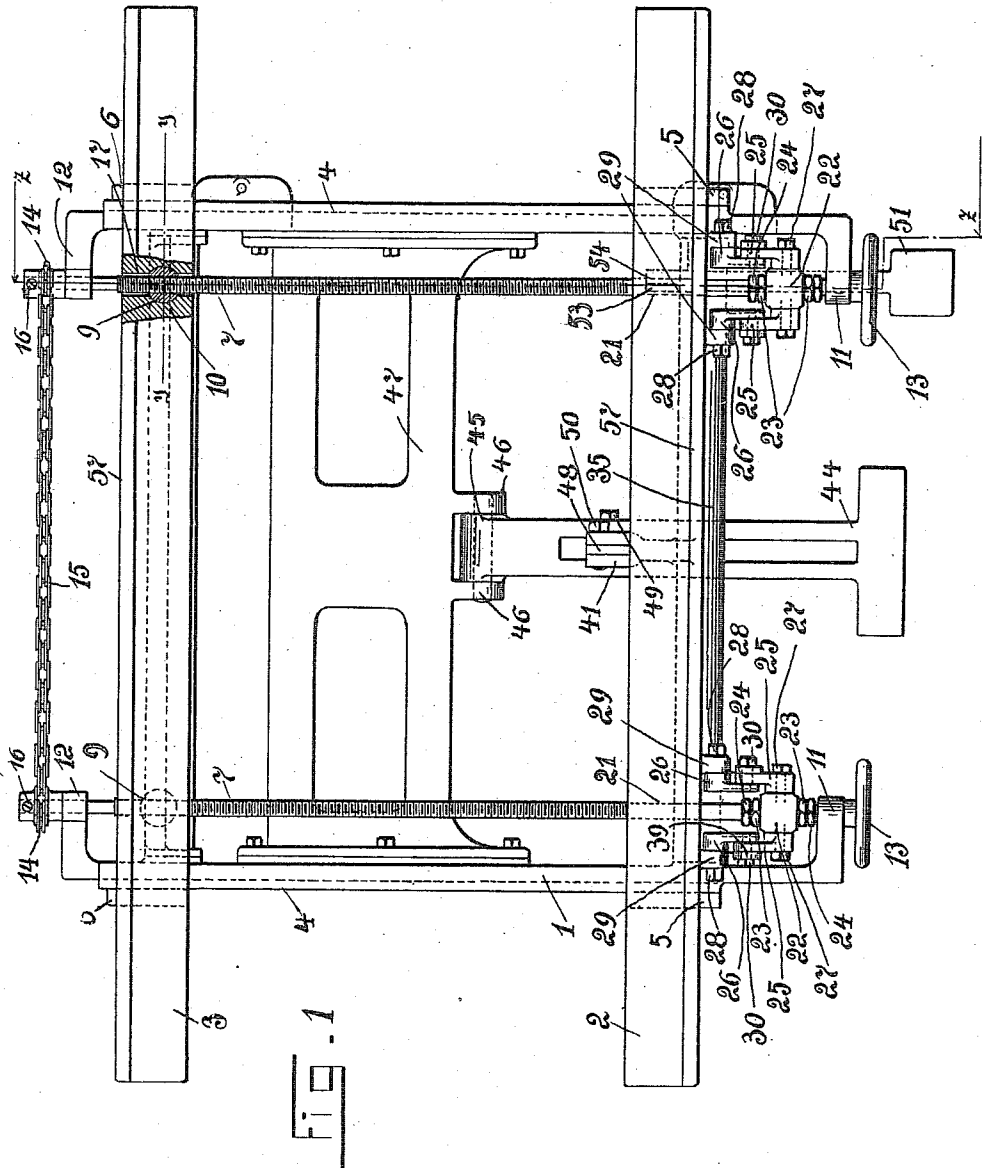


J. R. THOMAS.
CLAMPING APPARATUS.
APPLICATION FILED OCT. 15, 1909.

985,857.

Patented Mar. 7, 1911.

2 SHEETS—SHEET 1.



Witnesses:

C. Klostermann

Lillian Burnett

Inventor.

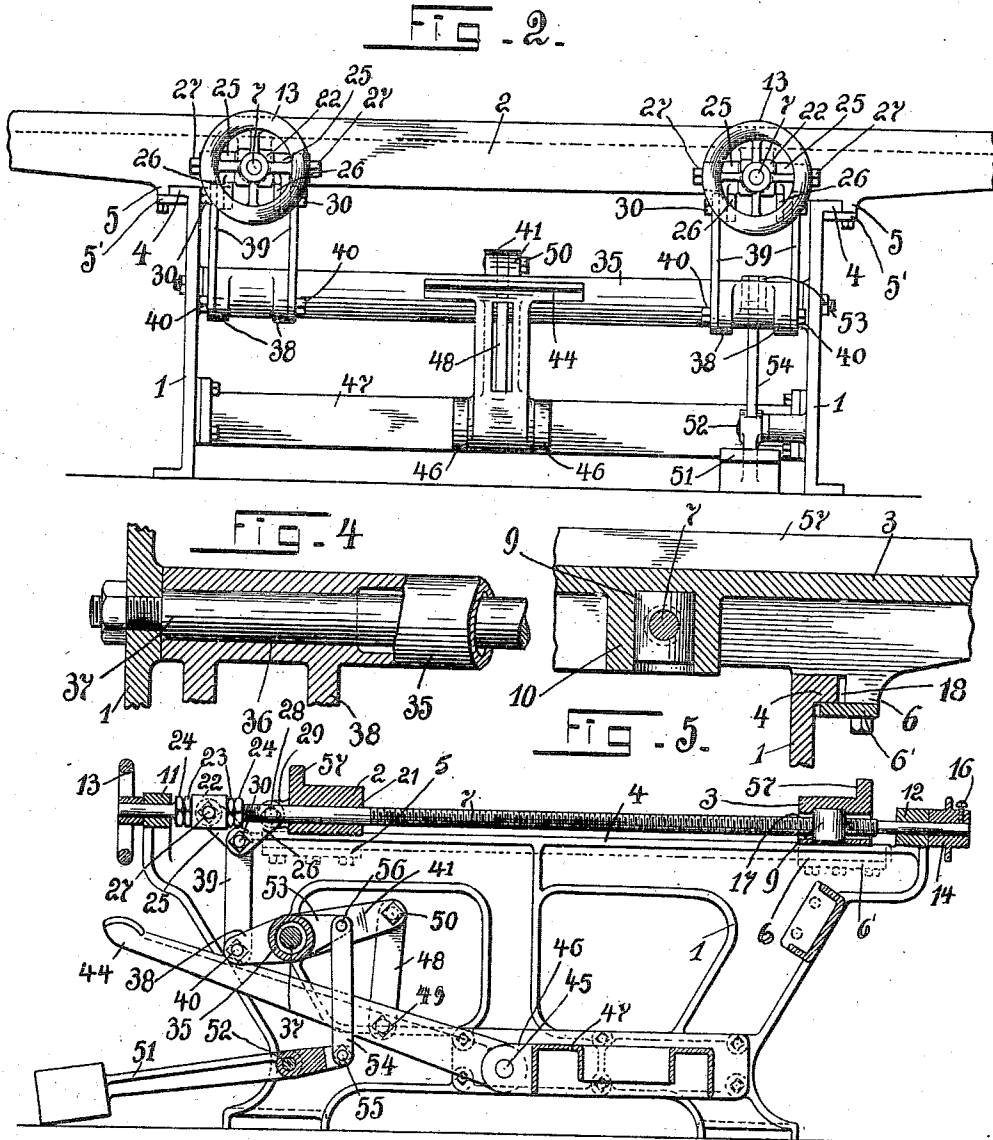
John R. Thomas,
by L. F. Herbst,
his attorney.

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by R. D. Herbert
his Attorney.

UNITED STATES PATENT OFFICE.

JOHN R. THOMAS, OF CINCINNATI, OHIO, ASSIGNOR TO J. A. FAY & EGAN COMPANY,
OF CINCINNATI, OHIO, A CORPORATION OF WEST VIRGINIA.

CLAMPING APPARATUS.

985,857.

Specification of Letters Patent.

Patented Mar. 7, 1911.

Application filed October 15, 1909. Serial No. 522,858.

To all whom it may concern:

Be it known that I, JOHN R. THOMAS, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Clamping Apparatus, of which the following is a specification.

My invention relates to clamping apparatus such as employed for instance in clamping doors and sash and similar objects to closely unite the joints thereof.

The object of my invention is to provide clamping apparatus in which the clamping strain is removed from the frame of the machine and is received by a rod or rods which act as a tension member or members for enabling a maximum amount of clamping force to be applied with a minimum amount of metal upon which the clamping strain is exerted.

In clamping mechanism of the character mentioned great strains are applied in the clamping action. In the forms of clamping apparatus now in general use, great strains are received by the frame of the machine, necessitating that the frame receiving the strains be made exceedingly heavy and resulting in breakage of the frame in the operation of the machine.

My improved construction removes this objection and provides a device in which the frame may be comparatively light, as the direct strain of the clamping action is removed from the frame.

The invention will be further readily understood from the following description and claims, and from the drawings, in which latter:

Figure 1 is a plan view of my improved device, partly broken away. Fig. 2 is a front elevation of the same. Fig. 3 is a vertical cross-section of the same taken on the line $z-z$ of Fig. 1. Fig. 4 is a detail in axial section of the mounting for the rockable sleeve; and, Fig. 5 is a detail in vertical section on the line $y-y$ of Fig. 1 showing the mounting between the adjustable clamping-bar, the rod and the frame.

1 represents the frame on which clamping-members 2 3 have movement. The clamping-members are shown as clamping-bars. The clamping-bar 2 is preferably the mov-

able bar for effecting the clamping action, and the clamping-bar 3 is preferably an adjustable bar for regulating the effective distance between the bars.

4 are guideways on the frame on which the guides 5 of the clamping-bar 2 and the guides 6 of the clamping-bar 3 have movement. These respective guides have retaining-pieces 5' 6' for holding the clamping-bars to the guides 4.

7 7 are tension-members and are shown as adjusting rods having threaded connection with nuts 9 9, shown as swivel-nuts having swiveling movement in bearings 10 of the clamping-bar 3.

The screw-rods are journaled in bearings 11 12 in the frame and have handles 13 at their forward ends. They are preferably connected for combined movement, as by providing the same with sprocket-wheels 14 connected by a sprocket-chain 15, so that upon turning of one of the handwheels the screw-rods will be turned in unison. If it is desired to turn one of the screw-rods independently of the other, one of the sprocket-wheels may be disconnected from the screw-rod, as by loosening one of the set-screws 16 securing the respective sprocket-wheels to the screw-rods.

The swiveling connection of the nuts 9 in the clamping-bar 3 permits the clamping-bar 3 to be set at an angle with relation to the clamping-bar 2, so that work which has edges out of parallel with each other may be clamped by my improved device. For permitting angular positioning of the clamping-bar 3, the apertures 17 in said clamping-bar through which the screw-rods pass are formed of larger diameter than the screw-rods and lateral space 18 is provided between the guideways 4 on the frame and the guides 6 of the clamping-bars 3.

Relative movement longitudinal of the tension-member is caused to take place between the movable clamping-member and the tension-member for effecting the clamping operation, the strain of this movement being directed upon the tension-member and upon the movable clamping-member. The clamping-bar 2 preferably has bearings 21 for the screw-rods 7, the screw-rods being journaled in these bearings and the bearings having movement longitudinal of the screw-

rods. This construction prevents tilting or lateral displacement between the tension-member and movable clamping-member, providing mutual support for said members at the point of greatest lateral strain between them.

The clamping force exerted for clamping the piece of work is exerted lengthwise of the tension-member as a pulling strain upon said tension-member. For effecting this movement I have provided each of the screw-rods with a collar 22 positioned lengthwise thereof between the positioning nuts 23 and jam-nuts 24.

25 26 are toggle-links at the respective sides of each of the screw-rods connecting the collars 22 with the clamping-bar 2. The toggle-links 25 are pivotally connected with the collars 22 by bolts 27, and the toggle-links 26 are pivotally connected with the clamping-bar 2 by bolts 28 received in lugs 29 on the clamping-bar, the toggle-links 25 26 being connected together by bolts 30.

35 is a rockable member shown as a sleeve having a bearing 36 at each end thereof about a connecting bar 37 between the side members of the frame. The sleeve has arms 38 thereon to which links 39 are articulated on bolts 40, the links 39 connecting with the toggle-links, as by having the bolts 30 pass therethrough. The sleeve is also provided with an arm 41 and forms a lever pivoted about the connecting-bar 37 for operating the toggle-links and forming powerful means for causing relative approach between the clamping-bars 2 and 3.

44 is an operating treadle having a pivot 45 shown as a pin received in lugs 46 of a cross-girt 47. The operating lever is connected with the arm 41 by a link 48 which is articulated to the operating treadle by a bolt 49 and to the arm 41 by a bolt 50. The construction is such that pressure exerted by the foot of the operator upon the operating treadle is imparted through the operating treadle to the rockable member and the toggle-links for exerting great pressure upon the stock being clamped by the clamping members.

For relatively opening the clamping-members, I prefer to provide a reversing treadle 51 pivoted to the frame on a stud 52 and connected with an arm 53 of the sleeve 35 by a link 54, a bolt 55 connecting the reversing treadle with the link and a bolt 56 connecting the link with the arm 53. The pivot of the operating treadle is preferably in the rear of its connection with the sleeve, forming a lever of the second class, whereas the reversing treadle is pivoted forwardly of its connection with the sleeve, forming a lever of the first class, the connections of the operating treadles with the sleeve being to one side of the vertical plane of the axis thereof, so that the treadles may be operated

for performing their operative functions by downward pressures of the foot thereon and be out of the way of the operator.

In operation, the piece desired to be clamped is placed upon the clamping members between the upright flanges 57 thereof. The foot is placed upon the operating treadle, the force applied thereby causing the toggle-links to straighten for assuming an approximately parallel relation. This causes the working strain of the toggle-links 25 to be exerted upon the tension-members and through the latter upon the clamping-member 3, and the working strain of the links 26 to be exerted upon the clamping-member 2 for causing relative approach between the clamping-members, and causing the entire load of the clamping strain to be received in the tension-members and relieving the frame from this clamping strain.

In the construction shown the screw-rods are held against longitudinal movement by the hand-wheels and sprocket-wheels respectively contacting the front and rear bearings of the frame.

It is within the spirit of my invention that the adjustments for sizes and the movement for clamping may take place in either or both of the clamping members, and other changes may be made in the specific constructions shown without departing from the spirit of my invention. The adjustment for sizes of pieces is preferably obtained by adjustment of the rear clamping-bar 3 which may be caused to assume selective positions lengthwise of the screw-rods and be moved closely adjacent to the clamping-bar 2.

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

1. In a clamping apparatus, the combination of a supporting frame, a tension-member, a clamping-member having connection with said tension-member, a mating clamping-member, link-mechanism between said mating clamping-member and tension-member, supporting means independent of said tension-member between said clamping-members and supporting frame, and means for operating said link-mechanism, substantially as described.

2. In a clamping apparatus, the combination of a frame, a screw-rod journaled therein, a clamping-member having connection with said screw-rod, a mating clamping-member, link-mechanism between said mating clamping-member and screw-rod for causing relative movement between said mating clamping-member and screw-rod, and means for operating said link-mechanism, and constructed and arranged for causing the clamping strain between said clamping-members to be exerted through said screw-rod, substantially as described.

3. In a clamping apparatus, the combination of a frame, a pair of clamping-members, a screw-rod journaled in said frame, a nut having threaded connection with said screw-rod and swiveling connection with one of said clamping-members for adjusting said clamping-member, a collar in which said screw-rod turns, means between said screw-rod and collar for limiting endwise movement between them, toggle-links between said collar and the other of said clamping-members, and means for operating said toggle-links, substantially as described.

4. In a clamping apparatus, the combination of a frame, a pair of clamping-members, a screw-rod journaled in said frame, a nut having threaded connection with said screw-rod and swiveling connection with one of said clamping-members for adjusting said clamping-member, a collar in which said screw-rod turns, means between said screw-rod and collar for limiting endwise movement between them, toggle-links between said collar and the other of said clamping-members, a rockable member having an arm at one side thereof having operative connection with said toggle-links and a pair of arms at the other side thereof, and operating levers of different classes having operative connection with said pair of arms for rocking said rockable member in opposite directions, substantially as described.

5. In a clamping apparatus, the combination of a frame, a plurality of tension-members therein, a plurality of clamping-members having slidable connection with said frame, one of said clamping-members having adjustable and swiveling connection with said tension-members and another of said clamping-members having slidable connection with said tension-members, and toggle-links having operative connection with

said tension-members and last named clamping member, for the purpose described.

6. In a clamping apparatus, the combination of a frame, a plurality of screw-rods journaled therein, a plurality of clamping-members having slidable connection with said frame, nuts for said screw-rods having swiveling connection with one of said clamping-members, the other of said clamping-members having sliding bearings about said screw-rods in which said screw-rods are journaled, collars received about said screw-rods, means for limiting endwise movement between said collars and screw-rods, toggle-links between said collars and said last named clamping-member, and means for operating said toggle-links, substantially as described.

7. In a clamping apparatus, the combination of a main frame, a screw-rod journaled in said frame, a clamping-member having connection with said screw-rod, a mating clamping-member, link-mechanism having connection with said mating clamping-member, and said screw-rod for causing relative movement between said mating clamping-member and screw-rod and for causing the clamping strain between said clamping-members to be exerted through said screw-rod as a tension-member lengthwise of said screw-rod, and means for operating said link-mechanism, substantially for the purpose described.

In testimony whereof, I have signed my name hereto in the presence of two subscribing witnesses.

JOHN R. THOMAS.

Witnesses:

HARPER S. ROSS,
RICHARD D. COAN.