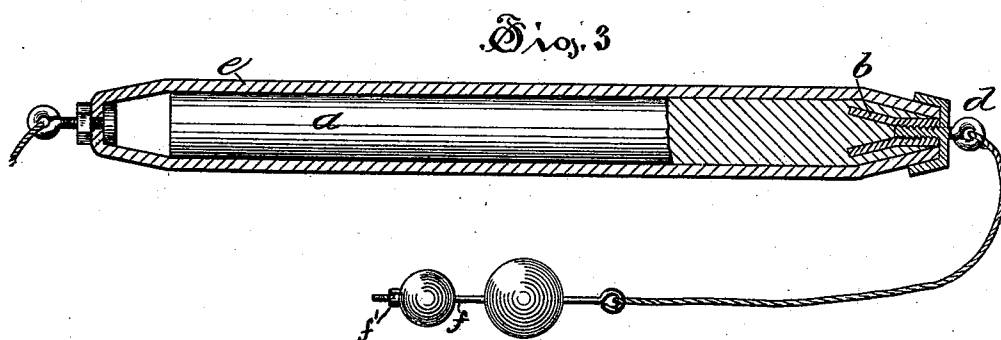
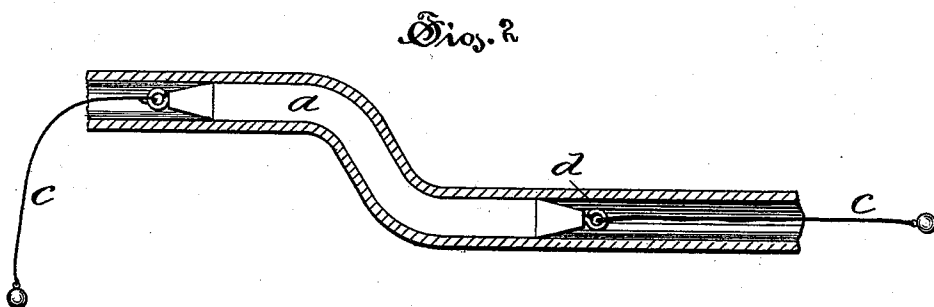
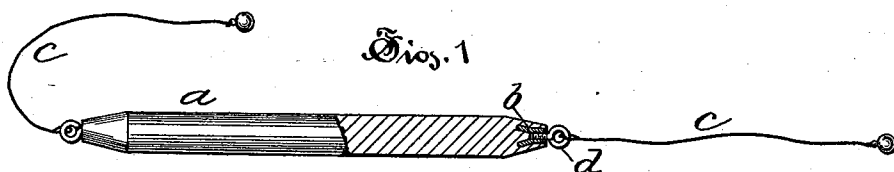


(No Model.)

W. VANDERMAN.
PIPE BENDER AND FORMER.

No. 423,544.

Patented Mar. 18, 1890.



Witnesses:

Harry R. Williams,

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UNITED STATES PATENT OFFICE.

WILLIAM VANDERMAN, OF WILLIMANTIC, CONNECTICUT.

PIPE BENDER AND FORMER.

SPECIFICATION forming part of Letters Patent No. 423,544, dated March 18, 1890.

Application filed May 31, 1889. Serial No. 312,812. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM VANDERMAN, of Willimantic, in the county of Windham and State of Connecticut, have invented certain
5 new and useful Improvements in Pipe Benders and Formers, of which the following is a full, clear, and exact description, whereby any one skilled in the art can make and use the same.

10 The object of my invention is to provide a device by means of which pipe composed of thin metal, especially lead of the lighter grades—such, for instance, as are used for waste-pipes—may be bent without kinking;
15 and my invention also contemplates the making of a device for removing kinks and bends or like defects that are produced in such pipes by handling and transportation.

20 My invention consists in a cylinder of elastic and somewhat flexible material provided with a flexible connection, by means of which the device may be inserted into or removed from a pipe; and it further consists in details of the several parts making up the bender as
25 a whole, and in their combination, as more particularly hereinafter described, and pointed out in the claims.

Referring to the drawings, Figure 1 is a side view of a mandrel for use in bending metallic
30 tubes, with part at one end cut in section to show the construction. Fig. 2 is a view in central section of a bent pipe, showing the flexible mandrel within the pipe. Fig. 3 is a detail view, on enlarged scale, of a compound
35 mandrel, partly in section. Fig. 4 is a detail view, in cross-section, of the compound mandrel.

In the accompanying drawings, the letter *a* denotes my improved flexible mandrel in its
40 simplest form, which consists of a cylinder of india-rubber or like elastic material of considerable density, but sufficiently flexible to take a comparatively sharp bend. This is provided, usually, at both ends with some
45 means, as a clamp-socket *b*, embedded in or secured to the end of the cylinder for attaching a chain *c* or like flexible part, that serves as a means for inserting the former into a pipe or removing it therefrom. The part secured
50 to the end of the mandrel proper may have a screw-socket, into which the shank of a screw-eye *d* may be removably inserted; or it may

terminate in a joint or hook or like part, to which the chain or like flexible connection may be attached or secured. To use this man-
55 drel, the end of the chain is dropped into and through a pipe until its end projects from the opposite end of the pipe, and then the mandrel is pulled along the pipe until it reaches the proper position in which a bend is to be
60 made. When the mandrel is in this latter position, the pipe may be bent into any desired form without any danger of kinking, splitting, or otherwise injuring the pipe. The mandrel
65 is then readily removed from the pipe by pulling upon the chain or flexible connection or leader.

I have found it of advantage to make a sort of compound mandrel by using the same dense
70 cylinder as a core or filling-piece for an elastic tube *e*, of india-rubber, and such tube is also used with other kinds of flexible filling—as, for instance, sand or water—the ends of the tube being closed and provided with de-
75 pressions for attaching a chain or like leader or feature for pulling the mandrel into and out of a pipe. In case the rubber core *a* is used, a clamp is attached to the end of the mandrel, and the elastic tube is slipped upon
80 the mandrel, to which it is securely clamped at its opposite end. This special compound mandrel consisting of a core of elastic material of considerable density, with the flexible
85 cover of greater elasticity, is the preferred form for some kinds of work; but my invention is not limited to this special form of compound mandrel. One main advantage of the
latter form of mandrel is that in using a single core of a standard size—as, for instance, three-fourths of an inch in diameter—and
90 making the tubular covers of any thickness, varying by eighths of an inch, a single core for about the smallest size of pipe may be made to serve for all succeeding sizes by the
95 simple addition of the tubular cover of suitable thickness to make up the required diameter.

The mandrel may be so arranged at the end that the clamp is secured at one end to both the inner part or the core and the outer cov-
100 ering, while at the other end the clamp is attached to the tubular covering, and by pulling upon the latter end to remove it from the pipe this strain stretches the outer covering,

diminishes it somewhat in diameter, and aids in the removal of the mandrel from the pipe.

The chain or leader is provided, preferably, at the outer end with a spindle *f*, that is provided with a removable cap *f'* at the end, and on this spindle is strung a former that may be globular, cylindrical, or tapered in form, the only essential feature being that it shall be circular or round in cross-section at the widest part, and such former is used to straighten pipe and remove kinks or like indentations or defects that are sometimes present in pipes owing to carelessness in handling or shipment, and such formers may be attached to the leader in advance of the bender, so that all such kinks are removed in advance of the mandrel, and the latter may then be brought to the proper position in the pipe where the bend is to be formed.

I claim as my invention—

1. In combination in a mandrel for use in bending metallic pipes, a flexible and elastic core or filling piece on which a cover is snugly fitted, an india-rubber covering fitted on the core, and a chain or cord attached to the end of the mandrel, all substantially as described.

2. In a device for use in bending pipes, in combination with a cylindrical core of india-rubber provided at the end with a clamp-

socket, a clamp securing the core at one end only to the tubular elastic covering, the elastic covering snugly and removably fitted upon said core, and a cord or chain secured to the free end of the elastic covering, all substantially as described.

3. In a device for use in bending pipes, in combination, an elastic flexible cylinder, a chain or like flexible part connected to said cylinder and terminating in a spindle, and a former round in cross-section and borne on the spindle, all substantially as described.

4. In a device for use in bending pipes, in combination, a cylindrical core of india-rubber or like elastic material, the clamp-sockets secured to the opposite ends of said core, the clamps adjustably secured to said core-pieces, the elastic core-cover composed of india-rubber or like gum, with the end adapted to be secured to the core by means of the clamp, the flexible chains or like connections attached to the clamp, and the pipe-formers connected to said chains and being annular in cross-section, all substantially as described.

WILLIAM VANDERMAN.

Witnesses:

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