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(54) Handling of panels or plates

(57) A bearing, supporting and guide assembly for flat panels or rigid or semirigid plates to be treated with machine tools for print fixing, assembling and transfer, such as calenders, rolling units, or "A" plasticators and the like items, comprises at least two arms (11) engaging, at one end, on articulated joints (6', 6") featuring a dual orthogonal movement mounted on shoes (4) sliding on slides (1,1') that are located, or incorporated, at least on the inlet portion of the mentioned machine tools. The shoes (4) can be blocked on independent positions along the arms (11); the articulated joints (6', 6'') allow the arms (11) to perform a first orthogonal horizontal opening and/or closing rotation and lock in place, relative to the mentioned machines, and a second orthogonal arm lifting and locking rotation (11) for alignment at the same height as the working planes (13) of the mentioned machines

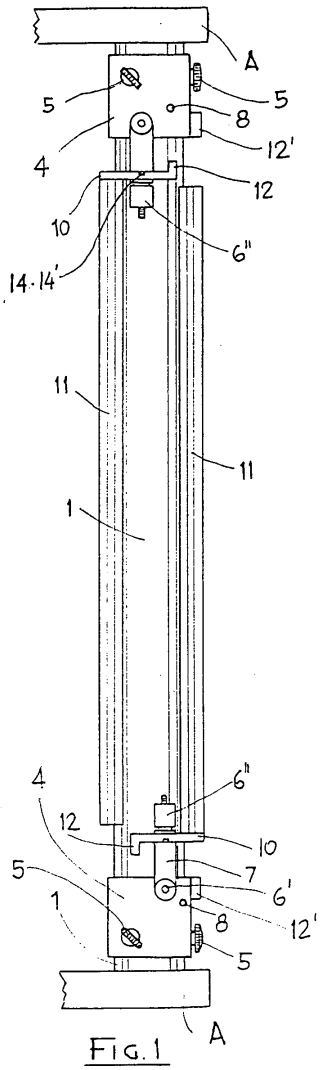

FIG. 1

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Description

[0001] This invention refers to a bearing, supporting and guide assembly for flat panels or rigid or semirigid plates to be treated with printing machine tools, such as calenders, rolling mills and plasticators, namely intended for the following applications:

- Print fixing of all types: digital, offset, rotogravure, silk-screen printing, heliograph and the like processes,
- Mounting of self-sticking and non-self-sticking prints on sheets and/or reels, or on natural or synthetic fibre panels in the form of a rigid or a semirigid plate,
- Operations meant to transfer, through heated or cold rollers, the print onto sheets and/or reels, or onto natural or synthetic fibre flat panels, in the form of a rigid or semirigid plate and the like items.

[0002] It is known that the current and most remarkable calenders, plasticators or rolling units, used for print fixing, mounting and transfer have heated or cold rollers, which can exert pressure and easily, accurately and automatically or semi automatically execute all of the following operations:

- mounting,
- Tackifying of prints, panels, plates and the like items, from whatever natural or synthetic fibre material, with both-sides adhesive tape,
- One-side protection, named printing rolling, and both-sides protection, named encapsulation, in one sole step, with pressure adhesive tapes or both-sides adhesive tapes,
- One-side protection, named printing rolling, and both-sides protection, named encapsulation, in one sole step, with heat-activated thermoadhesive tapes, with the input of medium and high temperatures,
- transfer, by means of heated or cold rollers and pressure, of images printed on sheets or reels, onto flat panels and rigid or semirigid plates, made from whatever natural or synthetic fibre material.

[0003] It is also known that, as regards the treatment on flat panels or rigid and/or semirigid plates, e.g. for the panelling, the mounting, the panelling and the assembling of self-adhesive and not self-adhesive sheets, the application of sheets and/or films of whatever type, self-adhesive or two-sides adhesive tapes, the feed-through and guidance operations between the rollers of the machine tools themselves prove to be more delicate, as the intrinsic hardness of panels and plates imposes manual support and guidance actions, possibly with the aid of external supporting makeshift means, typically including tables, stands or, at best, adapted rollerways, placed alongside these machines.

[0004] In these conditions, though in a position to execute the foregoing treatments well enough, owing to the operator's personal experience and competence, locating the panels and/or the plates however demands staff to be actively present, proves to be less reliable, more exhausting and expensive. Another problem is that, though using the foregoing makeshift means, the alignment of the machine inlet planes is always almost approximate and difficult to accomplish.

[0005] An object of this invention is to remedy the above-mentioned problems.

[0006] This object is also achieved by using a supporting, bearing and guidance unit for flat panels or rigid or semirigid plates to be treated with machine tools for print fixing, assembling and transfer, such as calenders, rolling units or "A" plasticators and similar items, in accordance with claim 1. Further advantageous characteristics are stated in the dependent claims.

[0007] The supporting, bearing and guidance unit in accordance with this invention includes at least two opening and closing arms which engage, at one end, double orthogonal joints mounted on shoes which are able to run along at least one slide located or crosswise incorporated at least on the front inlet portion of any of these machine tools, in parallel alignment with the main rollers; these shoes allow the arms to be independently closed in any desired position; the double orthogonal joints mounted on these shoes are in a position to perform a first horizontal orthogonal opening and closing rotation of the arms in place, as to the machines, and a second orthogonal positioning rotation that lifts and closes these very arms, thus performing a perfect alignment flush with the work plane; the arms can have a fixed or a telescopic length and can include extractable and folding ends that are meant to act as ground resting feet; at least one of the arms includes alignment means for the panels, or similar items, undergoing treatment.

[0008] The advantages achieved by the supporting, bearing and guidance unit according to this invention mainly consist in that the arms, wide open and aligned with the inlet portion of the machine tools, make up a perfect plane to bear and orthogonally align the flat panels and/or the rigid or semirigid plates, so that their insertion among the treatment rollers occurs simply, rapidly and automatically, in an extremely precise and cheap manner, exactly like the print finishing treatments performed on flexible surfaces.

[0009] Another advantage is in that the supporting, bearing and guidance unit in accordance with this invention is structured in such a manner as to be easily incorporated in or applied as an additional accessory to whatever model of machine tool of the foregoing type. A further advantage is in that the structure of this unit is conceived in such a way as to also allow it to be possibly used on the outlet of the machine tools, so as to act as an unloading slide properly supported for panels having undergone the treatment; in this case, owing to the minor need for aligned support on the outlet, the orthogonal rise of the arms can be disregarded.

[0010] The invention is thoroughly described hereinafter, in accordance with its embodiments, which are only provided as examples, but which are not meant to be restrictive, with reference to the attached drawings, wherein:

figure 1 is an example of supporting, bearing and guidance unit according to this invention, as seen in a location plan and with the arms in the closing position,

fig. 2 shows the same example of unit as that of figure 1, as seen in a location plan and with the arms in the opening position in any chosen points,

fig. 3 shows the location plan of an example of arms end supporting shoe, running along shaped slides, with the double orthogonal joint in the closing position,

figure 4 is the location plan of the same arms end supporting shoe as that of figure 3, with the first joint turned to set the corresponding arm to open and orthogonally align as to a machine tool,

figure 5 is the location plan of the same arms end supporting shoe with open arm as that of figure 4, with the second joint turned in orthogonal rise, to place the arm aligned flush with the work plane of the machine tools,

figure 6 is the cross-section of an end supporting shoe, running along shaped slides, with an arm open in a locked horizontal orthogonal position (first rotation figure 4) and turned in an orthogonal rising position of alignment and lock (second rotation figure 5),

figure 7 is a partial perspective view of the same supporting shoe as that of figure 6, with an arm open in a locked horizontal orthogonal position and in a turned orthogonal rising position of alignment and lock, and

figure 8 is a partial view, bottom up, of a different embodiment of the unit in accordance with this invention, wherein the arms end supporting shoes run along parallel slides and wherein the arms are opened through the actuation of twisted cam joints which combine the two movements of opening and flush alignment with the work plane of the machines.

[0011] With reference to the figures, the supporting, bearing and guidance unit for calenders, rolling units or plasticators is mainly composed of at least one fixed slide 1 which is incorporated or added, in a transversal front position, as a supplement to whatever model of "A" machine tool of the foregoing type.

[0012] In figures 1 to 7, the slide 1 is composed of at least one section bar among those available on the market, with peripheral longitudinal grooves, preferably in the shape of an overturned T 2, or the like, in which complementary threaded pins 3 engage in an alignment, sliding and locking fit, combined with some shoes 4, generally, but not exclusively two in number, which are located, when the unit is in the closing position, at the end of this very slide 1. The choice of the section bars of the foregoing type, to make up the slides 1 is mainly only dictated by financial reasons and structural simplicity; however, the possibility to adopt different sections bars or slides, whether simple or multiple, single or double, with a round-shaped, quadrangular or polygonal section, with screws or other suitable mechanical means, is not excluded. The shoes 4 can be made run along the slide 1 until the desired positions are reached, depending on the dimensions of the flat panels and/or rigid or semirigid plates to be treated 19, and can be locked there by locking the mentioned pins 3 with respective nuts, which can be normal or, preferably, with threaded grips 5. Any locking systems and/or stops can even be installed on slide/slides 1, along with or as an alternative to the stops on the mentioned shoes.

[0013] On each shoe 4 there is a double joint featuring orthogonal movement composed of:

- a first joint 6' made up of a vertical pin around which a lever 7 may turn, only by 90°, from a closing position in alignment with slide 1 in an orthogonal opening position, restrained by a stop 8, such as a pin, a square or a similar item, with coupling means for lever 7,
- a second joint 6", located on the front end of the mentioned lever 7, composed of a release ratchet 9 featuring two orthogonal positions, which supports a connected transversal bracket 10.

[0014] At one end of each bracket 10 the rear portion of a section bar 11 is connected, whereas at the other end of the bracket a positioning stop 12 is located which, in operating conditions, engages a corresponding stop 12' integral with each running slide 4 in a bond of adhesion and aligned support with a corresponding stop.

[0015] The section bar 11 of each shoe 4 extends until forming one of the bearing arms for flat panels, rigid or semirigid plates and similar items, 19 to be treated. When the joints 6' are in the closing positions, the transversal brackets 10 of joints 6" remain horizontally oriented and all of the arms 11 arrange in such a way as to align with the mentioned at least one transversal fixed slide 1.

[0016] With the first joint 6' turned, each lever 7 arranges itself at 90° as to the closing position and rests against a stop 8, thus setting the corresponding arm 11 in the opening position and in an orthogonal position as to the work plane 13 of the "A" machine equipped with the unit making up the object of this invention.

[0017] Then, by pulling and turning the release ratchet 9, each transversal bracket 10 moves back, releases its notch 14' from the vertical tooth 14 that is found on the front end of the mentioned levers 7, lines up and refastens to the same tooth 14 with a second tooth 14" of its, placed at 90° as to the first tooth. By releasing the ratchet, the transversal brackets 10 arrange themselves vertically, thus raising the corresponding arms 11 and thus perfectly

aligning them with the mentioned work plane 13.

[0018] On the external side face of at least one of the arms 11, which are also made of section bars commonly found on the market, even if not in a restrictive manner, some vertical side can be applied, which can be made of vertical pins 18, located on pads 15 equipped with at least one headed screw to be anchored to one of the longitudinal grooves 16 and which can be locked with a grip 17.

[0019] In other embodiments, the side slides 18 can even be made of squares, plaques, side sheets or similar items, which are suitable to make up proper orthogonal beats as to the upper faces of the arms 11. In this manner, the panels or plates to be treated 19, resting on level ground on the upper faces of the arms 11, orthogonally oriented and rising before the mentioned work plane 13 of "A" type machine tools can even rest, at least on a side edge, on the mentioned vertical side slides 18 and thus be correctly lead to the operating means of the machines.

[0020] Any needle roller o idle wheel slides from material featuring low surface roughness and/or tension such as polished metal, *teflon,* polythene, PVC and similar materials, can be installed on the upper face of each arm 11, to facilitate the sliding of the panels or plates 19 undergoing treatment.

[0021] Figure 8 illustrates a different example of unit wherein the end-supporting shoes 4' of the arms 11 engage parallel slides 1' and may run on them through, e.g. side wheels or axial-running ball bearing bushes, brasses, racks or the like items.

[0022] In another example of unit, each arm 11 is bonded to a twisted can joint 29 which simultaneously unites the two opening orthogonal alignment and flush lifting movements, as to the work plane 13 of the "A" machines. By turning the arm in the opening or closing direction, each arm 11 causes a corresponding crown 20, which comprises a cam 29, to rotate; the latter, by crawling on a fixed dowel 21, helped by the push exerted by a counter spring 22, produces the simultaneous opening or closing rotatory shifting and, in the vertical direction, the rise or fall of the corresponding arms 11.

[0023] The arms 11 can be of telescopic type or include extractable and foldable front ends that are meant to act as resting foots above-ground.

Claims

1. A supporting, bearing and guidance unit for fixed panels or rigid or semirigid plates to be treated with machine tools for print fixing, assembling and transfer, such as calenders, rolling units or "A" plasticators and the like items **characterized in that** it includes at least two arms (11) which engage, on one end, orthogonally moving double joints (6, 6'), mounted upon shoes (4) that run on at least one slide (1) located on, or integrated with at least the inlet portion of these machine tools; these running shoes (4) comprising independent locking means (3, 5) of the arms (11) in the desired positions and the mentioned double joints (6', 6'') being able to perform a first orthogonal horizontal opening and/or closing and or position-locking of the arms (11), as to the work plane (13) of these machines, and a second rotation to orthogonally raise and lock these very arms (11), in flush alignment with the same work plane.

2. A unit according to claim 1 **characterized in that** the mentioned first joints (6') are made up of levers (7) which, at the opening stage, arrange themselves at 90° as to the closing position that is parallel to the mentioned at least one transversal slide (1), and settle against stops (8) that are made of pins, squares or similar items, possibly with coupling means to the levers themselves, placing the corresponding arms (11) in an orthogonal position as to the work plane (13) of the mentioned "A" machines, and **characterized in that** the mentioned second joints (6'') are made up of release ratchets (9), that are found at the front end of these levers (7), which keep the mentioned corresponding integral transversal brackets (10) in the closing or opening position through horizontal or vertical hooking of notches (14', 14''), to be coupled with corresponding notches (14) located at the front end of the levers themselves (7).

3. A unit according to claims 1 and 2, **characterized in that** at least one of the mentioned arms (11) is equipped with at least one vertical side slide to orthogonally orient the edges of the panels and/or the rigid or semirigid plates or similar items (19) to be treated, as to the entrance of these machine tools; the mentioned at least one slide being made of a block (15), comprising at least one anchoring screw (17) to the arm and at least one vertical resting pin (18), orthogonal to the horizontal upper plane of the same arm.

4. A unit according to claims 1, 2 and 3 **characterized in that** at least one of these arms (11) is equipped with at least one vertical side slide to orthogonally orient the edges of the panels and/or rigid or semirigid plates or similar items (19) to be treated, as to the entrance of these machine tools, made of an orthogonal beat, as to the horizontal upper plane of the mentioned at least one arm (11) in the shape of a square, plaque, side sheet or similar items.

5. A unit according to the previous claims, **characterized in that** the upper plane of these arms (11), on which the panels (19) to be treated rest, is equipped with sliding means with needle rollers, idle wheels, with slides made from materials featuring low surface roughness and or tension such as polished metal, *teflon,* polythene, PVC.

6. A unit according to claims 1 to 5 **characterized in that** the mentioned shoes (4) that support the ends of these arms (11) engage parallel slides (1) made of sections bars with longitudinal grooves in which the heads of independent locking means such as threaded pins (3) match the related threaded nuts or grips (5), and **in that** the mentioned slides (1) are provided with lock systems and/or stops combined with or alternative to the stops on the mentioned shoes (4).

7. A unit according to claims 1 to 5 **characterized in that** the mentioned shoes (4'), that support the ends of the mentioned arms (11), engage shaped parallel slides (1') through sliding means such as side wheels, axially-running ball bushes, brasses and racks, and **in that** the mentioned slides (1') are equipped with lock systems and/or stops combined with or alternative to the stops on the mentioned shoes (4').

8. A unit according to claim 1, **characterized in that** these arms (11) are bonded to a twisted cam joint (29) that combines the two orthogonal alignment opening and the flush lifting movements, as to the work plane (13) of the "A" machines through the rotation of a crown (20) that includes the mentioned cam (29), which operates by crawling on a fixed dowel (21) helped by the push exerted by a counter spring (22).

9. A unit according to the previous claims, **characterized in that** these arms (11) have a fixed length or a telescopic extension and include, or not include, extractable and folding front ends in the shape of above-ground resting feet.

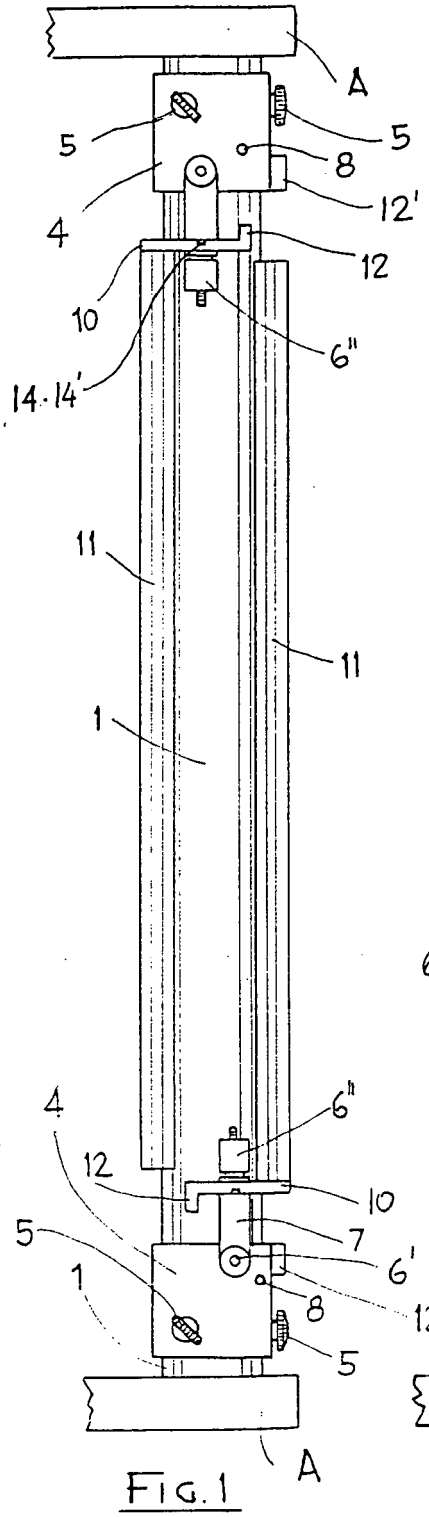
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FIG. 1

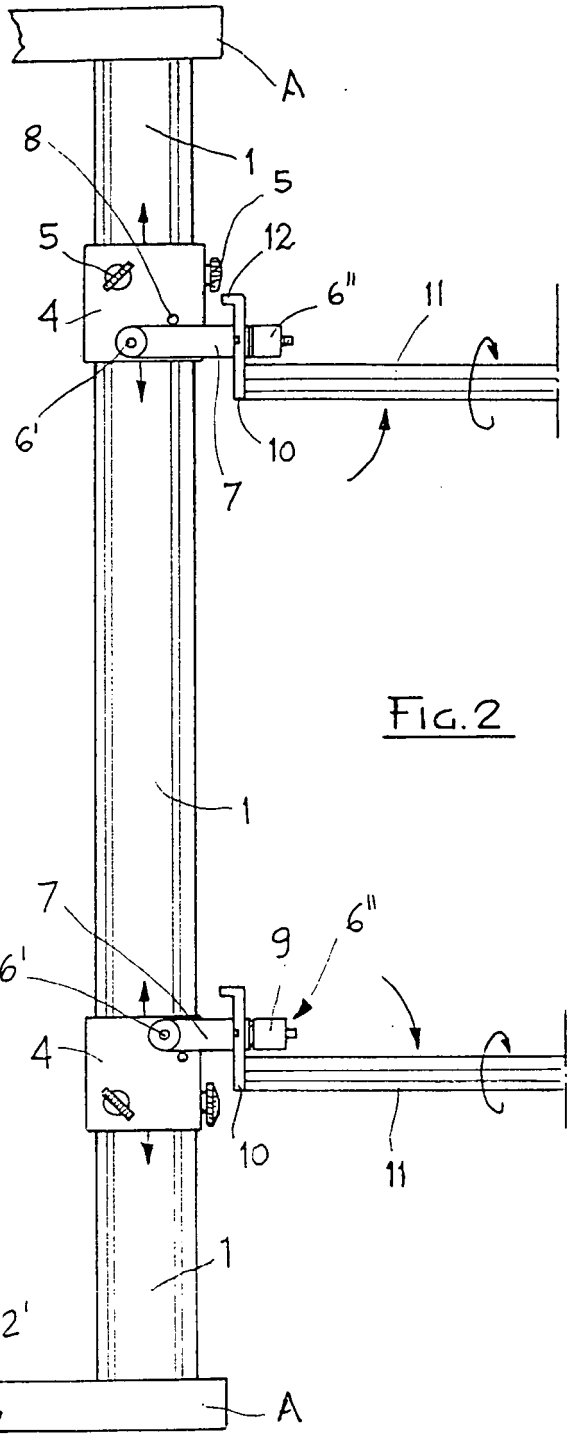
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FIG. 2

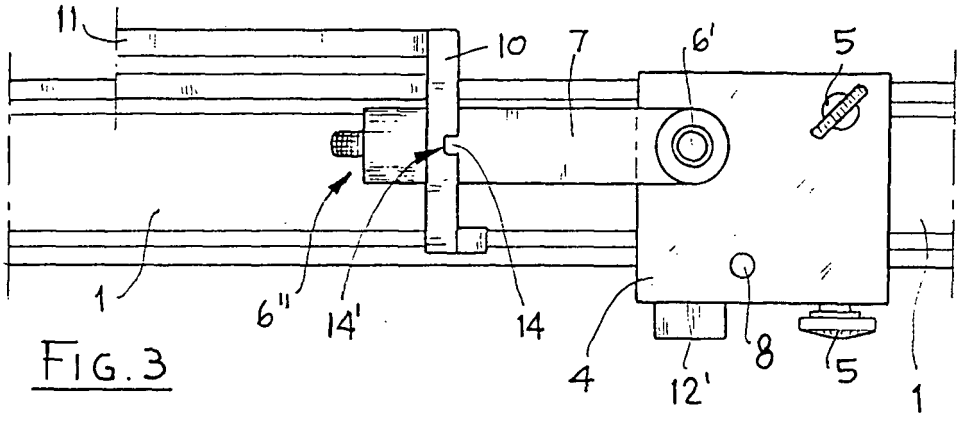

FIG.3

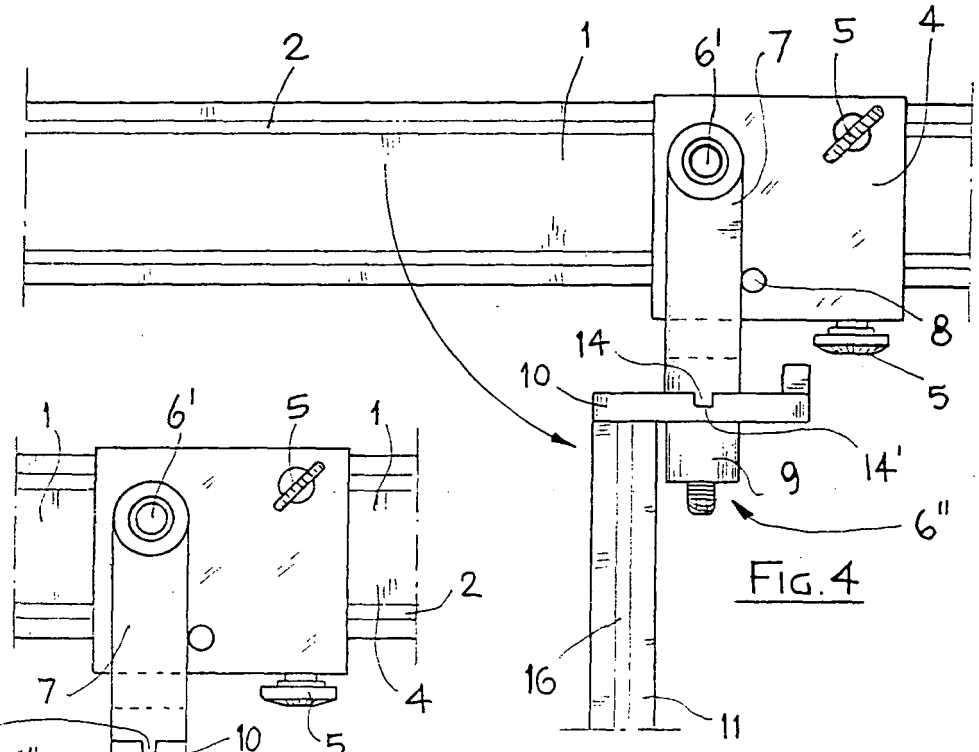

FIG.4

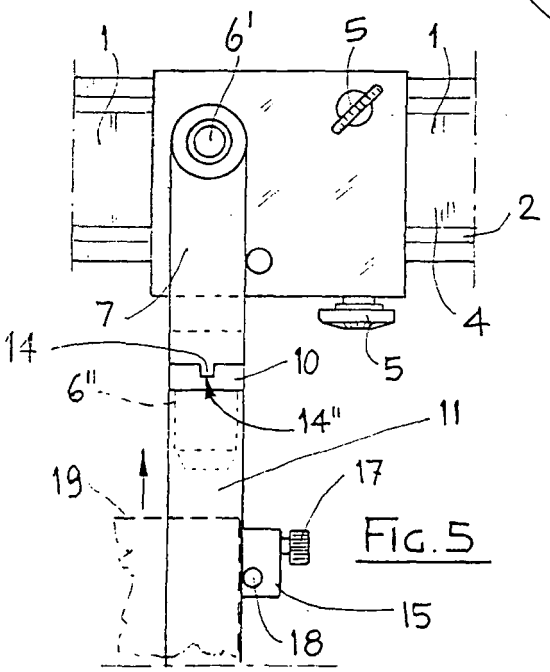

FIG.5

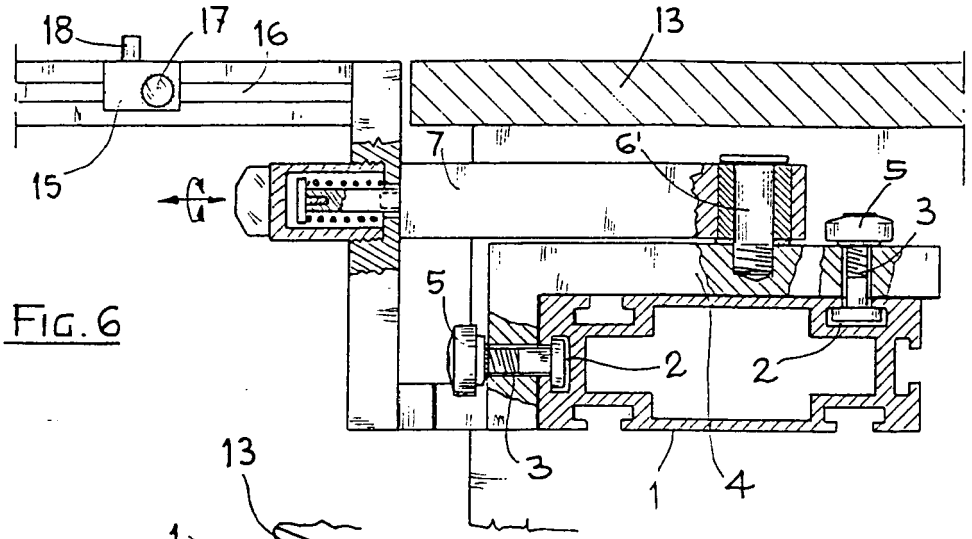

FIG. 6

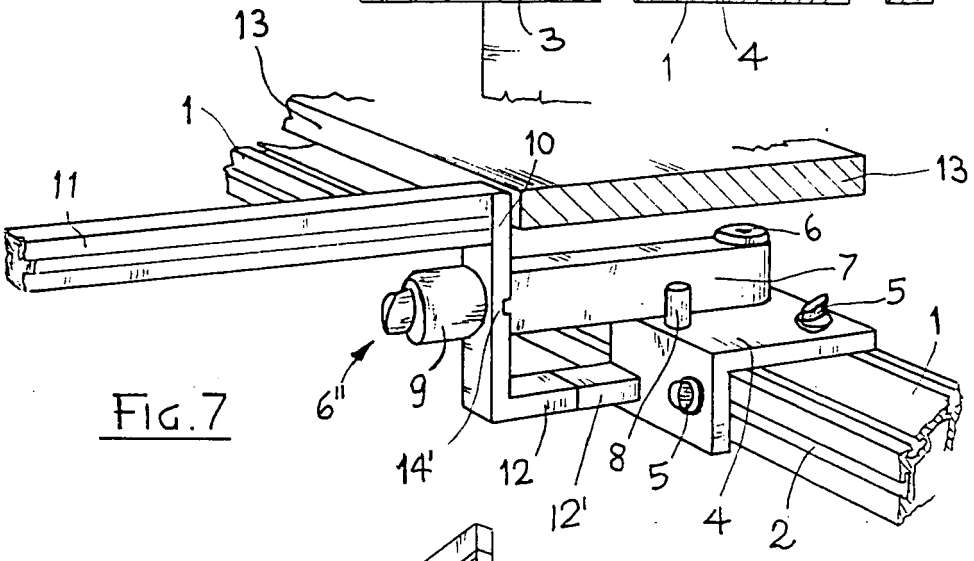

FIG. 7

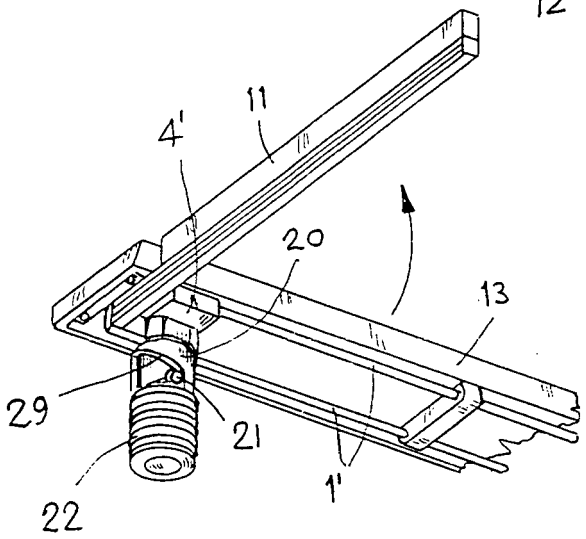

FIG. 8