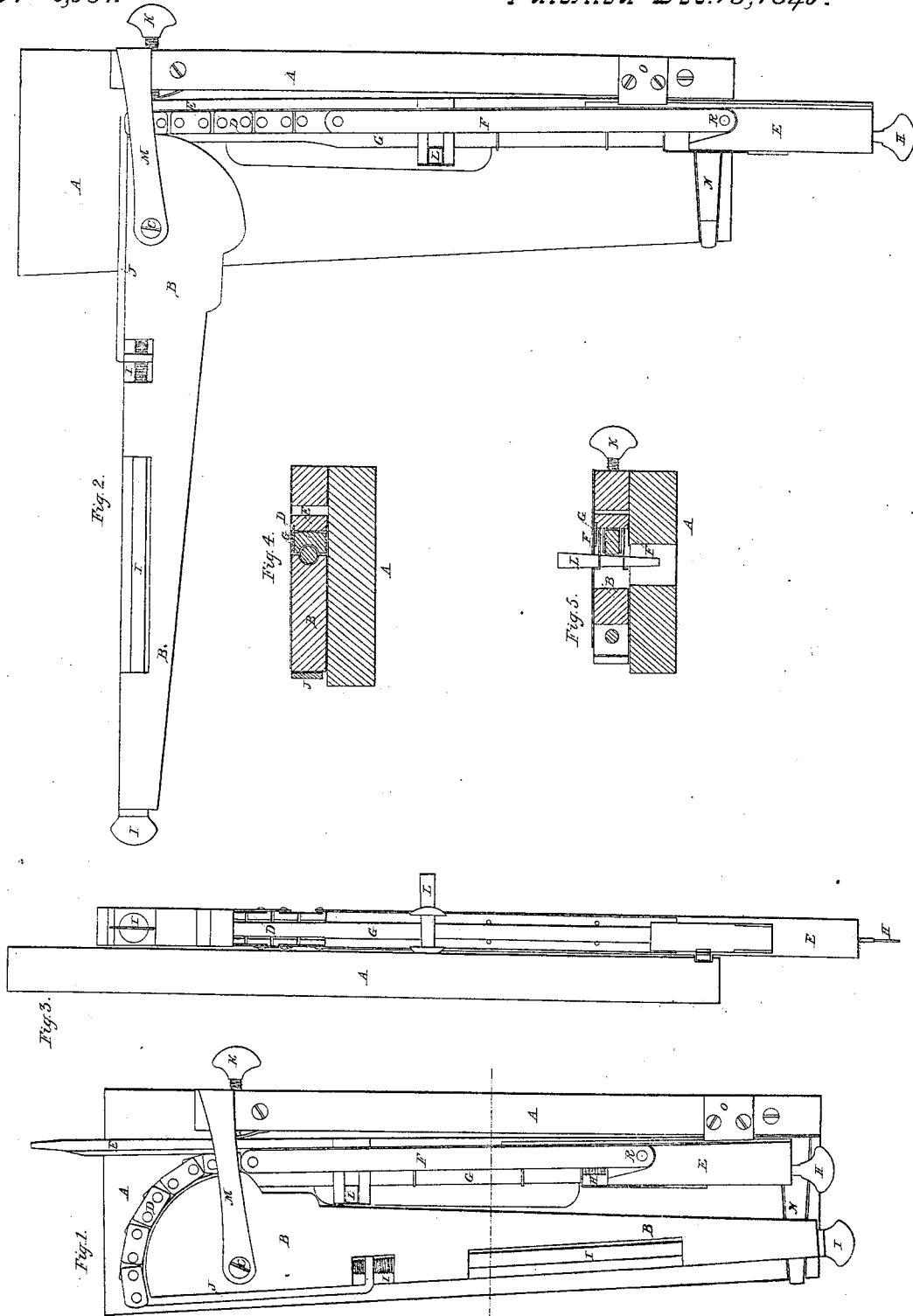


T. Blanchard, Bending Wood.

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UNITED STATES PATENT OFFICE.

THOMAS BLANCHARD, OF BOSTON, MASSACHUSETTS.

BENDING WOOD.

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To all whom it may concern:

Be it known that I, THOMAS BLANCHARD, of the city of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement, being a Method of Bending Timber and other Fibrous Substances; and I do hereby declare that the following specification and drawing making part of the same is a full description of my new mode or method of accomplishing the said object, which I have exemplified in one form of machinery for bending plow-handles. Other articles will require different forms and different arrangements of machinery.

Figure 1 is a top view of the machine, with the mold lever brought home to its place after the operation of bending is completed. Fig. 2 is a top view with the mold lever thrown open to receive the timber for the operation. Fig. 3 is a sectional side view of the sliding beam E and bench A. Fig. 4 is a transverse section and end view of Fig. 1. Fig. 5 is another transverse end view section of Fig. 1.

The same letters apply to all the figures.

A A is the bed piece or bench on which the machine is formed and may be made of wood or metal.

B is the mold that gives the curve to the inside of the handle turning on a pin or fulcrum C the other end extending back of sufficient length to form a lever of sufficient power to bend the handle when brought around one quarter of a circle more or less as is required.

D is the chain with hollow links that forms the outside of the handle and extends the whole length of the curve part of the handle and is connected at one end to a sliding bar J on one side of the mold lever B. The other end of the said chain is connected by two straps E parallel with each other, (only one of them is shown in the drawing) the whole length of the handle and made fast to the sliding beam E by a joint at R and of sufficient distance apart for the handle G to lay between them, each strap is connected by a pin to the last link of the chain, one on each side of said link.

H, is the upsetting screw passing through

the end of the sliding beam E and comes in contact with the end of the handle and is for the purpose of upsetting the handle and preventing the fibers on the outside from separating while bending. I is a draft screw placed in the mold lever and extending forward in a parallel line with the mold lever and enters a female screw at one end of a sliding bar J, on one side of the mold lever, the other end of said bar is connected to the opposite end of the chain from the one before mentioned. This screw serves to grip the top end of the handle and hold it fast between the first link of the chain and the mold D and allows various sizes of handles to enter the same mold and is brought to its bearing before the bending of the handle commences.

K is a set screw passing through a stationary flange on one side of the bench, and serves to press one end of the sliding beam E against the back, or outside of the chain at the bending point, and keeps the chain and sliding beam at a sufficient distance from the mold lever sufficient to allow the timber, or handle to lay between them.

O is a clamp made fast to the top of the flange by two screws, one end of which is a hook, falling into a groove on the top of the sliding beam and serves to keep that end of the sliding beam in its place, but allows it to slide freely.

C is the fulcrum or pin in which the mold lever turns, this pin is supported on top of the lever by a brace M, through which it passes into the bench, the other end of said brace extends across the bench over the sliding beam and is made fast to the stationary flange a part of the bench.

L is a key or wedge to hold the timber firm in its bed in the sliding beam and prevents its springing sideways while the upsetting and bending process is performed.

N is a spring catch made fast at one end to the bench, the other end having a hook to hold the mold lever when the operation of bending is performed as shown in Fig. 1.

The mode of operation is as follows: The mold lever is thrown open at right angles with the bench as shown in Fig. 2, the timber or handle G is placed in the round end

extending forward between the chain and the mold, the other end extending back to the upsetting screw the key L, is then driven in, (see Fig. 5) to hold it in place but still
 5 allow it to slide in end sufficient to upset, the draft screw I is then turned to bring the end of the handle and end of the chain firm against the mold, the set screw (K, is then turned up to bring the beam E against
 10 the back of the chain to give it proper support. The tender then applies his hand to the upsetting screw H, and turns it forward and presses the handle endwise, driving the upper end firm against the slide J, which
 15 is connected with the first link of the chain which operation strengthens the chain taut and completes the preparation ready for the bending process, power is then applied to the end of the mold lever and brought
 20 around which draws the sliding beam forward with the handle as the curve is formed, the upsetting screw follows with the handle and sliding beam, and prevents the outside of the timber at the curve from parting or
 25 breaking during the operation the upsetting screw should be relaxed a little, to prevent the timber on the inside of the curve from crippling or overlapping when the mold lever is brought home to its place the spring
 30 catch takes hold of the end of the lever and prevents it from going back, and the work is completed.

That part of the pawl handle which is bent is of an oval form and is turned or
 35 wrought in proper shape before it is bent, it is formed deepest or thickest transversely to the curve, consequently the links or blocks that forms the chain are hollow to conform to the outside of the curve, and the lever
 40 mold having a corresponding hollow to fit the inside.

The chain may be dispensed with in bending large curves with flat sides, such as feloes for wheels where the sides having flat
 45 surfaces. A metallic strap of metal may be substituted; and a number of pieces can be put to the operation of bending at once in the same mold or a whole plank of suitable thicknesses may be bent at once, and sawed
 50 into feloes afterwards, in that case, there would be no side twist or winding in the operation of bending, but if they are sawed into squares before bent, the wind or side crook may be prevented by placing a number
 55 together, and prevent the side spring by side clamps to keep them in the right direction while they are bent, these side clamps may extend around the mold which will prevent the side movement while receiving the
 60 proper curve.

A cylinder or drum may be used for a mold formed cylindrical, or elliptical or any figure required—and instead of a lever to move it, cog wheels may be used and any

power applied. The upsetting power must
 65 be given by the screw or other mechanical power when the timber is first placed in the mold while in its straight form, by screwing or pressing against the ends of the timber—care should be taken to prevent its
 70 crippling by having clamps attached to the sliding bed. As soon as the bending process commences, the end pressure, or upsetting screw must begin to relax in proportion to the thickness of the timber, and
 75 shortness of the arc of the curve required—also in proportion to the toughness, or tenderness of the timber, but no definite rule can be given. Experience only can determine. In all cases the end pressure must
 80 be kept sufficiently tight, so as to prevent the outside of the curve from parting or breaking while the inside of the curve the timber will be upset—this relaxation of the end pressure must be continued until the work
 85 is done. There are many mechanical methods by which the relaxation of the end pressure can be made self acting and uniform—one of which, is as follows—on the end of the upsetting screw H a bevel tooth
 90 wheel meshing into another bevel wheel may be attached at one end of a shaft at right angles with the upsetting screw—on the other end of the shaft may be attached a spur wheel meshing into a stationary rack;
 95 as the sliding bed advances in the operation of bending the spur wheel meshing into the stationary rack will turn the bevel gears and the upsetting screw H, in a backward
 100 direction, thus relaxing the pressure against the end of the timber uniformly during the whole operation—to vary the speed of the relaxing screw, for the various curves and thicknesses of timber to be bent, a number of spur wheels of different sizes may be placed
 105 on the shaft so that either of them can mesh into the rack at pleasure, which will vary the speed as required on the outside of the bevel wheel on the upsetting screw—instead of a thumb piece for it, as shown in the
 110 drawing a crank may be substituted, which would be preferable in heavy work to throw the screw forward with sufficient power—the bevel wheel on the screw shaft H may be connected with it by a ratchet wheel and
 115 pawl so that the screw can be driven forward when the timber is first placed in the sliding bed by turning the crank without revolving the gear work, and when it is reversed by the gear, the pawl will take hold
 120 the ratchet wheel which is made fast to the screw shaft.

I do not claim as my invention the mechanical powers by which the operation of bending timber is effected—nor any particular form of machinery to carry my new
 125 method into operation—but the machine herein described is a form which I have

adopted to carry out, and combine my new method of bending timber. But

What I do claim is—

My method of bending fibrous materials
5 by means of the upsetting movements or the
upsetting and relaxing movements combined, as exemplified in the screw H,
whether such movement, or movements, be

produced by means of the screw, wedge,
comb, lever, rack and pinions, or any other 10
equivalent means.

THOS. BLANCHARD.

Witnesses:

EDWARD F. HALL,
DUDLEY H. BAYLEY.

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