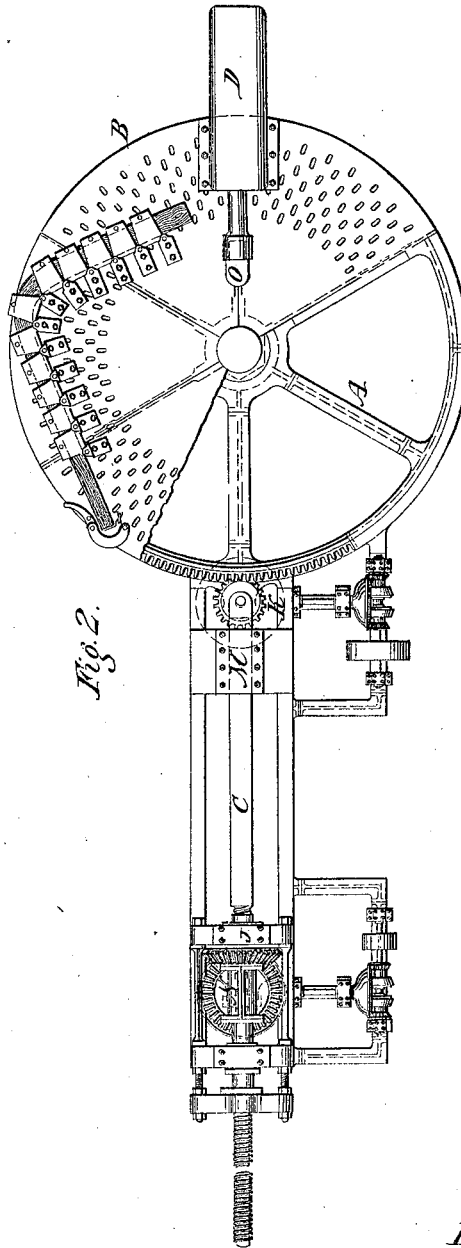
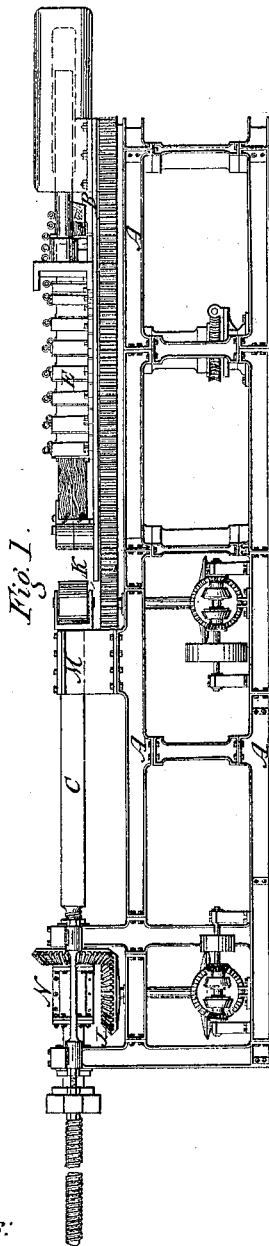


*J. W. Griffiths,  
Bending Nood.*

*N<sup>o</sup> 51,826.*

*Patented Jan. 2, 1866.*



*Witnesses:*

*J. H. Loomis  
John Loom*

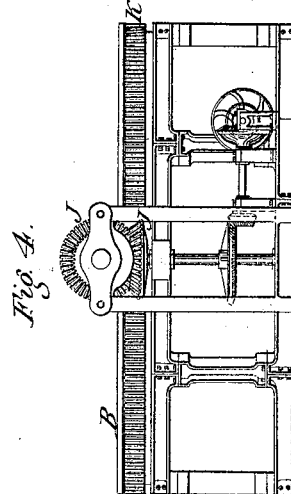
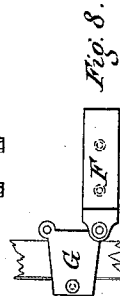
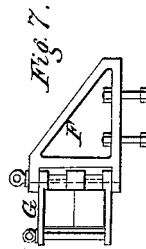
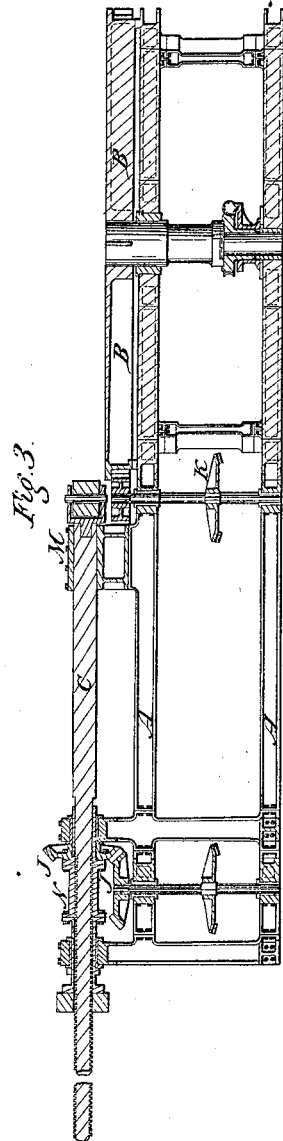
*Inventor:*

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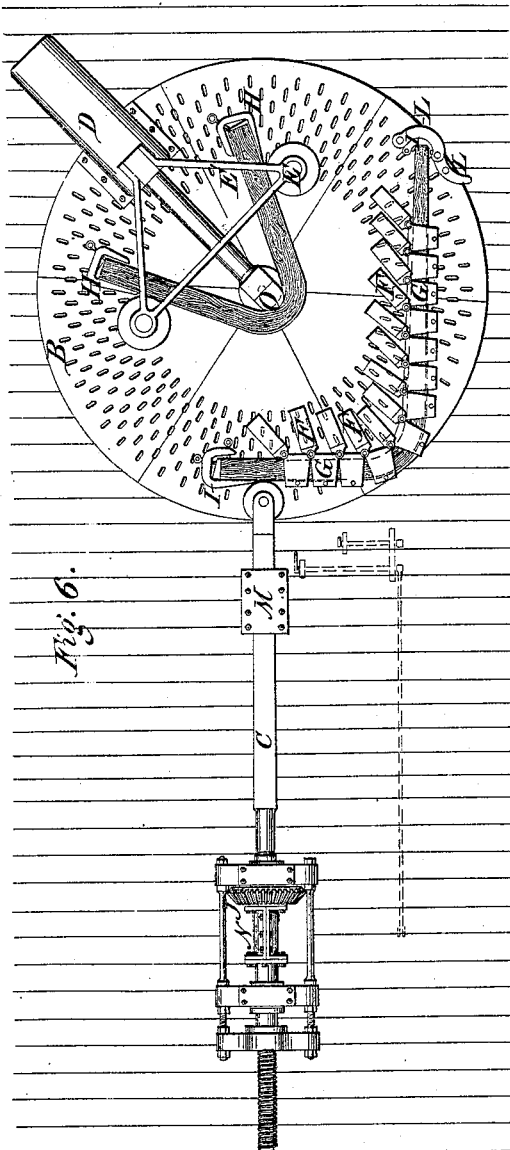
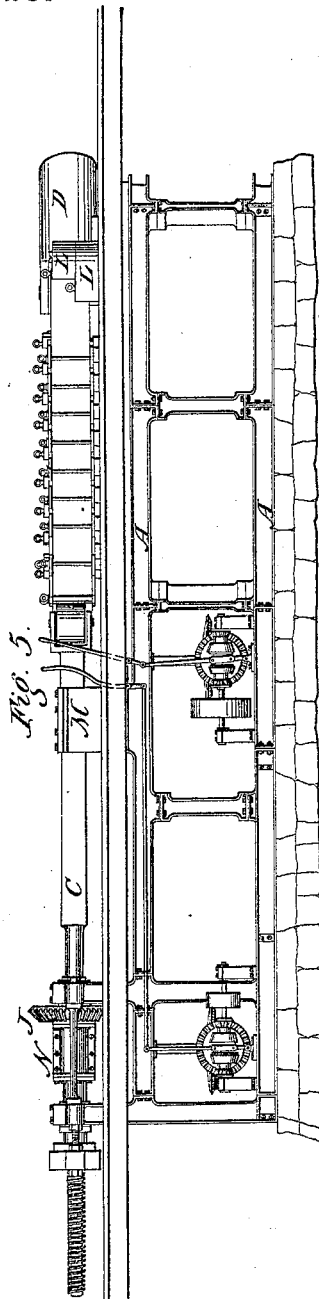
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*No. 51,826.*

*Patented Jan. 2, 1866.*



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# UNITED STATES PATENT OFFICE.

JOHN WILLIS GRIFFITHS, OF BROOKLYN, NEW YORK.

## IMPROVEMENT IN WOOD-BENDING MACHINES.

Specification forming part of Letters Patent No. 51,826, dated January 2, 1866.

*To all whom it may concern:*

Be it known that I, JOHN WILLIS GRIFFITHS, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful machine for bending wood from the straight growth into all the required forms for the frame-timbers and knees of ships and for other purposes, which I have denominated "Griffiths' Ship-Timber-Bending Machine;" and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification, in which—

Figure I is a side elevation or longitudinal projection of the machine. Fig. II is a ground plan with part of the revolving disk broken off, showing the segment and pinion, also the circular frame upon which the periphery of the disk rests. Fig. III is a longitudinal section through the center of the frame and disk, showing the shaft which supports the disk at the center in its rotundity. Fig. IV is an end elevation at the compressor end of the machine, showing the bevel-wheels which turn the screw of the compressor. Fig. V is a side elevation with the joint and mold set and the timber bent around it. The levers are also shown in position for starting, stopping, and reversing the motion of the machine by means of bevel-gear and clutch. Fig. VI is a ground plan, showing part of the machine above the floor. A piece of timber and knees are shown bent and mounted upon the revolving disk. Fig. VII is an elevation of one of the adjustable holders for the joint-mold and one of the links of the joint-mold hinged thereto. Fig. VIII is a plan view of the same.

The same letters in all the figures designate the same parts of the machine.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

The machine is constructed of iron. The frame A, Fig. V, rests upon masonry in the cellar of the building.

B is the revolving disk, mounted upon a shaft which extends down through the middle of the frame into a socket. The disk is also supported at its periphery by the circular part of the frame beneath the cog-segment.

C is the compressor or follower, which is extended and drawn back by means of a screw and nut, N, turned by bevel-wheels. It passes between collar-guides M, and has rollers in its projecting end, which revolve as they are pressed by the screw against the timber-strap, while the timber is being bent into the mold by revolving the disk. The compressor is also used for bending knees or floor-timbers and breast-hooks, when not required for bending frame-timbers. In such cases the rollers in the end are removed and a thrusting-head, O, substituted, the same as that used at the hydraulic press.

D is the hydraulic press for bending knees, floor-timbers, and breast-hooks.

E E are two vertical shafts, with projecting collar-rings resting upon the disk. The lower end of each has a bolt passing down through the disk, with nut below. Upon these shafts rollers revolve as the timber is forced between them by the head of the hydraulic press. E' is a triangular stay bracing said vertical shafts E E.

F, Figs. VI, VII, and VIII, is one of the adjustable holders for the joint-mold, having a slot for the through holding-down bolt to the disk, and G is one of the links of the joint-mold, having a bolt passing through the joint or hinge into the adjustable holder; also, another bolt-hole for inserting a bolt behind the timber as it is bent to confine it to the mold, the timber starting from the head-clamp L, outside of the joint-mold, which is mounted on the adjustable holders. The face of the timber, being parallel to the surface of the bed-plate and at right angles with the vertical side of the sectional mold, forms a rectangular groove. It is around this mold that the timber is bent, the flange serving as a guide for the straight timber as the disk or bed-plate revolves. It is manifest that the mold may be set to any desired curvature by the manner of bolting the adjustable holders to the disk or bed-plate.

H is a strap and end clamp for bending knees, placed on the timber before bending it, while its form is straight.

I is also a strap, with end clamps for bending frame-timbers. The ends of the strap differ from the knee-strap, because frame-timbers are tapering, while the knee has both ends of the same size.

J is the beveled-gear wheels for extending the compressor, with clutch for reversing the motion.

K shows the geared wheels for revolving the disk.

L is a double head-clamp swung upon a bolt at one end, while the other is secured by a pin. When a frame-timber is to be bent a key is inserted between the head-clamp and head of the strap, which confines the smaller ends of the frame-timber straps into the clamp. The position of this clamp is suited to all the various curvatures required, all forms radiating from this point. There are two frame-timbers bent at the same time in the same mold, one above the other.

Inasmuch as the frames of wooden vessels as now constructed are made up of a series of timbers of short lengths with crooks forced from trees of straighter growth than the curvature sought to be made, necessitating a double course of timbers for each frame, which, by overlapping the butts and bolting together edgewise, gives an uncertain amount of strength, the frame not unfrequently being ruptured in process of raising by its own gravity, it is manifest that any machinery which

has a capacity for bending frame-timbers of any curvature required, from the straight growth in a single length from keel to rail, and for bending knees of any size and length of arm required, must be a valuable auxiliary to the art of ship-building.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The machine for bending timbers herein described, constructed and operating substantially as herein set forth.

2. The joint-mold with adjustable holders, constructed substantially as herein shown and described.

3. The joint-mold with adjustable holders, in combination with the revolving disk and compressor, substantially as described.

4. The combination of the hydraulic press, thrusting-head O, and vertical shafts E E, as and for the purpose described.

5. The double head-clamp L, in combination with the joint-mold and adjustable holders.

JOHN WILLIS GRIFFITHS.

Witnesses:

J. J. COOMBS,  
JOHN COON.