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(54) **RELEASE MECHANISM FOR CONTAINER CLAMPING DEVICE**

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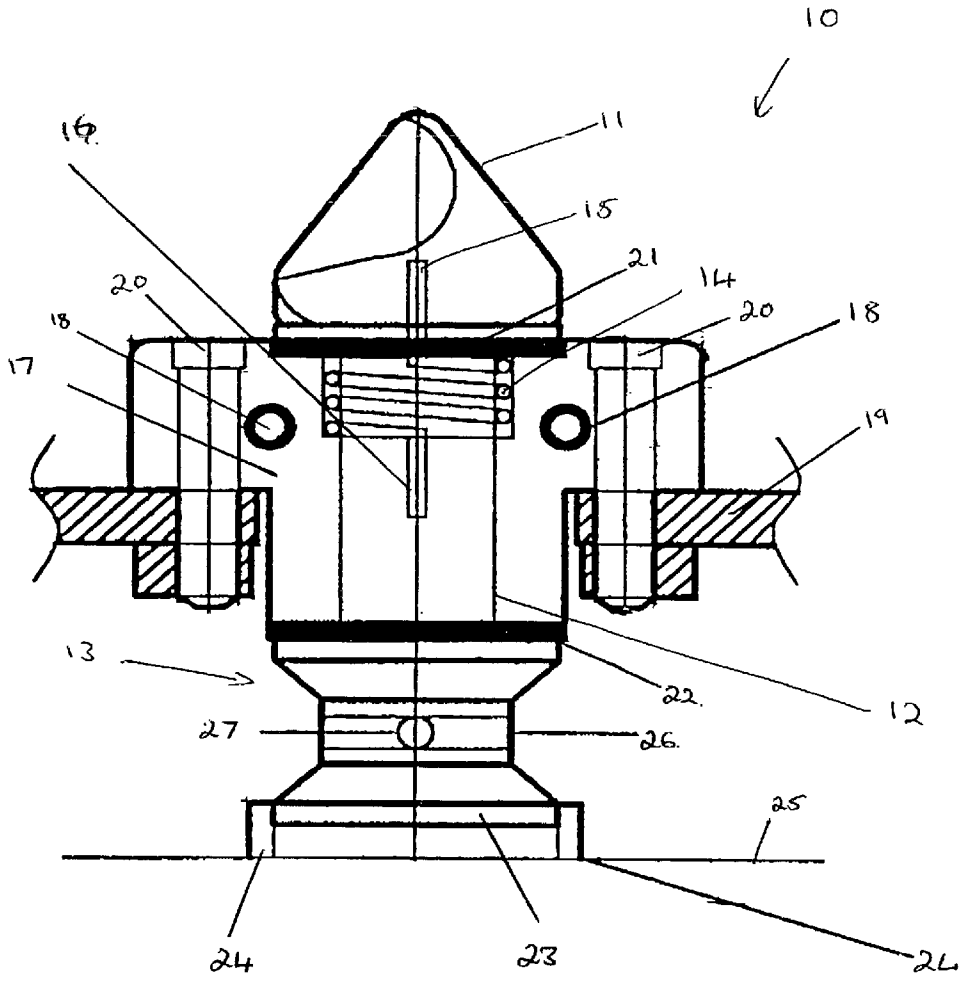
(57) **ABSTRACT**

A releasable semi-automatic clamping device for holding down a corner fitting of a container to an underlying support, such as a load platform of a road or rail vehicle, in which the device enters the corner fitting via a lower entrance aperture upon relative closing movement between the support and the corner fitting. The device comprises a clamping head which is rotatable between a clamping position and a release position, and which is usually biased towards the clamping position by a biasing means. A remotely operated release mechanism is coupled with the clamping device and can be operated remotely to move the clamping head from the clamping position to the release position, and includes a remote actuator positionable at a remote operating location, e.g. the cab of a vehicle or in the cockpit of an aircraft, and an elongate connection, preferably a cable, interconnects the remote actuator and the clamping head.



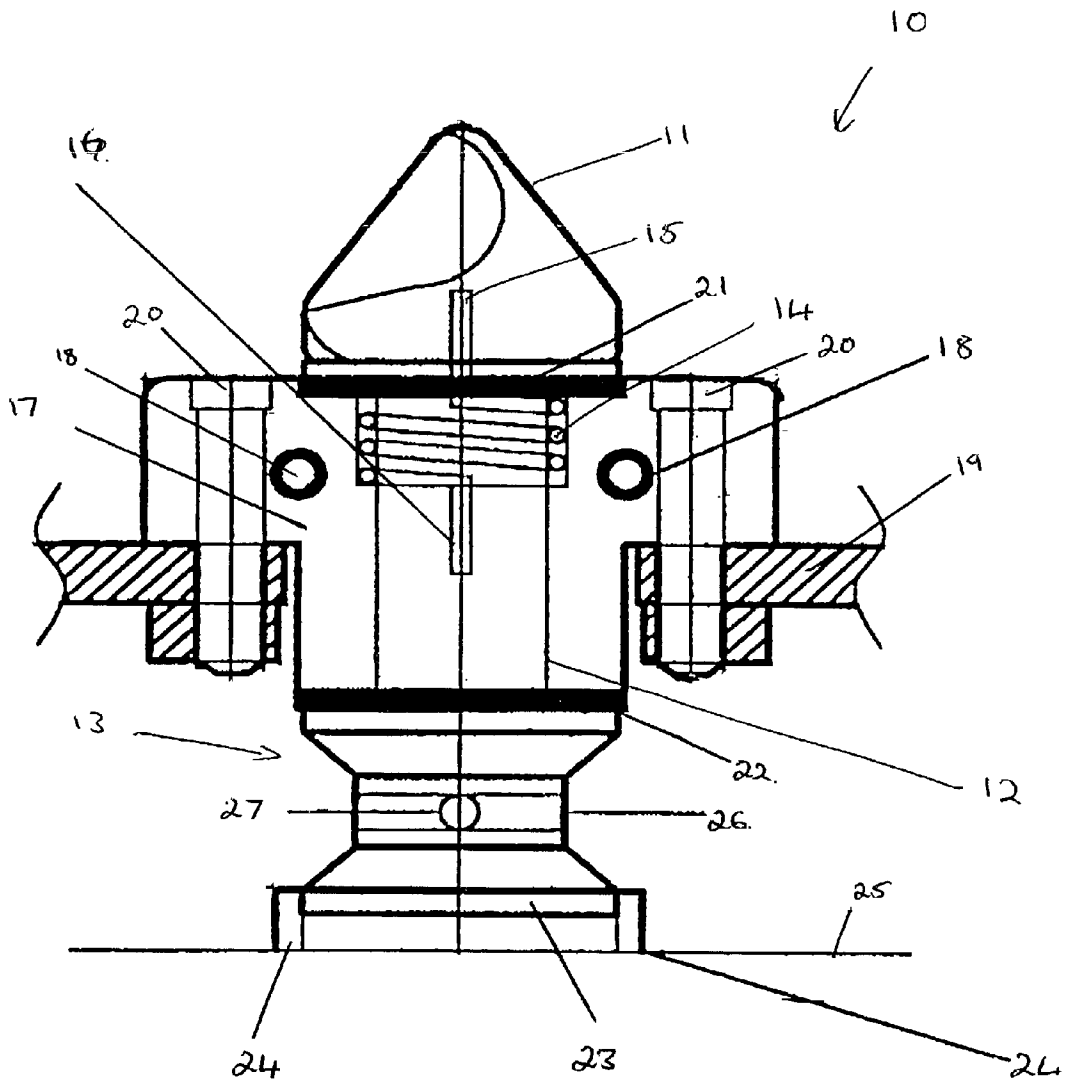


Figure 1

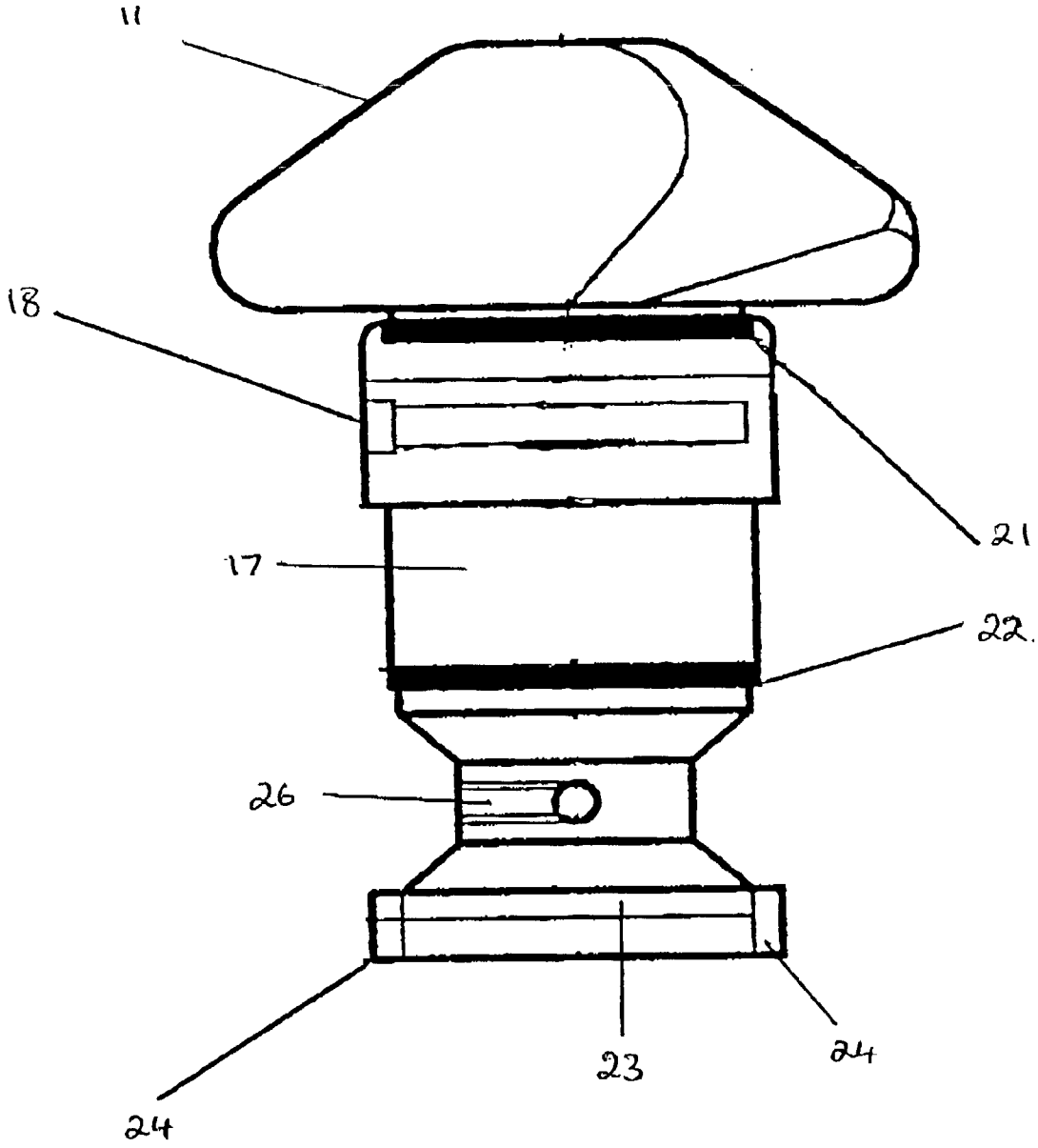


Figure 2.

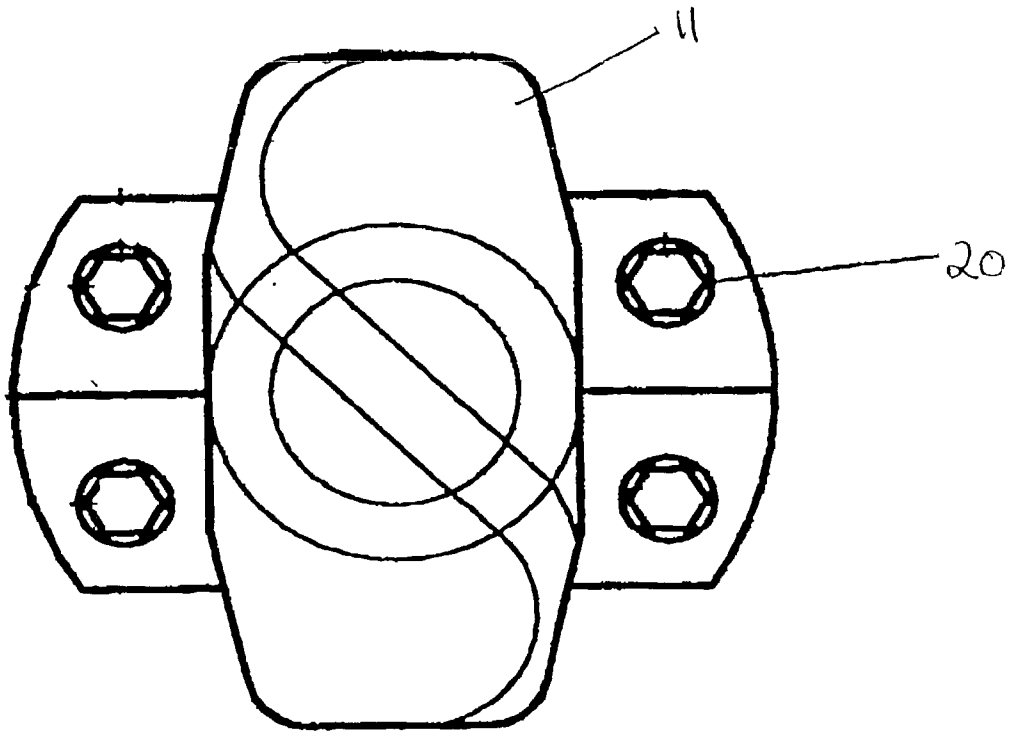


Figure 3.

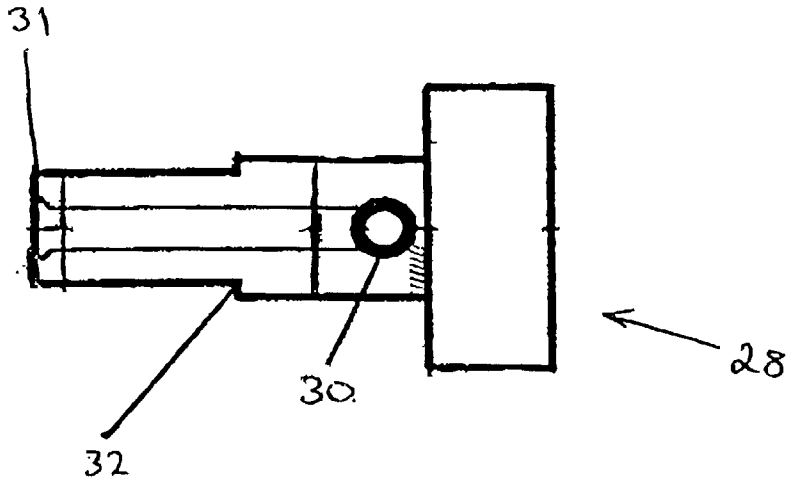


Figure 4

RELEASE MECHANISM FOR CONTAINER CLAMPING DEVICE

[0001] The present invention relates to a release mechanism for a container clamping device which enables a clamping head of the clamping device to be moved from a holding position to a release position, the clamping head serving to hold down a container on an underlying load supporting platform.

[0002] Known locking devices, commonly called "semi-automatic twistlok" devices, are used for holding-down containers on to loading platforms, such as the platform of a trailer or a rail vehicle, the cargo hold of all aeroplane or the deck of a ship. These devices have a specially shaped head, known as the twistlok, which is spring-loaded to a hold-down position, in which the head fits inside an ISO aperture comer fitting on the container. Thus, the comer fitting is held down allowing the corner of the container to be secured on the load platform.

[0003] In use, the container is lowered against the head which rotates against a biasing spring (which normally acts to keep the head in a locked or clamping position). Upon rotation through approximately 90°, the aperture is then able to fit over the clamping head and once the edges of the aperture are below the head the latter rotates backwards to its hold-down position under the influence of the biasing spring to retain that comer of the container.

[0004] Typically, the twistlok head is released by means of a manually operated lever connected to the lower end of the shaft of the head. This allows manual rotation of the head to the release position, against the biasing spring, allowing the container to be lifted free of the twistlok head. Release of the lever then allows the twistlok head to return, under the biasing control of the spring back to tie hold-down position.

[0005] The operating levers or handles are commonly visible on the exterior of containers being transported by trailer. However, in many situations where twistloks are used there is often very little space to allow an operator access to such handles. For example, very large vehicles or containers are often loaded inside an aircraft and occupy much of the available floor space. Thus, there is often little room for the operator to gain access to corner clamping devices. Often the operator has to manouevre himself around the restrained loads to get to the release handles. This stretching may result in injuries such as twists or sprains. Moreover, if the load has moved during transit or the load is on an unstable surface such as a ship there is a chance that the load may move or slide when released potentially endangering the safety of the operator.

[0006] There exists therefore a very substantial need to provide a safe, simple, reliable, yet inexpensive means of releasing clamping heads.

[0007] According to the present invention there is provided a releasable semi-automatic clamping device for holding down a corner fitting of a container to an underlying support, said device entering the corner fitting via a lower entrance aperture upon relative closing movement between the support and the corner fitting, and in which the device comprises:

[0008] a clamping head which is rotatable between a clamping position and a release position;

[0009] a biasing means arranged to bias the clamping head towards the clamping position; and,

[0010] a release mechanism which is operative to move the clamping head from the clamping position to the release position, said release mechanism comprising:

[0011] an actuator positionable at a remote operating location; and

[0012] an elongate connection for interconnecting the actuator to the clamping head.

[0013] By positioning the actuator of the release mechanism in a position remote from the actual loading area, say for example in the cab of an articulated lorry, the load can be released in a more convenient manner by the operator. In the case of an aircraft the release actuator could be positioned in the cockpit, in a covered recess on the exterior of the aircraft or in the vicinity of a payload door to allow easy access to the user. If several individual loads have to be unlocked, the respective release actuators could be positioned close to each other. Thus loads can be released sequentially with those closest to the exit being unloaded first.

[0014] Conveniently, said actuator is securable in either one of first or second positions, corresponding respectively to the clamping position and release position of the clamping head. Securing the actuator at the second position where the load can be released from the clamping allows the clamping head to be retained in the release position Preferably, the actuator is a substantially T-shaped member. In preferred embodiments, the connection member is a flexible tension link. Using a tension link means that the connection means can be kept taut whilst in the first position of the actuator (the locking position of the clamping head) thus allowing such a cable connector to be easily and safely passed through ducting without the risk of the cable snagging or catching something. By applying a small amount of tension to the already taut cable the clamping head can be released easily. Conveniently, the actuator comprises a push- rod arrangement.

[0015] In preferred embodiments, the mounting body is provided with thrust bearings adjacent the clamping head and the base portion of the rotatable shaft. These thrust bearings or washers allow relatively free rotation of the clamping head, shaft and base portion with respect to the mounting body. Preferably, guide members are provided which engage the base portion of the rotatable shaft. These guide members prevent twisting of the shaft and base portion as a pulling torque is applied to the base portion. In preferred embodiments, an upper portion of the mounting body acts as a shear block. The mounting block takes up any lateral forces imposed upon the clamping device if the load being held there happens to slide.

[0016] Preferred embodiments of the release-mechanism of the present invention will now be described in detail, by way of example only, with reference to the accompanying drawings, in which:

[0017] **FIG. 1** is a side view of a clamping device according to the invention, incorporating a remote release mechanism, and fixed to a support surface;

[0018] **FIG. 2** is a side view of the clamping device of **FIG. 1**, not showing the support surface;

[0019] **FIG. 3** is plan view of the clamping device of **FIG. 1**, not showing the support surface; and,

[0020] **FIG. 4** is a detail view of a release mechanism actuator.

[0021] FIGS. **1** to **3** show a semi-automatic clamping device (**10**) which has a shaped clamping head (**11**) also known as a twistlok, a rotatable spindle body (**12**) and a base portion (**13**). A biasing spring (**14**) is fixed at one end (**15**) to the clamping head (**11**) and at the other end (**16**) to a mounting body (**17**) which surrounds the spindle body (**12**). The spring acts as a resilient biasing means which biases the clamping head to the clamping position as illustrated in **FIG. 3**.

[0022] The mounting body (**17**) is assembled by clamping together separate portions by means of bolts (**18**), and the whole is secured to a support surface (**19**) by screws (**20**). Thus the clamping device can be easily removed from the support surface and the mounting body removed in order that servicing or repair can be carried out to the rotatable parts. Upper and lower portions of the mounting body are provided with upper and lower nylon thrust washers (**21**, **22**) which enable the clamping head (**11**), spindle (**12**) and base portion (**13**) to rotate relatively freely with respect to the mounting body. These washers can be replaced if required. A lower end (**23**) of the base portion (**13**) abuts a PVC sleeve (**24**) which acts as a guide for the base portion as it rotates. The PVC sleeve is attached to a surface (**25**) beneath the support surface (**19**).

[0023] A channel (**26**), offset from the centre, is provided in the base portion into which an elongate connector is connected In one embodiment, the connector is a tensile connector in the form of a flexible tension link (not shown), such as a cable, having one end be inserted into the channel. The cable is secured in the channel (**26**) by means of a clamp screen (**27**). The other end of the cable is secured to an actuator (**28**) as illustrated in **FIG. 4** which enables the clamping head (**11**) to be rotated by around 90° from the clamping position shown in **FIG. 2** to a release position. The actuator or handle (**28**) is generally T-shaped and has a channel (**29**) into which the cable (not shown) can be secured by means of clamp (**30**).

[0024] The actuator (**28**) fits inside a mounting block (not shown) provided at a remote location, for example the cab of a transport vehicle, or at some convenient point where access can be achieved inside the loading compartment of an aircraft or ship. The actuator (**28**) operates via the cable to apply a torque to the base portion (**13**) thereby rotating the assembly including the rotatable spindle and clamping head. The actuator (**28**) can be moved between two set positions; a locking or clamping position (**31**) and a release position (**32**). In the locking position, any slack on the connector cable between the actuator and the base portion is taken up, the twistlok head being held in the locked position by spring (**14**).

[0025] In use, a container (not shown) having a an ISO aperture corner fitting comprising a securing aperture may be lowered on to the clamping head (**11**) which is biased to a clamping position, shown in **FIG. 2**. The weight of the container bearing down on the specially contoured surface of the clamping head (**11**) causes it to rotate against the force of the biasing spring. Once the clamping head has been rotated through approximately 90°, to a release position, the edges of the aperture can fit over the clamping head (**11**) and sit adjacent the sides (**31**) of the mounting block, the container resting on the support surface (**19**). Once the edges of the aperture the have cleared the clamping head (**11**), the head is then free to return to the clamping position under the action of biasing spring (**14**).

[0026] The clamping head can then be simply moved to the release position by the release mechanism of the present invention. The clamping head can be secured in the release position by clamping the actuator (**28**) in the second position. Once a securing fitting on a container has been lifted away from the clamping device, the clamping head can then be returned to its locking position by unclamping the actuator and allowing it to return to the first position under the stored tension in tie flexible tension link.

[0027] In a further embodiment of the invention (not shown), the cable connector between the base portion and the actuator handle may be replaced by a push rod arrangement. Rather than incorporating a flexible tension link as the connecting means between the actuator arid the base portion of the rotatable spindle, a rod of a relatively lightweight, durable material can be fixed to either end and a handle portion provided for the operator. By simply pushing on the rod the assembly of the rotatable spindle and clamping head can be rotated and any fitting secured around the clamping head released.

I claim:

1. A releasable semi-automatic clamping device for holding down a corner fitting, of a container to an underlying support, said device entering the corner fitting via a lower entrance aperture upon relative closing movement between the support and the comer fitting, and in which the device comprises:

a clamping head which is rotatable between a clamping position and a release position;

a biasing means arranged to bias the clamping head towards the clamping position; and,

a release mechanism which is operative to move the clamping head from the clamping position to the release position, said release mechanism comprising:

an actuator positionable at a remote operating location; and

an elongate connection for interconnecting the actuator to the clamping head.

2. A clamping device according to claim 1, including a rotatable shaft on which said clamping head is mounted, and a base portion on which the shaft is mounted and which is securable to said support.

3. A clamping device according to claim 1, in which said elongate connection is a tensile connection.

4. A clamping device according to claim 3, in which the tensile connection is a cable.

5. A clamping device according to claim 1, in which said elongate connection is a push-rod connection.

6. A clamping device according to claim 1, in which said actuator is a T-shaped member.

7. A clamping device according to claim 6, in which said T-shaped member is securable in either one of a first or second position, corresponding respectively to the clamping position and the release position of the clamping head.

8. A clamping device according to claim 1, in which the clamping head is automatically moveable from the clamping position to the release position, against the action of the biasing means, upon engagement of the clamping head with the lower entrance aperture of the corner fitting.

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