(No Model.) 2 Sheets—Sheet 1.

J. R. McNABB.

BENDING MACHINE.

No. 457,789. Patented Aug. 18, 1891.

Fig. 1

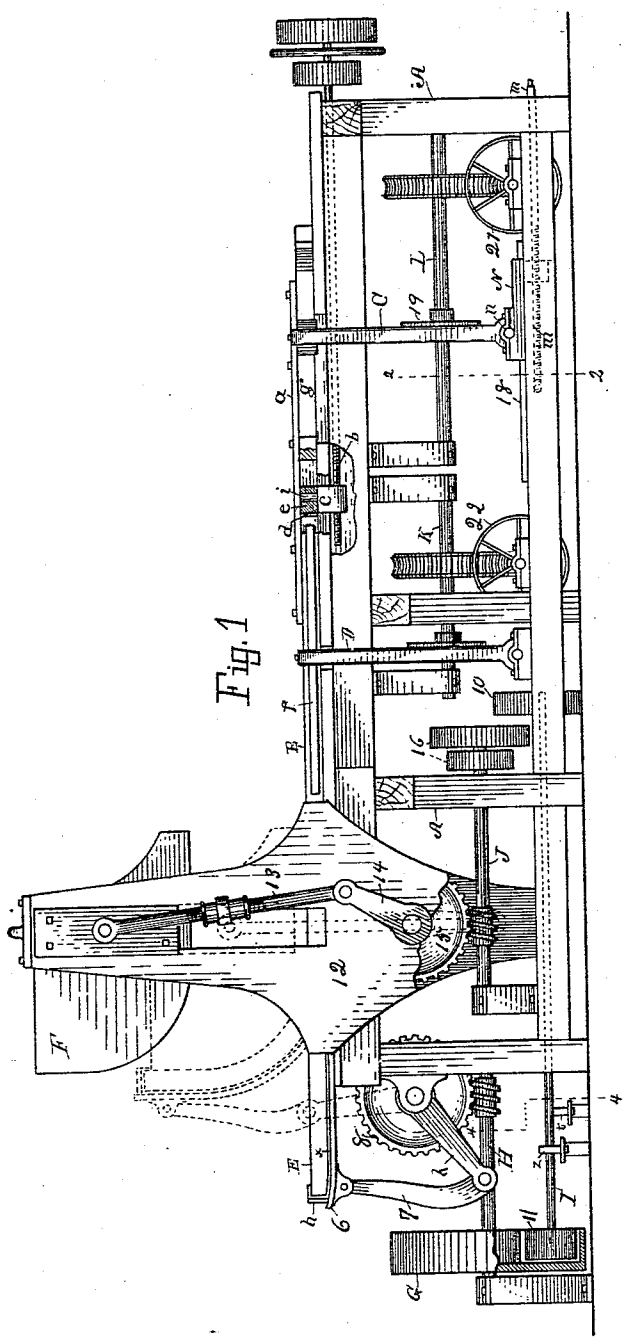
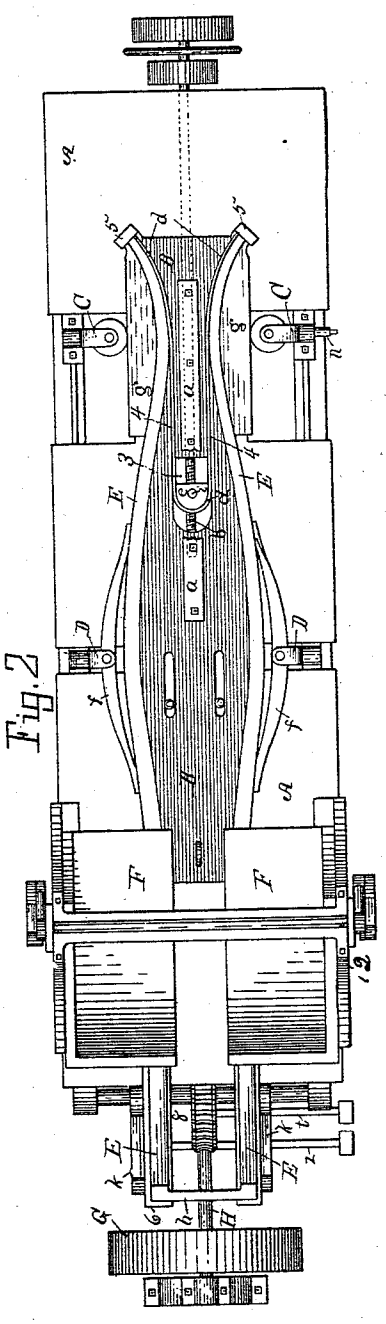


Fig. 2



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(No Model.) 2 Sheets—Sheet 2.

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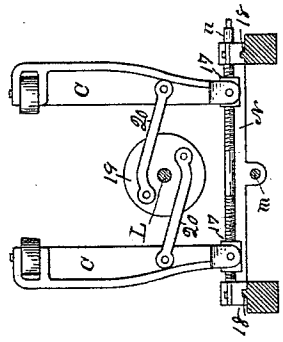


Fig. 3

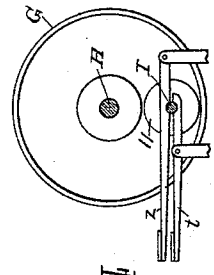


Fig. 4

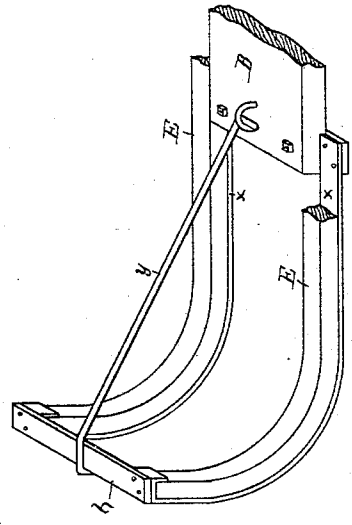


Fig. 5

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UNITED STATES PATENT OFFICE.

JOHN R. McNABB, OF KALAMAZOO, MICHIGAN.

BENDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 457,789, dated August 18, 1891.

Application filed July 19, 1890. Serial No. 359,267. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. NCNABB, a citizen of the United States, residing at Kalamazoo, county of Kalamazoo, State of Michigan, have invented a new and useful Bending-Machine, of which the following is a specification.

This invention relates to that class of bending-machines in which a form is employed upon a table and against which form the thills are clamped, and in which machines the rear ends of the thills are formed by being bent around vertically-playing forming-blocks.

The principal object of this invention consists in a machine in which the horizontal form against the sides of which the thills are clamped is not adjustable endwise for the purpose of bringing the stops against the forward ends of the thills, but is provided with other means for this purpose.

A further object is to produce a power-machine in which none of the parts have to be operated by hand.

Other objects consist of certain construction and combination of parts below described and claimed.

In the drawings forming a part of this specification, Figure 1 is a side elevation. Fig. 2 is a plan. Fig. 3 is a sectional elevation on line 2 2 in Fig. 1, looking from a point at the left. Fig. 4 is a section on line 4 4 in Fig. 1, looking from a point at the right, and Fig. 5 shows broken lettered details in perspective from Figs. 1 and 2.

Referring to the lettered part of the drawings, A is the table upon which the horizontal form B is detachably placed in the ordinary manner. The sides of this form B are made to conform to the shape of the thills E. The form B is the same as though made of one piece, for the front and rear part are attached together by the bar *a*, said parts having been severed by the passage-ways 4 4, leading into a slot 3 through the form B, Fig. 2. These passage-ways 4 4 are simply spaces between the sides of the slot 3 and the sides of the rear or detachable part of the form B. In the slot 3 and mounted upon the screw-shaft *b* is an adjustable block *c e*, the part *e* thereof being pivoted at *i* to the part *c*.

At *d* is a hair-pin-shaped elastic strap which passes through the passage-ways 4 4 and around the pivoted block *e*, as in Figs. 1 and 2. Each end of the strap *d* is provided with stops 5 5, which are brought against the front ends of the thills E by running the block *e* farther to the left by means of the screw-shaft *b*, said shaft being operated by power applied to the belt-wheels at the right-hand end of said shaft, no belts being here shown. This action tensions the strap *d*, hence bringing the stops 5 5 against the ends of the thills, and of course the stops are released by moving the block *e* the other direction, which movement slackens the strap. Heretofore in some instances these stops 5 5 have been attached to the end of the form B and the form moved endwise to bring them against the ends of the thills, which is undesirable, for the principal reason that the desired location of the bends in the thills in accordance with the shape of the form B is changed. The rear end of the form B is provided with the ordinary elastic straps *x*, turned at the end and connected by bar *h*, Figs. 2 and 5, and the ends of the thills E abut against said turned ends, as shown in said figures.

The table A is provided with elastic straps 6, upon which the straps *x* of the form B are placed. The straps 6 are connected with the crank *k* by means of the arms 7, which are pivoted at the ends to said straps 6 and the cranks *k*.

The shaft H, Figs. 1 and 2, is provided with a friction-disk G, having a hollow space around its interior hub and its internal periphery of its outer rim, Figs. 1 and 4. The shaft H is gear-connected with the gear 8 of the shaft of the cranks *k*.

The shaft I, which is driven by power being applied to its pulley 10 is provided at the outer end with a friction-disk 11 in the interior space of the friction-disk G, and being of a diameter less than the width of said space, so that by stepping on the treadle *z* the shaft I, with its disk 11, is lowered, causing the shaft H to revolve in one direction, and by stepping on the treadle *t* the shaft I and its disk 11 are raised, causing the friction-disk G to revolve in the other direction, and by this means the elastic straps 6 and *x* are swung upward and downward. The dot-

ted position shown in Fig. 1 shows these parts carried upward, thus curving the ends of the thills against the curved portions of the forming-blocks F, said blocks having first been lowered onto the thills, as indicated in dotted position in said figure. These blocks F move in slide-bearings in the standards 12 of the table A. The forming-blocks F are raised and lowered by means of cranks 14, and connecting-rods 13 by means of the power-shaft J, which is gear-connected with the gear 15 of the shaft of the cranks 14. Belts are attached in the ordinary manner from suitable power to the pulleys 16 of the shaft J, said belts not being here shown. When the ends of the thills are bent up, as in dotted position in Fig. 1, the straps 6 are lowered and the forming-blocks F are raised, observing first to lock the straps *x* and the thills in their bent position by means of a rod *y* in the ordinary manner, as shown in Fig. 5, it being understood, of course, that the form B is taken off from the table with the thills attached to it in their bent position, and another form put on when continuing the operation in bending another set of thills, as in the ordinary manner of such machines.

At C C, Figs. 2 and 3, are clamping-arms, one each side of the table A, and pivoted at their base to the collars 17. These collars are internally threaded and mounted upon the threaded shaft *n*, which shaft has bearings in the carriage N. By turning the shaft *n* one way and the other these clamping-arms are brought nearer together or farther apart, as desired.

The carriage N is mounted upon a track 18 in a manner to slide toward one end of the table A or the other to change the position of the clamping-arms in accordance with the length of the thills being bent. The carriage is thus adjusted by means of the threaded shaft *m*, which passes through a threaded hole in a pendent projection of the carriage, as shown in Fig. 3.

Both the shaft *n* and shaft *m* are provided with a wrench-seat at the outer end, so as to be operated by a wrench. These clamping-arms have a friction-roller in the top, which comes in contact with the formers *g* during the operation. These formers are convexed on their inner edge to conform to the bowed shape of the front end of the thills, as heretofore.

The clamping-arms C are operated by means of a crank-disk 19 and arms 20, which arms are pivoted to said crank-disk and to the clamping-arms, as in Fig. 3. This crank-disk is mounted upon the shaft L, which shaft is gear-connected with the shaft of the pulley 21. Power is applied to this pulley in the operation so as to revolve it in one direction to swing the clamping-arms toward each other and cause said arms to press against the formers *g*, which has the effect to bend the thills E in against the edges of the form B and revolve it the other direction to open the clamping-arms, all of which will be readily understood by referring to Figs. 2 and 3.

Some distance from the clamping-arms C are clamping-arms D, which are like the arms C and are operated in the same manner and by like means so far as opening and closing them are concerned, except the upper ends of these clamping-arms D are provided with forming-bars *f*, centrally pivoted thereto, said forming-bars being concaved on their inner edge to fit against the outward bulge of the thills at the widest point in the form B. In this part of the construction the shaft K and pulley 22 are duplicates of the shaft L and pulley 21, before described. It will be observed that these clamping-arms C C and D D do not swing around horizontally, as heretofore, and thus begin to act before they get to the point where the greatest degree of pressure takes place, but swing directly toward each other in their upright position. This latter plan is deemed preferable, since there is less friction and less danger of bending and breaking the arms and no danger of misplacing the form B and formers *g*.

Referring again to the pivoted block *e*, it should have been stated that this block may or may not be pivoted, but preferably is pivoted, as it will slightly yield one way or the other according to any difference there may happen to be in the lengths of the strap at the sides, and, furthermore, the block *c* will not be canted and cramp on the screw-shaft.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a bending-machine, a form having the slot and the passage-ways leading therefrom, a pivoted adjustable block in said slot, means for moving said block, and the elastic strap placed in said passage-ways looped around the block and provided at the ends with the stops, substantially as set forth.

2. In a bending-machine, the combination of the form, the clamping-arms which are swung in an upright position directly toward the sides of the form, the power-shaft having the crank-disk, and the arms pivotally attached to said crank-disk and to the clamping-arms, substantially as set forth.

3. In a bending-machine, the combination of a form, the clamping-arms pivoted to be swung in an upright position toward the sides of the form, the collars to which the lower ends of said arms are pivoted, and a shaft screw-threaded through said collars for moving them inward or outward, substantially as set forth.

4. In a bending-machine, the combination of a form, the rear clamping-arms and forming-blocks, the forward clamping-arms, and the bowed forming-bars pivoted to the upper ends of said clamping-arms and transversely thereto, substantially as set forth.

5. In a bending-machine, the combination

of the table having the elastic straps at the end, a form having the elastic straps which rest upon the former-named straps, the crank-shaft, the arms pivotally attached to the cranks and to the elastic straps of the table, a shaft-gear connected with the crank-shaft and provided with the friction-disk, the power-shaft having the disk for engaging the other disk, and the treadles, between which treadles said power-shaft has bearings, substantially as set forth.

In testimony of the foregoing I have hereunto subscribed my name in presence of two witnesses.

JOHN R. McNABB.

Witnesses:
L. N. BURKE,
JOE D. COWIE.