Sept. 6, 1938. M. K. VON ZIMMERMANN 2,129,457

DRAWING BOARD

Filed Sept. 26, 1935 4 Sheets-Sheet 1

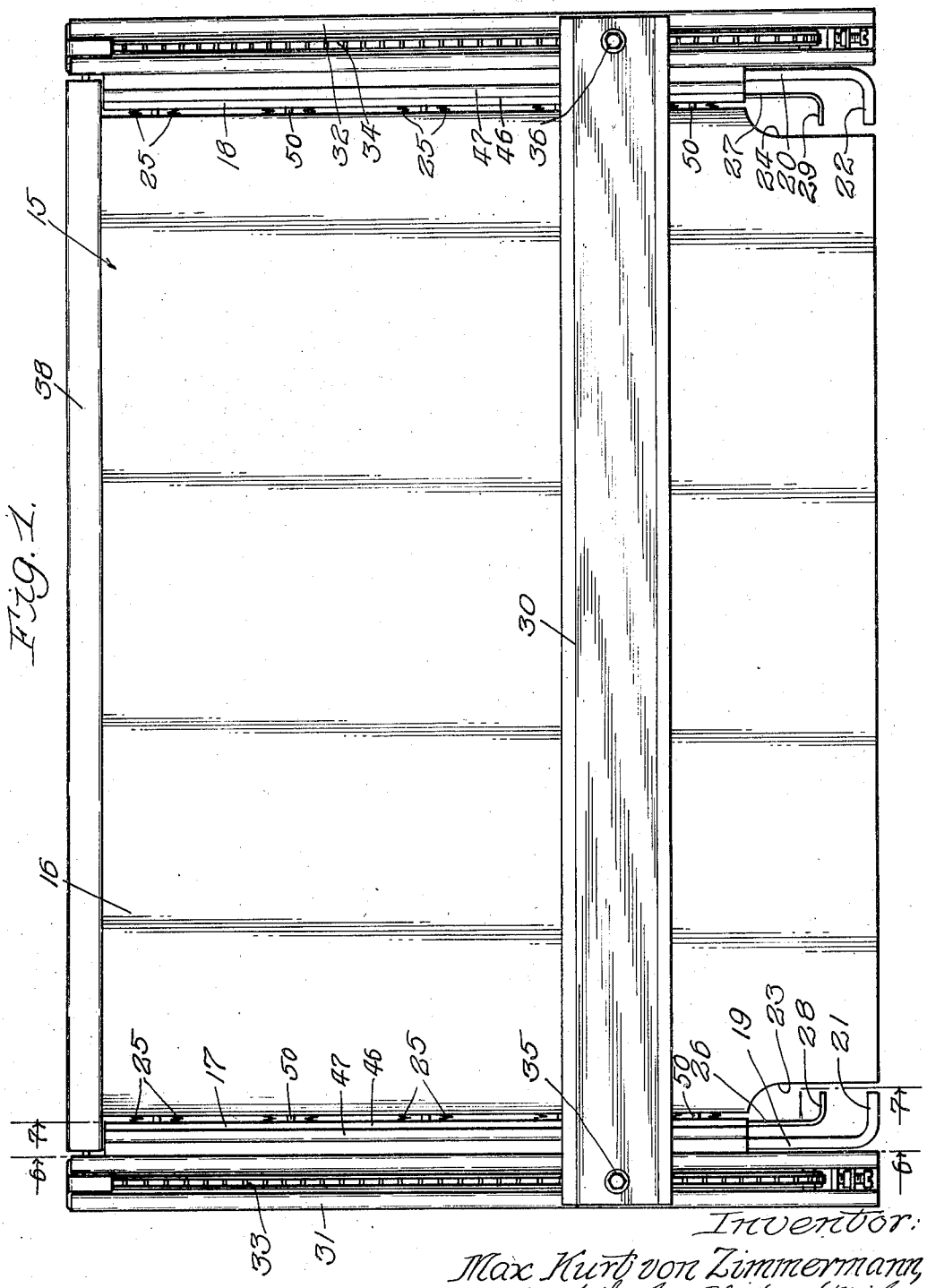

Fig. 1.

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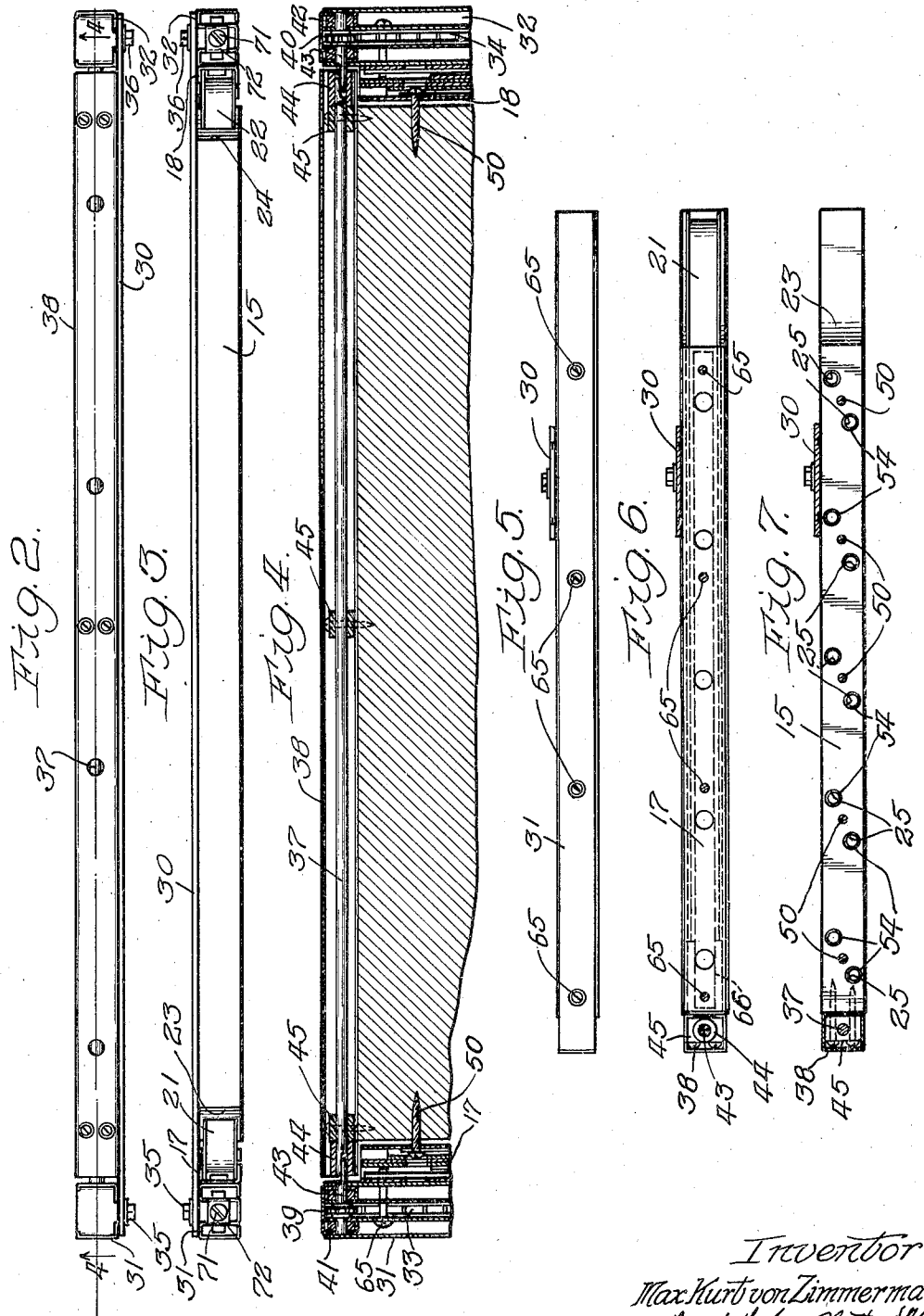

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DRAWING BOARD

Filed Sept. 26, 1935 4 Sheets-Sheet 3

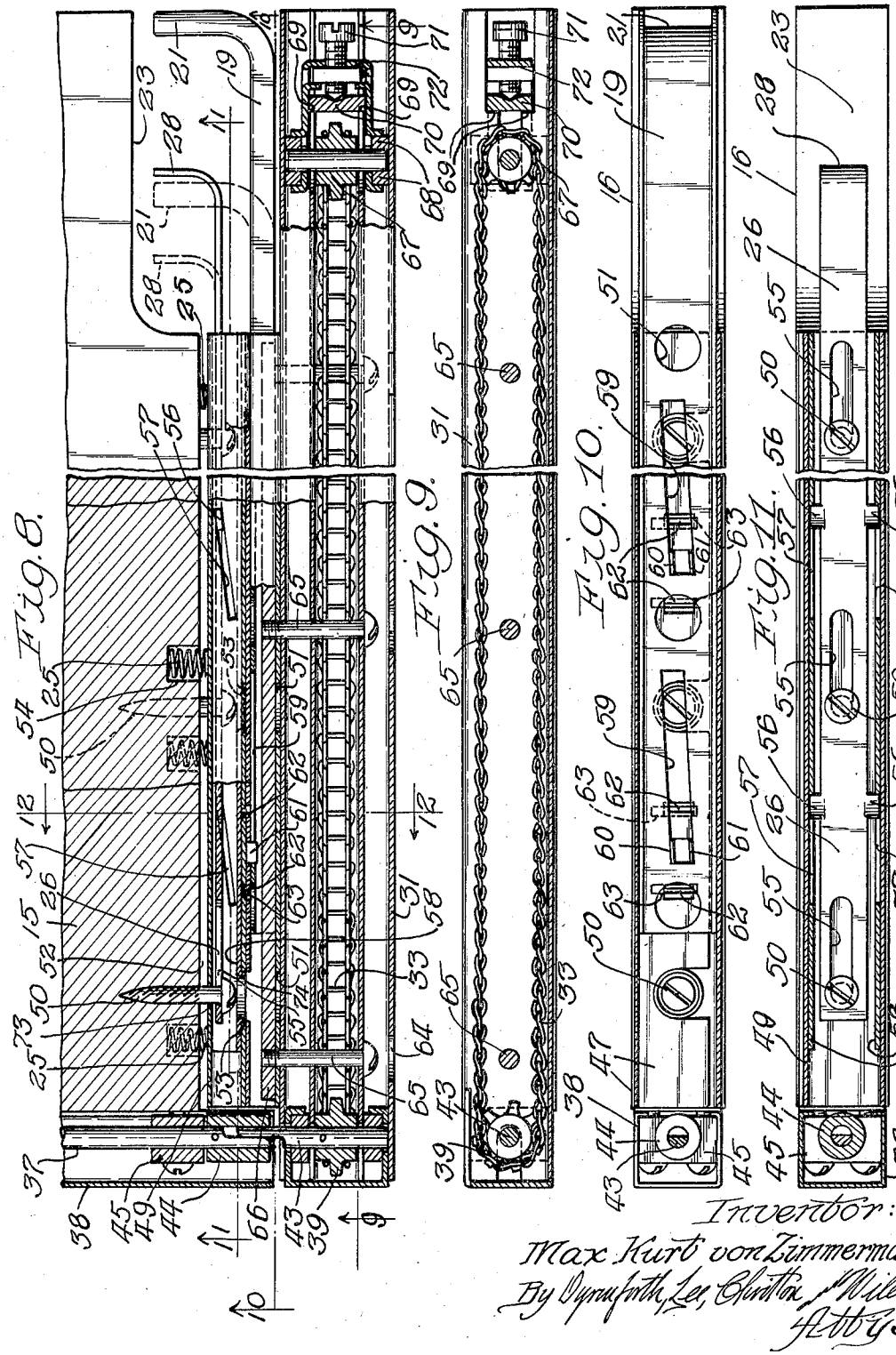

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

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DRAWING BOARD

Filed Sept. 26, 1935 4 Sheets-Sheet 4

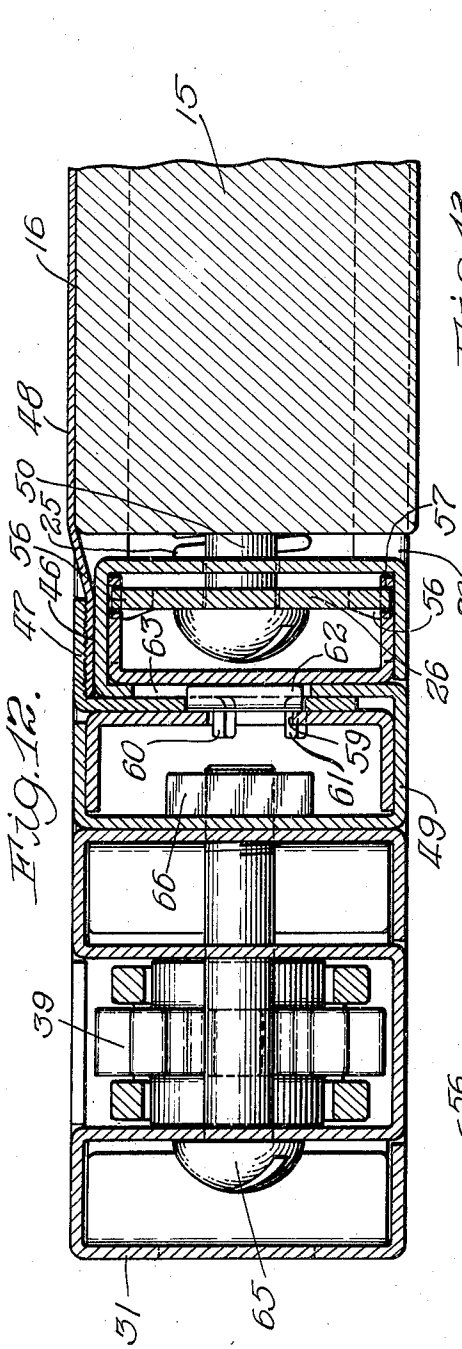

Fig. 12.

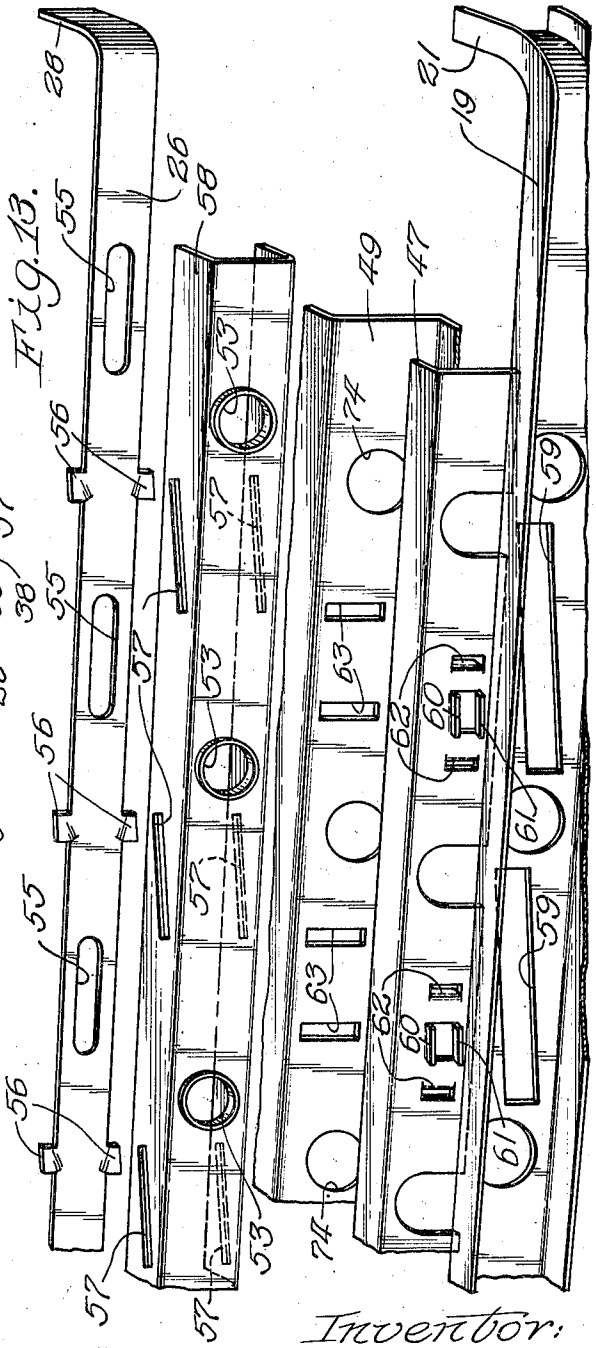

Fig. 13.

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UNITED STATES PATENT OFFICE

2,129,457

DRAWING BOARD

Max Kurt von Zimmermann, Elkhart, Ind.

Application September 26, 1935, Serial No. 42,338

4 Claims. (Cl. 45—131)

This invention relates to a drawing board, and more particularly to a drawing board having means for clamping and stretching the paper thereon.

One feature of this invention is that it provides means for clamping the edge of a sheet of drawing paper throughout substantially its entire length; another feature of this invention is that the clamping means are below the drawing surface thus presenting no obstruction to free movement of a triangle, protractor or other tool over the whole drawing surface; still another feature of this invention is that the clamping means is positively operable; still another feature of this invention is that the clamping means may be moved outward slightly from the drawing surface in order to stretch the paper; yet another feature of this invention is that a permanently aligned parallel straight-edge is attached to the board; other features and advantages of this invention will be apparent from the following specification and the drawings, in which—

Fig. 1 is a top plan view of the board; Fig. 2 is a vertical elevation of the top of the board; Fig. 3 is an elevation of the bottom of the board; Fig. 4 is a sectional view along the line 4—4 of Fig. 2; Fig. 5 is an end view of the board; Fig. 6 is a view along the line 6—6 of Fig. 1; Fig. 7 is a view along the line 7—7 of Fig. 1; Fig. 8 is a horizontal sectional view of one end of the board; Fig. 9 is a view along the line 9—9 of Fig. 8; Fig. 10 is a view along the line 10—10 of Fig. 8; Fig. 11 is a view along the line 11—11 of Fig. 8; Fig. 12 is a sectional view along the line 12—12 of Fig. 8; and Fig. 13 is an exploded view of the slides and associated parts.

Applicant has developed a drawing board which firmly clamps the paper throughout its length along two opposite edges, slightly below the drawing surface, and then moves the clamping members outward in order to stretch the paper and keep it taut on the drawing surface of the board. The clamping and stretching means are provided with manually operable slides, but the stretching means is spring pressed so that the paper cannot be torn through the application of too strong a pull. The board is also provided with a parallel straight-edge, which straight-edge is so mounted as to be movable across the surface of the board and yet be maintained in proper alignment.

Referring more particularly to the drawings, the reference numeral 15 indicates the drawing board in general. The board has a drawing surface 16, and immediately adjacent the edges thereof clamping means 17 and 18, which means are operated by the slides 19 and 20, which slides are here shown as terminating in finger grips 21 and 22 located in recesses 23 and 24 in the board 15. Springs 25 are inserted between the drawing board 15 and the clamping means 17 and 18, respectively, and the stretching action of these springs is controlled by slides 26 and 27 having finger grips 28 and 29, these last mentioned finger grips lying further within the recesses 23 and 24, as is illustrated in Fig. 1. A straight-edge 30 is movably carried by straight-edge supporting means 31 and 32 attached to the clamping and stretching means 17 and 18. The straight-edge 30 is attached to the chains 33 and 34 by any convenient means, as by the bolts 35 and 36. These chains are carried by sprockets in the straight-edge supporting means, and are connected by the transverse shaft 37 located in the housing 38 at the top of the board.

The connecting means between the chains 33 and 34, as particularly illustrated in Fig. 4, serves to insure a corresponding motion in the chains whenever the straight-edge is moved up and down the drawing surface of the board. It will be noted that the chains 33 and 34 are carried at their upper ends by sprocket wheels 39 and 40, which wheels are journalled in bearings 41 and 42. Inasmuch as the construction on opposite ends of the connecting shaft 37 is similar, only that at one end will be described in detail. The sprocket 39 is rigidly attached to a stub shaft 43, which shaft is non-rotatably slidably splined, at its inner end, to the assembly of sleeve 44 and connecting shaft 37. The shaft 37 is journalled at this end in the bearing 45, and is restrained from lengthwise movement by the cooperation of this bearing with the sleeve 44, and the similar assembly on the other end of the shaft, since the inner faces of the sleeve 44 act as thrust bearings. This construction enables the straight-edge supporting member 31 to be moved outwardly from the board a short distance during stretching of the paper without in any way disturbing the operative connection between the chains 33 and 34 through the shaft 37. It is to be understood that at least one end of the straight-edge 30 is slottedly mounted over a sleeve on one of the bolts 35 or 36, attaching the straight-edge to the chains, so that small movements necessary to stretch the paper will not be restrained by the straight-edge.

Referring more particularly to Fig. 12, it will be noted that the board 15 has immediately adjacent the edge thereof and slightly below the drawing surface 16 a lower clamping member or clamping surface 46 on the frame 49 and a second

clamping member or jaw 47, these two clamping members being adapted to grippingly retain the edge of a sheet of drawing paper 48.

The construction and operation of the clamping and stretching means will be more readily understood from a description in connection with Fig. 8. The frame 49 is attached to the board 15 by screws 50 threaded therein. The screws 50 are inserted through the openings 51, 53, 55 and 73 and are not driven in tight against the board, a space 52 being left between the frame 49 and the edge of the board 15. Yielding thrust members, here illustrated as coil springs 25, are mounted in recesses 54 in the board 15. As will be noted from Fig. 7, these springs are mounted immediately adjacent the screws 50, but in staggered relation thereto. This staggered relation, wherein some of the springs press against the frame 49 above the level of the screws 50 and some press against the frame below that level, serves to keep the frame and clamping means in proper alignment with the board, and to prevent them from twisting under the strain of stretching the paper. Positive means for keeping the clamping means in proper alignment with the board can be provided by adding guide pins to the frame of the clamping means and corresponding guide holes in the board, or by other convenient means. This construction, wherein the paper is stretched over the drawing surface by spring pressure rather than by positive means, has several advantages. Shrinkage or swelling of the paper due to changes in temperature or humidity of the surrounding atmosphere is automatically compensated for by movement in and out of the clamping means, for example, against the outward thrust of the springs. The usual holding means, such as thumbtacks, staples, Scotch tape, and the like, are open to objection in this regard in that atmospheric changes either cause the paper to buckle or to tear.

The heads of the screws 50 engage the slide 26, the screws themselves passing through slots 55 in said slide. The slide 26 is provided with ears 56, which ears are adapted to extend into slots 57 in a channel bar 58 inside of and anchored to the frame 49. The channel bar 58 is a snug fit within the frame 49, and is anchored in place and prevented from lengthwise movement by having ears or tabs 74 punched outwardly through the holes 53 in the center vertical wall of the frame 49, which holes also serve to clear the heads of the screws 50 when they are removed. Referring to Fig. 8, the method of anchoring the channel bar may be clearly seen in connection with the opening 53 back of the head of the screw farthest to the left in the view. The slots and ears are inclined at a convenient angle, here shown as about seven degrees, which slots are so arranged that pushing the finger grip 28 into the position shown in dotted lines in Fig. 8, through the engagement of the slide 26 with the heads of the screws 50, causes the entire frame 49 and clamping means 17 to move inwardly to a position substantially in contact with the edge of the board 15. When the slide is pulled out until the finger grip 28 is in the position illustrated in Fig. 8, the slide 26 moves away from the heads of the screws 50 and enables the springs 25 to force the clamping means 17 away from the board and thus to stretch the sheet of paper 48, shown in Fig. 12.

The clamping means, comprising the clamping member 47 and the clamping surface 46 of the frame 49, is operated by the slide 19 and finger grip 21. The slide 19 has therein angularly disposed slots 59. These slots 59 extend longitudinally of the slide, but are inclined at some slight convenient angle, here shown as about three degrees. The vertical portion of the clamping member 47 has projections 60 and 61 cooperating with each of the edges of each of the slots 59. Inasmuch as the clamping member 47 is free to move vertically, but is restrained from horizontal motion through the projections 62 extending into vertical slots 63 in a vertical portion of the frame 49 immediately adjacent the vertical portion of the clamping member 47, longitudinal movement of the slide 19 results, through the action of the slot 59 on the projections 60 and 61, in positive upward or downward movement of the clamping member or jaw. When the finger grip 21 on the slide 19 is in the position illustrated in dotted lines in Fig. 8, the clamping member 47 is raised a short distance above the clamping surface 46 of frame 49. When the slide 19 is pulled out until the finger grip 21 is in the position illustrated in Fig. 8, however, the upper clamping member or jaw 47 is brought down into positive clamping engagement with the surface 46. The clamping surface 46 is preferably corrugated to give a better grip on the sheet of paper 48. When the clamping means is in clamped position, as illustrated in Fig. 12, for example, the top of the clamping member or jaw 47 is slightly below the level of the drawing surface 16 on which the paper lies. This permits unobstructed movement of a triangle or other drawing tool when working near the edge of the paper.

The straight-edge supporting member 31 is attached to the outer portion of the frame 49 of the clamping and stretching means. Referring more particularly to Fig. 8, it will be seen that the means 31 has openings 64 therein through which screws 65 are inserted and threaded into a retaining bar 66 lying within the frame 49. The straight-edge supporting means 31 is thus readily removable from the board, since removal of the screws 65 enables the supporting means 31 to be taken off, the slidably splined stubbed shaft 43 slipping out of the collar or connecting link 44. The lower chain sprocket 67 is journalled in a slidable bearing 68, in order to take up any slack which may occur in the chain 33. The straight-edge supporting means or frame 31 is provided with shoulders 69 against which rest a plate 70. An adjustment screw 71 is threaded into a square nut anchored to the extension 72 of the bearing 68, and is adapted to abut the plate 70. Rotation of the screw 71 thus serves to move the idler sprocket 67 further from the sprocket 39, and thus any slack occurring in the chain 33 as the result of wear may be taken up in order to keep the straight-edge in proper relation with the drawing surface of the board at all times.

The operation of the board is as follows: The straight-edge is moved downward off the drawing surface. The finger grips 21, 22, 28 and 29 are pushed inwardly, to the positions illustrated in dotted lines in Fig. 8. The clamping member 47 is thereby raised from the clamping surface 46, and the entire clamping means is held immediately adjacent to the edge of the drawing board 15. A sheet of drawing paper 48 is then placed on the board and its opposite ends slipped into the clamping means between the members 46 and 47, for example. The slides 19 and 20 are then pulled outwardly to the positions illustrated in Fig. 1, which brings the clamping members positively

down into engagement with the paper and clamps the paper firmly against the clamping surfaces. The slides **26** and **27** are then pulled out to the positions illustrated in Fig. 1, and the pressure of the springs **25** against the frame **49** then pushes it outwardly until the paper **48** is stretched to a tension equal to that of the springs **25**. The paper is thus stretched smoothly and tightly over the drawing surface, and is ready for the draftsman. It will be noted, with particular reference to Fig. 12, that the bottom of the frame **49** and the straight-edge supporting means **31** are not flush with the bottom of the board **15**, but slightly higher. These parts do not rest on the table or other surface on which the board is placed, but are completely carried by the board at all times. Proper freedom of movement for stretching is thus assured.

The straight-edge **30** may be left at one end of the board, out of the way, or it may be used in drawing. Where desired to move the straight-edge up or down, it is only necessary to grasp either end, since the connecting shaft **37** and the chains **33** and **34** assure equal motion of both ends of the straight-edge **30**. Where it is desired to use the clamping and stretching means only the straight-edge and supporting members **31** and **32**, and the connecting shaft and housing **38** may be removed from the board.

While I have shown and described certain embodiments of my invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be without departing from the spirit and scope of the invention as disclosed in the appended claims, in which it is my intention to claim all novelty inherent in my invention as broadly as permissible, in view of the prior art.

What I claim as new, and desire to secure by Letters Patent, is:

1. A drawing board of the character described, including: a drawing surface; clamping means adjacent said drawing surface, said means including a clamping surface, a slide member, and a vertically movable jaw member adapted to clamp substantially the entire edge of a sheet of paper in contact with said clamping surface; a slot in said slide member, said slot being at an angle to the motion of said slide; and a projection on said jaw member extending into said slot, whereby longitudinal movement of said slide effectuates positive vertical movement of said jaw member.

2. A drawing board of the character described, including: a drawing surface; clamping means adjacent said drawing surface; spring means for moving said clamping means away from said drawing surface, whereby a sheet of paper held in said clamping means is stretched; and manually operable means for holding said clamping means immediately adjacent the edge of said drawing surface, said last mentioned means including a slide having diagonal slots therein adapted to cooperate with members on said clamping means received by said slots.

3. A drawing board of the character described, including: a drawing surface; clamping means adjacent said drawing surface, said clamping means being manually operable by means of a slide; spring means for moving said clamping means away from said drawing surface, whereby a sheet of paper clamped in said means is stretched; and means for holding said clamping means immediately adjacent the edge of said drawing surface, said means including manually operable slide means.

4. A drawing board of the character claimed in claim 3, wherein both of said slides have their tips extending inwardly of said clamping means and within a recess in said board.

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