J. M. HILL.

MACHINE FOR TAPPING MAINS, &c.

APPLICATION FILED MAY 18, 1911.

1,045,289. Patented Nov. 26, 1912.

Fig. 1.

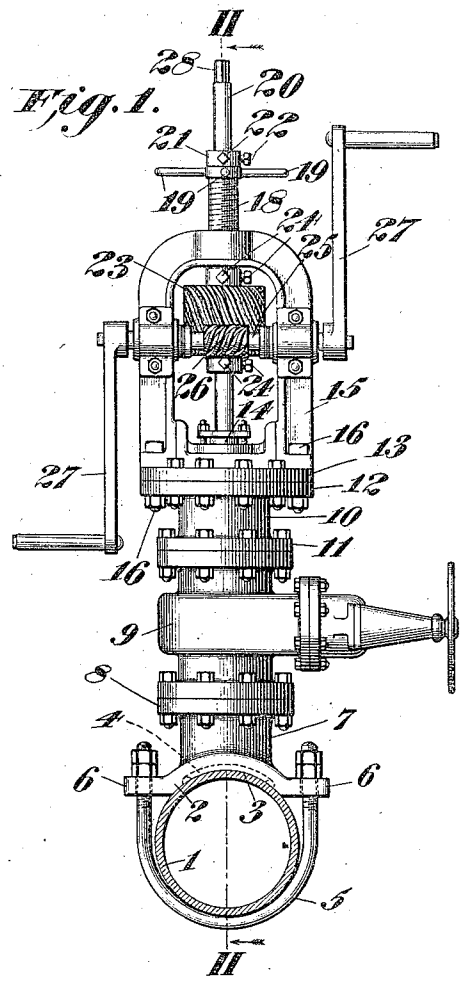


Fig. 2.

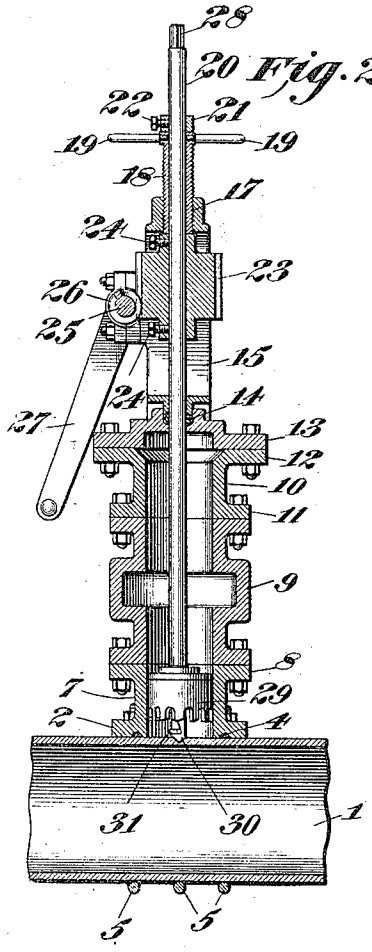


Fig. 3.

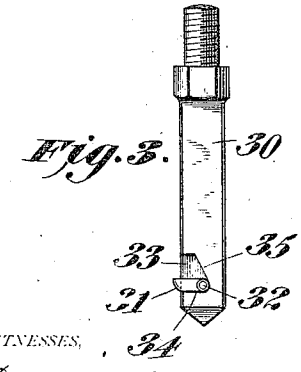


Fig. 4.

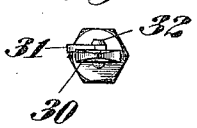


Fig. 6.

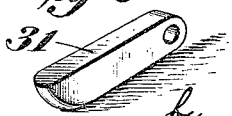
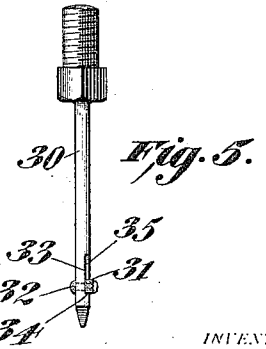


Fig. 5.



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MACHINE FOR TAPPING MAINS, &c.

1,045,289. Specification of Letters Patent. Patented Nov. 26, 1912.

Application filed May 18, 1911. Serial No. 627,949.

To all whom it may concern:

Be it known that I, JOHN M. HILL, a citizen of the United States, residing in the city of Johnstown, in the county of Cambria and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Tapping Mains, &c.; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in machines for making openings in service mains, pipes, tanks or similar constructions and providing small but efficient connections thereto.

One of the objects of my invention is to provide a machine for tapping water, gas, steam, oil or other pipes, and the like, and making branch connections therefrom, or thereto, without the necessity of shutting off the pipe to be tapped, which would interfere with the service of the same throughout the district where the connection is to be made.

Another improvement in my device is the manner in which I form and mount the driving worm and driven worm wheel, which enables them at all times to be in mesh while raising and lowering the drill and the milling tool.

Another object is to provide a means for removing the severed disk section of the main or pipe which has been cut therefrom, by the milling tool or cutter.

The objects of my invention will be further pointed out in the following specification and claim, reference being had to the accompanying sheet of drawings in which:—

Figure 1 is a front elevation of my improved device with its attachments on the main, the main being shown in cross section. Fig. 2 is a vertical section taken on the line II—II of Fig. 1 showing parts in elevation. Fig. 3 is a front elevation of the pilot drill. Fig. 4 is an end elevation of the pilot drill; Fig. 5 is a side elevation of the same, and Fig. 6 is a detail view of the pivoted finger.

Referring to the various characters of reference upon the drawings 1 indicates the main upon which I mount a saddle 2 having its lower face concaved to conform with the contour of the main or pipe as at 3, with an annular groove 4 half-round in cross section thereon, for the reception of packing. U-bolts 5 pass under the main, having their ends screw-threaded and extending upwardly through holes in the outwardly extending flanges 6 on the saddle 2 and provided with nuts on the outer ends of said U-bolts 5, which securely clamp the two together, while the annular packing ring which may be composed of rubber, composition, soft metal, or any other suitable substance, acts as a gasket to prevent leakage.

The branch pipe 7 formed integral with, or connected to, the saddle, extends outwardly and has a flange 8 around its outer edge to which is bolted or otherwise secured, the corresponding flange of a gate valve casing 9.

The separator or extension coupling 10 has a lower flange 11 bolted to the upper flange of the gate valve casing in a manner similar to that of the branch pipe, and is provided with an upper flange 12 of slightly larger diameter, to which is bolted the base casing 13 of my tapping machine, which has a gland in its center as indicated at 14, through which a drill stock passes as shown.

The numeral 15 indicates the yoke or supporting frame, which is of general U-shape in cross section, and inverted so that its ends, which are flanged, are secured to the base casting 13 and the upper flange 12 of the separator or extension coupling 10 by means of the bolts 16. A hole through the arched central portion of the yoke or frame is screw threaded internally as shown at 17; in this is an annular sleeve 18, provided with hand rods 19 at its upper end. The outer periphery of said sleeve 18 is threaded and serves as a feed screw to raise and lower the drill stock 20 which passes through the center of same.

A collar 21 is placed on the top end of the sleeve 18 and is adjustably screwed to the drill stock 20 by means of the set bolts 22. An elongated worm-wheel 23 is attached to the drill-stock 20 under the sleeve 18 by means of the set bolts 24. The driving shaft 25 is provided with a worm 26 mounted on, or formed integral therewith; which meshes with the worm-wheel 23, and is mounted in bearings on either side of the yoke or supporting frame 15. The ends of the shaft 25 are squared to receive the crank arms 27 for operating the tapping machine. The drill-stock 20 has its upper end squared as shown at 28 upon which one of the crank

arms 27 may be placed to turn the drill-stock direct, if desired. A milling cutting tool 29 is attached to the lower end of the drill-stock having its external diameter substantially the same as the interior of the branch pipe 7.

30 is a pilot drill attached to the lower end of the drill-stock in the center of the milling tool and extending a short distance beyond the same in order to pierce the center of the section of the main or pipe to be cut out before the milling tool begins the operation of cutting out the disk section. A finger 31 having its outer edge rounded, is pivotally riveted or bolted to the pilot drill 30 as indicated at 32. The recess 33 has a horizontal shelf portion 34 upon which the finger 31 normally rests, and also has inclined rear edge 35 as shown. The rounding of the outer curved end of the finger 31 prevents it from cutting or sticking in the wall of the drilled hole. With this construction, while the pilot drill is passing through the wall of the main or pipe, the outer end of the finger 31 will swing upward and backward until it comes in contact with the rear inclined edge 35 where it will remain until the end of the pilot drill has passed through the side of the main far enough to allow the finger to fall by gravity, when it will drop to its normal position, and will thereby retain the severed disk of the main or pipe section after it has been cut out by the milling tool.

Having thus given a description of my apparatus, I will now describe its operation as follows:—The saddle 2, the gate valve casing 9, the separator or extension coupling 10 and the base casting 13 to which my tapping machine with its various parts are attached, are mounted on the main pipe 1 in the position shown in Figs. 1 and 2. The crank arms 27 are then turned in the usual manner, and at the same time the screw threaded sleeve 18, acting as the feed screw, is fed downward by means of the handles 19 which lowers the drill-stock 20, as the screw threaded sleeve 18 is confined on the drill-stock between the collar 21 and the worm-wheel 23. As the drill-stock continues to be lowered the pilot drill 30 pierces the main 1, the finger 31 swings upward and backward until it approaches the inclined edge 35 of the recess where it will remain until after the pilot drill has passed through the main a sufficient distance to release the finger when it will fall to a horizontal position, or at right angles to the drill axis, inside the main. As the drill-stock continues to be fed forward the milling tool comes in contact with the main and being advanced, severs the disk portion from the main, while the finger on the pilot drill retains the severed disk and prevents it from falling within the main. It will be noticed that as the drill-stock is advanced the worm-wheel will also be advanced, as it is rigidly secured to the stock by set bolts, but on account of its being elongated, the worm 26 will always be in mesh with the worm-wheel, and this construction, which is simple and efficient, forms a particular feature of my invention. After the disk portion has been cut from the main 1 the set bolts 24 of the worm-wheel are loosened, which will allow the drill-stock to be raised until the milling-tool and pilot drill with disk attached are within the separator or extension coupling 10. The valve within the casing 9 is then closed, and the bolts which unite the separator or extension coupling 10 with the upper flange of the valve casing, may be taken out and the tapping machine removed. After this is done a branch pipe or connection is secured to the outstanding flange of the valve casing 9 and the operation is finished in-so-far as the use of my tapping machine is concerned. The saddle and attached valve are left on the main and form part of the permanent connection, which is smaller and neater than customary heretofore.

Although I have shown and described my improvements in considerable detail, I do not wish to be limited to the exact and specific details shown and described, but may use such substitutions, modifications or equivalents thereof, as are embraced within the scope of my invention or as pointed out in the claim.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

In a machine for tapping mains, a cylindrical drill-stock, cutting devices attached to the inner end thereof, an elongated worm-wheel axially mounted on said drill-stock, a revoluble worm in constant mesh with said worm-wheel, an annular externally threaded feed screw revolubly mounted on said stock near the outer end thereof, the lower end of said feed screw abutting said worm-wheel and the outer end thereof abutting a collar removably mounted on said drill-stock, whereby said drill-stock may be readily revolved, lowered or raised, as desired, while said worm and worm-wheel are constantly in mesh.

In testimony whereof I hereto affix my signature in the presence of two witnesses.

JOHN M. HILL.

Witnesses:
ELMER SEAVEY,
ROBERT A. BEERS.