

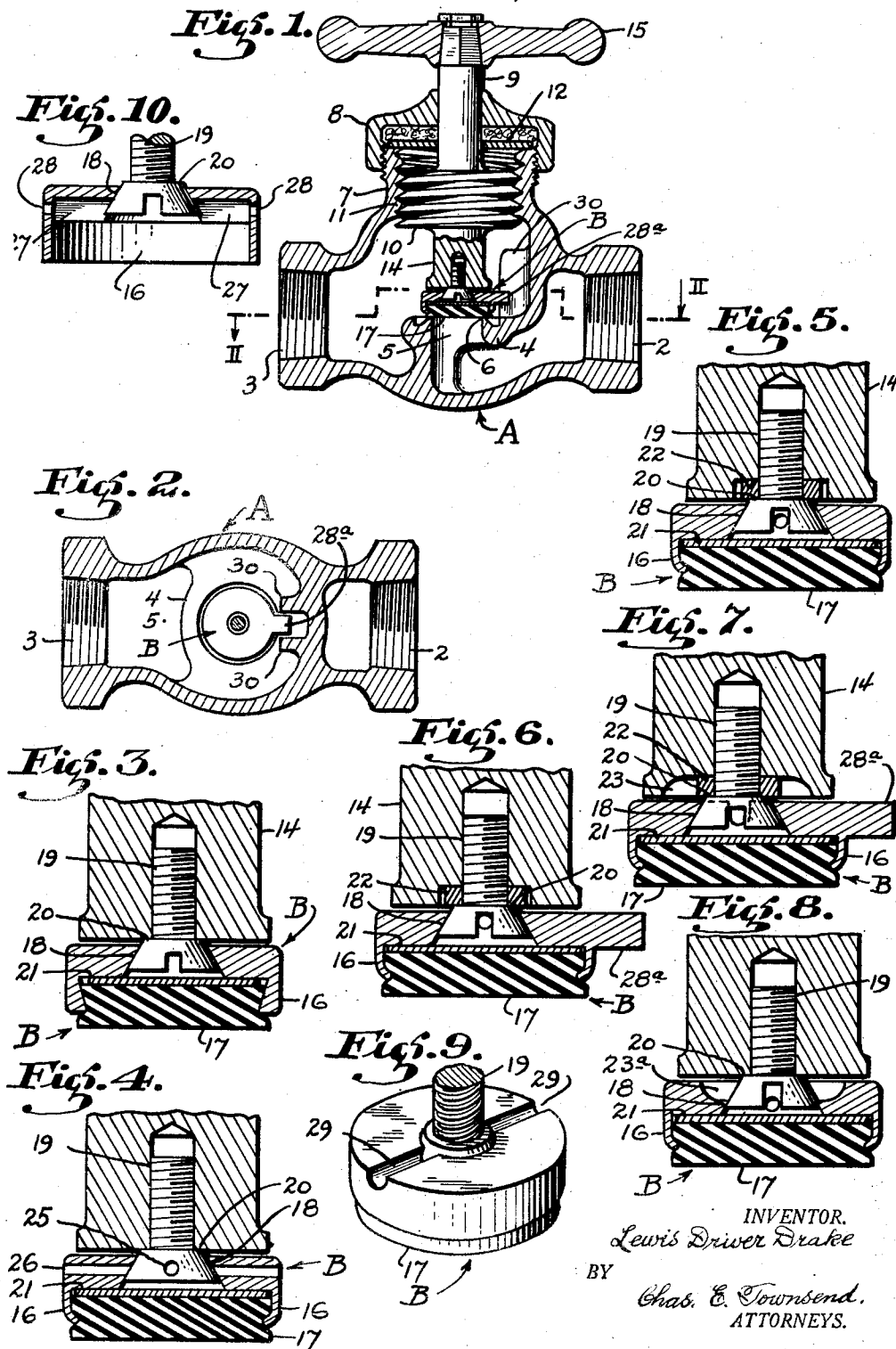
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VALVE

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VALVE

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This invention relates to a valve structure of the compression type.

The object of the present invention is generally to improve and simplify the construction and operation of valves; to provide a valve structure embodying a valve body, a valve seat, a stem and a valve head with a detachable connection between them, said detachable connection forming a swivel which permits rotation of the stem while the valve head remains stationary on the valve seat; to provide means for securing the valve head against rotation both while in and out of engagement with the valve seat; to provide a valve structure comprising a head member, a pin, preferably a screw, extending therethrough to permit swiveling or rotation of the head with relation to the screw, and a rigid spacer in the form of a disc within the valve head covering the screw, and a wear-absorbing facing seated on said spacer and secured in the head; and further, to provide means for temporarily securing the screw against rotation with relation to the valve head when applying or removing said head from the stem.

The valve structure is shown by way of illustration in the accompanying drawing, in which

Fig. 1 is a central vertical longitudinal section of the valve;

Fig. 2 is a cross section taken on line II—II of Fig. 1;

Fig. 3 is an enlarged central vertical section showing one form of valve head and the method of attachment to the stem;

Fig. 4 is a similar section showing another form of structure;

Fig. 5 is a similar section showing the use of a lock washer;

Fig. 6 is a similar section showing the valve head provided with a lug to secure the head against rotation;

Fig. 7 is a view similar to Fig. 6, showing the end of the valve stem cut away to reduce the frictional area between the valve head and stem;

Fig. 8 is a section similar to Fig. 7, showing the valve head cut away to reduce the frictional resistance between the valve head and stem;

Fig. 9 is a perspective view of the detachable head, showing its inner face grooved for the reception of an implement, and

Fig. 10 is a vertical cross section of the valve head showing the head slotted and perforated for the reception of an implement, said view showing the spacer and wear-absorbing disc removed.

Referring to the drawing in detail, and par-

ticularly to Fig. 1, A indicates a valve body provided with inlet and outlet connections as indicated at 2 and 3. These may be internally or externally threaded, or they may be flanged, as conditions may demand. Formed within the valve body is a cross partition 4 having the usual flow passage 5 and surrounding valve seat 6, and extending upwardly from the body and disposed centrally thereof is a neck member 7, the upper end of which is externally threaded to receive a packing retaining and compressing cap 8. Extending through the cap is a valve stem 9. A portion of this stem is enlarged, as at 10, and is externally threaded to engage cooperating threads 11 formed on the interior of the neck. Interposed between a washer, indicated at 12, which rests on top of the neck portion, and the cap 8, is a suitable packing material to prevent leakage around the stem. The lower end of the valve stem, indicated at 14, carries a valve head generally indicated at B, while the upper end of the stem is provided with a handle 15 whereby rotation is transmitted to move the valve head into and out of engagement with the valve seat.

The structure just described is more or less standard in construction, and has therefore been only briefly described. The invention here involved is directed to the valve head and its connection with the valve stem and also with the valve body. It comprises a valve head which may be formed by stamping, die-casting, or otherwise. Its lower face is provided with a recess 16 to receive and secure a wear-resisting facing material in the form of a disc 17 which may be made from leather, rubber, vulcanized rubber, fiber, or other materials; in other words, the disc may be made from a resilient or a comparatively hard material, depending upon its use, and the lower face of the disc may be in the form of a cone or it may be flat or otherwise shaped, to conform to the seat which it is to engage.

The depression formed for the reception of the wear-absorbing disc is surrounded by an annular flange, and this may be thicker at the outer edge, as shown in Fig. 3, to provide a recess which is larger in diameter at the inner end, or the flange may be of substantially uniform thickness throughout, to permit the flange to be spun or crimped inwardly to permanently secure the wear-resisting disc, as shown for instance in Fig. 4. When using the type of flange shown in Fig. 3, a disc of resilient or compressible material should be employed, as it will have to be compressed in order that it may be introduced through the smaller outer end of the recess.

In all instances the head is provided with a central opening 18 to permit a pin, preferably in the form of a screw 19 and hereinafter to be referred to as a screw, to pass therethrough and to permit the screw to be screwed into a threaded passage formed in the end of the stem. Further, the screw head must be provided with a shoulder 20 to engage the end of the stem, said shoulder providing sufficient clearance between the head and the end of the stem to permit free relative rotation between them; in other words, to permit a swivel or rotatable connection between the head and stem. A spacer disc 21 of metal or some other rigid material is placed on the bottom of the recess between the screw head and the wear-absorbing material, to provide a firm uniform seat for said material and to prevent contact with the head of the screw, as such contact might produce a binding action or resist rotation between the swiveled parts.

In Figs. 5 and 6 a lock washer 22 is shown between the end of the stem and the shoulder on the screw. This serves the obvious function of preventing accidental release of the screw.

In Fig. 7 the end of the stem is recessed as shown at 23 to reduce the frictional area between the stem and head to a minimum. In Fig. 8 the same result is obtained by recessing the surface of the head as shown at 23a.

Where a compressible or removable wear-absorbing disc is employed, as shown in Fig. 3, access to the slotted head of the screw, to unscrew or to insert and tighten the same, is obtained by removing the discs 17 and 21, but where the wear-absorbing disc 17 and the underlying disc 21 are permanently secured in the recess of the head, as shown in Fig. 4, the slotted end of the screw head is not accessible, and other means must accordingly be provided to temporarily secure the valve head and screw against rotation with relation to each other, as the screw could otherwise not be screwed into the end of the valve stem.

To accomplish this a hole 25 is drilled transversely through the screw and through the valve head, as indicated at 26 in Fig. 4. An implement in the form of a pin or a short length of stiff wire is passed through the holes 25 and 26, and when this is done the head and screw are locked with relation to each other and may be rotated as a unit when the screw is being screwed into the end of the stem; and when it is seated and tightened against its shoulder the pin may be removed, thereby leaving the valve head free to swivel with relation to the stem.

In the structure shown in Fig. 10 the slot in the screw head serves the same function as the transverse hole 25, and a slot 27 together with the two aligning holes 28 is formed in the valve head. In the structure shown in Fig. 9, the slot in the screw head is again employed and the inner face of the valve head is grooved as indicated at 29. Hence when a pin or like implement is passed through the drilled holes and/or grooves or slot in the screw head, a temporary interlock is formed which permits insertion or removal of the screw and valve head from the stem, it being understood that the cap 8, together with the stem and valve head, is removed from the valve body to facilitate this operation.

In certain types of valve use, particularly where high temperatures or high pressures, or both, are encountered, minor distortion, such as that due to unequal expansion, become of greater magnitude, and to limit their wear and maintain complete closure it is preferable not only that ro-

tation of the valve on its seat be prevented but that the same parts of the valve and seat make the same contacts on all closures. To accomplish this, a lug 28a is formed at one side of the valve head. This lug extends radially and outwardly from the valve head and into a slot formed between a pair of lugs 30 formed in the valve body. This structure prevents rotation of the valve head, whether in or out of engagement with the valve seat; thus if there are any irregular surfaces presented, either by the valve facing or by the valve seat, such faces will always register when the valve is raised and later brought back into engagement with the valve seat. Hence the chance of leakage is materially reduced.

The valve head structure and connection shown here provides metal-to-metal contact between all of the rotating parts. The valve stem is free to rotate at all times without imparting rotary movement to the valve head and facing, regardless of whether the valve is in or out of engagement with the valve seat. By the use of the rigid spacer 21 the facing material 17, whether constructed of compressible or of hard material, is kept out of contact with the screw head, and free rotating of the stem and screw when raising, lowering or applying pressure to the valve head and facing is insured. Further, the bearing or contact area between the rotatable stem and valve head may be varied as shown in Figs. 7 and 8, to give excellent valve closure with a minimum of friction.

While certain features of my invention have been more or less specifically described and illustrated, I nevertheless wish it understood that changes may be resorted to within the scope of the appended claims.

Having thus described and illustrated my invention, what I claim and desire to secure by Letters Patent is:

1. In a compression valve structure of the character described, a valve body having a valve seat, a rotatable valve stem, a valve head comprising a member having a peripheral flange projecting from one face to form a recess, a shouldered screw extending through the valve head from the recess and threaded into the stem and forming a swiveled connection between the valve head and the stem and attaching the valve head to the stem, said screw being rigid with the stem and rotatable in fixed relation therewith independently of the valve head, a wear-resisting member seated in the recess and permanently secured therein by the peripheral flange and permanently covering the screw head, and adapted to be carried into contact with the valve seat by the stem, said valve head being provided between the face contacting the stem and the wear-resisting member with means for affording access to the screw for rotating the same after the wear-resisting member has been permanently secured in said recess, whereby the head, the wear-resisting member and the screw may be assembled as a permanent unit before being applied to the stem.

2. In a compression valve structure of the character described, a valve body having a valve seat, a rotatable stem, a swiveled valve head on the stem, said valve head comprising a disk-like member having a peripheral flange projecting from one face to form a recess, a shouldered screw extending through the valve head from the inner face of the recess and screwed into the stem, attaching the valve head to the stem forming a swiveled connection between the head and the stem, the screw being rigidly attached to the

stem and rotating integral with the stem, the valve head being free to cease rotation while in contact with the valve seat, a wear resisting member seated in the recess and permanently secured therein by said flange, said wear-resisting member permanently covering the screw head, and means on the screw engageable temporarily from a point radial from the screw for rotating the screw for attaching and detaching the swivelled valve head and the valve stem.

3. In a compression valve structure of the character described, a valve body having a valve seat, a rotatable stem, a swivelled valve head on the stem, said valve head comprising a disk-like member having a peripheral flange projecting from one face to form a recess, a shouldered screw extending through the valve head from the inner face of the recess and screwed into the stem, attaching the valve head to the stem forming a swivelled connection between the head and the stem, the screw being rigidly attached to the stem and rotating integral with the stem, the valve head being free to cease rotation while in contact with the valve seat, a wear resisting member seated in the recess and permanently secured therein by said flange, said wear-resisting member permanently covering the screw head, and means in the swivelled head for accessible engagement temporarily with the screw from a point radial from the screw for attaching and detaching the swivelled valve head and the stem.

4. In a compression valve structure of the character described, a valve body having a valve seat, a rotatable stem, a swivelled valve head on the stem, said valve head comprising a disk-like member having a peripheral flange projecting from one face to form a recess, a shouldered screw extending through the valve head from the inner face of the recess and screwed into the stem, attaching the valve head to the stem forming a swivelled connection between the head and the stem, the screw being rigidly attached to the stem and rotating integral with the stem, the valve head being free to cease rotation while in contact with the valve seat, a wear resisting member seated in the recess and permanently secured therein by said flange, said wear-resisting member permanently covering the screw head, and implement actuated means for temporarily engaging the screw permanently assembled within the swivelled valve head from a point radial to the screw for rotating the screw for attaching and detaching the swivelled valve head and the stem.

5. In a compression valve structure of the character described, a valve body having a valve seat, a rotatable stem, a swivelled valve head on the stem, said valve head comprising a disk-like member having a peripheral flange projecting from one face to form a recess, a shouldered screw extending through the valve head from the inner face of the recess and screwed into the stem, attaching the valve head to the stem forming a swivelled connection between the head and the stem, the screw being rigidly attached to the stem and rotating integral with the stem, the valve head being free to cease rotation while in contact with the valve seat, a wear resisting member seated in the recess and permanently secured therein by said flange, said wear-resisting member permanently covering the screw head, a passage formed in the screw, a passage formed in the swivelled valve head adapted to align with the passage in the screw, said pas-

sages being adapted to receive temporarily a pin whereby the screw permanently assembled within the swivelled valve head is rotated in attaching and detaching the swivelled valve head and the stem.

6. In a compression valve structure of the character described, a valve body having a valve seat, a rotatable stem, a swivelled valve head on the stem, said valve head comprising a disk-like member having a peripheral flange projecting from one face to form a recess, a shouldered screw extending through the valve head from the inner face of the recess and screwed into the stem, attaching the valve head to the stem forming a swivelled connection between the head and the stem, the screw being rigidly attached to the stem and rotating integral with the stem, the valve head being free to cease rotation while in contact with the valve seat, a wear resisting member seated in the recess and permanently secured therein by said flange, said wear-resisting member permanently covering the screw head, said wear-resisting member having a continuous unbroken face on the valve seat side, and means on the screw engageable temporarily from a point radial from the screw for rotating the screw for attaching and detaching the swivelled valve head and the valve stem.

7. In a compression valve structure of the character described, a valve body having a valve seat, a rotatable stem, a swivelled valve head on the stem, said valve head comprising a disk-like member having a peripheral flange projecting from one face to form a recess, a shouldered screw extending through the valve head from the inner face of the recess and screwed into the stem, attaching the valve head to the stem forming a swivelled connection between the head and the stem, the screw being rigidly attached to the stem and rotating integral with the stem, the valve head being free to cease rotation while in contact with the valve seat, a spacer plate located in said recess and a wear-resisting member also located in said recess, said spacer plate being located in the inner portion of the recess and covered by the wear-resisting member with its periphery bearing against the inner face of said disk-like member recess and presenting a solid unyielding surface to the wear-resisting member and permanently covering the screw head and spacing the screw head from the wear-resisting member, said wear-resisting member being seated in the recess exteriorly of the spacer plate and permanently secured therein, and means on the screw engageable temporarily from a point radial from the screw for rotating the screw for attaching and detaching the swivelled valve head and the valve stem.

8. In a compression valve structure of the character described, a valve body having a valve seat, a rotatable stem, a swivelled valve head on the stem, said valve head comprising a disk-like member having a peripheral flange projecting from one face to form a recess, a shouldered screw extending through the valve head from the inner face of the recess and screwed into the stem, attaching the valve head to the stem forming a swivelled connection between the head and the stem, the screw being rigidly attached to the stem and rotating integral with the stem, the valve head being free to cease rotation while in contact with the valve seat, a wear resisting member seated in the recess and permanently secured therein by said flange, said wear-resisting member permanently covering the screw head,

and means on the screw engageable temporarily from a point radial from the screw for rotating the screw for attaching and detaching the swivelled valve head and the valve stem, said stem being provided with a central recess formed in the inner end of the stem reducing frictional contact area between the stem and the valve head.

9. In a compression valve structure of the character described, a valve body having a valve seat, a rotatable stem, a swivelled valve head on the stem, said valve head comprising a disk-like member having a peripheral flange projecting from one face to form a recess, a shouldered screw extending through the valve head from the inner face of the recess and screwed into the stem, attaching the valve head to the stem forming a swivelled connection between the head and the stem, the screw being rigidly attached to the stem and rotating integral with the stem, the valve head being free to cease rotation while in contact with the valve seat, a wear resisting member seated in the recess and permanently secured therein by said flange, said wear-resisting member permanently covering the screw head, means on the screw engageable temporarily from a point radial from the screw for rotating the screw for attaching and detaching the swivelled valve head and the valve stem, said stem being provided with a central recess formed in the inner end of the stem reducing frictional contact area between the stem and the valve head, and a lock washer arranged in the recess of the inner end of the stem and interposed between the shouldered head of the screw and the stem to prevent unscrewing of the screw.

10. In a compression valve structure of the class described, a valve body having a valve seat, a rotatable valve stem, a valve head comprising a member having a peripheral flange projecting from one face to form a recess, a shouldered screw extending through the valve head from the recess and threaded into the stem and forming a swivelled connection between the valve

head and the stem and attaching the valve head to the stem, said screw being rigid with the stem and rotatable in fixed relation therewith independently of the valve head, a wear-resisting member seated in the recess and permanently secured therein by the peripheral flange and permanently covering the screw head and adapted to be carried into contact with the valve seat by the stem, said valve head being provided in its face contacting with the stem with a groove for affording access to the screw for rotating the same after the wear-resisting member has been permanently secured in said recess whereby the head, the wear-resisting member and the screw may be assembled a permanent unit before being applied to the stem.

11. In a compression valve structure of the character described, a valve body having a valve seat, a rotatable valve stem, a valve head comprising a member having a peripheral flange projecting from one face to form a recess, a shouldered screw extending through the valve head from the recess and threaded into the stem and forming a swivelled connection between the valve head and the stem and attaching the valve head to the stem, said screw being rigid with the stem and rotatable in fixed relation therewith independently of the valve head, a wear-resisting member seated in the recess and permanently secured therein by the peripheral flange and permanently covering the screw head, and adapted to be carried into contact with the valve seat by the stem, said valve head being provided between the face contacting the stem and the wear-resisting member with means for affording access to the screw for rotating the same after the wear-resisting member has been permanently secured in said recess, whereby the head, the wear-resisting member and the screw may be assembled as a permanent unit before being applied to the stem, said valve head being provided with a recess in its stem contacting face to reduce frictional area between the stem and the valve head.

LEWIS DRIVER DRAKE.

CERTIFICATE OF CORRECTION.

Patent No. 2,271,391.

January 27, 1942.

LEWIS DRIVER DRAKE.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, second column, line 15, claim 10, for "a a" read --as a--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 24th day of March, A. D. 1942.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.