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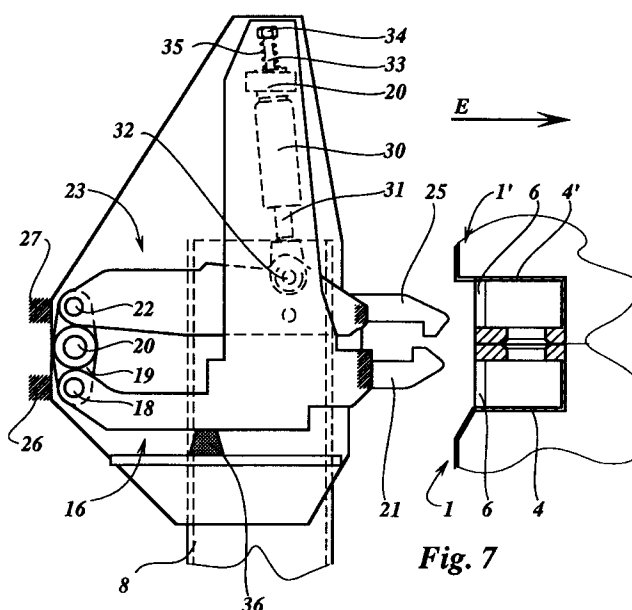
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Kanaaldijk Noord 23**(54) **A carrying device for picking up two containers placed one on top of the other.**

(57) The invention relates to a carrying device to be coupled to a vertically adjustable support of a fork-lift truck or the like for picking up two containers placed one on top of the other. Coupling means (16-23) arranged in pairs, one above the other, which are pivotally connected to the frame (8) of the carrying device, are disposed in such a manner that an insert end (21) of each pair of coupling means can be inserted into a coupling piece (4) which is provided

near the upper side of the lower of the two containers placed one on top of the other, and that an insert end (25) of the other coupling means of the pair in question can be inserted into a coupling piece (4') which is located near the aforesaid coupling piece (4) of the lower container and which is provided at the bottom side of the upper of the two containers placed one on top of the other.

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The invention relates to a carrying device to be coupled to an adjustable support of a fork-lift truck or the like for picking up two containers placed one on top of the other, said containers near their corner points being provided with coupling pieces, which have openings into which coupling means connected to the frame of the carrying device can be inserted, said coupling means being arranged in pairs, in such a manner that an insert end of each pair of coupling means can be inserted into a coupling piece which is provided near the upper side of the lower of the two containers placed one on top of the other, and that an insert end of the other coupling means of the pair in question can be inserted into a coupling piece which is located near the aforesaid coupling piece of the lower container and which is provided at the bottom side of the upper of the two containers placed one on top of the other.

In order to obtain a good understanding of the problems underlying the present invention the known state of the art will be explained first with reference to the accompanying Figures 1 - 6, wherein:

Figure 1 is a diagrammatic perspective view of a conventional container.

Figure 2 is a diagrammatic side view of a part of a frame of a carrying device with a container coupled thereto, with a first embodiment of a coupling means for coupling the container to the frame of the carrying device.

Figure 3 is a diagrammatic illustration of a second embodiment of a coupling means.

Figure 4 is a diagrammatic illustration of a third embodiment of means for coupling a container to a frame of the carrying device.

Figure 5 is a diagrammatic plan view of a part of a frame of a carrying device comprising a further embodiment of coupling means.

Figure 6 is a diagrammatic sectional view of coupling pieces located one above the other of two containers placed one on top of the other, in combination with the frame shown in Figure 5.

As is shown in Figure 1, a conventional parallelepiped container 1 has two side surfaces 2 extending parallel to each other, two end surfaces 2' extending perpendicularly to said side surfaces 2, an upper surface 3 and a bottom surface (not shown in Figure 1) extending parallel to said upper surface 3. Generally the length of a side surface 2 is greater than the width of an end surface 2'. Furthermore coupling pieces 4 are conventionally provided in the corner points of the container, said coupling pieces in three surfaces extending perpendicularly to each other being provided with openings 5 - 7 for inserting coupling means, which form part of a lifting or carrying device of some kind, by means of which the container in question

can be lifted and/or moved, or which form part of a vehicle and by means of which the container in question can be secured to the vehicle.

Especially empty containers are often moved with a so-called fork-lift truck, to which end a carrying device is coupled to said fork-lift truck, in such a manner that said carrying device is movable upwards and downwards in a conventional manner by means of the lifting mechanism of the fork-lift truck or the like. In that case the carrying device is provided with coupling means, which can be inserted into the coupling pieces of a container in order to secure said container to the carrying device in question.

Thus Figure 2 diagrammatically shows a part of a frame 8 of such a carrying device to be coupled to a fork-lift truck or the like. In this embodiment according to Figure 2 the frame 8 is thereby provided near its upper ends with two spaced-apart, hook-shaped coupling means 9, which can be inserted into coupling pieces 4 provided near the upper edge of the respective container 1, namely through the openings 6, whilst the ends of said hook-shaped coupling means will thereby come to lie in the openings 5, as will be apparent from Figure 2. The container thereby butts against a cross beam of the frame 8 near its bottom side.

An advantage of this construction is that there are no parts which project beyond the upper surface 3 of the container, so that it is possible to place a second container on top of the container that is coupled to the frame. Such a second container placed on top of the container that is coupled to the frame 8 is not secured in any way, however, with the attendant risk that the upper container may fall off the lower container when two containers placed one on top of the other in this manner are being moved by means of the fork-lift truck or the like, with all its consequent dangers.

Figure 3 shows an embodiment wherein the frame 8 of the carrying device is provided with arms 10 extending above the container 1 coupled to the frame 8, to which arms 10 coupling means having unround heads 11 and being pivotable about vertical axes are secured. In a first position of the unround heads 11 said unround heads 11 may be passed through the holes 5 located at the upper sides of the coupling pieces 4, after which the coupling pieces may be pivoted into a second position, such that the unround heads 11 cannot be retracted in upward direction from the respective holes 5 any more. With this embodiment it is not possible to place a second container on top of the first container, however.

In the embodiment shown in Figure 4 the frame 8 is provided with hook-shaped coupling means 12 fixedly connected to the frame, which

may be passed from above through the openings 5 of coupling pieces 4 provided at the upper side of the container. Furthermore the frame is provided with pins 13 which are movable to and from in the direction of the arrow A by setting means not shown, which pins may be passed through the openings 6 of the coupling pieces 4.

It will be apparent that also with this construction it is not possible to place one container on top of the other.

Figures 5 and 6 show an embodiment wherein two containers 1 and 1' placed one on top of the other can be secured with respect to the frame 8 of the carrying device. It is this embodiment, which is known per se, that is referred to in the preamble of claim 1 of the present application.

As shown in Figures 5 and 6 hooks 14 are secured to the frame 8 of the carrying device, said hooks 14 corresponding with the hooks 9 of the embodiment shown in Figure 2, whereby a lower container 1, more in particular the coupling pieces 4 of said lower container 1, can be coupled to the frame 8 of the device by means of said hooks 14 in the manner described with reference to Figure 2.

Near its ends the frame 8 is furthermore provided with hook-shaped coupling means 15, which can be moved, by setting means not shown, parallel to a side surface 2 of the container 1', as indicated by means of the double arrows B, and whose insert ends may be inserted into or retracted from openings 7 of coupling pieces 4' in the end surfaces 2, said coupling pieces 4' being located near the lower corner points of a container 1' placed on top of the lower container 1.

A drawback of this embodiment is that when such a carrying device is used it is not possible to place containers in line, with their side surfaces 2' butting against each other, or to pick up containers which are placed with their side surfaces 2' butting against each other by means of the carrying device.

The object of the invention is to obtain a carrying device to which two containers placed one on top of the other can be secured in a safe manner, whereby the insert ends of the coupling means co-operating with the lower container and the insert ends of the coupling means co-operating with the upper container can be inserted into the openings in the surfaces, located one above the other, of the respective coupling pieces of the containers in question, as a result of which it becomes possible to place the containers in firmly abutting relationship with their end surfaces and/or side surfaces, or to pick up containers that firmly abut against each other by means of the carrying device.

According to the invention this may be achieved in that the two coupling means are placed one above the other, being pivotally coupled with

their ends remote from the insert ends to be inserted into the coupling pieces of the containers to a coupling arm which is pivotally coupled to the frame of the carrying device between the coupling points of said coupling means.

The invention will be explained in more detail hereafter with reference to Figures 7 - 12, wherein:

Figure 7 is a side view of two coupling means arranged to form a pair.

Figure 8 shows a part of Figure 7, partly in plan view and partly in sectional view.

Figures 9 and 10 are views corresponding with Figure 7 of the coupling means in slightly altered positions.

Figure 11 shows a second embodiment of coupling means according to the invention.

Figure 12 shows a part of Figure 11, seen in the direction according to the arrow XII.

In the embodiment shown in Figures 7 - 10 the frame 8 is provided with two pairs of coupling means, which are spaced apart by a distance which at least substantially corresponds with the distance between two coupling pieces 4 provided in the corner points of a container.

Each pair of coupling means is provided with a first coupling means 16, which is built up of two substantially L-shaped plates 17 extending parallel to each other. The legs of said plates 17, which extend substantially horizontally, are coupled to the lower end of a coupling arm 19 by means of a pivot pin 18. The coupling arm 19 is pivotally coupled to the frame 8 of the carrying device by means of a pin 20 extending parallel to the pin 18.

The substantially vertically extending legs of the plates 17 are interconnected by means of a connecting piece 20.

A hook-shaped insert end 21 of the coupling means 16 is located at the side of the coupling means 16 remote from the pivot pin 18.

One end of a coupling means 23 located above the coupling means 16 is coupled to the end of the coupling arm 19 projecting above the pin 20 by means of a pivot pin 22 extending parallel to the pins 18 and 20. Said coupling means 23 is built up of two plate-shaped parts 24 and a hook-shaped insert end 25 located above the insert end 21.

Stops 26 and 27, which are only schematically indicated in the Figure, are provided near the pivot pins 18 and 22 respectively, said stops 26 and 27 bounding the pivoting movement of the coupling arm 19 about the pin 20.

As is schematically indicated in Figure 8, compression springs 28 and 29 are provided between the plate-shaped parts 17 of the coupling means 16 and the part of the coupling means 23 located between said plate-shaped parts, said compression springs 28 and 29 enabling a certain pivoting of the upper coupling means, in particular of the insert

end 25 of said coupling means, in horizontal direction with respect to the insert end 21 of the lower coupling means 16, as is indicated by means of the double arrow C.

A setting cylinder 30 located above the coupling means 23 is furthermore provided between the plate-shaped parts 17 of the coupling means 16. The piston rod 31 of said setting cylinder is pivotally coupled to the upper coupling means 23 by means of a pivot pin 32.

An upwardly extending rod 33 is attached to the upper end of the setting cylinder 33, said rod being passed with a certain amount of play through a hole provided in the plate 20. A compression spring 35 is provided between the plate 20 and a retaining member 34 provided on the upper end of the rod 32.

As will furthermore be apparent from Figure 7, the lower coupling means is supported at its bottom side, between its ends, by a preferably slightly resilient support 36 attached to the frame 8.

From Figure 7 it will be apparent that the insert ends 21 and 25 located one above the other of the coupling means 16 and 23 can be moved in the direction of the arrow E by means of a vehicle supporting the frame 8, in order to be inserted into respectively the openings 6 located one above the other of a coupling piece 4 located near the upper edge of a lower container 1 and a coupling piece 4' located near the bottom edge of a container 1' placed on top thereof. The insert ends 21 and 25 may remain freely adjustable during insertion, whilst the upper insert end 25 may be pushed downwards by means of the setting cylinder 30 following insertion, as a result of which a firm engagement of the hook-shaped insert ends 21 and 25 into the openings 5 of the coupling pieces 4 and 4' will be effected.

Of course it cannot be guaranteed that the containers are at all times exactly aligned in vertical direction. Thus the coupling pieces 4 and 4' of the containers placed one above the other may be slightly shifted in the longitudinal direction of the respective side face with respect to each other, as is schematically indicated in Figure 8. Such a lateral displacement may be set off by the above-described pivotability of the upper coupling piece 23 with respect to the lower coupling piece 16 in the direction according to the arrow C. In order to ensure that the insert end 25 of the upper coupling piece can readily slide into the respective opening 6 of the coupling piece 4', the free end of said insert end is pointed, as is apparent in particular from Figures 7 and 8.

As is furthermore indicated in Figures 9 and 10 the containers may have shifted in a direction transversely to the side surfaces provided with the holes 6 into which the insert ends 25 and 21 are

inserted. Such a displacement may be set off by pivoting of the coupling arm 19 about the pivot pin 20, whereby the coupling means 16 and 23 can slightly move in a direction perpendicularly to the surfaces of the containers provided with the openings into which the insert ends must be inserted. As will be apparent from Figures 9 and 10 such a movement of the coupling means 16 and 23 is limited by stops 26 and 27 co-operating with the coupling arm 19.

The dimensions of the coupling pieces with the holes provided therein are not always the same for all containers. It must be possible to move the free ends of the insert ends 21 and 25 apart by means of the setting cylinder 30, over such a distance that it can be ensured, also with the largest coupling pieces, that the insert ends 21 and 25 can be retracted from the coupling pieces without impediment.

Not only can the setting cylinder readily follow the movements of the coupling pieces 16 and 23 in their longitudinal direction as a result of the above-described spring suspension of the setting cylinder 30 by means of the spring 34, but it has also become possible to push the free ends of the insert ends slightly together when containers whose coupling pieces have minimal dimensions are to be handled.

Figure 11 shows a further embodiment. In this Figure 11 those parts whose functions correspond with the parts described above with reference to Figures 7 - 10 have been given the same reference numerals as in the said Figures 7 - 10.

This embodiment does not comprise a setting cylinder 30. Furthermore compression springs 42 are provided between the coupling means 23 and parts 40 and 41 of the coupling means 16 extending above and under said coupling means 23, so that the coupling means 23 can move out resiliently in horizontal as well as in vertical direction with respect to the coupling means 16.

The insert end 43 of the upper coupling means 23 is pivotable about the longitudinal axis of the coupling means 23 by setting means not shown. Said insert end is thereby provided with an unround head 44, as will be apparent in particular from Figure 12. In a first position of said unround head the unround head may be passed through the opening 6 of the coupling piece 4 of an upper container, to extend into the interior of said coupling piece, whereupon the head of said insert end can be moved into another position in order to secure said insert end to the coupling piece in question.

For the rest the operation of this second embodiment of the coupling means will be essentially similar to the operation of the coupling means as explained with reference to Figures 7 - 10.

Claims

1. A carrying device to be coupled to an adjustable support of a fork-lift truck or the like for picking up two containers placed one on top of the other, said containers near their corner points being provided with coupling pieces, which have openings into which coupling means connected to the frame of the carrying device can be inserted, said coupling means being arranged in pairs, in such a manner that an insert end of each pair of coupling means can be inserted into a coupling piece which is provided near the upper side of the lower of the two containers placed one on top of the other, and that an insert end of the other coupling means of the pair in question can be inserted into a coupling piece which is located near the aforesaid coupling piece of the lower container and which is provided at the bottom side of the upper of the two containers placed one on top of the other, characterized in that said two coupling means are placed one above the other, being pivotally coupled with their ends remote from the insert ends to be inserted into the coupling pieces of the containers to a coupling arm which is pivotally coupled to the frame of the carrying device between the coupling points of said coupling means.

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2. A carrying device according claim 1, characterized in that stops are provided, which bound the pivoting movement of said coupling arms with respect to the frame.

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3. A carrying device according claim 1 or 2, characterized in that the lower coupling means is supported near its bottom side, between its ends.

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4. A carrying device according to any one of the preceding claims, characterized in that said coupling means are resiliently movable with respect to each other, in a direction transversely to their longitudinal direction.

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5. A carrying device according to any one of the preceding claims, characterized in that said coupling means are resiliently movable in vertical direction with respect to each other.

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6. A carrying device according to any one of the preceding claims, characterized in that the insert ends of said coupling means are hook-shaped.

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7. A carrying device according to any one of the preceding claims 1 - 5, characterized in that at least one insert end is provided with an unround head, which is adjustable in the longitudinal direction of the coupling means in question.

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8. A carrying device according to any one of the preceding claims, characterized in that a setting means is provided, by which an upper coupling means is vertically adjustable.

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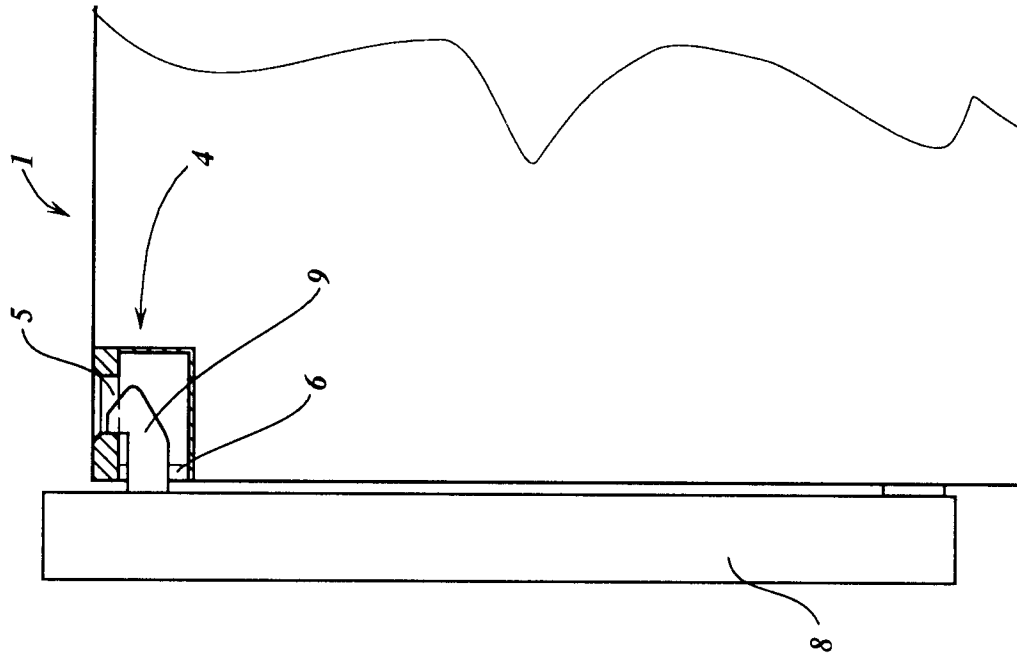


Fig. 2

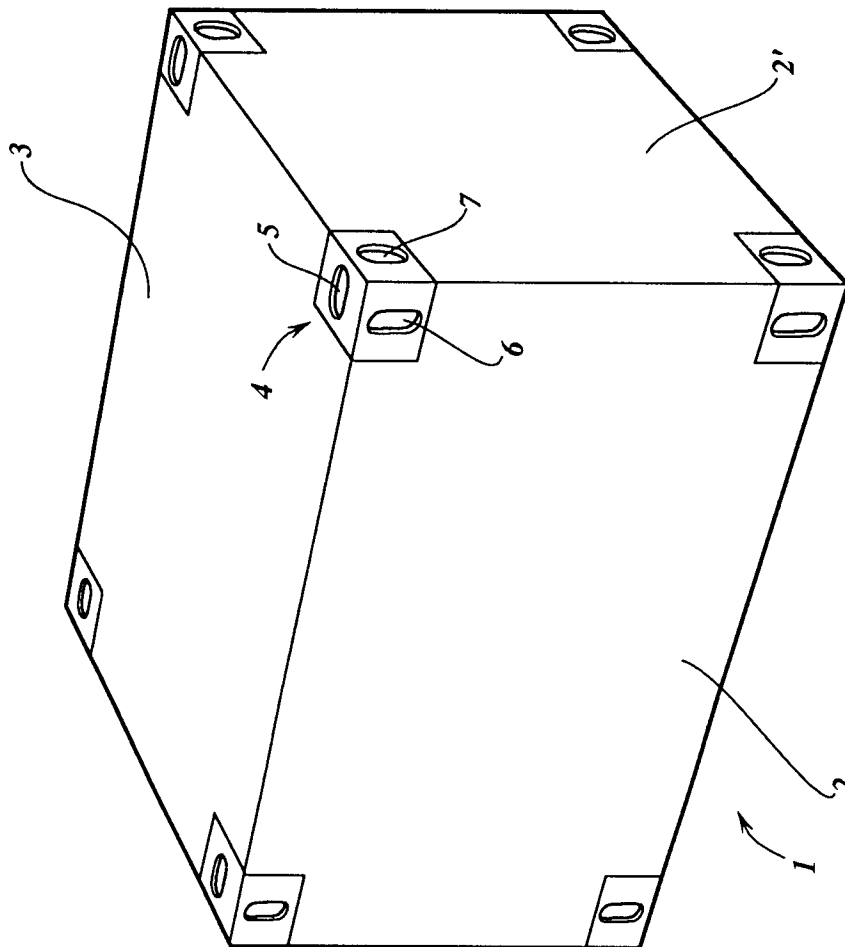
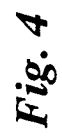
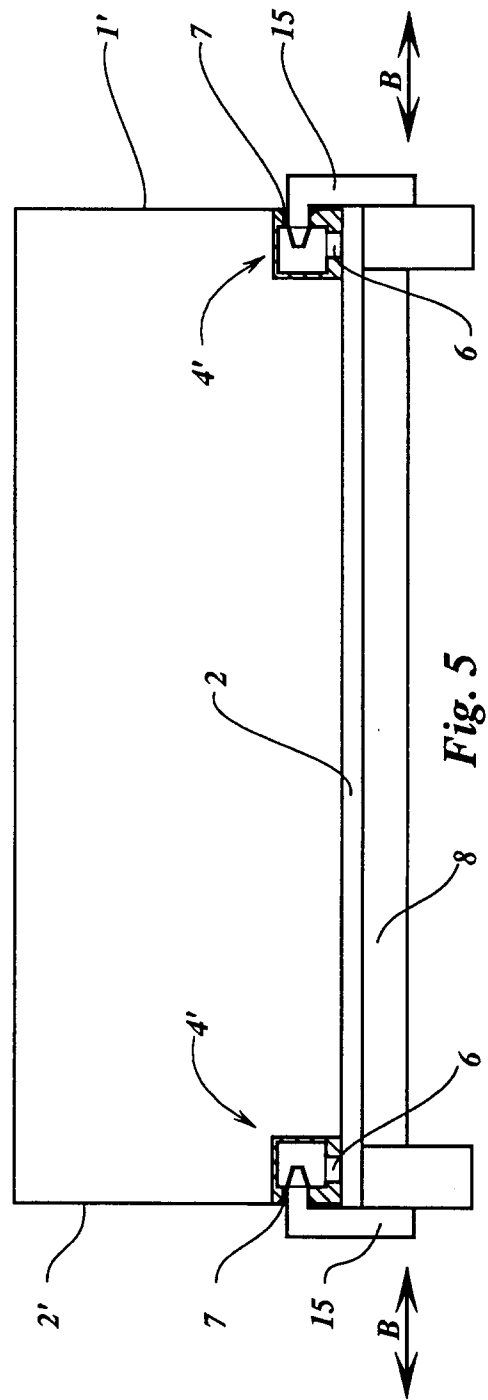
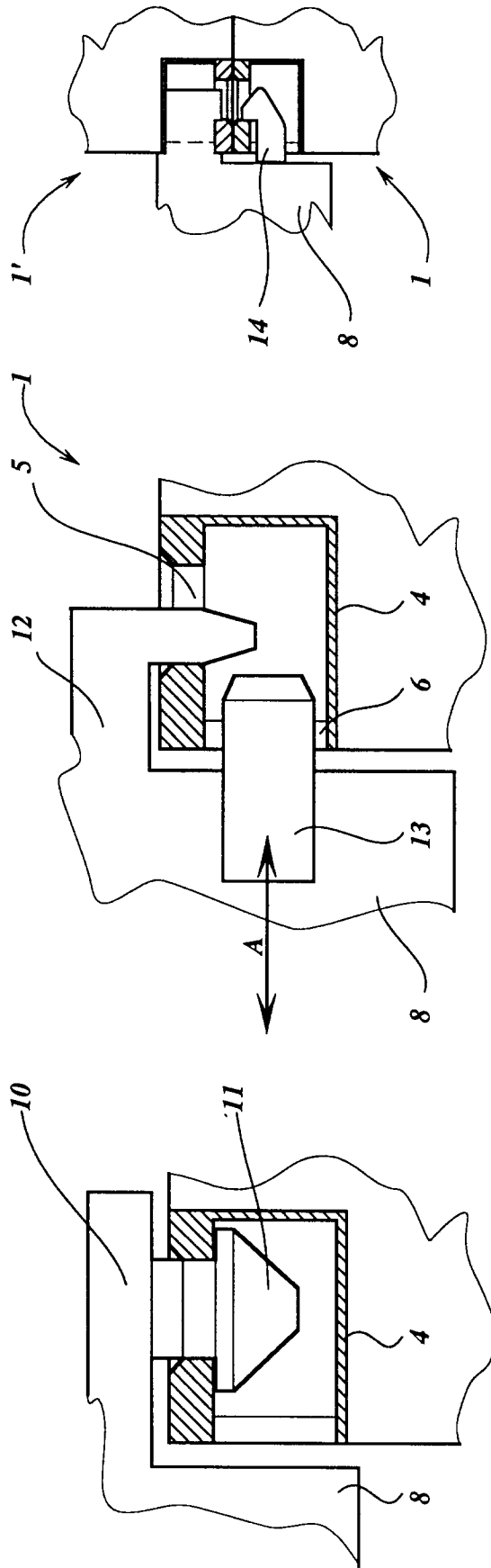


Fig. 1



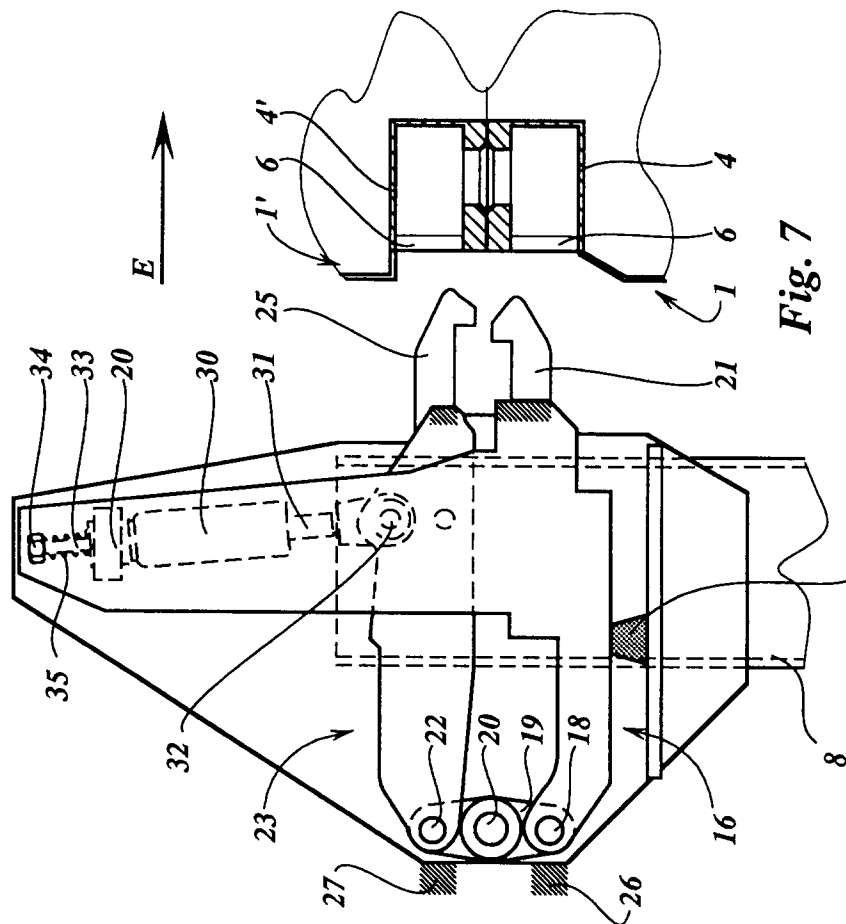


Fig. 7

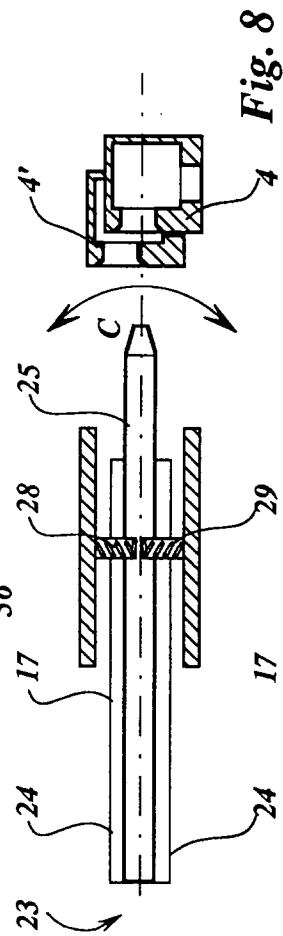


Fig. 8

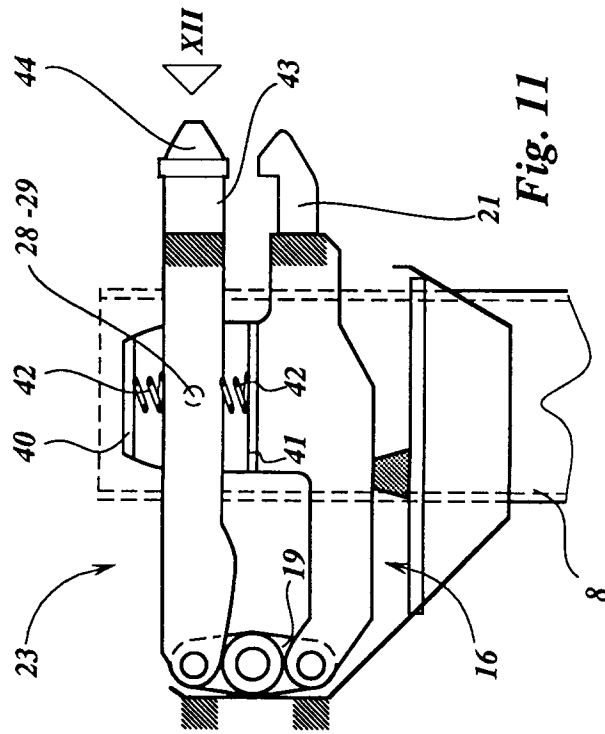


Fig. 11



Fig. 12

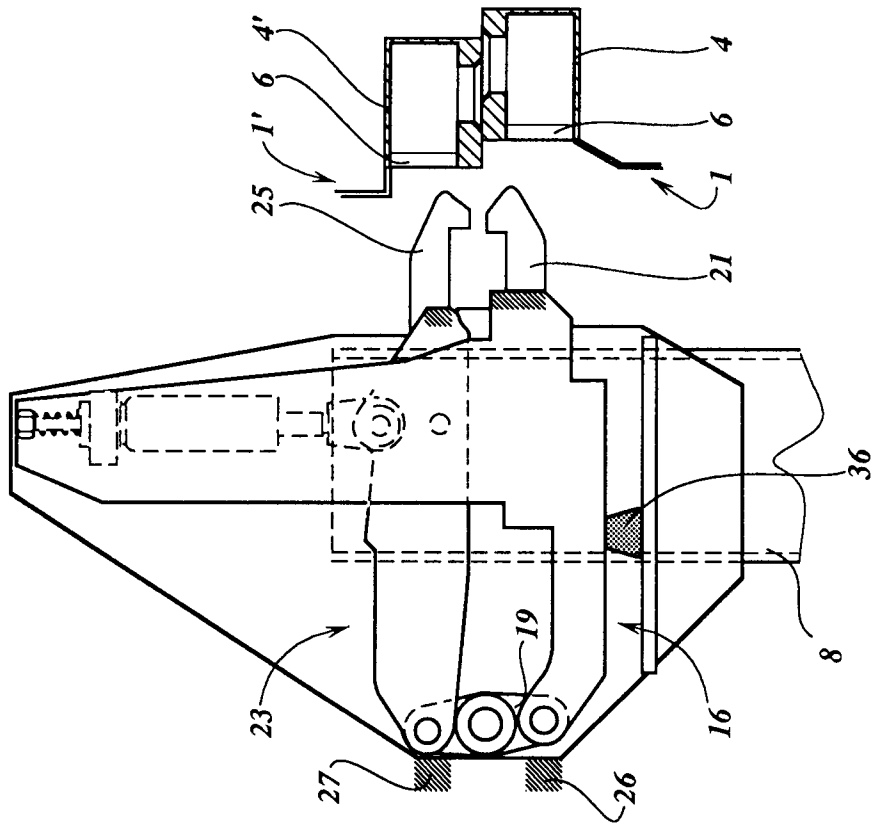


Fig. 9

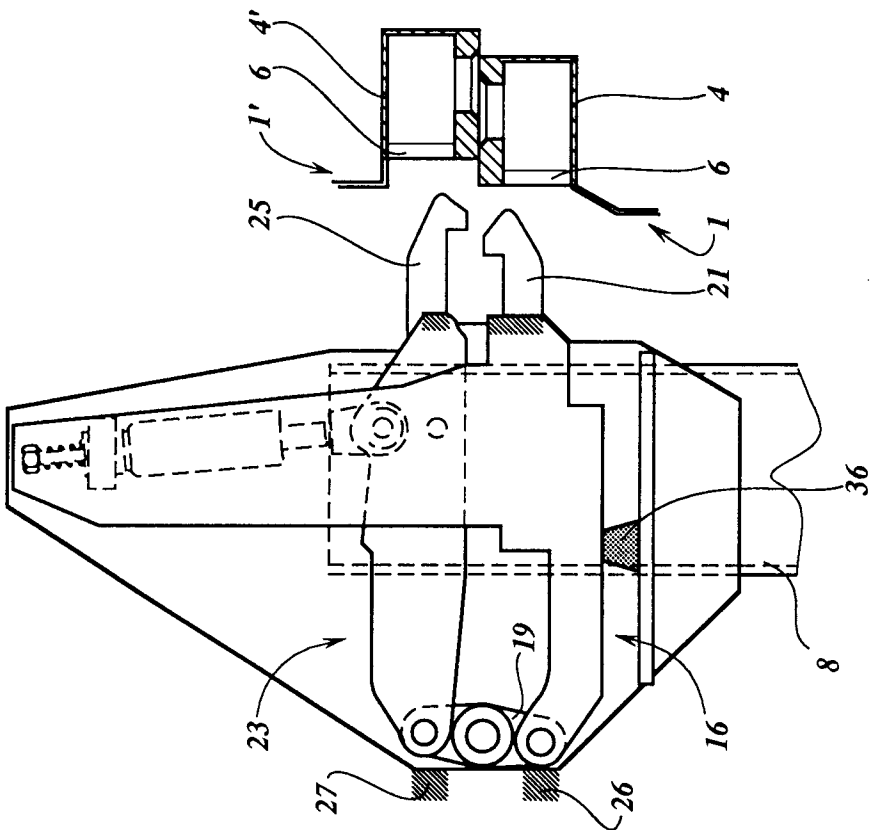


Fig. 10



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EUROPEAN SEARCH REPORT

Application Number
EP 94 20 2192

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	DE-A-37 41 714 (ASEA BROWN BOVERI AG) * column 4, line 14 - line 60; figures 1,2 *	1	B66F9/18
A	idem ---	6,8	
A	PATENT ABSTRACTS OF JAPAN vol. 17, no. 233 (M-1407) 12 May 1993 & JP-A-04 361 984 (YAMATOMI SANGIYOU) 15 December 1992 * abstract * -----		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B66F B66C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 20 September 1994	Examiner Beernaert, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			