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MEANS FOR POSITIONING DRAWING-LAYOUT TABLES

Harold Guy Butler, Oxford, England, assignor to
Harris and Sheldon Limited, Birmingham, and
Joseph Sankey and Sons Limited, Bilston,
Staffordshire, England

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This invention relates to tables, benches or supports, for use in lofting or the laying out of drawings, where a full size drawing of an article or part to be manufactured is made upon a plurality of separate plates, panels or the like, each of which may be used as an actual template for producing a portion of the article, or from each of which a full size reproduction may be made, such, for example, as by photographic means. Whilst the drawing is being made the plates, panels or the like, are each mounted upon a separate table, bench or support, being suitably positioned on the latter, and being provided, for example, with holes at the corners receiving fixing-screws, or for fitting over pins or dowels on the table, bench or support, the plates or panels, with the tables or supports, being arranged side by side, and/or in rows, to make up an area of the size required, according to the size of the article or part which is to be produced. Since that part of the drawing on each plate or panel represents a specific portion of the complete article which is to be produced it will be obvious that the tables, benches or supports, which carry the plates, panels or the like, must be very accurately positioned relatively to one another before the drawing is made, otherwise the article resulting from the composite drawings on the several plates or panels will be incorrect. It is also important that all of the plates or panels should lie level with one another or in the same plane.

The object of the present invention is to provide improved and efficient means for enabling the tables, benches or supports which carry the plates, panels or the like, to be kept or maintained in their correct relative positions whilst they are in use, and also to enable them to be correctly repositioned, if necessary, after they have been moved or separated. A further object is to provide means for enabling the tables, benches or supports, to be adjusted so that all of the plates or panels are perfectly level with one another, in the same plane.

According to the invention, a table, bench or support, for a plate, panel or the like, for use in the laying out of full-scale drawings, is provided with an abutment or buffer which is adapted to be adjusted so that it may be caused to contact with, or to engage, an adjacent table, bench or support, or an opposed part thereon, when the relative positions of the tables, benches or supports, are correct, after which the latter may be held together by bolts or other means, so that the said abutment or buffer is kept in close engagement with the said adjacent table or opposed part. The correct positions of the tables, benches or supports may be obtained initially by a master-plate or member which is placed over two or more tables, benches or supports, or over portions thereof, suitable means being provided for correctly locating the said master-plate or member, which may be temporarily secured by screws, or may have holes for engaging pins or dowels on the tables, benches or supports. Once the correct positions for the latter have been found it is only necessary to adjust the abutments until they contact with the parts with which they are to co-operate and thereby secure them together by suitable means, such as by bolts. The adjacent sides of a plurality of tables or supports may carry pairs of opposed abutments or buffers, one or both pairs being adjustable. Each abutment or buffer may, for example, consist of an externally threaded part screwing into a bush or threaded hole in the side of the table, whilst the abutments or buffers may be tubular to receive coupling bolts or rods which serve to connect or lock the tables together after the abutments or buffers have been adjusted; or other coupling means, such as clamps, may be provided to hold the tables and abutments together.

To enable all of the tables or supports to be adjusted so that the plates or panels which they carry lie perfectly level the legs of the tables may be adjustable in length, being provided, for example, with feet carried by rods screwing into the legs.

Figure 1 of the accompanying drawings represents a perspective view of a drawing-layout or lofting table provided with positioning means constructed in accordance with this invention, showing the layout-plate in position, the said plate and the top of the table being broken away. Figure 2 is a plan view of one end of the table, with the layout plate and the top of the table broken away. Figure 3 represents a side elevation of one end of the table, upon a larger scale, showing how the adjustable abutment or buffer projects horizontally from the table.

Figure 4 is a side elevation showing several drawing-layout tables secured together, with the opposed abutments or buffers in engagement.

Figure 5 represents a vertical section through the ends of two adjacent tables, showing the adjustable abutments or buffers (in elevation) engaging one another and secured together, and showing also the manner in which the drawing-layout plates may be positioned.
Figure 6 illustrates a section taken through two engaging buffer devices, showing the bolt employed to secure them together.

Figure 7 is a sectional view of one of the feet of the table, showing the screw means provided for levelling the table.

Figure 8 shows a form of ball caster with which the legs of the tables may be provided.

Figure 9 is a section through the adjacent ends of two drawing-layout tables fitted with abutments of a modified construction and adjustable by means, a clamp being provided for securing the tables together.

Figure 10 represents a horizontal section through one of the abutments shown in Figure 9.

Figure 11 shows tables fitted with buffers of another construction, and adjustable by cam means.

Figure 12 illustrates modified means for securing two tables together, after the abutments have been adjusted to contact with one another.

Figure 13 shows a modified form of foot with which the tables may be provided.

Referring to Figures 1 to 7 of the drawings, the full-scale layout or lotting tables 1 each comprise a metal top frame 2 supported by legs 3 and provided with a top 4 which is adapted to receive a work-plate or panel 5 upon which the drawing is to be made, the said top 4 being conveniently made of plywood; or it may be of any other suitable material. The top frames 2 of all the tables are each provided, according to this invention, at each end with a pair of adjustable abutments or buffers 6 arranged near the opposite corners of the table, four similar abutments or buffers 6 being provided at each side of the table, with one at each corner, as shown in Figure 1 of the drawings. The abutments or buffers 6 at the one side or end of one layout table are adapted to be set so that they contact with the abutments or buffers 6 carried by the adjacent side or end of the next layout table only when the tables are in their correct relative positions.

The legs 3 of the tables may be suitably braced together, and the top frame 2 of each table is provided with deep vertical walls through which the abutments or buffers 6, which are tubular and are externally-threaded, are arranged to pass, the said abutments being disposed horizontally so that they project out from the said top frame. Each tubular abutment or buffer 6 is arranged to screw into a threaded hole in a nut or bush 7 (see Figures 3 and 6) welded or otherwise fixed to the inner face of the respective vertical wall of the top frame 2 of the table, so that the head-end 8 of the abutment is presented outwards and may engage the head-end 8 of an abutment 6 projecting from the side or end of an adjacent table or support. The threaded abutments or buffers 6 are therefore externally-threaded, are arranged to extend inwards from the vertical wall of the top frame 2 and is fitted with a lock-nut 8, whilst each abutment or buffer is open-ended, the arrangement being such that when any drawing-layout tables are correctly placed together the abutments 6 or buffers 6 on the end or side of one table lie immediately opposite the abutments or buffers 6 on the adjacent end or side of the other table, so that a continuous open-ended passage is provided through each pair of opposed abutments. A coupling bolt 9 is adapted to be passed up to its head-end through each pair of opposed tubular abutments or buffers for the purpose of securing the latter, and the two tables 1, together, the said coupling bolt 9 being fitted at its one end with a wing nut 10. The top frame 2 of each layout table is fitted at the corners with bosses 11 secured to the said top frame by welding or other means, and arranged to extend up through the wooden top 4 of the table. These bosses 11 are formed with threaded holes to receive screws 12, which serve to position, and temporarily to secure, the layout plate 5 to the top table, the screws being passed through holes provided in the corners of the said plate, and being secured into the bosses 11, as shown in Figure 5 of the drawings; or the holes in the layout plate 5 may be arranged to fit over positioning pins projecting up from the tables. By detaching the screws 12 the layout plate 5 may be readily removed, when required.

The tops 4 of the tables 1, and the lofting plates 5, are of the same size, and a number of the tables are adapted to be placed side by side and end to end in rows, so that the plates 5 which they carry together form an area of a suitable size for engaging a full-size drawing of the part or article which is to be manufactured. The arrangement is such that the plates 5 all lie close together in the same plane, and it is essential not only that all of the plates should be perfectly level, but that the tables should be correctly lined up, and that is that they must always be correctly positioned relatively to one another otherwise the article or part produced from the composite drawing will obviously be incorrect. This correct positioning of the tables may be readily obtained by means of the adjustable abutments or buffers 6, once the proper positions of the tables 1 have been initially obtained, and the tables 1 may be separated as often as desired, the abutments or buffers 6 enabling them to be always placed together again in their correct relative positions.

The correct setting of the tables 1 may be obtained initially by means of a master-plate (not shown) of a sufficient size to extend over a plurality of the tables, or over portions thereof, and provided with holes which are engaged by the screws 12, so that when the latter are screwed into the base 7, the tables are correctly aligned in all directions. The abutments or buffers 6 at the one side or end of one of the tables are arranged so that they then lie immediately opposite the abutments or buffers 6 at the opposed side or end of an adjacent table. The opposed abutments 6 are then adjusted so that they just contact with one another, after which they may be secured by the lock-nuts 8, and a coupling bolt 9 is passed through them, so that each pair of opposed abutments, and consequently the adjacent tables, are thus positively secured together. All of the tables 1 are connected together in this manner, so that they cannot move out of their correct positions, but after the drawing has been made the tables 1, with their separate plates 5, may be readily separated, if desired, the abutments or buffers 6 ensuring that they may always be correctly repositioned when brought together again.

The lock-nuts 8 may be omitted, if desired, but the provision of these lock-nuts prevents the abutments or bolts 6 from being inadvertently unscrewed when the tables have been separated.

To enable the tables 1 to be connected together, the tops 4 of all of the tables lie in the same horizontal plane the legs 3 of each table are provided with levelling means comprising feet 13 swivelly attached to the ends of bolts 14 which screw into the lower ends of the legs. As shown
in Figure 7, the lower end of each leg 3 is bent in to provide a horizontal part 15, the latter carrying a nut 16 adapted to receive the bolt 14, so that by screwing the bolt more or less through the nut, the position of the leg 3 in relation to the end of the table leg may be varied. The bolt may then be secured by a lock-nut 17. By suitably adjusting the bolts 14 on the legs of the table it will be readily seen that the tops of all of the tables may be easily arranged so that they lie perfectly level and all in the same plane.

The table legs 3 may be fitted with ball castors, if desired, each leg 3, for example, being provided with a ball 10 projecting from a housing 19 which is fitted with a closure member 20 carried by a rod 21, the latter screwing into a nut or bush 22 on the end of the leg. By adjusting the rods 21 on the legs the tables may be levelled, as in the preceding construction. Any other form of castor may be provided, and the table legs may be fitted 21, and adjustable levelling means.

Instead of the opposed abutments or buffers on the drawing-layout tables being screwthreaded, as described, they may be slidably mounted and arranged to be moved outwards, to contact with an opposing abutment or buffer, by a wedge, or by a cam or other suitable means. Figures 9 and 10 of the drawings show wedge-operated abutments or buffers 23. Referring to these figures, each abutment or buffer 23 is slidably mounted within a sleeve or bush 24 welded, or otherwise fixed, to the inside face of the top frame 2 of the table, the said sleeve or bush 24 being apertured at opposite sides to receive a transverse wedge 25. This wedge 25 is arranged to pass through a transverse aperture 26 in the slideable abutment or buffer 23, as shown in Figure 10, the said aperture having an inclined face 29 which co-operates with the inclined face of the wedge member, and when the wedge 25 is moved inwards the abutment or buffer 23 may be caused to slide outwards into engagement with the opposing buffer on the adjacent table. The wedge may carry a spring 30, so that it may be held in its adjusted position by a nut 28; or it may be held in place by other means. The inclined face 29 of the abutment or buffer may be kept up against the inclined face of the wedge, when the tables are separated, by means of a spring 29. The tables may be held together in their correct positions, after the necessary adjustments have been made to the abutments, by means of a clamp 30 engaging the top frames 2 of adjacent tables, as shown in Figure 9, thus maintaining the opposed abutments in contact.

In the construction illustrated in Figure 11 cam means are shown for adjusting the abutments, each abutment comprising a part 31 fixed to the top frame 2 of the table and having an outwardly-projected cam-face 31a, and a co-operating rotatable part 32 with a cam-face 32a opposed to the cam-face of the part 31. The parts of the two opposed buffers are coupled together by a central bolt 33 fitted with a wing-nut 34, and after the rotatable cam-parts 32 of opposed abutments have been turned to contact with one another, the nut 34 on the central bolt is tightened to secure the parts together and hold the tables in their correct positions. The rotatable part 32 of each abutment or buffer may carry an integral sleeve 35 fitting into the co-operating fixed part 31, so that the parts are retained together when the bolt 33 is removed.

The drawing-layout tables or supports may ob-

viously be of any suitable construction. Also, adjustable abutments or buffers of any other form may be provided, which enables them to be moved into contact when the tables are in their correct positions, foot 13 in relation to the end of the table leg may be varied.

The tables or supports for the drawing layouts may be secured together, with the abutments or buffers of adjacent tables in contact, by any other desired means. The table-securing means shown in Figure 12 may, for example, be employed, a hinged shackle or link 38 being connected to one of the tables and being provided with a hook-end for engaging over a pin or stud 37 on the adjacent table. The other end of the shackle or link 38 has a circular aperture which engages an eccentrically-mounted disc 39 attached to the adjacent table and adapted to be turned by a handle 39. By turning the disc 38 the shackle or link is moved endwise and the two adjustable abutments are clamped firmly together. This arrangement obviates the necessity for a bolt connecting together the abutments.

If desired, tables may be provided having legs 3 fitted with feet 40 and rounded upon their underside as shown in Figure 13, so that the tables may be more readily pushed about into different positions, thus facilitating the handling of the tables.

The feet 40 may be each carried by an adjustable screwed rod or bolt 14, to permit of the table being levelled.

Any desired number of abutments or buffers may be provided at the ends or sides of the tables or supports.

I claim:

1. Means for use in laying out of drawings, comprising adjacent supports for the drawings, screw-threaded parts carried by opposed portions of the supports, tubular abutments projecting horizontally from the supports and actuated, by engaging the said screw-threaded parts, so that abutments on adjacent supports may be set to contact with one another when the supports are in their correct relative positions, and coupling bolts passing axially through opposed tubular abutments for securing them in their adjusted positions.

2. Means for use in laying out of full-scale drawings, comprising adjacent supports for the drawings, adjustable abutments carried by opposed parts of the tables and projectable horizontally from the latter, and wedges for moving the opposed abutments into contact with one another when the supports have been set in their correct relative positions.

3. Drawing-layout tables, drawing-layout plates, means for positioning a drawing-layout plate on each table, internally-threaded socket members on opposed parts of the table, externally-screwed tubular abutments projecting horizontally from the tables and subjecting the socket members, so that abutments on adjacent tables may be set to contact with one another when the tables are in their correct relative positions, and bolts passing axially through opposed tubular abutments for securing them in their adjusted positions and for holding the tables together.

4. Means for laying out full-scale drawings, comprising supports for the drawings, opposed buffer devices on the supports, means for adjusting the buffer devices so that they contact with one another when the supports are in their correct relative positions, and clamps for securing the supports together after the buffer devices have been adjusted to contact with one another.
5. Means for use in laying out drawings, comprising adjacent tables for supporting the drawings, opposed abutments on the tables, means for adjusting the abutments, and means for holding the tables together after the adjustment of the abutments.

6. Means for use in the layout of drawings, comprising adjacent tables for supporting the drawings, opposed tubular abutments projecting from the tables, means for adjusting the abutments relatively to the tables so that they contact when the tables are in their correct relative positions, and means passing through the opposed tubular abutments for securing them together after adjustment.

7. Means for use in the laying out of full scale drawings, comprising adjacent tables for the drawings, buffers carried by and projecting from the tables and having opposed faces adapted to contact with one another, means for adjusting each buffer relatively to the table by which it is carried, so that the distance between adjacent tables is varied when the buffers are in contact, and means for holding the tables together in their adjusted positions with the opposed faces of the adjusted buffers in contact.

8. Means for use in laying out full scale drawings, comprising adjacent tables for the drawings, buffers carried by and projecting from the tables and having opposed faces adapted to contact with one another, means for adjusting one of the buffers relatively to the table by which it is carried, so that the distance between adjacent tables is varied when the buffers are in contact, and means passing through the opposed tubular abutments for securing them together.

HAROLD GUY BUTLER.