Dec. 1, 1936. I. W. SPRINK 2,062,769

QUENCHING MACHINE

Filed June 22, 1933 6 Sheets-Sheet 1

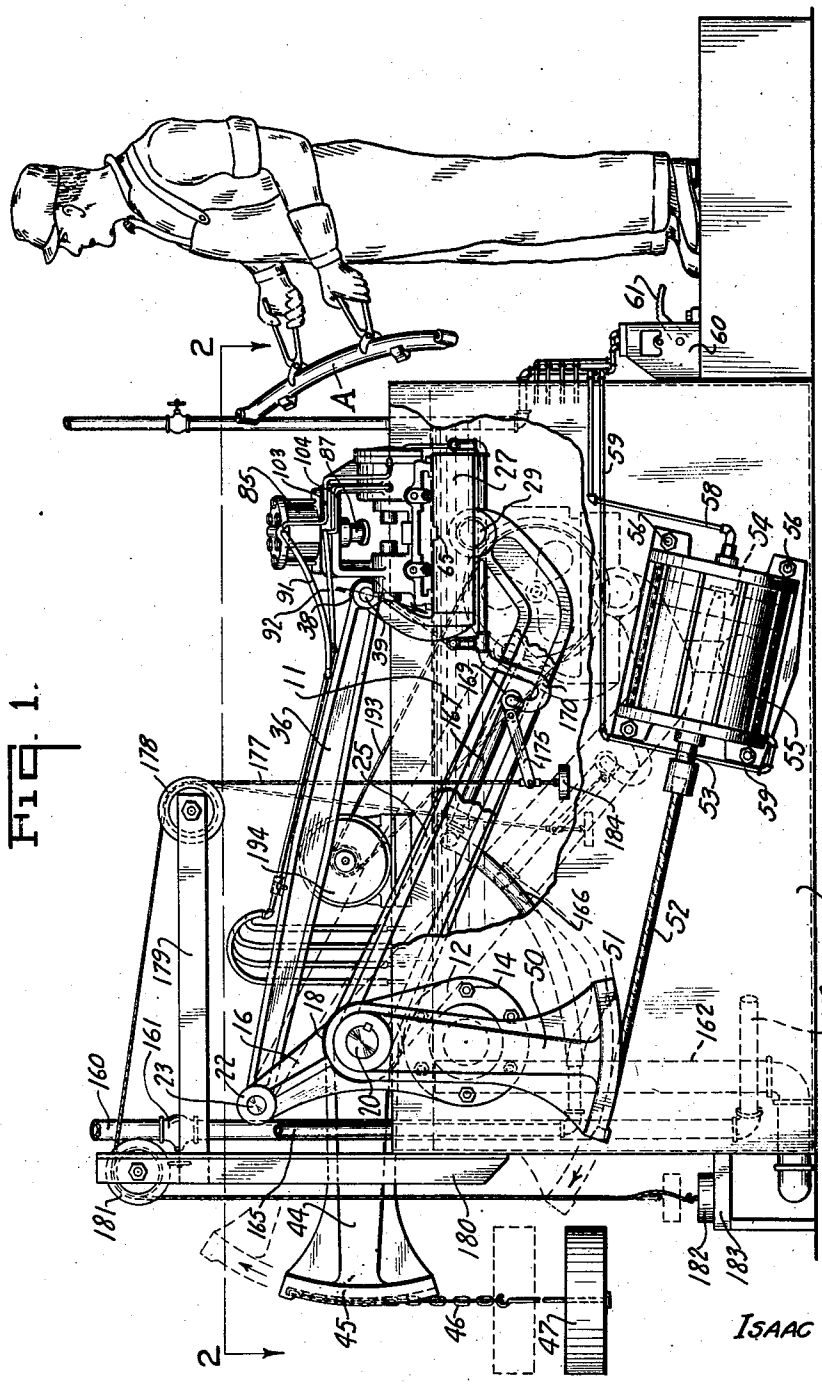


FIG. 1.

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Dec. 1, 1936. I. W. SPRINK 2,062,769

QUENCHING MACHINE

Filed June 22, 1933 6 Sheets-Sheet 3

Fig. 3.

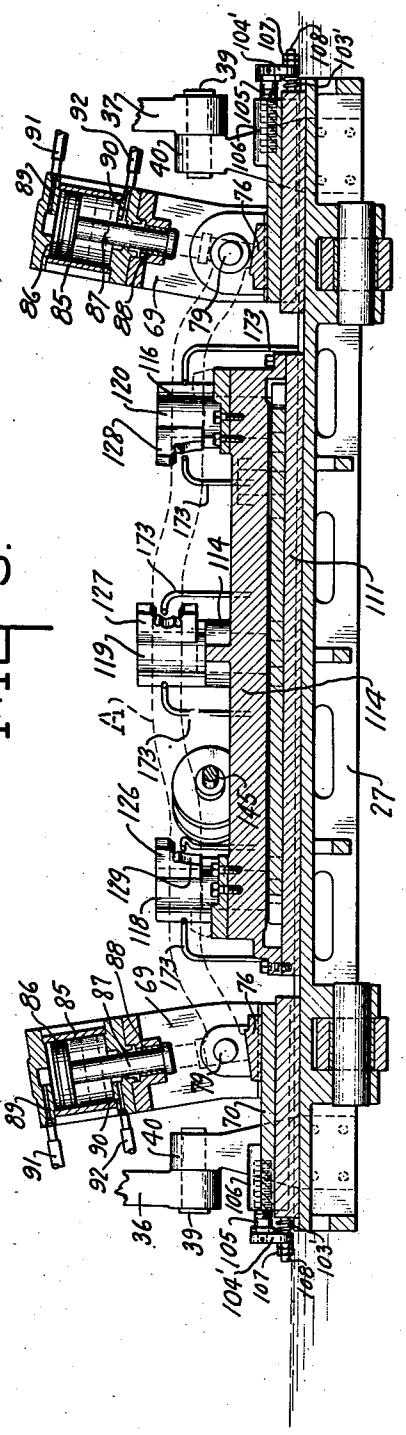
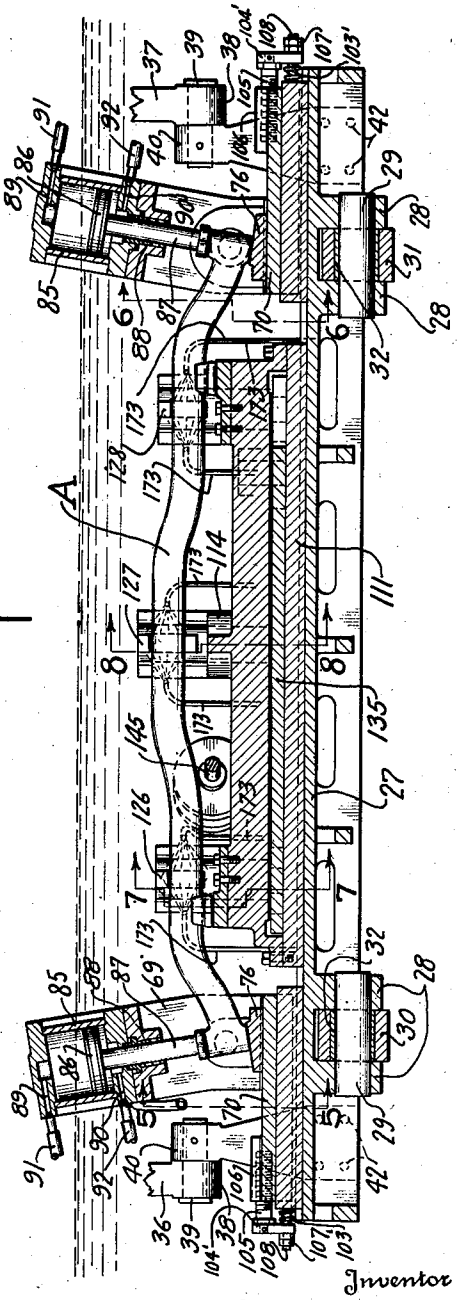


Fig. 4.



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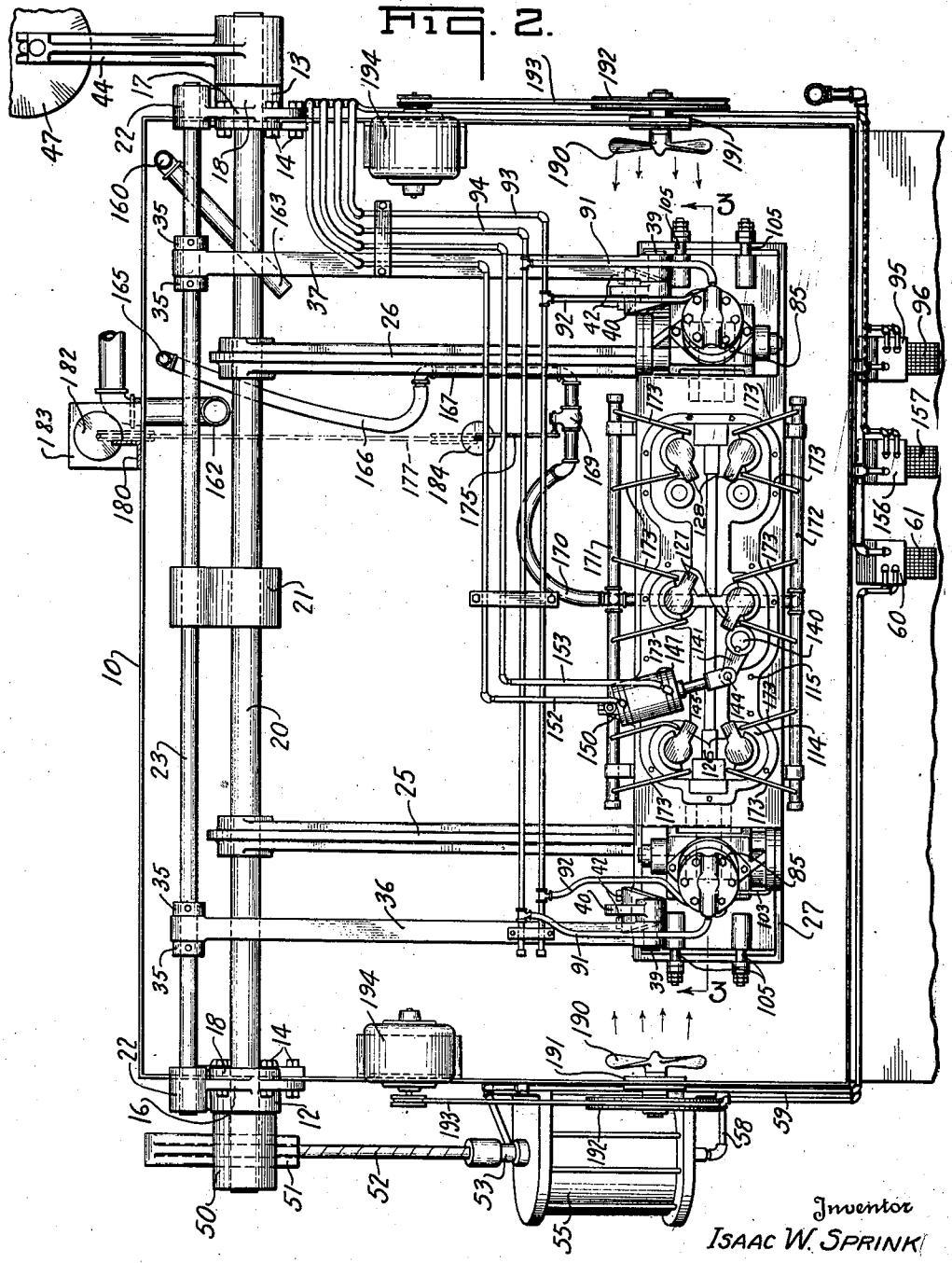
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Dec. 1, 1936. I. W. SPRINK 2,062,769

QUENCHING MACHINE

Filed June 22, 1933 6 Sheets-Sheet 2

Fig. 2.



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Dec. 1, 1936. I. W. SPRINK 2,062,769

QUENCHING MACHINE

Filed June 22, 1933 6 Sheets-Sheet 4

Fig. 5.

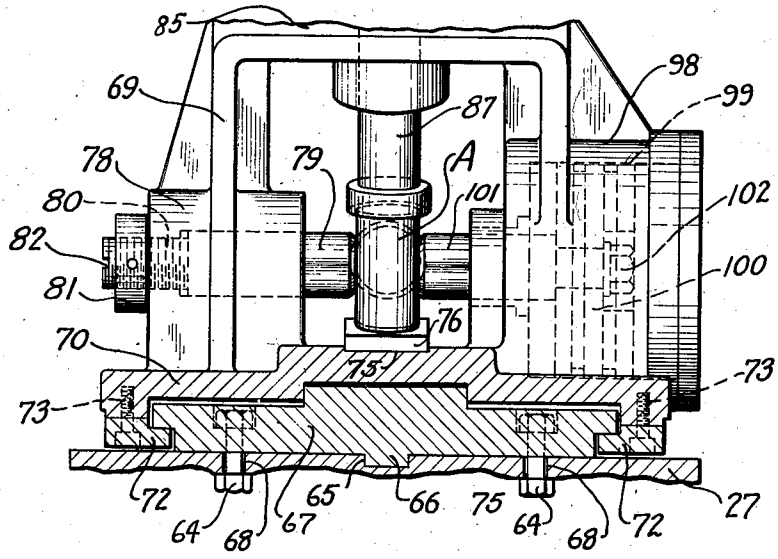
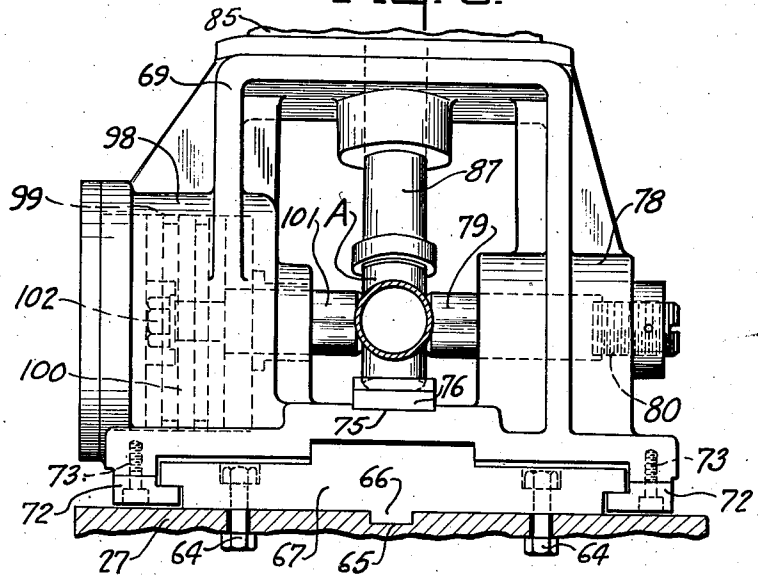


Fig. 6.



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QUENCHING MACHINE

Filed June 22, 1933 6 Sheets-Sheet 5

Fig. 7.

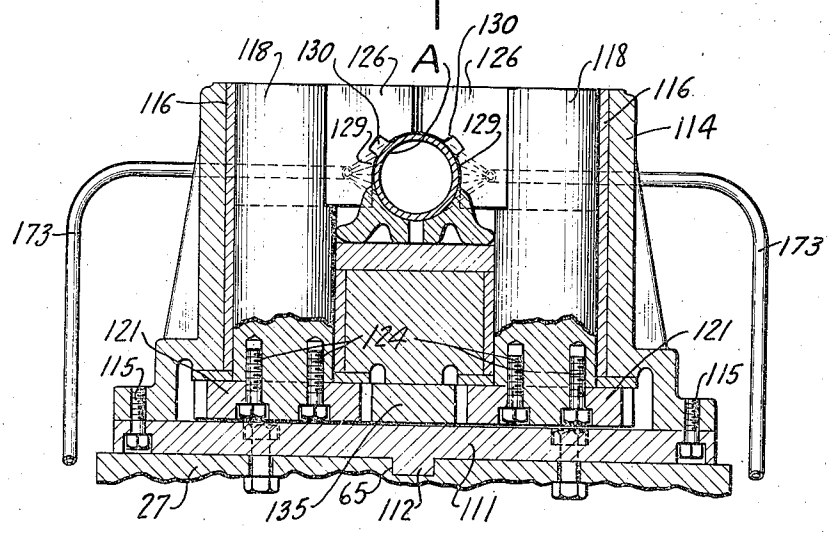
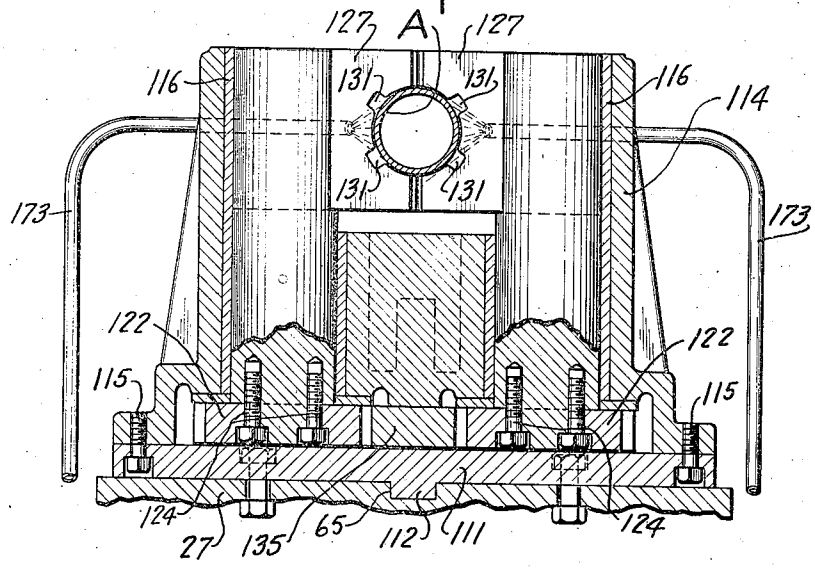


Fig. 8.



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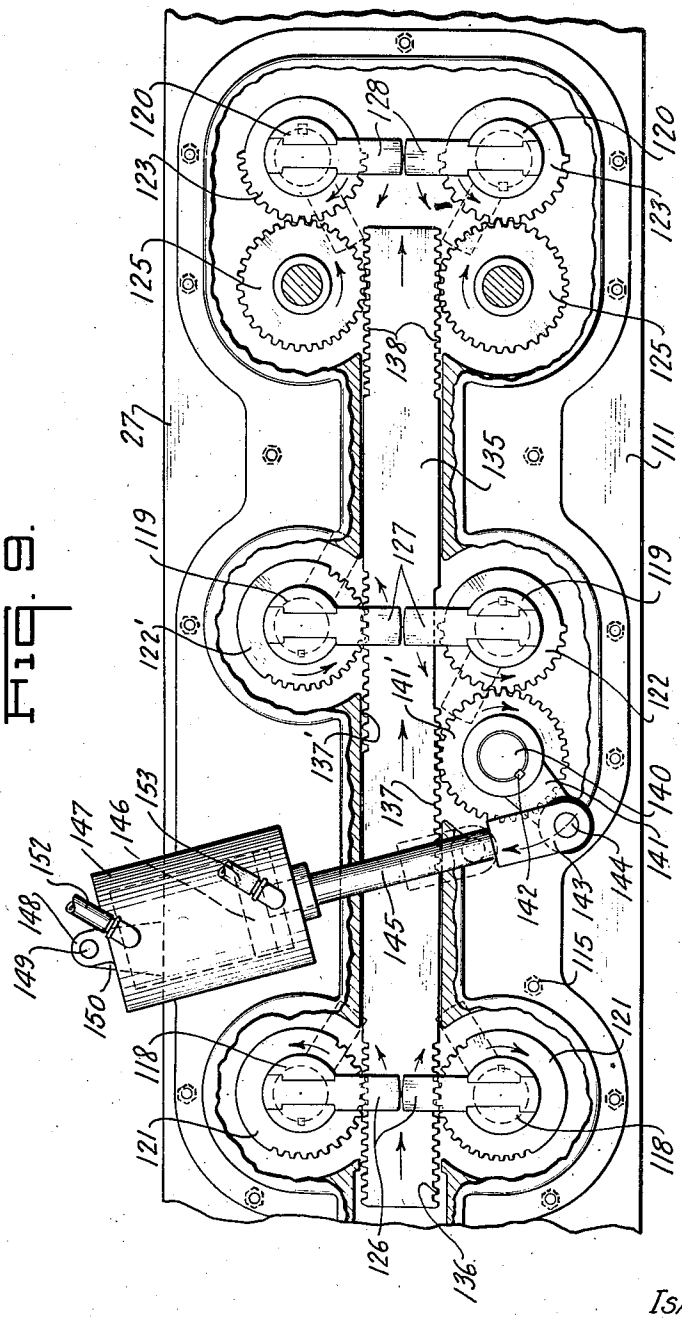
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Dec. 1, 1936. I. W. SPRINK 2,062,769

QUENCHING MACHINE

Filed June 22, 1933 6 Sheets-Sheet 6

Fig. 9.



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UNITED STATES PATENT OFFICE

2,062,769

QUENCHING MACHINE

Isaac W. Sprink, Whitehouse, Ohio, assignor to The Logan Gear Company, Toledo, Ohio, a corporation of Ohio

Application June 22, 1933, Serial No. 677,004

10 Claims. (Cl. 266—6)

This invention relates to a mechanism or machine for hardening, tempering or quenching articles of manufacture, and, more particularly to a machine for quenching articles such as tubes, axles, bars, rods and the like.

The invention has for an object the provision of a machine wherein the article to be quenched is mounted in suitable retaining devices and moved into a medium in a manner to provide substantially uniform quenching.

The invention embraces the provision of a machine utilizing a comparatively large receptacle containing the quenching bath, and an article support or table which is automatically movable into and out of the bath by means controlled by the operator of the machine.

A further object of the invention is the provision of a machine of this character incorporating readily operable means for retaining the article to be quenched in proper position upon a support, and of means for simultaneously immersing the article in the quenching bath and directing jets of quenching fluid upon the article.

A further object is the provision of means for retaining the article to be quenched in position upon a support in such a manner that during quenching, tempering or change of the temperature of the article, the same is permitted to undergo its natural contraction or expansion, at the same time avoiding distortion thereof.

Still a further object is the provision of a quenching machine in which the article support is conveniently positioned to insert and withdraw articles to be quenched, the article support being movable for immersion into the quenching bath by means under control of the operator.

Still a further object of the invention is the provision of simple and effective means for agitating the quenching bath so as to provide a substantially uniform temperature throughout the bath during quenching operations.

Further objects and advantages are within the scope of this invention such as relate to the arrangement, operation and function of the related elements of the structure, to various details of construction and to combinations of parts, elements per se, and to economies of manufacture and numerous other features as will be apparent from a consideration of the specification and drawings of a form of the invention, which may be preferred, in which:

Figure 1 is a side elevational view of a machine of my invention illustrating one form of use to which the invention may be put;

Figure 2 is a top plan view of the machine illustrated in Figure 1;

Figure 3 is a vertical sectional view taken substantially on the line 3—3 of Figure 2;

Figure 4 is a view similar to Figure 3 showing an article in position during the quenching operation;

Figure 5 is a transverse vertical sectional view taken substantially on the line 5—5 of Figure 4;

Figure 6 is a view taken substantially on the line 6—6 of Figure 4;

Figure 7 is a transverse sectional view taken on the line 7—7 of Figure 4 illustrating the article retaining means and method of supporting and quenching the article;

Figure 8 is a transverse view taken on the line 8—8 of Figure 4 illustrating the article retaining means and method of supporting and quenching the article;

Figure 9 is an enlarged top plan view illustrating the method of operating the article retaining means, certain parts being removed.

I have illustrated a form of my invention as a quenching machine particularly adapted for quenching or tempering tubular axles, but it is to be understood that the invention is susceptible of change and variation to render it suitable for use in quenching or hardening various articles of manufacture.

Referring to the drawings in detail, the machine includes a substantially rectangular tank or receptacle 10 which forms the major support or frame structure for the other elements of the machine as well as a container for the quenching fluid or bath 11. Supported at the rear portions of the side walls of the receptacle 10 is a pair of supporting brackets 12 and 13 which are fixedly secured to the tank by means of bolts 14, these brackets being provided with upwardly projecting portions 16 and 17. The portions 16 and 17 are formed intermediate their ends with enlarged bosses 18 in which is journalled a shaft 20 extending longitudinally of the receptacle 10. The upward extremities of members 16 and 17 are provided with enlarged bosses 22 within which is positioned a second shaft 23 substantially parallel and co-extensive with shaft 20. The shafts 20 and 23 are held in proper spaced relation by means of a block 21 arranged intermediate the bearing brackets 12 and 13. Fixedly secured to shaft 20 and extending forwardly thereof is a pair of spaced arms 25 and 26 whose forward ends project upwardly and are pivotally connected to a work supporting table or bed plate 27. The bed plate 27 is provided with

downwardly projecting ear portions 28 which are bored to receive a pintle or pivot pin 29, the ears 28 straddling the enlarged ends 30 and 31 of the arms 25 and 26, the ends being provided with bearing bushings 32 journalled for movement on the pivot pin 29.

Journalled on shaft 23 and held in proper spaced relation by means of collars 35 pinned to the shaft, is a pair of forwardly extending arms 36 and 37 which are enlarged at their forward ends as at 38 and transversely bored to accommodate pivot pins 39. The pivot pins 39 extend into and are carried by brackets 40 which extend upwardly and rearwardly of the bed plate 27 being secured to the latter by means of bolts 42.

It is to be noted that the arms 25, 26, 36 and 37 form the supporting means for the bed plate 27 and parts carried thereby. With particular reference to Figure 1, the axes of shafts 20 and 23 and the axes of the pivot pins 29 and 39 form the apices of a parallelogram of such a nature that when shaft 20 is rotated in journals carried by brackets 12 and 13 in a clock-wise direction the forward extremities of arms 25, 26, 36 and 37 will be lowered in a parallelogrammatic relation to the axes of the shafts and pivot pins whereby the bed plate 27 and associated parts may be lowered into the quenching bath 11, the bed plate and its associated parts being maintained in a horizontal position during the downward movement by means of the above described method of support.

In order to facilitate ease of operation of raising and lowering the work support or bed plate 27 and parts carried thereby, a balancing means is provided. This balancing means consists, in the embodiment shown, of an arm 44 fixed upon an extremity of shaft 20 exteriorly of the tank or receptacle 10, the arm 44 extending rearwardly of the receptacle 10 is formed with an arcuately shaped end 45 to which is connected a cable or chain 46 which overlies the arcuate portion 45 of the arm 44 being connected at its lower extremity to a weight 47. The length of the lever arm 44 and weight 47 are proportioned to approximately balance the arms 25, 26, 36, and 37 and the bed plate 27 and associated parts so that comparatively little effort is required to operate this mechanism.

Fixed to an extremity of the shaft 20 is an arm 50 having an arcuate extremity 51 to which is fixed one end of a cable 52, the other end being connected to a piston rod 53 the latter in turn being fixed to a piston 54 reciprocably positioned within a cylinder 55. The operating cylinder 55 is secured to the exterior of an end wall of the casing or receptacle 10 by means of bolts 56. The mechanism may be operated by any suitable means, as for example hydrostatic or pneumatic means, in the form shown the means employed being pneumatic, the air being conveyed to the ends of the cylinders by means of tubes or pipes 58 and 59. The ingress of air into the cylinder 55 is controlled by means of valves contained in a box-like receptacle 60 operated by a foot treadle 61 as particularly shown in Figures 1 and 2.

The machine of my invention is particularly illustrated as adapted for use in tempering or quenching tubular axles and while the means for securing the axle in position are of a particular configuration to accommodate the same, it is to be understood that the means may be utilized for accommodating articles of other configuration for quenching or tempering. In the embodiment illustrated, the means comprises two types of retaining devices, first a means for securing the ends of the axle tube, and second, a means for retaining intermediate portions of the tube.

The first mentioned of these devices will now be described. As the device for retaining the axle ends are the same in construction and operation, a detailed description of one will suffice for both, the structures being shown in Figures 3 to 6 inclusive of the drawings. The bed plate 27 of the movable table is provided with a central longitudinally arranged groove or way 65 to receive a correspondingly shaped projection 66 formed upon a plate 67 carried by the table 27, the plate 67 being fixedly secured to the table 27, by means of screws 64 passing through elongated slots 68 in the bed plate 27 so as to facilitate longitudinal adjustment of the plates 67 to accommodate various lengths of tubes or axles.

Slidably supported upon plate 67 is a frame casting 69 having a base portion 70, the lower face of which is machined to slidably fit the upper surface of plate 67 being held in slidable relation with plate 67 by means of removable way blocks 72 which are held to base portion 70 of casting 69 by means of screws 73. The base portion 70 is provided with a machined groove 75 within which is received an anvil or supporting block 76 which is preferably fabricated of hardened steel and is adapted to form a locating or positioning support for the end of the axle tube. The anvil 76 engages the lowermost surface of the end of axle tube A as illustrated in Figure 4 to properly position this portion of the axle in the quenching machine. The casting 69 is provided with a transversely extending boss 78 which is bored to receive a pin 79, the forward end of which is adapted to engage and properly locate the side of an end of the axle tube A as particularly illustrated in Figure 5. The other end of pin 79 is of reduced diameter as shown at 80 and is threaded into a portion of the bore in the boss 78 and also receives a nut 81 which serves as a locking nut. The pin 79 may be adjusted by a manipulation through the insertion of a screw-driver into a kerf in the end thereof and may be locked in adjusted position by nut 81.

It will be seen from the foregoing description that the anvil 76 and the pin 79 serve as locating and positioning means for two surfaces at the end of the axle tube. The casting 69 is formed with an upwardly projecting portion incorporating a cylinder 85 within which is slidably positioned a piston 86 connected to a substantially vertically movable plunger 87 operating in a stuffing box or gland 88 formed in the casting 69. Formed in the casting at points respectively above and below the piston 86 are apertures 89 and 90 which communicate with tubes 91 and 92 in turn communicating by means of other tubes 93 and 94 with a valve 95 controlled by a foot treadle 96 as particularly illustrated in Figure 2. The tubes 91, 92, 93, and 94 are adapted through the control of valve 95 to admit air into and out of the cylinder 85 so as to depress or retract piston 86 and likewise plunger 87 into or out of contact with an upper surface of the end of the axle tube A as particularly illustrated in Figures 4 and 5 wherein the plunger 87 is shown in contact with the end of the axle tube

to hold the tube under pressure in contact with the positioning anvil 76.

The casting 69 is also formed with an enlarged circular portion 98 which is bored to form a cylinder illustrated in dotted lines at 99 in Figure 5 within which is reciprocably positioned a piston 100 which is fixedly secured to a plunger 101 by means of a nut 102 threaded upon a reduced end of plunger 101. This cylinder 99 is provided with inlet and outlet ports similar to the ports 89 and 90 of cylinder 85. These ports are interconnected with tubes 91 and 92 by means of tubes 103 and 104 as particularly illustrated in Figure 1 and through the medium of tubes 91, 92, 93, and 94 to the valve 95. Depression of foot treadle 96 causes a rush of air or other operating medium through tubes 93, 94 and 91 and 92 to inject air or the like above pistons 86 and 100 substantially simultaneously, thus bringing plungers 87 and 101 into forcible contact with the upper and lateral surfaces of the end of the axle tube A as particularly shown in Figure 5, thus properly locating the end of the axle tube against the anvil 76 and locating pin 79. The pressure maintained back of pistons 86 and 100 during the quenching operation fixedly limits and maintains the ends of the axle tube in a predetermined position both horizontally and vertically. After the axle is quenched, however, it contracts and due to its comparatively great longitudinal dimension the contraction amounts to considerable throughout its length which normally would tend to pull the ends of the axle inwardly. This inward contraction, however, is permitted by reason of slidably positioning the castings or members 69 which carry the axle retaining pistons so as to permit the ends of the axle, the anvils 76 and pistons and associated parts to move bodily inwardly with the axle against the tension of springs 103 particularly illustrated in Figures 3 and 4. After the quenching operation and the axle is removed from the machine in a manner to be hereinafter described the springs 103 return the casting 69 and its base portion 70 and parts carried thereby to their outmost position as shown in Figures 3 and 4. The springs 103' act against lugs 104' carried by threaded studs 105 threaded into bores in bosses 106 forming a part of the base portion 70. The initial position of the base 70 with respect to the table 27 is adjustable through the medium of nuts 107 carried upon threaded studs 108 which pass through the coil springs 103 and openings in lugs 104, the studs 108 being secured in member 67 which in turn is secured to the table 27 in the machine. In this manner, the contractions of the axle during its cooling or quenching operation are compensated for by permitting the axle end retaining means of the machine to move with the axle so that portions of the latter are not in any way distorted during quenching.

The retaining means for the central portions of the axle will now be described. Secured to the bed or base plate 27 of the machine intermediate the movable castings or members 69 is a plate 111 which also has a tang 112 similar to the tang 66 which also engages and fits in groove 65 this means serving to properly arrange plate 111 with the other parts of the machine carried by the table 27. Mounted upon plate 111 is an elongated casting or supporting member 114 which is secured to plate 111 by means of screws 115. Carried by the member 114 are a plurality of sets or pairs of cylindrical bushings 116 snugly fitting in vertical bores in the member 114 as particularly illustrated in Figures 7 and 8. Revolubly mounted within bushings 116 are a plurality of sets of shafts 118, 119, 120, two shafts making up each set. Fixedly secured to the lower ends of shafts 118, 119 and 120 respectively are sets of gears 121, 122, 122' and 123, the gears being held to the shafts by means of screws 124. The sets of gears 121, 122, 122' and 123 have teeth only throughout substantially half of their peripheries for a purpose to be hereinafter explained.

The upper portions of shafts 118, 119, and 120 are transversely slotted to snugly receive and fixedly retain members or clamping gates 126, 127, and 128 as particularly illustrated in Figure 7. The gates 126 are arcuately cut away as at 129 to accommodate the axle, tube, or other member to be quenched designated at "A". The arcuate portions 129 of the gates are further provided with recesses 130 to permit the application of the quenching fluid to the axle or member to be quenched which will be hereinafter more fully explained. The gates 128 are substantially of the same configuration as the gates 126 having substantially the same cut-away portions in order to accommodate, receive and clamp the axle or other member to be quenched.

The gates 127 of the central set of clamping means are particularly illustrated in Figure 8 and are cut away or provided with semi-circular recesses to accommodate the axle and are in addition provided with recesses 131 to permit quenching fluid to readily reach the axle portion which is within the clamping gates.

The means for simultaneously rotating the gates 126, 127, and 128 are particularly illustrated in Figure 9 which means includes a horizontally positioned longitudinally movable operating member 135 which is provided with toothed rack portions 136, 137, and 138. Suitably journalled parallel and adjacent to one of the shafts 119 is a shaft 140 and fixed to its lower end is a translating gear 141'. Also fixed to shaft 140 is an arm 141 keyed or otherwise fixed thereto as at 142 which is connected by means of a clevis 143 and pin 144 to a rod 145 which is provided at its opposite extremity with a piston 146 operating in a cylinder 147. The cylinder 147 is also provided with a lug 148 whereby the cylinder is pivoted by means of a pin 149 to a bracket 150 integrally formed as a part of the bed plate 27 of the machine. The cylinder 147 is pivotally supported, as there is oscillatory movement of the cylinder when the piston 146 and piston rod 145 are moved to operate shaft 140. The piston 146 is also preferably fluid operated as by air or the like conveyed to and from the cylinder by means of conduits 152 and 153 which communicate with a valve mechanism contained within a housing 156 operated by means of a treadle 157 similar to the treadles 61 and 96.

The gear 141 is in mesh with both the operating member 135 through the rack teeth 137 and with the teeth of gear 122, the teeth of gear 122' being in mesh with rack teeth 137' formed on member 135 while the teeth of gears 121 are in mesh with toothed rack portions 136 formed on member 135. The toothed rack portions 138 also formed on one end of member 135 are in mesh with intermediate gears 125 which in turn mesh with teeth on gears 123. In the embodiment illustrated, the interposition of intermediate gears 125 is provided in order that the clamping gates 128 will move inwardly at the same time that clamp-

ing gates 126 move inwardly. Figure 9 illustrates the position of the gates 126, 127, 128 in axle clamping and quenching position. When air or other medium is applied through conduit 153 the piston 146 is moved rearwardly bringing clevis 143 to the position shown in dotted lines in Figure 9, causing a rotation of shaft 140 and the various gears hereinbefore described causing the axle clamping gates to move in the directions respectively indicated by the arrows adjacent each gate, the movement of the member 135 being indicated also by means of directional arrows. In the above manner, the application of air through conduits 152 and 153 simultaneously opens or closes all of the axle clamping gates. It is to be understood that while in the embodiment illustrated six gates or three sets, two gates to a set are illustrated, any number of clamping gates or means may be operated through the mechanism hereinbefore described.

The receptacle 10 contains the quenching or cooling medium 11, as for example, water, oil or other suitable material, in the embodiment illustrated water or oil being a satisfactory medium. The quenching fluid comes from a supply (not shown) by means of a conduit 160 in which is a valve 161 controlling the flow of fluid into the receptacle, the conduit 160 having a horizontal discharge portion 163 positioned near the floor of the receptacle 10. An overflow pipe 162 is provided whose upper extremity is so positioned as to determine the lever of the quenching fluid in the receptacle 10, any excess fluid being carried away by means of the pipe 162. In addition to this supply of cooling medium, it is desirable to apply specific jets of quenching fluid to the article to be quenched adjacent the clamping gates 126, 127 and 128. To this end a quenching fluid supply conduit 165 is provided having a rubber tube or other flexible connection 166 with a tube 167 carried by the arm 26 which in turn supports the table 27 and moves with the arm. Connected with tube 167 is a check valve 169 which in turn is connected with a tube 170 to distributing conduits 171 and 172 which in turn are provided with comparatively small tubes 173 the ends of the tubes 173 terminating so as to direct quenching fluid upon the article to be quenched at the points of contact of the gates 126, 127, 128 with the article. By this means an adequate supply of quenching fluid is applied to the article during the quenching operation in addition to its immersion in the fluid.

The valve 169 is adapted to be operated to permit the passage of quenching fluid to the tubes 173 only during the immersion of the table 27 and article carried thereby in the receptacle 10. During this operation, the valve is operated by arm 175, the outer end of which is pivotally connected to a cable 177 which passes upwardly over pulley 178 carried by an arm 179 forming the horizontal part of the frame structure 180 supported at the rear wall of the receptacle 10 as particularly shown in Figures 1 and 2 The cable 177 passes over another pulley 181 having its other extremity secured to a weight 182 which normally rests upon a pedestal or support 183 located adjacent the rear of the receptacle 10 and beneath the frame 180. The extremity of the cable connected to arm 175 is also provided with a weight 184 which at all times places a tension upon the cable and also provides a means for causing the oscillation of arm 175 to open or close valve 169 as hereinafter explained and control the flow of fluid through the jets or tubes 173 to the article to be quenched.

In the operation of this portion of the mechanism, the valve 169 is in closed position when the parts are in the position indicated in full lines in Figure 1 with the article elevated above the quenching fluid in which position the weight 182 rests upon the pedestal 183, the weight 184 on the opposite end of the cable serving to hold the arm 175 in the position shown closing the valve 169 so that no quenching fluid is flowing through tubes 173. When, however, the table 27 carrying the article to be quenched is lowered into the quenching fluid by a manipulation of food pedal 61, the weight 182 being heavier than the weight 184, causes arm 175 to oscillate, with the lowering movement of the table into the fluid, in a clockwise direction as illustrated in dotted lines in Figure 1 to a position opening the valve 169 and permitting the flow of quenching fluid through tubes 173 to the article adjacent the clamping gates, the excess of movement of arm 25 into the quenching fluid carrying with it the valve 169 and the arm 175 being absorbed by upward movement of the weight 182 to dotted position as illustrated in Figure 1 thus maintaining the valve 169 open during the immersion of the article in the quenching fluid and a consequent flow of additional quenching fluid directed upon the article through the tubes 173. When the table is moved upwardly to bring the article out of the quenching bath in receptacle 10, the weight 182 is again brought to rest upon pedestal 183 in which position weight 184 then operates to oscillate arm 175 in a counter-clockwise direction to close valve 169.

It has been found that the additional quenching jets 173 are not always required for satisfactory quenching depending upon the character and type of the article being quenched, but has in some instances been found desirable in order to provide a satisfactorily uniform quenching of an article.

I have also provided means for continuously agitating the quenching fluid in receptacle 10 which is obtained by means of agitating propellers 190 journalled upon bearing brackets 191 carried by the side walls of the receptacle 10 and operated by means of pulleys 192 and belts 193 connected to a source of power as for example, motors 194 carried by the walls of the receptacle 10 as particularly illustrated in Figures 1 and 2. By this means, the energization of the motors 194 operate to rotate the propellers 190 to continuously agitate the quenching fluid in receptacle 10 and thus tend to keep the quenching fluid at a substantially uniform temperature throughout to further enhance the satisfactory quenching of the articles.

The operation of the device of my invention is as follows: When the arrangement is used for quenching axles, the axle is first placed in position as illustrated in dotted lines in Figure 3, in full lines in Figure 4 and the treadle 96 depressed by the operator which controls the flow of air or actuating fluid to cylinders 85 and 99 causing the plungers 87 and 101 to engage and fixedly secure the ends of the axle in position against the stop 79 and the anvils 76. The treadle 157 is then depressed by the operator which controls the air flow to cylinder 147 which simultaneously revolves the gates 126, 127 and 128 into the position shown in Figures 4 and 9 to retain or clamp the intermediate portions of the axle. The operator then depresses the treadle 61 which controls the

flow of air or actuating fluid to cylinder 55 permitting air to flow into the cylinder and move the piston 54 therein to a left hand position and as the weight of the supporting table 27 and parts carried thereby including the axle to be quenched are heavier than the weight 47 and arm 44, the table and axle drop under the force of gravity and become immersed in the quenching bath 11 contained in receptacle 10. At the same time that the table and axle are immersed in the bath, the valve 169 is actuated through the relative movement of arm 175 caused by weight 182 opening valve 169 and permitting quenching fluid to flow through tubes 173 so as to direct additional quenching fluid upon the axle at the point of engagement of the gates 126, 127, 128 therewith so that the axle may be chilled or tempered uniformly.

As the axle is chilled in the quenching bath it contracts carrying with it frame castings or member 69 which slide inwardly longitudinally upon the ways or plates 67 against the tension of springs 103. In this manner the normal contraction caused by chilling of the axle is accommodated without permitting any lateral distortion of the axle. When the axle has cooled sufficiently the operator again depresses treadle 61 which reverses the direction of the flow of air or actuating fluid into cylinder 55 moving piston 54 to the right hand position as shown in dotted lines in Figure 1 which elevates or raises the table, parts carried thereby and axle out of the quenching fluid or bath the parts moving to the position indicated in full lines in Figure 1. The operator then again depresses treadles 96 and 157 which causes air or actuating fluid to flow in a reverse direction in cylinders 85, 99, and 147 to withdraw plungers 87 and 101 from engagement with the ends of the axle and also to open the clamping gates 126, 127, and 128 after which the axle may be lifted out of the machine and the operations repeated with other axles. It is to be noted that upon release of the plungers 87 and 101 in engagement with the ends of the axle the frame member 69 and parts carried thereby immediately move to their initial positions under the influence of spring 103 in position to receive another heated axle.

It is apparent that, within the scope of the invention modifications and different arrangements may be made other than is herein disclosed, and the present disclosure is illustrative merely, the invention comprehending all variations thereof.

What I claim is:

1. In a quenching machine, means for retaining an object to be quenched comprising a plurality of object retaining means; a quenching medium; means for causing relative movement between said object retaining means and the quenching medium to effect a quenching of the object; means operable upon relative movement between the object retaining means and the quenching medium to cause a flow of quenching medium directed upon the object.

2. In a quenching machine; a quenching medium; a retaining means for an object to be quenched; movable means for submerging said object retaining means in the quenching medium; a plurality of tubes for directing quenching fluid upon said object; and automatic means operable simultaneously with submersion of the object to cause flow of quenching medium through said tubes to the object to be quenched.

3. In a quenching machine, a reservoir adapted to contain a quenching medium; a table; means for moving said table into and out of the quenching medium; a plurality of means carried by said table for retaining and guiding a member to be quenched, said retaining means being positioned adjacent the ends of the object to be quenched; said means being mounted for longitudinal movement with the object as the latter is contracted and cooled by the quenching medium, the guiding means being positioned intermediate said retaining means; the engagement of said guiding means with the object being such as to permit relative sliding movement between the object and said guiding means during the quenching operation.

4. In a quenching machine, a table adapted to support an article to be quenched; means carried by the table and movable to a position for guiding intermediate portions of the article during longitudinal movements and restricting lateral movement thereof during quenching; an anvil adapted to support an end of the article; said anvil being capable of longitudinal movement; and clamping means adapted to engage and hold the article in contact with the anvil, said clamping means being movable with the anvil and the object during the quenching operation.

5. In a quenching machine, a supporting table; means for supporting an article upon said table including a plurality of relatively movable members for guiding portions of the article intermediate its ends; means for actuating said relatively movable members from a position remote from the article to article guiding position; and clamping means engageable with the ends of the article and capable of longitudinal movement therewith during the quenching operation.

6. In a quenching machine, a reservoir adapted to contain a quenching fluid; a movable table; a plurality of links supporting said table; means for substantially counterbalancing the weight of said table; said table adapted to support an object to be quenched; fluid actuated means for lowering and elevating said table into and out of the quenching medium; and fluid actuated means carried by said table for clamping the object to be quenched thereto.

7. A quenching machine including a reservoir adapted to contain a fluid quenching medium; a table; means for moving said table into and out of said quenching medium; a plurality of anvils carried by said table and capable of longitudinal movement with respect thereto, said anvils adapted to support the extremities of an object to be quenched; means for clamping the object to said anvils; a plurality of pivoted guide members positioned between said anvils and adapted to retain the object against lateral movement; a plurality of quenching fluid conducting tubes terminating adjacent the pivoted guide members; and automatic means operable upon movement of the table into the bath of quenching fluid for ejecting fluid from said tubes upon the object.

8. A quenching machine including a reservoir adapted to contain quenching medium; a table; means for moving said table into and out of said quenching medium; a plurality of anvils carried by said table and capable of longitudinal movement with respect thereto, said anvils adapted to support the extremities of an object to be quenched; fluid actuated plungers positioned adjacent said anvils and adapted to engage and clamp extremities of the object to the anvils; a plurality of pivotally supported object guiding

members arranged between said anvils; rack and gear mechanism for actuating said guiding members; and fluid actuated means for initiating the operation of said rack and gear mechanism.

9. In a quenching machine a reservoir adapted to contain a quenching fluid; a table; means including a plurality of pivoted arms supporting said table; fluid actuated means for submerging said table in said quenching fluid; means engageable with the ends of an object to be quenched for retaining the same upon said table; a plurality of sets of pivotally supported guiding members engageable with the object intermediate its ends; and rack and gear mechanism for simultaneously actuating all of said sets of guiding members.

10. A quenching machine including a table; a plurality of object supporting means mounted upon said table; said object supporting means being capable of longitudinal movement with respect to the table; a plurality of pivotally supported members for retaining the object against lateral movement intermediate its ends; gear and rack mechanism for causing simultaneous pivotal movement of said members; and fluid actuated means for operating said pivotally supported members.

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