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(54) Pipe bending apparatus

(57) The apparatus comprises a stand (10) on which is mounted an axle (12) carrying a half wheel former (14) with three peripheral grooves (16, 18, 20) therein. Each groove is to accommodate a differently diametered pipe. A shaped pressure device (56) is pivotally mounted on said axle (12) and has a passageway with a transverse roller (48) for each groove. A rest (54) pivotal in a second parallel axle has one entry aperture with a pipe bearing surface for each groove. Each peripheral groove and corresponding passageway and entry is in alignment to receive a pipe.

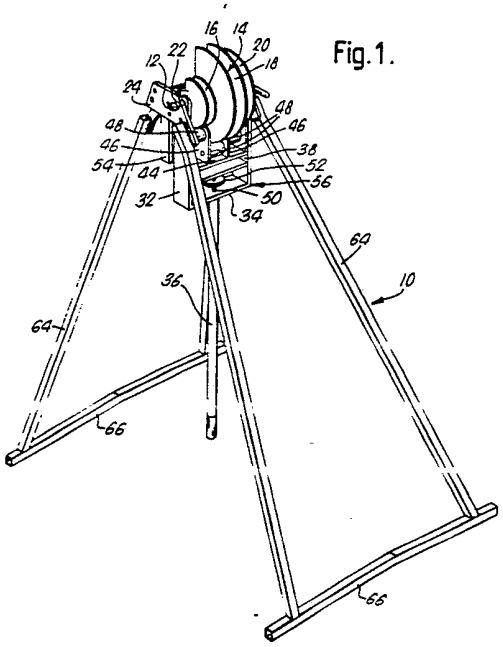

Fig.1.

The drawing(s) originally filed was (were) informal and the print here reproduced is taken from a later filed formal copy.

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Fig.1.

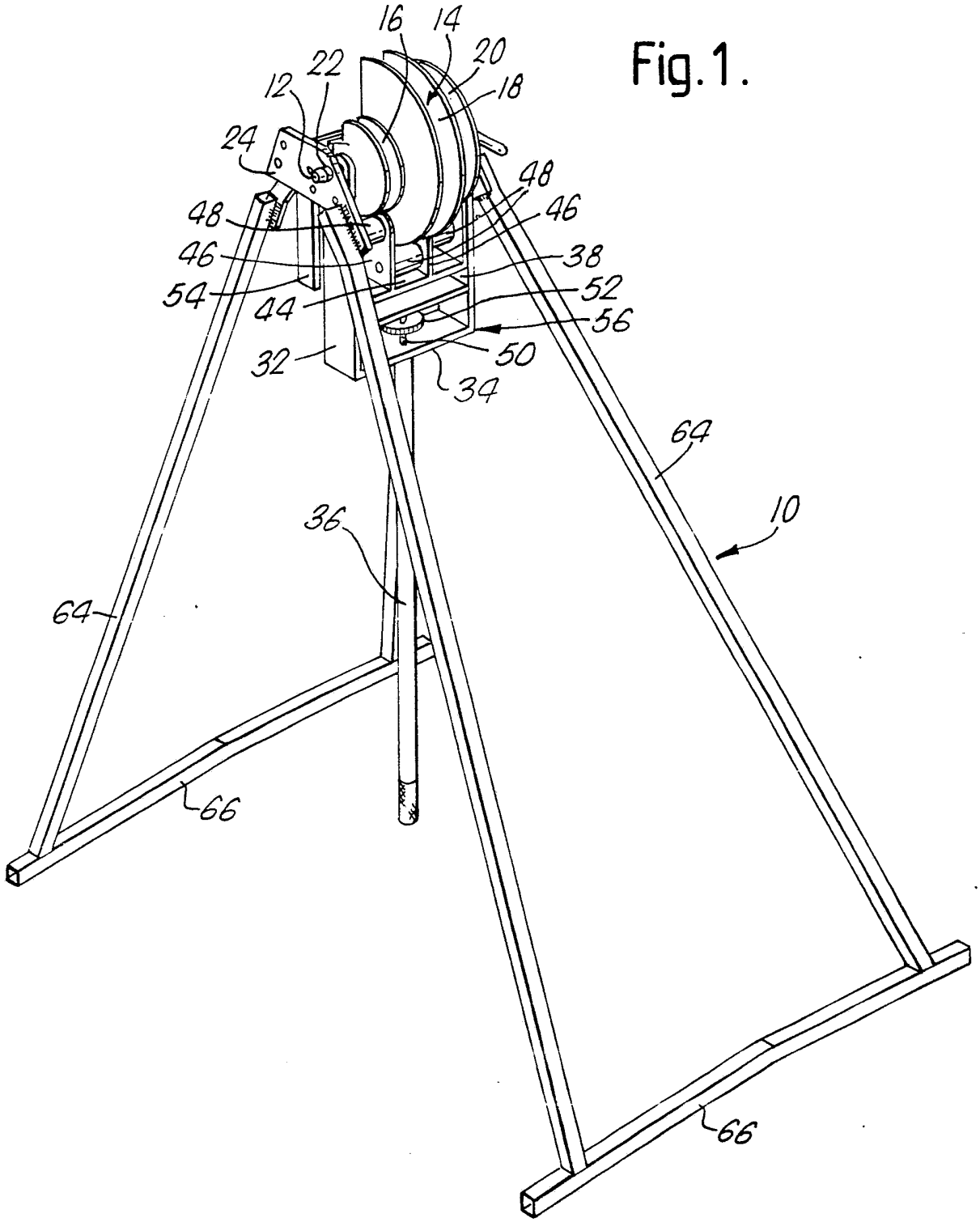

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Fig. 2.

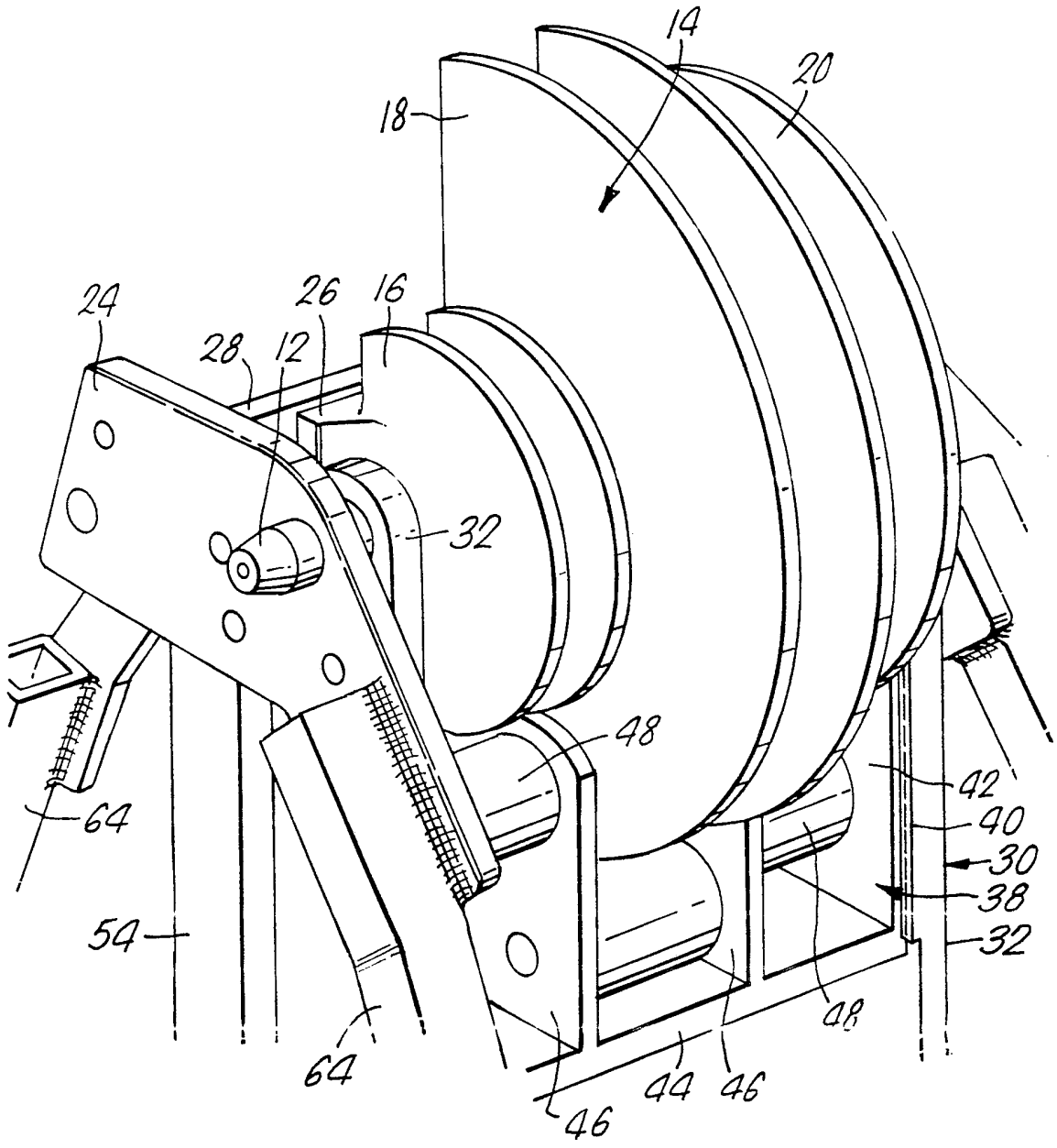

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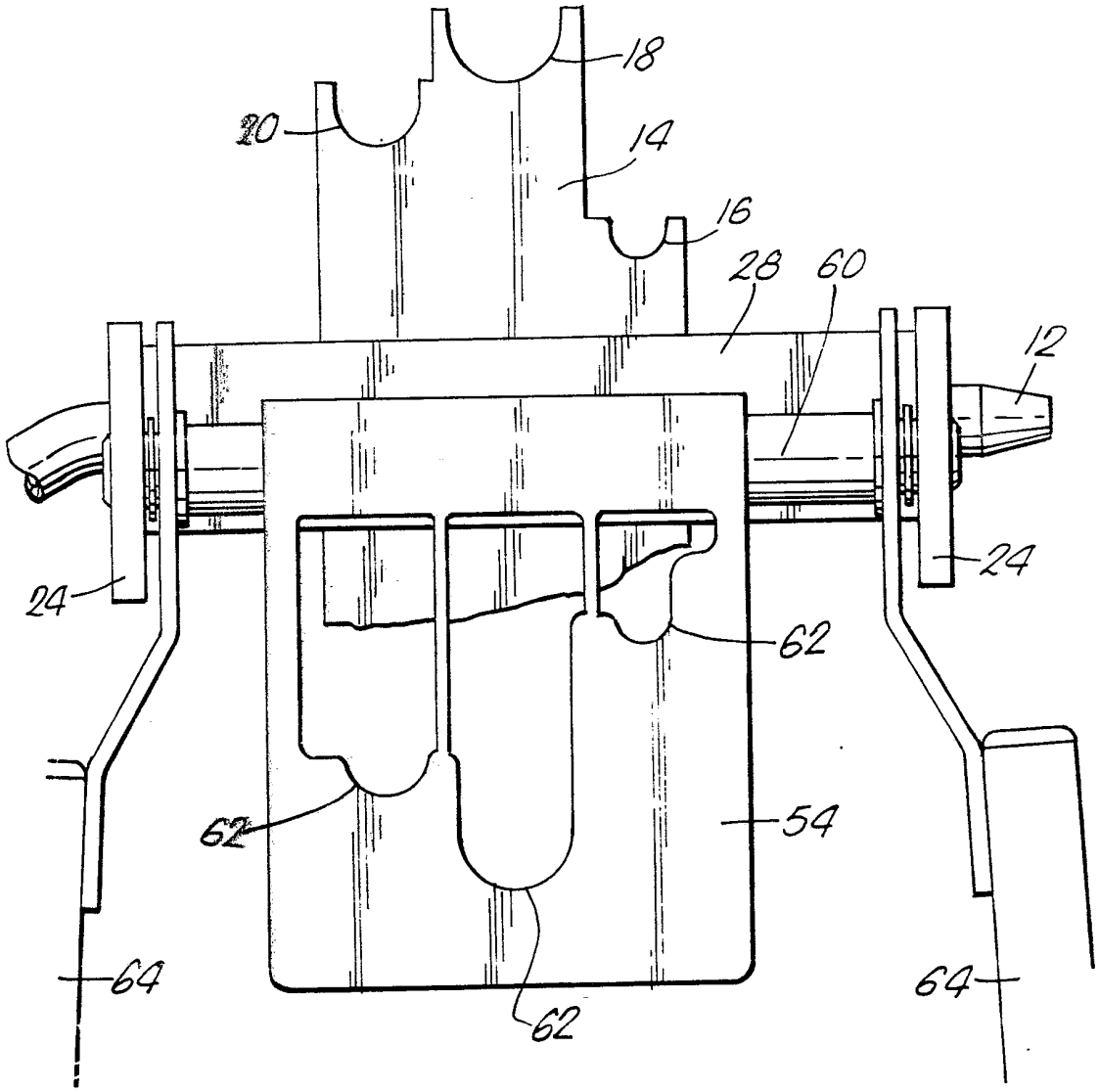
Fig.3.



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PIPE BENDING APPARATUS

This invention relates to a pipe bending apparatus.

Heretofore, such apparatus includes a stand on which a stationary shaped former, or pressure anvil, is provided, whose conformation is such that it can accommodate, for the purposes of bending, one of three common sizes of pipe or conduit, such as 15 mm (1/2 inch), 22 mm (1 inch), or 28 mm (1 1/2 inches) diameter sizes, a shaped former for each size being provided with the stand ready for fitment. A single entry pivotal roller pressure device and a single entry pivotal rest are provided, the device having a handle. Three short lengths of grooved bar are provided, each bar having a groove to correspond to a groove in a former. A pipe is bent with whatever shape of bend is required by firstly selecting the required former or anvil size to accommodate the pipe to be bent, and with the device and rest both in parallel planes, one on each side of the former, locating the pipe between and through them with a selected grooved bar to correspond with the selected grooved former located between the pipe to be bent and the device, and by using the handle causing the pipe to be bent around the former as the device is moved around and relative to the former.

Such pipe bending apparatus, which is used (primarily, but not necessarily) in the plumbing and electrical fitting fields, is a common implement of the trade but all suffer from the disadvantage that only one shaped former, or pressure anvil, can be used in an apparatus at any one time. Such a disadvantage has a detrimental effect upon productivity and work schedules and much time can be wasted on a site when shaped formers have to be changed as different pipe or conduit sizes are required to be bent. To overcome this disadvantage, it has been known to have three pipe bending apparatus side-by-side on site, each fitted with a different sized shaped former. This solution while overcoming the previous disadvantage suffers itself from the disadvantage of being three times the cost.

It is an object of the present invention to obviate or mitigate the above disadvantages.

Accordingly, the present invention is a pipe bending apparatus comprising a stand on which is mounted an axle carrying a half wheel former with two or more peripheral grooves therein, each groove being to accommodate a differently diametered pipe, a shaped pressure device pivotally mounted on said axle and having a passageway with a transverse roller for each groove, and a pivotal rest having one entry with a bearing surface for each groove, each peripheral

groove and corresponding passageway and entry being in alignment to receive a pipe.

Preferably, the former has three grooves. The groove to accommodate the largest diametered pipe is preferably central with one of the other grooves positioned on each side thereof.

Preferably also, the axle is journalled in two bearing holes, one provided in each of two opposed cheeks at the top of said stand. The former is preferably freely rotatable on said axle however in position on the stand is prevented from rotating thereon by a stop face provided thereon abutting against a bar secured between said cheeks. The pressure device is preferably a U-bracket with the outer ends of whose limbs are apertured and engaged by the axle, one limb on each opposite side of the former. Mid-way of the web of the bracket, an elongate handle is provided extending oppositely from the limbs. The outer end of the handle is preferably knurled or has a hand grip. Within the bracket, a slide preferably moves in tracks provided one on the inside of each limb. The slide has preferably two side walls with a bridging back and with two equi-spaced internal partition walls extending forwardly from the back parallel with the side walls towards the former. The partition walls preferably compartment the space between the side walls into three passageways, one between each set of opposed walls. Each passageway has

preferably a transverse low-friction rotatable roller at a desired spacing from the axle and former to suit the diameter of the pipe to be bent. The slide preferably moves relative to the bracket by means of a screw-threaded element secured to the back and in threaded engagement with a large-diametered knurled nut, the element moving into or out of the handle which is tubular at least at its inner end as the slide is moved away from or towards the former respectively.

Preferably further, the rest is formed having three elongate entries, the rest being pivotally carried by a second axle between the two cheeks and parallely spaced from the first axle, the ends of the entries remote from the pivotal connection being shaped bearing walls. The stand is preferably collapsible and is formed by two similar leg arrangements pivotally connected at their upper ends by the second axle, each leg arrangement being formed of two upwardly converging legs having their bottom ends rooted to a stabilising bar, the outer ends of which project beyond the roots.

An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Fig. 1 is a perspective view from the front and one side of a pipe bending apparatus according to the present invention;

Fig. 2 is an enlarged perspective view from the front of the pipe bending components mounted at the top of a stand; and

Fig. 3 is a rear view of the apparatus shown in Fig. 2.

Referring to the drawings, the pipe bending apparatus comprises a stand 10 at the top of which is mounted a horizontally disposed axle 12 which carries centrally thereof a half wheel pressure anvil or shaped former 14 having three peripheral grooves 16, 18, 20. Each groove is to accommodate a differently diametered pipe. The groove 18 to accommodate the largest diametered pipe is central as shown with one of the other grooves 16, 20 positioned on each side thereof.

The axle 12 is journalled in two bearing holes 22, one provided in each of two opposed cheeks 24 at the top of said stand 10. The former 14 is freely rotatable on said axle 12 however in position on the stand 10 is prevented from rotating thereon by a stop face 26 provided thereon abutting against a bar 28 secured between said cheeks 24.

A shaped pressure device 56 is pivotally mounted on said axle 12. The pressure device is a U-bracket 30 with the outer ends of whose limbs 32 are apertured and engaged by the axle 12, one limb 32 on each opposite side of the former. The former 14 and limbs 32 occupy thelength of the axle 12 between the cheeks 24 so to

prevent axial movement relative to the axle 12. Mid-way of the web 34 of the bracket 30, an elongate handle 36 is provided extending oppositely from the limbs 32. The outer end of the handle 36 is preferably knurled or is provided with a hand grip (not shown). Within the bracket 30, a slide 38 moves in tracks 40 provided one on the inside of each limb 32. The slide 38 has two side walls 42 with a bridging back 44 and with two equi-spaced internal partition walls 46 extending forwardly from the back 44 parallel with the side walls 42 towards the grooves of the former 14. The partition walls 46 compartment the space between the side walls 42 into three passageways, one between each set of opposed walls. Each passageway has a transverse low-friction rotatable roller 48 at a desired spacing from the axle 12 and former 14 to suit the diameter of the pipe to be bent. The slide 38 moves relative to the bracket 30 by means of a screw-threaded element 50 secured to the back 44 and in threaded engagement with a large-diametered knurled nut 52. The element 50 moving into or out of the handle 36 which is tubular at least at its inner end as the slide 38 is moved away from or towards the former 14 respectively.

A pivotal rest 54 is provided and formed of a casting having three elongate entries 58. The rest is pivotally carried on a second axle 60 between the two

cheeks 24 and parallely spaced from the first axle 12 on the side of the bar 28 remote from the axle 12. The ends of the entries 58 remote from the pivotal connection are shaped bearing walls 62 as shown.

The stand 10 is preferably collapsible and is formed by two similar leg arrangements pivotally connected at their upper ends by the second axle 60. Each leg arrangement is formed of two upwardly converging legs 64 having their bottom ends rooted to a stabilising bar 66. The outer ends of the bars 66 project beyond the roots to stabilise the stand. The leg arrangements can be folded together to allow the stand to be easily transported.

Each peripheral groove and corresponding passageway and entry are in alignment to receive a pipe.

During bending the pipe is held in the required, initially horizontal, position by means of a roller in a passageway of the device 56 situated at the front of the anvil 14 and a corresponding bearing wall 62 of the rest 54 which is situated at the rear of the pressure anvil 14 both being similarly disposed in either an upward or a downward position depending upon whether the pipe is being forcefully bent downwards or upwards on the apparatus. Three short length grooved bars as heretofore used are also used with the above-described apparatus, a grooved bar being located between the selected roller in the passageway and the pipe in the

groove of the former.

When being used the apparatus functions in a similar manner as a conventional pipe bending apparatus however there is no necessity to change any anvil when dealing with a mixture of 15 mm, 22 m and 28 mm tubes. It will also be readily appreciated that the anvil can be made to deal with two or more than three sizes of pipes and the grooves can be suited to accommodate any size of pipes other than those specified above.

Variations and modifications can be made without departing from the scope of the invention above-described.

CLAIMS:

1. A pipe bending apparatus comprises a stand on which is mounted an axle carrying a half wheel former with two or more peripheral grooves therein, each groove being to accommodate a differently diametered pipe, a shaped pressure device pivotally mounted on said axle and having a passageway with a transverse roller for each groove, and a pivotal rest having one entry with a bearing surface for each groove, each peripheral groove and corresponding passageway and entry being in alignment to receive a pipe.

2. Apparatus as claimed in Claim 1, wherein the former has three grooves.

3. Apparatus as claimed in Claim 2, wherein the groove to accommodate the largest diametered pipe is centrally positioned with one of the other grooves positioned on each side thereof.

4. Apparatus as claimed in any one of the preceding Claims, wherein the axle is journalled in two bearing holes, one provided in each of two opposed cheeks at the top of said stand.

5. Apparatus as claimed in Claim 4, wherein the former, freely rotatable on said axle, is prevented from rotating thereabout by a stop face provided thereon

abutting against a bar secured between said cheeks.

6. Apparatus as claimed in any one of the preceding Claims, wherein the pressure device is a U-bracket with the outer ends of whose limbs are apertured and engaged by the axle, one limb on each opposite side of the former.

7. Apparatus as claimed in Claim 6, wherein mid-way of the web of the bracket, an elongate handle is provided extending oppositely from the limbs.

8. Apparatus as claimed in Claim 7, wherein the outer end of the handle is knurled or is provided with a hand grip.

9. Apparatus as claimed in Claim 6, 7 or 8, wherein within the bracket, a slide moves in tracks provided one on the inside of each limb.

10. Apparatus as claimed in Claim 9, wherein the slide has two side walls with a bridging back and with two equi-spaced internal partition walls extending forwardly from the back parallel with the side walls towards the former.

11. Apparatus as claimed in Claim 10, wherein the partition walls compartment the space between the side walls into three passageways, one between each set of opposed walls.

12. Apparatus as claimed in Claim 11, wherein each passageway has a transverse low-friction rotatable

roller at a desired spacing from the axle and former to suit the diameter of the pipe to be bent.

13. Apparatus as claimed in any one of Claims 9, 10, 11, or 12, wherein the slide moves relative to the bracket by means of a screw-threaded element secured to the back and in threaded engagement with a large-diametered knurled nut, the element moving into or out of the handle which is tubular at least at its inner end as the slide is moved away from or towards the former respectively.

14. Apparatus as claimed in any one of Claims 4 to 13, wherein the rest has three elongate entries and is pivotally carried by a second axle between the two cheeks and parallely spaced from the first axle, the ends of the entries remote from the pivotal connection being shaped bearing walls.

15. Apparatus as claimed in Claim 14, wherein the stand is collapsible and is formed by two similar leg arrangements pivotally connected at their upper ends by the second axle.

16. Apparatus as claimed in Claim 15, wherein each leg arrangement is formed of two upwardly converging legs having their bottom ends rooted to a stabilising bar, the outer ends of which project beyond the roots.

17. A pipe bending apparatus substantially as hereinbefore described with reference to the accompanying drawings.

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