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PIPE TAPPING MACHINES

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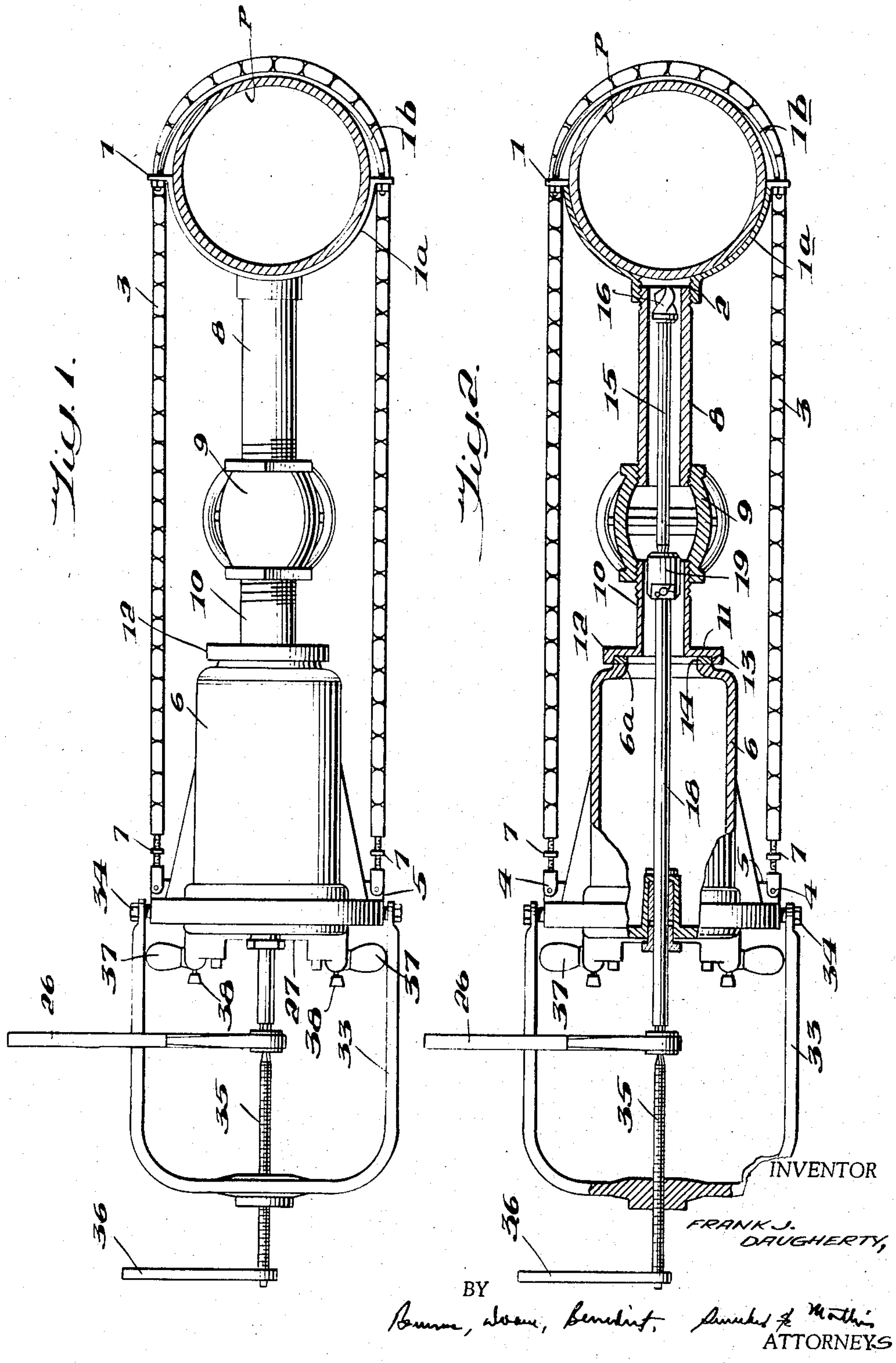

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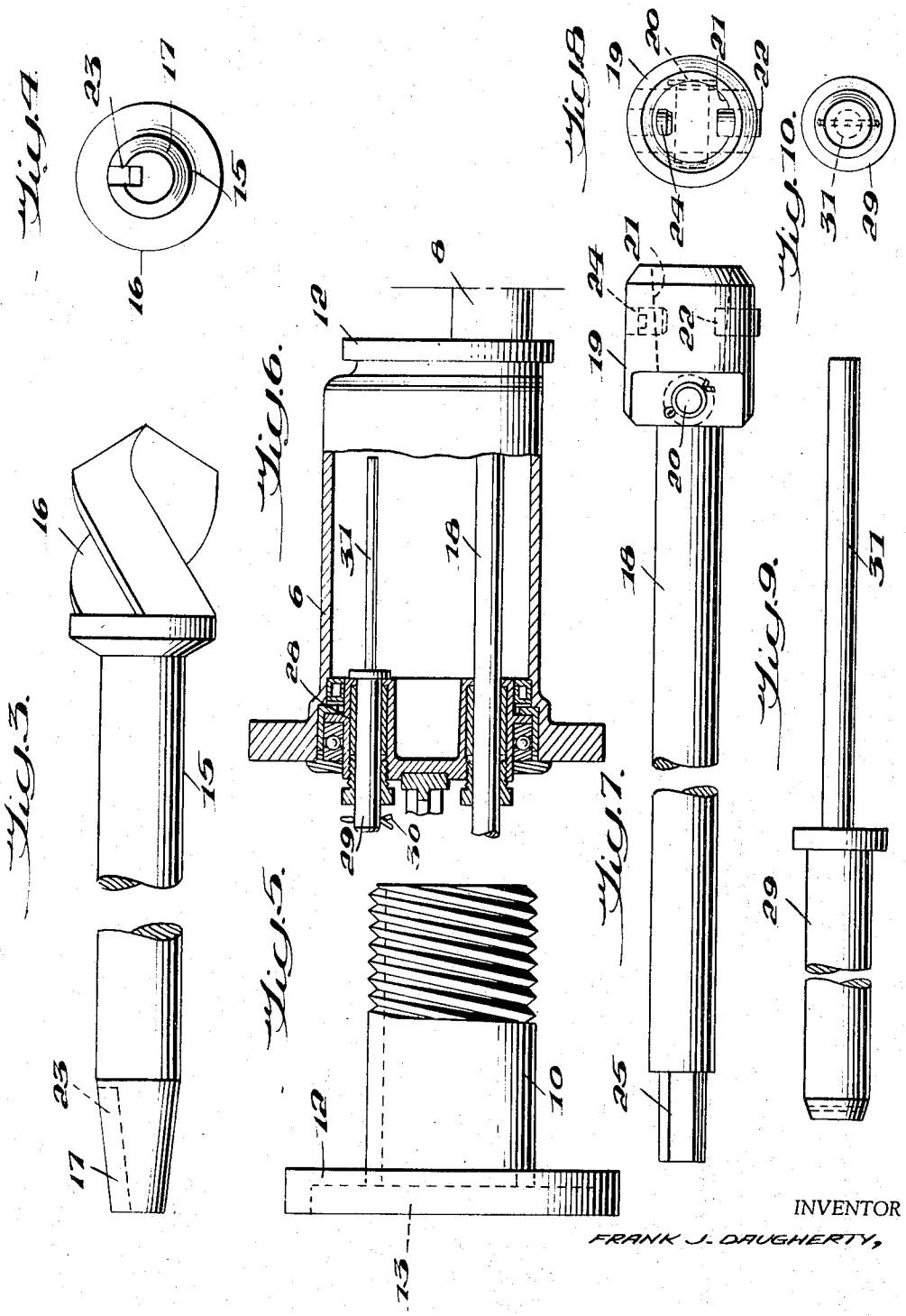

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PIPE TAPPING MACHINES

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This invention relates to improvements in pipe tapping machines and, more particularly, to such machines as are used for tapping water pipes and other lines under pressure.

Machines have been provided heretofore and are in use for tapping a water line under pressure in which the tap may be as much as one inch in diameter. However, where the size of tap exceeds one inch, the machines provided heretofore for the purpose have been much more expensive and complex than the relatively simple machines used for making a tap of a water line under pressure not to exceed one inch in diameter. It has long been desirable to provide machines that are less expensive and which will, nevertheless, be capable of making a tap size of a water line under pressure in excess of one inch, as for example, up to two inches and more.

One object of this invention is to simplify and improve machines for this purpose.

Another object of the invention is to provide a machine of comparatively simple and inexpensive construction which may be used for making a tap into a water line under pressure up to several inches in diameter.

Still another object of the invention is to provide for tapping a line under pressure without weakening the line, and, in fact, strengthening it.

These objects may be accomplished, according to one embodiment of the invention, by providing an elongated body having connected therewith a recessed footing, nipple and gate valve which are connected with the pipe to be tapped by a flexible clamp device, such as a chain. Extending through these parts are a shaft and tap having provision for operating the tap under pressure through a side of the pipe. By operating the shaft, the tap is made, after which the bit and shaft can be withdrawn into the body and the gate valve closed, and then the operating parts can be removed. This provides a comparatively simple structure which is inexpensive to build and simple to use, but is effective for making taps into water lines under pressure up to and including several inches.

This embodiment of the invention is illustrated in the accompanying drawings, in which:

FIG. 1 is a plan view of the machine in place on a water line;

FIG. 2 is a longitudinal sectional view therethrough;

FIG. 3 is a side elevation of the drill, removed;

FIG. 4 is an end elevation thereof;

FIG. 5 is a side elevation of a recessed fitting;

FIG. 6 is a detail section through the machine head;

FIG. 7 is a side elevation of an operating shaft;

FIG. 8 is an end elevation thereof;

FIG. 9 is a side elevation of a plug for the head of the body; and

FIG. 10 is an end elevation thereof.

The invention is shown as adapted for use in tapping a water line under pressure which may be formed by a pipe, generally designated at P. Such pipes are frequently made of steel, asbestos cement, or other materials, any of which are capable of being tapped by this machine.

The pipe P has a collar 1 applied thereto at the point where the opening is to be formed. While this collar can be of any well known construction, it is illustrated, as an example, as provided with a service saddle 1*a* secured to the pipe by a pair of straps 1*b*. The saddle 1*a* has a threaded opening 2 formed therein through which the tap may be made.

Extending around the pipe P is a flexible device, such as a chain 3, which is separate from the collar 1. The opposite ends of the chain 3 have clevises 4 thereon pivotally connected with ears 5 that extend laterally from opposite sides of an elongated body 6. These ends of the chain should be detachable from the body, for ready separation and removal therefrom. Adjustable means, such as a chain tightening stud 7, should be provided for the length of the chain 3, two of which are shown adjacent the clevises 4 at the opposite ends of the chain.

Connected with the threaded opening 2 in the saddle 1*a* of the collar 1 is an elongated nipple 8, one end of which is threaded into the opening 2 and the opposite end has threaded thereon the body of a gate valve, generally indicated at 9. The opposite side of the body of the gate valve 9 has threaded therein the sleeve portion 10 of a fitting 11. The fitting 11 has a recessed head 12 formed at one end of the sleeve 10 and extending laterally over the adjacent end of the body 6. The head 12 is recessed at 13 to receive therein a packing ring 14 interposed between the recessed face of the head 12 and the adjacent end of the body 6. It will be noted from FIG. 2 that the open end 6*a* of the body 6 is enlarged for freedom of passage of operating parts therethrough or access thereto. The body shown is of a well-known form used in tapping machines.

A drill bit is indicated generally at 15 and is elongated so as to provide a shank portion that extends outwardly in the nipple 8 and may extend through or substantially through the body of the gate valve 9 in the relation illustrated in FIG. 2. At one end, the drill bit is provided with a drill 16 thereon capable of forming a hole of the desired diameter through a side of the water line or pipe P upon rotation of the drill bit. At its opposite end, the shank of the drill bit 15 is provided with a male coupling member, generally indicated at 17.

Extending through the body 6 is a shaft 18 of sufficient length to extend into coupling engagement with the adjacent end of the drill 15. This coupling connection is illustrated as provided by a socket 19 (FIGS 7 and 8) rigidly connected with the end of the shaft 18 by a removable knockout pin 20.

The socket 19 has a recess in the open end thereof, generally indicated at 21, preferably complementary to the male connecting portion 17 on the drill bit 15 to receive the latter into the recess 21 of the socket. A pin or lug 22 extends into one side of the recess 21 to engage in a groove 23 in the connecting portion 17 of the drill bit 15 so as to form a driving connection between the shaft 18 and the drill bit. These parts are held secured in engaged relation by a set screw 24 which extends into the side of the socket 19 opposite from the pin 22. This means forms an operative driving connection between the shaft 18 and the drill 15 which will serve to rotate the latter upon rotation of the shaft 18.

The opposite end of the shaft 18 is squared or polygonal in cross section, as indicated at 25, for application thereto of a ratchet-type wrench, generally indicated at 26, so as to turn the shaft 18 manually to operate the drill 16.

The body 6 is elongated and hollow and may be of a conventional well known construction which need not be described in detail. However, it is preferably provided with a head 27 detachably mounted on a seat at the outer end of the body 6. Suitable means are provided for detachably securing the head on the body and for forming a bearing support and seal therebetween. Suitable means should also be provided to form a packing gland around the shaft 18 at the point where it extends through the head 27 so as to prevent leakage thereby while allowing for relative turning movement. If a conventional form of body 6 is used, this ordinarily has a valve assembly mounted in a packing sleeve 28 offset from the opening

through which the shaft **18** extends, which conventional valve assembly is not required with this invention. It may be replaced with a plug **29** detachably held in place by a cotter pin **30** through the upper end thereof. The lower end of said plug **29** is provided with an elongated handle **31** to facilitate insertion of the plug through the enlarged open end **6***a* of the body **6** and into place in the sleeve **28**.

A yoke **33** is pivotally connected at **34** on opposite sides of the body **6** capable of swinging movement to one or either opposite side thereof. A feed screw **35** is threaded through the closed side of the yoke **33** in axial alignment with the shaft **18** and into abutting relation with the end of this shaft. The end of the shaft **18** preferably has a recess therein to receive the end of the feed screw **35**. A handle **36**, such as a ratchet member, is applied to the end of the feed screw **35** for rotating the latter and thereby applying endwise pressure to the shaft **18**.

Handles **37** are applied to the head **27** of the body **6** for manipulating the latter and for turning it with respect to the body **6**. These handles **37** preferably are shorter than the inner spacing of the yoke **33** to permit swinging of the yoke to either opposite side. Locking pins **38** hold the head **27** against turning movement and may be withdrawn to permit of such turning when the conventional valve assembly is used therein.

The machine may be used for making taps in excess of two inches into water lines under pressure, as well as smaller sizes, if desired. In making such tapped opening into a water line, the clamp or strapped saddle, generally designated at **1**, is first applied to the water line P at the point where the tap is to be made. Then, connected with the threaded portion of the saddle, is the nipple **8** and gate valve **9**, with the valve member of the latter open. The fitting **10** is threaded into the opposite side of the gate valve **9**. The body **6** is then brought into alignment with its enlarged inner end bearing against the gasket **14** on the flange **12** of the fitting **10**. The flexible device, such as the chain **3**, is then extended around the pipe P and connected at its opposite ends with the ears **5** on the body **6**. These parts are then drawn up tight by the chain tightening studs **7** in the usual manner.

The drill bit **16** is inserted through the assembly, substantially as indicated in FIG. 2, with the shank **15** of this drill bit connected in the socket **21** of the holder **19** so as to rotate with the turning movement of the shaft **18**. The ratchet handle **26** is applied to the end of the shaft **18** and the feed screw **35** is brought into alignment therewith. The parts are then ready for operation. The swinging movement of the handle **26** causes the drill bit **16** to cut into the side of the pipe P, which cutting motion continues while feeding the assembly inward by the rotation concurrently therewith of the feed screw **35** by the ratchet handle **36**. This movement continues until the pipe has been penetrated by the drill bit.

The drill **16** can then be withdrawn past the gate valve **9**, together with the shank **15** thereof and the shaft **18**. The gate valve can then be closed to hold the pressure of the line. The chain **3** is then released and the body **6** and fitting **10** removed without releasing the pressure on the line. The clamp **1**, nipple **8** and valve **9** remain on the pipe P, permitting the branch line to be connected into the valve **9** and controlled thereby.

The clamp **1** around the pipe at the point of tapping prevents breakage of the pipe during the drilling thereof. It strengthens the pipe and remains in place during subsequent use.

The construction is simple and inexpensive to build. It may be used for any desired size of pipe to make either small or large openings therein under pressure.

While the invention has been illustrated and described in one embodiment, it is recognized that variations and changes may be made therein without departing from the invention.

I claim:

In a pipe tapping machine, the combination with an elongated tapping body having one end thereof substantially open, and means for closing the opposite end of a pipe clamp with a saddle and clamp arranged to encircle a pipe to be tapped, said saddle having a threaded opening in a side thereof, a valve intermediate the pipe clamp and the tapping body, a nipple connected with one side of the valve and with the threaded opening, a fitting connected with the opposite side of the valve and with the open end of the tapping body, and a chain pivotally connected at opposite ends with the tapping body in position to extend in embracing relation around the pipe to hold the parts in aligned relation securely on the pipe during tapping, said fitting and tapping body being held in aligned relation by the clamping relation of the chain, and a drill having an operative driving connection with the tapping body for movement therethrough into tapping engagement with a side of the pipe.

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