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DEVICE FOR ASSEMBLING VARIABLE SIZES OF FRAMED SCREENS  
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4 Sheets-Sheet 1

[Diagram of device for assembling variable sizes of framed screens]

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DEVICE FOR ASSEMBLING VARIABLE SIZES OF FRAMED SCREENS

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This invention relates to framed screens and it is more particularly concerned with assembly machines for use in securing the screening to the frame with splines set into grooves or channels.

More particularly, the invention comprises improvements over the one described in Conrad, Patent No. 2,753,897, issued July 10, 1956, whereby a single unit may be adjusted for use with different sizes of frames, thereby obviating the necessity of providing separate units for each size frame to be screened.

According, it is the general object of this invention to provide a device for assembling framed screens of different sizes.

Another object of the invention is the provision of a size-adjustable device for assembling framed screens in which the adjustment from one size to another can be made quickly, easily and conveniently.

A still further object of the invention is the provision of an adjustable device of the type mentioned which is rugged and, at the same time, simple in construction and operation.

These and other objects, advantages, and features of the invention will appear more fully from the following description considered together with the accompanying drawings:

In the drawing:

Fig. 1 is a top plan view of an embodiment of the invention with the screen supporting platen removed.

Fig. 2 is a side elevational view of the same embodiment.

Fig. 3 is a section, on a larger scale, along the line 3—3 of Fig. 1.

Fig. 4 is a section along the line 4—4 of Fig. 3.

Fig. 5 is a plan view of a corner section broken away from the remaining part of the embodiment.

Fig. 6 is a section, on a larger scale, along the line 6—6 of Fig. 2.

Fig. 7 is a plan view, like Fig. 1, with the addition of the screen and screen frame members in position thereon ready for assembly, but partly broken away.

Fig. 8 is a schematic view of portions of the screen frame, screen, and spline, showing their relative positions in the device prior to final assembly.

Fig. 9 is a section along the line 9—9 of Fig. 7, on a larger scale.

Fig. 10 is a view similar to Fig. 9 with the screen, screen frame and spline in final assembly.

Fig. 11 is a cross sectional view through a portion of an assembled framed screen.

Figs. 12 and 13 are fragmentary sections of modified forms of the invention.

Referring more particularly to the drawing, it will be seen which numerals designate like parts, the embodiment illustrated comprises a horizontal support or base 21 of generally rectangular shape. Adjacent the edge of each side of the base member there is secured at the median point a shaft bearing 22, 23, 24 and 25 for the outer ends of shafts 26, 27, 28 and 29, respectively.

Two of these shafts 26 and 28 are disposed longitudinally of the base 21, and the other two shafts 27 and 29 are disposed laterally thereof and at right angles to the shafts 26 and 28.

The inner ends of the shafts 26, 27, 28 and 29 pass into a central gear box 30 and are rotatably mounted in bearings in the side walls 31, 32, 33 and 34 of the gear box, such as the bearings 35 and 36 for the shafts 27 and 29, respectively, in the walls 32 and 34. Pairs of holding collars 37, 38, 39, 40, 41, 42, and 43, 44 on the shafts straddle their respective bearing locations and are secured to the shafts with pins 45 for rotation therewith to hold the shafts in position longitudinally relative to the gear box 30. The gear box 30 is fixed to the base 21 by screws 46 or by any other suitable means.

The inner ends of the longitudinal shafts 26 and 28 carry each a bevel gear 47 and 48, respectively. These bevel gears are placed in meshed relation with a common idling bevel gear 49 rotatably mounted on a stub shaft 50 that is secured to a side wall of the gear box 30 by means of a nut 51 engaging a threaded recessed portion 52 of the stub shaft. As a result of this arrangement the shafts 26 and 28 are constrained to rotate in opposite directions.

The inner ends of the lateral shafts 27 and 29 also carry bevel gears 53 and 54 which are in meshed relation with an idling bevel gear 55 rotatably mounted on the shaft 26.

One of the longitudinal shafts, say shaft 26, and one of the lateral shafts, say shaft 29, each carry on the outside of the gear box 30, means for rotating it, such as the manual means illustrated, comprising a spur gear 56 rotatable with the shaft, and a hollow arm 57 hingedly mounted on bearing 58 on the shaft adjacent the gear 56 carrying a spring loaded pawl 59 in contact with spurs of the gear 56, the loading spring being designated by the numeral 60. The pawl 59 is movable manually against the face of the spring by rod 61 projecting through the end of the arm 57 and provided with a knob 62.

Each of the shafts 26, 27, 28 and 29 also carry a pinion gear and each of these pinion gears is keyed to rotate with its corresponding shaft and to slide axially thereon. Thus, typically, the longitudinal shaft 26 carries the pinion gear 63 and the lateral shaft 27 carries the pinion gear 64.

The pinion 63 is meshed with a pair of diametrically opposed horizontal rack gears 65 and 66 extending in opposite lateral directions.

Similarly, the pinion gear 64 meshes with rack gears 67 and 68 extending in opposite longitudinal directions. A similar pinion gear (not shown) provided for the longitudinal shaft 26, meshes with rack gears 69 and 70 and a similar pinion gear (not shown) is provided for the lateral shaft 29 meshing with rack gears 71 and 72.

Each pinion gear is housed in a box with openings for slidably receiving the rack gears. Thus, typically, the gear 63 is housed in a gear box 73 having end walls 74 and 75, a top wall 76, and an inner side wall 77, and outer side wall 78, the bottom wall being provided by the base 21. The end walls 74 and 75 have top and bottom openings 79, 80 and 81, 82 for slidably supporting the rack gears 65 and 66 in meshed relation with the gear 63. Similar gear boxes 83, 84 and 85 are provided for the other pinion gears and their corresponding rack gears.

These gear boxes are each secured to a unit 86, 87, 88 or 89 which provide support for the members of the screen assembly. Thus, typically, the unit 88 comprises a bottom 90 slidably resting on the base 21 and secured to the inner wall 91 of gear box 84, by screws 92 so as to move with the gear box. The unit 88 also has up-
rights 93 and 94 which extend upwardly from and are secured to the bottom member 90 by screws 95 or any other suitable means. Between the wall 91 and uprights 93, 94, an intermediate wall 96 is integral with the bottom member 90 and subdivides the unit into two sections 97 and 98. Each of these sections is provided with a vertically reciprocating floating block or carrier 99 and 100 which blocks are urged to the limit of their respective uppermost positions by coil springs 101 and 102, respectively, their uppermost positions being limited by upwardly facing abutment shoulders 103 and 104 on the blocks 99 and 100 engaging, respectively, downwardly facing shoulders 105 of the uprights 93, 94 and a downwardly facing shoulder 106 of the wall 91.

The intermediate walls 96 of the various units are adapted as supports for the splines 107. The inner or primary floating blocks 99 have portions forming lower shelves 108 which are adapted as supports for a removable rigid sheet 109, such as of plywood, which in turn supports the screening 110 to be set into the channel 111 of the frame 112. Marginal portions 113 of the screening 110 extend beyond the edges of the sheet 109 and are supported by an upwardly extending rabbeted portion 114 of the inner block 99. The marginal portions also extend over the splines 107, substantially as shown.

The outer or secondary floating blocks 100 also have recessed portions forming shelves 115 to support the frame 112 in proper position relative to and above the screening and splines for assembly therewith.

All the units 86, 87, 88 and 89 have these identical parts. Corner units 116, 117, 118 and 119 also have similar parts, angularly disposed to accommodate the corner parts of the screen, except that they do not have the gear boxes, the walls 91 being the outer walls to which the ends of corresponding rack gears are secured by bolts 119A.

The sheet 109 is representative of a group of sheets of different sizes each used for a different size of screen. Hence, they act also as gauges or templates to define the limits of adjustment of the device to the size desired for a particular screen assembly. Access holes 120 and 121 are cut out of each of these sheets over the pawl carrying arms 57.

In Figs. 12 and 13, modified forms of the invention are shown wherein a vertical shim 122 in Fig. 12 and a horizontal shim 123 in Fig. 13 are used to accommodate frames of somewhat different dimensions or shapes.

The assembly is effected by placing the splines, screening, and frames on the device in the relative positions shown, after first adjusting its size to that desired with the pawl carrying arms 57 and then applying downwardly against the upper side of the frame a pressure platen (not shown) as a result of which the frame moves downwardly relative to the splines and border edges of the screening and the splines are forced into the channels or grooves 111 of the frame, the floating blocks 99 and 100 yielding under the pressure. The platen is then moved upward and the assembled screen removed.

I claim:

1. An adjustable device for assembling the elements of different sizes of framed screens, said elements consisting of a frame having grooves on a face thereof, a sheet of screening, and splines adapted to be disposed in the grooves of the frame together with border edges of the screening; said device comprising a table, a plurality of units slidably supported on the table and arranged in the general shape of a rectangle, said units including angular units defining the corners of the rectangle and intermediate units positioned along the sides of the rectangle between consecutive pairs of angular units, said units comprising median supports for the splines, primary floating carriers on the units extending above the median supports for yieldingly supporting a sheet of screening, secondary floating carriers on the units extending above the primary floating carriers for yieldingly supporting the frame, rotatable shafts connecting the intermediate units to each other, a central gear box interconnecting said shafts, said corner units being connected to the intermediate units by rack gears carried by the corner members and pinion gears meshing with the rack gears, said pinion gears being slidably carried on the shafts for rotation therewith, and bearings for rotatably supporting the ends of the shafts on the table.

2. An adjustable device as defined by claim 1 and means for rotating said shafts.

3. An adjustable device as defined by claim 1 in which the gear box comprises two sets of bevel gears, each set having a pair of gears in meshed relation, one gear of each pair being mounted for rotation with one of the shafts and the other being mounted for rotation with another shaft.

4. An adjustable device as defined by claim 3 in which the pairs of gears are in meshed relation through an intermediate idling gear.

5. An adjustable device as defined by claim 2 in which the means for rotating the shafts comprises a ratchet gear mounted for rotation with one of each connected pair of shafts, an arm pivotally mounted on the shaft adjacent the ratchet gear, a pawl carried by the arm normally in contact with the ratchet gear, resiliently yieldable means urging the pawl in contact with the ratchet gear, and means for moving the pawl out of contact with the ratchet gear against the action of the yieldable means.

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