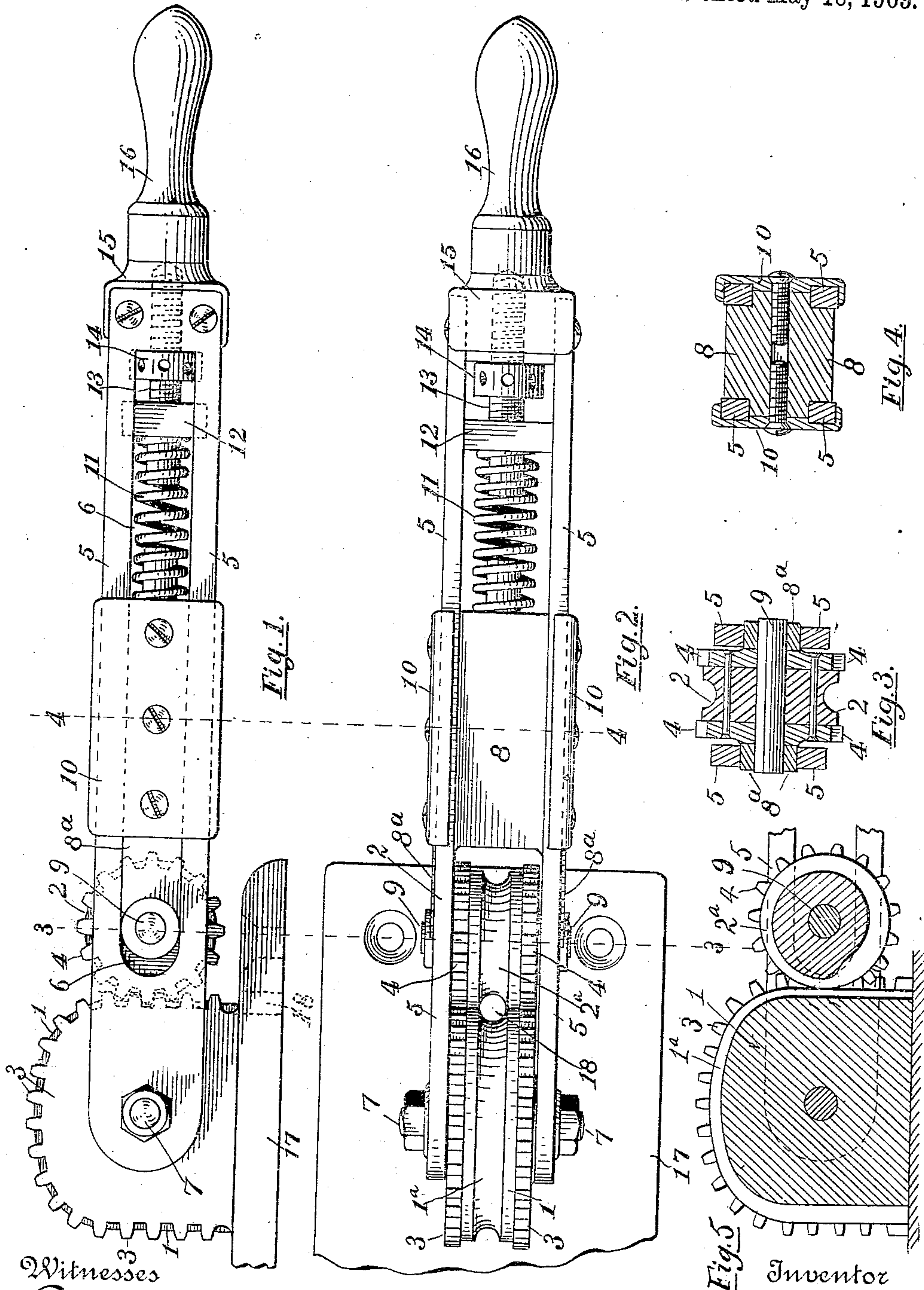


I. S. DEMENT.  
TUBE BENDER.  
APPLICATION FILED AUG. 29, 1906.

921,677.

Patented May 18, 1909.



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# UNITED STATES PATENT OFFICE.

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## TUBE-BENDER.

No. 921,677.

Specification of Letters Patent.

Patented May 18, 1909.

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*To all whom it may concern:*

Be it known that I, ISAAC S. DEMENT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Tube-Benders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in tube bending and forming devices, and more particularly to such devices for bending tubes used in making brass musical wind instruments; and its object is to provide a device on which such tubes may be bent rapidly, uniformly and true; that will not buckle or wrinkle the tubes on the compressed or concave side of the curve; that will permit the bending of such tubes in other curves than true circles, and in various new and useful features, hereinafter more fully described and particularly pointed out in the claims.

My device consists essentially of a stationary form, a rotary die engaging the same, gear teeth on the form and die which mesh to secure any predetermined surface relation of the form and die, a pivoted lever upon which the rotary die is adjustably mounted for actuating the same, and an adjustable tension spring mounted on the lever and adapted to hold the rotary die in engagement with the form, as will more fully appear by reference to the accompanying drawings, in which:

Figure 1. is a side elevation of my improved tube bending and forming device; Fig. 2. a plan view of the same; Fig. 3. a transverse section taken on the line 3—3 of Figs. 1 and 2; and Fig. 4. a transverse section taken on the line 4—4 of Figs. 1 and 2. Fig. 5 is a sectional detail illustrating a modification in the construction.

Like numerals refer to like parts in all of the figures.

1 is a stationary form mounted on a bed plate 17 and having a groove 1<sup>a</sup>, which groove is adapted to receive one-half of the transverse section of the tube to be bent. Attached to each side of the form 1 are plates having gear teeth 3, the pitch line of which corresponds to the outline of the form 1. Centrally located in, and projecting from each side of the form 1, is a stud

7, upon which is pivoted a lever, which consists of sides 5, having a longitudinal slot 6 therein, and a spacing block 15 at the end, to which is attached the operating handle 16. Slidably mounted on this lever is a block 8 having slides 8<sup>a</sup> which traverse the slots 6, and with plates 10 attached to the slides and engaging the sides 5 of the lever.

Fixed in the ends of the slides 8<sup>a</sup> is a pin 9 on which is journaled the rotary die 2 which has a groove 2<sup>a</sup> corresponding in length and cross-section to the groove 1<sup>a</sup>. Attached to each side of the rotary die 2 are pinions 4, which mesh with the gear teeth 3, thus maintaining any predetermined surface relation between the respective grooves of the form and die.

To hold the rotary die 2 in contact with the form 1, a spring 11 is provided which engages the blocks 8 and 12, at its respective ends, and is held in place by a short stud projecting into the coils of the spring from each of these blocks. The tension of this spring may be adjusted by the nut 14 and a screwthreaded stud 13 of the block 12. is an opening in the bed-plate 17 adapted to receive the end of the tube to be bent to hold the same in contact with the groove 1<sup>a</sup> of the form 1.

I can readily and accurately bend and form tapered tubes with my device, by providing tapered grooves in the form and die, which being geared together always retain their respective face relation to each other.

The modification necessary to bend tapered tubes is clearly shown in Fig. 5, wherein the grooves in the form 1 and in the die are tapering.

The operation of my device is as follows: After being prepared in the usual manner, the end of the tube to be bent is forced into the opening formed by the grooves of the form and die, until the end of said tube engages the opening 18 in the bed plate and is held therein against the drawing action of the die, either manually or by any suitable clamp (not shown). The tube to be bent is made a little over the size of the grooves of the form and die, which correspond to the required size and shape of the finished tube, thus when the rotary die is forced longitudinally of the tube and around the form, the tube is slightly reduced in size and caused to assume the shape of the



grooves of the die and form, while it is at the same time bent into the required curve. The action of the spring in bending an irregular curve is such as to apply the extra pressure needed when traversing the points where the shorter bends are being made, and on the straighter portions of the curve the tension of the spring is less.

When the spring has once been adjusted to the proper tension this increase and decrease of pressure in bending the tubes is accomplished automatically.

What I claim is:

1. In a tube bending and forming device, the combination with a stationary form, two levers spaced apart and pivoted to opposite sides of said form, a block slidably mounted on said spaced levers, a rotary die pivoted between said levers, connecting means between said die, and said block, and means carried by the spaced levers for engagement with said block to force the die into co-operative relation with said form.

2. In a tube bending and forming device, the combination with a stationary form, of two levers spaced apart and pivoted to opposite sides of said form and provided with longitudinal slots, a block slidably mounted on said spaced levers, arms carried by said block and extending into said slots, and means carried by the spaced levers for engagement with said block and the arms carried thereby to force the die into coöperative relation with said form.

3. In a tube bending and forming device, the combination of a stationary form, a lever pivoted at one end on said form, a block having extensions forming a yoke slidably mounted on said lever, a rotary die journaled on said extensions and adapted to contact and traverse the form, an adjusting member also mounted on said lever, and a spring between the slidable block and adjusting member, whereby the rotary die is held in contact with the form.

4. In a tube bending and forming device, the combination of a form having gear teeth, a lever pivoted at one end on the form, a block having extensions slidably mounted on the lever, a rotary die journaled on the block and having a pinion which meshes with the gear teeth on the form, a spring in engagement with the block and lever, and adjusting means between the

spring and lever, whereby the pressure between the die and form may be varied.

5. In a tube bending and forming device, a stationary form, spaced levers swinging from said form and with longitudinal slots, arms slidable in said slots, a die mounted for rotation in said arms, and a yieldable means confined between said levers and operating on said arms to support the die yieldable relative to the form.

6. In a tube bending and forming device, a stationary form with a tapering groove, spaced levers swinging from said form and with longitudinal slots, arms slidable in said slots, a die mounted for rotation in said arms and provided with a tapered peripheral groove adapted to co-act with the tapered groove of said form, and yieldable means confined between said levers and operating on said arms.

7. In a tube bending and forming device, a stationary grooved form provided with spaced gears, two levers spaced apart and having pivotal connection with said form, a block slidably mounted on said spaced levers, a rotary die having geared connection with the gears of the form, a connection between the die and block, a yieldable element confined between the levers to force the die toward the form, and means between the yieldable element and the outer ends of said levers to adjust the tension of said yieldable element.

8. In a tube bending and forming device, a base provided with an opening, a stationary form on the base, two levers spaced apart and having pivotal connection with the form, a block slidably mounted on said levers and having extensions, a rotary die journaled in said extensions for coöperation with said form, the form and die being grooved with the opening formed by the meeting grooves of the form and die disposed over the opening in said base for the passage of the tube through the opening formed by the grooves in the form and die and into the opening in the base, and means for placing the die under tension.

In testimony whereof I affix my signature in presence of two witnesses.

ISAAC S. DEMENT.

Witnesses:

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