THE PRINCIPLE OF WORKING BY HYDRAULIC MOTOR, REVERSIBLE IN HYDRAULIC PUMP, WITH ELLIPTIC ROTATIVE PISTON

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Abstract:

This paper present for production structure by hydraulics motors and pumps factory, a new type hydraulic motor reversible in hydraulic pump by elliptic rotative piston. The working of this type hydraulic motor or pump is abide by the kinetic mechanism discovery by engineer Mureşan Nicodim and pantented by four inventions (70799,76973, 77503, 76950 – O.S.I.M. Bucarest) , wich to allude at propriety of the mathematical ellipse :
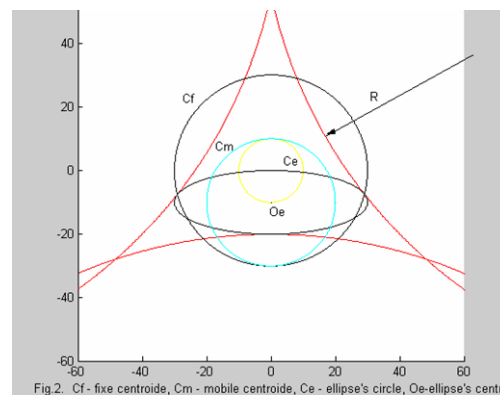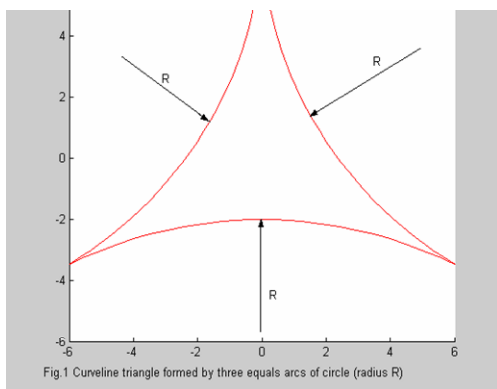
$$x^2/a^2 + y^2/b^2 - 1 = 0,$$

whatever to be rotative into the one curveline triangle ,formed by three equals circle arcs, vaulted to interior, with radius R, made permanent contact with the flanks of curveline triangle and by one rotation of elliptic piston ist formated three spacious chambers at every apex of curveline triangle.
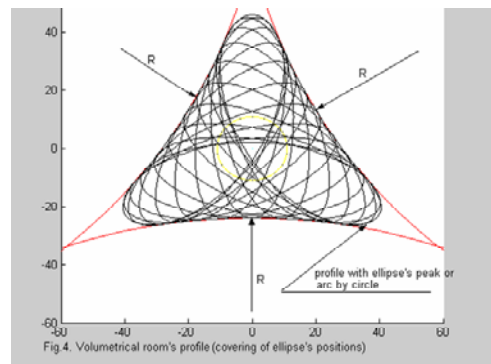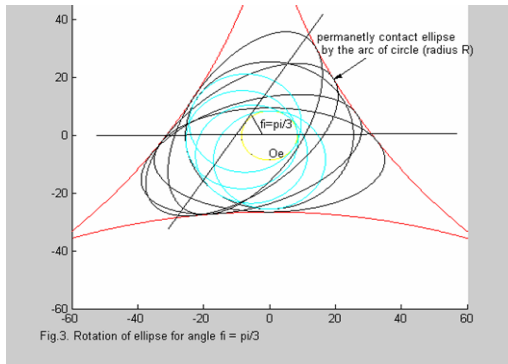
Key words: rotative in curveline triangle , three equals circle arcs, propriety of the mathematical ellipse, animateds representations

This paper present for production structure by hydraulics motors and pumps factory, a new type hydraulic motor reversible in hydraulic pump by elliptic rotative piston. The working of this type hydraulic motor or pump is abide by the kinetic mechanism discovery by engineer Mureşan Nicodim and pantented by four inventions (70799,76973, 77503, 76950 – O.S.I.M. Bucarest) wich to allude at propriety of the mathematical ellipse :

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whatever to be rotative into the one curveline triangle ,formed by three equals circle arcs, vaulted to interior, with radius R, made permanent contact with the flanks of curveline triangle. I presente few animateds representations by computer soft MATLAB, propriety of the mathematical ellipse ,rotative into the one curveline triangle ,formed by three equals circle arcs (Fig. 1,2,3, and 4):

Fig.1 Curveline triangle formed by three equals arcs of circle (radius R)

Fig.2. Cf - fixe centroide, Cm - mobile centroide, Ce - ellipse's circle, Oe-ellipse's centre

Fig.3. Rotation of ellipse for angle fi = pi/3

Fig.4. Volumetrical room's profile (covering of ellipse's positions)

The advantages of Mureşan hydraulic motor and pump with elliptic rotative piston are:

       1)   -By one rotation of elliptic piston ist formated three spacious chamber at every   apex of curveline triangle.

      2) -Mecanic efficiency for hydraulics motors and pumps there is η_m=0,95.

      3) -Torsion cuple by hydraulics motors [N.m] is constant, if hydraulic fluide supplay is with the constant debit [l/min] and the presion [bar] .

      4)-Dynamic equilibrium there is perfect at rotation with fixed axes for elliptic piston and volumetric chamber, on account centrodes by plane-mouvement are circles with gear raport 2 / 3,(fixe centrode and mobile centrode).

      5)-Constant debit [l/min] for hydraulic pump at constant rotation of pivot [rot/min].

      6)-The ellipse by section of elliptic piston may be whatever (**a , b** $\in$ **R$^+$**)

      7)-The centre of ellipse on mouvement per circle.(the circle of ellipse's centre)

      8) -The processing of elliptic piston is easy, because I have a invention about this tool-machine, which have a good precision (10^{-3}mm).

      9) –The processing of volumetric chamber is ease to make.

    It is made one prototype hydraulic motor by elliptic rotativ piston, reversible in hydraulic pump. Parameters of the ellipse was **a**=40[mm] and **b**=20[mm], width 25[mm].

The elliptic piston, together with the volumetric chamber, have axes of rotation fixes into space with eccentricity **e** =(a-b)/2.

The distribution is made by flange clasped on the rotative volumetric chamber . This hydraulic motor is presented in (Fig. 5,6 and 7) This prototyp fuction very good.

Fig.5 Hydraulic motor or hydraulic pump
elliptic piston

Fig.6 The volumetric chamber and rotative

Fig.7 The distribution is made by flange
clasped on the rotative volumetric chamber

REFERENCES:

[1] MIHAILA I., – *Tehnologii Neconventionale*, Ed.Univ.din Oradea, 2003
[2] GANEA M., – *Masini si echipamente tehnologice pentru prelucrarea suprafetelor in 4 si 5 axe CNC*, Ed.Universitatii din Oradea, 2004, ISBN 973.613.598.5.
[3] MUREŞAN NICODIM, *Pompă (motor) hidraulică*; Brevet invenţie nr. 70799/1977 – SOIM, Bucureşti.18] [4] MUREŞAN NICODIM, *Pompă şi motor hidraulic cu piston rotativ*; Brevet invenţie   nr. 76973/1977 – OSIM Bucureşti.
[5] MUREŞAN NICODIM, *Pompă şi motor hidraulic cu piston şi cameră rotitoare*; Brevet invenţie nr. 76950/1979 – OSIM,Bucureşti.
[6] MUREŞAN NICODIM *Maşină pentru rectificat suprafeţe eliptice*; Brevet invenţie nr. 77503/1979 – OSIM,Bucureşti.