

Aug. 7, 1928.

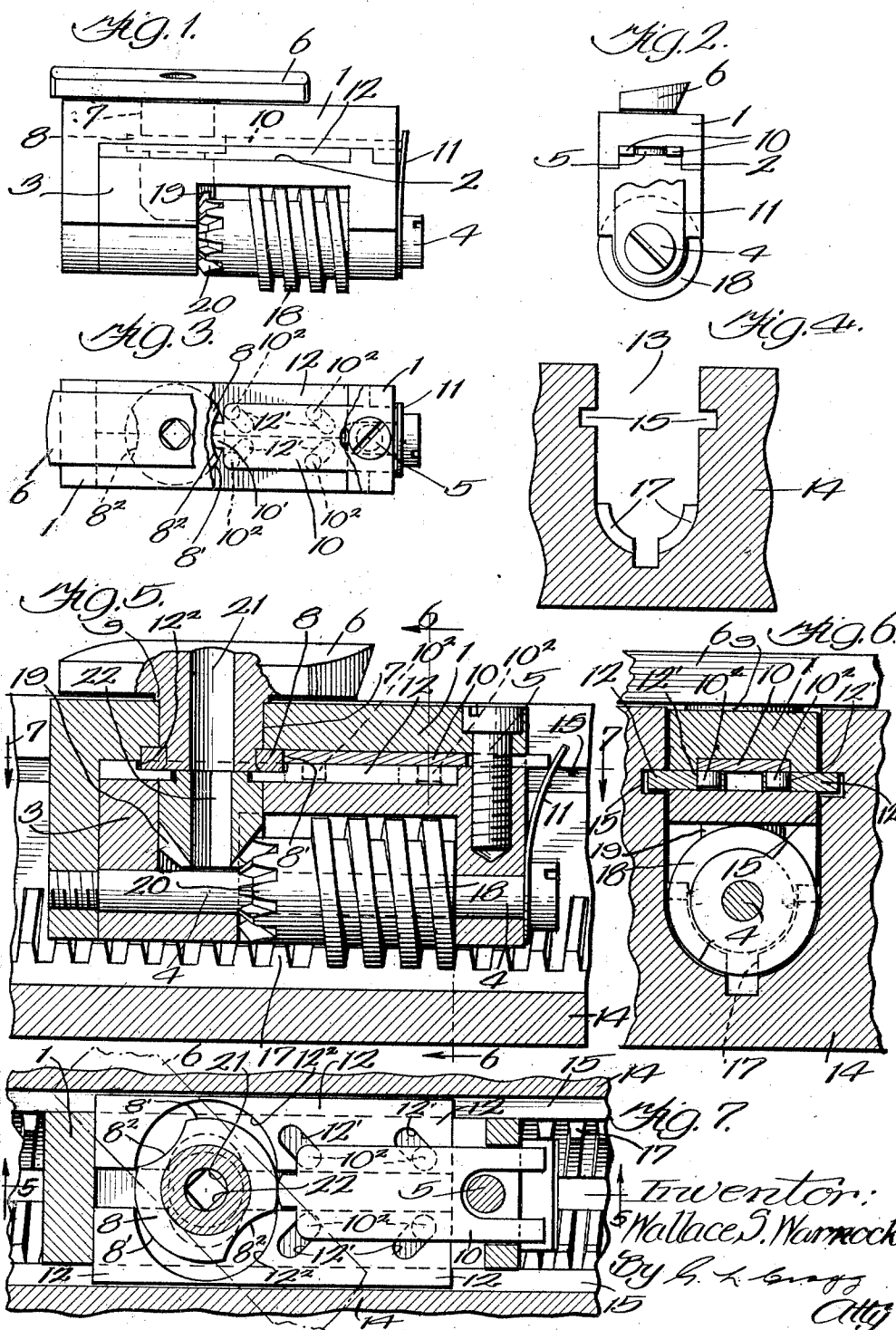
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1,680,030

CLAMPING DEVICE

Filed Aug. 10, 1927

2 Sheets-Sheet 1



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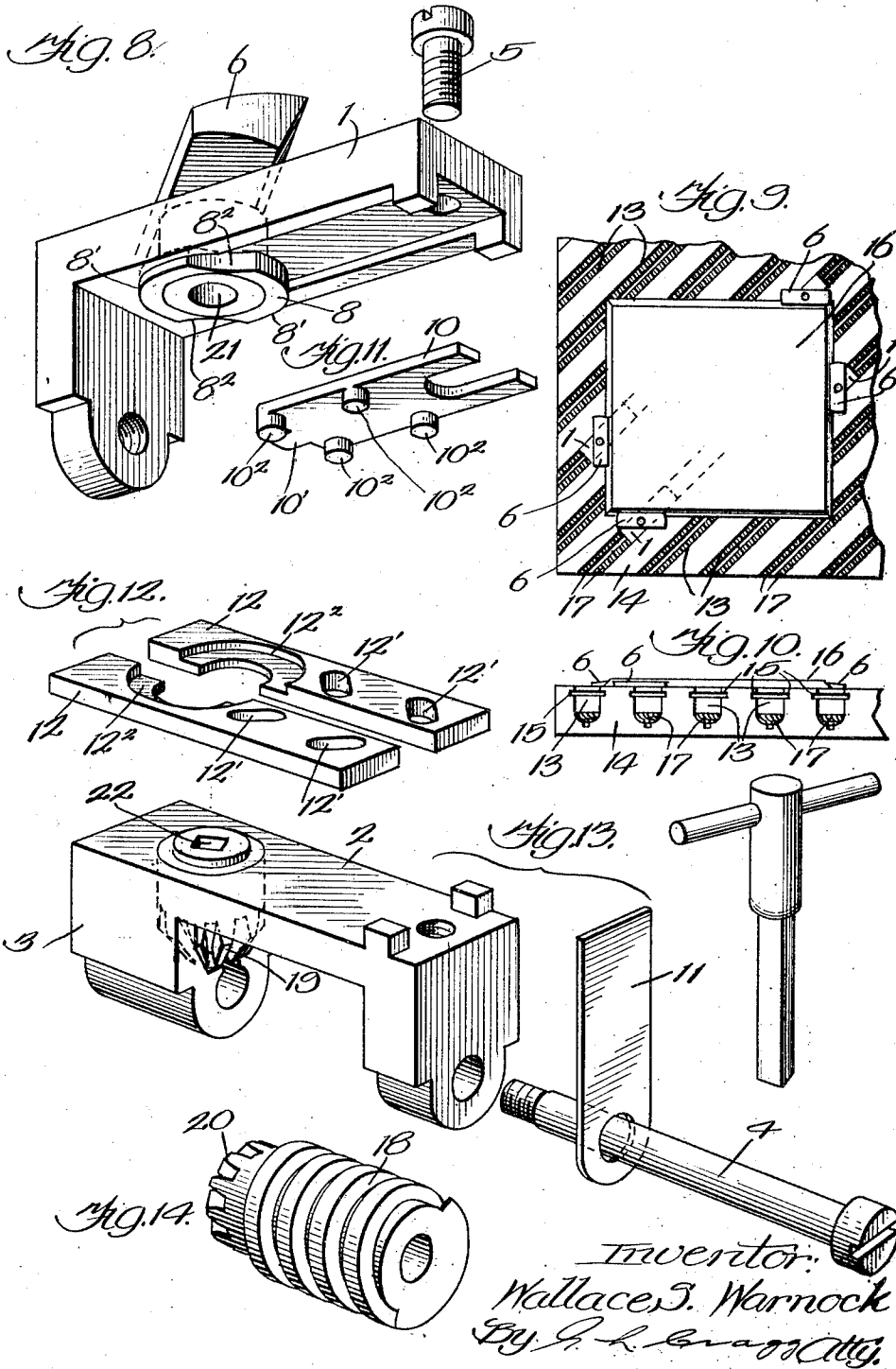
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2 Sheets-Sheet 2



Patented Aug. 7, 1928.

1,680,030

UNITED STATES PATENT OFFICE.

WALLACE S. WARNOCK, OF CHICAGO, ILLINOIS.

CLAMPING DEVICE.

Application filed August 10, 1927. Serial No. 212,081.

My invention relates to clamping devices for holding printing elements upon printing form supporting beds, such clamping devices being commonly termed "register hooks".

The structure of my invention includes a bed which is preferably provided with parallel grooves margined by shoulders desirably at the tops of the grooves and serving to receive retaining plates provided upon the bodies of the clamps to hold them within the grooves, the clamping jaws being provided above the bed or form support. The jaws are rotatable upon axes that are angular to the bed or form support and are in controlling relation to the retaining plates, the jaws serving to project the plates beneath the shoulders when the jaws are turned into work engaging positions. Worm screws are desirably carried by the bodies of the clamps parallel to the grooves, the threads upon the screws being in mesh with segmental threads provided upon the lower parts of the grooves. Bevel pinions are provided upon the worm screws and other bevel pinions are journaled in the bodies of the clamps and are in mesh with the first bevel pinions, the second bevel pinions being accessible for operation by an adjusting wrench which is preferably passed through the jaws. The clamps are thus bodily movable along the grooves to bring the jaws into the desired engagement of the work to be held thereby.

The mechanism whereby a clamping jaw is enabled to adjust the retaining plates associated therewith is desirably inclusive of a cam upon the stem of the jaw and in the plane of the retaining plates, an adjusting plate operable by the cam and having wedging or spreading engagement with the retaining plates, and a spring serving to hold the adjusting plate against the cam.

The invention will be more fully explained in connection with the accompanying drawings in which Fig. 1 is a side view of the clamping device as it is preferably constructed; Fig. 2 is an end view with the spring which appears thereat broken away; Fig. 3 is a plan view with parts broken away; Fig. 4 is a cross sectional view of a portion of the printing bed or form support illustrating one of the clamp receiving grooves thereof; Fig. 5 is a longitudinal sectional view of the clamp on a larger scale, a portion of the bed that received the body

of the clamp being also illustrated in section; Fig. 6 is a sectional view on line 6—6 of Fig. 5; Fig. 7 is a sectional view on line 7—7 of Fig. 5; Fig. 8 is a perspective view illustrating one part of the clamp body, the jaw thereon, the cam upon the stem of the jaw, and an assembling screw or bolt taking part in assembling the clamp body portion illustrated with another clamp body portion; Fig. 9 is a plan view, on a smaller scale, illustrating a printing plate held in a printing bed or form support by the clamping device of my invention; Fig. 10 is an end view of the arrangement illustrated in Fig. 9; Fig. 11 is a perspective of the adjusting plate; Fig. 12 is a perspective view of a pair of retaining plates; Fig. 13 is a perspective view illustrating the clamp body portion that is complementary to the clamp body illustrated in Fig. 8, one of the bevel pinions journaled in this clamp body portion, another assembling bolt for assembling the two clamp body portions, and a leaf spring that serves to press upon the adjusting plate of Fig. 11; and Fig. 14 is a perspective view of the worm screw.

The body of the clamp is composed of an L-shaped member 1 and a U-shaped member 2 whose mid or base portion engages one side of the L-shaped portion and one of whose sides 3 engages the remaining side of the member 1. An assembling bolt 4 passes through the ends of the U-shaped member 2 and is threaded into the latter side of the L-shaped member 1. Another assembling bolt or screw 5 passes through the outer end of the side of the L-shaped member 1 and engages the mid or base portion of the U-shaped member 2, this bolt being threaded into said U-shaped member. The work engaging jaw 6 is formed with a stem 7 which is journaled in the top side of the clamp body, as indicated most clearly in Fig. 5. A cam 8 is fastened upon the lower end of the stem 7, this cam constituting a flange whose upper face is in contact with the lower face of the horizontal side of the body member 1, being maintained in this relation by a shoulder 9 which contacts with the top face of said horizontal side of the body member 1. Such lower face of this body member is raised as indicated in Fig. 8 to a depth less than the thickness of said cam and just sufficient to snugly receive the adjusting plate 10 which is slidable longitudinally of the clamp body. This plate is pressed upon by a

leaf spring 11 which is clamped by the head of the bolt 4 against the clamp body. The spring serves to maintain the reduced end 10' of the plate 10 in engagement with the cam 8. Said cam has two diametrically opposite arcuate dwells 8' that are coaxial with the jaw stem 7. It also has two diametrically opposite concave actuating portions 8² that are located between the parts 8'. When either of the dwells 8' engages the plate portion 10', the plate 10 is thrust outwardly from the axis of the jaw 6 against the force of the spring 11 and when either cam portion 8² receives the plate portion 10', the plate 10 is moved toward the stem of the jaw by the spring 11 to the extent permitted by the cam.

The adjusting plate 10 is formed with depending fingers 10² that enter the slots or recesses 12' in the retaining plates 12 which are employed to hold the body of the clamp within the groove 13 of the bed or form support 14, the plates 12 being movable transversely of the clamp body and being projectable laterally thereof at their longitudinal sides in order that they may serve to hold the clamp in assembly with the work support. The upper sides of said retaining plates 12 are formed with recesses 12² which snugly receive the arcuate portions 8' of the cam 8 whereby said plates are prevented from being moved lengthwise of the clamp body. The slots or recesses 12' in each retaining plate 12 are slanted as illustrated whereby the adjusting plate 10 has wedging engagement with the retaining plates. When the jaw 6 is placed lengthwise of the clamp body, the cam portions 8² are positioned so that one of them fully receives the adjusting plate portion 10', the wedging fingers 10² then causing the retaining plates to move together to bring the outer longitudinal edges of these plates flush with the sides of the clamp body. When these retaining plates are thus drawn inwardly toward each other, the clamp body may be inserted into the selected one of the parallel grooves 13 formed in the bed support 14, this groove being of just such depth as to bring the plates 12 into the plane of the slots 15 formed in the sides of the groove 13, these slots being just of sufficient depth to snugly receive the outer longitudinal sides of these plates when the jaw 6 is turned into a work holding position such as illustrated in Figs. 5, 7, 8 and 9, the jaw, in being brought into its work holding position, forcing the adjusting plate 10 outwardly until its cam engaging portion 10' is engaged by one of the dwells 8'. The work holding jaw 6 is then held from vertical displacement and close to the work support 14 to take part in holding the plate or work 16 close upon its support.

The clamping device is also desirably adjustable in the groove 13 that receives it so

that its location may be readily changed to suit the location of the printing element 16. When the clamp is thus constructed, I provide sectional threads 17 in the lower parts of the grooves 13, these threads being in the nature of racks. A worm screw 18 is mounted upon the stem of the bolt 4 and is free to turn on and with respect to such stem, said worm screw being in thrusting relation to the body of the clamp so that when the screw is turned the clamp will be forced to move along the groove in which its body is received. Said screw is desirably turned by means of two intermeshing bevel pinions 19 and 20, the pinion 19 being housed by the body member 2 and rotatable therein while the pinion 20 is desirably directly formed upon the body of the screw 18. The pinion 19 is coaxial with the jaw stem 7. Said jaw stem is provided with a cylindrical bore 21 while the pinion 19 is provided with a square bore 22 that is in alignment with the bore 21. A square wrench may be passed through the bore 21 into the bore 22 in order to turn the pinion 19 to turn the screw 18 and force or effect the travel of the clamp.

In the use of the clamping device, the body thereof is placed in the groove 13 that receives it in close proximity to the work that is to be held, the actual clamping engagement of the clamping jaw with the work being effected by turning the screw 18 in the manner described. While I have illustrated the bed or form support 14 as being flat, it is to be understood that the clamp of my invention is not to be limited to such a flat support.

My copending applications Serial No. 257,406 and Serial No. 257,407, filed February 27, 1928, disclose printing press beds upon which the clamping device herein disclosed may be employed.

Changes may be made without departing from the invention.

Having thus described my invention, I claim:

1. A clamp structure including the body thereof; a jaw upon said body and having a stem journaled within the body; a cam upon said stem; an adjusting plate engageable with the cam; and a retaining plate with which the adjusting plate is in wedging engagement, said retaining plate being constrained to move transversely of the clamp body upon movement of the adjusting plate by the cam and projecting laterally beyond the clamp body in one position to serve to hold the clamp in place.

2. A clamp structure including the body thereof; a jaw upon said body and having a stem journaled within the body; a cam upon said stem; an adjusting plate engageable with the cam; a retaining plate with which the adjusting plate is in wedging engagement, said retaining plate being constrained

to move transversely of the clamp body upon movement of the adjusting plate by the cam and projecting laterally beyond the clamp body in one position to serve to hold the clamp in place; and a spring maintaining the adjusting plate in engagement with the cam.

3. A clamp structure including the body thereof; a jaw upon said body and having a stem journaled within the body; a cam upon said stem and having an arcuate portion coaxial with the stem and an actuating portion; an adjusting plate engageable with the cam; and a retaining plate with which the adjusting plate is in wedging engagement, said retaining plate being constrained to move transversely of the clamp body upon movement of the adjusting plate by the actuating portion of the cam and projecting laterally beyond the clamp body in one position to serve to hold the clamp in place.

4. A clamp structure including the body thereof; a jaw upon said body and having a stem journaled within the body; a cam upon said stem and having an arcuate portion coaxial with the stem and an actuating portion; an adjusting plate engageable with the cam; a retaining plate with which the adjusting plate is in wedging engagement, said retaining plate being constrained to move transversely of the clamp body upon movement of the adjusting plate by the actuating portion of the cam and projecting laterally beyond the clamp body in one position to serve to hold the clamp in place; and a spring maintaining the adjusting plate in engagement with the cam.

5. A clamp structure including a body thereof; a jaw upon said body and having a stem journaled within the body; a cam upon said stem; an adjusting plate engageable with the cam; a retaining plate with which the adjusting plate is in wedging engagement, said retaining plate being constrained to move transversely of the clamp body upon movement of the adjusting plate by the cam and projecting laterally beyond the clamp body in one position to serve to hold the clamp in place; a rotatable worm screw carried by the clamp body for engagement with a rack; and meshing pinions, one in driving relation to the worm screw and the other accessible for operation to the jaw of the clamp.

6. A clamp structure including the body thereof; a jaw upon said body and having a stem journaled within the body; a cam upon said stem; an adjusting plate engageable with the cam; a retaining plate with which the adjusting plate is in wedging engagement, said retaining plate being constrained to move transversely of the clamp body upon movement of the adjusting plate by the cam and projecting laterally beyond the clamp body in one position to serve to hold the

clamp in place; a spring maintaining the adjusting plate in engagement with the cam; a rotatable worm screw carried by the clamp body for engagement with a rack; and meshing pinions, one in driving relation to the worm screw and the other accessible for operation to the jaw of the clamp.

7. A clamp structure including the body thereof; a jaw upon said body and having a stem journaled within the body; a cam upon said stem and having an arcuate portion coaxial with the stem and an actuating portion; an adjusting plate engageable with the cam; a retaining plate with which the adjusting plate is in wedging engagement, said retaining plate being constrained to move transversely of the clamp body upon movement of the adjusting plate by the actuating portion of the cam and projecting laterally beyond the clamp body in one position to serve to hold the clamp in place; a rotatable worm screw carried by the clamp body for engagement with a rack; and meshing pinions, one in driving relation to the worm screw and the other accessible for operation to the jaw of the clamp.

8. A clamp structure including the body thereof; a jaw upon said body and having a stem journaled within the body; a cam upon said stem and having an arcuate portion coaxial with the stem and an actuating portion; an adjusting plate engageable with the cam; a retaining plate with which the adjusting plate is in wedging engagement, said retaining plate being constrained to move transversely of the clamp body upon movement of the adjusting plate by the actuating portion of the cam and projecting laterally beyond the clamp body in one position to serve to hold the clamp in place; a spring maintaining the adjusting plate in engagement with the cam; a rotatable worm screw carried by the clamp body for engagement with a rack; and meshing pinions, one in driving relation to the worm screw and the other accessible for operation to the jaw of the clamp.

9. A clamp structure including the body thereof which is formed of two members, one an L-shaped member and the other a U-shaped member whose mid or base portion is in close approximation to one side of the L-shaped member, there being a recess extending longitudinally of the clamp between said mid or base portion of the U-shaped member and the adjacent side of the L-shaped member; a jaw upon said body and having a stem journaled within the body; a cam upon said stem; an adjusting plate slidable within said recess and engageable with the cam; and a retaining plate with which the adjusting plate is in wedging engagement, said retaining plate being constrained to move transversely of the clamp body upon movement of the adjust-

ing plate by the cam and projecting laterally beyond the clamp body in one position to serve to hold the clamp in place.

10. A clamp structure including the body thereof which is formed of two members, one an L-shaped member and the other a U-shaped member whose mid or base portion is in close approximation to one side of the L-shaped member, there being a recess extending longitudinally of the clamp between said mid or base portion of the U-shaped member and the adjacent side of the L-shaped member; a jaw upon said body and having a stem journaled within the body; a cam upon said stem; an adjusting plate slidable within said recess and engageable with the cam; a retaining plate with which the adjusting plate is in wedging engagement, said retaining plate being constrained to move transversely of the clamp body upon movement of the adjusting plate by the cam and projecting laterally beyond the clamp body in one position to serve to hold the clamp in place; and a spring maintaining the adjusting plate in engagement with the cam.

11. A clamp structure including the body thereof which is formed of two members, one an L-shaped member and the other a U-shaped member whose mid or base portion is in close approximation to one side of the L-shaped member, there being a recess extending longitudinally of the clamp between said mid or base portion of the U-shaped member and the adjacent side of the L-shaped member; a jaw upon said body and having a stem journaled within the body; a cam upon said stem and having an arcuate portion coaxial with the stem and an actuating portion; an adjusting plate slidable within said recess and engageable with the cam; and a retaining plate with which the adjusting plate is in wedging engagement, said retaining plate being constrained to move transversely of the clamp body upon movement of the adjusting plate by the actuating portion of the cam and projecting laterally beyond the clamp body in one position to serve to hold the clamp in place.

12. A clamp structure including the body thereof which is formed of two members, one an L-shaped member and the other a U-shaped member whose mid or base portion is in close approximation to one side of the L-shaped member, there being a recess extending longitudinally of the clamp between said mid or base portion of the U-shaped member and the adjacent side of the L-shaped member; a jaw upon said body and having a stem journaled within the body; a cam upon said stem and having an arcuate portion coaxial with the stem and an actuating portion; an adjusting plate slidable within said recess and engageable

with the cam; a retaining plate with which the adjusting plate is in wedging engagement, said retaining plate being constrained to move transversely of the clamp body upon movement of the adjusting plate by the actuating portion of the cam and projecting laterally beyond the clamp body in one position to serve to hold the clamp in place; and a spring maintaining the adjusting plate in engagement with the cam.

13. A clamp structure including the body thereof which is formed of two members, one an L-shaped member and the other a U-shaped member whose mid or base portion is in close approximation to one side of the L-shaped member, there being a recess extending longitudinally of the clamp between said mid or base portion of the U-shaped member and the adjacent side of the L-shaped member; a jaw upon said body and having a stem journaled within the body; a cam upon said stem; an adjusting plate slidable within said recess and engageable with the cam; a retaining plate with which the adjusting plate is in wedging engagement, said retaining plate being constrained to move transversely of the clamp body upon movement of the adjusting plate by the cam and projecting laterally beyond the clamp body in one position to serve to hold the clamp in place; a bolt passing through the sides of the U-shaped member into the adjacent side of the L-shaped member; a rotatable worm screw journaled upon said bolt for engagement with a rack; and meshing pinions, one in driving relation to the worm screw and the other accessible for operation to the jaw of the clamp.

14. A clamp structure including the body thereof which is formed of two members, one an L-shaped member and the other a U-shaped member whose mid or base portion is in close approximation to one side of the L-shaped member, there being a recess extending longitudinally of the clamp between said mid or base portion of the U-shaped member and the adjacent side of the L-shaped member; a jaw upon said body and having a stem journaled within the body; a cam upon said stem; an adjusting plate slidable within said recess and engageable with the cam; a retaining plate with which the adjusting plate is in wedging engagement, said retaining plate being constrained to move transversely of the clamp body upon movement of the adjusting plate by the cam and projecting laterally beyond the clamp body in one position to serve to hold the clamp in place; a spring maintaining the adjusting plate in engagement with the cam; a bolt passing through the sides of the U-shaped member into the adjacent side of the L-shaped member; a rotatable worm screw journaled upon said bolt for engagement with a rack; and meshing pinion, one in

driving relation to the worm screw and the other accessible for operation to the jaw of the clamp.

15. A clamp structure including the body
5 thereof which is formed of two members, one an L-shaped member and the other a U-shaped member whose mid or base portion is in close approximation to one side of the L-shaped member, there being a recess
10 extending longitudinally of the clamp between said mid or base portion of the U-shaped member and the adjacent side of the L-shaped member; a jaw upon said body and having a stem journaled within the body; a cam upon
15 said stem and having an arcuate portion coaxial with the stem and an actuating portion; an adjusting plate slidable within said recess and engageable with the cam; a retaining plate with which the adjusting
20 plate is in wedging engagement, said retaining plate being constrained to move transversely of the clamp body upon movement of the adjusting plate by the actuating portion of the cam and projecting laterally
25 beyond the clamp body in one position to serve to hold the clamp in place; a bolt passing through the sides of the U-shaped member into the adjacent side of the L-shaped member; a rotatable worm screw
30 journaled upon said bolt for engagement with a rack; and meshing pinions, one in driving relation to the worm screw and the other accessible for operation to the jaw of the clamp.

35 16. A clamp structure including the body

thereof which is formed of two members, one an L-shaped member and the other a U-shaped member whose mid or base portion is in close approximation to one side of the L-shaped member, there being a recess
40 extending longitudinally of the clamp between said mid or base portion of the U-shaped member and the adjacent side of the L-shaped member; a jaw upon said body and having a stem journaled within the body; 45 a cam upon said stem and having an arcuate portion coaxial with the stem and an actuating portion; an adjusting plate slidable within said recess and engageable with the cam; a retaining plate with which the ad- 50 justing plate is in wedging engagement, said retaining plate being constrained to move transversely of the clamp body upon movement of the adjusting plate by the actuating portion of the cam and projecting 55 laterally beyond the clamp body in one position to serve to hold the clamp in place; a spring maintaining the adjusting plate in engagement with the cam; a bolt passing through the sides of the U-shaped member 60 into the adjacent side of the L-shaped member; a rotatable worm screw journaled upon said bolt for engagement with a rack; and meshing pinions, one in driving relation to the worm screw and the other accessible for 65 operation to the jaw of the clamp.

I witness whereof, I hereunto subscribe my name.

WALLACE S. WARNOCK.