WAYS OF INCREASE DISPERSION SPRAY OF MULTICOMPONENT FUEL MIXTURE ARE IN COMBUSTION CHAMBERS OF DIESELS

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Abstract: *The article gives an analysis of the ways of dispersing a single large droplet of fuel mixture in the combustion chambers of engines, indicating the way to increase the dispersity of the spreading due to the magnetization of the pumped multicomponent fuel mixture.*

Key Words: *process, disparaging, closeness, a multicomponent fuel, disperse enormous drops, to stability of drop, thermal and magnetic influences, plenitude of combustion, homogeneous mixture, reticulated turbilasator.*

1. INTRODUCTION:

The analysis of research of processes of disparaging of different liquids shows that the process of their disparaging in combustion of engines chambers depends not only on influence of aerodynamic force and from their closeness, viscidity and electrostatic field. At presence of relative rate of movement of multicomponent fuel aerodynamic forces of air, proportional to the square of speed, aim to crush initial large to the disperse large drops, forces of surface-tension prevent to it. Correlation of these two forces determines the optimal size of drops and modes of combustion of fuel in combustion of engine chambers. Thus the state of single drop in combustion chambers depends on correlation of high temperature aerodynamic stream and her "durability" determined by a surface-tension and viscidity of the given fuel mixture.

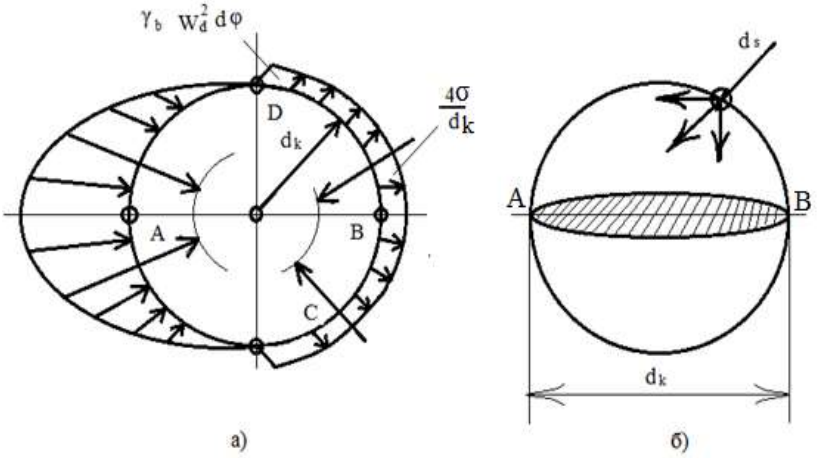

Fig. 1. Chart of forces operating on the initial drop of self - mixture fuel (a) : is a midsection of initial drop

Approximately considering the form of initial drop spherical, we determine the terms of her stability :

- the stable state

$$\frac{\gamma_b W_{от}}{2g} = \frac{4\sigma}{d_k} \quad (1)$$

- the unstable state

$$\gamma_b \frac{W^2}{2g} > \frac{4\sigma}{d_k} \quad (2)$$

For the examined (fig. 1, б) section there is force of f, with that one half of drop is attracted to other will be equal:

$$f = \pi d_k \sigma \quad (3)$$

or

$$f\int_{(s/2)} P\cos\varphi\cdot d\cdot s=\int_{(\frac{\pi}{2}d_k^2)}\cos\varphi\cdot d\cdot s=\frac{\pi}{4}d_k^2P$$

or

$$\text{P}=\frac{4\sigma}{d_k}=\frac{2\sigma}{r_k} \quad (4)$$

The analysis of these terms of crushing of fuel mixtures shows that at constancy of the left part of condition (1 and 2) of crushing of drop can be ratability at reduction of size of surface-tension and accordingly sizes of intrinsic pressure. In-process [1] efficiency of adjusting of right member of equalization (4) is shown by affecting dripping snow of the electrostatic field. In obedience to M.S. Volynsky the criterion of crushing of drops of liquid is:

$$D=\frac{\gamma_b W_{\text{от}}^2 d_k}{g\sigma} \quad (5)$$

at D ≥10,7 - a split comes, and at D ≥14 is crushing of drops. The last speed with that a drop is able to move in mid air not swelling equal (m/s) :

$$W_{\text{пред}}=\sqrt{\frac{2\tau D}{\gamma_b d_k}}=\sqrt{\frac{g\sigma D}{2\gamma_b}},$$

here σ - in the kg/ m; γ_b- kg/ м^3; d_k ,b-m; g - 9,8 м/с^2. It follows from this that the radius of the initial most large drops will be equal (м) :

$$r=\frac{g\sigma D}{2\gamma_b W_{OT}^2} \quad (6)$$

In-process [2] it is also shown that due to influence of magnetic-field and temperature of milk it is possible to promote divide into fatty marbles :

$$E=\frac{\sigma^1-\sigma}{\eta}\cdot r^2 \quad (7)$$

where σ^1 and σ is a surface-tension of milk and fatty marble, g/of см3; r is a degree of fatty marble of cm; η it is viscidity of milk of g/sm.sec. From here follows that artificial thermal and magnetic affecting closeness and viscidity diesel - bioetalon mixtures over would bring to the increase of dispersion of the formed drops and as a result creation of condition for complete combustion of fuel mixture without formation of harmful extras of anthropogenic particles, in an environment. From the stated also follows that a designer can perfect the system of serve of multicomponent fuel mixture of playing in favor of to the increase plenitude of her combustion.

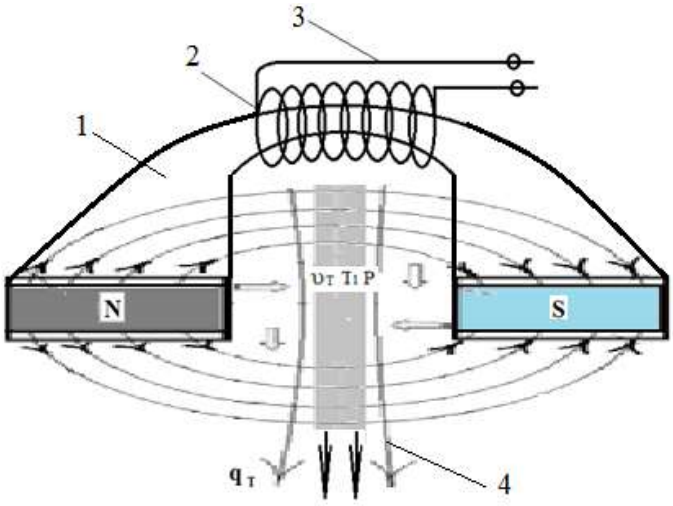

Рис.2. Chart of flowing around of fuel mixture through the electromagnetic field:

1 is a permanent magnet; 2 is a puttee; 3 - a chain is electric; 4 is the magnetic field; q_T is an expense of fuel mixture.

For the accepted construction tension of magnetic-field is equal:

$$B=k\cdot n\cdot I \quad (8)$$

Here: k is a coefficient of proportion; n is a number of coils of spool; I is strength of current in a magnetic spool, A.

Expense of fuel mixture through the field of permanent magnet:

$$q_T=\gamma_T\cdot b\cdot\vartheta_T\cdot z\ ,\ \text{m}^3/\text{sec} \quad (9)$$

Here: γ_T is specific weight of fuel of kg/of м^3; b, h is a width and thickness and appear streams of fuel, m; ϑ_T is speed of expiration of fuel a m/s; z is a number of channels with permanent magnets.

Size of z - for this system 1,0 is equal. So that to increase the expense of appeared fuel it is possible:

- to increase the stream of fuel breadthways;
- to increase h - thickness of stream of the given fuel;
- to increase ϑ is speed of the given fuel mixture that depends on the productivity of plunger pump;
- to increase z is a number of magnetic channels.

Widely open, closed and post nebulizers are used in engines, application on a fig. 3.

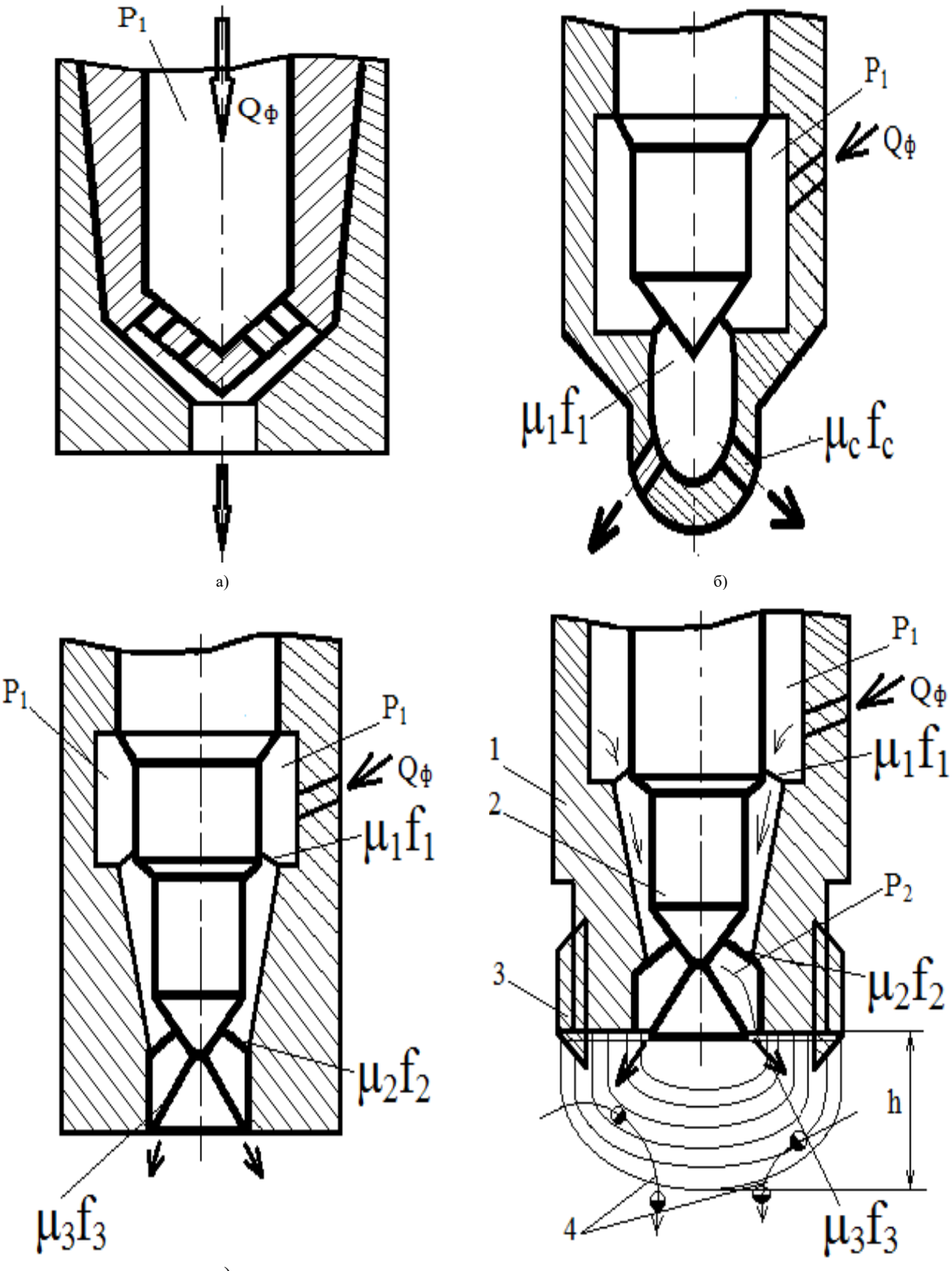

Fig. 2 Basic parameters of sprayers diesels: а-open; б-close (ordinary); в-idle; г-idly sprayer with reticulated turbolisator; $Q_ф$ - second volume expense of fuel; P_1 is pressure in a cylinder; P_2 is pressure in the corps of nebulizer.

There is impossibility of receipt of homogeneous (homogeneous) fuel mixtures to the basic lacks of these constructions. With the purpose of decision of this problem it is recommended additionally to equip their by us removable turboisalator. To recommend a construction is shown on rice 3, century.

Size of kinetic energy of contributing of fuel for recoil sprayers, counted up on a formula:

$$E_T = \frac{\omega_T^2}{2} = \frac{\varphi_c^2 \Delta P}{\rho_T}, \text{ J/kg;} \qquad (10)$$

$$\text{or } E_T = \frac{\varphi_c^2 \Delta P}{\rho} \cdot 10^4$$

where ω_T on is speed expiration of fuel through a nozzle section, m/s; φ_c is a coefficient of speed (φ_c=0,7); ΔP is an overfill of pressure in the nozzle opening, n/m^2. Field energy formulas for appearing mixture it is possible to write down in a next kind:

$$E_{см}=E_T+E_в,$$

where E_B is specific energy of current of air in a swirl chamber.

The use of reticulated turboisalator allows to promote turbo isolator of vertical stream and to improve the process of spontaneous combustion of fuel the same in diesels. It is possible to extract perfection of process of self-fire of fuel mixtures the choice of structural parameters of reticulated turboisalator in diesels. In the device (rice 2) offered by us before starting of fuel mixture in a combustion of engine chamber she passes through the system of the preliminary heating to the temperature of on and electromagnet, where a decline of closeness and viscidity of the tricked into multicomponent fuel mixture is.

2. CONCLUSIONS:

1. From the decline of plenitude of combustion of traditional fuels in combustion of engines chambers there are harmful gas shake contaminating an environment.
2. Analytical dependences allowed to expose physical essence of process of combustion of fuel in engines and perfect the system of serve of multicomponent fuel mixtures by their preliminary heating and electro-magnetizing.

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