Aug. 23, 1960 J. D. STORY 2,949,947

STRAIGHT BEAM ADJUSTABLE JAW CLAMP

Filed Nov. 10, 1958 2 Sheets-Sheet 1

FIG_1

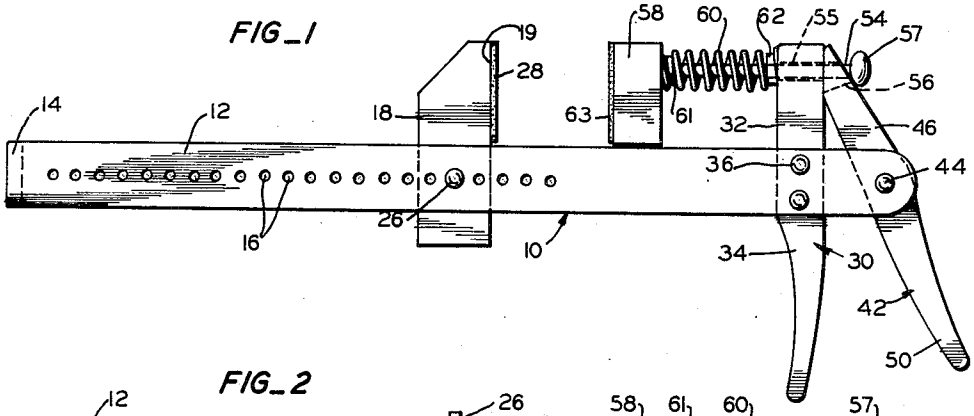


FIG_2

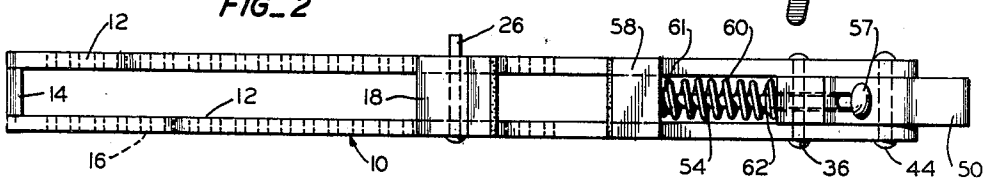


FIG_3

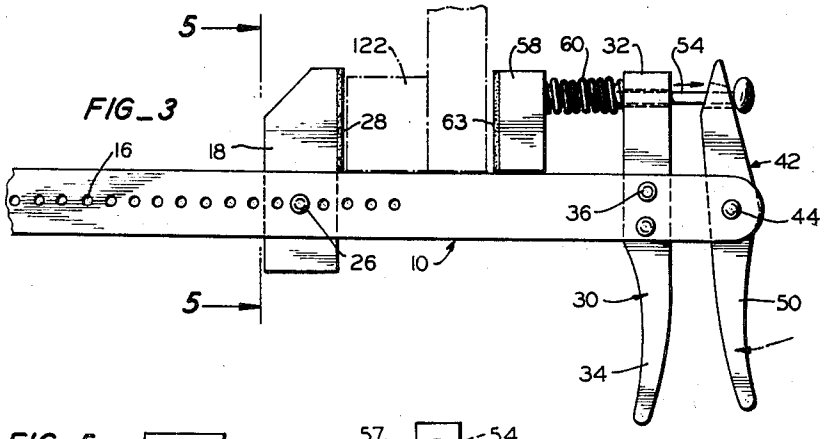
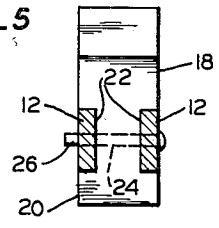


FIG_5



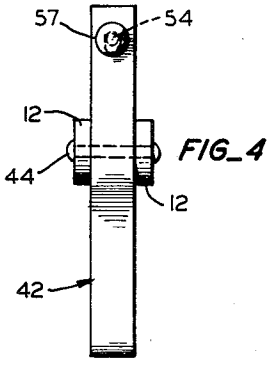


FIG_4

INVENTOR.
JOHN D. STORY
BY Hopkins & Neal

ATTORNEYS

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STRAIGHT BEAM ADJUSTABLE JAW CLAMP

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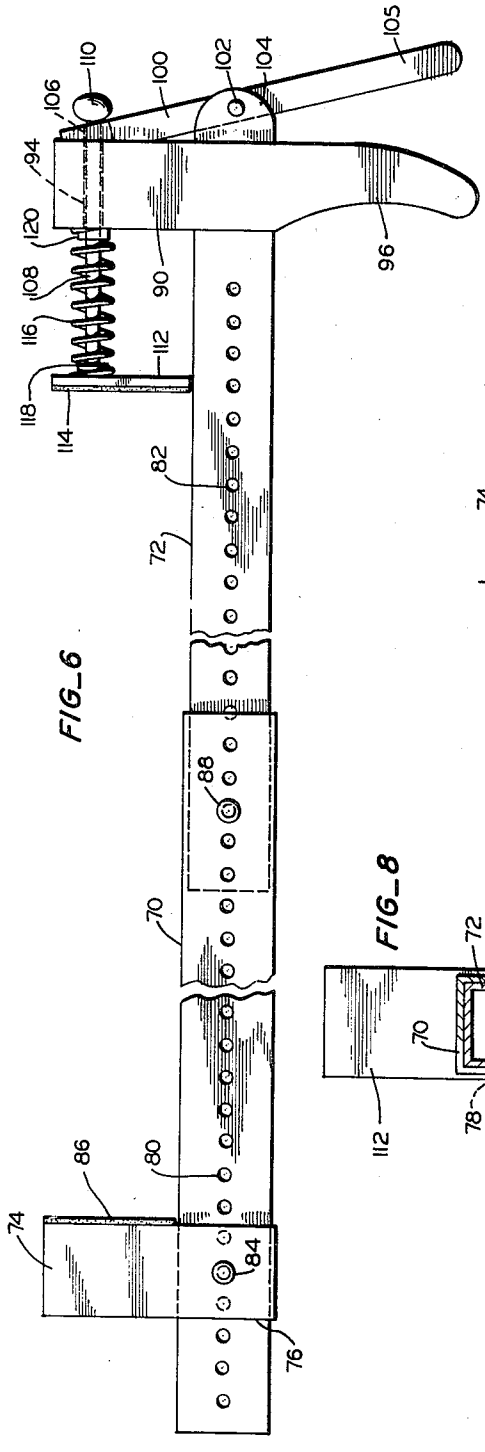


FIG_6

FIG_8

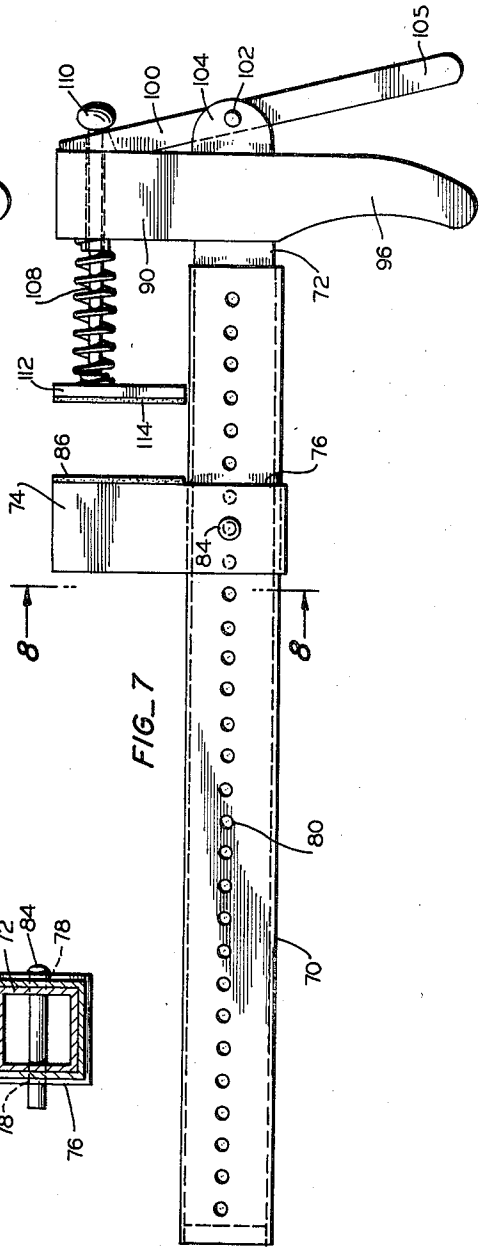


FIG_7

INVENTOR.
JOHN D. STORY
BY Rogers & Neal
ATTORNEYS

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STRAIGHT BEAM ADJUSTABLE JAW CLAMP

John D. Story, 101 SE. 8th St., Bethany, Okla.

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3 Claims. (Cl. 144—303)

This invention relates in general to clamps and more particularly to a hand operated resilient clamp.

It is an object of this invention to provide a clamp which may be quickly and easily operated and which automatically accommodates itself to work of varying shapes and sizes.

It is another object to provide a clamp of the character described which requires only one hand for application and removal from clamping position and thus leaves the other hand of the clamp operator free for holding or positioning the work being clamped.

It is still another object of this invention to provide a clamp, as described above, which is particularly well adapted for gluing and which will apply an even pressure to the glued joint without the necessity for periodic retightening of the clamp jaws as the glued joint sets up.

A further object of this invention is to provide a clamp of the character described which may be adjusted to accommodate work of a wide variety of shapes and sizes and which is simple in design and easy of manufacture.

Other objects and advantages of this invention will become apparent from the following description when taken in conjunction with the drawings forming a part of this specification, in which:

Figure 1 is a view of the clamp in side elevation;

Figure 2 is a view in plan;

Figure 3 is a view in side elevation showing work, indicated in phantom outline, positioned between the clamped jaws;

Figure 4 is a view in end elevation of the clamp;

Figure 5 is a view in section taken on the line 5—5 of Figure 3 illustrating the disposition of the outer clamp jaw relative to the clamp frame;

Figure 6 is a view in side elevation illustrating a modification of the clamp incorporating an extensible telescopic frame;

Figure 7 is a view in side elevation illustrating the telescopic frame in contracted position; and

Figure 8 is a view in section taken on the line 8—8 of Figure 7 illustrating the construction of the telescopic frame.

Referring now to the figures, there is shown in Figure 1 a clamp frame 10 comprised of parallel spaced-apart bars 12 of rectangular cross-section, as shown in Figure 5. The bars 12 are tied together at one end by transverse member 14, which also serves as a spacer, and are provided with a plurality of complementary apertures 16 spaced at intervals for a substantial portion of their lengths.

The adjustable jaw 18 of the clamp structure is provided with a work engaging face 19 and a shank 20, notched or relieved on its opposite sides, as at 22 (see Figure 5). The shank 20 is slidably received between the bars 12 and the fit between the notched areas of the shank and said bars prevents deflection of the work engaging face 19 of the jaw 18 away from its normal right angle disposition relative to the longitudinal axes of the bars 12. The shank 20 is apertured, as at 24,

to receive a locking pin 26 passed through corresponding apertures 16 in the bars 12, as a means of fixing the jaw 18 on the frame.

A resilient facing material 28, such as rubber or felt, is secured to the work engaging face 19 of the jaw 18 to facilitate gripping of the work and, at the same time, to prevent marring of the articles being clamped.

To provide a support for the second jaw of the clamp, a post 30 is rigidly mounted on the bars 12, with an outer portion 32 projecting at substantially right angles to the longitudinal axes of the bars in apposition to the jaw 18 and an inner portion received between the bars 12 to which it is secured by means of the rivets 36. Integral with the post 30 and extending beyond the bars 12 on the side thereof opposite the portion 32 of the post 30, a hand grip 34 is provided for a purpose to be hereinafter described.

Although the combined post 30 and grip 34 are indicated to be separable from the frame bars 12, it should be understood that such arrangement is only for convenience of manufacture. Thus, these members, or either of them, if preferred, can be made integral parts of the frame bars 12.

A lever 42 is fitted between the outer ends of the frame bars 12 and pivotally connected thereto by a pin 44. An end 50 of the lever 42 extends from the bars 12 in complementary relation to the grip 34, while the opposite, or outer, levelled end 46 thereof projects from the opposite side of the bars 12 to normally bear through its bevelled portion against the outer portion 32 of the post 30 at an angle thereto.

The second jaw 58 of the clamp structure is carried at one end of a rod 54, the opposite end of which projects through an aperture 55 in portion 32 of post 30 and a cone-shaped aperture 56 in the end 46 of lever 42, terminating in a ball-like enlargement or head 57. A coil spring 60 encircles that portion of the rod 54 between the jaw 58 and post 32, and its ends engage bosses 61 and 62, respectively, disposed on the said jaw 58 and post 32. Thus, jaw 58 is spring loaded and normally projected in its distended position relative to the opposite jaw 18. It is retractable upon movement of grip end 50 of lever 42 toward the fixed grip 34 and resultant compression of spring 60.

Like jaw 18, jaw 58 is generally rectangular in shape and provided with a work-engaging face 63 covered with a facing material for like purposes.

In Figure 6 the modified clamp is shown as comprising a frame of telescopic design for accommodating work of a wide variety of sizes and shapes. It incorporates an outer tubular member 70 and an inner tubular member 72 telescopically disposed therein, as shown in Figure 8. While the said tubular members 70 and 72 have been shown as squared in cross-section, it will be appreciated that they may, if desired, be cylindrical. An outer jaw 74 of generally rectangular shape is carried by the outer tube member 70 and adapted for adjusting movement thereon. The outer jaw 74 is provided at its lower end with a collar 76 which closely embraces member 70, preventing such outer jaw from rotative or tilting movement relative to the box member 70. There are provided at either side of collar 76 apertures 78 which are positioned for registry with similarly disposed and opposing apertures 80 and 82 in tubular members 70 and 72, respectively. As shown in Figure 8, the apertures 78, 80 and 82, when registered, serve to receive a locking pin 84 which fixes the position of the outer jaw 74 relative to the outer tubular member 70. The work-engaging surface 86 of outer jaw 74 is suitably covered with a resilient material, as in the case of jaws 18 and 58.

Fixing of the outer tubular member 70 relative to the inner tubular member 72 may be accomplished by posi-

tioning of the locking pin 84, as above described, when these telescoping members are in an overlapping position at the location where fixing of the outer jaw 74 is desired, as illustrated in Figure 7. Should tubular members 70 and 72 be in a non-overlapping position at such point, as in Figure 6, they may be fixed against movement relative to each other by use of a second locking pin 88 inserted through their respective aligned apertures 80 and 82.

The mounting of the inner jaw 112 is substantially the same as in the case of the forms of the device shown in Figures 1 to 3, inclusive, and the description thereof may be relatively brief. A post 90 is secured to the inner tubular member 72, as by welding, and is provided at its outer end with an aperture 94, and its inner end terminates in a grip or handle 96 projecting from the side of the member 72 opposite the post 90.

A lever 100 is pivotally secured through pin 102 to the projecting arms 104 of a yoke formed by extending the sides of the inner tubular member 72. One end of the lever 100 is bevelled and projects from the member 72 at an angle to and normally abutting post 90, and its opposite end 105 projects from member 72 to complement grip 96. The end of lever 100 abutting post 90 is provided with a conical-shaped aperture 106 in substantial registry with aperture 94 therein.

Jaw 112 is carried at one end of a rod 108, the opposite end of which extends through apertures 94 and 106 in post 90 and lever 100, respectively, terminating in an enlarged head 110 engaging the end of said lever. A coil spring 116 encircles the rod 108 between jaw 112 and post 90 and engages bosses 118 and 120, respectively, disposed thereon. Like the other jaws, the work-engaging surface of jaw 112 is covered by a resilient material 114.

In the operation of the first form of the device (Figures 1 to 3, inclusive) the operator first gauges the overall thickness of the pieces to be joined and appropriately positions the jaw 18 by removal of the locking pin 26 and a sliding of the jaw along the bars 12 to the determined position, with reinsertion of the pin 26 fixing the jaw in its new position. Manual movement of the lever grip 50 toward fixed grip 34 by squeezing them causes the lever to rock on its pivot and through engagement with head 110 to draw rod 54 through post 32 and thus compress the spring 60. This action moves jaw 58 relatively away from jaw 18 to permit engagement or insertion of the laminated pieces to be joined, and when the positioning is accomplished the manual pressure on lever 42 is relaxed to permit expansion of the spring 60 to force jaw 58 into engagement with a surface of the work or pieces to be joined.

As will be appreciated, the actual clamping of the work in the manner above described is a one-handed operation, leaving the other hand of the operator free for aligning and guiding of the pieces to be joined.

As shown in Figure 3, the adjustable jaw 18 is suitably positioned relative to the jaw 58 for clamping about the work 122. However, should the work be of greater size than can be accommodated by manual retraction of the jaw 58 away from the jaw 18 through the rocking of the lever 42 or of a size smaller than can be accommodated by the extension of jaw 58 in the direction of the jaw 18 through the action of spring 60, the adjustable jaw 18 may conveniently be moved relative to jaw 58 by removal of the locking pin 26 from its locking position. Guided by the bars 12, the jaw 18 is accordingly re-positioned to accommodate the work and the locking pin replaced in locking position. Because the travel of jaw 58 is limited by abutment of lever 42 with post 30, the desired spacing of the jaws may be easily gauged while the biasing force of spring 60 is at the same time maintained within fixed limits.

From the above, it may be seen that rough adjustment of the jaw spacing may be achieved through movement of jaw 18, the resiliently biased jaw 58 then serving as a work-seeking fine adjustment. It is this work-seeking feature of the inner jaw which is of particular advantage in the clamping together of wood members for gluing. With the inner jaw 58 constantly urged by the compression spring 60 in the direction of the adjustable jaw 18 and into engagement with the work, an even clamping pressure on the glued joint is assured at all times during set-up, and the tedious and time-consuming re-tightening of the clamp, often associated with the gluing together of wood members in the use of conventional clamping devices, is eliminated. The resilient material secured to the work-engaging surfaces 28 and 63 of jaws 18 and 58 of course serve to prevent both the slippage of the clamp relative to the work and the marring of the work surface in its engagement with the jaws.

The biasing force exerted by the compression spring 60 against the inner jaw 58 may be varied as desired by changing the spring. In order to facilitate such spring changing, the enlarged end portion 57 may be a separate member threaded to the end of the rod 54 for easy removal to permit disassembly of the rod from its installed position in handle 42 and post 30.

But for its extensible telescoping frame, the operation of the modified clamp of Figure 6 is essentially similar to that of the clamp of Figure 1. Thus, the operator, through gripping the complemental grip 96 and the lever end 105, is able to effect the pivotal movement of lever 100 and the desired movement of jaw 58. Coil spring 116 serves to urge jaw 112 into a work-engaging position and the same advantages are inherent in this arrangement as those cited above for the clamp of Figure 1.

Through use of the telescoping tubular members 70 and 72, the ability of the modified clamp to adapt to various loads is considerably increased. Thus, not only is the outer jaw 74 movable relative to its immediate supporting member for accommodating the work, but the frame itself may be adjusted to accommodate such work. As indicated above, in the extended position of Figure 6 an additional locking pin 88 is required for locking the members 70 and 72 relative to one another. The relative positions of members 70 and 72 may, of course, be easily adjusted by removing and replacing the locking pin 88 in appropriate aligned apertures of such members. When the clamp frame is in a contracted position, such as that of Figure 7, the locking pin 88 may be dispensed with and the locking pin 84 utilized both for the locking of the jaw 74 and the members 70 and 72, as shown in Figure 8. It should here be noted that additional apertured telescopic members may be added where necessary to permit increased spacing of the jaws to accommodate work of relatively large size.

From the above it can be seen that I have provided a clamp of relatively simple design, quickly and easily operated and having wide application. It will be appreciated that the embodiments of this invention as herein described may be altered, changed or modified without departing from the spirit or scope of the invention as herein claimed.

What is claimed is:

1. A clamp comprising in combination, a frame including a pair of parallel spaced apart bars, each bar having a plurality of complementary apertures, an adjustable jaw having an aperture therein and having notches on opposite sides slidably received between the bars with the notches fitting the respective bars to prevent deflection of the work-engaging face of the jaw from a right angle disposition relative to the longitudinal axes of the bars, a locking pin adapted for insertion into the jaw aperture and in corresponding bar apertures in registry therewith for fixing said jaw on the frame, a post rigidly mounted on the bars having an outer apertured portion projecting substantially at right angles to the longitudinal axes of the bars in apposition to the adjustable jaw and a hand-grip portion projecting

beyond the side of the bars opposite said outer apertured portion, a lever mounted intermediate of its ends between the outer ends of the bars and for pivotal movement relative thereto having an outer apertured portion adapted to bear against the outer apertured portion of the post and a portion disposed in complementary relationship with the grip portion of the post for hand gripping by the clamp operator to effect pivotal movement of the lever, a second jaw carried at one end of a rod, the opposite end of which projects through the respective apertures in the outer portions of the post and the lever terminating in a head adapted to bear upon the lever as the latter is manually pivoted to effect movement of the rod and the second jaw carried thereby, said head thereby limiting the movement of the rod and said second jaw as the lever outer portion abuttingly engages the post outer portion, and a coil spring encircling that portion of the rod between said second jaw and the post and urging said head to bear against the lever while urging said second jaw to project into a normal distended position relative to the adjustable jaw for cooperation therewith in the clamping of work positioned between said jaws.

2. A clamp comprising in combination, a frame, a jaw secured to the frame, a post secured to the frame having an outer portion with an aperture therein and a grip portion, said outer portion projecting beyond the frame in apposition to the jaw and said grip portion projecting beyond the frame oppositely from said outer portion, a lever pivoted to the frame having an outer portion with an enlarged aperture therein adapted to bear against the outer portion of the post and a portion disposed in complementary relationship with the grip portion of the post for manual gripping in conjunction therewith to effect pivotal movement of the lever, a second jaw carried at one end of a rod the opposite end

of which extends through the apertures in the outer portions of the post and the lever terminating in a head adapted to bear upon the lever as said lever is pivoted to move the rod and the second jaw carried thereby, said head limiting the movement of the rod and said second jaw as the lever outer portion abuttingly engages the post outer portion, and a coil spring encircling the portion of the rod between said second jaw and the post and urging said head to bear against the lever while urging said second jaw to project toward the jaw secured to the frame with which latter the second jaw is adapted to cooperate in clamping together work inserted between said jaws.

3. The combination of claim 2, wherein the jaw secured to the frame has an aperture therein and is movable longitudinally of the frame and the frame is provided with complementary apertures, corresponding apertures of the frame being adapted for registry with the aperture in the jaw for receiving a locking pin to fix the jaw on the frame, and the frame includes a pair of tubular members disposed one within the other in telescopic relationship for permitting adjustment of the spacing between the movable jaw and the second jaw to accommodate work of various sizes and shapes.

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