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(71) Applicant (for all designated States except US): **DT-VÝHYBKÁRNA A STROJÍRNA, A.S.** [CZ/CZ]; Dolní 100, CZ- 797 11 Prostějov (CZ).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **NAVRATIL, Dusan** [CZ/CZ]; Kotkova 23, CZ-796 01 Prostějov (CZ).

(74) Agent: **HOLASOVA, Hana**; Krizova 4, CZ- 603 00 Brno (CZ).

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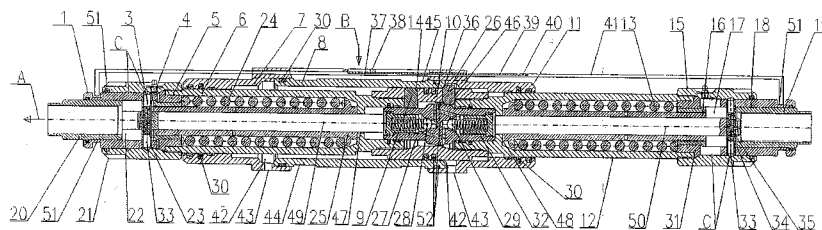
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(54) Title: ACTIVE MEMBER OF THE HYDRAULIC LOCKING DEVICE EQUIPPED WITH MECHANIC LOCKING AND RETENTION



(57) Abstract: The active member of the hydraulic locking device equipped with mechanic locking and retention for setting of the railway switches switch rails and crossing movable points consists of hollow piston and the controlling piston, in which the hollow piston (10) is connected to the hollow piston rods (6, 12), in which the compressive springs (13, 24) are situated seated to the flanges (31, 5) on the hollow piston rods (6, 12) and slide bushings (16, 25) on the piston rods (49, 50) of the controlling piston (32). The piston rods (49, 50) of the controlling piston (32) are connected with endings (19, 20) via hollow pins (23, 34) and via dog grooves (17, 22) in endings (19, 20) with retention sleeves (1, 18).

Active member of the hydraulic locking device equipped with mechanic locking and retention

Field of the invention

The technical solution deals with active member of the hydraulic locking device equipped with mechanic locking and retention equipment for the switch rails setting in the set of switches and setting of crossings with movable parts consisting the hollow piston and the controlling piston.

The state of the art

The locking devices known and used for setting of the turnout switch rails so far are the hook one, jaw and dovetail type and others, based on the principle to secure and keep the switch rails position adjacent to the stock rail at the position of single locking devices. To enable the switch rails mechanic throw-over into their limiting positions, the electric-mechanic, or electric-hydraulic drives situated off the inter-rails space is applied. The locking device control is carried out by means of bars situated under the rail foot. The other known solution is with mechanic locks inside the hydraulic valve situated in space between rails. The given kinds of locking device may be multiplied and their actuation is solved by means of set of couplers, which secure its drive and its synchronization, or the hydraulic system provides the actuation from the central power unit.

As the stated types disadvantage occurs the impossibility of the perfect rail bed tamping in area of locking devices and possibility to influence the lock functioning by means of weather conditions and therefore the higher exigency of maintenance. The multiple locking devices disadvantage is the set of bars alongside the track and their length dilating, which has impact to the flawless function of the turnout. The known solutions with hydraulics inside the rail gauge do not have the mechanic signalling of the lock retention condition. It is known the solution inside the rail gauge, when its active member consists of hollow piston with inside positioned controlling piston, which secures the locking and retention. The equipment like this is reliably setting the switch

rails and the movable points of the crossing, or else non-destructive trailing of the switch is not possible and the intelligible optical signalling of the locking and retention position is not adopted.

The nature of the technical solution

To secure the non-destructive trailing of the turnout with rail vehicle is the task of the technical resolution by means of hydraulic locking device active member equipped with hollow piston and a floating piston as well.

As a solution occurs the idea of active member application with hollow piston and with floating piston as well pursuant to the mentioned solution. With hollow piston are connected the hollow pistons rods and the compressive springs are seated in the hollow piston rods flanges and the sliding bushings are on the piston rods of the controlling piston, piston rods are connected with ending socket and by means of hollow pins via stop groove in the ending socket with retention sleeves.

This solution diminishes the switch trailing time, stabilizes the operating medium pressure and improves the medium circulation, when the controlling piston is equipped with transfer valves.

In terms of the retention sleeve locking securing and improvement against vibrations it is advantageous that in the hollow pins are latches pressed with springs, which are seated into grooves situated in the heads connected with hollow piston rods, which makes the reliability and safety operation of the active member even higher.

With respect to the reliable optical signalling and improvement of information on real state of the cylinder locking it is advantageous when the retention sleeves are equipped with groove for the rule, laid into the frame connected with covers, or with a cylinder and where there is a different colour scale applied.

Survey of drawing illustration

The technical solution shall be clarified by means of figure, where the active member with mechanic way of locking and retention is displayed as a sectional view.

Examples of the technical solution

The active member of the hydraulic locking device pursuant to the drawing consists of the cylinder 8, which is equipped with peripheral bossing 44, 45 for pro fastening sleeves (not illustrated). From the left and the right hand side is the cylinder 8 closed with covers 7, 11, which are equipped with filling hole 43 and connects with lock chamber 42. Through the covers 7, 11 the hollow piston rods 6, 12 are coming and there are connected with hollow piston 10. The locking segments 9, 26, are the part of the hollow piston and there are freely movable in openings 14, 46 adjusted in the hollow piston 10 and in the limiting positions of the hollow piston 10 are seated into appropriate lock chamber 42 in covers 7, 11. Inside the hollow piston 10 between the bottoms 47, 48 of hollow piston rods 6, 12 it is situated the movable controlling piston 32. With controlling piston 32 are connect the piston rods 49, 50 penetrating the bottoms 47, 48 of the hollow piston rods 6, 12. Inside the hollow piston rods 6, 12 on slide bushings 16, 25 of piston rods 49, 50 there are situated the pressure springs 13, 24. The springs 13, 24 are one side supported by the slide bushings 16, 25, where the end posts 19, 20 are screwed on, connected with switch rails (not illustrated) and exert the pressure towards the slide bushings 16, 25 to the bottoms 47, 48 of the hollow piston rods 6, 12. The opposite side of springs 13, 24 exerts the pressure by means of flanges 5, 31 and via heads 15, 21 towards the hollow piston rods 6, 12, where the heads 15, 21 are screwed on. In ending sockets 19, 20 the oval grooves 17, 22, are situated, where the hollow pins 23, 34 are coming through. By means of hollow pins 23, 34 laid on the piston rod ends 49, 50 of the controlling piston 32 the piston rods 49, 50 are situated and connected with retention sleeves 1, 18 equipped with groove 51 established for rule 41 of the optical signalling and for controlling circuits (not illustrated). Inside the hollow pins 34, 23 the freely movable latches 3, 33 are situated, pressurized with springs 4, 35. For latches 3, 33 are in heads 15, 21 adjusted the grooves C, the spacing of which is given by the necessary movement of the switch rails (not illustrated) when the rail vehicle is trailing the switch.

The part of the controlling piston 32 is the couple of one-way transfer valves 28, 29, which enable the working fluid transfer from one side of the piston 32 to the opposite side of the piston 32. The active member setting optic indication is carried out by the mentioned rule 41, which is in movable way laid in the observational frame 38. On the

rule 41 it is situated the scale of different colours 37, 39, 40. The active member is provided equipped with sealing 30 to prevent the working fluid leakage.

The picture depicts position of the active member, when the right hand switch rail (not illustrated) fits tightly to the stock rail. The switch setting into opposite position, when the right-hand switch rail is moved off the stock rail is initiated by the working fluid transfer into filling hole 43 in the cover 11. Transfer of the working fluid moves the controlling piston 32 into position, where the locking segment 26 is unlocked (retention-free) and consequently it is moved by the medium pressure to the extension 27 of the hollow piston 10 along the wedge area 36 from lock chamber 42 in the cover 11 (unlocking). Following fluid pressure makes the hollow piston 10 move to the left-hand side, where the locking segment 9 gradually moves under lock chamber 42 in the cover 7, into which is after controlling piston 32 movement completion inserted with its taper edge (locking). The controlling piston 32 movement goes on until the stop block 47, when the retention of the segments is carried by means of extension 27 of the controlling piston 32. The hollow piston 10 movement is transferred via hollow piston rods 6, 12. The controlling piston 32 movement is via hollow pins 23, 35 transferred onto retention sleeves 1, 18, consequently onto rule 41 and onto controlling circuits (not illustrated). Together with controlling piston 32 movement is in connection transfer of latches 3, 33 in hollow pins 23, 35 in grooves C onto head 15, 21 inner area. The latches 3, 33 are pressed onto the inner surface of the grooves C by means of springs 4, 35, which initiates the gripping force necessary to lock the piston 32 in the limiting position. The hollow pins 23, 34 free transfer into both limiting positions is carried out by the oval grooves 17, 22 in endings 19, 20.

When trailing the switch by the railway vehicle, the wheel flange exerts the force onto remote switch rail in direction A and this way transfers the tightly connected ending 20 and the spring 24 is squeezed in the same time by means of slide bushing 25, which is connected with ending 20. The opposite end of spring bears against the piston rod 6 via flange 5 and via head 21. After adjusted spring tension overcome by means of hollow pin 23, this movement is transferred onto controlling piston 32, which with its edge enables the locking segments slide 26 from the lock chamber 42 and this way enables termination of the hollow piston retention. The further pull of the remote switch rail (not illustrated) onto ending 20 in direction A initiates the movement of the locking segments 26 out of the lock chamber 42 along the taper edge 36 of the hollow cylinder 10 and its seating to the functional diameter of the piston extension 27. The controlling

piston 32 fitting to the tapered head of the opposite locking segments 9 enables the following movement of the hollow piston 10 together with controlling piston 32 and with another locking segments 9 towards the left-hand stock rail (not illustrated). The common operation of all parts is terminated in general position of piston rods making the suitable space for railway vehicle wheel-flange trailing. The controlling piston 32 movement is transferred via hollow pins 23, 34 onto retention sleeves 18, 1 as well. With retention sleeves is connected the slide rule for optical indication 41, which coloured scale shows in the control frame 38 when looking in the direction B the current state of the cylinder retention.

Keeping the exact position of the controlling piston 32 and of retention sleeves 18, 1 in the point of retention secures the clamping mechanism equipped with latches 33, 3 and with springs 35, 4, which exert the pressure and inserting into C grooves situated in the heads 15, 21 and in the limiting positions arises the gripping force, which prevents movement of sleeves and that of controlling piston induced for instance by means of railway vehicles running. The transfer valves 28, 29 inside the controlling piston 32 enable within the time limited period of trailing the immediate transfer of the hydraulic fluid from one side of the transfer valve to another. The transfer valves may be of whatever design just aiming to accelerate the turnout trailing process at most.

Industrial applicability

The hydraulic active member has advantageous utility for the control and trailing of the railway turnout switches and for the crossings with movable parts.

CLAIMS

1. The active member of the hydraulic locking device equipped with mechanic locking and retention for setting of the railway switches switch rails and crossing movable points consists of hollow piston and the controlling piston, characterized in that the hollow piston (10) is connected to the hollow piston rods (6, 12), in which the compressive springs (13, 24) are situated seated to the flanges (31, 5) on the hollow piston rods (6, 12) and slide bushings (16, 25) on the piston rods (49, 50) of the controlling piston (32). The piston rods (49, 50) of the controlling piston (32) are connected with endings (19, 20) via hollow pins (23, 34) and via dog grooves (17, 22) in endings (19, 20) with retention sleeves (1, 18).
2. The active member according to the claim 1, characterized with controlling piston (32) which is equipped with transfer valve (28, 29).
3. The active member according to the claim 1 or 2, characterized with hollow pins (23, 34) with latches (3, 33) loaded with springs (4, 35) inserting into grooves (C) on heads (15, 21) connected with hollow piston rods (6, 12).
4. The active member according to the claim 1, 2 or 3, characterize the fact, that the retention sleeves (1, 18) are equipped with groove (51) for the rule (41) situated into the frame (38) connected with covers (7, 11) or with cylinder (8).
5. The active member according to the claim 4, characterized with rule (41) equipped with scale in different colours (37, 39, 40).

