Aug. 10, 1948. J. C. RENFROE 2,446,610

PLATE LIFTING CLAMP

Filed Aug. 10, 1946

2 Sheets-Sheet 1

Fig. 1.

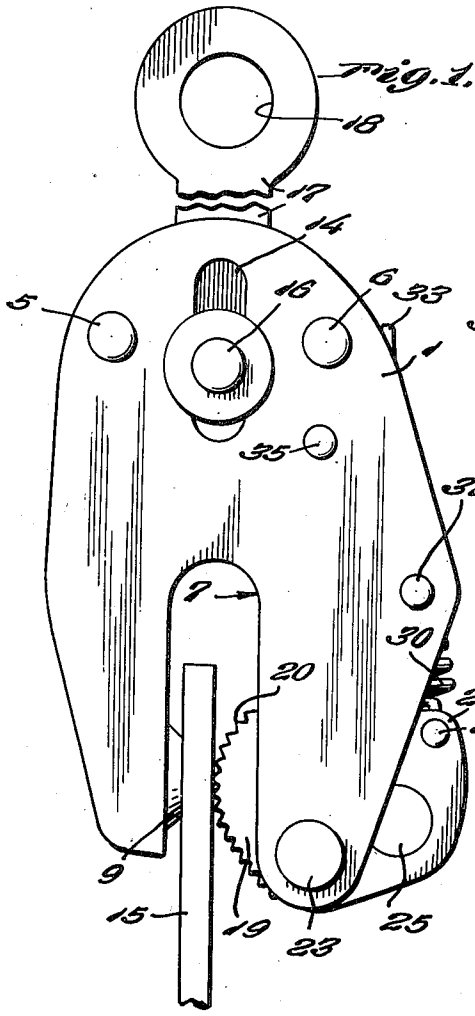


Fig. 2.

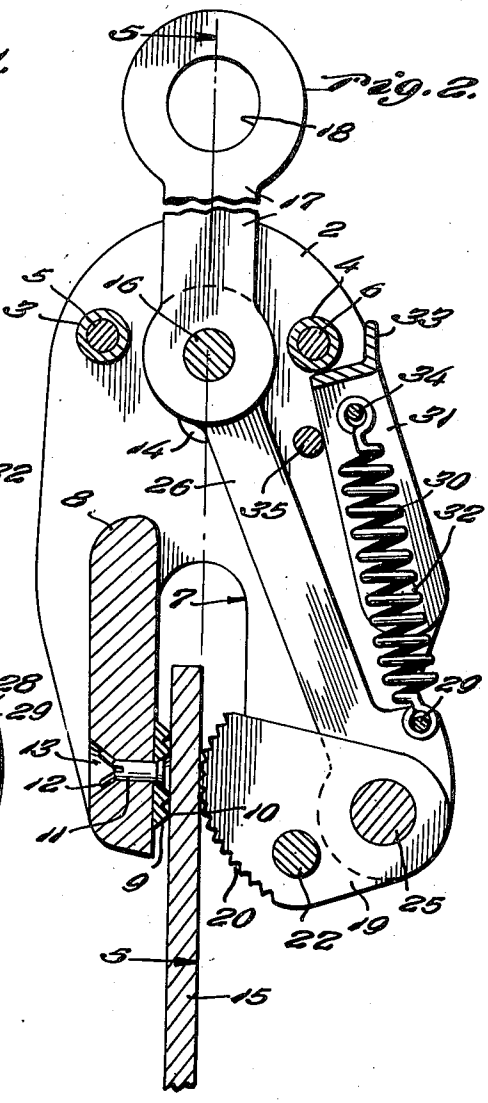
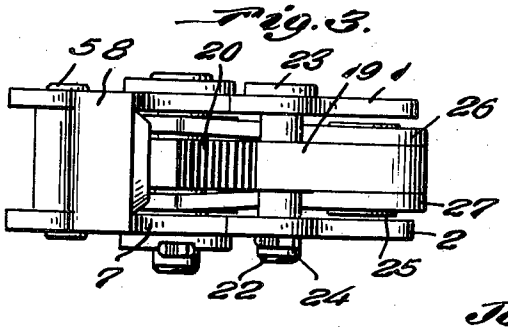


Fig. 3.



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Filed Aug. 10, 1946 2 Sheets-Sheet 2

Fig. 4.

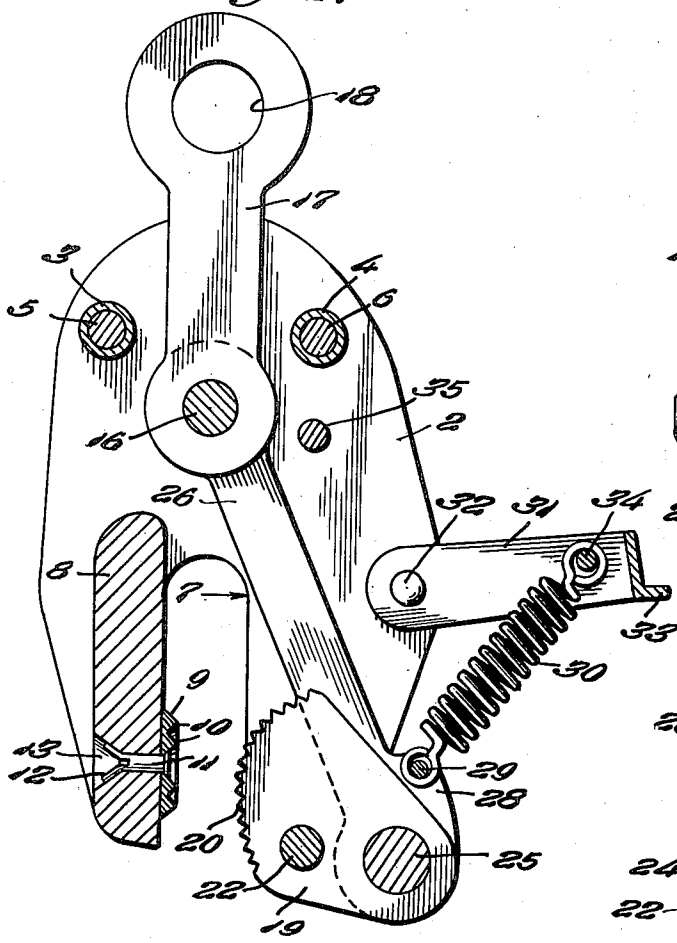


Fig. 5.

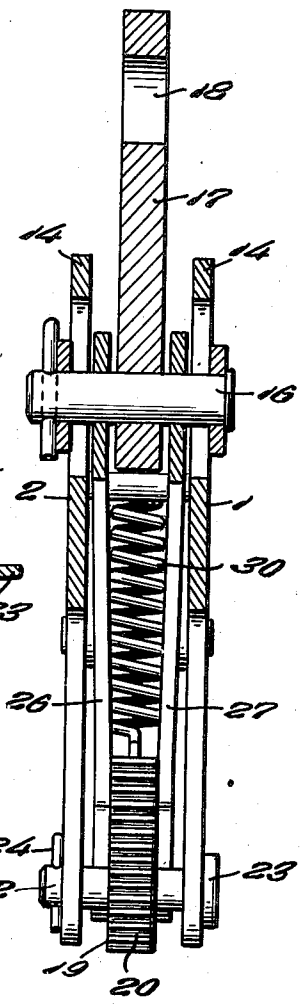
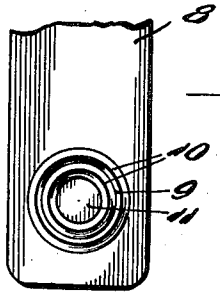


Fig. 6.



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Patented Aug. 10, 1948 2,446,610

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PLATE LIFTING CLAMP

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Application August 10, 1946, Serial No. 689,722

4 Claims. (Cl. 294—104)

1

This invention relates to a new and improved form of plate lifting clamps, and more especially to a resiliently tensioned manually operated pivoted jaw construction for said clamp.

An object of the invention is to provide an improved form of plate lifting clamp which will be formed with a vertically extending slot in its lower edge with a fixed plate engaging jaw in one side thereof, and a pivotally mounted toothed camming jaw in the opposite side of said slot, the same being linked with a vertically adjustable clevis, and by means of a coil spring with a pivoted jaw locking and releasing arm.

Another object of the invention is to provide an improved plate lifting clamp for lifting heavy steel plates and the like, said clamp being formed with spaced interconnected body members having a vertical slot extending upwardly into the said body members and an aligned slot disposed above said first mentioned slot, together with a fixed plate engaging jaw secured in one side of said first mentioned slot, and a pivoted toothed jaw mounted in the opposite side of said slot, the same being connected by means of a pair of links connected with the transversely extending pin slidably positioned in the uppermost slot and secured to the lower end of the clamp clevis, with the added feature of a jaw releasing lever connected with said pivoted jaw by means of a coil spring and a cross pin connected with said links.

A further object of the invention is to provide an improved form of steel plate lifting clamp having a fixed jaw and a pivoted jaw mounted at the opposite sides of a vertical slot formed in the bottom of said clamp body, together with a clevis connected with said pivoted jaw for operating the same to effect a camming and locking engagement with a plate when positioned in said slot, and a pivotally mounted jaw releasing lever connected by means of a spring with the linkage connected between said pivoted jaw and clevis, whereby said lever will be manually swung outwardly away from the clamp body to release the hold of the pivoted jaw upon the plate, and by moving the lever inwardly past center, the pivoted jaw will be locked and the plate may not be released until the locking lever is deliberately and positively swung past center and away from the clamp body.

Another object of the invention is to provide

2

an improved steel plate lifting clamp which will be highly efficient in operation, and relatively inexpensive to manufacture and produce.

Other objects will appear as the description proceeds.

In the accompanying drawings which form a part of the application,

Figure 1 is a side elevation of the improved plate lifting clamp with a plate engaged and locked between its fixed and pivoted jaws;

Figure 2 is a similar view with one side body member removed to show the positioning of the various parts when in locked position;

Figure 3 is a bottom plan view of the improved plate lifting clamp;

Figure 4 is a side elevation of the improved plate lifting clamp with a side body member removed to show the positioning of the various parts when in released or unlocked position;

Figure 5 is a vertical sectional view taken on the line 5—5 of Figure 2, and

Figure 6 is a front elevation of the concentrically ribbed or toothed fixed jaw.

Like characters of reference are used throughout the following specification and the accompanying drawings to designate corresponding parts.

In carrying out the invention, there is provided an improved form of steel plate lifting clamp comprising a pair of spaced parallel extending body members 1 and 2, the same being connected together and held in the proper spaced relation by means of the spacing collars 3 and 4 supported upon the headed bolts 5 and 6, respectively, arranged near the upper portion of the clamp body.

A vertical slot 7 is formed in the lower edge of the clamp body approximately centrally of said body, one side of said slot 7 being formed by the connecting web 8 formed between the said spaced body members 1 and 2. The web 8 is apertured to receive the fixed jaw 9 which is formed with concentrically disposed ribs or teeth 10 and is supported in place by means of the headed rivet 11 whose opposite end is split as at 12 and is upset in the countersunk bore 13 in the opposite side of said web 8.

The vertical slots 14 are formed through the side members 1 and 2 in alignment with the slot 7 in which the steel plates 15 are received,

and support the vertically adjustable cross pin 16 upon which the clamp clevis 17 is supported for vertical adjustment with said pin 16. An eye 18 is formed in the upper end of the clevis 17 for attachment to a hook upon a hoist line (not shown).

An arcuate camming jaw 19 formed with the teeth 20 is pivotally supported upon the cross pivot pin 22 mounted between the body side plates 1 and 2, said pin being headed at 23 on one end, and transversely apertured at its other end to receive the cotter pin or key 24. The end of the camming jaw 19 remote from the teeth 20 supports a large bearing pin 25 upon the outer ends of which the spaced connecting links 26 and 27 are mounted, one at either side of the jaw and extending upwardly between the side body members 1 and 2 to be secured or mounted at either side of the clevis 17 upon the cross pin 16. An ear 28 is integrally formed on the outer portion of each of the lower ends of the links 26 and 27 and are connected by means of the pin 29 which supports the lower end of the coil tensioning and locking spring 30.

The U-shaped jaw releasing and locking arm 31 is pivotally mounted upon the cross pin 32 disposed between the side body members 1 and 2, and is formed with the finger engaging lip 33 at its upper end for operating the same. The pin 34 is mounted between the sides of the locking arm 31 at its upper end, and supports the upper end of the coil tensioning and locking spring 30. A stop pin 35 is connected between the side members 1 and 2, and limits the inward movement of the locking and releasing arm 31, which is moved past center to lock the pivoted jaw in clamped position regardless of the position of the clevis, and regardless of whether or not the plate and clamp is suspended or on the ground.

From the foregoing description, it will be apparent that the mode of operation of the improved plate lifting clamp is as follows: The clamp will be supported by a hook (not shown) on the end of a lifting cable, said hook being engaged through the eye of the lifting clevis, and the clamp will be opened by pulling outwardly on the U-shaped jaw locking and releasing arm 31, which will move the toothed pivoted jaw to a point practically within the space between the parallel body members 1 and 2, laterally of the notch or slot 7. The clamp is then placed over the edge of a steel plate or other thin edged element by inserting the plate or element within the slot 7, after which the locking and releasing arm 31 is pushed inwardly until it passes over dead center, thereby locking the pivoted jaw in camming engagement with the side of the said plate or element. It will be found that no matter whether the clevis is at the top or bottom of its movement within the slots 14, it will be impossible to accidentally or intentionally remove the clamp from the plate without first manually moving the locking and releasing element to its outermost position, thereby releasing the pivoted jaw to disengage the same from the plate or element.

From the foregoing description, it will be apparent that there has been devised and provided a highly efficient form of plate lifting clamp which will be positive in action to lock a plate or element between its jaws, and which will also be necessary to deliberately release the jaw releasing arm before the pivoted jaw will be enabled to release the plate from between it and the fixed jaw.

While the preferred embodiment of the instant invention has been illustrated and described, it will be understood that it is not intended to limit the scope of the invention thereto, as many minor changes in detail of construction may be resorted to without departure from the spirit of the invention.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. A plate lifting clamp having spaced parallel interconnected side members, a connecting web between said members, said clamp being formed with a vertical plate receiving slot extending upwardly from its lower edge, a fixed jaw supported by said web at one side of said slot, a pivoted toothed camming jaw mounted at the opposite side of said slot, said side members having opposed vertical slots formed through their upper ends in alignment with said plate receiving slot, a transversely extending bearing pin slidably mounted in said slots, a clevis secured to said pin having an eye in its upper end, connecting links pivotally connected with said pin and with the outer end of said pivoted jaw, a jaw locking and releasing arm pivoted between said side members, and a coil spring connected between the lower ends of said links and to a point on the end of said arm remote from its pivot.

2. A plate lifting clamp having spaced parallel interconnected side members, a connecting web between the lower ends of said members, said clamp being formed with a vertical plate receiving slot extending upwardly from its lower edge, a stationary jaw supported by said web at one side of said slot, a split pin for securing said jaw in position, said web being countersunk to protect the split ends of said pin from accidental removal, a toothed camming jaw pivoted between said side members at the opposite side of said slot, said side members having opposed vertical slots formed through their upper ends in alignment with said plate receiving slot, a transversely extending bearing pin adjustably mounted between said slots, a clevis secured to said pin formed with a hook receiving eye in its upper end, connecting links between said side members pivotally connected with said bearing pin and with the outer end of said pivoted jaw, a U-shaped jaw locking and releasing arm pivotally connected between said side members, a coil spring connected between the lower ends of said links and to a point on the end of said arm remote from its pivot, and a stop pin between said side members disposed past center when said arm is in locked position.

3. A plate lifting clamp comprising spaced parallel interconnected side members having an inwardly directed vertical plate receiving slot formed in its lower edge, a clevis supported in the upper end of said clamp in alignment with said slot for vertical adjustment, a fixed jaw in one side of said slot, a pivoted camming jaw in the opposite side of said slot, linkage connected between said clevis and said pivoted jaw, and a jaw locking and releasing arm pivotally attached to said clamp and connected with said pivoted jaw for locking the jaw in clamped position when said arm is moved past dead center and for releasing said jaw when said arm is moved in the opposite direction.

4. A plate lifting clamp comprising spaced parallel interconnected side members, said members having a vertical plate receiving slot formed in their lower ends, a clevis supported in the upper

end of said clamp in alignment with said slot, a removable fixed jaw in one side of said slot, a pivoted camming jaw in the other side of said slot, linkage connected between said clevis and said pivoted jaw, and a resiliently tensioned jaw locking and releasing arm pivotally attached to said clamp and connected with said pivoted jaw for locking the jaw in clamped position when said arm is moved past dead center and for releasing said jaw when said arm is moved in the opposite direction.

JOSEPH C. RENFROE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,514,983	Monnich	Nov. 11, 1924
2,360,601	Waldrup	Oct. 17, 1944
2,370,411	Monaco	Feb. 27, 1945