Nov. 11, 1924. 1,515,286

H. M. SVEBILIUS

QUICK ADJUSTABLE CLAMP

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Fig. 1

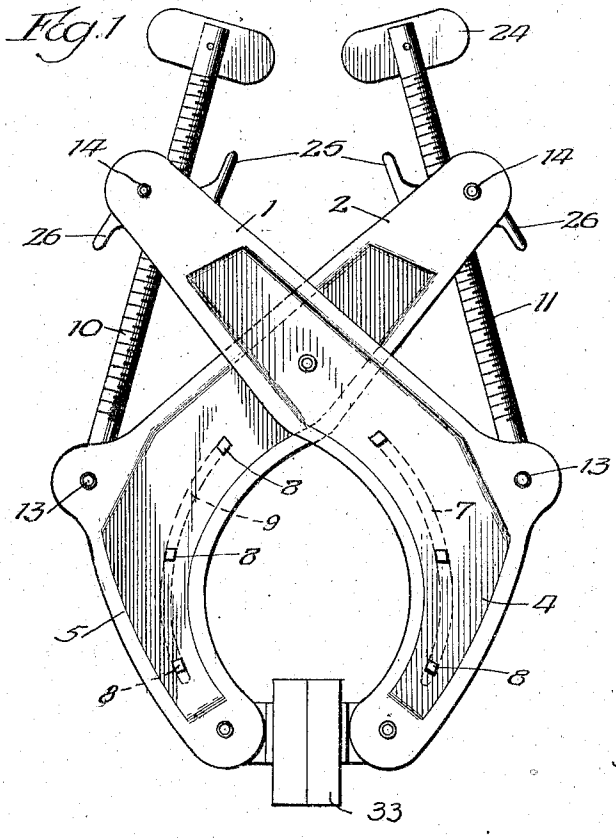


Fig. 2

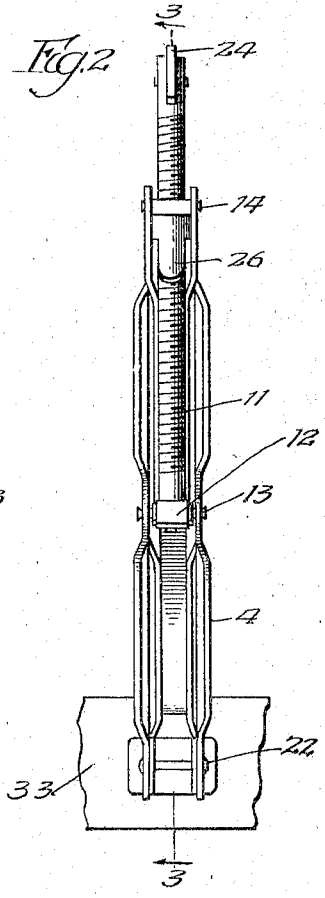


Fig. 4

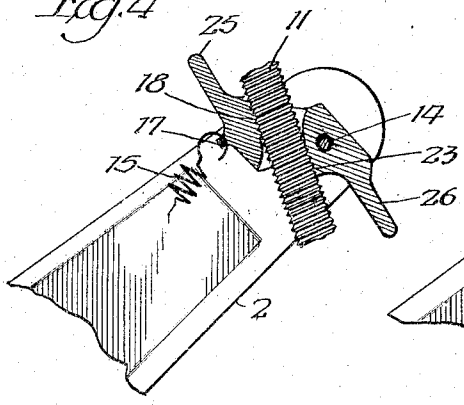
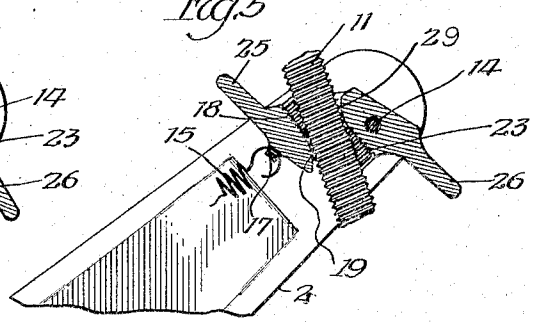


Fig. 5



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Fig. 3

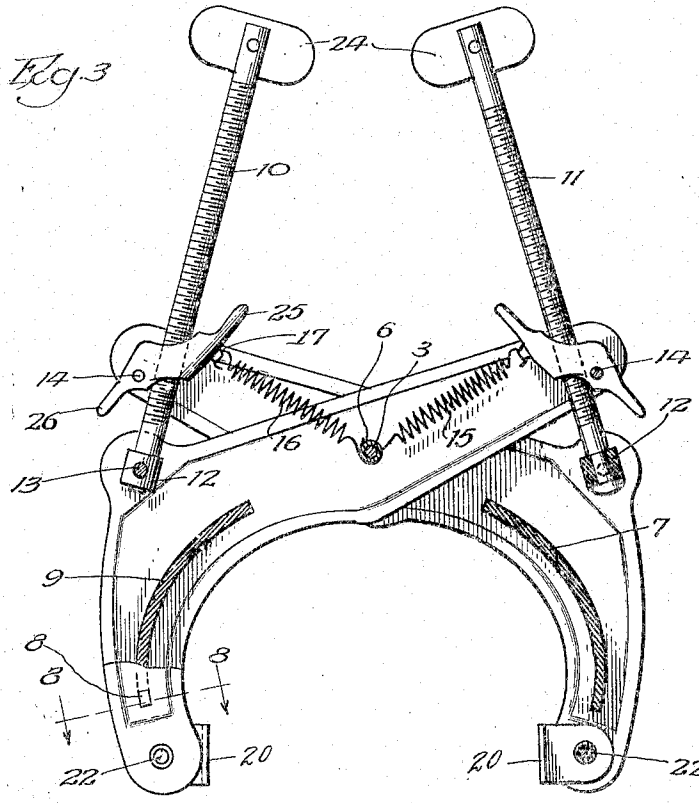


Fig. 9

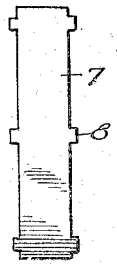


Fig. 6

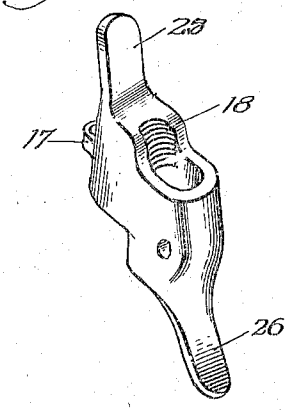


Fig. 7

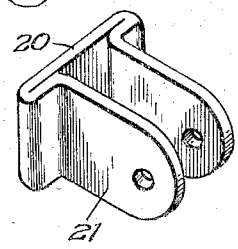
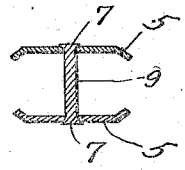


Fig. 8



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UNITED STATES PATENT OFFICE.

HENRY M. SVEBILIUS, OF EVANSTON, ILLINOIS.

QUICK-ADJUSTABLE CLAMP.

Application filed January 21, 1924. Serial No. 687,575.

To all whom it may concern:

Be it known that I, HENRY M. SVEBILIUS, citizen of the United States, residing at Evanston, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Quick-Adjustable Clamps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to hand clamps and in some of its general aspects aims to provide a hand clamp which can be quickly moved in either its opening or closing direction so as to adapt it instantly for use with objects of widely varying thicknesses; aims to provide effective means for tightening the clamp after its jaws have been brought into engagement with in interposed group of objects; aims to provide a clamp construction for this purpose in which a large share of the parts can be cheaply manufactured out of sheet material; aims to provide simple and effective reinforcing for stiffening certain members of the clamp; and aims to provide simple means for automatically releasing the clamping mechanism when the grip on the interposed group of objects is loosened.

It also aims to provide a spring-retracted clamp clutching arrangement in which the tightening movement of the clamp tightening screws automatically tightens the clutch and holds the clutch operatively engaged so long as the clamping pressure is exerted. Furthermore, my invention aims to provide an adjustable clamp in which the tightening mechanism can readily be operated from one end of the clamp, in which certain portions are disposed for convenient access to the fingers of the operator, and in which the tightening and operating means will not interfere with the more common operations on the clamped work. Still further and also more detailed objects will appear from the following specification and from the accompanying drawings, in which drawings,

Fig. 1 is an elevation of a clamp embodying my invention, showing this as it appears when clamping two relatively thin blocks to each other.

Fig. 2 is an end elevation of the same clamp.

Fig. 3 is a central and longitudinal section through the same clamp, taken along the line 3—3 of Fig. 2, but showing the clamp widely opened and with its gripping mechanism released and with the swiveling trunnion for one of the threaded stems shown in section.

Fig. 4 is an enlarged section through one of the threaded clutches, showing this as it appears when the clamp is in gripping operation after the manner of Fig. 1.

Fig. 5 is a similarly enlarged section, showing the position of the gripping clutch when it is released after the manner shown in Fig. 3 so as to permit the threaded stem to slide freely through it.

Fig. 6 is an enlarged perspective view of one of the stem-gripping clutches.

Fig. 7 is an enlarged perspective view of one of the swiveled jaw tips of the clamp.

Fig. 8 is an enlarged section taken through one of the jaw arms of the clamp along the line 8—8 of Fig. 3 and showing the method of fastening a reinforcing web to the jaw arms.

Fig. 9 is an elevation of one of the reinforcing webs before the same is attached to the pair of jaw arm portions between which it is interposed.

In the embodiment of the drawings, the clamp of my invention comprises a pair of main members pivoted to each other intermediate of their ends after the manner of shears or pliers, so as to afford handle arms 1 and 2 extending in one general direction (or upwardly) from the pivot pin 3 and jaw arms 4 and 5 extending in the other or downward direction from the said pivot. Each of these main members desirably comprises two relatively spaced parts extending parallel to each other and arranged so that the two parts which constitute one of the main members are interposed between the two parts which comprise the other main member.

Thus, the drawings show the inner of the

main members as comprising a pair of levers formed of sheet steel and spaced from each other at their jointed connection by a bushing 6 which surrounds the interposed portion of the pivot pin 3. The two parts of this inner main member are also spaced from each other by a stiffening web 7 which corresponds in width to the distance between the two jaw arm portions of the said inner main member and which has its longitudinal edges provided with projections 8 after the manner shown in Fig. 9. Each of these projections extends through a corresponding perforation in an adjacent jaw arm portion and is staked over into the said perforation so as to anchor the stiffening members rigidly to the two jaw arm portions between which it is interposed. The companion parts comprising the other main member bear against the outer faces of the two parts constituting the said inner main member adjacent to their pivotal connection and are similarly spaced from and rigidly secured to each other by a stiffening web 7 as shown near the lower right hand corner of Fig. 3.

Pivoted to the free end of each of the upper or handle arms of the clamp is a clutch which has certain parts thereof threaded as hereafter more fully described and which is adapted to have its threads engage a threaded stem or thrust member swiveled to the other main member, so that the pivotally connected arms of the clamp can be moved either toward or away from each other by rotating either of these stems.

For this purpose I desirably connect the lower end of each of these threaded stems or thrust members 10 and 11 by a swivel joint to a trunnion 12, which trunnion has a pair of projecting arms 13 extending through the opposed counterpart portions of the jaw arm of one of the main members after the manner shown in Figs. 2 and 3.

Each of these threaded stems extends through the bore of a clutch which desirably is constructed after the manner shown in Figs. 6 and 4. This clutch is pivoted near the lower end of its bore to a pin 14 extending through the opposed portions of the adjacent handle arm of one of the main members, and each clutch has upon its interior a threaded portion 18 which terminates above the said pivot pin 14 and is disposed on the opposite side of the bore from the said pin. Then I provide spring means associated with each of the clutches for normally rocking the clutch about its pivotal mounting to a position in which its said threaded portion is out of engagement with the thread of the adjacent threaded stem or thrust member, after the manner shown in Fig. 5. For this purpose I am here showing a pair of tension springs 15 and 16 each hooked at one end over the spacer bushing 6 which surrounds the main pivot 3 of the clamp, and each hooked at its other end into a perforated lug 17 disposed on one of the clutches at the opposite side of the pivot mounting of the clutch and somewhat above the said pivotal mounting. Then I provide a smooth and desirably round shouldered bore portion at the same side of the clutch with the said threaded portion 18 but below the latter and desirably also form a similar smooth and rounded portion 29 substantially opposite the lower part of the said threaded portion 18.

With the clutch thus arranged, it will be obvious from Fig. 5 that each spring normally holds the threaded portion 18 of the clutch disengaged from the stem passing through this clutch, so that this stem can slide freely between the said round shouldered bore portions which effectively form a smooth bore oblique to the axis of the thread of the clutch. Consequently, when the clamp is inoperative, as shown in Fig. 3, its main arms can readily be moved so as to increase or decrease the distance between the tips of the jaws, thereby permitting an instantaneous gripping of an interposed group of objects of any desired thickness without turning any threaded portion of the clamp. To make this gripping more effective, I desirably provide each jaw tip with a clamping jaw 19 swiveled to the jaw tip of one of the main members. Such a swiveled jaw tip is desirably formed of a single piece of sheet steel bent upon itself to afford a flat work-engaging portion 30 and to form a pair of spaced arms 21 each of which is connected to the said portion 20 by a reverse bend, the said arms 21 being perforated to fit a pivot pin 22 which connects it to the jaw tip portions of the adjacent main member.

After the clamp has been closed upon the interposed work, as for example on the pair of wood blocks 33 shown in Figs. 1 and 2, each of the clutches is manually rocked about its pivotal mounting against the resistance of the spring connected to that clutch, so as to bring the upper threaded portion 18 of the clutch into engagement with the adjacent threaded stem or thrust member. Then this adjacent stem is rotated in a direction tending to screw the same downward. When thus rotated, the threaded engagement of the stem with the clutch tends to move the clutch upwards and hence tends to rock it still more in the same direction in which it was moved for the purpose of engaging the clutch with the threads of the stem, namely a direction which would be clockwise in Figs. 4 and 5. Consequently, this action forces the stem against the other side of the bore of the clutch and causes the clutch to grip the stem in such a manner that the spring will not swing it out of its

said stem engaging position after the clutch rocking digital pressure is relaxed.

To increase the effective engagement with the adjacent threaded stem, I desirably provide each clutch also with a lower threaded portion 23 disposed at the opposite side of the bore of the clutch from the said threaded portion 18 but lower than this threaded portion, as shown in Figs. 4 and 5. To facilitate the moving of the threaded stems and of the clutches, I desirably provide each of the same with suitably formed finger pieces. Thus, I am showing each of the threaded stems as having at its upper end a cross-bar 24 which can readily be grasped by the fingers of the operator, and am showing each of the clutches as having an upper finger-piece 25 and a lower finger-piece 26. These finger-pieces on each clutch project beyond the adjacent handle arm of the clamp, and with moderate sizes of my clamp, these finger-pieces can readily be reached by the same hand of the operator which holds the clamp to the work, thereby expediting the manipulation of my clamp.

Owing to the position of the lug 17 on each of the clutches with respect to the pivotal mounting of this clutch, the spring associated with each latched clutch still tends continuously to swing the clutch into its unlatched position. Consequently, as soon as each of the threaded stems is turned backwards so as to release the firm gripping of the work which was clamped between the jaws, the springs automatically snap the clutches out of engagement with the threaded stems, thereby permitting the clamp to be opened wide for the removal of the previously clamped work and for applying the clamp to the next job.

By forming each of the main members out of counterpart sheet steel portions, which desirably have their edge parts bent towards each other so as to stiffen them, I can secure great strength in a relatively light and cheap construction. At the same time, the reinforcing webs 7 prevent relative movement of the two parts comprising each jaw arm, thereby affording the required rigidity.

By thus providing for a free sliding of the threaded stems or thrust members with respect to the clutches when the clamp is being opened or closed, I have found that I can save approximately four-fifths of the time which is consumed with the ordinary clamps, such as the so called C clamps commonly used by pattern makers. Furthermore, with my adjustable clamp, the tightening screws or threaded stems are out of the way of the work, so that they do not interfere with the drilling of holes transverse of the clamping jaw tips after the manner of the tightening screws in such C clamps.

However, while I have illustrated and described the adjustable clamp of my invention in an embodiment including a highly desirable shaping of various parts, I do not wish to be limited to the details of the construction and arrangement as thus disclosed, it being obvious that the same might be varied in many ways without departing either from the spirit of my invention or from the appended claims.

I claim as my invention:—

1. An adjustable clamp comprising a pair of main members pivotally connected intermediate of their ends to afford jaw arms and handle arms at respectively opposite sides of the pivotal connection, a pair of threaded thrust members each swiveled at one end to the jaw arm of one member and extending past the handle arm of the other member, and two threaded clutches movably mounted respectively on the two handle arms and each movable into and out of threaded engagement with the adjacent thrust member.

2. An adjustable clamp comprising a pair of main members pivotally connected intermediate of their ends to afford jaw arms and handle arms at respectively opposite sides of the pivotal connection, a pair of threaded thrust members each swiveled at one end to the jaw arm of one member and extending past the handle arm of the other member, two threaded clutches movably mounted respectively on the two handle arms and each movable into and out of threaded engagement with the adjacent thrust member, and spring means normally holding each thrust member out of its said threaded engagement.

3. A clamp as per claim 1, in which each clutch is pivoted to one handle arm on an axis transverse of that of the adjacent thrust member and has an internally threaded substantially semi-cylindrical portion adapted to engage the thread of the thrust member.

4. A clamp as per claim 1, in which each clutch is pivoted to one handle arm on an axis transverse of that of the adjacent thrust member and has a pair of oppositely facing and internally threaded and substantially semi-cylindrical portions disposed at opposite sides of its pivotal connection to the adjacent handle arm.

5. A clamp as per claim 1, in which each clutch is pivoted to one handle arm on an axis transverse of that of the adjacent thrust member and has a pair of oppositely facing and internally threaded and substantially semi-cylindrical portions disposed at opposite sides of its pivotal connection to the adjacent handle arm, and in which the thrust member engageable by each clutch extends continuously through the latter.

6. A clamp as per claim 1, in which each clutch is pivoted to one handle arm on an axis transverse of that of the adjacent thrust member and has a pair of oppositely facing and internally threaded and substantially semi-cylindrical portions disposed at opposite sides of its pivotal connection to the adjacent handle arm, and in which the thrust member engageable by each clutch extends continuously through the latter, the bore of the clutch having smooth shoulders directed towards each other to permit the adjacent thrust member to slide freely through the nut when the nut is in its inoperative position.

7. A clamp as per claim 1, in which each nut has a fingerpiece for enabling it to be digitally moved into its said threaded engagement.

8. An adjustable clamp comprising a pair of main members pivotally connected to each other intermediate of their ends to afford jaw arms extending in the same general direction from the pivotal connection and handle arms extending in the opposite general direction, a clutch pivoted to the handle arm of one member and having a partially threaded bore, and a threaded member extending through the clutch and swiveled upon an arm of the other main member and having its thread engageable by the thread of the clutch when the clutch is in one position but clearing the said thread when the clutch is moved about its pivot to another position.

9. A clamp as per claim 8, in which the pivotal connection between the nut and the handle arm is disposed between the said thread of the clutch and the swiveled connection of the said threaded member to the said arm of the other main member, so that a turning of the threaded member when the thread of the clutch is engaged therewith will tend to move the nut about its pivotal mounting into tighter thread engaging relation to the threaded member.

10. A clamp as per claim 8, in which the pivotal connection between the clutch and the handle arm is disposed between the said thread of the clutch and the swiveled connection of the said threaded member to the said arm of the other main member, so that a turning of the threaded member in the clamp-tightening direction will move the clutch about its pivotal mounting into tighter engagement with one side of the threaded member, thereby swinging the threaded member in one direction about its swiveled connection to the said arm of the other member, and means for limiting the swinging movement of the threaded member in the said direction.

11. A clamp as per claim 8, in which the pivotal connection between the clutch and the handle arm is disposed between the said thread of the clutch and the swiveled connection of the said threaded member to the said arm of the other main member, so that a turning of the threaded member in the clamp-tightening direction will move the clutch about its pivotal mounting into tighter engagement with one side of the threaded member, thereby swinging the threaded member in one direction about its swiveled connection to the said arm of the other member, and means for limiting the swinging movement of the threaded member in the said direction, the said means comprising a second threaded portion disposed upon the bore of the clutch and nearer to the pivot than the first named threaded portion but on the opposite side of the threaded member.

12. A clamp as per claim 8, in which the pivotal connection between the clutch and the handle arm is disposed between the said thread of the clutch and the swiveled connection of the said threaded member to the said arm of the other main member, so that a turning of the threaded member in the clamp-tightening direction will move the clutch about its pivotal mounting into tighter engagement with one side of the threaded member, thereby swinging the threaded member in one direction about its swiveled connection to the said arm of the other member, and means for limiting the swinging movement of the threaded member in the said direction, the said means comprising a second threaded portion upon the bore of the clutch and nearer to the pivot than the first named threaded portion but on the opposite side of the threaded member, the clutch having a smooth edged transverse gore extending oblique to the axis of its threaded portions and between these portions.

13. An adustable clamp comprising a pair of main members pivotally connected intermediate of their ends to afford jaw arms and handle arms at respectively opposite sides of the pivotal connection, a pair of threaded thrust members each swiveled at one end to the jaw arm of one member and extending past the handle arm of the other member, and two threaded clutches movably mounted respectively on the two handle arms and each movable into and out of threaded engagement with the adjacent thrust member, and a pair of tension springs respectively associated with the two clutches and each continuously tending to move one of the clutches out of threaded engagement with the adjacent thrust member.

14. An adjustable clamp comprising a pair of main members pivotally connected intermediate of their ends to afford jaw arms and handle arms at respectively opposite sides of the pivotal connection, a pair of threaded thrust members each swiveled at one end to the jaw arm of one

member and extending past the handle arm of the other member, and two threaded clutches movably mounted respectively on the two handle arms and each movable into and out of threaded engagement with the adjacent thrust member, and a pair of tension springs respectively associated with the two clutches and each continuously tending to move one of the clutches out of threaded engagement with the adjacent thrust member, each of the springs having one end in operative engagement with the pivot of the said main members.

Signed at Chicago, Illinois, January 12th, 1924.

HENRY M. SVEBILIUS.