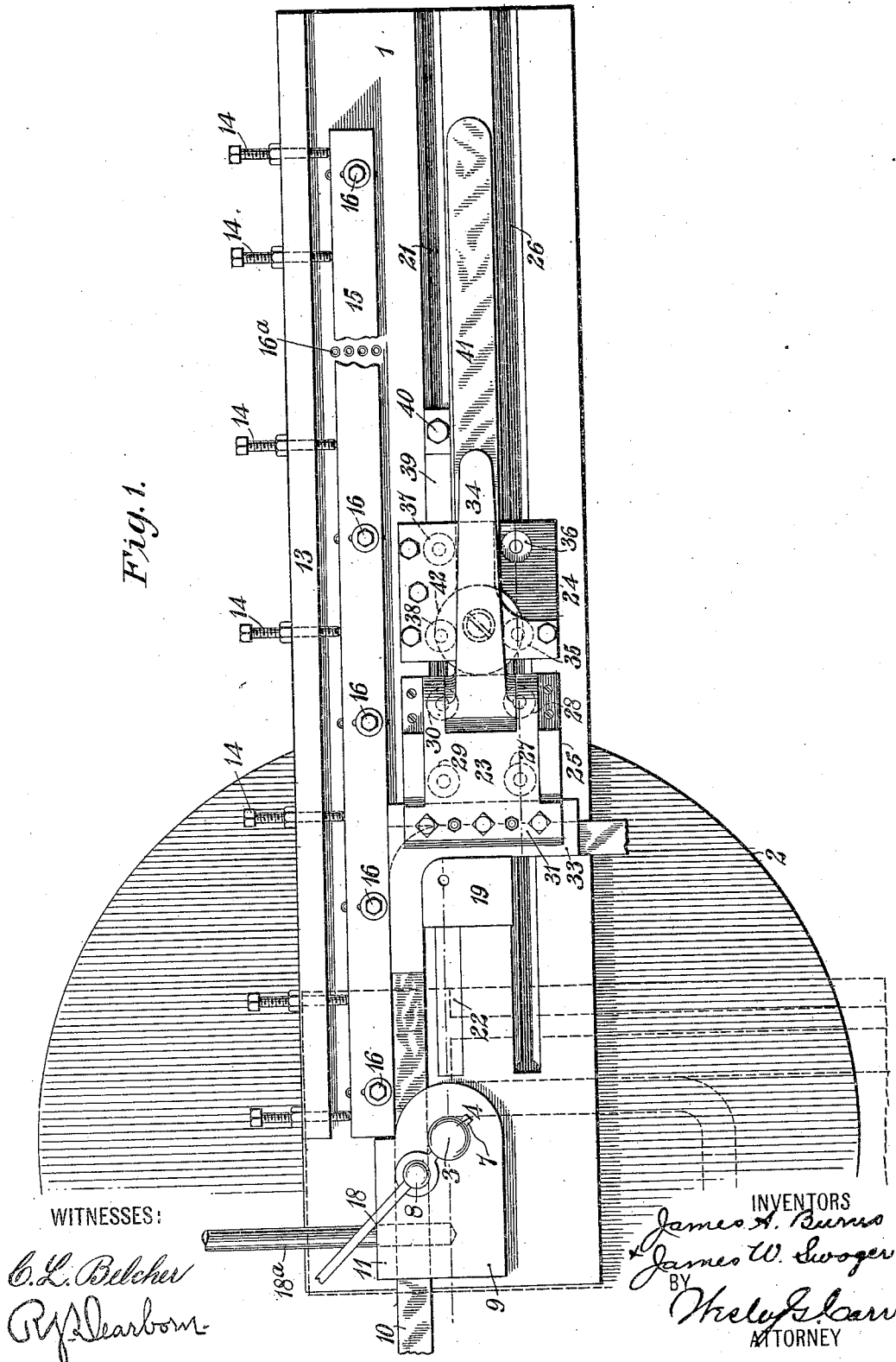


959,452.

2 SHEETS—SHEET 1.

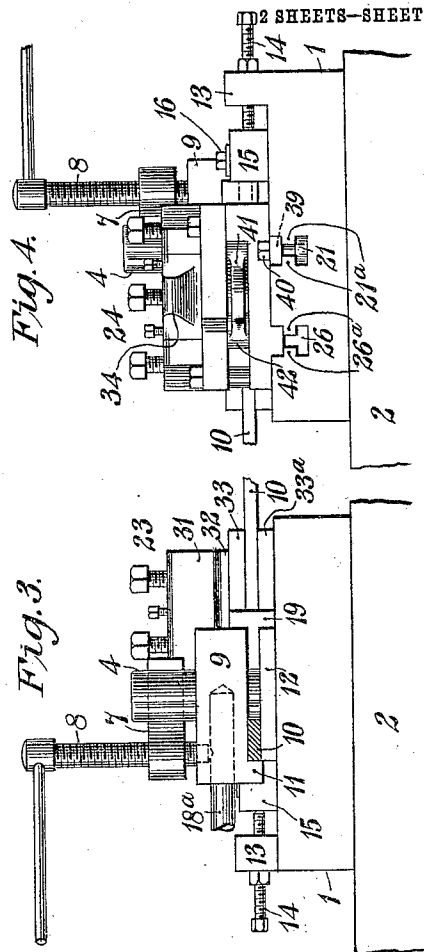
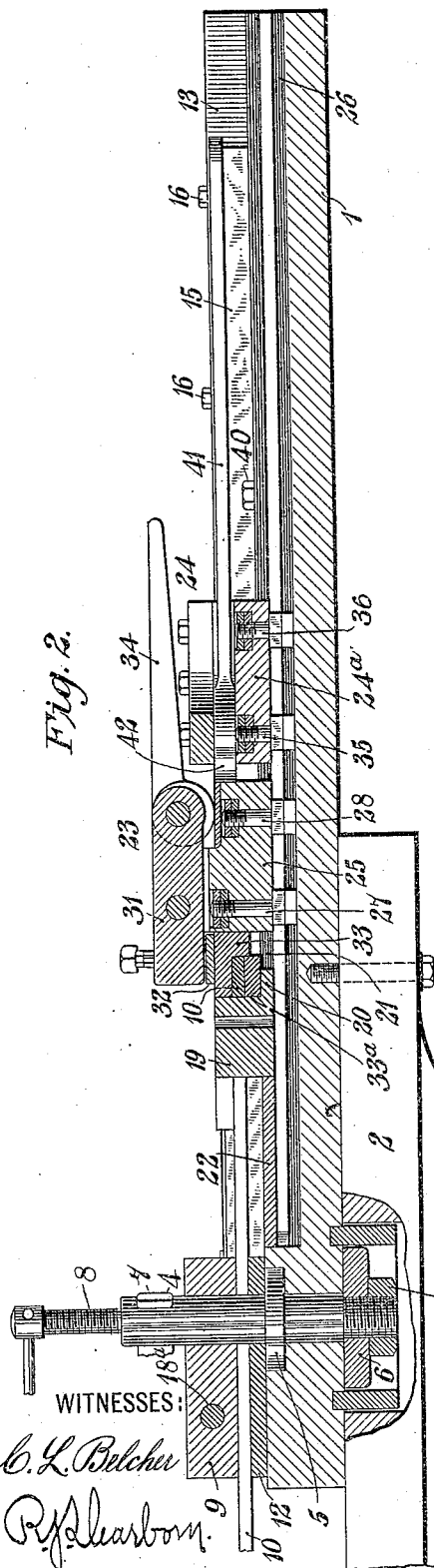
Fig. 1.



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2 SHEETS—SHEET 2.



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COIL-BENDING MACHINERY.

959,452.

Specification of Letters Patent.

Patented May 31, 1910.

Application filed July 3, 1905. Serial No. 268,264.

To all whom it may concern:

Be it known that we, JAMES A. BURNS and JAMES W. SWOGER, citizens of the United States, and residents, respectively, of Homestead and of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Coil-Bending Machinery, of which the following is a specification.

Our invention relates to machines for bending metallic strap and it has for its object to provide a means for securely holding the strap in position during the bending operation, that shall be simple and durable in construction and that may be readily released and reclamped.

Heavy copper strap is used to a great extent for series field magnet windings on large direct current electrical machines and for other similar windings for carrying large currents, the bending of which has heretofore involved much difficulty and labor that may be avoided by the use of our invention.

The bending machine which embodies our invention is specially advantageous in that it may be adjusted to various sizes of strap and to coils of various dimensions, and is provided with clamping devices which may be readily operated without changing the setting for the machine as each successive bend is made in the coil, thereby materially facilitating the process of manufacture.

Our invention is illustrated in the accompanying drawings in which—

Figure 1 is a plan view of an assembled machine embodying our invention. Fig. 2 is an elevation of the machine showing the bed plate in cross-section through the clamping devices and through the center line of the bender pin. Fig. 3 is an end elevation of the machine above the table and Fig. 4 is a similar elevation of the opposite end from that shown in Fig. 3.

Referring to the drawings, one end of a rectangular clamping bed plate 1 is rigidly fastened to a rotatable round table 2 which is mounted upon a base 17 and may be rotated by power from any desired source, suitable gearing 17^a being utilized for applying the power. A bender pin 4, is provided with a collar or flange 5 that is fitted into a recess in bed plate 1 at its center of revolution, so that the plate 1 may turn freely in

a horizontal plane around the bender pin 4 as an axis. A collar 6 is fastened to the bender pin 4 by a nut 6^a that is threaded upon the lower end of the pin 4 to hold it in position. The pin 4 is provided with a key 7 that is tapped to receive a set screw 8 which operates vertically to exert downward pressure upon a bender block 9, the said block being drilled to fit the bender pin 4 and rounded at one end concentrically with said pin. The radial distance from the adjacent side of the pin 4 to the rounded end of the block 9 corresponds to the width of the strap 10 to be bent. Beneath the block 9 is a plate 12 of similar shape except that it has a projection 11 at one side which engages the strap 10 to hold it against the bender pin 4 and which drops behind the plate when the strap is removed.

To accommodate different sizes of strap, a number of bender blocks 9 and corresponding plates 12 may be provided and each block may have its own bender pin, if desired. The bed plate 1 is provided with a flange 13 at one side, in which set screws 14 are inserted at frequent intervals to act as back supports for a bar 15, which is bolted by cap screws 16 to the bed plate 1 and extends from the end of the flange 11 on the block 9 to a point near the outer end of the bed plate 1. The bed plate 1 is provided with sets of holes 16^a for the screws 16 so that the distance of the bar 15 from the flange 13 may be kept constant throughout its length but may be varied to suit the width of the strap 10. The bender block 9 has a hole 18 drilled in its side to receive a rod 18^a, the outer end of which may engage a stationary part in order to keep the block 9 from turning as the table 2 is rotated.

After the first bend has been made in the strap 10 by moving the table 2 through an arc of 90°, the strap is removed and the table is returned to its original position. The corner already formed is then clamped at the desired distance from the bender pin 4 by means of a spacing strip 22, a corner block 19 which is provided with a projection 20 to enter a groove 21 in the bed plate 1, and a plurality of clamps 23 and 24. The groove 21 in the bed plate 1 is partially divided, by side projections 21^a, into an outer portion and an inner portion and the bed plate is provided with another similar

groove 26 that is partially divided by like projections 26^a.

The clamp 23 comprises a base block 25 which is provided with projections that enter the outer portions of the grooves 21 and 26 and is fastened to the bed plate by a plurality of bolts 27, 28, 29 and 30, the bolt heads being located in the inner portions of the grooves beneath the projections 21^a and 26^a in order to permit a sliding motion of the base block along the table and prevent the block from being lifted away from the table. The clamp also comprises a plate 31 which is hinge-connected to the base block, and is provided with an adjustable clamping plate 32. When the bent strap 10 is in position around the corner block 19, with a corner plate 33 above it and another corner plate 33^a below it, the front end of the hinged plate 31 is forced down against the clamping plate 32 by means of the lever 34, the front end of which is of eccentric or cam shape and is pivoted to the rear end of the plate and bears against the block 25.

The clamp 24 comprises a block 24^a that is similarly attached to the bed plate 1 by a plurality of bolts 35, 36, 37 and 38 and is moved into engagement with the clamp 23 and held in that position by a strip 39 and a bolt 40. A lever 41 is provided with an eccentric head or cam 42 and is attached to the block 24^a to act in a plane parallel to the bed plate to force the clamp 23 against the corner plate 33 and rigidly clamp the spacing strip 22, the corner block 19, the strap 10, the corner plate 33 and the blocks 25 and 24^a between the spacing strip 39 and the inner end of the groove 21.

The principal advantage of the clamps 23 and 24 lies in the fact that the spacing strips may be set at the proper distance for a certain size of coil and then, by means of the two levers 34 and 41, the strap may be readily loosened and reclamped without disturbing the spacing strips, thereby materially facilitating the formation of a coil in which the number of turns is often relatively large.

Although we have shown and described a machine comprising a specific arrangement of parts as a means to an end, we desire it to be understood that all variations of size and form which do not differ materially in mode of operation or result are to be included within the scope of our invention.

We claim as our invention:

1. The combination with a table, of a block movably mounted thereon and provided with means for clamping a body against the table, and a second block adjustably clamped to the table and provided with a lever-operated cam to engage one end of the first block.

2. The combination with a table and a block mounted thereon and adjustable along

the face thereof, of a plate pivotally mounted upon said block with its pivotal axis parallel to the table and projecting beyond one end of said block, of a lever-operated cam to turn said plate upon its axis and force its projecting end toward the table.

3. The combination with a table and a block adjustably clamped thereto and provided with a lever-operated cam having its axis parallel to the table, of a movable block one end of which is engaged by said cam.

4. A clamping device comprising a base block, a member pivotally mounted thereon and provided with a clamping plate, a lever-operated cam for actuating said member to exert a downward pressure, a second block, a rotatably mounted eccentric head and a handle lever for turning said head to exert horizontal pressure against the first block.

5. The combination with a slotted plane table, of a plurality of blocks having means to engage the slots in said table, a hinged plate mounted upon one of said blocks to exert a downward pressure, a lever-operated cam to actuate said plate, and a lever-operated cam mounted upon the other block to exert longitudinal pressure against the first block.

6. In a coil bending machine, the combination with a base, a rotatable table mounted thereon, and an independently rotatable bender pin concentric with the axis of rotation of said table, of means for clamping a metal strap on said table, and a stationary guide that holds said strap against said bender pin.

7. In a coil bending machine, the combination with a rotatable table having a plurality of slots, and an independently rotatable bender pin concentric with the axis of rotation of said table, of a clamping device provided with a series of projections to engage said slots and comprising a base block, a clamping member pivotally mounted on said block and a lever-operated cam for actuating said clamping member.

8. In a coil bending machine, the combination with a rotatable table, a stationary supporting base therefor, an independently rotatable bender pin concentric with the axis of rotation of said table, and a guide block that is held stationary by a retaining rod to engage said bender pin, of a plurality of clamps which engage slots in said table.

9. In a coil bending machine, the combination with a rotatable table, a stationary supporting base therefor, an independently rotatable bender pin concentric with the axis of rotation of said table, and a stationary guide block that engages said bender pin, of a plurality of clamps which engage slots in said table and a corner spacing block which also engages said slots and may be fixed at any convenient distance from said bender pin by said clamping devices.

10. In a coil bending machine, the combination with a rotatable table, a stationary supporting base therefor, an independently rotatable bender pin concentric with the
5 axis of rotation of said table, and a guide block that is held stationary by a retaining rod to engage said bender pin, of a clamp comprising a base block, a hinged plate and an eccentric lever for actuating said plate to
10 exert a downward pressure, a second base block, a rotatably mounted eccentric head and a handle lever for operating said head to exert horizontal pressure against the first block.

In testimony whereof, I have hereunto 15
subscribed my name this 20th day of June,
1905.

JAMES A. BURNS.

Witnesses:

W. I. REICH,
J. W. McMINN.

In testimony whereof, I have hereunto
subscribed my name this 23rd day of June,
1905.

JAMES W. SWOGER.

Witnesses:

WESLEY G. CARR,
R. J. DEARBORN.