Nov. 22, 1960 C. J. RENFROE 2,961,270

L-BEAM CLAMP

Filed Aug. 21, 1957

Fig. 1.

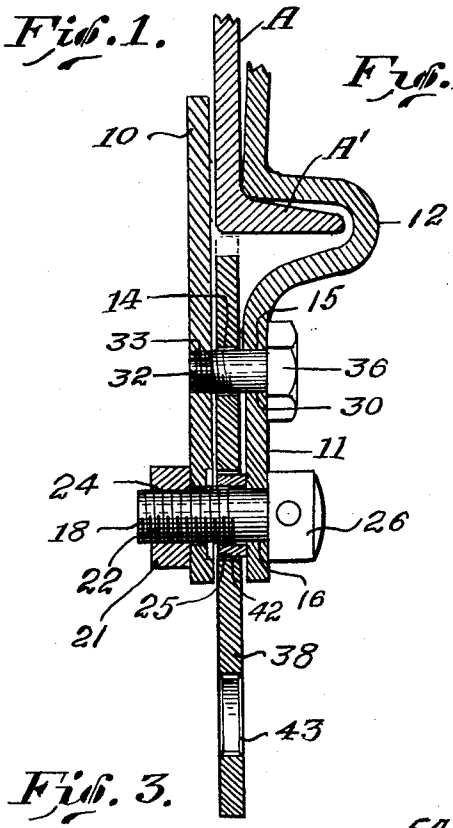


Fig. 2.

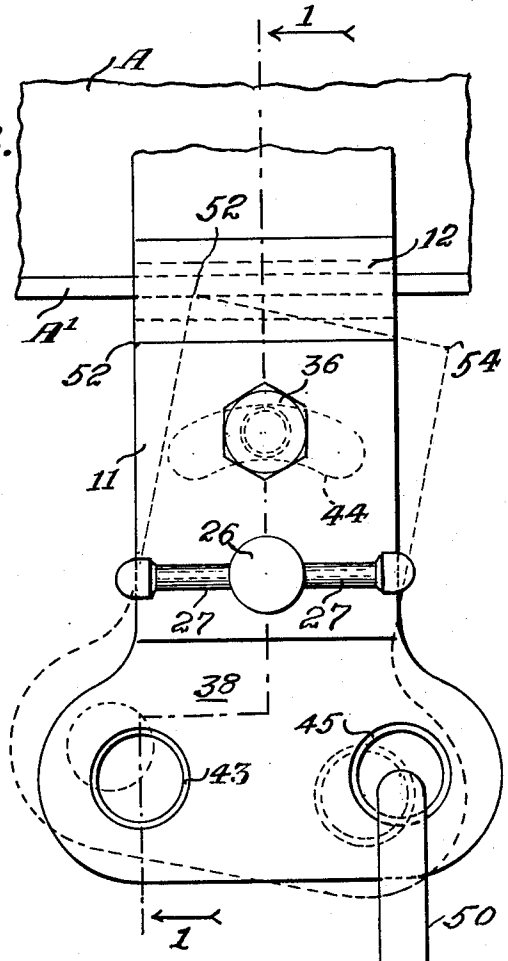


Fig. 3.

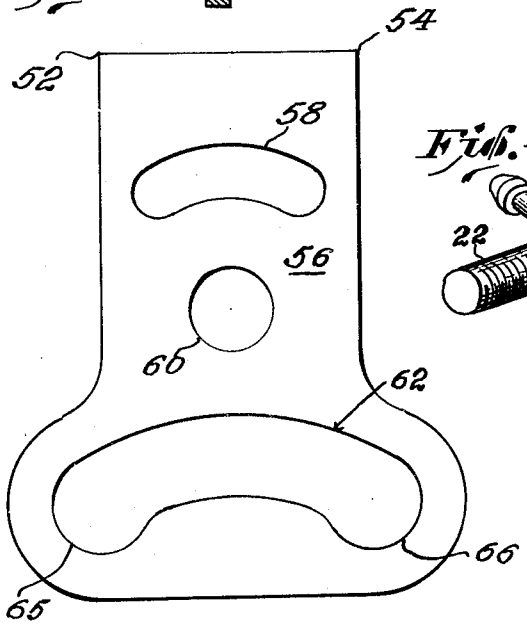
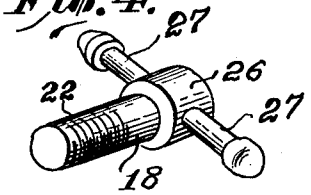


Fig. 4.



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L-BEAM CLAMP

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7 Claims. (Cl. 294—85)

This invention relates to a beam clamp which is particularly constructed for use with L-beams or other angled beams that are provided with single flanges as distinguished from the flanges of an I-beam.

An object is to provide an automatically locking beam clamp.

Another object is to provide a beam clamp of the type set forth wherein there is a double locking of clamp to the beam.

A further object is the provision of an automatically locking beam clamp which automatically locks the clamp to the beam when the load is applied and at whatever angle it is applied, i.e. whether the load is applied in a vertical direction or at an angle to this direction.

Yet another object is to provide a beam clamp having a plurality of locks, one of which is automatic in its operation and the other of which must be manually locked and released. As soon as the manual lock is released, and upon removal of the load, the automatic lock will immediately release the beam clamp from the beam.

A further object is the provision of a highly efficient and safe locking means for locking a beam clamp along the length of an angled beam.

Other objects will appear hereinafter throughout the specification.

In the drawings:

Figure 1 is a transverse vertical section partly broken away, taken on the line 1—1 of Figure 2;

Figure 2 is a side elevation of the device, and showing the clamping means in non-locking position in full lines, and in clamping position in dotted lines.

Figure 3 is a modified form of the shackle plate in side elevation; and

Figure 4 is a perspective view of the shackle bolt.

Referring now to the drawings, A shows a structural beam which is L-shaped in cross section, the flange being indicated at A^1. The beam clamp consists of a pair of body portions **10** and **11** of dissimilar shape, body portion **10** having flat sides, as shown in Figure 1, while body portion **11** is provided with a U-shaped clamping portion for clampingly engaging the flange A^1 of an L-shaped beam. The flat body portion **10**, as shown, will engage the side of the beam clamp.

The body portions **10** and **11** are provided with upper apertures **14** and **15**, respectively.

The body portion **11** is provided with a lower aperture **16** for the reception of a pivot bolt **18**. This bolt is provided with screw threads **22** which engage the threads **24** of a nut **21**, and the bolt is also provided with a head **26** and handle portions **27** extending through the bolt head, as seen in Figure 4.

Bolt **18** is further provided with a bearing sleeve **25** so as to allow the body members to be adjusted toward and from each other to accommodate different sized beams A having longer or shorter flanges A^1. This bolt supports bearing sleeve **25** which is located in the aperture **42** of shackle plate **38**.

The locking bolt is shown at **36**. This bolt is provided with threads **32** which engage threads **33** on plate **10**, and the bolt is provided with a head **36**. It will be noted that the rotation of the bolt head **36** so as to tighten the same will move the plates **10** and **11** toward each other so as to tightly grip the shackle plate **38** which is located between these plates.

This shackle plate is shown in Figure 1 and provided with a grooved slot **44** for the reception of the locking bolt **36**. As shown in Figure 2, the shackle plate is provided with offset openings **43** and **45** either of which may accommodate the load connecting means. This load connecting means may comprise any suitable structure such as a chain fall **46**, a connector **48** and a link or hook **50** that may be engaged with either of the apertures **43** or **45**.

The shackle plate is provided with teeth **52** and **54**, in order that the shackle plate may engage the under side of the flange A^1 when the load is supported in the aperture **45**, and the under side of said flange A^1 is engaged by tooth **54** when the load is supported by engagement with aperture **43**.

In Figure 3 is illustrated a slightly modified form of the invention wherein the shackle plate **56** is provided with an arcuate slot **58**, a pivot opening **60**, and teeth **52** and **54**.

In place of the openings **43** and **45** of the structure shown in Figure 2, there is provided a second arcuate slot **62** whose ends have enlarged portions **65** and **66**. With the construction shown in Figure 3, the load may be quickly shifted from the enlarged portion **66** to the enlarged portion **65**, or vice versa.

It will be understood that except for the substitution of the slot **62** with its enlarged portions **65** and **66** for the openings **43** and **45**, the shackle plate **56** is identical with the shackle plate **38** and it may be used interchangeably in the construction shown in the several figures.

When the load is applied to either of the openings **43** and **45**, the plate will swing on the pivot bolt **18** so that the teeth will engage the under side of the beam flange A^1. Assuming the load is applied as shown in Figure 2, this will cause the plate to rotate in a clockwise direction to cause its tooth **52** to engage the under side of the flange A^1, or the tooth **52** of plate **56**, should this plate be substituted for plate **38**. After this engagement has taken place, the head **36** of bolt **30** is rotated so as to cause the nut to be tightened on the threads **32**, thereby causing body portions **10** and **11** to move toward each other until they clampingly engage the side faces of the shackle plate **38**, or **56**, according to which plate is used.

A double lock is therefore provided by the structure shown and the several figures, namely the lock caused by the engagement of the shackle plate tooth and the gripping engagement of the body portions on the side faces of the shackle plate, the latter being accomplished by the rotation of the bolt head **36**. The bolt head may be rotated to cause the clamping engagement between the body portions and the shackle plate by means of a socket wrench. With the body portions in firm clamping engagement with the shackle plate, the tooth can not become disengaged from the flange A^1 even though the load would shift from time to time.

It will be understood that the present invention, while it is adapted to move along a stationary beam to lock a load in position on said beam, may be used for moving a beam from place to place. This may be accomplished by attaching the shackle plate to a beam and lifting the beam with the aid of a clamp, hoist, chain block or the like. As soon as the lifting operation starts, the clamp will automatically lock itself to the beam as the load is

applied. In other words, the invention is adapted to use the beam as the load, in place of supporting a load beneath the stationary beam, forming part of a load transportation system in shipyards, aboard ships, or industrial plants.

The above description and drawings disclose several embodiments of the invention, and specific language has been employed in describing the several figures. It will, nevertheless, to understood that no limitations of the scope of the invention are thereby contemplated, and that various alterations and modifications may be made such as would occur to one skilled in the art to which the invention relates.

I claim:

1. A self-locking beam clamp comprising a pair of body portions, one of said body portions having straight sides and the other of said body portions having a U-shaped clamping portion at one end thereof adapted for embracing the flange of a structural beam, the said U-shaped clamping portion adapted to extend longitudinally along the flange of said beam, each of said body portions having a pivot-receiving opening, a shackle plate having sides located between said body portions having a pivot-receiving opening, pivot means extending through the pivot-receiving openings of said body portions and shackle plate, said shackle plate having an upper surface and sides defining corners with said upper surface located below said U-shaped clamping portion of said U-shaped body portion and below said beam, said upper surface having teeth means located adjacent at least one of said corners and adapted to engage the under side of a beam upon rotation of said shackle plate on said pivot means, load attaching means on said shackle plate laterally offset from a line extending substantially medially and longitudinally of said pivot means whereby when said load is attached to said load attaching means said plate will pivot until its tooth means engages said beam, and means for clampingly engaging said body portions with the sides of said shackle plate, said clamping means including means for guiding said shackle plate in its pivotal movement, said means being located between said teeth means and said pivot means.

2. A self-locking beam clamp comprising a pair of body portions, one of said body portions having straight sides and the other of said body portions having a U-shaped clamping portion at one end thereof adapted for embracing the flange of a structural beam, the said U-shaped clamping portion adapted to extend longitudinally along the flange of said beam, each of said body portions having a pivot-receiving opening, a shackle plate located between said body portions having a pivot-receiving opening, pivot means extending through the pivot-receiving openings of said body portions and shackle plate, teeth means on said shackle plate having an upper surface and sides forming corners with said upper surface, said teeth means being located adjacent to said corners and being adapted to engage the under side of said beam upon rotation of said shackle plate on said pivot means, load attaching means on said shackle plate laterally offset from a line extending substantially medially and longitudinally of said pivot means whereby when said load is attached to said load attaching means said plate will pivot until its tooth means engages said beam, and means for clampingly engaging said body portions with said shackle plate, said last named means including screw-threaded means for causing said body portions to move toward each other into clamping engagement with said shackle plate, said shackle plate having an arcuate slot surrounding said screw-threaded means, said clamping means including means for guiding said shackle plate in its pivotal movement, said means being located between said teeth means and said pivot means.

3. A self-locking beam clamp comprising a pair of body portions, one of said body portions having straight sides and the other of said body portions having a U-shaped clamping portion at one end thereof adapted for embracing the flange of a structural beam, the said U-shaped clamping portion adapted to extend longitudinally along the flange of said beam, each of said body portions having a pivot-receiving opening, a shackle plate located between said body portions having a pivot-receiving opening, pivot means extending through the pivot-receiving openings of said body portions and shackle plate, teeth means on said shackle plate having an upper surface and sides forming corners with said upper surface, said teeth means being located adjacent to said corners and being adapted to engage the under side of a beam upon rotation of said shackle plate on said pivot means, load attaching means on said shackle plate laterally offset from a line extending substantially medially and longitudinally of said pivot means whereby when said load is attached to said load attaching means said plate will pivot until its tooth means engages said beam, and means for clampingly engaging said body portions with said shackle plate, said pivot means including a sleeve for pivotally mounting said shackle plate bolt, said clamping means including means for guiding said shackle plate in its pivotal movement, said means being located between said teeth means and said pivot means.

4. A self-locking beam clamp comprising a pair of body portions, one of said body portions having straight sides and the other of said body portions having a U-shaped clamping portion at one end thereof adapted for embracing the flange of a structural beam, the said U-shaped clamping portion adapted to extend longitudinally along the flange of said beam, each of said body portions having a pivot-receiving opening, a shackle plate located between said body portions having a pivot-receiving opening, pivot means extending through the pivot-receiving openings of said body portions and shackle plate, teeth means on said shackle plate having an upper surface and sides forming corners with said upper surface, said teeth means being located adjacent to said corners and being adapted to engage the under side of a beam upon rotation of said shackle plate on said pivot means, load attaching means on said shackle plate laterally offset from a line extending substantially medially and longitudinally of said pivot means whereby when said load is attached to said load attaching means said plate will pivot until its tooth means engages said beam, and means for clampingly engaging said body portions with said shackle plate, said load attaching means comprising a pair of apertures in said shackle plate, each aperture being located in offset relation with a line passing through the center of said shackle plate, said clamping means including means for guiding said shackle plate in its pivotal movement, said means being located between said teeth means and said pivot means.

5. A self-locking beam clamp comprising a pair of body portions, one of said body portions having straight sides and the other of said body portions having a U-shaped clamping portion at one end thereof adapted for embracing the flange of a structural beam, the said U-shaped clamping portion adapted to extend longitudinally along the flange of said beam, each of said body portions having a pivot-receiving opening, a shackle plate located between said body portions having a pivot-receiving opening, pivot means extending through the pivot-receiving openings of said body portions and shackle plate, teeth means on said shackle plate having an upper surface and sides forming corners with said upper surface, said teeth means being located adjacent to said corners and being adapted to engage the under side of said beam upon rotation of said shackle plate on said pivot means, load attaching means on said shackle plate laterally offset from a line extending substantially medially and longitudinally of said pivot means whereby when said load is attached to said load attaching means said plate will pivot until its tooth means engages said beam, and means for clampingly engaging said body portions with said shackle plate,

said last named means including screw-threaded means for causing said body portions to move toward each other into clamping engagement with said shackle plate, said load attaching means comprising a pair of apertures in said shackle plate, each aperture being located in offset relation with a line passing through the center of said shackle plate, said clamping means including means for guiding said shackle plate in its pivotal movement, said means being located between said teeth means and said pivot means.

6. A self-locking beam clamp comprising a pair of body portions, one of said body portions having straight sides and the other of said body portions having a U-shaped clamping portion at one end thereof adapted for embracing the flange of a structural beam, the said U-shaped clamping portion adapted to extend longitudinally along the flange of said beam, each of said body portions having a pivot-receiving opening, a shackle plate located between said body portions having a pivot-receiving opening, pivot means extending through the pivot-receiving openings of said body portions and shackle plate, teeth means on said shackle plate having an upper surface and sides forming corners with said supper surface, said teeth means being located adjacent to said corners and being adapted to engage the under side of a beam upon rotation of said shackle plate on said pivot means, load attaching means on said shackle plate laterally offset from a line extending substantially medially and longitudinally of said pivot means whereby when said load is attached to said load attaching means said plate will pivot until its tooth means engages said beam, and means including screw-threaded means on said pivot means and further including a bolt located above said pivot means and extending through an aperture in saild cam shackle plate, and screw-threaded means on said bolt for clampingly engaging said body portions with said shackle plate, said load attaching means comprising a slot, and enlarged openings forming the ends of said slot, said enlarged openings being located on opposite sides of a line passing through the longitudinal center of said shackle plate, said clamping means including means for guiding said shackle plate in its pivotal movement, said means being located between said teeth means and said pivot means.

7. A self-locking beam clamp comprising a pair of body portions, one of said body portions having straight sides and the other of said body portions having a U-shaped clamping portion at one end thereof adapted for

embracing the flange of a structural beam, the said U-shaped clamping portion adapted to extend longitudinally along the flange of said beam, each of said body portions having a pivot-receiving opening, a shackle plate located between said body portions having a pivot-receiving opening, pivot means extending through the pivot-receiving openings of said body portions and shackle plate, teeth means on said shackle plate having an upper surface and sides forming corners with said upper surface, said teeth means being located adjacent to said corners and being adapted to engage the under side of said beam upon rotation of said shackle plate on said pivot means, load attaching means on said shackle plate laterally offset from a line extending substantially medially and longitudinally of said pivot means whereby when said load is attached to said load attaching means said plate will pivot until its tooth means engages said beam, and means for clampingly engaging said body portions with said shackle plate, said means for clampingly engaging said body portions with said shackle plate including screw-threaded means located above said pivot means, and further including screw-threaded means on said pivot means for causing said body portions to move toward each other into clamping engagement with said shackle plate, said load attaching means comprising a slot, and enlarged openings forming the ends of said slot, said enlarged openings being located on opposite sides of a line passing through the longitudinal center of said shackle plate, said clamping means including means for guiding said shackle plate in its pivotal movement, said means being located between said teeth means and said pivot means.

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