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(54) **Grab for wire mesh packs**

(57) A grab (1) for lifting wire mesh packs, comprising two pairs of mutually opposite and mutually connected arms (2), each arm being provided with teeth (4) which

face the teeth (4) of the opposite arm (2), the arms being adapted to grip a wire mesh pack by inserting the arms within the wire mesh pack.

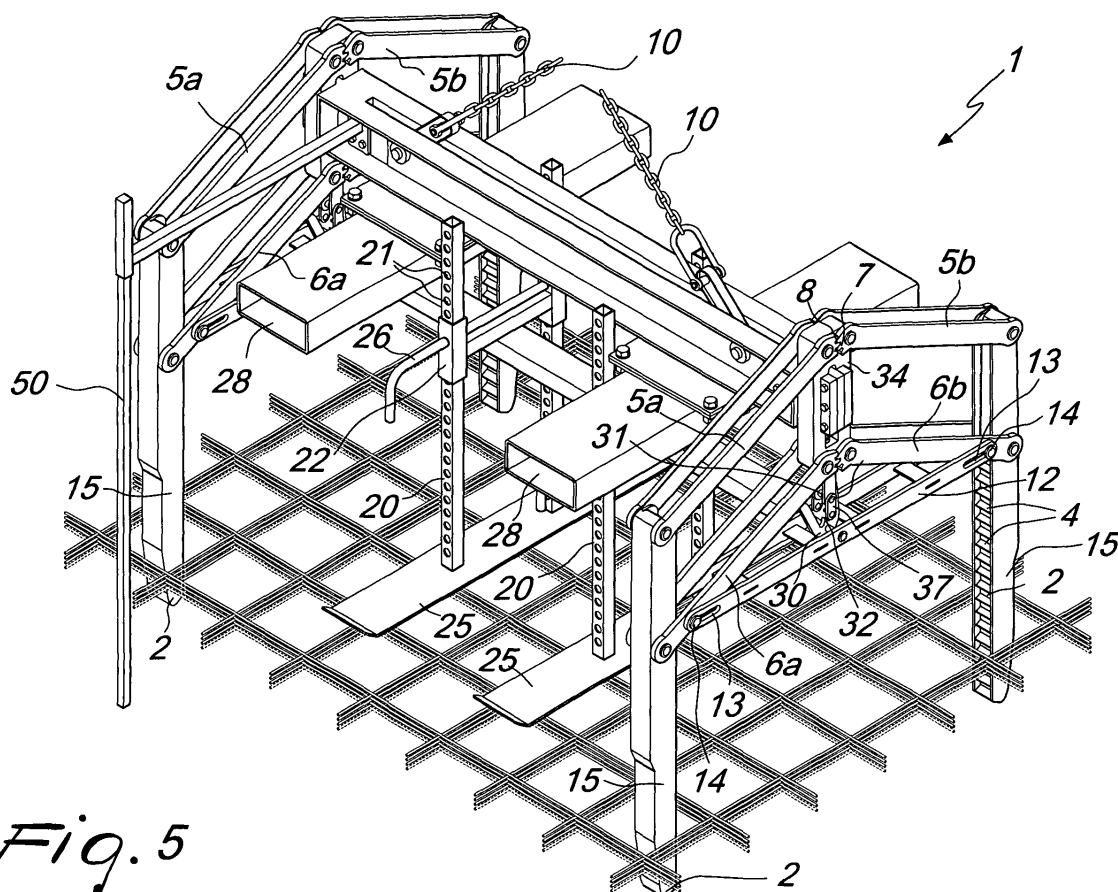


Fig. 5

Description

[0001] The present invention relates to a grab for wire mesh packs with improved functionality.

[0002] As is known, packs of wire mesh must be loaded onto, and unloaded from, trucks for their transport.

[0003] To perform this operation, a sort of grab is generally used which is provided with jaws which externally surround the wire mesh packs in order to be able to lift them and deposit them onto the truck and then unload them later.

[0004] This operation is generally performed while the jaws of the grab externally surround the wire mesh packs.

[0005] However, this solution entails drawbacks.

[0006] Wire mesh packs in fact usually have such dimensions that when the grab surrounds them externally in order to be able to load them onto a truck, the truck must have openable sides, and such sides must therefore be opened, otherwise the loading operation is impossible.

[0007] This situation occurs also upon unloading.

[0008] Moreover, wire mesh packs have variable dimensions, and this entails the need to use grabs of different sizes.

[0009] Moreover, conventional grabs have a limited ability to surround mutually stacked wire meshes, accordingly forcing the operator to perform a plurality of lifting operations in order to lift a plurality of wire mesh packs.

[0010] Moreover, in order to be able to arrange the wire mesh packs tightly side-by-side in a truck or in a storage area, the operator cannot rely on conventional grabs, since such grabs, by having jaws which surround the wire mesh packs externally, do not allow to arrange the packs adjacent to each other, with consequent space occupation problems.

[0011] Moreover, conventional grabs are normally actuated by means of a bridge crane and instead cannot be always used with lift trucks.

[0012] The aim of the present invention is to provide a grab for wire mesh packs which allows to load and unload such packs even on trucks which are not provided with opening sides, or in any case without having to open the sides of trucks.

[0013] Within this aim, an object of the present invention is to provide a grab for wire mesh packs which allows to have a grip which is adjustable depending on the height of the wire mesh pack.

[0014] Another object of the present invention is to provide a grab for wire mesh packs which has a grip indication device which allows the operator to have the visual perception of the successful grip of the wire mesh packs.

[0015] A further object of the present invention is to provide a grab for wire mesh packs which can be operated both by a bridge crane and by a lift truck.

[0016] A still further object of the present invention is to provide a grab for wire mesh packs which is highly reliable, relatively simple to provide and at competitive costs.

[0017] This aim and these and other objects, which will become better apparent hereinafter, are achieved by a grab for lifting wire mesh packs, characterized in that it comprises two pairs of mutually opposite and mutually connected arms, each arm being provided with teeth which face the teeth of the opposite arm, said arms being adapted to grip a wire mesh pack by inserting said arms within said wire mesh pack.

[0018] Further characteristics and advantages of the invention will become better apparent from the description of a preferred but not exclusive embodiment of the grab according to the present invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a side elevation view of the grab according to the present invention;

Figures 2-4 are schematic front elevation views of operating positions of the grab according to the present invention;

Figure 5 is a perspective view of the grab according to the invention.

[0019] With reference to the figures, the grab according to the present invention, generally designated by the reference numeral 1, comprises four jaws, which are arranged at the corners of a quadrilateral and are connected to each other by means of an I-shaped structure. The structure is designated by the reference numeral 3.

[0020] Each one of the jaws comprises an arm 2 provided with a plurality of teeth 4, which face the teeth 4 of an opposite arm 2.

[0021] The four arms 2 are mutually connected in pairs to mutually opposite arms by means of two pairs of levers 5a, 5b and 6a, 6b.

[0022] The levers 5a and 5b, as well as the levers 6a and 6b, are pivoted to the respective arms 2, and engage each other, i.e., the lever 5a meshes with the lever 5b thanks to the presence of complementary teeth 7 and recesses 8.

[0023] Meshing of the levers 5a and 5b and 6a and 6b allows the levers to maintain a stable coupling when the load is lifted.

[0024] Conveniently, the grab is sized so that the arms 2 grip the wire mesh packs from the inside, thus allowing to limit greatly the space occupation, so as to be able to load wire mesh packs onto a truck even if the truck does not have opening sides or in any case without having to open such sides.

[0025] The structure 3 for connecting the arms 2 of the grab is connected, by means of a chain 10, to a ring 11 in order to lift the grab as a whole.

[0026] A cross-member 12 connects the two levers 6a and 6b and is provided, at each of its respective ends, with a slot 13 which allows the sliding of a pivot 14 rigidly coupled to the levers 6a and 6b, so that the grab can become wider and narrower according to the sliding of the pivot 14 within the slot 13.

[0027] Each one of the arms 2 of the grab, in addition to being provided with said teeth 4, which face the teeth of the opposite arm 2, has, at the opposite side with respect to the one provided with the teeth 4, a beveled portion 15, which ends with a tapering region 16 at the lower end of the arm 2. This shape of the arm allows said arm to be inserted easily into one or more wire mesh packs, without having grip points which can hinder its insertion within the wire mesh pack.

[0028] Moreover, each one of the arms 2 is provided with a covering element adapted to protect the teeth as they exit.

[0029] A device is connected to the structure 3 for mutually connecting two arms arranged so that their teeth do not face each other and is constituted by two tubular elements 20 provided with respective holes 21 and with a sleeve 22 within which the tubular element 20 slides. An abutment element is welded to the lower end of each tubular element and is constituted by a plate-like element 25, which is adapted to be rested against the upper surface of the lifted wire mesh pack when the arms 2 have already been lowered into the meshes of the wire mesh pack. This allows to adjust the depth of the grip of the jaws.

[0030] Conveniently, there are four tubular elements 20, like the four arms 2, which are arranged in pairs and in such a manner that two abutment elements are inserted respectively in the two mutually opposite pairs of tubular elements 20.

[0031] The position of the abutment element can be adjusted by sliding the tubular element 20 within the sleeve 22 and by fixing the tubular element 20 by means of a rod-like pin 26, which is inserted so as to mutually connect two tubular elements 20 arranged so that their holes 21 face each other.

[0032] Moreover, the element 3 for mutually connecting two arms 2 of the structure is provided, in a downward region, with grip means for the prongs of a fork-lift truck.

[0033] The grip means comprise two tubular elements 28, which are bolted to the connecting element 3 and are arranged externally with respect to the tubular elements 20, between such elements and each arm 2.

[0034] Accordingly, the tubular elements 28 lie transversely with respect to the longitudinal extension of the grab and allow the insertion of a pair of prongs so as to be able to lift the grab if a bridge crane is not available.

[0035] A device 50, constituted by an arm arranged externally with respect to the grab according to the invention, is adapted to be arranged externally with respect to the grab so as to allow a visual indication that the grab and in particular the arms 2 have been lowered into the wire mesh pack so as to reach the selected layer of wire mesh, so as to have the assurance that said arms also grip the lowest wire mesh of the wire mesh pack to be lifted, accordingly lifting the entire pack.

[0036] In order to ensure that the levers 5a and 5b and 6a and 6b maintain their position when the arms 2 have been inserted in the wire mesh pack, a mechanism 30 is

provided for locking the levers 5a, 5b and 6a, 6b.

[0037] The locking mechanism is constituted by a fork-like element 30, which is pivoted to the connecting element 12 which mutually connects the two levers 6a and 6b.

[0038] The fork-like element is provided, at one of its ends, with a hook-shaped portion 31 and, at the bottom of the fork, with a protruding tooth 32.

[0039] A plate 34 is provided for connecting the end of the four levers 5a, 5b and 6a, 6b, which mesh together by means of the teeth 7 and the recesses 8.

[0040] Such plate 34 is provided internally with a slot 35, along which an adjustment screw 36 slides which is provided, in a downward region, with a pawl 37 which is provided with two pins 38 and 39 which are arranged at the respective ends.

[0041] The pins 38 and 39 are adapted to engage respectively the hook-shaped portion 31 or the tooth 32 at the bottom of the fork-like element 30.

[0042] When the tooth 38 engages the hook-shaped portion 31, the grab according to the invention is in the locking position and the levers 5a, 5b and 6a, 6b can no longer change their relative position, remaining open. This occurs when the grab is lowered. Vice versa, when the grab is lifted, and therefore the plates 25 rest on the wire mesh, and the levers 6a, 6b and 5a, 5b rotate with respect to each other so as to clamp the arms 2 around the wire mesh pack, the pawl also moves downwardly and the pin 38 disengages from the hook-shaped portion 31 while the pin 39 rests against the tooth 32 arranged at the bottom of the fork-like element 30.

[0043] The grab according to the invention operates as follows.

[0044] The operator lifts the grab, either by means of a bridge crane or by means of a fork-lift truck, and arranges the arms 2 within the meshes of the wire mesh pack, until the indicator 40 indicates the selected depth. This is indicated by the indicator 40 provided in association with the grab according to the invention.

[0045] The pins 26 are inserted and the grab is lowered. This entails the disengagement of the element 31 from the pin 38: in this manner, the arms 2 can close. Once the wire mesh pack has been transported to its destination, the grab is lowered and the plates 25 act as retainers on the wire mesh, while the element 31 engages the pin 38. In this manner, the arms open and can no longer close.

[0046] In practice it has been found that the grab according to the invention fully achieves the intended aim and objects, since it allows to have a structure with compact dimensions which allows to engage the wire mesh pack from the inside, accordingly allowing to load wire mesh packs onto trucks without having to open the sides of said trucks, further being able to arrange the wire mesh packs closely adjacent to each other.

[0047] Moreover, the teeth of the arms 2 are larger at the lower end of each arm 2 and their size decreases along the extension of the arm. This prevents the arms

2, which can diverge slightly during lifting, from being unable to grip with the same force the wire mesh element that lies lowest in the pack with respect to the upper ones.

[0048] For this purpose, the lower teeth grip the wire mesh pack with a larger surface than the teeth arranged higher up along the extension of the arm 2.

[0049] The grab thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may further be replaced with other technically equivalent elements.

[0050] In practice, the materials used, as well as the contingent shapes and dimensions, may be any according to requirements and to the state of the art.

[0051] The disclosures in Italian Patent Application No. MI2004A001992 from which this application claims priority are incorporated herein by reference.

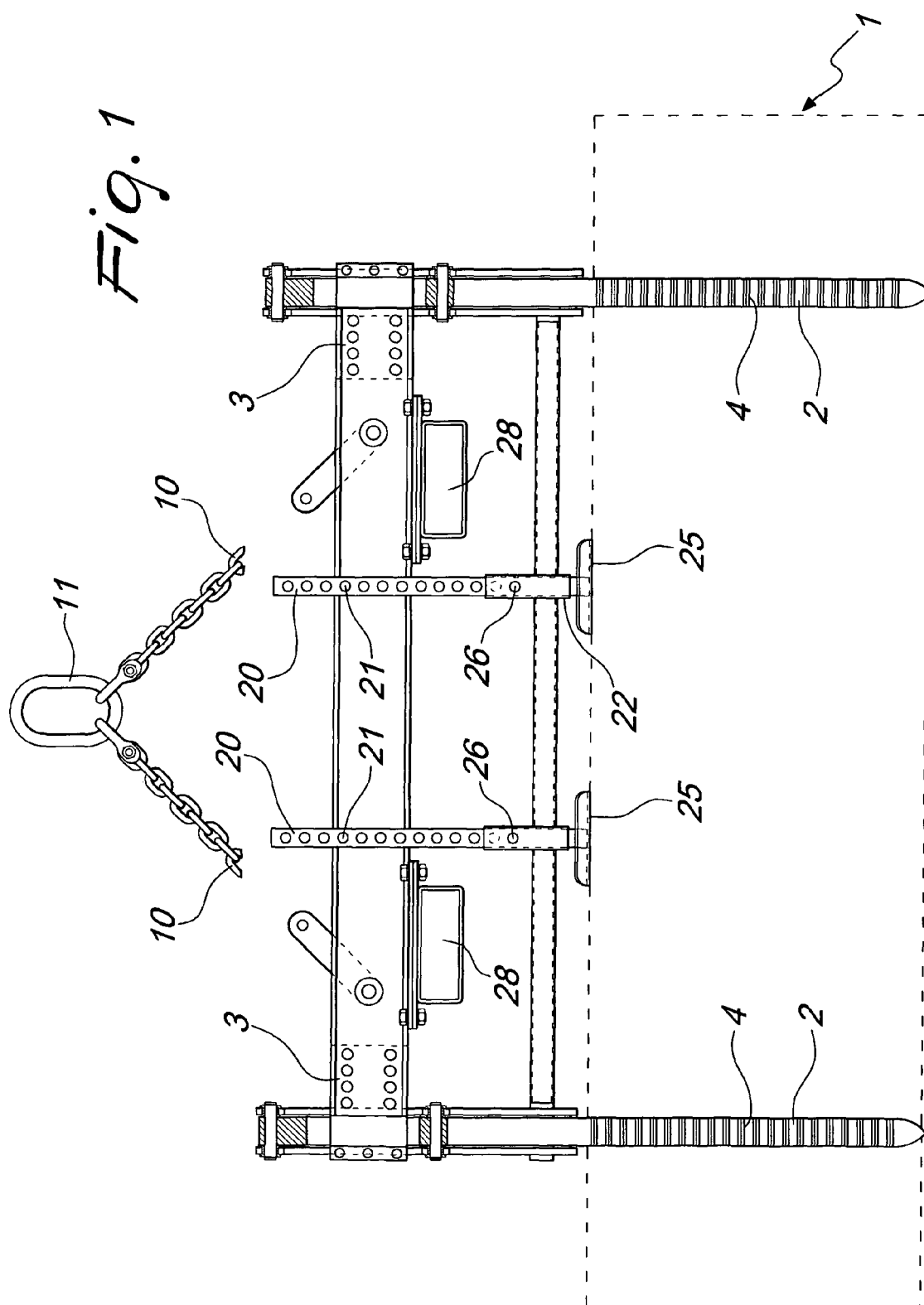
[0052] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

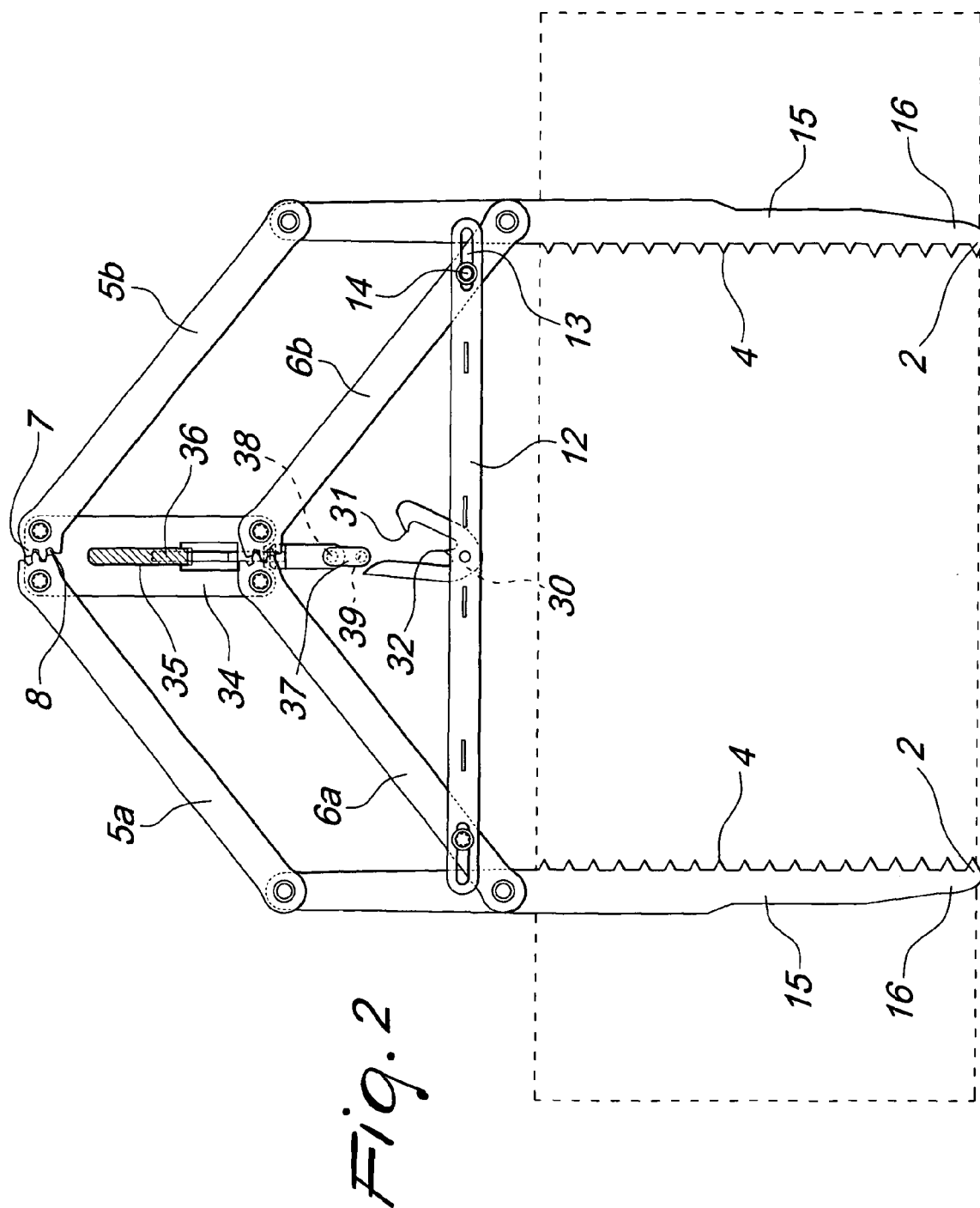
Claims

1. A grab for lifting wire mesh packs, **characterized in that** it comprises two pairs of mutually opposite and mutually connected arms, each arm being provided with teeth which face the teeth of the opposite arm, said arms being adapted to grip a wire mesh pack by inserting said arms within said wire mesh pack.
2. The grab according to claim 1, **characterized in that** the two pairs of mutually opposite arms are mutually connected by means of two pairs of levers which are pivoted, at one end, to the respective arms and mesh with each other at the opposite end.
3. The grab according to claim 2, **characterized in that** it comprises a connecting element adapted to connect the lower pair of said two pairs of levers which connect two mutually opposite arms, said connecting element being provided, at its respective ends, with two slots within which the respective pivots which protrude from each pair of levers can slide.
4. The grab according to one or more of the preceding claims, **characterized in that** each one of said arms is provided with teeth whose size decreases starting from the lower end of said arms.
5. The grab according to one or more of the preceding claims, **characterized in that** each one of said arms has, at the surface that lies opposite the surface provided with said teeth, a beveled portion which ends

at the lower end of the arm with a tapering portion.

6. The grab according to one or more of the preceding claims, **characterized in that** it comprises a structure for mutually connecting two arms of said grab whose teeth do not face each other.
7. The grab according to one or more of the preceding claims, **characterized in that** said connecting structure has, in a downward region, two tubular elements, which are arranged transversely to the longitudinal extension of said grab and are adapted to allow the engagement of lifting forks and of a fork-lift truck.
8. The grab according to one or more of the preceding claims, **characterized in that** it comprises elements for protecting the teeth of said arms.
9. The grab according to one or more of the preceding claims, **characterized in that** it comprises an abutment element, which is adapted to be lowered into contact with the upper surface of the wire mesh pack after said arms have been inserted within said wire mesh pack.
10. The grab according to one or more of the preceding claims, **characterized in that** it comprises a grip indication element, which is arranged externally with respect to said grab and is adapted to indicate that the arms have been inserted to the selected depth.
11. The grab according to one or more of the preceding claims, **characterized in that** it comprises locking means, which are adapted to allow the locking of said pairs of levers in order to keep said facing arms at a selected grip width.
12. The grab according to claim 11, **characterized in that** said locking means comprise a fork-like element, which is pivoted on said connecting element provided with slots at its ends.
13. The grab according to one or more of the preceding claims, **characterized in that** it comprises a plate-like element, which is connected to said pairs of levers and is provided with a slot within which a screw slides which is provided, in a downward region, with a pawl adapted to engage said fork-like element of said locking means.





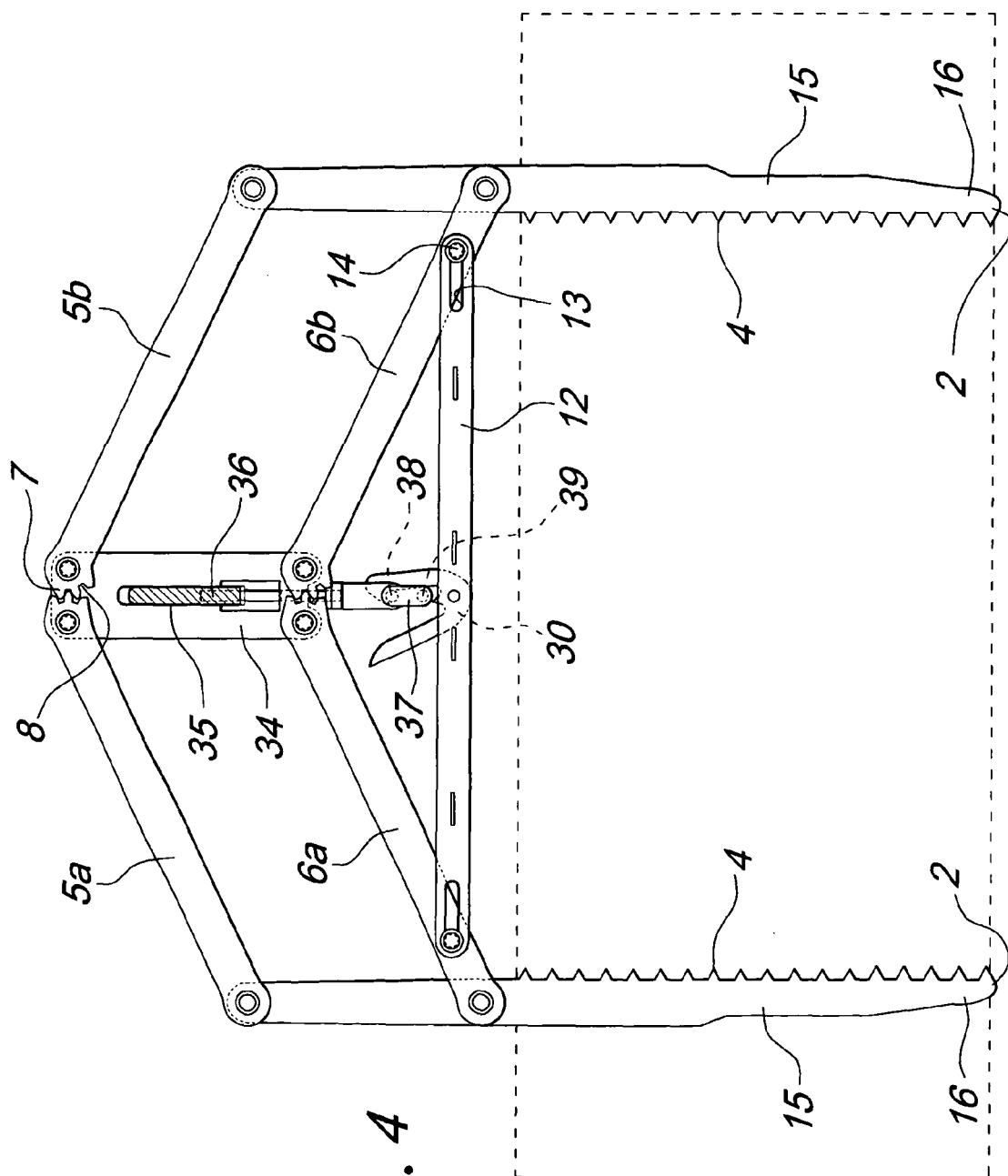


Fig. 4

