

(No Model.)

2 Sheets—Sheet 1.

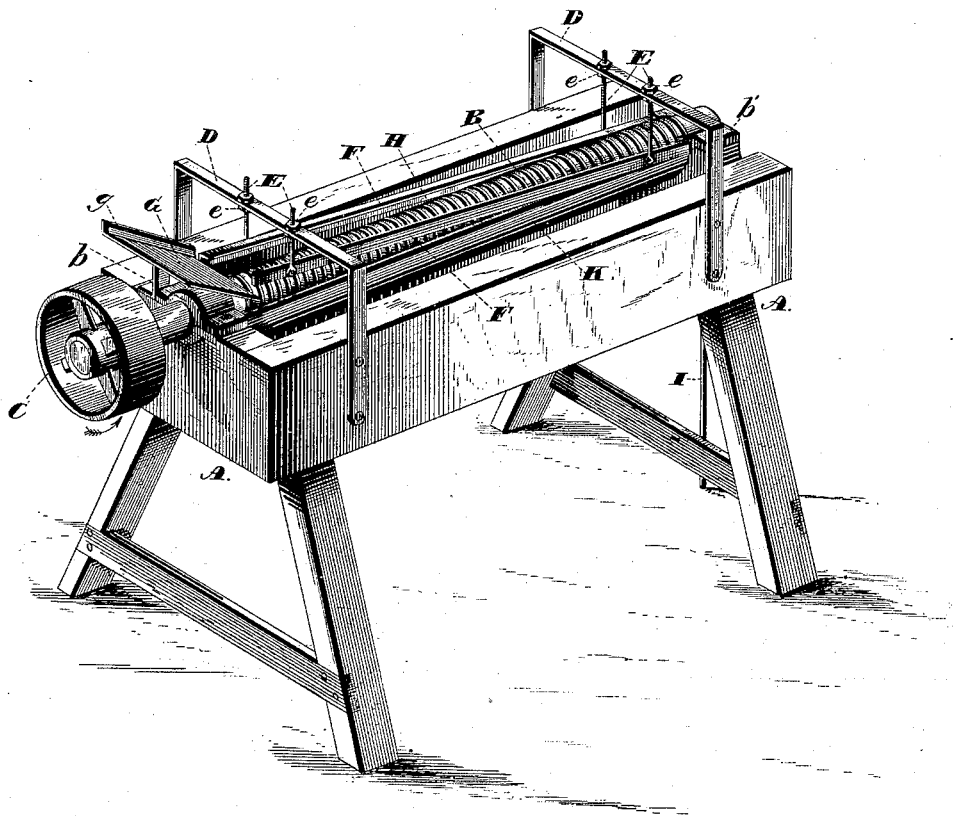
C. B. HOPKINS

MACHINE FOR BENDING PIPE STEMS, &c.

No. 344,739.

Patented June 29, 1886.

Fig. 1.



Witnesses:
Chas. J. Williamson.
Henry C. Hazard.

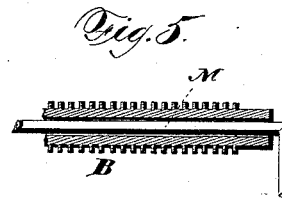
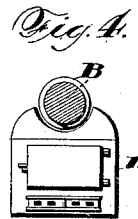
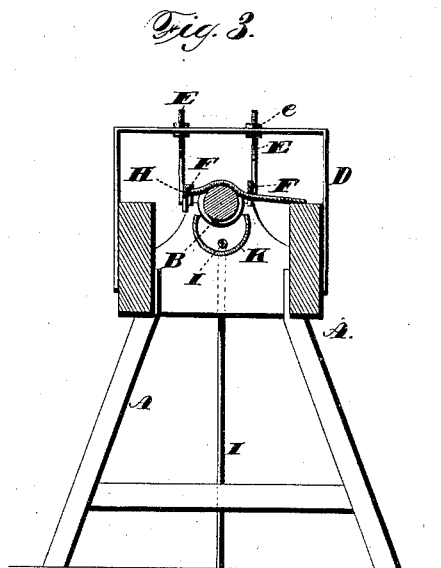
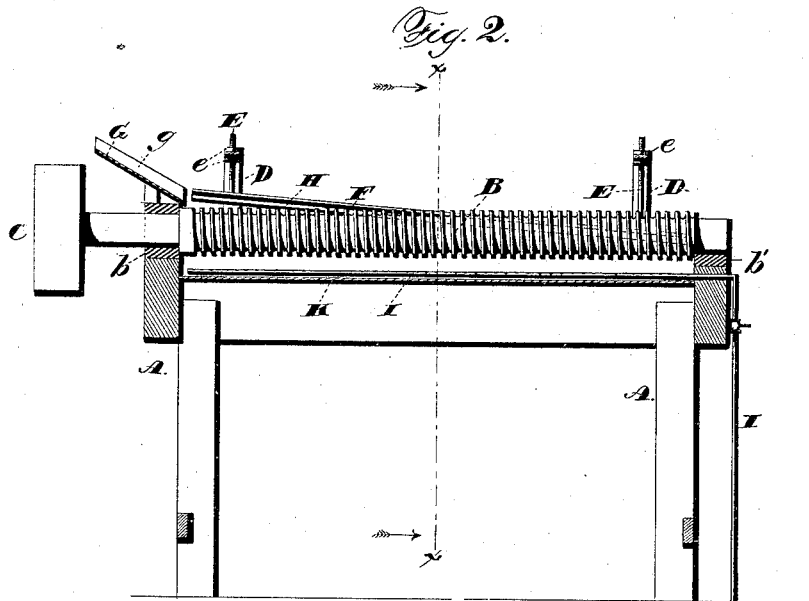
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UNITED STATES PATENT OFFICE.

CABEL B. HOPKINS, OF LOUISVILLE, KENTUCKY.

MACHINE FOR BENDING PIPE-STEMS, &c.

SPECIFICATION forming part of Letters Patent No. 344,739, dated June 29, 1886.

Application filed November 5, 1885. Serial No. 181,943. (No model.)

To all whom it may concern:

Be it known that I, CABEL B. HOPKINS, of Louisville, in the county of Jefferson, and in the State of Kentucky, have invented certain new and useful Improvements in Machines for Bending; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 shows a perspective view of my machine; Fig. 2, a longitudinal section of the same; Fig. 3, a transverse section of the same on line *x x* of Fig. 2; Fig. 4, a detail view in elevation of a modified form of heater, and Fig. 5 a detail view in side elevation of a modified form of screw and heating device.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention is to provide a machine for bending pipe-stems, adapted also for bending rods, tubes, or bars of wood, metal, or other material; and to this end it consists in the machine and the construction, arrangement, and combination of the parts thereof, as hereinafter specified.

In the drawings, A designates the frame of the machine, which can be of any desired shape, construction, and material. Journaled in bearings at each end of the frame are the plane ends of screw B. At one end—which I call the “front” end—beyond the bearing, the screw shank or shaft is provided with a band-pulley, C, as shown in the drawings, or with a gear-wheel, by which the screw is to be driven from any desired source of power. If desired, a crank could, of course, be placed on the shaft and the screw could then be rotated by hand.

The bearing *b* for the screw-shaft at the front end of the screw is preferably made in the usual form of a full journal-bearing surrounding the shaft, while the other bearing, *b'*, at the rear end of the screw, is simply a half-bearing, as shown, in which the screw-shaft rests. If desired, however, I contemplate making this bearing a full one, also, like the other, as described and shown.

The pulley C and screw are to be driven in the direction indicated by the arrow in Fig. 1, when the screw is, like the one shown, a right-hand one. The grooves between the threads of the screw, where the machine is to be used

to bend pipe-stems, are preferably made, as shown in Fig. 2, with their bottoms or inner portions rounded.

Where square rods, tubes, or bars are to be bent, the grooves are to be correspondingly shaped, as shown in Fig. 5, so that said rods, tubes, or bars will have as much of their surfaces in contact with the sides and bottoms of the grooves as possible.

Attached at each end to one side of the frame or bed A are the frames D D, extending across the machine above the screw and near the ends of the machine. Passing up through suitable holes in the horizontal transverse portions of these frames are the screw-threaded rods E E, two for each frame, carrying at their lower ends the bending-bars F F, situated on opposite sides of the screw in vertical planes, substantially parallel to the axis of the screw. On the threaded rods above and below the horizontal portion of frames D D are nuts *e e*, by which the rods can be adjusted vertically and fastened at any desired adjustment. As shown in the drawings, this adjustment is so made that the front ends of the bending-bars F F are above the level of the upper side of the screw, and the bars incline downward on each side of the screw from the front to the rear ends, so that the latter ends are considerably below the level of the top of the screw. The angle of this incline can easily be changed and adjusted by relative adjustment of the rods supporting the opposite ends of the bars.

At the front end of the machine is an inclined feed-table, G, with a guide rib or flange, *g*, at the left side thereof, against which the ends of the stems abut as the latter are placed on the table and moved down over the same under the ends of the bending-bars onto the screw, where each stem is received and engaged by a groove of the screw. By the rotation of the latter in the direction set forth, the stems lying across the screw will then be carried along toward the outer or rear end of the machine, and will be bent gradually more and more as they move along, as the bending-bars which hold them down on opposite sides of the screw descend lower and lower. The outer ends of the bars are set low enough to give the stems the proper amount of bend, so that as the stems reach the end of the screw

they can be discharged or removed from the machine properly bent.

To keep the stems from being carried lengthwise over to one side of the screw, I provide the bending-bar, which is on the side toward which the stems tend to be carried by the rotation of the screw, with a longitudinal flange, H, against which the ends of the stems bear as the stems are carried along the screw, as shown best in Fig. 3. For convenience, the bar is made of angle-iron, as shown, with the horizontal part of the angle adapted to engage the upper sides of the stems and the vertical part to engage their ends.

In bending stems and tubes, rods, or bars of wood it is desirable to heat the screw so that said stems, tubes, rods, or bars will be heated quite hot as they are moved along. They will, then, as is well known, best receive and retain the bend given. I therefore provide longitudinally under the screw a gas-pipe, I, perforated on its upper side so as to give a series of jets along under the screw. To confine the heat from these jets and direct it against the screw, I employ the U-shaped shield or hood K, as shown best in Fig. 3. If desired, I can heat the screw by means of a furnace, L, provided with a closed concave top, partially embracing the screw, as shown in Fig. 4.

In Fig. 5 I show the screw as made hollow, to be heated from within by means of the steam-pipe M, which is to pass entirely through the screw and preferably out through the bearing portions of the screw-shaft, so that a thorough circulation of steam, superheated if desired, can be kept up through the pipe. The grooves between the threads in this screw are shown as shaped so as to adapt the screw for best use in connection with rods, tubes, or bars square or rectangular in cross-section.

With the gas-jet form of heater, as shown in Figs. 1, 2, and 3, and described hereinbefore, I find that the screw and the stems are heated sufficiently to cause the latter to retain the bends given them, even when the machine works very rapidly and the stems are carried along through the machine continuously.

Obviously the threads on the screw and the grooves between the same can be, as indicated hereinbefore, shaped to suit rods, bars, or tubes of any shape in cross section.

Where the screw is to be heated by steam, the steam-pipe need not extend through the screw, for, if desired, the pipes for supplying the steam can be connected with the ends of the hollow screw by couplings allowing rotation of the latter. If desired, heated air or the heated products of combustion from a fire or furnace can be thus conducted into and through the screw.

If desired, the guide-bars could be made stationary and horizontal and the screw be supported in adjustable bearings, so that its angle with relation to the plane of the lower edges of the bars could be adjusted as desired. This would be a mere reversal of my construc-

tion, not involving departure from my invention, as shown and described.

I am aware that in wood ornamenting and charring machines it is old to heat the ornamenting or charring rolls or cylinders in various ways, and I therefore do not claim or intend to cover by my claims such a construction.

Having thus described my invention, what I claim is—

1. In a bending-machine having a suitable supporting-frame for its parts, the rotary screw, in combination with inclined guides on each side of the screw, substantially as and for the purpose described.

2. In a bending-machine having a suitable supporting-frame for its parts, in combination with the rotary screw adapted to engage and carry along the stems or bars to be bent as it rotates, means, substantially as described, adapted to engage said stems or bars on opposite sides of the screw and carry the portions so engaged lower and lower as the stems or bars are carried along by the screw, substantially as and for the purpose described.

3. In a bending-machine having a suitable supporting-frame for its parts, in combination with the rotary screw, the bending-bars on opposite sides of the screw inclined with reference to the plane of the upper side of the screw, substantially as and for the purpose described.

4. In a bending-machine having a suitable supporting-frame for its parts, in combination with the rotary screw and the inclined bars on each side thereof for engaging the upper side of the article to be bent as it is carried along by the screw, a guide adapted to engage the end of the article so as to prevent it being carried off to one side of the screw, substantially as and for the purpose described.

5. In a bending-machine having a suitable supporting-frame for its parts, in combination with the rotary screw adapted to receive the stem or rod to be bent in the groove between its threads, the inclined bending-bars on opposite sides of the screw, and a guide rib or flange on one of the bars adapted to engage the end of the stem or bar, substantially as and for the purpose described.

6. In a bending-machine having a suitable supporting-frame for its parts, in combination with the rotary screw, the adjustable inclined bending-bars on each side of the screw, substantially as and for the purpose described.

7. In combination with the rotary screw supported in suitable bearings, the frames above the screw near its ends, the bending-bars on each side of the screw, the threaded rods attached to the bars and extending up through the frames, and nuts on the rods, substantially as and for the purpose described.

8. In a bending-machine having a suitable supporting-frame for its parts, in combination with the rotary screw, the inclined bending-bar on one side of the same adapted to engage the upper side of the stem or other article to

be bent, and the inclined bending-bar on the other side of the screw, made of angle-iron, having a portion to engage the top of the stem and a portion to engage its end, substantially as and for the purpose described.

9. In a bending-machine having a suitable supporting-frame for its parts, in combination with the rotary screw, the gas-tube below the same perforated so as to give a series of jets along under the screw, substantially as and for the purpose described.

10. In a bending-machine having a suitable supporting-frame for its parts, in combination with the rotary screw, a heating device for heating the screw arranged longitudinally with reference to the same, all substantially as and for the purpose described.

11. In a bending-machine having a suitable supporting-frame for its parts, in combination with the screw, and the gas-pipe below the same adapted to furnish a series of gas-jets,

the concave hood inclosing the jets and the lower portion of the screw, substantially as and for the purpose described.

12. In a bending-machine having a suitable supporting-frame for its parts, in combination with the screw adapted to receive the stem or rod to be bent in the groove between its threads so as to carry it along as the screw revolves, the bending-bars on each side of the screw inclined with reference to the plane of the upper side of the screw, a guide to engage one end of the stem or rod, and means, substantially as described, for heating the screw.

In testimony that I claim the foregoing I have hereunto set my hand this 27th day of October, A. D. 1885.

CABEL B. HOPKINS.

Witnesses:

JAS. E. HUTCHINSON,
HENRY C. HAZARD.