Feb. 21, 1939. J. M. LANCASTER 2,148,208

FURNITURE CLAMP

Filed Nov. 23, 1937 4 Sheets-Sheet 1

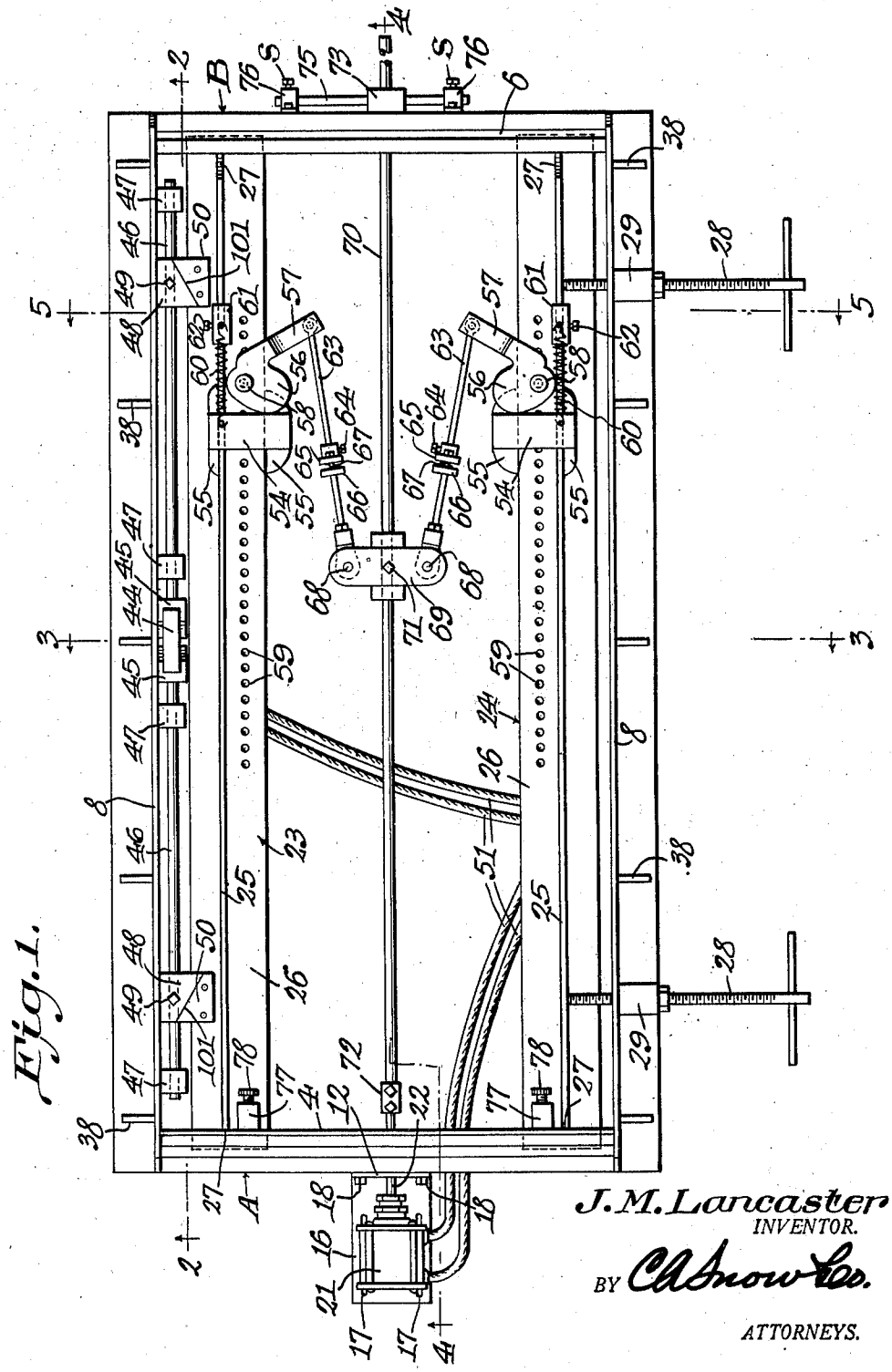


Fig. 1.

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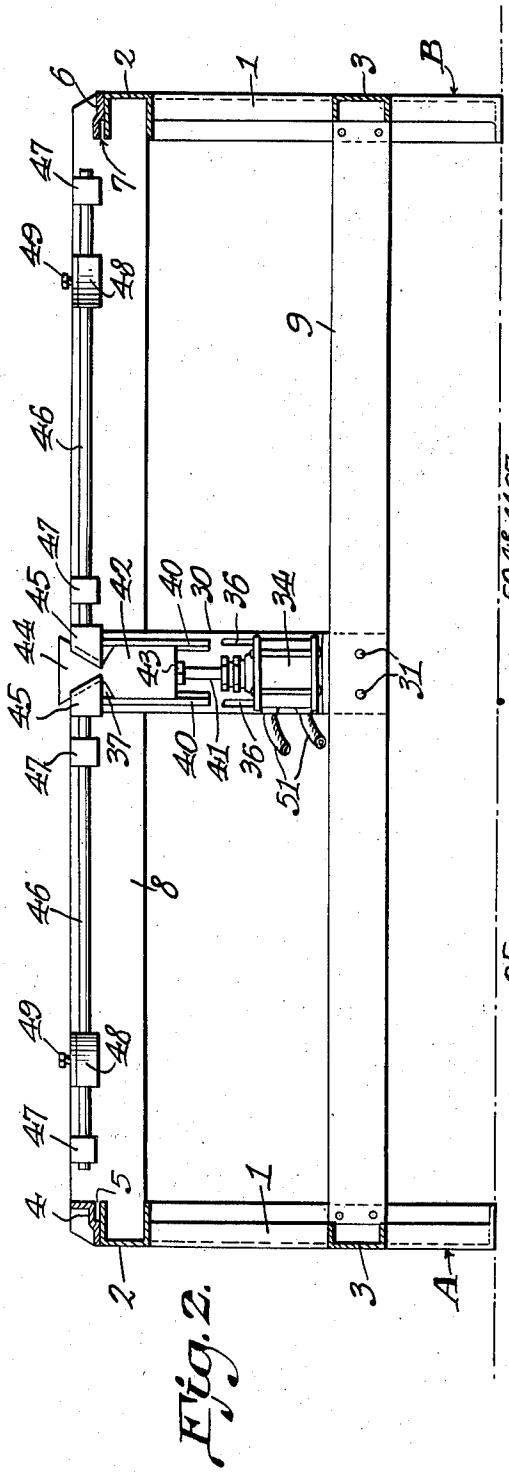


Fig. 2.

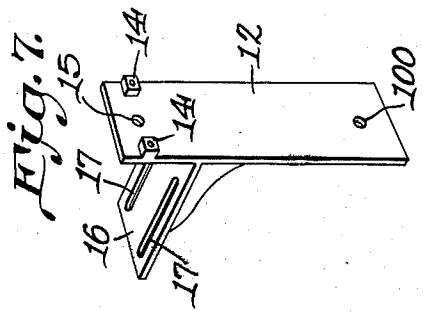


Fig. 1.

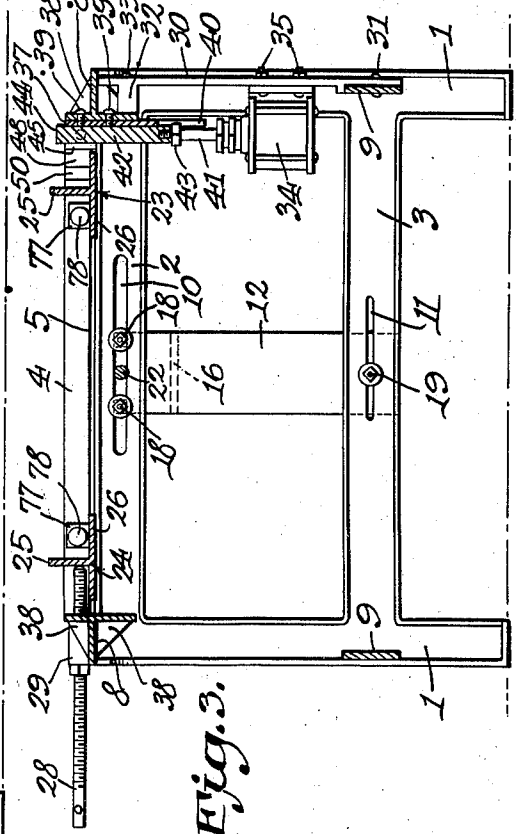


Fig. 3.

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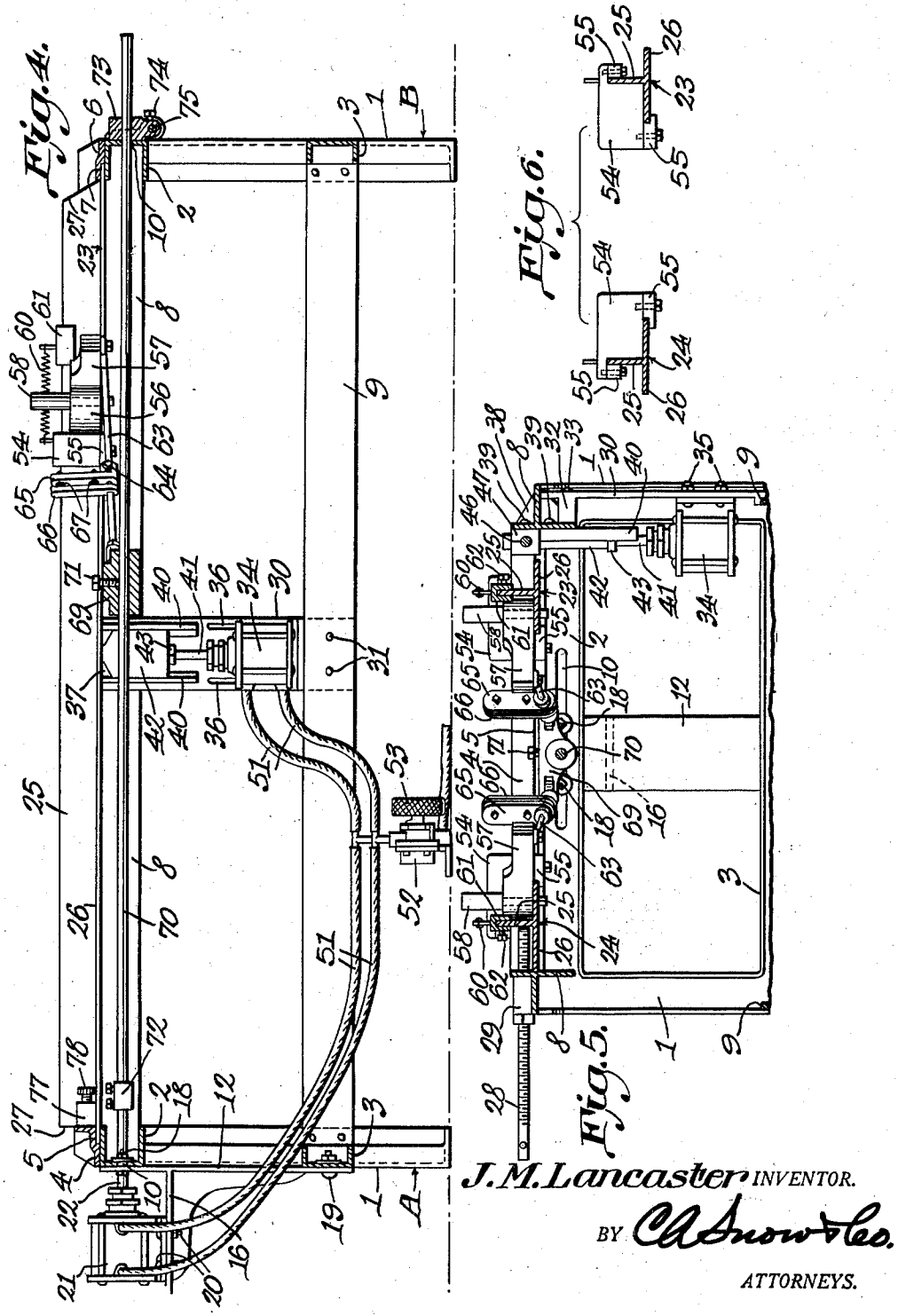


Fig. 4.

Fig. 6.

Fig. 5.

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FURNITURE CLAMP

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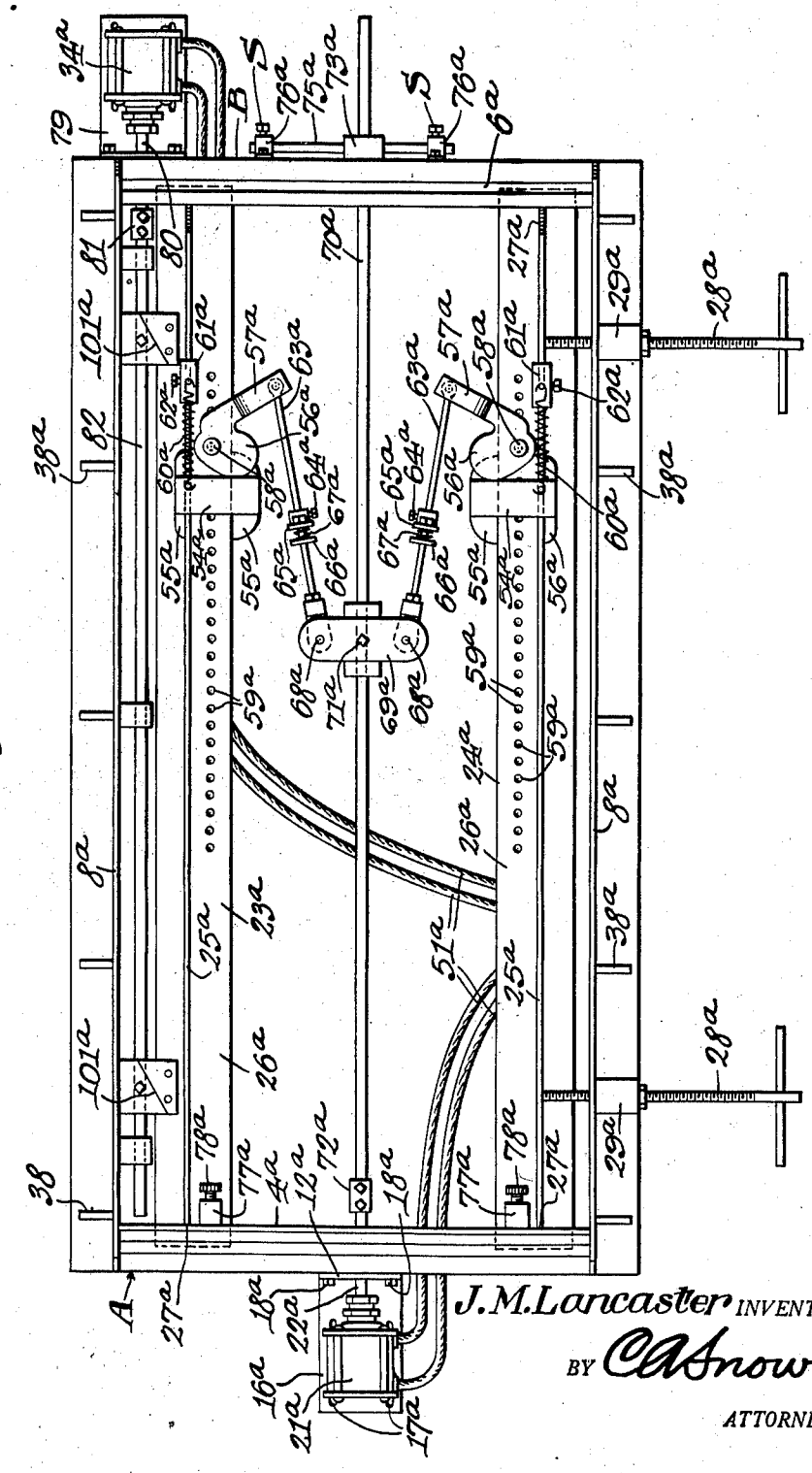


Fig. 8.

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UNITED STATES PATENT OFFICE

2,148,208

FURNITURE CLAMP

Jeter M. Lancaster, High Point, N. C.

Application November 23, 1937, Serial No. 176,125

8 Claims. (Cl. 144—289)

The device forming the subject matter of this application is adapted to be employed for clamping furniture and the like, and one object of the invention is to provide novel means for imparting movement to the clamping elements, another object of the invention being the provision of novel means whereby the clamping elements may be actuated by fluid pressure, and more specifically by air pressure.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the present invention appertains.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed, without departing from the spirit of the invention.

In the drawings:

Fig. 1 shows in top plan, a device constructed in accordance with the invention;

Figs. 2, 3, 4 and 5 are sections taken respectively on the lines 2—2, 3—3, 4—4 and 5—5 of Fig. 1;

Fig. 6 is a cross sectional detail showing the mounting of certain of the pressure members;

Fig. 7 is a perspective view disclosing one of the brackets;

Fig. 8 is a top plan showing a modification.

Referring to Figs. 1 to 7, there is provided a supporting frame, that end of the frame which is marked by the reference letter A being considered the forward end of the frame, and the rear end of the frame being designated by the letter B, for convenience in referring to movements and describing the relative location of parts.

The frame is of rectangular outline in plan, as shown in Fig. 1, and comprises corner legs 1, connected across the ends of the frame by front and rear upper cross bars 2, which may be channel members. Front and rear lower cross bars 3 connect the legs 1 at the ends of the frame. At the forward end of the frame (Fig. 2), a fixed abutment in the form of an angle member 4 is secured to the front upper cross bar 2, a portion of the horizontal flange of the abutment 4 being spaced from the front upper cross bar 2 to form a guideway 5. At the rear end of the frame, a strap 6 is secured to the rear upper cross bar 2 and is offset to define a guideway 7, corresponding to the guideway 5.

The upper cross bars 2 at the ends of the frame are connected by upper longitudinal rails 8, which may be T-members, buttressed as shown at 38. The legs 1 of the frame are connected by lower longitudinal rails 9. Figure 3 shows that the upper cross bars 2 have horizontal slots 10, the lower cross bars 3 having horizontal slots 11.

There is provided a vertical first support 12, shown in detail in Fig. 7 and this support rests against the outer surfaces of the front cross bars 2 and 3, as Figs. 4 and 1 will show. The support 12 has lugs 14, which fit slidably in the slot 10 of the front upper cross bar 2. The support 12 has an opening 15, located between the lugs. The support 12 carries a forwardly extended horizontal bracket 16, provided with elongated slots 17. Securing elements 18 (Fig. 3) are threaded into the lugs 14 of the support 12 and engage the front cross bar 2. A securing element 19, such as a bolt, passes through a hole 100 in the support 12 and secures the lower portion of the support to the front lower cross bar 3, the securing element being located in the slot 11 of the lower forward cross bar 3, as Fig. 3 will disclose.

By means of securing elements 20, disclosed in Fig. 4, an air cylinder 21 is secured to the bracket 16, for adjustment longitudinally of the machine, the securing elements 20 passing through the slots 17 (Fig. 7) of the bracket 16. A piston operates in the air cylinder 21, and the piston rod 22 passes through the opening 15 of the support 12 and through the slot 10 of the upper forward cross bar 2 (Fig. 3).

Lateral parallel clamps or pressure members 23 and 24 (Fig. 1) are located inwardly of the upper longitudinal rails 8 of the frame. Figure 5 discloses that each of the lateral pressure members 23 and 24 is of inverted T-shape, and includes a vertical upstanding flange 25 and a horizontal flange 26. According to Fig. 4, the upstanding flanges 25 are cut away at their ends as at 27, leaving terminal portions of the horizontal flanges 26 to slide in the guideways 5 and 7, transversely of the machine, the construction being such that the lateral pressure members 23 and 24 can be adjusted toward and away from each other, crosswise of the frame.

The first pressure member 24 is carried inwardly by screws 28, threaded into lugs 29 on one of the upper longitudinal rails 8. In order to secure an inward movement of the second lateral

pressure member 23, there is provided a mechanism next to be described.

A second vertical support 30 is supplied and is secured at its lower end, as shown at 31 in Figs. 3 and 2, to the lower rail 9 at one side of the machine. In Fig. 5 it is shown that the support 30 is equipped with an inwardly projecting lug 32 which bears against the depending flange of the adjacent rail 8, a securing element 33 passing through the lug and engaging the depending flange of the said rail.

To the inner surface of the support 30 (Fig. 3) an air cylinder 34 is attached by securing members 35, the support 30 having vertically elongated slots 36 (Figs. 2 and 4) receiving the securing members 35 and providing for a vertical adjustment of the pressure cylinder 34.

In Fig. 3 it appears that a guide plate 37 is secured at 39 to the inner surface of the corresponding upper longitudinal rail 8, the guide plate 37 having depending arms 40 which are disclosed in Figs. 4 and 2, the space between the arms 40 being sufficient to accommodate the upper portion of the air cylinder 34, should the air cylinder be adjusted upwardly to a considerable extent beyond the position shown in the drawings.

A piston reciprocates in the cylinder 34 and the piston rod is marked by the numeral 41. The piston rod 41 is threaded (Fig. 3) into the lower end of a slide 42 and is held in the slide by a lock nut 43. The slide 42 (Fig. 2) is held for vertical reciprocation on the guide plate 37. At its upper end, the slide 42 is equipped with a wedge-shaped head 44.

The head 44 of the slide 42 is received in oppositely disposed U-shaped guides 45 (Fig. 1) secured (Fig. 2) to the inner ends of oppositely disposed, aligned slide rods 46, mounted for right line reciprocation in bearings 47 secured to the adjacent upper longitudinal rail 8. Wedge blocks 48 are secured for adjustment at 49 to the slide rods 46, near the outer ends of the slide rods, the wedge blocks 48 cooperating along lines 101 with wedge blocks 50 secured to the outer part of the horizontal flange 26 of the lateral pressure member 23. The wedge blocks 48 and 50 may be alluded to as cooperating cam members located, respectively, on the slide rods 46 and on the lateral pressure member 23.

From the cylinder 34, and from the cylinder 21, conduits 51 lead to a valve mechanism 52 (Fig. 4), located on the floor of the shop in which the machine is used, and shown as having a foot control 53, although any sort of control may be used.

Longitudinal third pressure members 54 are held by cleats 55 (Fig. 6) on the pressure members 23 and 24, for movement longitudinally thereof. The longitudinal pressure members 54 are advanced by cams 56, which bear against them, the cams having tail pieces 57. The cams 56 are mounted on pivot elements 58, adapted to be mounted in any of a line of holes 59 in the flanges 26 of the lateral pressure members 24 and 23. The pressure members 54 are held in contact with the cams 56 by pull springs 60, attached to inverted U-shaped anchors 61, held securely but for adjustment on the flanges 25 of the pressure members 24 and 23 by securing devices 62.

The inner ends of the tail pieces 57 of the cams 56 are pivoted to links 63. On each link 63 is mounted, for adjustment longitudinally of the link, by means of a set screw 64, an abutment 65. Located in advance of the abutment 65, and freely slidable on each link 63 is a block 66. A compression spring 67 surrounds the rod 63 and is interposed between the block 66 and the abutment 65. The parts 64, 65, 66 and 67 constitute yieldable pressure members adjustable longitudinally of the links 63.

The forward ends of the links 63 are pivoted at 68 to a cross head 69, adjustable longitudinally of a slide rod 70, but capable of being secured to the slide rod by a set screw 71 or the like.

The forward end of the slide rod 70 is connected by a coupling 72 to the rear end of the piston rod 22 of the cylinder 21. The rear part of the slide rod 70 reciprocates longitudinally, and can be adjusted transversely in the slot 10 of the rear upper cross bar 2 (Fig. 4) the said slot corresponding to the slot 10 in the forward cross bar 2 of Fig. 5. The rod 70 reciprocates in a bearing 73 (Fig. 4) held by a securing device 74 on a guide rod 75 (Fig. 1) disposed parallel to the rear upper cross bar 2 of the frame and held thereon by brackets 76 and set screws S.

If desired, spacer blocks 77 may be placed removably on the flanges 26 of the lateral pressure members 23 and 24, in engagement with the fixed abutment member 4. Adjusting devices 78, such as screws, are threaded into the spacers 77.

As to general operation, the piece of furniture or the like is clamped laterally between the vertical flanges 25 of the pressure members 23 and 24. The piece of furniture or the like is engaged at one end by the longitudinal pressure members 54. Ordinarily, the opposite end of the piece of furniture is engaged by the fixed abutment 4, but if there are irregularities in that end of the piece of furniture, such irregularities may be taken care of by placing the spacer blocks 77 on the flanges 26, in engagement with the abutment member 4, the screws 78 being threaded in or out, as occasion may demand.

There may be some portions of the piece of furniture which will not be engaged by the pressure members or clamps 54, and such portions of the furniture will be engaged by the yieldably backed blocks 66 on the links 63. The portions of the furniture referred to may not project lengthwise of the machine to the same extent and for that reason the parts 65—66—67 are mounted on the links 63 for adjustment longitudinally of the links. It may be here noted that by the time that the blocks 66 get in their work, the links 63 will have approached substantial parallelism, and the blocks 66 will operate in planes practically at right angles to the longitudinal axis of the machine, that axis being represented by the slide rod 70.

The machine is set up for the particular job, as to width, by moving the lateral pressure member 24 inwardly through the instrumentality of the screws 28. As to length, both the longitudinal pressure members 54 and the anchors 61 may be adjusted lengthwise of the machine, the anchors being held in place by the securing devices 62. The cross head 69 is slid along the rod 70 and held in adjusted position by the set screw 71. The yieldable pressure members 65—66—67 may be adjusted along the links 63 and be held in adjusted positions by means of the set screws 64. The cams 56 may be adjusted so that they will engage the longitudinal pressure members 54 by shifting the pivotal mountings 58 for the cams 56 into any of the openings 59 in the flanges 26 of the lateral pressure members 23 and 24.

Assuming that the machine now is set up to accommodate approximately the size and shape

of the article of furniture to be pressed, the valve mechanism 52, operated by the control 53, admits air to the cylinders 21 and 34. The piston rod 22 of the cylinder 21 moves the slide rod 70 forwardly, and by means of the cross head 69, the links 63, and the cams 56, the pressure members 54 are advanced.

Pressure in the cylinder 34 moves the piston rod 41 downwardly, the slide 42 is carried downwardly, the wedge shaped head 44 on the slide cooperates with the guides 45 on the slide rods 46, to move them in opposite directions, the wedge blocks 48 on the rods 46 cooperate with the wedge blocks 50 on the lateral pressure member 23, the lateral pressure member 23 is moved inwardly, and the article is clamped crosswise by the flanges 25 of the pressure members 23 and 24. The mechanism shown at 52—53, which is of standard commercial construction, also functions to cause the cylinders 34 and 21 to retract, respectively, the piston rods 41 and 22, and relieve the clamping action.

Owing to the provision of the slots 36 in the support 30, the cylinder 34 may be adjusted vertically, so that the wedge shaped head 44 of the slide 42 will cooperate properly with the parts 45 of the slide rods 46, a proper cooperation between the wedge blocks 48 and 50 of Fig. 1 being attained.

When the pressure member 24 is moved inwardly or outwardly, to accommodate the general size of the work, the slide rod 70 ought to be adjusted accordingly, transversely of the machine, so that it will operate about half way between the sides of the piece of work. By loosening the securing elements 19, and by adjusting the bearing 73 along the guide rod 75, the slide rod 70 and all parts connected with it, such as the air cylinder 21 and the cross head 69, may be adjusted transversely of the machine.

In Fig. 8, parts hereinbefore described are designated by numerals already used, with the suffix "*a*". In this form of the invention the slide 42 and attendant parts is dispensed with. The cylinder 34*a* is mounted on a bracket 79, attached to one end of the frame, and the piston rod 80 is connected by a coupling 81 to a single slidable rod 82. In Fig. 1, the cooperating edges 101 of the two sets of cam blocks 48 and 50 converge, but in Fig. 8 the corresponding edges 101*a* slant in the same direction, because in Fig. 8 the rod 82 operates by cylinder pull, in one direction, to set the lateral pressure member or clamp 23*a*, whereas in Fig. 1 the rods 46 move in opposite directions, under the impulse of the wedge head 45 of the slide 42, to set the clamp 23 of Fig. 1.

Having thus described the invention, what is claimed is:

1. In a device of the class described, a frame provided with an abutment, a first lateral clamp and a second lateral clamp slidable on the frame toward and away from each other, means under the control of an operator for adjusting the first clamp with respect to the second clamp, fluid-pressure-actuated means for adjusting the second clamp with respect to the first clamp, third clamps slidable on the first and second clamps toward and away from the abutment, a slide mounted to reciprocate in the frame, fluid-pressure actuated means for reciprocating the slide, and mechanism connected to the slide for advancing the third clamps, said mechanism embodying movable members cooperating with the third clamps, to advance them, and means for mounting said movable members on the first and second clamps for adjustment longitudinally thereof.

2. A device of the class described, constructed as set forth in claim 1, and wherein the fluid-pressure-actuated means for adjusting the second clamp embodies slides mounted for right-line reciprocation on the frame, coacting cam elements on the last-specified slides and on the second clamp, a wedge operating between the inner ends of the last-specified slides, and a fluid-pressure cylinder the piston rod of which is operatively connected to the wedge.

3. A device of the class described, constructed as set forth in claim 1, and wherein the fluid-pressure-actuated means for adjusting the second clamp embodies a single slide mounted for right-line reciprocation on the frame, coacting cam elements on the last-specified slide and on the second clamp, and a fluid-pressure cylinder the piston rod of which is connected directly to the single slide.

4. In a device of the class described, a frame provided with an abutment, a first lateral clamp and a second lateral clamp slidable on the frame toward and away from each other, means for moving the clamps toward and away from each other, third clamps slidable on the first and second clamps, toward and away from the abutment, a slide mounted for right-line reciprocation on the frame in a direction parallel to the first and second clamps, a cross head adjustable longitudinally of the slide, cams cooperating with the third clamps, means for mounting the cams in adjusted positions longitudinally of the first and second clamps, and links pivoted to the cams and to the cross head.

5. A device of the class described, constructed as set forth in claim 4, in combination with means for mounting the slide for adjustment in the frame, transversely with respect to the first and second clamps.

6. A device of the class described, constructed as set forth in claim 4, in combination with pressure members mounted for adjustment on the links, longitudinally thereof, toward and away from the abutment, and means for holding the pressure members on the links, in adjusted positions longitudinally of the links.

7. A device of the class described in claim 4, in combination with springs connected at one end to the third clamps and holding them in engagement with the cams, and means for anchoring the other ends of the springs to the first and second lateral clamps in adjusted positions longitudinally of said clamps, thereby to regulate the effort of the springs.

8. A device of the class described, constructed as set forth in claim 1, and wherein the fluid-pressure-actuated means for adjusting the second clamp embodies slides mounted for right-line reciprocation on the frame, coacting cam elements on the last-specified slides and on the second clamp, a wedge operating between the inner ends of the last-specified slides, a fluid-pressure cylinder the piston rod of which is connected to the slide, and means for mounting the cylinder on the frame for adjusting transversely of the last-specified slides, thereby to adjust the position of the wedge with respect to the last-specified slides and to adjust the cam elements of said slides with respect to the cam elements of the second clamp.

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