(No Model.)

4 Sheets—Sheet 1.

J. B. ROOT.

SPIRAL PIPE MACHINE.

No. 346,500. Patented Aug. 3, 1886.

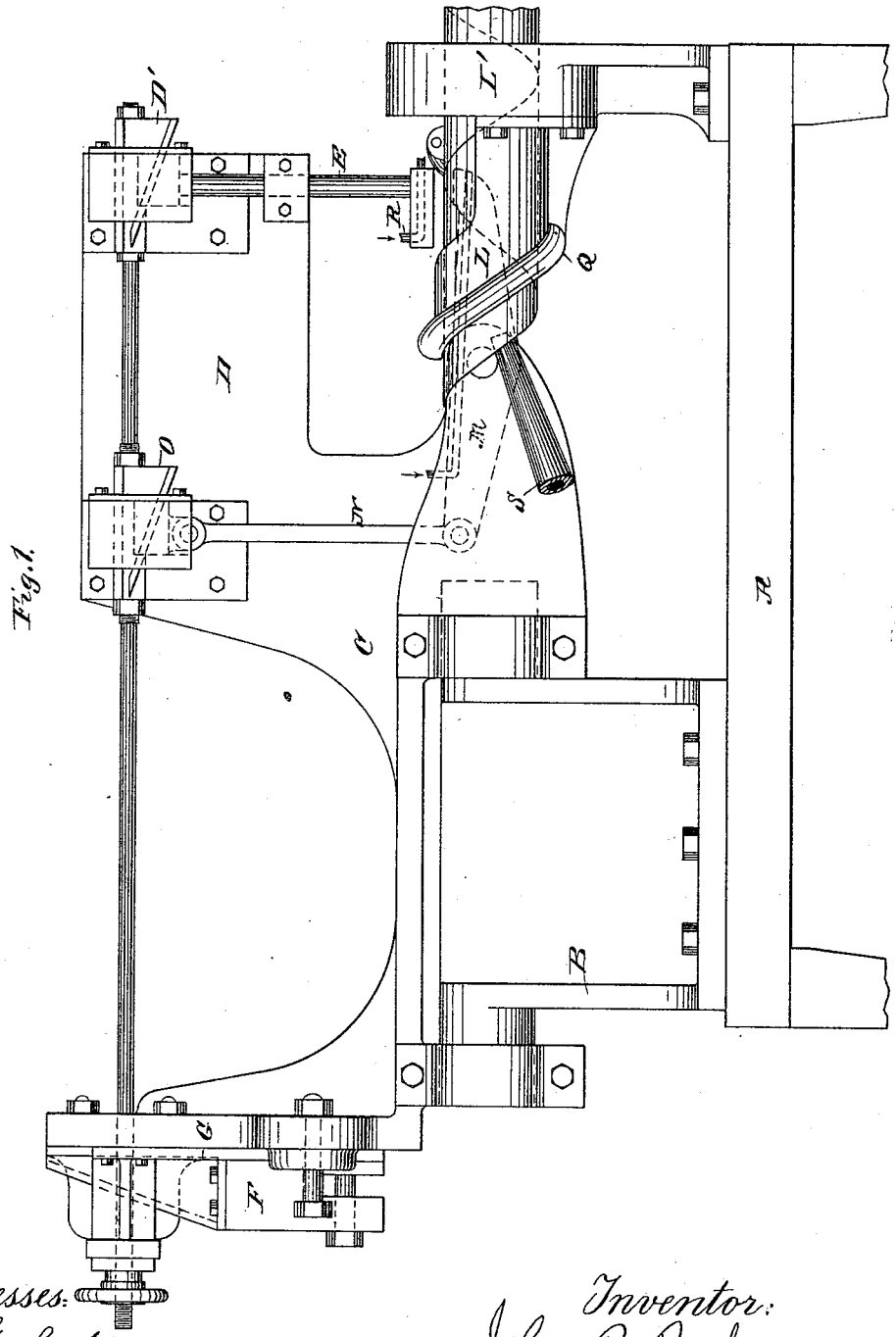

Fig. 1.

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Robt. H. Duncan

Inventor:
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by Paul A. Duncan
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(No Model.)

4 Sheets—Sheet 2.

J. B. ROOT.

SPIRAL PIPE MACHINE.

No. 346,500. Patented Aug. 3, 1886.

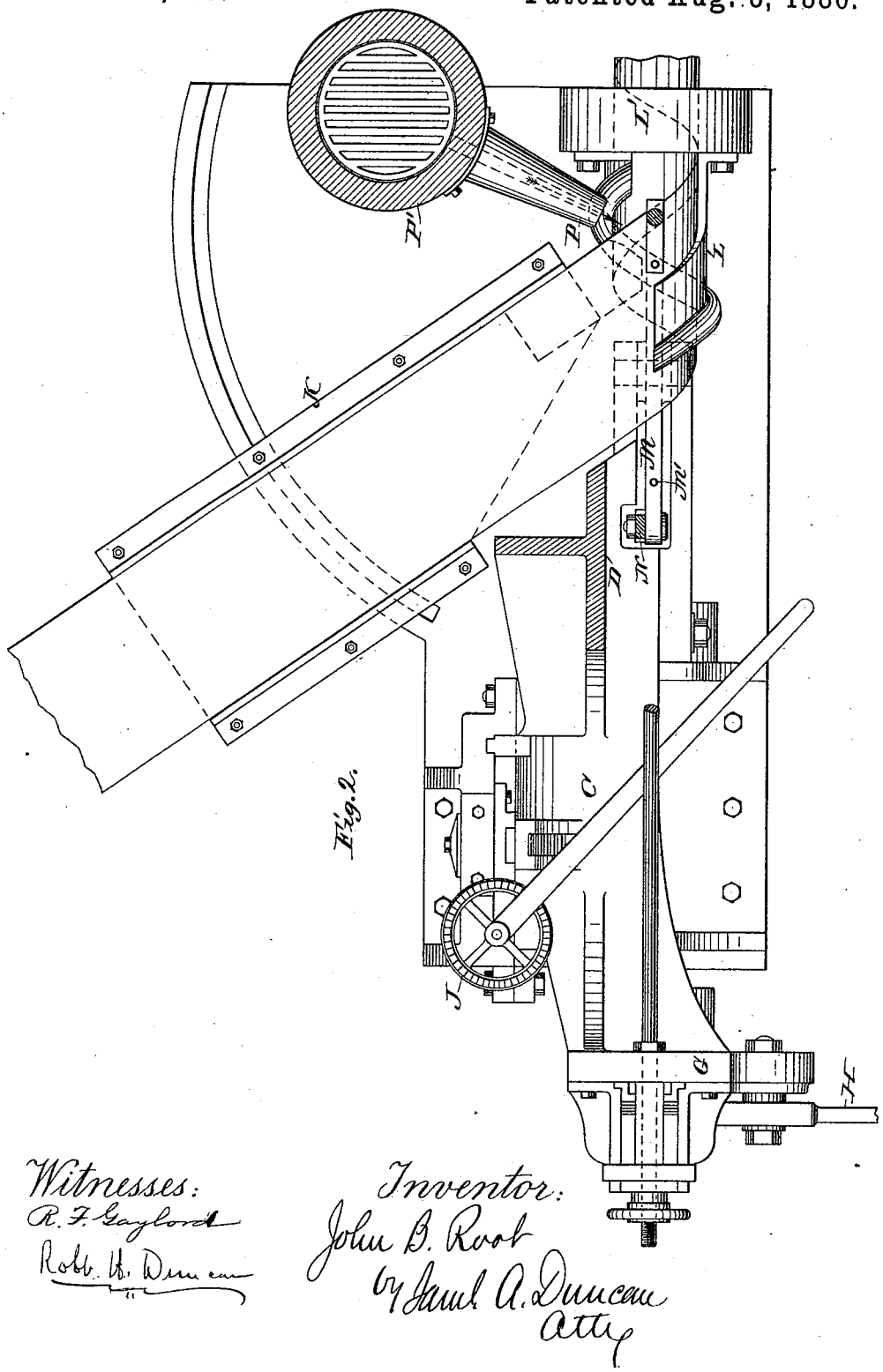

Fig. 2.

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(No Model.)

4 Sheets—Sheet 3.

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SPIRAL PIPE MACHINE.

No. 346,500. Patented Aug. 3, 1886.

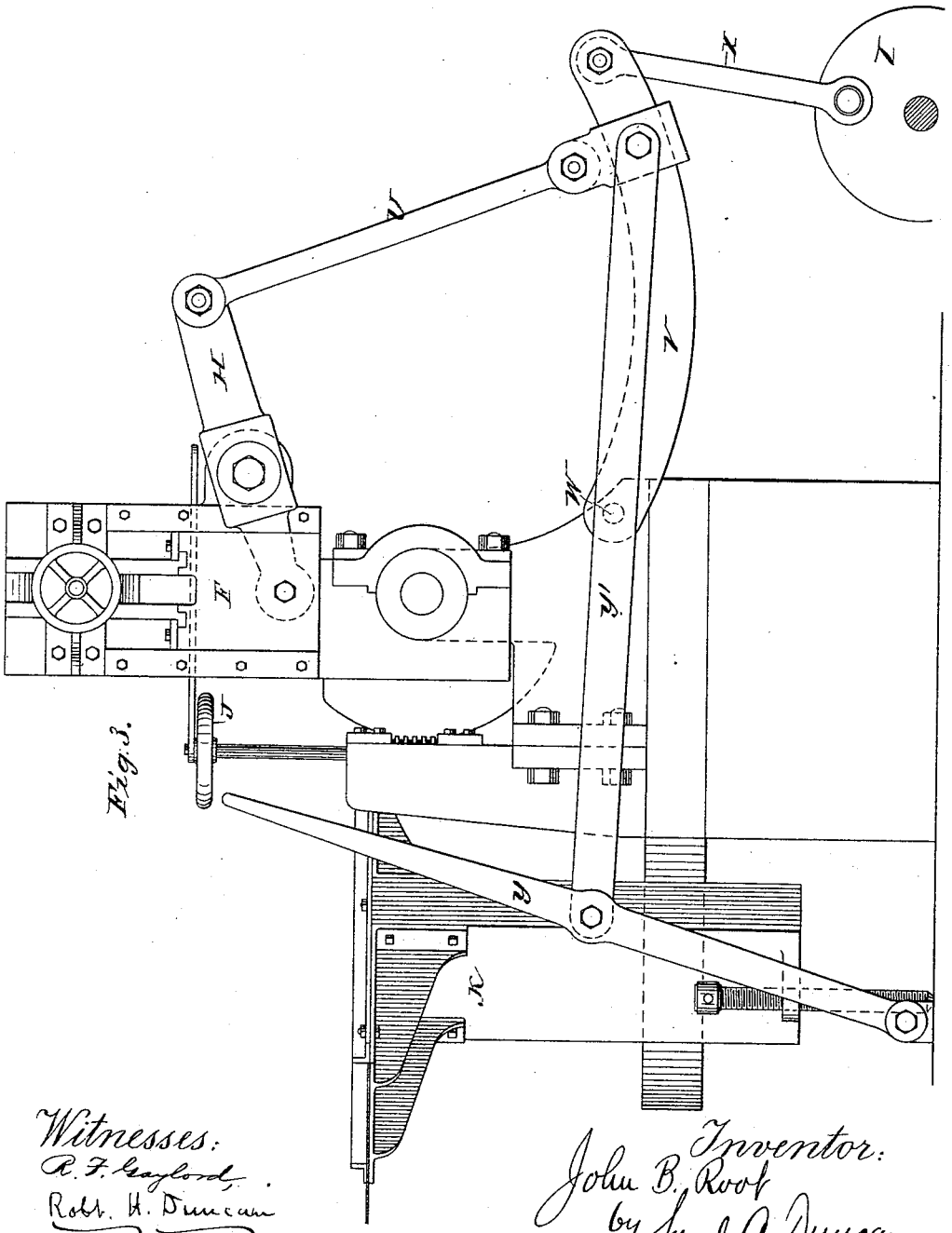

Fig. 3.

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(No Model.) 4 Sheets—Sheet 4.

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SPIRAL PIPE MACHINE.

No. 346,500. Patented Aug. 3, 1886.

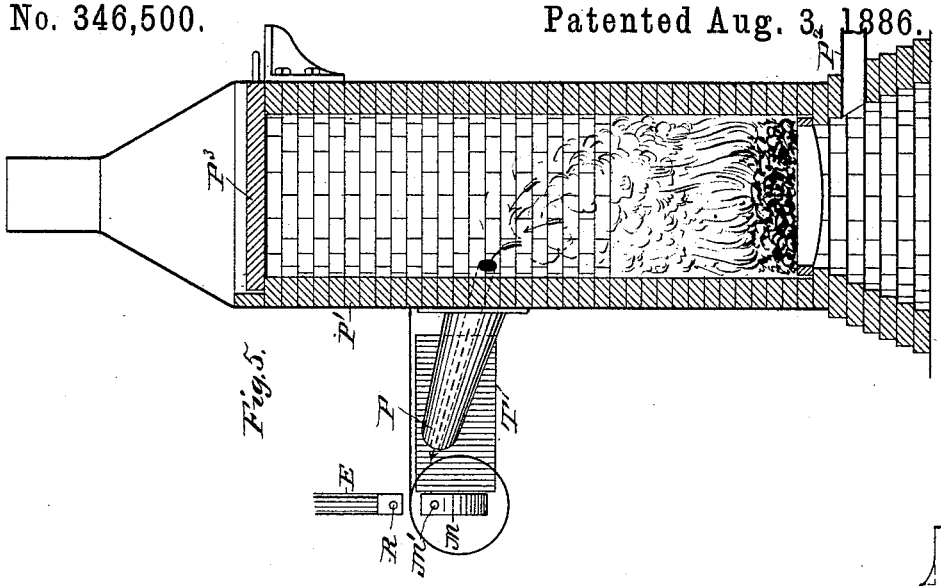

Fig. 5.

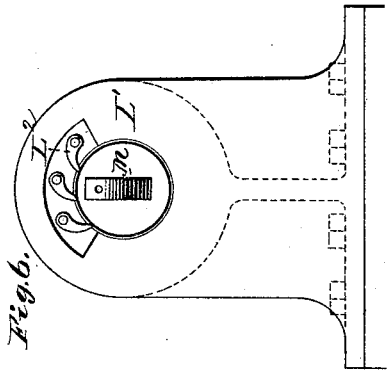

Fig. 6.

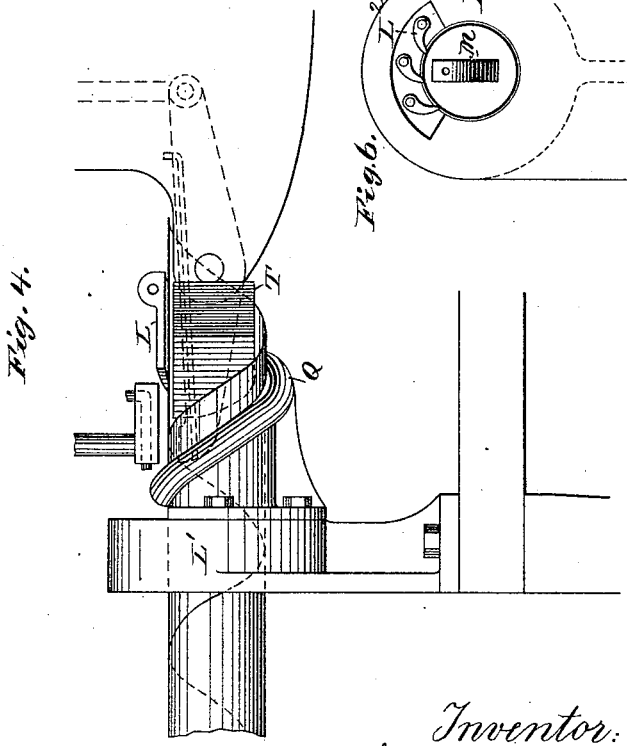

Fig. 4.

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UNITED STATES PATENT OFFICE.

JOHN B. ROOT, OF PORT CHESTER, NEW YORK.

SPIRAL-PIPE MACHINE.

SPECIFICATION forming part of Letters Patent No. 346,500, dated August 3, 1886.

Application filed October 18, 1883. Serial No. 109,401. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. ROOT, of Port Chester, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Spiral-Pipe Machines; and I herewith declare the same in and by the following full, clear, and exact description thereof, which will enable others skilled in the art to which they appertain to make and use the same.

These improvements relate to the spiral-pipe forming and riveting machine shown and described in Letters Patent of the United States No. 271,740, granted me February 6, 1883; and they consist in means for adapting that machine to forming spiral pipe having its seams welded or fused together.

In the accompanying drawings, Figure 1 is an elevation view of a machine embodying the present improvements. Fig. 2 is a plan view thereof. Fig. 3 is an end view thereof. Fig. 4 is a view of the clamping mechanism from the side opposite that shown in Fig. 1. Fig. 5 is a detail view from the same position of the clamping mechanism and blank, showing, likewise, the furnace in section; and Fig. 6 is a front elevation view of the shaping-ring and its supports.

Referring to these views in detail, A indicates the bed of the machine; B, the supports and bearings of the spirally-reciprocating saddle C; D, the frame, which rises from the saddle and supports the wedge that actuates the seam-closing bar E; F, a wedge moving in vertical ways on the upright G of the saddle and operated by a lever, H, attached at its fulcrum-point to the same upright and connected at its outer end with a driving-wheel, I. J is the hand-wheel which governs the longitudinal throw of the saddle. K is the adjustable feed-roll frame, and L is the shaping-ring, which assists in giving cylindrical form to the blank, all as more fully described in said patent.

Pivotally secured to the front end of the saddle is a clamping-lever, M, which reaches within the shaping-ring to just below the head of the clamping-bar. This lever has a suitable clamping-face at its outer end, and is connected at its inner end by a pitman, N, with the block of a wedge, O, arranged on the same rod as is the clamping-bar wedge. The action of these parts is this: The first part of the swing of the saddle-lever moves the vertically-reciprocating wedge F upward, which causes the wedges D′ and O to move inwardly, thus bringing the outer end of the clamping-lever and the head of the clamping-bar together, and closing down the seam or the overlapping edges of the blank which lie between them. As said wedges become fixed, the further swing of the saddle-lever throws the saddle in a spiral direction on its bearings, thus drawing the clamped blank forward and forming it within the shaping-ring. As the saddle-lever begins its return or upward swing, it first acts to withdraw the vertical wedge, which its shorter arm is connected with, and thereby pushes out the horizontal clamping-wedges and separates the clamping bar and lever, so that they lose their hold upon the blank. These several wedges now reach the end of their play, and the further upward swing of the saddle-lever causes the saddle to return to its first position, during which return movement, of course, the blank is stationary.

In this machine I have mounted the shaping-ring on a fixed support, L′, as it thus acts, in conjunction with the clamping and feeding mechanism, to shape and retain the blank in a manner permitting the omission of the commonly-used mandrel or shaping-bar. The blank is held in its forward position by pawls L^2, which catch and hold it when the saddle returns, but permit its forward spiral movement when the saddle advances. These pawls may, however, be substituted by other devices arranged to accomplish the same end, and I do not therefore confine myself to them alone. Extending around the shaping-ring is a waterway, Q, through which a stream of water may be forced for the purpose of keeping such ring cool, and a like passage, R, extends through the head of the clamping-bar, as also one, M′, through the clamping-lever, for the same purpose. These passages are connected with some source of water by flexible connections so arranged as not to interfere with the operation of the machine. A nozzle, S, connected with an air-blowing or force pump or similar mechanism, is located at and within the inner end of the shaping-ring, and its purpose is to produce a draft of air through the finished pipe, and thereby carry off any smoke or steam that

may occur at the place of welding, and permit the operator to have the heated portion of the blank constantly in view. It also serves, as is manifest, to keep the working parts cool.

A further protection against undue heating of the parts of the machine consists in a fire-brick block, T, (shown in plan in dotted lines in Fig. 2 and in elevation in Figs. 4 and 5,) suitably supported under the blank, where it receives the jet and directs it upon the blank, it being so arranged that the greater portion of the flame and heat impinges against the blank. This block serves also to preserve uniformity in the heating process by itself retaining and applying the heat, and thereby reducing the effect of irregular action of the jet.

The character of the seam is immaterial to the general operation of the machine. It may be simply overlapping and be set down and welded together by the clamping bar and lever, as is here particularly designed; or it may be an offset seam, or a locking or any other form of seam adapted to be closed by the devices shown.

To effect the closing of the seam the overlapping edges are brought to the proper welding condition by a heating-jet directed upon them at and near the point of junction, which jet is continuously maintained while the machine is in operation. Such a jet is shown at P, and it is derived from a furnace, P′, which is provided with a blast-pipe, P^2, and a fire-brick damper, P^3, arranged to regulate the heating-jet by controlling the heat passing off through the stack-pipe of the furnace.

It is to be particularly noticed that the heating-jet is applied only to the edges of the blank to be welded together, and while the blank is being drawn into the machine and shaped into cylindrical form.

I am aware that various heating devices have been used in connection with machines for welding, and that flames or jets have been used for maintaining or increasing the heat of blanks previously heated by a furnace or other separate means; but I am not aware that a heating-jet has been used in the manner herein contemplated by me—that is, to bring the overlapping edges of a pipe-blank to a welding heat in a machine adapted to shape the blank and weld its edges together, and to operate continuously for any desired time.

In Fig. 3 I show improved means for adjusting the circular throw of the saddle. I have heretofore connected the pitman U of the saddle-lever directly to the crank-pin of the driving-wheel I; but in this case I connect this pitman with the driving-wheel through the medium of the arc V, which passes through the lower end of such pitman, and has one end fixed at W, and the other end connected with the driving-wheel by a crank-arm, X. A lever, Y, serves, by means of a connecting-rod, Y′, to move the lower end of the pitman along this arc, which alters the length of the swing of the saddle-lever, and therefore the circular throw of the saddle. This means of adjustment is for regulating the feed of the blank to the time necessary to properly heat its edge. In the manufacture of quite thin pipe it is plain that the proper heating of the blank is quickly accomplished, and that it may be drawn in at the highest practicable speed of the machine; but in making pipe of thick metal more time is required to heat the blank, and its feed must be correspondingly slower. So, too, the power of the jet may vary, and thereby demand a change in the speed of the blank, whatever its thickness may be. These means of adjusting the operation of the machine are further particularly useful, because they can be operated while the machine is running, and with the similarly-operated device that governs the longitudinal throw of the saddle, and the means for regulating the intensity of the jet, they put the entire action of the machine under the control of the operator.

What is claimed as new is—

1. In a spiral-pipe machine, the combination of a spirally-reciprocating saddle, a clamping mechanism borne thereon, consisting of an inner clamping-lever and an outer clamping-bar, and operating-connections uniting said clamping mechanism and the saddle with the driving mechanism.

2. In a spiral-pipe machine, the combination of a spirally-reciprocating saddle, a clamping mechanism borne thereon, consisting of an inner clamping-lever and an outer clamping-bar, and wedges for operating said lever and bar, and operating-connections uniting said clamping mechanism and the saddle with the driving mechanism.

3. In a spiral-pipe machine, the combination of the reciprocating saddle C, the clamping mechanism D′ E M O, the wedge F, for operating said clamping mechanism, and the lever H, for rocking the saddle and driving the wedge F, substantially as described.

4. The combination of the clamping and blank-advancing mechanism of a spiral-pipe machine with a fixed shaping-ring, substantially as described.

5. In a spiral-pipe machine, the combination of the welding-bar E and the lever M, each provided with water-passages, substantially as and for the purpose described.

6. In a spiral-pipe machine, the shaping-ring L, provided with a water-passage, Q, substantially as and for the purpose set forth.

7. In a spiral-pipe machine, a fixed shaping-ring provided with pawls arranged to prevent the backward movement of the blank.

8. In a spiral-pipe machine, the combination of the saddle C, the pitman U, attached thereto, and the arc V, with its connection with the driving mechanism, substantially as described.

9. The combination, in a spiral-pipe machine, of spirally-reciprocating blank shaping and welding mechanism, and a heating-jet applied to the overlapping edges of the

blank at their point of junction, substantially as described.

10. The combination, in a spiral-pipe machine, of spirally-reciprocating blank shaping and welding mechanism, a heating-jet applied to the overlapping edges of the blank at their point of junction, and a fire-brick arranged to receive and direct the heating-jet upon the overlapping edges of the blank, substantially as described.

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R. F. GAYLORD.