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Csapforgó szerelvény

Az európai szabadalom ellen, megadásának az Európai Szabadalmi Közlönyben való meghirdetésétől számított kilenc hónapon belül, felszólalást lehet benyújtani az Európai Szabadalmi Hivatalnál. (Európai Szabadalmi Egyezmény 99. cikk(1))

A fordítást a szabadalmas az 1995. évi XXXIII. törvény 84/H. §-a szerint nyújtotta be. A fordítás tartalmi helyességét a Szellemi Tulajdon Nemzeti Hivatala nem vizsgálta.

TAPERED PLUG VALVE

The invention relates to a cock fitting comprising a cock plug disposed in a housing, wherein the plug is connected to a drive arrangement for raising and subsequently rotating the plug, wherein the drive arrangement comprises a control housing with a shaft mounted in the control housing in an axially displaceable and rotatable manner, wherein the shaft is loaded by a pressure spring in the axial direction of the shaft.

A cock fitting of the type mentioned in the introduction is known from the prior art. Such a cock fitting, also configured as a tap cock or as a cock switch-over device, is used in places in which closing or switching a pipe must occur in an extremely reliable manner under great forces and high thermal stresses. As explained, the known tap cocks or cock switch-over devices are used to this end.

A known tap cock is characterized in that, in the housing, the cock plug is first pulled out of its seat by a spindle, then turned and then lowered again. The advantage of this procedure is that even with high forces, wear is minimal. A cock switch-over device operates in a similar manner; here also the cock plug is first axially lifted out of the original seat, then turned and then lowered again.

In big cock fittings, in which more specifically exactness and precision during lifting and rotation are important, the use of so-called ball screw transmissions is known. The cock plug is first lifted by way of the ball screw transmission, wherein in the upper final position, a further axial movement is blocked by a ball of the ball screw transmission, and the force acting onto the ball screw transmission leads to a rotation of the cock plug. After a rotation of ca. 90°, the ball falls out of the ball lock, the cock plug can be lowered again and the procedure can begin anew. A disadvantage of this known prior art, is that the balls operated more specifically under high thermal stress variations and high mechanical strain. The operational security of such a tap cock is then no longer ensured.

WO 2009/005348 A2 discloses a cock fitting according to the preamble of claim 1.

Therefore, the problem underlying the invention is to provide a cock fitting of the type mentioned in the introduction, which operates without wear and in an extremely reliable manner over a long period of time, independently of its constructional size and independently of high thermal stress and more specifically also independently of great thermal stress variations.

In order to solve the object, it is proposed according to the invention, that the drive device is configured so that it operates hydraulically for lifting as well as rotating the cock plug, that the control housing forms a first chamber, wherein the shaft is mounted in the first chamber, wherein the shaft in the chamber has a working surface, wherein the chamber is chargeable with a fluid, wherein by charging the chamber with a fluid, the shaft is displaced axially against the force of the pressure spring, wherein in the axially displaced state of the shaft, the shaft is rotatable by a value of ca. 90° by way of a hydraulically operating rotating device.

It has already been pointed out that a cock fitting is characterized in that the cock plug is not rotated in the seat but is first lifted out of the seat of the fitting, is then rotated in the free state and subsequently lowered back into the seat in the rotated state. The hydraulically operating drive device now ensures that the cock plug is lifted and is rotated in the second step by this hydraulically operating device. This means that the pressure for lifting the cock plug is also maintained during the rotation of the cock plug.

The drive device has a so-called control housing with an axially displaceable and rotatable shaft inside the control housing. The cock plug is located on the shaft at its end. The shaft protrudes with the cock plug into the pipe. This also means that the axial movement of the cock plug as well as the rotational movement of the cock plug occurs by way of the axial movement of the shaft and the rotation of the shaft.

The shaft is loaded by a pressure spring in the axial direction of the shaft. From this, it is clear that the shaft and thus the cock plug are first lifted against the force of the pressure spring in order to be then rotated in this state. After the rotation, the cock plug is pressed into the seat in the pipe due to the force of the pressure spring. This means that the cock fitting comes with a relatively high security due to the mechanical pressure spring, since the cock plug always definitely gets back into the seat due to the pre-tensioned pressure spring, even if the hydraulic system should fail.

The rotating device comprises a paddle wheel disposed on the shaft, which is set into a rotating motion by the fluid. Hereby, the paddle wheel is located in another chamber of the control housing. Limit switches are respectively provided for the axial movement of the shaft and the rotation of the shaft. This means that when the cock plug is lifted out of the seat in the fitting, a limit switch is activated after running along a predetermined stroke, wherein the rotational movement is then initiated, wherein the cock plug is then set down again after a rotation of e.g. 90°.

In the following, the invention is exemplarily explained in more detail based on the drawing.

The cock fitting labeled 1 as a whole is disposed in the pipe 2. The cock fitting 1 comprises a so-called control housing 10, wherein the control housing 10 receives a shaft 11 in an axially displaceable and rotatable manner. In this context, the shaft has a circumferential collar 14 in the area of the first chamber 12, which is supplied by a hydraulic pump 13. Above the collar, which is disposed on the shaft 11, there is a pressure spring 16. This pressure spring 16 is mounted on a circumferential protrusion 18 disposed on the wall of the housing 10, wherein another second chamber 20 is provided above the protrusion 18, wherein the chamber 20 is also supplied by a hydraulic pump 21. The second chamber 20 in connection with the hydraulic pump 21 forms a rotating device 27, together with the paddle wheel 24. Furthermore, a limit switch 31 is located above the collar 14 in the housing, wherein a second limit switch, which is activated after a rotation of the paddle wheel 24 by 90°, is not shown in the drawing.

The cock plug 40 is located on the shaft 11 at the bottom end, wherein the cock plug is received in an axially displaceable and rotatable manner in the housing of the fitting located in the pipe 2. The housing itself is labeled 45, the seat in the housing 45 for the cock plug has the reference number 47. The operating mode of the cock fitting is such that the chamber 12 is first pressurized by the hydraulic pump 13, for example by pressing oil under pressure into this chamber. The oil pressure acts onto the surface of the collar 14, so that the shaft is displaced in the direction of the arrow 50. The stroke corresponds to the distance between the limit switch 31 and the collar 14 in the figure. Once the collar 14 has reached the switch 31 and the pressure spring 16 is consequently pre-tensioned against the protrusion 18, the hydraulic pump 21 is activated, which introduces a hydraulic fluid into the second chamber 20. The paddle wheel 24 is located on the shaft 11, the paddle wheel 24 being rotated by the hydraulic fluid. After a rotational movement of ca. 90°, the first chamber 12 is relieved of

the pressure of the hydraulic fluid that was applied by the hydraulic pump 13, so that due to the pre-tension of the pressure spring 16, the cock plug is lowered downward. In this respect, the cock plug hereby gets back into its seat 47.

List of reference numbers:

1	cock fitting
2	pipe
10	control housing
11	shaft
12	first chamber
13	hydraulic pump
14	circumferential collar
16	pressure spring
18	protrusion
20	second chamber
21	hydraulic pump
24	paddle wheel
27	rotating device
31	limit switch
40	cock plug
45	housing
47	seat
50	arrow

CSAPFORGÓ SZERELVÉNY

Szabadalmi igénypontok

1. Csapforgó szerelvény (1), amely egy házban (45) elrendezett csapforgót tartalmaz, ahol a csapforgó egy mozgatószerkezettel van összekötve a csapforgó megemelésére és ezt követő elforgatására, ahol a mozgatószerkezet egy szabályozó házzal (10) rendelkezik, amely egy a szabályozó házban (10) axiálisan eltolható és elforgathatóan ágyazott tengellyel (11) van felszerelve, ahol a tengely (11) a saját axiális irányában egy nyomórugó (16) terhelése alatt áll, és ahol a mozgatószerkezet mind a csapforgó megemeléséhez, mind pedig annak elforgatásához hidraulikusan működtetett módon van kialakítva,

azzal jellemezve, hogy

a szabályozó ház (10) egy első kamrát (12) képez, ahol a tengely (11) ebben az első kamrában (12) van ágyazva, és ahol a tengely (11) a kamrában egy hatásos felülettel rendelkezik, emellett a kamra egy fluid közeg nyomása alá kerülhet és a kamra fluid közeg nyomása alá kerülésekor a tengely (11) axiálisan eltolódik a nyomórugó (16)

ereje ellenében, és a tengely (11) axiálisan eltoló helyzetében egy hidraulikusan működő forgatószerkezet (27) révén a tengely (11) 90°-os mértékben elforgatható.

2. Az 1. igénypont szerinti csapforgó szerelvény (1), *azzal jellemezve*, hogy a forgatószerkezet (27) egy a tengelyen (11) elrendezett lapátkereket (24) tartalmaz.

3. A 2. igénypont szerinti csapforgó szerelvény (1), *azzal jellemezve*, hogy a lapátkerék (24) a szabályozó ház (10) egy további, második kamrájában (20) van elrendezve.

