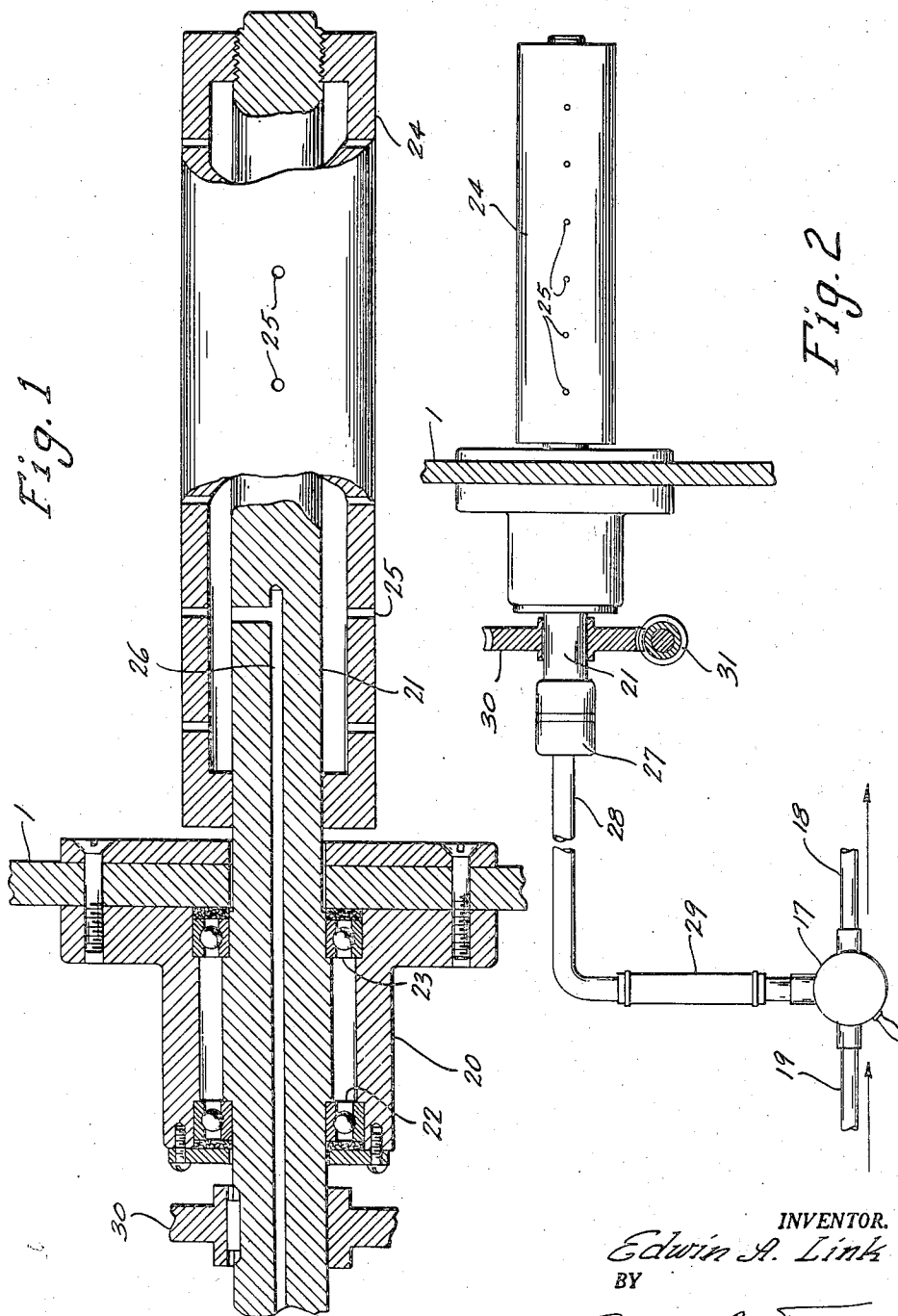


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E. A. LINK
VACUUM MANDREL

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INVENTOR.
Edwin A. Link
BY
Arthur R. Woolfolk
Attorney

UNITED STATES PATENT OFFICE

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VACUUM MANDREL

Edwin A. Link, Milwaukee, Wis., assignor to McGraw Electric Company, Milwaukee, Wis., a corporation of Delaware

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1 Claim. (Cl. 242—68)

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This invention relates to vacuum mandrels.

This application is a division of my prior application Serial No. 781,073, filed October 21, 1947, now Patent No. 2,567,387 dated September 11, 1951, for Vacuum Mandrels, assigned to the same assignee as the present application.

In making capacitors, long ribbons of metal foil and dielectric are wound into a cylindrical form and are then usually flattened. These ribbons are delicate and easily injured and it has been found difficult to start the winding and hold the ribbons to the mandrel and to remove the wound assembly without damage to the ribbons.

This invention is designed to overcome the above noted difficulties and objects of this invention are to provide a novel form of vacuum mandrel which will hold the ribbons to the mandrel and insure compact and uniform winding and which will provide means for readily detaching and freeing the wound assembly from the mandrel so that it may be freely slipped from the mandrel without any injury to the ribbons although the mandrel is not tapered but is a true cylinder throughout.

An embodiment of the invention is shown in the accompanying drawings, in which:

Figure 1 is a longitudinal sectional view showing the mandrel, such view being partly broken away.

Figure 2 is a side view of the structure shown in Figure 1 on a reduced scale and showing the manner in which the mandrel is connected to the three-way valve.

Referring to the drawings, it will be seen that a support or plate 1 is provided with a bearing supporting casing 20 on its rear side and revolvably carries the shaft 21, preferably ball bearings 22 and 23 being provided at spaced points on the shaft 21 so as to secure the shaft against lateral motion. The shaft rigidly carries the mandrel 24. For instance, the mandrel may be screwed onto the outer end of the shaft 21 as shown in Figure 1 and may have a snug fit with the shaft at its inner end. The mandrel is provided with a plurality of apertures 25 and the shaft is provided with a passageway 26 communicating with the hollow interior of the mandrel and consequently with the apertures 25. The shaft 21 is connected by means of a rotary air coupling 27 with a pipe 28. This pipe is connected with the three-way valve 17 by means of a flexible hose or tubing 29 so that any jarring or slight motion of the pipe 28 will not be communicated to the three-way valve 17. The mandrel is rotated in any suitable manner as by means of the worm wheel 30 driven by the worm 31.

A three-way valve 17 is arranged to selectively connect the pipe 29 and consequently the hollow interior of the mandrel with a source of vacuum as by means of the vacuum pipe 18 or with a

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source of compressed air as by means of the compressed air pipe 19.

In using the apparatus the three-way valve is turned so as to connect the hollow interior of the mandrel with the vacuum source and thus produce a suction at each of the openings 25. The outermost sheet of dielectric ribbon is brought into contact with the mandrel and the mandrel is rotated. This sheet is held by suction to the mandrel and is wound thereon and the other sheets of dielectric ribbon and foil ribbon are led into the space between the first sheet and its partially wound portion. The winding is continued until the requisite number of layers has been formed. The sheets are held tightly to the mandrel and are undamaged.

When a sufficient number of layers has been formed the mandrel is stopped, the sheets cut across, and the three-way valve is turned to admit compressed air. This forces a minute film of air between the wound assembly and the mandrel and allows the assembly to be readily slipped off the mandrel.

It will be seen that a novel form of vacuum mandrel has been provided by this invention which is particularly useful in the winding of the delicate dielectric and foil ribbons of capacitors.

It is to be noted particularly that there is no danger of damaging these delicate ribbons during the winding process or during the removal process.

Although this invention has been described in considerable detail, it is to be understood that such description is intended as illustrative rather than limiting, as the invention may be variously embodied and is to be interpreted as claimed.

I claim:

A vacuum mandrel construction comprising a support, a shaft revolvably supported from said support and having an inner end portion and an outwardly projecting portion, bearing means between said support and said shaft arranged to provide axially spaced bearing zones for said shaft, means for rotating said shaft, a mandrel rigidly carried by the outwardly projecting portion of said shaft and having substantially airtight connection with said shaft at the inner and outer ends of said mandrel, said mandrel having a plurality of apertures opening through its peripheral surface, said shaft having a passageway opening through its inner end portion and communicating with the apertures in said mandrel, a source of vacuum, a source of compressed air, valve means, and a rotary air coupling between the inner end portion of said shaft and said valve means, said valve means being arranged to selectively connect the passageway of said shaft with said source of vacuum and said source of compressed air.

EDWIN A. LINK.

No references cited.