June 4, 1963 J. S. FEELER 3,092,058

PIPE AND FLANGE ALIGNER

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FIG 1

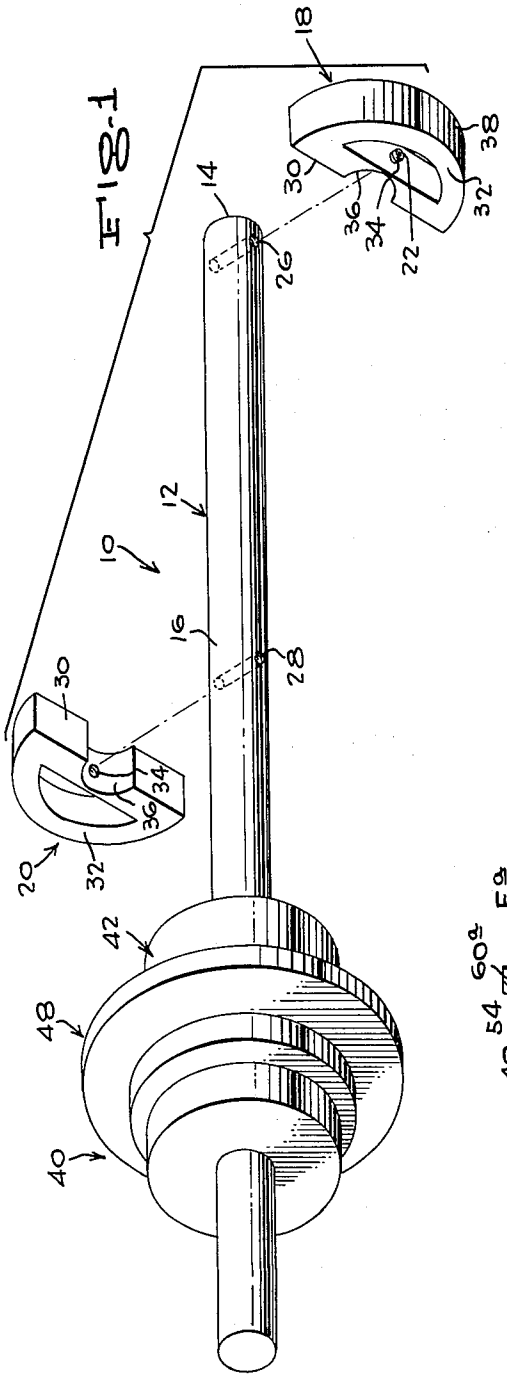
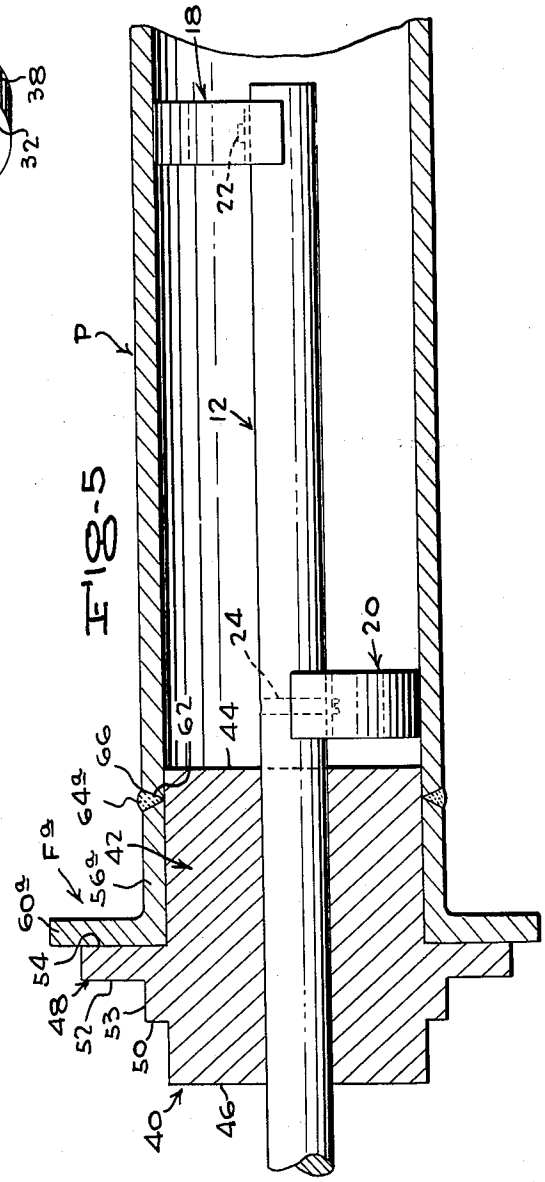


FIG 5



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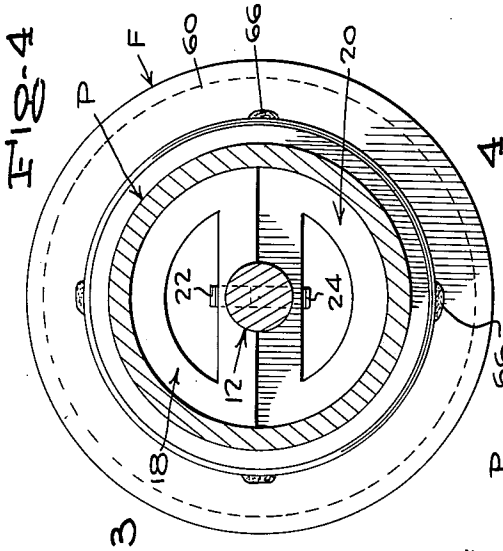


FIG. 4

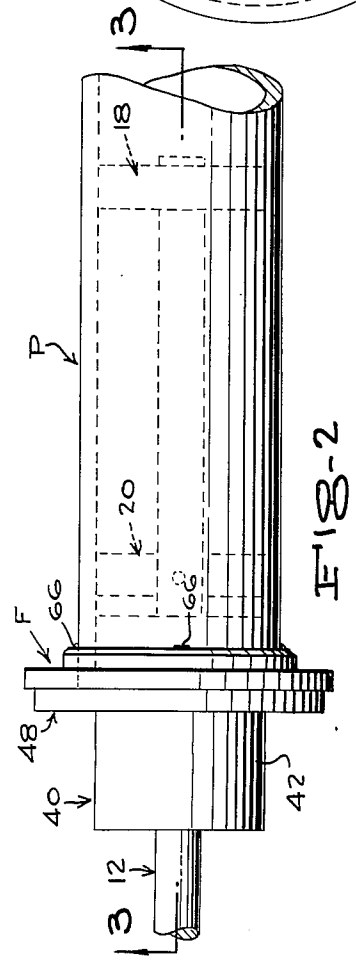


FIG. 2

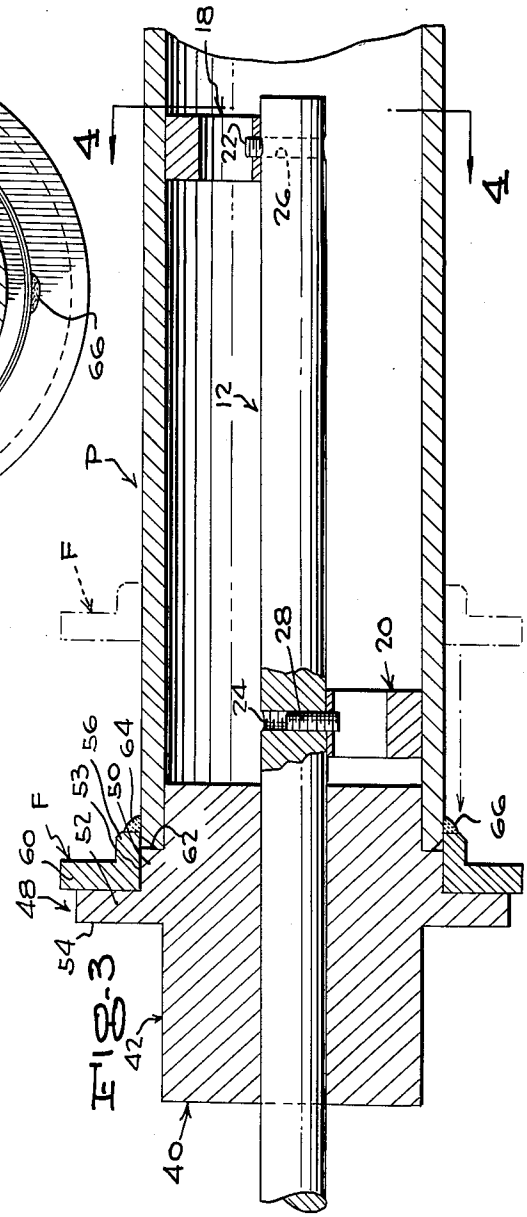


FIG. 3

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PIPE AND FLANGE ALIGNER

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This invention relates to a novel and improved pipe and flange aligner for use in welding flanges on ends of pipe sections.

The primary object of the invention is the provision of a more efficient and more easily used time- and labor-saving device of the kind indicated, which involves a positioning rod having pipe engaging shoes for engaging the interior of a pipe section, and a gradiently shouldered mandrel which is slidably mounted on the rod and is reversible on the rod, so as to accommodate both slip-on flanges and weld-neck flanges.

Another object of the invention is the provision of a device of the character indicated above wherein interchangeable shoes of different diameters, to non-adjustably engage in pipe sections of different diameters, are provided for mounting on the positioning rod, so as to eliminate the inaccuracies and misalignments of pipe sections and flanges which are incidental to the use of present adjustable pipe and flange aligners.

A further object of the invention is to provide a device of the character indicated above which is composed of a small number of uncomplicated and easily assembled parts, and which can be made in rugged and serviceable forms at relatively low cost.

Other important objects and advantageous features of the invention will be apparent from the following description and the accompanying drawings, wherein, for purposes of illustration only, a specific form of the invention is set forth in detail.

In the drawings:

FIGURE 1 is an exploded perspective view of a device of the invention;

FIGURE 2 is a side elevation showing the device operatively engaged in a pipe section and its mandrel supporting a welded clip-on flange;

FIGURE 3 is an enlarged longitudinal section taken on the line 3—3 of FIGURE 2;

FIGURE 4 is a transverse section taken on the line 4—4 of FIGURE 3; and

FIGURE 5 is a view like FIGURE 3, showing the mandrel supporting a weld-neck flange.

Referring in detail to the drawings, wherein like and related numerals designate like and related parts throughout the several views, and first to FIGURES 1 to 4, the illustrated device, generally designated **10**, comprises an elongated preferably smooth cylindrical positioning rod **12**, which has a free distal end **14**, and an intermediate portion **16**. At a point close to the end **14** an inner arcuate shoe **18**, preferably semi-cylindrical in form, is secured on and extends laterally from the rod **12**, and outer shoe **20** is secured on and extends laterally from the opposite side of the rod **12**, and is diametrically opposite in position to the inner shoe **18**, the shoes being held removably in place by means of studs **22** and **24** which are threaded in radial bores **26** and **28** provided in the rod **12**.

The shoes **18** and **20** are similar in form and in size, and comprise open semi-cylindrical bridges which have straight flat diametrical portions **30** and semi-circular portions **32**, the studs being threaded through bores **34** which are centered in the diametrical portions **30** and open to semi-circular notches **36** therein, which conformably receive and engage the positioning rod **12**, so that the outer peripheral surfaces **38** of the semi-circular portions **32**

are concentric to the axis of the rod **12**. The shoes **18** and **20** are selected as to diameter, for mounting on the rod **12**, in accordance with the inside diameter of a pipe section P with which the device **10** is to be used.

The device further comprises a gradiently shouldered mandrel **40**, which, like the shoes **18** and **20**, can be provided in a number of different inter-changeable sizes. The mandrel **40** comprises an elongated, preferably solid cylindrical body **42** having an outside diameter to fit snugly and slidably into a particular pipe section P, the body **42** having first and second squared ends **44** and **46**, respectively.

Surrounding and fixed on the mandrel body **42**, at a point intermediate its ends and preferably nearer to its first end **44** than to its second end **46**, is a step-cut annulus **48** which faces the first end **44** and provides an inner or first shoulder **50**, of the outside diameter of the pipe section P, an intermediate or second shoulder **52**, and an outer or third shoulder **54**.

The intermediate or second shoulder **52** is on a stop **53** of the same diameter as the first shoulder **50**, and as shown in FIGURE 3, spaced from the first shoulder **50** at a distance less than the length of the collar **56** of a slip-on pipe flange F, and can be smaller in diameter than the flange element **60** of the flange F. The outer or third shoulder **54**, which faces toward the second end **46** of the mandrel **40**, is of the full diameter of the step-cut annulus **48**.

In use and operation, for positioning and welding a slip-on flange F on the pipe section P, at the outer end **62** thereof, the flange F is initially engaged on an intermediate part of the pipe section, as indicated in phantom lines in FIGURE 3, and the positioning rod **12** and its shoes **18** and **20** slid into the pipe sections, so that the outer shoe **20** is located near to the outer end **62** of the pipe section P. The mandrel **40** is then slid along the rod **12** and its first end **44** engaged in the pipe section until the first shoulder **50** thereof abuts the outer end **62**. The slip-on flange F is then moved along the pipe section P until its flange element **60** is positioned on the stop **53** and bears against the intermediate or second shoulder **52**, and so that the free edge **64** of the collar **56** reaches inwardly beyond the outer end **62** of the pipe section P. With the components of the device held in these positions, relative to the pipe section P, tack welds **66** are applied around the pipe section and the collar edge **64**, so as to secure the slip-on flange F to the pipe section, and the device **10** is withdrawn from the pipe section.

For welding a weld-neck flange F*a* on the outer end of a pipe section P, as shown in FIGURE 5, the device **10** is applied to the pipe section as described above, but with the mandrel **40** in reversed position, with its second end **46** within the pipe section. In this case, the neck or flange collar **56***a* which is smaller in diameter than the collar **56** of the slip-on flange F, and is of the same diameter and thickness as the side wall of the pipe section, is engaged on the mandrel body **42** behind the annulus **48**, with the flange element **60***a* engaged with the outer or third shoulder **54**. This puts the free edge **64***a* of the neck **56***a* in abutment with the outer end **62** of the pipe section P, whereat tack welds **66***a* are applied to the edge **64***a* and the pipe section end **62**, and the device then is withdrawn from the pipe section P and the weld-neck flange F*a*.

It is to be observed that the mandrel **40**, and the shoes **18** and **20** are readily replaceable, when worn, so as to restore the accurate alignment of pipe sections and flanges obtainable by the fixed, rather than adjustable character of the device **10**.

Although there have been shown and described herein preferred forms of the invention, it is to be understood that the invention is not necessarily confined thereto, and that any change or changes in the structure of and in the relative arrangements of components thereof are contemplated as being within the scope of the invention as defined by the claims appended hereto.

What is claimed is:

1. A pipe and flange aligner comprising a positioning rod smaller in diameter than the inside diameter of a pipe section and adapted to extend from an end of said pipe section, said rod having an inner end, an inner arcuate shoe fixed on the rod at its inner end, an outer arcuate shoe fixed on the rod and spaced from the inner shoe, said shoes being diametrically opposed and engageable with the interior of a pipe section, and a mandrel slidably circumposed on the rod, said mandrel having a cylindrical body of the inside diameter of a pipe section, said mandrel body having first and second pipe section entering ends, a fixed annulus surrounding said mandrel body and spaced from its ends, said annulus having stepped first, second, and third shouders, two of said shoulders being adapted to engage the neck of a pipe flange to be welded on a pipe section in which an end of a mandrel is adapted to be engaged, said shoes being open semi-cylindrical bodies having flat diametrical portions and arcuate portions having peripheral surfaces to conformably engage an interior of the pipe section, said diametrical portions having notches receiving the positioning rod, and studs threaded through the diametrical portions and threaded into the rod.

2. A pipe and flange aligner comprising a positioning rod smaller in diameter than the inside diameter of a pipe section and adapted to extend from an end of said pipe section, said rod having an inner end, an inner arcuate shoe fixed on the rod at its inner end, an outer arcuate shoe fixed on the rod and spaced from the inner shoe, said shoes being diametrically opposed and engageable with the interior of a pipe section, and a mandrel slidably circumposed on the rod, said mandrel having

a cylindrical body of the inside diameter of a pipe section, said mandrel body having first and second pipe section entering ends, a fixed annulus surrounding said mandrel body and spaced from its ends, said annulus having stepped first, second, and third shoulders, two of said shoulders being adapted to engage the neck of a pipe flange to be welded on a pipe section in which an end of a mandrel is adapted to be engaged, said shoes being open semi-cylindrical bodies having flat diametrical portions and arcuate portions having peripheral surfaces to conformably engage an interior of the pipe section, said diametrical portions having notches receiving the positioning rod, and studs threaded through the diametrical portions and threaded into the rod, said shoes being similar and interchangeable.

3. A pipe and pipe flange aligner comprising a gradiently shoudered mandrel having an axial bore extending therethrough, a rod extending slidably through said bore, and a pair of shoes fixed on the rod at longitudinally spaced points along the rod, said shoes being diametrically opposed to each other and having arcuate outer surfaces which are in concentric relationship, said shoes being fixed to diametrically opposed sides of said rod, said shoes being semi-circular and having flat diametrical inner surfaces, said inner surfaces being formed with arcuate notches conformably receiving said rod, and studs threaded through the rod and into the inner surfaces of the shoes.

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