

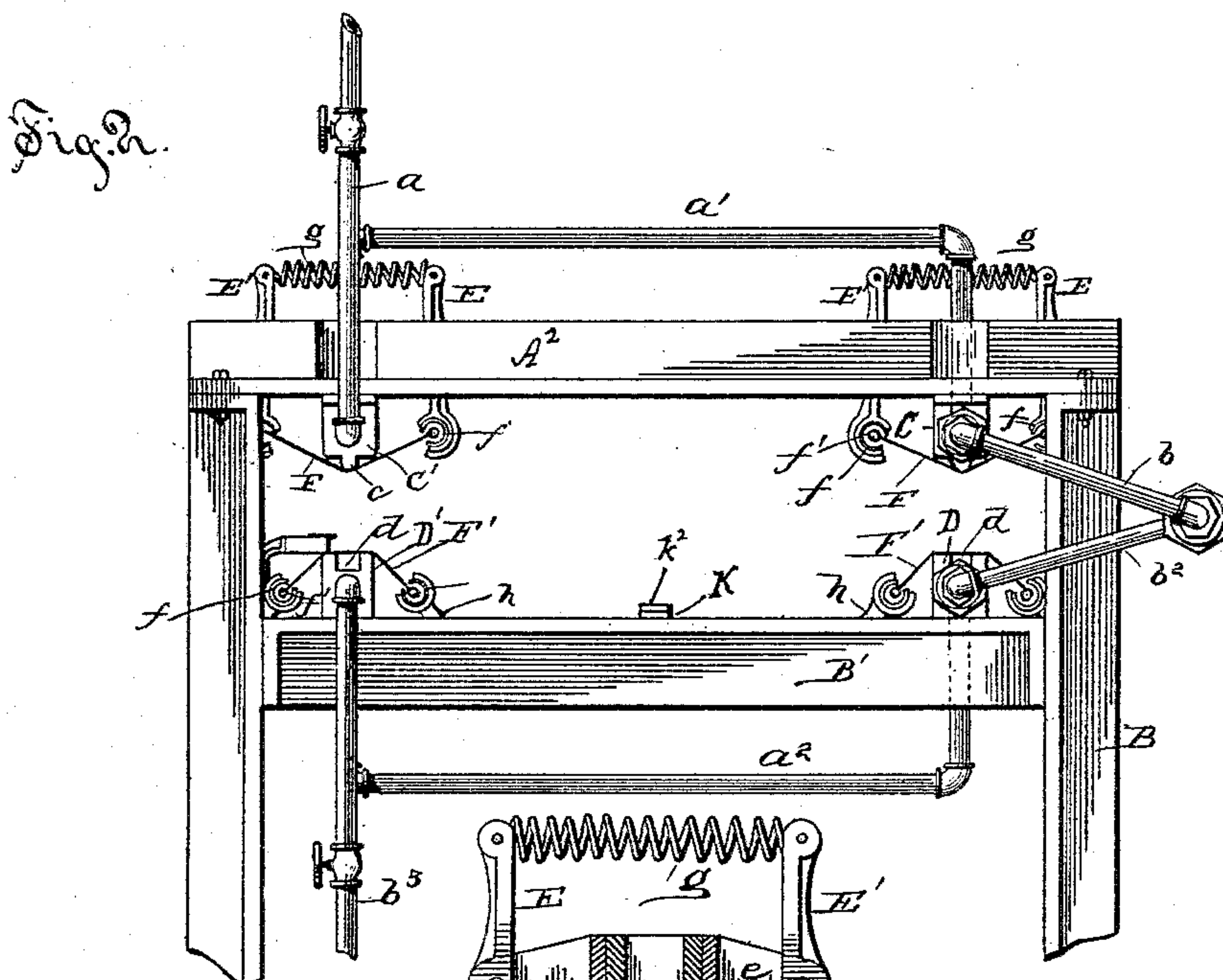
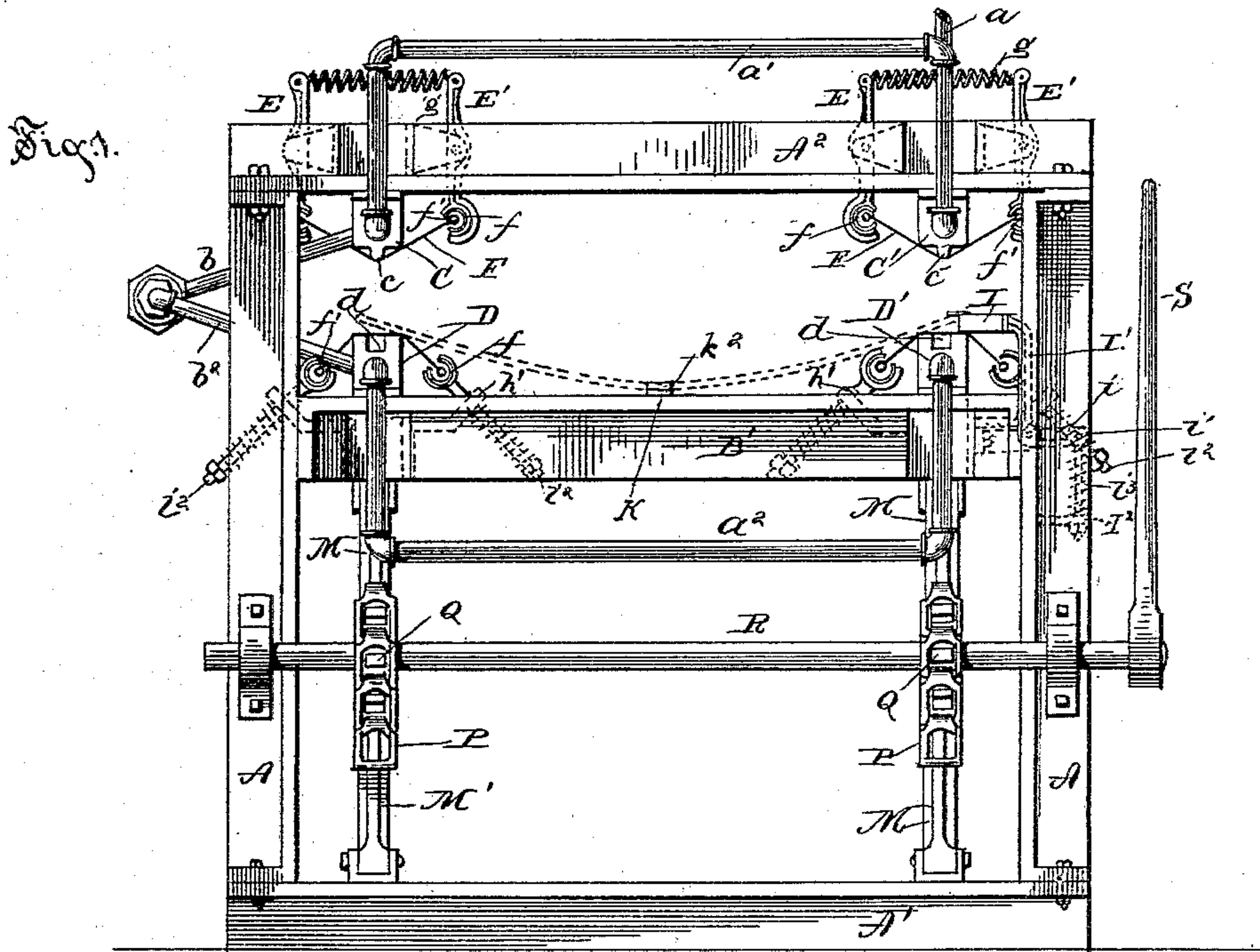
(No Model.)

2 Sheets—Sheet 1.

C. B. JAMESON.
WOOD PULP BOARD BENDING MACHINE.

No. 401,353.

Patented Apr. 16, 1889.



WITNESSES

J. Coleman
John Smirre

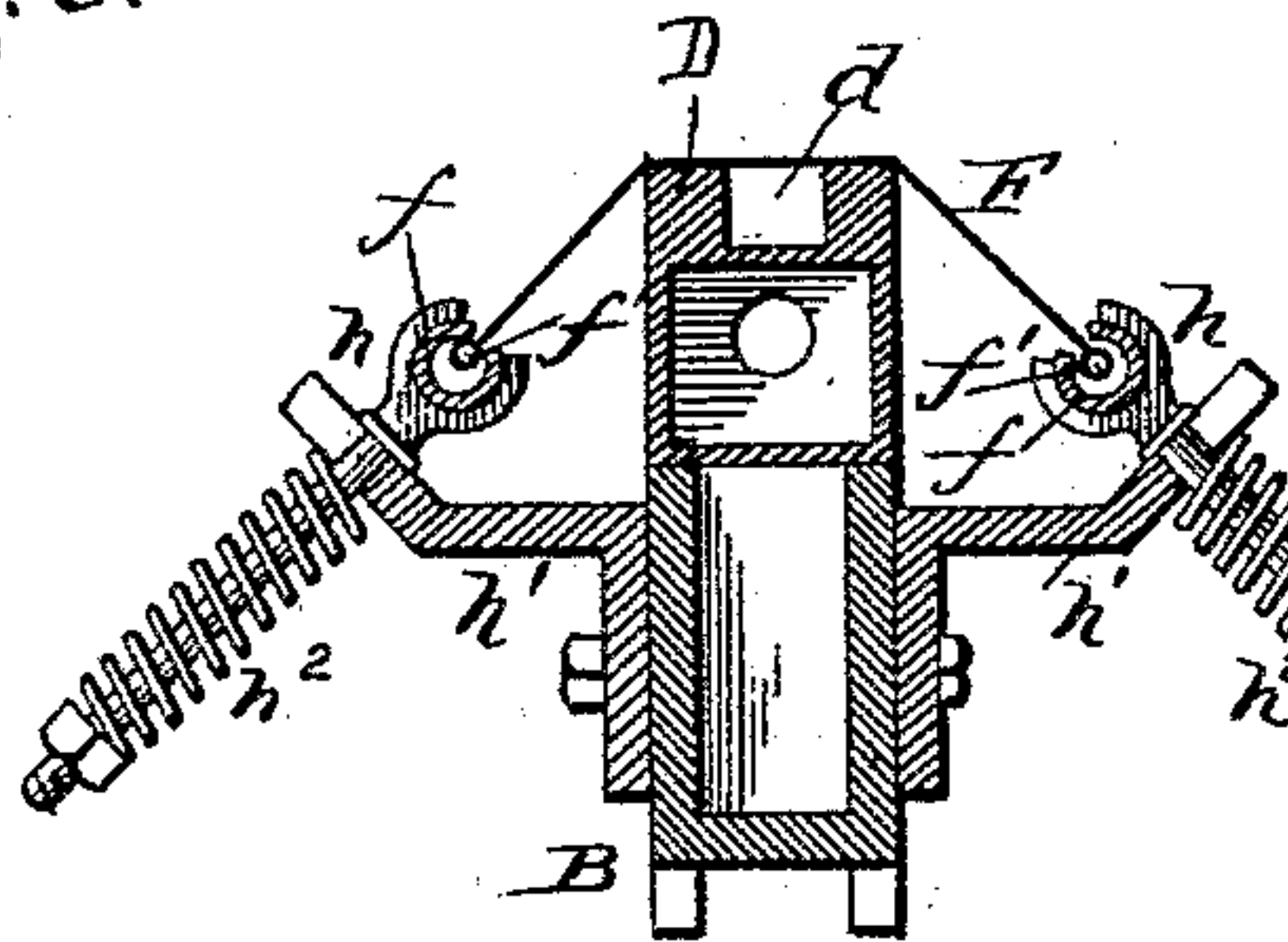
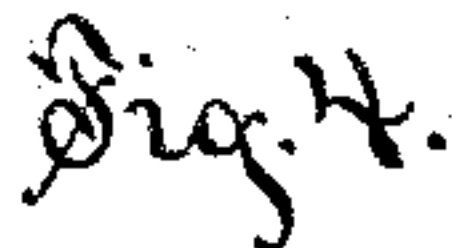
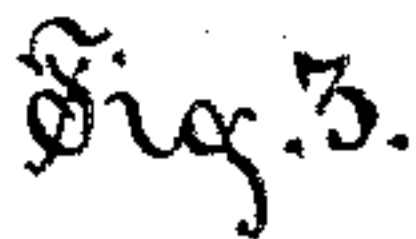
INVENTOR

Charles B. Jameson,
By A. B. Smith & Son,
Attorneys.

2 Sheets—Sheet 2.

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WITNESSES

J. Coleman,
J. Smiric

INVENTOR

Charles R. Jameson,
By Will Smith & Son,
Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES B. JAMESON, OF MANSFIELD, OHIO, ASSIGNOR TO THE BODINE
ROOFING COMPANY, OF SAME PLACE.

WOOD-PULP-BOARD-BENDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 401,353, dated April 16, 1889.

Application filed May 25, 1888. Serial No. 275,095. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. JAMESON, of Mansfield, county of Richland, and State of Ohio, have invented a new and useful Improvement in Wood-Pulp-Board-Bending Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention relates to a machine or press for bending wood-pulp board.

The machine illustrated in the drawings hereto annexed is designed more particularly for bending the edges of sheets of wood-pulp board intended for roofing purposes, to form the joints which run up and down the roof, and which may be in the form of a concavo-convex rib or bead, that upon the edge of one board or sheet overlying the corresponding rib of the board or sheet adjoining it on the side. It has heretofore been found impracticable to bend these wood-pulp boards for purposes such as indicated, owing to the brittle character of the material, which caused it to break instead of bending, and so to render the material useless for the purpose for which it was intended. I have overcome this difficulty in the machine hereinafter described by bending the pulp board, after moistening the portions to be bent, between heated dies and interposed sheets of flexible material under tension, and which serve to hug tightly the surfaces of the board and to bend with and follow the latter closely and snugly and under constant tension into the bends or depressions of the die, and so prevent the material of the latter from cracking or breaking while being subjected to the bending action of the dies, as hereinafter described and claimed.

In the accompanying drawings, Figure 1 is an end elevation of my improved machine, and Fig. 2 is a similar view showing the opposite end to that shown in Fig. 1. Fig. 3 is a side elevation. Fig. 4 is a longitudinal vertical section in line with the central longitudinal gage rod or bar with the lower part of the frame broken away; and Figs. 5 and 6 are detail views showing in section, one an upper fixed die, the other a lower movable die, with the flexible sheets between which the material

is compressed, and means for holding said sheets under tension.

A A indicate suitable uprights; A', the lower and A² the upper horizontal frame-bars uniting the uprights and forming an upright rectangular frame, within which a horizontal frame composed of longitudinal bars B B and transverse connecting-bars B' B' is arranged to slide. The bars composing the frame are for the greater part, preferably, of cast-iron and T-shaped in cross-section; but the longitudinal upper bars of the main frame and the longitudinal bars also of the sliding inner frame are preferably made U-shaped, as shown in the sectional views, Figs. 5 and 6; but any suitable form of bars may be employed, so long as the desired strength of frame is secured without unnecessary weight of material.

C and C' indicate the upper die-bars, being in the present instance the male portions each of the dies, arranged longitudinally of the machine and secured to the under sides of the longitudinal frame-bars A².

D D' are the lower die-bars, located on the longitudinal bars B of the movable frame. These die-bars are made, preferably, rectangular in form in cross-section and hollow to form steam-chambers, the bars C and C' being provided with pendent longitudinal tongues or ribs c, which are adapted to enter and press the material into corresponding grooves, d, in the bars D. One of the hollow die-bars, C', has a steam-supply pipe, a, connected with it at one end, and at its opposite end is connected by a pipe, a', with the bar C, through which the steam passes to said bar C, and thence through said bar and flexible or jointed pipes b b' b² to the die-bar D' of the movable frame. The steam passes through the bar D' and through a pipe, a², connecting its opposite end with the die-bar D, thence through said bar and out through a discharge-pipe, b³, to any suitable point of discharge.

The upper longitudinal bars, A², of the frame have brackets e attached to their sides, and within which are pivoted levers E E', arranged in pairs and provided on their lower ends with U-shaped sockets, within which are held pipes f, having each a longitudinal slit

in one side extending from end to end. Strips or sheets of canvas, F, or other suitable strong and flexible material, are secured (through loops formed in their edges) to rods f' , which are then slipped endwise into the pipes f , the canvas passing out through the slits in the pipes, the rods holding the edges or ends of the canvas within the pipes. The canvas, extending between the levers E and E', passes under the die-bars—one for each, as shown—and, the upper ends of the levers being connected and drawn toward each other by springs g , the canvas is stretched across the face of the die under tension due to the action of the springs, but which allows the canvas to yield or pay itself out to meet the requirements of the die in a manner that will be readily understood. Similar sheets, F', are stretched over the faces of the lower die-bars, held under tension by means of rods in split pipes secured in arms or rods h h' , which in this case are shown arranged to slide in suitable ways or brackets, h' , on the movable frame B B', and held away from each other by springs h^2 , which serve to hold the sheets F' also under constant tension, while permitting them to yield as the sheet is carried into the die.

I is a gage plate or bar secured to elbow-levers I' to overhang the outer edge of one of the die-bars, D', and which levers are pivoted each at its elbow in a bracket, i , attached to and moving with the frame B B'. The horizontal outwardly-projecting arms i i' of this lever are connected through links i^2 through a bar, I², with the machine-frame, and are thereby prevented from rising as the frame B B' rises, while the elbow of the lever, being pivoted to said frame, necessarily rises with the frame. By this arrangement the gage I, which is attached to the upright arm of the lever and is in place when the frame B B' is down to receive the pulp board and determines its position laterally in said frame as the frame rises, is swung outward out of the way of the dies, and is returned to said position again when the frame is lowered to receive another board. Springs i^3 on the links i^2 insure the proper return of the gage-bar to position to receive the board.

K indicates a centrally-arranged longitudinal gage-bar supported at its ends on the end bars, B', of the movable frame and connected therewith through suitable longitudinal slots, k , and bolts or screws k' , which allow it a limited endwise movement. It is held normally at the forward end of its throw or movement by a spring, l , connecting it with the forward bar B'. This bar is provided in front of the rear bar of the frame with a pin or stop, k^2 , which projects both above and below it—above for the inner edge of the pulp board to abut against, and below to abut against the rear bar, B', or other suitable stop to limit its throw and determine the position endwise of the pulp board. The surface of this central gage-bar, K, is below that of the die-bars D and D' to allow the board when placed on the

latter to sag in the center between the die-bars, and so provide the slack necessary for the formation of the ribs and grooves at the sides of the board.

The pulp boards to be operated upon first have their ends moistened in any suitable manner. They are then placed on the die-bars D and D', with one end resting snugly against the side gage and with the center sagging and the rear end thrust against the stop-pin k^2 . It is then pushed inward until the bar K reaches the limit of its backward movement, when it is in the desired position (indicated in dotted lines, Fig. 1) and in readiness to have the dies brought to act upon it.

The means shown for supporting and operating the movable frame carrying the die-bars D and D' are as follows:

M M' represent toggle-links connected by interposed short links or yokes m and pivoted at their ends, one at its lower end to a longitudinal lower frame-bar, A', and the other at its upper end to the lower face of a longitudinal bar, B, of the moving frame, through suitable plates, m' and m^2 , as shown. These links are arranged in pairs, or two or more underneath each die-bar D and D', and its supporting-bar, and those in the same longitudinal plane are connected by a rod, N, which passes through the central perforated connecting-links m , and is threaded at its ends to receive nuts n and n' —one on each side of said central links—for holding them with the connected toggle-links of each pair, respectively, at the same angle of relation to the supporting-bars and moving frame-bars, and to prevent the links m from moving faster at one end than at the other I connect a U-shaped yoke, O, to said ends by the same bolts which unite them to the link-arms M and M'. These yokes project inward toward each other, and have perforated ears on their inner ends, through which the rod N passes, and which serve to prevent the links m from being deflected from their vertical position, and thereby prevent the cramping or bending of the rod N and the unequal movement of the link-arms.

Driving-chains P are connected to the forward ends of the rods N, and extend thence over sprocket-wheels Q on a transverse shaft, R, mounted in suitable bearings on the forward end of the frame, and actuated by means of a lever, S, for vibrating the toggle-links and raising and lowering the movable frame B B', carrying the movable dies D and D' and the pulp board to be operated upon thereby; but any suitable means may be employed for operating said frame and dies, those referred to being shown and described because they have been found effective in practice for the purpose.

The moving frame B B' will of course be provided with suitable angle-irons or projections (indicated at b^4) for guiding and holding it in proper working relation to the machine-frame.

The board to be operated upon being in po-

sition, as above described, the moving dies are forced upward and carry the board with them against the fixed dies C and C', and the edges of the board are bent into the desired form and allowed to stand so compressed between the dies and interposed flexible aprons, the latter being always under tension until the material becomes dry and set in the desired form. In the process the central sag of the board referred to is taken out of it, and said center is lifted above the stop-pin k^2 , allowing the bar K and stop k^2 to be drawn forward by the spring L, in readiness to receive a new sheet or board, and out of the way of the board which has been operated upon and which is thrust rearward out of the machine by the action upon it of a new board in being inserted. The flexible aprons F and F', by the tension exerted upon them, are made to press firmly on the surfaces of the material acted upon, and so to overcome the tendency of the particles to separate and crack open or break apart, and thus destroy the board, and the dies being heated, as described, they are made to warm the material, vaporize the moisture therein, and to dry the boards rapidly, thus hastening the process of bending and setting the material in the desired forms.

Having now described my invention, I claim as new—

1. In a machine for bending wood-pulp board, the combination, with the dies, of the interposed flexible sheets and yielding holders therefor on opposite sides of the dies for keeping the sheets under tension, substantially as described.

2. The combination of fixed and movable hollow dies, interposed flexible sheets between which the material operated upon is pressed into the dies, and yielding holders for said sheets for keeping them under tension, substantially as described.

3. The combination of the fixed and movable hollow dies, the flexible sheets held under tension between said dies, yielding holders for said sheets, and means, substantially as described, for maintaining the tension on said flexible sheets during the operation of bending the material operated upon.

4. The combination of the fixed and movable dies C C' and D D', the steam-pipes a and a' , supplying and connecting the fixed dies, the flexible pipe connecting the fixed and movable dies for supplying steam to the latter, the pipe a^2 , connecting the movable dies, and the exhaust b^3 , all substantially as and for the purpose described.

5. The combination, with the fixed hollow dies, of the movable hollow dies, the steam-pipes connecting said fixed and movable dies and permitting their relative movement toward and away from each other, the frame or support for the movable dies, and the toggle-links connected in pairs to opposite sides of said support for upholding and moving it, those upon the same side being connected to move together, substantially as described.

6. In a machine for molding pulp board, the combination, with the movable frame or table supporting the movable dies, of the parallel hollow dies on said frame, and the toggle-links for upholding and moving said frame, connected in pairs to opposite sides thereof, those upon the same side being connected to move together and all connected to a common shaft or motor for simultaneous movement, substantially as described.

In testimony whereof I have hereunto set my hand this 19th day of May, A. D. 1888.

CHAS. B. JAMESON.

Witnesses:

JOS. W. PAULE,
E. E. BOLLINGER.