

P. MUELLER & A. C. SCHUERMANN.

PIPE TAPPING MACHINE.

APPLICATION FILED NOV. 23, 1910.

990,580.

Patented Apr. 25, 1911.

3 SHEETS—SHEET 1.

Fig 1

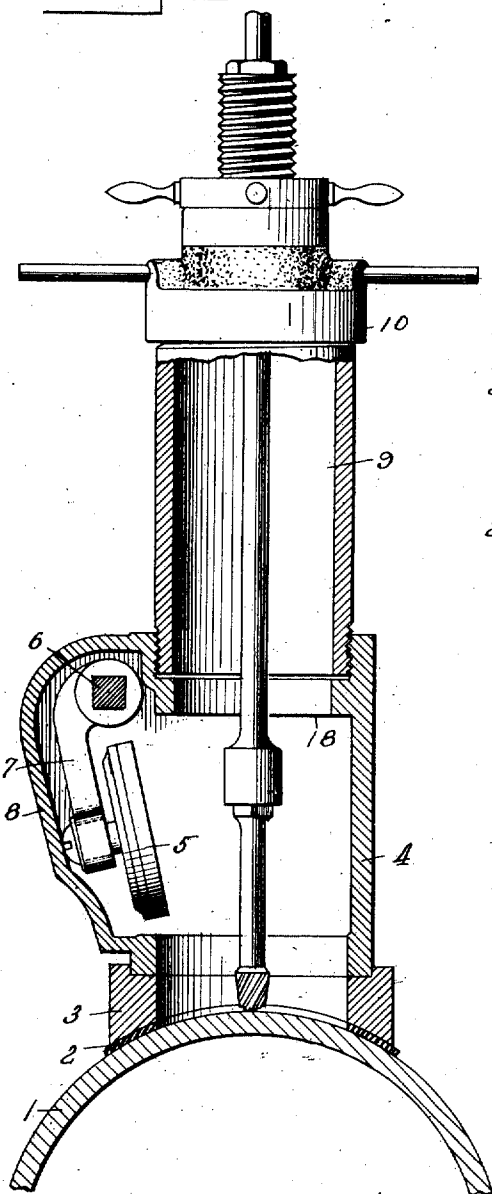
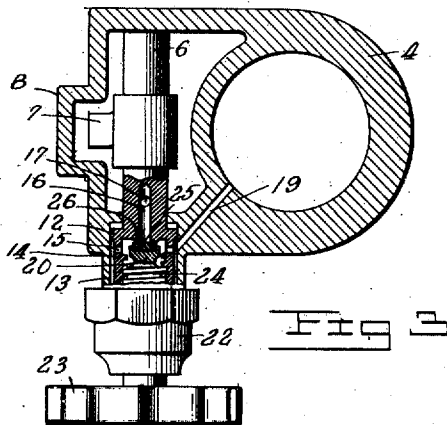
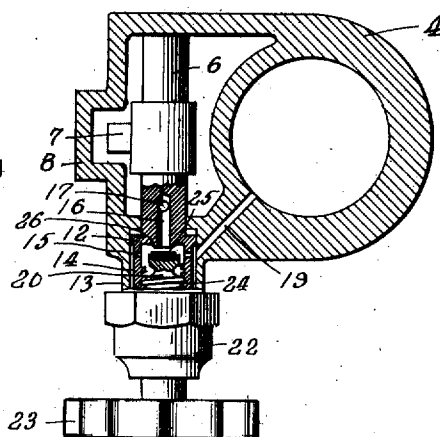


Fig 2



Witnesses

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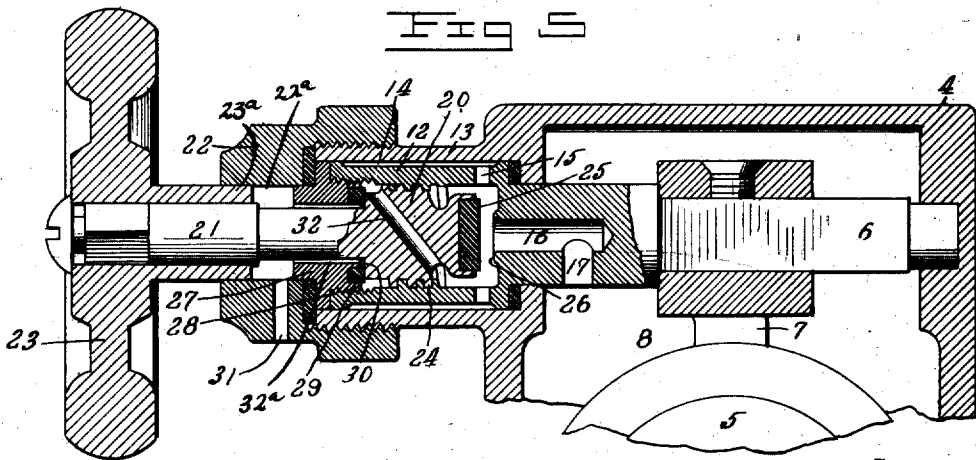
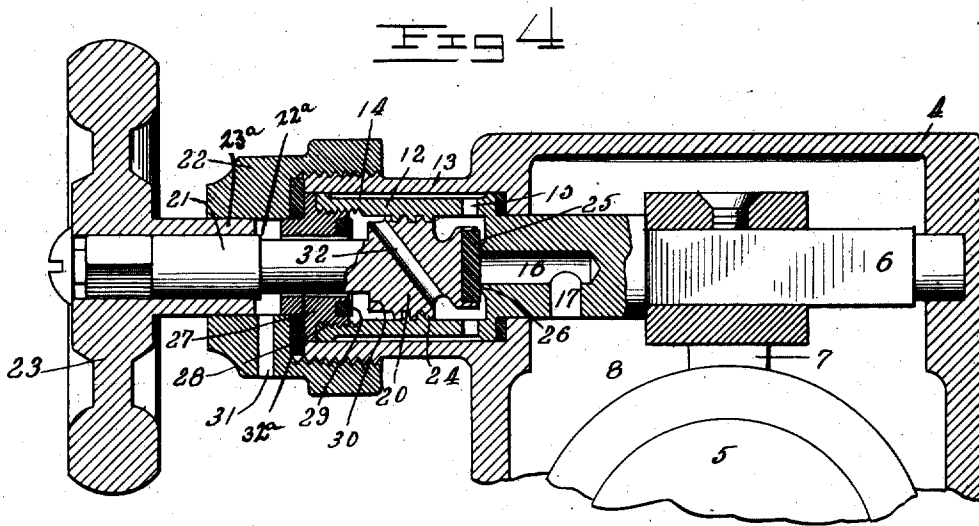
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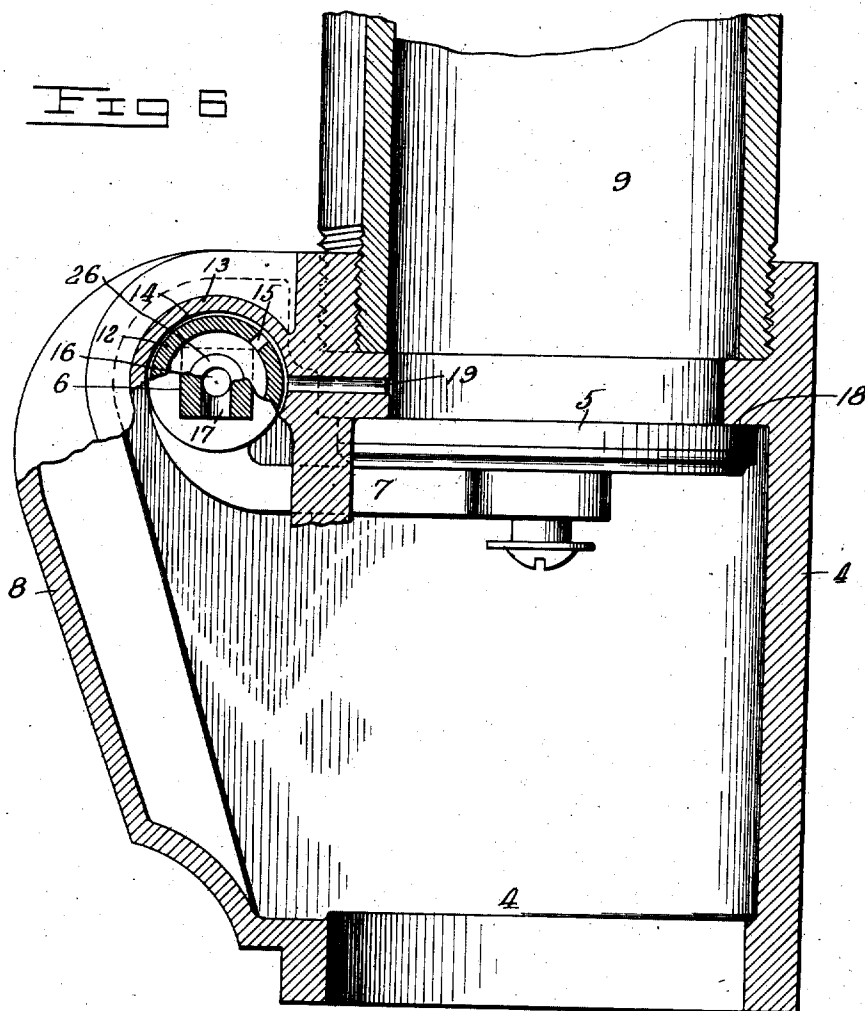
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Witnesses

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UNITED STATES PATENT OFFICE.

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PIPE-TAPPING MACHINE.

990,580.

Specification of Letters Patent.

Patented Apr. 25, 1911.

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To all whom it may concern:

Be it known that we, PHILIP MUELLER and ANTON C. SCHUERMANN, citizens of the United States, residing at Decatur, in the county of Macon and State of Illinois, have invented new and useful Improvements in Pipe-Tapping Machines, of which the following is a specification.

Our present invention relates generally to machines for tapping, drilling and inserting corporation cocks in pipes in which water is under pressure, and has among its more important objects to provide an improved construction of by-pass valve and operating means therefor so associated and arranged in coöperative relation with the main or flap-valve as that a single operating means serves to control the operation of both valves, and one valve may be operated independently of and in advance of the other in order to provide for an equalization of pressure in the cylinder above and below the main or flap valve to prevent a misuse of and an easy operation of the latter, and in order to drain the cylinder when desired.

In machines for tapping mains, and particularly water-mains, a valve body is employed in which there is a main or flap valve designed to divide the body into two compartments and there is also a removable cap at the upper end of a cylinder attached to the valve body through which the boring bar passes, the main or flap valve being employed to close off communication between the "main" being tapped and the upper part of the chamber formed by the valve-body and cylinder, during the operation of removing the boring tool from the boring bar and attaching thereto the corporation cock which is to be screwed into the tapped hole in the "main". There is also employed in machines of this type, a so-called "by-pass valve" designed to equalize the pressure in the upper and lower portions of the said chamber in order to prevent a misuse of the apparatus and also permit an easy opening of the main or flap-valve, but heretofore these by-pass valves have generally been provided with an operating stem or handle separate and independent from the operating means for the main or flap valve. This is not only inconvenient in many respects, but has been found to be decidedly objectionable, because it often happens, and

especially where the machine is in the hands of an inexperienced or careless operator, that the latter through inadvertence or neglect will fail to open the by-pass valve preparatory to opening the main or flap-valve, and not realizing his omission will attempt to open the main or flap-valve while the full pressure of the main is exerted thereon, a wrench or spanner being sometimes used for the purpose, and this often results in twisting or breaking the stem of the main or flap-valve or otherwise injuring the machine.

It is the purpose of the present invention to obviate this objection found to exist in prior machines and to provide a construction wherein the initial movement of the operating means for opening the main or flap-valve, will first operate to open the by-pass valve to cause an equalization of the pressure in the chamber above and below the main or flap-valve and the continued or subsequent operation of said means will impart an opening movement to the said main or flap-valve.

To these and other ends the invention resides in the features of construction and combination and arrangement of parts herein shown and described and then more definitely pointed out in the claims.

In the annexed drawings which are illustrative of a preferred embodiment of our invention, Figure 1 is a view in vertical section of so much of the machine as is necessary to an understanding of the invention, the machine being shown attached to a main to be tapped. Fig. 2 is a horizontal section taken through the by-pass valve, the latter being shown in closed position and the main or flap-valve in open position. Fig. 3 is a similar section, the by-pass valve being shown in closed position. Fig. 4 is a vertical section on an enlarged scale, showing the by-pass valve closed and the main or flap-valve open. Fig. 5 is a view similar to Fig. 4 and showing the by-pass valve open. Fig. 6 is an enlarged vertical section taken through that part of the valve-body and the sleeve-like extension of the pintle for the main or flap-valve, to show the by-pass connection above and below the said valve, a portion of the said sleeve-like extension being broken away for clearness of illustration.

Referring to the drawings the reference numeral 1 indicates a fragment of the main or pipe to be tapped, 2 a gasket or packing ring, 3 a saddle, and 4 a valve body. In the present instance the valve body has therein a main or flap valve 5 attached to a pintle 6 through an arm 7, the said pintle being operated by suitable novel means hereinafter described in order that the main valve may be opened and closed, and the valve body is recessed or enlarged as shown at 8 to contain the said main valve when in its open position. The parts specifically referred to by reference numerals have no particular reference to our present invention beyond exemplifying a main or flap valve that may be used to divide the valve body into two compartments after the main or pipe has been drilled and tapped, and while a corporation cock is being attached to the boring bar in place of the drilling and tapping tool usually employed in connection with machines of this type.

The valve body 4 which may be of any preferred form rests on a saddle 3, the saddle fitting against a gasket as 2 on the main or pipe 1, and the entire machine is fastened to the said pipe in any preferred manner as is well understood. A cylinder 9 extends from the upper end of the valve body and with such cylinder suitable drilling and tapping mechanism is associated. When the machine is attached to a main or pipe to be tapped and to which a corporation cock is to be applied, the main or flap valve is left open and the drilling and tapping tool is inserted through the valve body into contact with the pipe or main. The upper end of the machine is closed in the customary manner by means of a cap 10 through which the stem of the boring bar passes, and when the drilling and tapping tool has penetrated the pipe water therefrom naturally flows into and fills the tapping machine exerting its pressure therein equal to the pressure in the pipe being tapped. When the drilling and tapping operation is completed, the tap is withdrawn from the pipe and raised above the main or flap valve after which said valve is closed, and a part of the water above the valve is drawn off so that the bottom of the said valve will receive the pressure existing in the main for the purpose of holding the valve closed. The cap 10 may then be removed to permit detachment of the boring tool and the substitution therefor of the corporation cock. The cap is then replaced with the corporation cock attached to the boring bar ready to be inserted in the hole tapped in the main or pipe. Water is then passed around the gate through a suitable by-pass until the pressure of the water in the compartments above and below the main valve is equalized, whereupon the main valve may be opened and the corporation cock

set in place by the boring bar. After this the water in the machine may be drawn off through a suitable drain passage, so as to do away with the flow of water that would otherwise result from detaching the machine from the pipe, and as a final act the machine itself is detached from the pipe.

Our present improvement has to do more particularly with the by-pass and its associated valve which in the present instance is of the compression type, and also has to do with the means for draining the machine before detachment from the pipe being tapped. The pintle 6 to which the arm 7 carrying the flap valve 5 is attached is journaled in the walls of the valve body 4, as clearly shown, one end of the said pintle being provided with an enlarged sleeve-like extension 12, which extension projects into and is rotatably mounted in a hollow boss 13 in the present instance shown as formed integral with the valve body 4 and projecting laterally therefrom. The external diameter of the sleeve-like extension 12 is slightly less than the internal diameter of the hollow boss 13 so as to leave an annular passage 14 between these two members which annular passage is in open communication with the interior of the sleeve-like extension by means of ports 15. The said pintle 6 is provided with an axial passage 16 intersected by a lateral port 17 which communicates with the compartment in the lower part of the valve body 4 below the seat 18 for the main valve. A passage 19 is also formed in the valve body 4 and leads from a point directly above the main valve seat 18 to the annular passage 14 in such manner that the said passage 19, the annular passage 14, ports 15, axial passage 16, and lateral port 17, constitute a by-pass leading upon opposite sides of the valve seat 18, so that when the main or flap valve 5 is closed water may be caused to flow through this said by-pass in order to equalize the pressure in the valve body and the sleeve 9 attached thereto upon opposite sides of the said flap valve. This by-pass is controlled by means of an auxiliary or by-pass valve which in the instance shown is of the compression type, this type of valve being preferably employed because of the obvious advantages of such type over other known types of valves, and because it has been found best suited to the conditions existing in this type of machine.

As clearly shown in the drawing the by-pass valve consists of a head 20 carried by a stem 21 passing through an aperture in a packing nut 22 screwed to the end of the hollow boss 13, the said stem 21 being provided with an operating handle 23. The stem 21 as will be seen is arranged in axial alinement with the pintle 6 of the main valve and the head 20 of the by-pass valve

is provided on its periphery with high-pitch threads 24 which engage corresponding threads on the interior surface of the sleeve-like extension 12 of the main valve pintle 6, so that by turning the valve stem the valve face 25 may be moved into engagement with or away from the valve seat 26 surrounding the axial passage 16 formed in the pintle 6 so as to open or close this passage as desired.

A sleeve 27 is interposed between the packing nut 22 and the end of the sleeve-like extension 12, and is in threaded engagement with said extension at 28 as shown, the stem 21 of the by-pass valve passing through an opening formed in said sleeve and the said sleeve being further provided at its inner end with a valve seat 29 against which the outer end 30 of the head 20 may bear, these said parts constituting a valve to provide a closure for the passage between the stem 21 and the opening in the sleeve 27 through which said stem passes. The nut 22 is provided with a lateral drain port 31, through which water from the valve body may be drained when the by-pass valve is in position to close the by-pass, an inclined passage 32 being provided transversely through the head 20 of the by-pass valve in order to permit said draining action to take place.

By the construction thus described it will be seen that the by-pass valve may have a movement entirely independent of the movement of the main or flap valve and in advance thereof in order that after the main or flap valve has been closed and has the pressure from the main or pipe exerted thereupon said valve cannot be moved to open position without first opening the by-pass valve and thus equalizing the pressure in the valve body above and below the main or flap valve, this operation necessarily resulting from the construction shown and described, wherein it will be noted the operating means for the by-pass valve also constitutes the operating means for the main or flap valve.

In operation let it be assumed that the flap valve has been closed and water from the tapped main or pipe is exerting its pressure thereupon, and it is desired to open said valve in order to permit the insertion in the tapped hole in the main or pipe of the corporation cock which has been previously attached to the boring bar, and let it also be assumed that the by-pass valve is closed against the valve seat 26 formed on the end of the pintle 6 and around the axial passage 16. The valve stem 21 is then turned in the proper direction to open the by-pass valve and water will immediately rush from the lower part of the valve body through the lateral port 17, axial passage 16, ports 15, annular passage 14, and through the passage 19 into the upper part of the valve body above the main or flap valve thus equalizing

the pressure therein. Continued movement of the valve stem will bring the outer end 30 of the head 20 of the by-pass valve into engagement with the seat 29 formed on the sleeve 27, thus closing the drain passage and so interconnecting by the frictional engagement of the by-pass valve with the sleeve 27 and the sleeve-like extension 12 of the pintle 6 as to cause the latter to be operated in a manner to open the main or flap valve. By turning the stem 21 through the medium of the handle 23 in the opposite direction, the face 25 of the by-pass valve will be brought into engagement with the valve seat 26 of the pintle 6 to close the by-pass and continued turning movement of the stem will, through the frictional engagement of the face 25 and seat 26, cause the pintle to rotate and bring the main or flap valve to closed position, and when in this position the upper part of the valve body will be drained through passage 19, annular passage 14, ports 15, inclined passage 32, space 32^a around the valve stem 21, and out through the lateral drain port 31 in nut 22.

As will be seen by referring to Figs. 4 and 5 of the drawings, the handle 23 is provided with a relatively long sleeve portion 23^a, through which the stem 21 passes, and which sleeve projects for a considerable distance into an opening 22^a in the end of the nut 22. By this construction and arrangement of parts the valve stem 21 is materially strengthened and accidental lateral bending thereof is not likely to occur.

By the construction shown and described wherein a common operating means is employed for both the main or flap valve and the by-pass valve, the one operating in advance of the other, either to effect an equalization of the pressure in the valve body above and below the main or flap valve or to drain that compartment in the valve body above the main or flap valve, it will be apparent that the machine may be safely placed in the hands of unskilled operators without danger of misuse, such as would result in breakage, it being practically impossible to open the main or flap valve when the pressure from the main is exerted thereon without first effecting an equalization of the pressure above and below said valve, because the initial movement of the operating means for the valves first operates to open the by-pass valve before any movement is or can be imparted to the main or flap valve.

What we claim is:

1. In a tapping machine, a valve body, a main-valve therein, said body having a by-pass formed therein and leading around said valve, a by-pass valve of the compression type for controlling communication through said by-pass on opposite sides of the main-valve, and an operating device common to both said valves.

2. In a tapping machine, a valve body, a main valve therein, said body having a by-pass formed in a wall thereof and leading around said valve, a by-pass valve of the compression type for controlling communication through said by-pass on opposite sides of the main valve, and an operating device common to both said valves, said device permitting operation of one valve independently of the other.

3. In a tapping machine, a valve body, a main valve therein, said body having a by-pass in a wall thereof and leading around the main valve, a by-pass valve of the compression type for controlling communication through said by-pass on opposite sides of the main valve, and an operating device common to both valves, said device permitting operation of the by-pass valve in advance of and independently of the main valve.

4. In a tapping machine, a valve-body, a main valve therein, a pintle carrying said valve, said pintle having an axial port, a by-pass valve of the compression type designed to open and close said port, and an operating device for said by-pass valve cooperatively associated with said pintle for imparting movement thereto and to the main valve, for the purpose described.

5. In a tapping machine, a valve-body, a main valve therein, a pintle carrying said valve, said pintle having an axial port, a by-pass valve of the compression type designed to open and close said port, and an operating stem for said by-pass valve in axial alinement with the pintle for imparting movement thereto and to the main valve.

6. In a tapping machine, a valve-body, a main valve therein, a by-pass valve of the compression type for establishing communication on opposite sides of the main valve, means associated with and under the control of the by-pass valve, for draining the valve-body above the main valve, and an operating device common to both said valves.

7. In a tapping machine, a valve-body, a main valve therein, said body having a by-pass leading on opposite sides of the main valve when the latter is in closed position and also having a drain port, a by-pass valve of the compression type for controlling said by-pass and also said drain port, and an operating device common to both said valves.

8. In a tapping machine, a valve body, a main valve therein, said body having a by-pass leading on opposite sides of the main valve when the latter is closed, and also having a drain port, a by-pass valve of the compression type having opposed valve faces for controlling respectively the said by-pass and the drain port, and an operating device common to both said valves.

9. In a tapping machine, a valve-body, a

pintle journaled therein and having an axial passage at one end, a flap valve carried by said pintle adapted when closed to divide the valve body into two compartments, a by-pass valve of the compression type in axial alinement with the pintle and having a face adapted to close said axial passage, and an operating device for said by-pass valve.

10. In a tapping machine, a valve-body, a pintle journaled therein and having an axial passage in one end, a flap valve carried by said pintle adapted when closed to divide the valve body into two compartments, a by-pass valve of the compression type in axial alinement with the pintle and having a face adapted to close against said axial passage, and an operating stem for the by-pass valve having a threaded connection with the said pintle.

11. In a tapping machine, a valve body, a pintle journaled therein and having an axial passage in one end and a sleeve-like extension, a flap valve carried by said pintle adapted when closed to divide the valve body into two compartments, a by-pass valve of the compression type in axial alinement with the pintle and having a threaded engagement with the said sleeve-like extension, and also having a face adapted to close against said axial passage, and an operating stem for the by-pass valve.

12. In a tapping machine, a valve body having a laterally extending hollow boss, a pintle journaled into said body and having a sleeve-like extension extending into said boss, said pintle having an axial passage in one end, a by-pass valve in axial alinement with said pintle and having a face adapted to close against said axial passage in the pintle and an operating stem for the by-pass valve.

13. In a tapping machine, a valve body having a laterally extending hollow boss, a pintle journaled in said body and having a sleeve-like extension extending into said boss, said pintle having an axial passage, a by-pass valve of the compression type comprising a head having a face adapted to close against said axial passage, high-pitch threads on said head engaging complementary high-pitch threads on said sleeve-like extension, and an operating stem carried by said head.

14. In a tapping machine, a valve body having a laterally extending hollow boss, a pintle journaled in said body and having a sleeve-like extension extending into said boss, a portion of said extension being of less external diameter than the internal diameter of the boss to provide an annular passage, said sleeve-like extension having ports leading to said annular passage, a by-pass valve of the compression type comprising a head having a threaded engagement with the sleeve-like extension and provided with a face adapted to close against the axial passage in the pin-

tle, and an operating stem in axial alinement with said head.

15. In a tapping machine, a valve body having a laterally extending hollow boss, a gland nut thereon provided with a drain port, a pintle journaled in said body and having a sleeve-like extension projecting into said boss, there being an annular passage between said boss and sleeve-like extension and said extension having a lateral port communicating with said annular passage, a by-pass valve of the compression type comprising a head having a threaded engagement with said sleeve-like extension and having opposed faces one of which is adapted to close against said axial passage and the other adapted to close said drain port, said head having a transverse passage therethrough, and an operating stem in axial alinement with the head.

16. In a tapping machine, a valve body, a valve therefor, a by-pass establishing a communication between the divisions of the valve body formed by closing the valve, a drain opening communicating with the by-pass, a by-pass valve of the compression type for controlling the said by-pass and drain opening, and a single operating device for said valves.

17. In a tapping machine, a valve body, a valve therefor, a by-pass for establishing communication between the divisions of the valve body formed by closing the valve, a drain opening communicating with the by-pass, a by-pass valve of the compression type for controlling the said by-pass and the drain opening, and an operating stem for the by-pass.

18. In a tapping machine, a valve-body, a pintle journaled therein having an axial port in one end and a valve seat surround-

ing said port, a sleeve-like extension on the pintle, a flap-valve carried by the pintle, a by-pass valve of the compression type comprising a head having a high-pitch thread connection with said sleeve-like extension and provided with a face adapted to close against said valve seat on the pintle, and a stem for the said valve head in axial alinement with the pintle.

19. In a tapping machine, a valve-body, a main valve therein for dividing the body into two compartments, a by-pass formed in the valve-body around the main valve for establishing communication between the divisions of the body formed by closing the valve, a by-pass valve of the compression type for controlling the said by-pass, and a screw-stem for the by-pass valve, said stem having an operative connection with the main valve for opening and closing the latter.

20. In a tapping machine, a valve-body, a main valve therein for dividing the body into two compartments, a by-pass leading around the main-valve for establishing communication between the divisions of the body formed by closing the valve, a by-pass valve of the compression type for controlling said by-pass, and a screw-stem for operating the by-pass valve, said stem having an idle movement relatively to the main valve and also adapted to open and close said main valve.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

PHILIP MUELLER.

ANTON C. SCHUERMANN.

Witnesses:

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