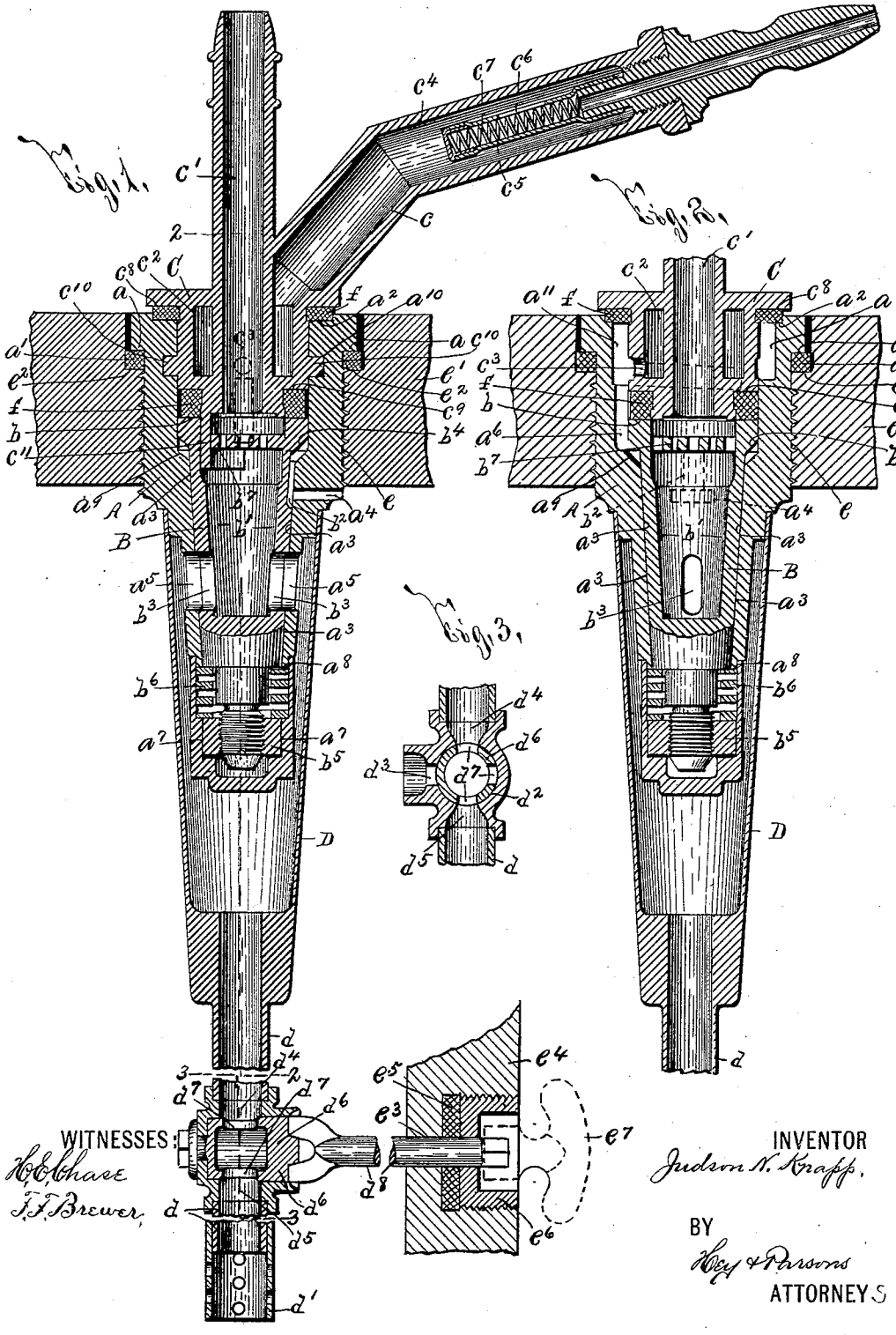
(No Model.) 2 Sheets—Sheet 1.

J. N. KNAPP.

TAPPING APPARATUS.

No. 602,510. Patented Apr. 19, 1898.



WITNESSES:
H. C. Chase
F. F. Brewer.

INVENTOR
Judson N. Knapp.

BY
Hoyt & Parsons
ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.)

2 Sheets—Sheet 2.

J. N. KNAPP.

TAPPING APPARATUS.

No. 602,510. Patented Apr. 19, 1898.

Fig. 6.

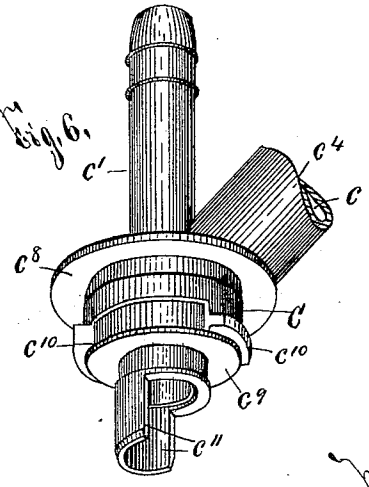


Fig. 7.

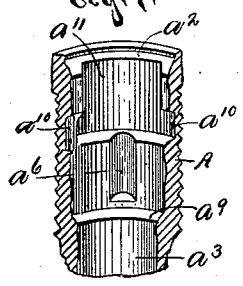


Fig. 4.

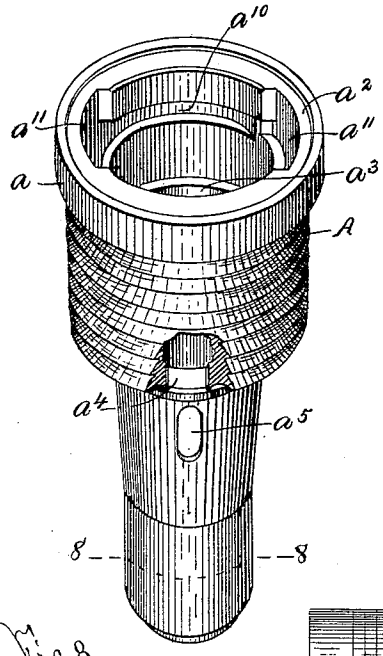


Fig. 5.

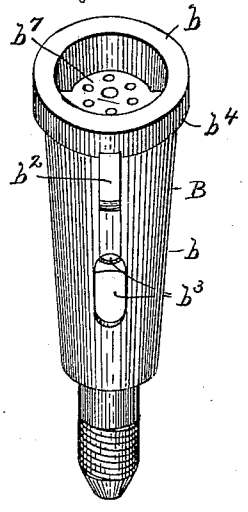


Fig. 10.

Fig. 11.

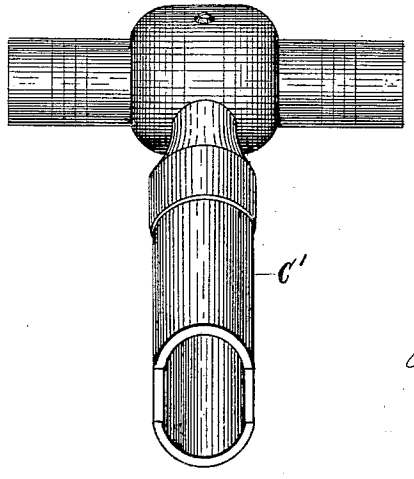


Fig. 8.

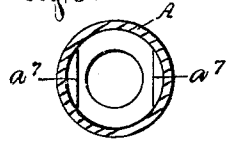
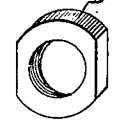


Fig. 9.



WITNESSES:

F. F. Brewer.

H. C. Chase.

INVENTOR

Judson N. Knapp

BY

Hoyt & Parsons

ATTORNEYS.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JUDSON N. KNAPP, OF SYRACUSE, NEW YORK.

TAPPING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 602,510, dated April 19, 1898.

Application filed March 11, 1897. Serial No. 626,912. (No model.)

To all whom it may concern:

Be it known that I, JUDSON N. KNAPP, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Tapping Apparatus, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to improvements in tapping apparatus, and has for its object the production of a device which is particularly practical and simple in construction, is highly effective in use, and permits the passage of fluids therethrough in opposite directions; and to this end it consists, essentially, in the general combination, construction, and arrangement of the component parts of a tapping apparatus, all as hereinafter fully described, and pointed out in the claims.

In describing this invention reference is had to the accompanying drawings, forming a part of this specification, in which like letters indicate corresponding parts in all the views.

Figure 1 is a longitudinal section, partly in elevation, of my improved tapping apparatus shown as operatively secured to a portion of a barrel or other receptacle, parts of said apparatus being broken away. Fig. 2 and 3 are respectively vertical and horizontal sections taken on lines 2 2 and 3 3, Fig. 1. Figs. 4, 5, and 6 are respectively isometric views of the tap or bushing, the key or valve-piece, and the plug for operating said key or valve-piece. Fig. 7 is an isometric view of a detached portion of the tap or bushing. Fig. 8 is a transverse section taken on line 8 8, Fig. 4. Fig. 9 is an isometric view of the nut arranged in the inner end of the tap or bushing and movable lengthwise of the key or valve-piece. Fig. 10 is an elevation of a spring for engaging said nut, and Fig. 11 is an isometric view of a wrench for operating the key or valve-piece.

My improved tapping apparatus is secured to a suitable barrel or other receptacle and preferably consists of a tap or bushing A, a key or valve-piece B, a plug C, and a pipe or conduit D. The tap or bushing A is usually inserted into an aperture *e*, formed in the end wall *e'* of the barrel or other receptacle provided with my invention; but it is obvious that, if desired, said tap or bushing may be secured to a side wall of said barrel or other receptacle. The inner end of the aperture *e* and the adjacent portion of the periphery of the tap or bushing A are usually threaded, and the outer ends of said aperture and tap or bushing are formed with separated shoulders $e^2 a$, which engage an interposed packing-ring *a'*. The threaded surfaces of the aperture *e* and tap or bushing A facilitate the securement and removal of the tap or bushing, and the packing-ring *a'* obviates the escape of any liquid between said threaded surfaces. It is obvious, however, that the tap or bushing may be otherwise secured to the barrel or receptacle provided with my improved tapping apparatus.

The tap or bushing A is preferably formed with a substantially circular engaging face a^2 and inlet and outlet fluid-passages, which usually consist of a substantially central lengthwise chamber a^3, inlet and outlet openings a^4 a^5 a^5, and an inlet conduit or groove a^6. The chamber a^3 is preferably formed with a closed inner end and a tapering central portion decreased in diameter toward said closed inner end. The inlet-opening a^4 is usually arranged above the outlet-openings a^5, as best seen at Fig. 1, and said inlet and outlet openings usually extend outwardly from the chamber a^3 to the exterior face or periphery of the portion of the tap or bushing, which projects beyond the inner face of the wall *e'*. The inlet conduit or groove a^6 opens from the outer or upper end of the chamber a^3 and extends substantially lengthwise of said chamber between the inlet-opening a^4 and the circular engaging face a^2. The lower end of the chamber a^3 of the tap or bushing A is usually provided with lengthwise shoulders a^7 and an annular shoulder a^8. The construction of these shoulders may be facilitated by forming the lower end of the tap or bushing A of a separate piece of metal or other suitable material, having its upper end secured to the lower end of the remaining or upper portion of said tap or bushing. It is apparent, however, that the tap or bushing may, if desired, consist of a single piece of metal or other suitable material.

As clearly seen in Figs. 1 and 2, the key or valve-piece B is arranged within the chamber a^3 of the tap or bushing A and is usually

formed with a substantially circular engaging face b and inlet and outlet fluid-passages, which usually consist of a central lengthwise chamber b', an inlet conduit or groove b^2, and outlet-openings b^3. Said key or valve-piece is rocked on a longitudinal axis by the plug C or a suitable wrench C', Fig. 11, for moving the inlet conduit or groove b^2 and the outlet-openings b^3 into and out of alinement with the inlet and outlet openings a^4 a^5 a^5 of the tap or bushing A. The central portion of the key or valve-piece decreases in diameter toward the inner or lower end of said key or valve-piece and usually closely fits the central portion of the tap or bushing A. The upper end of the key or valve-piece is preferably enlarged and formed with an upwardly-inclining annular shoulder b^4, arranged slightly above an annular shoulder a^9 at the upper end of the tapered or central portion of the chamber a^3. The lower end of the key or valve-piece B is usually threaded for engaging a nut b^5, which is movable lengthwise of said lower end, and is prevented from revoluble movement by the shoulders a^7 of the tap or bushing A. A suitable spiral spring b^6 encircles the inner or lower end of the key or valve-piece B and is engaged with the nut b^5 and the annular shoulder a^8 of the lower end of the chamber a^3. The threads upon the inner end of the key or valve-piece for engaging the nut b^5 are preferably so inclined that as said key or valve-piece operates to move the conduit or groove b^2 and the outlet-openings b^3 b^3 out of alinement with the inlet and outlet openings a^4 a^5 a^5 the nut b^5 is drawn upwardly for additionally tensioning the spring b^6 and compelling the same to hold the key or valve-piece downwardly with additional force. The nut b^5 and the spring b^6 form a particularly practical and effective means for firmly holding the key or valve-piece B in position; but is obvious that any other suitable means may be used, if desired.

The plug C is secured within the upper end of the chamber a^3 of the tap or bushing A and is formed with inlet and outlet conduits c c' for communicating with the inlet and outlet fluid-passages of the tap or bushing A and the key or valve-piece B. The outer end of the inlet-conduit c is usually arranged at an angle with the conduit c' for forming a convenient and effective handle or lever which facilitates the securement of said plug in operative position within the tap or bushing. The inner end of the conduit c usually consists of a chamber c^2, surrounding the adjacent portion of the outlet-conduit c', and an opening c^3, which extends from said chamber to the exterior of the plug C for communicating with the inlet conduit or groove a^6. The inlet-conduit c is usually provided with an enlarged portion c^4, and a tubular valve c^5, which is arranged within said enlarged portion, is formed with a flexible wall and communicates with the outer or upper end of said conduit c. The flexible wall of the valve c^5 is formed with a lengthwise groove or slit c^6, and a spiral spring c^7 is usually arranged within said valve for preventing undue bending of its flexible wall. The pressure within the valve c^5 opens the slit or slot c^6, and the pressure within the enlarged portion c^4 of the conduit c closes said slit or slot. The valve c^5 is particularly simple and effective; but it is obvious that any other suitable valve may be used, if desired.

The plug C is provided with annular engaging faces c^8 c^9 and suitable shoulders or lugs c^{10} c^{11}. The faces c^8 c^9 are arranged above the corresponding faces a^2 b of the tap or bushing A and the key or valve-piece B, and suitable yielding washers or packing-rings f are normally interposed between said faces c^8 c^9 a^2 b for preventing communication between the inlet and outlet fluid-passages of said tap or bushing and key or valve-piece. The shoulders or lugs c^{10} project from opposite portions of the periphery of the plug C and are preferably formed with inclined upper faces, which engage the upper faces or shoulders of opposite partially circular grooves a^{10} in the inner face of the tap or bushing A. Opposite lengthwise grooves a^{11} extend from corresponding extremities of the grooves a^{10} to the outer end of the tap or bushing A and permit the entrance of the shoulders or lugs c^{10} to the grooves a^{10}. The shoulder or lug c^{11} preferably consists of a half-round projection which extends from the lower end face of the plug C into the upper end of the chamber b' of the key or valve-piece B and engages a perforated shoulder b^7, provided in the upper end of said chamber. The shoulders or lugs c^{10} hold the plug C in its operative position, and the shoulder or lug c^{11} forms a particularly simple means for engaging and partially rotating the key or valve-piece B.

The pipe or conduit D communicates with the outlet-openings a^5 a^5 of the tap or bushing A and extends downwardly to the bottom wall (not illustrated) of the barrel or other receptacle provided with my invention. As preferably constructed, the pipe or conduit D consists of sections d d', telescoping one within the other, the bottom end of the lower section being formed with suitable openings. The top end of the upper section d is usually enlarged for encircling the lower or inner end of the tap or bushing A and is suitably secured to said tap or bushing. The section d' is generally formed with a transversely-extending chamber d^2, which is provided with an opening d^3 in one end and upper and lower openings d^4 d^5, communicating with the upper and lower portions of the pipe or conduit D. A valve-piece d^6 is arranged in the chamber d^2 and is formed with openings d^7, which are alined with the openings d^3 d^4 d^5 for permitting the passage of the outgoing fluid from either the lower portion of the pipe or conduit D or the chamber d^2 to the upper portion of said pipe or conduit. The valve-piece d^6

is actuated by a suitable operating-piece d^8, having one end engaged with said valve-piece and its opposite end passed through an aperture e^3 in the adjacent side or wall e^4 of the barrel or other receptacle provided with my invention. A suitable packing-ring e^5 and collar e^6 encircle the outer end of the operating-piece for preventing leakage of the fluid from the barrel or other receptacle around the operating-piece d^8. A socket-wrench e^7 (shown by dotted lines in Fig. 1) may be used for turning the operating-piece d^8 and actuating the valve-piece d^6.

My improved tapping apparatus is usually used in connection with barrels or receptacles from which the liquor is forced by the pressure of an incoming fluid, as air, and consequently said apparatus is so constructed as to permit both the entrance of the air and the outflow of the liquor.

In the operation of my improved tapping apparatus the incoming air or other fluid passes from the inlet-conduit c into the upper end of the chamber a^3 beneath the upper packing-ring f and flows through the conduit or groove a^6 into the space interposed between the shoulders a^9 b^4, whence it passes through the conduit or groove b^2 and the inlet-opening a^4 to the interior of the barrel or other receptacle. The outgoing fluid or liquor passes from either the chamber d^2 or the lower end of the pipe or conduit D, through the tubular valve-piece d^6, to the upper end of the pipe or conduit D, and thence escapes through the openings a^5 a^5 b^3 to the chamber b' of the key or valve-piece B, whence it passes to the outlet-conduit c' of the plug C. After the desired quantity of liquor has been withdrawn from the barrel or other receptacle to which my improved tapping apparatus is secured the plug C is partially rotated until its shoulders or lugs c^{10} are alined with the lengthwise grooves a^{11} of the tap or bushing A, whereupon said plug may be readily withdrawn. No escape of the liquor takes place upon the withdrawal of the plug C, as the partial rotation of said plug moves the conduit or groove b^2 and the outlet-opening b^3 out of alinement with the inlet and outlet openings a^4 a^5 a^5 of the tap or bushing A.

The operation and construction of my invention will now be readily understood upon reference to the foregoing description and the accompanying drawings.

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

1. In a tapping apparatus, the combination of a barrel or other receptacle having an aperture in one of its walls, a tap or bushing inserted into the aperture and having inlet and outlet fluid-passages, and an engaging shoulder, a movable key or valve-piece arranged within the tap or bushing at the inner side of the engaging shoulder and provided with inlet and outlet fluid-passages for communicating with the former passages, and means projecting within the tap or bushing and detachably interlocking with the shoulder of the tap or bushing and the key or valve-piece for moving said key or valve-piece, substantially as and for the purpose described.

2. In a tapping apparatus, the combination of a barrel or other receptacle having an aperture in one of its walls, a tap or bushing inserted into the aperture and having inlet and outlet fluid-passages, a movable key or valve-piece arranged within the tap or bushing and provided with inlet and outlet fluid-passages for communicating with the former passages, and a plug formed with shoulders detachably interlocking with the tap or bushing and the key or valve-piece for moving said key or valve-piece, said plug having inlet and outlet conduits for communicating with said passages, substantially as and for the purpose specified.

3. In a tapping apparatus, the combination of a barrel or other receptacle having an aperture in one of its walls, a tap or bushing inserted into the aperture and having a substantially central chamber formed with an engaging shoulder and inlet and outlet openings extending outwardly from the chamber to the exterior of the tap or bushing, a movable key or valve-piece arranged within the chamber at the inner side of the engaging shoulder and having inlet and outlet fluid-passages for communicating with said openings, and means projecting within the inner chamber of the tap or bushing and detachably interlocking with the shoulder of said chamber and the key or valve-piece for moving said key or valve-piece, substantially as and for the purpose set forth.

4. In a tapping apparatus, the combination of a barrel or other receptacle having an aperture in one of its walls, a tap or bushing inserted into the aperture and having a substantially central chamber and inlet and outlet openings extending outwardly from the chamber to the exterior of the tap or bushing, and a movable key or valve-piece arranged in the chamber of the tap or bushing and provided with a conduit or groove opening from the periphery of the key or valve-piece and communicating at one end with the chamber of the tap or bushing and at its opposite end with the inlet-opening of said tap or bushing, said key or valve-piece being also provided with a substantially central chamber and an opening extending outwardly from the chamber to the exterior of the key or valve-piece for communicating with the outlet-opening of the tap or bushing, substantially as and for the purpose specified.

5. In a tapping apparatus, the combination of a barrel or other receptacle having an aperture in one of its walls, a tap or bushing inserted into the aperture and having a substantially central chamber and an inlet conduit or groove and an outlet-opening communicating with the chamber, a movable key or valve-piece arranged in the chamber of the

tap or bushing and provided with inlet and outlet fluid-passages for communicating with said inlet conduit or groove and outlet-opening, and a plug detachably interlocking with the tap or bushing and the key or valve-piece for moving the key or valve-piece, said plug having inlet and outlet conduits for communicating with the inlet-conduit of the tap or bushing and the outlet fluid-passage of the key or valve-piece, substantially as and for the purpose set forth.

6. In a tapping apparatus, the combination of a barrel or other receptacle having an aperture in one of its walls, a tap or bushing inserted into the aperture and having a substantially central chamber, inlet and outlet openings extending outwardly from the chamber to the exterior of the tap or bushing, and an inlet conduit or groove opening from said chamber and extending toward the outer end of the tap or bushing, a key or valve-piece arranged in the chamber of the tap or bushing and provided with inlet and outlet fluid-passages for communicating with said openings and conduit or groove, and a plug projecting within the chamber of the tap or bushing and detachably interlocking with the tap or bushing and the key or valve-piece for moving the key or valve-piece, said plug being formed with inlet and outlet conduits for communicating with the inlet conduit or groove of the tap or bushing and the outlet fluid-passage of the key or valve-piece, substantially as and for the purpose described.

7. In a tapping apparatus, the combination of a barrel or other receptacle having an aperture in one of its walls, a tap or bushing inserted into the aperture and having a substantially central chamber, inlet and outlet openings extending outwardly from the chamber to the exterior of the tap or bushing, and an inlet conduit or groove opening from said chamber and extending toward the outer end of the tap or bushing, a key or valve-piece arranged in the chamber of the tap or bushing and provided with a conduit or groove opening from its periphery for communicating with said inlet conduit or groove and inlet-opening, said key or valve-piece being also provided with a substantially central chamber and an opening extending outwardly from the chamber to the exterior of the key or valve-piece for communicating with the outlet-opening of the tap or bushing, and a plug secured within the chamber of the tap or bushing and formed with inlet and outlet conduits for communicating with the inlet conduit or groove of the tap or bushing and the substantially central chamber of the key or valve-piece, substantially as and for the purpose set forth.

8. In a tapping apparatus, the combination of a barrel or other receptacle having an aperture in one of its walls, a tap or bushing inserted into the aperture and having a substantially central chamber provided with a circular engaging face, said tap or bushing being provided with inlet and outlet openings extending outwardly from the inner end of the chamber to the exterior of the tap or bushing, and an inlet conduit or groove opening from said chamber and arranged between the circular engaging face and the inlet and outlet openings, a key or valve-piece arranged in the chamber of the tap or bushing and formed with a circular engaging face, said key or valve-piece being provided with a conduit or groove opening from its periphery for communicating with the former inlet conduit or groove and said inlet-opening, and being also provided with a substantially central chamber and an opening extending outwardly from the chamber to the exterior of the key or valve-piece for communicating with the outlet-opening of the tap or bushing, a plug secured within the chamber of the tap or bushing and provided with annular engaging faces arranged adjacent to the former engaging faces, said plug being formed with inlet and outlet conduits for communicating with the inlet conduit or groove of the tap or bushing and the substantially central chamber of the key or valve-piece, and yielding washers interposed between said engaging faces, substantially as and for the purpose described.

9. In a tapping apparatus, the combination of a barrel or other receptacle having an aperture in one of its walls, a tap or bushing inserted into the aperture and having inlet and outlet fluid-passages, a key or valve-piece arranged within the tap or bushing and provided with inlet and outlet fluid-passages for communicating with the former passages, and a plug projecting within the tap or bushing and detachably interlocking with the tap or bushing and the key or valve-piece for moving the key or valve-piece, said plug having inlet and outlet conduits communicating with said passages, and arranged at an angle with each other, substantially as and for the purpose specified.

10. In a tapping apparatus, the combination of a barrel or other receptacle having an aperture in one of its walls, a tap or bushing inserted into the aperture and having inlet and outlet fluid-passages, a key or valve-piece arranged within the tap or bushing and provided with inlet and outlet fluid-passages for communicating with the former passages, a plug projecting within the tap or bushing and detachably interlocking with the tap or bushing and the key or valve-piece for moving the key or valve-piece, said plug having inlet and outlet conduits for communicating with said passages, and a valve arranged within the inlet-conduit of the plug, substantially as and for the purpose set forth.

11. In a tapping apparatus, the combination of a barrel or other receptacle having an aperture in one of its walls, a tap or bushing inserted into the aperture and having inlet and outlet fluid-passages, a key or valve-piece pro-

vided with inlet and outlet fluid-passages for communicating with the former passages, a plug secured in the tap or bushing and having inlet and outlet conduits for communicating with said passages, said inlet-conduit being provided with an enlarged portion, a tubular valve arranged within the enlarged portion and formed with a yielding wall having a substantially lengthwise slit or slot, and a spiral spring arranged within the tubular valve, substantially as and for the purpose described.

12. In a tapping apparatus, the combination of a barrel or other receptacle having an aperture in one of its walls, a tap or bushing inserted into the aperture and having inlet and outlet fluid-passages, a key or valve-piece provided with inlet and outlet fluid-passages communicating with the former passages, and a plug secured in the tap or bushing and having inlet and outlet conduits for communicating with said passages, the lower end of the inlet-conduit consisting of a chamber surrounding the outlet-conduit, and an opening extending from the chamber to the exterior of the plug for communicating with the inlet fluid-passage of the tap or bushing, substantially as and for the purpose specified.

13. In a tapping apparatus, the combination of a barrel or receptacle provided with an aperture in one of its walls, a tap or bushing inserted into the aperture and provided with inlet and outlet fluid-passages, said tap or bushing having its inner face formed with opposite partially-circular grooves and opposite lengthwise grooves extending from the outer end of the tap or bushing to the partially-circular grooves, a key or valve-piece arranged in the tap or bushing and provided with inlet and outlet fluid-passages for communicating with the former passages and a plug for operating the key or valve-piece, said plug having inlet and outlet conduits for communicating with said inlet and outlet fluid-passages, and being formed with opposite laterally-projecting shoulders or lugs, for entering said lengthwise and partially-circular grooves of the tap or bushing, substantially as and for the purpose described.

14. In a tapping apparatus, the combination of a barrel or other receptacle having an aperture in one of its walls, a tap or bushing inserted into the aperture and having a substantially central chamber formed with an engaging face, a key or valve-piece arranged in the chamber and provided with a threaded inner end, means for partially rotating the key or valve-piece, a non-revoluble nut adjustable lengthwise of the threaded end of the key or valve-piece, and a spring interposed between said nut and the engaging face of the tap or bushing, substantially as and for the purpose set forth.

15. In a tapping apparatus, the combination of a barrel or other receptacle having apertures in two of its walls, a tap or bushing inserted into one of said apertures and provided with inlet and outlet fluid-passages, a key or valve-piece arranged in the tap or bushing and having inlet and outlet fluid-passages for communicating with the former passages, means for operating the key or valve-piece, a pipe or conduit communicating with the outlet fluid-passage, of the tap or bushing, said pipe or conduit being provided with a transversely-extending chamber interposed between its opposite extremities, and formed with openings in one end and in its upper and lower portions, a second valve-piece arranged in the chamber and formed with openings for communicating with the former openings, and an operating-piece arranged in the other of said apertures for actuating the second valve-piece, substantially as and for the purpose specified.

In testimony whereof I have hereunto signed my name, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 30th day of January, 1897.

JUDSON N. KNAPP.

Witnesses:
E. A. WEISBURG,
K. H. THEOBALD.