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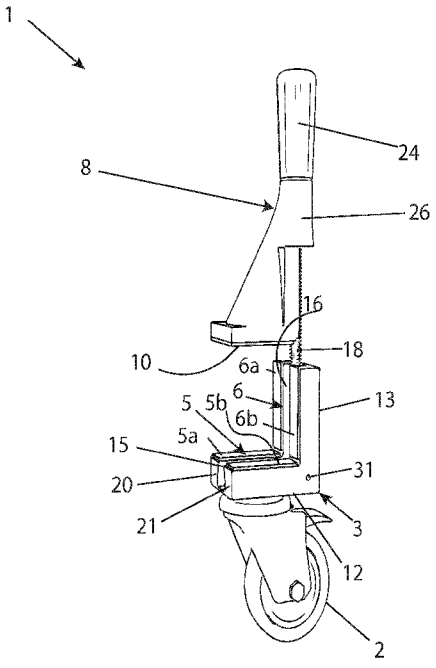


Fig 1

(57) Abstract: The present invention relates to a wheel assembly (1) for moving an object. The wheel assembly comprises a wheel (2), a body (3) supported by the wheel and has a first clamping surface (5) adapted to bear against the object, and a clamping element (8; 42) that has a bearing surface (10) adapted to along with the first clamping surface (5) secure the object between the clamping element (8; 42) and the body (3). The body (3) has a second clamping surface (6) adapted to bear against the object and is arranged perpendicular to the first clamping surface (5). The clamping element is arranged movable between a first and a second position in such a way that the clamping element is adapted to secure the object against the first clamping surface (5) in the first position, and the clamping element is adapted to secure the object against the second clamping surface (6) in the second position.

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A mountable wheel assembly for transportation of objects

Field of the invention

The present invention relates to a temporarily mountable wheel assembly in order to facilitate the transport of an object.

Background of the invention

The transport of an object can be tedious and heavy, and therefor equipment such as pallet trucks are often used for the transport. In some cases, for example in narrow passages, pallet trucks cannot be used or are not so effective. The design of some objects also causes an instability when they are conveyed by a pallet truck. In those cases, the object is often carried manually, with the risk of injury on the carrying person. An alternative is therefore to mount wheels under the object during the transportation in order to facilitate the transport.

It is also known to use removable wheels designed for being temporarily mounted on an object that is to be transported. The wheels are mounted on the object that is to be moved and the wheels can then be removed for use on another object.

EP0865992 shows removable wheels adapted to be temporarily mounted on a pallet. Each wheel is provided with a u-shaped metal frame that forms a space. The u-shaped metal frame is open laterally for receiving the pallet. The pallet is locked in place inside the space with a thumbscrew. The inner lower part of the u-shaped space has serrated projections that attaches to the wood of the pallet.

It is normally possible to mount the wheels on the object in only one way. Flat objects can be difficult to move since they after the mounting of the wheels are located at an inappropriate height for the person moving the object. The non-flexible mounting also result in that the object is required to be at a certain position during transportation, which can make it difficult to e.g. transport the object through narrow passages. The design of some objects can also make it difficult to mount the wheels on the object.

Object and summary of the invention

It is an object of the present invention to provide an improved mountable wheel assembly for the transport of an object, which is more flexible than earlier known mountable wheel assemblies.

This object is achieved by a wheel assembly as defined in claim 1.

The wheel assembly comprises a wheel and a body supported by the wheel having a first clamping surface adapted to bear against the object, and a clamping element having a bearing surface, and the clamping element is arranged to cooperate with the first clamping surface to secure the object between the clamping element and the body. The body has a second

clamping surface adapted to bear against the object, wherein the second clamping surface is arranged perpendicular to the first clamping surface. the clamping element is arranged rotatable relative the body (3) between a first position and a second position so that the bearing surface is facing the first clamping surface when the clamping element is in the first position and the bearing surface is facing the second clamping surface when the clamping element is in the second position, and the clamping element is arranged linearly movable in relation to the body so that the distance between the bearing surface and the clamping surfaces is adjustable to enable the clamping element to secure the object against the first clamping surface in the first position, and to secure the object against the second clamping surface in the second position.

With a clamping surface is meant the surface which the object will press against when it is subjected to pressure from the clamping element.

With clamping element is meant the movable unit that presses the object against the clamping surface.

With bearing surface is meant the surface of the clamping element that presses the object against the clamping surfaces.

Since the clamping element is arranged rotatable relative the body, the clamping element can be moved between the first and the second positions by simply turning the clamping element. By turning the clamping element between the two positions, it becomes possible to mount the wheel assembly in two ways. Since the clamping element is movable in a linear direction in relation to the body, the distance between the bearing surface and the clamping surface can easily be adjusted to the size of the object or the part of the object that the wheel assembly is to be mounted to.

The bearing surface of the clamping element is facing the first clamping surface when the clamping element is in the first position, wherein a first opening is formed between the bearing surface and the first clamping surface for receiving the object, and the bearing surface of the clamping element is facing the second clamping surface when the clamping element is in the second position, wherein a second opening is formed between the bearing surface and the second clamping surface for receiving the object. The clamping element is arranged movable in relation to the body so that the size of the first opening is adjustable in the first position and the size of the second openings is adjustable in the second position.
In the first position, a first opening is formed between the bearing surface of the clamping element and the first clamping surface, which is adapted for receiving the object, or a part of the object. In the second position a second opening is formed between the bearing surface of the clamping element and the second clamping surface which is adapted to receive the object, or a part of the object. The first and the second openings are perpendicular to each other, which means that it is possible to choose between two angles for mounting the wheels to the object. This makes it possible to choose in which position the object is to be transported in

e.g. if the object is to be transported in a horizontal or a vertical position. For example a flat plate may be suitable to transport in a vertical position through a small corridor or an opening. Sometimes it can be advantageous to transport the object in a horizontal position, e.g. if it becomes very unstable to transport it in a vertical position.

According to an embodiment of the invention, the wheel assembly comprises an elongated element that is rotatable between a raised and a lowered position, the clamping element is in the first position when the elongated element is in the raised position, and the clamping element is in the second position when the elongated element is in the lowered position. The elongated element allows the clamping element to be turned between the first position and the second position.

According to an embodiment of the invention, the clamping element is connected to the elongated element so that the bearing surface is arranged perpendicular to the longitudinal axis of the elongated element. Since the clamping element is connected to the elongated element so that its bearing surface is perpendicular relative the longitudinal axis of the elongated element, the bearing surface of the clamping element will be perpendicular to its earlier position in the second position. Thereby, the clamping element can be adjusted to be opposite both clamping surfaces.

According to an embodiment of the invention, the clamping element is movably connected to the elongated element so that the bearing surface is linearly movable along the elongated element. This allows the distance between the bearing surface and the clamping surface to be effectively adjusted.

According to an embodiment of the invention, the body comprises a first part that is provided with the first clamping surface and a second part protruding from the first part and provided with the second clamping surface, and each of the first and second parts is provided with an elongated groove adapted to receive the elongated element when the elongated element is in the raised or the lowered position. In this way the elongated element will not constitute as an obstacle when the object is inserted into the opening between the body and the clamping element. The elongated groove also facilitates transport of elongated objects.

According to an embodiment of the invention, the body comprises two L-shaped elements that are arranged parallel and at a distance from each other so that a space is formed between them. The L-shaped elements cause a first and a second clamping surface to be formed perpendicular to each other. The space forms in this embodiment the elongated groove where the elongated element is received.

According to an embodiment of the invention, the clamping element comprises a fastening member with said bearing surface arranged in a lower part of the fastening member, and a handle arranged in connection to an upper part of the fastening member, and the handle comprises a through hole with internal threads, wherein the handle and the fastening member

are arranged movable along the elongated element. This allows for an easy way to move the fastening element along the elongated element.

According to an embodiment of the invention, the clamping element comprises a threaded rod connected to the fastening member and connected to the elongated element with an extension rod, and internal threads of the extension rod is adapted to engage with external threads on the threaded rod. The advantage with this embodiment is that a common clamp can be used as a fastening member which can facilitate the production since no custom production is needed.

According to an embodiment of the invention, the elongated element comprises external threads, the internal threads of the handle is adapted to cooperate with the external threads of the elongated element, so that the handle moves along the elongated element. The fastening member is arranged so that the bearing surface pushes an object in a direction towards the opposite clamping surface when the handle is rotated.

According to an embodiment of the invention, the first and the second clamping surface along with the bearing surface is made of an elastic material. In one embodiment, the elastic material is arranged on the two L-shaped element, and on the bearing surface. The elastic material improves the attachment of the object and facilitate the securing of the object between the bearing surface and the clamping surface. The elastic material also facilitate the securing of the object between the fastening element and the body. The elastic material also protects against scratches.

Brief description of the drawings

The invention will now be explained more closely by the description of different embodiments of the invention and with reference to the appended figures.

Fig. 1 shows a perspective view seen from the side of a wheel assembly according to a first embodiment of the invention with a clamping element in a first position.

Fig. 2 shows a perspective view seen from the side of the wheel assembly as shown in figure 1 with the clamping element in a second position.

Figs. 3a-e show a perspective view seen from the side of the wheel assembly when the clamping element switches between the first and the second position.

Fig. 4 shows a perspective view seen from behind the wheel assembly when the clamping element is in the first position.

Fig. 5 shows a handle in a cross-section view.

Fig. 6 shows a fastening member in a cross-section view.

Fig. 7 shows two wheel assembly's mounted on an object with the clamping elements in the second position, seen from a side view.

Fig. 8 shows a wheel assembly according to a second embodiment with a clamping element in the second position, seen from a side view.

Fig. 9 shows an extension rod according to the second embodiment seen from a side view.

Detailed description of preferred embodiments of the invention

Figure 1 shows a side view of a first embodiment of a wheel assembly 1 with a clamping element 8 in a first position. Figure 2 shows the same embodiment of the wheel assembly, but with the clamping element 8 in a second position. The wheel assembly is temporarily mountable on an object in order to facilitate transportation of the object.

The wheel assembly 1 comprises a wheel 2 and a body 3 that is supported by the wheel. The body has a first clamping surface 5 and a second clamping surface 6 adapted to bear against the object. The first and the second clamping surfaces 5, 6 are arranged perpendicular to each other. The wheel assembly 1 further comprises the clamping element 8 that has a bearing surface 10. The bearing surface 10 is arranged to along with the first clamping surface 5 secure the object between the clamping element 8 and the body 3 when the clamping element 8 is in the first position, as shown in figure 1. The bearing surface 10 is also adapted to along with the second clamping surface 6 secure the object between the clamping element 8 and the body 3 when the clamping element is in the second position, as shown in figure 2. The clamping element 8 is arranged to be movable between the first position and the second position.

According to this embodiment, the wheel 2 is a pivot-wheel that is adapted to transport an object in different directions. The wheel 2 is operatively connected to the body 3, meaning that the wheel can be directly or indirectly mounted to the body 3. For example, the wheel can be connected to the body by means of a brake. In this embodiment, the wheel is arranged pivotal in relation to the body 3.

The body 3 is split into a first and a second part which hereinafter is referred to a lower body part 12 and an upper body part 13. The lower body part 12 comprises the first clamping surface 5 and the upper body part 13 comprises the second clamping surface 6. The lower and upper body parts 12, 13 are perpendicular to each other. Together the lower and upper body parts 12, 13 form a L-shaped body 3. In this embodiment the lower and the upper body parts 12, 13 is provided with an elongated groove adapted to receive an elongated element 18. The elongated grooves splits the clamping surfaces 5, 6 in two parts. The body 3 comprises in this embodiment two L-shaped element 20, 21 that are arranged in parallel and at a distance from each other so that a space is formed between them, see figure 1. The L-shaped elements 20, 21 are fixedly connected to each other. Each of the L-shaped elements 20, 21 comprise a first clamping surface part 5a, 6a and a second clamping surface part 5b, 6b that is arranged perpendicular to each other, see figure 1. Together the clamping surface parts 5a, 5b form the first clamping surface 5, and the clamping surface parts 6a, 6b form the second clamping surface 6.

When the clamping element 8 is in the first position, the clamping element 8 is arranged linearly movable towards the lower body part 12 and when the clamping element 8 is in the second position, the clamping element is arranged linearly movable towards the upper body part 13. In this way the distance between the bearing surface 10 and the clamping surfaces 5, 6 becomes adjustable. The clamping element 8 is preferably connected to the elongated element 18. The clamping element is arranged so that the bearing surface 10 is perpendicular to the longitudinal axis of the elongated element. The clamping element is arranged movable along the elongated element 18. The clamping element 8 is movably connected to the elongated element 18 so that the bearing surface 10 is linearly movable along the elongated element. The elongated element 18 is arranged rotatable in relation to the body 3 between a raised and a lowered position. The elongated element 18 rotates around an axis 31 that extends through the body 3 parallel to the clamping surfaces 5, 6. In this embodiment the axis is mounted between the L-shaped elements 20, 21 and on the transition between the lower body part and the upper body part 12, 13, see figure 1. When the elongated element 18 is in the raised position the clamping element 8 is linearly adjustable towards the lower body part 12, and when the elongated element 18 is in the lowered position the clamping element 8 is linearly adjustable towards the upper body part 13. In this embodiment, the elongated element 18 is arranged to rest in the elongated groove 15, 16 between the two L-shaped elements 20, 21 in the raised position and in lowered position. The elongated element 18 has external threads 19.

In this embodiment the clamping element 8 comprises a handle 24 and a fastening member 26 that comprises said bearing surface 10. The bearing surface 10 is attached to the part of the fastening member that is in the closest proximity to the opposing clamping surface 5, 6. The bearing surface 10 and the clamping surfaces 5, 6 are preferably provided with an elastic material, e.g. rubber or plastic, for further securing the object.

The handle 24 is arranged in connection to an upper part of the fastening member 26. The handle 24 is arranged rotatable in relation to the fastening member 26. The handle 24 comprises a through hole 25 with internal threads 29. In one embodiment, the handle 24 comprises upper and lower parts 24a, 24b, see figure 5. The lower part 24b is intended to be pushed into the fastening member 26. The fastening member 26 comprises a through hole 27 without threads, see figure 6. The through hole in the fastening member is circular and has a diameter that is larger than the diameter of the elongated element 18 including the external threads 19 so that the fastening member 26 is allowed to move freely around and along the elongated element 18. The handle 24 and the fastening member 26 are arranged movable along the elongated element 18. The elongated element 18 is rotatably connected to the body 3 and extends through the through hole 25, 27 in the fastening member 26 and the handle 24. The handle 24 comprises internal threads 29 that engages with the external threads 19 of the elongated element 18. The handle 24 therefore becomes adjustable along the elongated element 18 through rotation of the handle 24. In this embodiment the fastening member 26 pushes an object towards the opposite clamping surface 5, 6 when the upper part of the

handle 24a is rotated and bear against the fastening member 26, and thereby securing the object between the bearing surface 10 and the clamping surface 5, 6. In an alternate embodiment, the fastening member 26 is instead attached to the handle 24 in a way that prevents the fastening member 26 from moving in a linear direction in relation to the handle 24, but allows the fastening member 26 to rotate freely and independent of the rotation of the handle 24. The advantage with this embodiment is that the entire clamping element 8 can be moved linearly along the elongated element 18 by just turning the handle.

The clamping element 8 is arranged so that the bearing surface 10 is facing the first clamping surface 5 when the clamping element 8 is in the first position, as shown in figure 1. A first opening 34 for receiving the object is formed between the bearing surface 10 and the first clamping surface 5 when the clamping element 8 is in the first position, see figure 3b. The clamping element 8 is arranged so that the bearing surface 10 is facing the second clamping surface 6 when the clamping element 8 is in the second position, as shown in figure 2. A second opening 36 for receiving the object is formed between the bearing surface 10 and the second clamping surface 6 when the clamping element 8 is in the second position, see figure 3e. The openings 34, 36 are arranged perpendicular to each other, which makes it possible to secure an object in two different positions. It is possible to choose between either locking the object parallel to or perpendicular to the wheel 2 depending on what is preferred at the time. The object is secured by adjusting the distance between the clamping element 8 and the clamping surfaces 5, 6. A plurality of wheel assemblies 1 can be necessary for the object to be stable.

Figures 3a-e show the wheel assembly 1 according to the first embodiment when the clamping element 8 switches between the first position and the second position. In this embodiment it is necessary for the fastening member 26 to be rotated half a turn around the elongated element 18 when the clamping element 8 switches position. This enables the fastening member 26 to secure an object against the second clamping surface 6 in the same way as securing an object against the first clamping surface 5. Since the body 3 prevents the fastening member 26 from rotating when the bearing surface 10 is too close to the first clamping surface 5 the fastening member needs to be in a position around the elongated element 18, which makes rotation possible. Figure 3a shows the wheel assembly 1 with the clamping element 8 in the first position. In this position an object can be secured and transported in a horizontal position. Figure 3b shows the wheel assembly 1 with the clamping element 8 in a position that allows the fastening member 26 to be rotated freely around the elongated element 18. In one embodiment the fastening element 26 has a stabilising means 38 that is shown in figure 3d and extends down into the elongated groove 15, 16. The stabilising means 38 is arranged to prevent the fastening member 26 from rotating. The advantage with this embodiment is that the bearing surface 10 is allowed to always push an object towards the middle of the opposite clamping surface 5, 6, which increases the securing of the mounting. Rotation of the fastening member 26 is not possible since the lower part of the stabilising means 38 is in a position below the body 3. Figure 3c shows the fasting member 26 when it has been rotated 180° from

its earlier position. Figure 3d shows the wheel assembly 1 when the elongated element 18 is turned towards the second position of the clamping element 8. Figure 3e shows the wheel assembly 1 with the clamping element 8 in the second position. In this position an object can be secured and transported in a vertical position.

Figure 4 shows the wheel assembly 1 seen from behind. In this embodiment the upper body part 13 has a stop 40 mounted on the rear side of the two L-shaped elements 20, 21, for preventing the elongated element 18 to be rotated beyond the first position of the clamping element 8. In this embodiment the stop 40 is a part of the body 3 and forms a wall between the L-shaped elements 20, 21. In another embodiment the stop can be a plate that is mounted between the L-shaped elements 20, 21.

Figure 5 shows a cross-section view of an embodiment of the handle 24 in a front view. The internal threads 29 of the handle is mounted in the through hole 25 of the handle. Figure 5 also shows the upper and lower part 24a, 24b of the handle 24.

Figure 6 shows the fastening member 26 with the through hole 27.

Figure 7 shows an object mounted on two wheel assemblies 1 with the clamping element 8 in its second position. The object is a flat plate that due to the second position of the clamping element 8 can be mounted in a horizontal position. It is possible to use only one wheel assembly mounted on the object. The object is then rotated towards the person that moves the object and is conveyed like a wheelbarrow.

Figure 8 shows a second embodiment of a wheel assembly 39 with a clamping element 42 in the second position. A screw clamp is mounted on the wheel assembly 39 and comprises an elongated element 44, the clamping element 42, and a threaded rod 46. The parts shown in figure 8 corresponding to parts included in the first embodiment shown in figures 1-7, have been given the same reference numeral.

The clamping element 42 comprises a handle 48 and a fastening member 50. In this embodiment the handle 48 and the fastening member 50 are separately mounted on the threaded rod 46, where the handle 48 is mounted on the upper part of the threaded rod 46 and the fastening member 50 is mounted on the lower part of the threaded rod. The screw clamp also comprises an extension rod 56. The threaded rod 48 has external threads 52 that are in engagement with internal threads 54 on the extension rod 56. Figure 9 shows the internal threads of the extension rod 56. The position of the fastening member 50 in relation to the extension rod 56 is therefore adjustable. In this embodiment, the extension rod 56 has a mounting hole 58, see figure 9, through which the elongated element 44 extends. The elongated element 44 is mounted in the same way as the elongated element 18 in the earlier mentioned embodiment and is in the same position relative the body 3 in the raised and lowered position as the earlier mentioned embodiment, but the clamping element 50 is not mounted around the elongated element 44 in this embodiment. The clamping element holds

its position relative the elongated element 44 by means of the extension rod 56 that is movable linearly along the elongated element 44. In this embodiment the elongated element 44 does not have any threads, but instead has small extensions 60 designed to prevent the extension rod 56 from moving along the elongated element 44 when the clamping element 50 secures an object against the body 3.

The present invention is not limited to the embodiments disclosed but may be varied and modified within the scope of the following claims. In an alternative embodiment, the wheel assembly does not have an elongated element. Instead the clamping element could be removable from the body and be moved, separated from the other parts of the wheel assembly, between the first position and the second position. It is also possible for the elongated element to be replaced by a plate. In another embodiment there are no elongated grooves separating the clamping surfaces into two parts. Instead each of the clamping surfaces can be linked together to form a larger surface that extends between the upper and lower body.

Claims

1. A wheel assembly (1;39) for moving an object, wherein the wheel assembly comprises:
- a wheel (2),
- a body (3) supported by the wheel (2) and having a first clamping surface (5) adapted to bear against the object, and
- a clamping element (8;42) having a bearing surface (10), and the clamping element is arranged to cooperate with the first clamping surface (5) to secure the object between the clamping element (8;42) and the body (3), characterized in that the body (3) has a second clamping surface (6) adapted to bear against the object, wherein the second clamping surface is arranged perpendicular to the first clamping surface, the clamping element (8;42) is arranged rotatable relative the body (3) between a first position and a second position so that the bearing surface (10) is facing the first clamping surface (5) when the clamping element is in the first position and the bearing surface is facing the second clamping surface (6) when the clamping element (8;42) is in the second position, and the clamping element is arranged linearly movable in relation to the body so that the distance between the bearing surface (10) and the clamping surfaces (5,6) is adjustable to enable the clamping element to secure the object against the first clamping surface (5) in the first position, and to secure the object against the second clamping surface (6) in the second position.

2. The wheel assembly (1;39) according to claim 1, wherein a first opening (34) for receiving the object is formed between the bearing surface (10) and the first clamping surface (5) when the clamping element is in the first position, and a second opening (36) for receiving the object is formed between the bearing surface (10) and the second clamping surface (6) when the clamping element (8;42) is in the second position, and the clamping element is arranged movable in relation to the body so that the size of the first opening is adjustable in the first position and the size of the second opening is adjustable in the second position.

3. The wheel assembly (1;39) according to any of the previous claims, wherein the wheel assembly further comprises an elongated element (18;44) rotatable between a raised and a lowered position, the clamping element (8;42) is connected to the elongated element (18;44) so that its bearing surface (10) is arranged perpendicular to the longitudinal axis of the elongated element, and the clamping element (8;42) is in the first position when the elongated element (18;44) is in the raised position and the clamping element is in the second position when the elongated element is in the lowered position.

4. The wheel assembly (1;39) according to claim 3, wherein the clamping element (8;42) is movably connected to the elongated element (18;44) so that the bearing surface (10) is linearly movable along the elongated element.

5. The wheel assembly (1;39) according to claim 3 or 4, wherein the body (3) comprises a first part (12) provided with the first clamping surface (5) and a second part (13) protruding from the first part and provided with the second clamping surface (6), and each of the first and second parts (12,13) is provided with an elongated groove (15,16) adapted to receive the elongated element (18;44) when the elongated element is in the raised or the lowered positions.

6. The wheel assembly (1) according to any of the claims 3 - 5, wherein the clamping element (8) comprises a fastening member (26) and said bearing surface (10) is arranged in a lower part of the fastening member (26), and a handle (24) arranged in connection to an upper part of the fastening member (26), and the handle (24) comprises a through hole (25) with internal threads (29), wherein the handle (24) and the fastening member (26) are arranged movable along the elongated element (18).

7. The wheel assembly (1) according to claim 6, wherein the elongated element (18) comprises external threads (19), the internal threads (29) of the handle (24) is adapted to cooperate with the external threads (19) of the elongated element (18), so that the handle is movable along the elongated element.

8. The wheel assembly (1;39) according to any of the previous claims, wherein the body (3) comprises two L-shaped elements (20,21) arranged in parallel and at a distance from each other so that a space is formed between them.

9. The wheel assembly (39) according to any of the claims 1 - 8, wherein the clamping element (42) comprises a threaded rod (46) connected to the fastening member (50) and connected to the elongated element (44) by means of an extension rod (56), and internal threads (54) of the extension rod (56) is adapted to engage with external threads (52) on the threaded rod (46).

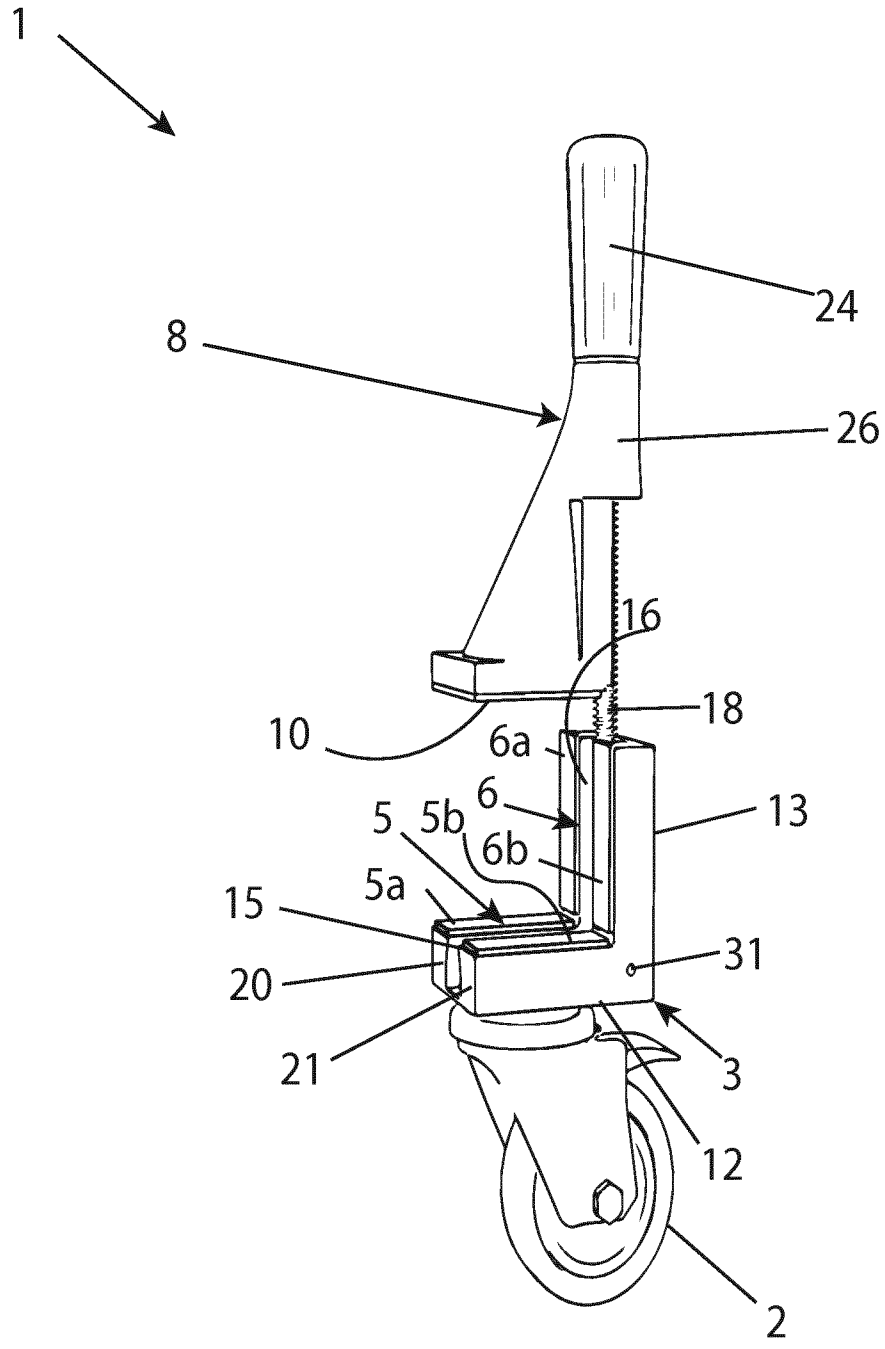


Fig 1

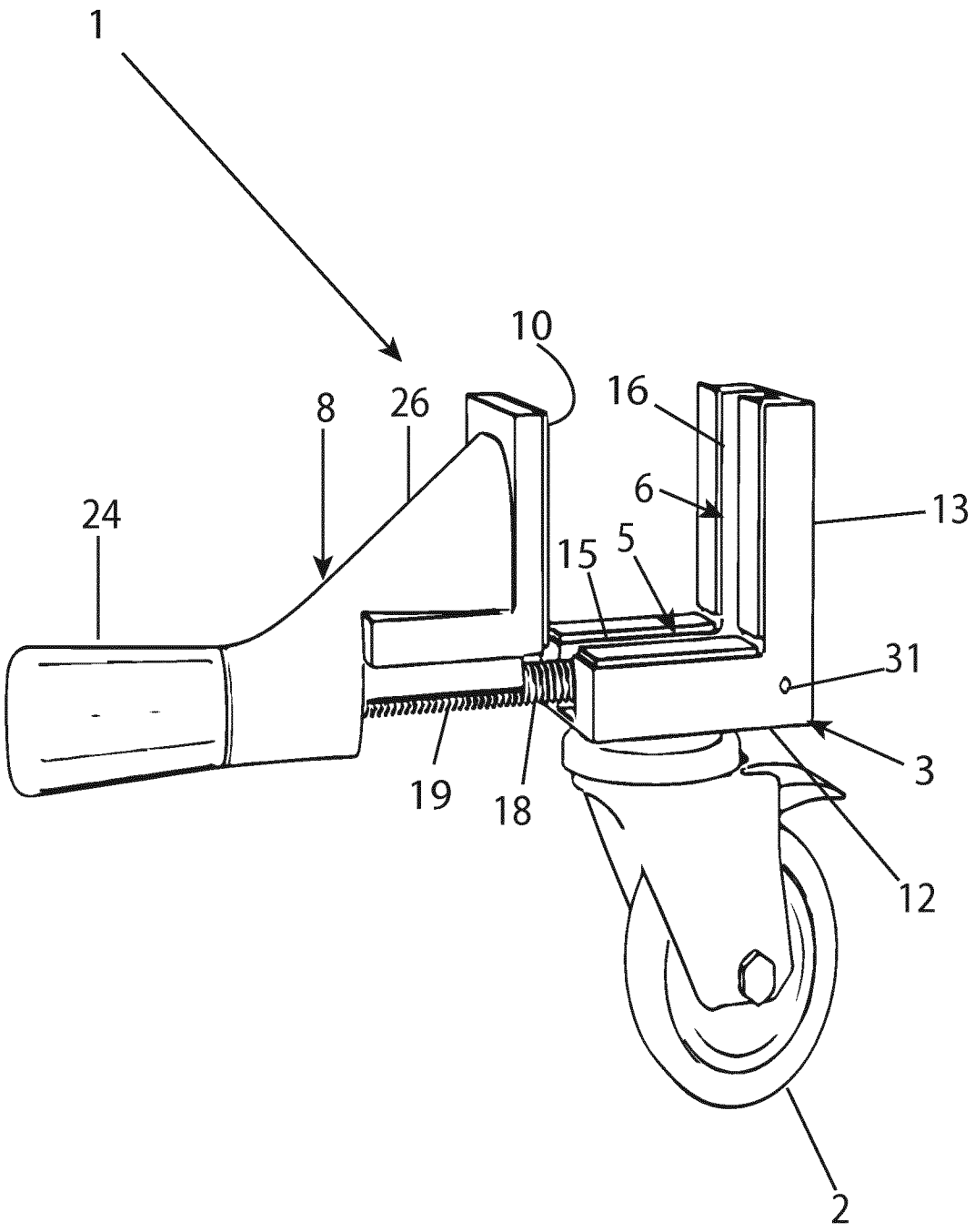


Fig 2

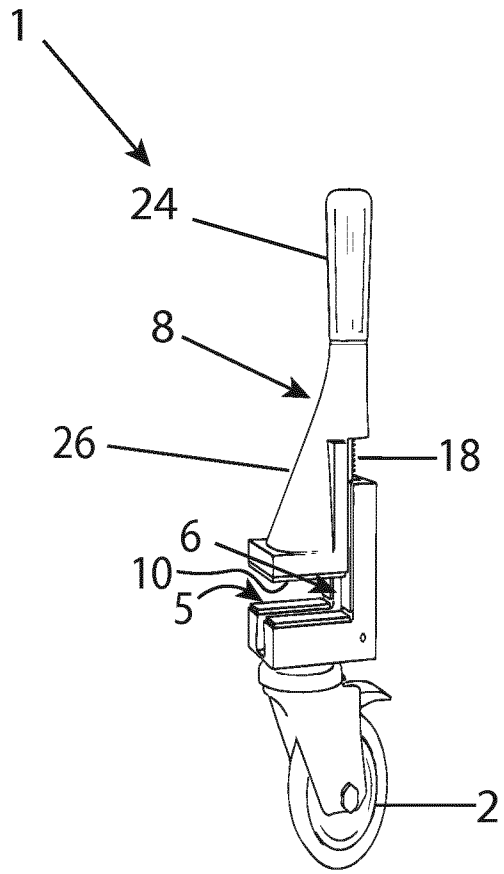


Fig 3a

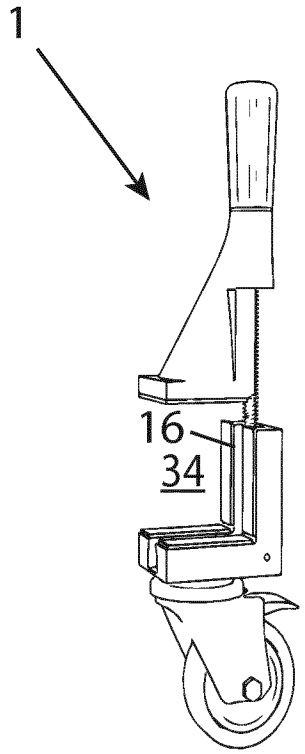


Fig 3b

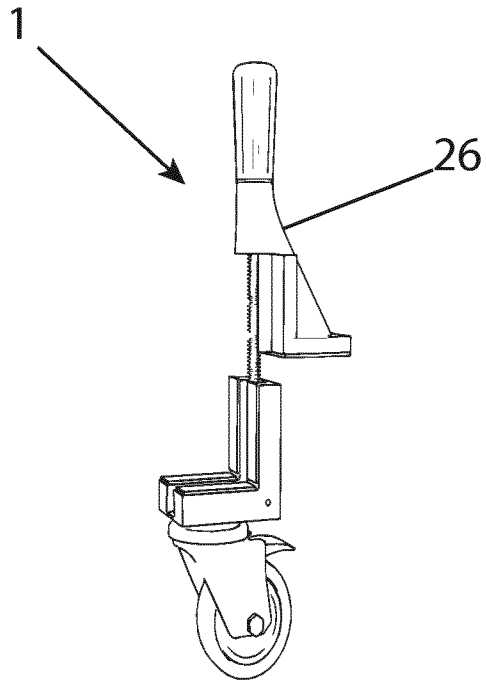


Fig 3c

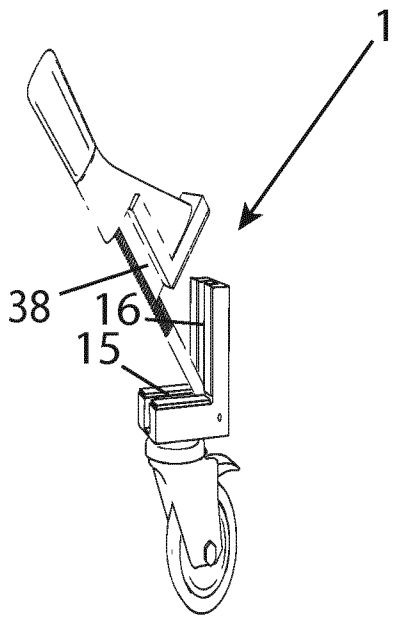


Fig 3d

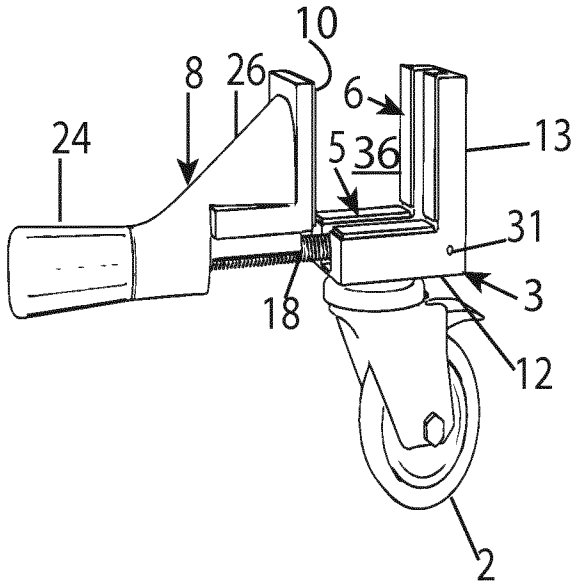


Fig 3e

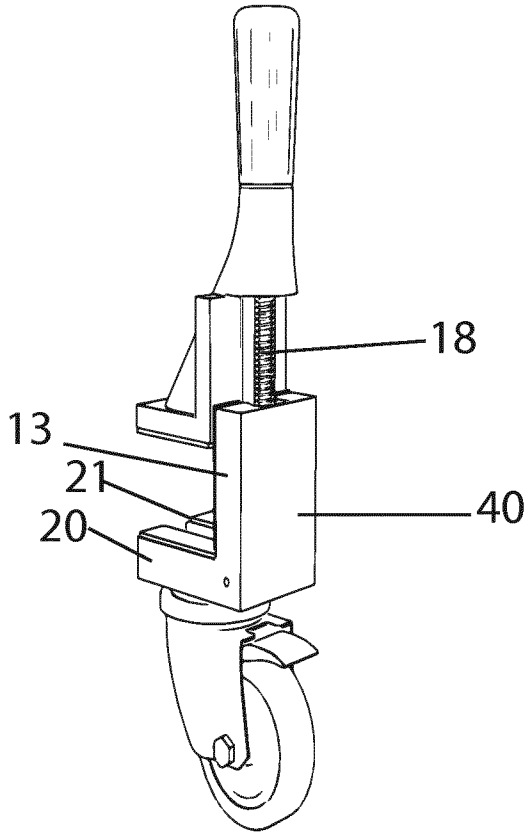


Fig 4

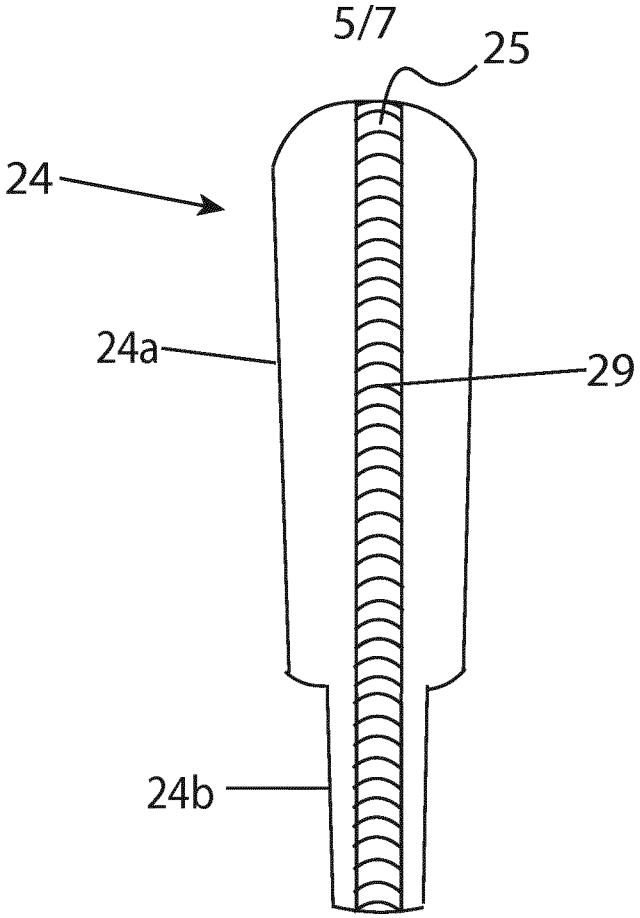


Fig 5

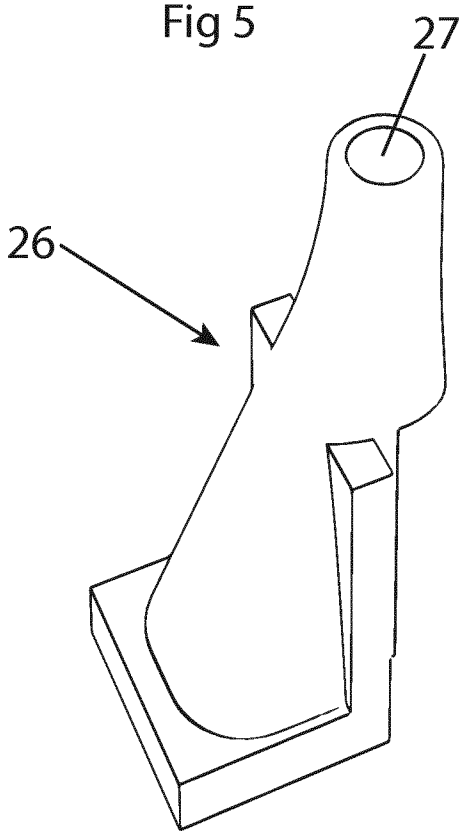


Fig 6

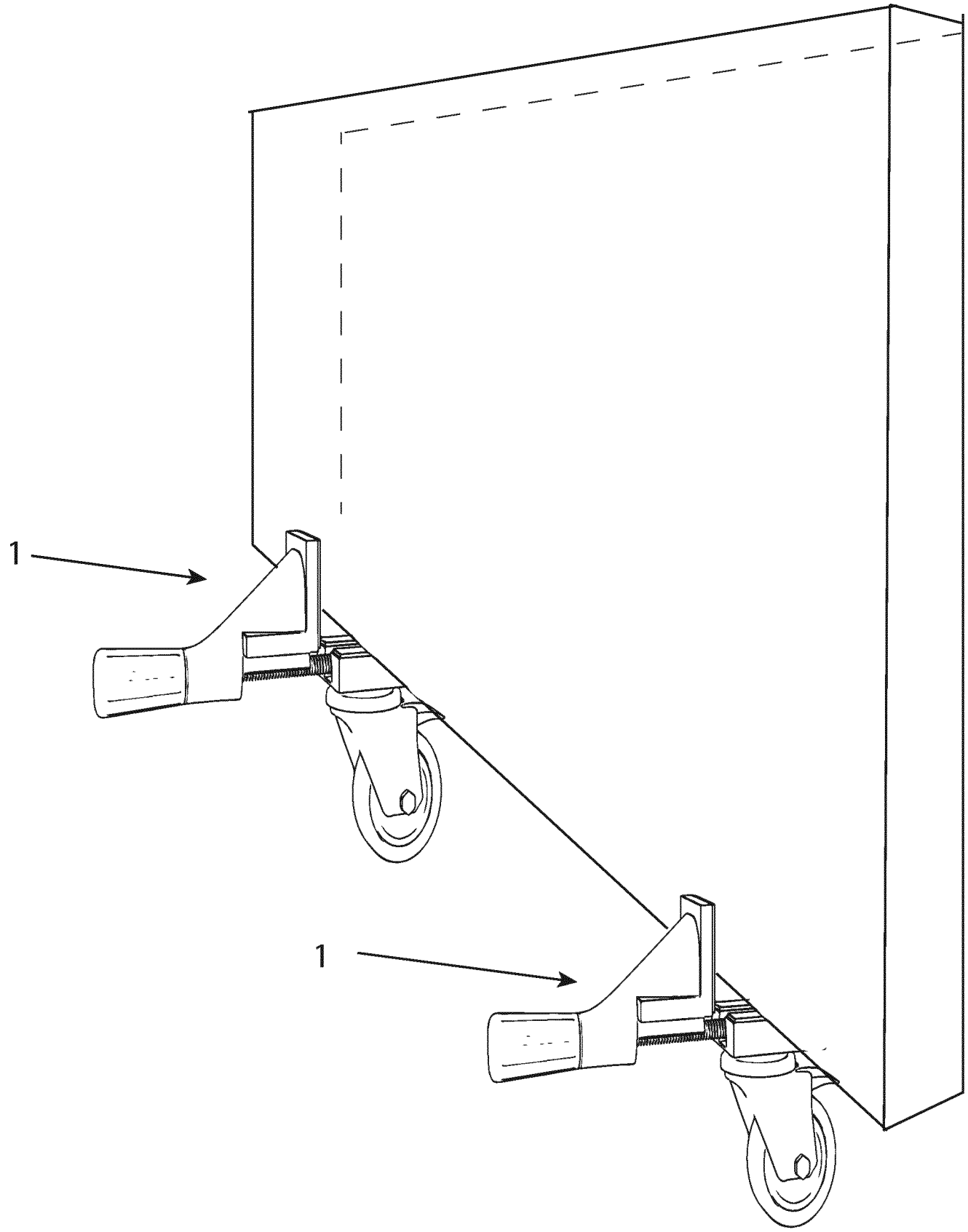


Fig 7

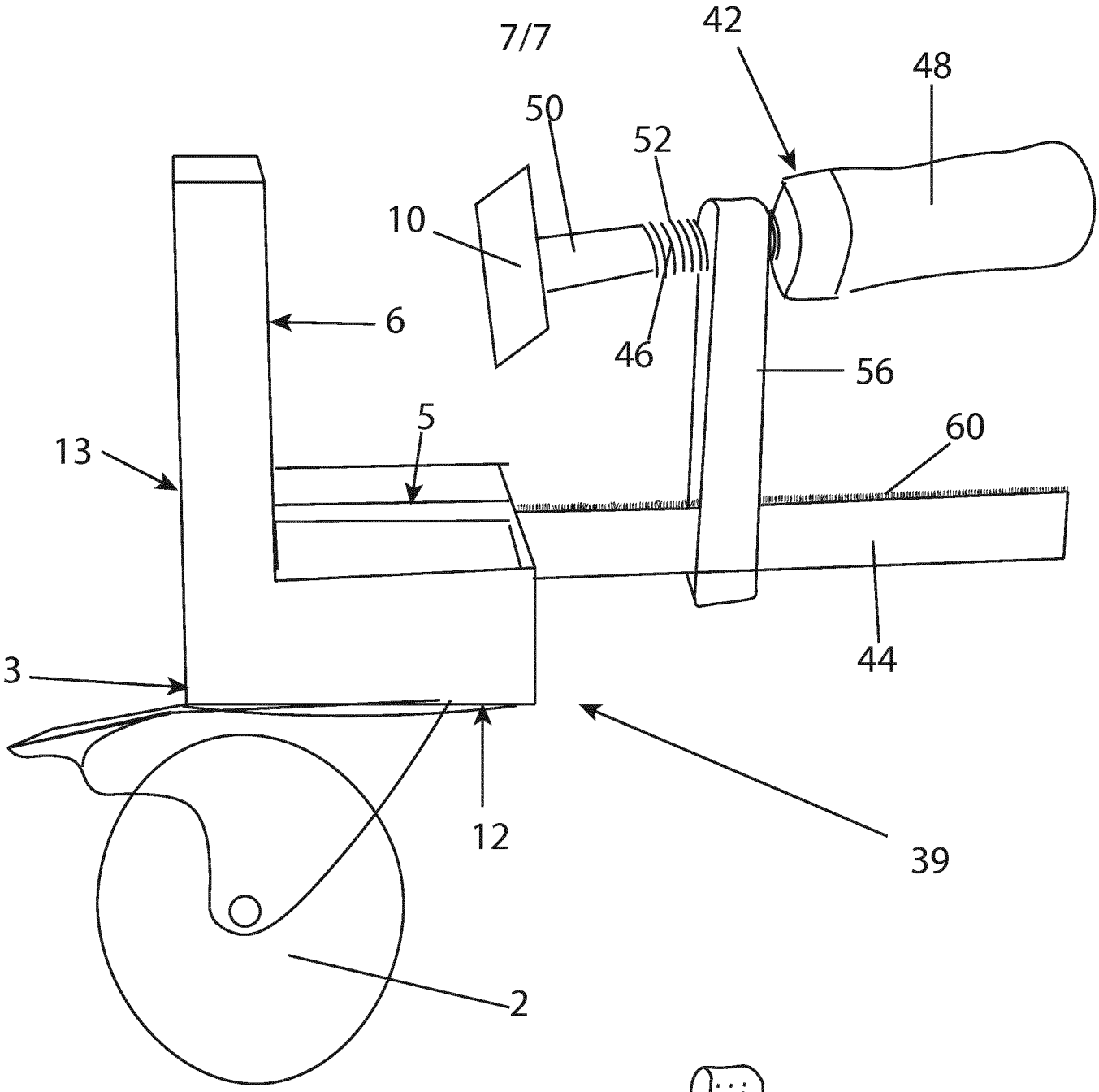


Fig 8

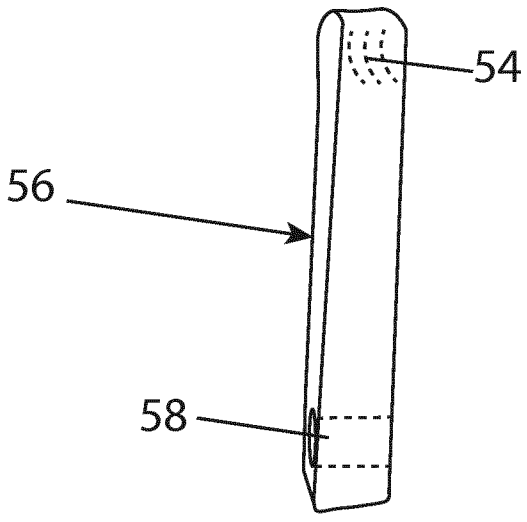


Fig 9

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2017/058811

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65G7/04 B60B33/04
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65G B65D B60B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2006/000055 A1 (ASHER SAMUEL M [US]) 5 January 2006 (2006-01-05) paragraphs [0014] - [0017], [0034]; figures 1-13	1-9
A	EP 0 865 992 A2 (AMEISBICHLER RUDOLF [AT]) 23 September 1998 (1998-09-23) cited in the application figures 1-2	1-9

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 June 2017	10/07/2017

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Dominois, Hugo

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2017/058811

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006000055 A1	05-01-2006	NONE	
EP 0865992 A2	23-09-1998	AT 1828 U1	29-12-1997
		EP 0865992 A2	23-09-1998