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E. T. TAL
EJECTOR FOR RECIPROCATING BENDER
WITH PIVOTED SIDEARMS
Filed Jan. 16, 1947

2,477,910

Fig. 1

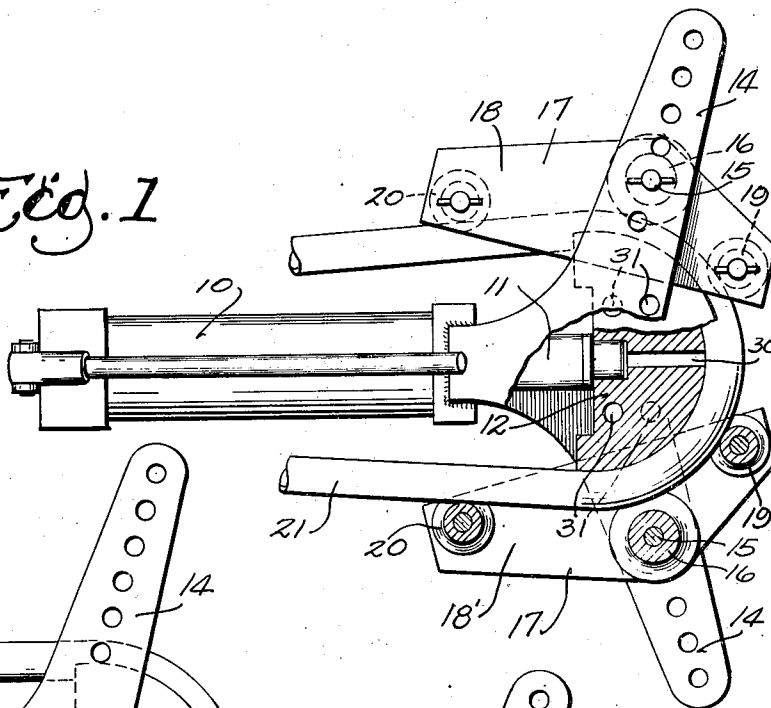


Fig. 2

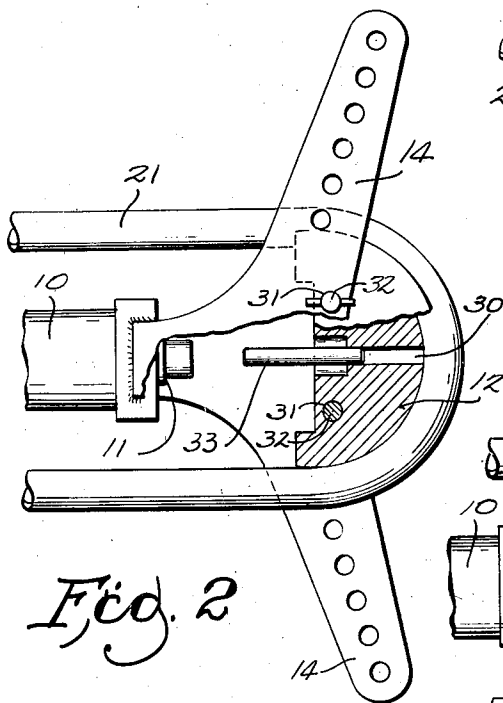
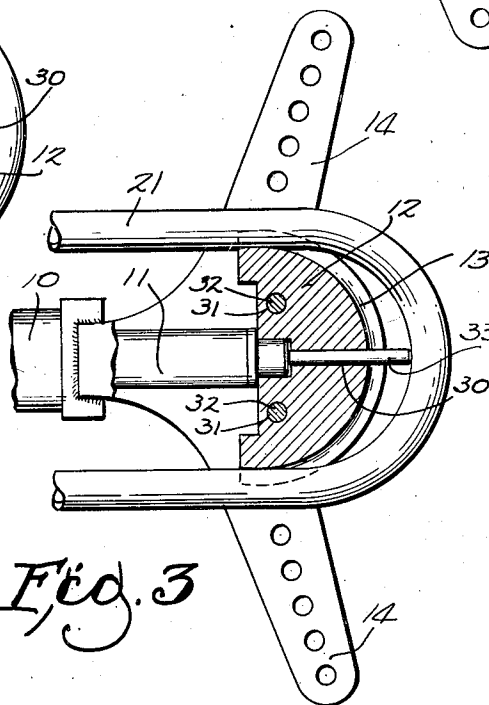


Fig. 3



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2,477,910

EJECTOR FOR RECIPROCATING BENDER
WITH PIVOTED SIDEARMSEdward T. Tal, Milwaukee, Wis., assignor to Tal's
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Application January 16, 1947, Serial No. 722,380

6 Claims. (Cl. 153—33)

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This invention relates to pipe bending apparatus, and it is particularly concerned with a device arranged to disengage a bent section of pipe from a central forming member about which the pipe may have been shaped in providing the bend therein. This application is a companion to application for U. S. Patent on Pipe bending apparatus, by Henry A. Mueller, Serial Number 722,410, filed January 16, 1947.

In the said companion application of Mueller there is disclosed apparatus useful in providing bends up to 180° in sections of pipe, the pipe there being pressed into the channeled, forwardly arced surface of a forming member. When bent in this manner, even to an extent considerably less than 180°, the pipe tends to become bound in the channel and may be removed therefrom only with difficulty.

It is a primary object of the present invention to provide an improved device for disengaging a bent pipe section from a forming member over which the pipe has been bent or shaped.

A more particular object is to provide apparatus whereby the forming means to which the pipe has become bound may be anchored and the force of the forming ram or plunger thereafter utilized to disengage the pipe from the anchored forming means.

Other objects of the present invention will become apparent from a consideration of the following description and appended claims, and of the accompanying drawings, wherein:

Figure 1 is a plan view of a pipe ejector embodying the features of my invention, and showing the same in association with pipe bending equipment preparatory to an ejecting operation, a fragment of the bending equipment being broken away.

Figure 2 is a fragmentary plan view of the ejector with portions of the bending equipment removed, the plunger retracted, and the ejecting pin inserted for operation by the plunger.

Figure 3 is a view similar to Figure 2, showing the plunger advanced and the pipe ejected to a position where it can be manually removed from the forming member.

In the drawing, like parts are identified by the same reference numerals in the several views.

The apparatus generally shown in Figure 1 is arranged to provide permanent bends up to 180° in a section of pipe. While the bending apparatus and its method of use are particularly described in the said companion application of Mueller, the same will be briefly described here

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that the present invention may be the more readily understood.

The bending apparatus illustrated includes a cylinder 10 having a plunger 11 which detachably carries a forming element 12. The leading surface 13 (see Figure 3) of the element 12 is channel shaped and arcuate to provide a pipe engaging portion which may exceed 180°. Opposed frame pieces 14 are secured to cylinder 10, and mounted between the frame pieces upon removable spindles 15 are rollers 16 and intermediately fulcrumed levers 17 pivotal coaxially with rollers 16. Levers 17, each of which comprises spaced plates 18 and 18', carry pipe engaging rollers 19 on their forward arms, and pipe engaging rollers 20 on the rearward arms.

The apparatus described above will provide any bend up to 180° in a section of pipe 21, the bend being made as the pipe is pressed into conformity with surface 13 as the forming element is advanced by plunger 11 between the rollers 16. As the advancing pipe engages rollers 19, levers 17 are swung about their axis until rollers 20 engage sections of pipe 21 extending rearwardly of the forming element 13. With continued advance of the pipe, the said rearwardly extending sections are pressed towards each other until an initial bend somewhat in excess of 180° has been provided in the pipe. Once the pipe has been removed from the apparatus it will tend somewhat to assume its original position and the final bend will approximate 180°.

After the bending operation is complete, the next step, preparatory to removing the pipe from its position of engagement about forming element 12, is to retract the said element and pipe until spindles 15 and the rollers 16 and levers 17 carried thereby can be removed, as indicated in Figures 2 and 3.

As noted above, pressing the pipe 21 into the channeled surface 13 tends to bind the pipe to forming element 12, and the bent pipe is then hard to remove.

I provide element 12 with an aperture, or bore, 30 which is aligned with the plunger 11, the bore opening at one end adjacent the point of contact with the plunger and at the other end in the center of the channeled surface 13. Frame pieces 14 and the forming element 12 are provided with registering openings 31, and when these openings are brought into alignment through movement of the forming element 12, anchorage pins 32 may be fitted therein so as to secure the forming element between the frame pieces. After this anchorage has been effected, plunger 11 is

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withdrawn from its position of engagement with forming element 12 (Figure 2) and an ejector pin 33 is then fitted within the bore 30, this pin having a length greater than that of the bore. The ejector pin is a plunger extension which is separate from the plunger as herein disclosed only because the plunger stroke is short. When plunger 11 is again advanced, it engages pin 33 and forces the same against the inner surface of the formed section of pipe 21, thereby ejecting the pipe from channel 13 (Figure 3). The pipe may then be manually withdrawn the rest of the way from the apparatus.

It only remains to remove the anchoring pins 32 and the ejector pin 33 to prepare the apparatus for use in a subsequent bending operation.

I claim:

1. In a pipe bending tool, the combination with a set of guiding wings, of a pipe bending element movable between said wings into contact with a pipe to bend the latter, said element having an aperture in its line of movement, an ejector pin insertable in the aperture, a hydraulic cylinder fixed to said wings in line with the aperture in said element and having a plunger detachably engaged therewith and retractable to a position for insertion of said pin into and for forcing said pin through the aperture, and means for holding said element against movement relative to said wings while said pin is being forced through the aperture.

2. The combination of claim 1 wherein said holding means comprises locking pins for connecting the element with its guiding wings.

3. A device of the character described, comprising a cylinder, a plunger projecting from one end of the cylinder, a forming block in line with the plunger and engageable by the exposed end thereof, said block having a bore extending there-through aligned with said plunger, pipe intercepting means connected with a wall of said cylinder and arranged to shape a pipe over an advancing leading surface of said forming block, means for anchoring said block after a pipe bending operation, and an overlength ejector pin slidably mounted within said bore for disengaging the pipe from said anchored block under pressure applied by said plunger.

4. The device of claim 3 in further combination with a frame member connected to a wall of said cylinder, said frame member serving to support said pipe intercepting means and as an anchorage for said forming block, and wherein

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said anchorage means comprise a set of anchor pins arranged for reception in aligned openings in said forming block and said frame member.

5. In combination, an arcuately channeled forming element, coating roller supports with respect to which said forming element is normally reciprocable, a ram plunger detachably connected with the forming element for reciprocation thereof, means for detachably connecting the forming element with the supports instead of the plunger upon completion of a forming operation, said element having a bore opening through it into its channel in the direction of plunger reciprocation, and a plunger extension movable in the bore for work ejection from the channel under plunger actuation when the said element is released from the plunger and connected to the supports.

6. In a pipe bending machine, a frame, a pressure operated piston in a cylinder connected with the frame, a pipe bending block movable in the frame upon application thereto of pressure by the piston, the block having a passage there-through to the pipe engaging surface thereof and in the line of pressure application to the block by the piston, means for fixing the position of the block in the frame in spaced relation with the end of the piston, and an ejector pin of greater length than the length of the block passage and insertable into the block passage through the space between the end of the piston and the block, the application of pressure to the pin by the piston acting on a pipe engaged in the block for releasing the pipe.

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