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WORKSHOP CARRIAGE

The invention relates to a workshop trolley with a carcass, which has an upper side, a lower side, a front and a rear side, as well as two opposing side surfaces, wherein at least one section of the upper side forms a work surface, and on the lower side wheels are arranged for the movement of the carcass, and at least one drawer moveably arranged in the carcass and/or at least one shelf compartment formed in the carcass for the storage of tools and the suchlike, wherein the at least one drawer and/or the at least one shelf compartment is/are accessible from the front side.

Tools, for example screwdrivers and spanners, machines, abrasives and spare parts, for example screws and nuts, or aerosol cans, for example with lubricants or solvents, are typically stored in the drawers or shelves of the workshop trolley. The workshop trolley can be moved by the wheels on a surface in order to move the workshop trolley, for example in a workshop, to the location where the workshop trolley is needed, for example a repair being carried out at the desired location, or for example the engine of a motor vehicle being repaired. The work surface of the workshop trolley can be used to carry out minor repairs on it. To carry out the repair on the work surface, it may be necessary to have several objects within reach, for example tools, spare parts, machines, circuit diagrams or even a laptop.

Since the work surface of the workshop trolley is small, it is often problematic to have all these objects within reach and at the same time still have a work surface available for repairs.

US 2012/0085714 A1 discloses wire mesh walls that can be attached to a stand or tool holding device and are configured to receive holding devices, for example shelf baskets, hooks, etc.

US 2011/0192810 A1 discloses an assembly for a tool cabinet with two suspension rods which are attached separately from one another to a side wall of the tool cabinet. Several tool brackets with tools mounted on them can be hung between the suspension rods.

DE 20 2016 102 444 U1 discloses a tool trolley having a main frame and a plurality of receiving boxes arranged on the main frame.

US 2010/0295430 A1 discloses a tool-organising device having a wall plate. The wall plate has numerous openings into which tools can be hooked or inserted.

DE 20 2010 011 399 U1 discloses a workshop trolley having a housing supported on wheels and having a tray surface on the top.

US 2015/0267847 A1 discloses a tool cabinet having an inlet valve and a plurality of outlet

valves which are connected to one another by way of integrated pneumatic air lines. A large number of different pneumatic tools are attached to the outlet valves. A plurality of holders for holding the pneumatic tools are arranged on an outer surface of the tool cabinet.

DE 20 2013 104 429 U1 discloses a tool cabinet having a tray plate for holding at least one object. The tray plate is connected to the tool cabinet by way of a lowering unit. The tray plate can be raised or lowered by means of the lowering unit.

DE 201 05 683 U1 discloses a mobile assembly workstation having a work plate arranged on a mobile frame and a mounting for components, tools, equipment and the like.

DE 20 2013 105 620 U1 discloses a tool trolley having a solar panel that can convert solar energy into electrical energy. A large number of batteries, which are electrically connected to the solar panel, are arranged in a drawer of the tool trolley. An air compressor is arranged in a mounting space of the tool cabinet and can generate compressed air when the air compressor is supplied with power from the batteries.

US 9,808,930 B1 discloses a tool cabinet having a cabinet body and a suspension plate which is attached to the cabinet body by means of two slide rails. The slide rails extend in an up/down direction so that the suspension plate is movable in an up/down direction relative to the cabinet body between a raised position and a lowered position.

DE 20 2013 104 356 U1 discloses a cabinet having a housing, a mounting space being formed on an outer side of a rear wall of the housing. The cabinet further comprises a plate which can be pushed into the mounting space. The plate has a plurality of holes, into each of which a hanging rod can be inserted in order to hang a hand tool.

The present invention therefore addresses the problem of creating a workshop trolley which allows as many objects as possible to be within reach while keeping the work surface as free as possible.

This problem is solved according to the invention by the features of claim 1.

The work equipment can be selected from a group consisting of small parts box, aerosol can, spray bottle, laptop, tools, machines or lamps.

The bracket is advantageously made of metal, for example steel, or of plastic, in particular glass fibre-reinforced plastic, or at least one section of the bracket is made of metal and at least one section is made of plastic.

The holding end of the bracket is preferably arranged above the upper side of the carcass, in particular 10–50 cm, preferably 20–30 cm, so that the work equipment is easily accessible to a user.

The bracket mounting is advantageously connected to the carcass in a detachable manner, for example by way of a screw-in or plug-in joint, or in a non-detachable manner, for example by way of a riveted joint.

The bracket mounting is preferably arranged between the upper side and the lower side of the carcass, in particular on an outer side of the carcass, in particular in the centre between the upper side and the lower side, more particularly between the centre and the upper side.

The bracket mounting can have a single bracket connection location for connection to a single mounting end of a bracket, such that only one bracket can be attached to the bracket mounting.

The bracket mounting can alternatively have a plurality of individual, i.e. mutually separate, bracket connection locations for connection to a mounting end of a bracket, such that a bracket can be attached to each of the separate bracket connection locations. Alternatively, the bracket mounting can have at least one rail-shaped bracket connection location for connection to at least one mounting end of a bracket, such that the mounting end of the bracket can be attached to the continuous bracket connection location at any number of positions and, if necessary, a plurality of mounting ends of a plurality of brackets can be attached to the continuous bracket connection location.

In general, the bracket mounting can have at least one single bracket connection location and/or at least one continuous bracket connection location.

The mounting end of the bracket can be connected to the bracket connection location in a detachable manner, for example by way of a screw-in or plug-in joint, or in a non-detachable manner, for example by way of a riveted joint, or in a sliding manner, for example by way of a tongue and groove joint.

The bracket mounting comprises a bracket rail on the rear side of the carcass, which runs parallel to the lower side and at a distance of 1–30 cm, in particular 10–20 cm, from the upper side, in particular over the entire width of the back, i.e. from one side surface to the other.

The mounting ends of different brackets are advantageously constructed in an identical manner and can be connected to the bracket mounting by way of a plug-in joint, the bracket mounting comprising recesses which are arranged in a grid and into which the plug-in elements of the mounting end can be plugged, such that the plug-in elements of the mounting ends of the bracket can be plugged into any, but predetermined, recesses of the grid of the bracket mount.

An angle is preferably formed between the mounting end and the holding end of at least

one bracket, in particular between 10° and 80° , preferably between 30° and 60° , in order to arrange the holding end of the bracket and thus work equipment held by it directly above the upper side of the carcass.

The holding end can comprise a mounting for a laptop or a holder for aerosol cans, for example in the form of cup holders, or a writing surface for the support of a writing pad, for example in the form of a surface inclined obliquely to the upper side, or a mounting for small parts boxes, for example in the form of a straight strip, onto which the small parts boxes can be mounted by means of a groove, or a holder for screwdrivers, for example a surface running parallel to the upper side, in which there are recesses into which screwdrivers can be inserted, or a mounting for spanners, for example in the form of slots running parallel to one another, into which the central sections of spanners can be inserted, or a mounting for writing instruments, such as pens, for example.

Further features, details and advantages of the invention arise from the claims and the following description of preferred embodiments as well as from the drawing. In the figures:

- Figure 1 shows a perspective front view of a workshop trolley according to the invention,
- Figure 2 shows a perspective rear view of a workshop trolley of figure 1,
- Figure 3 shows an enlarged detail of the view of figure 2 from a first direction,
- Figure 4 shows an enlarged detail of the view of figure 2 from a second direction,
- Figure 5 shows a perspective front view of various brackets with associated work equipment,
- Figure 6 shows a perspective rear view of the brackets of figure 5,
- Figure 7 a) shows a first perspective view of a workshop trolley with a bracket 11 in a further embodiment,
- Figure 7 b) shows a second perspective view of the workshop trolley and bracket of figure 7a), and
- Figure 7 c) shows an enlarged view of a detail of figure 7b).

Figure 1 shows a workshop trolley 1 having a carcass 3 which has an upper side 3O, a lower side 3U, front and rear sides 3V, 3R and two opposing side surfaces 3S. A section of the upper side 3O forms a work surface 3OA. Wheels 5 are arranged on the lower side 3U for moving the carcass 3. Seven drawers 7 are slidably arranged in the carcass in order to store tools and the like therein, the drawers 7 being accessible from the front side 3V in order to open or close them for removing or storing tools. A handrail 15 is arranged on the side surface 1SF, on the left in figure 1, for pushing the workshop trolley 1. In addition to the work surface 3OA, a compartment division 17 having a plurality of

compartments is formed in the upper side 3O of the carcass in order to accommodate small parts therein.

Three brackets 11 are arranged on the workshop trolley 1: A bracket 11 on the left in figure 1 carries two spray bottles 13SF, a bracket 11 in the middle in figure 1 carries two aerosol cans 13A and a bracket 11 on the right in figure 1 carries two small parts boxes 13K.

Figure 2 shows a perspective rear view of the workshop trolley of figure 1. Figure 3 shows an enlarged detail of the rear view of the workshop trolley 1 of figure 1 from a first direction, and figure 4 shows same from a second direction.

As shown in figures 2 to 4, a bracket mounting 9 in the form of a bracket rail 9TS, in this case an extruded aluminium profile, is attached to the rear side 3R of the workshop trolley 1; in the present case, the bracket rail 9TS is screwed to the rear side 3R of the carcass. The bracket rail 9TS extends over the entire width of the rear side 3R of the carcass 3, i.e. from one side surface 3S to the other, opposite side surface 3S. Two grooves 9TSN in which slot nuts are slidably arranged are formed in the bracket rail 9TS.

The brackets 11 have a mounting end 11A for connection to the bracket mounting 9 in the form of the bracket rail 9TS and an opposite holding end 11T for holding work equipment 13, in this case the aerosol can 13A, the small parts box 13K and the spray bottles 13SF.

In the present case, the mounting end 11A has four through-bores, through which a screw can be screwed into a slot nut in the grooves 9TSN, thereby attaching the mounting end 11A to the bracket rail 9TS so that the bracket 11 is attached to the workshop trolley 1. The opposing holding ends 11T are each configured to hold work equipment and make it available for a user.

The holding end 11T of the bracket 11 on the left in figure 1 is substantially an aluminium tube 19 running perpendicular to the upper side 3O, at the upper end of which a wire frame 21 running perpendicular thereto is arranged, the wire of which wire frame forms four rectangles of equal size (alternatively circular or oval recesses), more precisely: the circumference of four rectangles of equal size. Spray bottles 11SF can be suspended in this wire frame 21. The holding end 11T of the bracket 11 in the middle in figure 1 forms a holder for two aerosol cans 13A: A lower flat notch of the bracket 11 forms a closed placement surface for the aerosol cans 13A and an upper, circumferential notch of the bracket 11 forms a lateral mounting for each of the aerosol cans 13A, i.e. it forms two square open areas, the respective circumferences of which form a lateral mounting for an aerosol can 13A. The holding end 11T of the bracket on the right in figure 1 forms a

linear edge which acts as a tongue, onto which the groove of a small parts box 13K can be plugged. A small parts box as described in DE102015206606 is particularly suitable as the small parts box 13K. Objects other than spray bottles can also be attached to the holding end of the bracket on the left in figure 1, for example lamps in order to illuminate the upper side 3O of the carcass.

The bracket 11 in the middle in figure 1 and the bracket 11 on the right in figure 1 are each made from a flat sheet metal section. The bracket 11 on the right in figure 1 is a flat sheet metal section, the mounting end 11A of which has the four holes for inserting screws for connecting to slot nuts in the grooves 9TSN of the grooves in the bracket rail 9TS. The bracket 11 in the middle in figure 1 is also a flat sheet metal section, from the middle region of which a rectangular section has been bent by 90° to form the lower notch for placing aerosol cans 13A. First two square surfaces were punched out of an upper section of the bracket, with a thin edge remaining in each case, and the two edges of the squares were then bent by 90° in order to form the lateral mounting for the aerosol cans. Figures 5 and 6 show a perspective front and rear view of four different brackets 11, of which the bracket 11 on the left in figure 5 is designed for holding a laptop 13L, the bracket 11 next to it is designed for holding a writing surface 13SU, the bracket 11 next to it is designed for inserting screwdrivers 13S into recesses of a horizontal section of the bracket 11 and the bracket 11 next to it is designed for inserting a hammer head into a recess of a horizontal section of the bracket 11.

All brackets 11 of figure 5 are made from sheet metal by punching and bending. The brackets 11 each have four recesses (through-holes) at their mounting end 11A so that screws can be screwed through same into respective slot nuts of a groove of the bracket rail 9TS. The holding ends 11T of the brackets 11 have the corresponding shape for mounting the work equipment 13, i.e. the laptop 13L, the writing surface, the screwdriver 13S or the hammer head 13H.

Figure 7 shows a workshop trolley 1 in an alternative embodiment.

The rear side 3R of the workshop trolley 1 is designed as a perforated metal sheet, i.e. as a flat metal sheet in which the same latching recesses 9R are formed in a regular, array-like pattern. The mounting ends 11A of the brackets 11 that fit the workshop trolley 1 are designed as flat sheet metal sections which have plug-in elements 11S that fit the latching recesses 9R. To connect the bracket 11 to the workshop trolley 1, the plug-in elements 11S are inserted into the latching recesses 9R. In this embodiment, the number and position of the latching recesses determine the connection options for the bracket 11 and the workshop trolley 1. Different brackets 11 can have different arrangements of plug-

in elements 11S, for example depending on the load-bearing capacity to be provided by the bracket 11 or the width of the bracket 11 in the direction of the rear side 3R.

A bracket mounting 9 is thus generally attached to one of the side surfaces 3S and/or to the rear side 3R and offers the possibility of connecting at least one bracket 11. In a first embodiment, the bracket mounting 9 can have only one bracket connection location 9TV for connecting exactly one bracket 11. In this case, the bracket mounting 9 is adapted precisely to one specific bracket 11. In a second embodiment, however, the bracket mounting 9 can have a plurality of bracket connection locations 9TV that are separate from one another for connection to precisely one bracket 11 in each case. The bracket connection locations 9 can in this case advantageously all be constructed in the same way. In this case, the brackets 11 can be attached to each of the individual bracket connection locations 9TV. However, should at least one bracket 11 require a different connection to the bracket mounting 9 than the other brackets 11, the bracket connection locations 9TV can be adapted to a specific bracket. For example, it is possible for the at least one other established bracket 11 to be always arranged at a specific location, for example always in the centre of the side surfaces 3S and/or the rear side 3R. In a third embodiment, the bracket mounting 9 can have at least one continuous bracket connection location 9TV, in which at least one bracket 11 can be attached to different locations of the bracket connection location 9TV. An example of such a continuous bracket connection location 9TV is a bracket rail 9TS in which the bracket 11 can be attached along the bracket rail 9TS in a continuous manner at any length value in the longitudinal direction of the bracket rail 9TS. The bracket rail 9TS can have such a length in the longitudinal direction that not only one bracket 11 but a plurality of brackets 11 can be attached to the bracket rail 9TS. The bracket rail 9TS thus does not provide discrete bracket connection locations 9TV for the brackets 11, i.e. such that are only prescribed at individual locations, but rather a continuous range of connection possibilities, i.e. a continuous range in the longitudinal direction of the bracket rail 9TS. In a fourth embodiment, the variants two and three described above can be combined: In this embodiment there is thus at least one bracket connection location 9TV (embodiment two) and at least one continuous bracket connection location 9TV (embodiment three).

The bracket connection locations 9TV for connecting the bracket mounting 9 to the bracket 11 can be designed in various ways: the mounting end 11A of the bracket 11 can be connected to the bracket connection location 9TV in a detachable manner, for example by way of a screw-in or plug-in joint, or in a non-detachable manner, for example by way of a riveted joint, or slidably, for example by way of a tongue and groove joint. In the

slidable variant, the mounting end 11A of the bracket 11 can be inserted into the bracket rail 9TS, for example by way of a tongue and groove joint, and then be slidable along the bracket rail 9TS.

The mounting ends 11A of the bracket 11 for connection to the bracket mounting 9 of the workshop trolley 1 can be constructed identically or differently. In other words, all of a set of brackets 11 for the workshop trolley 1 can have the same mounting end 11A. Alternatively, at least one mounting end 11A of a bracket 11 can be formed differently. However, all of the mounting ends 11A of the brackets 11 for a workshop trolley 1 are advantageously formed identically.

A holding end 11T of a bracket 11 can have a mounting for holding a suction cup for connection to a car or glass pane, the mounting preferably being mounted in a vertically displaceable and pivotable manner. By using a plurality of such brackets, a car or window pane can be held horizontally or vertically on the workshop trolley 1 in order to process it.

The bracket mounting 9 of figures 1–4 is shown as a bracket rail 9TS having two grooves 9TSN and made from an aluminium profile. If the bracket mounting 9 is generally provided in the form of a rail, lines of any kind can additionally run in the rail in order to supply tools, lamps or machines.

Therefore, a power and/or water and/or air pressure line can run at least in sections in such a rail. Lights, machines or sockets on or in the workshop trolley 1 can be supplied with power by the electricity conducted in the rail. Spray bottles 13SF or the like can be refilled by the water line routed in the rail (from a water connection or a canister in the workshop trolley). Machines, for example pneumatic screwdrivers, can be operated using air pressure routed in the rail, or the compressed air can be used for cleaning, for example machines or tools, by way of a nozzle.

A bracket 11 can have holders for machines, tools or lamps, which are supplied with electricity and/or water and/or air pressure from the lines routed in the rail. The rail thus provides corresponding couplings at which the electricity and/or water and/or air pressure lines end, for example a 230-V socket or a water tap or a compressed-air coupling. The machines, tools or lamps have plugs for connection to the couplings, for example a 230-V plug or an opening for filling water into the spray bottle 13SF or a compressed -air coupling.

The bracket 11 on the left in figure 1 has a profile rod running downwards in figure 1, the holding end 11T of which carries the wire frame for holding the spray bottles 13SF. This profile bar can either be attached to the bracket rail 9TS at different heights or it can be a

telescopic profile rod in order to arrange the wire frame at different distances from the upper side 3O of the carcass.

List of reference signs

1	Workshop trolley
3	Carcass
3O	Upper side of the carcass
3OA	Work surface on the upper side of the carcass
3R	Rear side of the carcass
3S	Side surface of the carcass
3U	Lower side of the carcass
3V	Front side of the carcass
5	Wheel
7	Drawer
9	Bracket mounting
9R	Latching recess
9TS	Bracket rail
9TSN	Groove in the bracket rail
9TV	Bracket connection location
11	Bracket
11A	Mounting end for connection to the bracket mounting
11S	Plug-in element
11T	Holding end for holding items of work equipment
13	Work equipment
13A	Aerosol can
13H	Hammer head
13K	Small parts box
13L	Laptop
13S	Screwdriver
13SU	Writing surface
13SF	Spray bottle
15	Handrail
17	Compartment division
19	Aluminium tube
21	Wire frame

VÆRKSTEDSVOGN**Patentkrav**

1. Værkstedsvogn (1) med et legeme (3), der har en overside (3O), en underside (3U), en for- og en bagside (3V, 3R) samt to modsatte sideflader (3S), hvor i det mindste et afsnit af oversiden (3O) danner en arbejdsflade (3OA), og der på undersiden (3U) er placeret hjul (5) til at bevæge legemet (3), samt mindst én skuffe (7), der er placeret forskydeligt i legemet (3), og/eller mindst én reolhylde, der er udformet i legemet, til opbevaring af værktøj og lignende, hvor den i det mindste ene skuffe (7) og/eller den i det mindste ene reolhylde er tilgængelige på forsiden (3V), kendetegnet ved i hvert enkelt tilfælde en holderoptagelse (9) på bagsiden (3R) og/eller den i det mindste ene sideflade (3S), på hvilken der er fastgjort i det mindste en holder (11), hvor den i det mindste ene holder (11) har en optagelsesende (11A) til forbindelse med holderoptagelsen (9) og en overfor liggende bærende (11T) til at bære arbejdsredskaber (13), hvor holderoptagelsen (9) omfatter en holderskinne (9TS) på bagsiden (3R) af legemet, der forløber parallelt med undersiden (3U) og i en afstand på 1-30 cm, særligt 10-20 cm, fra oversiden (3O), særligt over den samlede bredde af bagsiden, dvs. fra den ene sideflade (3S) til den anden.
2. Værkstedsvogn ifølge krav 1, kendetegnet ved, at arbejdsredskabet (13) er udvalgt fra en gruppe, der består af en kasse med smådele (13K), aerosoldåse (13A), sprayflaske (13SF), laptop (13L), værktøj, maskiner eller lamper.
3. Værkstedsvogn ifølge krav 1 eller 2, kendetegnet ved, at holderen (11) består af metal, eksempelvis stål, eller af plast, særligt glasfiberforstærket plast, eller at i det mindste et afsnit af holderen (11) består af metal og i det mindste et afsnit af plast.
4. Værkstedsvogn ifølge et af de foregående krav, kendetegnet ved, at bærenden (11T) af holderen (11) er placeret oven over oversiden (3O) af legemet (3), særligt 10-50 cm, foretrukket 20-30 cm, således at arbejdsredskaberne (13) er let tilgængelige for en bruger.
5. Værkstedsvogn ifølge et af de foregående krav, kendetegnet ved, at holderoptagelsen (9) er forbundet aftageligt, eksempelvis via en skrue- eller

stikforbindelse, eller ikke-aftageligt med kroppen (3), eksempelvis via en nitteforbindelse.

6. Værkstedsvogn ifølge et af de foregående krav, kendetegnet ved, at holderoptagelsen (9) er placeret mellem oversiden (3O) og undersiden (3U) af legemet (3), særligt på en yderside af legemet (3), særligt midt mellem over- og undersiden (3O, 3U), yderligere særligt mellem midten og oversiden (3O).
7. Værkstedsvogn ifølge et af de foregående krav, kendetegnet ved, at holderoptagelsen (9) har et enkelt holderforbindelsessted (9TV) til forbindelse med en enkelt optagelsesende (11A) på en holder (11), således at der kun kan fastgøres én holder på holderoptagelsen.
8. Værkstedsvogn ifølge et af kravene 1 til 6, kendetegnet ved, at holderoptagelsen (9) har enkelte, dvs. fra hinanden adskilte, holderforbindelsessteder (9TV) til en respektiv forbindelse med en optagelsesende (11A) på en holder (11), således at der på hvert enkelt af de adskilte holderforbindelsessteder kan fastgøres én holder.
9. Værkstedsvogn ifølge et af kravene 1 til 6, kendetegnet ved, at holderoptagelsen (9) har mindst ét skinneformet holderforbindelsessted (9TS) til forbindelse med i det mindste en optagelsesende (11A) på en holder (11), således at holderens optagelsesende på det kontinuerlige holderforbindelsessted kan fastgøres i så mange positioner som ønsket, og der eventuelt kan fastgøres flere optagelsesender på flere holdere på det kontinuerlige holderforbindelsessted.
10. Værkstedsvogn ifølge mindst et af kravene 7 til 9, kendetegnet ved, at holderoptagelsen (9) har mindst et enkelt holderforbindelsessted (9TS) og mindst ét kontinuerligt holderforbindelsessted (9TS).
11. Værkstedsvogn ifølge et af de foregående krav, kendetegnet ved, at optagelsesenden (11A) på holderen (11) er forbundet aftageligt med holderforbindelsesstedet (9TV), eksempelvis via en skrue- eller stikforbindelse, eller ikke-aftageligt, eksempelvis via en nitteforbindelse, eller forskydeligt, eksempelvis via en fer-not-forbindelse.

12. Værkstedsvogn ifølge et af de foregående krav, kendetegnet ved, at der mellem optagelsesenden (11A) og bæreeenden (11T) på mindst én holder (11) er dannet en vinkel, særligt på mellem 10 og 80°, foretrukket mellem 30 og 60°, for at placere bæreeenden (11T) på holderen og dermed et arbejdsredskab (13), der bæres af denne, umiddelbart over legemets overside (3O).
13. Værkstedsvogn ifølge et af de foregående krav, kendetegnet ved, at bæreeenden (11T) omfatter en holder til en laptop (13L) eller en optagelse til aerosoldåser (13A), eksempelvis i form af bægerholdere, eller omfatter et skriveunderlag til støtte af en skriveblok, eksempelvis i form af en overflade, der hælder i forhold til oversiden, eller omfatter en optagelse til kasser til smådele (13K), eksempelvis i form af en lige liste, som kasserne til smådele kan anbringes på med en not, eller omfatter en optagelse til skruetrækkere (13S), eksempelvis en overflade, som forløber parallelt med oversiden, og i hvilken der er udsparinger, hvor der kan indsættes en skruetrækker, eller skruenøgler, eksempelvis i form af slidser, der forløber parallelt med hinanden, i hvilke der kan indsættes det midterste område af en skruenøgle, eller omfatter en holder til skriveredskaber som eksempelvis blyanter.

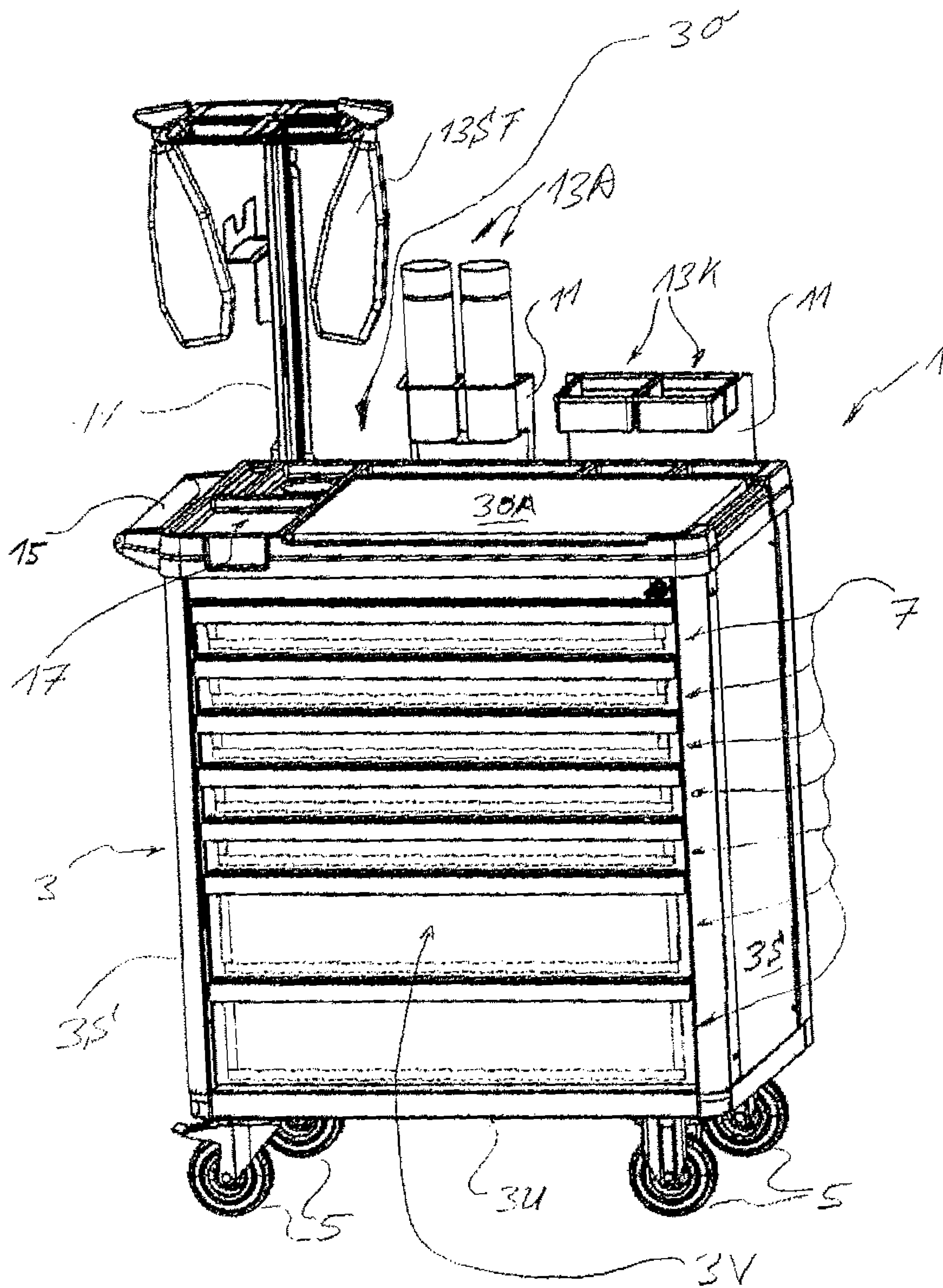


Fig. 1

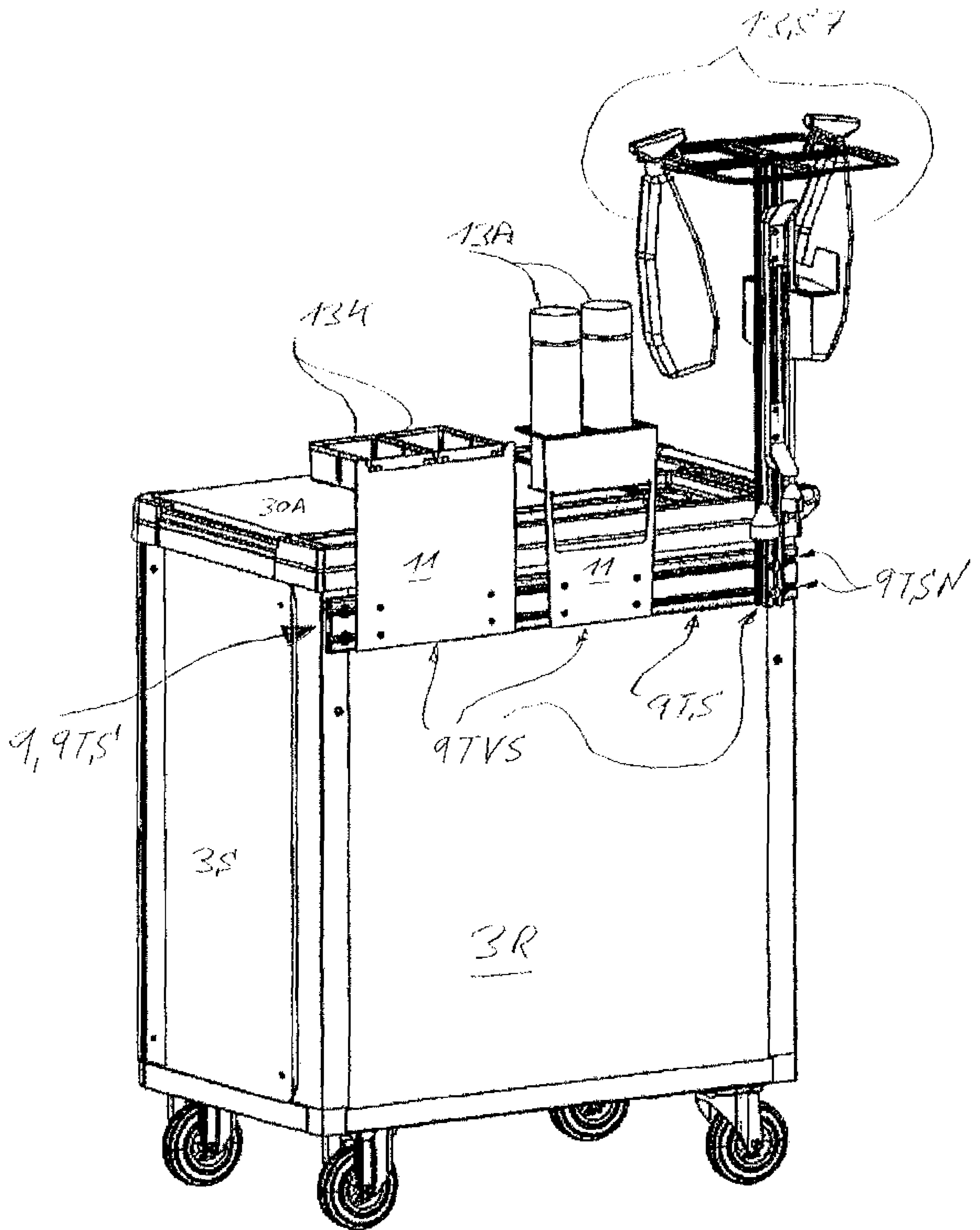


Fig 2

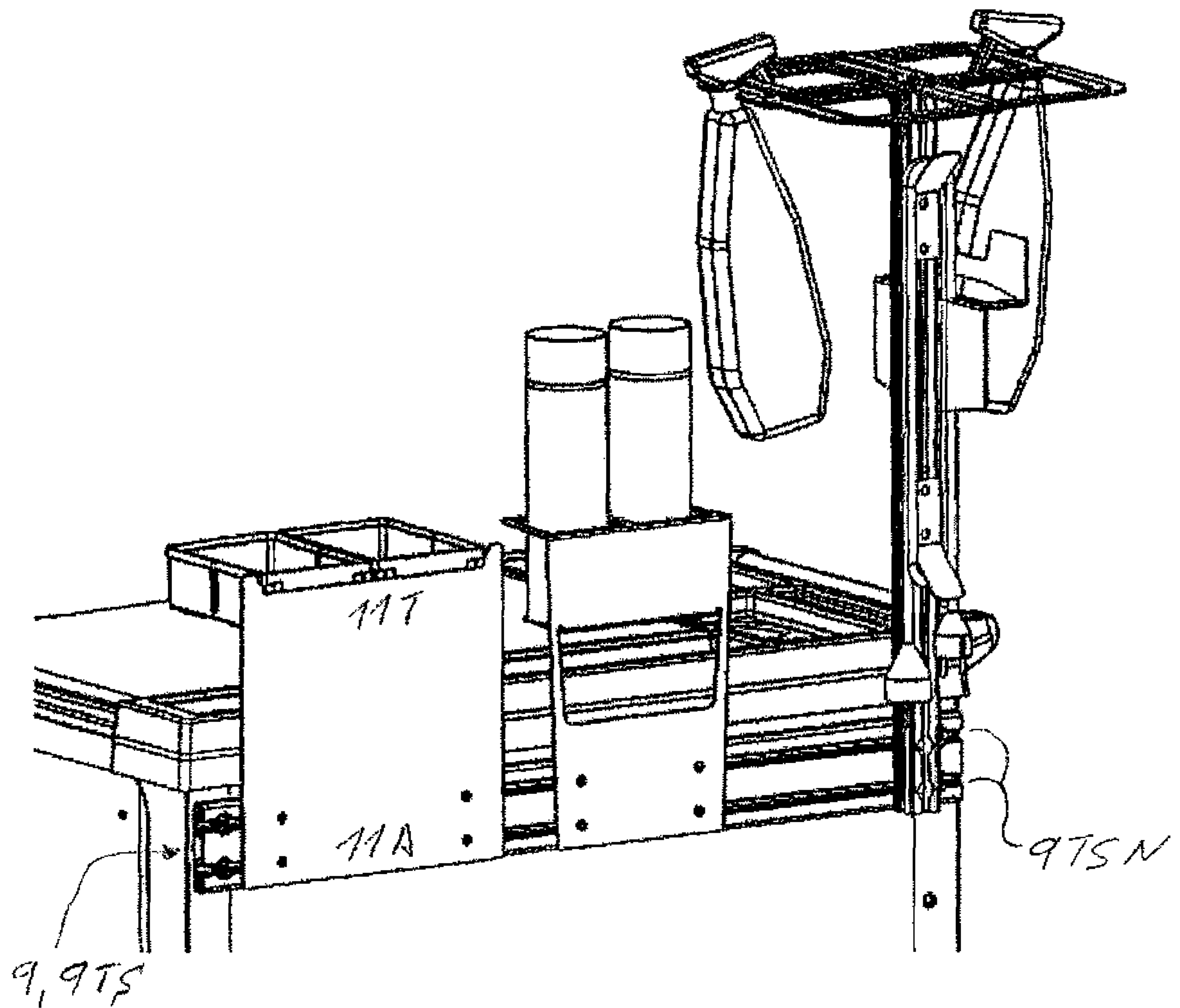
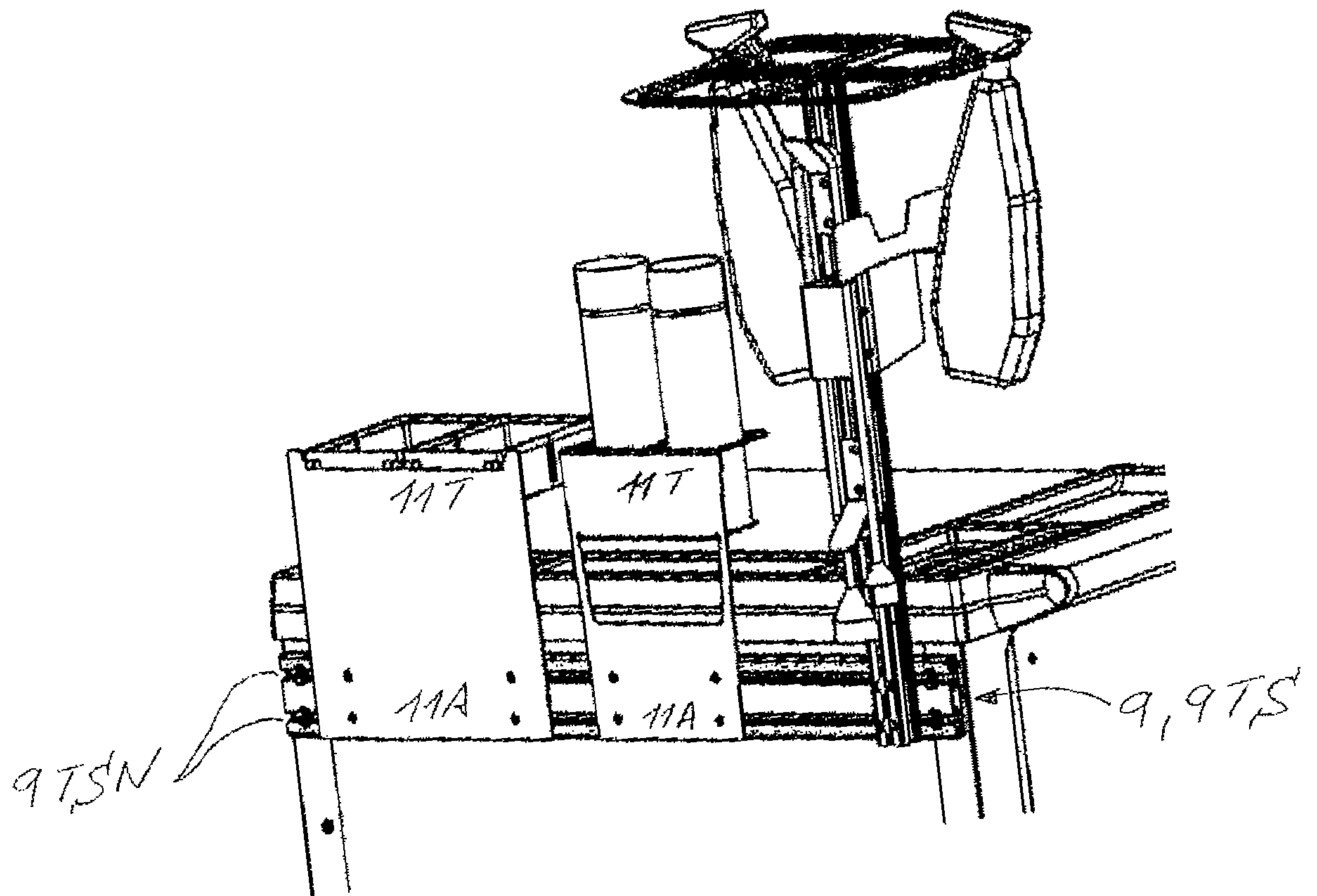


Fig 2



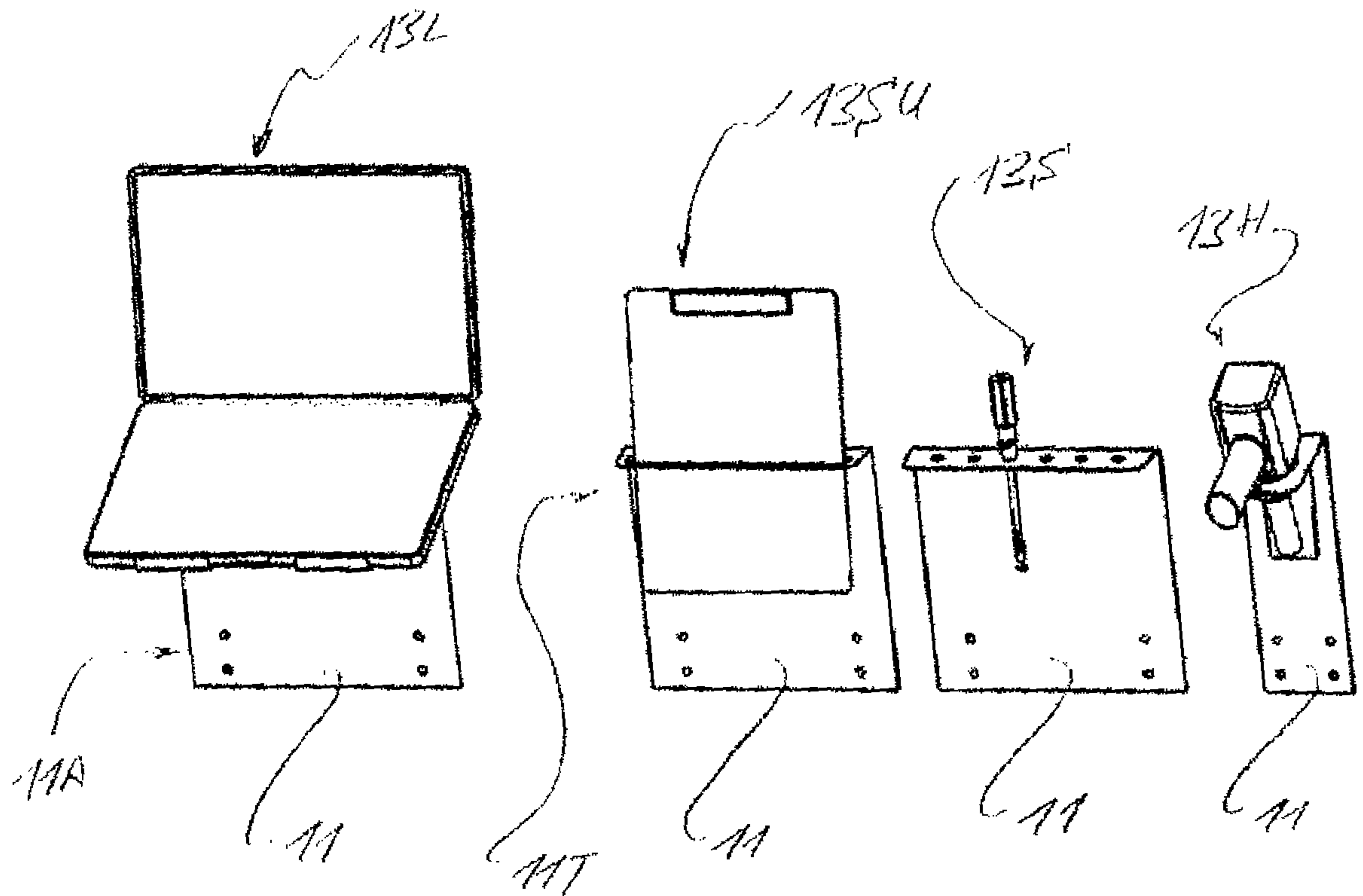


Fig 5

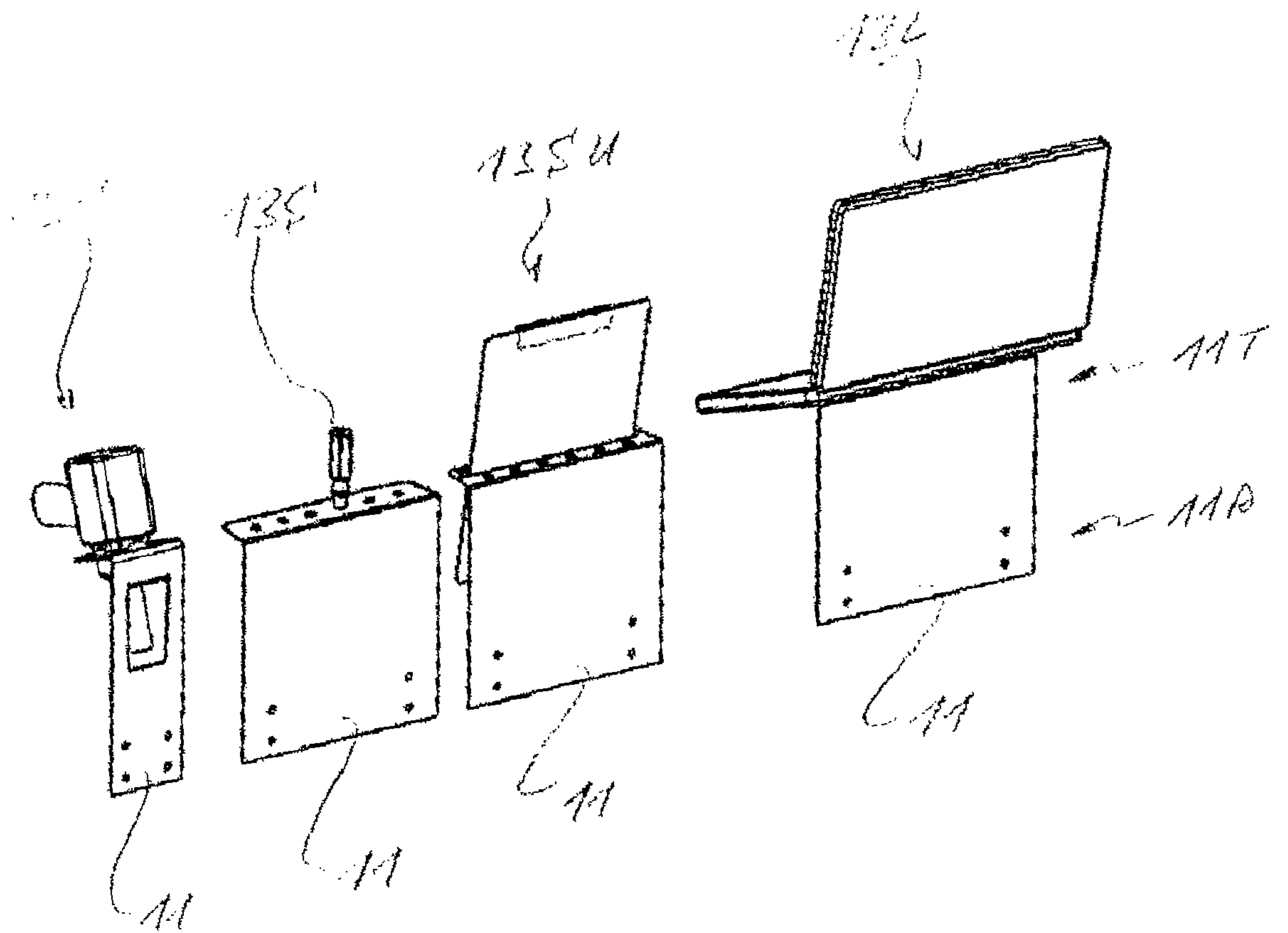


Fig 6

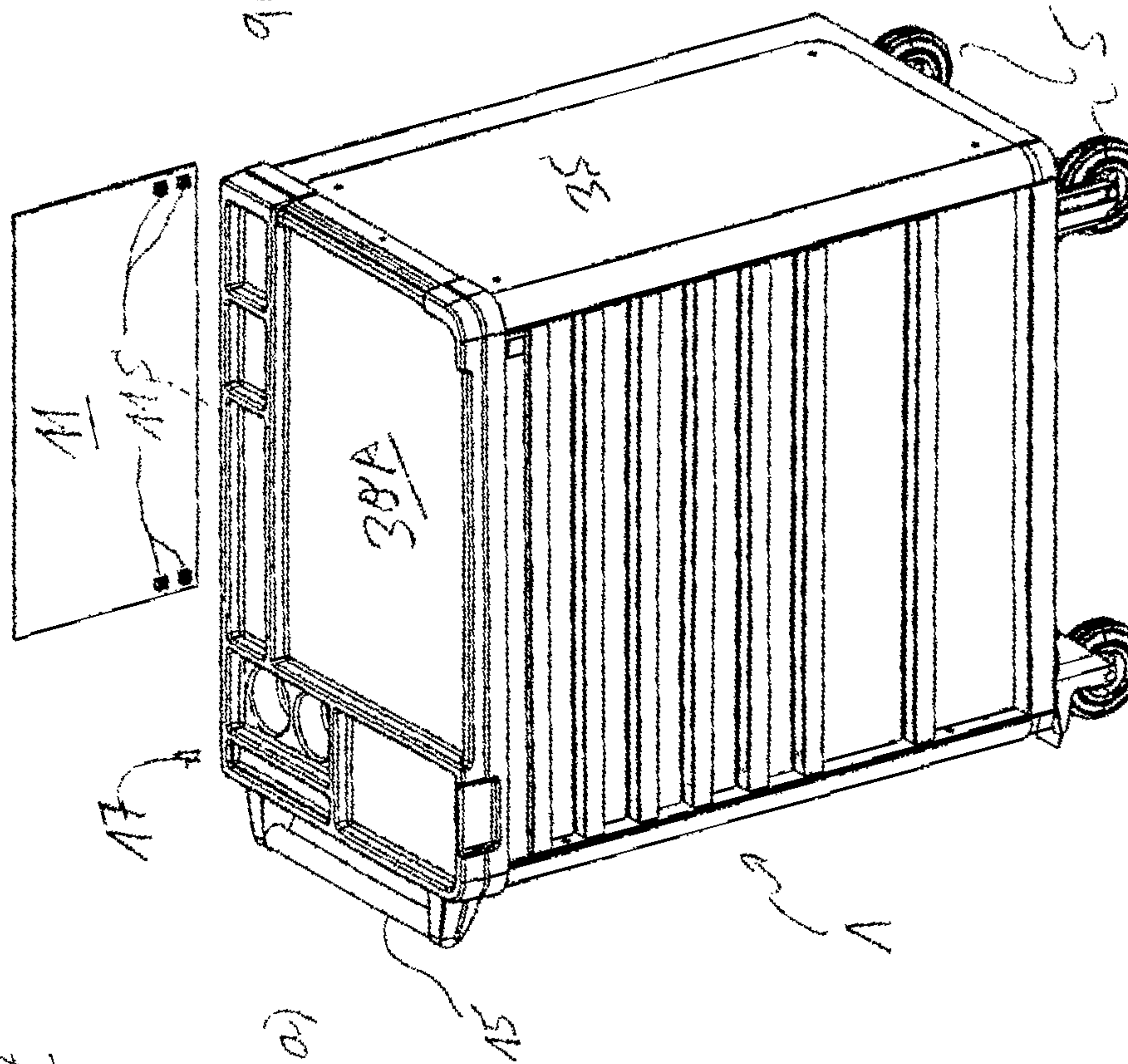
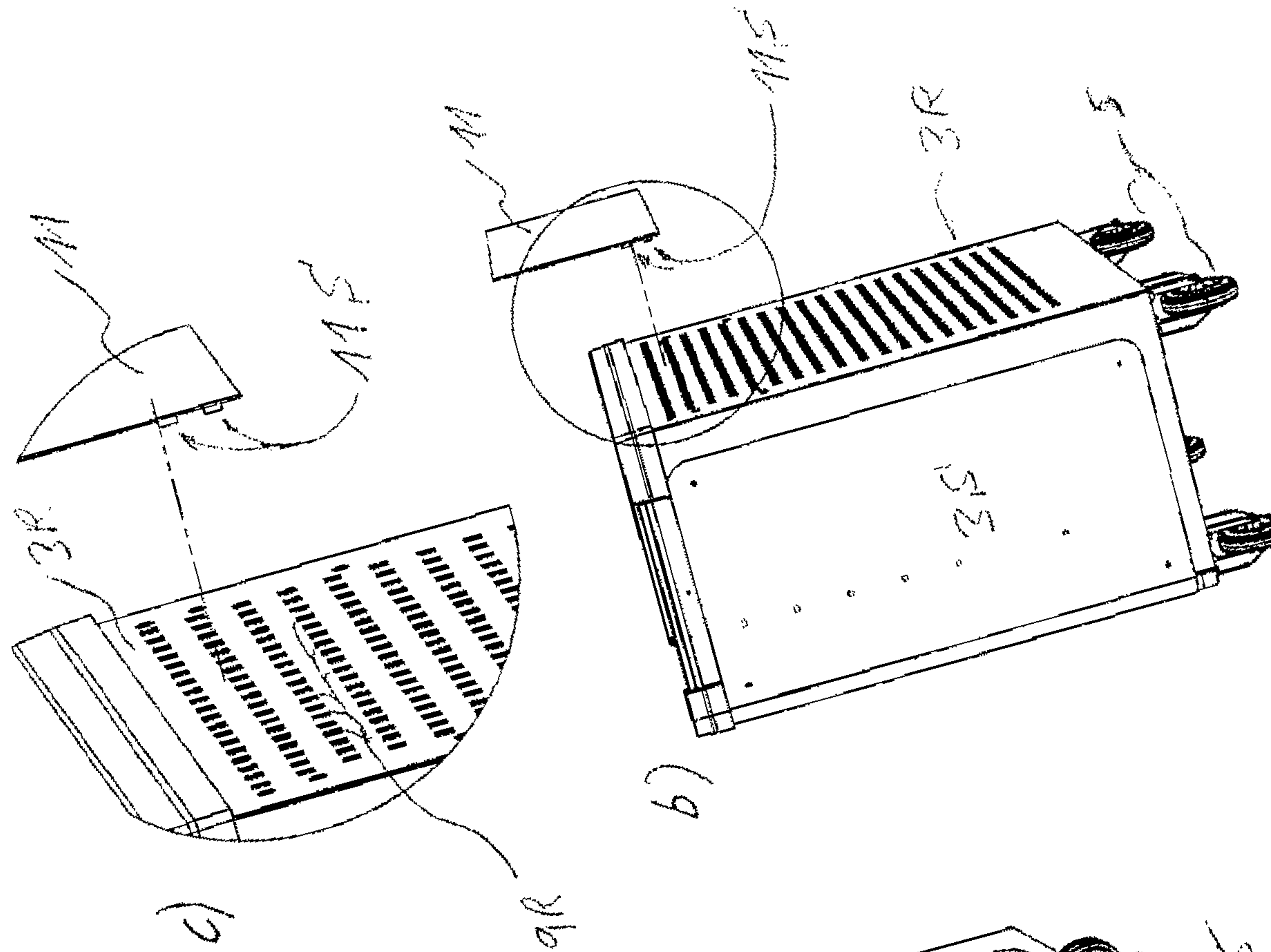


Fig. 7