The moisture of monolayer will be last removed in the process of drying CPM. The approximate value of the heat of its desorption can be determined according to the constant C BET equation [5]:

$$\frac{\frac{P}{P_s}}{\alpha \cdot \left(1 - \frac{P}{P_s}\right)} = \frac{1}{\alpha_m \cdot C} - \frac{C-1}{\alpha_m \cdot C} \cdot \frac{P}{P_s}, \quad (2)$$

where P – the vapor pressure of the adsorbate, P_s – the saturated vapor pressure of the adsorbate, α – the amount of adsorbed vapor, α_m – monolayer capacity, C – constant: $C = e^{\frac{E-L}{R \cdot T}}$, where EL – net heat of adsorption, R – gas constant, T – temperature of adsorption. The net heat of the desorption of the monolayer for the CPM is 8,55 kJ/mol, which characterizes a relatively weak link with the surface of moisture. BET specific surface area is 52 m^2/g, with the area of water molecules of 12,5 $Å^2$ [5].

The results of the research can be used in the analysis of the properties of textile and other materials as the objects of technological processing.

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FUNCTIONAL PROVISION OF THREAD CUTTING RELIABILITY OF SEMI-AUTOMATIC SEWING MACHINE

Stanislav Krasner, senior lecturer; Boris Sunkuyev, professor;
Dmitriy Korneenko, teaching assistant
Vitebsk State Technological University, Vitebsk, the Republic of Belarus

Department of machines and devices for light industry (MDLI) of educational institution "Vitebsk State Technological University" in cooperation with JSC "Scientific and production bureau of design and research in machine building" (Vitebsk) has modernized the mechanism of multihead semi-automatic sewing machine. In the process of designing of automatic thread cutting mechanism a goal arose, to determine the degree of blade tension required to eliminate the offset of movable blade.

The object of our research is the range of tension required for elimination of possible mutual offset of thread cutting blades used in multihead semi-automatic sewing machines.

While designing thread cutting unit of multihead semi-automatic machine, it is necessary to foresee steps for elimination of possible parasite blade offset, caused by the impact of the sewing thread on blades. This impact during cutting process is estimated in [1]. The goal of designing is to estimate functional and technological factors, influencing on thread cutting quality, then determine the significance of these factors and make up formulas both in general and as a partial solution for multi-head semi-automatic sewing machines, which would help to improve the quality of manufactured goods.

Since in the process of thread cutting there occurs a parasite mutual offset of fixed and movable blades relative to X axis, it is necessary to foresee steps for its elimination at the stage of designing the mechanism. The factor of economic efficiency also put some restrictions on parameters of accuracy of parts of the mechanism. Therefore it is required to define the design criterion which would provide reliable thread cutting. This criterion, in general, appears as follows:

$$d_{min} » D_{max} = e \; D_i, \qquad (1)$$

where d is a preliminary tension;

D is blade offset towards X axis, caused by technological (denote such offsets as D_m (Fig. 1)) and design (denote them as $D_к$) parameters.

Among the technological impacts, the main one is found to be the blade offset caused by the application of force N_x which emerges at thread cutting. If both blades are movable, the force N_x makes them to move out of position, and, as a result, blades cannot complete cutting at its final stage. The residual thickness of uncut part of the thread within the line OO_1 is calculated from the congruence

$$D_m = D_{m1} + D_{m2}, \qquad (2)$$

where D_{m1} and D_{m2} are the offsets of blade 1 and blade 2 respectively.

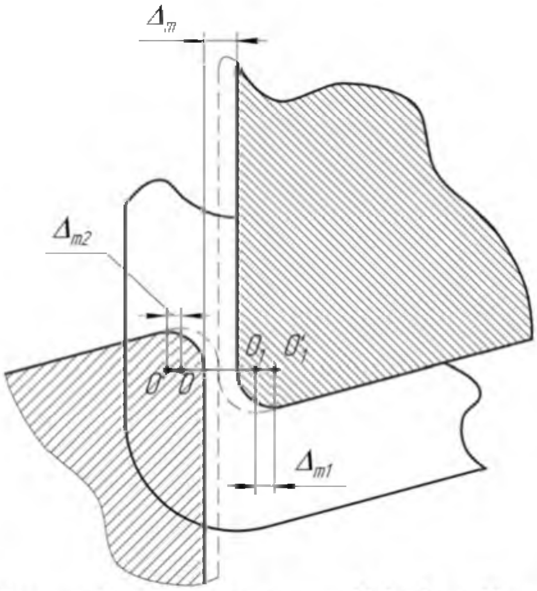

Figure 1 – Parameters of blade offsets

If only one blade is movable, we consider that this blade only moves into offset, i.e. $D_m = D_{m1}$.

Blade design flaws which result in offset occurrence are mostly presented by their shape defections and defections of tool's mounting face position relative to technological bases. Thus, the summary blade offset caused by one parameter or other is to be expressed by formulas:

For configuration with two movable blades:

$$D = D_{\kappa} + D_{m1} + D_{m2}; \quad (3)$$

For configuration with a single movable blade:

$$D = D_{\kappa} + D_{m}. \quad (4)$$

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TECHNOLOGICAL PROVISION OF THREAD CUTTING RELIABILITY OF SEMI-AUTOMATIC SEWING MACHINE

Stanislav Krasner, senior lecturer; Boris Sunkuyev, professor;
Dmitriy Korneenko, teaching assistant
Vitebsk State Technological University, Vitebsk, the Republic of Belarus

To determine offsets, caused by technological reasons, we worked out the calculation model of cutting tool, shown in Fig.1. This model contains one moveable and one fixed blade. Here, 1 is a moveable detail (a holder) which holds the moveable blade 2.

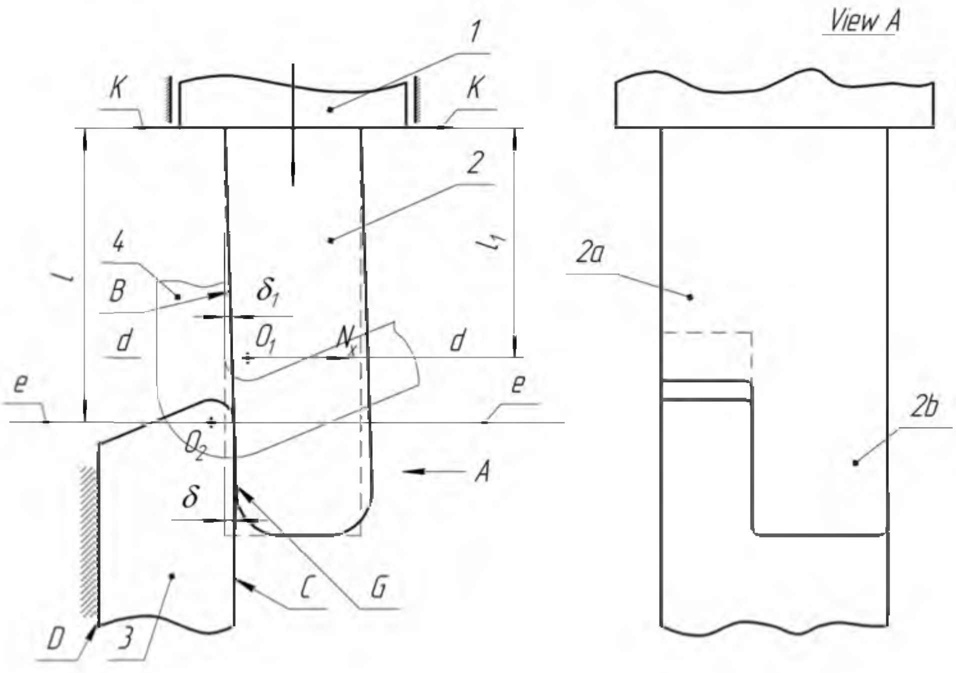

Figure 1 – Blade offset at thread cutting