

No. 607,416.

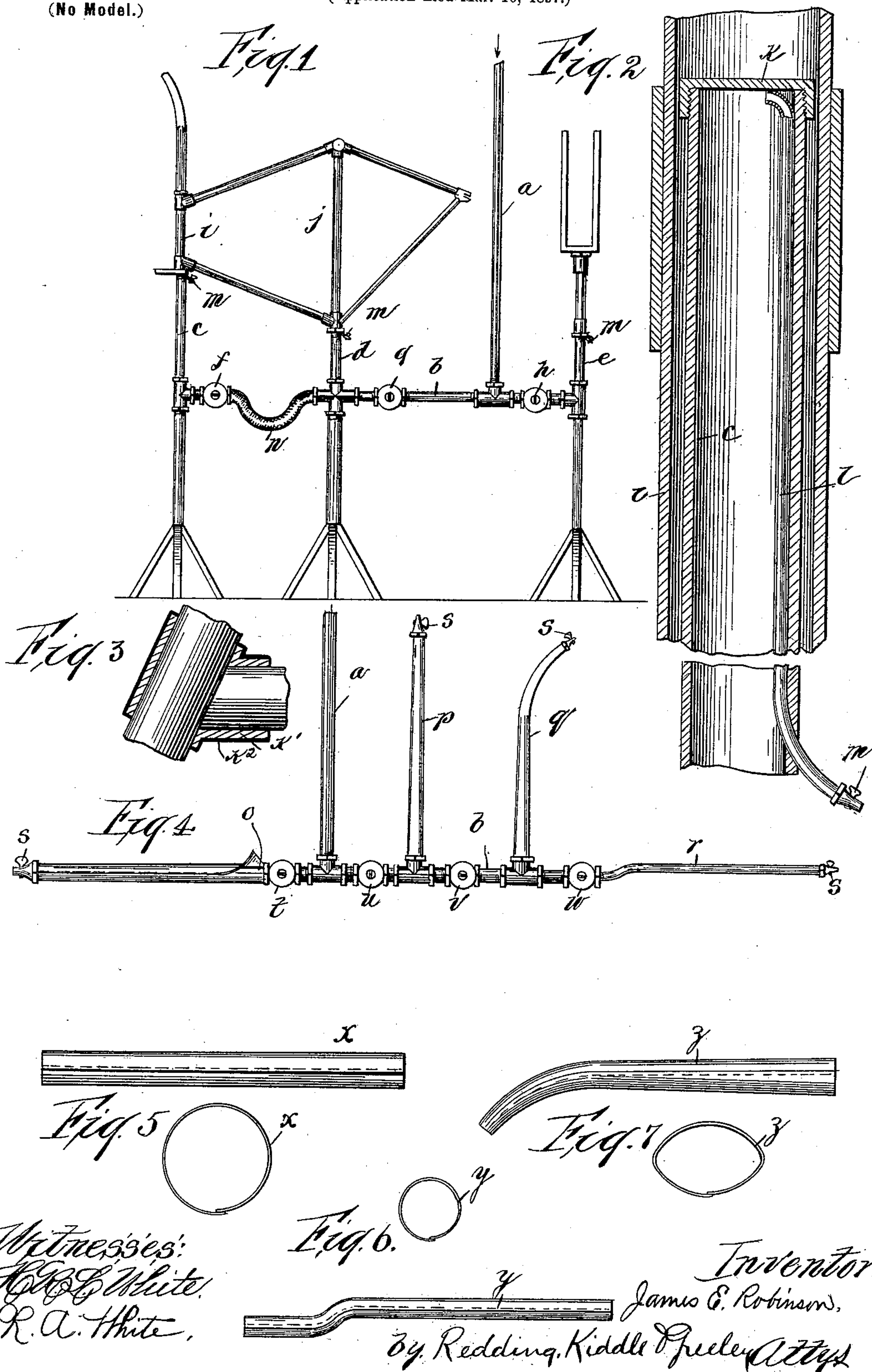
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J. E. ROBINSON.

PROCESS OF APPLYING CELLULOID OR OTHER LIKE COVERINGS TO HOLLOW METAL TUBES.

(Application filed Mar. 16, 1897.)

(No Model.)



UNITED STATES PATENT OFFICE.

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PROCESS OF APPLYING CELLULOID OR OTHER LIKE COVERINGS TO HOLLOW METAL TUBES.

SPECIFICATION forming part of Letters Patent No. 607,416, dated July 12, 1898.

Application filed March 16, 1897. Serial No. 627,855. (No specimens.)

To all whom it may concern:

Be it known that I, JAMES E. ROBINSON, a citizen of the United States, residing in the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Processes of Applying Celluloid or other Like Coverings to Hollow Metal Tubes, &c., of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

The object of my invention is to provide a satisfactory process whereby the members of a bicycle-frame or other structure and the connecting-joints may be provided with a suitable covering of celluloid having a smooth, even, and glossy surface free from blisters and inequalities, whereby the difficulties incident to the application of either plastic or sheet celluloid, and particularly the former, to metal surfaces may be avoided, all of which is hereinafter more particularly described and claimed.

It has heretofore been found impracticable to cover bicycle-frames with plastic or sheet celluloid for the reason that the plastic material, when dried or baked in the usual way applicable to ordinary enamels, tends to run to the lowest point and to form in drops or ridges, while if sheet-celluloid is used it is liable to warp or blister, and in either event the result is entirely unsatisfactory. I have discovered that when plastic celluloid or other like material is applied to a hollow tube which is heated from within it will dry very rapidly and in a perfectly satisfactory manner, so that the application of two or three coats with an ordinary brush will form a sufficient body to cause a complete protection to the metal covered thereby and at the same time produce an artistic effect. The result is equally satisfactory when sheet-celluloid or other like material is applied.

In the drawings, Figure 1 is a side elevation of an apparatus adapted to be employed in the covering of bicycle-frames, showing a frame connected therewith. Fig. 2 is an enlarged vertical sectional view in detail of one of the heating-tubes of my improved appara-

tus inserted within the tube of a bicycle-frame. Fig. 3 is a sectional view in detail of a joint, showing my improved covering applied thereto. Fig. 4 is a view of apparatus for molding sheet-celluloid or other like material to the proper forms to cover the respective tubes of the frame; and Figs. 5, 6, and 7 are side and end views, respectively, of molded tubing adapted to be applied to different parts of the frame.

Referring to the drawings, *a* represents a steam-service pipe, which is connected with a horizontal pipe *b*, adapted to be supported upon any suitable standard or frame. Connected with the pipe *b* are upwardly-extended branches *c*, *d*, and *e*, the steam-passage to which, respectively, is controlled by means of valves *f*, *g*, and *h*. The branches *c*, *d*, and *e* are of sufficiently small diameter to permit them to freely enter the tubes *ij* of an ordinary bicycle-frame, thereby supporting said frame in a position to be readily operated upon. Each of the tubes *c*, *d*, and *e* is closed by means of a cap *k* at the upper end, and within each is secured a small tube *l*, Fig. 2, which extends from the top of the tube *c*, where it is open, as shown, to a point below that which is reached by the bicycle-frame when supported upon said vertical tubes. The tube *l* is then carried out to the open air and a petcock *m* is arranged at the lower end, thereby enabling the air to escape from the pipes *c d e* when steam is admitted thereto. A flexible tube *n*, Fig. 1, is interposed in the pipe *b* to enable the tubes *c d* to be adjusted to bicycle-frames of varying lengths.

When the frame is in the position shown in Fig. 1, the steam is admitted to one or more of the pipes *c d e*, and the corresponding petcocks *m* are opened to permit the air to escape from the pipes. The heated steam-pipes cause the joints and tubing of the frame to become heated in turn, and when this occurs celluloid or other like material in a semi-liquid or plastic condition is applied with a brush to the joints and to such parts of the frame or tubing as may be desired. The parts being heated from within, the plastic or semi-liquid material is thereby caused to dry very

rapidly and to adhere very closely and uniformly to the metal. Two or three coats are usually necessary to produce a satisfactory result. In order to give the desired finish to the coating thus applied, a liquid coating may be added, and while yet soft rubbed with a fine cloth, and if a gloss is desired this may be followed in like manner with a liquid coating of transparent celluloid or other like material.

My improved process, as described, is especially applicable to the joints of the frame, although it may be applied to the tubing as well; but I prefer to cover the tubing with sheet-celluloid or other like material and the joints with the plastic material.

In Fig. 3, k' represents one of the joints, and k^2 the coating applied thereto. In order to successfully employ sheet-celluloid or other like material, it should be first molded to fit the respective parts. This may be accomplished as follows by means of the apparatus shown in Fig. 4: In said figure, a represents a steam-service pipe, and b a horizontal steam-pipe connected therewith in the same manner as the device shown in Fig. 1. Branches o q r , respectively, are connected with the pipe b and are shaped to correspond to the main tubes, fork, and braces, respectively, of a bicycle-frame. A branch p is also connected in like manner with the pipe b , which is elliptical in cross-section, like the branch q , and differs therefrom only in being made straight. Petcocks s are placed in the ends of each of the parts o p q r to permit the escape of air, and valves t u v w are interposed in the pipe b to control the admission of steam to the branches o , p , q , and r , respectively, which constitute mandrels upon which the sheets of celluloid or other material may be molded. The desired parts are cut by hand or otherwise from the celluloid or other sheets to the requisite shape and size to fit the structure desired and form an overlapping seam. Steam is then admitted to the respective mandrels until they reach the proper temperature, preferably about 200° Fahrenheit, when the sheet is wrapped around and pressed against the mandrel by hand, the operator using suitable gloves for the purpose, until it assumes the exact shape of the mandrel. Steam is then turned off long enough to permit the temperature to lower a few degrees, when the molded shell may be removed from the mandrel without distortion.

In Figs. 5, 6, and 7, x , y , and z , respectively, represent the various-shaped shells formed upon said mandrels, each having an open overlapping joint at the side, as shown. When the joints of the frame are coated with plastic

celluloid or other like material, as described, the shells x y z may be opened and sprung upon the tubes, braces, and forks of the frame and cemented thereto while the frame is hot, which enables them to be more accurately and securely fitted without the formation of wrinkles or blisters.

A bicycle-frame covered in the manner described is not only durable and lasting, but may be made to present a highly artistic and pleasing appearance. Ornate combinations and effects may be produced in this way that are impossible of attainment by methods heretofore employed. Moreover, when applied in the manner described the covering will withstand severe blows and rough usage without abrasion.

I do not claim, broadly, in this application the method of forming the open-seam tubes, as the same forms the subject-matter of my application, Serial No. 627,854, of even date herewith.

Having thus described my invention, I claim—

1. The method of covering bicycle and other hollow framework with celluloid, which consists in first applying heat to the interior of the frame, then during the continuation of the application of the heat applying to the heated frame, and manually shaping thereto a permanent covering of celluloid and finally allowing the frame to cool; substantially as described.

2. The herein-described method of covering the bars of a hollow framework with celluloid, which consists in first applying heat to the interior of the frame-bars, then during the continuation of the application of the heat springing over the same, and manually shaping thereto open-seam tubes of celluloid corresponding in contour to the said frame-bars and uniting the tube edges, and finally allowing the frame to cool; substantially as described.

3. The herein-described method of covering the joints of bars of a hollow framework, which consists in first heating the hollow framework from within, then coating the heated joints with semiliquid celluloid, then applying to the heated frame-bars open-seam tubes corresponding in shape thereto, and uniting the longitudinal edges of the tubes together, and then allowing the frame to cool; substantially as described.

This specification signed and witnessed this 10th day of March, A. D. 1897.

JAMES E. ROBINSON.

In presence of—

JAMES JAY TAYLOR,
ALBERT G. SPALDING.