

APPLICATION FILED AUG. 9, 1912.

Patented Jan. 21, 1913.

2 SHEETS—SHEET 1.

A detailed technical drawing of a mechanical assembly, likely a pump or engine component, shown in three different views. The top view shows a horizontal shaft passing through a central housing, with various internal components like valves or pistons labeled with letters such as A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UU, UV, UW, UX, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YY, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ. The drawing includes numerous labels and arrows indicating the movement and function of the parts.

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a 2000

By Franklin W. Douglass

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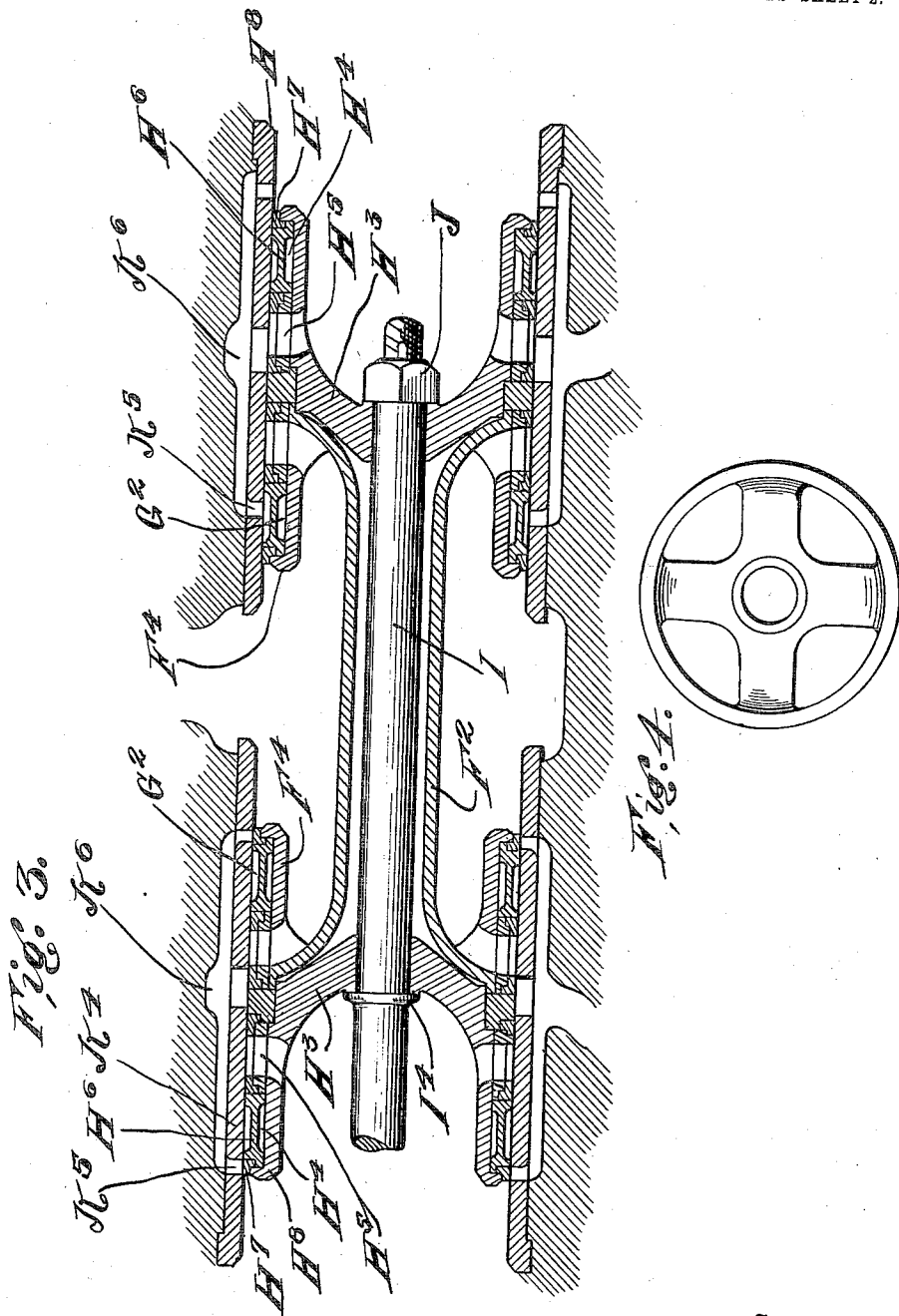
J. B. KINGAN & H. F. RIPKEN.
PISTON VALVE.

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2 SHEETS—SHEET 2.



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PISTON-VALVE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, JAMES B. KINGAN and HUGO F. RIPKEN, citizens of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Piston-Valves; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in piston slide valves designed for use for releasing steam and other liquid under pressure to and from cylinders of engines, pumps, etc.

More specifically, the present invention comprises certain improvements upon our pending application Serial Number 701,401 and differentiates essentially therefrom in that in the present apparatus the disadvantage of the steam having to pass through a long and contracted port through the entire body of the valve is eliminated, whereas, by the present invention, the steam will reach the cylinder much quicker than in the former apparatus and which is considered an important desideratum.

The invention comprises various details of construction and combinations and arrangements of parts which will be hereinafter fully described, shown in the accompanying drawings and then specifically defined in the appended claims.

We illustrate our invention in the accompanying drawings, in which:—

Figure 1 is a central sectional view through the apparatus. Fig. 2 is a slight modification of the construction of the invention, Fig. 3 is a sectional view showing both double admission and exhaust ports and Fig. 4 is a face view of a spider disk.

Reference now being had to the details of the drawings by letter, A designates a steam chamber in the casing B into which chamber the fluid pressure is introduced, and C designates a bushing having ports C' and D communicating with the cylinder passageway E. Mounted within the bushing is the body F having a return portion F' at each end, which is cylindrical shaped with a circumferential groove G formed therein,

and H and H' designate spider arm disks, the central portions of which are apertured for the reception of the piston rod I, said spider disk H fitting against a shoulder I' preventing its movement in one direction, while the other spider arm is retained in place by means of a nut J. Each spider arm has a circumferential flange I' and a flanged packing ring K is fitted over each of said flanges and seats upon a shoulder L formed upon a follower or bull ring L', one mounted about each circumference of a spider disk. It will be noted upon reference to the drawings that, when the parts are assembled as shown in Fig. 1, the spider arms serve to hold the bull rings frictionally against the ends of the body F.

A ported follower or bull ring N is seated in the circumferential groove in the return portion F of the body portion of the piston, said bull ring N being provided with two annular shoulders upon one of which a flanged packing ring O is seated and upon the other a similar angled packing ring O', the flanges of the packing rings O and O' being flush respectively with the marginal edges of the openings O² in the circumference of the follower or bull ring N. A second bull ring or follower, designated by letter Q, is also seated in each circumferential groove and the outer end of each follower Q abuts against the adjacent edges of the bull ring N and the adjacent edges of the ring O', while the inner end of each follower or bull ring Q, each of which is provided with a flange, receives a packing ring R which is flanged and extends over the end of the recess in the return portion F of the body of the piston. The live steam which is introduced into the chamber is adapted to pass through the port T, as shown by arrows in Fig. 1 of the drawings.

In operation, when the parts are adjusted in position shown in Fig. 1 of the drawings, it will be noted that the packing rings O, forming portions of the edges of the ports O², and the packing ring R are starting to open the ports C' and D in the bushing C simultaneously, thereby giving a double admission of pressure through the passageway E to the cylinder, this double admission remaining until the valve reaches its point of cut-off, thereby insuring a much more desirable distribution of pressure than could otherwise be obtained or than is obtained through the use of a double port

valve which has one of these ports passed through or partly around the body of the valve. Referring to the positions of the ports at the right hand end of the piston, it will be noted that, when the port D in the bushing C is open to the exhaust chamber, the port C' is protected by the packing rings R and O' and remain so until after the exhaust closure has occurred and admission is started, thereby preventing any communication between live and exhaust pressure chambers.

In Fig. 2 of the drawings will be seen a slight modification of the construction of apparatus whereby the same functions may be performed as in the construction shown in Fig. 1, the differences in construction between this modified form and that shown in Fig. 2 consisting in the manner of constructing the wings or flanges which, in Fig. 2, instead of forming a part of the body of the valve, are a part of the spiders S, said extensions being designated by letter S', and S² designates the body between the shell intermediate the spiders S. In said modified form the bearing and bull rings are of similar construction as those illustrated in Fig. 1 of the drawings, and designated as follows:—R² is a packing ring upon the circumference of the cylindrical wing S', Q' a follower or bull ring, O³, O⁴, K' and K² packing rings and N' a bull ring or follower. In this modified form, it will be noted that an outside admission valve is produced, that is a valve having its live pressure chamber at the outer ends instead of in the middle as illustrated in Fig. 1 of the drawings.

In Fig. 3 of the drawings, we have shown a sectional view through the valve and illustrating both the double admission and exhaust and in which the inside valve arrangement is similar to that disclosed in Fig. 1, comprising the piston rod I with the body F² mounted within the bushing, the return portion F⁴ being provided with a groove G² therein, and H³ designate spider arm disks, the central portion of one of said spider arms resting against the shoulder H⁴ and the other being engaged by a nut J upon the threaded end of the piston. The spider arms H³ have recesses H² formed in the circumference thereof and each is provided with a port H⁵, and H⁶ designates a bull ring mounted in said recess. H⁷ is a flanged packing ring engaging shoulders upon the opposite edges of the bull ring, one of said packing rings engaging over a flange H⁸ and the outer end of the spider arms. The bushing K⁴ is provided with a port K⁶ which registers with the chamber K⁵. Each end of the piston is similarly equipped with an extension of the spider arms for the purpose of providing a double admission and exhaust.

While we have shown our invention made up of certain parts assembled as shown and described, it will be understood that, if desired, the valve may be made in the form of a single or solid casting and may be varied as to details of construction without in any way departing from the spirit of the invention.

What we claim to be new is:—

1. A piston slide valve for engines, etc., comprising a casing, a bushing mounted therein and provided with a series of ports adapted to communicate with the cylinder of an engine and provided with other ports for communication with the steam chamber, a piston cylinder with projections at the ends thereof which are circumferentially grooved, bull rings mounted within said grooves, one of said rings being provided with ports, packing rings about the edges of said rings and outer circumference of the piston cylinder and so arranged as to afford a double admission of pressure to the cylinder, as set forth.

2. A piston slide valve for engines, etc., comprising a casing, a bushing mounted therein and provided with a series of ports adapted to communicate with the cylinder of an engine and provided with other ports for communication with the steam chamber, a piston cylinder with projections at the ends thereof which are circumferentially grooved, bull rings mounted within said grooves with their adjacent edges in contact with each other, one of said rings being provided with ports, flanged packing rings mounted upon shouldered portions of said rings and affording means for a double admission of pressure to the cylinder of an engine, as set forth.

3. A piston slide valve for engines, etc., comprising a casing, a bushing mounted therein and provided with a series of ports adapted to communicate with the cylinder of an engine and provided with other ports for communication with the steam chamber, a piston cylinder comprising a body portion with a return cylindrical projecting portion at each end thereof which is circumferentially grooved, a spider disk engaging the ends of said body portion, a piston rod fastened to said disk, bull and packing rings seated in said grooves and affording means whereby a double admission of pressure to the cylinder of an engine is afforded, as set forth.

4. A piston slide valve for engines, etc., comprising a casing, a bushing mounted therein and provided with a series of ports adapted to communicate with the cylinder of an engine and provided with other ports for communication with the steam chamber, a piston cylinder comprising a body portion with a return cylindrical projecting portion at each end thereof which is circumferentially

grooved, a spider disk engaging the ends of said body portion and provided each with a circumferential flange, a bull ring about each spider disk and in contact each with one of said flanges, bull and packing rings mounted in said grooves, one of the bull rings being ported, portions of the packing rings forming parts of the marginal edges of the ports therein, the apparatus affording means for the admission of a double pressure to the cylinder of an engine, as set forth.

5. A piston slide valve for engines, etc., comprising a casing, a bushing mounted therein and provided with a series of ports adapted to communicate with the cylinder of an engine and provided with other ports for communication with the steam chamber, a piston cylinder comprising a body portion with a return cylindrical projecting portion at each end thereof which is circumferentially grooved, a spider disk engaging the ends of said body portion and provided each with a circumferential flange, a bull ring about each spider disk and in contact each with one of said flanges, bull rings mounted in each of said grooves, one of said rings being provided with ports and each ring shouldered, angled packing rings mounted upon said shoulders, a bull ring about the circumference of each disk and provided

with a circumferential shoulder, an angled packing ring about the shoulder upon the bull ring about each disk and against which an adjacent bull ring of the disk frictionally bears, and a piston upon which said disks are mounted, as set forth.

6. A piston slide valve for engines, etc., comprising a casing, a bushing mounted therein and provided with a series of ports adapted to communicate with the cylinder of an engine, other ports for communication with a steam chamber, a piston cylinder comprising a body portion with spider disk having arms which are circumferentially recessed, suitably packed bull rings mounted in said recesses, a piston rod passing through said spider arms, a body about said rod and engaging said arms and provided with a return flange circumferentially recessed and suitably packed bull rings therein, as set forth.

In testimony whereof we hereunto affix our signatures in the presence of two witnesses.

JAMES B. KINGAN.
HUGO F. RIPKEN.

Witnesses:

D. G. CAMPBELL,
FRANK WARREN.