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SPRING LOADED RATCHET CLAMP

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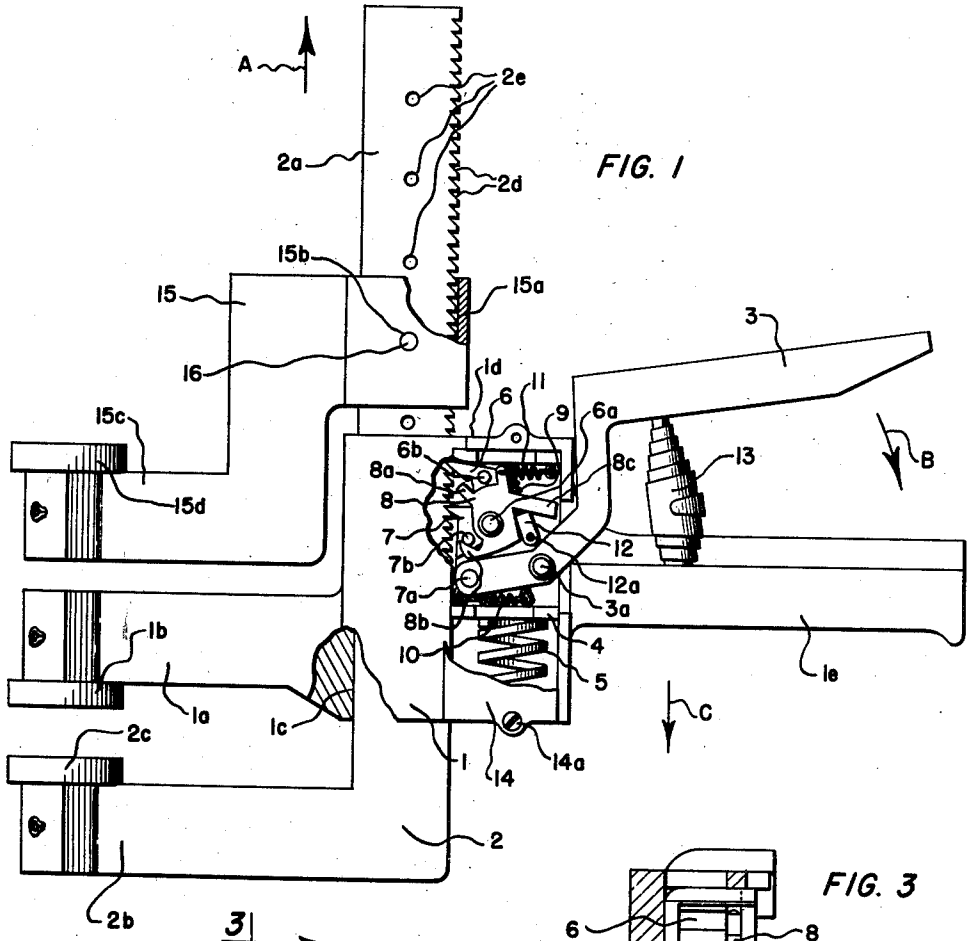


FIG. 1

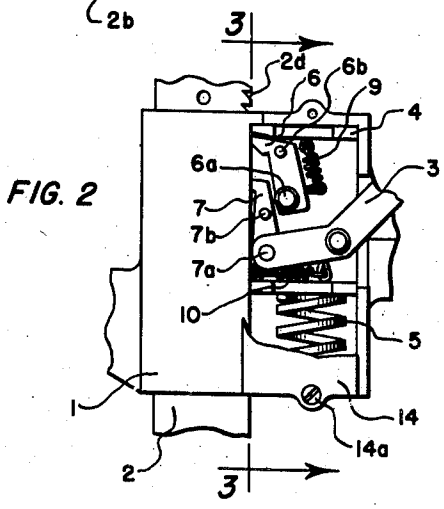


FIG. 2

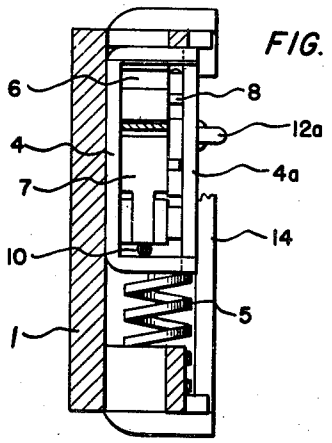


FIG. 3

INVENTOR.
THEODORE R. SWEET

BY

Wm. H. Dean

AGENT

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SPRING LOADED RATCHET CLAMP

Theodore R. Sweet, San Diego, Calif.

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4 Claims. (Cl. 144—303)

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My invention relates to a spring loaded ratchet clamp and the objects of my invention are:

First, to provide a clamp of this class which may be set upon various objects whereupon the jaws of the clamp are spring loaded against the article on which they are set preventing vibration of the work or the article from loosening the jaws of the clamp,

Second, to provide a spring loaded ratchet clamp of this class having jaws which may be set in spring loaded relationship with each other on opposite sides of a certain article of wood or the like in which shrinkage of the material is compensated for by the spring loaded relationship of the jaws which are urged toward the work whereby the clamp maintains a firm grip and compressive holding relationship on the article regardless of shrinkage thereof,

Third, to provide a spring loaded ratchet clamp of this class which may be very quickly set in compressive relationship with various articles and which may be readily and easily released therefrom,

Fourth, to provide a spring loaded ratchet clamp of this class which may be used as a spreading device in which the spreading jaws are spring loaded and maintain firm engagement with the internal portions or intermediate portions of work regardless of vibration or yield thereof,

Fifth, to provide a spring loaded ratchet clamp having a novel control means for operating ratchet pawls which are spring loaded relative to the ratchet rack of the movable jaw of said spring loaded ratchet clamp,

Sixth, to provide a spring loaded ratchet clamp of this class which is very compact and strong in proportion to its size,

Seventh, to provide a spring loaded ratchet clamp of this class having novel means for spring loading a carriage in which the ratchet pawls are pivoted adjacent to a stationary frame in which the jaw engaged by said ratchet pawls is slidably mounted, and

Eighth, to provide a spring loaded ratchet clamp of this class which is very simple and economical in construction, efficient in operation and which will not readily deteriorate or get out of order.

With these and other objects in view as will appear hereinafter, my invention consists of certain novel features of construction, combination and arrangement of parts and portions as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawing and to the

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characters of reference thereon forming a part of this application in which:

Fig. 1 is side elevational view of my spring loaded ratchet clamp showing portions thereof broken away and in section to amplify the illustration and showing both compressive and spreader jaws in position. Fig. 2 is a fragmentary side elevational view similar to Fig. 1 showing parts removed from the side of the carriage frame to expose the ratchet pawl mechanism and Fig. 3 is a sectional view taken from the line 3—3 of Fig. 2 showing portions broken away to amplify the illustration.

Similar characters of reference refer to similar parts and portions throughout the several views of the drawing.

The frame 1, jaw 2, lever 3, carriage 4, spring 5, ratchet pawls 6 and 7, pawl control plate 8, springs 9, 10, and 11, cam 12, handle spring 13, cover plate 14 and the spreader jaw 15 constitute the principal parts and portions of my spring loaded ratchet clamp.

The frame 1 is provided with an integral clamp jaw 1*a* having a removable pressure pad 1*b* as shown in Fig. 1 of the drawings and the jaw 2 is a substantially L-shaped member slidably mounted in the bore 1*c* of the frame 1, which bore is rectangular in cross section and adapted to prevent turning of the ratchet shank 2*a* of the jaw 2 therein. The extending jaw portion 2*b* is provided with a removable jaw pad 2*c* similar to the member 1*b* of the jaw portion 1*a* of the frame 1. The jaw 2 is provided with a row of ratchet teeth 2*d* engageable by the ratchet pawls 6 and 7 which are mounted on the movable carriage 4 on the pins 6*a* and 7*a* respectively. It will be noted that the pin 6*a* is stationarily fixed to the carriage 4 while the pin 7*a* is mounted on the end of the lever 3 which is pivoted to the pin 3*a* fixed to the carriage 4. The carriage 4 is a U-shaped carriage as shown in Fig. 3 of the drawing and is reciprocally mounted in the frame 1 longitudinally parallel with the bore 1*c* and engages the compression spring 5 which is a preloaded spring tending to force the carriage 4 toward the end 1*d* of the frame 1. The ratchet pawls 6 and 7 are engageable with the ratchet teeth 2*d* and are provided with control pins 6*b* and 7*b* respectively which project therefrom and are engageable by the pawl control plate 8. The pawl control plate 8 is provided with fingers 8*a* and 8*b* which lie in a plane adjacent the sides of the ratchet pawls 6 and 7. The spring 9 mounted in the carriage 4 tends to force the pawl 6 into engagement with the ratchet teeth 2*d* of the jaw 2 while the spring

10 interconnecting one end of the ratchet pawl 7 and the lever 3 tends to force the end of the ratchet pawl 7 into engagement with the ratchet teeth 2d of the jaw 2. The spring 11 tends to pivot the pawl control plate 8 in a clockwise direction about the axis of the pin 6a while the cam 12 mounted on the pin 12a in the top 4a of the carriage 4 is engageable with the arm 8c of the pawl control plate 8 for holding the same against tension of the spring 11 in the solid line position as shown in Fig. 1 of the drawing so that both of the ratchet pawls 6 and 7 are engageable with the teeth 2d. The spring 13 tends to force the lever 3 away from the manual handle portion 1e which is fixed on the frame 1. It will be here noted that the top 4a of the carriage 4 is provided with openings which receive the projecting ends of the pins 6a and 3a and is covered by the cover plate 14 which maintains the same in place. The cover plate 14 is provided with an opening therein through which the arm 12a of the cam 12 extends which is not shown in the drawing. The cover plate 14 is secure to the frame 1 by means of the screws 14a as shown best in Figs. 1 and 2 of the drawing. The spreader jaw 15 is provided with a rectangular bore portion 15a slidably positioned on the shank 2a of the jaw 2 and is provided with a pin receiving opening 15b adapted to receive a pin extendable through any one of the openings 2e in the shank 2a of the jaw 2. This spreader jaw 15 is thus fixed in certain position on the jaw 2 by means of the pin 16 and this spreader jaw 15 is provided with a jaw portion 15c having a compression pad 15d arranged to operate in opposition to the pad 1b for spreading various objects apart as desired.

The operation of my spring loaded ratchet clamp is substantially as follows:

When the pawl control plate 8 is in position as shown in Fig. 1 of the drawings the lever 3 may be consecutively pressed downwardly and released upwardly relative to the handle 1e on the frame 1 which causes pivotal movement of the lever 3 on the pin 3a carried by the carriage 4. The pin 7a pivoted to the end of the lever 3 carries the ratchet pawl 7 which engages the teeth 2d and forces the shank 2a of the jaw 2 upwardly in the direction as indicated by the arrow A in Fig. 1 of the drawings, each time the lever 3 is pressed downwardly in the direction as indicated by the arrow B. When the lever 3 is moved upwardly the pawl 6 engages the respective teeth 2d holding the jaw 2 until the ratchet pawl 7 is again engaged for a successive forceful movement of the jaw 2 in the direction as indicated by the arrow in Fig. 1 of the drawings. When an object positioned between the jaw pads 1b and 2c is forcefully engaged each successive movement of the lever 3 forces the carriage 4 downwardly in the direction of the arrow C compressing the spring 5 and heavily loading the engaged ratchet pawls 6 and 7 so that they maintain a spring loaded pressure upon the jaw 2 in the direction of the arrow A forcefully clamping an object between the pads 1b and 2c.

It will be here noted that when it is desired to release the ratchet pawls 6 and 7 from the teeth 2d of the jaw 2, the cam 12 is rotated in a clockwise direction until its side is adjacent the arm 8c permitting the spring 11 to force the projection 8a into engagement with the pin 6b on the pawl 6 which tends to overcome the tension of the spring 9 and to release said pawl 6 from its engagement with the teeth 2d by pivoting the pawl 6 over the axis of the pin 6a. It will be noted that the ratchet pawl 6 must first be initially released from the teeth 2d before the spring 11 may act as hereinbefore described. In order to release the pawl 6 the lever 3 is pressed downwardly in the direction as indicated by the arrow B toward the handle 1e which forces the pawl 7 into engagement with the teeth 2d of the jaw 2 slightly raising the same relative to the frame 1 which automatically releases the bearing on the ratchet pawl 6 permitting the spring 11 to create sufficient compression of the project 8a on the pin 6b to retract the end of the ratchet pawl 6 from the particular tooth 2d which it engages. Release of the lever 3 permits the spring 13 to move the same in the opposite direction, whereupon the pin 7b engages the projection 8b of the pawl control plate 8 which retracts the end of the pawl 7 from the ratchet 2d which it engages permitting freely slidable relationship of the shank 2a in the bore 1c of the jaw 2 and frame 1 respectively. When it is desired to spread certain objects apart the pad 15d and 1b are inserted therebetween and the lever 3 is operated in the manner hereinbefore described which causes separation of the jaw arm 1a and the jaw arm 15c.

Though I have shown and described a particular construction, combination and arrangement of parts and portions I do not wish to be limited to this particular construction, combination and arrangement but desire to include in the scope of my invention the construction, combination and arrangement substantially as set forth in the appended claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a spring loaded ratchet clamp, a frame, a jaw member reciprocally mounted in said frame having ratchet teeth thereon, said frame having a stationary jaw adjacent said first mentioned jaw, a carriage in said frame mounted for rectilinear reciprocation therein, a spring tending to force said carriage in one direction coinciding with the tightening direction of said first mentioned jaw relative to said frame, a pair of pawls pivotally mounted in said carriage and a lever for operating said pawls for progressively moving said movable jaw relative to said jaw on said frame whereby said spring is compressed by said carriage and the tension of said spring is transferred through said pawls to said jaw reciprocally mounted in said frame.

2. In a spring loaded ratchet clamp, a frame, a jaw member reciprocally mounted in said frame having ratchet teeth thereon, said frame having a stationary jaw adjacent said first mentioned jaw, a carriage in said frame mounted for rectilinear reciprocation therein, a spring tending to force said carriage in one direction coinciding with the tightening direction of said first mentioned jaw relative to said frame, a pair of pawls pivotally mounted in said carriage and a lever for operating said pawls for progressively moving said movable jaw relative to said jaw on said frame whereby said spring is compressed by said carriage and the tension of said spring is transferred through said pawls to said jaw reciprocally mounted in said frame, one of said pawls being pivotally mounted on the inner extending end of said lever, said lever being pivotally mounted on said carriage, the other pawl being mounted on said carriage, and a pawl control plate engageable with said pawls for dis-

engaging the same from said first mentioned jaw member.

3. In a spring loaded ratchet clamp, a frame, a jaw member reciprocally mounted in said frame having ratchet teeth thereon, said frame having a stationary jaw adjacent said first mentioned jaw, a carriage in said frame mounted for rectilinear reciprocation therein, a spring tending to force said carriage in one direction coinciding with the tightening direction of said first mentioned jaw relative to said frame, a pair of pawls pivotally mounted in said carriage and a lever for operating said pawls for progressively moving said movable jaw relative to said jaw on said frame whereby said spring is compressed by said carriage and the tension of said spring is transferred through said pawls to said jaw reciprocally mounted in said frame, one of said pawls being pivotally mounted on the inner extending end of said lever, said lever being pivotally mounted on said carriage, the other pawl being mounted on said carriage, a pawl control plate engageable with said pawls for disengaging the same from said first mentioned jaw member, and a cam on said frame for shifting said ratchet pawl control plate.

4. In a spring loaded ratchet clamp, a frame having a bore therethrough, a jaw member on said frame, a second jaw member shiftably mounted in said bore having ratchet teeth thereon, a carriage in said frame movable parallel to the axis of said bore, a compression spring tending to force said carriage in one direction coinciding with the tightening direction of said second jaw relative to said first jaw, a ratchet pawl pivotally mounted on said carriage having a spring urging the same into engagement with said second jaw at its ratchet teeth portions, a lever pivotally mounted on said carriage, a second ratchet pawl pivotally mounted on said lever and engageable with the teeth of said second mentioned jaw, a spring tending to force said second mentioned ratchet pawl into engagement with said teeth of said second mentioned jaw, a control plate pivotally mounted on said carriage and having projection portions engageable with said ratchet pawls for disengaging the same from the teeth of said second mentioned jaw, a cam for pivoting said pawl control plate for disengaging said ratchet pawls from the teeth of said second mentioned jaw, and a handle fixed to said frame and extending therefrom in spaced relationship to said lever, and spring means operatively mounted on said handle for forcing said lever away from said handle.

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