(No Model.) 3 Sheets—Sheet 1.

J. LAIDLAW.

MACHINE FOR FORMING BARS INTO HELICES.

No. 456,829. Patented July 28, 1891.

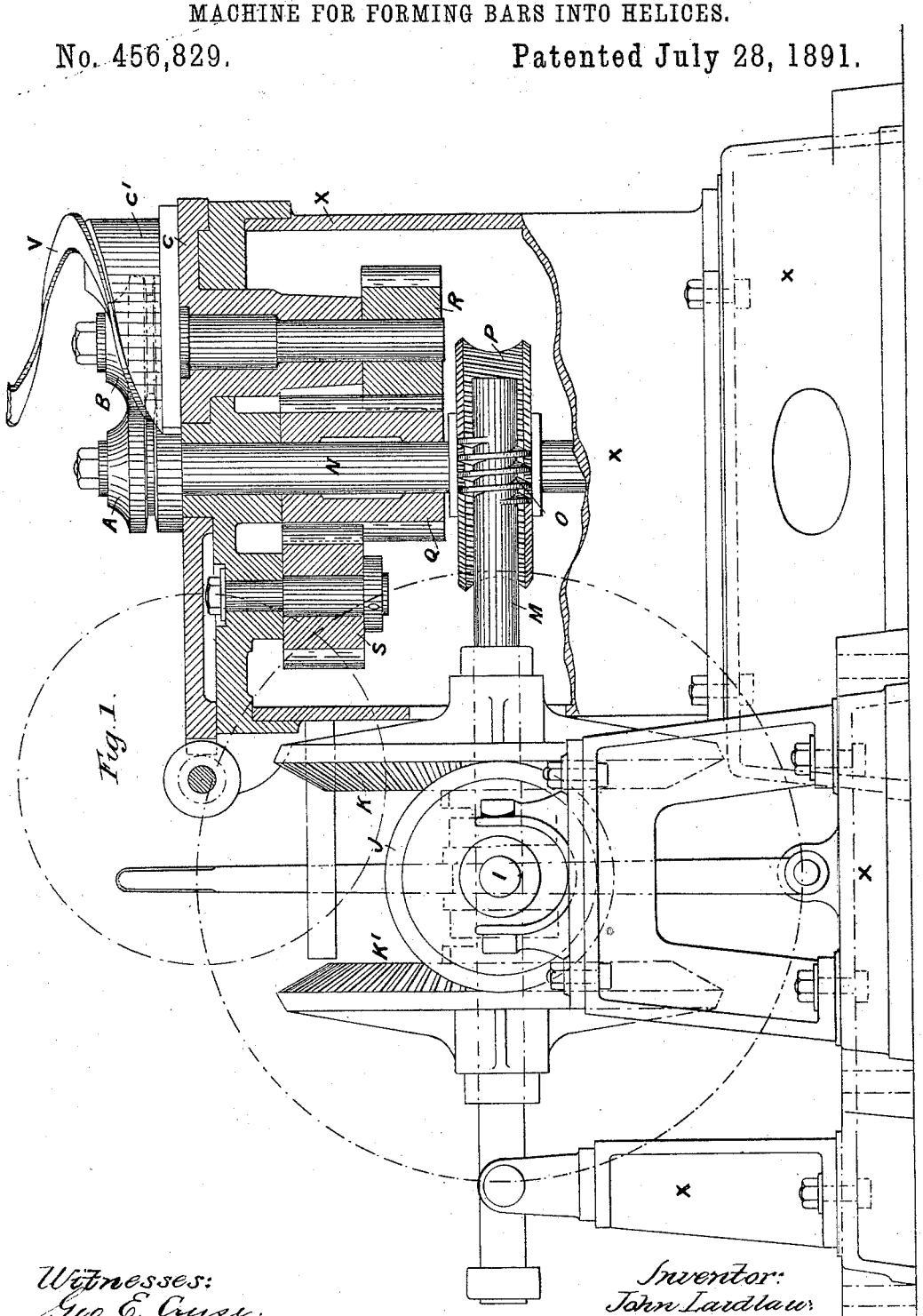

Fig. 1.

Witnesses:
Geo. E. Cuser.
S Cotton

Inventor:
John Laidlaw
By Knight Bros.
Attorneys.

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(No Model.) 3 Sheets—Sheet 2.

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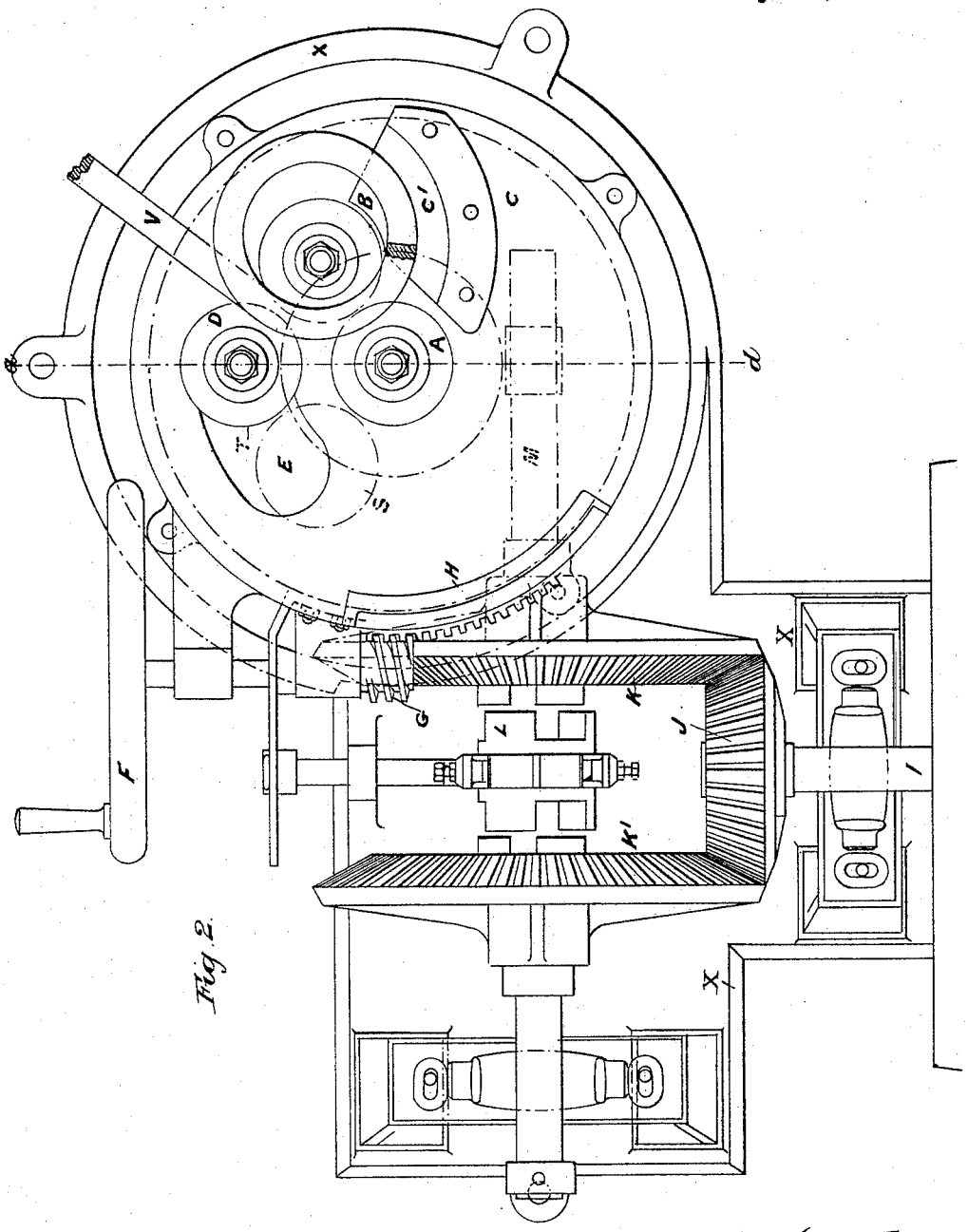

Fig. 2.

Witnesses:
George E. Curve.
S. Cotton

Inventor:
John Laidlaw.
By Knight Bros
Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 3.

J. LAIDLAW.

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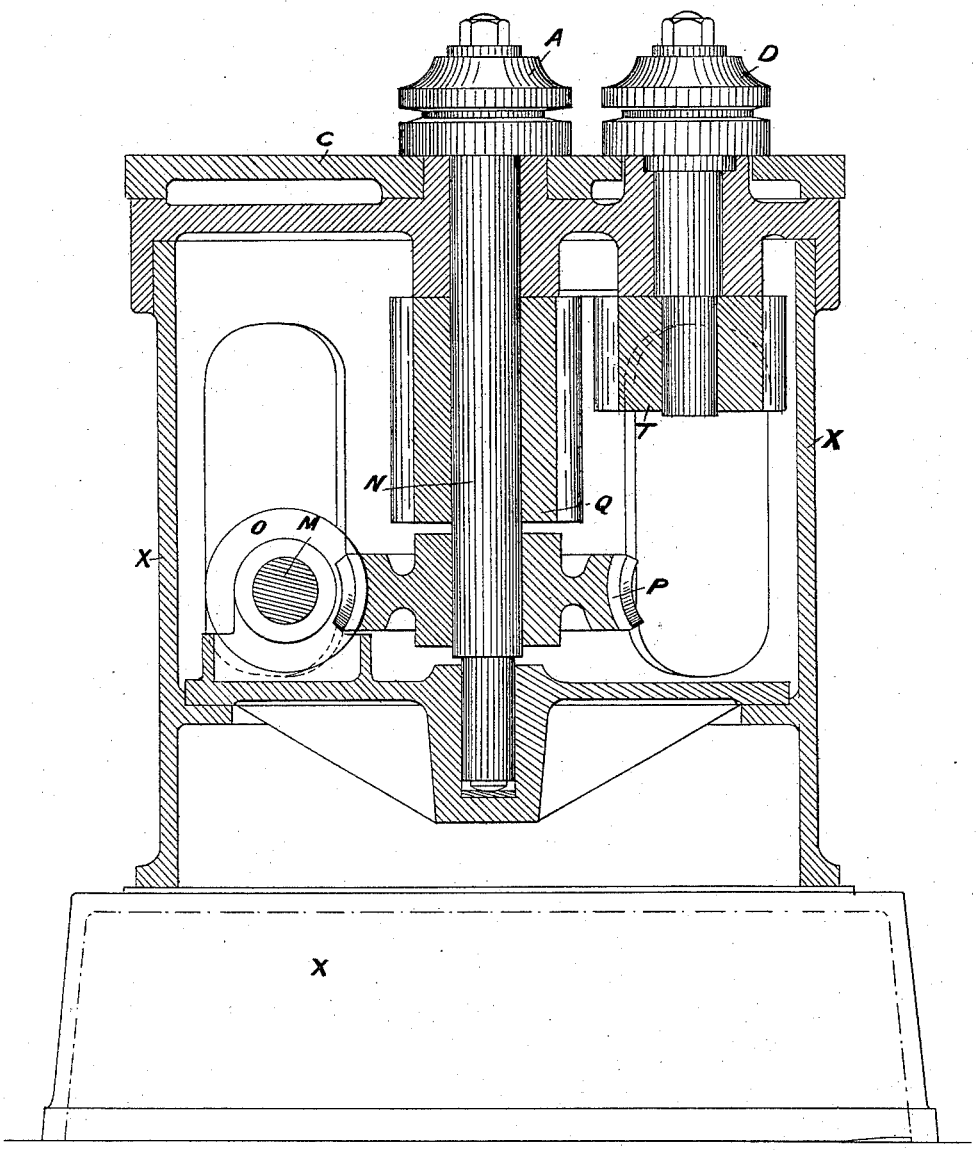
Fig. 3.



Witnesses:
George E. Cruse.
S. Cotton

Inventor:
John Laidlaw.
By Knight Bros.
Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN LAIDLAW, OF GLASGOW, SCOTLAND.

MACHINE FOR FORMING BARS INTO HELICES.

SPECIFICATION forming part of Letters Patent No. 456,829, dated July 28, 1891.

Application filed May 15, 1891. Serial No. 392,866. (No model.)

To all whom it may concern:

Be it known that I, JOHN LAIDLAW, of the firm of Watson, Laidlaw & Co., engineers, of 98 Dundas Street, Kingston, Glasgow, in the counties of Lanark and Renfrew, North Britain, have invented an Improved Machine for Forming Solid Bars into Helices, of which the following is a specification.

This invention relates to a machine for forming solid bars into helices.

In carrying out my invention I employ three or more, but preferably three, rollers. One of the rollers is carried on the end of a shaft. The upper or neck bearing of this roller serves as an axis for a turn-table, which carries one of the rollers at a determined distance from the revolving center of the turn-table. The third roller is carried on a short shaft running in a bearing cast on the frame-work and located immediately underneath the turn-table. There is a circular slot in the turn-table concentric with the first roller to allow this third roller to come into suitable position and at the same time permit of the turn-table being moved round as much as is required. It will be seen that since the axis of the first and the axis of the third roller carried from below the turn-table have fixed centers, the roller carried upon the turn-table may readily be moved into any suitable position relative to the other two rollers to obtain the required curve. Suitable grooves are made in all the rollers to suit the section of the bar to be operated upon. A suitable inclined or wedge-shaped surface is placed so that after the bar has passed through the bending-rollers it is forced over the guiding-roller or wedge to give the required helix.

In the drawings, Figure 1 is an elevation partly broken away and partly in section. Fig. 2 is a plan. Fig. 3 is a transverse section on line *a d*.

The frame-work or stand of the machine is marked X.

A, B, and D are the three rollers. The roller A is carried on a shaft N, the upper or neck bearing of which is in the center of the turn-table C. The roller B is supported on and moves with the turn-table, and is therefore always at a constant distance from the central roller A. The third roller D is carried on an independent shaft, which comes up through the slot E formed in the turn-table. If the turn-table is moved, the distance between the rollers D and B will be increased or diminished, according to the direction of motion. A rack H is formed on the periphery of the turn-table, so that the turn-table, with the roller it carries, may be turned round by means of the hand-wheel F and worm-wheel G. The position of the roller B relatively to the rollers A and D can thus be adjusted to suit the curve into which the bar is to be formed. The rollers are grooved, as shown at Figs. 1 and 3, to suit the section of the bar to be operated upon. A guiding-surface C′, Figs. 1 and 2, is formed upon or fixed to the turn-table in order to set the bar up into the helical form after it passes through the bending-rollers.

The arrangement for actuating the rollers will now be described. The first-motion shaft I carries a bevel-wheel J, which gears with two bevel-wheels K and K′. By throwing the clutch L into gear with one or other of the bevel-wheels K or K′ the second-motion shaft M is caused to turn in either direction. This second-motion shaft M communicates motion to the axis N of the roller A by means of the worm O and worm-wheel P. The axis N carries a tooth-wheel Q, gearing into a tooth-wheel R on the axis of the roller B. The tooth-wheel Q also gears into an intermediate tooth-wheel S, which gears into a tooth-wheel T, attached to the axis of the roller D.

It is necessary that all the rollers should be driven together by gearing and that the surfaces in contact with the bar operated upon should move in the same direction as the bar when passing through.

To bend a bar V with this machine, the table is turned to the proper position, so that the bar, passing from the roller D between the rollers A and B, shall be bent to the required curve. As the bar leaves the rollers it is forced slightly upward over the inclined surface C′, so as to obtain the required helix.

Having thus fully described the nature of my invention and the manner of carrying the same into practice, the following is what I claim as new therein and desire to secure by Letters Patent—

1. The herein-described machine for forming bars into helices, consisting of two rollers

whose axes are fixed relatively to one another, a turn-table mounted upon the axis of one of said rollers and provided with a concentric slot in which the axis of the other roller operates, another roller mounted upon and movable with the turn-table, and suitable means for driving said rollers and moving the turn-table, substantially as set forth.

2. The hereinbefore-described machine for forming bars into helices, consisting of two rollers whose axes are fixed relatively to one another, and a third roller carried on and movable with a turn-table, the axis of one of the rollers being in the center of this turn-table, with an inclined wedge or guiding-surface attached to the turn-table, the three rollers being driven together by gearing, substantially as described, and illustrated on the accompany drawings.

3. The herein-described machine for forming bars into helices, consisting of a central roller A, mounted upon the shaft N, which is provided near its lower end with a tooth-wheel Q, a turn-table C, mounted concentric with the shaft N and provided with a concentric slot E, a roller D, mounted upon a suitable shaft supported in a fixed bearing in the frame-work and extending through the slot E and gearing at its lower end with the tooth-wheel Q through suitable gearing, a roller B, mounted upon the turn-table C and gearing with the tooth-wheel Q, an inclined guiding-surface C′, also mounted upon the turn-table C, means for revolving the shaft N, and means for moving the turn-table C, substantially as set forth.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.

JOHN LAIDLAW.

Witnesses:
JOHN LIDDLE,
ARTHUR HARTLEY YUILE,
Both of 154 *St. Vincent Street, Glasgow.*