

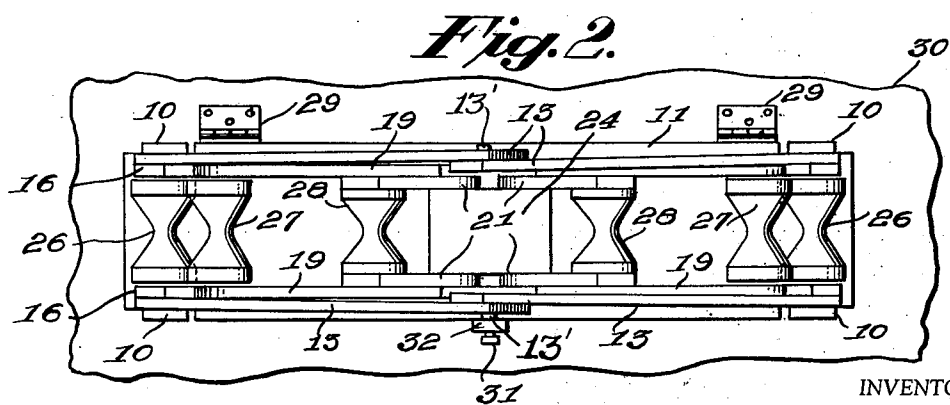
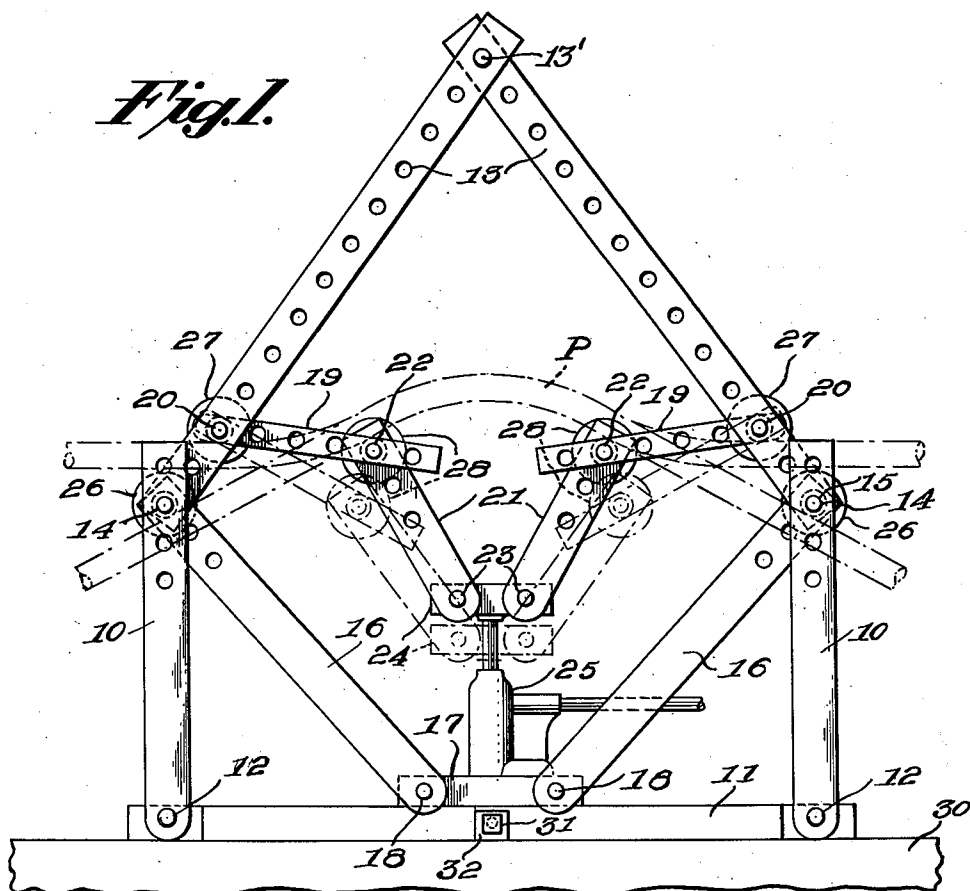
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SADDLE-TYPE PIPE OR ROD BENDING MACHINE

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SADDLE-TYPE PIPE OR ROD BENDING MACHINE

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4 Claims. (Cl. 153—39)

This invention relates to a saddle-type pipe or rod bending machine.

While the machine is specially adapted for bending pipes, it is equally applicable to tubular members for various purposes, such as railings, portiere suspensions, and the like.

As is well known by those skilled in the bending of pipe and other tubular members, great care must be exercised in the bending operation to maintain a true tubular form throughout the bent portion since tubular members are prone to distortion of their walls when subjected to improperly applied forces in the bending operations.

Thus it has been a practice in the bending of pipe and other tubular articles to pack them with sand to avoid crinkling thereof when subjected to bending forces, the sand in effect providing a solid member which more readily submits to bending operations.

It has been found from sustained experimentation that a pipe or other tubular member does not properly submit to bending operations where it is subjected to localized pressure or when the pipe is subjected to forces transversely of its axis, but which are relatively fixed in the direction of such axis.

It is accordingly a primary object of the present invention to provide a bending machine for tubular members wherein a tubular member is movably supported at points between which a bend is to be initiated and wherein forces are exerted on the member intermediate said points which are movable axially of the member, thereby avoiding any localized pressure on the member.

A further object of the invention is to provide a bending machine for tubular members which includes relatively adjustable cooperating elements thereby rendering the machine adaptable for various forms of bends in tubular members ranging from one-half inch to three inches in diameter.

With these objects in view, the invention comprises providing a saddle-type pipe or rod bending machine provided with a frame, rotatable member engageable means supported by the frame in relative spaced arrangement and rotatable member engaging and bending means supported by said frame, all as will be explained more fully hereinafter and finally claimed.

These and other objects and advantages of the invention will be apparent from the following description when considered in connection with the accompanying drawing, in which:

Fig. 1 is a side elevational view of the improved bending machine in accordance with a preferred structural embodiment thereof.

Fig. 2 is a top plan view of the machine illustrated in Fig. 1.

Referring now in detail to the drawing, the machine comprises a frame which may be desirably formed of metal bar stock, and which as shown includes four generally vertically disposed corner posts 10 whose lower ends are locked, as by pins 12, to a base plate 11.

Projecting upwardly from points adjacent the upper ends of the pair of posts or arms 10 at each side of base plate 11 is an inverted V-shaped adjustable frame member 13 comprising parallel coextensive apertured elements whose convergent ends are adjustably connected as at 13' and the lower divergent ends of which are connected to said posts as by means of removable pins 14 extending through aligned apertures 15 in the posts and frame members.

Diagonal brace members 16 intersect arms 10 and have their upper ends held by pins 14, their lower ends converging to and being pinned to opposite sides of a suitable base 17 adapted to support the pressure or force applying means for bending the pipe, which is illustrated as being a conventional jack. Suitable means such as pins 18 position the braces relative to the base 17. The base 17 is rigidly secured to the base plate 11 by means of brace members 16.

A pair of links 19 have their outer ends pivotally connected to each frame member 13 by means of pins 20.

The paired arms or links 21 have the diverging ends thereof pivotally connected to each arm 19 by means of pins 22 and the opposite or converging ends of arms 21 are connected to the pins indicated at 23 on the substantially rectangular head 24. From an examination of the top plan view of the improvement illustrated in Fig. 2, it will be obvious that all of the various arms referred to hereinbefore are duplicated and extend parallel to one another. However, an examination of Fig. 1 is preferable for visualizing the operation of the machine.

A pipe engageable roller of spool-like configuration is pivotally supported on each of the pins 14, 20 and 22, there being a roller 26 between the upper ends of each pair of vertically extending posts 10; a roller 27 is positioned between the respective arms of the frame members 13 adjacent the lower ends thereof, and a roller 28 between each pair of arms 19. The rollers 26 and 27 as shown in Fig. 1 are predeterminedly positioned adjacent to the ends of the apertured frame 13 but are capable of relative adjustment by removing pins 20 and repositioning them in other apertures in members 13.

It will be apparent to those skilled in the art that this machine is extremely adaptable and considerably more versatile to bending operations than the customary well-known bending machine. For example, with the machine lying in a horizontal plane, the arms or posts 10 may be disconnected from pins 12 and attached to pins 23. Thereafter, the pin 13' is removed from the intersection of arms 13—13 (as shown in Fig. 1) and the arms crossed at a lower point and the pin reinserted to widen the angle. Obviously, this will bring rollers 27—27 downwardly and, in a sense, elevate rollers 26—26 relative thereto. At this time, depending on the material to be bent it will be necessary to remove the pins 20—20 and rollers 27—27 and then replace them in another group of suitable apertures slightly nearer to the newly chosen intersecting point of the arms 13—13. It will be readily apparent that by using the machine its versatility will be easily understood.

Furthermore, the rollers 28 are capable of adjustment relative to the apertured arms 19 and 21 merely by removing pins 22 and repositioning them in other suitably aligned apertures of the several clearly shown in the arms 19 and 21 (see Fig. 1).

The machine is capable of use in a vertical position, as shown, which is highly suitable for relatively short lengths of pipe.

With elongated pieces of pipe it may be advantageous to position the machine horizontally and in order to provide for either position of the machine, the base 11 is hingedly supported as at 29 on a suitable bench 30, partially indicated in the drawings.

The versatility of this bending machine may be further

demonstrated by an examination of Fig. 1 and by visualizing it lying in a horizontal plane. By detaching the co-extensive paired arms 10 from pins 12 and swinging them inwardly they may be attached at 23 to rectangular head 24. Obviously, arms 21 will be removed from head 24 to permit attachment of arms 10 thereto. Those skilled in the art will immediately appreciate that by repositioning these arms 10 in the manner described, rollers 27 will be moved downwardly and rollers 26 will be swung upwardly, thereby creating a wedging effect between rollers 26 and 27 and permitting the formation of a saddle bend in the material being worked upon.

The base 11 on which the machine is mounted is maintained in its upstanding or vertical position by means of a headed latch pin 31 projecting through a lug 32 carried by the bench 30 said pin being constructed and arranged to coincide with an aperture provided in said base 11 adjacent said lug.

In operation, the rollers 26, 27, and 28 are pre-determinately positioned relative to the respective arms by which they are supported for a particular size and shaped pipe desired to be bent.

As shown in dot-and-dash lines in Fig. 1, a pipe P is supported at spaced points between and in engagement with rollers 26 and 27 and the pressure applying means or jack 25 has been operated to move the head 24 vertically upward with a resulting toggle action of the arms 19 and 21 and a corresponding arcuate movement of the pins 22 carrying rollers 28 which have a wiping action on the length of the pipe intermediate the rollers 27 and 28 and a perfect bend is formed in the pipe due to the shifting of the points of pressure between said rollers.

In Fig. 1, the position of rollers 28 is shown in dot-and-dash lines in a preceding stage of movement of the jack head 24 and which illustrates the relative lateral movement of the rollers 28 in their divergent oscillatory movement under the action of the pressure means.

The oscillatory path of the rollers 28 is capable of variation by adjustment of the roller supporting pins 22 in the apertured arms 19 and 21 for effecting any desired form of bend.

Moreover, the pipe P may, as shown in dot-and-dash lines in Fig. 1, be supported beneath the rollers 26 for effecting a more extreme bend therein, such as a 90° bend.

While I have disclosed my invention in accordance with a single specific structure embodiment thereof, such is to be considered as illustrative only and not restrictive,

the scope of the invention being defined in the sub-joined claims.

I claim:

1. A bending machine comprising a base, a force applying means including a movable part and a stationary part, said stationary part being fixedly located with respect to said base, pairs of parallel co-extensive arms attached at one end to said base, said pairs of arms being relatively disposed at opposite sides of said force applying means, brace means attached to the stationary part of said force applying means and adjustably relatively secured to said arms remote from the points of attachment of the arms to the base, pairs of relatively spaced parallel arms adjustably joined at one of their ends to said parallel co-extensive arms to thereby form a first connection, means adjustably attaching the other ends of said arms together in inverted V form, two pairs of links, end adjacent portions of the links of each pair being pivotally joined together to form a second connection, the ends of said links remote from said second connection being pivotally joined respectively to the movable part and to one arm of said inverted V to form a third connection, and means carried by said first, second, and third connections for operative engagement with a workpiece.

2. A bending machine as claimed in claim 1, wherein the means carried by the first, second and third connections comprise rollers that cooperate to bend a workpiece upon actuation of the force applying means.

3. A bending machine as claimed in claim 2, wherein the rollers are adjustably supported relative to said parallel co-extensive arms forming the first connection.

4. A bending machine as claimed in claim 2, wherein the rollers are adjustably supported relative to the two pairs of links, the end adjacent portions of which form a second connection.

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