end of the lathe can be retracted simultaneously by depressing the "retract both left-hand spindles" push button switch 290 to close its normally open contacts 291-292, thereby establishing a circuit from the line 105 through wire 293 and operating solenoid 294 of relay 133 to line 110. Energization of relay 133 actuates the relay to open its normally closed contacts 132, 153 and close its normally open contacts 295-296. The opening of the normally closed contacts 132, 153 of relay 133 breaks the holding circuit for relays 128, 150 thereby allowing the valves 91, 92 to return to their off positions. The closing of contacts 295 of relay 133, which are in parallel circuit with the contacts 206 of relay 136 energizes the operating solenoid 215 of valve 85 to cause the motor C to retract the large spindle 16 and the closing of contacts 296 of relay 133, which are in parallel circuit with the contacts 225 of relay 211, energizes the operating solenoid 230 of valve 86 to cause the motor D to retract the small spindle 17.

Both spindles at the right-hand end of the lathe can be simultaneously retracted by the operator depressing the "both right-hand spindles" push button switch 300 to close its normally closed contacts 301-302 thereby establishing a circuit from the line 105 to wire 303 through the operating solenoid 304 of relay 176 to the line 110. Actuation of the relay 176 opens its normally closed contacts 175, 192 and closes its normally closed contacts 305, 306. The opening of the normally closed contacts 175, 192 break the holding circuits for the relays 172, 187 which in turn deenergizes the operating solenoid 141' of valve 91' and operating solenoid 156 of valve 92' allowing the valves to return to their off positions. The closing of the normally open contacts 305, which are in parallel circuits with the contacts 207 of relay 136 energizes the operating solenoid 215' of valve 85' shifting the valve to the right to cause the motor C' to retract the large spindle 16' and the closing of contacts 306 of relay 176 which are in a parallel circuit with the contacts 226 of relay 211, energizes the operating sole-

noid 230' of valve 86' to cause the motor D' to retract the small spindle 17'. The spindles continue to retract as long as the push button switch 300 is held depressed.

5 The spindles can be positioned in any desired projection or position by first advancing them and then retracting them to the desired position.

One of the features of the control disclosed is the fact that reduced pressure is maintained on the spindles during the cutting operation thus permitting a higher pressure to be employed to initially seat the chucks in the logs than might be desirable during the peeling operation, particularly near the end of the operation, as the log may bend if too high a pressure is employed upon the spindles.

10 The pressure reducing regulator 88 is adjustable as are the pumps 80, 80' and are preferably such that pressures from 300 to 600 pounds per square inch, and more, can be employed to initially seat the chucks in the log, and the chucks maintained engaged with the log during the cutting operation at substantially less pressure, for example, with pressures from 50 to 300 pounds per square inch.

20 Full pressure may be maintained in the fluid pressure actuated motors during the cutting operation, if desired, by providing suitable holding circuits for relays 108, 162 and a selecting switch by which the operator may either insert or remove these circuits from the control and simultaneously remove the relays 128, 150, 172, 187 from the circuit when the holding circuits, referred to, are inserted in the control. As a further alternative arrangement, the holding pressures can be removed entirely by providing a selector switch, by the use of which the operator can remove the relays 128, 150, 172, 187 from the circuit.

25 From the foregoing description of the preferred embodiment of the invention it will be apparent that the fluid actuated motors, which reciprocate the spindles at either end of the lathe are concentric with one another thus reducing the overall length of the lathe. It will also be observed that they are independent of one another. In other words, each motor has its own discrete cylinder within which its piston element reciprocates.

30 The invention is applicable to veneer lathes in which the spindles at one end of the lathe are fluid actuated and the spindles at the other end actuated or reciprocated by some other means, for example, a screw and nut or screw and nut device.

35 While the preferred embodiment of the invention has been described in considerable detail the invention is not limited to the particular construction shown or to the particular control arrangement described. The control system shown and described is believed to cover most of the basic situations encountered in the operation of the lathe which forms the preferred embodiment of the invention but it is to be understood that various changes may be made therein to suit different conditions.

40 Having described my invention, I claim:

1. In a veneer lathe having a plurality of concentric rotatable spindles each having a chuck thereon, mechanism for moving said spindles and said chucks axially comprising: double acting, reciprocating-type, fluid actuated motors having discrete fluid chambers in fixed concentric telescopic relation with one another, a piston movable in each of said fluid chambers, means operatively connecting said pistons individually to said spindles for reciprocating the same, and means for selectively connecting said fluid chambers of said motors to a source of fluid and to discharge means for reciprocating said spindles.

2. In a veneer lathe having two spaced aligned pairs of concentric rotatable, discrete spindles each having a chuck on an end thereof adapted to hold therebetween a log to be peeled, mechanism for effecting axial movement of said spindles comprising: two pairs of reciprocating-type, double acting, fluid actuated motors, each pair

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of said motors having discrete fluid chambers in fixed concentric telescopic relation with one another, a piston movable in each of said fluid chambers, means operatively connecting said pistons of one pair of said motors to the outer ends of one of said pairs of spindles and means operatively connecting said pistons of the other pair of said motors to the outer or non-adjacent ends of the other pair of said spindles, and means for selectively connecting said fluid chambers of said motors to a source of fluid and discharge means for reciprocating said spindles.

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