March 6, 1934. F. W. WILHELM 1,949,521

DRAWING BOARD STRUCTURE

Filed Dec. 8, 1930 2 Sheets-Sheet 1

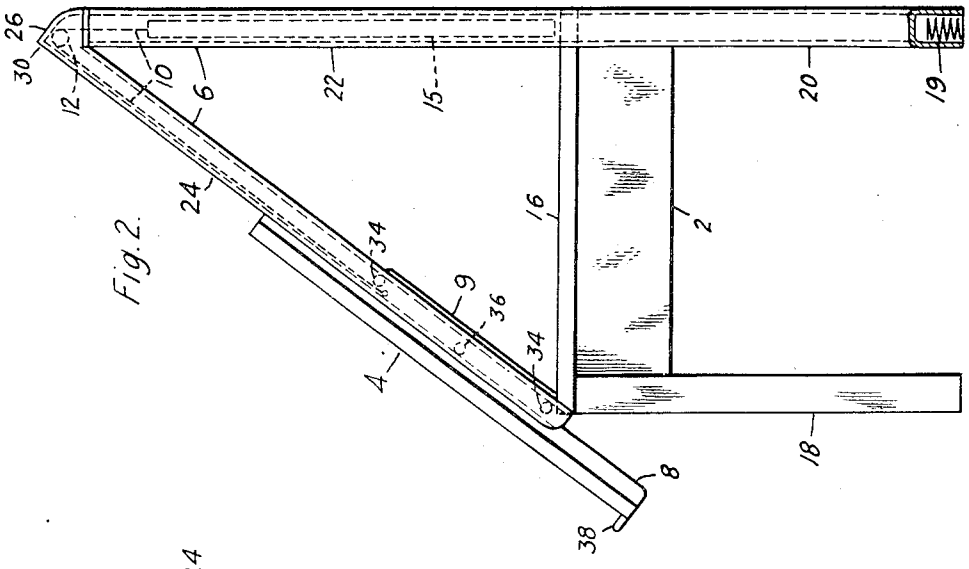


Fig. 2.

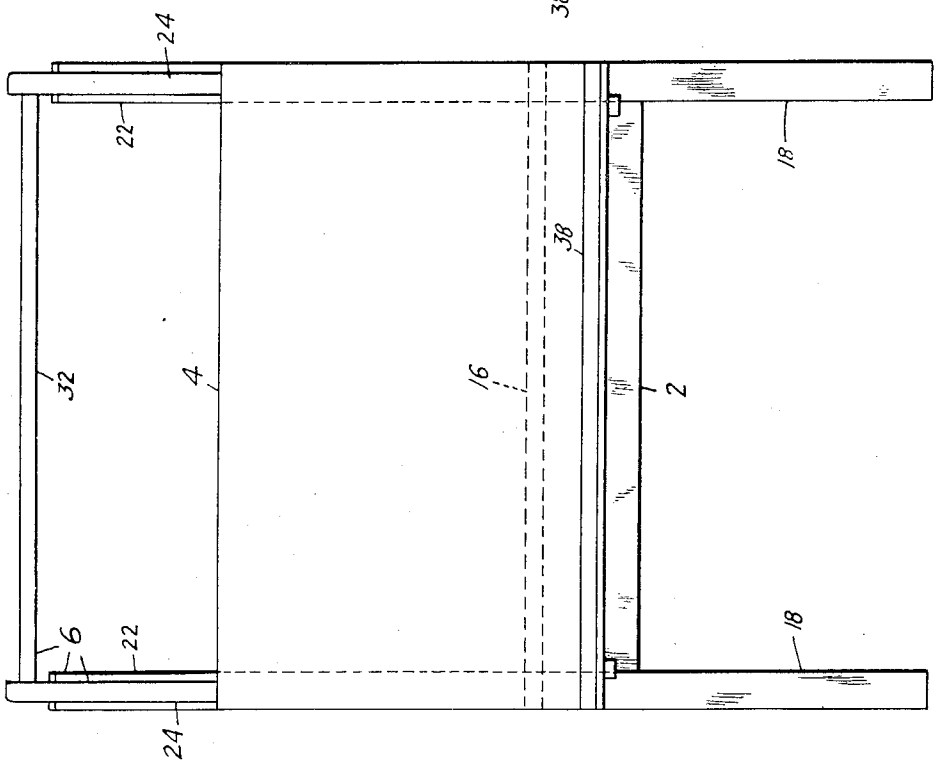


Fig. 1.

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DRAWING BOARD STRUCTURE

Filed Dec. 8, 1930 2 Sheets-Sheet 2

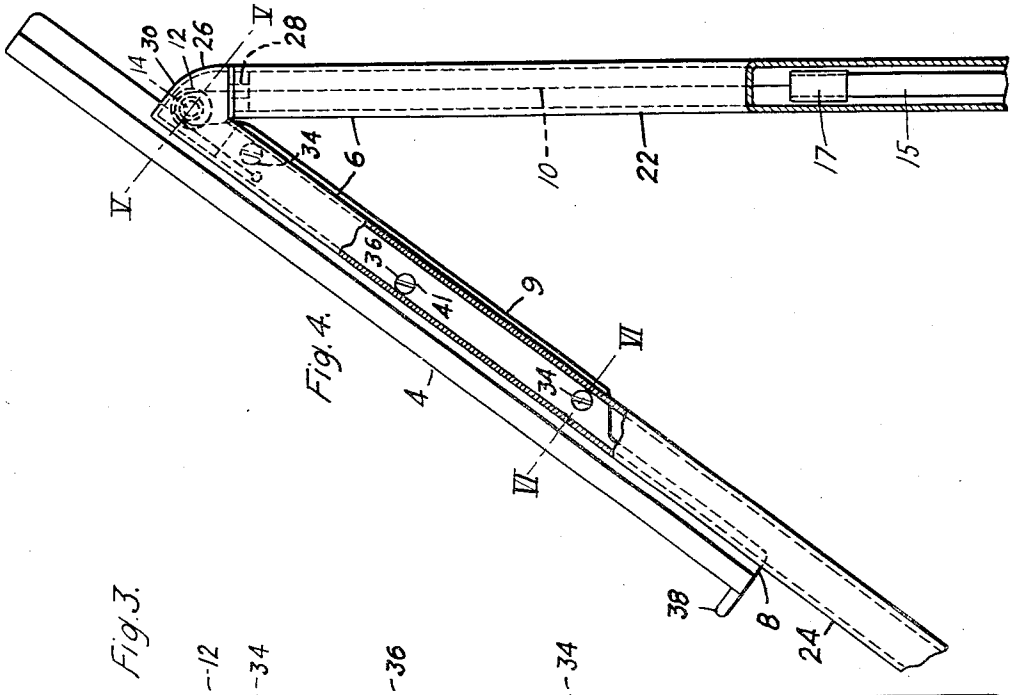


Fig. 4.

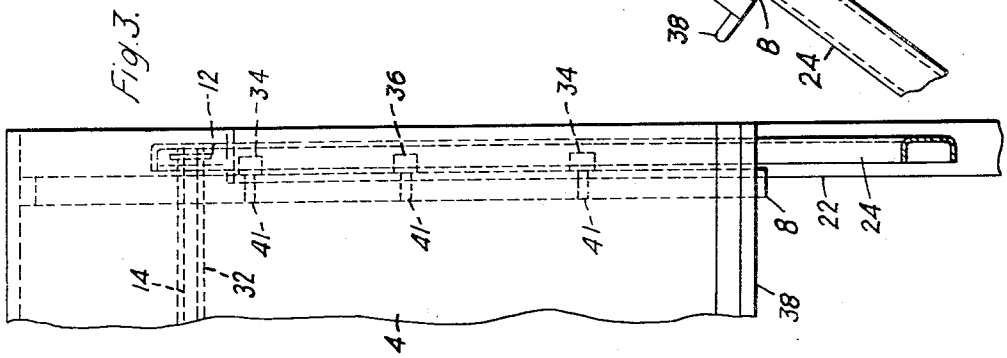


Fig. 3.

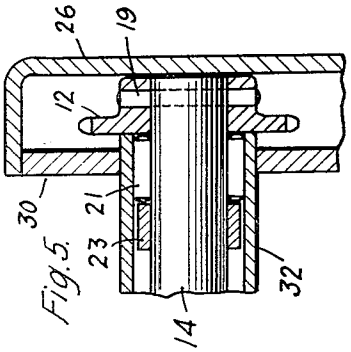


Fig. 5.

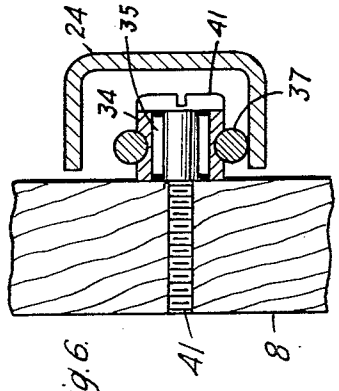


Fig. 6.

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UNITED STATES PATENT OFFICE

1,949,521

DRAWING BOARD STRUCTURE

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Application December 8, 1930, Serial No. 500,709

8 Claims. (Cl. 45—131)

My invention relates to drawing board structures and particularly to means for supporting and moving the boards.

One object of my invention is to render less arduous the efforts of draftsmen in connection with their work on drawing boards.

Another object of my invention is to provide a structure that shall be convertible from the form of an ordinary desk or table to the form of a sloping drawing board structure with substantially a minimum of effort and in substantially a minimum of time.

Another object of my invention is to provide a convertible table and drawing board structure that shall be free from unsightly mechanism for effecting the conversion.

Another object of my invention is to provide a drawing board structure wherein the board may be moved by a slight touch applied to substantially any part thereof.

Another object of my invention is to provide a combined table and drawing board structure in which a portion of the means for supporting the table board above a floor shall also support the drawing board above the table board.

Another object of my invention is to support a drawing board above a table at an angle thereto at which both pencils and pens may effectively be employed in working thereon.

A further object of my invention is to provide a combined table and drawing board structure that shall be simple and durable in construction, economical to manufacture and effective in its operation.

With such objects in view, as well as other advantages which may be incident to the utilization of the improvement, the invention consists in the parts and combinations thereof hereinafter set forth and claimed, with the understanding that the several necessary elements constituting the same may be varied in proportion, arrangement and texture without departing from the nature and scope of the invention.

Particularly in the use of relatively large drawing boards, of the ordinary type, it is necessary for the draftsmen to be on their feet a great part of the time, during which they are working on the boards, and to do a considerable amount of stretching and bending of their bodies to reach various distant parts of the boards.

To alleviate this condition to a certain extent, high stools are employed but this expedient leaves something to be desired since the stools are stationary and require the draftsmen to move themselves and the stools about to a considerable extent.

There are the further considerations of loss of time and the adverse effect in the quality of the work which are substantial.

There is a structure including an ordinary sloping drawing board on a table or desk, in which the drawing board is useful substantially only as a drawing board and the table is of little use aside from supporting the drawing board, when the drawing board is on it. In other words, the drawing board itself does not constitute a good table or desk, and the latter is of little use for ordinary desk or table work, unless the drawing board is removed. In the ordinary structures, frequent removal and replacement of the drawing board are unhandy operations.

When an operator requires frequent access to, or use of, a drawing board and a table or desk, his preferred recourse ordinarily is to have permanent installations of each. This condition requires a substantial amount of space.

In my co-pending application, Serial No. 362,257, filed May 11, 1929, and subsequently issued as patent No. 1,898,514, February 21, 1933, is shown a combined drawing board and table structure constructed, and for operation generally, in accordance with the present invention. It comprises a table above which a drawing board is mounted at an angle for movement between positions above and below the front edge of the table, whereby the operator may sit in comfort in an ordinary chair and have, almost instantly at his desire, a table or a drawing board, each in its complete character separate and independent of the other.

However, the device of the co-pending application has several features over which the present invention is a substantial improvement, such as the angle at which the drawing board is operated, the economy of manufacture, the mechanical balance of the parts, the ease of operation and other features.

It is my aim to overcome all of the objections to the use of the usual devices above-mentioned, as well as to improve the structure of the co-pending application, and, accordingly, in practicing my present invention, I provide means for concealing the working parts, members constituting parts of both the table and drawing board features, a single shaft or element for a plurality of flexible elements in a counterweight mechanism, a novel arrangement of guide elements, for the drawing board and other features, to be herein fully set forth.

In order to make the invention more clearly understood, means are shown in the accompanying drawings for carrying the same into practical effect without limiting the improvements in their useful applications, to the particular constructions which, for the purpose of explanation, are made the subject of illustration.

Figure 1, of the accompanying drawings, is a front elevational view of a structure embodying my invention,

Fig. 2 is a side elevational view, taken at right angles to Fig. 1, of the structure shown therein,

Fig. 3 is an enlarged detail view of the right-hand portion of the device, as viewed in Fig. 1,

Fig. 4 is a view a right angles to Fig. 3 of the structure thereof, parts being broken away for clearness,

Fig. 5 is an enlarged detail view, taken along the line V—V of Fig. 4, and

Fig. 6 is an enlarged detail view, taken along the line VI—VI of Fig. 4.

The device comprises, in general, a table 2, a drawing board 4, a frame structure 6 for supporting the board 4, on the table 2 and means including elements 8, 10, 12, 14 and 15 for controlling the movement of the board 4.

The table 2 comprises a table board 16, front legs 18 and rear legs 20 that constitute portions of the frame structure 6. The table 2, which, for purposes of illustration only, is shown as an ordinary table, may be of any desired style or type, or may be a desk having a center drawer, side drawers, or any other suitable appurtenances.

The drawing board 4 is of a usual type for use in offices, homes or other places by draftsmen, artists and others, and preferably consists of soft wood for the ready reception of thumb tacks. However, this feature is purely incidental and may be varied at will to render the board of any desired character. The elements 8, corresponding to the usual reinforcing flanges or ribs of drawing boards, are preferably provided with deeper central portions 9.

The frame structure 6 comprises upright members 22, constituting continuations of the rear legs 20 of the table 2, as above set forth, or as corner braces of a desk, the members 20 and 22 at each end of the rear side of the table or desk preferably being in one homogeneous part. These parts are also, each of hollow construction, and preferably of metal such as a tube or channel of any suitable cross-sectional area, although tubes of rectangular cross-sectional area are preferred for reasons which will hereinafter appear.

Parallel arms or members 24, preferably of channel-shape, subtend the angle between the table board 2 and the upright members 22, preferably at an angle of approximately thirty seven degrees to the vertical, although substantial variations from this precise angle may be employed, depending on the use to which the device is to be put, the character of its surroundings and other factors.

Brackets 26, or equivalent means of any suitable construction and artistic design, are suitably secured to, or constitute parts of, the upper ends of the upright elements 22 and, as shown, constitute top covers for the elements 22 having vertical apertures 28 therethrough and upstanding portions 30; the upper ends of the sloping arms 24 being parts of, or suitably supported by, the brackets 26 or adjacent parts. The brackets 26 and other parts adjacent thereto may be, in actual practice, of more ornate design, and the sprocket-wheel elements 12 enclosed thereby.

A hollow cross arm 32, such as a channel member or tube of any desired cross-sectional area but preferably of uniform cylindrical shape, is rigidly connected between the upright members 22 in register with openings in the upstanding portions 30 of the brackets 26.

The lower ends of the diagonal arms 24 are preferably disposed in relatively widely spaced relation along the forward portion of the table board 16 to which they are preferably permanently secured, in which case the upper ends thereof are also preferably permanently secured in position.

The diagonal arms 24 are preferably disposed with the open channel sides facing each other at the adjacent inner vertical-plane sides thereof so that guide rollers 34 and 36, secured to the elements 8 at the underside of the drawing board 4, as by screw-threaded shafts 41, may operate in, and be concealed by, the arms.

The portion 9 of each element 8 preferably carries two of the rollers 34 to roll along the upper surface of the lower side wall of the adjacent diagonal channel arm 24 and one roller 36 to roll along the under surface of the upper side wall thereof; the rollers in each channel being spaced therealong, to provide stability for the drawing board. The rollers are preferably mounted on roller bearings 35 and provided with yieldable tread elements 37 to assist in easy and quiet operation thereof. Equivalent arrangements may be employed to limit the board 4 to the exact movement desired and free from appreciable movement in any other direction.

The shaft or spindle 14 extends through, and beyond each end of, the hollow cross arm 32, as well as through openings in the upstanding portions 30, if desired, and carries the sprocket-wheels 12 in fixed relation thereto adjacent to each end thereof, as by pins or keys 19. Roller bearings 21, held in position by sleeves 23, secured to the shaft 14, operate between the shaft 14 and the brace 32 to render easier the rotation of the shaft. The flexible elements or chains 10, concealed in the diagonal channel arms 24 and upright members 22, are connected between the elements 8, under the drawing board 4, and weight members 15, in the upright members 22, and are adapted to ride over the sprocket-wheels 12.

In the device of the co-pending application above mentioned, there are no elements corresponding to the hollow stationary cross arm 32 and the rotatable shaft or spindle 14 herein. In their stead, there is but a single cross element, in the form of a rod, tube, or bar which acts as a brace in the frame 6 but upon which pulley wheels, corresponding to the sprocket-wheels 12 herein, are loosely mounted. This construction, by permitting independence of movement between the pulleys, renders it necessary to engage the drawing board adjacent to its central portion to readily move it along the diagonal guides. Force applied adjacent to the ends of the drawing board causes a binding action and thereby offers a much greater resistance to movement.

In the present structure, since the sprocket-wheels are fixed to the same shaft, a slight force applied at any position on the drawing board, permits the board to be readily moved. This feature is a great convenience to the operator, who thereby may move the board by touching it at any position.

The weight members 15 are preferably of rectangular cross sectional area closely conforming to the rectangular tubes 20 and 22 in which they

are disposed; this feature providing probably the most economical structure for preventing torsional twist of the chains 10 and having a contour in accordance with, and most generally appropriate to, the design of modern furniture. Elements 17, preferably of yieldable material, such as rubber, lead or micarta, may be provided on the weight members 15 in the form of sleeves, or otherwise, to render the movement thereof in the tubes 22 silent. Springs 19 adjacent to the bottom of the tubes, or rectangular columns enclosing the weight members, may be employed as shock absorbers for the weight members at the lowermost positions thereof.

In operation, the operator sits in front of the structure to employ the same either as a drawing or artist's board or as a table or desk. When in use as the latter, the drawing board 4 is in an upper position entirely clear of the table, as shown in Figs. 3 and 4, so as not to interfere with the full free use of the latter; the operator being able to lean forward on the table or to freely reach over and about it, without interference from the drawing board.

When it is desired to employ the drawing board, the latter may be pulled downwardly by a slight touch of the hand applied at any part of the board, to the position illustrated in Figs. 1 and 2, it not being necessary to grasp it strongly or to apply the force at any particular place. In the latter position of the drawing board, the operator may sit in comfort in an ordinary chair and work with facility and substantially minimum effort over the major portion of the area of the board.

By such construction and operation, the invention affords much convenience, comfort and facility of manipulation to the operators who may so readily convert the structure from one to the other of its forms as to encourage faster and better work, and to render the manipulation of the structure a pleasure rather than a task. The conversion being an extremely easy and rapid operation, encourages recourse to it at the slightest desire, neither form being such that there is any reluctance toward effecting the change.

The angle of slope of the board 4 is chosen to provide comfort and efficiency, as well as to permit the use of pens, brushes and the like and to preclude undue running of any ordinary light liquid layer applied to the drawing paper or other medium employed.

A usual ledge 38 is provided preferably at, or adjacent to, the lower edge of the board 4 as a repository for pencils, erasers, pens, brushes, triangles and the like, and may be used as a straight-edge or guide for the triangles and other drawing implements.

The weight of the members 18 is chosen to balance the board 4, plus the usual drawing machine and other objects thereon, within close limits; the slight friction of the working parts permitting some latitude in this respect, so that, the movement is effected quietly, easily, quickly and effectively, irrespective of the ordinary slight variations in load.

The construction permits the parts to be accurately fitted and balanced within very close limits without undue manufacturing effort, such as delicate machining, is very economical to manufacture, and effective in its operation, and provides advantages in the way of comfort, ease of manipulation, improved quality of work and other features not known by me to be even closely approached in any other device for similar work.

I claim as my invention:

1. In combination, a desk or table having a working top surface, a drawing board support attached to said desk or table including a guide, a drawing board mounted on said support and adapted to be adjustably moved on said guide relative to said desk or table top from a position adjacent to said top to a position spaced sufficiently therefrom to permit working on said desk, means for preventing binding of the board relative to said guide, and means for maintaining said board in adjusted position.

2. In combination, a desk or table having a working top surface, a drawing board support attached to said desk or table, a drawing board mounted on said support for adjustable movement relative to said desk or table top from a position adjacent to said top to a position spaced sufficiently therefrom to permit working on said desk, and means including a counterbalancing device for maintaining said board in adjusted position, said counterbalancing device including a plurality of spaced flexible elements each connected to the board, relatively fixed rotatable members on which said flexible elements move and weight means for said flexible elements.

3. In combination, a desk or table having a working top surface, a drawing board support attached to said desk or table including a hollow portion, a drawing board mounted on said support for adjustable movement relative to said desk or table top from a position adjacent to said top to a position spaced sufficiently therefrom to permit working on said desk, and means including a counterbalancing device for maintaining said board in adjusted position, said counterbalancing device including a weight member enclosed by said hollow portion.

4. In combination, a desk or table having a working top surface, members constituted both as supports for a drawing board and as supports for the table, a drawing board mounted on said supports for adjustable movement relative to said desk or table top from a position adjacent to said top to a position spaced sufficiently therefrom to permit working on said desk, and means for maintaining said board in adjusted position.

5. In combination, a desk or table having a working top surface, hollow members constituted both as supports for a drawing board and as supports for the table, a drawing board mounted on said supports for adjustable movement relative to said desk or table top from a position adjacent to said top to a position spaced sufficiently therefrom to permit working on said desk, and means including a counterbalancing device for maintaining said board in adjusted position, said counterbalancing means including weight members having portions in said hollow members.

6. In combination, a desk or table having a working top surface, a drawing-board supporting element attached to said table, a drawing-board element mounted on said supporting element for adjustable movement relative to said desk or table top from a position adjacent to said top to a position spaced sufficiently therefrom to permit working on said desk, a plurality of sets of spaced parallel guide tracks on one of said elements, a plurality of single wheel carriages on the other of said elements each including wheels engaging both of the tracks of one of said sets, each wheel engaging only one of the tracks of its set, and means for maintaining said board in adjusted position.

7. In combination, a desk or table having a

working top surface and hollow upright rear legs extending above said surface, a shaft supported by said legs laterally thereto above said surface, rotatable elements fixed relative to the shaft, a drawing board movable in a plane subtending the angle between said surface and said legs between a position adjacent to said top and a position spaced sufficiently therefrom to permit working on said desk, means cooperating with said legs for supporting the drawing board in said plane, flexible elements extending from said drawing board over said rotatable elements and downwardly into said legs, and weight means secured to said flexible elements below said rotatable elements.

8. In combination, a desk or table having a working top surface and tubular upright rear legs extending above said surface, a tubular brace extending between said legs above said surface, a shaft in said brace, rotatable elements fixed relative to the shaft adjacent to said legs, beams extending diagonally downward from positions on said legs adjacent to said shaft to positions adjacent to the forward edge of said top, a drawing board mounted on said beams for movement from a position below said top to a position spaced sufficiently above said top to permit working on said desk, weight members in said legs, and flexible elements extending from said drawing board over said rotatable elements and downwardly into said legs to said weight members.

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