The operation of the Vint device is described and the technical characteristics of the device presented. The Vint device exhibits higher precision and productivity than analogous devices.

Key words: control, threaded connection.

The degree of undercutting of a thread to the flank of a machine part is an important parameter of a threaded connection of mated parts and is responsible for the strength and reliability of connections. Therefore, the upper tolerance limit of this parameter is often specified in design documentation. Whereas the normal degree of undercutting according to [1] may be reliably assured by means of tools and the appropriate technology, it is not always possible to obtain short undercutting and, even more so, nonstandard short undercutting due to the structural requirements for certain parts. Therefore, for a number of specialized machine parts this parameter is subjected to complete control.

The methods and devices used to control the length of a thread are well known [1, 2] and have long been used in manufacturing, though they cannot be used to directly control undercutting of a thread to the flank of a part.

A design may be constructed with the use of two sensors, one to measure the length of the thread and the other the distance from the flank of the part to the start of the thread, and from their difference determine the desired undercutting; a comparison of the latter with the specified value then allows us to decide whether the part is suitable. Such a solution, however, leads to relatively large control errors, since the errors of the two linear dimension sensors and the error of their position along the single line used for conducting the measurements occur in the solution. Moreover, still another consequence of this solution is the low productivity of control due to the need to additionally execute several sequential operations.

We decided to find a method and create an instrument for controlling the undercutting of a thread to the flank of a machine part that exhibits a higher degree of control precision and productivity and that can also function in production shops.

We wish to propose the following solution of this problem.

In the well-known methods [2, 3], tolerances on the length of the thread and on the screw torque are specified and a thread go-gage is mounted coaxial to the thread, the thread is screwed in, and the screw torque and length of the thread from the end face controlled. Once a specified tolerance on the torque or length of the thread is attained, screwing is halted, and in the former case the part is rejected and in the latter case, declared accepted.

In the proposed method, the length of the thread is not measured, a base plate is preliminarily mounted coaxial with the opening and the latter is made to travel simultaneously as the gage is screwed in, parallel to the axis of the thread until it is caught in the flank of the part. The gap between the base plate and the go-gage along with the screw-in torque is thus controlled. Once a specified torque tolerance is attained, the process of screwing in is halted and the part is rejected; the process of screwing in of the part is also halted once the sum of the values of the thickness of the plate and a gap of specified tolerance on the undercutting of the thread is attained, and the part is declared to be acceptable.

With such a method, the control error is independent of the length of the thread.
The proposed method was implemented in the Vint device, the design of which is presented in Fig. 1. The device is intended for use in controlling two parameters, the relative mean diameter of the thread and undercutting of the thread SpM2, 46-8h6h, to the flank of the “clamp” part shown in Fig. 2. The maximal value of the controlled undercutting (0.8 mm) is spec-

Fig. 1. Diagram of Vint device: 1) base; 2, 6, 7, 14) sensors that measure the base plate support, gap, torque, and initial position of the tail spindle, respectively (the sensor and module of the thread ring gage screw indicator connected to it are not shown); 3) machine part; 4) base plate; 5) sleeve; 8–10, 12, 13) logic, start, display, reversing gear, and amplifier modules, respectively; 11, 17, 21, 22) processing and control blocks, tail spindle displacement block, and sorting, transport, and setting blocks, respectively; 15) reverse drive; 16) tail spindle; 18) shaft; 19) spring; 20) thread ring gage.

Fig. 2. Diagram of the controlled device.

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