

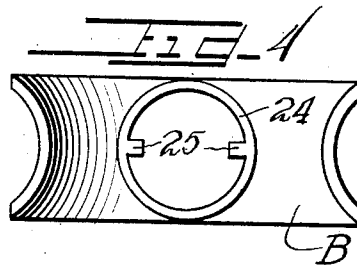
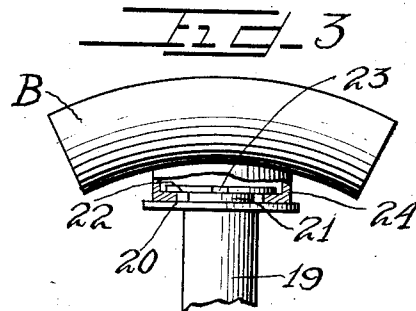
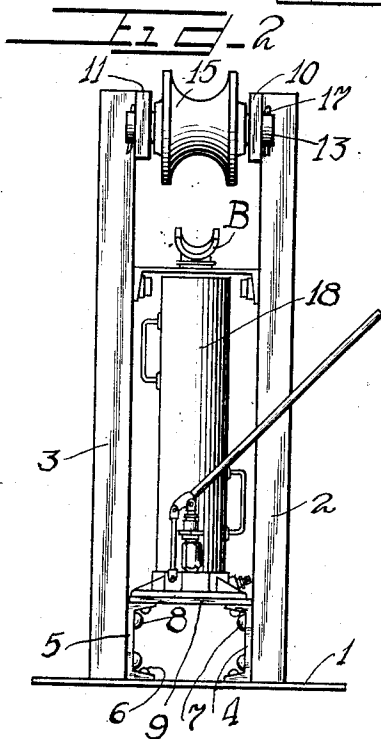
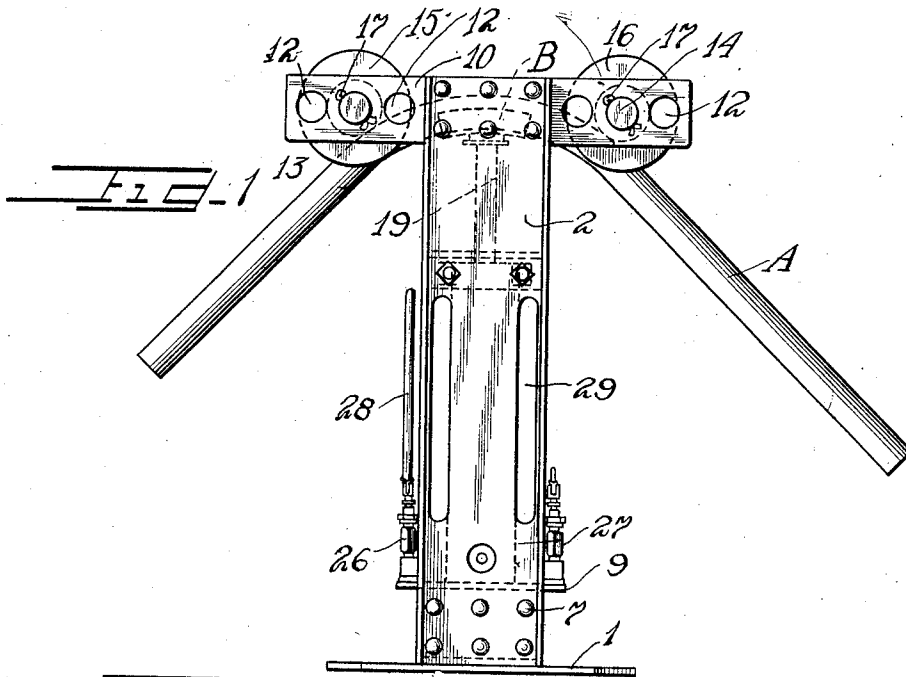
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HYDRAULIC PIPE BENDING MACHINE

Filed Feb. 17, 1930



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HYDRAULIC PIPE BENDING MACHINE

Application filed February 17, 1930. Serial No. 428,879.

This invention relates to a hydraulic pipe bending machine and more particularly although not exclusively to a portable compact machine whereby the machine may be readily carried from job to job for bending various sizes of pipe on the job as desired.

An object of the invention is to provide a small sturdy pipe bending machine:

Another object of the invention is to provide a readily portable hydraulic pipe bending machine which may be moved from place to place and provided with sufficient capacity to bend any and all pipes utilized in building construction and the like.

A further object of the invention is to provide a pipe bending machine with bending rolls which rotate during bending and a plunger for moving a pipe against said rolls for bending the pipe.

A yet further object of the invention is to provide a pipe bending machine with a bending plunger having interchangeable bending shoes applicable thereto for receiving pipe of different sizes and for effecting bends of different angularities.

A yet further object of the invention is to provide a hydraulic pipe bending machine of relatively large capacity and yet light enough for ready portability.

The above, other and further objects of the invention will be apparent from the following description, accompanying drawing and appended claims.

According to the invention the machine contemplates spaced bending rolls which are adjustable for varying the space between the rolls whereby different bends may be applied to pipes together with a hydraulic plunger for bending the pipe against the rolls. The invention further contemplates the use of interchangeable bending shoes for application to the plunger to receive pipes of various sizes and for effecting bends of different angularities.

An embodiment of the invention is illustrated in the accompanying drawing and the views thereof as follows:

Figure 1 is a front elevational view of a pipe bending machine embodying the present invention.

Figure 2 is a side elevational view of the machine illustrated in Figure 1.

Figure 3 is a side elevational view of one of the interchangeable bending shoes and showing in section the preferred form of removable attachment with the plunger.

Figure 4 is a bottom plan view of the shoe of Figure 3 removed from the plunger.

The drawing will now be explained.

The illustrated embodiment of the invention includes a base plate 1 onto which are attached a pair of upright channel members 2 and 3.

The channels 2 and 3 are connected at the bottom by channels 4 and 5 which in turn are riveted to the plate 1 by rivets 6. Channels 4 and 5 are riveted to the channels 2 and 3 respectively by rivets 7 and 8.

A plate 9 is riveted to the upper flanges of the channels 4 and 5.

The base plate 1 is large enough to properly support the machine in operative position on a floor.

A T-head is provided on the frame and in the present instance is made up of two bars 10 and 11 riveted respectively to the rear sides of the webs of the channels 2 and 3. The bars 10 and 11 are spaced as are the channels 2 and 3 as illustrated in Figure 2 of the drawing.

The bars 10 and 11 are provided at each end with a plurality of openings 12 for receiving stub shafts 13 and 14 respectively of bending rollers 15 and 16.

The faces of these rollers are concave as may be observed in Figure 2.

The rollers 15 and 16 are freely mounted on the shafts 13 and 14 in order that the rollers may be moved to any of the several openings 12 for varying the space between these rollers.

The stub shafts 13 and 14 are retained in the bars 10 and 11 by suitable means such, for instance, as cotter pins 17.

The rollers 15 and 16 are referred to herein as bending rollers.

The means for bending a pipe A is shown in the illustrated embodiment of the invention as consisting of a hydraulic jack 18

which is supported on the plate 9 attached to the channels 4 and 5.

The hydraulic jack 18 is provided with a plunger 19 which in the illustrated embodiment of the invention has a shoulder 20 at its upper end which is greater in diameter than the plunger 19. A portion 21 of the plunger above the collar 20 is reduced in diameter and terminates in a plate member 22 which is smaller in diameter than the collar 20. The plate member 22 is provided with a pair of slots 23 at diametrically opposite points preferably transversely of the head of the machine.

A shoe B which is convexly curved longitudinally and concavely curved transversely is provided with a hollow boss 24 which is cylindrical in plan and which has a pair of inwardly extending lugs 25 at diametrically opposite points for entering the slots 23 in the plate member 22 of the plunger.

The shoe B is applied to the plunger by turning it so that the lugs 25 enter the slots 23 until the portion 24 rests on the collar 20 of the plunger whereupon the shoe is turned so that the lugs are moved out of register with the slots, thereby securely fastening the shoe to the plunger.

The operative position of the shoe B is such that the curvature thereof follows the curvature of the concave faces of the bending rollers so that a pipe A may be received by the shoe and forced against the bending rollers for bending purposes.

The illustrated form of hydraulic jack is provided with two valves 26 and 27 operable by a handle 28 which may be interchangeably engaged with either of the valves.

The two valves are provided so as to secure fast or slow motion of the plunger 19 depending on the size and kind of pipe being bent.

The valve 26 is provided for advancing the plunger 19 slowly when heavy pipe or pipe of large diameter is being bent, while the valve 27 is provided for advancing the plunger 19 faster for bending lighter pipe.

The pipe bending machine of this invention may be readily carried from place to place, from job to job, or from any place on a job to any other place for convenience in bending pipe being installed. The machine is made to receive small pipe as well as large pipe and the preferable capacity of the jack as at present employed is thirty tons whereas the weight of the whole machine is approximately three hundred pounds.

The channel upright member 22 is slotted at 29 for the purpose of lightening the weight of the machine. Additional slots might be provided in convenient places where it is desirable to lighten the machine to a greater extent.

It is of course understood that small pipes may be readily bent at rather sharp angles

whereas larger and heavier pipes have to be bent on greater radii and more slowly.

The machine of this invention lends itself very readily to the bending of small pipes as well as large.

Should it be desired to bend a small light pipe then the rollers 15 and 16 would be moved so that the shafts 13 and 14 thereof would lie in the innermost of the holes 12, that is, bringing the rollers together as closely as possible so that when the plunger 19 is actuated, a sharp angle would be defined or formed in the pipe, whereas should it be desired to bend a heavier pipe such, say for instance, as a three inch pipe, then the rollers 15 and 16 would be moved to the intermediate holes 12 as illustrated in Figure 1. The rollers should be moved to the outermost holes for bending heavier pipe as may be readily understood.

While the rollers 15 and 16 accommodate all sizes of pipe within the capacity of the apparatus the shoes B are of different sizes to accommodate the different pipe sizes a proper size shoe for the purpose desired being readily insertible in the manner previously described.

It will be observed that this machine lends itself very readily to the bending of pipes of various sizes and also to the bending of these pipes with any radius or curvature desired.

The illustrated embodiment has utilized a hydraulic jack for actuating the bending plunger. While, of course, it is more convenient to utilize a hydraulic jack, yet it is to be understood that any other actuating means for the plunger might be utilized as desired. It is within the scope of the invention to utilize an air cylinder in place of the hydraulic jack or any other suitable means for effecting movement of the plunger in the manner desired.

The invention has been described herein more or less precisely as to details, yet it is to be understood that the invention is not to be limited thereby as, of course, changes may be made in the arrangement or proportions of parts and equivalents may be substituted without departing from the spirit and scope of the invention.

The invention is claimed as follows:

1. A pipe bending machine including a pair of spaced bending rollers, a plunger movable between said rollers for moving a pipe against the same for bending purposes, said plunger having a collar about its end adjacent said rollers and a flange spaced from said collar, said flange having oppositely disposed slots therein, a pipe receiving shoe having a seat for engaging said collar and having projecting lugs entering said slots when applied to said plunger, said shoe being retained on said plunger by being turned to move said lugs out of register with said slots, and hydraulic means on said machine for actuating said plunger.

2. A pipe bending machine comprising a base, a pair of opposed spaced vertical members secured at their lower end on said base, a rod mounted supported by said members and movable vertically therebetween, power means mounted supported on said vertical members to actuate said rod, a pair of oppositely directed transversely extending wing members secured to the upper end of each of said vertical members to provide a support for rollers, a pair of rollers mounted on said wings, one on either side of the line of movement of said rod and spaced equally therefrom, and a curved shoe on said rod cooperating with said rollers to bend pipe.

3. A pipe bending machine comprising a base, a vertical column secured at its lower end on said base, a rod mounted movable vertically on said column, power means on said column to actuate said rod, a pair of oppositely directed transversely extending wing members secured to the upper end of said column, a roller on each of said wings, said rollers being spaced equally on either side of the line of movement of said rod, and a curved and grooved shoe on said rod, said rod being movable upwardly to bend pipe between said shoe and said rollers.

In testimony whereof, we have hereunto subscribed our names at Chicago, Cook County, Illinois.

GUSTAVE LIDSEEN.
JOHN E. FLANAGAN.

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