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233

[56] **References Cited**

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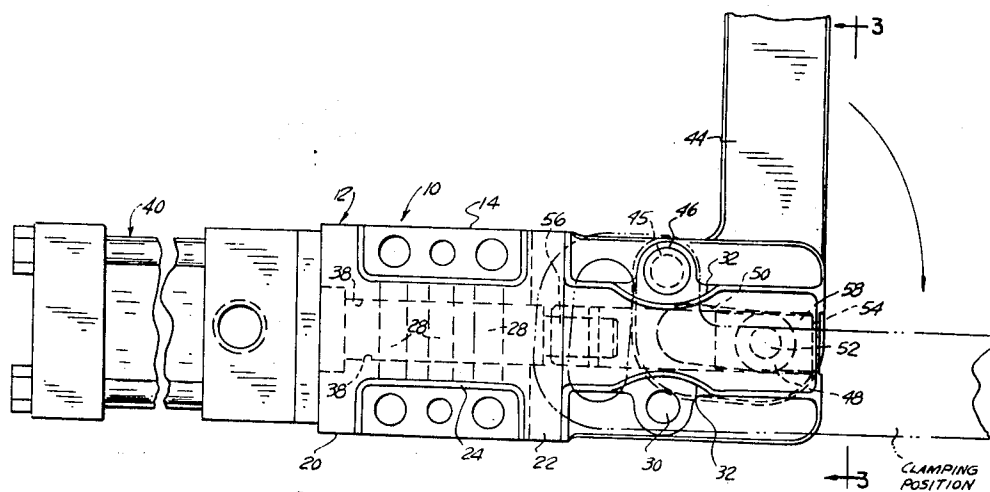
[54] **CAM WEDGE POWER CLAMP**
1 Claim, 5 Drawing Figs.

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ABSTRACT: A power-actuated clamp used for holding work-pieces in a fixed position having reversible parts for simplified construction.



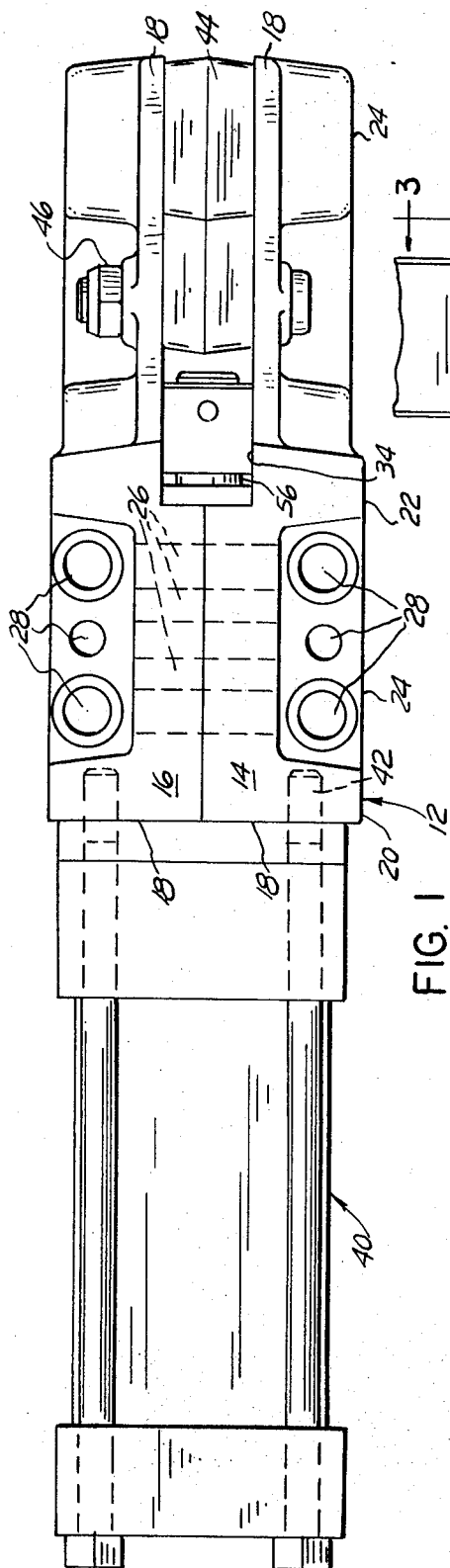


FIG. 1

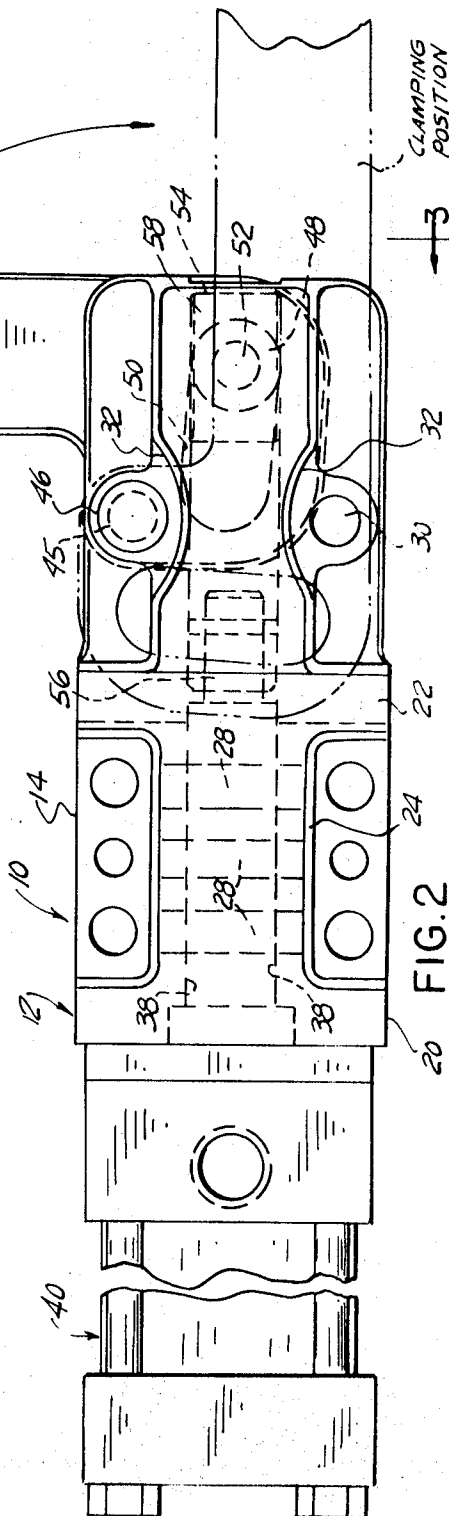
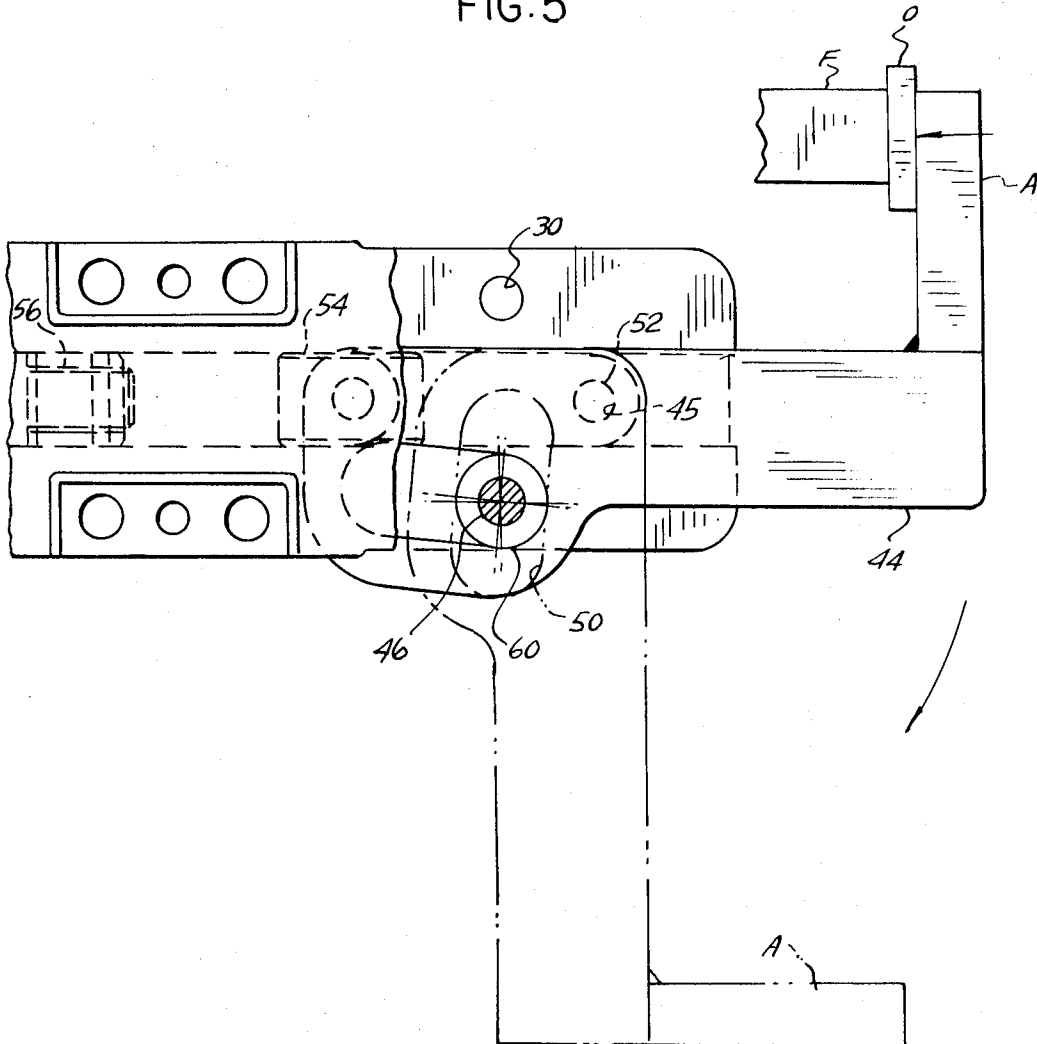


FIG. 2

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FIG. 5



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CAM WEDGE POWER CLAMP

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a cylinder-operated power clamp having a body section comprising two identical parts which enables the clamp to be simply and economically manufactured.

2. The Prior Art

Various power clamps are known in the art. The clamps in general have a cast body section used in securing the clamp arm. These body sections are in general one piece.

It is an object of this invention to provide a new and improved power clamp having a body section of two identical and interchangeable parts.

Other objects and advantages of this invention will become apparent from the following specification when considered in conjunction with the accompanying drawings, in which:

FIG. 1 is a plan view of the power clamp of this invention;

FIG. 2 is a side elevational view of the clamp of FIG. 1;

FIG. 3 is a sectional view in the direction of arrows 3—3 of FIG. 2;

FIG. 4 is a side elevational view of a body member forming a part of the power clamp of this invention; and

FIG. 5 is a side elevational view of an alternative embodiment of the clamp of the invention, with parts shown in phantom.

Referring now to the drawings, the power clamp 10 of this invention comprises a body 12 which comprises two identical members 14 and 16 which abut each other on a common side. Each member 14 or 16 comprises a base plate 18 having a vertically extending rib 20 at one end, and another vertically extending rib 22 at an intermediate location. A horizontally extending rib 24 extends the length of the base plate 18 between the vertically extending ribs 20 and 22, and also along the rest of the plate. The base plate 18 has bores 26 in the top and bottom in the included areas defined by the ribs 20, 22 and 24 and the horizontally extending rib 24 has vertical bores 28 in it through that section limited by the ribs 20 and 22. The bores 26 and 28 are means by which the body 12 can be attached to a support, i.e., screws or bolts can be inserted through the bores 26 or 28 into a support structure, not shown. Further to the right on the base plate 18, as seen in FIGS. 2 and 4, are a pair of horizontally extending vertically aligned bores 30, one on each side of the rib 24. The rib 24 has opposed arcuate recesses 32 adjacent the bores 30.

The inward side of the base plate 18 is offset from a point coinciding with the rib 22, on to the right end of the plate 18, as seen in FIG. 1, forming a recess 34. The inner face of the plate 18 defines a guide slot 36. The guide slot 36 merges into a semicylindrical longitudinal bore 38 as the rear of the plate 18 is approached. The opposed plates 18 form a longitudinal bore from the semicylindrical bores 38 when they abut each other.

A power cylinder 40 is secured to one end of the body by means of bolts which extend through the ribs 20. Thus, each body member 14 and 16 is fastened to the power cylinder 40. The power cylinder 40 may be either a hydraulically or pneumatically operated piston or solenoid.

A clamp arm 44 having a pivot bore 45 is pivotally mounted on body 12 by pivot bolt 46. Clamp arm 44 is illustrated without any particular fixture at its upper end portion, it being understood that the particular fixture used in conjunction with this assembly does not form a part of this invention.

A roller cam 48 rides in a follower slot 50 formed in the clamp arm 44. The roller cam 48 is carried by an axle 52 secured to the opposed arms of a clevis 54.

Clevis 54 is in turn rigidly connected to end of piston rod 56, and is mounted for reciprocating movement within the guide slots 36 formed in the opposed inner faces of the base plates 18 of body 12. A pair of bronze elongated blocks 58 for the axle 52 are slidably mounted at the outer ends of axle 52. The guide blocks 58 are seated in the slots 36 and provide smooth and easy reciprocating of clevis 54 in body 12.

In operation, actuation of the power cylinder 40 upon a predetermined signal causes leftward movement of piston rod 56 and clevis 54 from the position shown in the figures. This in turn causes roller cam 48 to move toward the left end of follower slot 50.

The follower slot 50 is inclined relative to the axis of reciprocation of the clamp arm 44. Because of the inclination of slot 50 with respect to the axis of reciprocation, clamp arm 44 is forced to pivot clockwise about bolt 46, as viewed in FIG. 2. A subsequent actuation of power cylinder 40 causes the process to be repeated in the reverse direction, with clamp arm 44 pivoting counterclockwise about bolt 46 until it is in the position shown in the figures.

It will be apparent that the power clamp of this invention provides a simple linkage with a minimum of moving parts while creating a high mechanical advantage. Clamp arm 44 is dimensioned relative to the recesses between the opposing portions of body members 14 and 16 to provide substantially no space between the side faces of the arm and the inner opposed faces of the body members, so as to eliminate the possibility of foreign matter and debris entering and fouling the mechanism. Furthermore, the positioning of the roller cam between the clevis legs and the positioning of the guide blocks outside the clevis legs provides an extremely rigid assembly.

While as shown in the figures the clamp arm 44 is pivotable from a horizontal to an upwardly vertical position, it can also be pivoted from a horizontal to a downwardly vertical position. This is accomplished by simply reversing the arm and pivoting it about the lower of the vertically aligned bores 30.

Thus, it is apparent that the two members 14 and 16 are interchangeable and they also allow a clamp arm to be pivoted from a horizontal to an upwardly vertical direction or from a horizontal to a lower vertical direction without modification of the body component.

In an alternative embodiment, as seen in FIG. 5, the clamp arm 44 is pivotably connected at the base thereof to the clevis 54 by means of the axle 52 extending through the clevis 54 and pivot bore 45 of the clamping arm 44. A pivot bolt 46 extends between the lower orifices 30 and through the follower slot 50 of the clamp arm 44. A cam roller 60 is confined within the follower slot 50. This allows the clamp arm 44 to have both a reciprocal movement imparted by the piston rod 56 of the power cylinder and a rotational movement around the pivot bolt 46 extending through the orifices 30. Thus, clamping force is imparted by retracting the arm 44 by means of the clevis 54. When an attachment A is mounted on the end of the clamping arm 44, and the arm 44 is simultaneously retracted and pivoted, the object 0 being clamped, is squeezed between the attachment A and a support fixture F.

I claim:

1. A clamp comprising a body section comprising a pair of reversibly interchangeable substantially identical abutting body members, each of which has a pair of vertically aligned pivot holes for pivotably mounting a clamping arm between opposed body members, said pivot holes of opposed body members being axially aligned, said body members defining a longitudinal bore, there being formed upon the interior of said body members a pair of enclosed inwardly opening body groove tracks communicating with said bore, means for mounting said body members on a support structure, a clevis mounted for reciprocating motion in said bore and having spaced legs, means for reciprocating said clevis, an axle transversely connecting said legs and provided with guide blocks on the outer ends thereof slidable in said body groove tracks, a clamping arm having a pivot bore and a follower slot offset and inclined from the axis of said longitudinal bore, mounted for pivotal movement between opposed portions of the body, said axle being confined within said slot or said pivot bore, and, wherein, said axle extends through said pivot bore, a pin extends through an opposed pair of said pivot holes and said follower slot, and a cam roller is situated within said follower slot and around said pin; whereby reciprocation of said clevis causes said clamping arm to simultaneously pivot and linearly extend or retract along the axis of said bore.