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APPARATUS FOR SUPPORTING AND ADJUSTING THE
POSITION OF A DEVICE WITH RESPECT TO WORK

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2 SHEETS—SHEET 1

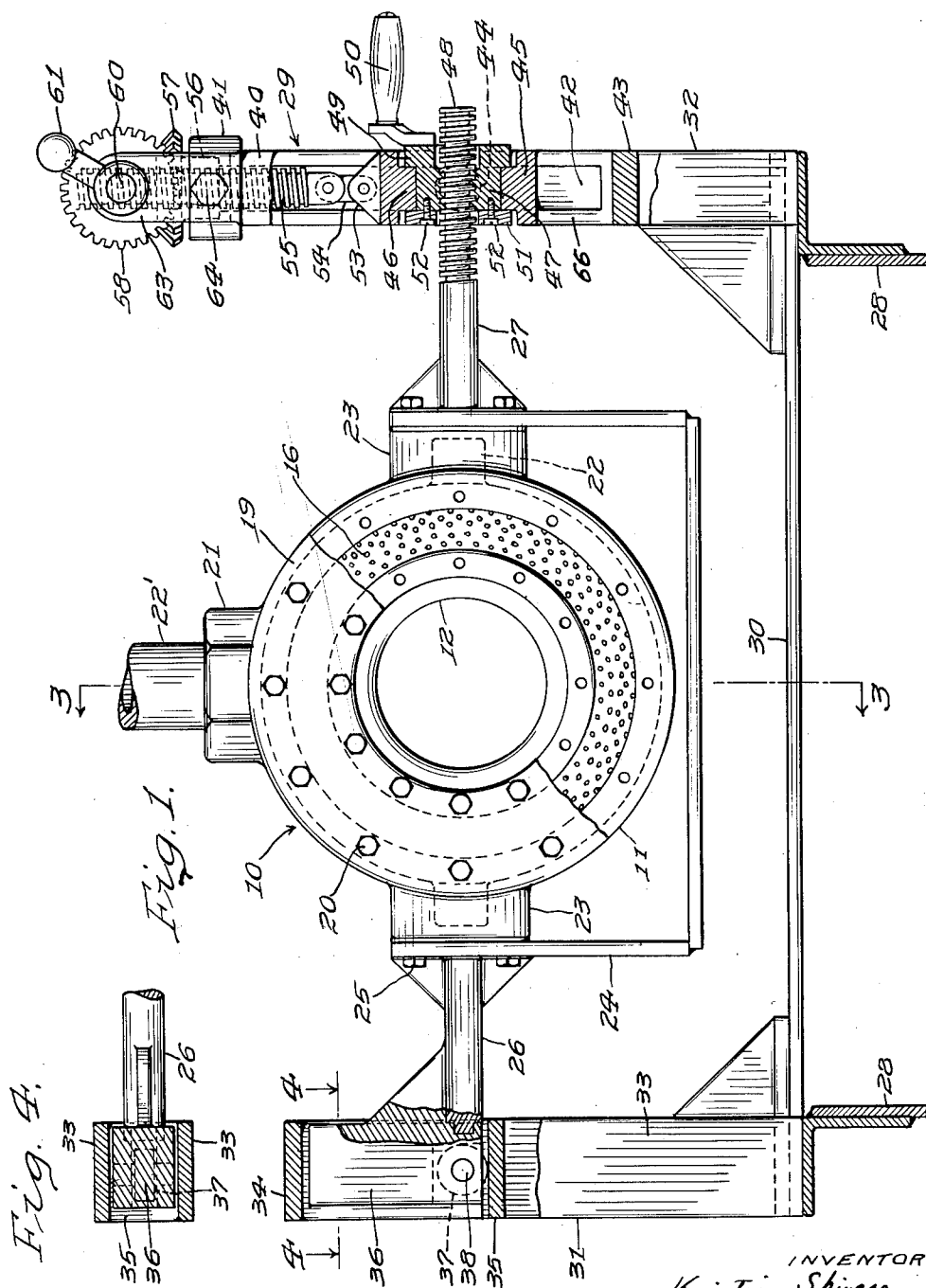


Fig. 1.

Fig. 4.

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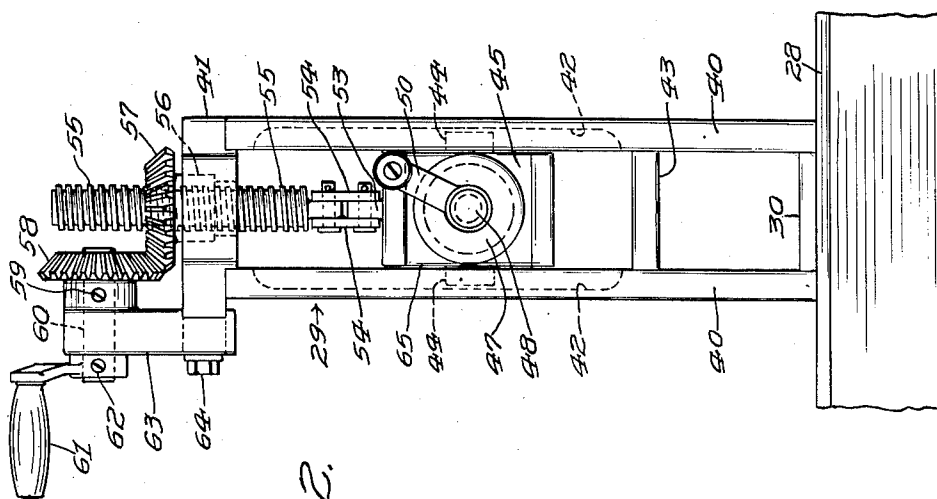
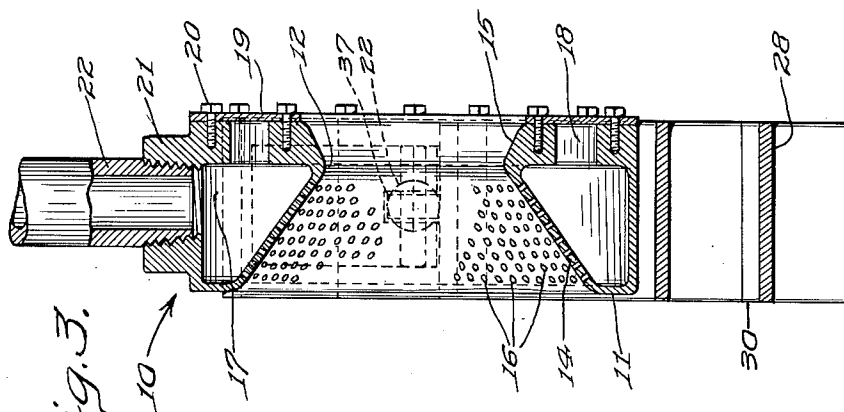
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2 SHEETS—SHEET 2



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APPARATUS FOR SUPPORTING AND ADJUSTING THE POSITION OF A DEVICE WITH RESPECT TO WORK

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This invention relates to apparatus for supporting and adjusting the position of a device adapted to be used for processing work, and more particularly to apparatus for accurately positioning such a device which is of annular form and through which work of elongated extent is adapted to pass.

It is an object of the invention to provide an improved apparatus for supporting and adjusting the position of a device employed for processing work, especially a device of annular form and through which work is adapted to pass, whereby an operator can readily adjust the device both horizontally and vertically in a plane transverse to the direction of movement of work while remaining at one place to observe the adjustments being made. More particularly, it is an object of the invention to provide an improved apparatus of this type for simultaneously adjusting such a device both vertically and horizontally in a plane transverse to the direction of movement of the work, whereby an operator can quickly and accurately align the device with respect to the work to be processed thereby.

The above and other objects and advantages of the invention will be more fully understood from the following description taken in conjunction with the accompanying drawings forming a part of this specification, and of which Fig. 1 is a side elevation, partly in section, of apparatus embodying the invention for accurately positioning a quench head with respect to work of elongated extent adapted to pass therethrough; Fig. 2 is an end view of the apparatus shown in Fig. 1; Fig. 3 is a vertical sectional view, taken at line 3—3 of Fig. 1, to illustrate the quench head more clearly; and Fig. 4 is a fragmentary horizontal sectional view, taken at line 4—4 of Fig. 1, to illustrate details of the apparatus.

In the drawings I have shown my invention in connection with a quench head 10 of annular form for applying a cooling agent, such as water, for example, to successive longitudinal portions of heated work so as to rapidly quench and cool the work after the application of heat is completed and the desired heating of the work to an elevated temperature is accomplished.

The quench head 10 comprises a hollow ring or annular-shaped member 11 having the inner peripheral surface thereof in the form of a venturi including a narrow throat 12 and outwardly flaring conical-shaped walls 14 and 15 projecting in opposite directions from the throat. The conical-shaped wall 14 is provided with a multiplicity of small apertures or openings 16 through which the cooling agent is discharged from a chamber 17 formed in the hollow member 11.

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Adjacent the conical-shaped wall 15 the member 11 is formed with an annular slot 18 which communicates with the chamber 17 and affords access to the latter. A flat annular-shaped plate 19 is removably secured by cap screws 20 to the face of member 11 having the slot 18, and a suitable gasket (not shown) may be provided between the plate 19 and the member 11 to insure a fluid tight seal to close off the slot 18.

The top of the member 11 is formed with an enlarged boss 21 having a threaded opening to receive a conduit 22' through which the quenching and cooling agent is supplied to the quench head 10. The member 11 at opposite sides thereof is formed with lugs 22 which receive and position enlarged bosses 23 secured in any suitable manner, as by welding, for example, to the outer cylindrical face of the member 11. The spaced-apart sides of a U-shaped frame 24 are removably secured at 25 to the bosses 23, and to such sides are rigidly secured the inner ends of horizontally disposed members 26 and 27, respectively.

The quench head 10 is desirably located adjacent to heating apparatus (not shown) for progressively heating successive longitudinal portions of elongated work in the desired manner to a predetermined high temperature. The heated work emerges from such heating apparatus and passes through the throat 12 of the quench head 10. Successive longitudinal portions of the work are rapidly cooled and quenched by the multiplicity of small streams of quenching fluid applied to the entire peripheral surface of the work. In order to uniformly quench and cool successive longitudinal portions of the work, it is desirable to position the quench head 10 accurately with respect to the work passing therethrough.

In accordance with my invention, the device employed for processing work, such as the quench head 10, for example, is mounted on a support or suitable framework 28 by apparatus 29 which is so constructed and arranged that, while an operator remains at one place, the device can be adjusted both horizontally and vertically in a plane transverse to the direction of movement of the work to position the device accurately with respect to the work.

The apparatus 29 for supporting the quench head 10 and adjusting the position thereof with respect to work, includes an elongated base plate 30 fixed in any suitable manner across the framework 28, and spaced-apart vertical supports 31 and 32 extending upwardly from the ends of the base plate 30. The vertical support 31 comprises a pair of spaced-apart vertical plates 33 having the bottom ends thereof secured to the sides of the base plate 30, and the top ends thereof se-

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cured to a spacer bracket 34. A spacer plate 35 is provided in the gap between the vertical plates 33 and secured thereto at a region intermediate the top and bottom ends of the vertical plates.

Above the horizontal spacer plate 35 and in the gap between the vertical plates 33 is provided a block 36 which is slightly less in height than the distance between the plate 35 and the top spacer bracket 34. The bottom part of the block 36 is recessed to receive a roller 37 fixed to a short shaft 38 which is journaled in the block. To the bottom part of the block 36, at about the height of the roller 37, is fixed the outer end of the member 26 whose inner end is secured to the U-shaped frame 24, as previously explained.

The opposite vertical support 32 comprises a pair of spaced-apart vertical plates 40 having the bottom ends thereof secured to the base plate 30 and the top ends thereof secured to the bottom face of a spacer bracket 41 at notched regions thereof, as shown in Fig. 2. The inner faces of the vertical plates 40 are channelled to form vertically extending grooves 42 which extend upwardly from an intermediate reinforcing spacer plate 43 to a region adjacent to the top spacer bracket 41. The grooves 42 receive round or circular lugs 44 projecting from the opposing vertical edges of a rectangular-shaped block 45 which is adapted to move vertically in the gap between the vertical plates 40.

As best shown in Fig. 1, the opposing sides or faces of the rectangular block 45 are recessed and the intermediate portion 46 thereof of reduced thickness is formed with a circular opening to receive a rotatable cylindrical hub 47. The hub 47 is provided with a threaded opening which receives the threaded outer screw portion 48 of the member 27 whose inner end is fixed to the U-shaped frame 24, as previously explained.

The hub 47 is flanged at 49 to provide a shoulder which bears against the portion 46 in block 45 of reduced thickness, and to this flange 49 is secured a crank 50 for rotating the hub 47. The hub 47 is held in the rectangular block 45 by an apertured plate 51 which is fixed by cap screws 52 to the hub 47 and is of greater diameter than the central opening in the block 45.

To an apertured lug 53 fixed to the top part of the block 45 are pivotally connected the lower ends of a pair of connecting links 54, the opposite ends of which are pivotally connected to the lower end of a vertically disposed screw 55. The spacer bracket 41 is formed with a central opening through which the screw 55 extends. The top part of the central opening in the spacer bracket 41 is enlarged to form a well in which is journaled an internally threaded hub 56 of a bevel gear 57.

The screw 55 is in threaded engagement with and adapted to be moved axially by the hub 56 of the bevel gear 57 which meshes with another bevel gear 58 removably secured at 59 to a shaft 60. A crank 61 is removably secured at 62 to the shaft 60 which is journaled in a bracket 62 removably secured at 64 to the spacer bracket 41.

The U-shaped frame 24 and horizontally disposed members 26 and 27 connected thereto essentially form an elongated arm or carrier member upon which the quench head 10 is removably secured. To adjust the quench head 10 horizontally in a plane transverse to the direction of movement of work adapted to pass therethrough, the hub 47 is rotated by the crank 50, thereby imparting axial movement to the threaded outer part 48 of the member 27 to move the latter to-

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ward or from vertical support 31 depending upon which direction the crank 50 is rotated. In this way, the quench head 10 can be moved either to the left or right from the position shown in Fig. 1; and during such movement of the quench head 10, the roller 37 journaled in the block 36 moves on the horizontal spacer plate 35. By providing the roller 37 to loosely support one end of the carrier member for the quench head 10, the frictional resistance to horizontal adjustment of the quench head is at a minimum, thereby facilitating this adjustment of the quench head by turning movement of the crank 50.

To adjust the quench head 10 vertically in a plane transverse to the direction of movement of the work adapted to pass therethrough, the bevel gear 58 is rotated by the crank 61 which in turn rotates the bevel gear 57 and hub 56 fixed thereto, thereby imparting axial movement to the screw 55 to move the rectangular block 45 up or down depending upon which direction the crank 61 is turned. When the block 45 is moved vertically up or down from the position shown in Fig. 1, the U-shaped frame 24 and members 26 and 27 fixed thereto pivot about the axis of the roller 37 on the spacer plate 35.

The block 36 is of such height that a space is provided between the top thereof and the spacer bracket 34 to permit the block to tilt an adequate distance in a counter-clockwise direction from the position shown in Fig. 1 when the rectangular block 45 is moved upwardly by the screw 55; and the outer end of member 26 is fixed to the block 36 an adequate distance from the bottom thereof, so that the inner edge of the spacer plate 35 will not obstruct the desired tilting movement of the block 36 in a clockwise direction from the position shown in Fig. 1.

When axial movement is imparted to the screw 55 to move the rectangular block 45 up and down in the vertical support 32, it will be seen in Fig. 1 that provision must be made to permit the block 45 to tilt slightly in a counter-clockwise direction when the block 45 is moved up and to permit the block 45 to tilt slightly in a clockwise direction when it is moved down. This is so because the hub 47 always remains substantially normal and at a right angle to the axis of the member 27. It is for this reason that the round or circular lugs 44 are provided at the vertical edges of block 45 which ride in the channels 42 formed at the inner opposing faces of the plates 40.

The circular lugs 44 riding in the channels 42 permit the block 45 to tilt either to the left or right from the position shown in Fig. 1 when the horizontally disposed member 27 is moved to an inclined position from the more or less horizontal position of Fig. 1. Since the block 45 may move either in a clockwise or counter-clockwise direction from that shown in Fig. 1, the block 45 is pivotally connected by the links 54 to the lower end of the screw 55 to prevent binding and jamming of any parts of the mechanism when adjusting the quench head 10 vertically with respect to the work adapted to pass therethrough.

While the block 45 can move angularly toward the left or right from the position shown in Fig. 1, as just explained, the block 45 is otherwise more or less rigidly positioned in the vertical support 32. Thus, the vertical edges of the block 45 at each side of the circular lugs 44, indicated at 65 in Fig. 2, are closely adjacent to and overlie the regions of the inner faces of the vertical plates 40 at each side of the grooves 42, indicated at 66 in Fig. 1. Hence, as the block 45 is moved up

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and down between the vertical plates 40, the block 45 is prevented from moving angularly from the position shown in Fig. 2, thereby eliminating any likelihood of the block 45 jamming or tilting between the vertical plates 40. Likewise, the block 36 in the vertical support 31 is snugly disposed between the vertical plates 33 so that the quench head 10 will always remain in the desired vertical position. Further, the hub 47 is securely held in the central opening in the block 45 by the flanged portion 49 thereof and the plate 51 which bear against the opposing sides of the portion 46 of the block 45 which is of reduced thickness.

In view of the foregoing, it will now be understood that an improved apparatus has been provided for adjusting the position of a device, such as the quench head 10, which is employed for processing work. The quench head 10 can be adjusted both vertically and horizontally by an operator while remaining at one place by reason of the close proximity of the cranks 50 and 61. This is especially important when the framework 28 is of considerable width and extends for some distance in the direction of movement of the work. Also, in many instances the spaced-apart vertical supports for the device employed for processing work must be spaced quite a distance apart in order not to be subjected to excessive heating.

Hence, if the adjustments at each of the vertical supports 31 and 32 were made independently of the other, it would be necessary for two operators to make such adjustments or for one operator to go back and forth about the framework 28.

In accord with the instant invention a single operator can make all the necessary adjustments of the device at one side of the equipment. Further, all of the adjustments can be accurately made by simply turning the cranks 50 and 61, thereby avoiding the trial and error positioning of a device which is usually necessary when the vertical adjustments, made independently of each other at the two spaced-apart supports, affect the horizontal adjustments between the supports.

While I have shown and described a single embodiment of the invention, I do not wish to be limited to the particular arrangement set forth. Moreover, the invention may be applied equally well for accurately positioning devices, such as heaters, sprayers and material applying devices, for example, employed for processing work. I therefore aim in the following claims to cover all modifications and changes that fall within the true spirit and scope of the invention.

What is claimed is:

1. Apparatus of the character described comprising an elongated horizontally disposed carrier member carrying at a region intermediate the ends thereof a device for processing work, rolling means at one end of said carrier member, a first support for said carrier member upon which said rolling means rests and is adapted to move thereon, a second support at the opposite end of said member, said second support comprising mechanism including a first manually operable rotatable element for moving said member back and forth between said first and second supports and a second manually operable rotatable element for tilting said member up and down about said rolling means at said first support.

2. Apparatus of the character described comprising an elongated horizontally disposed carrier member carrying at a region intermediate

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the ends thereof a device requiring accurate positioning with respect to work, rolling means at one end of said carrier member, a first support for said carrier member upon which said rolling means rests and is adapted to move thereon, and a second support at the opposite end of said carrier member, said second support including adjusting means for moving said member back and forth between said first and second supports and additional adjusting means for vertically moving said member up and down about said rolling means at said first support.

3. Apparatus for adjusting a device to be used in processing work comprising an elongated arm to which said device is attached intermediate the ends thereof, a pair of parallel posts, a supporting member carried by said one of said posts, means attached to one end of said arm and operative to engage said member for lateral and pivotal movement thereon, mechanism receiving the other end of said arm and supported by the other of said posts operative to move said arm back and forth between said posts, and means carried by the other of said posts to shift said mechanism along said other of said posts and thereby change the angular position of said arm with respect to said pair of posts.

4. In a device for quenching elongated work, the combination of an annular quench head through which the work passes, a substantially horizontally extending member upon which said quench head is mounted, a pair of parallel vertically extending supports, cooperating means on one of said supports and one end of said member to mount the latter for horizontal and pivotal movement on said support, the other end of said member being threaded, a nut receiving said threads mounted for rotating movement in the second support, means to rotate said nut to thereby move said member back and forth between said supports, and means to raise and lower said nut in said support to thereby tilt said member relative to said supports.

5. In combination with a device for processing elongated work, a substantially horizontally extending member, means to mount said device on said member intermediate the ends thereof, a pair of parallel vertically extending supports, cooperating means on one end of said member and one support to mount said end of said member for horizontal and pivotal movement in said support, a rotatable part mounted in the second support, cooperating means between the other end of said member and said part to move said member back and forth between said supports upon rotation of said part, and means to move said part vertically in said second support to thereby tilt said member relative to said supports.

6. The combination of claim 5 in which the means to move said part includes a threaded member attached to said part, a nut receiving said threaded member, means to mount said nut for rotation and against axial movement in said second support and means to rotate said nut.

KRISTIAN SKIVENSEN.

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