

¹ KINEMATIC ANALYSIS OF PISTON MECHANISM IN VALVELESS INTERNAL COMBUSTION ENGINE WITH MORE COMPLETE EXPANSION

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Abstract

This paper presents kinematic analysis of valveless internal combustion engines with more complete expansion of the working body. Radial-rotary valveless internal combustion engine with more complete expansion of the working body, is one of the possible ways of converting chemical energy of fuel into mechanical work. The engine is designed so that the changes of thermodynamic state of the working body are different than in conventional engines. Specific differences are reflected in more complete expansion of working body somewhere known as Miller cycle (modern version of Atkinson cycle), valveless gas flowing and full discharge the combustion chamber of the residual products of combustion. In this construction the movement of the piston is a different than in a conventional piston mechanism. Movement of the piston has brought another motion, ie. rotation of the cylinders around the axis which is placed at exactly defined position. Ratio between the drive shaft and the movable cylinder is (-1). The paper presents values of velocity and acceleration of the important points of the kinematical group consisting in described concept. An account of the basic values are also given in tables and chart form, also this paper presents analysis of differences between this IC engine and conventional mechanism. In this paper was used material of patent applications under the number 2008/0607 of Intellectual Property Office of the Republic of Serbia.

Key words: IC engine, kinematic, Miller cycle.

KINEMATSKA ANALIZA KLIPNOG MEHANIZMA BEZVENTILSKOG MOTORA SUS SA POTPUNIJIM ŠIRENJEJEM RADNOG TELA

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Rezime: U radu je prikazana kinematska analiza bezventilskog motora sa unutrašnjim sagorevanjem i potpunijim širenjem radnog tela. Radijalno-rotacioni bezventilski motor SUS sa potpunijim širenjem radnog tela predstavlja jedan od mogućih načina pretvaranja hemijske energije goriva u mehanički rad. Motor je tako dizajniran da su promene stanja radnog tela drugačije nego kod konvencionalnog motora SUS. Razlike se ogledaju u potpunijem širenju radnog tela poznato i kao Milerov ciklus (modernija verzija Atkinsonovog ciklusa), bezventilskom razvodu radnog tela i potpunom pražnjenju komore

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za sagorevanje od zaostalih produkata sagorevanja. Kod ove konstrukcije motora kretanje klipova je drugačije izvedeno. Kretanju klipa je dovedeno još jedno kretanje, tj. obrtanje cilindra oko ose koja je postavljena na tačno definisanom položaju. Prenosni odnos između kolenastog vratila i pokretnih cilindara iznosi (-1) . U radu su takođe prikazane vrednosti brzine i ubrzanja najvažnijih tačaka novog kinematskog lanca. Dobijene vrednosti date su u vidu tabela i dijagrama, gde je takođe dat akcenat na bitne razlike između ovog i konvencionalnog motora SUS. U radu je korišćen materijal patentne prijave broj 2008/0607 zavoda za intelektualnu svojinu Republike Srbije.

Ključne reči: motor SUS, kinematika, Milerov ciklus