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Prop locking device and method

Abstract

A prop locking device 10 comprises a base portion (12) having a first plate (20) having an aperture (22) for receiving a shaft (11) of a prop (8). The base portion (12) includes a mounting formation (14, 16) configured to secure the base portion (12) to a ground support plate (6) of the prop (8). At least one locking aperture (22) is formed in the first plate (20) for receiving a locking member (50). An upper member (30) includes a second plate (34) having at least one locking aperture (36) for receiving the locking member (50). A collar (30) is secured to the second plate (34) and configured to be seated around a body portion (9) of the prop (8). When the locking member (50) is inserted through aligned locking apertures (22, 36) of the first plate (20) and the second plates (34), the collar (32) prevents rotation of the body portion (9) of the prop (8) about a longitudinal axis (X).

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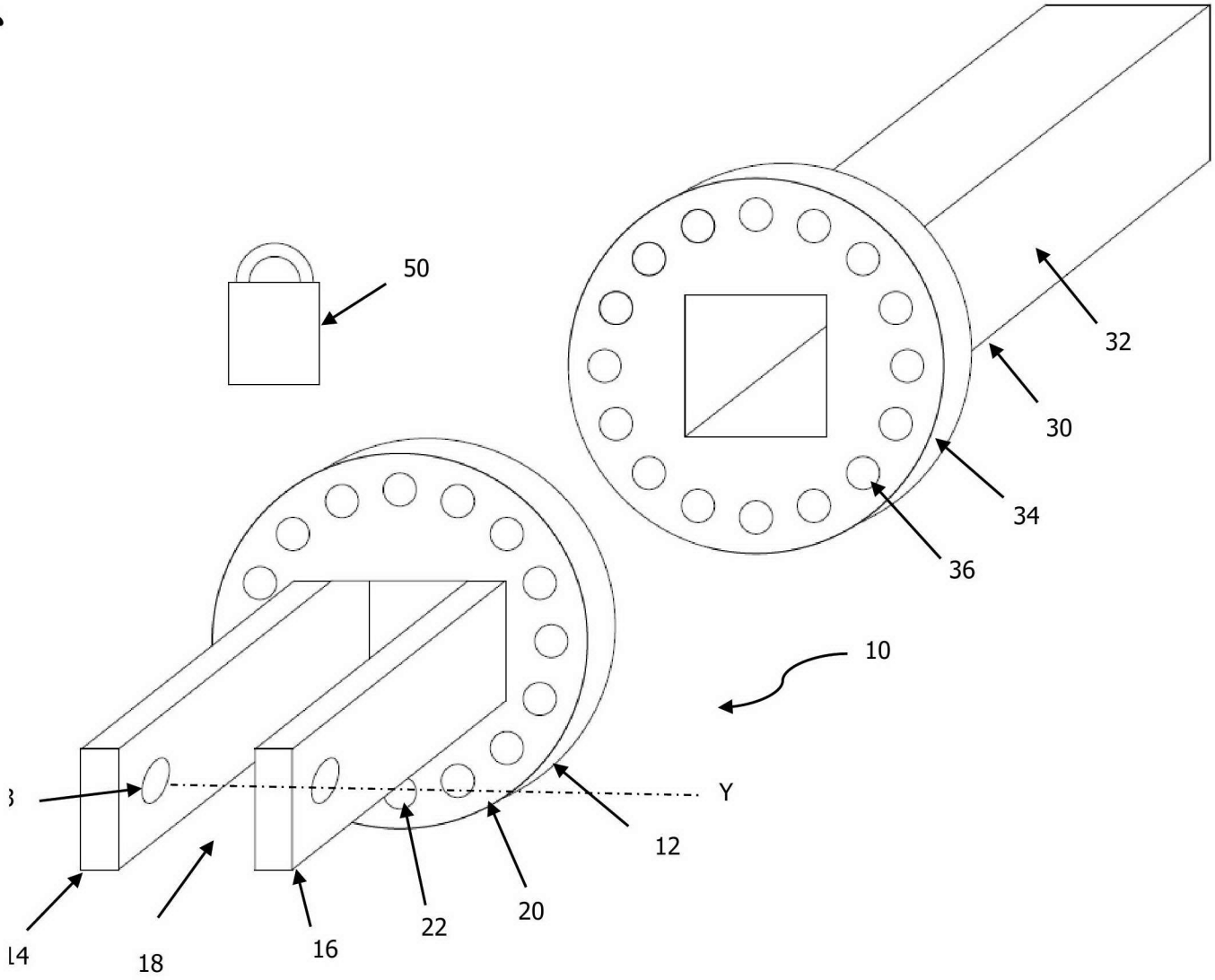

Fig. 1

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Innovation Patent Specification

Title: Prop locking device and method

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The following is a full description of the invention which sets forth the best method known to the applicant of performing it.

Prop locking device and method

Technical Field

[0001] The present disclosure relates to a prop or brace locking device and method. In particular, the present invention relates to a prop or brace lock for use on construction sites. However, it will be appreciated that the invention can be used in other applications.

Background of the Invention

[0002] Props or braces are used in construction for various tasks such as supporting a load whilst newly poured concrete is curing or alternatively while precast concrete panels are being installed and secured.

[0003] Developments in precast and tilt up construction techniques have seen ever increasing panel sizes being achieved. A result of this development has seen a need for greater load bearing systems for both bracing and aligning the panels during installation.

[0004] Advancements in precast concrete construction techniques have seen precast concrete used increasingly frequently on commercial and even residential projects. Advantages with precast concrete allow the wall, roof or other such panel to be formed offsite in a controlled environment under strict quality controls. The concrete panel can then be delivered to site at the appropriate stage of the construction process for prompt installation. This provides several advantages over site formed and poured concrete. Firstly this technique obviates the need for formwork to be manually formed on site, and hence the forming is conducted in a controlled environment, which is unaffected by weather conditions. Furthermore, the amount of labour required on site can be significantly reduced.

[0005] In addition, precast concrete is generally formed on a horizontal plane, meaning it is easier to embed structural steel such as reo mesh in the panel.

[0006] Furthermore, the time required to install precast concrete panels on site is greatly reduced, and this assists to expedite the building process, as it is not necessary to wait for the concrete to cure on site before other construction process can continue. These advantages can result in cost savings to the developer and a higher quality end product.

[0007] However, there are existing drawbacks with the supporting of concrete panels during installation. Normally the panels will be seated on a foundation and initially held in

the desired vertical orientation with braces or props until the requisite coupling members can be installed to secure the combined panel assembly to each other in a way that is structurally sound.

[0008] It is often necessary to wait for non-compressible grout to dry beneath the panels before the props can be removed.

[0009] There are safety issues with the current props used for supporting precast panels, also known as tilt props.

[0010] The props are designed to be adjustable in length. Typically the prop is secures to the foundation or ground at one end, and the other end is secured to the panel. By adjusting the length of the prop, the builder can adjust the vertical position of the concrete panel, until it is in the desired position.

[0011] Tilt props normally have two distinct adjustment mechanisms. Firstly, approximate adjustment is achieved by telescoping inner and outer tubes to the nearest incremental hole. A pin is then inserted and the pin can be locked in position with a padlock to prevent unintentional removal of the pin. In addition to the approximate adjustment, the tilt prop also allows for final adjustment, by rotating the outer portion of the brace. This process of final adjustment typically relies on a screw threaded shaft extending from the lower end the brace.

[0012] A drawback with existing tilt props, and other types of props, is that it is only possible to mechanically lock the approximate adjustment mechanism. As such, it is not readily possible to lock the final adjustment mechanism, so there is a risk of vandals or other parties interfering with the verticality of the panels.

[0013] Furthermore, if the screw thread engagement between the threated shaft and the prop body fails, the prop can collapse, and the concrete panel may fall to the ground, which can result in fatal injuries.

Object of the Invention

[0014] It is an object of the present invention to substantially overcome or at least ameliorate one or more of the above disadvantages, or to provide a useful alternative.

Summary of the Invention

[0015] In a first aspect, the present invention provides a prop locking device comprising:

a base portion having:

a first plate having an aperture for receiving a shaft of a prop,

a mounting formation configured to secure the base portion to a ground support plate of the prop;

at least one locking aperture formed in the first plate for receiving a locking member;

an upper member having:

a second plate having at least one locking aperture for receiving the locking member;

a collar secured to the second plate and configured to be seated around a body portion of the prop:

wherein when the locking member is inserted through aligned locking apertures of the first plate and the second plates, the collar prevents rotation of the body portion of the prop about a longitudinal axis.

[0016] At least one the first plate and the second plate preferably has a plurality of locking apertures located on a pitch circle diameter.

[0017] Both of the first plate and the second plate preferably has a plurality of locking apertures located on a common pitch circle diameter.

[0018] The collar preferably has a square, rectangular or round cross-sectional profile when viewed through a plane extending perpendicular to a longitudinal axis of the prop.

[0019] The mounting formation is preferably defined by first and second arms extending generally parallel to each other, a clearance being defined between the arms.

[0020] The first and second arms preferably each include a hole configured to receive a shaft or a bolt to secure the base portion to the ground support plate.

[0021] The clearance between the first and second arms is preferably sufficient to receive the shaft of the prop.

[0022] In a second aspect, the present invention provides a method of installing a prop locking device, the method including the step of:

decoupling a ground support plate of a prop by removing a locking pin,

securing an upper member of the prop locking device to the prop by:

inserting a body portion of the prop into a collar of the upper member, the collar being secured to a second plate having at least one locking aperture,

securing a base portion to the prop by:

inserting a shaft of the prop into an aperture of the base portion, the base portion having a first plate with at least one locking aperture for receiving a locking member;

inserting the locking pin through one or more apertures formed in a mounting formation of the base portion, and also through an eyelet of the shaft of the prop and also through an engagement lug of the ground support plate; and

securing the locking pin to prevent unintentional removal.

Brief Description of the Drawings

[0023] A preferred embodiment of the invention will now be described by way of specific example with reference to the accompanying drawings, in which:

[0024] Fig. 1 is schematic view of the prop locking device of the invention; and

[0025] Fig. 2 is a side view depicting the prop locking device of Fig. 1 secured to a prop in-situ.

Detailed Description of the Preferred Embodiments

[0026] A prop or brace locking device 10 and a method of installing and using the device 10 is disclosed in the drawings. The prop locking device 10 is intended for use with props, and in particular tilt props when installing and setting large panels, such as precast concrete, tilt up concrete, glass panes or steel. It will be appreciated that the prop locking device 10 can be used in other applications where a large and/or heavy component requires temporary support.

[0027] The prop locking device 10 includes two primary components, namely a base portion 12 and an upper member 30. The device 10 can be retrofitted to existing tilt props or braces with minimal intervention or modification.

[0028] The base portion 12 is designed to be bolted or otherwise secured to the ground support plate 6 of an existing tilt prop 8. In particular, conventional tilt props 8 normally have a ground support plate 6 which is connected with a pin connection (defined by a bolt and nut) to the threaded shaft 11 of the tilt prop 8. This arrangement allows the ground support plate 6 to pivot about a single axis relative to the elongated body 9 of the tilt prop 8.

[0029] The base portion 12 is designed to secure to the tilt prop 8 ground support plate 6 using the existing bolt holes formed therein. However, it will be appreciated that the base portion 12 can alternatively be welded or otherwise attached to the threaded shaft 11 of the

existing tilt prop, or attached in some other manner to the ground support plate, or even the ground.

[0030] In the embodiment depicted in the drawings, the base portion 12 includes a first mounting formation in the form of two arms 14, 16 which extend in a generally parallel direction and are separated by a clearance 18. The clearance 18 allows the mounting lug of the ground support plate 6 to be located therein. The clearance 18 is also sufficiently wide to concurrently receive the end of the threaded shaft 11 of the existing tilt prop 8.

[0031] The base portion 12 also includes a first plate 20, upon which the arms 14, 16 are welded, or otherwise attached. The first plate 20 and arms 14, 16 can be integrally formed by casting, for example from aluminium or cast iron.

[0032] In the embodiment depicted in the drawings, the first plate 20 is round and has a plurality of holes 22 formed around its perimeter on a common pitch circle diameter. The holes 22 extend through the first plate 20.

[0033] The upper member 30 includes a collar 32, and a second plate 34. In the embodiment described and shown in the drawings, the second plate 34 is the same as the first plate, being generally circular and having holes 36. The holes 22 of the first plate 20 are aligned with the holes 36 of the second plate 34, and on the same pitch circle diameter.

[0034] By placing a lock through two aligned holes 22, 36 of the first and second plates 20, 34, the rotation of the plates 20, 34 can be isolated relative to each other. It will be appreciated that in an alternative embodiment, a single hole may be located on one of the two plates 20, 34, and a full set or holes provided around the circumference of the other plate 34, 20. This arrangement also provides the same ability to rotationally lock the plates 20, 34 relative to each other.

[0035] In the embodiment depicted in Fig. 1, the collar 32 is square. However, it will be appreciated that a collar 32 may be a rectangular collar or a tubular collar, depending on the type of tilt prop 8 that the device 10 is intended to be used with.

[0036] In the event that the collar 32 is square or rectangular, the collar 32 is designed to be seated snugly around a corresponding square or rectangular elongated body portion of the prop. As such, the collar 32 is unable to rotate relative to the longitudinal body 9 of the prop 8.

[0037] When the two plates 20, 34 are connected with a lock 50, the lock 50 prevents the two plates 20, 32 from being rotated relative to each other. This also has the effect of

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preventing the threaded arm 11 of the prop from being retracted or withdrawn from the body of the prop 8.

[0038] Effectively the base portion 12 is secured to the ground support plate 6 in a manner that prevents the base portion 12 from rotating relative to the ground support plate 6 about the longitudinal axis X of the prop 8. However, the base portion 12 can pivot about the axis Y, defined by the pin connection with the ground support plate 6. The axes X and Y being generally perpendicular axes.

[0039] In order to retrofit the device 10 to an existing tilt prop 8, the ground support plate 6 of the prop 8 is removed by separating the nut and bolt that define the pin connection between the ground support plate 6 and the threaded shaft 11.

[0040] The collar 32 is then slid over the elongated body 9 of the prop 8. The base portion 12 is then also slid over the end of the threaded shaft 11, such that the eyelet which is located at the end of the shaft 11 is in alignment with the two holes 13 formed on the end of the arms 14, 16. The pin connection, normally in the form of a bolt, is then inserted through the holes 14, 16 and also through the eyelet of the threaded shaft 11, and the lug of the ground support plate 6. Once the bolt and nut are connected, the base portion 12 is effectively secured to ground support plate 6 of the prop 8, and the upper member 30 is located around the longitudinal body 9 of the prop 8.

[0041] In operation, the user secures the ground support plate 6 to the concrete slab or foundation with a suitable masonary fastener. A similar engagement is made between the vertical support plate 15 and the panel 17 to be supported.

[0042] A locking pin is inserted between the two telescoping inner and outer tubes of the prop 8 to the nearest incremental hole, resulting in approximate adjustment of the prop 8.

[0043] Final adjustment of the prop 8 is made by rotating the outer longitudinal body 9 of the prop. This final adjustment sets the position of the threaded shaft 11. Once final adjustment is achieve, and the panel 17 is in the desired vertical position and aligned with any adjacent panels, the two plates 20, 34 of the prop locking device 10 are secured to each other by passing a lock through two aligned holes 22, 36 of the plates 20, 34. This locking stage prevents any further fine adjustment of the prop. This serves two purposes. It prevents the prop 8 from collapsing if the threaded connection between the shaft 11 and the prop 8 fails. Secondly, it prevents unauthorised persons from making any further fine adjustment to the length of the prop.

[0044] Occasionally the prop 8 will be of a type having a round body 9. In this arrangement, the prop 8 is modified by welding or otherwise attaching a square or rectangular casing (not shown) to a portion of the outside of the body 9. In this way, the additional casing prevents the collar 32 from rotating relative to the prop 8, in the manner described above. It will be appreciated that alternative modifications to the prop 8 may be made, such as welding two longitudinally extending strips to the body 9 on diametrically opposing sides, so that the collar 32 is unable to rotate relative to the body. Alternatively, the casing could be engaged with the body 9 using the locking pin which is inserted between the two telescoping inner and outer tubes of the prop 8, resulting in approximate adjustment of the prop 8. It will be appreciated other methods may be employed to alter the cross-sectional shape of the prop 8 from round to another shape or configuration which prevents the collar 32 from rotating relative to the prop 8. For example, the casing could be clamped to the body 9 of the prop 8.

[0045] Once the concrete panel is set, and it is time to remove the props 8, the locks 50 can be unlocked or alternatively cut off.

[0046] Although the invention has been described with reference to specific examples, it will be appreciated by those skilled in the art that the invention may be embodied in many other forms.

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The claims defining the invention are as follows:

1. A prop locking device comprising:

a base portion having:

a first plate having an aperture for receiving a shaft of a prop,

a mounting formation configured to secure the base portion to a ground support plate of the prop;

at least one locking aperture formed in the first plate for receiving a locking member;

an upper member having:

a second plate having at least one locking aperture for receiving the locking member;

a collar secured to the second plate and configured to be seated around a body portion of the prop:

wherein when the locking member is inserted through aligned locking apertures of the first plate and the second plates, the collar prevents rotation of the body portion of the prop about a longitudinal axis.

2. The prop locking device of claim 1, wherein at least one the first plate and the second plate has a plurality of locking apertures located on a pitch circle diameter.

3. The prop locking device of claim 2, wherein both of the first plate and the second plate has a plurality of locking apertures located on a common pitch circle diameter.

4. The prop locking device of any one of the preceding claims, wherein the collar has a square, rectangular or round cross-sectional profile when viewed through a plane extending perpendicular to a longitudinal axis of the prop.

5. The prop locking device of any one of the preceding claims, wherein the mounting formation is defined by first and second arms extending generally parallel to each other, a clearance being defined between the arms.

6. The prop locking device of claim 5, wherein the first and second arms each include a hole configured to receive a shaft or a bolt to secure the base portion to the ground support plate.

7. The prop locking device of claim 6, wherein the clearance between the first and second arms is sufficient to receive the shaft of the prop.

8. A method of installing a prop locking device, the method including the step of:

decoupling a ground support plate of a prop by removing a locking pin,

securing an upper member of the prop locking device to the prop by:

inserting a body portion of the prop into a collar of the upper member, the collar being secured to a second plate having at least one locking aperture,

securing a base portion to the prop by:

inserting a shaft of the prop into an aperture of the base portion, the base portion having a first plate with at least one locking aperture for receiving a locking member;

inserting the locking pin through one or more apertures formed in a mounting formation of the base portion, and also through an eyelet of the shaft of the prop and also through an engagement lug of the ground support plate; and

securing the locking pin to prevent unintentional removal.

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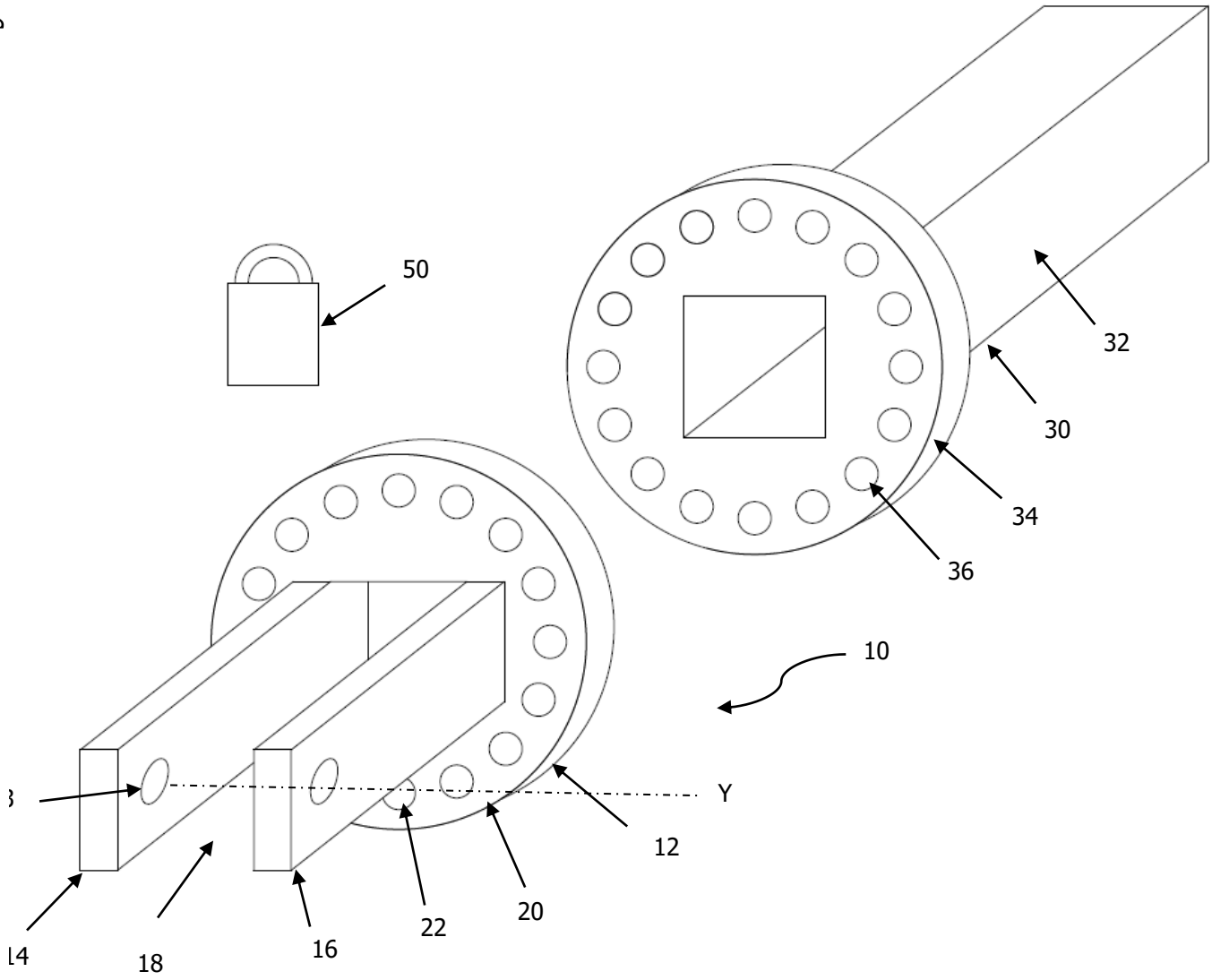

Fig. 1

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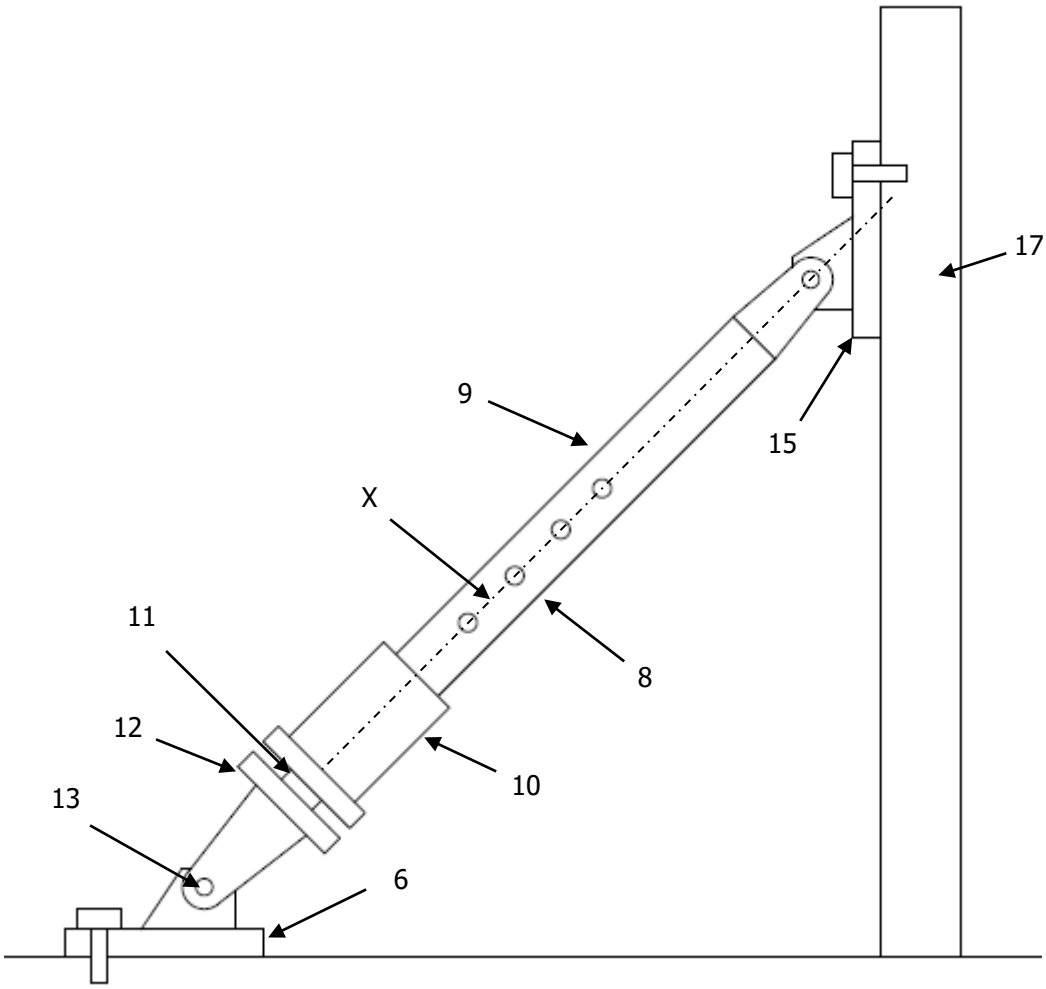

Fig. 2