

Oct. 19, 1926.

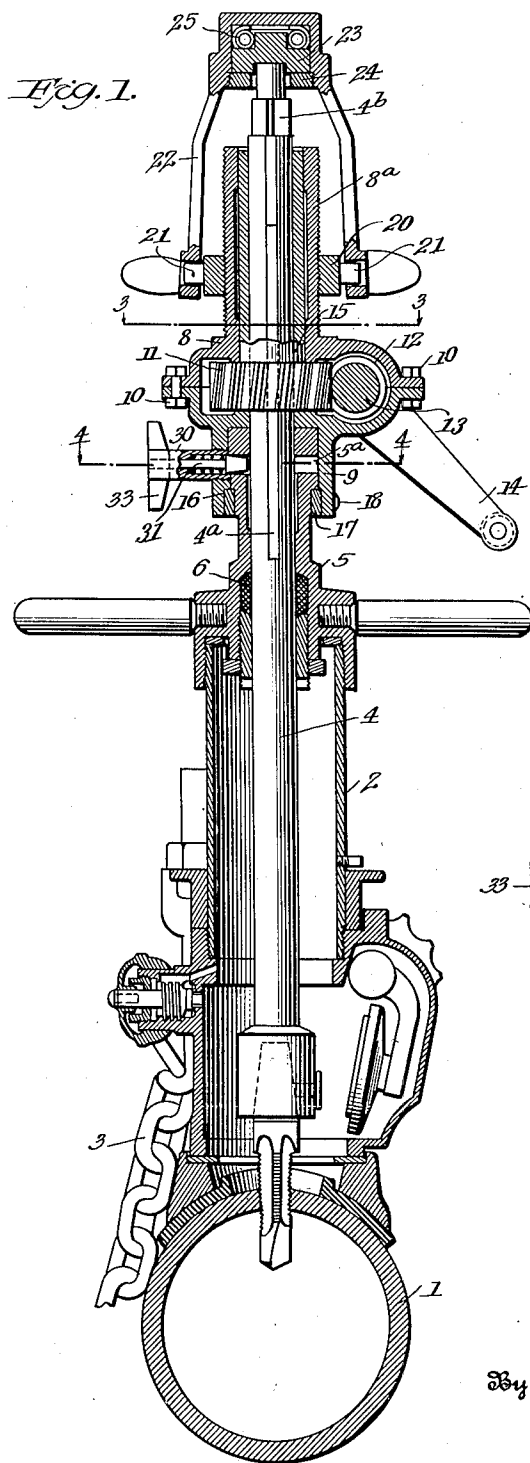
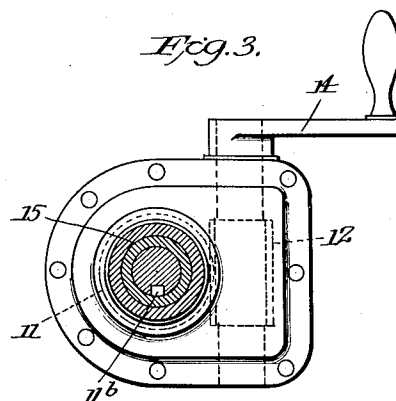
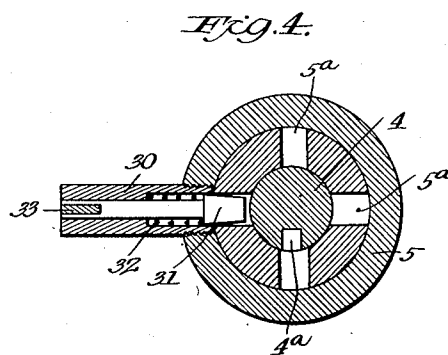
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MACHINE FOR TAPPING MAINS

Filed Dec. 31, 1925

2 Sheets-Sheet 1



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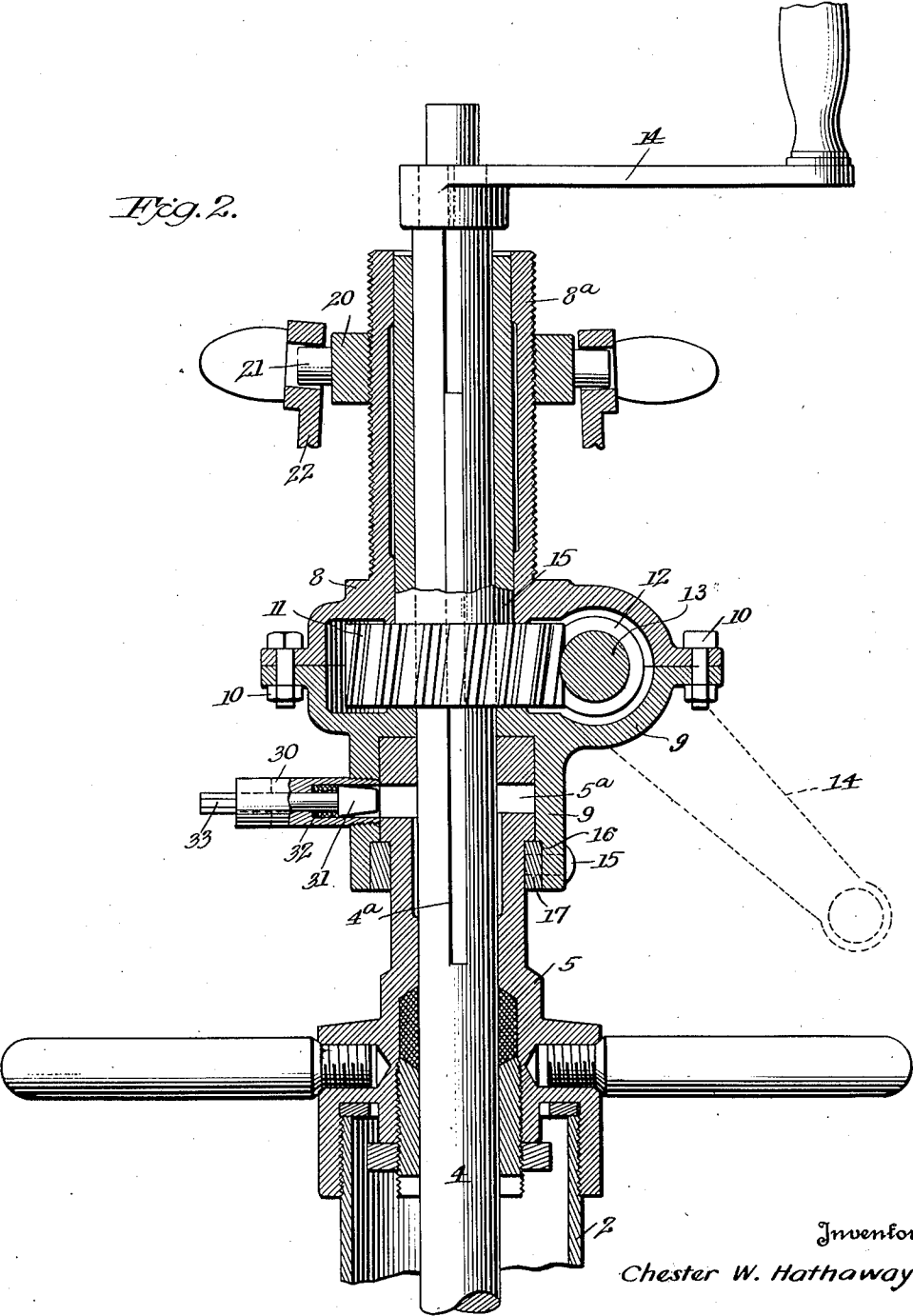
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2 Sheets-Sheet 2

Fig. 2.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR TAPPING MAINS.

Application filed December 31, 1925. Serial No. 78,720.

The present invention relates to improvements in machines for tapping mains for fluid under pressure, such as gas and water, and consists in the construction and arrangement of parts that will be hereinafter particularly described and claimed.

In the accompanying drawings:—

Figure 1 is a sectional elevation of a main tapping machine, having an embodiment of the present invention applied thereto.

Figure 2 is a similar section on an enlarged scale of the improvements showing the parts in position assumed when the boring tool is to be withdrawn from a main.

Figure 3 is a horizontal section substantially on the line 3—3 of Figure 1.

Figure 4 is a similar view substantially on the line 4—4 of Figure 1.

In the drawings, 1 designates a gas or water main, and 2 the body of the cylindrical casing of a tapping machine, which is customarily secured in position on the main by suitable means, such as a chain 3.

The form of tapping machine proper illustrated in the accompanying drawing is of a well known type comprising the casing 2, and a boring bar 4, which extends longitudinally through the casing. As usual, the casing 2 is closed at its upper end by a tubular cap 5, within which is arranged a packing or stuffing box 6 that closely surrounds the boring bar 4.

The operation of the parts of the tapping machine proper illustrated will be readily understood by those skilled in the art, and it is not thought to be necessary to describe these more in detail here.

According to the present invention, the boring bar 4 is made somewhat longer than the tapping machines as heretofore commonly constructed, and the upper or outer end of such bar extends through a sectional sleeve or casing and projects slightly beyond the upper end thereof.

The sleeve or casing referred to comprises two sections 8, 9, which are detachably connected, as by bolts 10, the meeting ends of said sections being expanded or enlarged to provide a gear casing or housing within which are arranged a worm gear 11 and a worm 12, the latter being secured to a shaft 13 mounted in bearings on the casing and provided at one end with a handle or crank 14, by which it may be rotated.

The boring bar 4 is provided with a lon-

gitudinal extending groove 4^a, within which is fitted a key 11^b on the gear 11, so that while the bar will be rotated with the gear 11, it is also possible to move the same longitudinally relative to said gear to move the lower end toward and from the main as is required in operating the tapping machine.

It will be seen that the gear 11 is provided with an elongated upwardly projecting hub 15, which has a bearing in the upper portion 8 of the sectional sleeve or gear casing before referred to. This elongated bearing, provided by contact between the hub 15 and the surrounding portion of the sectional casing, serves to maintain the gear and other parts in proper relation and hold the boring bar in the desired position.

The upper end of the cap 5 of the cylindrical casing 2 of the tapping machine is enlarged to provide an annular shoulder 16. This upper enlarged portion of the cap extends into a socket formed in the lower member 9 of the sectional casing and gear housing and an annulus or ring 17 secured to the lower end of said member 9 cooperates with the shoulder 16 to prevent the gear casing from being lifted vertically out of engagement with the cap 5.

As is customary in tapping machines, longitudinal movement of the boring bar 4 is effected through a connection between a nut 20 and the upper end of said bar, whereby as the nut is rotated pressure will be applied to force the bar downward.

The nut 20 engages a threaded section 8^a of the sectional gear casing, and said nut is provided with diametrically opposite trunnions 21, on which are mounted the members of a yoke 22.

The upper end of the boring bar is reduced and extends into a socket formed in a plug 23, which is received in the socket formed in the closed end of the yoke 22, a suitable nut 24 being provided for retaining this plug in engagement with the yoke. Preferably anti-friction balls 25 are interposed between the end of the yoke, and the plug 23, so that rotation of the boring bar will not be retarded.

The gear casing and parts carried thereby are adapted to be maintained in rigid relation to the cylinder 2 of the tapping machine, while the boring bar is being actuated to penetrate the main 1, or to apply a fitting to such main, the connection between

the casing members being adapted to be released so that the gear casing and boring bar may be freely rotated together relative to the body of the tapping machine in order to withdraw the tool at the inner end of the bar from engagement with the main.

Various forms of detachable locking means for effecting this purpose may be provided. As shown, the depending skirt-like portion of the lower section 9 of the gear casing is provided with a laterally extending tubular branch 30, within which is arranged a reciprocating locking pin 31 adapted to enter any of a plurality of sockets or radial apertures 5^a formed in the outer enlarged section of the cap member 5 of the tapping machine. As shown, there are four of these apertures 5^a, and the pin 31 is adapted to enter any one of these. By these means the position of the gear casing relative to the casing of the tapping machine may be varied so that the actuating crank arm 14 will be arranged for easy manipulation in the particular trench or pit in which the machine is to be operated.

The locking pin 31 is constantly pressed toward the boring bar by a coiled spring 32, which is arranged between a shoulder or abutment in the bore of the member 30 and the head of the pin 31. The outer end of the stem of the pin 31 is shown as bifurcated, and within the bifurcation is secured a wing member 33. When the parts are in operative position to prevent relative rotation between the gear casing and the cap of the casing of the tapping machine proper, this wing member 33 is within a suitable slot formed in the outer end of the lateral projection 30. By exerting pressure outward on this enlarged, wing-like, head, the pin will be withdrawn from the cooperating socket or aperture 5^a, and when thus withdrawn a quarter turn of the pin will position the enlarged head 33 at right angles to the slot in the plug 30, and cause such head to cooperate with the outer end of the plug to retain the parts in the position shown in full lines in Figure 2.

When the machine is operated to produce a cut in the wall of the main 1, or to effect the connection with the main of a corporation stop, for example, the boring bar will be rotated by turning the shaft 13, and gears 12 and 11, longitudinal feeding movement of the bar being produced by occasionally rotating the nut 20 and through the plug 23 within the closed end of the yoke 22, forcing the bar downward.

This operation involves a relative slow rotation of the boring bar, and after the desired cut in the main has been effected, the bar may be more rapidly disengaged by first moving the yoke 22 upward slightly on the threaded section 8^a of the gear casing and disconnecting it from the upper end of

the boring bar, after which the crank 14 may be engaged with a polygonal section 4^b at the outer end of the projecting bar, and when the locking pin 31 is adjusted to disconnect the casing member 9 from the cap 5, the bar may be rapidly rotated. During this rapid rotation of the boring bar the entire gear casing and gear contained therein rotate with the bar relative to the tapping machine proper.

It is believed that the operation and advantages incident to the improvements will be readily understood from the foregoing description in connection with the drawings.

It will be seen that applicant's invention provides a very simple means by which the boring bar of a tapping machine may be positively actuated by gears, and, when desired, the bar may be rapidly rotated in a reverse direction to disconnect the tool carried thereby from the main.

Having thus described the invention, what is claimed as new is:—

1. In a machine for tapping mains, the combination with a casing adapted to be secured to a main, and a boring bar extending through the outer end of said casing, of a sectional sleeve rotatably surrounding the casing adjacent its outer end, a shaft journaled in bearings on said sleeve, gearing housed within the sleeve and connecting said shaft and boring bar, for rotating the bar while permitting longitudinal movement thereof, connections between said sleeve and the boring bar for feeding the bar longitudinally, and an adjustable connection between said sleeve and casing normally holding said parts in rigid relation and adapted to be adjusted to permit the sleeve and gearing housed therein to turn with the boring bar relative to the casing.

2. In a machine for tapping mains, the combination with a casing adapted to be secured to a main, and a boring bar extending through the outer end of said casing, of a sectional sleeve rotatably surrounding the casing adjacent its outer end, a shaft journaled in bearings on said sleeve, gearing housed within the sleeve and connecting said shaft and boring bar, for rotating the bar while permitting longitudinal movement thereof, connections between said sleeve and the boring bar for feeding the bar longitudinally, and a latch member carried by the sleeve and adapted to engage the casing at any of a plurality of points to maintain a rigid connection between said parts or to be positioned to permit the sleeve and gearing housed therein to turn with the boring bar relative to the casing.

3. In a machine for tapping mains, the combination with a casing adapted to be secured to a main, and a boring bar extending through the outer end of said casing, of a sectional sleeve rotatably surrounding the

casing adjacent its outer end, a shaft journaled in bearings on said sleeve, gearing housed within the sleeve and connecting said shaft and boring bar, for rotating the bar while permitting longitudinal movement thereof, connections between said sleeve and the boring bar for feeding the bar longitudinally, a plurality of circumferentially spaced sockets or apertures being formed in the portion of the casing surrounded by the sleeve, and a lock pin carried by the sleeve and adapted to engage any of said sockets or apertures and hold the sleeve in rigid relation to the casing, the sleeve and gearing housed therein being rotatable with the boring bar relative to the casing when said pin is withdrawn from engagement with the casing.

4. In a machine for tapping mains, the combination of a casing adapted to be secured to a main, a boring bar extending through the outer end of the casing, a sectional sleeve loosely surrounding the casing adjacent its outer end, and provided at an intermediate point in its length with an enlarged portion constituting a gear housing, a gear within and completely enclosed by said housing engaging the boring bar to rotate it but permitting longitudinal movement of the bar relative to said gear, said gear having an elongated hub portion surrounding the boring bar and having a bearing in the sleeve above the gear housing portion thereof, means for actuating said gear extending to the outside of the housing, and connections between the sleeve and boring bar for effecting longitudinal movement of the boring bar.

5. In a machine for tapping mains, the combination of a casing adapted to be secured to a main, a boring bar extending through the outer end of the casing, means for rotating the boring bar, an externally threaded sleeve surrounding the boring bar between its outer end and the casing and connected with the latter, a nut engaging the thread on said sleeve, a yoke pivotally connected to the nut and extending across the outer end of the boring rod, a plug having a socket receiving the outer end of the boring bar, means securing said plug in position within the outer end of the yoke, and anti-friction balls arranged between said plug and the closed end of the yoke.

6. In a machine for tapping mains, the

combination of a casing adapted to be secured to a main and having an annular flange about its outer end, a boring bar extending through the outer end of the casing, a sectional sleeve surrounding the casing adjacent its outer end and having a member extending beneath said flange and preventing separation of the casing and sleeve in the direction of the length of the latter, gearing within the sleeve adapted to rotate the boring bar, a crank outside the sleeve for actuating the gearing, means cooperating with the boring bar and sleeve for feeding the boring bar longitudinally, and adjustable means normally holding the sleeve in rigid relation with the casing and adapted to be positioned to permit the sleeve and gearing to rotate with the boring bar relative to the casing.

7. In a machine for tapping mains, the combination with a casing adapted to be secured to a main, a cap for the outer end of said casing, a boring bar extending longitudinally through said cap, a worm gear splined to the boring bar, a support for said gearing on the casing cap and adapted to be turned about the axis of the boring bar, an actuating worm for the gear, means for effecting longitudinal movement of the boring bar relative to the gear, and means normally holding the worm gear support against movement relative to the casing cap and adapted to be adjusted to permit said support and the gearing to rotate bodily with the boring bar.

8. In a machine for tapping mains, the combination with a casing adapted to be secured to a main, a boring bar extending longitudinally through the outer end of said casing, a sleeve rotatably surrounding the casing adjacent its outer end, gearing supported by said sleeve and engaging the boring bar to rotate it while permitting longitudinal movement thereof relative to the gearing, means for effecting such longitudinal movement of the bar, and an adjustable spring pressed lock pin extending radially of the sleeve and normally engaging the casing to hold said parts in rigid relation, the sleeve and gearing being rotatable with the boring bar relative to the casing when said pin is adjusted to inoperative position.

In testimony whereof I have hereunto set my hand.

CHESTER W. HATHAWAY.