

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(54) A WORKBENCH

(71) I, RONALD PRICE HICKMAN, a British subject, of "Badgers", Middle Street, Nazeing, Waltham Abbey, Essex, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to workbenches and this application is a divisional application from the Applicants specification of Application No. 10484/68 (Serial No 1267032). The disclosure of this specification and drawings corresponds also to the disclosure and drawings of Specifications 50757/71 (Serial No. 1267035) and 50756/71 (1267034).

According to one aspect of the present invention a workbench comprises a base structure for resting on a floor, a top structure which incorporates a pair of spaced elongate beams, and an intermediate collapsible structure which interconnects the base structure and the top structure and which is capable of assuming either an erected position in which the beams together afford a substantially horizontal flat work surface, or a collapsed storage position in which the intermediate and top structures lie in close juxtaposition to the base structure.

According to another aspect of the present invention a workbench comprises a base structure for resting on a floor, a top structure, an intermediate structure which interconnects the base structure and top structure and which is collapsible between an erected position and a storage position in the latter of which the intermediate and top structures lie in juxtaposed relation to the base structure, the top structure in the erected position of the intermediate structure, providing a substantially flat work surface which is afforded by two elongate vice members capable of horizontal relative movement towards and away from one another thereby to form a vice.

Preferably the top structure incorporates a pair of horizontal supports extending beneath the vice members one of the vice members being secured in a stationary manner to the

horizontal supports and the other vice member bearing on the horizontal supports in a movable manner.

According to a particularly convenient feature the pair of vice members between them afford the complete working surface of the bench.

The intermediate structure may be hingeably connected to the top structure and to the base structure, and may include a pair of frames, each e.g. of H configuration. The intermediate structure may additionally include at least one brace which, in the erected position, extends between the top structure and the base structure, at an inclination to the vertical.

The base structure may include a horizontal platform.

The invention may be carried into practice in a number of ways but one specific embodiment will now be described by way of example with reference to the accompanying drawings in which:—

Figure 1 is a perspective view of one form of collapsible workbench constructed in accordance with the present invention;

Figure 2 is an end elevation, partly in section, of the upper end of the workbench showing the manner in which the top members act as a vice

Figure 3 is a front part-sectional elevation of the workbench of Figures 1 and 2;

Figure 4 is a plan view of a slideway incorporated in the workbench;

Figure 5 is a cross-section of the slideway on the line T—T of Figure 4;

Figure 6 shows certain parts of the workbench in plan with the pair of top members of the bench in parallel spaced relationship, and

Figure 7 is a plan view showing one end of the workbench with one of the top members drawn into contact with the other top member at one end only,

Figure 1 shows the general construction of a workbench having a base structure incorporating a base board 7 mounted in a rectangular framework which is supported by adjust-

able feet 1 and provided at each end with a vertical web 2 by which a pair of generally 'H' shaped frames 3 and 4 are located and pivotally mounted at 5 and 6 respectively for movement in the manner of a parallelogram between the working position of Figure 1 and a collapsed storage position in which the top members are in close juxtaposition to the base board. As shown in Figure 1 the pivotal connections of the rear frame 4 to the web 2 and a further web 13, to be described, are higher than the corresponding connections of the frame 3, so that in the collapsed position the rear frame 4 partially overlies the front frame 3. It will also be noted from Figure 1 that the plan area encompassing the top members when fully spaced apart is less than that of the base, and since the pivotal points 5 are situated approximately midway along the length of the webs 2, there is a forward portion of the base board 7 which provides a load-bearing platform upon which a person can stand beside the vice, and thereby provide added stability to the bench as a whole.

The upper ends of the frames 3 and 4 each afford a pair of spaced limbs which are pivoted at 10 to a vertical web 13 of horizontal support formed by a generally 'U' shaped inverted channel 14 the detailed form of which is shown in Figures 2 and 3. Thus, referring to Figure 3 the channel 14 also includes a second vertical web 15, the two webs 13 and 15 being interconnected by a further horizontal web 17. The diagonal bars 9 are secured to the webs 15 at pivot points 18 at their upper ends and at their lower ends cooperate with slots 20 to allow for collapsing of the workbench.

The work surface of the workbench is afforded by a pair of spaced elongate rectangular-section timber beams 21 and 22 having their horizontal surfaces aligned in the same plane. The beams also have opposed vertical surfaces 23 and 24 respectively which as will be described, can be drawn towards one another from their spaced apart positions of Figures 1, 2 and 6. At each end the front beam 21 is rigidly connected to the horizontal web 17 of the respective channel by means of a pair of screws 25 as shown in Figure 2, the front screw having a spacer washer 26 surrounding it between the beam and the web 17, and the rear screw 25 passing through a hole 27 in a slideway 28 formed for example of nylon or metal strip provided with a PTFE upper surface. The form of slideway is shown in detail in Figures 4 and 5. Apart from the hole 27 for the rear screw 25, it has a longitudinal slot 30 for a purpose to be described, and at its rear end is provided with a poppet stud 32 which, as shown in Figure 2, is received in an aperture 33 in the horizontal web 17 of the channel 14.

The horizontal web 17 is provided with a longitudinal slot 35 of a shape corresponding

to the slot 30 in the slideway and the two slots 30 and 35 have extending upwardly through them a projecting portion 40 formed on a slider member 41 shown in Figures 2 and 3. The portions 40 provide location means which, with the vertical side edges of the slots 30 will limit lateral movement of the beam 22. The upper surface of the projection 40 abuts the underside of an end of the rear beam 22 and the slider member 41 is secured to the beam 22 by a single screw 45, for which purpose the underside of the slider member 41 is provided with an open recess 46, as shown in Figure 3.

As shown in Figure 3 the slider member 41, below the web 17, is substantially wider than the width of the slots 30 and 35 so that the rear beam 22 whilst it can ride freely in a horizontal manner along the slideway, is prevented from moving bodily upward or of tilting upwards, e.g. adjacent its front edge. It is to be noted from Figure 3 that the width of the projection 40 of the slider member 41 is less than the width of the slots 30 and 35 to allow for lateral movement of the slider member in a manner to be described. For this purpose also the width of the lower, wider part of the slider member 41 is less than the width of the space between the webs of the channel 14.

As shown in Figure 2, on each side of the recess 46 the slider member 41 has a screw threaded bore 50 which co-operates with an externally screw threaded rod 51, the outer end of which, to the left in Figure 2, carries a crank handle 52 provided with a hinged end section 53 which can be maintained either in the position shown in Figure 2 for operating purposes or hinged downwards to the dotted line position 54 against the action of a spring biased plunger 55 when not in use. In order to support the end of the rod 51 adjacent its handle 52 the webs 13 and 15 of the channel 14 are interconnected at the front by a vertical transverse wall 58 through which the rod 51 passes, washers being provided on each side of the wall 58 and the rod being held in position by means of a circlip.

Accordingly, rotation of the rod 51 by means of its cranked handle 52 will cause horizontal movement of the slider member 41 towards or away from the front beam 21. The extent of movement of the slider member 41 is determined in one direction by abutment of the beams 21 and 22 against one another or in the case of rearward movement of the beam 22 by abutment of the projection 40 of the slider member 41 against the rear end of the slots 30 and 35. As shown in Figure 1 the beams 21 and 22 can be drawn together or moved apart by simultaneous or independent operation of identical screw threaded rods at each end by means of a pair of crank handles 52. In this way, therefore, the beams 21 and 22, apart from providing substantially

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horizontal surfaces, which together provide a working top surface upon which many operations can be carried out, also act in the manner of a vice between which lengths of timber or other material can be clamped.

Assuming that the beams 21 and 22 are initially in spaced parallel relationship as shown for example in Figures 1 and 2 equal rotation of the crank handles at each end will cause the beams to be maintained in parallel relationship but it is a particular feature of this workbench that one or other of the handles 52 can be operated quite independently of the other to the maximum limits allowed by movement of the respective slider members 41. In other words one end of the rear beam 22 may be fully separated from the front beam 21 and remain so whilst the other end of the rear beam 22 is drawn up fully into contact with the front beam 21. This extreme position is shown in Figure 7. It will be appreciated that during such independent movement of only one end of the beam 22, the beam will pivot at each end about the screws 45 by which it is secured to the two slider members 41. Assuming the extreme example mentioned above where one of the ends of the beam remains stationary, full clamping up for example of the right-hand end of the beam 22, with no movement of the left-hand end, in the manner shown in Figure 7, will of necessity require the slider member 41 on the right to move to the left due to the arcuate movement of the right-hand end of the rear beam 22. Such sideways movement of the slider member 41 is accommodated by the excess width of the slots 30 and 35 in relation to the width of the projection 40 of the slider member 41 as shown and described with respect to Figure 3. Figures 6 and 7 demonstrate this lateral movement of the slider member 41 between its extreme positions. Thus in Figure 6 the outline of the projection 40 of the slider member 41 is shown as engaging the right-hand face of the elongated slot 30 in the slideway 28. After full clamping up to the position shown in Figure 7 the projection 40 of the slider member 41 moves laterally to engage the left hand side of the slot 30. Of necessity in this arrangement the slider member 41 has to tilt slightly with respect to the longitudinal axis of the slot 30 in the clamped up position of Figure 7. This will cause slight lateral movement of the rear end of the screw threaded rod 51 as shown in Figure 7 but this can be readily accommodated by means of the tolerances in the manner of mounting of the rod 51 at its front end.

It will be appreciated that the relative dispositions of the parts in Figures 6 and 7 show an extreme condition in which a full movement of the rear beam has occurred at one end. In most instances such an extreme condition will not be required and there will usually be some clamping up at both ends either to the same

or a different extent. The manner in which the slider members 41 are mounted to permit this independent movement avoids any difficulty of seizure of one or other of the screw threaded rods during clamping up or release as would normally be expected to occur with spaced screw threaded members of this type. Normally with spaced screw threaded members it is necessary to maintain substantially equal rotation of each in order to prevent seizure. The use of a pair of spaced screw threads of which one can be in tension thus applying a compressional load on a part clamped between the vertical faces, and the other can, if desired, take a reaction load in compression, is particularly useful for the clamping up of short parts. This is especially so where the point of grip of the part is out-board of one of the screw threads.

Accordingly, the workbench according to the invention enables a part to be clamped up within the space between the two beams irrespective of whether its side faces are parallel or inclined to one another.

Whilst with the embodiment of Figures 1 to 7 the screw threaded rods 51 are used in tension for clamping up, this is not essential and compression screws could be used.

Whilst the twin screws have been described as being entirely independently operable it is envisaged that it may be possible to provide an optional link between them when it is desired that they should maintain the pair of top members in constant alignment. Equally it is envisaged that each screw may be provided with a quick release in order that the members can be drawn together or moved apart separately for coarse adjustment prior to clamping up.

WHAT I CLAIM IS:—

1. A workbench comprising a base structure for resting on a floor, a top structure which incorporates a pair of spaced elongate beams, and an intermediate collapsible structure which interconnects the base structure and the top structure and which is capable of assuming either an erected position in which the beams together afford a substantially horizontal flat work surface, or a collapsed storage position in which the intermediate and top structures lie in close juxtaposition to the base structure.

2. A workbench comprising a base structure for resting on a floor, a top structure, an intermediate structure which interconnects the base structure and top structure and which is collapsible between an erected position and a storage position in the latter of which the intermediate and top structures lie in juxtaposed relation to the base structure, the top structure in the erected position of the intermediate structure, providing a substantially flat work surface which is afforded by two elongate vice members capable of horizontal relative move-



horizontal surfaces, which together provide a working top surface upon which many operations can be carried out, also act in the manner of a vice between which lengths of timber or other material can be clamped.

Assuming that the beams 21 and 22 are initially in spaced parallel relationship as shown for example in Figures 1 and 2 equal rotation of the crank handles at each end will cause the beams to be maintained in parallel relationship but it is a particular feature of this workbench that one or other of the handles 52 can be operated quite independently of the other to the maximum limits allowed by movement of the respective slider members 41. In other words one end of the rear beam 22 may be fully separated from the front beam 21 and remain so whilst the other end of the rear beam 22 is drawn up fully into contact with the front beam 21. This extreme position is shown in Figure 7. It will be appreciated that during such independent movement of only one end of the beam 22, the beam will pivot at each end about the screws 45 by which it is secured to the two slider members 41. Assuming the extreme example mentioned above where one of the ends of the beam remains stationary, full clamping up for example of the right-hand end of the beam 22, with no movement of the left-hand end, in the manner shown in Figure 7, will of necessity require the slider member 41 on the right to move to the left due to the arcuate movement of the right-hand end of the rear beam 22. Such sideways movement of the slider member 41 is accommodated by the excess width of the slots 30 and 35 in relation to the width of the projection 40 of the slider member 41 as shown and described with respect to Figure 3. Figures 6 and 7 demonstrate this lateral movement of the slider member 41 between its extreme positions. Thus in Figure 6 the outline of the projection 40 of the slider member 41 is shown as engaging the right-hand face of the elongated slot 30 in the slideway 28. After full clamping up to the position shown in Figure 7 the projection 40 of the slider member 41 moves laterally to engage the left hand side of the slot 30. Of necessity in this arrangement the slider member 41 has to tilt slightly with respect to the longitudinal axis of the slot 30 in the clamped up position of Figure 7. This will cause slight lateral movement of the rear end of the screw threaded rod 51 as shown in Figure 7 but this can be readily accommodated by means of the tolerances in the manner of mounting of the rod 51 at its front end.

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2. A workbench comprising a base structure for resting on a floor, a top structure, an intermediate structure which interconnects the base structure and top structure and which is collapsible between an erected position and a storage position in the latter of which the intermediate and top structures lie in juxtaposed relation to the base structure, the top structure in the erected position of the intermediate structure, providing a substantially flat work surface which is afforded by two elongate vice members capable of horizontal relative move-



ment towards and away from one another thereby to form a vice.

3. A workbench as claimed in Claim 2 in which the top structure incorporates a pair of horizontal supports extending beneath the vice members one of the vice members being secured in a stationary manner to the horizontal supports and the other vice member bearing on the horizontal supports in a movable manner.

4. A workbench as claimed in Claim 3 in which the vice members are moved with respect to one another by a pair of vice operating devices each comprising a screw threaded rod extending substantially at right angles to the length of the stationary vice member.

5. A workbench as claimed in Claim 4 in which each screw threaded rod is axially fixed at its end adjacent the stationary vice member and extends through a nut secured to the movable vice member.

6. A workbench as claimed in any one of Claims 3 to 5 including location means which limits lateral movement of the movable vice member relatively to the horizontal supports.

7. A workbench as claimed in Claim 6 in which the location means comprises horizontally extending vertical faces one on each of the horizontal supports and against each of which an abutment, carried on the underside of the movable member, is arranged to engage.

8. A workbench as claimed in Claim 5, or as claimed in Claim 6 when appendant to Claim 5, in which the nuts partially provide means to prevent upward movement of the movable member away from the top structure.

9. A workbench as claimed in Claim 3 and as claimed in Claim 8 in which the horizontal supports each include a horizontal web under which the nut at least partially lies to prevent upward movement of the nut.

10. A workbench as claimed in Claim 9 in which the screw threaded rods are axially fixed to vertical walls of the horizontal supports.

11. A workbench as claimed in Claim 5 and as claimed in Claim 7 in which the abutments are formed by location portions one on each nut.

12. A workbench as claimed in Claim 11 in which the horizontal supports each include a horizontal web beneath which one of the screw threaded rods extends, with the location portion of the associated nut extending upwards within a guide slot in the web.

13. A workbench as claimed in Claim 12 in which each guide slot is laterally wider than its associated location portion to permit limited lateral movement of the location portion and hence the nut during independent operation of the screw threaded rods.

14. A workbench as claimed in any one of Claims 2 to 13 in which the pair of vice members between them afford the complete working surface of the bench.

15. A workbench as claimed in any one of Claims 2 to 14 in which the vice members are each formed of wood.

16. A workbench as claimed in Claim 15 in which each vice member is of substantially rectangular cross section.

17. A workbench as claimed in any one of the preceding claims in which the intermediate structure is hingeably connected to the top structure and to the base structure.

18. A workbench as claimed in Claim 17 in which the intermediate structure includes a pair of frames.

19. A workbench as claimed in Claim 18 in which each frame is of generally H configuration.

20. A workbench as claimed in Claim 18 or Claim 19 in which the intermediate structure additionally includes at least one brace which, in the erected position, extends between the top structure and the base structure, at an inclination to the vertical.

21. A workbench as claimed in any one of the preceding claims wherein the base structure includes a horizontal platform.

22. A workbench as claimed in any one of the preceding claims in which the base structure includes a substantially rectangular framework and the intermediate structure is connected to opposed sides of the framework.

23. A workbench as claimed in Claim 19 in which each frame is hingeably connected at two pivotal points to each of the top and base structures.

24. A workbench as claimed in Claim 22 and as claimed in Claim 23 wherein the two pivotal points between one frame and the base structure are positioned adjacent two corners of the framework and the two pivotal points between the other frame and the base structure are positioned substantially midway along the opposed sides of the framework.

25. A workbench as claimed in Claim 23 or Claim 24 in which each of the top and base structures affords a pair of substantially vertical parallel webs and the frames at their upper and lower ends are respectively located against the opposed faces of the pairs of webs.

26. A workbench as claimed in any one of Claims 19 or 23 to 25 in which the pair of H frames are hingeably mounted to the top structure and the base structure in the manner of a parallelogram.

27. A workbench as claimed in Claim 26 in which the hinge connections of one frame to each of the top and base structures are higher than the respective hinge connections of the other frame.

28. A workbench as claimed in Claim 27 in which the frame having the higher hinge connections is capable of partially overlying the other frame in the collapsed storage position.

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