W. ERICKSON.

BOLTING-UP DEVICE.

APPLICATION FILED FEB. 14, 1921.

**1,413,015.** **Patented Apr. 18, 1922.**

2 SHEETS—SHEET 1.

FIG. 1

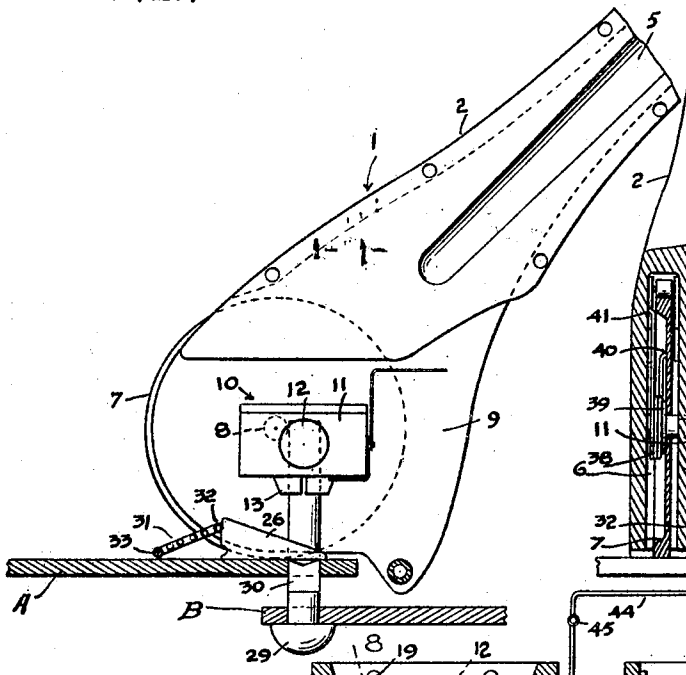
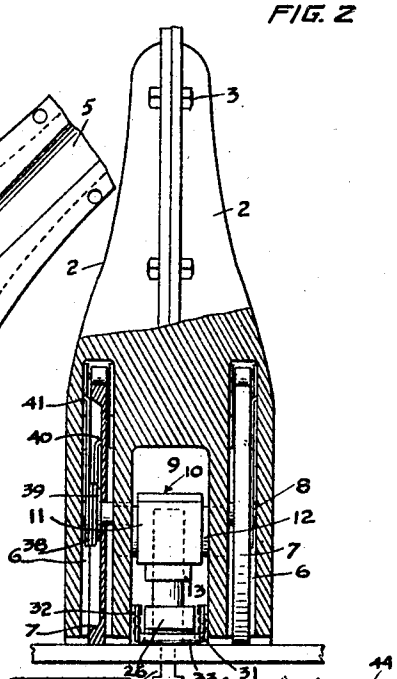


FIG. 2



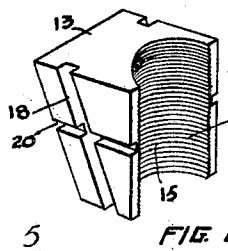


FIG. 6

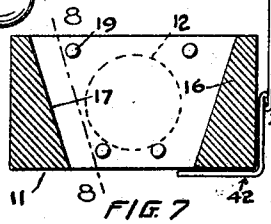


FIG. 7

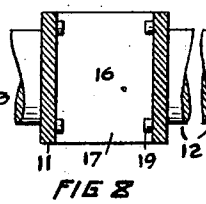


FIG. 8

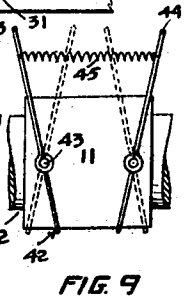


FIG. 9

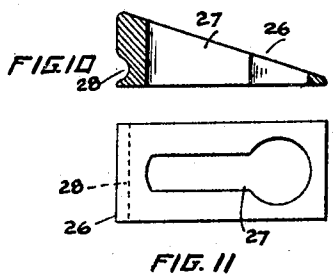


FIG. 10

FIG. 11

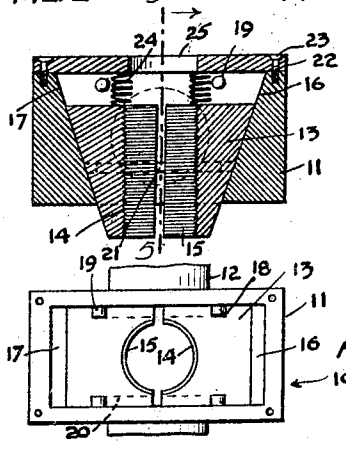


FIG. 3

FIG. 4

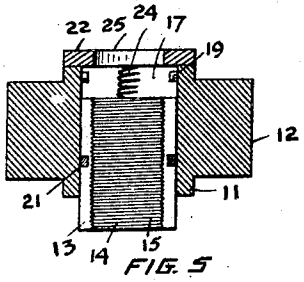


FIG. 5

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2 SHEETS—SHEET 2.

FIG. 12

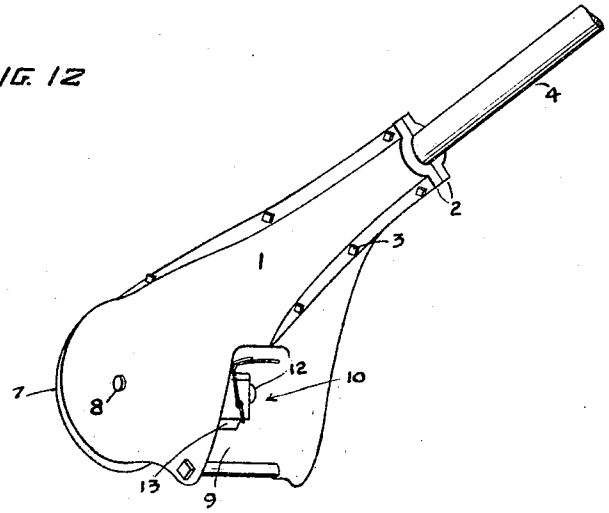



FIG. 13

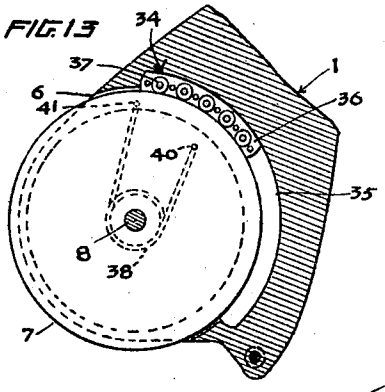
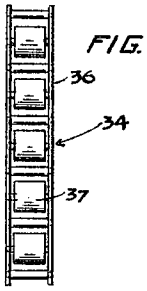



FIG. 14



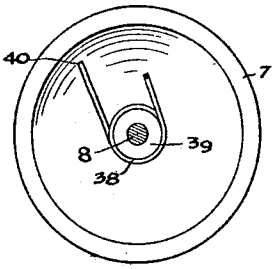
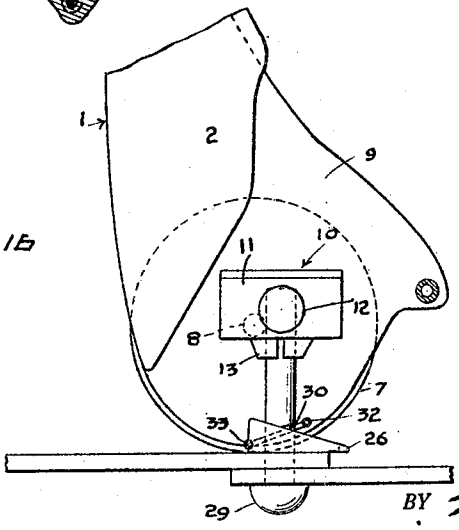




FIG. 15

FIG. 16




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# UNITED STATES PATENT OFFICE.

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## BOLTING-UP DEVICE.

1,413,015. Specification of Letters Patent. Patented Apr. 18, 1922.

Application filed February 14, 1921. Serial No. 444,654.

*To all whom it may concern:*

Be it known that I, WILLIAM ERICKSON, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in Bolting-Up Devices, of which the following is a specification.

This invention relates to a device for bolting up boiler plates, ship plates and the like, preliminary to riveting such plates.

In the art, at present, a great deal of time and labor are required to bolt up the plates of a ship, boiler or tank so as to hold the plates in position for riveting.

It is the primary object of this invention to provide a relatively simple and inexpensive device by means of which the bolting up operation may be carried out efficaciously and reliably and with a minimum expenditure of labor, the operation of securing the plates together taking up less time and labor than is the case in following out the present practice.

An object of the invention is to provide a device of the character described, which in the operation thereof to bring the plates together, sufficient leverage may be easily obtained to quickly draw the plates together; the device operating immediately upon the drawing of the plates together to move a wedging member, corresponding in purpose to the nut such as now used, into position to hold the bolt in place and the plates tightly together, this operation being carried out with a single movement of the device.

Another object of the invention is to provide a bolting up device of the character described which will also be of use in pulling together plates or members which are to be bolted permanently and which also will be of use in pulling bolts and the like from wooden members.

The invention possesses other advantages and features some of which, with the foregoing will be set forth at length in the following description where I shall outline in full that form of the invention which I have selected for illustration in the drawings accompanying and forming a part of the present specification. In said drawings I have shown one form of the construction of my invention, but it is to be understood that I do not limit myself to such form since the invention as expressed in the claims may be embodied in a plurality of forms.

Figure 1 represents a side elevation and partly broken away of the device of this invention, showing it as it would appear when in use in pulling plates together preliminary to bolting or riveting thereof.

Figure 2 is a front elevation of the device broken away and shown in part in vertical section.

Figure 3 is a vertical sectional view of the bolt clamping vise.

Figure 4 is a top plan view partly broken away of said clamping device.

Figure 5 is a sectional view taken on line 5—5 of Figure 3.

Figure 6 is a perspective view of one of the jaws of the device.

Figure 7 is a vertical sectional view of the jaw casing or housing.

Figure 8 is a sectional view taken on line 8—8 of Figure 7.

Figure 9 is an end elevation of the housing for the jaws.

Figure 10 is a longitudinal sectional view of one of the locking jaws.

Figure 11 is a top plan view of said locking wedge.

Figure 12 is a prespective view of the device of the invention assembled.

Figure 13 is a fragmentary vertical sectional view taken through the center of the device depicting one of the fulcrum rollers in side elevation.

Figure 14 is a top plan view of the anti-friction bearing device.

Figure 15 is a side elevation of one of the fulcrum rollers showing the spring means for turning the rollers and bearing device to normal position associated therewith.

Figure 16 is an enlarged side elevation of one half of the device showing the same as it would appear after the bolting up action has taken place.

In carrying out the invention there is provided an elongated body portion having at its lower end fulcrum rollers which are adapted to bear against the work. Carried by the body adjacent its lower end is a clamping device adapted to engage and clamp the bolt which is inserted through two plates to be drawn together and riveted. The clamping device is mounted eccentrically relatively to and between the rollers so that when clamped upon the bolt and the rollers are

brought to bear upon one of the plates, upon the movement of the body in a given direction said clamping device will pull outwardly on the bolt and the roller will press inwardly upon the plate whereby the bolt is brought home and the plates are pulled together. Mounted upon the body is means for moving a locking wedge member into such relation to the outer plate and bolt as to hold the bolt in position securing the plates together. This means is arranged so that when the wedge member is mounted upon the bolt at the beginning of the bolting up operation, at the completion of said operation the wedge is moved into position to hold the bolt in place.

Referring specifically to the form of the invention illustrated in the accompanying drawing there is provided an elongated body member 1 which serves as a lever and is preferably formed of two similar halves 2 bolted together as at 3. A handle 4 is preferably mounted in a socket 5 therefor provided between the halves of said body at one end thereof. At the other end of the body there are provided roller receiving recesses 6 in which fulcrum rollers are journalled in the opposite walls of the recesses 6 in any suitable manner but so as to dispose the lower edges of the rollers below the lower edges of the body, whereby said rollers may be made to engage the work in advance of said body.

Mounted in a central, end-opening recess 9 in said body between the rollers 7 is a bolt clamping device generally designated 10. The device 10 comprises a housing 11 having trunnions 12 extending from opposite sides thereof and pivoted in the opposed walls of the said recess 9 at points to one side of the trunnions 8, whereby said bolt clamping device is eccentrically mounted. Mounted within the housing 11 are opposed wedge-like jaws 13 preferably arranged for vertical adjustment within said housing. Each jaw is inclined inwardly and downwardly on its outer face and opposite said inclined face is provided with a semi-circular gripping face 14 which is formed with screw threads or serrations 15. The other opposed faces of the jaw are parallel and extend perpendicular. The housing 11 is rectilinear in outline and has certain opposed walls 16 formed with inclined interior faces 17 corresponding to the inclined faces of the jaws and contacting therewith. By this arrangement a wedging action is provided upon relative movement of the jaws and housing. In the parallel faces of the jaws there are provided inclined grooves 18 in which protuberances 19 carried on said opposed walls of the housing, slidably engage so as to insure the movement of said jaws towards and away from one another during the operation of the device. To prevent relative movement of the jaws there are provided grooves 20 which intersect the grooves 18 and extend at right angles thereto. The grooves 20 of one jaw aline with the grooves 20 of the other jaw and a key strip 21 is fitted in said aligned grooves 20 and engage snugly therein but not so as to prevent relative lateral movement of the jaws. The upper side of the housing is closed by a plate 22 secured in place by screws 23. The lower ends of the jaws are adapted to project below the lower side of the housing and to insure the presentation of the jaws in proper position to effect the clamping thereof at all times, small expansive springs 24 are interposed between and engage the upper faces of the jaws and under side of said plate 21. An opening 25 is provided in the plate 22 so as to permit the bolt to pass freely therethrough. The spaces provided by and between semicircular gripping faces 15 is in registration with said opening 25.

As a means for locking the bolt in place after it has been pulled into position and the plates have been forced together there is provided a wedge member 26, of substantially rectilinear outline having a key hole slot 27 extending longitudinally therein. In the rear face of this wedge member there is provided a transverse groove 28 for the purpose which will be later described.

A bolt such as will be used in connection with the device of this invention one of which, is shown in Figure 1 and is designated 29. The bolt 29 is provided with a reduced portion 30 intermediate of its ends. Said portion being formed by cutting recesses into opposite faces of the bolt.

As a means for moving the wedge members into position, flexible elements 31 are secured at certain ends as at 32 to the opposite walls of the recess 9 of the body and at their other ends are connected with a transverse bar or rod 33. This rod is adapted to engage in the groove 28 as shown in Figure 16 so as to cause to move the wedge into position at the same time that the bolt is pulled through the plates and the plates are pulled together.

As a means for preventing excessive strains and stresses from being transmitted to and taken up at the trunnions 8 for the roller 7 there is provided an anti-friction device 34 which is mounted between an arcuate bearing surface 35 opposite each roller 7 in the body, and each of said rollers. This device comprises an arcuate frame 36 carrying a plurality of preferably cylindrical roller bearings 37. The pressure exerted in the leverage action on movement of the body portion 2 is taken up largely by the bearings 37 and in this way the strain is relieved from the trunnions 8. To return the bearing device 37 to starting position as shown in Figure 13, a rectilinear coiled

spring 38 is mounted around a boss 39 on each roller 7. One end of this spring is fastened to the roller as at 40 and the other end is secured as at 41 (Figure 2) to the body 1. At the completion of the leverage stroke the rollers turn by action of the springs and the anti-friction devices will move into normal or starting position to again intercept the strains on the next leverage stroke.

As a means for insuring proper release of the jaws of the bolt, when the body is moved for effecting this action, there are provided angular detent members 42 each of which is pivoted intermediate of its ends as at 43 on one side of the housing 11. The lower extremities of these members extend beneath the housing and the other extremities are bent to provide handle portions 44 disposed above the housing to one side thereof. A spring 45 is connected at its ends with said member 42 and exerts a tendency which normally holds said members in position to prevent the dropping of the jaws below the lower side of the casing 11 as shown in Figures 7 and 9, said lower ends of the detent members being disposed in the path of the jaws. In effecting release of the jaws, the device is operated, so that the jaws are moved upwardly into the housing and said jaws will lie substantially flush at the lower ends with the lower side of the housing. When the jaws assume this position the detent members 42 move into the position shown in Figure 7, in the path of one of the jaws, and serve to prevent said jaws from dropping downwardly on to the bolt and again clamping the same.

*Operation.*

Assuming that it is desired to "bolt up" plates preliminary to riveting, the plates A and B as shown in Figure 1 are brought into position so that the rivet holes aline and the bolt 29 is then inserted through the holes. The wedge member 26 is then mounted upon the bolt and arranged to lie upon the outer plate A in the position shown in Figure 1. The device of my invention is then moved towards the bolt so that the latter will be inserted between the jaws 13 and the clamping faces 15 will engage with opposite faces of the bolt as shown in Figures 1 and 2. In inserting the bolt the jaws will move upwardly so as to permit of the bolt passing between said jaws. The springs 25 will tend to force the jaws downwardly so as to engage opposite faces of the bolt. The bar or rod 33 and flexible element 31 are arranged as shown in Figure 1 relative to the grooved end of the wedge. The device is now ready for the taking up or bolting up operation and by grasping the handle 4 and moving the body from right to left, with the rollers 7 bearing upon the plate A a leverage will be effected which will, owing to the eccentric mounting of the clamping device 10, move the casing 11 of said device outwardly and away from the plates. This action will, owing to the wedge shape of the jaws and the wedge shape walls of the housing for the reception of the jaws cause the jaws to be moved towards one another so as to effect a clamping of the bolt, with the result that the bolt will be pulled outwardly and the plates A and B will be moved together and into the position shown in Figure 16. During this movement of the body the bar 33 will engage in the groove 28 in the wedge and move the wedge so that the reduced portion of the bolt engages in the shank of the key hole opening in the wedge and the upper and lower faces of the wedge engage with the shoulder provided by reducing the bolt at the point 30. Further inward movement of the wedge causes a tight wedging between the shoulder of the bolt and the outer faces of the plate A with the result that the bolt is securely and firmly held in place with the plates close together as shown in Figure 16.

To release the clamping device the handle 4 is moved from left to right back into approximately the position shown in Figure 1 and this moves the casing 11 downwardly and causes the jaws 13 to be moved upwardly. Upward movement of the jaws owing to the wedge arrangement thereof with the housing causes a lateral and spreading apart movement of the jaws with the result that they release the bolt. At this time the detent members 42 spring into place so as to hold the jaws against being projected downwardly by the springs 24. After this reverse movement of the handle the device may then be lifted clear of the bolt and wedge and the operation may be repeated for "bolting up" another part of the plates.

Thus, it will be seen that with the device of my invention it will be possible to very quickly and easily bolt up plates and the like preliminary to riveting, the time consumed and troublesome operation of turning nuts on the bolt being eliminated. The complete bolting up action may be accomplished in a very short time since the pulling of the bolt in place and the securing of the bolt in such position are accomplished simultaneously. When it is desired to remove the bolts the wedge is knocked out of place and the bolts will readily drop and may be forced out of the rivet openings.

I claim:—

1. A bolting up device embodying in its construction, a body member adapted to bear at one end against the work, a bolt clamping device mounted upon said member to one side of a point thereof which engages with the work, a bolt locking member, said body being adapted to be rocked when said clamping device is engaged with the bolt and one

end thereof rests upon the work so as to pull the bolt into place and means on said body for engaging and moving said locking member into locking position simultaneously with the rocking of said body.

2. In combination with plates to be bolted up and a bolt extending therethrough and having wedge receiving portions, of a wedge member associated with said bolt, a body member having one end adapted for engagement with one of the plates, a bolt clamping device carried by the body member in such position thereon that when the body member is rocked with said end fulcruming on said plate, the bolt will be pulled into position and the plates moved together, and means operating to move said wedge into position to hold the bolt in place, during the rocking of said body member

3. In a bolting up device comprising a lever-like body adapted to fulcrum at one end upon the work and a bolt-clamping device carried by said body adjacent but to one side of the fulcrum point thereof, a bolt locking member and means for moving said locking member into locking position upon a lever action of said body.

4. In combination with plates to be bolted together and a bolt extending through said plates and having wedge engaging shoulders, of a wedge mounted upon said plate and adapted to be moved into engagement with said shoulders, a member arranged to be fulcrumed at one end thereof upon one of said plates, a bolt clamping device carried by said body adjacent but to one side of the fulcrum point thereof and means upon the body for moving said wedge into position upon movement of said member.

5. A bolting up device comprising a body having fulcrum rollers at one end thereof which rollers are adapted to engage the work, a bolt clamping device carried by the body at a point adjacent but to one side of the axis of said rollers, said device comprising a housing open on the side thereof opposed to the work, opposite gripping jaws mounted in the housing and having abutting inclined faces arranged to cause movement of the jaws toward one another when the housing is moved away from the work and movement of the jaws away from one another when the housing is moved toward the work.

6. A bolting up device comprising a body having fulcrum rollers at one end thereof which rollers are adapted to engage the work, a bolt clamping device carried by the body at a point adjacent but to one side of the axis of said rollers, said jaws having aligning grooves therein and key members mounted in said grooves to hold the jaws in the same plane and permit lateral movement of the jaws relative to one another.

7. In a bolting up device in combination with a bolt having a reduced portion intermediate of its ends of a wedge member having a key hole opening mounted upon said bolt and movable at right angles thereto so as to wedge with relation to the reduced portion and a member adapted to engage said bolt and said wedge member to simultaneously move the bolt longitudinally of its axis and the wedge member transversely of the bolt.

8. In a bolting up device a body portion, a fulcrum roller on the body adapted to bear upon the work, a bolt clamping device carried by the body adjacent but to one side of the center of the roller, anti-friction bearings interposed between the periphery of the roller and a part of the body, a frame for supporting said anti-friction bearings and spring means associated with the roller and body so as to return said frame and bearings to normal position after a predetermined movement of the body during the operation of the device.

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