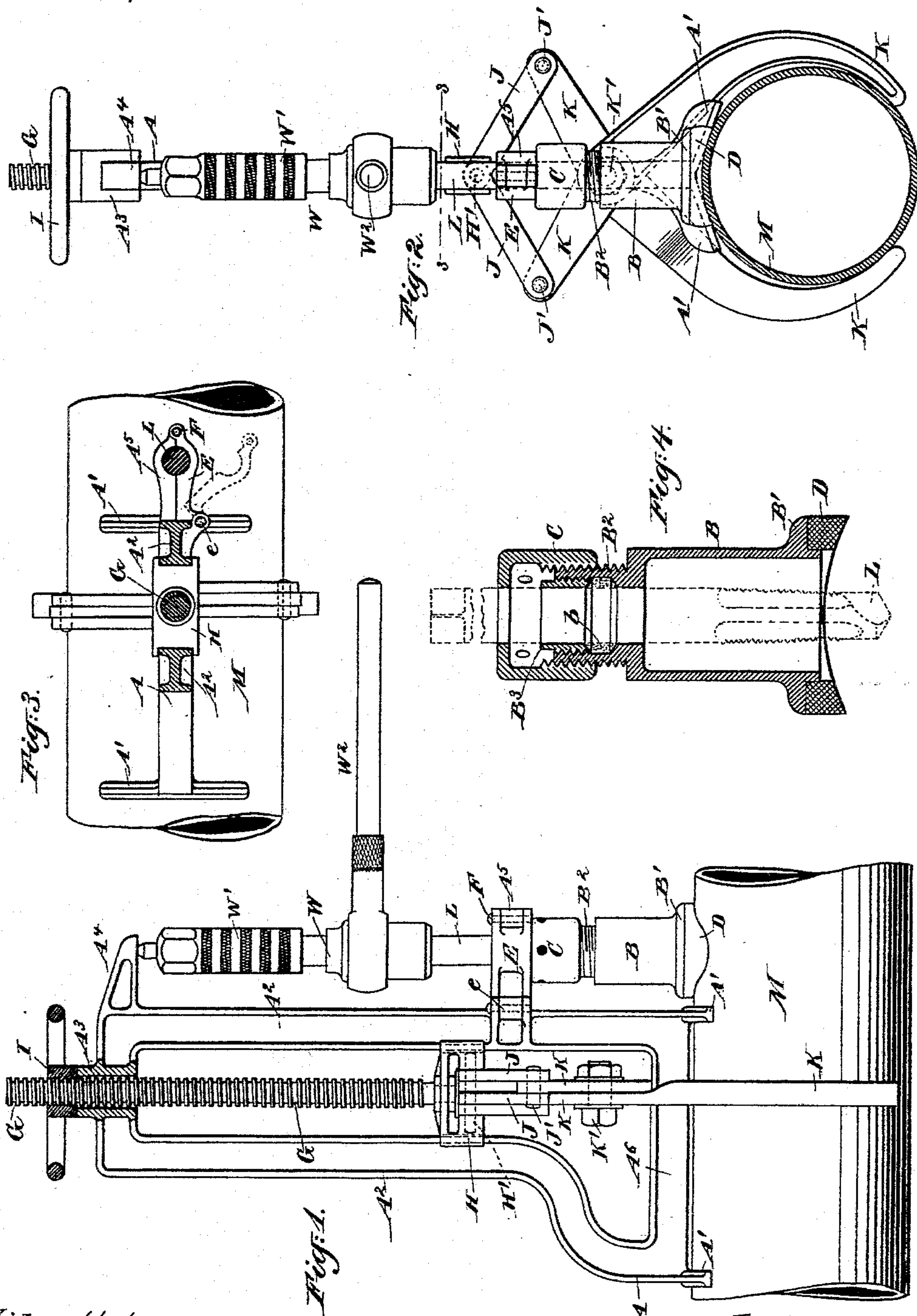


(No Model.)

M. F. SMITH.
TOOL FOR DRILLING AND TAPPING PIPES.

No. 515,976.

Patented Mar. 6, 1894.



Witnesses:

Charles R. Searle.
H. A. Johnston.

Inventor:

Millard F. Smith
by his attorney
Thomas Drew Nelson

UNITED STATES PATENT OFFICE.

MILLARD F. SMITH, OF BROOKLYN, NEW YORK, ASSIGNOR TO HIMSELF AND
CHARLES P. ADAMS, OF SAME PLACE.

TOOL FOR DRILLING AND TAPPING PIPES.

SPECIFICATION forming part of Letters Patent No. 515,976, dated March 6, 1894.

Application filed September 14, 1893. Serial No. 485,450. (No model.)

To all whom it may concern:

Be it known that I, MILLARD F. SMITH, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Tools for Drilling and Tapping Pipes, of which the following is a specification.

I use the long-approved drill-tap adapted to serve both as a drill and as a tap, driven by a ratchet lever. The improvement involves novel means both for securing the tool to the pipe and for inclosing and supporting the drill-tap to prevent the escape of fluid during and after the operation, and for conveniently removing and replacing it.

A single machine may be employed to treat pipes of a range of diameters from two (2) to twelve (12) inches. Another machine may treat pipes of diameters from twelve (12) to thirty (30) inches. I will describe the machine or tool as used for treating gas-pipes.

The accompanying drawings form a part of this specification and represent what I consider the best means of carrying out the invention.

Figure 1 is a side elevation of the machine showing the parts adjusted for use on a pipe of medium size. Fig. 2 is a corresponding view at right angles to that in Fig. 1. Fig. 3 is a horizontal section on the line 3—3 in Fig. 2. Fig. 4 is a central vertical section through a portion on a larger scale. The position of the drill-tap is indicated by dotted lines.

Similar letters of reference indicate corresponding parts in all the figures where they appear.

M is the pipe to be drilled and tapped.

A is the framing of cast iron, certain portions being designated, when necessary, by super-numerals.

A', A', are feet, each having a face formed with two inclines adapted to rest firmly on the pipe.

A², A², are parallel ways; A³ is a smoothly bored boss.

A⁴ is an arm which receives the thrust of the ratchet mechanism W. I prefer to use what is known as the Smith ratchet mechanism, well known in the market.

A⁵ is an arm which serves as a guide and lateral support for the upper portion of the drill-tap L and also as an abutment for the casing B, which latter is equipped with a flange B' at its base and a screw-thread B² at its head. On this screw-head is engaged a ring or cap C, which when turned in the proper direction abuts against the under side of the arm A⁵ and presses the flange down hard upon a thick washer D, which is of soft rubber and shaped so as to adapt it approximately to the surface of a pipe.

The drill-tap L has an accurately finished cylindrical body extending up and down through the casing B, which latter is equipped with a stuffing-box, having packing b and a gland B³ adapted to maintain a tight joint around the drill-tap and sufficiently compact to be inclosed within the casing.

E is a movable arm hinged to the framing at e, and adapted to match also against the drill-tap L and thus with the fixed arm A⁵ complete the guidance and lateral support of the drill-tap. There may be provisions as a knuckle and pin F for securing the movable arm E to the fixed arm A⁵ to allow the drilling and tapping to be effected, and for readily liberating it to allow the arm E to be swung out of the way to allow the casing B, C, and the drill-tap L to be removed when required.

G is a long and sufficiently stout screw moving freely through the boss A³ and engaged by a threaded hand-wheel or nut I above. Its lower end is rigidly set in a cross-head H which is guided by the ways A², and also engages by a stout pin H' with links J, J, which connect by pins J' with the ends of clamps K, K, formed with arms, curved as shown, and loosely united by a strong pivot K'. The lower ends of these arms are adapted to embrace the rounded surface of a pipe. A cross-bar A⁶ in the lower portion of the framing A holds the clamps approximately in position when the tool is out of use.

In adjusting the tool for use on large pipes, the hand-wheel or nut I is turned in the direction to lower the screw G and its connections, and to cause the lower ends of the clamps K to separate widely. In this condition, the pipe having been partially made bare, the tool-frame is brought into position

and its feet A' allowed to rest on the upper surface of the pipe. It is not necessary to dig under the pipe, but only sufficiently to allow the clamps K, K, to extend down and take a proper hold. This may with yielding earth be effected by working the tool up and down a few times by striking with the lower ends of the clamp-arms K on the earth each side of the pipe until they have been depressed to the proper depth. Now the feet having been carefully located in the required position on the pipe, the hand-wheel I is turned in the direction to raise the screw G and consequently the cross-head H, and to operate the links J, turning the clamp-arms K and causing their lower ends to tightly grasp the pipe. Now the hinged arm E being swung into the open position, the drill-tap L is introduced in the casing B, C, and the soft washer D being placed loosely in position at the bottom of the casing, the parts are placed in position for work and the hinged arm E is closed, embracing the cylindrical portion of the drill-tap L between itself and the fixed arm A⁵. Now the cap C is turned in the direction to raise it until it abuts against the under side of the arm A⁵ and also against the hinged arm E. A wrench may be applied in the last part of this movement to raise the cap C into firm contact with the face of the arm A⁵, and consequently to compress the rubber washer D and make a tight contact with the pipe M. Next the ratchet mechanism W is brought into position, being sufficiently contracted in length to allow the movement, and is engaged with the upper end of the drill-tap L. Then the threaded head W' being turned to elevate its point into sufficiently forcible engagement with a corresponding cavity in the under face of the arm A⁴, the lever W² is grasped and vibrated with the effect to turn the drill-tap. The force exerted by the cap C against the arm A⁵ to press the washer D upon the pipe, and the force exerted by the ratchet mechanism W against the arm A⁴ to press the drill down to its work, both lift on the framing A, and may in extreme cases lift the adjacent foot A' out of contact with the pipe, but this is of no consequence. The clamp-arms K hold the tool reliably. The drill may be fed downward by turning the head W' of the ratchet mechanism by hand or by a lever inserted in the hole in the obvious way as the work proceeds. The gas is prevented from escaping by the close fit of the rubber washer D against the pipe and by the stuffing-box B³. When the drill has been sufficiently sunk to engage the tap, and the tap has been operated to the proper depth, the hole is completed.

To prepare for the removal of the machine, the ratchet head W' is lowered, the entire ratchet W removed and the drill-tap L lifted sufficiently to clear it from the pipe. Next, the cap C is screwed downward and the hinged arm E turned into the open position. Now

the casing B with its connections are free from the other parts of the machine, and if there is much pressure of the gas or other fluid in the pipe, the casing B may require to be pressed down upon the soft washer D by the force of the hand or other means. Next the hand-wheel I is turned to lower the screw G and open the clamps K, and the frame A and its connections are lifted off and carried away. Finally, all being ready, the casing B and its connections may be moved rapidly out of the way, and a suitable cock or branch-pipe previously prepared may be applied and screwed into the hole thus prepared, the hand of the attendant, or any suitable temporary covering being applied to prevent the escape of fluid during any interim.

The invention is intended more particularly for gas, but it may be used for any liquids having moderate pressure.

I attach importance to the fact that there are two feet A', having their under surfaces V-shaped and arranged as shown, because they match fairly on pipes of different diameters, and maintain the position of the apparatus correctly even if the strain on the drill and tap shall be sufficient to lift one of the feet out of contact.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. I have shown two links J connecting the cross-head H with each of the clamp-arms K. There may be one on one side and two on the other, or the number may be otherwise varied.

I have shown holes in the cap C which facilitate its being turned by a suitable wrench or by a simple lever inserted therein; but these are not essential.

I have described the invention as used in tapping gas-mains, but it will be understood that it may be used in drilling and tapping other mains or pipes for any purposes. I have in my experiments operated successfully on upright hollow castings used as columns;—for such uses I can omit the case B.

I claim as my invention—

1. In a machine for drilling and tapping pipes, the frame A having feet A' arranged to match on the upper surface of a cylinder or pipe M, and also having guiding wings A², in combination with the clamps K, K, K', links J, cross-head H, and with the screw G and threaded nut or hand-wheel I, arranged to serve as herein specified.

2. In a machine for drilling and tapping pipes, the frame A having an arm A⁵, and means as specified for holding and releasing a pipe, and guiding and operating a drill-tap, in combination with the drill tap L, having a smooth body, and with a case B inclosing the same, provided with a stuffing box having packing b and a compressing gland B³, all arranged for joint operation substantially as herein specified.

3. In a machine for drilling and tapping pipes, the frame A having an arm A⁵, and

means as specified for holding and releasing a pipe, and guiding and operating a drill-tap, in combination with the drill tap L having a smooth body, and with a case B inclosing the same, a cap C screw-threaded on such case, and adapted to abut against said arm, and a stuffing-box having packing *b* and a compressing gland B³ inclosed in such cap, all arranged for joint operation substantially as herein specified.

4. In a machine for drilling and tapping pipes, the frame A having an arm A⁵, and means as specified for holding and releasing a pipe, and guiding and operating a drill-tap, in combination with the drill-tap L having a

smooth body, and with a case B inclosing the same, a cap C screw-threaded on such case, and adapted to abut against said arm, and a stuffing-box having packing *b* and a compressing gland B³ inclosed in such case, and a soft washer D arranged to be compressed between the case and the pipe, all arranged for joint operation substantially as herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

MILLARD F. SMITH.

Witnesses:

GEO. E. KNOWLES,
WM. H. HORTON.