(No Model.)

H. MUELLER.

MACHINE FOR TAPPING MAINS.

No. 265,624. Patented Oct. 10, 1882.

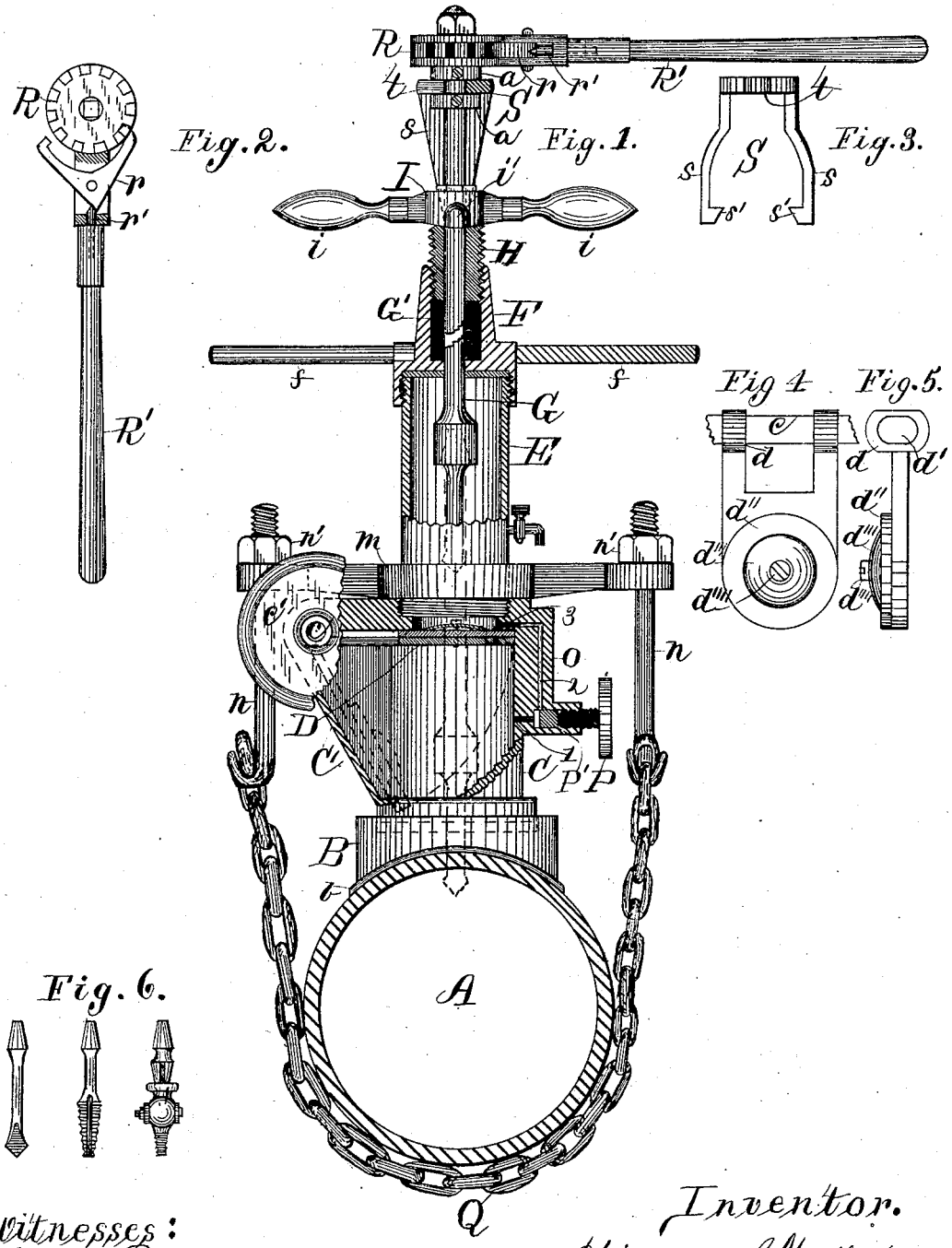

Fig. 6.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR TAPPING MAINS.

SPECIFICATION forming part of Letters Patent No. 265,624, dated October 10, 1882.

Application filed January 10, 1882. (No model.)

To all whom it may concern:

Be it known that I, HIERONYMUS MUELLER, a citizen of the United States, residing at Decatur, in the county of Macon and State of Illinois, have invented a new and useful Improvement in Machines for Tapping Water and Gas Mains while under Pressure, of which the following is a specification.

My invention relates to certain new and useful improvements in machines for tapping water and gas mains while under pressure, for which I obtained Letters Patent of the United States No. 129,853, bearing date July 23, 1872.

The first part of my invention consists in providing an indirect communication between the upper and lower chambers independent of the valve, and which is controlled by a screw-valve, for the purpose of equalizing the pressure within the chambers above and below the flap-valve, so that it may be opened or closed at will and without any great effort; the second in the feeding-yoke which forces the drill through the pipe, and the third in providing the upper surface of the flap-valve (which is suspended from a transverse shaft within the lower chamber) with a soft-rubber disk and devices for securing said disk to the valve, the arrangement and combination being hereinafter fully described. I attain these objects by the device illustrated in the accompanying drawings, in which—

Figure 1 is an elevation, partially in section, of the machine embodying my invention. Fig. 2 is a top view of the ratchet pawl and lever, partly in section. Fig. 3 is a side view of the yoke. Figs. 4 and 5 represent the flap-valve in plan and side views. Fig. 6 represents a corporation-cock with plug inserted preparatory to screwing into the main, also a tap and drill used in forming the hole in the main.

Similar letters refer to similar parts throughout the several views.

A represents the water or gas main.

B is a saddle, concaved on its lower side to fit the circle of the pipe, its upper surface provided with a recess to receive the lower end or base of the machine. A soft-rubber washer, *b*, is placed between the saddle and pipe to prevent leaking.

C represents the lower chamber of the machine, one of its sides being extended, as shown at C′, to allow the flap-valve D to swing downward out of the way of the drill-rod. In the upper part of this extension C′ of the chamber C is placed the shaft *c*, passing through the chamber laterally. It is journaled in the side walls. The central portion of this shaft is oblong, or may be square. The outer end is provided with a hand-wheel, *c′*, by means of which the flap-valve is opened or closed at will. The flap-valve D has an enlargement or head, *d*, at the end of the tangs, which is provided with an oblong hole, *d′*, adapted to fit loosely onto the central portion of the shaft *c*, so that when the valve is closed and pressure is brought to bear on it from below it will rise up and bear evenly against its seat, as shown clearly in Fig. 1. The upper surface of this valve is provided with a soft-rubber disk or washer, *d″*, and is secured thereto by a metallic disk, *d‴*, and screw *d⁗*. The necessity of this soft-rubber disk is obvious from the fact that when a hole is drilled into the pipe the pressure of the water or gas is so sudden in its rush into the chambers of the machine that the chips and dirt are carried up above the flap-valve, and some are liable to lodge on the upper surface of the valve, and in that event they are forced into the soft-rubber disk and allow the valve to close perfectly tight.

Into the top of the chamber C is screwed a second cylindrical chamber, E, (shown partially in section,) provided with a petcock near its lower end for the purpose of exhausting the chamber of water or gas after the flap-valve is closed, preparatory to removing the drilling-rod G to change the tools. Onto the upper end of this chamber E is screwed the head F, (shown in section,) which is in part a stuffing-box and guide to the drilling-rod G. There are two long rods or handles, *f f*, extending out from either side of this head, by means of which the head F is removed or replaced, as desired. Its upper end has a thread cut on the inside, and a packing-nut, H, is screwed into it, having a hole its entire length, which fits the drill-rod G. This packing-nut H serves two purposes: first, to force the packing G′ down tightly around the drill-rod, and, second, to serve as a feeding-screw, as will be clearly understood by the following description: Onto this packing-nut H is fitted a feeding-nut,

I, with handles *i i*, by which it is turned. On each of its sides, at right angles to the handles, are recesses or oblong slots *i'*, adapted to receive the dogs *s' s'* on the lower extremities of the arms *s s* of the yoke S. The upper part of the yoke is made circular in form, and provided with an oblong slot, *t*, let into one side and adapted to pass the drill-rod between the collars *a a*, as shown in Fig. 1, so that when the feeding-nut I is screwed downward on the packing-nut H, the dogs *s' s'* of the yoke S being engaged therewith and the slot *t* in the upper part of the yoke being fitted loosely on the drilling-rod, allowing it to turn with the feeding-nut I, the upper part of the yoke being confined between the collars *a a* of the drill-rod, it forces the rod downward or upward, according as the feeding-nut is turned. The drilling-rod is surmounted with a ratchet-wheel, R, and a hand-lever, R', bearing a double pawl, *r*, controlled by a spring and pin, *r'*, as shown in Fig. 2, the back end of the double pawl being formed with a point central between the two pallets, as shown, and the spring-pin, having a conical point which corresponds with the angles of the pawl, securely holds the pawl in either position, or when either of its points are engaged with the ratchet.

In order to secure the machine firmly to the main pipe, a strap or yoke, *m*, is used, consisting of a large ring adapted to fit loosely over the chamber E, and resting upon the upper end of the lower chamber, C, and having arms provided with holes at their ends to receive the hook-bolts *n n*, the hook on the lower end of these bolts being double for the purpose of hooking onto the outside of the links of a chain in the manner herein shown. The said chain Q having been passed under the pipe and hooked onto the bolts, the nuts *n' n'* are tightened until the machine is firm on the pipe.

One of the principal features or elements in my improved tapping-machine is the indirect communication between the upper chamber, E, and lower chamber, C, for the purpose of regulating or equalizing the pressure above and below the flap-valve D, which, it is obvious, must be done in order to open the flap-valve when the lower chamber is filled and the pressure in said chamber is equal to that within the main. In order that the construction and principle of this particular element in my machine may be more clearly and perfectly understood, I will call it a "pressure-regulating screw-valve," and describe it as follows: On the outside of the chamber C is cast a lug or boss, O, directly opposite the extension C', which boss extends from the top of the chamber down about one-half its length. At its lower extremity a lateral projection is formed, into the end of which a screw, P, is fitted, and a perforation is made into the chamber at 1, the outer rear orifice of which is closed by the screw P and plug or washer P'. Lengthwise of the boss O is a small hole, 2, which extends nearly to the tap, and then turns at right angles and perforates the interior of the chamber above the valve, as shown at 3, Fig. 1. Thus an indirect communication is obtained between the upper and lower chambers independent of the flap-valve. It is obvious that by turning the screw P when the lower chamber is full of water or gas it will pass through the channel 1, 2, and 3 into the upper chamber, and thereby equalize the pressure in each, and as soon as the pressure becomes equal in both chambers the flap-valve can be easily opened by the hand-wheel *c'*.

Having thus described my improvement in its details of construction, the operation is as follows; Put rubber ring on pipe; then put saddle on top; put small rubber in recess in top of saddle and then set machine on; draw nuts even, so as to get pressure on rubber alike; fasten it down solidly to pipe, as shown; unscrew head F; lift out drilling-rod G and insert drill; put head on and screw down tight; open valve D to let the drill pass through; put on yoke S, as shown in Fig. 1; screw down feeding-nut I; then proceed with ratchet-lever R and feed the drill with nut I till through pipe; then take off yoke S and pull up drill-rod as far as it will go; turn hand-wheel *c'* and close the valve D; open petcock, so that pressure sets the valve; unscrew head F; take the drill-rod out and change drill for tap; then put head on, as before. To open flap-valve D, turn screw P to the left to communicate lower pressure with upper chamber, so as to equalize pressure in each; then turn valve D until it stops; press down drill-rod until the tap takes hold; then proceed to cut the thread. To unscrew tap, reverse the pawl *r* in ratchet-wheel R, unscrew tap, and remove, as before.

I am aware that prior to my invention a swinging valve has been used in the lower chamber of a tapping-machine; so, also, has a ratchet operated by a double pawl and spring-pin. I therefore do not broadly claim such a combination.

Having thus fully described my improvement, what I claim, and desire to secure by Letters Patent, is—

1. In a machine for tapping water or gas mains while under pressure, an indirect communication between the upper and lower chambers independent of the valve D, said communication being controlled by a screw, P, as shown, for the purpose of equalizing the pressure in the upper and lower chambers when the valve D is closed, as specified.

2. In a machine for tapping water and gas mains while under pressure, the yoke S, having tangs *s s*, provided with dogs *s' s'*, adapted to engage with the feeding-nut I by hooking into the oblong slots *i*, its upper part having slot *t*, which fits on the drilling-rod G between the collars *a a*, substantially as set forth.

3. In a machine for tapping water and gas mains, the combination of the swinging valve,

the frame of which has the enlargements *d* and oblong hole *d'*, and the transverse shaft, from which the valve is suspended within the lower chamber, jointly with the soft-rubber disk *d''*, secured to the upper surface of the valve by a metallic washer and screw, substantially as and for the purpose described.

4. In a machine for tapping water and gas mains while under pressure, the valve D, constructed as described, and suspended within the lower chamber, substantially as set forth, jointly with an indirect channel between the upper and lower chambers, through the projection or lug O, for the purpose of equalizing the pressure above and below the swinging valve, so as to facilitate its operation, said channel being controlled by a screw, P, substantially as and for the purpose set forth.

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