

【DESCRIPTION】**【Invention Title】**

ADAPTOR FOR ELECTRONIC COMPONENT TESTING HANDLER

【Technical Field】

5 The present invention relates to an adaptor for an electronic component testing handler.

【Background Art】

Electronic components (e.g., semiconductor devices, wafers, solid-state drives (SSDs), etc.) produced are tested
10 by means of a tester and sorted into good products and defective products, so that only the good products are shipped.

The electronic components are tested in a state of being electrically connected to the tester, and in this case,
15 equipment for connecting the electronic components to the tester so that the electronic components can be tested is called an electronic component testing handler (hereinafter, referred simply to as 'handler').

The handler is designed and manufactured according to
20 the development of new electronic components, and furthermore, various studies for the stabilization of the handler are made.

Recently, an SSD as a large-sized electronic component on which various electronic devices are mounted has been widely prevailed.

25 When a small number of SSDs are produced because of low demand for the SSDs, the SSDs are electrically connected to the tester and released from the connected state by means of manual works, but as the demand for the SSDs drastically increases, it is hard to perform the testing manually.

30 However, the thicknesses, structures, and weights of the SSDs are different from those of the conventional electronic components, so that it is impossible to apply the

conventional handler to the SSDs to be tested. Accordingly, handlers adequate for testing large-sized electronic components such as SSDs are developed and disclosed in Korean Patent Application Laid-open Nos. 10-2019-0050483 and 10-2019-0061291.

The SSDs may have various sizes according to the types of electronic devices mounted thereon or the dedicated purposes thereof, and accordingly, handlers for testing the electronic components with such various sizes are required. However, the handlers are high-priced and big in size, and accordingly, there is a need to develop a technology in which the electronic components with various sizes can be tested through a single handler in consideration of a production cost and an installation place of the handler.

So as to test the electronic components with different sizes, further, the parts corresponding to the size of the corresponding electronic component have to be replaced, and even if there is no need to perform the replacement of the parts, downtime is required to supply a new electronic component. Accordingly, the workability of the handler and the tester becomes deteriorated, and labor losses increase, so that there is a need for a handler having no separate downtime even upon one-cycle operation or continuous operations.

In the case of semiconductor devices as products with mass production in small variety, a test tray on which hundreds of semiconductor devices are loaded is provided, and the semiconductor devices are grasped by a plurality of pickers and thus inserted into inserts of the test tray. In such a system, precise positions of the semiconductor devices are taken by the inserts, and the semiconductor devices are held in position in a process of being connected to the

tester, so that even if the precision in position becomes deteriorated, it does not matter.

However, the electronic component such as the SSD with various electronic devices inclusive of semiconductor devices mounted thereon is small-quantity produced in large variety corresponding to the diversity of application apparatuses, and further, the electronic component has to be subjected to various types of tests. In this case, all of the testers do not have the test sockets existing in the same positions as one another, and accordingly, a high-priced test tray and a handler corresponding to the test tray have to be manufactured and prepared according to the types of electronic components or the types of the testers. It is found through past studies that the connection of the electronic component to the test socket in a state where the electronic component is directly grasped by grippers, without any consideration for the above-mentioned requirements, causes serious problems.

For example, various types of the electronic components have various lengths and widths, and even in the case of the same types of electronic components, it is hard to make the electronic components having the same size as one another because of machining errors generated according to manufacturing characteristics. If the electronic component is grasped by the grippers, without any consideration for the above-mentioned situation, it may be lost due to the grasping failure by the grippers or damaged due to too strong pressurizing force of the grippers. Of course, even if the grippers are controlled to grasp the electronic component well, the electronic component may be twisted or turned when grasped according to portions grasped thereof or the grasping strength of the grippers, so that it is checked that it is

hard to allow the electronic component grasped by the grippers to come into precise contact with the test socket. To solve such problems, precise control of a driver is needed, and a driving shaft has to be substantially long so as to correspond to all types of electronic components. Further, there is a need to use a high-priced motor that is capable of controlling torques by situation to prevent the electronic component from being damaged, twisted, or undemandedly turned. However, this causes the equipment to become bulky and requires high production cost, thereby having no effectiveness. So as to achieve precise contacts of the electronic components, further, auto-teaching has to be performed to set accurate grasping positions of the electronic components by the grippers, which undesirably needs enormous costs and high technologies.

Generally, SSDs have the same widths as one another in the machining error range, irrespective of their types, but they have different lengths by type according to the number of electronic devices mounted thereon or the sizes of the electronic devices.

A compatible handler equipped with an adaptor is disclosed in Korean Patent Application Laid-open No. 10-2020-0073725 (hereinafter, referred to as 'prior application') as filed by the same applicant as the invention. The adaptor serves as a carrier for supplying an electronic component to a tester to allow the handler to treat various types of electronic components with different sizes, thereby improving the compatibility of the handler.

The most important requirements for an adaptor are the following.

Firstly, the adaptor has to appropriately grasp both ends of all types of SSDs with widths in error ranges caused by manufacturing tolerances.

Secondly, the adaptor has to grasp all types of SSDs being in general length ranges the electronic components can have (in the range from the SSD with the shortest length to the SSD with the longest length).

Thirdly, the adaptor has to have a structure in which the SSD is accurately seated. In this case, the structure represents the parts around the adaptor, but it represents the parts built in the adaptor. If the SSD is defectively seated on the adaptor, the defective seating causes the failure in appropriate electrical connection between the SSD and the tester in the future.

Lastly, the posture of the SSD seated onto the adaptor has to be accurately kept. Generally, all kinds of operating shocks are applied to the handler, and the adaptor has to move in a state of seating the electronic component thereonto. However, if the seated state of the SSD is not kept appropriately due to the operating shocks or the fluctuations of the SSD during the movement of the adaptor, the electrical connection between the SSD and the tester becomes defective.

Accordingly, there is a need to continuously develop a new adaptor in consideration of the above-mentioned requirements.

【Disclosure】

【Technical Problem】

Accordingly, the present invention has been made to solve the above-mentioned problems occurring in the related art, and it is an object of the present invention to provide an adaptor for an electronic component testing handler that is capable of appropriately grasping various electronic

components, irrespective of manufacturing tolerances or lengths in error ranges of the electronic components.

It is another object of the present invention to provide an adaptor for an electronic component testing handler that
5 is capable of accurately seating an electronic component thereonto and continuously keeping the seated state appropriately.

【Technical Solution】

To accomplish the above-mentioned objects, according to
10 the present invention, an adaptor for an electronic component testing handler may include: a pair of grasping levers located to face each other and linearly moving in a direction along which a distance therebetween becomes short or long to thus grasp both ends of the rear end portion of an electronic
15 component or release the grasping state; an installation frame for installing the pair of grasping levers to allow the pair of grasping levers to linearly move; a distance control mechanism disposed on the installation frame to apply a control force to the pair of grasping levers so that the pair
20 of grasping levers moves to the direction along which the distance therebetween becomes long; and operating members for applying pressurizing forces to the pair of grasping levers in the direction along which the distance between the grasping levers becomes short so that if the control force
25 applied to the pair of grasping levers from the distance control mechanism is removed, the pair of grasping levers moves to the direction along which the distance therebetween becomes short, wherein the grasping levers each have a guide groove formed long in forward and backward directions on the
30 surface facing each other to grasp both ends of the electronic component and guide forward and backward movements of the electronic component.

The distance control mechanism may be disposed linearly movable in forward and backward directions thereof on the installation frame and may include a control part having both ends coming into contact with the grasping levers so that if
5 the distance control mechanism moves backward by means of an external force, the control part applies the control force to the grasping levers in the direction along which the distance between the grasping levers becomes long, and if the distance control mechanism moves forward by means of the removal of
10 the external force, the control part releases the control force applied to the grasping levers.

The grasping levers each may have operating grooves formed on the surfaces facing each other, each operating groove having a slant surface so that the operating groove
15 becomes low in depth toward the rear side thereof, and the control part may have protruding portions protruding outward from both left and right sides thereof and thus corresponding to the operating grooves so that the protruding portions come into contact with the slant surfaces of the operating grooves
20 to allow the distance between the grasping levers to be varied according to the position of the control part.

The operating members may be formed of elastic members each having one side supported against the installation frame and the other side coming into contact with the grasping
25 levers.

The installation frame may have at least one or more position setting protrusions protruding from both left and right sides of the front end portion thereof and thus inserted into position setting grooves of a test hand for
30 moving the adaptor.

The installation frame may have an accommodation groove formed on the front end portion thereof to accommodate the

front end portion of the electrical component therein and support projections formed on left and right walls constituting the accommodation groove to support both sides of the front end portion of the electronic component, so that
5 the front end portion of the electronic component may be inserted between the left and right walls constituting the accommodation groove, while being supported against the support projections.

10 A seating space in which the guide grooves and the accommodation groove are included may be open in the forward and backward directions thereof.

Each guide groove may include a horizontal maintaining section in which the electronic component grasped in a lying posture is maintained horizontally on level, a width
15 increasing section increasing in width toward the forward direction from the front end of the horizontal maintaining section, and an open section having at least the same width as the front end of the width increasing section or a width more increased than the width increasing section.

20 The adaptor may further include a base member having a pair of base protrusions protruding therefrom to support the underside of the electronic component, the base protrusions having base projections protruding therefrom to prevent the electronic component seated in the lying posture from
25 escaping downward, and the pair of grasping levers each have a through groove passing the corresponding base protrusion therethrough.

The installation frame may have at least one or more position fixing grooves formed on both left and right sides
30 thereof to insert position fixing pins of a mounting stand for mounting the adaptor thereinto.

【Advantageous Effects】

According to the present invention, the adaptor for the electronic component testing handler has the following advantages.

5 Firstly, even if there is a manufacturing tolerance in the manufacturing process of the electronic component, the adaptor can seat the electronic component thereonto, while appropriately grasping the electronic component thereby.

10 Secondly, the electronic components with various lengths can be appropriately seated onto the adaptor of the present invention, thereby improving the compatibility of the electronic component testing handler.

15 Thirdly, the grasping levers can tightly grasp the electronic component by means of the elastic members, and the electronic component can be supported by means of the guide grooves and the stepped structures of the support projections even in the process of changing the posture thereof, so that the seated state of the electronic component can be appropriately kept.

20 Lastly, the rear end portion of the electronic component can be precisely and flatly kept in the horizontal maintaining sections of the guide grooves, thereby minimizing the occurrence of the failure in the electrical connection between the electronic component and the tester and thus improving the reliability of the handler.

25 **【Description of Drawings】**

FIG. 1 is a perspective view showing an electrical connection structure between an electronic component and a tester.

30 FIG. 2 is a schematic plan view showing an electronic component testing handler to which an adaptor according to the present invention is applied.

FIG. 3 is a perspective view showing the handler of FIG. 2.

FIG. 4 is a perspective view showing the adaptor according to the present invention.

5 FIG. 5 is an exploded perspective view showing the adaptor of FIG. 4.

FIG. 6 is a perspective view showing a grasping lever of the adaptor of FIG. 4.

10 FIG. 7 is a sectional view showing a guide groove formed in the grasping lever of FIG. 6.

FIG. 8 is a sectional view showing an operation of the guide groove of FIG. 7.

FIG. 9 is a perspective view showing a relation between the adaptor of FIG. 4 and a test hand.

15 **【Mode for Invention】**

The present invention is disclosed with reference to the attached drawings wherein for the brevity of the description, the repeated explanation on the corresponding parts will be avoided.

20 **<Explanation of electrical connection between an electronic component and a tester>**

A handler to which an adaptor according to the present invention is applied is more appropriately used in the case where a contact terminal portion of an electronic component
25 such as an SSD is inserted into a test slit of a tester.

For example, as shown in FIG. 1, a tester has a plurality of test slits S, and a contact terminal portion T of an electronic component ED is inserted into the corresponding test slit S, so that the electronic component
30 ED and the tester are electrically connected to each other.

<Brief explanation of a configuration of a handler>

FIG. 2 is a schematic plan view showing an adaptor for use in an electronic component testing handler (hereinafter, referred to as "adaptor") according to the present invention, and FIG. 3 is a perspective view showing the handler HR of FIG. 2.

According to the present invention, the handler HR includes a connection part CP, a stacker part SP, and a transfer apparatus TA.

The connection part CP serves to withdraw electronic components ED to be tested from customer trays and thus supply them to the testers or to collect the electronic components ED tested from the testers and thus load them onto the customer trays. The adaptor according to the present invention is used in the connection part CP.

The stacker part SP serves to store the customer trays brought into the handler HR to supply the customer trays on which the electronic components ED to be tested are loaded to the connection part CP or collect the customer trays on which the electronic components ED tested are loaded from the connection part CP and thus store them therein before they are taken out of the handler HR. Further, the stacker part SP serves to supply the stored customer trays on which the electronic components ED to be tested are loaded to the transfer apparatus TA or collect the customer trays on which the electronic components ED tested are loaded from the transfer apparatus TA.

The transfer apparatus TA serves to transfer the customer trays between the connection part CP and the stacker part SP. In specific, the customer trays on which the electronic components ED to be tested are loaded are transferred from the stacker part SP to the connection part CP through the transfer apparatus TA, and the customer trays

on which the tested electronic components ED are loaded are transferred from the connection part CP to the stacker part SP through the transfer apparatus TA.

<Explanation of schematic flow of an electronic component relating to the adaptor>

An explanation of the handler HR has been given in detail with reference to the prior application, and accordingly, the handler HR relating to the adaptor according to the present invention will be described briefly below.

In a state where the adaptor is seated onto a mounting stand, a moving hand (not shown) withdraws the electronic component ED from the customer tray CT and seats it onto the adaptor. In this case, an adaptor opener (not shown) opens the adaptor to allow the moving hand to seat the electronic component ED onto the adaptor.

The adaptor onto which the electronic component ED is seated moves from a setting position to a grasping position, together with the mounting stand, and then rotates to stand up. A test hand (not shown) grasps the adaptor standing up, moves it, and thus electrically connects the electronic component ED to the tester. After that, if testing for the electronic component ED is completed, the tested electronic component ED is loaded onto the customer tray CT through the opposite operations to the operations mentioned above.

<Explanation of adaptor according to the present invention>

FIG. 4 is a perspective view showing the adaptor 100 according to the present invention, and FIG. 5 is an exploded perspective view showing the adaptor 100 of FIG. 4.

The adaptor 100 according to the present invention includes a pair of grasping levers 111 and 112, an

installation frame 120, a distance control mechanism 130, elastic members 141 to 144, and a base member 150.

The pair of grasping levers 111 and 112 is located to face each other and guided by means of guide bars 125 and 126 of the installation frame 120 so that the grasping levers 111 and 112 linearly move in left and right directions along which a distance therebetween becomes short or long. If the distance between the pair of grasping levers 111 and 112 becomes short, the pair of grasping levers 111 and 112 grasps both ends of the rear end portion of the electronic component ED being in a laying posture. Contrarily, if the distance between the pair of grasping levers 111 and 112 becomes long, the pair of grasping levers 111 and 112 is in an open state where the grasping state for the electronic component ED is released. Accordingly, if it is desired to allow the electronic component ED to be seated or withdrawn onto or from the adaptor 100 by means of the moving hand, the pair of grasping levers 111 and 112 has to be in the open state where the grasping state for the electronic component ED is released.

As shown in FIG. 6, the grasping levers 111 and 112 each have two operating grooves OG formed on the surfaces facing each other.

The operating grooves OG are formed on portions of the grasping levers 111 and 112 coming into contact with the distance control mechanism 130. The two operating grooves OG formed on each grasping lever are formed side by side in forward and backward directions. Each operating groove OG has a slant surface so that it becomes low in depth toward the rear side thereof.

Further, as shown in FIG. 6, the grasping levers 111 and 112 each have a guide groove GG formed long in forward and

backward directions on the surfaces facing each other above the operating grooves OG. The guide grooves GG serve to guide the movement of the electronic component ED in a process of moving the electronic component ED in forward and backward
5 directions (for example, a process of moving the electronic component ED so as to electrically connect the electronic component ED to be tested to the tester or a process of withdrawing the tested electronic component from the tester so as to move it to the adaptor). Furthermore, in the case
10 where the grasping levers 111 and 112 grasp both ends of the rear end portion of the electronic component ED, both ends of the electronic component ED are inserted into the guide grooves GG and thus locked thereonto in upward and downward directions, thereby enabling the guide grooves GG to grasp
15 the electronic component ED.

As shown in FIG. 7, each guide groove GG has a horizontal maintaining section HM, a width increasing section WG, a through hole section TS, and an open section OS sequentially in a direction from the rear side to the front
20 side thereof.

The horizontal maintaining section HM is narrow in width so that it has almost the same thickness as the electronic component ED, and accordingly, it allows a portion where a contact terminal T is located on the rear end portion of the
25 electronic component ED to be maintained horizontally on level, while appropriately grasping both ends of the electronic component ED.

The width increasing section WG increases in width toward the forward direction from the front end of the
30 horizontal maintaining section HM. Even if an area of the electronic component ED excepting a portion suckedly grasped by the moving hand is sagged by means of gravity in a process

of seating the electronic component ED onto the adaptor, accordingly, both ends of the electronic component ED are appropriately grasped by the pair of grasping levers 111 and 112.

5 The through hole section TS is constant in width toward forward and backward directions from the front end of the width increasing section WG, and it corresponds to a width of a through groove TG in forward and backward directions. In this case, both left and right base protrusions of the base
10 member 150 as will be discussed later pass through the through grooves TG of the grasping levers 111 and 112.

The open section OS has at least the same width as the front end of the width increasing section WG or a width more increased than the width increasing section WG.

15 The guide groove GG is open in forward and backward directions.

The guide groove GG as shown in FIG. 7 removes the problems occurring when the adaptor 100 grasps the electronic component ED even in the case where the electronic component
20 ED is bent toward a given direction, as shown in FIG. 8, while allowing the contact terminal T portion of the rear end portion of the electronic component ED to be maintained horizontally on level and thus inserted accurately into the test slit S.

25 The installation frame 120 is provided to supportingly install the pair of grasping levers 111 and 112, the distance control mechanism 130, the elastic members 141 to 144, and the base member 150.

The installation frame 120 has position setting
30 protrusions 121 protruding toward left and right directions from both left and right sides of the front end portion thereof.

The position setting protrusions 121 are inserted into position setting grooves SG formed on the grasping surfaces of a test hand 400 as shown in FIG. 9. In specific, when the test hand 400 grasps the installation frame 120, that is, the adaptor 100, the position setting protrusions 121 are inserted into the position setting grooves SG. Even though an external force is applied to the adaptor 100 in forward and backward directions in the state where the test hand 400 grasps the adaptor 100, the installation frame 120 is fixed in position, which causes the adaptor 100 to be fixed in position. In this case, one or more position setting protrusions 121 are formed. Of course, the position setting grooves may be formed on the installation frame 120, whereas the position setting protrusions 121 may be formed on the test hand 400.

Further, the installation frame 120 has the guide bars 125 and 126 long in left and right directions thereof to guide the linear movement of the pair of grasping levers 111 and 112 in the left and right directions thereof. Of course, the grasping levers 111 and 112 have through holes TH adapted to insertedly pass the guide bars 125 and 126 therethrough.

In addition, the installation frame 120 has an accommodation groove AG formed on the front end portion thereof to accommodate the front end portion of the electronic component ED therein. Further, the installation frame 120 has support projections J formed on left and right walls constituting the accommodation groove AG to support both sides of the front end portion of the electronic component ED. As a result, while both sides of the front end portion of the electronic component ED are supported against the support projections J, they are precisely inserted and placed between both walls, thereby enabling the electronic

component ED to be appropriately seated and kept in the seated state. Accordingly, the electronic component ED can be appropriately placed even in a state of a lying posture, and the electronic component ED can be appropriately placed even
5 in a state where the lying posture turns into a standing posture through posture conversion.

In the same manner as the guide grooves GG, the accommodation groove AG is open in forward and backward directions thereof. This means that a seating space of the
10 adaptor 100 in which the electronic component ED is seated is open in forward and backward directions thereof. In specific, the seating space in which the guide grooves GG and the accommodation groove AG are included is open in the forward and backward directions thereof. Accordingly, the electronic
15 components ED having various lengths may be seated onto the seating space over the guide grooves GG and the accommodation groove AG.

The distance control mechanism 130 is disposed on the installation frame 120 and applies a control force to the
20 pair of grasping levers 111 and 112 to move the pair of grasping levers 111 and 112 to a direction along which a distance between the pair of grasping levers 111 and 112 becomes long. To do this, the distance control mechanism 130 is disposed movable in forward and backward directions on the
25 installation frame 120 and includes a control part 131, a push plate 132, and transfer bars 133.

The control part 131 has two rolling rollers R located on both sides of the left and right sides thereof, and each rolling roller R forms protruding portions protruding outward
30 both sides of the left and right sides thereof.

The rolling rollers R are provided on the corresponding positions to the operating grooves OG. Accordingly, while

portions of the rolling rollers R are inserted into the operating grooves OG, the rolling rollers R come into contact with the surfaces forming the operating grooves OG. In specific, both ends of the control part 131 of the distance control mechanism 130 come into contact with the grasping levers 111 and 112 through the rolling rollers R. As the distance control mechanism 130 moves backward, the rolling rollers R come into contact with the slant surfaces of the operating grooves OG that become low in depth, and accordingly, the distance control mechanism 130 naturally applies the control force to the grasping levers 111 and 112 in the direction along which the distance between the grasping levers 111 and 112 becomes long.

Contrarily, as the distance control mechanism 130 moves forward, the rolling rollers R come into contact with the slant surfaces of the operating grooves OG that become high in depth, and accordingly, the distance control mechanism 130 naturally releases the control force applied to the grasping levers 111 and 112.

The push plate 132 receives an external force of the adaptor opener (not shown) in a forward direction applied to the distance control mechanism 130. In specific, the adaptor opener applies a force in a backward direction through the push plate 132 to supply a driving force moving the distance control mechanism 130 backward, and through the driving force of the adaptor opener, the distance control mechanism 130 moves backward.

The transfer bars 133 whose front ends are fixedly coupled to the push plate 132 and rear ends are fixedly coupled to the control part 131 serve to transfer the external force of the adaptor opener with which the push plate 132 pushes backward to the control part 131.

The elastic members 141 to 144 are disposed to allow one side to come into contact with the installation frame 120 and the other side to come into contact with the grasping levers 111 and 112. Accordingly, the elastic members 141 to 144
5 apply elastic forces to the grasping levers 111 and 112 in the direction along which a distance between the grasping levers 111 and 112 becomes short. If the control force applied to the grasping levers 111 and 112 through the distance control mechanism 130 is removed, as a result, the
10 grasping levers 111 and 112 move in the direction along which a distance therebetween becomes short by means of the elastic forces of the elastic members 141 to 144, thereby grasping the electronic component ED. Accordingly, the elastic members 141 to 144 serve as operating members for generating
15 pressurizing forces capable of grasping the electronic component ED and keeping the generated pressurizing forces, and furthermore, they serve to close the adaptor 100. Of course, motors, cylinders, or the like may be considered as the operating members, but so as to handle all widths of
20 electronic components having machining errors in a given range, without any separate setting, it is most desirable that the elastic members such as springs have to be provided as the operating members.

The elastic members 141 to 144 determine the distance
25 between the grasping levers 111 and 112 according to compressed degrees thereof. This means that the elastic members 141 to 144 serve as variable members for varying a grasping width (an isolation width between the grasping levers 111 and 112 for grasping the electronic component ED)
30 between the grasping levers 111 and 112. In specific, the grasping levers 111 and 112 can grasp the electronic

components ED with various widths in accordance with the compressed degrees of the elastic members 141 to 144.

The base member 150 serves to prevent the electronic component ED seated to the lying posture from escaping
5 downward therefrom when the grasping levers 111 and 112 are in a state of releasing the grasping state for the electronic component ED. Accordingly, the base member 150 has the base protrusions protruding upward from both left and right sides thereof, and the base protrusions include base projections
10 151 protruding therefrom to support the underside of the electronic component ED.

The base member 150 is approximately 'J' or 'U'-shaped and thus fixed to the installation frame 120. Further, the base protrusions protruding upwardly from both left and right
15 sides of the base member 150 pass through the through grooves TG, and the base projections 151 protrude from tops of the base protrusions. According to the present invention, for example, the base member 150 is formed integrally with the installation frame 120, but in some cases, the base member
20 150 may be detachably fixed to the installation frame 120 through fixing means.

Continuously, the operation of the adaptor 100 will be explained below.

As an initial ED or an ED to be tested is placed, the
25 adaptor 100 corresponding to the size of the electronic component ED to be tested is seated onto the mounting stand by a worker. After that, if it is desired that the electronic component ED withdrawn from the customer tray is seated onto the adaptor 100 by means of the moving hand, the adaptor
30 opener pushes the distance control mechanism 130 backward. In this case, the installation frame 120 is fixed to the mounting stand by means of position fixing grooves FG, so

that only the distance control mechanism 130 moves backward by means of the pressurizing force of the adaptor opener. In this process, the rolling rollers R move backward in the state of coming into contact with the slant surfaces of the operating grooves OG, and accordingly, the distance control mechanism 130 applies the control force to the grasping levers 111 and 112 in the left and right directions to allow a distance between the grasping levers 111 and 112 to become long, so that the adaptor 100 becomes open.

If the adaptor 100 has been open, the electronic component ED is seated onto the adaptor 100 by means of the moving hand. In this case, the rear end portion of the electronic component ED is placed on the base projections 151 of the base member 150, and the front end portion of the electronic component ED is placed on the support projections J, so that the electronic component ED is placed on the adaptor 100 in a state of being accurately maintained horizontally on level.

Next, if the moving hand releases the grasping state for the electronic component ED and moves to another position, the adaptor opener removes the external force applied to the distance control mechanism 130. As a result, the distance between the grasping levers 111 and 112 becomes short by means of the elastic forces of the elastic members 141 to 144, and the distance control mechanism 130 is pushed forward. In this process, both left and right ends of the electronic component ED are inserted into the guide grooves GG of the grasping levers 111 and 112, so that the electronic component ED is completely grasped by the adaptor 100.

In this case, the rear end portion of the electronic component ED is maintained flattenedly by means of the shapes of the guide grooves GG. Further, even though the electronic

component ED is somewhat bent, it can be appropriately grasped by the grasping levers 111 and 112 through the guide grooves GG. Moreover, even if there is a large tolerance in the width of the electronic component ED, the width of the accommodation groove AG is sufficiently large, so that the rear end portion of the electronic component ED is prevented from being fitted to the walls constituting the accommodation groove AG.

Further, the adaptor 100 seated onto the mounting stand stands vertically. In this case, the lower end portion of the electronic component ED standing vertically is supported against the guide grooves GG and the wall surfaces constituting the support projections J, so that the seated state of the electronic component ED is appropriately kept.

The adaptor 100 standing vertically is grasped by the test hand 400, and in this process, the position setting protrusions 121 are inserted into the position setting grooves SG. Accordingly, the adaptor 100 is grasped by the test hand 400 so that it can be placed on an accurate setting position. Further, the installation frame 120 is fixedly maintained in position even under the external force applied to the adaptor 100 in the future, which finally allows the adaptor 100 to be fixedly maintained in position.

After that, if the test hand 400 moves the adaptor 100 toward the tester to allow a position between the adaptor 100 and the test slit S to be accurately set, an opening element of the test hand 400 slightly pushes the distance control mechanism 130 to allow the distance between the grasping levers 111 and 112 to become slightly long, and in this state, a connection element of the test hand 400 pushes the electronic component ED toward a test socket to allow the rear end portion of the electronic component ED where the

contact terminal T exists to be inserted into the test slit S of the test socket.

Further, if the testing is done, the adaptor 100 operates to a state of fixing the electronic component ED thereto, and next, the electronic component ED is withdrawn from the test slit S by means of the test hand 400. The ED withdrawn moves through the opposite processes to the above-mentioned processes and is finally loaded onto the customer tray CT.

10 As mentioned above, the foregoing description of the embodiments of the invention has been presented for the purpose of illustration; it is not intended to be exhaustive or to limit the invention to the precise forms disclosed. Persons skilled in the relevant art can appreciate that many
15 modifications and variations are possible in light of the above teachings. It is therefore intended that the scope of the invention be limited not by this detailed description, but rather by the claims appended hereto.

【CLAIMS】**【Claim 1】**

An adaptor for an electronic component testing handler,
comprising:

5 a pair of grasping levers located to face each other and
linearly moving in a direction along which a distance
therebetween becomes short or long to thus grasp both ends of
the rear end portion of an electronic component or release
the grasping state;

10 an installation frame for installing the pair of
grasping levers to allow the pair of grasping levers to
linearly move;

 a distance control mechanism disposed on the
installation frame to apply a control force to the pair of
15 grasping levers so that the pair of grasping levers moves to
the direction along which the distance therebetween becomes
long; and

 operating members for applying pressurizing forces to
the pair of grasping levers in the direction along which the
20 distance between the grasping levers becomes short so that if
the control force applied to the pair of grasping levers from
the distance control mechanism is removed, the pair of
grasping levers moves to the direction along which the
distance therebetween becomes short,

25 wherein the grasping levers each have a guide groove
formed long in forward and backward directions on the surface
facing each other to grasp both ends of the electronic
component and guide forward and backward movements of the
electronic component.

30 **【Claim 2】**

The adaptor according to claim 1, wherein the distance
control mechanism is disposed linearly movable in forward and

backward directions thereof on the installation frame and comprises a control part having both ends coming into contact with the grasping levers so that if the distance control mechanism moves backward by means of an external force, the control part applies the control force to the grasping levers in the direction along which the distance between the grasping levers becomes long, and if the distance control mechanism moves forward by means of the removal of the external force, the control part releases the control force applied to the grasping levers.

【Claim 3】

The adaptor according to claim 2, wherein the grasping levers each have operating grooves formed on the surfaces facing each other, each operating groove having a slant surface so that the operating groove becomes low in depth toward the rear side thereof, and the control part has protruding portions protruding outward from both left and right sides thereof and thus corresponding to the operating grooves so that the protruding portions come into contact with the slant surfaces of the operating grooves to allow the distance between the grasping levers to be varied according to the position of the control part.

【Claim 4】

The adaptor according to claim 1, wherein the operating members are formed of elastic members each having one side supported against the installation frame and the other side coming into contact with the grasping levers.

【Claim 5】

The adaptor according to claim 1, wherein the installation frame has at least one or more position setting protrusions protruding from both left and right sides of the

front end portion thereof and thus inserted into position setting grooves of a test hand for moving the adaptor.

【Claim 6】

5 The adaptor according to claim 1, wherein the installation frame has an accommodation groove formed on the front end portion thereof to accommodate the front end portion of the electrical component therein and support projections formed on left and right walls constituting the accommodation groove to support both sides of the front end
10 portion of the electronic component, so that the front end portion of the electronic component is inserted between the left and right walls constituting the accommodation groove, while being supported against the support projections.

【Claim 7】

15 The adaptor according to claim 6, wherein a seating space in which the guide grooves and the accommodation groove are included is open in the forward and backward directions thereof.

【Claim 8】

20 The adaptor according to claim 1, wherein each guide groove comprises a horizontal maintaining section in which the electronic component grasped in a lying posture is maintained horizontally on level, a width increasing section increasing in width toward the forward direction from the front end of the horizontal maintaining section, and an open
25 section having at least the same width as the front end of the width increasing section or a width more increased than the width increasing section.

【Claim 9】

30 The adaptor according to claim 1, further comprising a base member having a pair of base protrusions protruding therefrom to support the underside of the electronic

component, the base protrusions having base projections protruding therefrom to prevent the electronic component seated in the lying posture from escaping downward, and the pair of grasping levers each have a through groove passing
5 the corresponding base protrusion therethrough.

【Claim 10】

The adaptor according to claim 1, wherein the installation frame has at least one or more position fixing grooves formed on both left and right sides thereof to insert
10 position fixing pins of a mounting stand for mounting the adaptor thereinto.