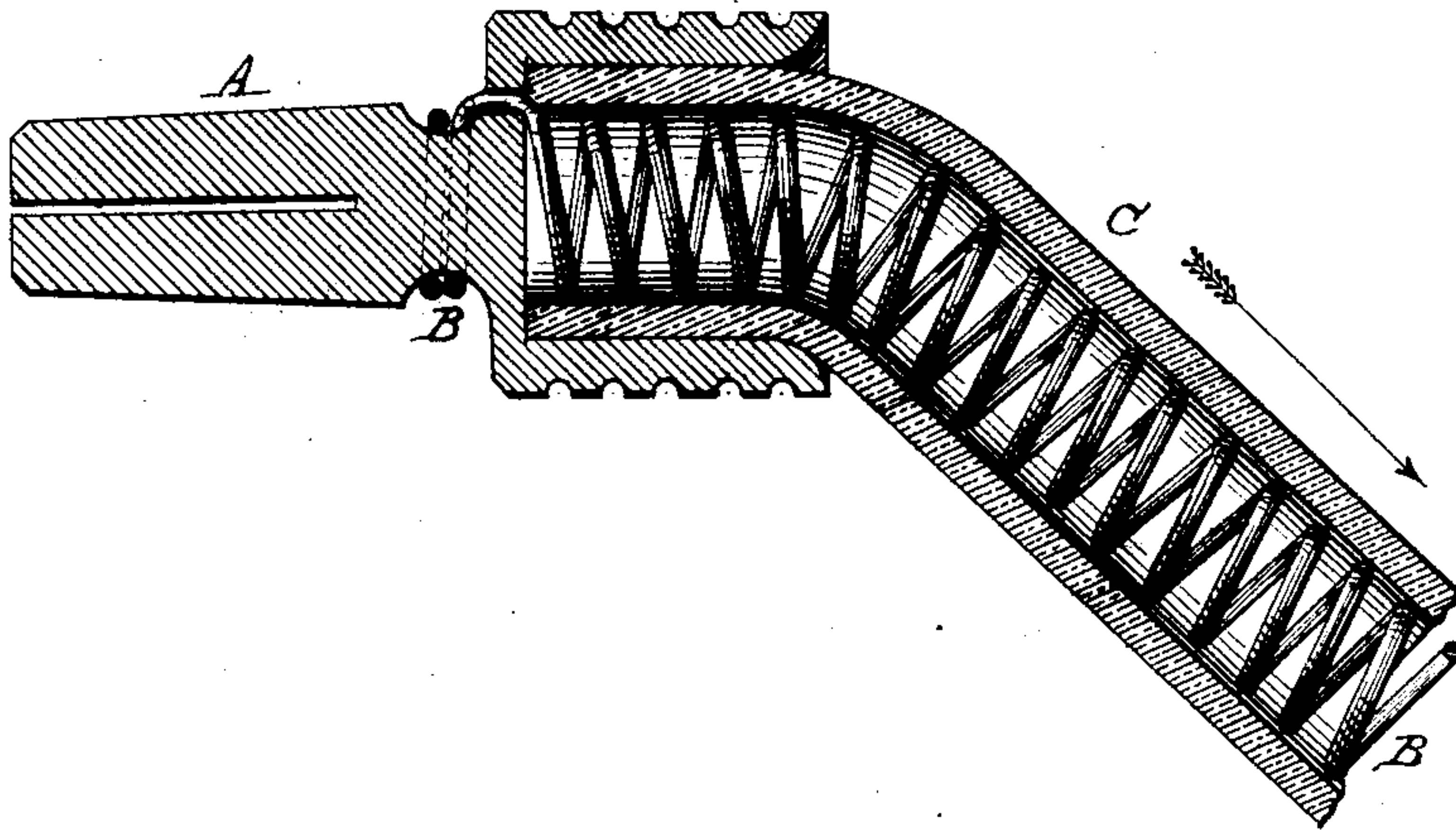


A. A. KNUDSON.  
Electric Conductor.

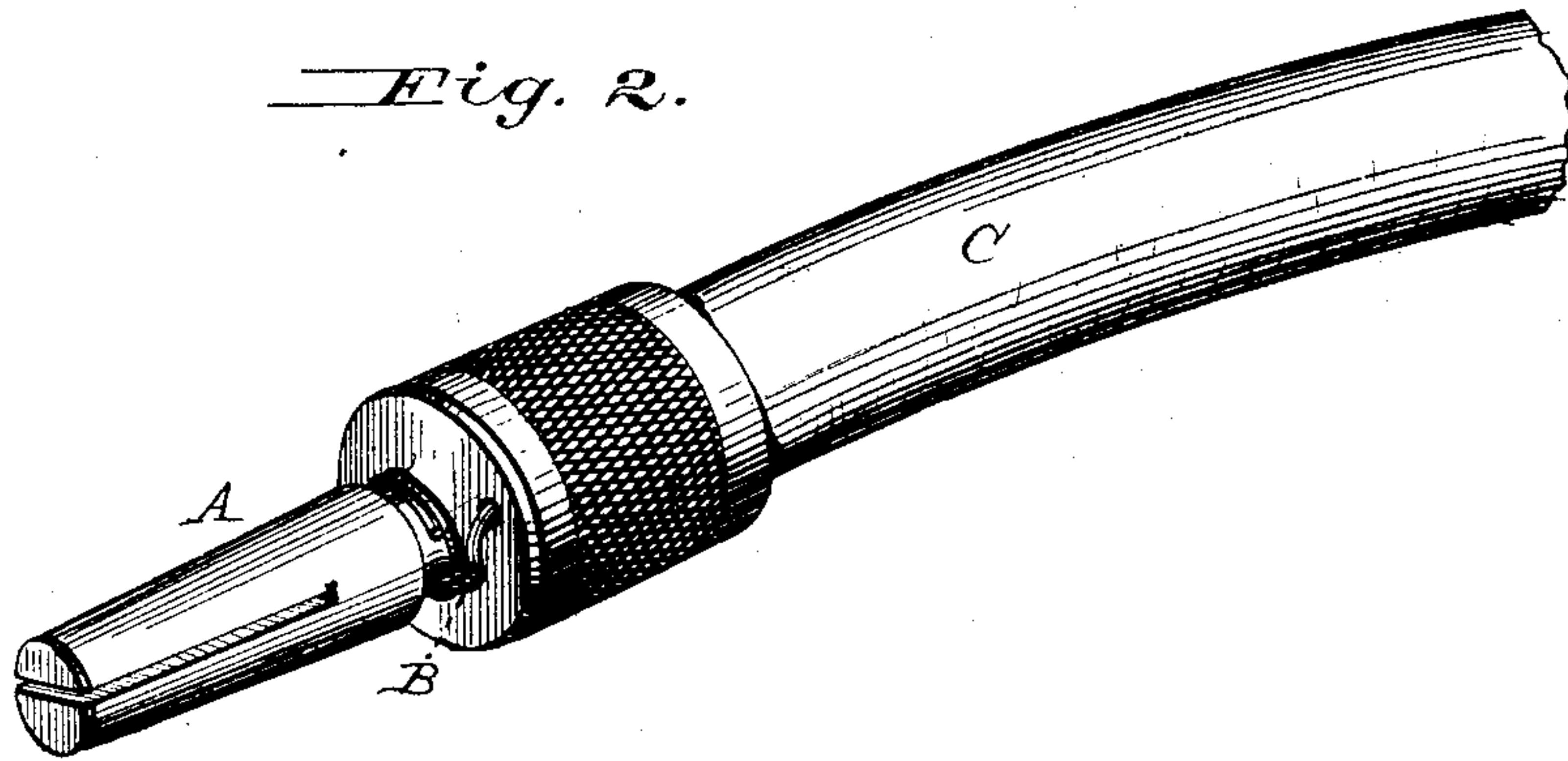
No. 221,074.

Patented Oct. 28, 1879.

*Fig. 1.*



*Fig. 2.*



*Attest:*  
*H. L. Perrine*  
*Geo. L. Ewin*

*Inventor,*  
*Adolphus A. Knudson*  
*By Forbes & Page*  
*Attorneys*

# UNITED STATES PATENT OFFICE.

ADOLPHUS A. KNUDSON, OF BROOKLYN, NEW YORK, ASSIGNOR TO  
ALBERT M. KALBFLEISCH, OF SAME PLACE.

## IMPROVEMENT IN ELECTRIC CONDUCTORS.

Specification forming part of Letters Patent No. **221,074**, dated October 28, 1879; application filed  
July 28, 1879.

*To all whom it may concern:*

Be it known that I, ADOLPHUS A. KNUDSON, of the city of Brooklyn, county of Kings, and State of New York, have invented a new and useful Improvement in Electric Conductors, of which the following is a specification.

This improvement relates to electrical conductors for connecting portable speaking-telephones to their key-boards, and other insulated conductors which are subjected to frequent bendings and longitudinal strains.

Heretofore such conductors have been made of insulated straight wire, which frequently breaks, or of fine wire coiled spirally and covered with braided insulating tubing. The latter are superior as regards durability, but are of a low degree of flexibility, and are inelastic, subjecting their fastenings to severe strains and requiring special adaptation of the latter.

The object of my present invention is to provide an elastic and flexible insulated conductor for the uses aforesaid, and to unite the same to a suitable key-board plug in the most simple and durable manner.

My said invention consists, first, in combining a spiral coil of hardened brass or other elastic wire with an insulating elastic tube of rubber or other suitable material; and, secondly, in attaching said conductor to a plug by means of a flaring or bell-shaped mouth, a threading-hole at the back of the latter, and a neck around which the end of the wire can be wrapped and secured.

In the accompanying drawings, Figure 1 is a longitudinal section of my invention. Fig. 2 is a perspective.

A is the plug; B, the conductor, and C the insulator.

The conductor B is preferably made of brass or other equally elastic wire. The in-

insulating covering C is preferably made of rubber or other elastic insulating tubing.

The plug A is composed of brass or other suitable material, with a flaring or bell-shaped mouth-piece, against which the insulator C will not be cut. The plug is intended to be used when my improved conductor is employed on a switch-board or other similar apparatus. The end of the insulator is tied near the end of the coiled wire, which is drawn through a hole in the plug A at the bottom of the flaring orifice, so that the insulator enters the flaring orifice and the wire is fastened around the neck of the plug.

I am aware that a coil of ductile conducting-wire has been inclosed in an elastic tube to provide for stretching, as described in British Patent No. 2,326 of 1858, for improvement in submarine cables, and I hereby disclaim the same as old.

What I claim as my invention is—

1. As an improvement in conductors for speaking-telephones and similar movable electrical apparatus, the within-described elastic and flexible insulated conductor, consisting of a spiral coil of elastic wire and an elastic insulator tube or covering inclosing said coil, for the purposes set forth.

2. The plug A, constructed with a flaring mouth, a threading-hole at the back of said mouth, and a contracted neck, as herein shown and described, in combination with the elastic and flexible coiled wire B and insulator tube or covering C, for the purposes specified.

ADOLPHUS A. KNUDSON.

Witnesses:

JOSEPH F. VERMILYE,  
CHARLES UNANGST.