

No. 620,213.

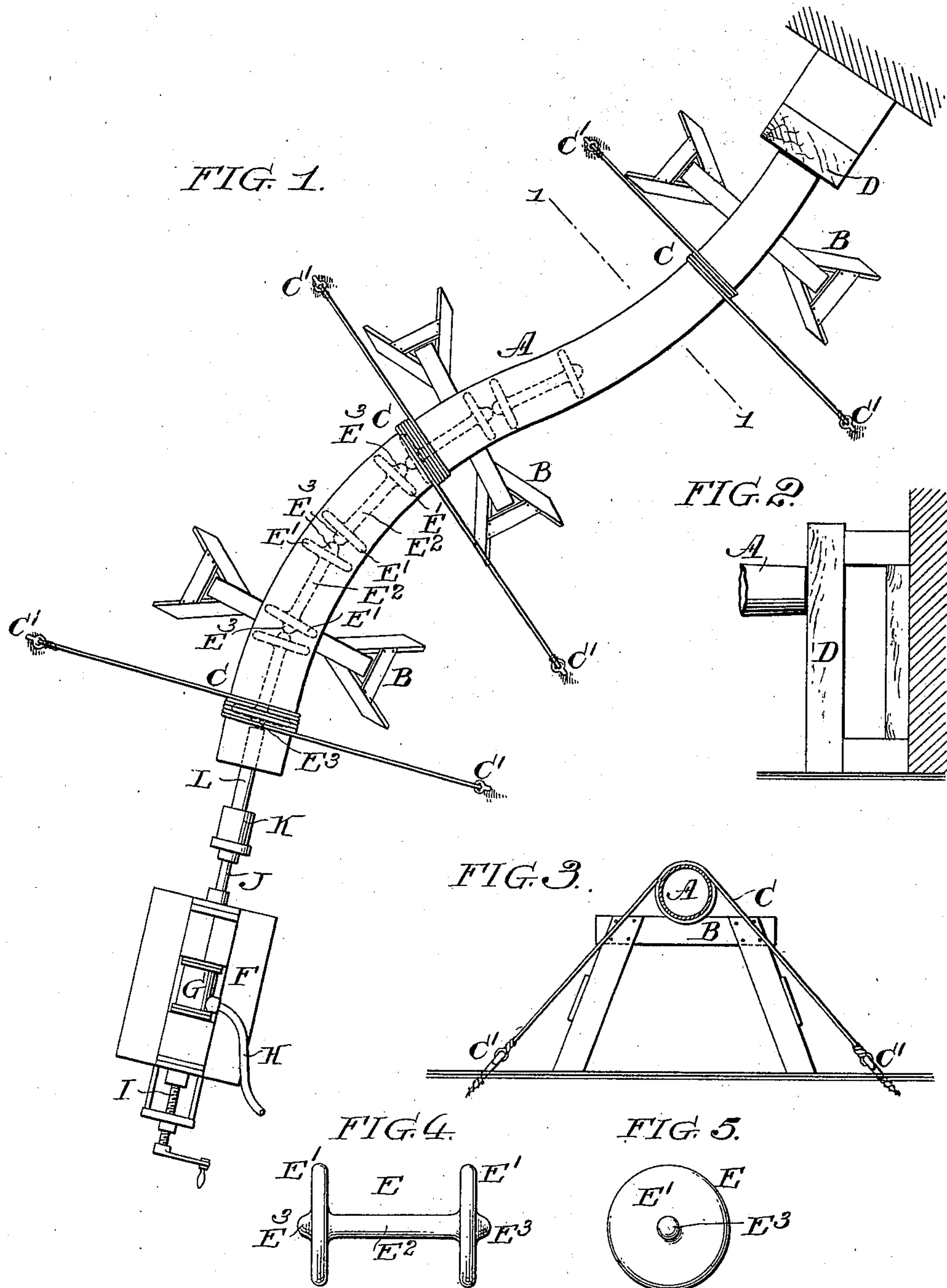
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B. C. BATCHELLER & R. GUNDLACH.

APPARATUS FOR UNIFYING SECTIONAL CURVATURE OF TUBES.

(Application filed Feb. 12, 1898.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR UNIFYING SECTIONAL CURVATURE OF TUBES.

SPECIFICATION forming part of Letters Patent No. 620,213, dated February 28, 1899.

Application filed February 12, 1898. Serial No. 670,044. (No model.)

To all whom it may concern:

Be it known that we, BIRNEY C. BATCHELLER and ROBERT GUNDLACH, citizens of the United States of America, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Apparatus for Unifying the Sectional Curvature of Tubes, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

Our invention relates to apparatus for unifying the sectional curvature of tubes, and primarily bent tubes of the kind used for pneumatic-despatch apparatus, in which uniformity in sectional curvature is of the greatest importance to the proper working of the system.

It is of course almost impossible to bend a tube without modifying its sectional curvature; and the object of our invention is to provide means for restoring the tube to its normal and proper sectional curvature without materially changing the lineal curvature, and we have discovered that this may be satisfactorily accomplished by the use of a number of expanding devices, each having but a small surface contact with the inside of the tube and which by reason of their function we will call "expanding mandrels," the said expanding mandrels being introduced into the tube in series and driven forward there-through by repeated light blows communicated directly to the outermost expanding mandrel and through it to the inner expanding mandrels, all of which are in contact progressively. In this way we are able not only to force the tube to the desired sectional curvature at any given point, but to maintain it at the desired curvature as the expanding mandrel progressively extends through the tube and we are able to do this without destructive strains to the material of which the tube is composed by reason of the fact that each blow is, compared to the strength of the material, a light one, and by reason of the small contact of each mandrel with the tube the work of expanding at any given point is comparatively small.

The nature of our invention and also cer-

tain features of advantageous construction in the devices and apparatus employed will be best understood as described in connection with the drawings, in which they are illustrated, and in which—

Figure 1 is a plan view illustrating the operation and apparatus used by us in restoring a bent tube to its proper sectional curvature. Fig. 2 is a side elevation of the buttress against which one end of the pipe rests. Fig. 3 is an end elevation taken as on the section-line 1 1 of Fig. 1. Fig. 4 is a side elevation of one of our expanding mandrels constructed as we prefer to construct it, and Fig. 5 is an end view of the same expanding mandrel.

A is a bent tube to be expanded or restored to proper sectional curvature and which, as shown, we secure in position to be operated upon by resting it upon trestles B B B, with its end abutted, as shown, against a supporting-block D.

C C are fastenings, of rope, each, as shown, wound around the pipe and anchored at each end to some convenient anchorage—as shown, bolts C' C', &c., secured to the floor. This or an equivalent mode of securing the tube in place, so that it will have a certain power of yielding or springing under blows, is an important practical feature of our construction, the cords permitting the pipe to yield slightly and spring back to true position, thus avoiding the shock which would be incident to the rigid anchoring of the tube in position.

E indicates our preferred form of expanding mandrel, made up, as best shown in Figs. 4 and 5, of two disks E' E', having rounded edges, said disks being secured together by a stud, as E², and preferably provided at the center of their outer faces with bosses E³, which when a "train," so to speak, of such mandrels are introduced into the tube, as shown in Fig. 1, come in contact with each other. The particular advantage of the form of expanding mandrel illustrated is that the two connected disks of course hold each other in proper alinement and at substantially right angles to the center line of the pipe, while at the same time the construction enables us to reduce the weight of each mandrel to a low point, and it is obviously very advantageous

that the weight of the mandrels shall be as light as possible, so as to reduce their inertia.

F is a frame or support, in or upon which the power-hammer G is secured so as to be longitudinally adjustable. Preferably a pneumatic power-hammer of great speed of movement is employed, H indicating a hole by which the air is introduced to the hammer, and the said hammer being made adjustable in the frame F, as by means of an adjusting-screw I.

J indicates the piston-rod of the hammer, having a head K, and L is a rod or bar through which the blow of the head K of the hammer is transmitted to the outermost of the expanding mandrels E. Of course the rod L may under certain conditions be secured to the hammer; but preferably it is rested against the boss E³ of the outer mandrel and struck by the hammer.

As shown, the train of mandrels E, shown as situated in the pipe, Fig. 1, are of progressively larger diameter, and this is obviously advantageous and under some conditions is practically necessary.

Having now described our invention, what

we claim as new, and desire to secure by Letters Patent, is—

1. An expanding mandrel for unifying the sectional curvature of tubes consisting of two disks each having narrow rounded edges rigidly secured together by a stud.

2. An expanding mandrel for unifying the sectional curvature of tubes consisting of two disks each having narrow rounded edges rigidly secured together by a stud and having on their outer faces central bosses for receiving or transmitting impact-blows.

3. In an apparatus for unifying the sectional curvature of tubes, the combination with means for anchoring the tube in place, of a power-hammer, a frame in which the hammer is adjustably secured, and a series of expanding mandrels adapted, as described, to be driven through the anchored pipe by the repeated impact-blows of the hammer.

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