Aug. 14, 1945. G. N. SIMONSEN 2,382,266

GAUGE FOR PIPE BENDING MACHINES

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Fig. 1.

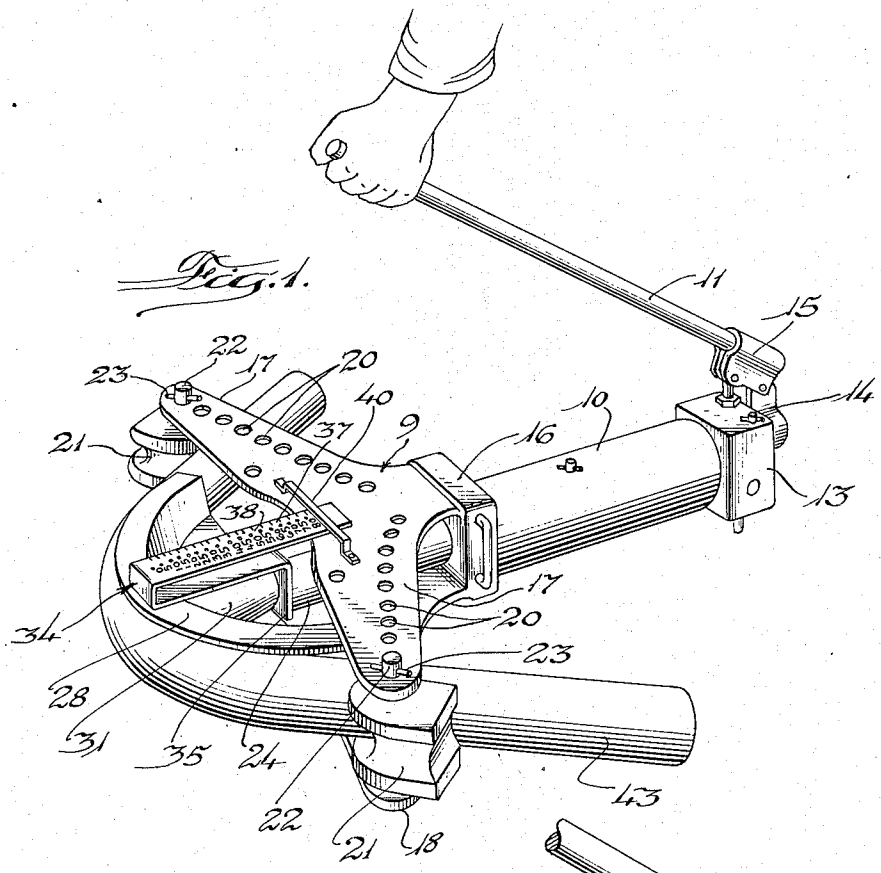
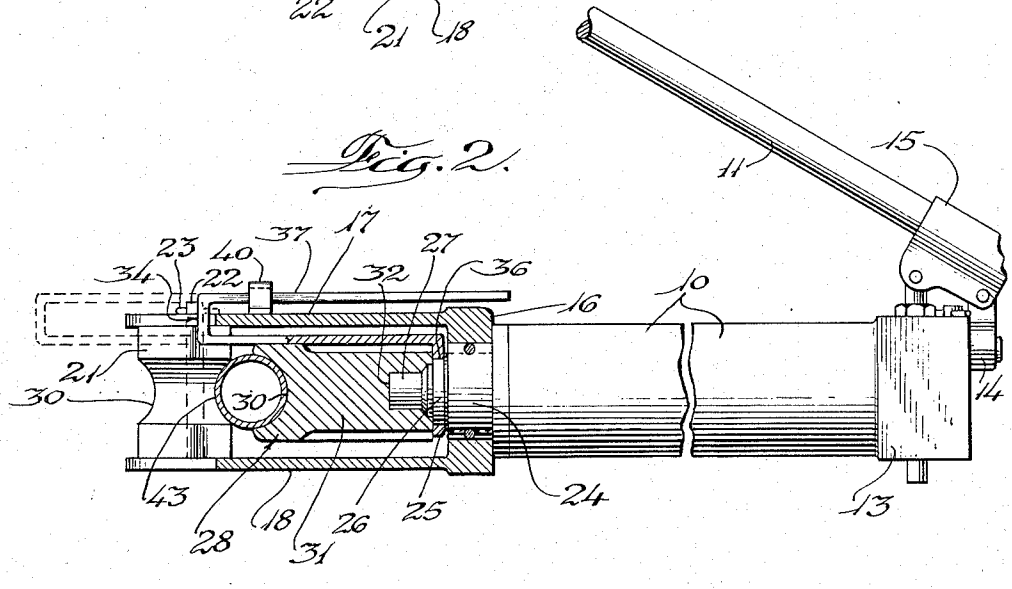


Fig. 2.



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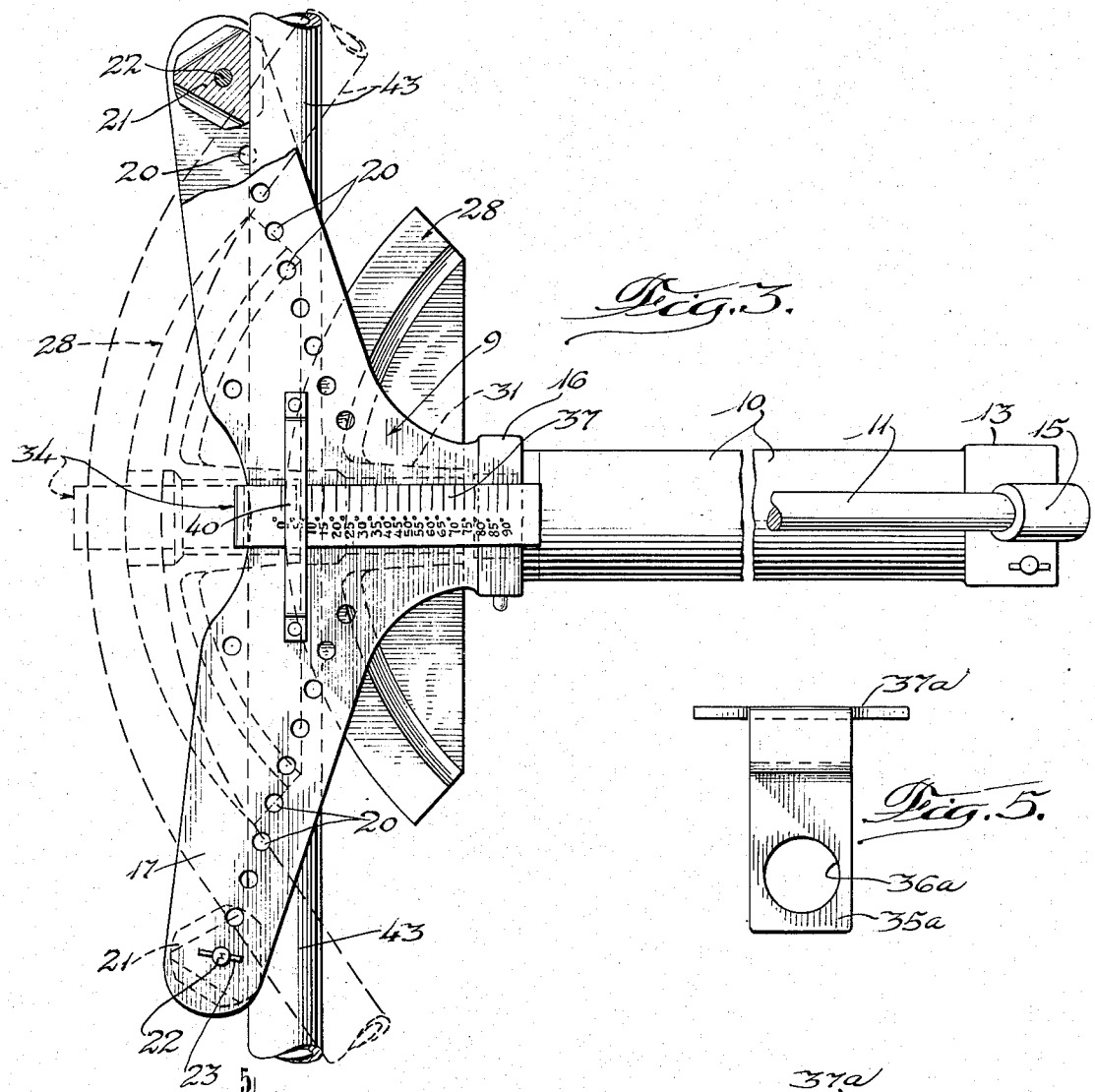


Fig. 3.

Fig. 5.

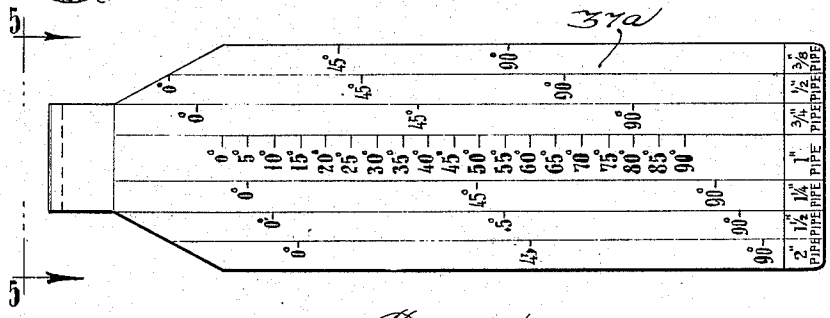


Fig. 4.

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UNITED STATES PATENT OFFICE

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GAUGE FOR PIPE BENDING MACHINES

George N. Simonsen, Chicago, Ill.

Application November 5, 1943, Serial No. 509,086

1 Claim. (Cl. 153—38)

My invention relates to gauges for pipe bending machines. My gauge is also capable of use in connection with a pipe bending machine used for bending rods. Its use results in economy of material for the reason that when a pipe or rod is once bent beyond the degree desired, it is difficult, if not impossible, to return it to a former condition without distortion. Without the use of a gauge, where a considerable amount of bending is done, a substantial percentage of the material being bent is wasted.

One object of my invention is the provision of an improved gauge which will enable the user of a pipe bending machine to determine accurately the degree of bend or angle applied to a pipe.

Another object of my invention is to provide a pipe bending gauge which is capable of use with various pipe bending machines on the market with little or no modification.

Another object of my invention is to provide a gauge for use in pipe bending which will be strong in construction and economically manufactured, easily applied to a pipe bending machine, and one which will not require adjustment.

Another object of my invention is to provide a gauge which will afford various scales for use in bending pipes of various diameters and wherein the scales are so arranged that they may be easily read by the operator of the pipe bending machine.

In the drawings:

Fig. 1 is a perspective view of a pipe bending machine of a well known form having attached thereto the gauge of my invention;

Fig. 2 is a view, partly in section and partly in elevation, of the equipment shown in Fig. 1;

Fig. 3 is a plan view of the device shown in Fig. 1, the movable parts of the pipe bending machine, the gauge and the pipe being also shown in dotted lines representing the positions they take in a pipe bending operation;

Fig. 4 is a plan view of a modified form of gauge having on the top thereof a plurality of scales used in conjunction with pipes of seven different diameters; and

Fig. 5 is an end elevational view of the gauge shown in Fig. 4.

Referring to Fig. 1 of the drawings, the reference character 9 indicates the frame of a pipe bending machine of a well known form available on the market. A hydraulic ram 10 is attached to the frame and has a pump operated by a handle 11, the handle 11 being pivotally mounted on the endpiece 13 of the hydraulic ram 10 by means of a support 14 and a bifurcated member 15. The frame 9 has cast integrally therewith a member 16 forming an end closure for the cylinder of the hydraulic ram 10. The frame 9 also comprises four arms, upper arms 17, 17, and lower arms 18, 18. The arms 17, 17, and 18, 18, are perforated as at 20, 20, for a purpose which will presently appear.

Arranged to be removably mounted between arms 17 and 18 are corner formers 21, 21, held in position by pins 22, 22, locked in proper position by cotter pins 23, 23. The hydraulic ram 10 has reciprocally mounted therein a piston 24 having near its outer end a shoulder 25 and reduced diameters 26 and 27. A shoe 28 of circular form, having its outer face of circular cross section 30 and on its inner side a shoulder 31, is provided. The shoulder 31 has in its inner end a recess 32 adapted to receive the end 27 of the hydraulic ram piston 24.

The gauge 34 of my invention comprises a substantially U-shaped piece of metal or other suitable material having at one end a leg 35, provided with an aperture 36, and at the other end a face 37 having indicia 38 to show the angle or bend given to a piece of pipe or other material. Attached to the frame 9 of the pipe bending machine is an indicator 40. The indicator 40 may be a strip of metal or other material formed for attachment to the frame 9 by means of welding or screws or bolts, or any other convenient method, and to permit the face 37 of the gauge 34 to pass under it and to enable the operator of the bending machine to obtain readings.

In the first instance, the indicia to be applied to the gauge 34 and the face 37 thereof is determined by use with one of the several forms of pipe bending machines available, the pipe being bent to an angle and recording the degree thereof on the face 37 of the gauge 34. Other degrees of bend are then recorded on the face 37 of the gauge 34 until the desired number of readings are obtained, it being necessary to measure the angle of the pipe bend with a protractor, combination square, or other instrument. After this has been done, duplicate gauges may be reproduced with facility. Various types of pipe bending machines on the market vary somewhat, particularly with reference to the diameter of the hydraulic piston 24 or the shape thereof, but for each form of pipe bending machine it is only necessary to vary the size or the character of the opening in the leg 35 of the gauge 34, or to make such other modifications as will be apparent from the construction of the bending machine to which my gauge is to be applied.

For various diameters of pipe to be bent in a

pipe bending machine, the manufacturers of the pipe bending machines furnish different shoes **28** having circular cross sections **30** to conform to the diameter of the pipe being bent. The gauge **34** shown in Figs. 1, 2 and 3 of the drawings, is one illustrating a form of my device for indicating the angle or bend given to pipes of one diameter, say, two-inch diameter.

Although bending machines may be made to bend any size of pipe, the machine shown in the drawings is one adapted for use with pipes ranging in diameter from three-eighths of an inch to two inches. In bending a pipe having a diameter of two inches, the pins **22** are inserted in the outermost holes **20, 20**, whereas, if a pipe having a diameter of three-eighths of an inch is being bent, the pins are initially placed in the innermost holes **20, 20**. Intermediate sizes of pipe require that the pins initially be inserted in the holes intermediate the inner and outer holes, all of which are marked by the manufacturers of the pipe bending machines.

In Fig. 4 is shown a gauge, also substantially U-shaped having a leg **35***a*, an aperture **36***a*, and a face **37***a*. In the form of gauge shown in Figs. 4 and 5, the face **37***a* is somewhat wider than the face **37** of the gauge shown in Fig. 1, but it may be of the same width as the gauge shown in Fig. 1, depending on how large the legends are desired to be and the number of scales to be applied to the gauge. In the gauge shown in Fig. 4, I have shown scales appropriate for indicating the angles of bend applicable to pipes of seven different diameters ranging from three-eighths inch to two inches.

The operation is as follows: The piston **24** of the hydraulic ram **10** is placed in a retracted position. A straight piece of pipe **43** to be bent, is then inserted between the shoe or bending former **28** and the corner formers **21**. When in this position, one edge of the indicator **40** lies directly over the reading "0" on the face **37** of the gauge. Hydraulic pressure is then built up in the hydraulic ram **10** forcing the shoe or bending former **28** outwardly against the pipe **43**. The pipe **43**, being held against outward movement by the corner formers **21, 21**, is bent around the shoe or bending former **28**, and the degree of angle or bend may be observed by sighting along the indicator **40** and obtaining the reading on the indicia appearing on the face **37** of the gauge **34**. The amount of bend given to a piece of pipe depends on the length of travel of the piston **24** out of the hydraulic ram **10** and the diameter of the pipe, and is limited thereby. If a greater angle of bend is desired than is afforded by one operation of the hydraulic ram **10** and the piston **24**, the piston **24** may be drawn into retracted position and the corner formers **21** removed and placed in another position between the arms **17** and **18** by removing the pins **22** and re-inserting them in other holes **20** closer to the center of the pipe bending machine. This operation may be repeated until the desired bend or angle is obtained.

What I claim is:

In a gauge for measuring the angle of bend in a pipe being bent in a bending machine having a transversely extending frame member provided with formers at opposite sides of the machine and an intermediate shoe adapted to be forced by power from one side to the other of the line connecting said formers, the combination of a U-bar, a leg carried by one end portion of the U-bar in substantially right-angled relation thereto for connecting the U-bar to the intermediate shoe of such bending machine with the other end portion of the U-bar extending along the face of the frame member between the formers, and means comprising an index and graduations for indicating the extent of movement of the shoe with respect to the formers.

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