No. 774,377. PATENTED NOV. 8, 1904.

L. H. BRINKMAN.

APPARATUS FOR BENDING PIPE.

APPLICATION FILED AUG. 19, 1904.

NO MODEL.

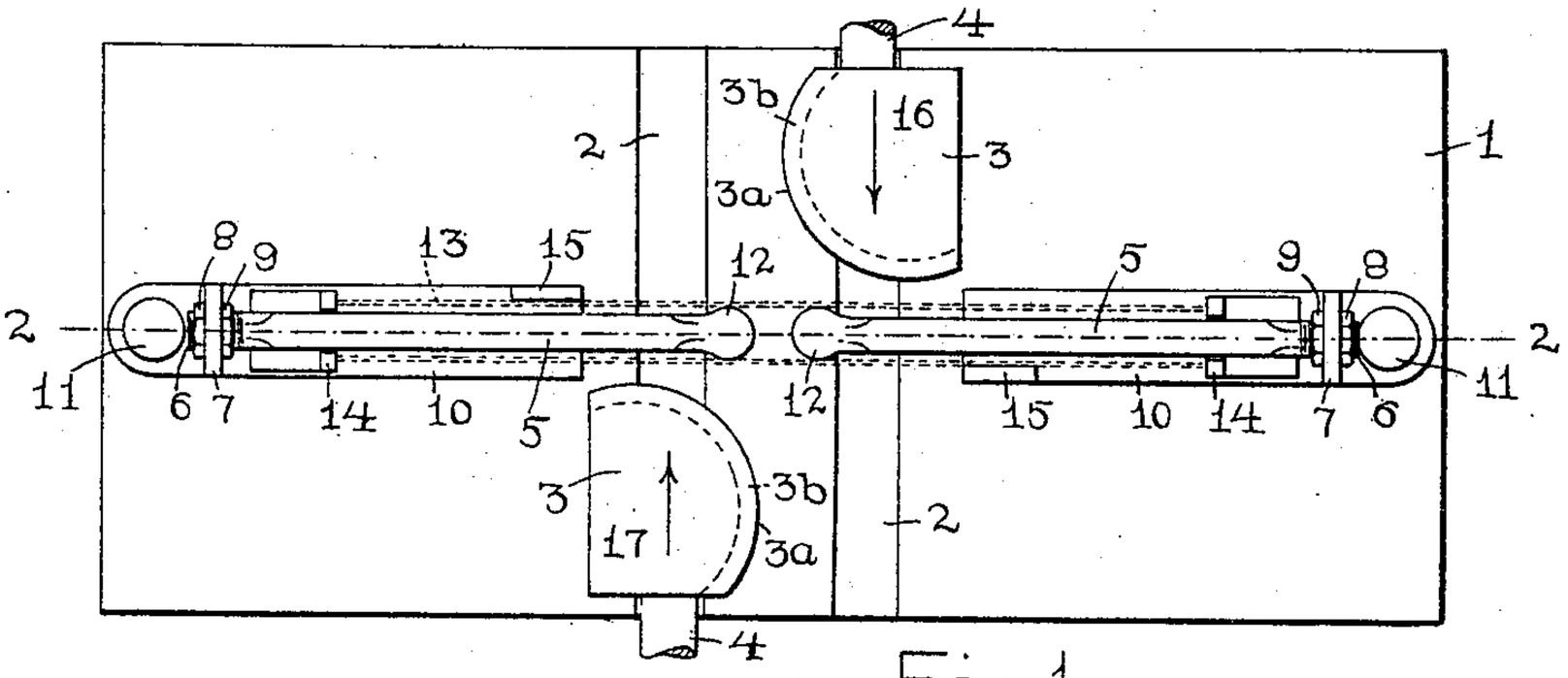

Fig. 1.

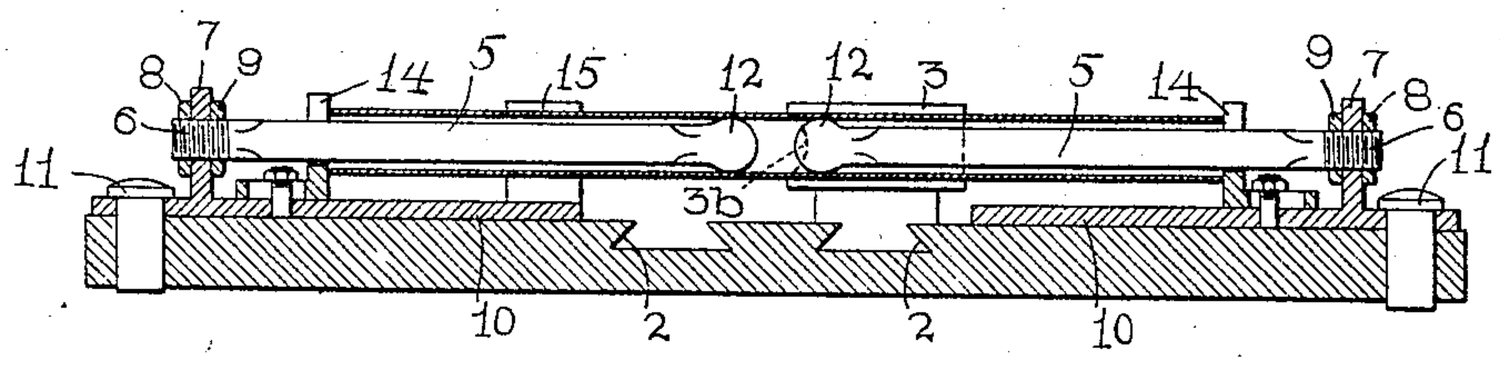

Fig. 2

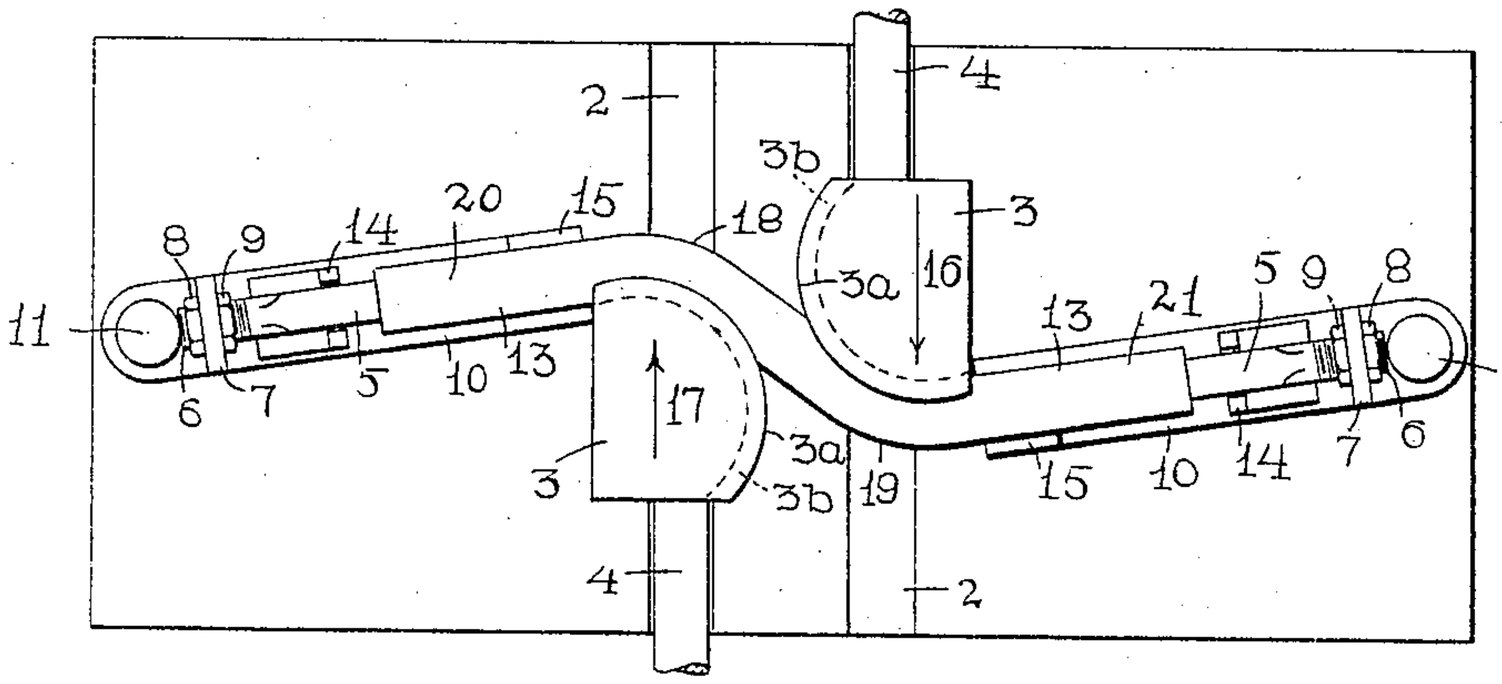

Fig. 3.

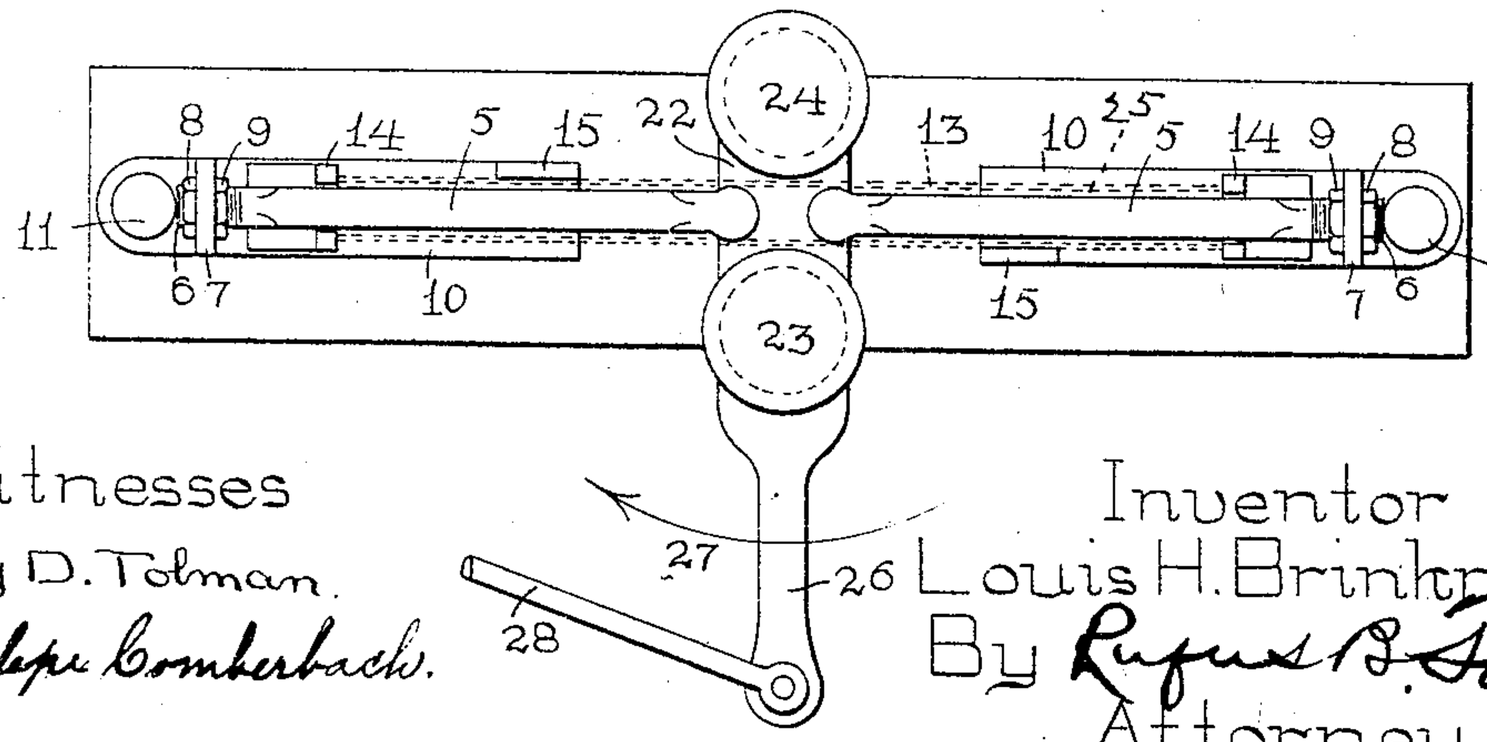

Fig. 4

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No. 774,377. Patented November 8, 1904.

UNITED STATES PATENT OFFICE.

LOUIS H. BRINKMAN, OF WEST HARTFORD, CONNECTICUT, ASSIGNOR TO WHITLOCK COIL PIPE COMPANY, OF WEST HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

APPARATUS FOR BENDING PIPE.

SPECIFICATION forming part of Letters Patent No. 774,377, dated November 8, 1904.

Application filed August 19, 1904. Serial No. 221,314. (No model.)

To all whom it may concern:

Be it known that I, LOUIS H. BRINKMAN, a citizen of the United States, residing at West Hartford, in the county of Hartford and State of Connecticut, have invented a new and useful Improvement in Apparatus for Bending Pipe, of which the following is a specification, accompanied by drawings forming a part of the same, in which—

Figure 1 represents a plan view of so much of my improved apparatus as is necessary to illustrate the character of my present invention. Fig. 2 is a vertical sectional view on line 2 2, Fig. 1. Fig. 3 is a plan view showing the position of the operating parts after a pipe has been bent, and Fig. 4 is a top view showing a modified form of the apparatus.

Similar reference characters refer to similar parts in the different views.

The object of my present invention is to provide an apparatus for imparting to pipes a double or reverse bend; and it consists in the construction and arrangement of parts, as hereinafter described, and set forth in the annexed claims.

Referring to the accompanying drawings, 1 denotes a table or supporting-bed provided with ways 2 2 for a pair of reciprocating formers 3 3, capable of sliding in the ways 2 2 and attached to actuating-rods 4 4, which are operatively connected with suitable mechanism for reciprocating the formers—such, for example, as a piston-equipped hydraulic cylinder. (Not shown.) The formers 3 3 are provided with opposing curved sides 3^a, having semicircular grooves 3^b, as represented by broken lines in Fig. 2. Between the formers 3 3 and in alinement with each other are a pair of mandrels 5 5, having their outer ends screw-threaded at 6 and held in the upturned brackets 7 7 by means of clamping-nuts 8 9. The brackets 7 7 are carried upon swinging arms 10 10, pivoted upon studs 11 11, held in the table 1. The inner ends 12 12 of the mandrels 5 5 are preferably spherical in shape and of sufficient diameter to substantially fill the interior of a pipe 13, held in the mandrels in position to be bent.

Adjustably held upon the arms 10 10 are angular stop-plates 14 14, adapted to bear against the opposite ends of a pipe held on the mandrels and adjust the position of the pipe on the mandrels. The inner ends of the swinging arms 10 10 are provided with upturned flanges 15 15 on that side of the mandrel opposite from the formers 3 3, said flanges being adapted to bear against the pipe held on the mandrels and cause the pushing strain applied to the pipe by the reciprocating formers in the operation of bending to be imparted to the swinging arms 10 10.

The operation of bending a pipe by my improved apparatus is as follows: The pipe 13 to be bent is placed upon the mandrels, which may be accomplished by removing one of the mandrels from its supporting-bracket, and the pipe is then longitudinally adjusted on the mandrels by means of the angular stop-plates 14 14. A simultaneous reciprocating movement in the direction of the arrows 16 17 is then imparted to the reciprocating formers 3 3 until the advance ends of the formers are moved past each other, as shown in Fig. 3, causing the swinging arms 10 10 to be swung on their pivotal studs 11 11 in opposite directions, as shown in Fig. 3, and allowing the reverse bends 18 19 to be imparted to the pipe 13. As the pipe 13 is caught between the opposing ends of the formers 3 and held from longitudinal movement the swinging movement of the arms 10 10 will cause the opposite ends of the pipe to be drawn from the mandrels 5 5 and away from the stop-plates 14, and the mandrels 5 5 will serve to hold the opposite ends of the pipe from bending, forming straight sections 20 21 between the reverse bends and the ends of the pipe.

In Fig. 4 I have shown a modified form of my apparatus, which consists in substituting for the pair of reciprocating formers 3 3 a lever 22, extending between the inner ends of the mandrels 5 5 and the table 1 and carrying thereon the grooved disks 23 24, arranged to bear against the opposite ends of a pipe held upon the mandrels 5 5 in the position indicated by the broken lines 25. The lever 22 is pro-

vided with a handle 26, to which power may be applied to rock the lever in the direction of the arrow 27 by any suitable means—such as, for example, connecting the end of the handle by a link 28 with a piston-equipped hydraulic cylinder. (Not shown.) The rocking movement of the lever 22 will carry the grooved disks 23 and 24 against opposite sides of the pipe, but in different planes, causing a reverse bend to be imparted to the pipe similar to that shown as produced by the formers 3 3 in plan view in Fig. 3.

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

1. In a pipe-bending apparatus, the combination with a supporting table or framework, of a pair of mandrels normally held in alinement and arranged to receive the pipe to be bent upon their inner ends, said mandrels being capable of a swinging movement about axes at right angles to the axes of the mandrels, a pair of formers, and means for moving said formers against opposite sides of the pipe to be bent and in different planes.

2. In a pipe-bending apparatus, the combination with a framework, of a pair of mandrels normally held in alinement and adapted to receive the pipe to be bent on their adjacent ends, said mandrels having fixed pivotal connections with the framework, whereby they are capable of swinging on axes at right angles to the axes of the mandrels, a pair of reciprocating formers on opposite sides of said mandrels, means for moving said formers in opposite directions and in different planes against a pipe held on said mandrels, whereby a reverse bend is imparted to the pipe.

3. In a pipe-bending apparatus, the combination with a supporting-frame, of a pair of swinging arms pivoted at their outer ends to said frame, brackets supported by said arms near their pivoted ends, a pair of mandrels held at their outer ends in said brackets, with the axes of said mandrels normally in alinement, and a pair of movable formers arranged to bear against opposite sides of said mandrels.

4. In a pipe-bending apparatus, the combination with a supporting-frame, of a pair of swinging arms pivotally supported on said frame, a pair of mandrels carried by said arms and normally held in alinement, and adapted to receive the pipe to be bent on their adjacent ends, and means for applying pressure in opposite directions to a pipe held on said mandrels and in different planes.

5. In a pipe-bending apparatus, the combination of means for holding the pipe to be bent between a pair of movable formers, and comprising a pair of mandrels inserted in opposite ends of the pipe, and a pair of movable formers arranged to bear against opposite sides of the pipe and in different planes.

6. In a pipe-bending apparatus, the combination of means for holding the pipe to be bent between a pair of movable formers and comprising a pair of mandrels pivoted at their outer ends and having their free ends inserted in the opposite ends of the pipe, a pair of movable formers arranged to bear against the opposite sides of the pipe and in different planes, whereby bending strains are imparted to the pipe in different planes, and means for longitudinally adjusting the pipe on said mandrels.

7. In a pipe-bending apparatus, the combination with a pair of movable formers for applying bending strains to the pipe in different planes and in opposite directions, of a pair of mandrels held at their outer ends with their inner and free ends arranged to be inserted in the pipe, swinging arms supporting said mandrels, and stop-plates adjustably held on said swinging arms and adapted to bear against the opposite ends of a pipe held on the mandrels.

Dated this 15th day of August, 1904.

LOUIS H. BRINKMAN.

Witnesses:

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