J. M. LEVIER.

PIPE BENDER.

APPLICATION FILED MAR. 12, 1907.

906,727. Patented Dec. 15, 1908.

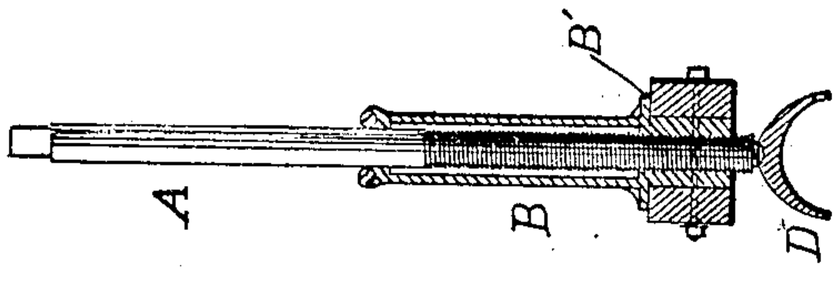

Fig. 3

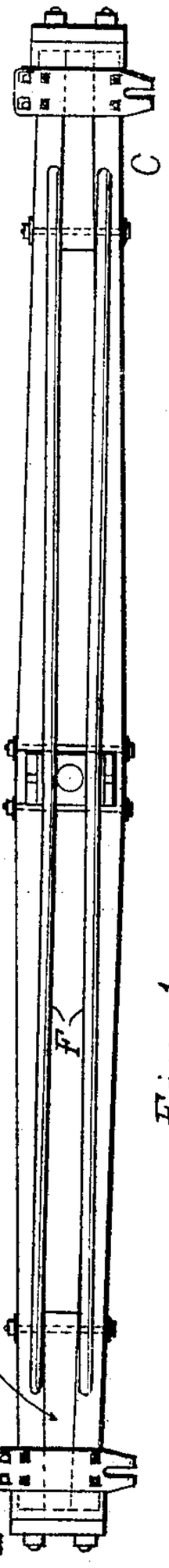

Fig. 1

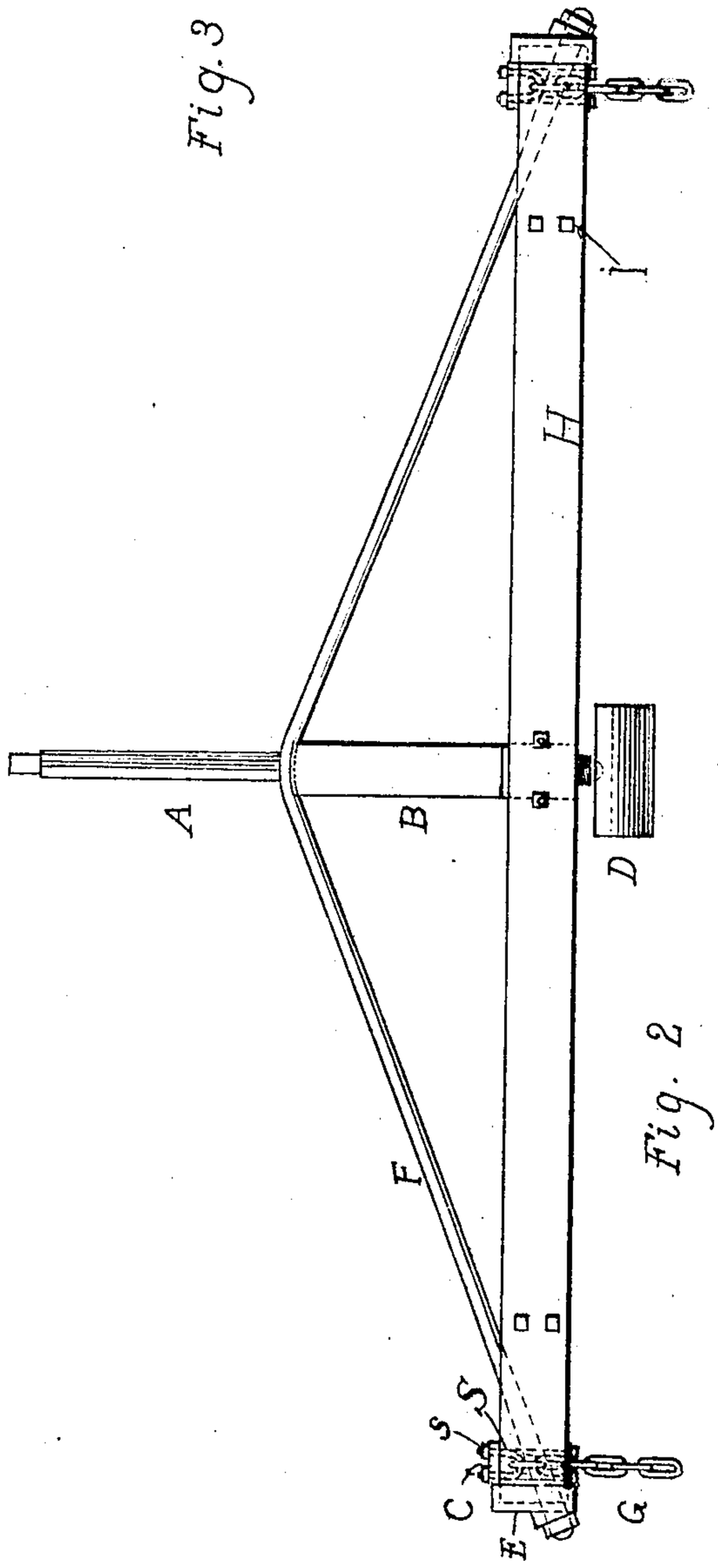

Fig. 2

Witnesses

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UNITED STATES PATENT OFFICE.

JOHN M. LEVIER, OF WESTON, WEST VIRGINIA.

PIPE-BENDER.

No. 906,727. Specification of Letters Patent. Patented Dec. 15, 1908.

Application filed March 12, 1907. Serial No. 362,068.

To all whom it may concern:

Be it known that I, JOHN M. LEVIER, a citizen of the United States, residing at Weston, in the county of Lewis and State of West Virginia, have invented certain new and useful Improvements in Pipe-Benders, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to pipe benders and particularly to that class of benders which employ a pressure device arranged intermediate the fulcrum or strain points on the pipe or article to be bent.

The invention is especially designed for bending heavy pipes such as are used for conveying oil, without heating them.

The object of the invention is to produce a device of this character which will be comparatively light for the work to be accomplished but which may have heavy strains put upon it without damage.

A further object is to cheapen the initial cost of such devices which have heretofore been expensive to manufacture and when broken could not easily be repaired. Most of these devices have been constructed by casting a frame work as a whole and then drilling or threading a portion thereof for the reception of a pressure screw. When the casting is broken in such a device the entire structure is rendered useless.

My invention obviates all difficulties and provides a cheap but strong structure which is powerful in action and may be repaired with ease and at comparatively small expense.

Briefly stated, the invention comprises a pair of girders having strain plates at the ends connected by tie or truss rods, and a pressure screw in the middle operating in a hollow strut which is bridged between the girders and the truss rods.

My invention is illustrated in the accompanying drawings in which—

Figure 1 is a top plan view of the device, Fig. 2 is a side elevation thereof, and Fig. 3 is a transverse central sectional view with the pressure screw in full lines.

Referring to the drawings, H indicates a girder composed of two parallel members, preferably of hard wood but which it will be understood, may be of iron in the form of I beams or of other suitable material. These bars are separated at their ends by slightly wedged-shaped blocks K and are connected by bolts I which pass through the bars and the said blocks, and also by the end caps or strain plates E, cast so as to fit over the ends of both bars and blocks. The construction is such that the bars are slightly bowed in the middle where they are held apart by the lower end of the strut B, the latter being secured against lateral movement by a pair of bolts arranged one on each side and passing through the girder. The strut B is hollow and provided with laterally extending flanges B′ which rest upon the side bars of the girder, thus preventing vertical movement in one direction. Interiorly of the lower end, the strut is threaded to receive and hold the pressure screw A which passes up through the strut and has a bearing in the upper end thereof between the truss rods F. The pressure screw is threaded for only a portion of its length and after passing through the threaded portion of the strut has a rounded end adapted for pivotal engagement with a foot step bearing in the curved shoe D, which may be of any size desired, and may therefore be changed to fit different sized pipes or rods. Passing through the ends of the girder bars on both sides of the spacing blocks K, are the enlarged or upset ends of the truss rods F. These rods are upset to provide an exaggerated threaded end to accommodate the tension nuts used to tighten them. The rods pass up over the strut B where they fit in grooves formed on both sides of the bearing of the pressure screw A. Bridged across the ends of the girder H and secured thereto by bolts or other suitable means are plates C of relatively heavy material each provided with two apertures *c*, *c′* at one end in which a U shaped staple S with threaded ends is held by nuts *s*, the chain G having its last link passed through the staple. The opposite end of the plate C projects over the edge of the girder H and is slotted to accommodate any desired link of the chain G, whereby the chain may be adjusted and tightly held for any size of pipe.

The operation is as follows: The device is laid upon its side and the chains straightened out to their full length. The pipe is now rolled up to the device and one link of the chain at each end is hooked into the slotted end of the plate C and thereby secured, the overhanging end tending to hold the chain in

position until a strain is placed thereon. The shoe D is then placed on the pipe and the screw A turned down on it. By rotating the screw any amount of pressure may be brought to bear against the pipe at a point intermediate the end chains G. The tightening of the screw may be accomplished in any suitable manner as by means of a crank, ratchet handle or similar device.

In order that my invention may be practiced by others without experimenting in advance, I give the following statement of materials and dimensions: The part A is of steel, approximately 48 in. long with a square top and threaded for 24 in. of its length. The strut piece B is of cast iron, solid for 6 in. from the bottom, and cast hollow for the remaining 22 in. The base is 5 in. square. Each plate C is made of wrought iron or steel $\frac{3}{4}$ in. thick, 4 in. wide, 12 in. long. The pressure shoe D is made of cast or malleable iron or steel forging to fit any sized pipe required, is $\frac{3}{4}$ of an inch at the points or thin edges, and 2 in. thick at the center, with a spherical bearing for the end of the screw. The casting is preferably 12 in. long. The end caps E are cast iron 6 in. by $7\frac{1}{2}$ in. on the inside, made in box shape, with $1\frac{1}{2}$ in. holes for the rods, the heavy portions of each cap being $1\frac{1}{2}$ in. thick with raised bevels to take the nuts on the tie rod F. Each tie rod F is made of soft steel or iron $1\frac{1}{4}$ in. in diameter by 12 feet 2 in. long, and is upset to $1\frac{1}{2}$ in. at each end. The chains G are 9/16 in. in diameter by 4 ft. 6 in. long each, and are attached to the plates by U shaped bolts threaded on each end. The bars H are of hard wood $2\frac{1}{2}$ in. by 6 in. by 11 ft. long, or of steel I beams 11 ft. long. The bolts I are 12 in. by $\frac{5}{8}$ in., and the other parts may be easily computed from the dimensions already given.

The device has proved exceedingly efficient in operation, and while of course I give these details of construction for convenience, many of them may be changed without changing the essential features. One of these essential features is the shoe D. Of course the shape and proportions of this shoe may be changed, and in fact the dimensions must be changed to accord with the shape and size of the pipe to be bent. This shoe holds the pipe in perfect shape while bending, leaving it as round as it was before applying the machine. For this purpose it is usually sufficient for the inner face of the shoe to be cylindrical, with the same radius of curvature as the pipe on which it is to be used. For different sizes of pipe there would thus be different shoes. I may, however, adapt the shoe to other pipes than round pipes as for example those which are square or elliptical in cross section. The bending of such pipes presents greater difficulties, especially the square pipe, and the preferable form of the shoe face would be angular, or L-shaped, the bend being thus made on a diagonal of the pipe. An elliptical pipe may be bent either on its major or its minor transverse axis, the inner face of the shoe being either on a wide and shallow curve or a narrow and deep curve to correspond. Where the pipe to be bent is thin or for some other reason is liable to buckle at the point of bending, I may shape the inner face of the shoe so as to produce a compound curved surface like that of a saddle. In fact as will be sufficiently apparent from this brief statement, I adapt my shoe to the pipe, and by properly shaping and proportioning it, can produce almost any desired effect.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In combination, a beam, a fixed strut or post perpendicular thereto, a tie rod connecting the ends of said beam and passing over the head of said strut to form a truss, flexible attaching means for a pipe at each end of said beam, and a pressure screw operating through said strut or post, in the direction of its axis.

2. In combination, a beam, a fixed strut or post, a tie rod connecting the ends of said beam and passing over the head of said strut, chain loops attached to the ends of said beam, means for removably holding one end of each chain loop, and a pressure screw intermediate said chain loops working through the axis of the strut or post.

3. In a pipe bender, the combination with a horizontal member, of an intermediate strut piece, a truss connection between the ends of said member and said strut piece, plates upon the ends of said horizontal member, chain loops connected to said plates permanently at one end and removably at the other, and a pressure screw threaded in said strut piece.

4. In a pipe bender, the combination with a pair of horizontal members, means for separating said members, end caps for said members, a strut piece located intermediate the ends of said members and having one end thereof between them, truss rods passing through the ends of said members and said caps and over the strut piece, plates connected to the ends of said horizontal members, a pair of chains each permanently connected at one end to the plates, means for removably connecting the opposite ends, a pressure screw passing through the strut piece intermediate the truss bars and having threaded connection with said strut piece, and a pressure shoe carried on the end of said pressure screw.

5. A pipe bender comprising the following instrumentalities: a pair of parallel horizontal members forming a truss beam, end caps for said beam, a central perpendicular post or strut, tie rods extending from the top of said post to both end caps of the beam, chain

loops each permanently connected at one end and adapted for temporary fastening at the other, to one cap, a pressure shoe shaped to fit the object to be bent, and a pressure screw therefor, carried by and turning in the central post or strut, together with means to turn the same.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN M. LEVIER.

Witnesses:
J. L. CAROTHERS,
JAMES G. BUNTING.