

# Turntable Lock for Elbow Units

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IN THE conventional elbow unit (Hosmer E-400) for above-elbow and shoulder-disarticulation amputees, manual control of

humeral rotation is permitted by virtue of cork and teflon gaskets providing mechanical friction between the top of the main portion of the elbow unit and the turntable to which the upper arm shell or socket is fastened (1). The amount of friction is determined by the tension maintained by the stud and attaching nut. Since humeral rotation is important for positioning the limb to obtain maximum functional usage, the friction must not be so

<sup>1</sup> Based upon *Elbow Rotation Lock* (2), published by Northwestern University Prosthetics Research Center, Chicago, Ill., in July 1964. The development reported was sponsored by the Veterans Administration.

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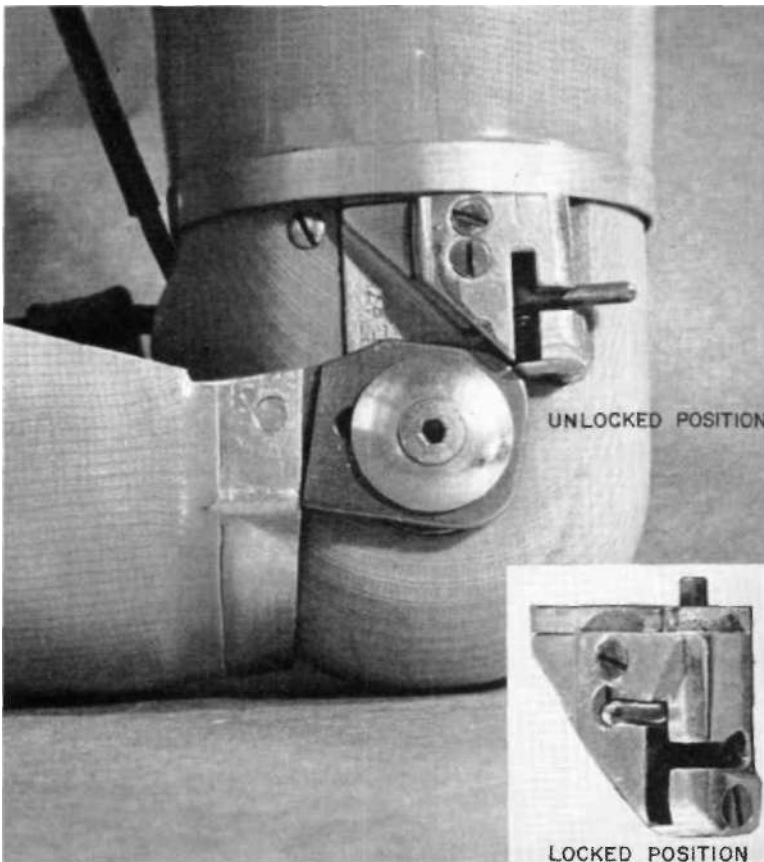


Fig. 1. Installation of lock.

## TURNTABLE LOCK FOR ELBOW UNITS

great as to rule out easy adjustment. At the same time there must be enough resistance to rotation to accomplish most activities.

There are times when a rigid arm is desirable; for example, when climbing ladders, using a shovel for long periods, carrying an object balanced on the forearm, or carrying an object held away from the body. To provide rigidity for such demanding tasks, the North Western University Prosthetics Research Center has developed a manually controlled lock which can be mounted on the area provided for a forearm lift assist on the Hosmer E-400 elbow unit. A spring forcefully engages the locking pin in one of three holes drilled through the turntable for this purpose. Since the turntable possesses enough friction for most activities, the locking pin need only be used to overcome the tendency of the forearm to rotate gradually

when shoveling, to provide the extra margin of safety when climbing vertical ladders, or to supply the rigidity needed in certain other tasks. The amputee returns the locking pin to the disengaged position when the task is completed.

Installation of the lock requires: first, drilling the indexing holes in the turntable; second, revising the plastic cap on the elbow unit and mounting the locking device; third, cutting a notch in the cork and teflon gasket to make room for the locking pin and regluing the gasket to the elbow unit.

Figures 1 and 2 are views of the locking device, and Figures 3, 4, and 5 show details of its installation.

The first prototype (not shown) of the lock was fitted to DM, a 38-year-old farmer who is a left above-elbow amputee. The lock was

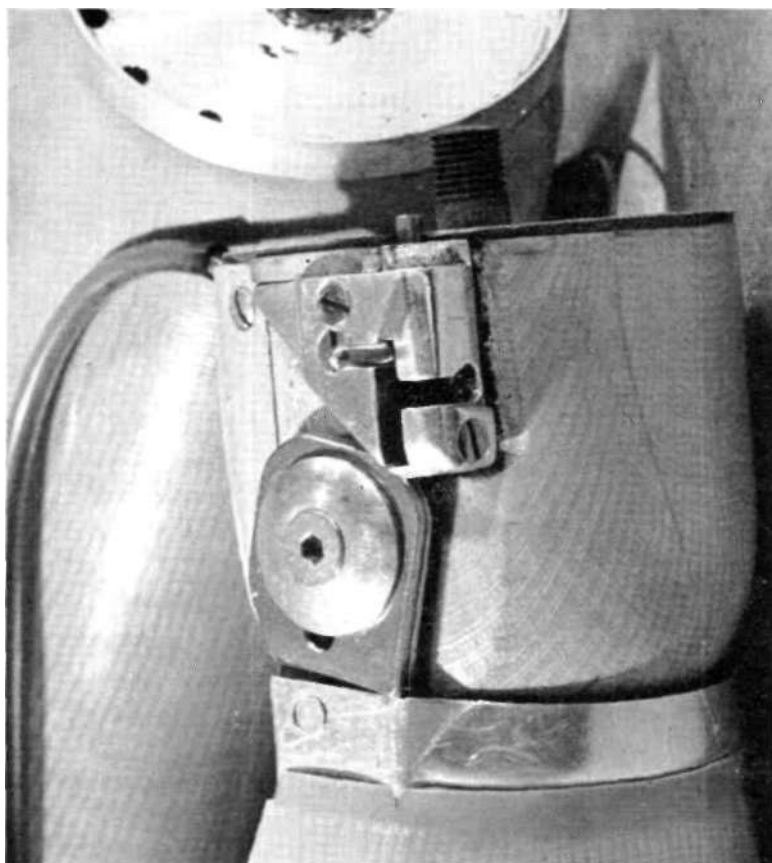


Fig. 2. View of modification showing indexing holes in turntable.



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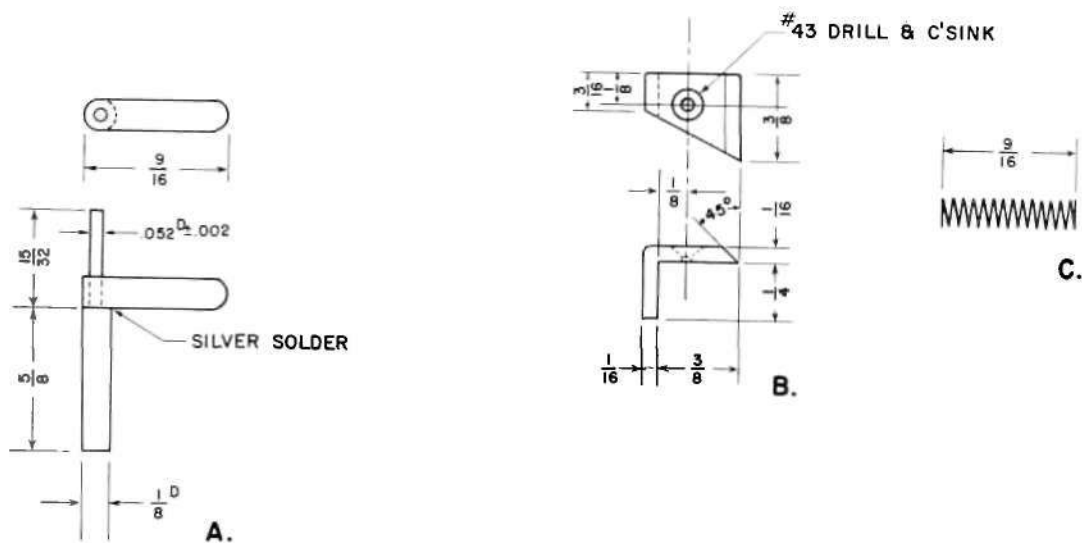


Fig. 4. Drawings of lock components. A, Pin; B, cap; C, spring.

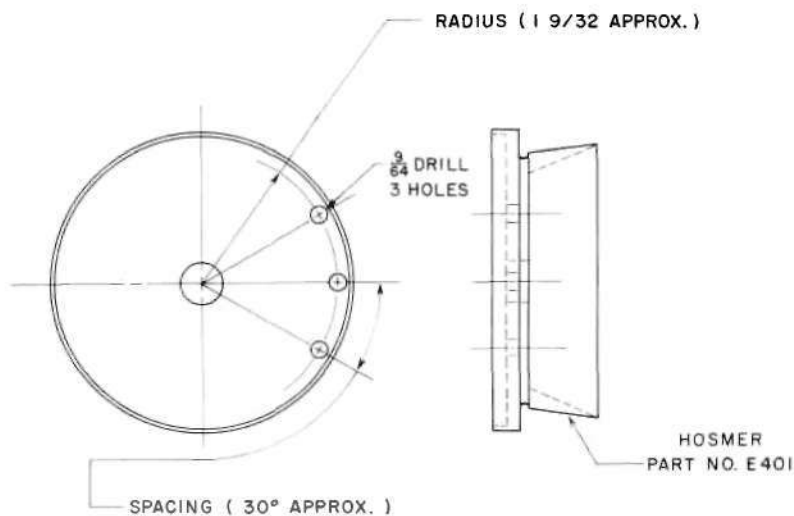


Fig. 5. Drawings of modified turntable. The radius of the indexing holes may be determined by using a 1/8-in. diameter scriber in the lock base mounted on the elbow and scribing directly on the turntable. The amputee can best select the locking positions after completion of the socket.

butt-welded, when climbing ladders, and in other situations where a static arm is required.

## LITERATURE CITED

1. Aitken, George T., T. J. Bushey, Edward R. Ford, and Fred Leonard, *Upper-extremity components*, Chap. 2 in *Orthopaedic Appliances Atlas*, Vol. 2, Edwards, Ann Arbor, Mich., 1960.
2. Sammons, Fred, *Elbow rotation lock*, Northwestern University Prosthetics Research Center, July 1964.