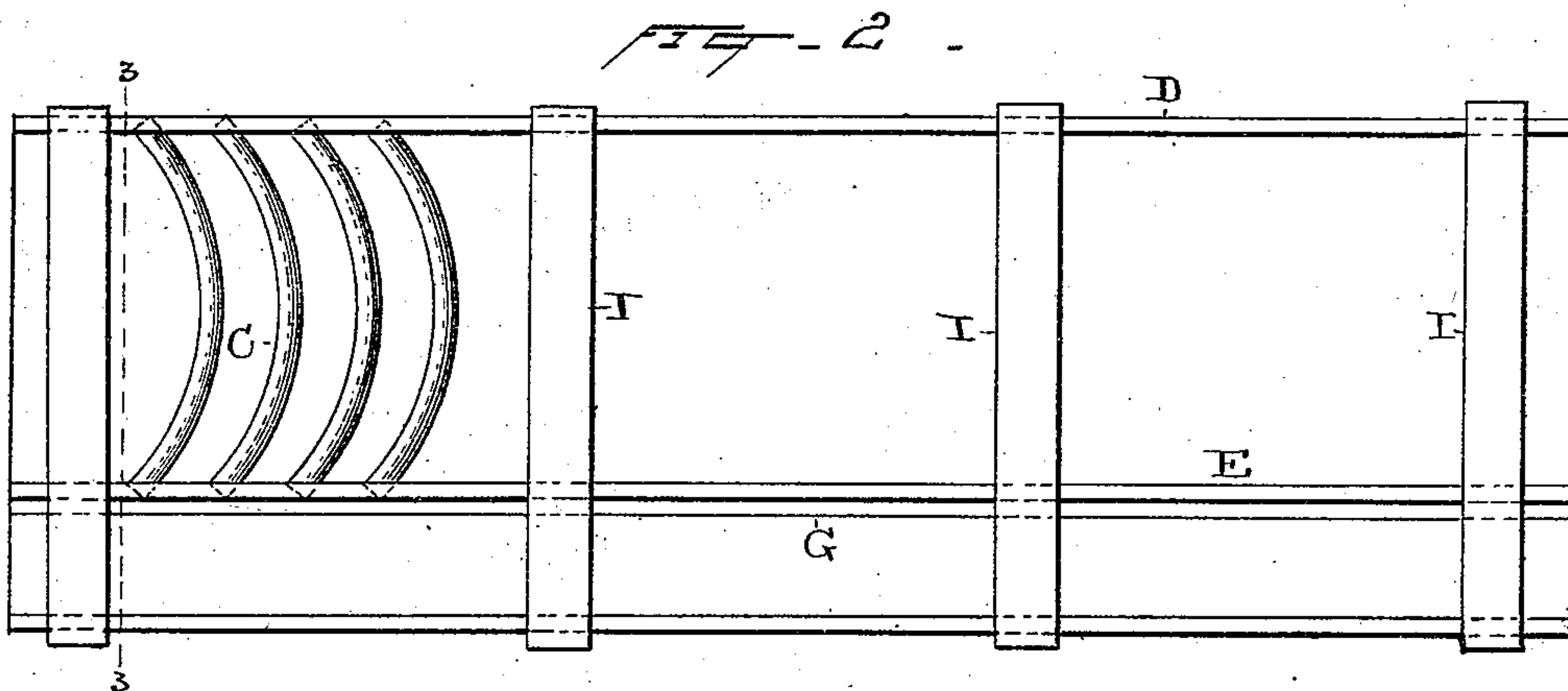
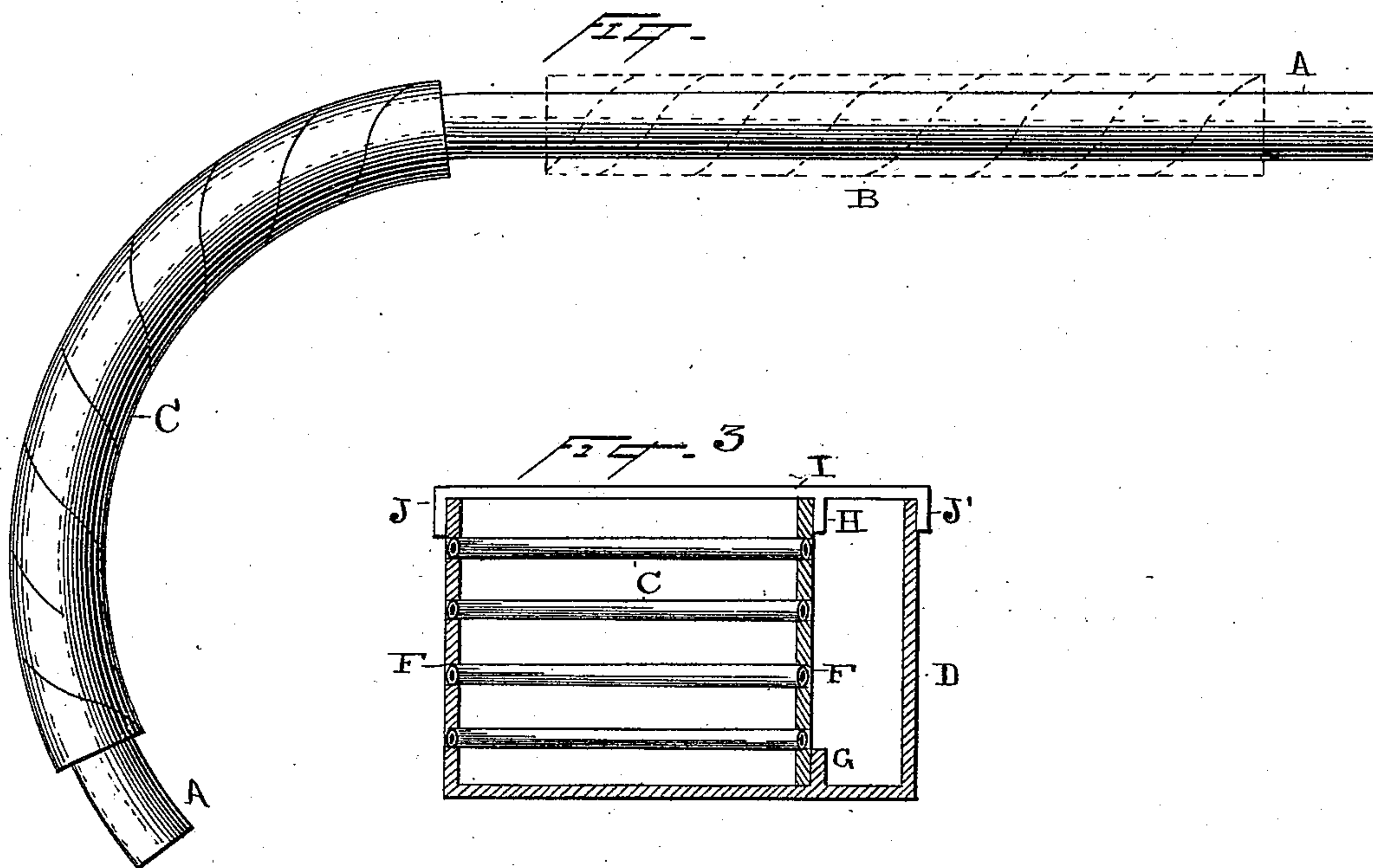


(No Model.)

E. T. GREENFIELD.
PROCESS OF PRODUCING PAPER ELBOWS.

No. 553,674.

Patented Jan. 28, 1896.



Witnesses
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UNITED STATES PATENT OFFICE.

EDWIN T. GREENFIELD, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE INTERIOR CONDUIT AND INSULATION COMPANY.

PROCESS OF PRODUCING PAPER ELBOWS.

SPECIFICATION forming part of Letters Patent No. 553,674, dated January 28, 1896.

Application filed June 5, 1890. Serial No. 354,315. (No model.)

To all whom it may concern:

Be it known that I, EDWIN T. GREENFIELD, a citizen of the United States, residing at New York city, in the county and State of New York, have invented a new and useful Process of Producing Paper Elbows, of which the following is a specification.

The object of my invention is a process and apparatus whereby paper elbows may be rapidly and economically manufactured and impregnated with a waterproofing compound.

Preferably the paper tube of which I make the bend or elbow is one formed with a longitudinally-seamed paper core and a spiral wrap or wrappings of the same material. Such a paper tube has been found to be well adapted to bending, its longitudinal core and spiral wrappings accommodating themselves readily to changes in form, the spiral wrappings, when an elbow or bend is formed, presenting the appearance of having been forced together on the inner side of the bend and away from one another on the outer side. Such a tube as I have described is clearly illustrated in Patent No. 441,846, dated December 2, 1890, to Daniel N. Hurlbut, to which reference should be made for a detailed description of the same.

For the purposes of the present invention it is sufficient for me to state that the spiral wrap or wrappings of said tubes are secured by cement or paste, so that when the tube is dampened, as I shall presently explain, the cement or paste will be dissolved sufficiently to allow said wrap or wrappings to move relatively to each other in the manner I have explained above, and when the tube is dried the cement or paste upon hardening will serve to secure the wrap or wrappings in their changed relations.

In bending a paper tube such as above described, a mandrel is employed of a little less diameter than the inside diameter of the tube, one end of which is straight and the other formed to the desired bend. Preferably I employ a mandrel heated to a temperature as high as it can be comfortably handled. A proper length of the paper tube to form the bend or elbow is taken while damp, or after having been suitably dampened, and is forced on the straight portion of the mandrel and on

the bent portion as far as it will go by hand. If it does not go far enough, then the straight end of the mandrel is placed in a vise, and an instrument is used to force the tube completely over the bent portion of the mandrel. When this is accomplished the tube will have the desired elbow or bend form. It is now either artificially dried after removal from the mandrel, or the heated mandrel when used will usually effect the drying and setting. The bend or elbow is then treated with the impregnating compound in any suitable manner.

The above describes the process carried on to produce a single finished elbow or bend, but in practice a number are finished simultaneously. In accomplishing this the tube is bent on the mandrel, as above, but when removed therefrom is placed in a receptacle provided with walls, in holes in which the bent tubes are placed, one of said walls being adjustable toward the other, so that the bend which the tube has when withdrawn from the mandrel can be increased by decreasing the distance of the walls apart. When the number of elbows or bends the receptacle is adapted to receive have been placed in position and forced or adjusted to the proper form, the receptacle may be dipped with the elbows or bends into the impregnating compound, thereby simultaneously applying the same to a number of bends or elbows, thus making them rigid.

In the accompanying drawings, forming a part of this specification, Figure 1 is a side elevation of mandrel for an elbow, showing in dotted lines the paper tube in the first position and in full lines in the final position. Fig. 2 is a plan view of the receptacle in which a number of the tubes are treated simultaneously in the impregnating compound. Fig. 3 is a cross-section taken on the line 3 3 of Fig. 2.

A is the mandrel, preferably heated, used in carrying on the process of forming a simple elbow. It is made up of a straight portion upon which the proper length of tube is first forced and of a curved portion of the curvature that the finished tube is to possess, and on which the straight tube is forced from the straight end of the mandrel. B is the

straight length of tube shown in dotted lines on the straight portion of the mandrel, and C (shown in full lines) is the same tube after it has been forced from the straight end of the mandrel onto the curved portion thereof. Before placing the paper tube on the mandrel it is dampened, if it is not already in a damp condition, whereby it is rendered more readily pliable. It is in the damp condition forced on the straight end of the mandrel as far as it will go by hand, and then the mandrel is introduced into a vise and a suitable tool used to force the paper tube around the curve of the mandrel.

The dampening of the tube serves to dissolve or render less adhesive the cement or paste which secures the spiral wrap or wrappings in place and allows the overlapping edges of the wrap or wrappings to move toward and over one another on the inside of the bend and away from and over one another on the outside of the bend, so that there can be no liability of the tube becoming buckled and a much neater and more perfect joint is produced. When the tube is dried, the cement or paste hardens and secures the wrap or wrappings in their changed positions.

When the paper tube has been forced on the curve of the mandrel, as shown in full lines, Fig. 1, it is either permitted to dry in that position on the mandrel, which will be quickly effected if the mandrel is heated, or it is removed therefrom while in the damp condition and placed with a number of other tubes which have been similarly formed in a receptacle which will maintain the tubes in the proper curvature until they have undergone the finishing treatment. Such a receptacle is illustrated in Figs. 2 and 3. It consists of an oblong box D open at the top, provided with a removable partition E. One of the side walls of the box is provided with a series of holes F arranged at determined distances apart, and the removable partition, which fits within the box, is provided with a corresponding number of holes F' in line with the holes in the side wall. This removable partition is maintained upright in the box by a rib G, which extends the full length of the box on the bottom thereof and by a depending lug H on the detachable cross-plates I, which plates are provided with lips J J' fitting over the outside walls of the receptacle. The tubes after removal from the mandrel are sprung into opposite holes in the side wall and removable partition, which are distant apart about the length of the chord joining the curve of the finished tube. After the receptacle has been filled with the proper number of the formed tubes it is immersed in a

bath of suitable impregnating material or compound and the whole number of tubes impregnated with such substance simultaneously, after which the same is allowed to dry on the tubes. They are then removed from the receptacle by taking off the plates I and dropping the removable partition to one side, when all the elbows will fall to the bottom of the receptacle and may be readily removed therefrom.

What I claim is—

1. The process of producing tubular paper bends or elbows, consisting in, first producing a short length of paper tube having a longitudinally seamed core and a spiral wrapping, said wrapping being secured by cement or paste; second, dampening the tube so as to dissolve or render less adhesive the said cement or paste, third, bending the tube to the desired shape over a mandrel, whereby the edges of the spiral wrapping will be moved relatively to each other, and, fourth, drying the tube so as to harden the cement or paste and to set the tube in its bent shape, substantially as set forth.

2. The process of producing tubular paper bends or elbows, consisting in, first producing a short length of paper tube having a longitudinally seamed core and a spiral wrapping, said wrapping being secured by cement or paste; second, dampening the tube so as to dissolve or render less adhesive the said cement or paste; third, bending the tube to the desired shape over a mandrel, whereby the edges of the spiral wrapping will be moved relatively to each other; fourth, drying the tube so as to harden the cement or paste and to set the tube in its bent shape; and fifth, treating the dried tube with a water-proofing compound, substantially as set forth.

3. The process of producing tubular paper bends or elbows, consisting in, first producing a short length of paper tube having a longitudinally seamed core and a spiral wrapping, said wrapping being secured by cement or paste; second, dampening the tube so as to dissolve or render less adhesive the said cement or paste; and third, bending the tube to the desired shape over a heated mandrel, whereby after the edges of the spiral wrapping are moved relatively to each other, the cement or paste will be hardened by said heated mandrel, substantially as set forth.

This specification signed and witnessed this 30th day of April, 1890.

EDWIN T. GREENFIELD.

Witnesses:

D. H. DRISCOLL,
W. PELZER.