April 17, 1934. C. M. BRENNER 1,955,356

DEVICE FOR PRODUCING JOINTS ON TUBULAR MEMBERS

Filed April 6, 1933 2 Sheets-Sheet 1

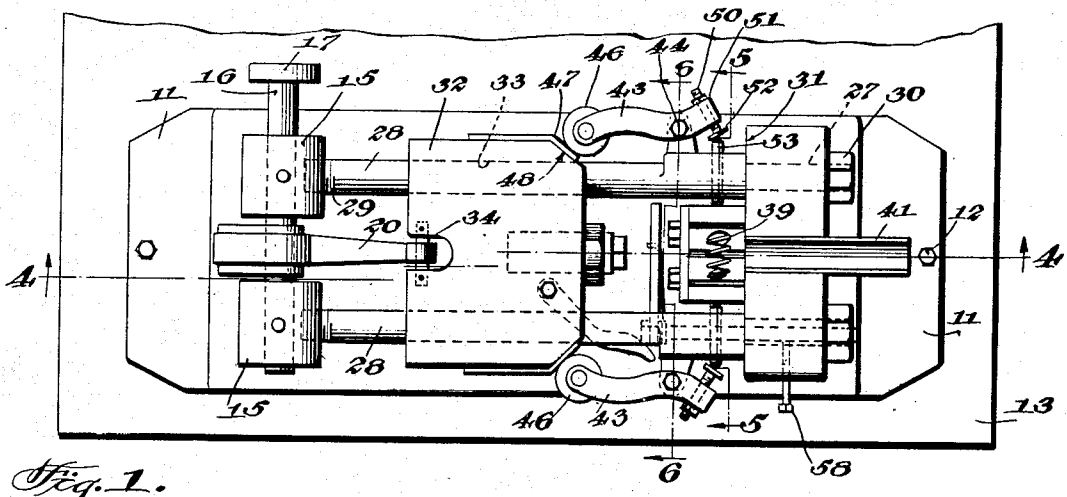


Fig. 1.

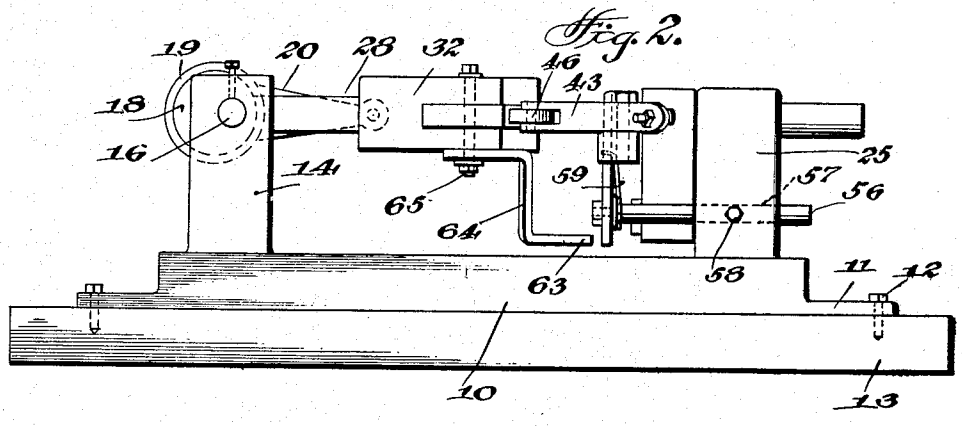


Fig. 2.

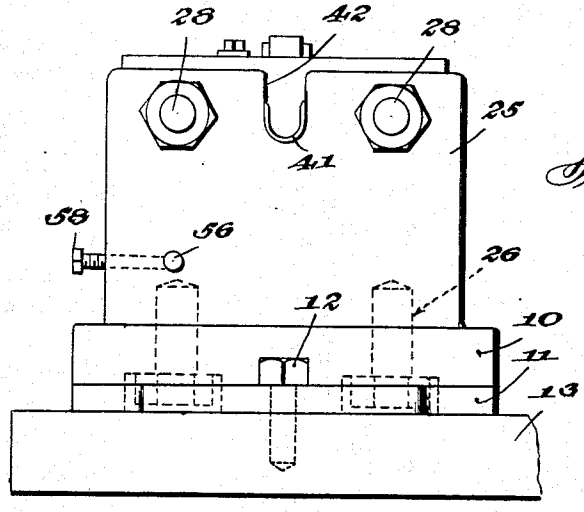


Fig. 3.

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Filed April 6, 1933 2 Sheets-Sheet 2

Fig. 4.

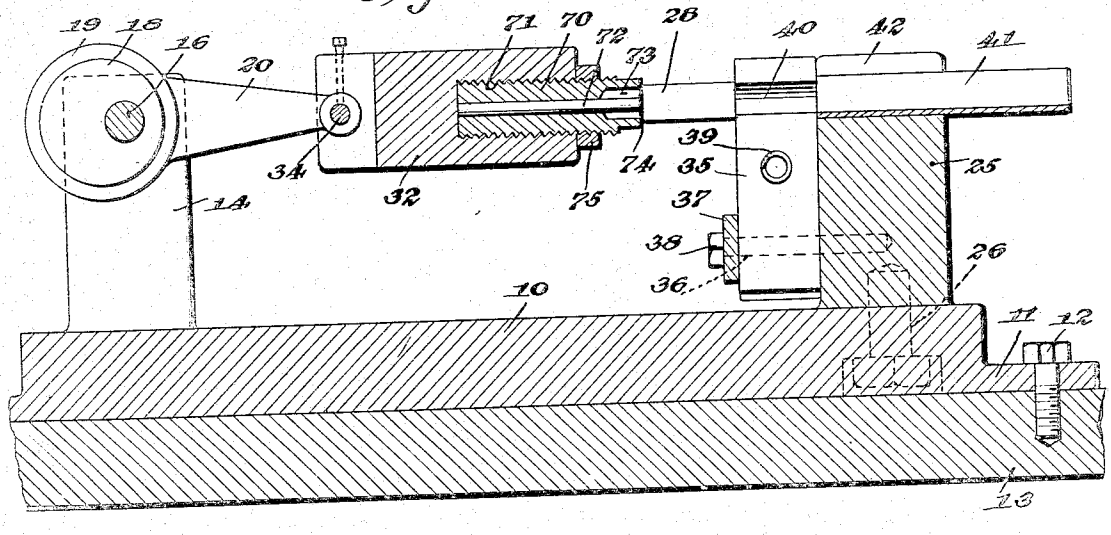


Fig. 5.

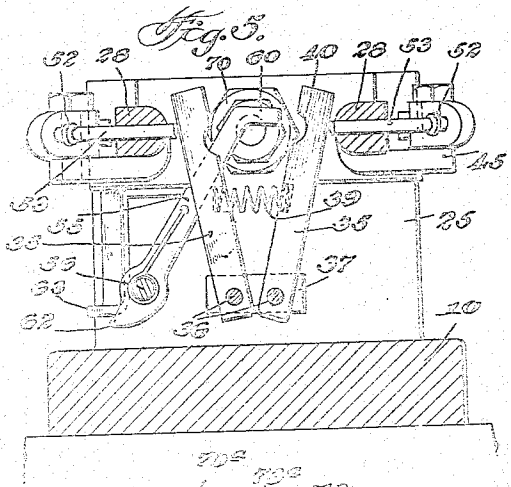
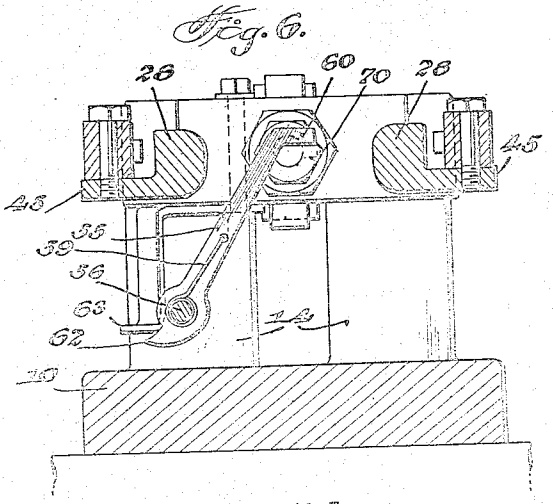


Fig. 6.



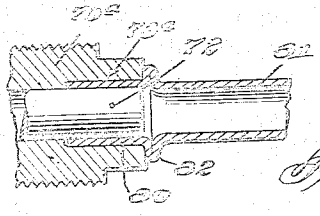


Fig. 7.

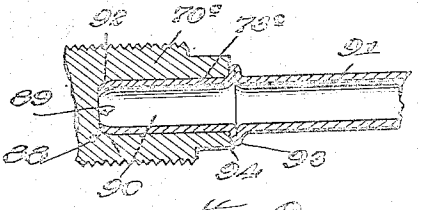


Fig. 9.

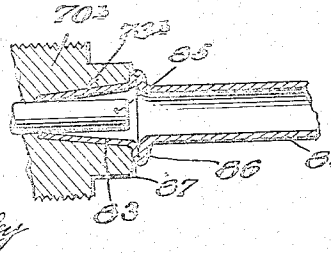


Fig. 8.

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UNITED STATES PATENT OFFICE

1,955,356

DEVICE FOR PRODUCING JOINTS ON TUBULAR MEMBERS

Charles M. Brenner, Shreveport, La.

Application April 6, 1933, Serial No. 664,818

2 Claims. (Cl. 153—79)

This invention relates to a device for producing a joint on a tubular member and forming an annular ring or projection on said member, the tubing being held immovably in a vice so that when pressure is applied between the points where the tube is unprotected by the jaws of the vice and a die encasing one end of the tubing, said tube will necessarily be expanded where it is not supported or encased, the tube collapsing outwardly at the exposed part of the tube, thereby making a joint.

Another object of the invention is the provision of a device for forming expanded portions on a tubular member to form a joint, the device being provided with jaws for automatically clamping a pipe rigidly, a cross head carrying a die co-operating with the jaws in spaced relation so that the length of the tubular member between the end of the die and the jaws permits the tubular member to collapse outwardly when pressure is applied on the tubular member by the predetermined movement of the die towards the clamping jaws.

This invention will be best understood from a consideration of the following detailed description, in view of the accompanying drawings forming a part of the specification; nevertheless, it is to be understood that the invention is not confined to the disclosure, being susceptible of such changes and modifications which shall define no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:

Figure 1 is a plan view of a joint forming device constructed in accordance with the principles of my invention,

Figure 2 is a side elevation of the device,

Figure 3 is a rear end elevation,

Figure 4 is a vertical longitudinal section taken along the line 4—4 of Figure 1,

Figure 5 is a transverse vertical section taken along the line 5—5 of Figure 1,

Figure 6 is a transverse vertical section taken along the line 6—6 of Figure 1,

Figure 7 is a fragmentary vertical section of a die and arbor with the pipe received therein disclosing the joint,

Figure 8 is a fragmentary vertical section of a modified form of the die disclosing a pipe in position with the tubular joint formed, and

Figure 9 is a fragmentary vertical section of a still further modified form of the die disclosing a pipe with the collapsed portion of the pipe forming a joint.

Referring more particularly to the drawings, 10 designates a base member which is provided with lips 11 at its opposite ends and these lips are secured by means of bolts 12 to a table or other support.

A pair of standards 14 rise from the base member 10 and the upper ends of these standards are provided with bearings 15 in which is mounted a shaft 16 driven by a pulley 17 in any suitable manner.

On the shaft 16 is mounted an eccentric 18 embraced by a strap 19 which is secured or formed integrally with a pitman or connecting rod 20. A block 25 is secured by means of bolts 26 to the base member 10. The block is provided with transverse passages 27 to receive the inner ends of guide rods 28 which are located in parallel relation and have their inner ends, as shown at 29, threaded into the bearings 15. A nut 30 threaded onto the inner end of each guide rod co-operates with a shoulder 31 on the guide rods for rigidly maintaining the guide rods in position.

A cross head 32 is provided with longitudinal passages 33 to receive the guide rods 28. This guide rod is pivotally connected at 34 with the pitman or connecting rod 20 so that when the cross head is reciprocated it will be guided in a horizontal plane by means of the rods 28.

A pair of gripping jaws 35 are pivotally mounted on pins 36 and these pins are secured in the block 25 in any approved manner. A bar 37 embraces the outer faces of the jaws 35 and are held in place by heads 38 on the pins 36. A spring 39 connected between the jaws 35 tends at all times to maintain the jaws in open position. These jaws are provided with cut-out portions 40 to receive the pipe when the same is inserted in position.

A support 41 is located within a passage 42 in the block 25 and extends beyond the inner face of the block to provide an adequate support for the pipe. The support 41 has one end adapted to be alined with the cut-out port on 40 of the jaws 35.

A pair of arms 43 are pivotally mounted at 44 upon brackets 45 extending from the guide rods 28. The outer end of each arm 43 is provided with a roller 46 adapted to engage a removable bushing or wear plate 47 secured to the sides of the cross head 32. The inner ends of the cross head are cut off at an angle, as shown at 48, and the wear plate is bent inwardly to provide a cam action against which the rollers operate when the cross head 42 is moved inwardly towards the jaw members 35 for spreading the arms 43.

A pin 50 is threaded into a transverse opening

on the inner end of each arm 43 and a lock nut 51 is provided to maintain the adjustment of the pin. Each pin is provided with a head 52 adapted to engage one end of a pin 53 slidably mounted in a guide rod 28. The inner ends of the pin 53 are adapted to engage the jaw members 35 for moving the jaw members inwardly toward each other so that the jaws or cut-out portions 40 will engage the pipe rigidly and hold the pipe against movement.

A gauge 55 in the form of an oscillating arm is pivotally mounted upon a pin 56 which extends through a passage 57 in the block 25 and is held against movement by a set screw 58. A pin 59 secured to the pin 56 and engaging the arm 55 tends to maintain the arm inwardly so that the gauge portion or finger 60 will extend in alignment with the jaws 40 and limit the outward movement of the pipe which is to be operated on.

The lower end of the arm 55 is provided with a toe 62 adapted to be engaged by a cam member 63 carried by a bracket 64 secured at 65 to the cross head 32.

One member of the die is shown at 70 which is threaded into an integrally threaded pocket 71 formed centrally of the cross head 32. This die is provided with a mandrel or arbor 72 which projects through a guide portion 73 of the member 70 and terminates adjacent the outer end of said die member. The outer end of the die member provides a shoulder 74 for a purpose which will be presently explained. A nut 75 is threaded onto the guide member 70 and secures said member in adjusted position within the threaded pocket 71.

Referring more particularly to Figs. 7 to 9, inclusive, it will be seen that the die member 70^a is provided with the mandrel or arbor 72 which is adapted to receive the inner end 80 of a pipe 81 which is adapted to have a flared point 82. The arbor 72 deeply fits within the pipe 81 while the end 80 is neatly received by the die 73^a.

As shown in Fig. 8 a die member 70^b has a tapered die 73^b to receive the tapered end 83 of the pipe 84. An arbor 85 projects into the tapered end 83 of the pipe 84. The flared or expanded portion 86 of the pipe 84 rests against a shoulder 87 of the die member 70^b.

The die member 70^c shown in Fig. 9 discloses a modified form of the die member shown in Figs. 7 and 8. In this case the arbor has been eliminated and the inner end 88 is curved adjacent the bottom 89 of the die 73^c so that when the inner end 90 of the pipe 91 is placed within the die 73^c the extreme inner end of the pipe will be bent along a curve as shown at 92 which conforms to the curvature of the portion 88 of the die 73^c. The pipe is provided with an expanded portion 93 which engages a shoulder 94 of the die member 70^c.

The operation of my device is as follows: The shaft 16 is revolved when the drum or shoulder 17 is rotated in any approved manner and the eccentric 18 through the connecting rod or pitman 20 will cause reciprocation of the cross head 32 so that the die member 70 is reciprocated and when the end of any of the pipes disclosed in Figs. 7 to 9, inclusive, has been received within the die 73, the portion of the pipe exteriorly of the die 73 and the jaws 35 will be exposed, causing the tube to collapse at this point to form either the joint 82, 86, or 93.

When the pipe has been placed upon the support 41 and has been moved inwardly it will engage the member 60 of the gauge arm 55 and be limited in its inward movement so that the proper amount of pipe will be positioned beyond the jaw members 35 to be received within the dies and to form the expanded joint as shown in Figs. 7 to 9, inclusive.

When the cross head 32 is moved inwardly the rollers 46 will engage the bushings 47 and by reason of the inclined portions 48 will cause the arms 43 to move outwardly, thereby moving the heads 52 of the pins 50 inwardly towards the jaws and the heads of these pins will engage the pins 53 forcing said pins inwardly. Since these pins engage the pivotally mounted jaw members 45 the jaw members will be moved inwardly and the jaws 40 will grip the pipe securely and hold the pipe against movement during the die operation.

As the cross head 32 is moved inwardly, the member 64 is likewise moved inwardly so that the cam 63 will engage the toe 62 of the gauge arm 55 and swing the gauge 60 outwardly and away from its alinement with the opening in the die member 70. Thus it will be seen that the operation of the various elements is entirely automatic and depends upon the reciprocating movements of the cross head 32. When the cross head 32 is moved outwardly the spring 39 will move the jaw members 35 away from each other and the spring 59 will move the gauge arm 55 inwardly, again placing the gauge element 60 in position to determine the inward position of the pipe.

Since the pipe is held rigidly by the jaws and has its inner end seated within the gauge 73, the portion of the pipe or tube which is exposed between the inner end of the die member 70 and the jaws 35 will collapse outwardly to form the joints 82, 86, or 93.

I claim:

1. A device for forming joints on tubular members comprising a die adapted to expand a portion of the tubular member, a base member, a block secured to said base member, substantially vertically disposed clamping jaws pivoted adjacent their lower ends on the block, means for normally maintaining the upper ends of the jaws in spaced relation, a movable crosshead carrying the die, means for reciprocating the crosshead, spaced rods for guiding the cross head and provided with transverse passages, a pin slidably mounted in each passage, one end of the pin normally engaging a clamping jaw, an arm pivotally mounted on each side of said block and having an end engaging the other end of a pin, the other ends of the arms adapted to be engaged by the moving crosshead for oscillating the arms to reciprocate the pins and move the jaws into gripping relation with the tubular member.

2. A device for forming joints on tubular members comprising a die adapted to expand a portion of the tubular member, a movable crosshead provided with a die, means for moving the cross head, a pivotally mounted gauge normally extending across the path of the die and adapted to engage the end of the tubular member and position the same to be engaged by the die, clamping jaws, means actuated by the movable cross head for causing the jaws to grip and hold the pipe against movement, and a cam means carried by the cross head and engaging the gauge for moving said gauge away from the end of the tubular member before the die comes into contact with the end of the tubular member.

CHARLES M. BRENNER.