

Nov. 1, 1927.

1,647,526

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IMPLEMENT FOR SMOOTHING BENT TUBING

Filed Nov. 9, 1926

2 Sheets-Sheet 1

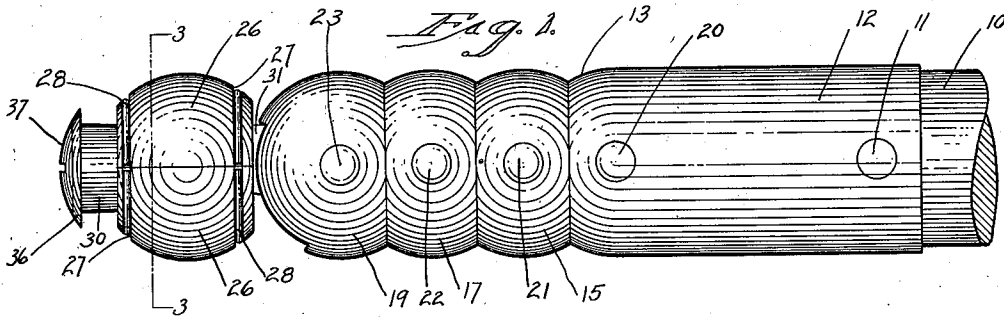


Fig. 2.

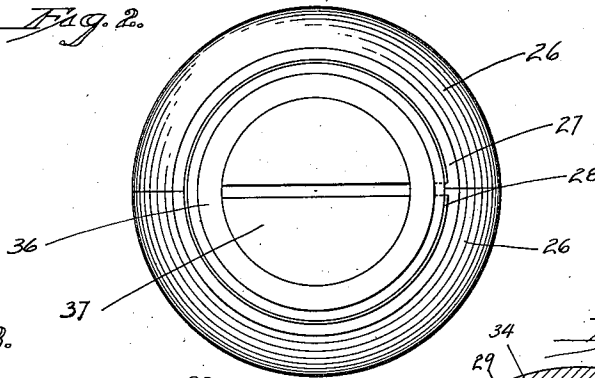


Fig. 3.

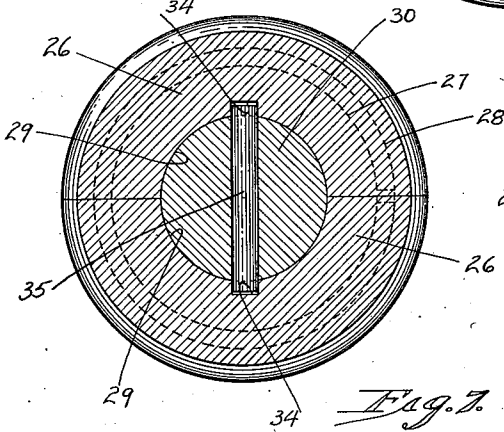


Fig. 4.

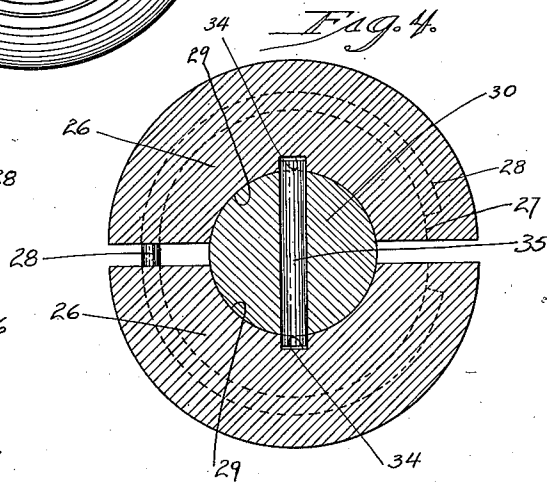
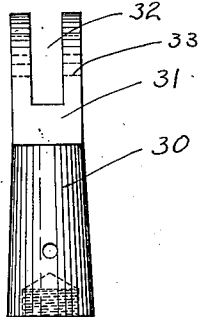


Fig. 5.



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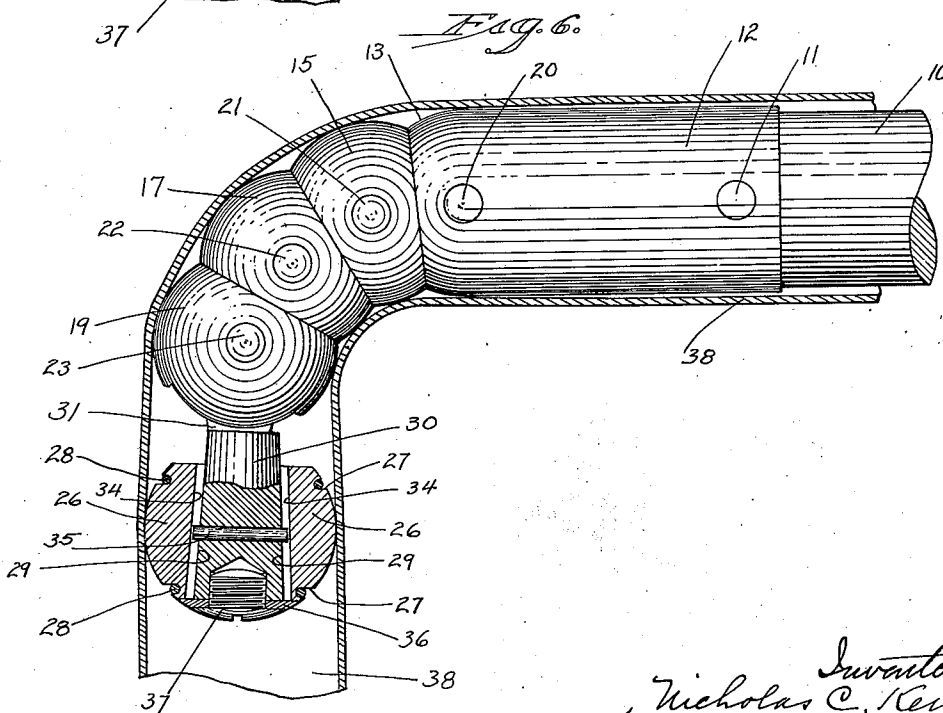
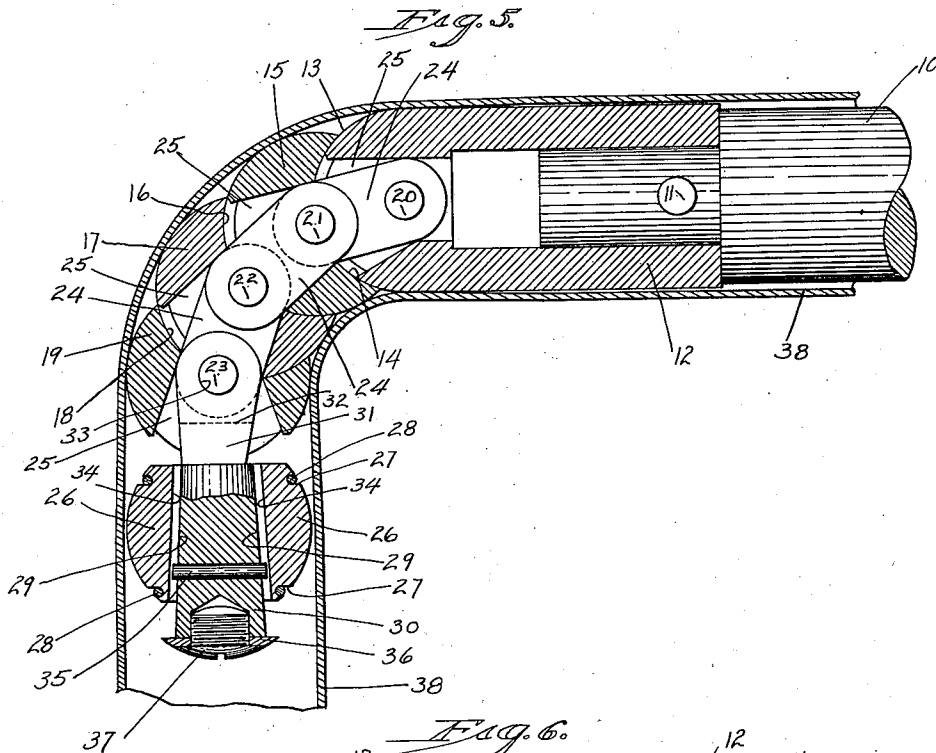
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IMPLEMENT FOR SMOOTHING BENT TUBING

Filed Nov. 9, 1926

2 Sheets-Sheet 2



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1,647,526

UNITED STATES PATENT OFFICE.

NICHOLAS C. KENNEY, OF WATERBURY, CONNECTICUT, ASSIGNOR TO CHASE COMPANIES, INC., OF WATERBURY, CONNECTICUT, A CORPORATION.

IMPLEMENT FOR SMOOTHING BENT TUBING.

Application filed November 9, 1926. Serial No. 147,259.

My invention relates to an implement for smoothing bent tubing, the object being to provide a simple, convenient and effective tool for the purpose indicated.

5 With these ends in view, my invention consists in an implement for smoothing bent tubing, characterized by the addition to the outer end of an articulated mandrel of an expansible, spherically contoured head in
10 such manner that the head will be automatically contracted on moving the mandrel in one direction, and conversely expanded by the movement of the mandrel in the opposite direction, whereby the said head is auto-
15 matically contracted when the implement is inserted into a tube, and automatically expanded therein on beginning to withdraw it therefrom.

My invention further consists in an implement for smoothing bent tubing characterized as above and having certain details of construction as will be hereinafter described and particularly pointed out in the claims.

In the accompanying drawings:

25 Fig. 1 is a view in elevation of a tube-smoothing implement embodying my invention;

Fig. 2 is an end view thereof on an enlarged scale;

30 Fig. 3 is a view thereof in transverse section on the line 3—3 of Fig. 1;

Fig. 4 is a similar view showing the expansible head as expanded;

35 Fig. 5 is a sectional view showing the implement in a tube, preparatory to smoothing the same;

Fig. 6 is a view corresponding to Fig. 5 but showing the flexible mandrel portion of the implement in elevation and its expansible
40 head in section and expanded; and

Fig. 7 is a detached view in elevation of the expanding stud.

In carrying out my invention, I employ an articulated or flexible mandrel of ap-
45 proved construction, consisting, as shown, of a shank 10 secured by a pin 11 to one end of a head 12, the opposite end of which is spherically-contoured, as at 13, to adapt it to enter a correspondingly-contoured recess or
50 cavity 14 in a substantially-spherical mandrel-section 15, which, in turn, enters a contoured-socket 16 in a corresponding, substantially-spherical mandrel-section 17 entering a correspondingly-contoured socket 18
55 in a substantially-spherical mandrel-section

19. The head 12 and the several mandrel-sections 15, 17 and 19 are coupled for articulation by diametric pins 20, 21, 22 and 23, and corresponding links 24 extending between the said pins and housed within the
60 said mandrel-sections, each of which is provided with a chamber 25 for the purpose. The particular construction of the mandrel above described forms no part of my present invention. Of course, it will be understood
65 that the number and type of the several articulated mandrel-sections may be varied as desired.

Given such an articulated mandrel as
70 above described, I provide its outer end with an expansible head consisting, as shown, of two substantially-hemispherical members 26 provided near their ends with circumferential
75 recesses 27 for the reception of spring-clips 28 exerting a constant effort to contract the said members 26. Each of the said
80 members 26 has, upon its inner face, a semi-conical groove 29, together forming a tapering bore fitting over a tapered expanding-stud 30 having a stem 31 entering the cham-
85 ber 25 of the mandrel-section 19 and bifurcated, as at 32, for the reception of the adjacent link 24 and perforated, as at 33, for the reception of the pin 23, whereby the ex-
85 pansible head is articulated with respect to the articulated or flexible mandrel. To prevent the members 26 from rotating with respect to the said stud 30, each is provided upon its inner face with a keyway 34 respec-
90 tively receiving the projecting ends of a pin 35 passing diametrically through the stud. To limit the outward movement of the members 26 with respect to the stud 30, I employ
95 a washer 36, held in place by a screw 37 entering the outer end of the stud, which has limited axial movement with respect to the members 26. For varying the expansion of the head, the screw 37 may be adjusted as required.

As shown in Figs. 5 and 6, the implement
100 is positioned in a bent tube 38.

As ordinarily used, my improved implement is inserted into the tube prior to the bending thereof. The act of inserting it serves to move its expansible head axially in-
105 ward over the conical stud, at which time its two members are drawn together by the spring-clips 28, thus reducing the expansible head to its minimum diameter. Conversely, in withdrawing the mandrel from the bent
110

tube, the members 26 of the head will lag behind, and the tapered stud 30, moving axially with reference to them, will positively expand them, against the tension of the spring-clips 28, to the diameter required to smooth or iron out any departures of the tube from true circular form in cross-section.

It will be understood that this ironing action above described takes place particularly in lines substantially at right angles to the axes of the pins uniting the several articulated sections of the implement, since the bending of the tube results in more or less distortion in the plane in which it is bent.

I claim:

1. An implement for smoothing bent tubes, consisting of an articulated mandrel comprising a plurality of spherically-contoured relatively-movable mandrel-sections and provided at its outer end with a spherically contoured, expansible head automatically contracted on its insertion into a tube and automatically expanded on beginning to be withdrawn therefrom.

2. An implement for smoothing bent tubes, consisting of an articulated mandrel comprising a plurality of spherically-contoured relatively-movable mandrel-sections and provided at its outer end with a spherically-contoured, expansible head automatically contracted on its insertion into a tube and automatically expanded on beginning to be withdrawn therefrom, the said head consisting of a tapered stud located within a plurality of spherically-contoured members, and means for yieldingly drawing the said members together.

3. An implement for smoothing bent tubes, consisting of an articulated mandrel provided at its outer end with a substantially-spherical, expansible head automatically contracted on its insertion into a tube and automatically expanded on beginning to be withdrawn therefrom, the said head consisting of a tapered stud, spherically-contoured members yieldingly held in position

with respect thereto, and adjustable means for limiting the axial movement of the said members with respect to the stud.

4. An implement for smoothing bent tubes, consisting of an articulated mandrel provided at its outer end with a substantially-spherical, expansible head automatically contracted on its insertion into a tube and automatically expanded on beginning to be withdrawn therefrom, the said head consisting of a tapered stud, a plurality of spherically-contoured members applied thereto, having their inner faces conformed to the taper thereof, means for preventing their rotation with respect thereto, and yielding means for drawing them together.

5. An implement for smoothing bent tubes, consisting of an articulated mandrel provided at its outer end with a substantially-spherical, expansible head automatically contracted on its insertion into a tube and automatically expanded on beginning to be withdrawn therefrom, the said head consisting of a tapered stud, spherically-contoured members applied thereto, means for normally drawing them together, and an adjusting-screw mounted in the stud for limiting the axial movement of the said members with respect to the said stud.

6. An implement for smoothing bent tubes, consisting of an articulated mandrel provided at its outer end with a substantially-spherical, expansible head automatically contracted on its insertion into a tube and automatically expanded on beginning to be withdrawn therefrom, the said head consisting of a tapered stud, two substantially-hemispherical members having semi-conical grooves in their inner faces for application thereto, yielding means for drawing them together thereupon, and means for adjusting the relative axial movement of the said members with respect to the said stud.

In testimony whereof, I have signed this specification.

NICHOLAS C. KENNEY.