

(No Model.)

3 Sheets—Sheet 1.

R. P. BURKHARDT.

PROCESS OF AND MACHINE FOR BENDING AND DRYING WOOD.

No. 482,782.

Patented Sept. 20, 1892.

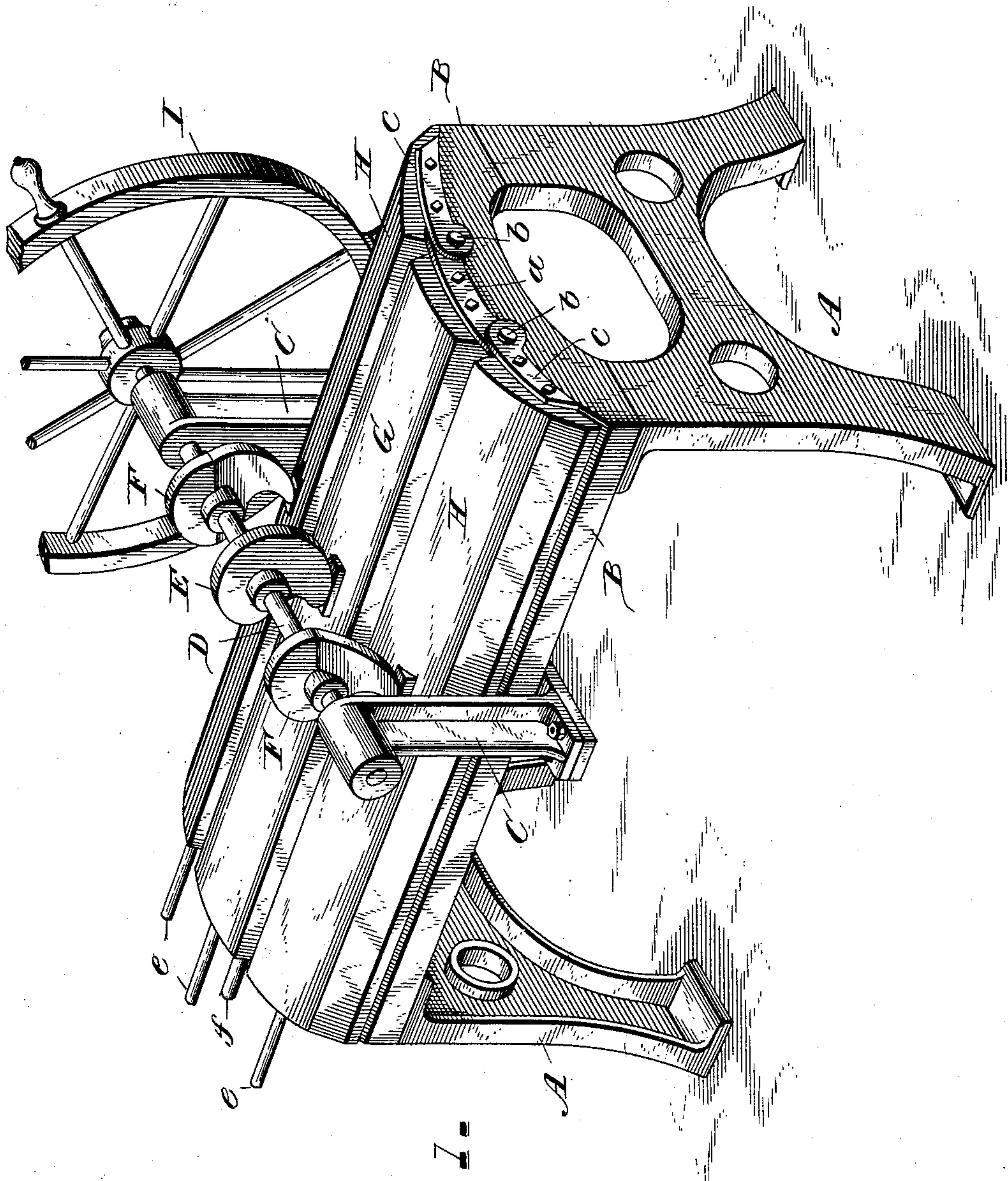


Fig. 1.

Witnesses.
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(No Model.)

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Fig. 2.

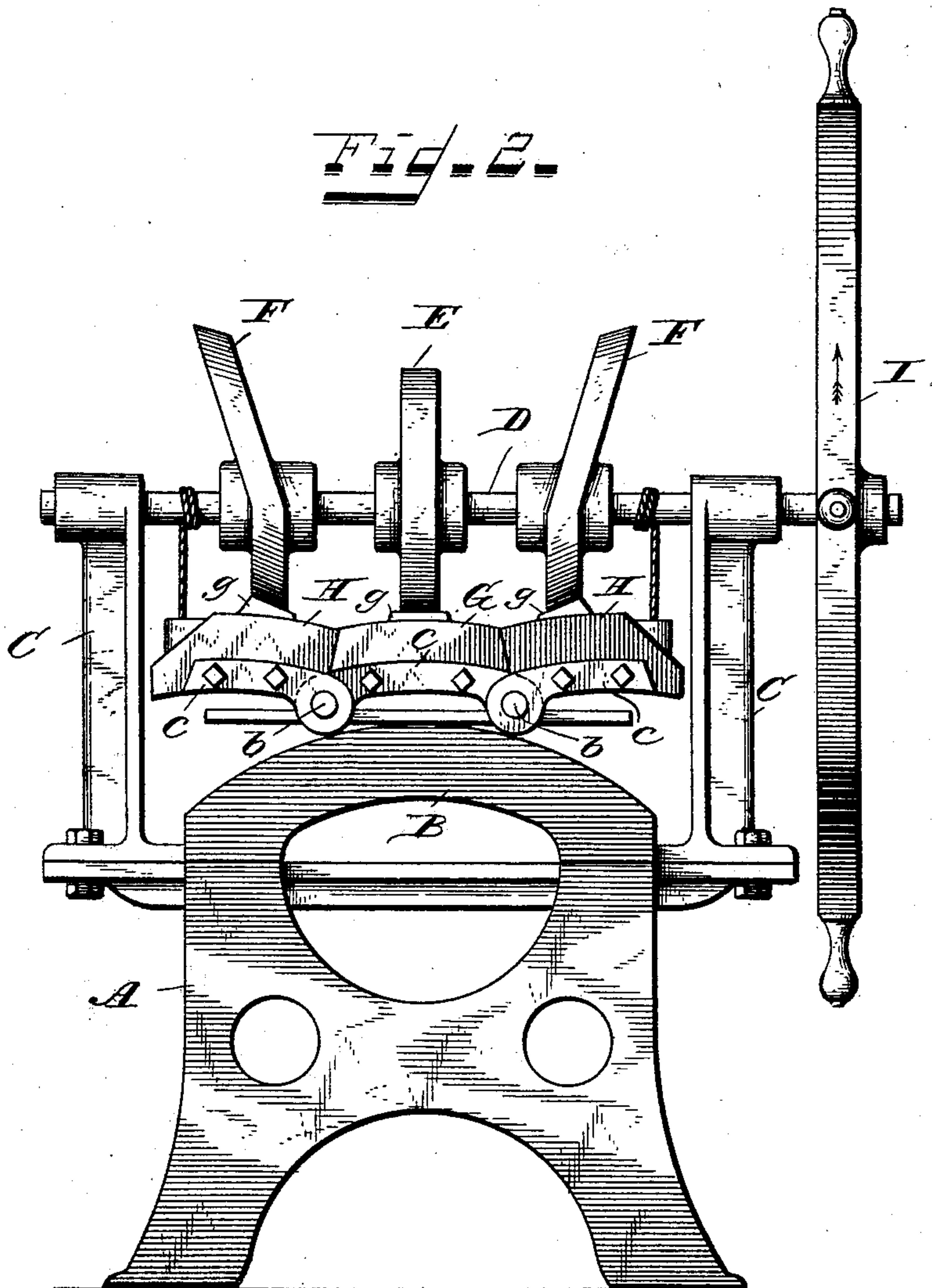
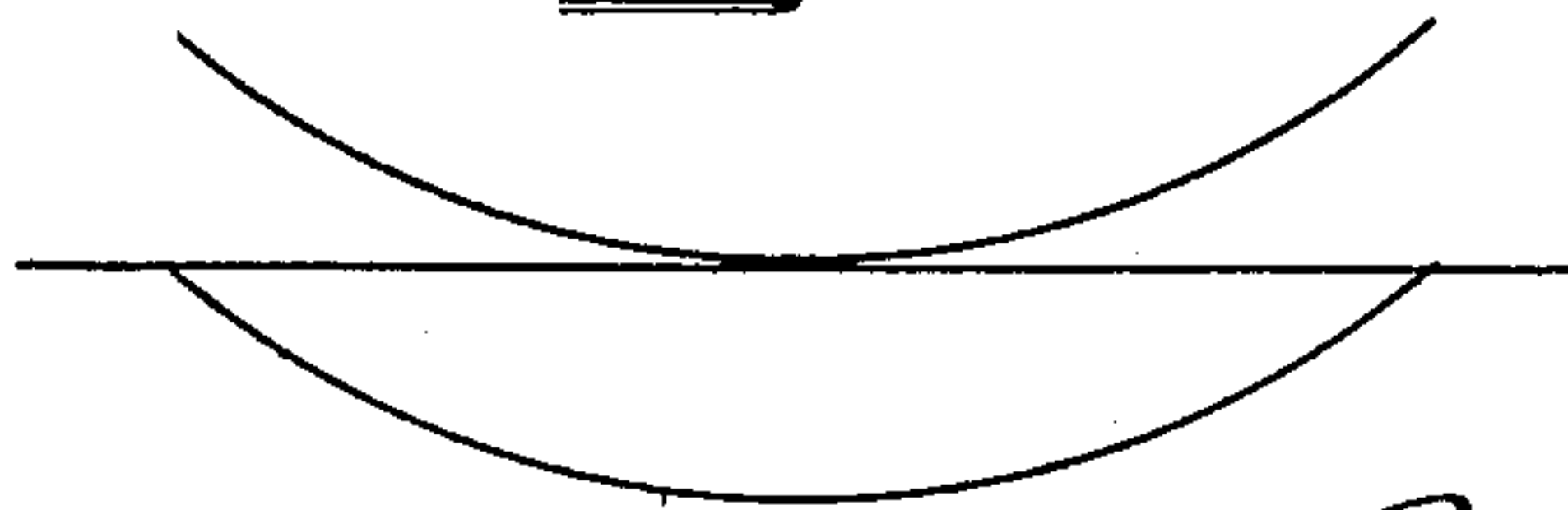


Fig. 5.



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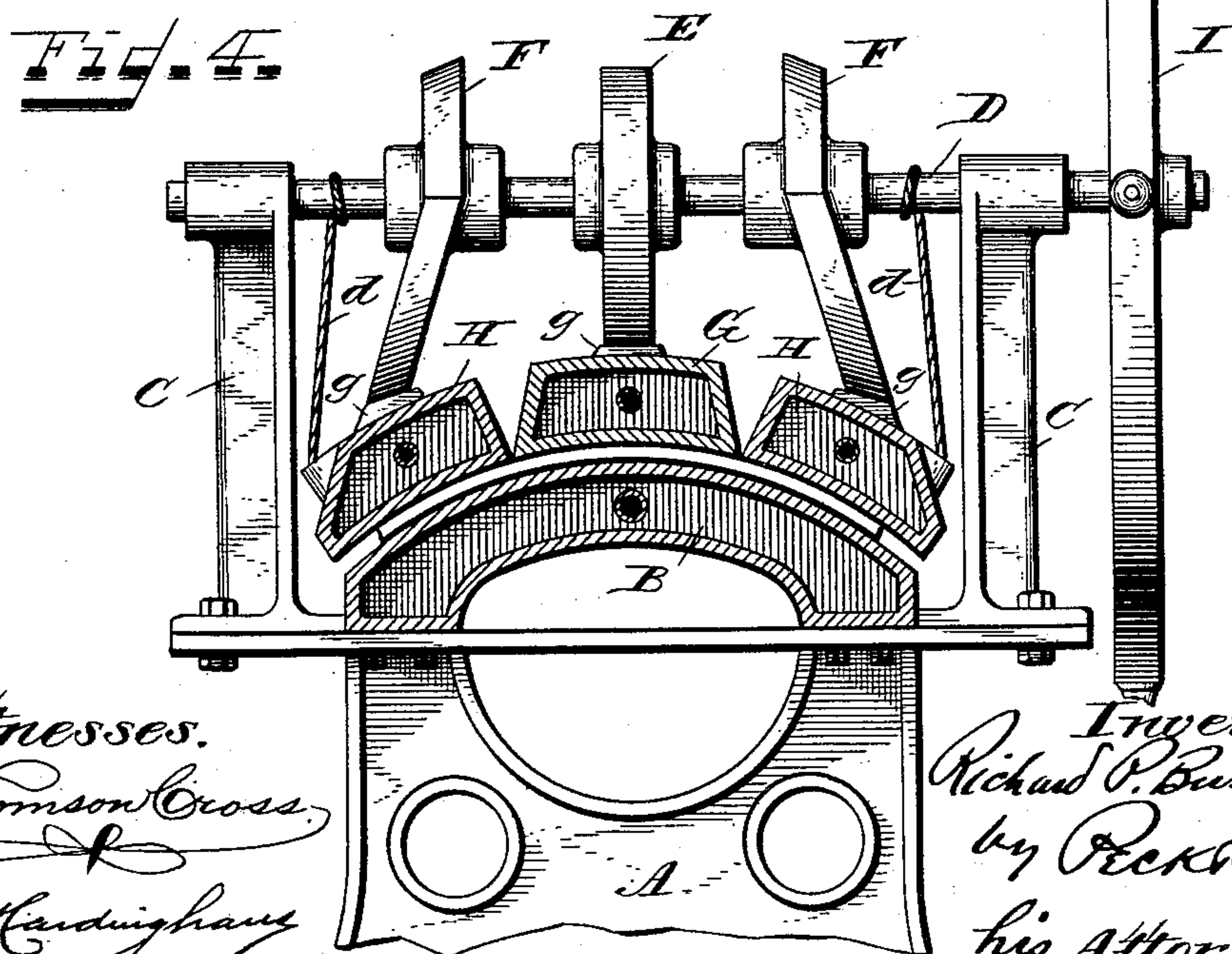
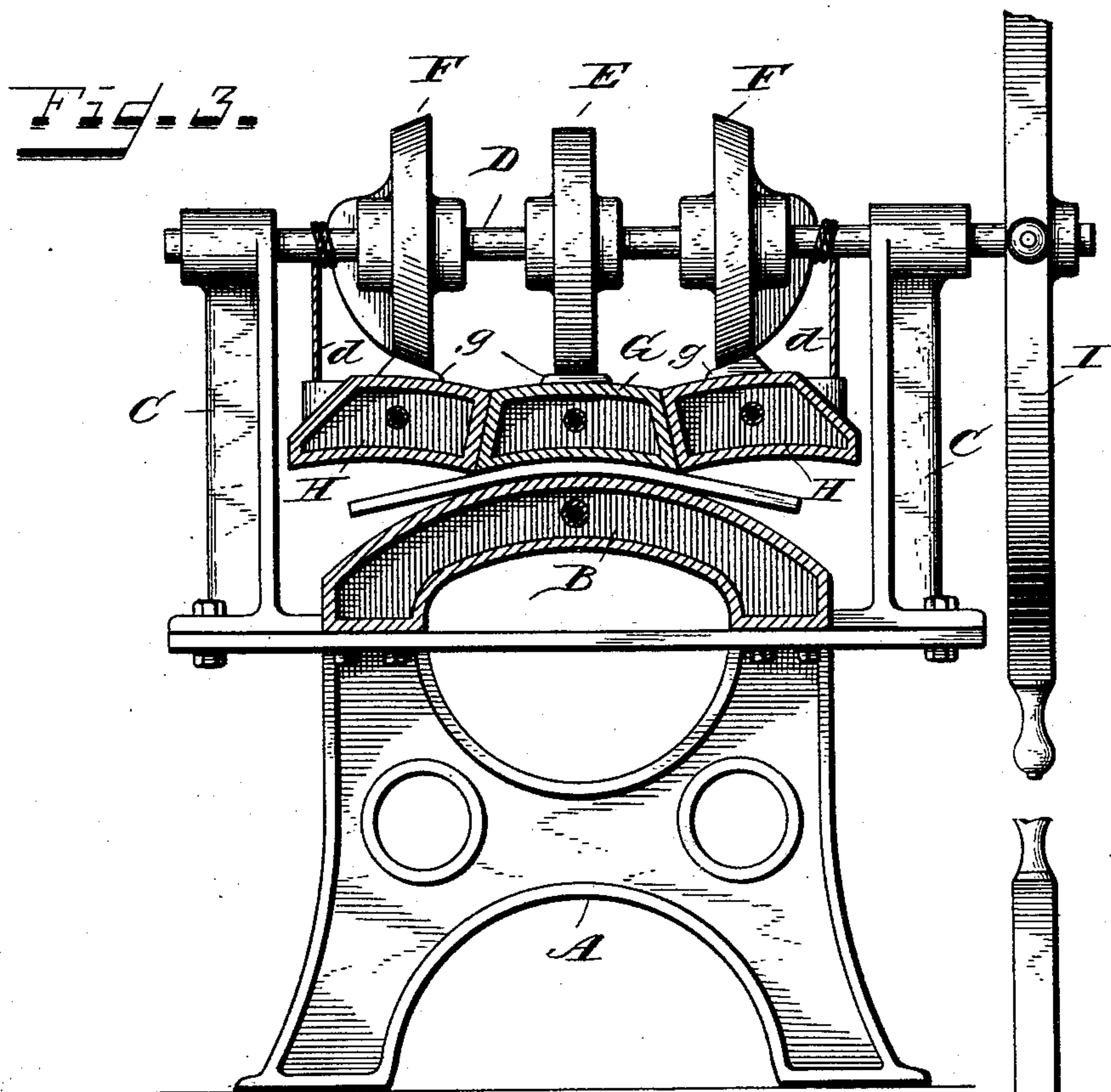
3 Sheets—Sheet 3.

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UNITED STATES PATENT OFFICE.

RICHARD P. BURKHARDT, OF DAYTON, OHIO.

PROCESS OF AND MACHINE FOR BENDING AND DRYING WOOD.

SPECIFICATION forming part of Letters Patent No. 482,782, dated September 20, 1892.

Application filed January 27, 1892. Serial No. 419,406. (No model.)

To all whom it may concern:

Be it known that I, RICHARD P. BURKHARDT, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Processes of and Machines for Bending and Drying Wood, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to the bending and drying of a number of strips of wood simultaneously, together with machines for such purpose; and it has for its object the improved process, as well as the improved machine for carrying out the process, whereby the work is simplified and the danger of breakage reduced to a minimum.

The novelty of my invention will be hereinafter set forth, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1, Sheet 1, is a perspective view of a machine embodying and for carrying out my invention. Fig. 2, Sheet 2, is an end elevation of the same. Fig. 3, Sheet 3, is a sectional end elevation illustrating the first step in bending. Fig. 4, Sheet 3, is a corresponding view at the completion of the operation. Fig. 5, Sheet 2, is a diagram to illustrate a former objectionable method of bending.

The same letters of reference are used to indicate identical parts in all the figures.

Upon any suitable rigid framework A is secured the hollow bending former or male die B, whose upper surface in cross-section has the curvature desired to be given to the wood.

Journaled in uprights C is a shaft D, extending horizontally across the middle of the machine and having fast thereon a middle cam E and two side cams F, and between these cams and the male die is the sectional hinged female die, composed in this instance of a hollow central section G, to which is hinged on each side a hollow section H. The length of these sections is the same as that of the male die, and their under surfaces are curved to fit evenly upon the male die when lowered thereon. As seen in Fig. 1, the hinging of the sections is effected by means of

straps a, bolted to the middle section and having pins b on their ends projecting through eyes in straps c, bolted to the sections H. The hinging points are thus coincident with the lower lines of juncture of the sections G H. The female die is suspended from the shaft D by means of cables or chains d, fast to the shaft and to the sections H, as shown, the latter serving to support the section G, as seen in Fig. 2. Steam is admitted through pipes e, with flexible connections, to the interior of the sections G H and through a pipe f to the interior of the male die B for drying the wood after it has been bent.

I is a hand-wheel fast upon the shaft D for oscillating the same, though any other suitable means may be employed for the purpose.

Where it is desired to have the dies of considerable length, two or more cam-shafts may be employed, so as to distribute the pressure evenly, as will be readily understood, and these shafts may, if desired, be geared together.

The process to be carried out by the machine above described is as follows: The strips of wood, properly steamed or moistened, are laid in a row across the top of the male die, as shown in Fig. 2, and the shaft D is given a quarter-turn in the direction of the arrow. This action, by the pressure of the cam E, brings down the section G upon the wood and bends it at its middle upon and clamps it upon the male die, as seen in Fig. 3. During this action the sections H are simply lowered and followed by the cams F without changing their relative position to the section G and without bending the outer projecting ends of the wood. Upon further turning the shaft D in the same direction the cam E remains on the dwell without exerting further pressure on the section G; but the cams F force down the sections H upon the outer ends of the wood and bend them down upon the die B, as seen in Fig. 4. Here the parts remain until the wood is properly dried, whereupon the shaft D is turned back and the female die is lifted by the chains d to permit the removal of the bent wood and the introduction of another lot to be bent.

By the above process of clamping the wood at its middle between the dies and partially

bending it and then completing the bending of its ends the danger of breaking the wood is almost entirely removed, and the advantage of this method of bending over that illustrated by the diagram in Fig. 5, where the curved lines represent the dies and the straight lines the wood, is obvious, for in the latter method the strain of bending is put entirely upon the middle of the wood and remains there until the bending is entirely completed.

The cams F are made flaring, as shown, to follow the arc described by sections H, and removable blocks *g* of varying thickness are interposed between the cams and sections G H to enable wood of varying thickness to be bent.

Having thus fully described my invention, I claim—

1. The process of bending wood, consisting in clamping it at its middle between rigid male and female dies and then bending its ends between said male die and additional female dies.

2. In a wood-bending machine, the combination, with a rigid male die, of a sectional female die, the parts of which are rigid, and means for clamping the wood first between the male die and middle section of the female die and then between the male die and outer

sections of the female die, substantially as described.

3. In a wood-bending machine, the combination, with a rigid male die, of a sectional female die, the parts of which are rigid and hinged together, and means for pressing the sections of the female die successively upon the male die, substantially as described.

4. In a wood-bending machine, the combination, with a male die and a sectional female die, of a shaft provided with cams for pressing the sections of the female die successively upon the male die, substantially as described.

5. In a wood-bending machine, the combination, with a male die and a sectional female die, of a shaft provided with cams for operating the sections of the female die successively in one direction and with chains or cables for operating it in the opposite direction.

6. In a wood-bending machine, the combination of the steam-heated male die B, the hinged sectional steam-heated female die G H, the shaft D, provided with cams E F, and the cables *d*, uniting the sections H and the shaft, substantially as described.

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Witnesses:

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