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ACTIVE WRIST FOR PROSTHESES (AKTIVNAYA KISTDLYA PROTEZOV),(U)
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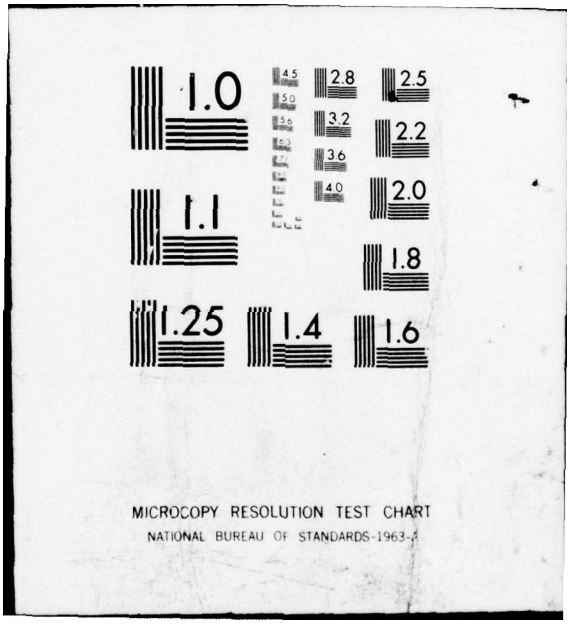
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WASHINGTON, D.C. 20314

(1) B.S.

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The invention refers to the field of medicine, particularly the application of prostheses, and has to do with devices for prosthesis of the upper extremities of an invalid, specifically an active wrist for prostheses.

Known active wrists for prostheses containing a housing, artificial fingers, and a drive mechanism are characterized by inefficient energy consumption required for their operation. This is because the grasping force of the artificial fingers is small in comparison with the force of the contracting groups of muscles.

The purpose of the invention is to develop a design for an active wrist for prostheses, so that a more rational expenditure of energy by the invalid will be ensured. In this device, the first finger in the active wrist of prostheses is made with a movable spring-loaded terminal phalange, and is equipped with a contact switch in the form of a lever, strap and pin. The drive mechanism is a grasp intensifier in the form of bushings, a clamp, supports, springs, an axle and eccentric, interacting with the drive rod.

Figures 1 and 2 show the proposed wrist in two projections, and an overall view; in Figure 3 we have a section along A-A in Figure 1; in Figure 4 a section along B-B in Figure 2 (grasping position); Figure 5 shows a section along B-B in Figure 2 (position with the fingers closed).

The active wrist for prostheses consists of a polyamide housing 1, a movable block 2 of the second through fifth fingers, and a movable base 3 for the first fingers, on which the contact switch and the mechanism for intensifying the grip are mounted.

The contact switch has a movable terminal phalange 4, which supports lever 5. The slot in lever 5 accepts pin 6 which is attached to strip 7. Bushing 8 on the first finger has mounted on it spring 9, one end of which is attached to pin 10, and the other is fastened to housing 11.

The mechanism for intensifying the grip operates as follows. Bushing 8 of the first finger and support 12 are covered by a clamp 13 with a support 14. Eccentric 15 supports bushing 16, spring 17, support 18 and axle 19 for the drive rod 20 for opening. The drive rod for opening is attached to roller 21 which is mounted by means of axle 22 on bracket 23. The bracket also supports

sector 24. Spring 25, which flexes the fingers, is fastened at one end to a rotating ring 26, and at the other end — to the axis of connecting rod 27.

The wrist is covered with a cosmetic covering.

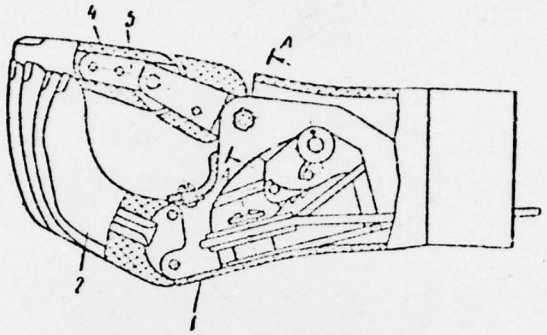

Figure 1.

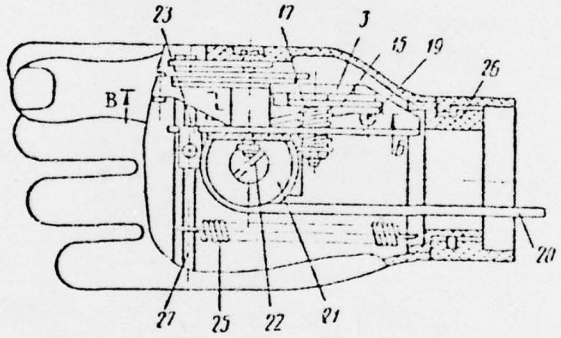

Figure 2.

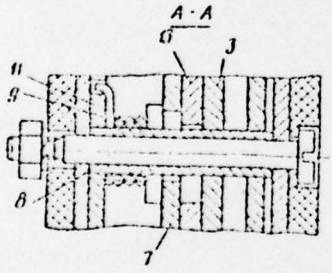

Figure 3.

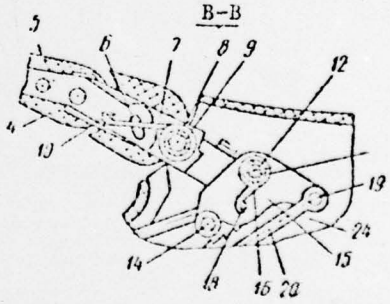

Figure 4.

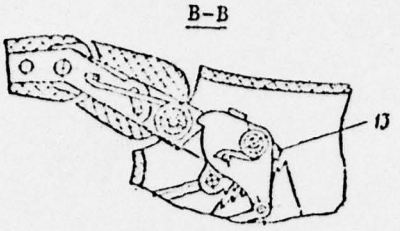

Figure 5.

Drive rod 20 for grasping, connected to the attachment of the prosthesis, rotates eccentric 15 and tightens spring 17, which causes clamp 13 to move. This results in relaxation of the fingers. Then rotation of eccentric 15 around its axis ceases and rotation on base 3 of the first finger begins, together with block 2 of the second through fifth fingers. As soom as the fingers are opened to a distance of 4 to 5 mm, the contact switch operates. The terminal phalange 4 and lever 5 are turned by the flexibility of spring 9. Lever 5 in turn moves disk 8 whose tooth comes in contact with the tooth of eccentric 15 (as shown in Figure 5). Further movement of eccentric 15 is prevented, and the fingers continue opening to the necessary position.

When the drive rod is slackened, the fingers are bent by the action of the previously tensed spring 25.

Since spring 9 of the switch is weaker than spring 25 of the fingers, after the fingers come in contact with an object, phalange 4 on the first finger turns and lifts the spring. Then eccentric 15 is released on the grip intensifier. Spring 12, turning eccentric 15, initially sets clamp 13 in motion until it comes in complete contact with the teeth of the clamp and sector 24. Then the movement of clamp 13 stops and eccentric 15, continuing to rotate, exerts a pressure on the base 3 of the first finger, which is transmitted to the object being grasped.

SUBJECT OF THE INVENTION

An active wrist for prostheses, containing a housing, artificial fingers and a drive mechanism characterized by the fact that, in order to have efficient expenditure of energy in the course of operation of the prostheses, the first finger is made with a movable spring-loaded terminal phalange and equipped with a contact switch in the form of a lever, strip and pin, and a drive mechanism that is a grasp intensifier in the form of bushings, a clamp, supports, spring, axes and ecdentric, interacting with a drive shaft.