

Sept. 5, 1961

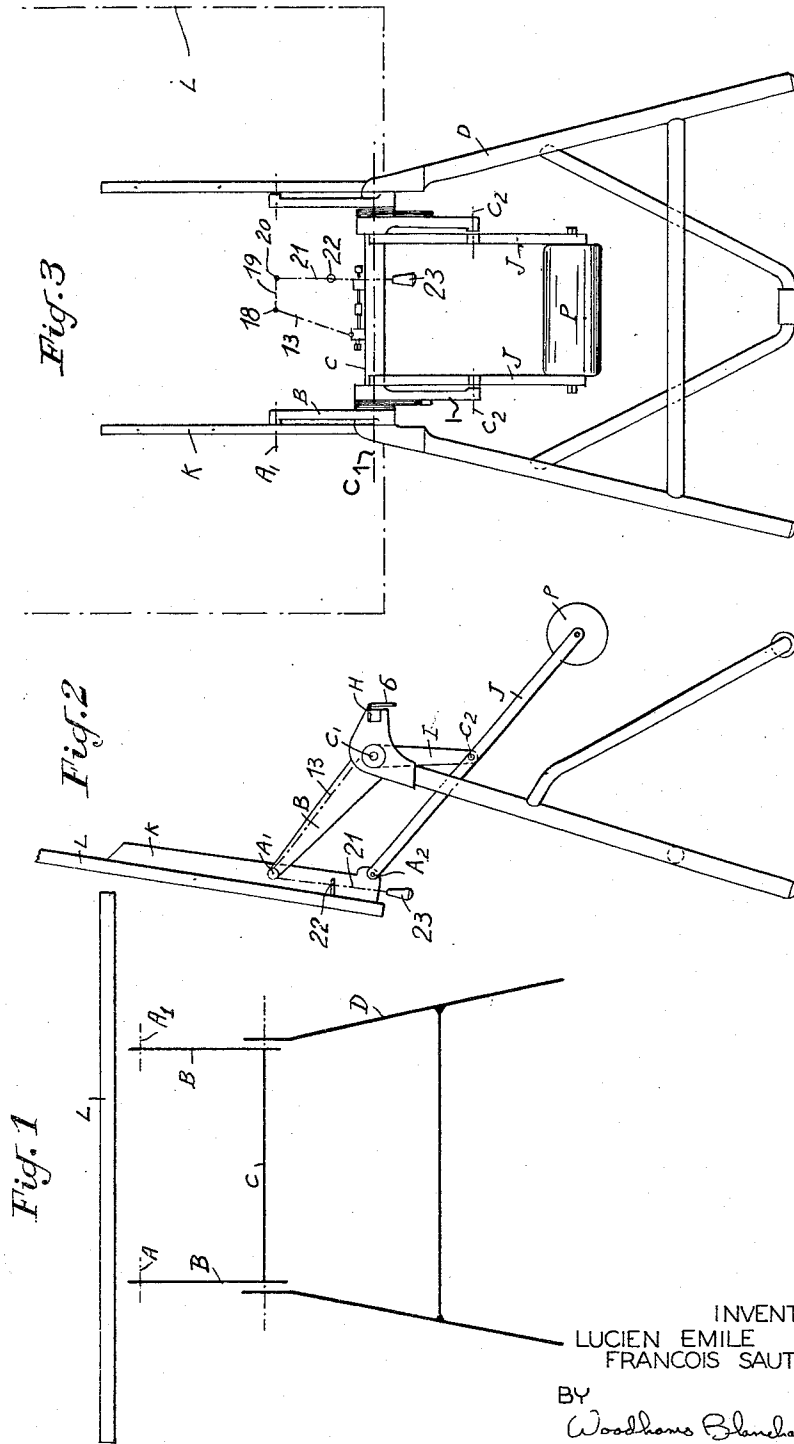
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2,998,672

DRAWING TABLE

Filed Sept. 24, 1959

6 Sheets-Sheet 1



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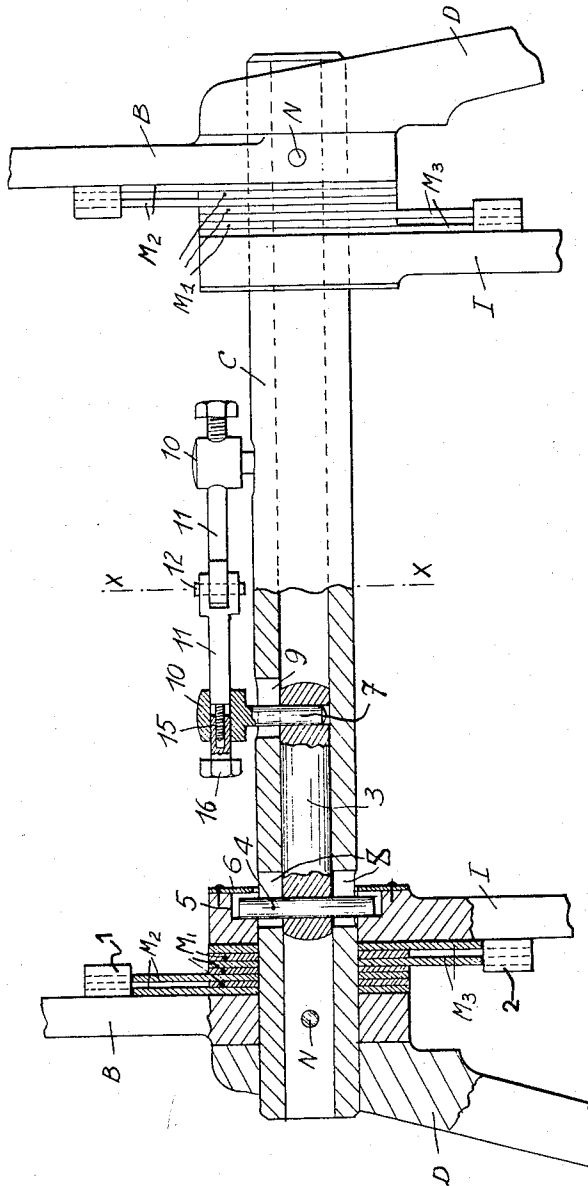
2,998,672

DRAWING TABLE

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Fig. 4



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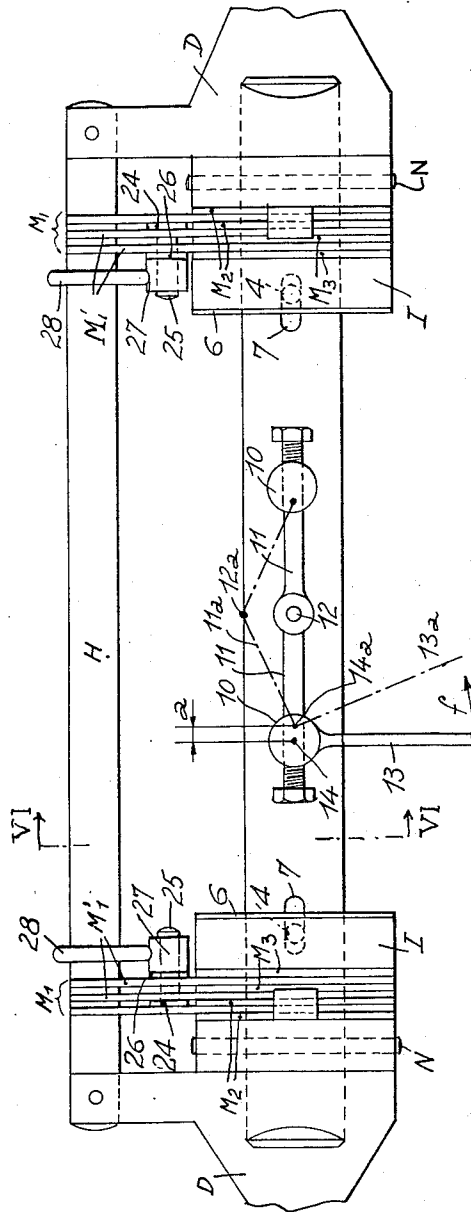
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DRAWING TABLE

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Fig. 5



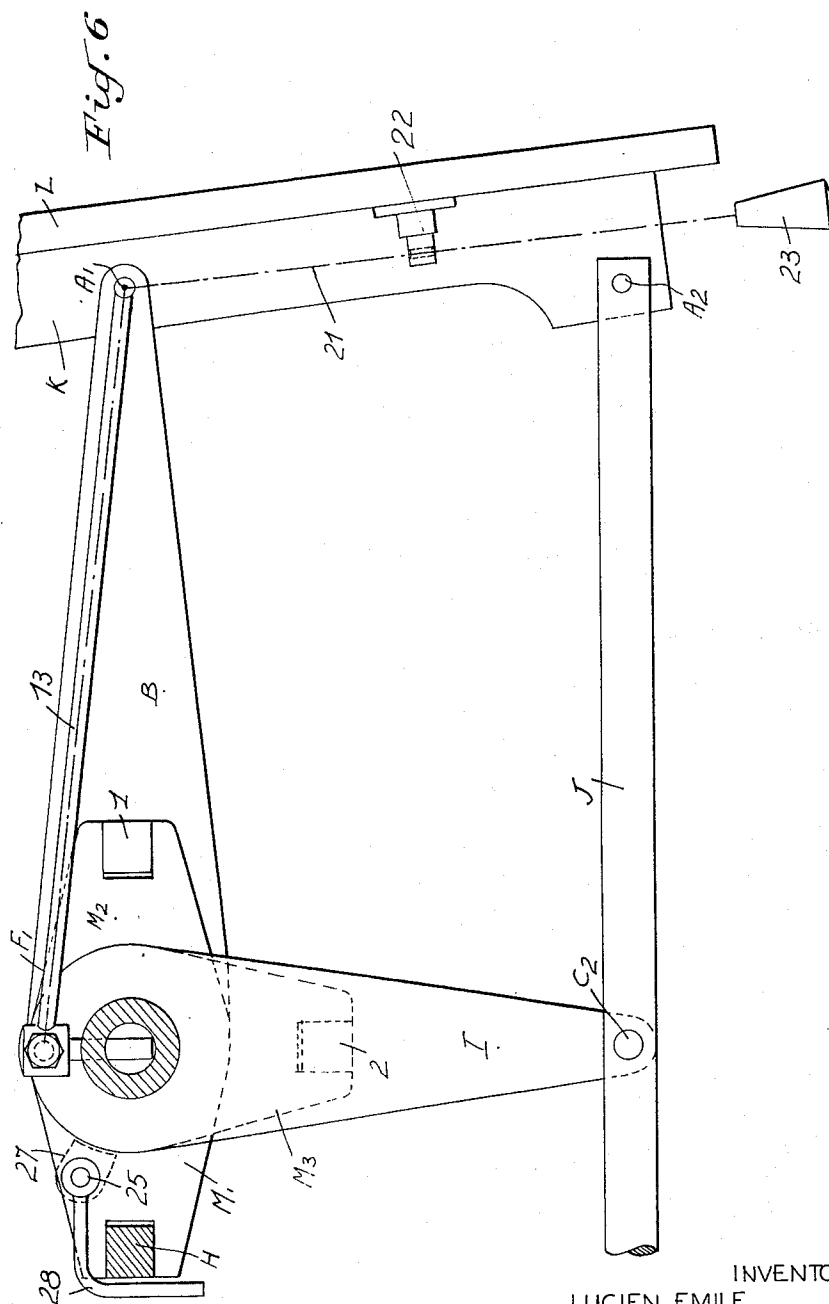
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DRAWING TABLE

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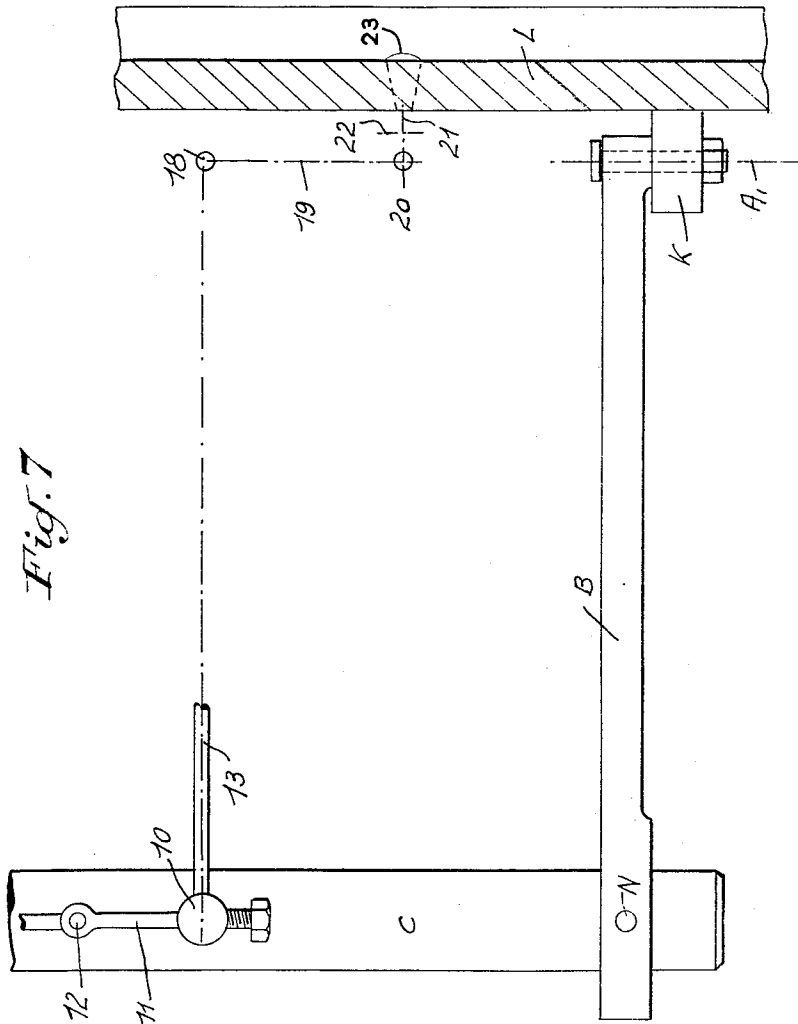
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DRAWING TABLE

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DRAWING TABLE

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FIG. 8

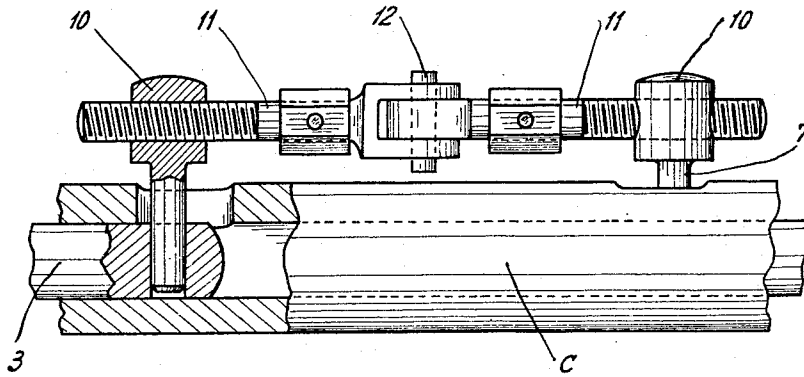
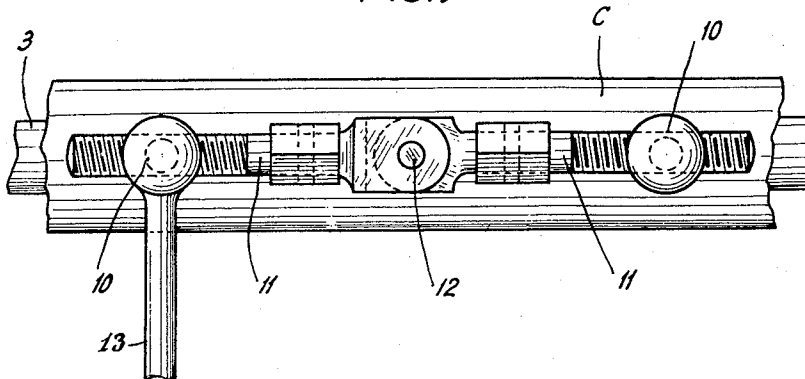


FIG. 9



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DRAWING TABLE

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10 Claims. (Cl. 45—131)

The locking systems of modern drawing tables of the articulated parallelogram type are in most cases effected by means of friction discs which are pressed one against the other. In order to do this however, the action is generally effected by deformation of the uprights of the table, unless it is by deformation of the parallelogram which couples the board directly to the feet.

In both cases, the result is a kind of elastic bond between the board proper and the ground, which deprives the table of the essential lateral rigidity for the correct use of drawing tables.

The table forming the object of the present invention provides a complete remedy for this serious drawback.

One form of embodiment of the table according to the invention is shown by way of example in the accompanying drawings, in which:

FIG. 1 is a diagrammatic view showing the table in elevation, the board being horizontal.

FIG. 2 is a side view showing the table in the working position.

FIG. 3 is a corresponding view in elevation.

FIGS. 4 and 5 are views to a larger scale of a portion of the table, in elevation with partial cross-section, and in plan respectively.

FIG. 6 is a cross-section taken along the line VI—VI of FIG. 5, the arm B being in the horizontal position.

FIG. 7 is a plan view corresponding to FIG. 6.

FIGS. 8 and 9 show respectively in elevation and in plan a regulating device for the locking of the table.

Referring first of all to FIG. 1, the table is composed of a drawing-board L articulated at A to the arms B which are similar to two parallelograms. These arms are rigidly fixed to each other by a shaft C on which they are pinned at N (FIGS. 4 and 5). This perfectly rigid assembly rests on the ground by the intermediary of a foot system D which is also indeformable, the uprights of which also are not subjected to any deformation, as will be seen from the description of the locking system, without deformation of the arms B or of the feet D, which forms the main object of the invention.

This locking is obtained by clamping together juxtaposed friction plates which are free for rotation on the shaft C and are alternately rigidly fixed to one of the arms B and I of the parallelogram, against plates rigidly fixed to the feet D.

As can be seen from FIGS. 2 and 3, the arms B and I, which are movable in rotation about the axis C₁ of the shaft C, are respectively articulated at A₁ to a longitudinal batten K of the board L and at C₂ to an arm J articulated at A₂ to the longitudinal batten K. The arm J carries a counter-weight P intended to balance the moving assembly, the centre of gravity of which is on the axis C₁. The uprights D of the foot system are connected to each other by a cross-member H (FIG. 5) which assists in making it absolutely indeformable. The cross-member H is of rectangular section. On the shaft C are engaged three series of friction plates M₁, M₂ and M₃. In plan view, these plates are provided with extensions (see FIG. 6) in which mortices are formed. The mortices of the plates M₁ engage on the cross-member H so that these plates are prevented from rotating. Between the plates M₁ are interleaved the plates of the group M₂ and then the plates of the group M₃. The plates of the group M₂ are rigidly fixed to the arm B by the engage-

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ment of their mortices with a square 1 carried by the arm B. In the same way, the plates of the group M₃ have their mortices engaged with a square 2 of the arm I. It will be understood that if a pressure is applied on the arms I in the direction of the shaft C and in the direction of its extremities, this pressure is transmitted to the plates which are thus pressed one against the other. The moving plates M₂ and M₃ are rigidly fixed to the plates M₁ which are fixed for rotation, and in consequence the board L may be fixed in any desired position without deformation either of the arms B or of the feet D.

This result is obtained in the following way: the shaft C (see FIG. 4) is hollow. In the bore of this shaft two cylindrical sliders 3 (of which only one is visible) are mounted so as to move in opposite directions on each side of the plane X—X of symmetry of the table, each slider having passing through it a stud 4 which is retained in a housing 5 of the arm I by a small plate 6. Each slider 3 receives its longitudinal movement through the intermediary of a further stud 7. The movements of the studs 4 and 7 in the shaft C are permitted by means of elongated slots 8 and 9 formed in the shaft C.

The clamping of the plates is effected by the displacement of the sliders 3 in the direction of the extremities of the shaft C. By this displacement, the studs 4 are pressed against the arm I.

In order to produce these displacements of the sliders 3, pivots are pivotally mounted in the sliders and carry a head 10 in which is fixed a lever 11. The two levers 11 are articulated one on the other about a shaft 12. On one of the heads 10 is fixed a lever arm 13 (FIG. 5) at right angles to the lever 11. These levers are shown in the locking position. In the release position, they move respectively to 13a and 11a by a movement of the lever 13 in the direction of the arrow f. This movement has displaced the axis 14 of the pivot by the distance a, the pivot having moved to 14a. In order to obtain the maximum clamping effect and the irreversibility of the said effect, it is important that in the locking position the axes of the two arms 11 and the shaft 12 are in the same plane.

A precise adjustment in order to ensure a suitable locking pressure is obtained by the following means: the extremity of the arm 11 which is engaged in the head 10 is extended by a threaded portion 15 (FIG. 4) on which is screwed the rod 16 of a bolt which is screwed into the head 10 of the stud 7. The pitches of the two threads are different, so that by rotation of the bolt 16 a differential movement is obtained which enables the length of the arms 11 to be regulated with all the precision desired. A further means of accurate adjustment of the locking pressure is that shown in FIGS. 8 and 9 in which the levers 11 are shown in the locking position, the two levers in line.

In this construction, the two levers 11 which are pivoted to each other at 12, are threaded and screwed into the heads 10 which form a nut. The two threads are of the same direction but have slightly different pitches, one of 1.5 mm. for example and the other of 2 mm. The result is that if in the locking position the clamping is inadequate to ensure the stability of the drawing board, a rotation of half a turn of the assembly of the two levers 11 on themselves in the suitable direction will cause the two studs 7 to move away from each other by one half the difference between the two pitches, namely 0.25 mm. By proceeding, if so desired, by successive half rotations, that is to say at each time, in the example considered, by an advance of 0.25 mm., it will become easy to ensure the clamping of the plates with a suitable accuracy, while replacing the shaft 12 in the position parallel to the axes of the studs 7, which permits of the operation of the arm 13, the rotation of which ensures the locking or conversely the release of the board.

The movements of the lever 13 are controlled from a distance, at a position readily accessible to the draughtsman, for example in the vicinity of the lower edge of the table, irrespective of the position of the table. This control is effected by a set of levers which can be seen in FIGS. 2, 3 and 7, in which these levers are shown diagrammatically in broken lines. Only the parts necessary to make the mechanism clearly understood have been shown. The lever 13 is pivoted with a swivel joint at one extremity 18 of a crank 19, the other extremity 20 of which is also pivoted with a swivel to a lever 21 which can oscillate about a shaft 22 and which is provided with an operating handle 23. The shaft 22 fixed to the board L (FIGS. 2 and 3) is perpendicular to the board so that the lever 21 oscillates in a plane parallel to that of the board. The rod 19 is arranged so as to be in the line of extension of the axis A, so that it moves substantially in a plane parallel to the board and actuates the lever 13 at 18 approximately at right angles to the latter, that is to say in the most rational conditions.

When a suitable inclination has been given to the board, it is an advantage to be able to move the latter by circular lateral movement about the shaft C, that is to say by locking only the arms I of the parallelograms.

This result is obtained in a very simple manner, as follows. A part M₁' of the fixed plates M₁—that which is interleaved in the plates M₃ rigidly fixed to the arm I—is the only part which is pressed against the latter, the lever 13 remaining in the release position. This device is obtained by separating the plates M₁' and M₃ from the others by a small plate 24 (FIGS. 5 and 6) to which is welded a threaded rod 25 which passes through them, and on which is engaged a washer 26 and a nut 27 provided with a clamping lever 28. By acting on this lever, the plates M₁' and M₃ are locked together, which renders the arm I fixed while leaving the arm B free to rotate.

In addition to the advantages indicated above, it is necessary also to note the following advantages obtained by the invention as compared with the known clamping devices with friction plates. In these devices, the friction plates are respectively made fast to the parallelogram and to the frame by means of studs which pass through them and which are fixed respectively to the parallelogram and to the frame. In spite of care taken during manufacture, it is not possible to ensure an absolutely accurate distance between the axis of rotation of the arm of the parallelogram on which the plates are engaged and the axes of the studs. In fact therefore, the latter only bear along one generator line of the bore of the discs, which results in a rapid wear of the latter and an undesirable play. By means of the engagement by mortice on flat surfaces carried by the members to be fixed, a sure contact of the discs is obtained, with a square for example, not just along a line but along a plane; in addition, the construction in the workshop requires much less precision. Furthermore, by virtue of the large supporting surface given to each plate, the latter can be much thinner and their number can consequently be increased, together with the clamping pressure proportional to the total surface of contact. With a very small force applied to the operating lever, there is obtained an absolutely perfect locking action.

What I claim is:

1. A drawing table of the type having deformable parallelograms of which two parallel arms are articulated to the drawing board, and comprising a shaft on which are mounted two of the adjacent arms of each said parallelogram, said shaft being rotatably mounted in bearings on the foot system, one of said adjacent arms being rigidly fixed to said shaft and the other freely mounted on said shaft, on which are provided between the two said arms three sets of friction plates, axially free with respect to said shaft, the first set, being fixed

to said foot system and the other two sets are respectively fixed to the two said arms, the plates of the last two sets being interleaved one by one between the plates of the first set, so that a pressure applied on said freely-mounted arm in the direction of the nearest foot presses said plates against each other and the last plate against the arm rigidly fixed to said shaft, thereby immobilizing the plates secured to the two said arms by frictionally engaging same with said first set of plates which are stationary and thereby holding the drawing board in any selected position.

2. A drawing table according to claim 1, in which said shaft carrying two adjacent arms of a parallelogram is tubular, and further comprises at each of its extremities, a slider movable inside said shaft and a transverse stud fast with said slider, the extremities of each stud passing through longitudinal slots in said shaft, whereby a pressure on the slider in the direction of the nearest parallelogram is transmitted to said freely-mounted arm and from said arm to the friction plates thus immobilizing the drawing board.

3. A drawing table according to claim 2, and further comprising a pivot mounted transversely on each of said sliders, said pivot passing through a longitudinal slot in said tubular shaft and carrying a perpendicular lever composed of two levers articulated one with the other about an axis parallel to said pivots, whereby a pivotal movement given to one of said pivots in one direction causes each of said sliders to move towards the corresponding freely-mounted arm.

4. In a drawing table according to claim 3, a device for ensuring the pivotal action of one of said pivots, comprising a lever fast with said pivots, said lever being coupled by a suitably articulated rod to an operating lever located under the table and parallel to said table, pivoted on a shaft perpendicular to the table, and having an operating handle which extends beyond the lower edge of said table.

5. In a drawing table according to claim 3, a precision adjustment device for the length of at least one of said levers, in which the two levers are provided, each at one of its extremities, with a threaded portion which screws into the head of the corresponding pivot, the two threads having the same direction but slightly different pitches.

6. In a drawing table according to claim 3, a precision adjustment device for the length of at least one of said levers, in which the extremity of said lever is slidably mounted in the head of said pivot, the latter being provided with a thread on which is screwed a nut, which is screwed in turn into the said head forming a nut, the two threads having a differential pitch.

7. A drawing table according to claim 1, in which the plates of the three said sets of plates have the shape of annular discs in which said transverse shaft is freely engaged, and are provided in their plane with an extension in which is formed a rectangular mortice adapted to come into engagement with a boss of corresponding rectangular section carried by the member of said table with which said plates are respectively associated.

8. In a drawing table according to claim 1, a device for ensuring the movement of said table parallel to itself after it has been given a suitable inclination, comprising independent clamping means provided so as to press one against the other, only the set of plates which is fast to said free arm and the partial set of plates fast with said foot system, which are interleaved with the preceding plates.

9. A device according to claim 8, comprising a bolt which passes through said plates, and on which is screwed a nut provided with a clamping lever.

10. A drawing table comprising: a drawing board; a support frame having a pair of spaced uprights; a shaft extending between and rotatably supported by said uprights; a pair of parallelogram linkages each com-

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prising first and second parallel arms pivotally connected at one end thereof to said drawing board and a third arm pivotally connected at one end thereof to said second arm, the other end of said first arm being fixed to said shaft and the other end of said third arm being pivotally mounted on said shaft; three sets of friction members mounted on said shaft for axial movement therealong; means nonrotatably securing one set of friction members to said first arm, the second set to said third arm and the third set to said uprights, the members of said first and second sets being interleaved with the members of

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said third set; and means movable axially with respect to said shaft and independently with respect to said uprights and said second and third arms for pressing said friction members together to thereby secure said shaft and said first and third arms in fixed position with respect to said uprights.

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