

No. 746,319.

PATENTED DEC. 8, 1903.

C. D. FREES.
TUBING.

APPLICATION FILED JULY 29, 1902.

NO MODEL

Fig. 1,

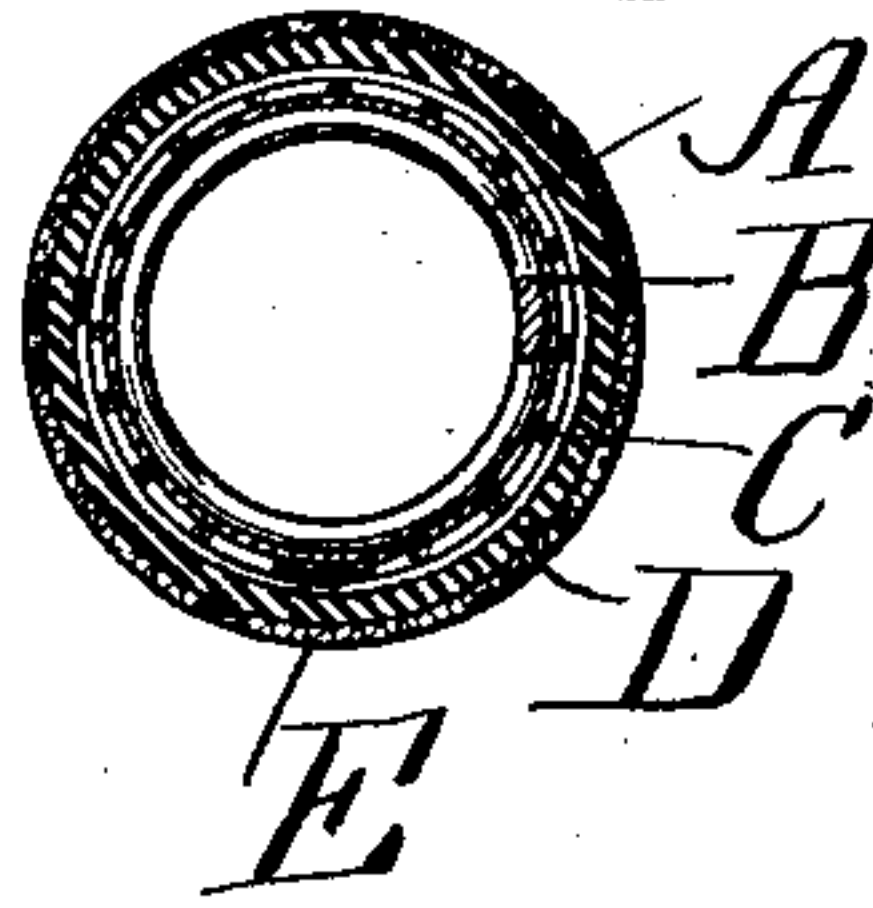


Fig. 2,

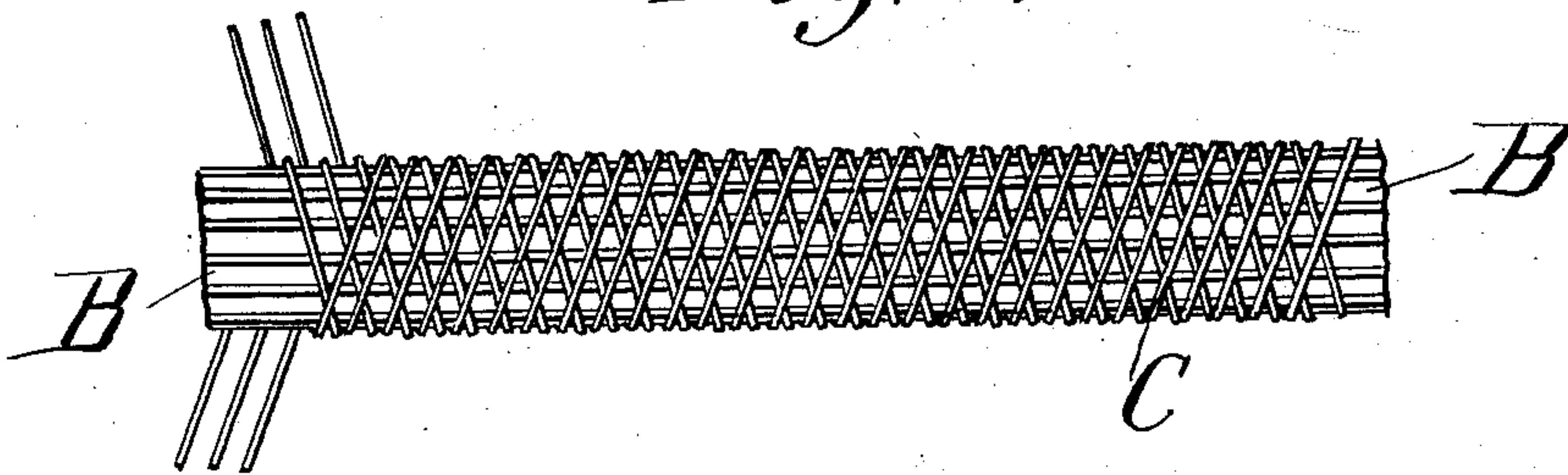
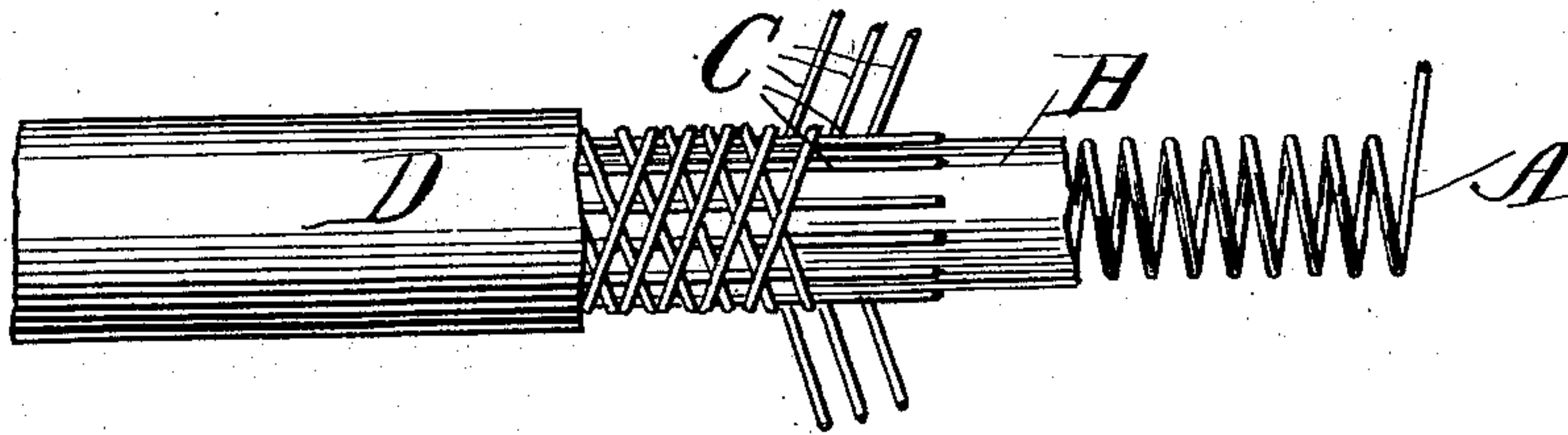


Fig. 3,



WITNESSES:

R. H. E. Starr.
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UNITED STATES PATENT OFFICE.

CHARLES D. FREES, OF HOBOKEN, NEW JERSEY.

TUBING.

SPECIFICATION forming part of Letters Patent No. 746,319, dated December 8, 1903.

Application filed July 9, 1902. Serial No. 114,851. (No model.)

To all whom it may concern:

Be it known that I, CHARLES D. FREES, a citizen of the United States of America, residing in Hoboken, New Jersey, have invented a new and useful Improvement in Tubing, of which the following is a specification.

My invention relates to improvements in tubing, and especially gas-tubing.

The object of the invention is to provide a tubing that shall be tight and substantially indestructible when exposed interiorly to gas in which while combining the necessary cheapness and economy of structure shall nevertheless provide protection for the impervious layers against the deteriorating action of the gas and also against the deteriorating effects of the acids that are almost always present or produced on the surface of the spiral wire, usually tinned on its outer surface, that is employed for sustaining the mechanical and also the gaseous pressures to which the tubing must be subjected in practical use.

To these ends the invention in its most preferred form combines an interior wire spiral overlaid with a thin layer of tissue or other paper, over which latter extend longitudinal strengthening-strands therefor and spiral binding-strands or wrapping, and all these elements underlie and are covered by the impervious composition. Finally, as is usual, the outside may be covered with a neat or ornamental woven fabric.

I am of course well aware that tubings having an impervious composition that is directly exposed to the interior gases and acids has been invented and described by a certain J. Taylor, wherein a tissue-paper covering exterior to the composition has been provided, and of course such covering may prevent in a large degree the disagreeable odors arising from the gaseous products that have passed through or are developed in the composition; but this invention does not provide any means of preventing the gases and acids from directly attacking the composition, and therefore serve by way of illustration to bring out the distinctive features of my own invention.

I am also aware that it is common to cover electric cables with sheet-lead at an expense of about ten cents a pound and that tubing of a so-called flexible nature has been described in which sheet-lead of spiral form has

been placed beneath a composition covering of rubber or elastic material; but such construction does not combine in a single structure the lightness, thinness, flexibility, and cheapness that result from the combined relationships of the layers which constitute my improved tubing. Neither does such tubing provide any longitudinal extending strands that tend to relieve the strain in the composition layer, because presumably the lead layer was relied upon for such purpose.

In the accompanying drawings similar letters of reference refer to corresponding parts.

In the drawings, Figure 1 represents a transverse cross-section of a piece of tubing embodying the preferred form of my invention. Fig. 2 represents a piece of the same tubing partially completed, but with the outer cover or covers removed. Fig. 3 is a detail view of a portion of tubing embodying the preferred form of my invention partially completed.

A represents a form, here shown as a metal spiral, of a suitable size.

B is a flexible insulator of paper or similar material.

C represents a binder, which preferably consists of a series of threads arranged substantially parallel to each other and around the circumference of the insulator and covered and secured in position by other threads superimposed thereon and wound in opposite directions. This preferred form of construction is shown in detail in Fig. 3. Any suitable woven or braided covering may be used for this binder.

D represents a sealing-covering of any suitable composition which is impervious to gas, and E represents the final outside covering, which may be of any suitable material, such as an ornamental fabric.

The insulator, although preferably of paper, may be of any suitable and flexible material which will prevent the composition of the sealing-covering from affecting the form and creating acids by its coaction therewith, and thus tending to destroy said composition.

I claim as the characteristic features of this invention the following:

1. In combination in a tubing, a flexible spiral of wire, a layer of paper exterior to the said spiral for preventing the free circulation of gases from the interior to the layers

exterior thereto, and longitudinal strengthening-strands and spiral binding-strands exterior to the said paper, and a flexible and substantially gas-tight composition also exterior to the said paper, for substantially the purposes set forth.

2. In combination in a tubing, a flexible spiral of wire, a layer of paper exterior to the said spiral for preventing the free circulation of gases from the interior to the layers exterior thereto, and longitudinal strengthening-strands and spiral binding-strands exterior to the said paper, and a flexible and substantially gas-tight composition also exterior to the said paper, and a woven fabric covering the said composition, for substantially the purposes set forth.

3. In combination in a tubing, a flexible spiral of wire, a thin light and highly flexible layer of fibrous material exemplified by paper, surrounding the said spiral, and a spirally-laid binder confining the said fibrous layer against the said wire spiral, and a sealing layer of substantially impervious non-metallic material, for substantially the purposes set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CHARLES D. FREES.

Witnesses:

DENNIS A. DONOVAN,
SAMUEL CURTIS.