Nov. 28, 1950 A. E. WATTS 2,532,250

TUBE FLARING MACHINE WITH A PLURALITY OF ALIGNED WORK HOLDERS AND DIES

Filed Oct. 3, 1947 2 Sheets-Sheet 1

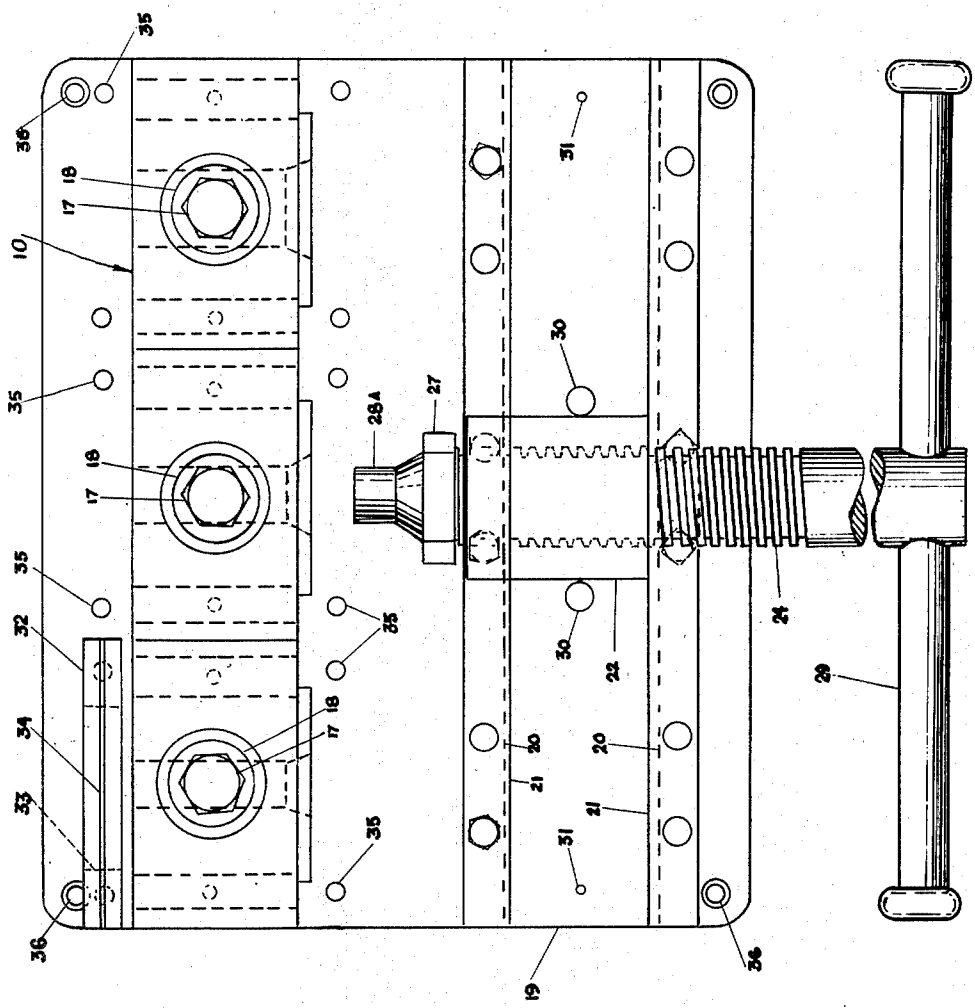

FIG. 1

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FIG. 3.

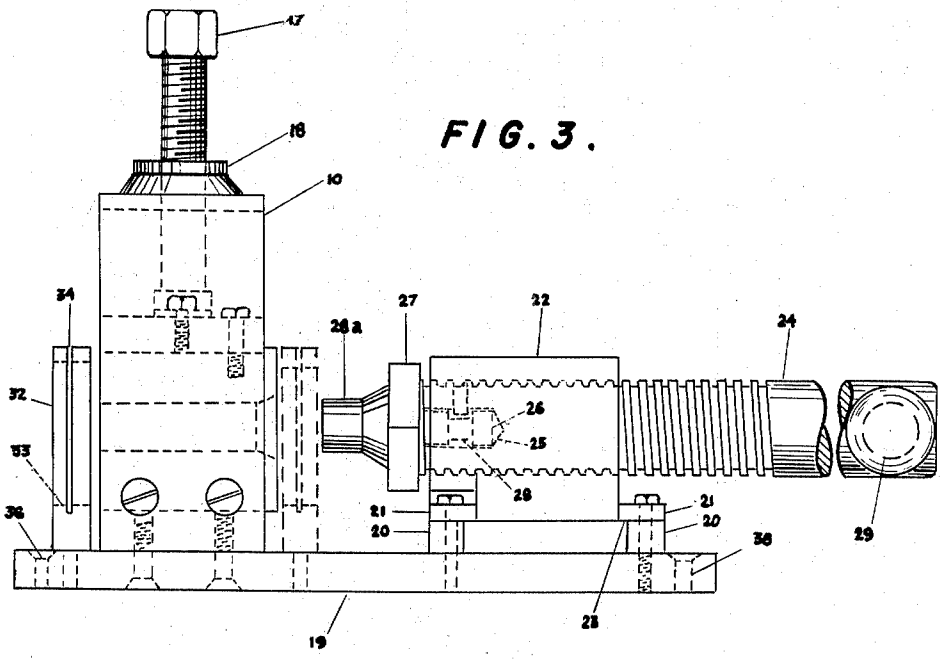
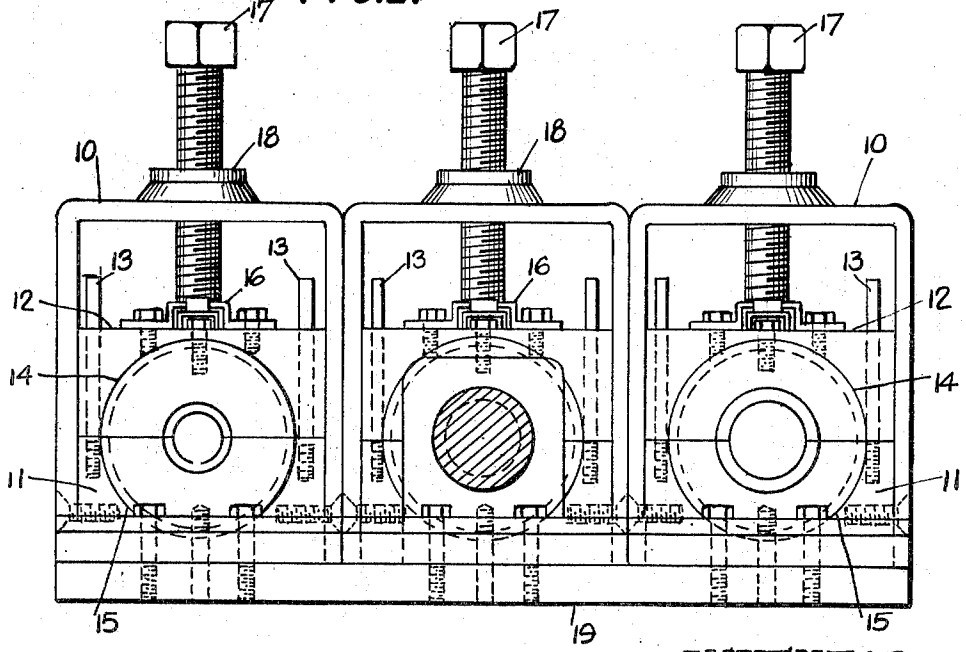


FIG. 2.



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TUBE FLARING MACHINE WITH A PLURALITY OF ALIGNED WORK HOLDERS AND DIES

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4 Claims. (Cl. 153—79)

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The invention relates to improvements in expanding machines for pipes and the like, as described in the present specification and illustrated in the accompanying drawings which form a part of the same.

The invention consists essentially of the novel features of construction as pointed out broadly and specifically in the claims for novelty following a description containing an explanation in detail of an acceptable form of the invention.

The objects of the invention are to devise a tube flaring machine with a plurality of aligned work holders and dies for flaring the ends of pipes uniformly; to provide a tube flaring machine which will facilitate flaring the ends of various sizes of pipes; to furnish an expanding machine provided with a means for cutting pipes so that the ends are uniform and perpendicular to the centre line of the pipe; to provide a device that will flare pipe ends which when connected by suitable means will be capable of distributing air, gas, steam, oil and water, etc.; to produce a tube flaring machine which is compact, facilitating transportation and storing of same; to provide a tube flaring machine which may be moved from one place to another without dismantling same; and generally to provide a tube flaring machine, for pipes which can be easily operated, inexpensive to manufacture, durable in construction and efficient for its purpose.

In the drawings:

Figure 1 is a plan view showing the tube flaring machine.

Figure 2 is a front elevation of the tube flaring machine.

Figure 3 is a side elevation of the tube flaring machine.

Like numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, the tube flaring machine consists of three pipe vises but could have any number of the same. Each of these pipe vises comprise an inverted U-shape bracket indicated by the numeral 10. This U-shape bracket being of a predetermined size and made of steel or any suitable material. A lower vise block 11 is fitted between the parallel flanges of the U-shape bracket 10 being flush with the ends of these flanges at the bottom thereof. This U-shape bracket is fixedly secured to the lower vise block by screws and the lower vise block, in turn, is secured to the base plate 19.

The upper vise block 12 is designed to slide up and down between the flanges of the U-shape

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bracket 10, being guided by means of the vertical guide pins 13. These guide pins are fixedly secured in the lower vise block 11 and pass through clearance holes in the upper vise block 12.

These upper and lower vise blocks have a semi-circular cut out in each so as to form a complete cylindrical bore when they are placed adjacent to one another. This cylindrical bore formed by the upper and lower vise blocks accommodates an expanding die. This expanding die consists of an upper portion 14 and a lower portion 15. The upper portion 14 of this expanding die being secured to the upper vise block 12 by means of a screw or otherwise attached, while the lower portion 15 of this expanding die is secured to the lower vise block 11 by means of a screw or otherwise attached.

The mating surface of the upper portion 14 and lower portion 15 of the expanding die forms a cylindrical clamping bore when they are placed adjacent to one another.

This cylindrical bore has a tapered flaring portion at one end of the same.

The bracket 16 is secured to the top of the upper vise block 12 and has a hole in same to guide the end of the vise tightening screw 17.

The U-shape bracket 10 has a collar 18 welded to the top of same and both are tapped for engagement with the tightening screw 17.

This tightening screw 17 is threaded almost the entire length of same, having a portion at the bottom smaller and forming a shoulder to engage in the bracket 16, while the top of this adjusting screw is provided with a hexagonal head.

These expanding dies which consist of the upper portion 14 and the lower portion 15 all have the same outside diameter, permitting them to be interchangeable in the cylindrical bore formed by any of the upper and lower vise blocks 12 and 11 respectively; while the bores in these expanding dies are each of a different size to take pipes of different diameters.

A pair of tracks consist of lateral guide bars 20 and 21 which are spaced a suitable distance from the vise blocks 11 and 12. These lateral guide bars 20 and 21 are parallel to one another, and also parallel to the vise blocks 11 and 12 which are in alignment with respect to one another.

The slide block 22 has a flanged portion 23 along each end at the bottom thereof, which in co-operation with the lateral guide bars 20 and 21, permit this slide block to be moved lat-

erally in either direction on the base plate 19. The slide block 22 is threaded and movably supports the longitudinal feed screw 24.

The forward end of the feed screw 24 has a bored hole 25 extending thereinto which rotatably accommodates the rear portion 26 of the expanding tool 27. The rear portion 26 of the expanding tool 27 has an annular recess 28 extending therearound, which in co-operation with a set screw in the longitudinal feed screw 24 maintains the expanding tool longitudinally in position. The front portion 28–A of the expanding tool is diametrical, and the rear portion thereof extends rearward and outward in a truncated conical manner.

The front portion 28A of each of the expanding tools 27 are of a different size to coincide with the sizes of the cylindrical bores in the expanding dies.

The feed screw 24 is provided with a slidable bar 29 which projects through the end thereof for manually turning the feed screw in either direction. The holes 30 and 31 in the base plate 19 are provided to accommodate stop pins to prevent lateral movement of the slide block 22 when desired.

A cutting guide block 32 is provided to facilitate the cutting of lengths of pipe, and also for cutting the ends even at right angles to the centre line of the pipe. This cutting guide block 32 has a hole 33 through same, which is large enough to permit the largest size of pipe intended for the machine to pass therethrough. The slit 34 in the cutting guide block serves as a guide for a hack-saw or other suitable cutting means. A pair of holes 35 are provided in the base plate 19 at the front and rear of each of the pipe vises, permitting the guide block 32 to be placed in any one of these positions and secured to this base plate by means of screws.

The base 19 of the tube flaring machine is provided with holes 36 to facilitate the mounting of same on a work bench or any other suitable place.

Any required size of expanding tool may be secured to the feed screw 24 and the parallel tracks mounting the slide block 22 permit the expanding toool to be moved laterally so as to be in alignment with the desired expanding die which is to be used. The pipe is securely held in one of the pipe vises by turning the tightening screw 17 and the expanding tool is then progressively moved forward by turning the feed screw 24. The expanding tool then enters the end of the pipe held in the expansion die, forcing the side walls of this pipe between the tapered portion on the expansion die and the truncated conical portion on the expanding tool; this forming a flare on the end of the pipe.

The expanding tool 27 is rotatably mounted on the end of the feed screw 24, permitting this feed screw to turn without turning the expanding tool 27.

The various parts of the tube flaring machine are easily accessible, facilitating the changing of interchangeable parts, and repairing or replacing of any of the other parts in the machine.

What I claim is:

1. In a tube flaring machine with a plurality of work holders and dies, a base plate, a plurality of vise members mounted in lateral alignment on said base plate, each of said vise members comprising an inverted U-shaped bracket, a lower vise block being fitted between the parallel flanges of said U-shaped bracket and being

flush with the ends of said flanges at the bottom thereof, the said U-shaped bracket being fixedly secured to said lower vise block, the latter, in turn, being fixedly mounted on said base plate, an upper vise block having means permitting same to slide up and down between the parallel flanges of said U-shaped bracket, tightening means being mounted on the web of said U-shaped bracket for tightening said upper vise block against said lower vise block, said upper vise block and said lower vise block each having a recessed portion on the adjacent faces of same and coinciding in size and shape to one another, said recessed portion in said upper vise block and said lower vise block forming supporting seats to accommodate an expanding die, the latter comprising an upper portion and a lower portion, said upper portion being fixedly secured to the seat of said upper vise block, and said lower portion being fixedly secured to the seat of said lower vise block, said upper portion and said lower portion each having a semi-circular recess on the adjacent faces of same and coinciding in size and shape to one another, said semi-circular recess in each of the same forming a clamping bore to accommodate a pipe, said clamping bore having a tapered flaring portion at one end thereof, said upper portion and said lower portion of said expanding die being opened and closed by means of said upper vise block in co-operation with said tightening means, said clamping bore in each of said vise members being a different size to accommodate pipes of different diameters, a longitudinally movable member and means for suitably mounting same on said base plate, said mounting means having lateral movement in either direction, so as to place said movable member in alignment with said pipe, a pipe flaring means connected to said movable member, means for progressively feeding said movable member longitudinally for engaging said pipe flaring means with the end of said pipe, said tapered portion within said expanding die in co-operation with said flaring means forming a flare on the end of said pipe.

2. In a tube flaring machine with a plurality of work holders and dies, a base plate, a plurality of vise members mounted in lateral alignment on said base plate, each of said vise members comprising an inverted U-shaped bracket, a lower vise block and an upper vise block, said lower vise block being fitted between the parallel flanges of said inverted U-shaped bracket and being flush with the ends of the flanges at the bottom thereof, said inverted U-shaped bracket being fixedly secured to said lower vise block and the latter, in turn, being fixedly mounted on said base plate, said upper vise block having holes extending vertically therethrough, vertical guide pins fixedly secured in said lower vise block and adapted to extend into the vertical holes in said upper vise block thus guiding vertical movement of the latter, said upper and said lower vise blocks each having a semi-circular cut-out therein thus forming a complete cylindrical bore when the same are placed adjacent to one another, an expanding die accommodated in each of said vise members and comprising an upper portion and a lower portion, said upper portion of said expanding die being supported in said upper vise block, and said lower portion of said expanding die being mounted in said lower vise block, thus forming a clamping bore to accommodate a pipe, a movable member mounted on said base plate, a pipe flaring means sup-

ported on said movable member, means for progressively feeding said movable member and said pipe flaring means longitudinally with respect to said base plate and towards any of said vise members.

3. In a tube flaring machine with a plurality of work holders and dies, a base plate, a plurality of vise members mounted in lateral alignment on said base plate, each of said vise members comprising a lower vise block fixedly mounted on said base plate, an inverted U-shaped bracket fixedly secured on each of said lower vise blocks and extending upward thereabove, an upper vise block located within said inverted U-shaped bracket above said lower vise block, said upper vise block having holes extending therethrough, pins mounted in said lower vise block and extending upward into the holes in said upper vise block for guiding upward or downward movement of the latter, a bracket secured to the top of each of said upper vise blocks, a collar secured to the top of each of said inverted U-shaped brackets, said collar having a tapped hole extending therethrough, a tightening screw threaded into said collar on each of said inverted U-shaped brackets, said tightening screw bearing downward on said upper vise block within each of said inverted U-shaped brackets, and said bracket on each of said upper vise blocks guiding the lower end of the respective tightening screw as it forces said upper vise block downward adjacent to said lower vise block, a threaded member mounted on said base plate and adapted to be laterally moved with respect thereto, a longitudinal feed screw supported in said threaded member, a pipe flaring means mounted on the forward end of said longitudinal feed screw, said vise members substantially gripping a pipe therein and said pipe flaring means engaging the end of the pipe and being progressively fed forward thus forming a flare on the aforesaid pipe.

4. In a tube flaring machine with a plurality of work holders and dies, a base plate, a plurality of vise members mounted in lateral alignment on said base plate, each of said vise members comprising a lower vise block fixedly mounted on said base plate, an inverted U-shaped bracket fixedly secured on each of said lower vise blocks and extending upward thereabove,

an upper vise block located within said inverted U-shaped bracket above said lower vise block, said upper vise block having holes extending therethrough, pins mounted in said lower vise block and extending upward into the holes in said upper vise block for guiding upward or downward movement of the latter, a collar secured to the top of each of said U-shaped brackets, said collar having a tapped hole extending therethrough, a tightening screw threaded into said collar on each of said inverted U-shaped brackets, said tightening screw bearing downward on said upper vise block within each of said inverted U-shaped brackets, an expanding die accommodated in said upper and said lower vise blocks for gripping a pipe therein as said upper vise blocks are moved adjacent to one another, a longitudinal feed screw suitably supported on said base plate, means for adjusting said longitudinal feed screw so as to bring the same in alignment with any of said expanding dies in said upper and lower vise blocks, an expanding tool rotatably mounted on the forward end of said longitudinal feed screw for engaging the end of the pipe held in said expanding die, said longitudinal feed screw being progressively moved forward, thus engaging said expanding tool with the end of the pipe and flaring the same outward against said expanding die, and said expanding tool having a tapered portion coinciding with a tapered portion in said expanding die.

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