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(54) **An apparatus for engraving images and its adaptor for holding the piece to be engraved**

Bildgraviereinrichtung und entsprechender Adapter zur Halterung des zu gravierenden Werkstückes

Dispositif pour graver des images et adaptateur correspondant pour maintenir la pièce à graver

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(73) Proprietor: **Semco Corporation**
**Chuo-ku**
**Tokyo 103-0027 (JP)**

(72) Inventor: **Hoshiyama, Yuichi**
**Room 802,2**
**Sapporo City**
**Hokkaido (JP)**

(74) Representative: **Power, Philippa Louise**
**Frank B. Dehn & Co.**
**St Bride's House**
**10 Salisbury Square**
**London**
**EC4Y 8JD (GB)**

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- **PATENT ABSTRACTS OF JAPAN vol. 001, no. 024 (M-012), 26 March 1977 (1977-03-26) -& JP 51 138982 A (TOKYO JUKI IND CO LTD), 30 November 1976 (1976-11-30)**
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## Description

**[0001]** This invention relates to an apparatus for engraving images and its adaptor, and more particularly, an apparatus for engraving images such as photographs of faces, addresses, names, autographs or signatures, images for identifying one's identity, or the images from a digital camera, scanner or other information taken from a computer through a network onto identification cards such as passports, drivers' licenses, employee certificates or credit cards, and its adaptor.

**[0002]** There have been proposed various engraving apparatuses (for example, US Patent No. 5,232,321, Japanese Patent publication Nos. 115676/1989, 24395/1993 and Japanese Utility Model Publication No. 201762/1988)

**[0003]** According to the conventional apparatus for engraving images on passports, driver's licenses, employee certificates or credit cards, a magnetic layer is coated on a surface of a plastic card or synthetic paper, and if necessary, a given thin colored layer is coated on a surface of the magnetic layer or synthetic paper, on which a given magnetic picture or image is engraved by a cutting head or a stylus.

**[0004]** When making passports, driver's licenses, employee certificates, credit cards or other products of this type, photographs of faces, addresses, names, signatures, or other images containing information regarding an identity, etc. are engraved onto the products together with data such as the position of an employee, ID number etc. in order to increase the security of the engraved cards and to avoid their forgery.

**[0005]** Engraving data sources can be roughly classified into image data and text data, which are displayed on a personal computer as independent data, and if necessary, they are combined in the personal computer.

**[0006]** In accordance with the conventional engraving apparatus, independent character data and independent image data are inputted by an independent controller.

**[0007]** In addition, it takes a long time and is expensive to develop software and data, and it is also necessary for a user to get used to the method of using the conventional engraving apparatus, thus increasing the burden for the user and making it difficult to transmit, edit and compress the data and causing much confusion and trouble.

**[0008]** The biggest disadvantage of the conventional engraving apparatus is that when making a personal card, it is necessary to make the engraving apparatus file each set of data such as a face picture, address, name, or signature of one person independently and to then designate all of the files and to collect and integrate the data from the files.

**[0009]** For the engraving data such as a face picture, address, name, signature and the images for engraving identifying information etc., there are plastic cards in addition to the magnetic or non-magnetic cards.

**[0010]** There are many different kinds of the magnetic, non-magnetic cards or plastic cards such as standard sized, large-sized, passport size and other sized cards.

**[0011]** Accordingly, it is necessary to make many different types of the expensive engraving apparatuses to handle the different cards.

**[0012]** Further, it is likely that vibrations of an engraving head of the conventional engraving apparatus cause the engraving apparatus itself to oscillate thus causing incorrect engraving.

**[0013]** A principal object of this invention at least in its preferred forms is to provide an apparatus for engraving images which comprises a personal computer, a controller, an X-axis pulse motor driver, a Y-axis pulse motor driver, an X-axis pulse motor, a tilt motor driver, a Z-axis head motor having a minute ΔY-axis driver, a stylus and a vacuum pump whereby photographs of faces, addresses, names, autographs, the images for engraving information identifying one's identity, the images from a digital camera, scanner or other information taken from a computer through a network can be automatically and correctly engraved on identification cards such as passports, drivers' licenses, employee certificates or credit cards.

**[0014]** Another object of this invention at least in its preferred forms is to provide an apparatus for engraving images whereby a side-by-side comparison of the original image with an engraved image is not required for an operator so that erroneous inputting of information or wrong engraving of another person can be substantially avoided.

**[0015]** Another object of this invention at least in its preferred forms is to provide an apparatus for engraving images comprising a vibration-preventing unit whereby smooth and correct engraving can be easily carried out without causing vibration.

**[0016]** Another object of this invention is to provide an apparatus for engraving images, which is simple in construction so as to facilitate easy assembly, operation and maintenance.

**[0017]** Another object of this invention at least in its preferred forms is to provide an apparatus for engraving images for a passport, identity card and the like whereby various different kinds of adaptors for holding the item to be engraved are prepared in advance in order to exchange the desired adaptors for different types of item without having to use different kinds of engraving apparatus for the different items.

**[0018]** Another object of this invention at least in its preferred forms is to provide an adaptor for use in an apparatus for engraving images on identification cards, which comprises a rectangular table having a positioning groove and a ridge, which are respectively provided around and near a peripheral edge portion thereof, and a plurality of small air openings provided through the table at the given positions whereby an item to be engraved can be sucked towards and located on the table correctly.

**[0019]** Still another object of this invention at least in its preferred forms is to provide an adaptor for use in an apparatus for engraving images which comprises a first

rectangular table, a second rectangular table which is rigidly secured at a given obtuse angle to the first rectangular table, and a third rectangular table which is pivotally connected to the second rectangular table so that an item to be engraved can be sucked towards and located on the second rectangular table correctly.

**[0020]** Viewed from one aspect, the invention provides an apparatus for engraving images which comprises means for supporting an item to be engraved and engraving means, characterised in that said means for supporting an item to be engraved comprises: a stand comprising a planar surface and a pair of legs rigidly mounted on a base support provided by a base plate having a given thickness and a width, wherein said each leg has an opening provided through a central portion thereof; a spindle penetrated through the openings of said legs supported by and extending between said legs parallel to said planar surface; and a pair of bearings mounted slidably on said spindle to reciprocate, wherein coil springs are provided on the spindle between each said leg and each said bearing to reduce the effect of vibration of the apparatus on a support surface for receiving the item to be engraved, said support surface being provided by a second base plate integrally mounted on the top portion of each bearing; said apparatus further comprising: a controller connected to a personal computer; a pair of driving and driven pulleys provided on a pair of blocks mounted on the second base plate; a timing belt engaged on said pulleys;

a Π-shaped rail mounted on the second base plate; an X-axis feeder provided on said timing belt and said Π-shaped rail; an X-axis pulse motor driver and an X-axis pulse motor connected to said X-axis feeder; a Y-axis driver connected to the controller; a Y-axis pulse motor driver connected to a Y-axis pulse motor; a Z-axis driver provided on a head base, which is a top portion of the Y-axis driver; a Z-axis driver including a Z-axis head driver and a Z-axis head; a stylus provided at a lower portion of the Z-axis head; a minute ΔY-axis driver having a Y-axis head driver and a ΔY-axis head connected to said stylus; and a tilt driver comprising a tilt pulse motor driver and a tilt pulse motor disposed at a front portion of the Y-axis driver in such a manner that when an adaptor is tilted rearwards, an item to be engraved such as a passport P or an identification card ID can be easily placed on the adaptor.

**[0021]** Preferred embodiments of the invention will now be described, by way of example only, and with reference to the accompanying drawings in which:

FIG. 1 is a perspective view of an embodiment of an apparatus according to the invention for engraving images or information identifying one's identity on a passport, or the like;

FIG. 2 is a schematic front view of the apparatus for engraving images shown in FIG. 1;

FIG. 3 is an enlarged element schematic perspective view of the apparatus for engraving images shown in FIG. 1;

FIG. 4 is an enlarged schematic front view of a driving unit of the apparatus having a vibration-preventing unit and an X-axis feeder as shown in FIGS. 2 and 3;

FIG. 5 is an enlarged schematic sectional view showing the vacuum relationship between an X-axis feeder, an adaptor and an engraved medium shown in FIG. 4;

FIG. 6 is a schematic block diagram of an apparatus for engraving images according to the invention;

FIG. 7 is a schematic front perspective view of an embodiment of an adaptor according to the invention;

FIG. 8 is a schematic perspective view of the adaptor shown in FIG. 7, seen from the rear;

FIG. 9 is a schematic perspective view of an embodiment of an adaptor according to the invention, showing that a third rectangular table is pivotally opened with respect to the second rectangular table;

FIG. 10 is a schematic perspective view of the adaptor shown in FIG. 9, seen from the rear; and

FIG. 11 is a schematic perspective view showing that in use a passport may be held between the second and third rectangular tables.

**[0022]** Referring to the accompanying drawings in which like numerals designate the like parts throughout the several views thereof, an apparatus EG for engraving images is connected to a personal computer PC as shown in FIG. 6.

**[0023]** As particularly shown in FIGS. 2-6, the apparatus EG comprises a base plate 10 having a given thickness and a width, on which a Π-shaped driving stand 12 having a pair of legs 12a, 12a and an upper surface extending between the legs is rigidly mounted.

**[0024]** An opening (not shown) is provided through a central portion of the leg 12a, and a pair of bearings 18, 18, each having an opening (not shown), are made independently.

**[0025]** Both end portions of a spindle 14 is penetrated through the openings of the bearings 18, 18 and the openings of the legs 12a, 12a with a pair of coil springs 16, 16, each being located between a leg 12a and a bearing 18 respectively.

**[0026]** It should be appreciated that the spindle 14 is mounted to extend horizontally and in parallel with the base plate 10 to form a vibration-preventing unit A.

**[0027]** A second base plate 20a is integrally mounted on the top of each bearings 18, 18, a pair of driving and driven pulleys 36 and 34 are provided on a pair of blocks mounted on the second base plate 20a, a timing belt 38 is engaged on these pulleys 36 and 34, an X-axis feeder 30 is provided on the timing belt 38 and a Π-shaped rail 28 extending parallel to the second base plate 20a and supported above it by legs extending downwardly at either end thereof, and an X-axis pulse motor driver 32 and an X-axis pulse motor 34a are connected to the X-axis feeder 30.

**[0028]** A Y-axis driver C that is connected to the controller CR of the engraving apparatus EG comprises a Y-axis pulse motor driver 76 and a Y-axis pulse motor 78.

**[0029]** A Z-axis driver D is provided on a head base, which is a top portion of the Y-axis driver C.

**[0030]** The Z-axis driver D comprises a Z-axis head driver 54, a Z-axis head 56, a stylus 58 provided at a lower portion of the Z-axis head 56, and a minute ΔY-axis driver E having a ΔY-axis head driver 60 and a ΔY-axis head 62 is connected to the stylus 58.

**[0031]** A tilt driver F which is connected to the controller CR comprises a tilt pulse motor driver 64 and a tilt pulse motor 66 which is provided at a front portion of the Y-axis driver C so that when an adaptor 80 is tilted rearwards, an item to be engraved such as a passport P or an identification card ID can be easily placed on the adaptor 80.

**[0032]** Mounted on the adaptor 80 and near the X-axis pulse motor 34a is a vacuum pump 68, an air hose 68a having a small diameter which is mounted to locate near the X-axis pulse motor 34a to work as a dust absorber 74 of the engraved cut dust or scrap.

**[0033]** As shown in FIGS. 5-8, an adaptor 80 of one embodiment includes a rectangular table having a given thickness and width, and it can be put on the feeder 30.

**[0034]** As particularly shown in FIGS. 7 and 8, another end portion of the air hose 68a is put into the air opening 80c from a backside of the positioning rectangular groove 80a which is provided near an outer periphery of the adaptor 80, a depressed rectangular plane 80a' which is defined by the rectangular groove 80a is lowered slightly by about 0.1mm relative to the outer surface of the adaptor 80, and a pair of small air openings 80c, 80c are provided through the adaptor 80 to locate at the upper and lower grooves 80a, 80a, thus sucking out air from behind the adaptor 80 to hold the media such as an identification card ID on the depressed rectangular portion 80a'.

**[0035]** An adaptor 90 of an alternative embodiment for engraving images on a passport P is shown in FIGS. 9-11, in which the adaptor 90 has a holding table 92 and an inclined table 94 which is rigidly secured to one side edge portion of the holding table 92 and a lid plate 98 which is pivotally secured to the other side edge portion of the holding table 92.

**[0036]** More particularly, the holding table 92 has a given thickness and width, and a depressed rectangular plane 92a' which is defined by the rectangular groove 92a and is lowered slightly by about 0.1mm relative to the outer surface of the holding table, and a pair of small air openings 92c, 92c which are provided through the adaptor 90 to locate at the upper and lower grooves 92a, 92a, thus sucking air from behind the adaptor to hold the engraved passport P on the depressed rectangular plane 92a'.

**[0037]** In addition, a pair of positioning ridges 96, 96 are provided on a top and a side portion of the holding table 92 respectively, and a rectangular window 98a is provided through the lid plate 98 in order to correspond with the depressed rectangular plane 92a'.

**[0038]** A pair of clips 94a, 94a are provided at both corner portions of the inclined table 94, and a pair of grips 98c, 98c are mounted at both upper and lower portions of an outer edge portion of the lid plate 98 so that the engraved passport P may be correctly held between the holding table 92 and the lid plate 98 and smooth engraving can be easily carried out without causing vibration.

**[0039]** As explained in the foregoing paragraphs and as particularly shown in FIGS. 7 and 8, the depressed rectangular plane 80a' which is defined by the rectangular groove 80a is lowered slightly by about 0.1 mm, and a pair of small air openings 80c, 80c are provided through the adaptor 80 to locate at the upper and lower grooves 80a, 80a so that media such as an identification card ID can be easily positioned on the depressed rectangular portion 80a' and held on the adaptor 80 by a negative pressure of air (or a vacuum).

**[0040]** It should be appreciated that a suction pump, a pressure sensor, an electromagnetic valve and piping (not shown) are connected to the air hose 68a in order to provide the negative pressure or vacuum required in use.

**[0041]** Like the example of the adaptor 80, the adaptor 90 for engraving images on a passport P comprises a depressed rectangular plane 90a' which is defined by the rectangular groove 90a and is lowered slightly by about 0.1mm, and a pair of small air openings 90c, 90c are provided through the adaptor 90 to locate at the upper and lower grooves 90a, 90a so that the engraved passport P can be disposed on the depressed rectangular portion 90a' to allow a correct and smooth engraving of the engraved passport P.

**[0042]** In operation, the apparatus EG for engraving images on a passport, identification card, or the like is connected to the personal computer PC, an item for engraving such as a magnetic card is manually put onto the adaptor 80 or 90, which is mounted on the X-axis feeder 30, into which one or more images such as a picture of a face, a name, signature, identifying information, etc. or other information data taken from a digital camera, scanner, or other computer through a network are transmitted by an image signal from the controller CR to cause the stylus 58 to be reciprocated rapidly right and left (in a direction of the X-axis), back and forth (in a direction of the Y-axis) and up and down (in a direction of the Z-axis) to engrave the desired images on the media such as a passport, identification card, or the like to a desired depth.

## Claims

1. An apparatus for engraving images which comprises means for supporting an item to be engraved and engraving means, **characterised in that** said means for supporting an item to be engraved comprises: a stand (12) comprising a planar surface and a pair of legs (12A) rigidly mounted on a base support (10) provided by a base plate having a given thick-

ness and a width, wherein said each leg has an opening provided through a central portion thereof; a spindle (14) penetrated through the openings of said legs supported by and extending between said legs parallel to said planar surface; and a pair of bearings (18,18) mounted slidably on said spindle to reciprocate, wherein coil springs (16) are provided on the spindle between each said leg and each said bearing to reduce the effect of vibration of the apparatus on a support surface (20A) for receiving the item to be engraved, said support surface being provided by a second base plate (20a) integrally mounted on the top portion of each bearing; said apparatus further comprising: a controller (CR) connected to a personal computer (PC);
a pair of driving and driven pulleys (34,36) provided on a pair of blocks mounted on the second base plate;
a timing belt (38) engaged on said pulleys;
a Π-shaped rail (28) mounted on the second base plate;
an X-axis feeder (30) provided on said timing belt and said Π-shaped rail;
an X-axis pulse motor driver (32) and an X-axis pulse motor (34a) connected to said X-axis feeder;
a Y-axis driver (C) connected to the controller;
a Y-axis pulse motor driver (76) connected to a Y-axis pulse motor (78);
a Z-axis driver (D) provided on a head base, which is a top portion of the Y-axis driver;
a Z-axis driver including a Z-axis head driver (54) and a Z-axis head (56) ;
a stylus (58) provided at a lower portion of the Z-axis head;
a minute ΔY-axis driver (E) having a Y-axis head driver and a ΔY-axis head connected to said stylus; and
a tilt driver (F) comprising a tilt pulse motor driver (64) and a tilt pulse motor (66) disposed at a front portion of the Y-axis driver in such a manner that when an adaptor (80;90) is tilted rearwards, an item to be engraved such as a passport P or an identification card ID can be easily placed on the adaptor.

**2.** An apparatus as claimed in claim 1, further comprising an adaptor (80;90), which comprises a rectangular table having a given thickness and width which is put on the feeder in use, said rectangular table having a positioning rectangular groove (80a;92a) provided near an outer periphery thereof, said rectangular groove defining a depressed rectangular plane (80a';92a') which is lowered slightly by about 0.1mm with respect to the outer periphery of the rectangular table, a pair of small air openings (80c;92c) provided through the adaptor to locate at the upper and lower ends of the rectangular groove, an air hose being disposed behind said table, one end portion of said air hose being put into the air opening from the rear and another end being connected to a vacuum pump in order to hold the item to be engraved to the adaptor through a negative pressure of air.

**3.** An apparatus as claimed in claim 2, said adaptor further comprising an inclined table (94) which is rigidly secured to one side edge portion of the rectangular table (92) and a lid plate (98) which is pivotally secured to the other side edge portion of the rectangular table, a pair of positioning ridges (96) being provided on a top portion and a side portion of the said rectangular table respectively, a rectangular window (98a) being provided through the lid plate in order to correspond with the depressed rectangular plane (92a'), a pair of clips (94a) being provided at both corner portions of the inclined table and a pair of grips (98c) being mounted at both upper and lower portions of an outer edge portion of the lid plate so that the item to be engraved may be correctly held between the holding table and the lid plate and smooth engraving can be.easily carried out without causing vibration.

**Patentansprüche**

**1.** Vorrichtung zum Gravieren von Bildern mit einem Mittel zum Stützen eines zu gravierenden Gegenstandes und einem Graviermittel, wobei die Vorrichtung **dadurch gekennzeichnet ist, dass** das Mittel zum Stützen eines zu gravierenden Gegenstandes folgende Elemente umfasst:

ein Gestell (12), das eine ebene Fläche und ein Paar von Beinen (12A) aufweist, wobei das Paar von Beinen starr auf einer Basisstütze (10) befestigt ist, die durch eine Basisplatte mit einer gegebenen Dicke und einer Breite bereitgestellt ist, und wobei jedes Bein eine Öffnung aufweist, die einen mittleren Abschnitt des jeweiligen Beines durchsetzt; eine Spindel (14), die die Öffnungen der Beine durchdringt, und die durch die Beine gelagert ist und sich zwischen den Beinen parallel zu der ebenen Fläche erstreckt; und ein Paar von Lagern (18, 18), die verschiebbar zum Hin- und Herbewegen auf der Spindel befestigt sind, wobei Spiralfedern (16) auf der Spindel zwischen jedem Bein und jedem Lager bereitgestellt sind, um den Effekt einer Vibration der Vorrichtung auf einer Stützfläche (20A) zur Aufnahme des zu gravierenden Gegenstandes zu verringern, wobei die Stützfläche durch eine zweite Basisplatte (20a) bereitgestellt ist, die integral auf dem oberen Abschnitt jedes Lagers befestigt ist; die Vorrichtung weist ferner folgende Elemente auf: einen Controller (CR), der mit einem Personal-Computer (PC) verbunden ist; ein Paar von antreibenden und angetriebenen

Riemenscheiben (34, 36), die an einem Paar von Blöcken, die auf der zweiten Basisplatte befestigt sind, bereitgestellt sind;
einen Treibriemen (38), der an den Riemenscheiben eingreift;
ein Π-förmiges Geländer (28), das auf der zweiten Basisplatte angebracht ist;
einen X-Achsen-Zuführer (30), der auf dem Treibriemen und dem Π-förmigen Geländer bereitgestellt ist;
einen X-Achsen-Pulsmotortreiber (32) und einen X-Achsen-Pulsmotor (34a), der mit dem X-Achsen-Zuführer verbunden ist;
einen Y-Achsen-Treiber (C), der mit dem Controller verbunden ist;
einen Y-Achsen-Pulsmotortreiber (76), der mit einem Y-Achsen-Pulsmotor (78) verbunden ist;
einen Z-Achsen-Treiber (D), der auf einer Kopfbasis, die ein oberer Abschnitt des Y-Achsen-Treibers ist, bereitgestellt ist;
einen Z-Achsen-Treiber, der einen Z-Achsen-Kopftreiber (54) und einen Z-Achsen-Kopf (56) beinhaltet;
eine Nadel (58), die an einem unteren Abschnitt des Z-Achsen-Kopfs bereitgestellt ist;
einen Präzisions-ΔY-Achsen-Treiber (E), der einen Y-Achsen-Kopftreiber und einen ΔY-Achsen-Kopf, der mit der Nadel verbunden ist, aufweist; und
einen Neigungs-Treiber (F), der einen Neigungs-Pulsmotortreiber (64) und einen Neigungs-Pulsmotor (66) aufweist, wobei der Neigungs-Pulsmotor (66) an einem vorderen Abschnitt des Y-Achsen-Treibers in einer Art und Weise angeordnet ist, dass wenn ein Adapter (80; 90) nach hinten geneigt wird, ein zu gravierender Gegenstand, wie zum Beispiel ein Reisepass P oder ein Personalausweis ID, leicht auf dem Adapter platziert werden kann.

**2.** Vorrichtung nach Anspruch 1, ferner aufweisend einen Adapter (80; 90), der einen rechteckigen Tisch mit einer gegebenen Dicke und Breite, der im Gebrauch auf den Zuführer aufgesetzt ist, aufweist, wobei der rechtekkige Tisch eine rechteckige Ausnehmung (80a; 92a) zum Positionieren aufweist, die nahe eines äußeren Randabschnitts des rechteckigen Tisches bereitgestellt ist, und wobei die rechteckige Ausnehmung ein vertieftes rechteckiges Feld (80a'; 92a') definiert, das geringfügig um ungefähr 0.1 mm in Bezug auf den äußeren Randabschnitt des rechteckigen Tisches abgesenkt ist, ein Paar von kleinen Luftöffnungen (80c; 92c), die den Adapter durchsetzen, um an den oberen und unteren Enden der rechteckigen Ausnehmung bereitgestellt zu sein, einen Luftschlauch, der hinter dem Tisch angeordnet ist, wobei ein Endabschnitt des Luftschlauchs von der Rückseite in die Luftöffnung eingebracht ist und ein anderes Ende mit einer Vakuumpumpe verbunden ist, um den zu gravierenden Gegenstand mittels eines negativen Luftdrucks an dem Adapter zu halten.

**3.** Vorrichtung nach Anspruch 2, ferner aufweisend einen geneigten Tisch (94), der starr an einem Seitenkantenabschnitt des rechteckigen Tisches (92) fixiert ist, und eine Deckelplatte (98), die drehbar an dem anderen Seitenkantenabschnitt des rechteckigen Tisches fixiert ist, ein Paar von Positionierungsrippen (96), die jeweils an einem oberen Abschnitt und an einem Seitenabschnitt des rechteckigen Tisches bereitgestellt sind, ein rechteckiges Fenster (98a), das die Deckelplatte durchsetzt, um mit dem vertieften rechteckigen Feld (92a') zu korrespondieren, ein Paar Halteklemmen (94a), die an beiden Eckabschnitten des geneigten Tisches bereitgestellt sind, und ein Paar Griffe (98c), die sowohl an oberen als auch an unteren Abschnitten eines äußeren Kantenabschnitts der Deckelplatte befestigt sind, so dass der zu gravierende Gegenstand korrekt zwischen dem Haltetisch und der Deckelplatte gehalten werden kann und ein gleichmäßiges Gravieren durchgeführt werden kann, ohne dass eine Vibration erzeugt wird.

**Revendications**

**1.** Appareil servant à graver des images qui comprend un moyen servant à soutenir un objet destiné à être gravé et un moyen de gravure, **caractérisé en ce que** ledit moyen servant à soutenir un objet destiné à être gravé comprend : un pied (12) comprenant une surface planaire et une paire de jambes (12A) solidement montée sur un support de base (10) fourni par une plaque de base ayant une épaisseur et une largeur données, dans lequel chaque dite jambe a une ouverture prévue à travers une partie centrale de celle-ci ; une tige (14) entrée à travers les ouvertures desdites jambes supportée par lesdites jambes et s'étendant entre lesdites jambes de façon parallèle à ladite surface planaire ; et une paire de paliers (18, 18) montée de façon coulissante sur ladite tige pour effectuer un mouvement de va-et-vient, dans laquelle des ressorts hélicoïdaux (16) sont fournis sur la tige entre chaque dite jambe et chaque dit palier pour réduire l'effet de vibration de l'appareil sur une surface de soutien (20A) servant à recevoir l'objet destiné à être gravé, ladite surface de soutien étant fournie par une deuxième plaque de base (20a) intégralement montée sur la partie supérieure de chaque palier ; ledit appareil comprenant en outre :

un dispositif de commande (CR) relié à un ordinateur personnel (PC) ;
➢ une paire de poulies entraînées et d'entraînement (34, 36) fournie sur une paire de blocs

montés sur la deuxième plaque de base ;
➢ une courroie crantée (38) mise en prise sur lesdites poulies :
➢ un rail en forme de Π (28) monté sur la deuxième plaque de base ;
➢ un dispositif d'alimentation d'axe X (30) fourni sur ladite courroie crantée et sur ledit rail en forme de Π ;
➢ un dispositif d'entraînement de moteur à impulsions d'axe X (32) et un moteur à impulsions d'axe X (34a) relié audit dispositif d'alimentation d'axe X ;
➢ un dispositif d'entraînement d'axe Y (C) relié au dispositif de commande ;
➢ un dispositif d'entraînement de moteur à impulsions d'axe Y (76) relié à un moteur à impulsions d'axe Y (78) ;
➢ un dispositif d'entraînement d'axe Z (D) fourni sur une base de tête, qui est une partie supérieure du dispositif d'entraînement d'axe Y ;
➢ un dispositif d'entraînement d'axe Z comportant un dispositif d'entraînement de tête d'axe Z (54) et une tête d'axe Z (56) ;
➢ un stylet (58) fourni au niveau d'une partie inférieure de la tête d'axe Z ;
➢ un dispositif d'entraînement d'axe ΔY de minute (E) ayant un dispositif d'entraînement de tête d'axe Y et une tête d'axe ΔY reliée audit stylet ; et
➢ un dispositif d'entraînement d'inclinaison (F) comprenant un dispositif d'entraînement de moteur à impulsions d'inclinaison (64) et un moteur à impulsions d'inclinaison (66) disposé au niveau d'une partie frontale du dispositif d'entraînement d'axe Y de telle façon que lorsqu'un adaptateur (80, 90) est incliné vers l'arrière, un objet destiné à être gravé tel qu'un passeport P ou une carte d'identité ID peut être facilement placé (e) sur l'adaptateur.

**2.** Appareil selon la revendication 1, comprenant en outre un adaptateur (80 ; 90), qui comprend une table rectangulaire ayant une épaisseur et une largeur données qui est mise sur le dispositif d'alimentation lors de l'utilisation, ladite table rectangulaire ayant une rainure rectangulaire de positionnement (80a ; 92a) fournie près d'une périphérie externe de celle-ci, ladite rainure rectangulaire définissant un plan rectangulaire abaissé (80a' ; 92a') qui est légèrement abaissé d'environ 0,1 mm par rapport à la périphérie externe de la table rectangulaire, une paire de petites ouvertures d'air (80c ; 92c) fournie à travers l'adaptateur pour se situer au niveau des extrémités supérieure et inférieure de la rainure rectangulaire, un tuyau d'air étant disposé derrière ladite table, une partie d'extrémité dudit tuyau d'air étant disposé dans l'ouverture d'air à partir de l'arrière et une autre extrémité étant reliée à une pompe à vide afin de maintenir l'objet destiné à être gravé sur l'adaptateur à travers une pression d'air négative.

**3.** Appareil selon la revendication 2, ledit adaptateur comprenant en outre une table inclinée (94) qui est solidement attachée à une partie de bord latéral de la table rectangulaire (92) et une plaque de couvercle (98) qui est attachée de façon pivotante à l'autre partie de bord latéral de la table rectangulaire, une paire de saillies de positionnement (96) étant fournies respectivement sur une partie supérieure et sur une partie latérale de ladite table rectangulaire, une fenêtre rectangulaire (98a) étant fournie à travers la plaque de couvercle afin de correspondre au plan rectangulaire abaissé (92a'), une paire d'étriers (94a) étant fournie au niveau des deux parties de coin de la table inclinée et une paire d'éléments de serrage (98c) étant montée au niveau des deux parties supérieure et inférieure d'une partie de bord externe de la plaque de couvercle de telle sorte que l'objet destiné à être gravé peut être correctement maintenu entre la table de maintien et la plaque de couvercle et une gravure douce peut être facilement exécutée sans entraîner de vibrations.

FIG. 1

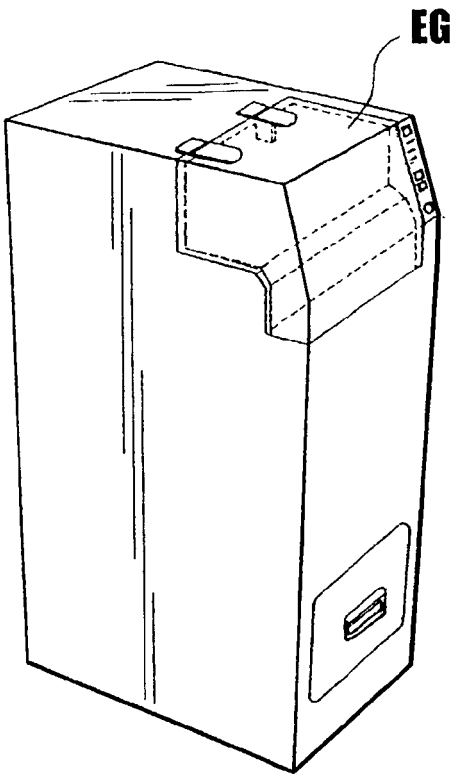



FIG. 2

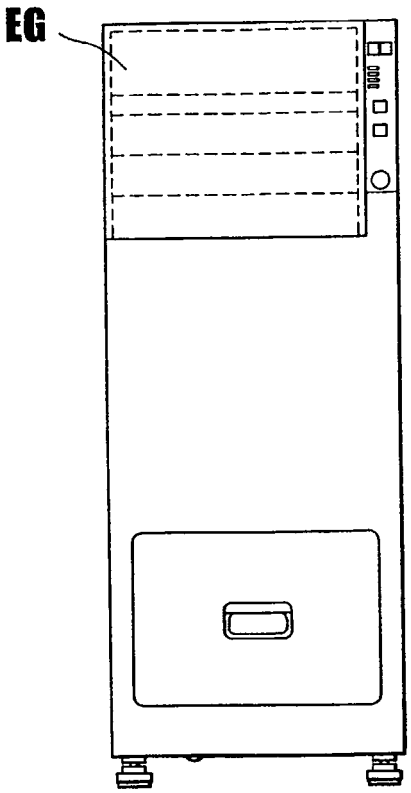


FIG. 3

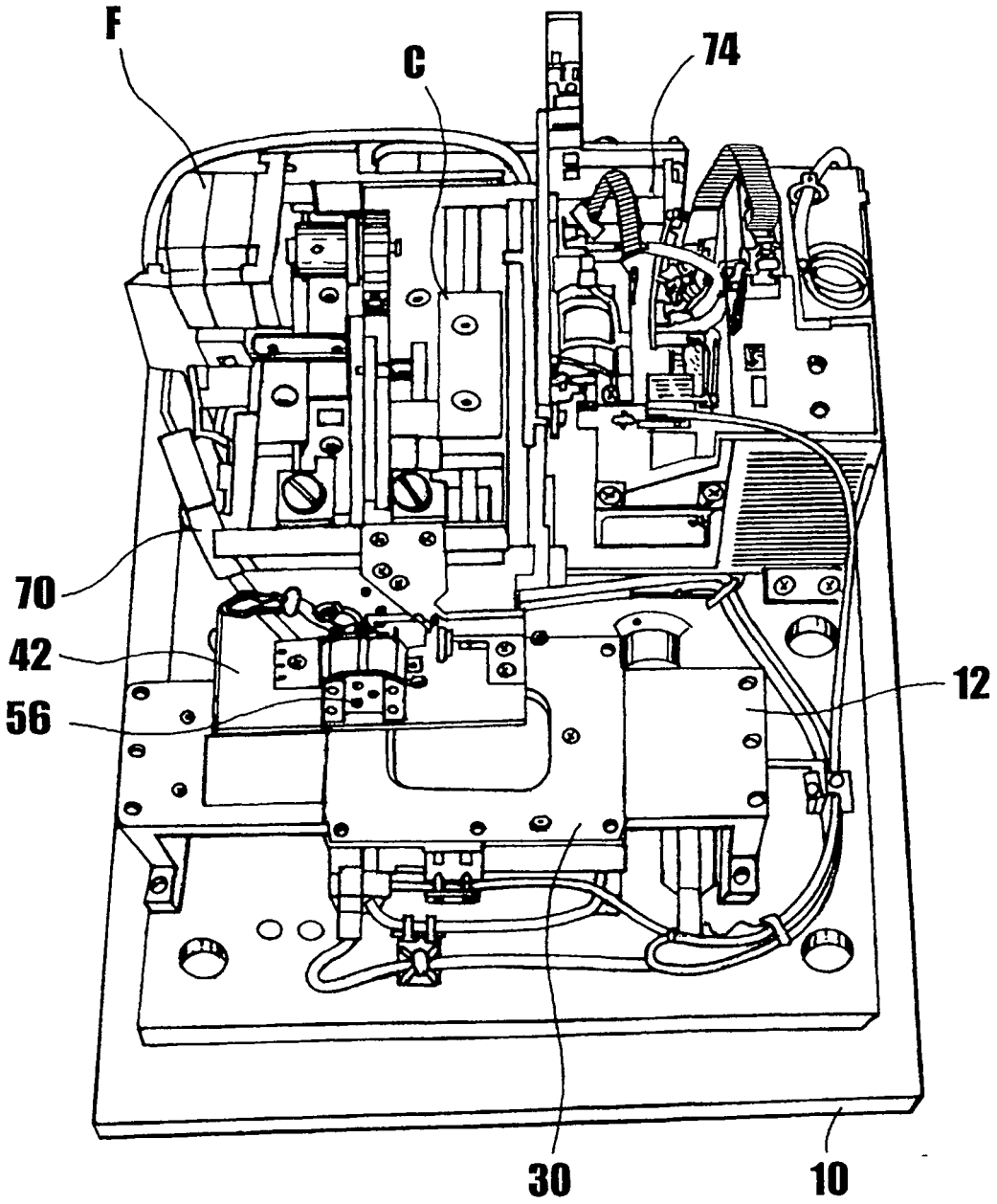


FIG. 4

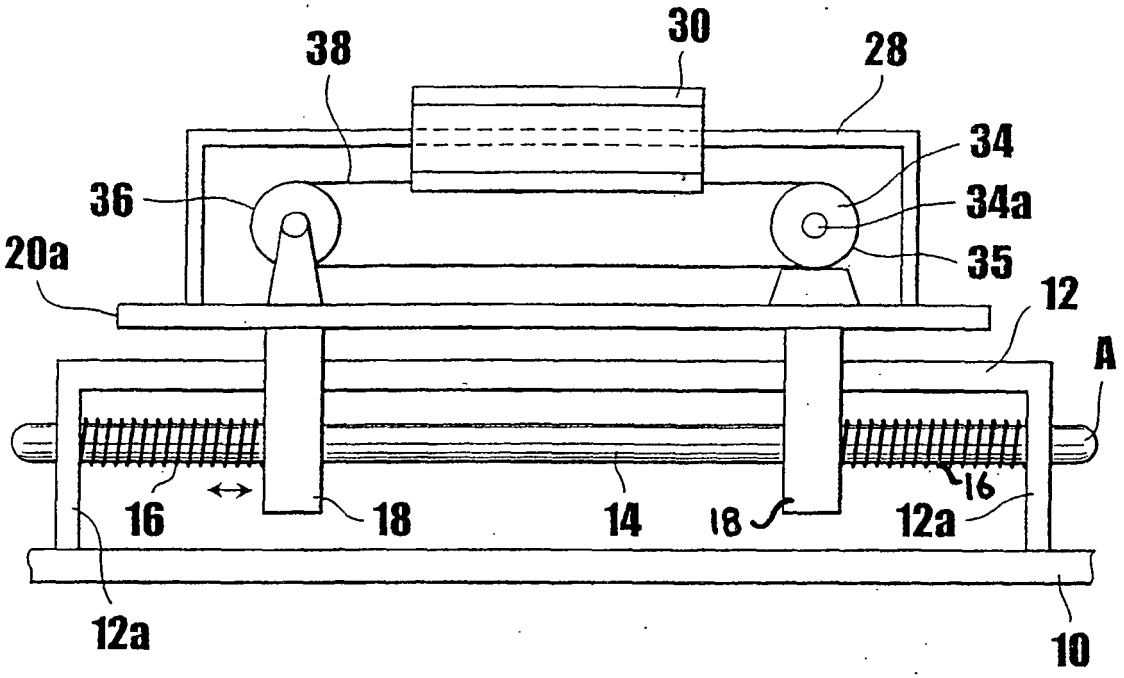
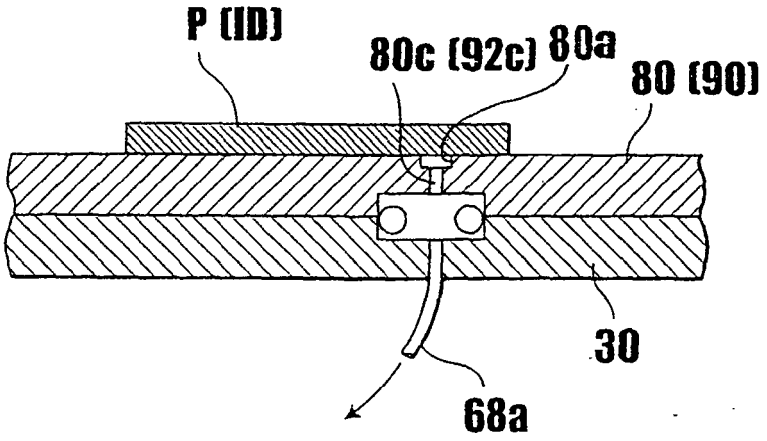

38
30
28
34
36
34a
35
20a
12
A
16
18
14
18
16
12a
12a
10

FIG. 5


P (ID)
80c (92c)
80a
80 (90)
30
68a

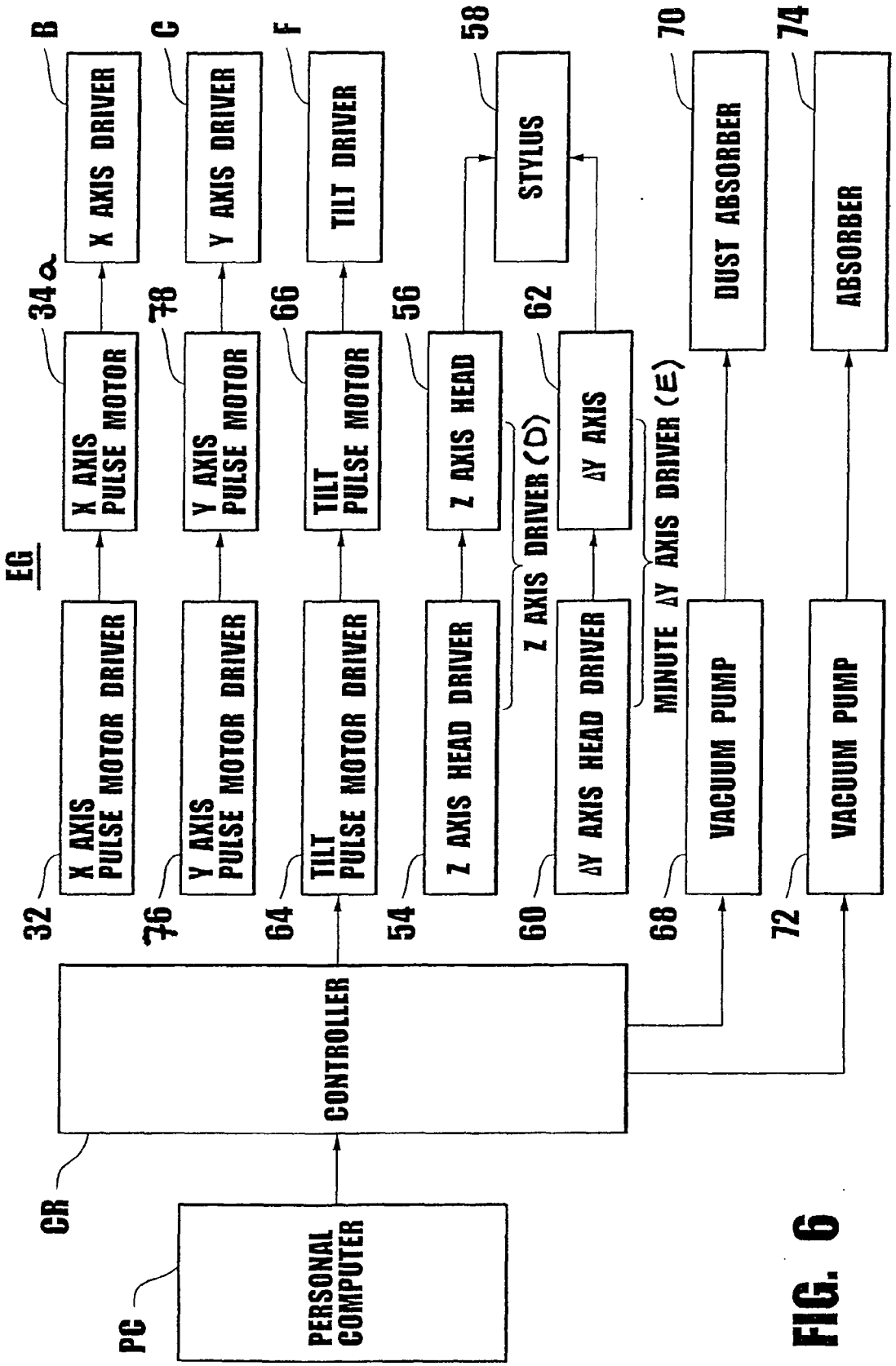

PC
PERSONAL COMPUTER
CR
CONTROLLER
EG
32
X AXIS PULSE MOTOR DRIVER
34a
X AXIS PULSE MOTOR
B
X AXIS DRIVER
76
Y AXIS PULSE MOTOR DRIVER
78
Y AXIS PULSE MOTOR
C
Y AXIS DRIVER
64
TILT PULSE MOTOR DRIVER
66
TILT PULSE MOTOR
F
TILT DRIVER
54
Z AXIS HEAD DRIVER
56
Z AXIS HEAD
Z AXIS DRIVER (D)
58
STYLUS
60
ΔY AXIS HEAD DRIVER
62
ΔY AXIS
MINUTE ΔY AXIS DRIVER (E)
68
VACUUM PUMP
70
DUST ABSORBER
72
VACUUM PUMP
74
ABSORBER

FIG. 6

FIG. 7

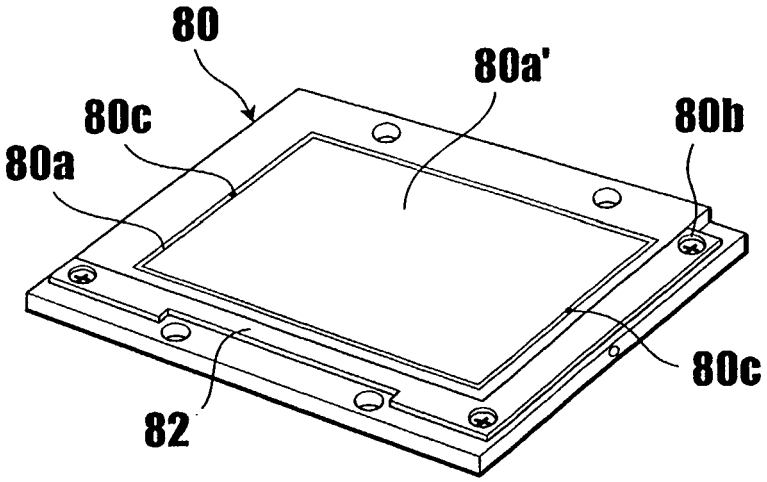



FIG. 8

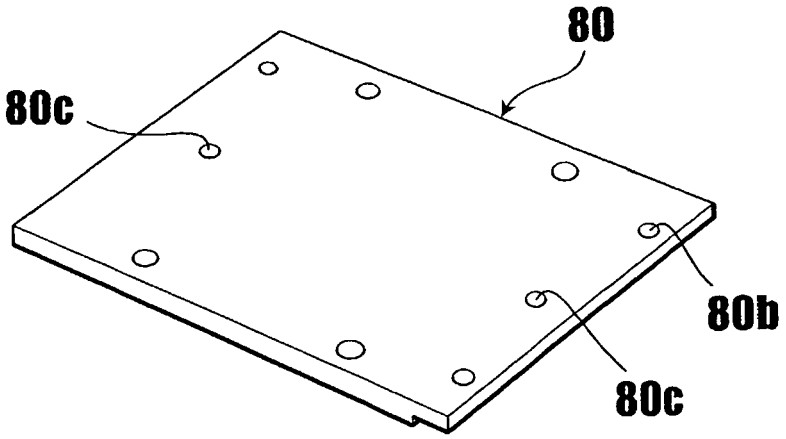


FIG. 9

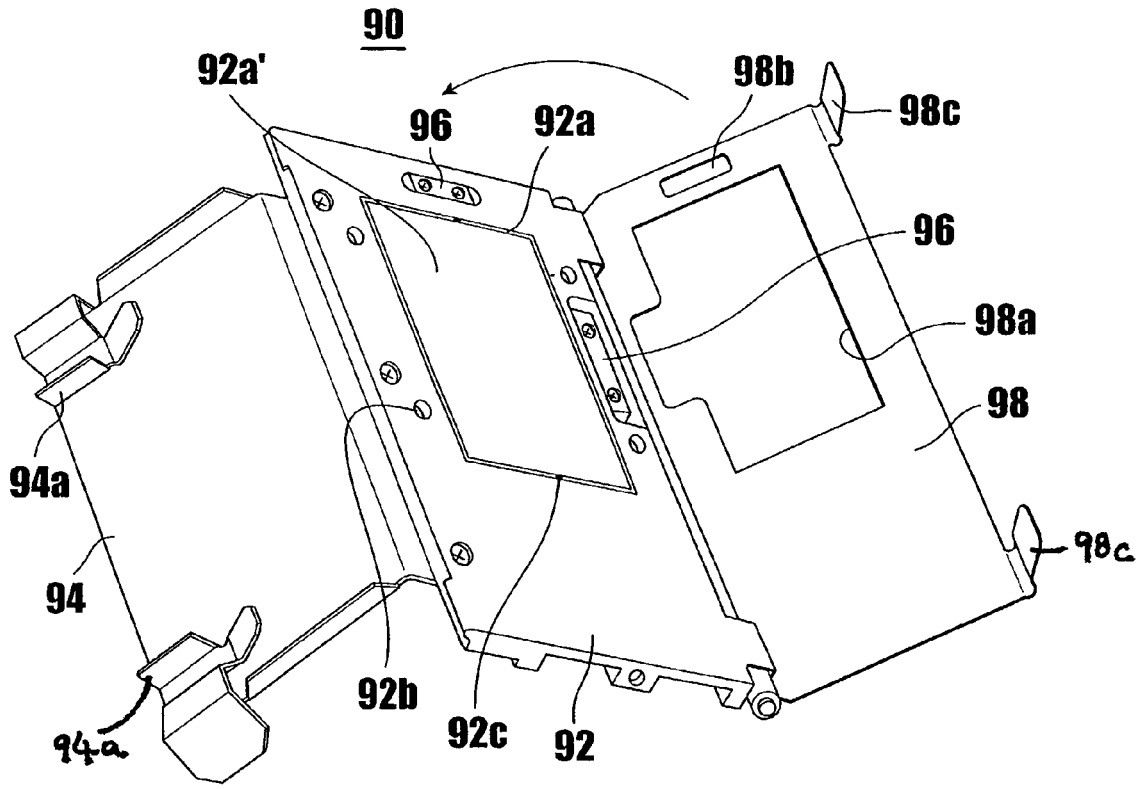


FIG. 10

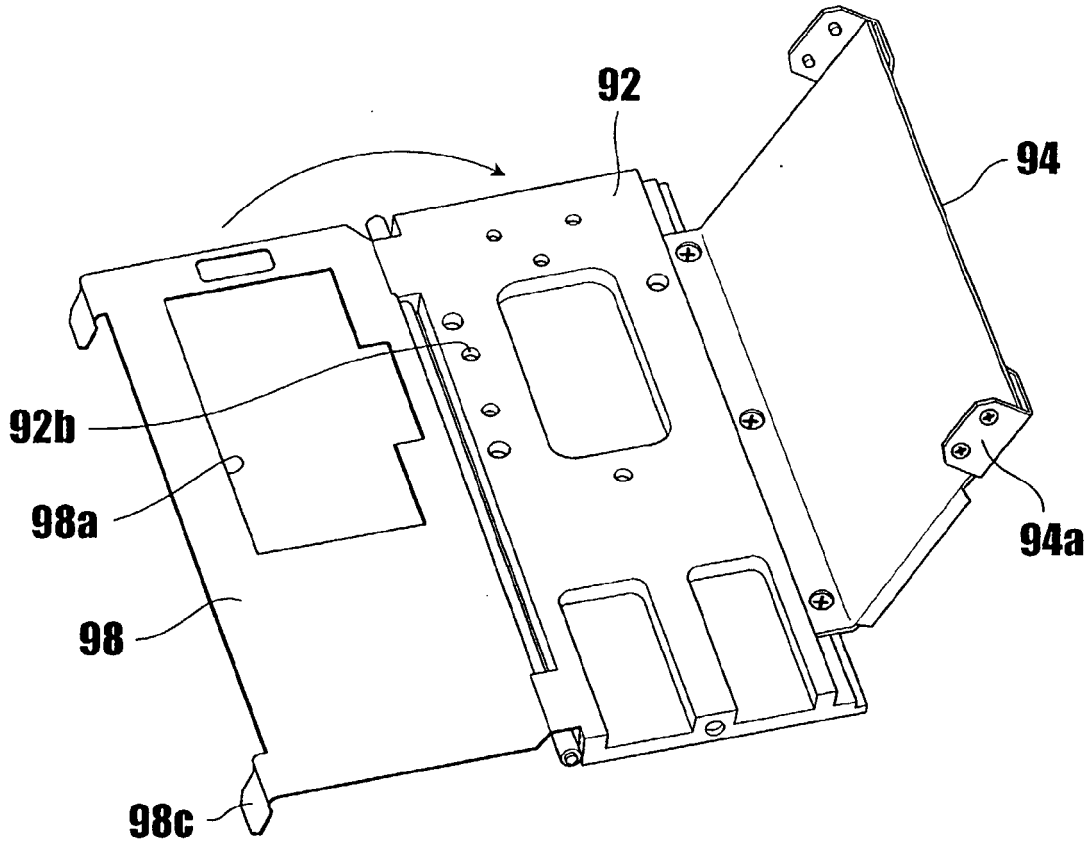
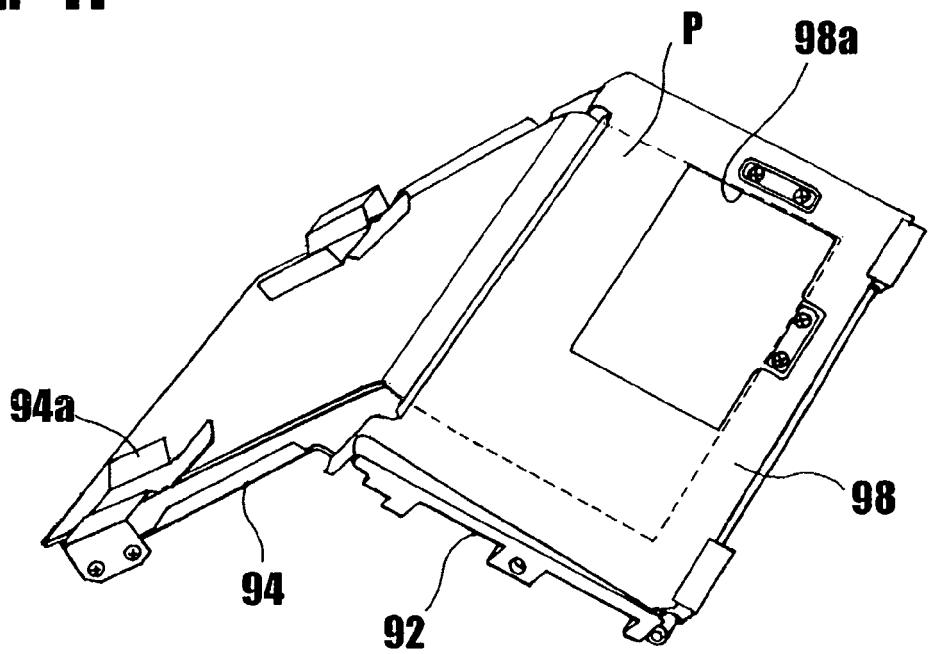



FIG. 11



## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


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