

MODERN GIVEN RECEPTIONS OF FIRM HYDROGEN

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The reception of firm hydrogen H is possible in the booster at action of pressure $q = 2 \times 10^6$ kg/sq mm, which twice is more q_1 for reception firm argon Ar and xenon Xe [1]. Thus, the reception of firm H billet by a diameter $D \geq 50$ mm is possible on press by effort $P \geq 160$ thousand ton (t.tn).

It was a hope to use the press with $P = 50$ t.tn, and also giant in the world press with $P = 75$ t.tn, made in Ukraine by Novo-Cramatorsk machine-building factory (NCMB), for decision prescribed task, but firm H billet was not produced [2, 3].

Firm hydrogen pressure was not also achieved inside six-puncheon volumetric compression booster, because of short working distance, caused breaking extruding substance (pyrophyllite), transmitted pressure between puncheons.

For elimination of presented lack, the complex of the equipment and apparatus was created in Ukraine [4...7].

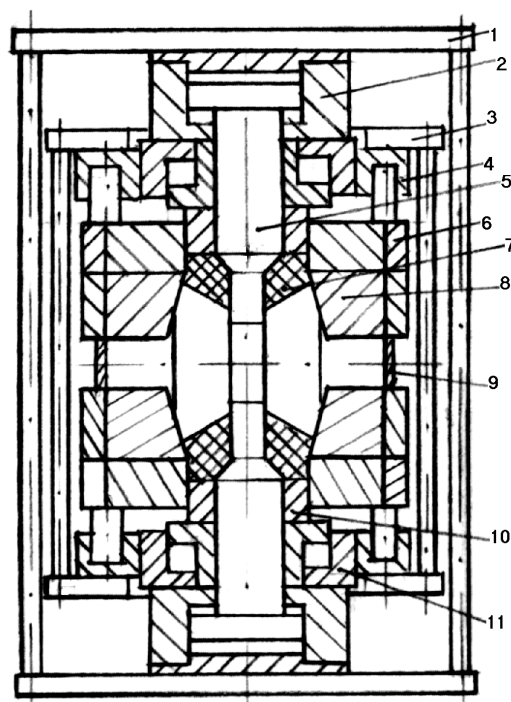


Fig. 1

However, the moratorium on that manufacturing and production was imposed under the decision of Central Committee of CPSU, as from the party USSR there could be a competition to world firms, engaged by production of natural diamonds.

From a complex [4...7] the booster is shown on a fig.1 [7]. There exist six source of effort. Frame 1; 3 place in equilibrium four significant forces, which concentrate efforts inward compression chamber. But efforts from another mutual-relative sources – extruding substance 7, direct outward compression chamber. In such manner differential support thin part of step punch 5 realize during working motion for two-eight times compression, for reception of firm hydrogen.

Small-sized press [6] by effort up to 30 t.tn can have weight 10...15 times smaller known press of such effort. It is perspective at a stage of improvement technological technique for firm H reception.

Known frame press of a design NCMB with maximal effort $P = 50...75$ t.tn are made on mechanical equipment with the limiting characteristics, and also with use existing mechanics of constructional materials [2, 3]. However, on the existing equipment with application of available constructional materials it is possible to make up the offered large-sized press [5] with effort $P \geq 160$ t.tn, which works at positive-displacement hydraulic pressure q , created in pump-controlled hydraulic press or by immersing press on required depth of water environment [8]. Press consists of one cylindrical tubular frame, in which two plunger move towards one another at action of pressure q . The working operation is made inside press.

When technological opportunities do not allow to make one-frame press with given diameter of plunger [5] or cross sizes of the booster (fig. 1) more internal diameter of an aperture press frame, in which goes plunger it is possible to apply many-side press (fig. 2) [7].

This press consists from traverse 1 and 16, connected by rods 11 and 21. Three pairs of plunger 8 and 13; 4 and 15; 18 and 23 are fixed on traverse, and diameters D_i satisfy to the following condition:

$$D_4 = D_{15} \text{ and } D_8 = D_{15} = D_{18} = D_{23} \quad (1)$$

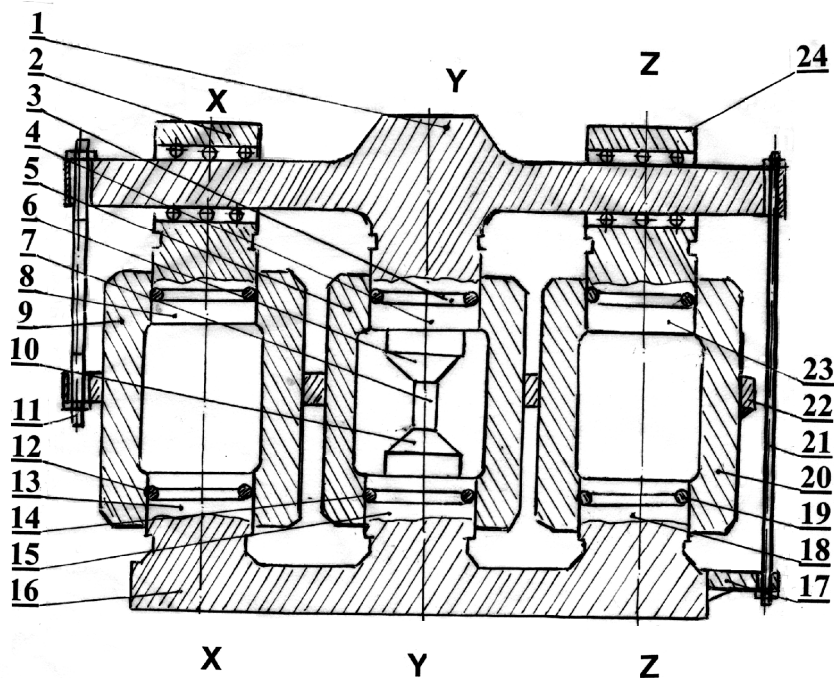


Fig. 2

Plungers in pairs 8 and 13; 4 and 15; 18 and 23 move towards one another in frame cylinder 5; 9 and 20. Frame 5 – worker one, however, it can be absent. Instead of frame 5 there can be a technological tool, for example, booster (fig. 1) or another tool. The second condition of three frame press work (fig 2) is equality inter-axis size: $XY = YZ$ (2).

Theoretical effort P on preparation 7 (fig. 2) we shall determine with the help of the following formula: $P = 0,25\pi q(D_4^2 + 2D_8^2)$ (3).

By advantage press (fig. 2, also [5]) is the stressed state of frame: volumetric or flat compression, due to that it can be executed from high-strength materials such as B_4C or SiC [9]. The second feature - improvement of a condition of external environment, - as a source of pressure can be used hydrostatic pressure of water environment (60 % of World ocean has depth 6000 m, for which $q = 600$ kg/sq sm.

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