J. A. LANDERS.

WORK CLAMP.

APPLICATION FILED SEPT. 6, 1916.

1,218,420.

Patented Mar. 6, 1917.

3 SHEETS—SHEET 1.

Fig. 1.

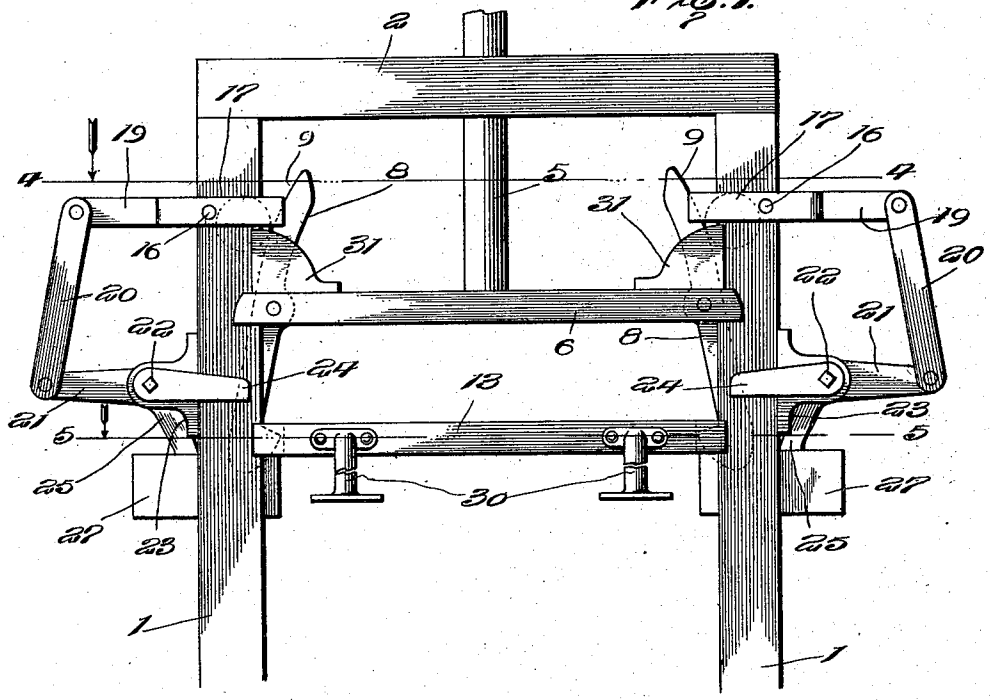
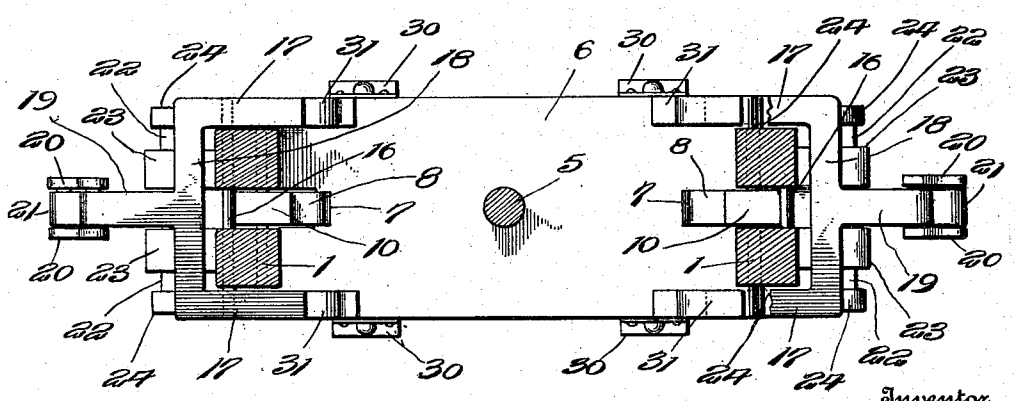


Fig. 4.



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3 SHEETS—SHEET 2.

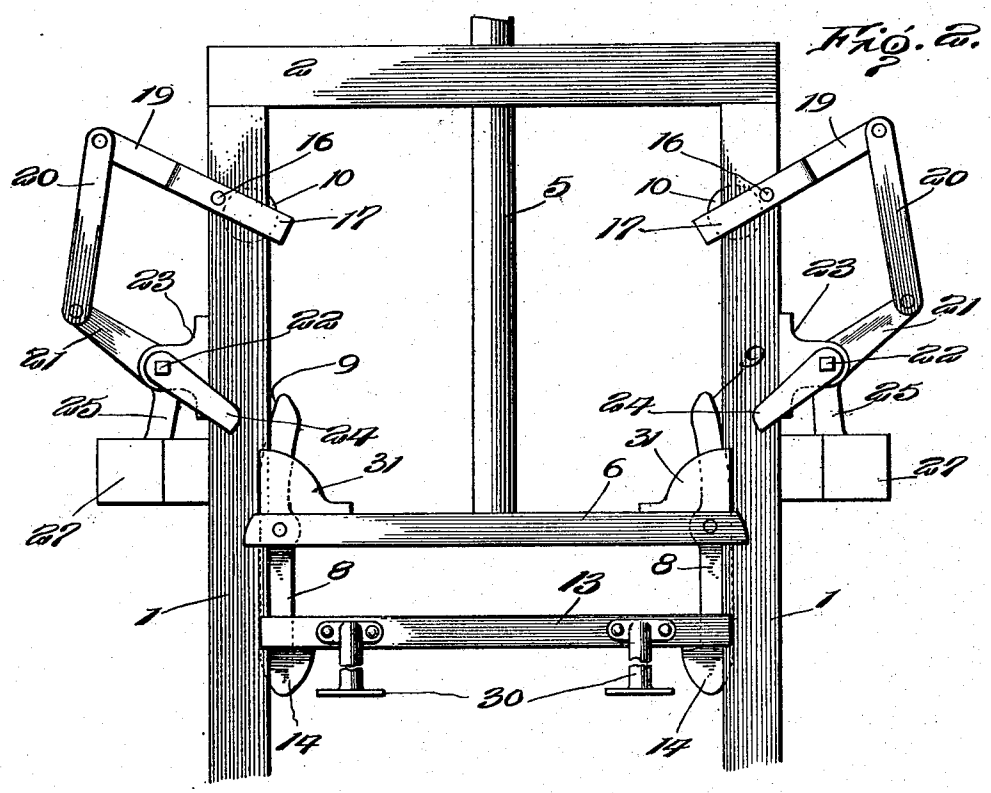


Fig. 4.

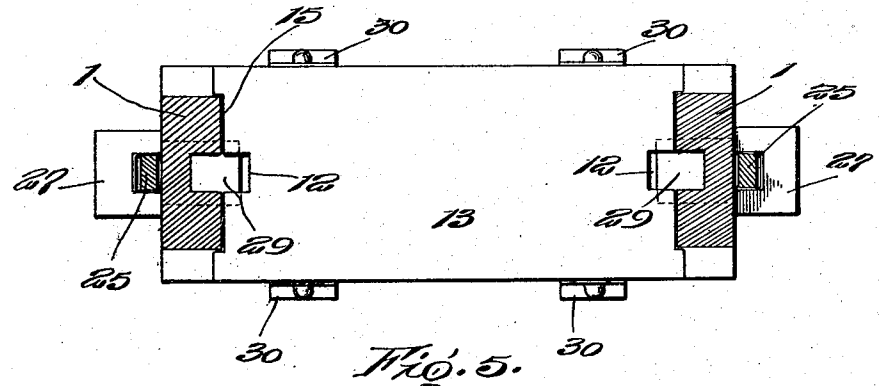


Fig. 5.

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3 SHEETS—SHEET 3.

Fig. 3.

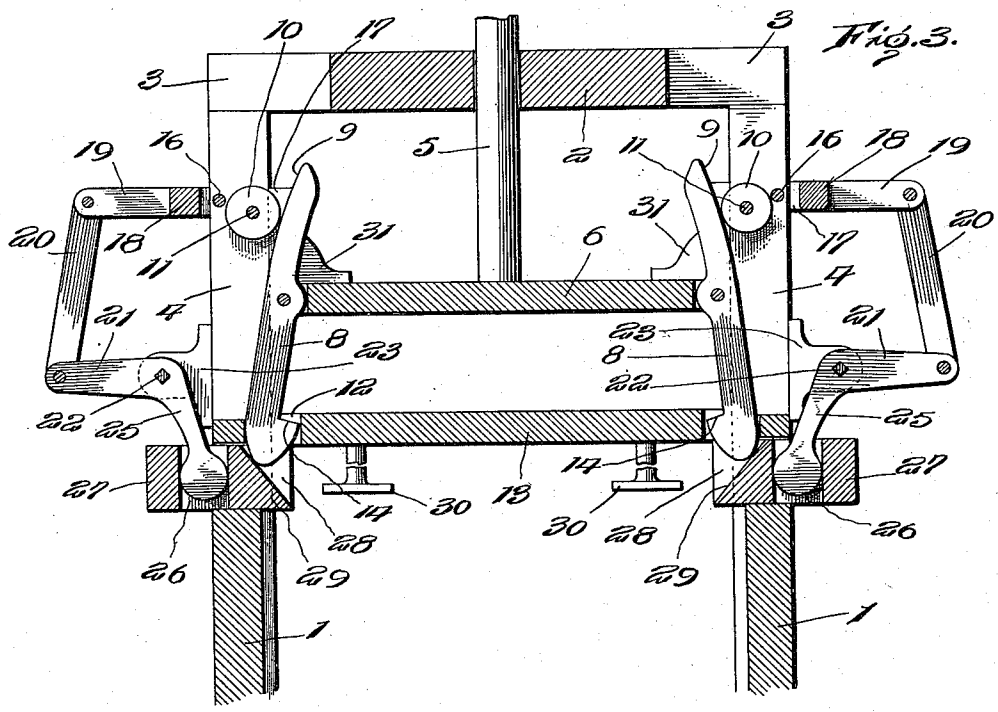


Fig. 7.

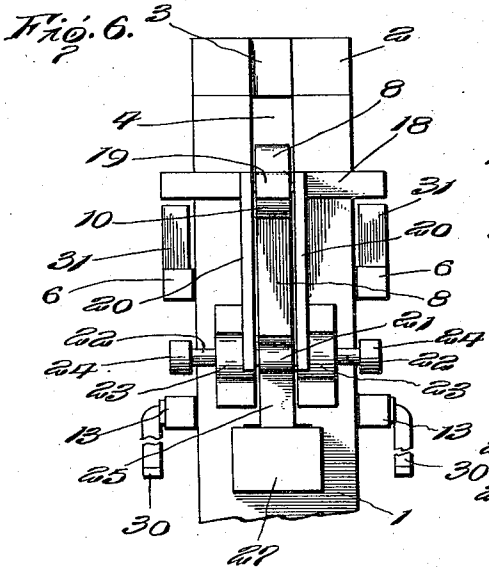
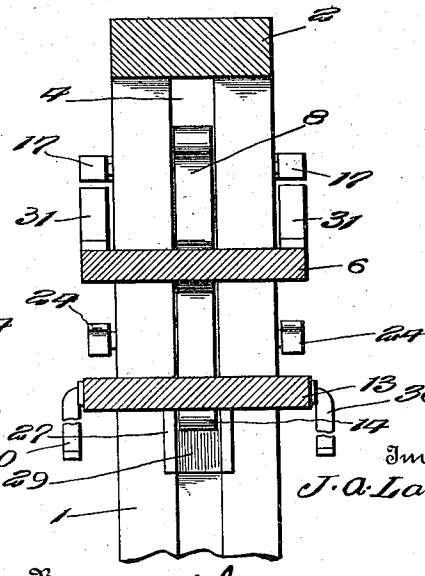


Fig. 6.



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UNITED STATES PATENT OFFICE.

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WORK-CLAMP.

1,218,420. Specification of Letters Patent. Patented Mar. 6, 1917.

Application filed September 6, 1916. Serial No. 118,737.

To all whom it may concern:

Be it known that I, JOHN A. LANDERS, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Work-Clamps, of which the following is a specification.

This invention relates to work holders and has for its object the provision of means whereby the work will be effectually clamped and then lowered to the point where the finishing or forming operations are performed and then raised and automatically released. A further object of the invention is to provide mechanism for the stated purpose which will be compact in arrangement and positive and efficient in operation.

The invention is illustrated in the accompanying drawings and will be hereinafter fully described, the novel features being subsequently particularly pointed out in the appended claims.

In the drawings:—

Figure 1 is a side elevation of my improved apparatus showing the same in the position assumed prior to the lowering of the work;

Fig. 2 is a similar view showing the work holding jaws in the lowered position;

Fig. 3 is a vertical longitudinal section showing the parts in the position illustrated in Fig. 1;

Fig. 4 is a horizontal section on the line 4—4 of Fig. 1;

Fig. 5 is a horizontal section on the line 5—5 of Fig. 1;

Fig. 6 is an end elevation; and

Fig. 7 is a transverse section.

In carrying out my invention, I employ a pair of standards or posts 1, which are connected at their upper ends by a beam or cross-bar 2, the said beam being constructed with notches 3 in its ends, which register with vertical slots 4 in the upper portions of the standards. A carrier rod 5 is slidably mounted in the beam 2 and has secured rigidly to its lower end in any desired manner the upper jaw or table 6, which is constructed with notches in its ends whereby it may fit around and slidably engage the standards 1, as will be readily understood. Within the said notches, indicated at 7, I pivot the dogs 8, which have their outer surfaces above their pivots somewhat curved, as indicated at 9, to ride easily against the rollers 10, which are mounted upon fixed rods 11 within the slots 4 of the standards near the upper ends of the same. The lower ends of the dogs 8 extend through notches or slots 12 in the ends of the lower table or jaw 13 and are constructed with the enlargements or heads 14 which are adapted to engage under the said lower table or jaw and thereby support the same, as shown in Fig. 2. The lower table is constructed at its ends with the recesses 15, whereby it may slidably fit upon the standards 1 so as to be guided in its vertical movements.

Pivotally mounted upon the upper portions of the standards 1 by pins 16 extending therethrough are the upper levers or trip arms 17, which are connected at their outer ends by cross bars or yokes 18 disposed adjacent the standards and constructed with intermediate lateral arms or extensions 19 which have their outer ends pivoted to the upper ends of links 20. The lower end of each link 20 is pivoted to the outer end of an arm or crank 21 projecting from a rock shaft 22 journaled in suitable brackets 23 on the sides of the standards and upon the ends of said rock shafts, I secure the lower levers or trip arms 24. Intermediate the ends of the rock shafts, cranks 25 depend therefrom and have their lower ends fitted in openings 26 provided in the retainers or supports 27 which are slidably mounted in the standards 1 and adapted to project through the same. The inner ends of these slides or supports are provided with recesses 28 having their lower walls inclined downwardly and inwardly, as shown at 29, to be engaged by the lower ends of the dogs 8 and thereby move the said dogs into engagement with the lower table or jaw. It will be noted that the lower ends of the cranks or arms 25 are enlarged and have convex surfaces to ride upon the walls of the openings 26 whereby friction will be minimized and the slides may be operated without any tendency to bind. These enlargements will be so formed and proportioned that the desired engagement between the cranks and the slides will be effected and lateral play of the cranks permitted without causing disengagement of the parts.

Buffers, indicated conventionally at 30, may be provided on the sides of the lower jaw to prevent forcible contact between the work clamp and the fixed part toward which it is moved.

The device is intended more particularly for use in oil-tempering springs. The springs are placed between dies which are then inserted between the jaws or tables 6 and 13 when the parts are in the position shown in Figs. 1 and 3, the lower table or jaw being supported by the inner ends of the slides 27 and the lower ends of the dogs 8 being housed within the notches 12 in the ends of the lower table or jaw. After the work has been placed in position, the carrying rod 5 is lowered so that the upper table will be brought into contact with the upper side of the work. This downward movement will be transmitted directly to the dogs 8 and the lower ends of said dogs will, consequently, be caused to ride downwardly and inwardly upon the inclined or beveled surfaces 29 of the slides 27, being thereby caused to move under the lower table 13 so that the enlargements or heads 14 will engage the underside of the said table, as shown in Fig. 2. As the downward movement continues the upper ends of the dogs will clear the rollers 10 and the ends of the upper table 6 will impinge against the inner ends of the trip arms or lower levers 24 and cause said levers or trip arms to swing downwardly, thereby rocking the shafts 22 and causing the cranks 25 to swing outwardly. The outward movement of the cranks 25 will, of course, withdraw the slides 27 from below the ends of the lower table 13 and the said table will then be supported entirely by the enlargements or heads 14 of the dogs 8, and the length of the dogs should be such that when the table is thus supported the work will be firmly clamped between the upper and lower tables. The withdrawal of the slides 27 permits the upper and lower tables to be moved downwardly to any desired degree, as will be readily understood, and this downward movement is continued until the work is immersed in the oil tank. After the springs are tempered the carrying rod 5 is raised, thereby lifting the tables 6 and 13 with the work clamped between them. When the lower levers or trip arms 24 were swung downwardly by the impact of the upper table 6, the cranks 21 were swung upwardly and the links 20 transmitted this movement to the upper arms 19 so that the yoke 18 with the upper trip arms or levers 17 were swung about the pivots 16 to the position shown in Fig. 2. When the tables are lifted, the ends of the upper table 6 will impinge against the downwardly extending inner ends of the upper levers or trip arms 17, as will be readily understood, moving past the lower levers 24 which are cleared by the table in its downward movement. As the table continues its movement the upper trip arms will be swung upwardly and the parts returned to the position shown in Figs. 1 and 3, so that the slides 27 will be projected under the ends of the table 13 to again support the same, and the movement of the parts is so timed that as the slides move inwardly under the table 13 the upper ends of the dogs 8 will engage the rollers 10 and will be swung inwardly so that the lower ends of said dogs will be swung outwardly to release the said lower table. The upper table may continue its upward movement sufficiently to release the work.

It is to noted that in the drawings I have illustrated strikers or projections 31 on the upper side of the table 6 at the ends thereof which will impinge against the ends of the upper trip arms or levers 17 when the table moves upwardly so that the said levers will be actuated before the dogs release the lower table 13, and, consequently, the slides 27 will be projected under the table in ample season to prevent dropping of the same. This arrangement also provides for a limited movement of the upper table independently of the lower table so that the tables may be separated sufficiently to permit the insertion and removal of the work without requiring any special mechanism for this particular purpose and without causing premature operation of the slides 27. The particular form of the brackets or strikers 31 is immaterial and I do not limit myself to any particular disposition of these elements as they may be varied at will and might, under some conditions, be omitted entirely. Other changes in the minor details of the construction and arrangement may be made without involving any departure from the spirit or scope of the invention as the same is defined in the following claims.

Having thus described the invention, what is claimed as new is:

1. In a device for the purpose set forth, the combination of a work-engaging member, means connected with said member to effect movement of the same, a second work-engaging member, means carried by first-mentioned member to engage and support the second member, means for releasing said engaging and supporting means, and other means for supporting the second-mentioned work-engaging member after said engaging and supporting means is released.

2. In a device for the purpose set forth, the combination of work-engaging members, dogs mounted upon one of said members to engage the other member and lock it against the work, means acting upon said dogs during a portion of their travel to release them from the last-mentioned work-engaging member, and means for supporting said member when at rest and adapted

to actuate the dogs during a portion of the travel of the same to engage said work-engaging members.

3. In a device for the purpose set forth, the combination of a pair of work-engaging members, dogs pivoted to one of said members and adapted to engage the other member, movable supports for the last-mentioned work-engaging member when the same is at rest constructed to act upon the dogs and move them into engagement with said member, and means interposed in the path of movement of the dogs to release them from said work-engaging member.

4. In a device for the purpose set forth, the combination of a pair of work-engaging members, means connected with one of said members to reciprocate the same, dogs pivoted to the ends of said member and constructed to engage the other member, and means whereby upon movement of the members in one direction the dogs will be released and upon movement of the members in the opposite direction the dogs will be caused to engage and support the work-engaging member and cause the members to move in unison.

5. In a device for the purpose set forth, the combination of reciprocable work-engaging members, supports mounted to move across the path of movement of said work-engaging members to support one of said work-engaging members when it is at rest, dogs carried by the other of said work-engaging members and adapted to engage under the first-mentioned work-engaging member, and means whereby upon movement of the work-engaging members in one direction the said supports will be withdrawn and the dogs engaged and upon movement of the members in the opposite direction, the dogs will be released and the supports projected.

6. In a device for the purpose set forth, the combination of work-engaging members, means for imparting reciprocatory movement to said members, dogs carried by the upper member and constructed to engage and support the lower member, means above the upper member for releasing said dogs from the lower member, slides adapted to support the lower member when it is at rest and constructed to cause the dogs to engage said member upon downward movement of the upper work-engaging member, upper and lower trip arms projecting into the path of the said upper work-engaging member, and means whereby when the lower trip arms are actuated by said upper work-engaging member the said slides will be withdrawn and when the upper trip arms are actuated the said slides will be projected.

7. In a device for the purpose set forth, the combination of upper and lower work-engaging members, means for clamping the lower member to the upper member, means for releasing said clamping means, upper and lower trip arms adapted to project into the path of movement of the upper work-engaging member, rock shafts carrying the lower trip arms, slides adapted to support the lower work-engaging member when it is at rest and to be engaged by the said clamping means to cause said means to engage said lower work-engaging member, cranks carried by the said rock shafts and fitted to said slides, and connections between the upper and lower trip arms.

8. In a device for the purpose set forth, the combination of upper and lower work-engaging members, dogs pivoted to the upper work-engaging member and constructed at their lower ends to engage under the lower work-engaging member, slides disposed to support the lower work-engaging member when it is at rest and having cam surfaces arranged to be engaged by the said dogs whereby they will be caused to engage under the lower work-engaging member, means for withdrawing said slides to permit movement of the work-engaging members, and means for releasing the said dogs at one limit of movement of the work-engaging members.

9. In a device for the purpose set forth, the combination of upper and lower work-engaging members, dogs pivoted at the ends of the upper work-engaging member and having outer convex surfaces at their upper ends, means for causing the lower ends of said dogs to engage under the lower work-engaging member, and rollers arranged to be engaged by the said convex surfaces of the dogs whereby to release the dogs from the lower work-engaging member.

In testimony whereof I affix my signature.

JOHN A. LANDERS. [L. S.]

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."