

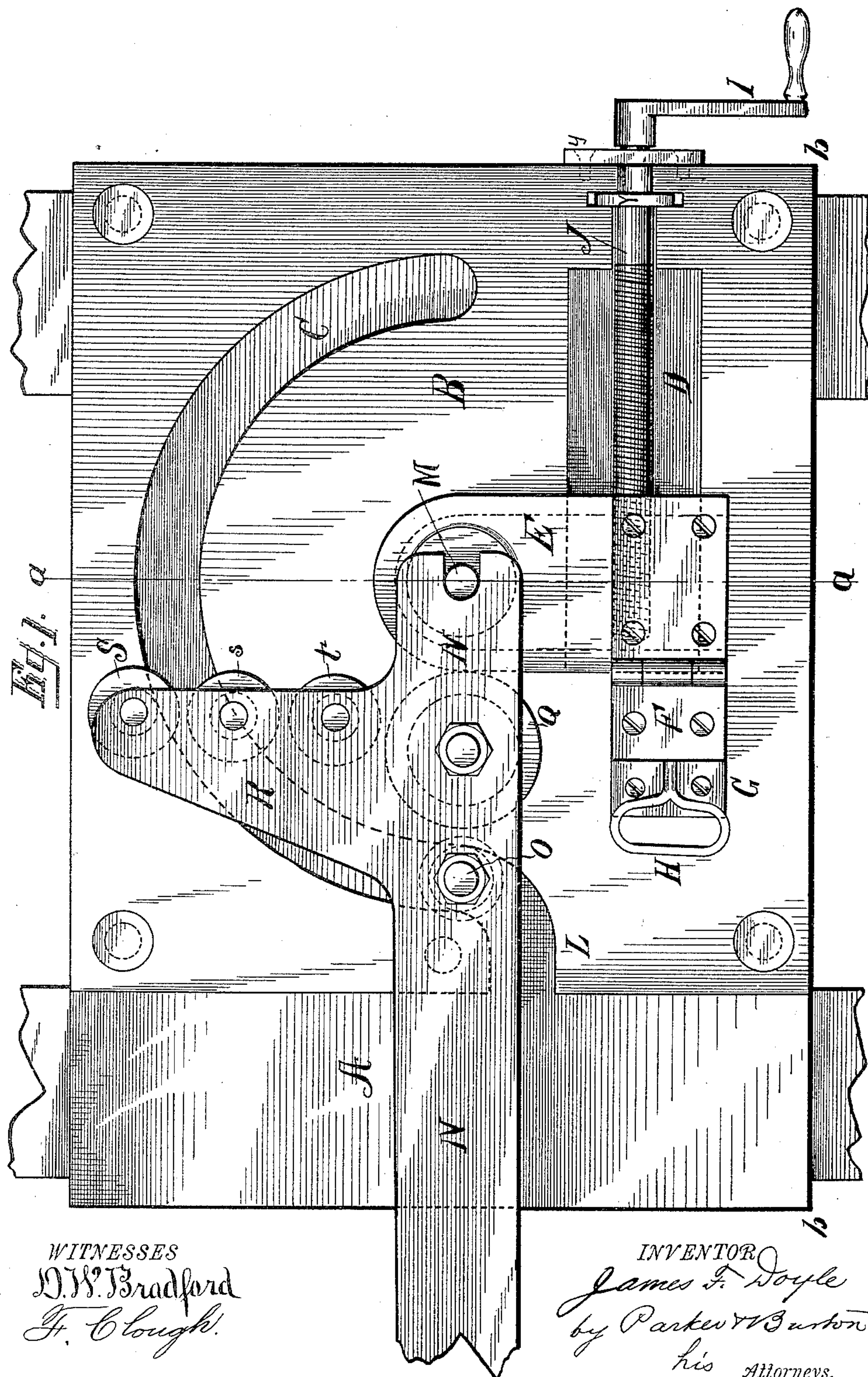
(No Model.)

2 Sheets—Sheet 1.

J. F. DOYLE.
PIPE BENDING MACHINE.

No. 462,538.

Patented Nov. 3, 1891.



(No Model.)

2 Sheets—Sheet 2.

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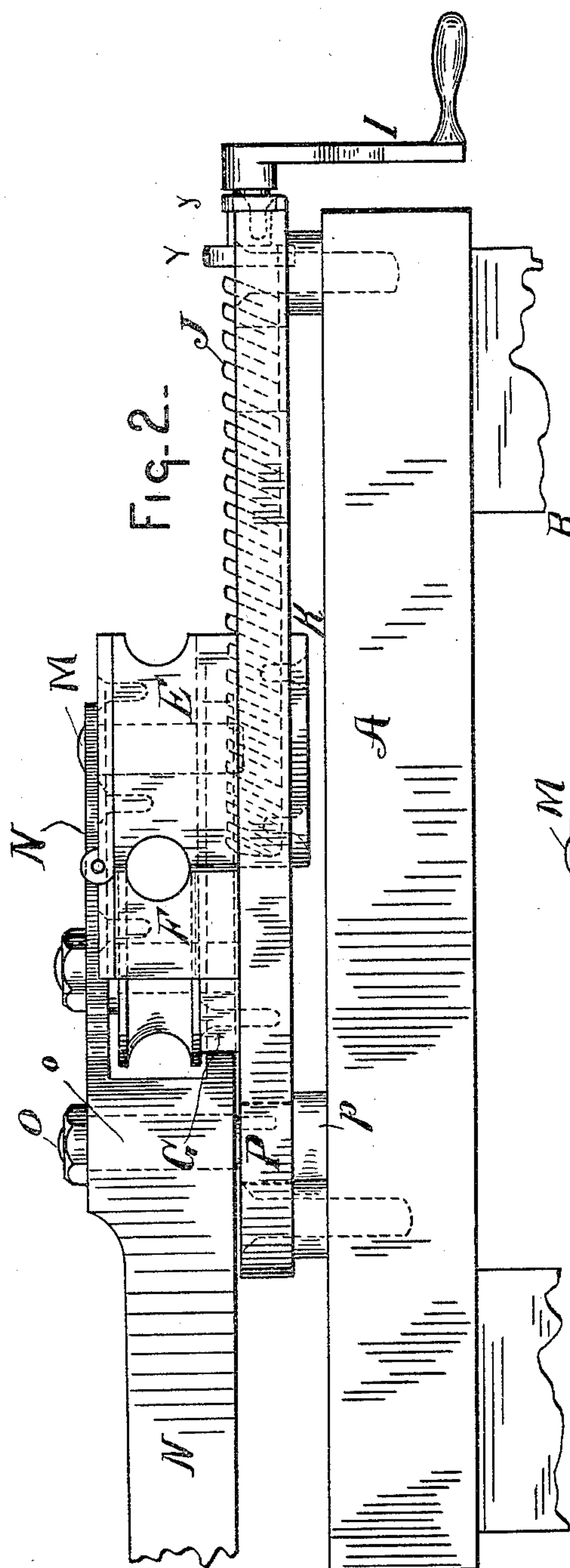


Fig. 2-

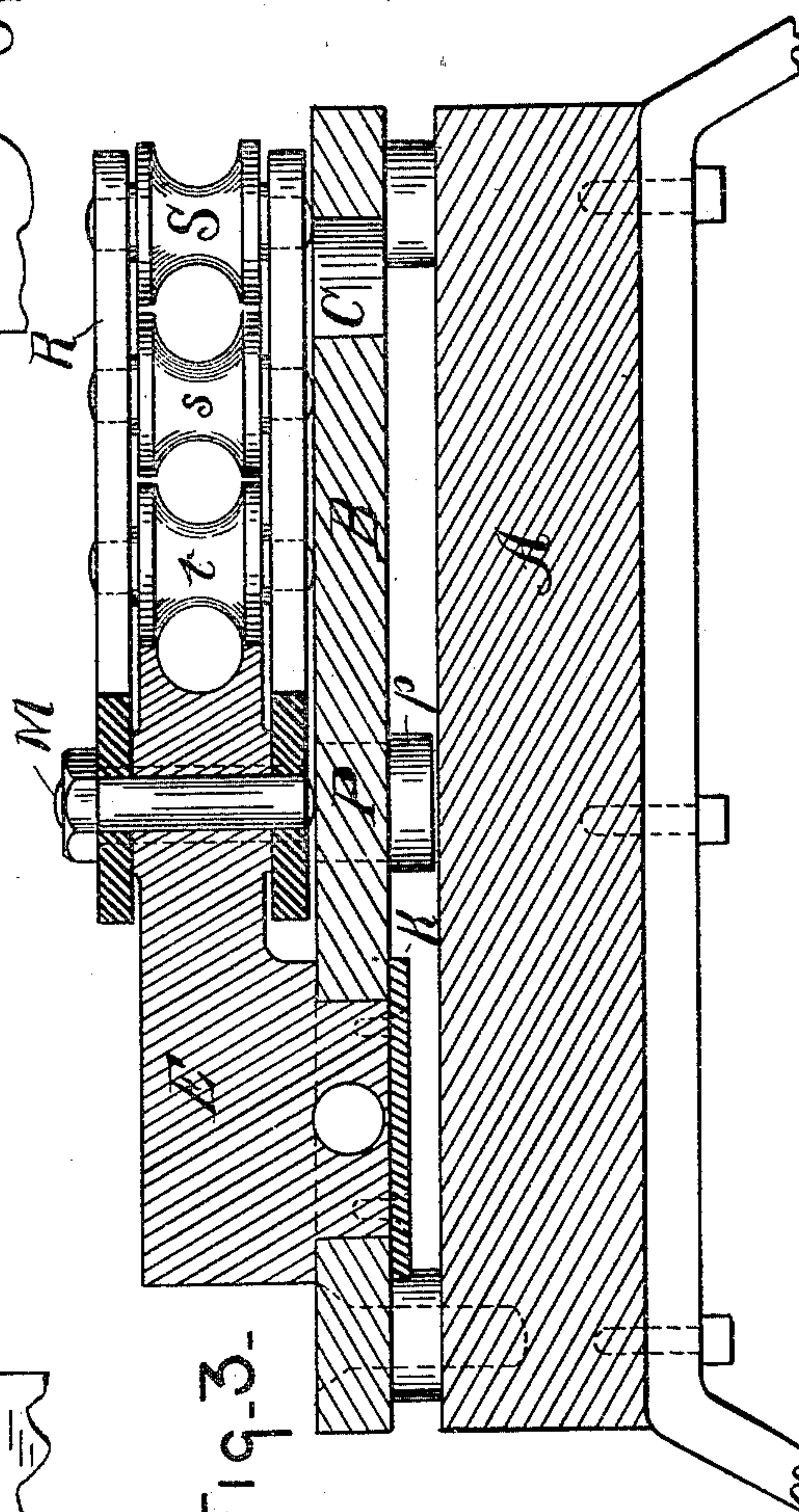


Fig. 3-

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UNITED STATES PATENT OFFICE.

JAMES F. DOYLE, OF DETROIT, MICHIGAN.

PIPE-BENDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 462,538, dated November 3, 1891.

Application filed June 15, 1891. Serial No. 396,240. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. DOYLE, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Pipe-Bending Machines; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to pipe-bending machines, and has for its object a machine by which an iron or other pipe can be bent cold to a full half-turn or less, as may be desired, without producing any of the unequal buckling or collapsing that is usual when empty pipes are bent cold. I accomplish this result by the use of the machine shown in the accompanying drawings and hereinafter described.

In the drawings, Figure 1 represents a plan view. Fig. 2 represents an elevation at the side *b b* of Fig. 1. Fig. 3 represents a section at the line *a a* of Fig. 1.

A represents the top of the table or any other firm support, to which is firmly attached the plate B. Usually the plate B is slightly elevated above the top of the table; but it may be fixed firmly down upon it, providing the guiding cam or groove C is undercut.

Through the plate B is a slot E, within which rests a sliding former E. To the former E is hinged a grip-block F, that normally drops down between the former E and a stop-block G, fixed to the plate B.

H represents a handle attached to the grip-block F, utilized to turn the grip-block F on its hinge. A winch I and screw J serve to press the former E and grip-block F against the stop G or to withdraw them, if desired, the arrangement for accomplishing this purpose being the usual one of turning the screw J, which is held from longitudinal movement by collars Y *y* in or on the former E. A plate K on the under side of the former E overlaps the edges of the opening D and prevents the former from escaping from the opening. Through the plate B is a second opening or slot C, semicircular in form and having an enlarged portion or extended portion L at one

end. This extended portion may be merely an enlargement in the size of the slot C, or it may be cut entirely through the side walls of the piece B. The end of the former E is semicircular and is concentric with the groove C, and at the center of the concentric circles, extending above the top surface of the former E, is a pin or bolt M, against which rests the concave end of the lever N. Through the lever N is passed a pin O, carrying below the lever and in the groove C a shaft *o*, carrying a friction-roller P. (Shown most plainly in Fig. 2.) Below the friction-roller P is the head or cap *p*, that prevents the lever from rising above the plate B or away from it, as the lever N is turned on the center M. There is also mounted on the lever N a roller Q, arranged to rest closely against the former E as the lever N is turned around the center M, and on an arm or offset R, extending from the lever N, are mounted a number of rollers, of which each outer one is slightly nearer to the end of the pipe under operation, when that is first placed in the bending machine and is straight than is the next roll toward the bending or forming roll Q. Thus the roll S leads slightly the roll *s* and the roll *s* leads slightly the roll *t* and the roll *t* leads slightly the forming-roll Q. The former E and the rolls S, *s*, *t*, and Q are all grooved with a radius of curvature equal or nearly equal to the pipe to be operated on. The grip-block F is grooved with a radius slightly greater than that of the pipe to be operated on, so that the tubular opening between the former E and the grip-block F is slightly smaller in what may be called its "horizontal diameter" (shown in Fig. 2 and 3) than the pipe which it is desired to bend, and thus I insure a tight grip on the pipe.

The pipe to be bent is placed through the tubular opening between the former E and the grip-block F, with the end to be bent extending beyond the curved part of the former E and in front of the rollers Q *t*, &c. The lever N is then pulled round, and the rollers pressed against the pipe, because of the movement of the roller Q in the circular slot C, bend the pipe into a quarter or half circle, as may be desired. After the pipe is bent into the required curve the lever N is returned until the roll Q passes into the part L of the

slot C and is removed from over the pipe. As soon as this is done the grip may be loosened, the grip-block F lifted, and the pipe removed.

Having thus described my invention, what I claim as novel, and desire to have secured to me by Letters Patent, is—

1. In a pipe-bending machine, the combination of a holding-plate, a sliding block arranged as a former to form the inner curve of a pipe to be bent, a pin or stud on said former, a curved slot in said plate, a lever arranged to rest against and turn around said pin or slot, a guiding-roll on said lever arranged to move in and be guided by the said slot, and a forming-roll carried by said lever, all substantially as and for the purpose described.

2. In a machine for bending pipe, a plate having curved slots C, the former E, with the stud M, concentric to the slot C, the lever N, turning on the stud M and held to it by the pin O, and the former-wheel Q, all combined and arranged as described, and for the purpose specified.

3. In a pipe-bending machine, the plate having a curved slot with an extension out at one end, and a lever turning on a pin concentric to said slot and held therein at all times by a pin O, but capable of removal out of the said slot when the pin O passes into said extension, substantially as and for the purpose described.

4. In a pipe-bending machine, a former having a curvature arranged to fit the inside of the desired bend, a lever turning on a pin central to the curvature of said former, a former-wheel mounted on said lever, and one or more supplemental wheels also mounted on said lever, each of said supplemental wheels being slightly in lead of the next wheel between it and said former-wheel, substantially as and for the purpose described.

JAMES F. DOYLE.

Witnesses:

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