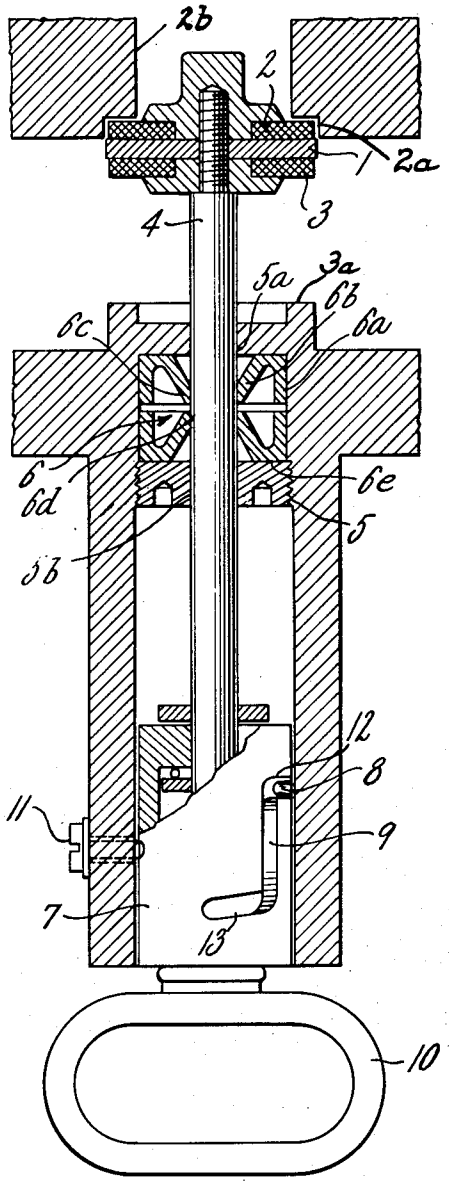
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HAND-OPERATED VALVE, IN PARTICULAR FOR VACUUM PLANTS

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HAND-OPERATED VALVE, IN PARTICULAR FOR VACUUM PLANTS

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This invention relates to hand-operated valves.

The valves used in vacuum plants are in most cases valves operated by means of screw spindles in which the seal between the valve spindle and the housing takes the form of stuffing boxes. The speed of opening and closing with such valves operated by means of screw threaded spindles is not great and thus does not permit a rapid valve operation in vacuum plants. If metal bellows are used they are subject to a considerable danger of fracture due to fatigue and breakage in the folds thereof whereby leakages often occur. Stuffing boxes similarly do not give any greater assurance of a good seal and require constant maintenance. With the valves operated by means of spindles the condition of closing or opening cannot be ascertained from the outside.

The present invention eliminates the disadvantages mentioned and relates to a hand-operated valve, in particular for vacuum plants, enabling a rapid and positively guided opening and closing thereof not known hitherto. The valve according to the invention is characterized in that the closing element is connected to a hand grip by means of a valve spindle mounted for axial displacement and is capable of being pressed against the valve seat by means of at least one bayonet slot and of being locked in either end position.

Thus without any undue delay and the necessity of first reading insignia or notices on the control handle connected to the spindle, it is possible to instantly permit correct manipulation of the valve and to complete same by a single movement of the operator's hand in one direction.

By way of example an embodiment of the object of the present invention is shown partly in longitudinal section in the drawing accompanying and forming part of this specification.

In the drawing, there is disclosed a valve head provided with the sealing disks or means **2** and **3** on either side of the head and is secured to the end of a valve spindle or stem **4** which passes through respective openings *5a*, *5b* provided in the part **5** of the valve housing for axial displacement. Two packing rings **6**, the inner spaces of which are filled with vacuum sealing medium, are arranged in opposed relation to each other to engage the valve spindle **4** and to take care of the vacuum-proof sealing of the interior of the housing towards the atmosphere. Each of the rings **6** is provided with a substantially cylindrical outer wall portion *6a* and with an inturned wall portion *6b* substantially coextensive with said outer wall portion and terminating in opposite inner and outer edges *6c*, *6d*. The inner edge *6c* of the inturned wall portion is shaped for engagement with valve spindle or element **4** along a linear contact area. Each ring **6** is further provided with an intermediate wall portion *6e* positioned to extend from said outer edge to said inturned wall portion and along a plane perpendicular to the longitudinal axis of element **4** to thereby define a substantially V-shaped pocket or space between the inturned wall portion *6b* and the outer wall portion *6a* and wherein the vacuum sealing medium is received. At the other end

of the valve spindle **4** there is a guiding cylinder **7**, which is provided with a longitudinal slot **9** angularly fashioned at either end and providing transverse slot portions **12**, **13** forming a bayonet slot. A nose or abutment **8** operatively connected to the spindle **4** engages in the bayonet slot **9—12—13** of the guiding cylinder **7**, said bayonet slot being fashioned in such a manner that the valve spindle can be displaced rotatably and longitudinally by means of a flat loop-shaped hand grip or handle **10** secured thereto and being capable of being locked in its end positions at **12**, **13** by rotating said hand grip, for example, to the left through an angle of 45° each. The pressure with which the closing element of the valve, i. e. the valve head **1** with its ring shaped seals **2** and **3**, bear against the corresponding valve surfaces or recesses (*2a*, *3a* in the closed or the open position of said valve can be adjusted by means of a set screw **11** extending through a sleeve containing guiding cylinder **7** to prevent the seals from being squashed.

As can be seen from the drawing, the valve disks **2**, **3** operate between two walls of a vacuum chamber. The far wall *2b* contains a passageway which may communicate with or be closed off (as shown) from the vacuum chamber by operation of the valve. The lip rings seat in an enclosure defined by the near wall *5a*, and the valve stem **4** is supported and guided by the adjacent edges of said near wall. The adjacent supporting and guiding edge *5a* and a threaded closure plate **5**, *5b* define the enclosure for rings **6**.

To open the valve the hand grip **10** is first of all rotated by 45° to the left and is then drawn towards the operator in direction parallel to the valve stem which action causes the rotational and longitudinal displacement of the valve spindle **4** and thus the opening of the closing element in the direction of opening whereupon the valve is locked in the open position by a further rotation by 45° in the same direction so that it cannot be again sucked into the closed position by the vacuum. For closing the valve the sequence of operations is reversed. The total rotation of the hand grip **10** on operation of the valve is therefore 90° so that the position of the hand grip noticeable from afar-off is a plain indication for whether the valve is open or closed. In order to keep away the vapour pressure of the sealing medium between the two lip rings **6** from the space of high vacuum on the valve being in the open position the valve head has sealing rings on either side one of which sealing rings rests against a corresponding seat *3a* on part *5a* of the valve housing in the open position of the valve.

The main advantage of the valve according to the present invention consists in that in spite of its large closing and opening travel, respectively, it can be operated rapidly and its position is immediately ascertainable from the outside, due to the non-circular configuration of the handle.

It can thus be seen that there has been provided according to the invention a valve structure adapted for use in particular in vacuum plants, said valve structure including a valve stem provided at one end thereof with a valve head carrying oppositely disposed sealing means selectively engageable with spaced valve seats upon movement of said valve stem in the direction of the same and provided at the other end with a substantially flat handle extending transversely of said stem and with the plane of the handle containing the axis of said stem, guide means for said stem and provided with a bayonet slot having a longitudinal slot portion extending in lengthwise direction of said stem and having a transverse slot portion located at either end of said longitudinal slot portion, said transverse slot portions extending in opposite directions to each other and defining respective locking end positions of said valve head, in which said sealing means engages the se-

lected valve seat, and means operatively connecting said stem with said bayonet slot to guide said handle for operating said stem and said valve head, whereby during initial rotation of said handle said valve head is unlocked from one of the end positions and upon subsequent longitudinal movement of said stem lengthwise of said longitudinal slot portion and finally upon further rotation of said handle in one and the same direction said valve head will be locked in the other end position, in which the location of said flat handle indicates said end positions of the valve head.

What I claim and wish to secure by Letters Patent is:

1. In a valve structure adapted for use in vacuum plants; a valve stem provided at one end thereof with a valve head carrying oppositely disposed sealing means selectively engageable with spaced valve seats upon movement of said valve stem in the direction of the same and provided at the other end with a substantially flat handle extending transversely of said stem and with the plane of the handle containing the axis of said stem, guide means for said stem and provided with a bayonet slot having a longitudinal slot portion extending in lengthwise direction of said stem and having a transverse slot portion located at either end of said longitudinal slot portion, said transverse slot portions extending in opposite directions to each other and defining respective locking end positions of said valve head, in which said sealing means engages the selected valve seat, and means operatively connecting said stem with said bayonet slot to guide said handle for operating said stem and said valve head, whereby during initial rotation of said handle said valve head is unlocked from

one of the end positions and upon subsequent longitudinal movement of said stem lengthwise of said longitudinal slot portion and finally upon further rotation of said handle in one and the same direction said valve head will be locked in the other end position, in which the location of said flat handle indicates said end positions of the valve head.

2. In a valve structure according to claim 1, including stem sealing means positioned intermediate said valve head and said guide means and circumposed about said stem, said stem sealing means including two hollow rings of elastic material each terminating in inturned lip-shaped wall portions for engagement with said stem, said two hollow rings being adapted to receive a vacuum sealing medium.

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