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(54) Clamping apparatus.

(57) Vice-type clamping apparatus has first and second jaw members (11, 12) mounted in spaced longitudinal relation on an elongate support (10) and with the jaws opposed. The first jaw member (11) is pivoted at or near to its lower end to the support (10) and is connected at its upper end through readily-releasable, pedal-operated actuating means (18, 20, 22, 23). The second jaw member (12) is constrained to be movable longitudinally of said support (10). The actuating means is in the form of a linkage and lever arrangement (18, 20) connected to a foot pedal (22) so that downward movement of the foot pedal (22) pivots the first jaw member (11) towards the second jaw member (12) made fast with the support (10) thereby to clamp a workpiece therebetween with the first jaw member (11) being lockable in its clamping position.

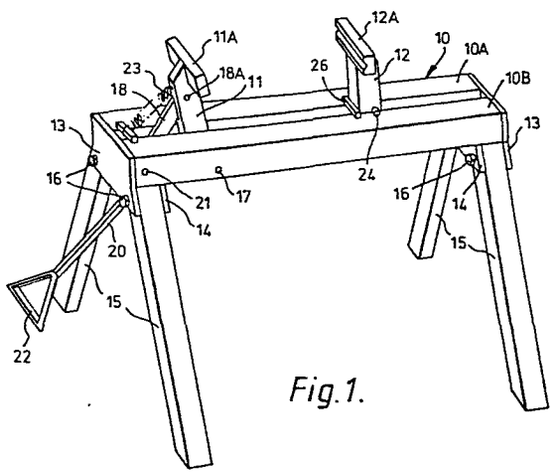

Fig.1.

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CLAMPING APPARATUS

This invention relates to clamping apparatus in the nature of a vice.

Vice type clamping apparatus have been in use for some time. However, have suffered from the disadvantage that either one clamping apparatus requires to be securely fixed to a work bench or the like and the workpiece secured therein to enable both hands to be free to work on the workpiece, or the clamping apparatus is hand held receiving only the free hand to be available to work on the workpiece.

It is an object of the present invention to obviate or mitigate this disadvantage.

According to a first aspect of the present invention, there is provided a clamping apparatus having a pair of clamping jaws mounted in spaced longitudinal relation on an elongate support, one of said jaws being adjustably movable longitudinally along the support and the other being pivotally connected to the support and pivotal towards and away from the adjustably movable jaw member by ready releasable pedal operated by actuating means which when the jaw is pivoted towards the longitudinally movable jaw can retain said pivoted jaw in said pivoted position.

According to a second aspect of the present invention, there is provided a clamping apparatus having first and second jaw members mounted in spaced longitudinal relation on an elongate support and with the jaws opposed, the jaw members being constrained to be movable longitudinally of said support, the first jaw member being pivoted at or near to its lower end to the support and being connected at its upper end through actuating means in the form of a linkage and lever arrangement to a foot pedal whose upper end is pivoted to said support, so that downward movement of the foot pedal pivots the first jaw member towards the second jaw member made fast with the support thereby to clamp a

workpiece therebetween with the first jaw member being lockable in its clamping position.

Preferably, the second jaw member can be made fast with the support in one of several positions longitudinally thereof.

Preferably also, the support comprises two laterally-spaced channel beams opening inwardly towards each other and spaced apart for movement of the law members therebetween.

Preferably further, the second jaw member has two pairs of axially opposed stub rods extending laterally from opposite lateral sides thereof and lying in vertically spaced planes passing through said axis, said rods constraining movement of said second jaw member on said support with one pair of rods being located above the beams and the other pair of rods being located below the beams in a manner which permits longitudinal and attitudinal movement of the second jaw member relative to the support whereby in one position, the second jaw member is made fast with the support and in all other positions, the second jaw member is free to move along or arcuately of the support. A bar is provided on the inner face of the second jaw member with its axis in the same plane as the upper pair of stub rods, the bar extending laterally beyond opposed lateral sides of the jaw member and serving to restrict the amount of attitudinal movement.

An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Fig. 1 is a perspective view of a clamping apparatus according to the prevent invention, showing an elongate support, legs for said support, first and second jaw members on said support, and a foot pedal connected through actuating means in the form of a linkage and lever arrangement to said first jaw member;

Fig. 2 is a side elevation with the support and legs shown in broken line; and

Figs. 3 and 4 are both side elevations to a larger scale with the first and second jaw members in non-clamping and clamping positions respectively, the support in each case being shown in broken line.

The elongate support 10 comprises two laterally-spaced channel beams 10A, 10B opening inwardly towards each other with their webs opposed, the beams 10A, 10B being spaced apart for movement of the first and second jaw members 11, 12 therebetween. The beams 10A, 10B are joined together at their ends by plates 13 and adjacent thereto by plates 14, plates 13 and 14 being parallel and extending below said beams 10A, 10B to the same extent and forming a mounting between which four legs 15 can be secured by bolts 16 as shown.

The first and second jaw members 11, 12 are mounted, with their jaws 11A and 12A respectively opposed, between said beams 10A, 10B and are constrained to move longitudinally and attitudinally of said support 10. The first jaw member is pivoted at 17 near its lower end to the support 10, the pivot being parallel to the upper and lower limbs of the beams 10A, 10B. Near to the upper end of the first jaw member one end of a link 18, extending away from the second jaw member, is pivotally connected at 18A, the other end of said link 18 being pivotally connected at 19 to the upper end of a cranked lever 20 pivoted at 21 to the support 10, the pivot being parallel to pivot 17. The lower end of the lever 20 is bifurcated and a foot pedal 22 unites the outer end of the bifurcated limbs. A spring 23 is anchored between the support 10 adjacent to the pertaining plate 13 and the first jaw member 11 rearwardly of the jaw 11A. This spring 23 holds the first jaw member 11 in a rest position and assists in returning the first jaw member 11 to its rest position. The link 18, lever 20, foot pedal 22 and spring 23 constitute readily-releasable pedal operated actuating means. The second jaw member 12 has two pairs of axially spaces tub rods 24, 25 which extend laterally from opposite lateral sides thereof and lie in vertically spaced planes passing through said axes.

The rods 24, 25 constrain movement of said second jaw member on said support with one pair of rods 24 being located above the beams and the other pair of rods 25 being located below the beams. The distance between vertical spaced planes is slightly greater than the depth of the beams. Verticals through the axes of rods 24 and 25 are spaced horizontally apart, the axes of rods 24 being more remote from the first jaw member 11 than is the axes of rods 25. There is therefore a tendency under gravitational forces for the second jaw to pivot about rods 24 towards the first jaw. A bar 26 is provided on the inner face of the second jaw member 12 with its axis in the same plane as the upper pair of stub rods 24, the bar 26 extending laterally beyond opposed lateral sides of the jaw member 12 and serving to restrict the amount of attitudinal movement thereof relative to the support 10. If pressure is applied to the second jaw member 12 in a direction away from the first jaw member 11, the second jaw member through interaction between the rods 24 and 25 and beams 10A, 10B clamps or makes fast itself to the support 10. In all other positions of the second jaw member, the second jaw member can be moved freely along the support.

In use, for a workpiece 30 to be clamped between the first and second jaw members, one side of the workpiece 30 is placed next to the jaw 11A of the first jaw member 11 and the second jaw member 12 is moved towards the workpiece to abut its opposite side by pressure on the foot pedal, the lever 20 moves about its pivot 21 to move link 18 to push the first jaw member 11 and workpiece against the second jaw member 12 to make it fast with the support 10. The foot pedal is clamped in position by the pivot 19 being moved from a position in which its axis lies below a line drawn between the axes of pivots 18A and 21 to a position in which its axis lies above said line and is held in this

position by the influence of the spring 23. Upward movement of the foot pedal readily releases this clamping position and the first jaw member 11 returns to its rest position under gravitational forces and influence of the spring 23, and the workpiece 30 can then be removed.

In a modification, the rods 24, 25 and bar 26 can be dispensed with and instead the second jaw member can track the beams 10A, 10B and means are provided for clamping the second jaw member 12 at any desired position on said support.

In a further modification the support may be mountable on a table or work bench.

A table extension may be provided to attach to one or other side of the support.

In a modification, the actuating means is a hydraulic or pneumatic ram operable by a foot pedal.

In a further modification the two beams are replaced by a single beam and the lower end of the second jaw is formed as an eye and threaded on to the beam. The stub rods 24, 25 and bar 26 being omitted in this modification. If necessary a longitudinal groove can be provided along one or both lateral sides of the beam.

CLAIMS

1. Clamping apparatus having a pair of clamping jaw members (11, 12) mounted in spaced longitudinal relation on an elongate support (10), one of said jaw members (12) being adjustably movable longitudinally along the support and the other jaw member (11) being pivotally connected to the support (10) and pivotal towards and away from the adjustable movable jaw member (12) by readily releasable, pedal-operated actuating means which when the jaw member is pivoted towards the longitudinally movable jaw member (12) can retain said pivoted jaw member (11) in said pivoted position.

2. Clamping apparatus having first and second jaw members (11, 12) mounted in spaced longitudinal relation on an elongate support (10) and with the jaws opposed, the jaw members (11,12) being constrained to be movable longitudinally of said support (10), the first jaw member (11) being pivoted at or near to its lower end to the support (10) and being connected at its upper end through readily-releasable, pedal-operated actuating means in the form of a linkage and lever arrangement (18,20) to a foot pedal (22) whose upper end is pivoted to said support (10), so that downward movement of the foot pedal (22) pivots the first jaw member (11) towards the second jaw member (12) made fast with the support (10) thereby to clamp a workpiece therebetween with the first jaw member(11) being lockable in its clamping position.

3. Clamping apparatus as claimed in claim 1 or 2, characterised in that the second jaw member (12) can be made fast with support (10) in one of several positions longitudinally thereof.

4. Clamping apparatus as claimed in claims 1 or 2, characterised in that the support (10) comprises two laterally spaced channel beams (10A,10B) opening inwardly towards each other and spaced apart for movement of the jaw members (11,12) therebetween.

5. Clamping apparatus as claimed in claim 4, characterised in that the second jaw member (12) has two pairs of axially opposed stub rods (24,25) extending laterally from opposite lateral side thereof and lying in vertically spaced planes passing through said axes, said rods (24,25) constraining movement of said second jaw member (12) on said support (10) with one pair of rods (24) being located above the beams (10A,10B) in a manner which permits longitudinal and attitudinal movement of the second jaw member (12) relative to the support (10) whereby in one position the second jaw member (12) is made fast with the support (10) and in all other positions the jaw member (12) is free to move along or arcuately of the support (10).

6. Clamping apparatus as claimed in claim 5, characterised in that a bar (26) is provided on the inner face of the second jaw member (12) with its axis in the same plane as the upper pair of stub rods (24), the bar (26) extending laterally beyond opposed lateral sides of the jaw member (12) and serving to restrict the amount of attitudinal movement.

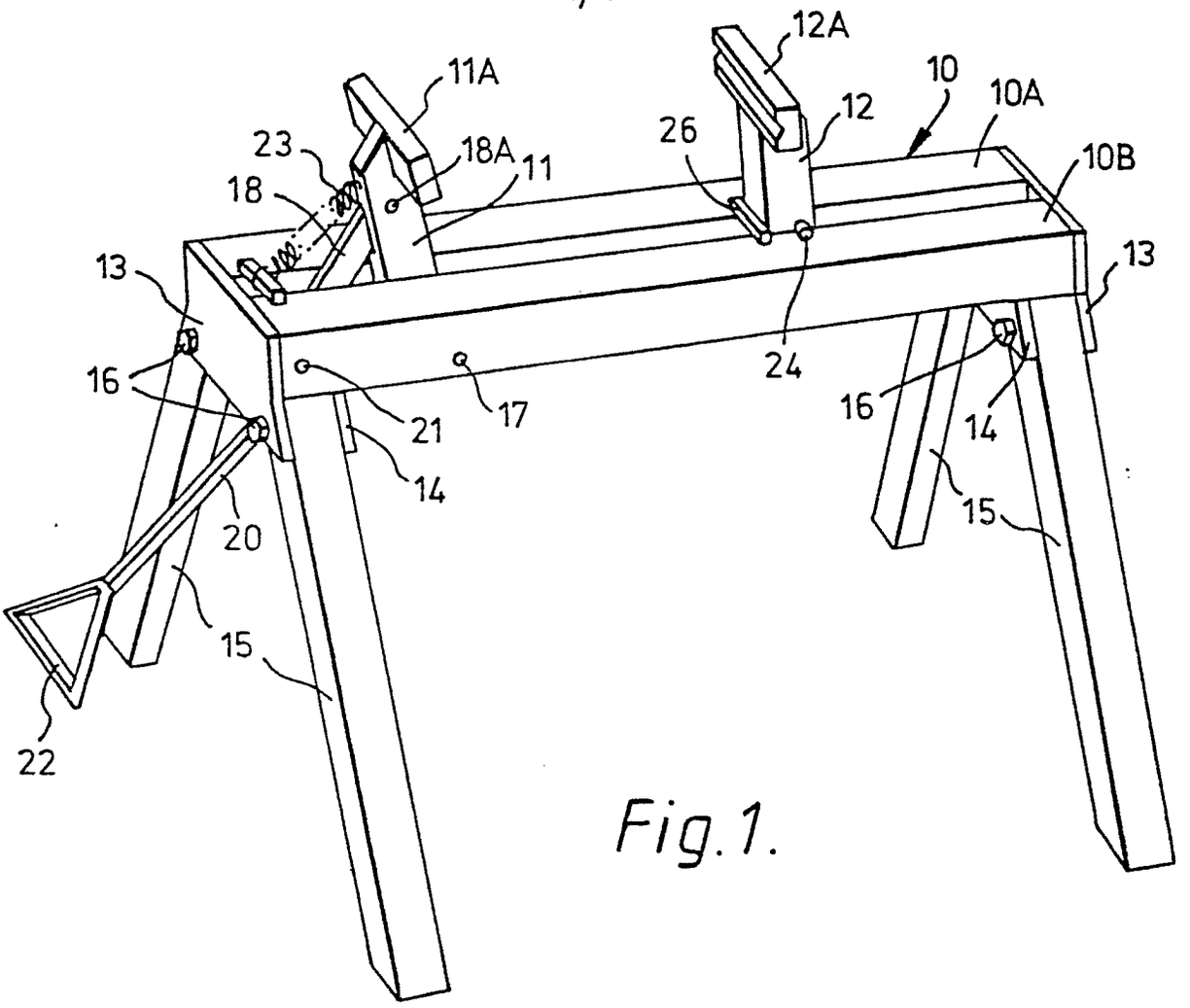
12A
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Fig. 1.

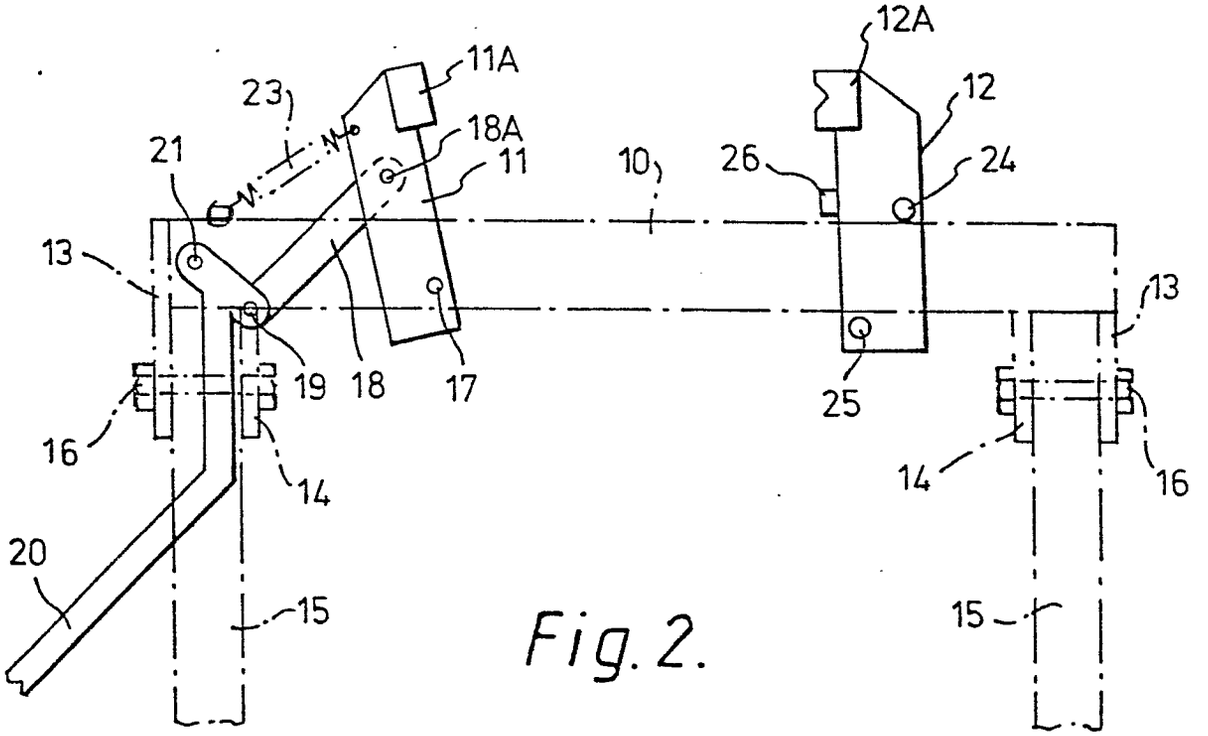
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Fig. 2.

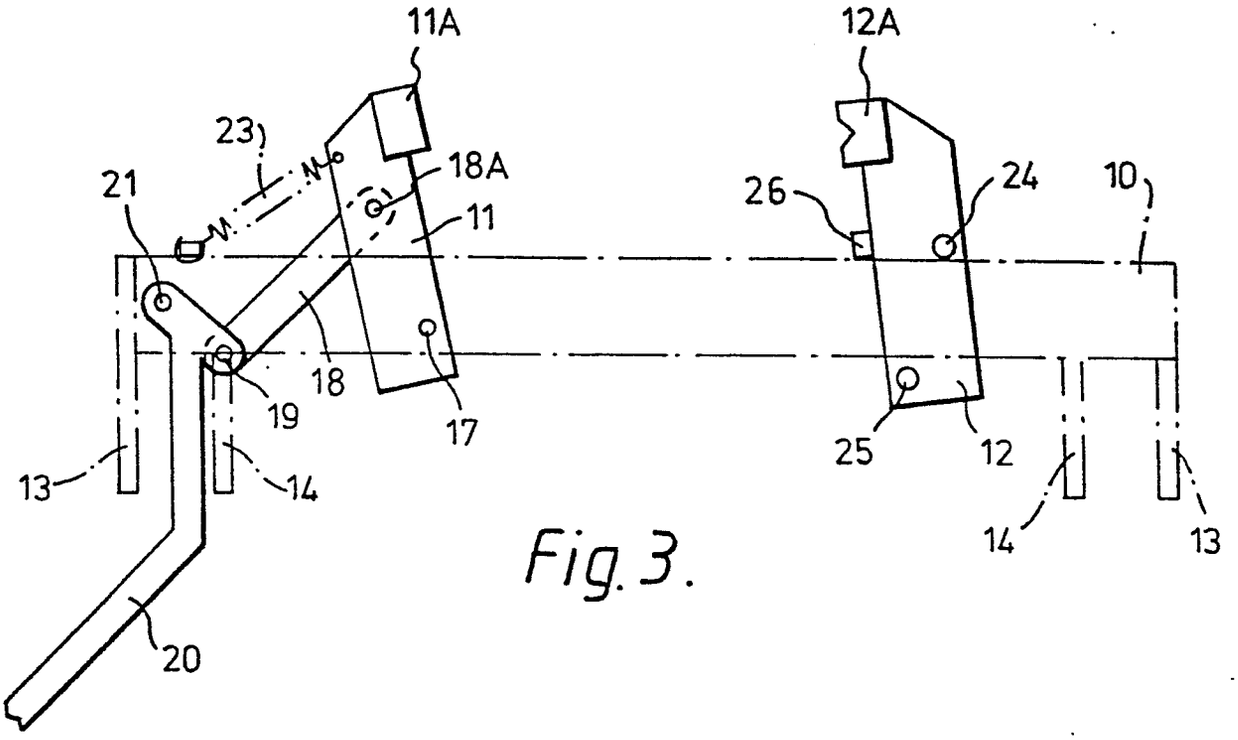
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Fig. 3.

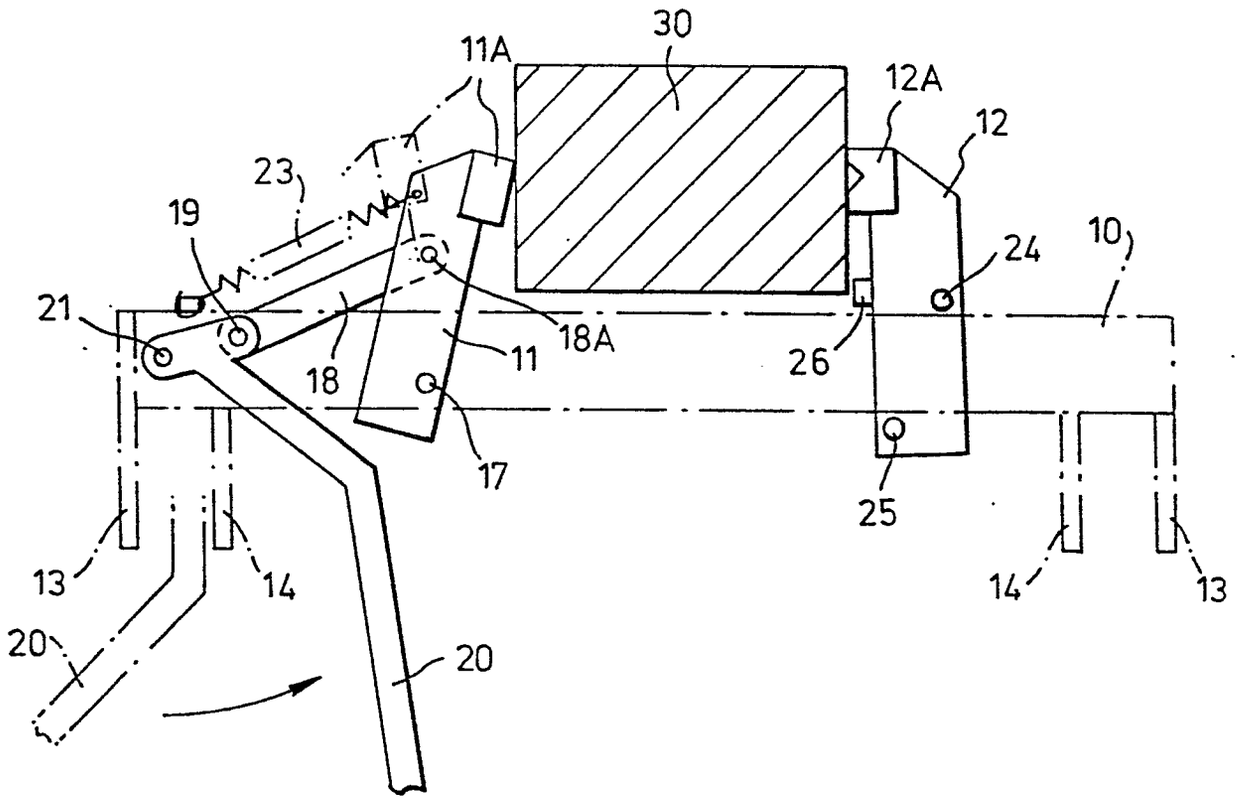
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Fig. 4.