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MACHINE FOR DRILLING, TAPPING, AND
INSERTING STOPS IN A PIPE

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2 Sheets-Sheet 2

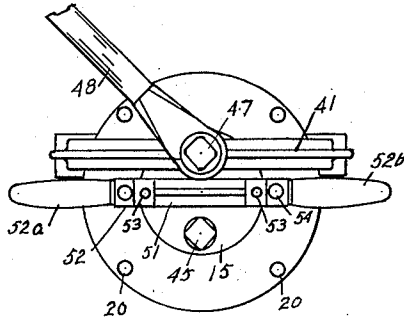


FIG. 2.

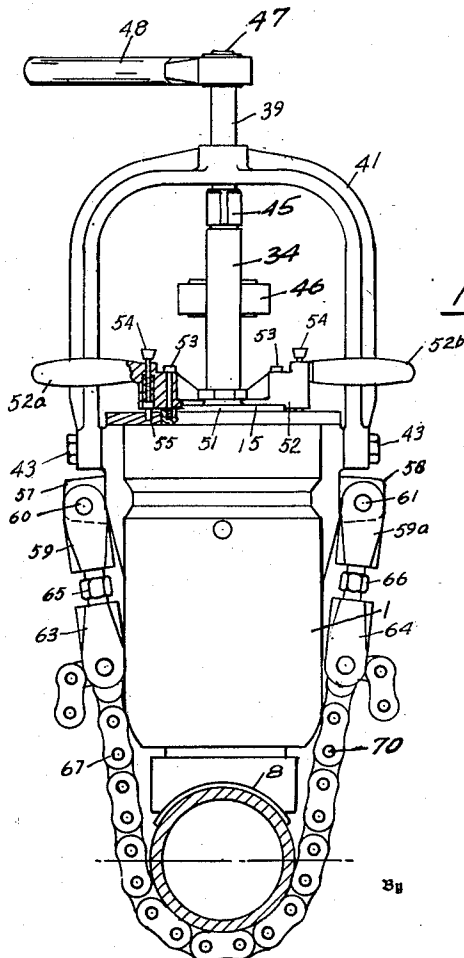


FIG. 3.

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MACHINE FOR DRILLING, TAPPING, AND
INSERTING STOPS IN A PIPENolan E. Dickason, Erie, Pa., assignor to Hays
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This invention relates generally to a machine for drilling a hole, tapping same, and threadably engaging a threaded member with the tapped hole and more particularly to such a machine for use in disposing a stop cock into the wall of a pipe or water main under pressure.

Machines of this character, made in accordance with the teachings of the prior art and with which I am familiar, must be taken apart after the drilling and threading of a hole in a pipe in order to insert a stop cock or other threaded member therein. The ratchet wrenches applied to these prior devices are a considerable distance from the pipe or main and a long lever arm is formed which tends to cause rotation of the device on the pipe. If the mandrel in these prior devices does not release from the stop cock, the operator must shut down the water main. In my device, the machine is stripped off of the mandrel and a wrench can be placed directly on the stop. Because of the short length of chain around the pipes in these prior devices, they are unstably mounted and provide a minimum of support for the machine. It has been necessary to tap holes substantially vertically with these prior devices, especially where accuracy must be obtained. The locking chain is only adjustable and detachable from one side in these prior devices and it is difficult to tighten or release them. In my device, the machine can be stripped off of the mandrel thereby permitting easy removal of the mandrel and in the event that the mandrel does not threadably release from the stop, a wrench may be placed directly on the stop. My machine is closer to the pipe thereby forming a short lever arm between the pipe and the point of application of a ratchet wrench. This minimizes any possibility of the machine rotating on the pipe. The supporting chain is carried up to a point high above the pipe near where the pulling is done, thereby lessening any possibility of rotation of my machine on the pipe. With the use of my machine, holes may be tapped at any angle. My chain is detachable from both sides and it may be adjusted from either side by double threaded members which tighten and release the chain at twice the speed as with the use of a single threaded member. I can vary the length of my chain. I have a simple release for my chain. If, by mistake, a cock is left open, it is exposed when my machine is stripped from the mandrel engaging the cock so that it may be closed prior to the time it does any damage. This is not true of prior devices. The engaging parts of my device such as sleeve bearings are

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easily removable and replaceable, thereby extending the life thereof indefinitely.

It is, accordingly, an object of my invention to overcome the above and other defects in machines for drilling and tapping a hole in a pipe under pressure and threading a stop cock in the tapped hole and it is more particularly an object of my invention to provide such a machine which is simple in construction, economical in cost, economical in manufacture, and efficient in operation.

Another object of my invention is to provide a machine adapted to clamp on a pipe and having shafts therein for holding a combined drill and tap and a stop cock respectively with means for rotating the shafts about a common center whereby they may assume the same aligned position over a particular point on a pipe.

Another object of my invention is to provide a ball thrust bearing assembly and novel sealing means in a machine for drilling a hole in a pipe under pressure, tapping same, and threading a stop cock therein to minimize friction.

Another object of my invention is to provide a novel assembly of parts in a machine for drilling and tapping a hole in a pipe under pressure, and for inserting a stop cock therein.

Other objects of my invention will become evident from the following detailed description, taken in conjunction with the accompanying drawings, in which

Fig. 1 is a transverse vertical sectional view of my novel machine;

Fig. 2 is a top plan view of my novel machine; and

Fig. 3 is an end elevational view of my novel machine with a part thereof broken away.

Referring now to the drawings, I show in Figs. 1 to 3 inclusive a cylindrical cup-shaped body 1 having an off-center opening 2 with a depending marginal flange 3 in the lower end thereof and stepped, annular inner shoulders 4 and 5 in the upper end thereof. The depending flanged portion 3 seats on a gasket 6 which in turn is seated on the inwardly extending flanged portion 7 of saddle 8 for seating on the outer side of a pipe. Different sizes of saddles may be utilized for adapting my machine to different sizes of pipe. An angularly extending apertured boss 9 is interiorly threaded for receiving a threaded plug 10, the boss 9 providing an entrance for a lubricant and a means to check for pressure and also release the pressure inside of the body 1. An annular, L-shaped ring 12 seats on the shoulder 5 of the body member 1. A ring gasket

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13 is disposed between the shoulder 5 and the bottom of ring 12 and it engages the top of a pressure seal assembly 14. A rotatable head 15 has an intermediate, outwardly extending, flanged portion 16 disposed in overlapping relationship with the lower leg of the L-shaped ring 12. A ball thrust bearing assembly 17 is juxtaposed on the outwardly extending flanged portion 16 of the member 15 and it is held in engagement therewith by an annular cap flange 18 with apertures 19 for receiving screw bolts 20 in threadable engagement with threaded apertures 22 in the outwardly extending portions 23 on the upper end of the body 1. The ball bearing assembly 17 permits easy rotation of engaging movable parts under pressure which forces it against the cap 18 on the upper end of the body 1. The cap flange 18 has an annular cut away portion 24 for receiving a conventional felt dirt seal or packing 25. The head 15 has diametrically opposed, apertured depending flanges 26 and 26a equi-distant from the center thereof internally threaded at 27 and 27a. The lower ends 28 and 28a of the apertured flanges 26 and 26a are flanged inwardly to seat replaceable sleeves 29 and 29a. The sleeves 29 and 29a are adapted to receive the shanks 33 and 34 of a tool holding member 35 and a stop cock holding mandrel or member 36 respectively. Gland nuts 30 and 30a threadably engage the threaded upper ends 27 and 27a of the apertured flanges 26 and 26a for engaging gland packings 31 and 31a in sealing relationship with the shanks 33 and 34. The upper ends of the shanks 33 and 34 have conventional center holes adapted to be engaged by the pointed end 38 of a feed screw 39 threadably engaging a threaded aperture 40 in an inverted, U-shaped, pivoted yoke 41. The yoke 41 is pivoted to the side of the body 1 by screw bolts 43. The upper ends 44 and 45 of the shanks 33 and 34 are square to engage a ratchet wrench 46. The upper end 47 of the feed screw 39 is also square to receive a ratchet wrench 48.

The head 15 has a diametrically extending groove 50 for receiving the bottom portion 51 of a handle member 52 with oppositely, outwardly extending handles 52a and 52b. The handle 52 is secured to the head 15 by cap screws 53. Spring urged stop pins 54 are carried on opposite ends of the handle 52 and are adapted to detachably engage recesses 55 in the cap flange 18.

The body 1 has diametrically opposite, outwardly extending, apertured ears 57 and 58 for pivotally securing clevises 59 and 59a by means of pins 60 and 61. Chain holders 63 and 64 are attached to the clevises 59 and 59a by chain tightening studs 65 and 66. A link chain 67 is detachably secured to the chain holders 63 and 64. I preferably provide removable pins 70 in some of the links in the chain 67 so that it may be readily shortened for small sized pipes.

I will explain the operation of my device with reference to the insertion of a stop cock into the wall of a pipe or water main under pressure; however, it should be understood that my machine may be utilized in any situation where it is desirable that two longitudinally movable and rotatable holding chucks or tools be aligned over one point on a surface.

In the operation of my novel machine, the saddle 18 is selected for the particular size of pipe in which a stop cock is to be threadably engaged. The chain 67 is then secured under the pipe and to the chain holders 63 and 64 as shown in Fig. 3. A combination drill and tap-

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ping tool 71 is then disposed in the tool holding chuck 35 and a stop cock 72 is disposed in the stop cock holder 36 as shown in Fig. 1. A ratchet wrench 46 is disposed over the square upper end 44 of the shank 33 and the pointed end 38 of the feed screw 39 is fed into the center hole in the upper end of the shank 33 by means of a ratchet wrench 48. Ratchet wrench 46 rotates the drilling and tapping tool holder 35 and ratchet wrench 48 moves it longitudinally through feed screw 39. Lubricant may be provided for the drilling and tapping through the apertured boss 9 in the side of the body 1. When the hole in the pipe is bored and tapped, the tool holder 35 is rotated in a counterclockwise direction after removing the feed screw 39 and the combination drilling and tapping tool 71 is moved up into the interior of the body 1 so that it can be rotated therein. The spring urged pins 54 in the handle 52 are then drawn out of engagement with the recesses 55 and the head 15 is rotated so that the stop cock 72 carried by the stop cock holder 36 is in alignment with the threaded aperture formed in the pipe at which time the spring urged pins 54 will engage suitably spaced recesses 55 in the cap flange 18. The stop cock holder 36 is then moved longitudinally until the stop cock 72 engages the tapped hole in the pipe after which it is rotated and engaged therewith. After the stop cock 72 is threadably engaged or inserted in the threaded aperture in the pipe, the chain 67 is released and the body 1 is pulled from the shank 34 of the stop cock holder 36. The holder 36 is then removed from the stop cock 72. Upon rotation of the head 15 to its original position as shown in Fig. 1 and the disposition of a new stop cock in the stop cock holder 36, my machine is ready to drill and tap another hole and insert a stop cock therewith.

It will be noted that in the drilling and tapping operation of my machine and the operation of inserting the stop cock, the hole in the pipe is sealed from atmosphere at all times inasmuch as the saddle 8 sealingly engages the pipe and all other parts are sealingly engaged. Rotation of the head 15 with the tool and stop cock holders 35 and 36 is simplified and made easy by the utilization of the ball thrust bearing assembly 17. The pressure seal assembly 14 prevents leakage.

It will be evident from the foregoing description that I have provided a novel machine for drilling a hole in a pipe or other vessel under pressure, tapping the hole, and then aligning a threadable member in alignment with the hole without exposing it to atmosphere and threadably engaging it with the threaded aperture formed by the tool of the machine. I have further provided a machine which has a ball thrust bearing assembly with an associated pressure seal assembly to permit a minimum resistance to the rotation thereof and to the movement of the moving parts.

Various changes may be made in the specific embodiment of my invention without departing from the spirit thereof or from the scope of the appended claims.

What I claim is:

1. A machine for drilling an aperture in a vessel, tapping same, and threadably engaging a threaded member with the formed tapped aperture within a sealed body comprising a vertically extending, cylindrical body having axially spaced, annular, internal shoulders, means for sealingly engaging the lower end of said body with a vessel, an L-shaped ring seated on the upper of said

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shoulders, a rotatable head having an outwardly directed flange overlapping the lower portion of said L-shaped ring and having diametrically opposed apertures equi-distant from the center thereof, a ball thrust bearing assembly mounted on the outwardly directed flange on said rotatable head and in engagement with the inner side of said L-shaped ring, a cap flange on said body engageable with the upper side of said ball bearing assembly, shafts extending through said apertures in said head and sealingly engaged therewith, a hinged yoke on said body, a feed screw for alternately engaging the upper ends of said shafts to feed them longitudinally, wrench engaging means on said shafts for rotating same, means on the lower ends of said shafts for attaching a tool and a threaded member respectively thereto, means for rotating said head and shafts under pressure whereby they may be aligned in the same position with respect to a point on said vessel, and a sealing ring mounted on the lower internal shoulder in said body.

2. A machine for drilling an aperture in a vessel, tapping same, and threadably engaging a threaded member with the formed tapped aperture within a sealed body comprising a vertically extending, cylindrical body having axially spaced, annular, internal shoulders, means for sealingly engaging the lower end of said body with a vessel, an L-shaped ring seated on the upper of said

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shoulders, a rotatable head having an outwardly directed flange overlapping the lower portion of said L-shaped ring and having diametrically opposed apertures equi-distant from the center thereof, a ball thrust bearing assembly mounted on the outwardly directed flange on said rotatable head and in engagement with the inner side of said L-shaped ring, a cap flange on said body engageable by the upper side of said ball bearing assembly, shafts extending through said apertures in said head and sealingly engaged therewith, a hinged yoke on said body, means on said shafts for rotating same, means on the lower ends of said shafts for attaching tools thereto, means for rotating said head and shafts under pressure whereby they may be aligned in the same position with respect to a point on said vessel, and a sealing ring mounted on the lower internal shoulder in said body.

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