

# UNITED STATES PATENT OFFICE.

FRANCIS EDWARD ELMORE AND ALEXANDER STANLEY ELMORE, OF LEEDS,  
ASSIGNORS TO THE ELMORE'S AMERICAN AND CANADIAN PATENT COP-  
PER DEPOSITING COMPANY, LIMITED, OF LONDON, ENGLAND.

## METHOD OF LOOSENING TUBES FROM MANDRELS.

SPECIFICATION forming part of Letters Patent No. 473,732, dated April 26, 1892.

Application filed February 11, 1892. Serial No. 421,184. (No specimens.) Patented in England March 23, 1891, No. 5,167; in  
Luxemburg June 1, 1891, No. 1,456, and in Italy June 10, 1891, LVIII, 229.

*To all whom it may concern:*

Be it known that we, FRANCIS EDWARD ELMORE and ALEXANDER STANLEY ELMORE, citizens of England, both residing at Spring Grove, Hunslet, Leeds, in the county of York, England, have invented a new and useful Method of Loosening from Mandrels Tubes Electrolytically Deposited Thereon, (for which we have obtained a patent in Italy, dated June 10, 1891, Vol. LVIII, 229, and in Luxemburg, dated June 1, 1891, No. 1,456, and made application in Great Britain for a patent, which patent when granted will bear date March 23, 1891, No. 5,167,) of which the following is a specification.

For the manufacture of tubes by electrolysis, as described in former specifications, a mandrel operating as a cathode is caused to revolve in an electrolytic bath in which there is an anode of the metal to be deposited, and the anode and cathode being connected to a source of electricity the metal as it is deposited on the mandrel is rendered dense, compact, and homogeneous in structure by a burnisher pressing against it and traveling to and fro longitudinally while the mandrel revolves. Tubes thus deposited in order that they may be removed from the mandrels have to be loosened thereon. This has usually been done by subjecting the deposited metal to the pressure of rollers, by which it is somewhat stretched, so that it can be taken off the mandrel.

According to our present invention we provide for loosening the shell of deposited metal from a hollow mandrel, which is of thin light

structure, not suited to withstand the pressure of rollers such as might be employed for stretching the deposited shell. Instead of loosening the shell by stretching it we loosen it by slightly reducing the size of the hollow mandrel on which it is deposited by reduction of the fluid-pressure within the mandrel. We therefore after the metal is deposited exhaust air from the interior of the mandrel, causing the mandrel to shrink from the shell deposited upon it; or before any deposit of metal takes place we charge the interior of the mandrel with compressed air, thus somewhat expanding it, and after the metal is deposited we let air issue from the mandrel, thus allowing it to shrink from the shell deposited on it.

Having thus described the nature of this invention and the best means we know for carrying the same into practical effect, we claim—

The herein-described method of loosening from a thin hollow mandrel a tube electrolytically deposited thereon, consisting in reducing the fluid-pressure within the mandrel.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 26th day of January, A. D. 1892.

FRANCIS EDWARD ELMORE.

ALEXANDER STANLEY ELMORE.

Witnesses:

A. S. FRYER,

Stenographer, 66 Hunslet New Rd., Leeds.

A. FRYER,

Clerk, 66 Hunslet New Rd., Leeds.