

July 7, 1942.

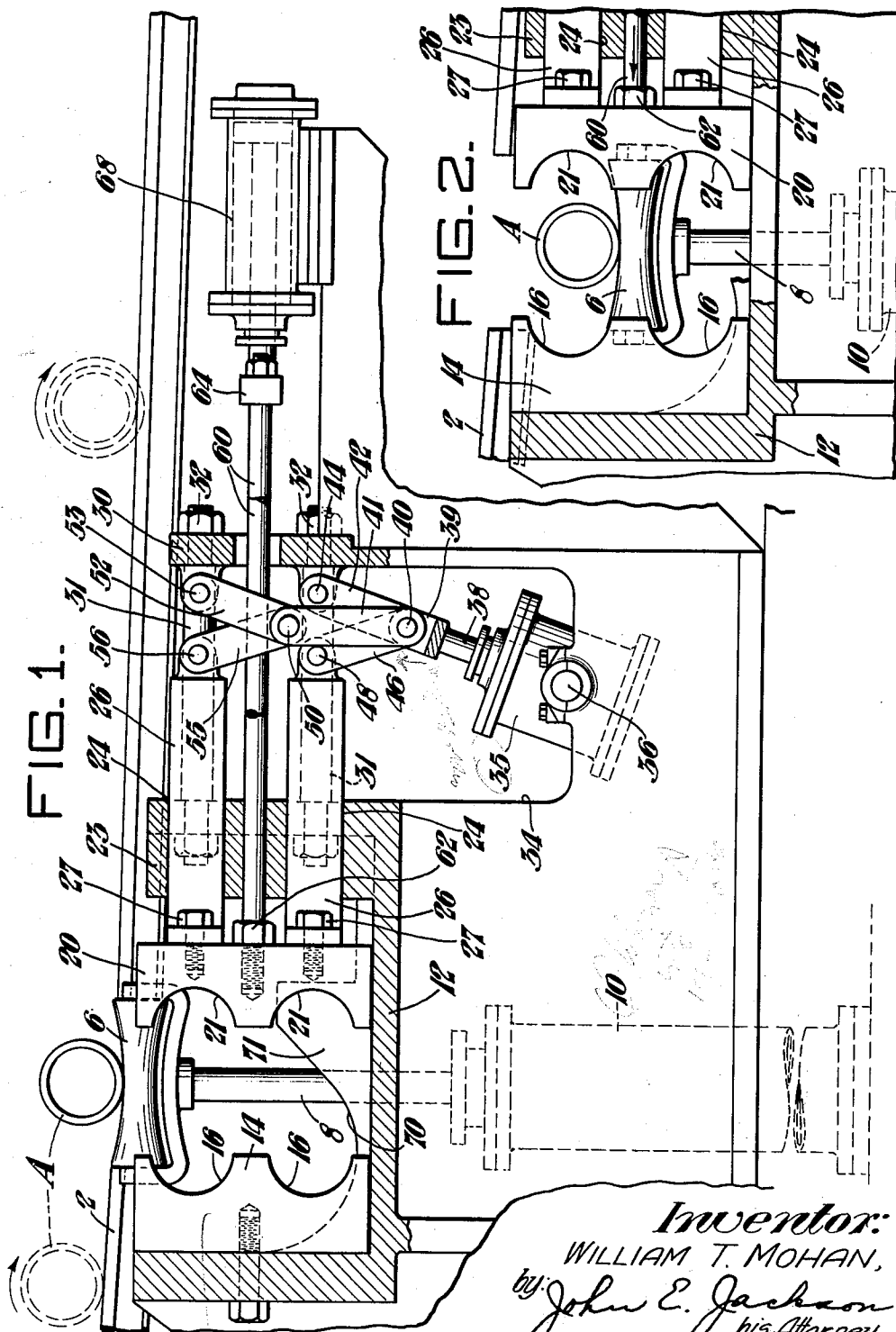
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2,289,140

HOLDING DEVICE

Filed June 14, 1940

3 Sheets-Sheet 1



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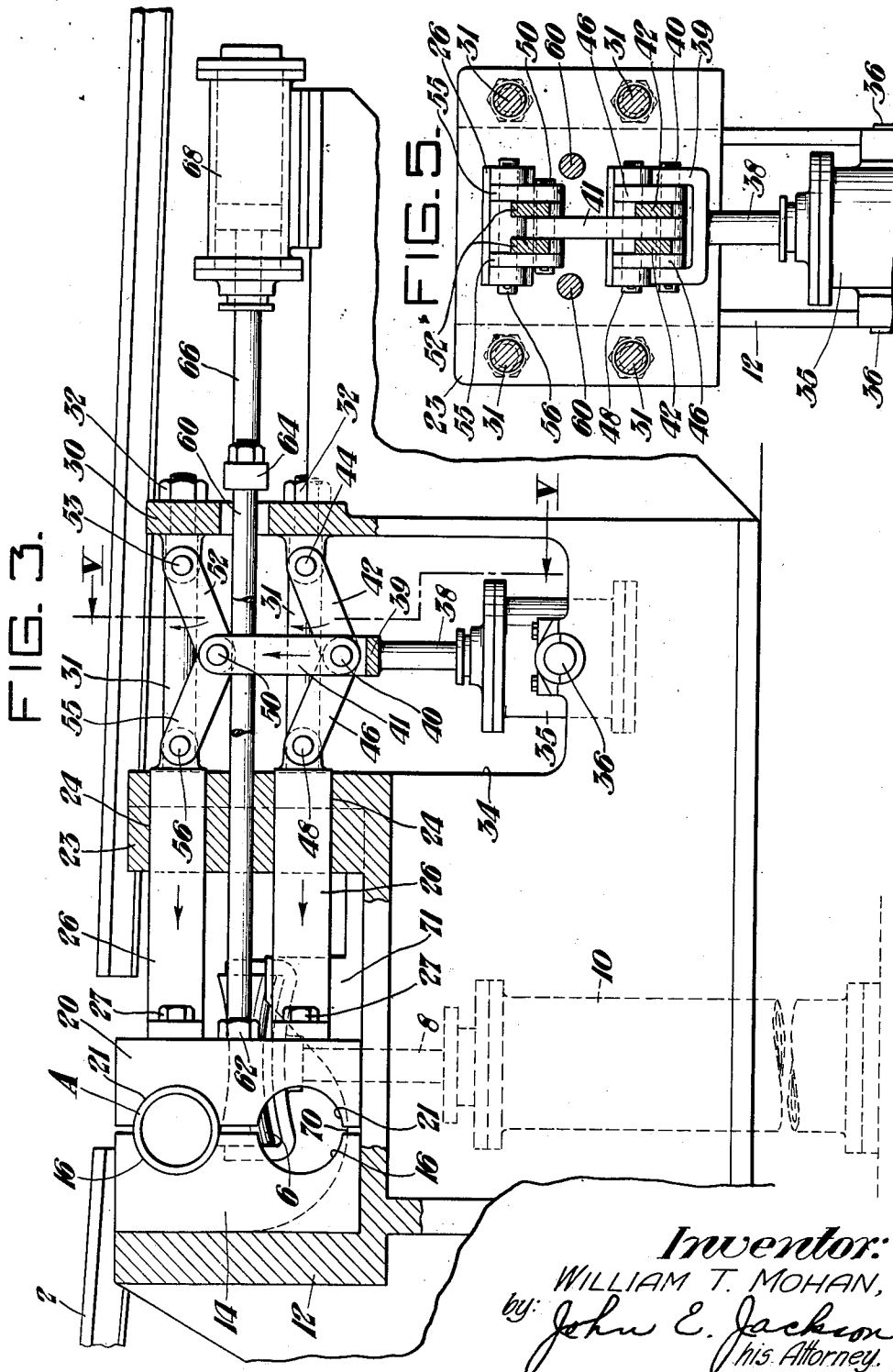
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3 Sheets-Sheet 2



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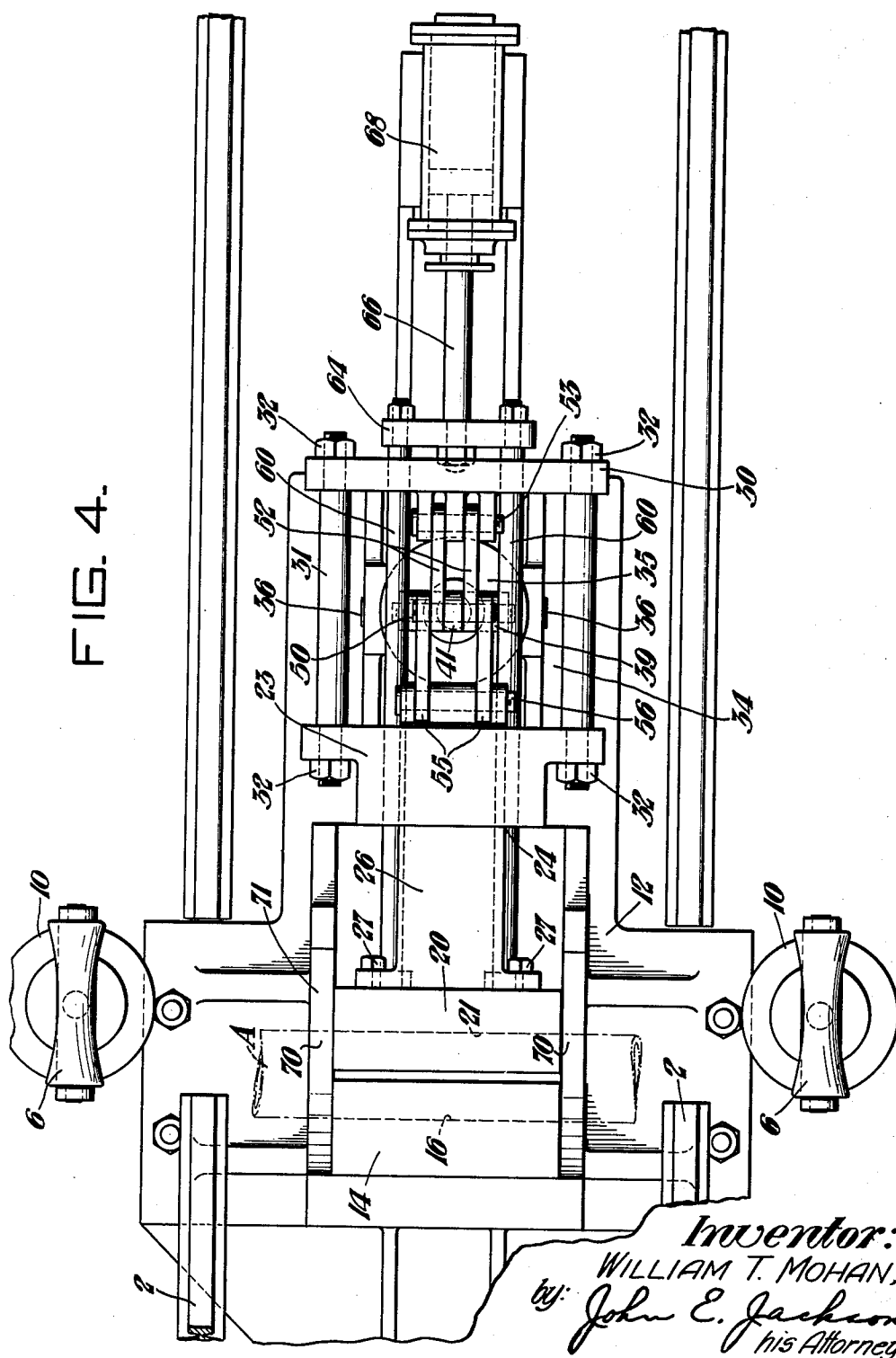
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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

2,289,140

HOLDING DEVICE

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2 Claims. (Cl. 81-17)

This invention relates to holding devices or "vises," and more particularly to those which are adapted to grip or hold objects against axial displacement during forming operations.

In the manufacture of tubes, by way of example, it is frequently necessary to forge the ends thereof to facilitate threading for a joint, or for other purposes; and in order to accomplish this it is necessary to securely grip the tube so that the thrust imparted during the forming operation, as for example, by the mandrel of a press, will not displace the tube axially in the forming die.

According to the prior art, the entering of the tube in the holding or gripping device is accomplished by separating the gripping instrumentalities a distance at least equal to the diameter of the tube; assuming, of course, that the tube is, as is customary, to be entered from the top of the die.

It is among the objects of the present invention to provide a holding device for workpieces during forming operations which will effectively resist axial displacement of the said workpiece, and one which is, at the same time, cheap and easy to manufacture, install and operate.

The foregoing and other objects will be apparent after referring to the drawings, in which:

Figure 1 is an elevation, partly in section, of the device of the present invention;

Figure 2 is a fragmentary elevation, partly in section, and disclosing several of the instrumentalities of Figure 1 in modified positions;

Figure 3 is a view similar to that of Figure 1, but disclosing the elements of the invention in other phases of operation;

Figure 4 is a plan; and

Figure 5 is a sectional view on the line V—V of Figure 3.

Referring more particularly to the drawings, the numeral 2 generally designates an inclined skidway, or other type of conveyor, which is adapted to translate the workpiece, shown in the present instance as comprising a highly heated tube A.

At the lower end of the inclined skidway 2 is a series of horizontally disposed grooved rollers 6 which are aligned to contact the tube A at suitable intervals along its axis. Each of the rollers 6 is rotatably mounted on the piston 8 of a vertically disposed air cylinder 10.

Immediately adjacent and slightly below the lower end of the inclined skidway 2 is a frame 12 to which there is secured a stationary half-grip 14, comprising two identical superposed semi-

circular recesses 16 which open horizontally and away from the skidway 2.

Disposed on the frame 12 and opposite the half-grip 14 is a reciprocable half-grip 20 which comprises two identical superposed semicylindrical recesses 21 which are identical to, and cooperate with, the recesses 16 in the oppositely disposed stationary half-grip 14. The half-grip 20 is reciprocable on the frame 12 in a manner which will hereinafter be more fully described.

On the side of the reciprocable half-grip 20 which is remote from the stationary half-grip 14, the frame 12 carries a vertical extension 23 having therein a pair of superposed horizontal apertures 24 through each of which there extends and projects from a horizontal slide block 26, one end of which is secured, as at 27, to the reciprocable half-grip 20.

Spaced on the side of the vertical extension 23 which is remote from the half-grips 14 and 20, the frame 12 carries a vertical extension 30 which is rigidly connected to the vertical extension 23 by bolts 31, the ends of which project beyond the extensions and are screw-threaded to carry nuts 32.

Disposed at the bottom of the space between the vertical extensions 23 and 30, which is designated hereinafter at 34, is a fluid cylinder 35 having a trunnion mounting 36 and provided with the usual piston rod 38. The top of the piston rod 38 carries a fork 39 through which there extends a pin 40. To this pin 40 is pivotally connected an intermediately disposed link 41 and on either side thereof a pair of links 42 which are pivotally connected to the vertical extension 30, as shown at 44. The pin 40 carries on either side of the links 42 a pair of links 46, the ends of which are pivotally connected, as at 48, to the lower of the superposed slide blocks 26.

The intermediately disposed pivoted link 41 on the pin 40 extends vertically and carries at its upper extremity a pin 50 which projects from either side thereof. Disposed on either side of the vertically extending pivoted link 41 the pin 50 carries a pair of pivoted links 52, the ends of which are pivotally connected, as at 53, to the vertical extension 30 of the frame 12.

Disposed on either side of the pivoted links 52 the pin 50 carries a pair of links 55 which are pivotally connected, as at 56, to the upper of the superposed slide blocks 26.

From the foregoing it will be seen that the operation of the fluid cylinder 35 in such manner as to raise the piston rod 38 will cause such movement of the slide blocks 26 as to move the

reciprocable half-grip 20 toward the stationary half-grip 14 after the half-grip 20 has been moved into engagement with or closely adjacent to the pipe A by the cylinder 68 and rods 60 and yoke 64, as hereinafter described.

A pair of parallel horizontal rods 60 are extended through the vertical extensions 23 and 30 of the frame 12 and are connected at one end, as shown at 62, to the reciprocable half-grip 20. The other ends of the rods 60 extend through and project from the vertical extension 30 of the frame 12 and are provided with a yoke 64 to the intermediate portion of which there is connected the piston rod 66 of a horizontally disposed fluid cylinder 68 which is carried by and secured to the frame 12.

In operation:

A pipe or tube A is rolled over the inclined skidway 2 and onto the rollers 6 carried on the pistons 8 of the vertically disposed air cylinders 10 which are at that time in elevated position. The fluid cylinders 10 are suitably operated to lower the piston rods 8 and, accordingly, the rollers 6 in such manner as to cause the pipe A to engage the inclined face 70 of a guide device 71 which is so constructed as to cause the pipe A to roll by gravity into the lower of the recesses 16 of the stationary half-grip 14.

By providing the superposed recesses 16 and 21 on the stationary and reciprocable half-grips 14 and 20, respectively, two lines of pass are provided whereby the pipe A having been partially shaped in one pass or recess may be entered at the other for final shaping, it being understood, of course, that the stationary half-grip 14 and the reciprocable half-grip 20 are readily removable to conform to the size of pipe being operated upon.

When a pipe A is disposed opposite either of the superposed recesses 16 in the stationary half-grip 14, fluid is admitted to the cylinder 68 whereby the piston rod 66 thereof operating through the yoke 64 and the rods 60 causes the reciprocable half-grip 20 to move closely adjacent to or actually in contact with the pipe A. When the reciprocable half-grip 20 is in the position stated, the fluid cylinder 35 is actuated to cause the slide blocks 26 to further move the reciprocable half-grip 20 toward the stationary half-grip 14 whereby the pipe A is very firmly gripped and may be operated upon without axial displacement.

According to the foregoing it will be understood

that the function of the fluid cylinder 68 is to advance the reciprocable half-grip 20 and the function of the fluid cylinder 35 is to operate through the toggle mechanism in such manner as to permit the reciprocable half-grip 20 to very securely grip the pipe A between it and the stationary half-grip 14.

While I have shown and described one specific embodiment of the present invention, it will be seen that I do not wish to be limited exactly thereto, since various modifications may be made provided they come within the scope of the claims.

I claim:

1. A vise comprising, in combination, a stationary member having a surface thereof conforming in part to the contour of a workpiece to be gripped in the vise, a reciprocable member having a surface thereof complementary to the contoured surface of said stationary member, power-actuated means for moving said reciprocable member toward and away from said stationary member, a stationary support, a lever system forming a toggle with the stationary support and said reciprocable member, and power-actuated means for operating said system of levers to move said reciprocable member into clamping engagement with an article disposed between said stationary member and said reciprocable member, said last-named means being pivotally mounted and operable when moved into position by said first-named means.

2. A vise comprising, in combination, a stationary member having a surface thereof conforming in part to the contour of a workpiece to be gripped in the vise, a reciprocable member having a surface thereof complementary to the contoured surface of said stationary member, power-actuated means for moving said reciprocable member toward and away from said stationary member, a stationary support, a lever system forming a toggle with the stationary support and said reciprocable member, and power-actuated means for operating said system of levers to move said reciprocable member into clamping engagement with an article disposed between said stationary member and said reciprocable member, said last-named means being movably mounted and operable when moved into position by said first-named means.

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