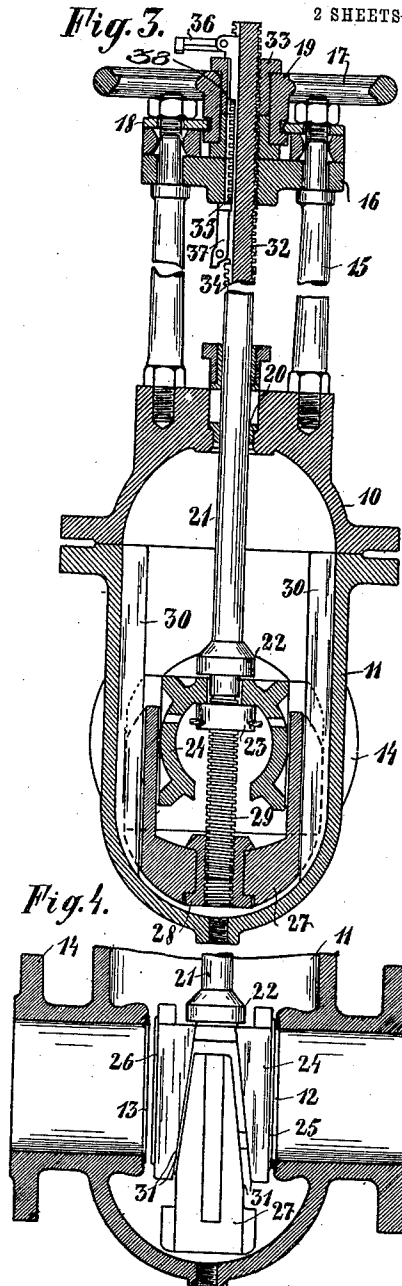
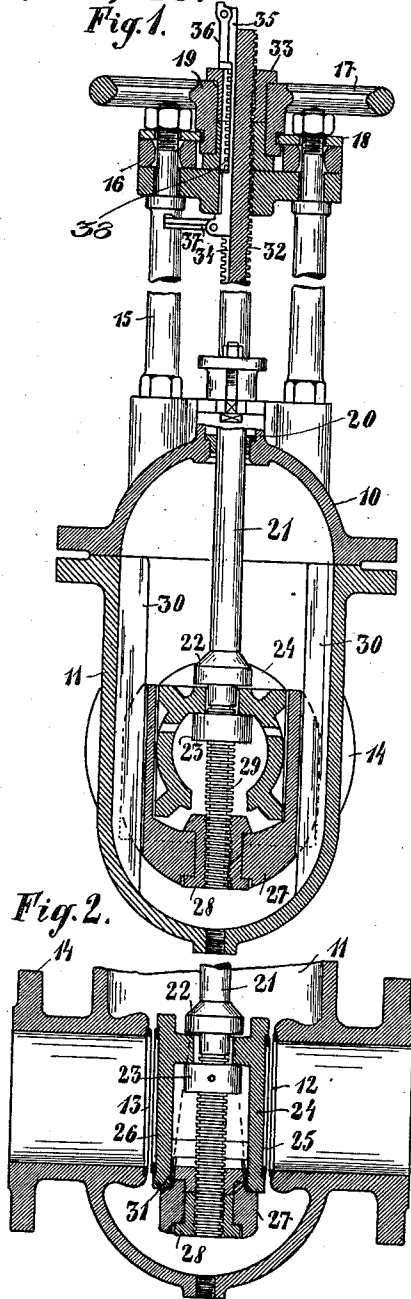


C. G. KLEINSCHMIDT.
SLIDING STOP VALVE.
APPLICATION FILED AUG. 19, 1911.

1,029,615.

Patented June 18, 1912.

2 SHEETS—SHEET 1.



Witnesses:
Katherine Koch
Daniel Holmgren.

Inventor:
Carl Georg Kleinschmidt
by his attorneys
Brisson & Gump

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2 SHEETS—SHEET 2.

Fig. 5.

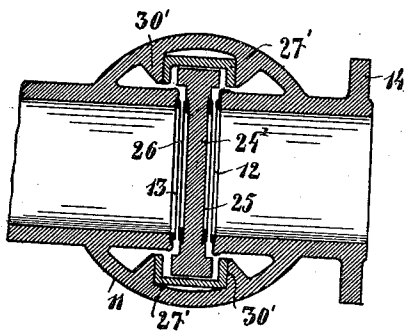


Fig. 6.

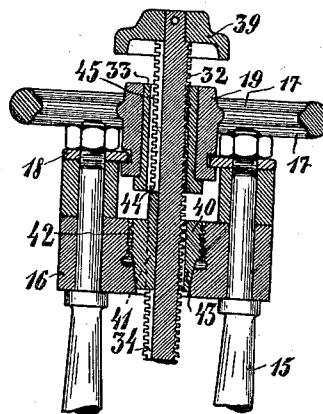


Fig. 8.

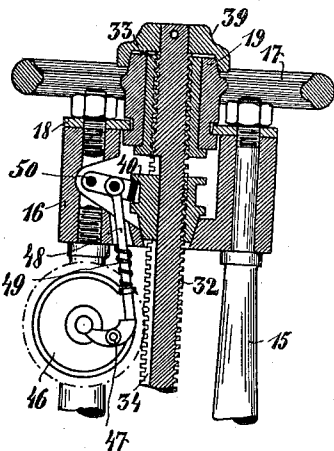
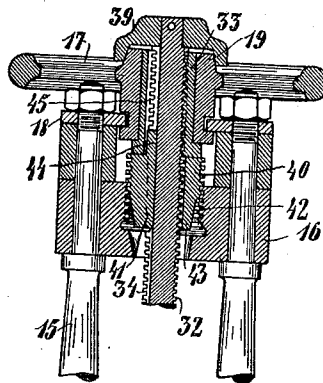


Fig. 7.



Witnesses:
Katherine Koch
Daniel Holmgren.

Inventor:
Carl Georg Kleinschmidt
by his attorneys
Brienen & Junge

UNITED STATES PATENT OFFICE.

CARL GEORG KLEINSCHMIDT, OF HERNE, GERMANY.

SLIDING STOP-VALVE.

1,029,615.

Specification of Letters Patent.

Patented June 18, 1912.

Application filed August 19, 1911. Serial No. 644,995.

To all whom it may concern:

Be it known that I, CARL GEORG KLEINSCHMIDT, a citizen of Germany, residing at Herne, in Westphalia, Germany, have invented certain new and useful Improvements in Sliding Stop-Valves, of which the following is a specification.

The present invention relates to a stop valve in which the valve body, before being raised is first caused to recede from its seat at right angles thereto without subjecting the valve mechanism and spindle to excessive strain.

The invention further comprises an arrangement whereby the movements associated with the operation of the valve are executed by a single spindle; the movement required for lifting the valve body from its seat after having been withdrawn therefrom being either effected manually or automatically.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of the valve showing the valve body withdrawn from its seat; Fig. 2 is a section of the lower part of Fig. 1 taken at right angles thereto; Figs. 3 and 4 are corresponding sections showing the valve body engaging its seat; Fig. 5 is a horizontal section of a modified form of valve body and housing; Figs. 6 and 7 are sections of a device for automatically controlling the spindle, and Fig. 8 illustrates a modified form in section of this automatic controlling device.

Referring to the form of valve illustrated in Figs. 1 to 4, the valve housing 11 closed by the cover 10 is provided with the seats 12 and 13 and with the usual coupling flanges 14. The columns 15 carry a bridge 16 on which the hand wheel 17 is rotatable, but is otherwise held immovable by the split disk 18 engaging a groove of the wheel hub 19. On the spindle 21 passing through a stuffing box 20 into the valve housing 11 is fitted the valve body 24 which is mounted between the fixed stop 22 and the movable stop 23, and is provided on one side with a seating surface 25 and on the other side with a seating surface 26. The valve body 24 is straddled by a substantially U-shaped yoke 27, the shanks of which are tapered so as to constitute wedges. Yoke 27 is connected to the lower end of spindle 21 by a sleeve 28 which is screwed on the thread 29 of said spindle. The yoke 27 is guided in paral-

lelism to spindle 21 between a pair of ribs 30 provided in the housing 11, while the tapering shanks of the yoke are adapted to engage correspondingly tapered guideways 31 of valve body 24. The spindle 21 is also provided at its upper end with a threaded section 32 which engages with an internal screw thread in the collar 33, fixed to hand wheel 17. The top part of the spindle 21 is provided with a groove in which the key 35 is free to slide longitudinally, said key having at its upper and lower ends hinged stops 36 and 37. The collar 33 of hand wheel 17 and the bridge piece 16 are also provided with grooves with which the key 35 is capable of engagement. The key 35 has a central recess 38, the relative dimensions of the parts being such that when the key is raised (Fig. 1) the lower unrecessed section thereof engages the groove of bridge piece 16 and thereby locks spindle 32 against rotation, while the upper unrecessed key section is out of engagement with the groove of collar 33, so that hand wheel 17 may be freely rotated on the spindle. When key 35 is lowered, its unrecessed sections occupy such positions that hand wheel 17 is coupled to spindle 32, while the latter is free to rotate within bridge piece 16.

The operation is as follows: In the position shown in Figs. 1 and 2 the yoke 27 is raised into engagement with the guideways 31 of valve body 24, thereby centering the latter, *i. e.*, the valve body 24 moves between the seats 12 and 13 with a certain amount of play. If now the hinged stop 37 is out of engagement with bridge piece 16 and the stop 36 in engagement with collar 33, the key 35 will be in that position in which it prevents the spindle 32 from turning with relation to the bridge piece 16, while on the other hand the hand wheel 17 is able to turn with respect to the spindle 32 owing to the recess 38 of the key. The hand wheel 17 can therefore be turned, and owing to the spindle 32 not taking part in this turning movement, it is forced to move longitudinally and in doing so, lifts the valve body 24 off its seat; turning the hand wheel 17 in the reverse direction causes the valve body to move downward.

In order to completely close the valve after having lowered the valve body 24, the stop 36 is thrown out of action and the key 35 pushed down until the stop 37 can be raised into its position of engagement

with bridge piece 16 (Fig. 3). The spindle 32 is now locked to the hand wheel, while the recess 38 of the key is in such a position that the spindle is able to turn with respect to bridge piece 16. By further turning the hand wheel, the spindle 32 and 21 is also turned so that with the aid of the screw thread 29 and that in sleeve 28, the yoke 27 is forced downward and partly out of the guide-ways 31. Owing to the valve body having a certain amount of side play on the spindle, it is forced to one side against its seat by the pressure of the medium to be controlled, for example to the right against the seat 12, as shown in Fig. 4, by steam flowing from left to right. By turning the hand wheel 17 in the opposite direction with the key 35 in the position indicated in Fig. 3, the yoke 27 is lifted and thereby forces the valve body 24 away from its seat 12 until it assumes the position shown in Fig. 2. If, now, the position of the key is altered to that shown in Fig. 1, and hand wheel 17 is rotated in the proper direction, the valve body 24 together with yoke 27 is raised to fully open the passage for the medium to be controlled.

It will be apparent that with the aid of the tapering yoke guided in the valve housing, the forces acting against the one sided pressure when the valve body is being withdrawn from its seat, can be taken up with a minimum expenditure of power, and that the spindle is relieved of all bending strain. This is of great advantage, inasmuch as pressure on the screw thread 29 and that in sleeve 28 is obviated.

In the form of construction shown in Fig. 5, the valve body 24¹ is flat, so that the seats 12, 13 can be arranged as closely as possible to one another. The yoke 27 which is shown in Figs. 1 to 4 to be received within the corresponding tapering ways 31 of valve body 24, is replaced by a yoke 27¹, the tapering shanks of which are of U-shaped cross section and straddle body 24¹. Yoke 27¹ which is guided in the valve housing 11 by the guides 30¹ embraces the valve body 24¹. This arrangement is advantageous as the seats being close together, tend to reduce whirling of the medium between these two points, consequently there is a steady flow of the medium when the valve body 24¹ is raised.

In the devices shown in Figs. 6 and 7 which are adapted to automatically convert the rotary movement of the spindle into longitudinal movement, and vice versa, the hand wheel 17 is mounted in the bridge 16 in the same way as before, and is also connected with the spindle screw thread 32 by the internal screw thread in the collar 33. In this case, however, the top of the spindle is provided with a cup 39 which forms together with the top of the hub 19

of hand wheel 17 a cone friction clutch. Within the bridge 16, there is also a coupling body 40 which is capable of sliding longitudinally on the spindle but can be locked to the same by a feather 41 made integral with body 40 and engaging the groove 34. This body 40 is connected by the screw thread 42 which has the same pitch as the screw thread 32, with the bridge 16 and at its lower end has a conical projection 43 which fits into a corresponding bore in the bridge 16 and thereby forms a cone clutch. At the top of body 40 feather 41 is prolonged to form a stud 44 adapted to fit into a corresponding groove 45 in the collar 33 of hand wheel 17.

The operation of the above described device is as follows:—When closing the valve, the cup 39 is lowered onto the coned hub 19 of hand wheel 17 and in this manner a friction clutch is formed at this point which prevents further rotation of the hand wheel 17 with respect to spindle 32. The position shown in Fig. 6 corresponds to the position of the valve body 24 and the yoke 27 as shown in Fig. 1, while Fig. 7 illustrates the position of the parts corresponding to that of the valve body and yoke as shown in Fig. 3. Upon further rotation of the hand wheel 17 in the same direction, the coupling body 40 is raised by the action of the screw thread 42, the clutch 43 is disengaged, and the stud 44 enters the groove 45 in collar 33. This rotation of the valve spindle 32 causes the yoke 27 to be moved out of the valve body 24 into the position shown in Fig. 3, while the body 40 impinges against the collar 33, thereby indicating that the valve is now completely closed. When the valve is to be opened, the hand wheel 17 is turned in the opposite direction so that the coupling body 40 is screwed back into the bridge 16 until the cone 43 becomes seated within the conical bore of bridge 16, while at the same time stud 44 is withdrawn from the groove 45 of collar 33. In this way, the continued rotation of wheel 17 will cause a corresponding upward movement of spindle 32, thereby opening the valve. In this way the movement of the spindle is automatically converted, it only being necessary to turn the hand wheel in the manner usual with ordinary stop valves. The principle on which this arrangement is based consists in using two alternately acting friction clutches, one of which couples the spindle in its lowest position to the hand wheel, while the other clutch connects the spindle with the bridge so that it is unable to move relatively thereto, but is capable of longitudinal movement.

The same principle is adapted in the construction shown in Fig. 8. In this case the screw connection of the clutch member 40 with the bridge 16 is omitted, a toothed

wheel 46 being substituted therefor, said wheel meshing with the screw spindle 32. It will be apparent that at that moment when the spindle is coupled to hand wheel 17 by means of the clutch member 39 and when the spindle begins to turn, the wheel 46 will be rotated. The wheel then by means of the pusher 47 advances rod 48 against the pressure of the spring 49, and by means of the pivoted arm 50, disengages the clutch member 40 so that the spindle coupled to the hand wheel again turns freely.

The operation of this modification is the same as that of the above described device. It may be mentioned that the principle of the invention is not confined to the particular forms of construction shown and described, and that the latter may vary without departing from the nature of the invention.

I claim:

1. In a slide valve, a casing having a seat, combined with a valve body adapted to be forced against said seat by the pressure of the medium to be controlled by the valve, a yoke straddling said body, a spindle carrying the valve body and yoke, means intermediate said body, yoke and spindle for rectangularly withdrawing the body from its seat upon a rotation of the spindle, and additional means intermediate the spindle and valve body for raising the latter upon a continued rotation of the spindle.

2. In a slide valve, a casing having a seat, combined with a valve body adapted to engage said seat and having tapering guides, a yoke having tapering shanks that straddle the body and engage the guides thereof, a threaded grooved spindle carrying said body and yoke, a bridge having a threaded perforation into which the spindle is tapped, a hand wheel threaded upon the spindle, and means for locking the spindle either to the bridge or to the hand wheel.

3. In a slide valve, a casing having a seat, combined with a spindle rotatable and axially slidable in said casing a valve body carried by the spindle and adapted to engage the seat, said body having a radial play with respect to said spindle and being pro-

vided with tapering guides, a yoke also carried by the spindle and having tapering shanks that straddle the valve body and engage the guides, a first means for locking the spindle against axial movement, a rotation of the spindle effecting an engagement between the shanks and guides to rectangularly withdraw the valve body from its seat, and second means for locking the spindle against rotation, an axial displacement thereof effecting a raising of the valve body and yoke.

4. In a slide valve, a casing having a seat, combined with a spindle rotatable and axially slidable in said casing, a valve body carried by the spindle and adapted to engage the seat, said body having a radial play with respect to said spindle and being provided with tapering guides, a yoke also carried by the spindle and having tapering shanks that straddle the valve body and engage the guides, a bridge having a threaded perforation engaged by the spindle, a hand wheel threaded upon the spindle, a key slidable in the spindle-groove and adapted to couple the spindle either to the bridge or to the wheel, and means for locking the key in position.

5. In a slide valve, a casing having a seat, combined with a spindle rotatable and axially slidable in said casing, a valve body carried by the spindle and adapted to engage the seat, said body having a radial play with respect to said spindle and being provided with tapering guides, a yoke also carried by the spindle and having tapering shanks that straddle the valve body and engage the guides, a bridge having a threaded perforation engaged by the spindle, a hand wheel threaded upon the spindle, a key slidable in the spindle-groove and adapted to couple the spindle either to the bridge or to the wheel, and a pair of stops fulcrumed to the key and adapted to respectively engage the bridge and wheel.

CARL GEORG KLEINSCHMIDT. [L. S.]

Witnesses:

CHAS. J. WRIGHT,
ALBERT F. NUFER.