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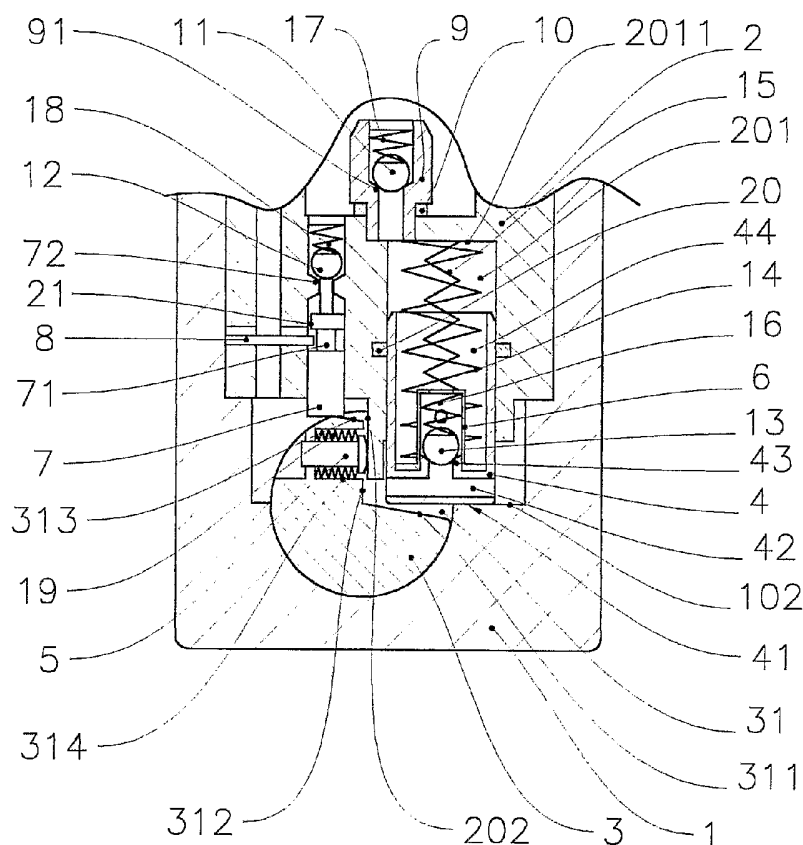
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- (71) Applicant and
(72) Inventor: PRÍBORSKY, Dusan [CZ/CZ]; Vrchlického 33, 586 01 Jihlava (CZ).
- (72) Inventor; and
(75) Inventor/Applicant (for US only): PRÍBORSKY, Alois [CZ/CZ]; U hrbitova 64, 586 01 Jihlava (CZ).
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(54) Title: HYDRAULIC JACK



(57) Abstract: Hydraulic jack comprising a housing (1,2) containing a hydraulic chamber (201), said chamber containing a hollow compressive piston (4) connected to the reservoir and connected via drive out valve (9) with the hydraulic space of the cylinder, the hydraulic space being connectable via by-passing valve (12) with the reservoir, the compressive piston comprises a suction valve (13) and is controlled by cross-shaft (3) of operating handle, wherein said shaft (3) has a slot (31) in the shape of a sector whose first surface (311) is opposite the piston head (41) and whose second surface (312) is opposite stopped area (202) of the pump body (2), and has a hole (314) containing a spring loaded pin (5). The shaft (3) also has a flat (313) which contacts the control pin (7) of by-passing valve (12).



SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
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— *with international search report*

HYDRAULIC JACK

Art domain

Technical solution of hydraulic jack construction especially for burden uplift, driven by man power.

Present prior art

We know various types of hydraulic jacks used to burden uplift and driven by human power, whose construction altogether consists in that piston is handled by swiveling lever imbedded on shaft, where is simultaneously, by this lever handled drainage as well, which consists of control pin, sealing element and spring, whereas at movement of the lever in direction piston uplift is burden uplifted. At opposite lever movement jack lowers the burden. Disadvantage of this machinery are bigger estate proportions and major number of constructional parts for its assemblage.

Essence of technical solution

Mentioned disadvantages largely solves hydraulic jack especially for burden uplift in whose housing is formed partly pressure piston unit and partly in pump-body of the housing hollow compressive piston whose hydraulic chamber is connected through drive out valve with hydraulic space of pressured piston unit, which is through by-passing valve joinable with hydraulic medium compensator, whereas hollow compressive piston is between its hydraulic space and hydraulic medium compensator procured with suction valve and is handled through crosswise saved in pendulum shaft with outer driving item. Essence of the technical solution consists in that shaft is procured with peripheral sector shape circumferential slot, whose first sheet fit in outer piston-head of hollow compressive piston and whose second sheet located opposite to

pump body stopped area is procured with hole in which is saved in stopped pin by spring-loaded cushioning springs, whereas second sheet connecting peripheral part of the shaft is procured with tapered lead-in sheet with which is in contact saved in control pin of the bypass valve.

Further essence of the technical solution is control pin procured partly with adjusting slot, for regulation of hydraulic medium at his bypass from space below compressive piston unit into compensator and partly with circumferential slot into whose connecting stacked limiter of its movement saved in vertical tailrace canal of hydraulic medium.

Also is essence that sheets of the circumferential slot pinching angle greater than 90° .

Finally, essence of the technical solution is that suction valve is saved in inner part of piston-head of hollow compressive piston through cylinder shaped washer, between which and front face of hollow compressive piston hydraulic chamber formed internal spring and external spring leant on peripheral hem of the washer.

New technical essence achieving higher effects in that constructional form allows at small estate dimensions identical or even higher efficiency.

Summary of pictures on enclosed drawings

Particular embodiment example of technical solution is sketchy illustrated on enclosed drawings, where fig.1 is partial vertical cut of hydraulic jack with shaft in lowering position, fig. 2 is identical partial vertical cut of hydraulic jack after swing of the shaft into outer position of the uplift of the operational piston and fig. 3 is identical partial vertical cut of hydraulic jack in static position.

Embodiment examples of technical solution

Hydraulic jack in accordance with technical solving consists of housing 1, in whose internal field 101 connected with not illustrated compensator of hydraulic media is formed, partly not illustrated pushed piston unit and partly fixated pump body 2. Near a bottom 102 of the housing 1 is crosswise lodged pendulum shaft 3, which is taken out outside the housing 1, where is procured or interlocked to likewise not illustrated driving element enabling elicitation of oscillatory movement, for example with tread bar. Pump body 2 in its bottom part procured with stop flat 202 created simultaneously with lengthwise axis of pendulum shaft 3.

In cylindrical hydraulic chamber 201 of the pump body 2 created asymmetrically in appearance to lengthwise axis of the shaft 3 is hollow compressive piston 4 saved in slide way which is in pump body 2 fitted by O ring seal 20 and which in static position fit with his piston-head 41 on bottom 102 of the housing 1. In the area of piston-head 41 are in hollow compressive piston 4 sideways-created suction passages 42 connected, through bottom saddle 43 with hollow 44 in hollow compressive piston 4. In hollow 44 of hollow compressive piston 4 is washer 6 saved in with advantage if cylinder shape, overlaying the bottom saddle 43, in which is pushed into inner spring 16 suction valve 13 for example ball. Washer 6 is pushed into inner flat of the piston-head 41 of the hollow compressive piston 4, partly with internal spring 15 inserted between upper lid of the washer 6 and bearing flat 2011 of the hydraulic chamber 201, and partly with bearing external spring 14 inserted between peripheral hem of the washer 6 and bearing flat 2011 of the hydraulic chamber 201 as well. Both springs 14 and 15 provide at the same time push into of the piston-head 41 of the hollow compressive piston 4 to the bottom 102 of the housing 1. Hydraulic chamber 201 of the pump body 2 is then with further workplaces of the hydraulic jack equipped with not illustrated elements of pushed piston unit connected through top saddle 91 of drive out valve 9 which is procured with sealing element 11, for example ball, controlled by upper spring 17.

In pump body 2 is saved in slide in way control pin 7, directed simultaneously with hollow compressive piston 4, which is in median part procured with circumferential slot 71 and in upper part above control pin 7 with by-passing valve 12 created with ball for example, pushed into by passing saddle 72 by limiting spring 18. Position of control pin 7 in pump body 2 is locked with stacked limiter 8 of its movement saved in pump body 2 in vertical tailrace canal of hydraulic media in the place of creating of circumferential slot 71. Above circumferential slot 71 is subsequently on the surface of the control pin 7 adjusting slot 21 created.

Shaft 3 is in area of imbed of hollow compressive piston 4 in pump body 2 procured with circumferential slot 31 in the shape of peripheral sector with angle of hole the first sheet 311 and second sheet 312 greater than 90°. First sheet 311 of the circumferential slot 31 is created opposite to piston-head 41 of the hollow compressive piston 4 and second sheet 312 of the circumferential slot 31 is created opposite to stopped area 202 of the pump body 2 and is procured in joining peripheral part of the shaft 3 with skewed splayed flat 313. Second sheet 312 of the circumferential slot 31 is further procured with hole 314 in whose is stopped pin 5 saved in and pre-spring washer springs 19 better dish shaped.

In static position of the hydraulic jack illustrated on fig. 3 is hollow compressive piston 4 pushed into by springs 14 and 15 to the bottom 102 of the housing 1, whereas pendulum shaft 3 is turned in way that stopped pin 5 on the second sheet 312 of the circumferential slot 31 is leaning on back stop flat 202 of the pump body 2. When human power starts to incidence on driving element shaft 3 swivel anticlockwise, whereby is by the first sheet 311 of the circumferential slot 31 jacked up hollow compressive piston 4 which at the same time expels hydraulic medium over drive out valve 9 to other working members of pushed piston unit of the hydraulic jack whereas further hydraulic medium is sucked out of compensator into inner space 101 below hollow compressive piston 4. Simultaneously stopped pin 5 zooms out from stopped area 202 of the pump body 2.

At backward pendulous movement of the shaft 3 into basic position that means clockwise direction, springs 14 and 15 make hollow compressive piston 4 move to the bottom 102 of the housing 1, whereas through suction passages 42 and suction valve 13 is hydraulic medium sucked into the space above hollow compressive piston 4. Simultaneously in the certain period coming to gear of the lead-in flat 313 with control pin 7 and stopped pin 5 starts to lean on stop flat 202 of the pump body 2 and the shaft 3 stops in basic position.

In case of continuation in backward pendulous movement of the shaft 3 illustrated on fig. 1, coming to uplift of the control pin 7, which lifts up by-passing valve 12 and hydraulic medium through by-passing valve 12 back into hydraulic chamber, whereas the speed of the drainage is given by size of adjusting slot 21.

Position of the pendulum shaft 3 in basic position means locked with counter power of the absorbing springs 19 on the one side and with the bearing external spring 14 with internal spring on the second side as well.

Industrial application

Hydraulic jack according to technical solution is possible to use everywhere where is need to achieve good parameters of up lift with simple equipment with small estate proportions.

Claims of protection

1. Hydraulic jack especially for up lift of burdens in whose housing (1) formed partly with pressure piston unit and partly with hollow compressive in pump-body (2) of the housing (1) hollow piston, whose hydraulic chamber (201) is connected through drive out valve (9) to hydraulic space of pressure piston unit, which is through by-passing valve (12) unit able with compensator of the hydraulic medium, whereas hollow compressive piston (4) is between hydraulic space and compensator of hydraulic medium procured with suction valve (13) and is controlled through crosswise pendulum shaft (3) by outer diving unit, **wherein** pendulum shaft (3) procured with circumferential slot (31) in the shape of peripheral sector whose first sheet (311) fits on outer piston-head (41) of hollow compressive piston (4) and whose second sheet (312) modified opposite to stopped area (202) of the pump body (2) is procured with hole (314) in which is saved in by washer springs (19) spring loaded stopped pin (5), whereas on second sheet (312) concur peripheral part of the shaft (3) procured with skewed lead-in flat (313), with whose is in pump body (2) slide in way saved in control pin (7) of bypassing valve (12) in contact.
2. Hydraulic jack according to the claim 1, **wherein** control pin (7) procured partly with adjusting slot (21) for flow control of hydraulic medium at his bypass from space below pressure piston unit into the hydraulic chamber and partly with circumferential slot (71) into which stacked limiter (8) of its movement saved in vertical tailrace canal of hydraulic medium.
3. Hydraulic jack according to the claim 1, **wherein** flats (311, 312) of peripheral sector (31) together pinching angle greater than 90°.
4. Hydraulic jack according to the claim 1, **wherein** suction valve (13) is saved in on inner part of the piston-head (41) of the hollow compressive piston (4) through cylinder shaped washer (6), between which and front face (2011) of the hollow

compressive piston (4) hydraulic chamber (201) is formed partly internal spring (15) and partly external spring (14) leant on peripheral hem of the washer (6).

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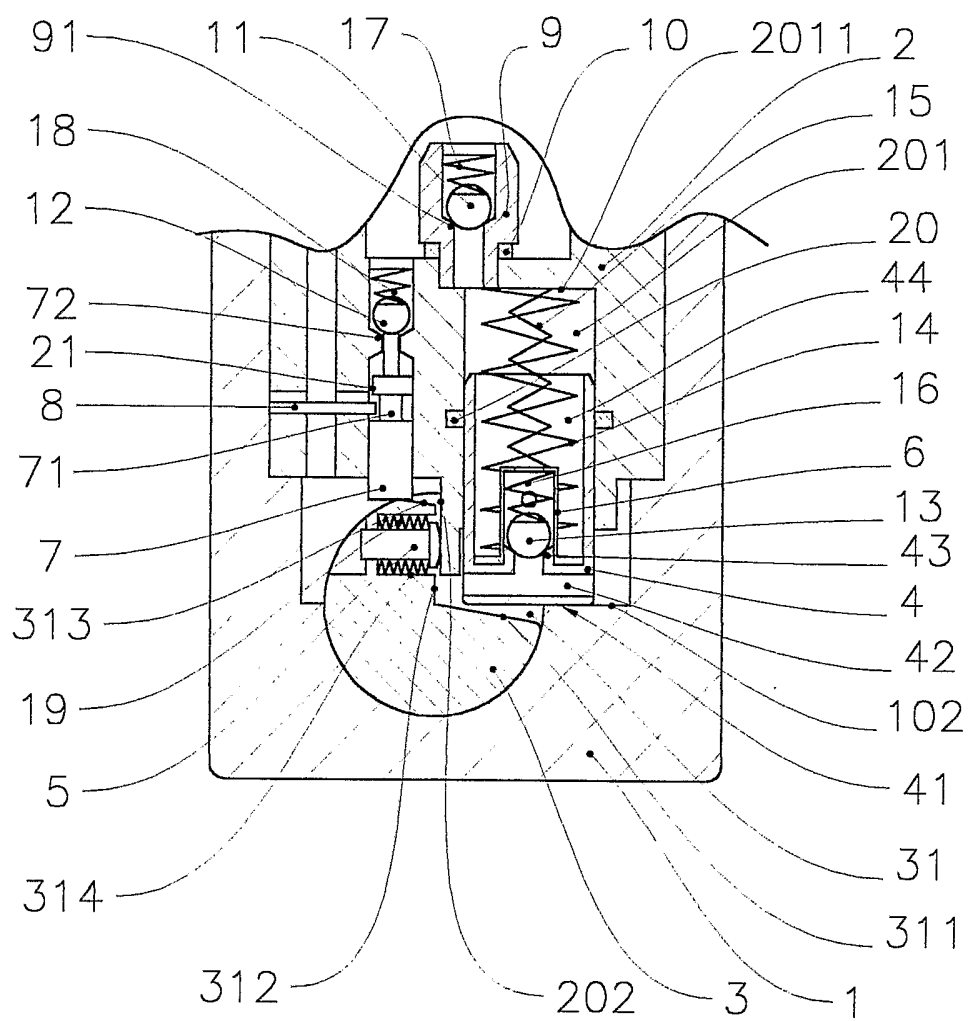


FIG. 1

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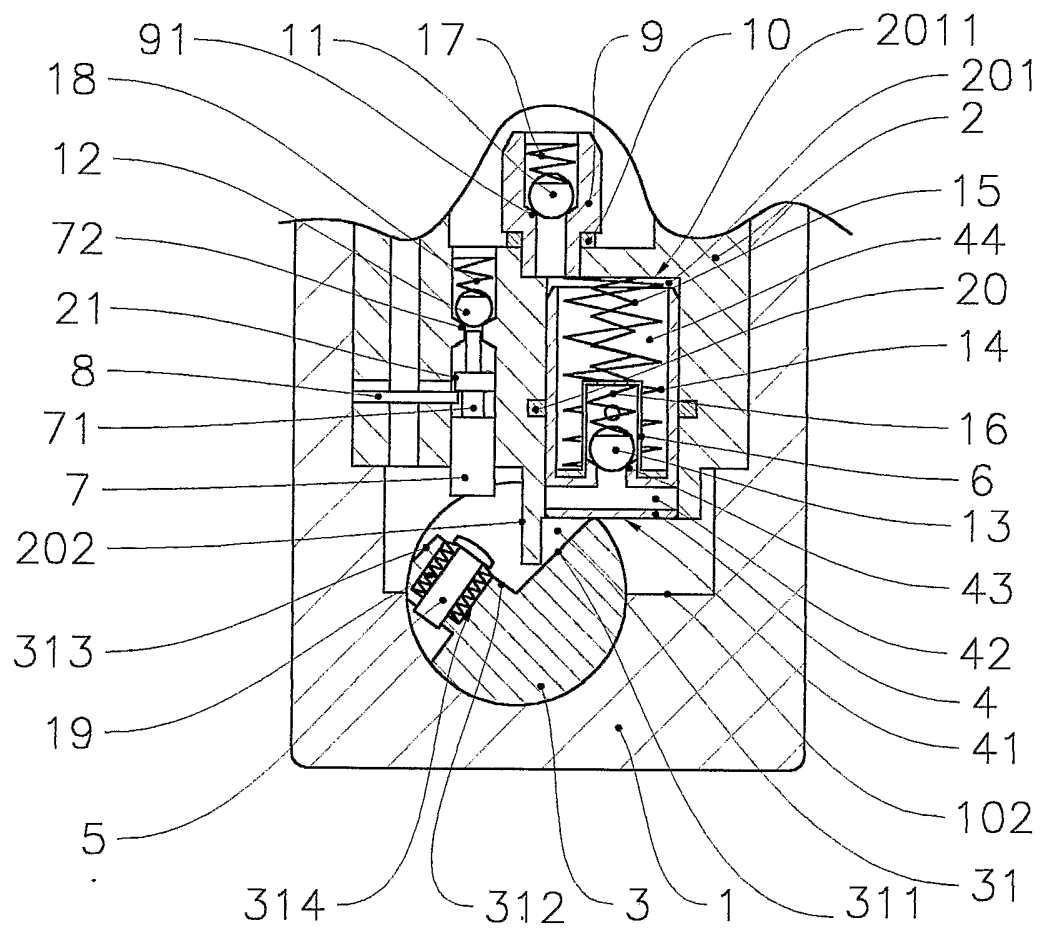


FIG. 2

INTERNATIONAL SEARCH REPORT

International Application No
PCT/CZ2004/000037

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B66F3/25 B66F3/42

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B66F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2 440 060 A (PAGE HERBERT E) 20 April 1948 (1948-04-20) the whole document	1
A	GB 643 462 A (SKYHI LTD; ALBERT HENRY STEAD) 20 September 1950 (1950-09-20) the whole document	1
A	US 1 667 759 A (WHITE THOMAS D) 1 May 1928 (1928-05-01) the whole document	1
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A	GB 2 009 322 A (MAYER FORDERTECHNIK GMBH WALTE) 13 June 1979 (1979-06-13) abstract	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Sheppard, B

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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