March 11, 1952 C. J. DIETRICH 2,588,810

ASSEMBLING AID FOR CONSTRUCTING FRAMEWORKS

Filed June 23, 1947

3 Sheets-Sheet 1

Fig. 1

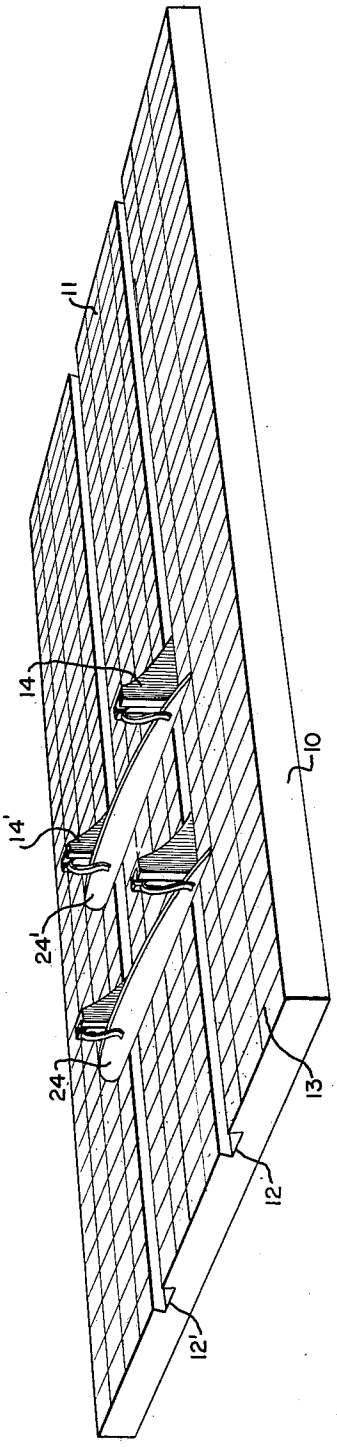


Fig. 2

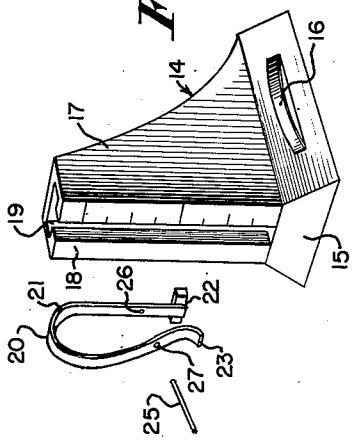
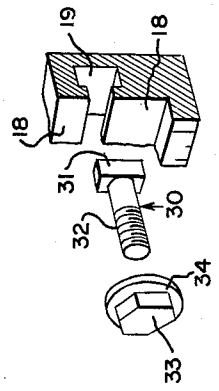


Fig. 3



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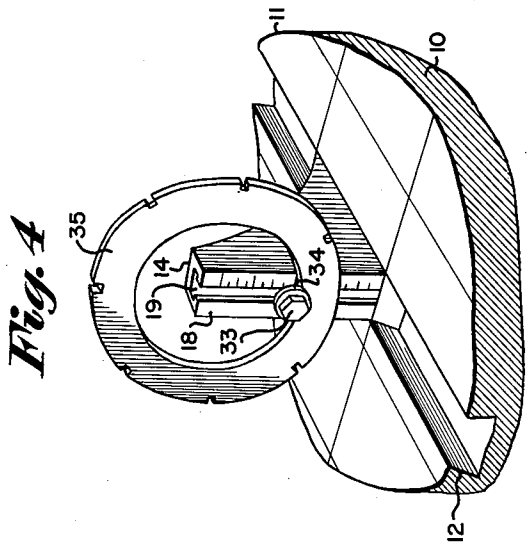

Fig. 4

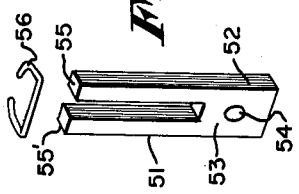

Fig. 11

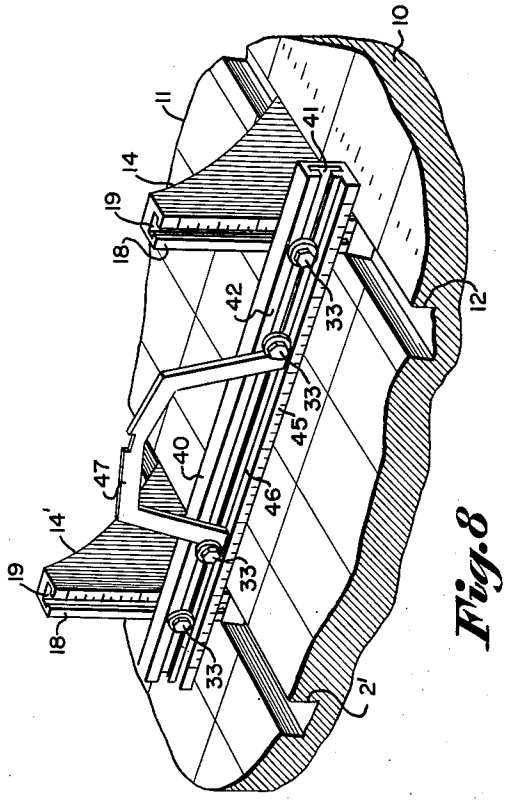

Fig. 8

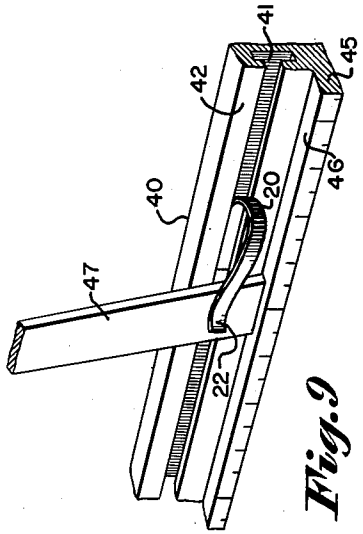

Fig. 9

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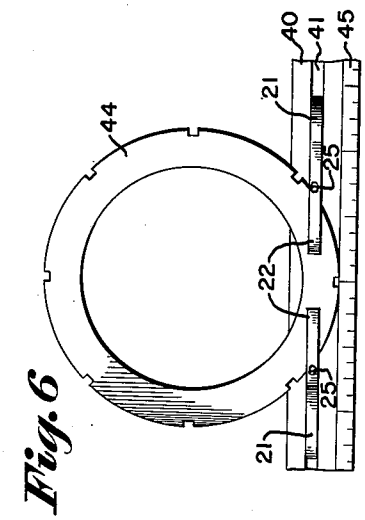

Fig. 6

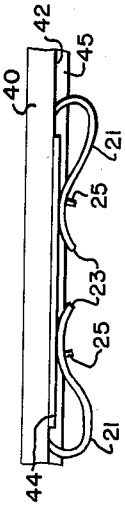

Fig. 7

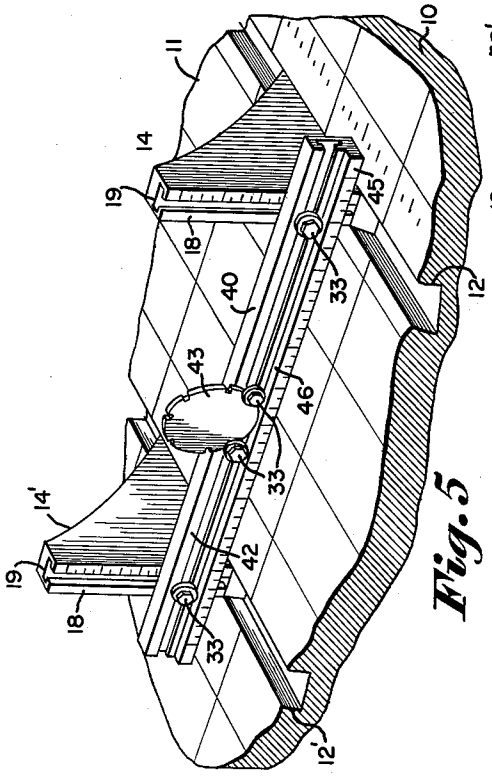

Fig. 5

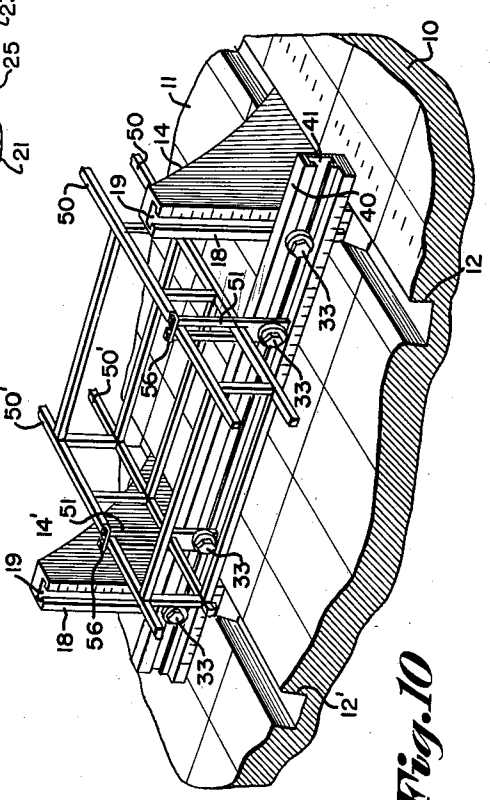

Fig. 10

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ASSEMBLING AID FOR CONSTRUCTING FRAMEWORKS

Clifford J. Dietrich, Charlottesville, Va.

Application June 23, 1947, Serial No. 756,509

4 Claims. (Cl. 29—286)

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This invention relates to a toy skeleton framework assembly aid, and more particularly to means for aiding in the assembly of and for positioning and supporting toy frame former elements and the like structural toy parts of model airplane or boats.

The provision of toy airplane and toy boat kits in the form of structural parts simulating various models of airplanes or boats, conventionally comprising various frame former elements such as body formers, wing ribs, stringers, struts and the like parts which require assembly by proper positioning and alignment of the elements, followed by gluing them together to form a skeleton framework, is well known. Among the problems arising in the construction of accurate scale models of airplanes or boats from such kits are the accurate positioning of the former elements in proper relative spacing from the other elements, and the alignment and orientation of these elements in conformity with that of the corresponding elements in the master device or plan of the device, and maintaining such spacing, alignment and orientation of the elements during the securing of the interconnecting elements of the framework to the positioned elements. For such purpose various assembly aids have been provided.

It is an object of the present invention to provide a new and useful assembly aid, particularly adapted for the construction of toy airplanes and boats, which is easy to assemble and which greatly facilitates the construction process by reducing the degree of skill required in making the assembly, and is conducive to more accurate and better results.

Another object of the present invention is to provide a novel device for positioning and aligning the structural elements of the skeleton framework of a toy airplane or boat or the like in accordance with their required position in the assembled toy and maintaining the position of such elements for a sufficient time to permit the interconnecting elements of the framework to be secured thereto.

Another object of the present invention is to provide a novel device, particularly adapted for the construction of toy airplanes and boats, for positioning and holding structural elements of the toy assemblage in desired relationship of spacing and alignment with the other structural elements of the assemblage, and facilitating the accurate and rapid assembly of the structural elements and their interconnecting elements into the structural framework.

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Other objects, advantages and capabilities of the invention will become apparent from the following description, taken in conjunction with the accompanying drawings showing only preferred embodiments of the invention, in which:

Fig. 1 is a general perspective view of the device comprising one form of the invention, illustrating how the same is employed in assembling the elements of a toy airplane wing;

Fig. 2 is an exploded perspective view of a sliding member and one species of clamping means coacting therewith for positioning and supporting the structural elements in positioned relationship;

Fig. 3 is an exploded perspective view of another or alternative species of clamping means;

Fig. 4 is a perspective view of one of the sliding members and the species of clamping means shown in Fig. 3 illustrating how the same is employed in positioning a ring-type airplane body former element;

Fig. 5 is a perspective view of another species of the invention illustrating how the same is employed in positioning a disk-type airplane body former element between a pair of the sliding members;

Fig. 6 is a front elevation of a portion of the cross member shown in Fig. 5 coacting with the species of clamping means shown in Fig. 2 to position and support an airplane body former element;

Fig. 7 is a top or plan view of the portion of the invention shown in Fig. 6;

Fig. 8 is a perspective view of the species of invention of Fig. 5 illustrating how the same is employed in assembling the elements of a toy boat hull;

Fig. 9 is a perspective view of the cross member shown in Fig. 8 with the species of clamping member of Fig. 2;

Fig. 10 is a perspective view of the species of invention of Fig. 5 with another form of clamping means illustrating how the same is employed in assembling a square-type model airplane fuselage;

Fig. 11 is an exploded perspective of the components of the clamping means shown in Fig. 10.

Referring to Figures 1 and 2 of the drawings, showing the components making up the invention as used in assembling a toy airplane wing, a supporting base member 10 forming a substantially rectangular work surface 11 of suitable dimensions is provided, having a plurality of dovetail grooves, as shown at 12, 12', recessed in the base member 10 and extending lengthwise there-

of. For convenience in determining position and spacing upon the work surface 11, rectangular coordinate calibrations 13 are provided on the surface 11.

Disposed within the dovetail grooves 12, 12' are a plurality of sliding members, shown at 14, 14', having a base 15, the sides of which are cut at an angle to correspond substantially to the sides of the dovetail grooves 12, 12', but of slightly less width than the dovetail grooves. The base 15 of the sliding member 14 is provided with a resilient element such as spring 16 adapted to extend between the base 15 and the adjacent side of the dovetail groove 12 within which the sliding member 14 is disposed to frictionally retain the sliding member 14 at the position it is adjusted to along the dovetail groove 12. Extending upward from the base 15 of the sliding member 14 is an upright portion 17 having a surface 18 extending perpendicular to the work surface 11, likewise having suitable scale calibration thereon for convenience in determining position along the surface 18. Within the upright portion 17 and extending through the surface 18 is a groove 19, preferably of substantially smaller width at the surface 18 than that within the upright portion 17, and the axis of the groove extending perpendicularly to the work surface 11. Adjustable clamping means are provided on the member 14, generally indicated by reference numeral 20, comprising, in the embodiment shown in Fig. 2, a substantially U-shaped ribbon spring 21, having means at one end 22 shaped to fit within groove 18 and slide axially therein, and free end 23 resiliently urged toward the end 22 and surface 18, thereby permitting the clamping means 20 to be adjusted vertically within the groove 19 to engage a structural element of the framework to be assembled, such as wing ribs 24, 24', between the ends 22, 23 and clamp the structural element at the desired position of vertical adjustment against the surface 18 by reason of the forces exerted against the element and the inner walls of the groove 19. To limit the degree to which the structural element can be inserted between the ends 22, 23 of the spring 21, a stop element 25 is provided, which is adapted to be inserted through openings 26, 27 in the ends 22 and 23, respectively, spaced the desired distance from the ends to cause the pin 25 to abut against structural element when inserted and prevent further insertion of the same.

By means of the arrangement above described, the sliding members 14, 14' can be adjusted axially of the dovetail grooves 12, 12' with the desired spacing between the perpendicular grooved surfaces 18 to correspond to the required spacing between elements of the toy framework. The accurate positioning of the members 14, 14' in accordance with the plan of the framework is rendered a simple and rapid operation by the calibrations 13 provided on the work surface 11, while insuring accurate alignment of the elements vertically. The elements of the framework, as the wing ribs 24, 24' shown in Fig. 1, may then be positioned against the grooved surface 18, and the clamping means, as spring 21, adjusted vertically within the groove 19 to engage the structural element and frictionally secure it against the grooved surface 18 and work surface 11. Obviously, the sliding members and their associated clamping means may be arranged to employ one for each structural element of the framework to be assembled, or the elements may be positioned by pairs of such sliding members, as shown in Fig. 1, with one sliding member engaging each end of the element.

Various means for clamping the framework elements, other than the spring clamping means 20, may be used without departing from the invention. An alternative clamping means that may be employed with the sliding member 14 is shown in Figs. 3 and 4, comprising bolt member 30, having a head member 31 of substantially the same width as the wider portion of the groove 19 adapted to slide axially therein, and a threaded shank 32 extending perpendicularly outward from the surface 18 when the head 31 is disposed within the groove 19. The head 31 of the bolt member 30 is provided with diametrically opposed planar surfaces on the sides thereof to engage and be guided by opposed sides of grooves 19 to prevent rotation of the bolt member 30 within the grooves 19. A nut member 33 is provided with a threaded bore permitting the nut 33 to be threaded onto the shank 32 of bolt member 30 and approach the surface 18, the surface 34 of the nut member 33 disposed toward the grooved surface 18 being of enlarged diameter to provide a large area for clamping a framework between the enlarged diameter surface 34 and the grooved surface 18, as shown in Fig. 4.

The above species of clamping means is particularly adapted for the positioning and alignment of body former elements in the assembly of a toy airplane structure, particularly of the ring-shaped variety as illustrated in Fig. 4. Since the body former elements, such as shown at 35, are frequently of different radii to achieve the desired taper characteristic of an airplane fuselage, it is desirable to clamp the body former elements at various positions on the grooved surfaces 18 to support the same at various distances above the work surface 11. Though this can be effected with the clamping means shown in Figs. 1 and 2, the means comprising bolt member 30 and nut member 33 are more convenient for this purpose. To position the body former elements for assembly, the sliding members 14 are disposed along one of the dovetail grooves 12, 12', the body former elements positioned adjacent the perpendicular grooved surfaces 18 at the desired distance above the work surface 11, the bolt member 30 moved along the groove 19 into engagement with the inner or outer periphery of the former element 35, and the nut member 33 rotated on the threaded shank 32 until the body former element is frictionally secured between the enlarged diameter surface 34 of the nut member 33 and the grooved surface 18. This permits accurate and stable positioning of the former elements in proper orientation and alignment for the stringer elements to be secured thereto to assemble the fuselage.

In the event the body former element is of the disk-shaped variety, as illustrated in Fig. 5, it is desirable to position the body former element between a pair of sliding members 14, 14' laterally spaced in different dovetail grooves 12, 12', rather than mount them on sliding members axially aligned in a single dovetail groove, as shown in Fig. 4. To accomplish this, the form of the invention shown in Fig. 5 is employed, in which a cross member 40 of sufficient length to extend between a pair of sliding members 14, 14' disposed in different dovetail grooves 12, 12', but with their grooved surfaces 18 lying in the same vertical plane, is provided. Extending lengthwise of the cross member 40 is a groove 41 of the character of the groove 19 provided in the sliding

member 14 and extending outward through a surface 42 of the cross member 40. The groove 41 in the cross member 40 is adapted to receive the head 31 of the bolt clamping member 30 or the end 22 of the spring clamping means 20, as shown in Figs. 6 and 7, and permit the clamping means to be adjustably positioned axially along the groove 41 in the same manner as in groove 18, to engage and frictionally retain the body former element of the fuselage framework, as former element 43 in Fig. 5 and former element 44 in Figs. 6 and 7, at the desired position along the surface 42. Suitable openings are provided through the cross member 40 near each end thereof and on an axis perpendicular to the surface 42, through which the threaded shank 32 of a bolt clamping member 30 may be inserted to secure the cross member 40 at each end to the sliding members 14, 14' at the desired position on the grooved surface 18, for vertical adjustment of the cross member 40. To further aid in stabilizing and clamping the body former element on the cross member 40, a longitudinal shoulder 45 is provided, extending lengthwise of the cross member 40 and having a surface 46 lying in a plane perpendicular to that of the surface 42 and parallel to the axis of groove 41, against which the periphery of the body former element may be disposed in clamped position.

By means of the cross member 40 and its associated elements a plurality of body former elements may be conveniently aligned and positioned on an axis extending parallel to that of the dovetail grooves 12, 12' between successive pairs of sliding member 14, 14' and spaced above the work surface 11 as required, whether the body former elements be of the disk or ring design.

This arrangement of elements constituting the assembly device is likewise useful in assembling rib elements in the required position and alignment for constructing a model boat hull, as illustrated in Figs. 8 and 9. The hull rib elements, as indicated at 47, may be positioned against the surface 42 of cross member 40 with the portion at each end of the rib element establishing the deck plane of the hull abutting against the surface 46 of shoulder 45, and clamping means, such as the bolt and nut clamping means 30—33 or the spring clamping means 20, as illustrated in Fig. 9, may be moved along the groove 41 to engage and clamp the ends of the rib element 47 against the surface 42 in position for securing the interconnecting elements thereto.

Referring now to Figs. 10 and 11, the elements of the assembly device are shown in operative condition for positioning and aligning the longitudinal stringer elements of a square-type model airplane fuselage as required for securing the transverse interconnecting stringer elements thereto. As shown, the longitudinal stringer elements, indicated at 50, 50', are supported in the required position between successive pairs of sliding member 14, 14' disposed in dovetail grooves 12, 12' by means of the cross members 40 and forked clamping means 51, shown in detail in Fig. 11, comprising a forked upright body member 52, having a base portion 53 with an opening 54 therein adapted to receive the threaded shank 32 of bolt clamping member 30 for securing the body member 52 to the cross member 40 at adjusted positions along the surface 42, and a pair of parallel arms 55, 55' defining an opening therebetween of substantially the width of the body stringer elements 50, 50'. A spring wire 56 adapted to slip over the forked end of the upright member 51 and shaped to extend around the arms 55, 55' of the upright member 51 and resiliently urge them together is provided to frictionally clamp the stringer elements within the opening defined by the arms 55, 55' after they have been positioned within the opening. Thus, the upright members 51 may be positioned laterally along the surface 42 of the cross member 40 in accordance with the required lateral spacing of the longitudinal stringer elements 50, 50', the stringer elements inserted into the opening provided in the upright members 51 and spaced within the opening in accordance with the required vertical spacing of the longitudinal stringer elements vertically, and the spring wire 56 applied over the ends of the arms 55, 55' to support the stringer elements in required position and alignment for securing the transverse stringer elements thereto to assemble the square-type fuselage framework.

From the above description, it will be readily apparent that the present invention provides a novel device for supporting the structural elements of a toy skeleton framework in required position and alignment for securing the interconnecting structural elements to the supported elements, which is easy to operate, reducing the skill required to assemble such toys, accurately supports the elements in mutually parallel planes to prevent improper orientation of the elements, facilitates the proper spacing and axial alignment of the elements, and is conducive to more rapid assemblage of such toy devices.

Although the invention has been described in considerable detail, it will be apparent that various modifications may be made in the invention without departing from the spirit and scope thereof, and it is desired, therefore, that only such limitations shall be placed thereon as are imposed by the prior art and are set forth in the appended claims.

What is claimed is:

1. Adjustable work holder for the parts of a plural part workpiece, comprising a planiform base having a pair of spaced parallel guide grooves with re-entrant sides, a pair of similar standards slidably fitting said grooves having mutually parallel faces perpendicular to said base, said faces each having a groove perpendicular to said base, said grooves having re-entrant sides, a cross member, first clamping means engaging said cross member having portions playing in the groove of said standards permitting adjustment of said cross member upwardly relative to said standards, said cross member having a longitudinal groove wider at its base than at its mouth, and second clamping means having portions playing in said longitudinal groove, permitting adjustment of said second clamping means longitudinally along said cross member.

2. Adjustable work holder as claimed in claim 1, said first and second clamping means being a leaf spring in the form of an open loop, and having a fixed cross piece at one end extending beyond said leaf spring adapted to play in a groove of the type defined in claim 1.

3. Adjustable work holder as claimed in claim 1, including a bar held by said second clamping means, having a slot of sufficient depth to receive two longitudinal parts of a workpiece in mutually spaced relation, and a keeper bridging said slot, frictionally engaging the bar to permit longitudinal adjustment of said keeper for adjusting the length of said slot.

4. Adjustable work holder as claimed in claim

1, said second clamping means being in the form of a bolt with a head shaped to slidably and non-rotatably fit in the longitudinal groove in said cross member, and a nut screwable on said bolt.

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