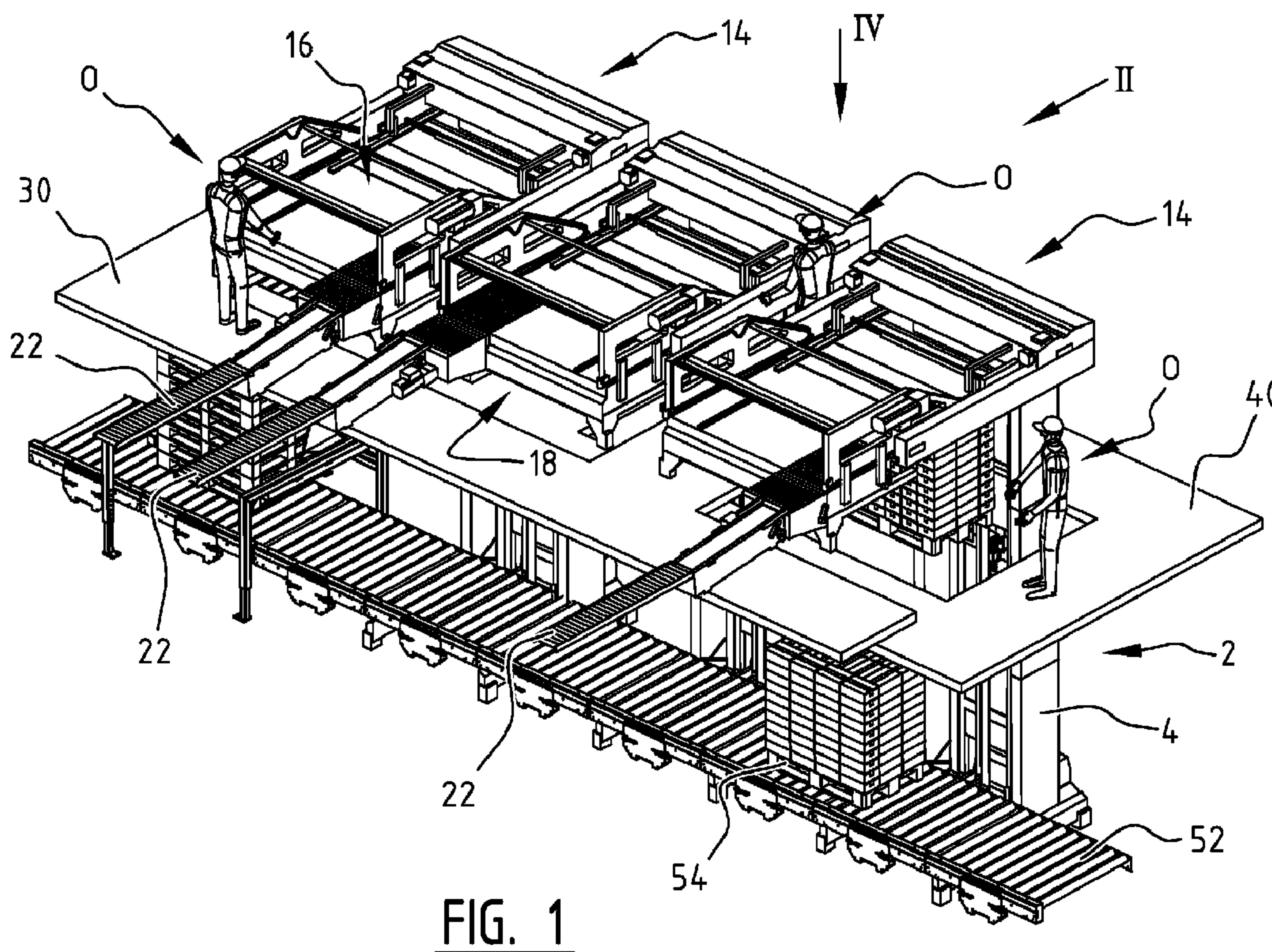




(86) Date de dépôt PCT/PCT Filing Date: 2015/07/07  
 (87) Date publication PCT/PCT Publication Date: 2016/01/14  
 (85) Entrée phase nationale/National Entry: 2016/12/21  
 (86) N° demande PCT/PCT Application No.: NL 2015/050496  
 (87) N° publication PCT/PCT Publication No.: 2016/007003  
 (30) Priorité/Priority: 2014/07/08 (NL2013147)

(51) Cl.Int./Int.Cl. *B65G 57/00* (2006.01),  
*B65B 17/00* (2006.01), *B65B 5/10* (2006.01),  
*B65G 57/03* (2006.01), *B65G 57/10* (2006.01),  
*B65G 61/00* (2006.01), *B66F 9/02* (2006.01)  
 (71) Demandeur/Applicant:  
 QIMAROX PATENTEN B.V., NL  
 (72) Inventeur/Inventor:  
 HANNESSEN, PIETER GERRIT, NL  
 (74) Agent: GOWLING WLG (CANADA) LLP

(54) Titre : ENSEMBLE COMPRENANT UN MONTE-PALETTES ET UN DISPOSITIF DE PALETTISATION  
 (54) Title: ASSEMBLY COMPRISING A PALLET LIFT AND A PALLETIZING DEVICE



**FIG. 1**

(57) **Abrégé/Abstract:**

The present invention relates to an assembly, comprising: - a pallet lift (2) with which a pallet is displaceable in height direction; - a palletizing device (14) which is arranged close to the upper side of the pallet lift (2) and with which objects are arrangeable on a

(57) **Abrégé(suite)/Abstract(continued):**

pallet supported by the pallet lift (2); - a first support surface (30) arranged at a first distance under the palletizing device (14) such that at least a part of the upper side of the palletizing device (14) is accessible to an operator standing on the first support surface (30); and - a second support surface (40) arranged at a second distance under the first support surface (30) such that at least a part of the underside of the palletizing device (14) is accessible to an operator standing on the second support surface (40).

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau(43) International Publication Date  
14 January 2016 (14.01.2016)(10) International Publication Number  
**WO 2016/007003 A1**

## (51) International Patent Classification:

*B65G 57/00* (2006.01)      *B65G 57/10* (2006.01)  
*B65G 57/03* (2006.01)

## (21) International Application Number:

PCT/NL2015/050496

## (22) International Filing Date:

7 July 2015 (07.07.2015)

## (25) Filing Language:

Dutch

## (26) Publication Language:

English

## (30) Priority Data:

2013147                      8 July 2014 (08.07.2014)                      NL

(71) Applicant: QIMAROX PATENTEN B.V. [NL/NL]; Nobelstraat 43, NL-3846 CE Harderwijk (NL).

(72) Inventor: HANNESSEN, Pieter Gerrit; Agnietenlaan 8, NL-3841 DJ Harderwijk (NL).

(74) Agent: HAAN, Raimond Johannes Gerardus; Bezuidenhoutseweg 57, NL-2594 AC Den Haag (NL).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,

BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

## Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(54) Title: ASSEMBLY COMPRISING A PALLET LIFT AND A PALLETIZING DEVICE

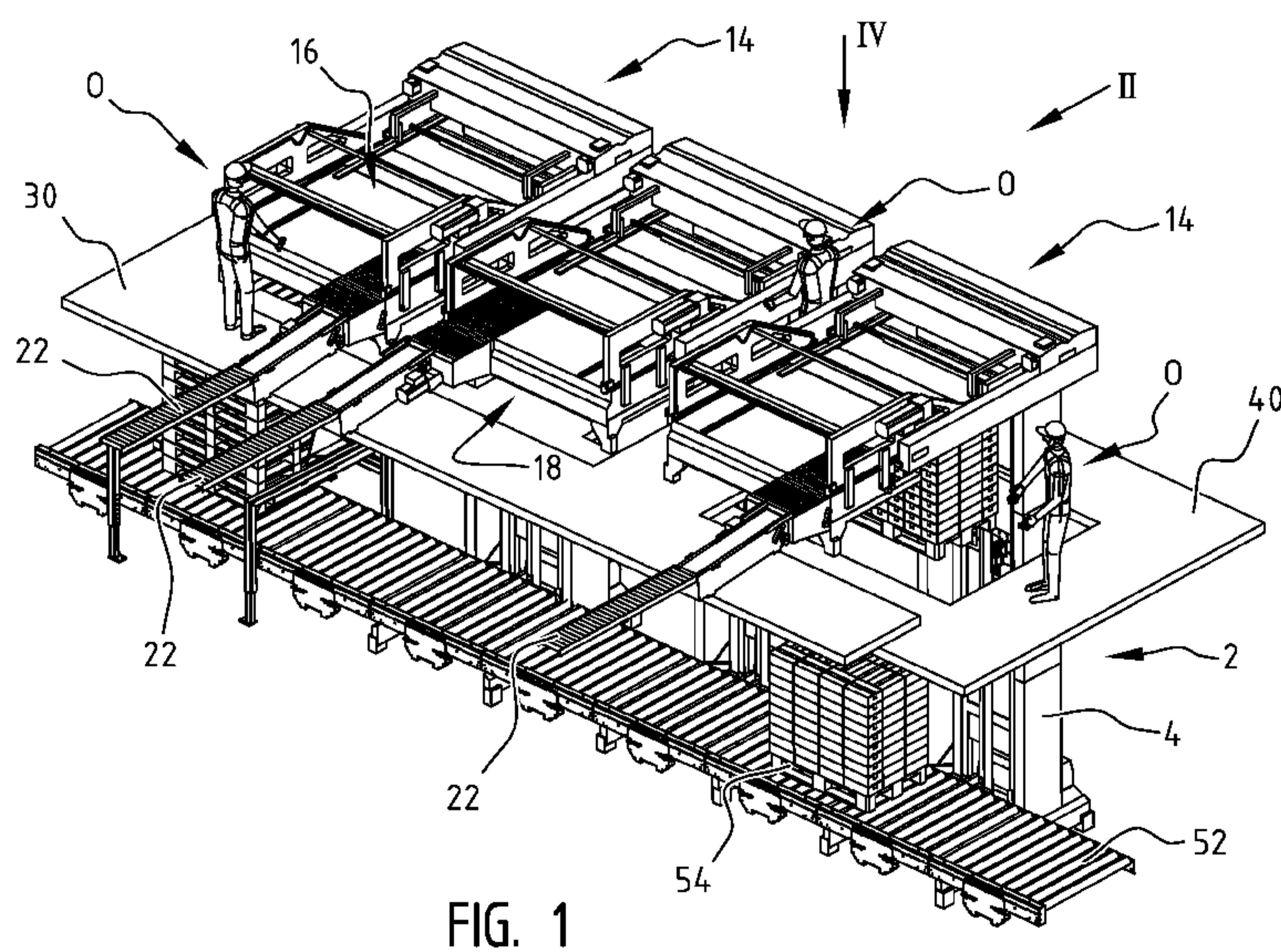


FIG. 1

(57) Abstract: The present invention relates to an assembly, comprising: - a pallet lift (2) with which a pallet is displaceable in height direction; - a palletizing device (14) which is arranged close to the upper side of the pallet lift (2) and with which objects are arrangeable on a pallet supported by the pallet lift (2); - a first support surface (30) arranged at a first distance under the palletizing device (14) such that at least a part of the upper side of the palletizing device (14) is accessible to an operator standing on the first support surface (30); and - a second support surface (40) arranged at a second distance under the first support surface (30) such that at least a part of the underside of the palletizing device (14) is accessible to an operator standing on the second support surface (40).



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**ASSEMBLY COMPRISING A PALLET LIFT AND A PALLETIZING DEVICE**

The invention relates to an assembly, comprising:

- a pallet lift with which a pallet is displaceable in height direction;
- 5 - a palletizing device which is arranged close to the upper side of the pallet lift and with which objects are arrangeable on a pallet supported by the pallet lift; and
- a first support surface arranged at a first distance under the palletizing device such that at least a part of the upper side of the palletizing device is accessible to an operator standing on the first support surface.

10 This configuration is frequently applied and has the significant shortcoming that the underside of the palletizing device is poorly accessible for the purpose of arranging an insert sheet on a layer, repairing breakdowns or performing maintenance operations.

The invention now has for its object to provide an assembly of the above described type wherein said drawbacks do not occur, or at least do so to lesser extent.

15 Said object is achieved with the assembly according to the invention, comprising:

- a pallet lift with which a pallet is displaceable in height direction;
- a palletizing device which is arranged close to the upper side of the pallet lift and with which objects are arrangeable on a pallet supported by the pallet lift;
- a first support surface arranged at a first distance under the palletizing device such that at least a part of the upper side of the palletizing device is accessible to an operator standing on the first support surface; and
- 20 - a second support surface arranged at a second distance under the first support surface such that at least a part of the underside of the palletizing device is accessible to an operator standing on the second support surface.

25 Because the assembly further comprises a second support surface arranged a second distance under the first support surface, an operator located on this second, lower-lying support surface can reach at least the part of the underside of the palletizing device in comfortable manner. An operator can for instance thus place an insert sheet on a layer of objects arranged by the palletizing device on a pallet and/or correct the placing thereof before a subsequent layer of objects is set down thereon.

The first support surface is arranged close to the upper side of the pallet lift and the palletizing device is accessible by an operator standing on this first support surface.

35 It is noted that the first support surface and/or the second support surface can be part of a building. The first and/or second support surface is alternatively supported on the assembly of the pallet lift and the palletizing device, or on the ground via a frame.

According to a preferred embodiment, the palletizing device comprises a forming surface

for forming objects thereon, and wherein the first distance at which the first support surface is arranged under the forming surface is substantially 0.5 - 1.1 m, more preferably substantially 0.6 - 1.0 m, and still more preferably substantially 0.7 - 0.9 m. A first distance of 0.8 m is found to be ideal for allowing an operator with an average body height of an adult person to reach over the palletizing device.

A 95<sup>th</sup> percentile adult male person in Europe has a body height of about 1.85 m and, with an arm extended fully upward, a reach in height direction of about 2.26 m. When reaching in forward direction the arm length is about 0.84 m.

In order to enable an operator with an average body height of an adult person, when he/she is standing on the second support surface, to reach from there at least a part of the underside of the palletizing device, according to a further preferred embodiment the second distance at which the second support surface is arranged under the first support surface is a maximum of 1.5 m, more preferably a maximum of 1.4 m and still more preferably a maximum of 1.3 m.

It is noted that the forming surface of the palletizing device is located in practice close to the underside of the palletizing device, as is for instance the case in the QIMAROX HIGHRUNNER® Mk7 supplied by applicant. At a maximum distance between the two support surfaces of 1.5 m the maximum distance from the lower-lying second support surface to the forming surface of the palletizing device amounts to about  $1.5 + 0.8 = 2.3$  m. This distance corresponds to the reach in height direction of a 95<sup>th</sup> percentile adult European male when he extends his arm in height direction.

According to a further preferred embodiment, the first support surface comprises at least one longitudinal part and at least one transverse part arranged transversely of the longitudinal part, wherein the first support surface is adjacent to at least two sides of the palletizing device and makes this latter accessible to an operator. Because the transverse part and the longitudinal part together make at least two (connected) sides of the palletizing device accessible to the operator, he/she can reach at least the forming surface of the palletizing device without further aids.

According to yet another preferred embodiment, the second support surface comprises at least one longitudinal part and at least one transverse part arranged transversely of the longitudinal part, wherein the second support surface is adjacent to the pallet lift on at least two sides and makes a pallet present on the pallet lift accessible to an operator. The pallet lift and a pallet present thereon are also readily accessible to an operator when he/she has access to at least two (connected) sides of the pallet lift.

It is particularly advantageous when, according to yet another preferred embodiment, the second support surface is provided with one or more further longitudinal parts and at least partially encloses the pallet lift on at least three sides. Not only is a pallet carried by the pallet lift thus readily accessible, the pallet lift itself is also readily accessible for the purpose of repairing

breakdowns and (maintenance) operations.

With a limited difference in level of a maximum of 1.5 m between the first and second support surfaces an adult person would have insufficient headroom available to him/her, and could bump against or otherwise be injured by the upper first support surface when this person is located on the underlying second support surface. This is effectively prevented when, according to yet another preferred embodiment, the transverse parts of the first support surface and the second support surface are arranged offset relative to each other, and wherein the first support surface is provided with recesses above the transverse parts of the second support surface. Also prevented in this way is that a person would have to move along the first support surface while bending or even crawling.

The palletizing device is provided via a feed conveyor with objects to be formed and arranged on a pallet. In order to make this feed conveyor readily accessible for the purpose of repairing possible breakdowns, the first support surface is preferably situated at least on the side of the palletizing device where the objects are supplied via a feed conveyor. According to yet another preferred embodiment, at least a longitudinal part of the first support surface is thus provided on the feed side of the palletizing device where the objects are supplied to the palletizing device.

In order to increase safety, according to yet another preferred embodiment one or more stairways and/or ladders are provided between the first support surface and the second support surface. These stairways and/or ladders allow an operator to move to another part of the one support surface via the other support surface. An operator located on the first support surface on a first side of the feed conveyor of the palletizing device can thus move via a stairway or ladder to the lower second support surface. The operator can move safely round the lift on this lower second support surface and move back onto the first support surface on the other side via a stairway or ladder. An operator can thus move from a first side of the feed conveyor to a second side thereof without the operator him/herself having to step over this conveyor or having to crawl underneath it, which would be unsafe. The operator can now walk around it safely via the second support surface.

In a factory setup a plurality of assemblies of a pallet lifts and associated palletizing device will generally be placed adjacently of each other. It is particularly advantageous according to yet another preferred embodiment of the invention that at least one transverse part of the first support surface and/or at least one transverse part of the second support surface comprise a surface area such that two adjacently disposed pallet lifts and/or palletizing devices are accessible therefrom.

Preferred embodiments of the present invention are further elucidated in the following description with reference to the drawing, in which:

Figure 1 is a perspective view of a factory setup with three sets of a pallet lift and associated palletizing device, with support surfaces according to the invention;

Figure 2 is a perspective view from the rear of the setup shown in Figure 1;

Figure 3 is a perspective view of the setup shown in Figure 1 looking obliquely upward from the underside;

Figure 4 is a top view of the setup shown in Figures 1-3;

Figure 5 is a top view as according to Figure 4 in which the first support surface is shown schematically;

Figure 6 is a top view as according to Figure 4 in which the second support surface is shown schematically; and

Figure 7 is a top view of six pallet lifts with associated palletizing devices with support surfaces according to the invention.

The perspective views shown in figures 1-3 show three pallet lifts 2, wherein close to the upper side of pallet lift 2 is arranged a palletizing device 14 with which objects are arrangeable on a pallet 54 supported by pallet lift 2. Pallet lift 2 comprises a frame 4 and a carrier 10 displaceable in a height direction along the frame via a guide 8 using a motor 6. Carrier 10 is configured to displace a pallet 54 in height direction to position close to forming surface 16 of palletizing device 14. Palletizing device 14 is configured to form on forming surface 16 objects supplied via a feed conveyor 22 on a feed side 18 of palletizing device 14 before they are set down onto the pallet 54 held aloft by carrier 10 of pallet lift 2. Once a layer of objects has been set down on pallet 54, pallet lift 2 lowers pallet 54 a layer height, after which palletizing device 14 can set down a subsequent layer of formed objects onto pallet 54.

Arranged close to palletizing device 14 at a first distance  $D_1$  thereunder is a first support surface 30. An operator O standing on this first support surface 30 can operate palletizing device 14 and perform operations therefrom, such as repairing breakdowns and carrying out maintenance operations.

Arranged at a second distance  $D_2$  under first support surface 30 is a second support surface 40. An operator O present on this second support surface 40 can from here reach the underside of palletizing device 14 and pallet 54 in comfortable manner and perform operations. Possible operations can comprise of placing and/or correcting the orientation of insert sheets, repairing breakdowns and performing maintenance operations.

First support surface 30 is for instance arranged at a distance of 0.8 metre below forming surface 16 which is generally situated close to the underside of palletizing device 14. A first distance  $D_1$  of 0.8 metre is found to be ideal to allow an operator O with an average body height of an adult person to reach over palletizing device 14.

In order to enable an operator O with an average body height of an adult person, when he/she is standing on second support surface 40, to reach at least a part of the underside of palletizing device 14 therefrom, the second distance  $D_2$  at which second support surface 40 is arranged under first support surface 30 is in the shown embodiment 1.3 metre. Although the

combined distance of the first distance  $D_1$  and second distance  $D_2$  is  $0.8 + 1.3 = 2.1$  metres in the shown embodiment, and is thus sufficiently high that a person with an average body height standing on second support surface 40 will not bang his/her head on the underside of palletizing device 14, the distance between first support surface 30 and second support surface 40 is  
5 insufficient for a standing adult person. For this reason the first support surface 30 and second support surface 40 are embodied and oriented relative to each other such that an operator O can take up a standing position on the underlying second support surface 40 without being obstructed here by the upper first support surface 30, as will be further elucidated with reference to figures 4-6.

10 The setup shown in figures 1-3 further comprises a pallet conveyor 52 with which pallets 54 can be fed to and removed from pallet lifts 2. A pallet buffer 56 is likewise provided for the storage of empty pallets 54.

Figure 4 is a top view of the setup shown in figures 1-3, and figures 5 and 6 show a schematic representation of the first support surface 30 (figure 5) and second support surface 40  
15 (figure 6), wherein the contours of palletizing device 14, feed conveyor 22 and pallet lift 2 are shown in broken lines. As shown in figure 5, the upper first support surface 30 comprises a longitudinal part 32 and two transverse parts 34 arranged transversely of this longitudinal part 32. First support surface 30 is hereby adjacent to at least two sides of palletizing device 14, whereby this latter is readily accessible to the operator O. Provided on first support surface 30 is a stairway  
20 50 with which this surface is accessible to an operator O from the ground.

Second support surface 40 likewise comprises a longitudinal part 42 and, in the shown embodiment, two transverse parts 44. Lift 2 with a pallet 54 optionally supported thereby is hereby also accessible from at least two sides by operator O in similar manner as just described.

In the shown embodiment a further longitudinal part 46 is also provided whereby pallet lift  
25 2 itself is also accessible from the rear, i.e. a total of three sides are accessible.

As shown in figure 7, it is particularly advantageous for a transverse part 34 of first support surface 30 and a transverse part 44 of second support surface 40 to be provided with a large surface such that they make two adjacently disposed pallet lifts 2 and/or palletizing devices 14 accessible from these parts 34, 44.

30 Although it shows a preferred embodiment of the invention, the above described embodiment is intended solely to illustrate the present invention and not to limit in any way the specification of the invention. Where measures in the claims are followed by reference numerals, such reference numerals serve only to contribute toward the understanding of the claims, but are in no way limitative for the scope of protection. The rights described are defined by the following  
35 claims, within the scope of which many modifications can be envisaged.

**Claims**

1. Assembly, comprising:

- a pallet lift with which a pallet is displaceable in height direction;

5 - a palletizing device which is arranged close to the upper side of the pallet lift and with which objects are arrangeable on a pallet supported by the pallet lift;

- a first support surface arranged at a first distance under the palletizing device such that at least a part of the upper side of the palletizing device is accessible to an operator standing on the first support surface; and

10 - a second support surface arranged at a second distance under the first support surface such that at least a part of the underside of the palletizing device is accessible to an operator standing on the second support surface.

2. Assembly as claimed in claim 1, wherein the palletizing device comprises a forming surface for forming objects thereon, and wherein the first distance at which the first support surface is arranged under the forming surface is substantially 0.5 - 1.1 m, more preferably substantially 0.6 - 1.0 m, and still more preferably substantially 0.7 - 0.9 m.

3. Assembly as claimed in claim 1 or 2, wherein the second distance at which the second support surface is arranged under the first support surface is a maximum of 1.5 m, more preferably a maximum of 1.4 m and still more preferably a maximum of 1.3 m.

4. Assembly as claimed in any of the foregoing claims, wherein the first support surface comprises at least one longitudinal part and at least one transverse part arranged transversely of the longitudinal part, wherein the first support surface is adjacent to at least two sides of the palletizing device and makes this latter accessible to an operator.

5. Assembly as claimed in any of the foregoing claims, wherein the second support surface comprises at least one longitudinal part and at least one transverse part arranged transversely of the longitudinal part, wherein the second support surface is adjacent to the pallet lift on at least two sides and makes a pallet present on the pallet lift accessible to an operator.

6. Assembly as claimed in claim 5, wherein the second support surface is provided with one or more further longitudinal parts and at least partially encloses the pallet lift on at least three sides.

7. Assembly as claimed in any of the claims 4-6, wherein the transverse parts of the first support surface and the second support surface are arranged offset relative to each other, and wherein the first support surface is provided with recesses above the transverse parts of the second support surface.

5

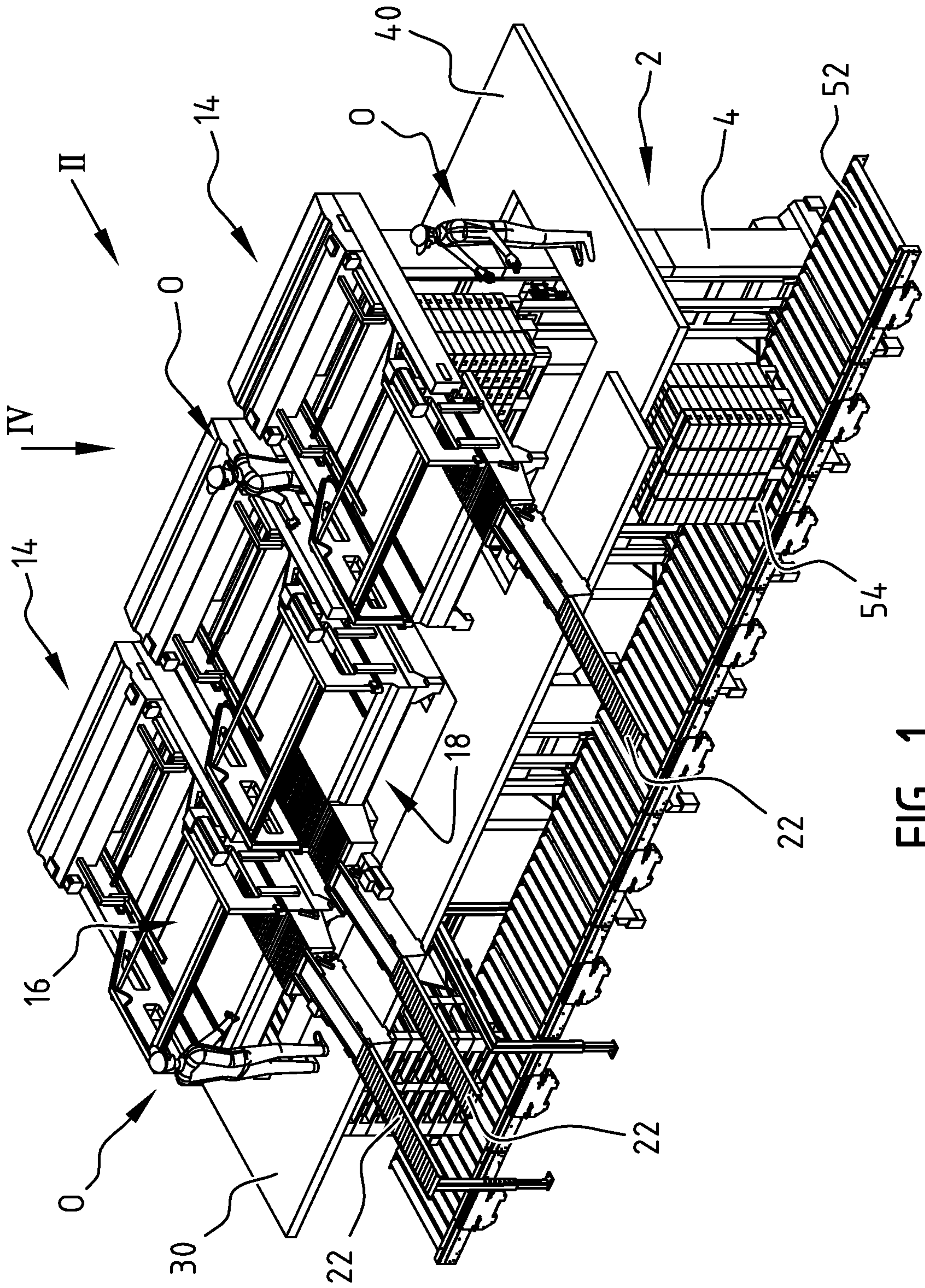
8. Assembly as claimed in any of the claims 4-7, wherein at least a longitudinal part is provided on the feed side of the palletizing device where the objects are supplied to the palletizing device.

10

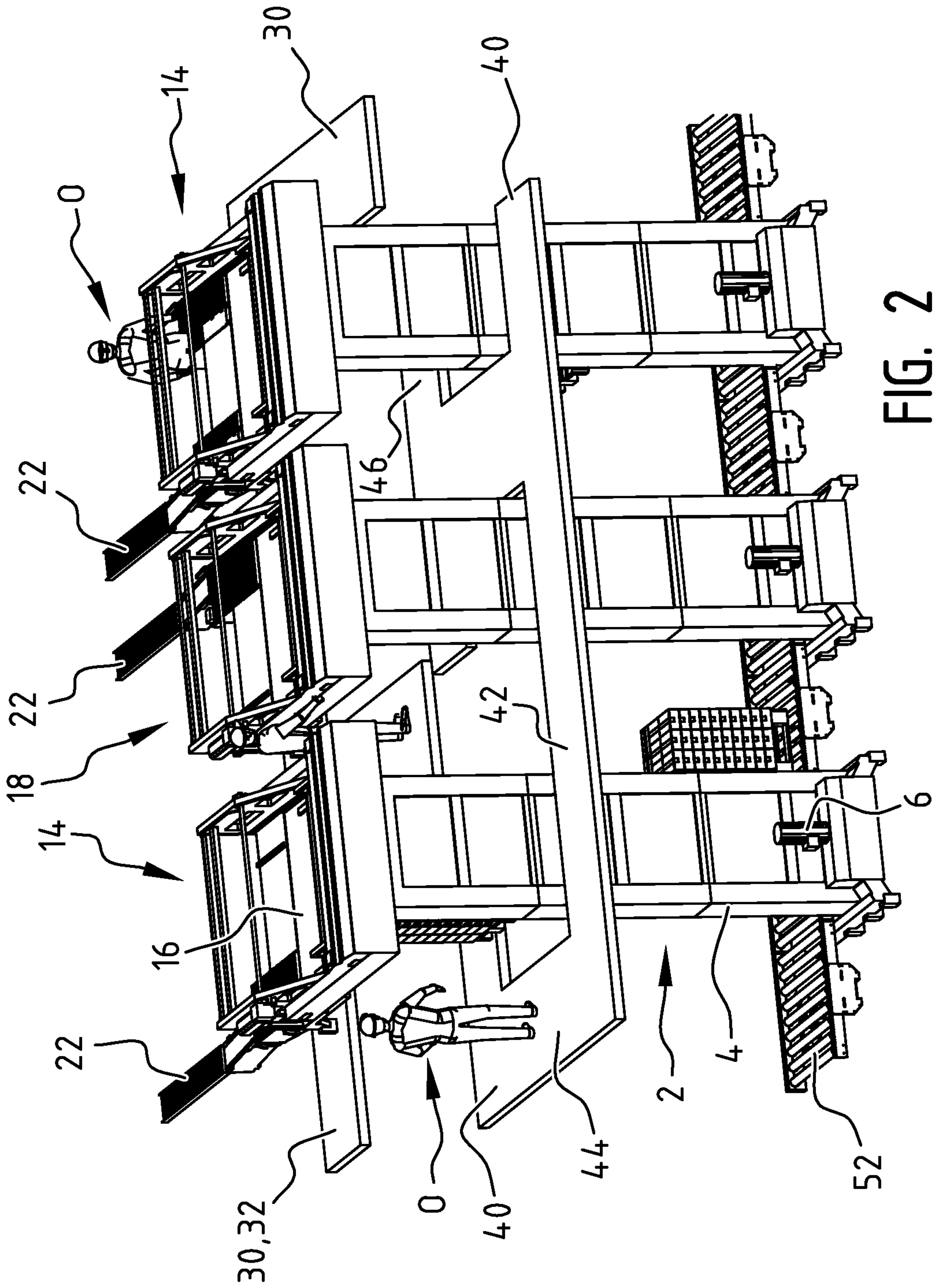
9. Assembly as claimed in claim 7 or 8, wherein one or more stairways and/or ladders are provided between the first support surface and the second support surface.

15

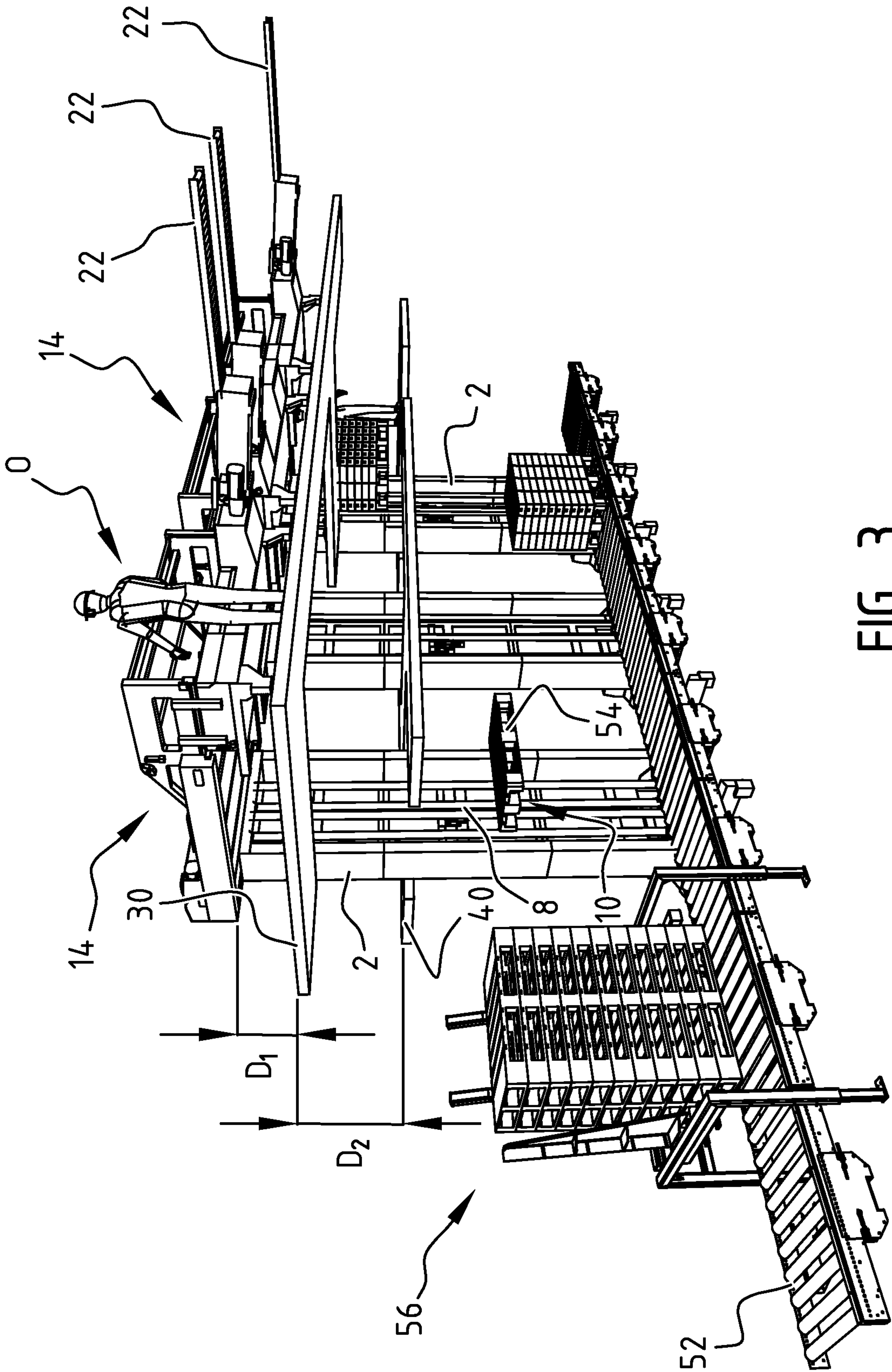
10. Assembly as claimed in any of the claims 4-9, wherein at least one transverse part of the first support surface and/or at least one transverse part of the second support surface comprise a surface area such that two adjacently disposed pallet lifts and/or palletizing devices are accessible therefrom.



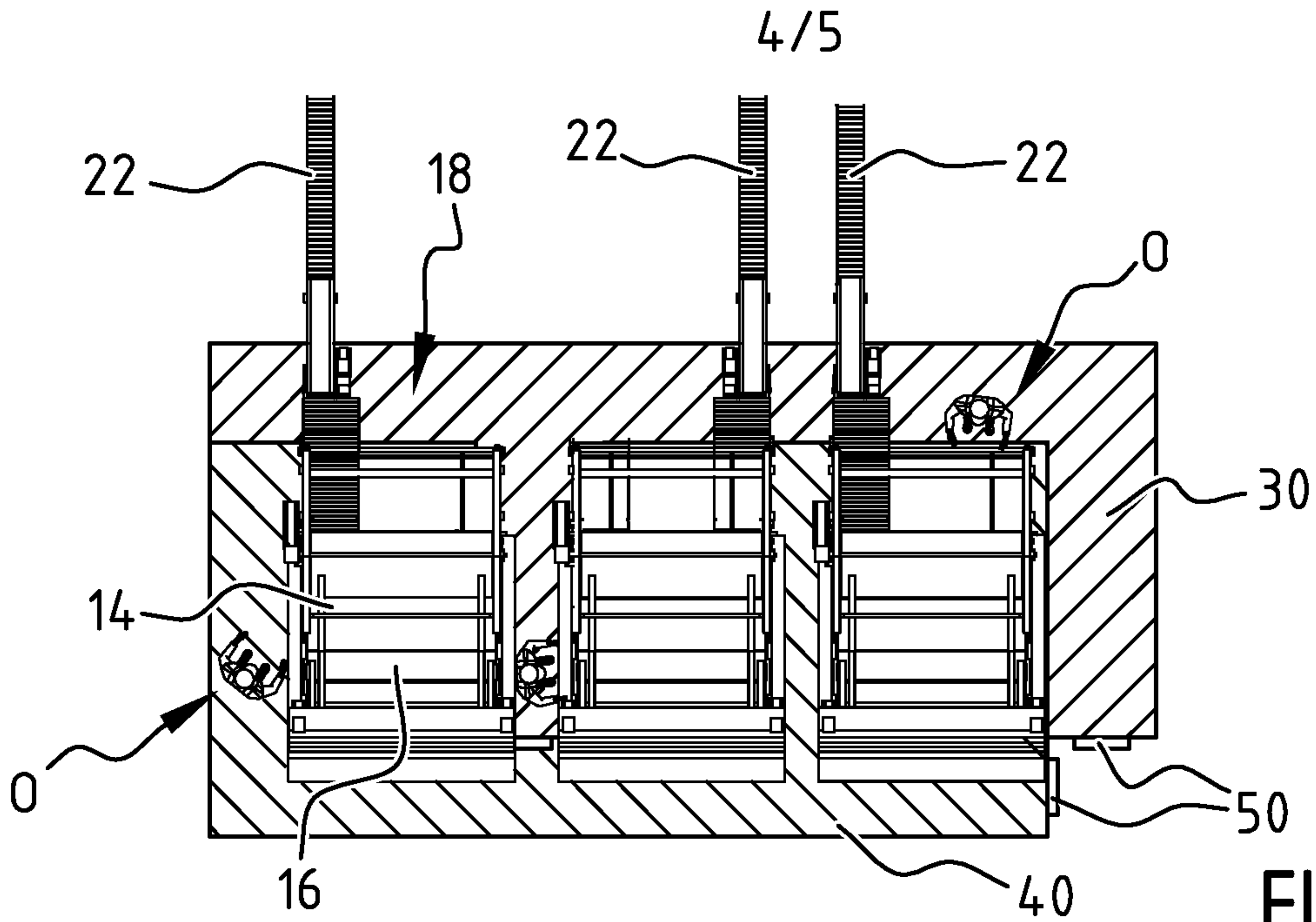
**FIG. 1**



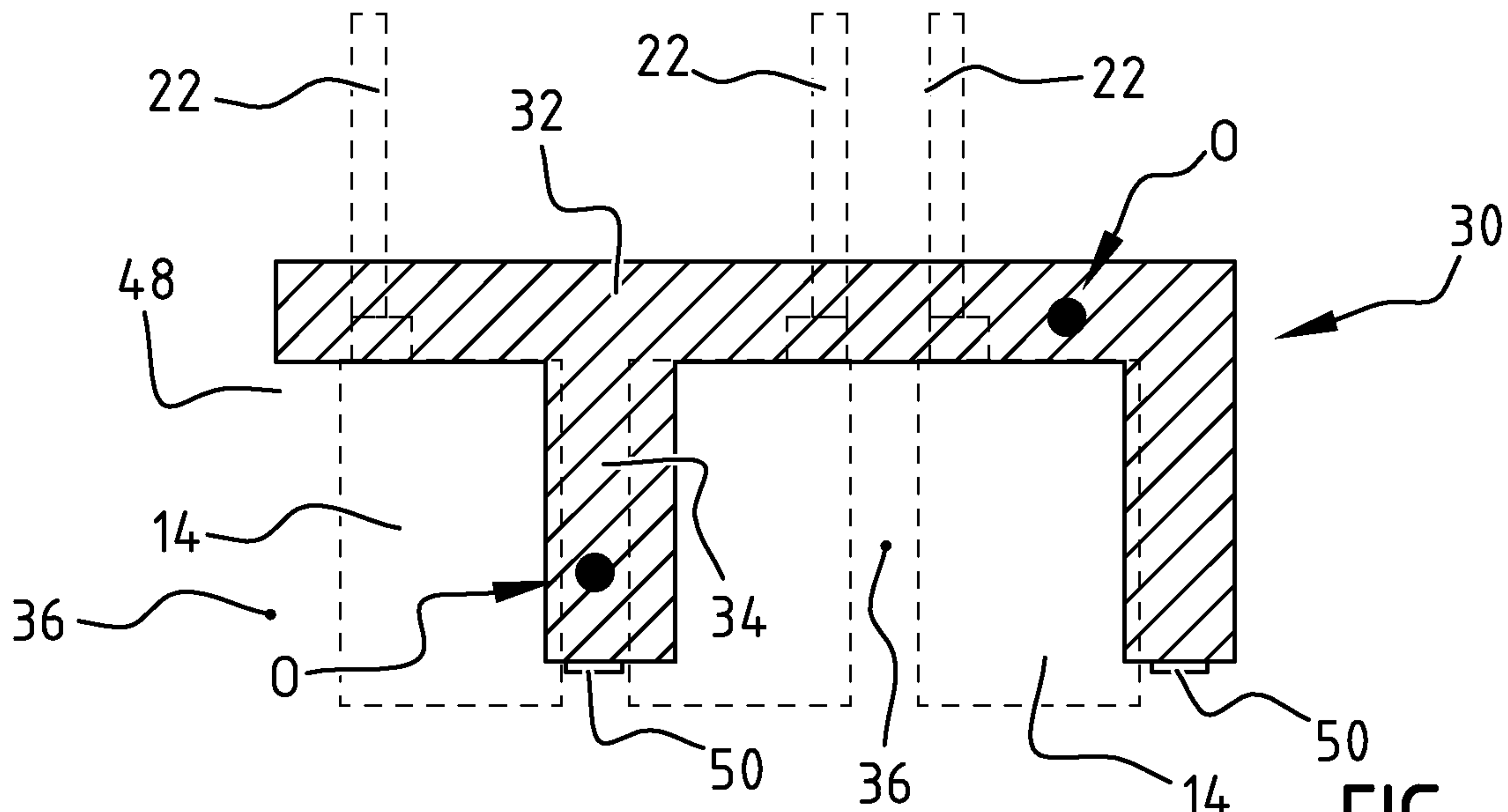
**FIG. 2**



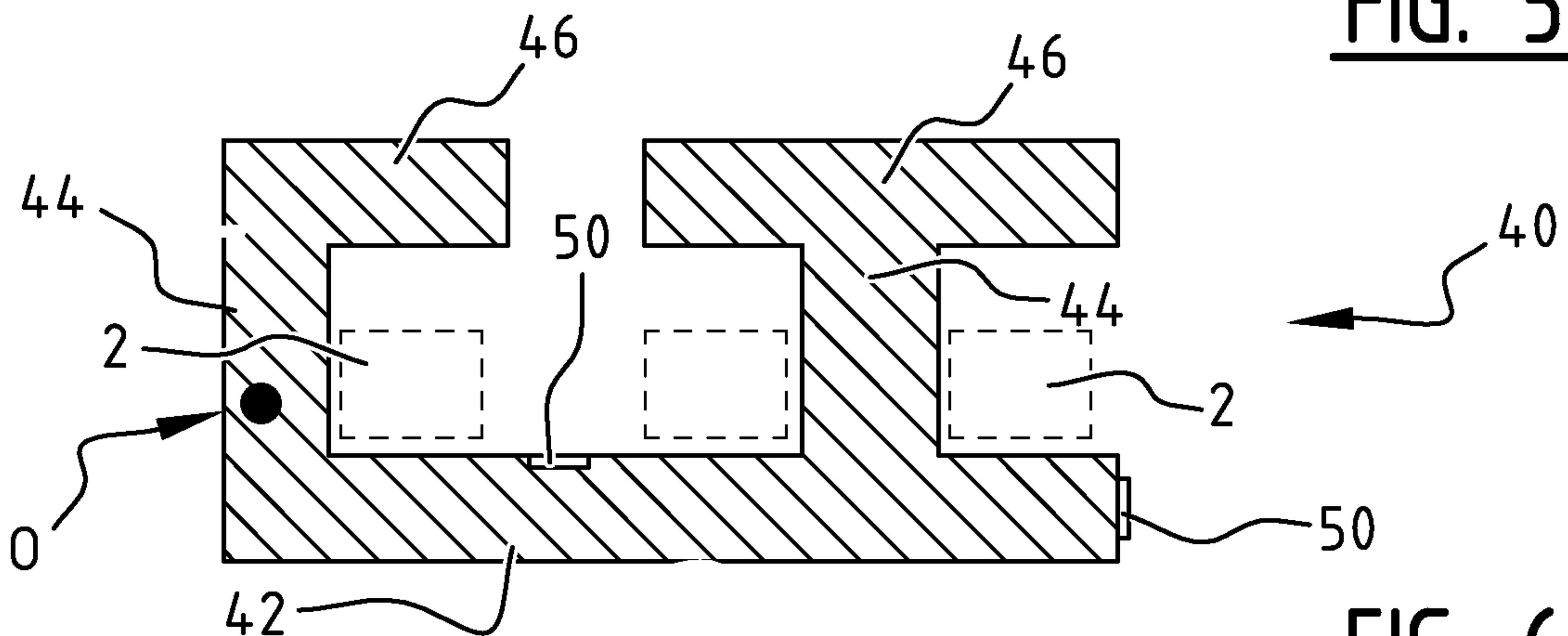
**FIG. 3**



**FIG. 4**



**FIG. 5**



**FIG. 6**

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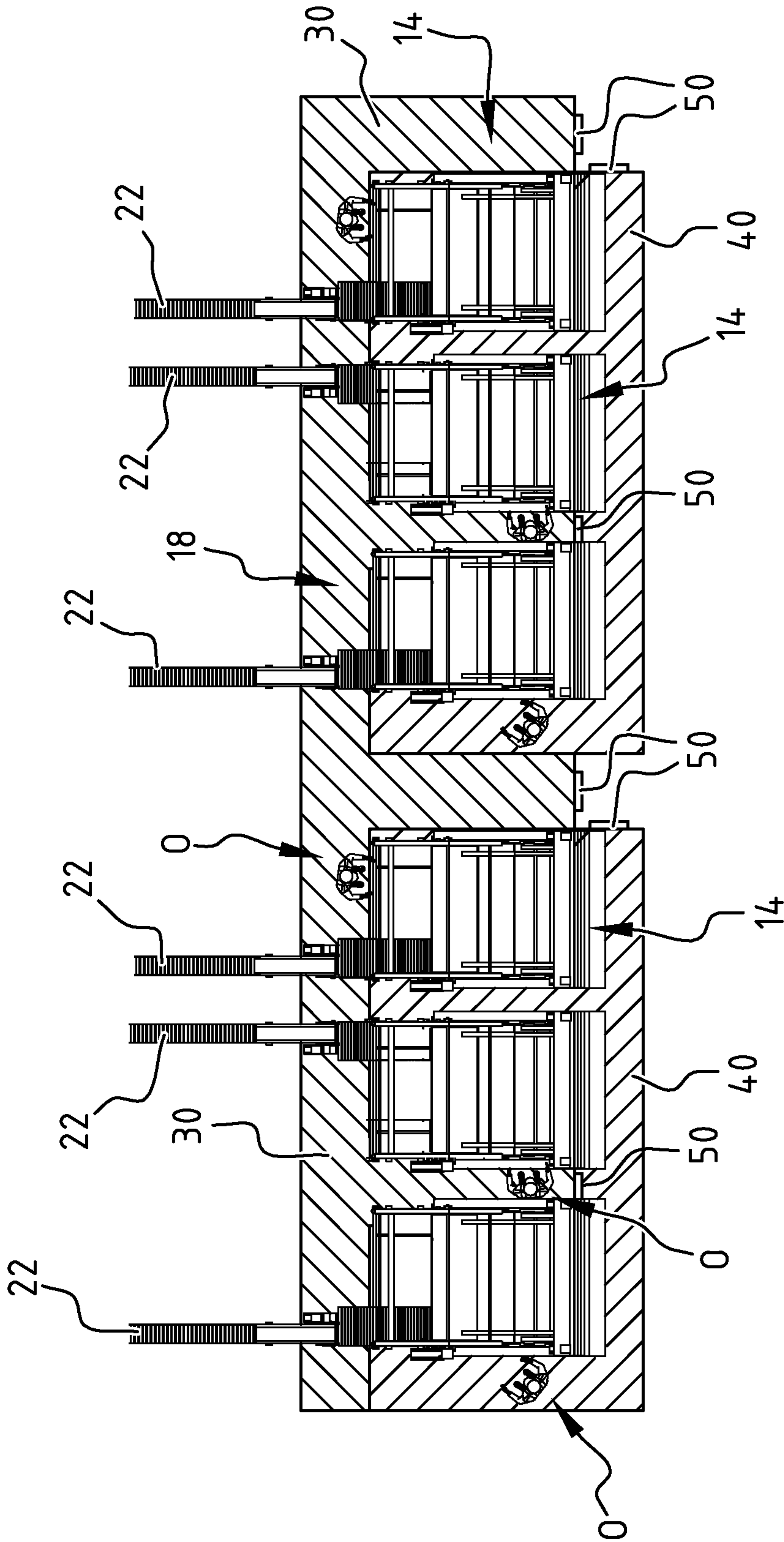
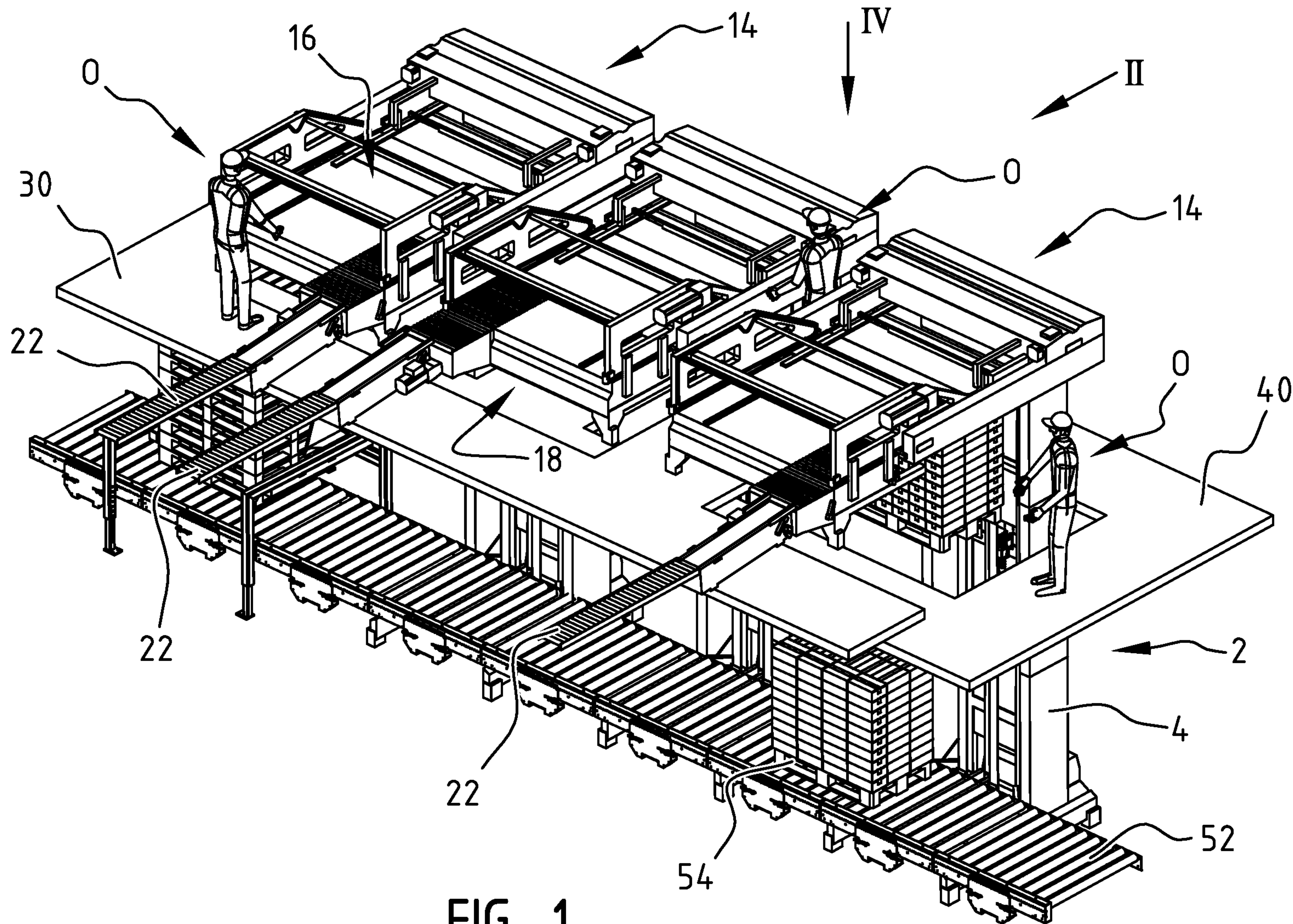


FIG. 7



**FIG. 1**