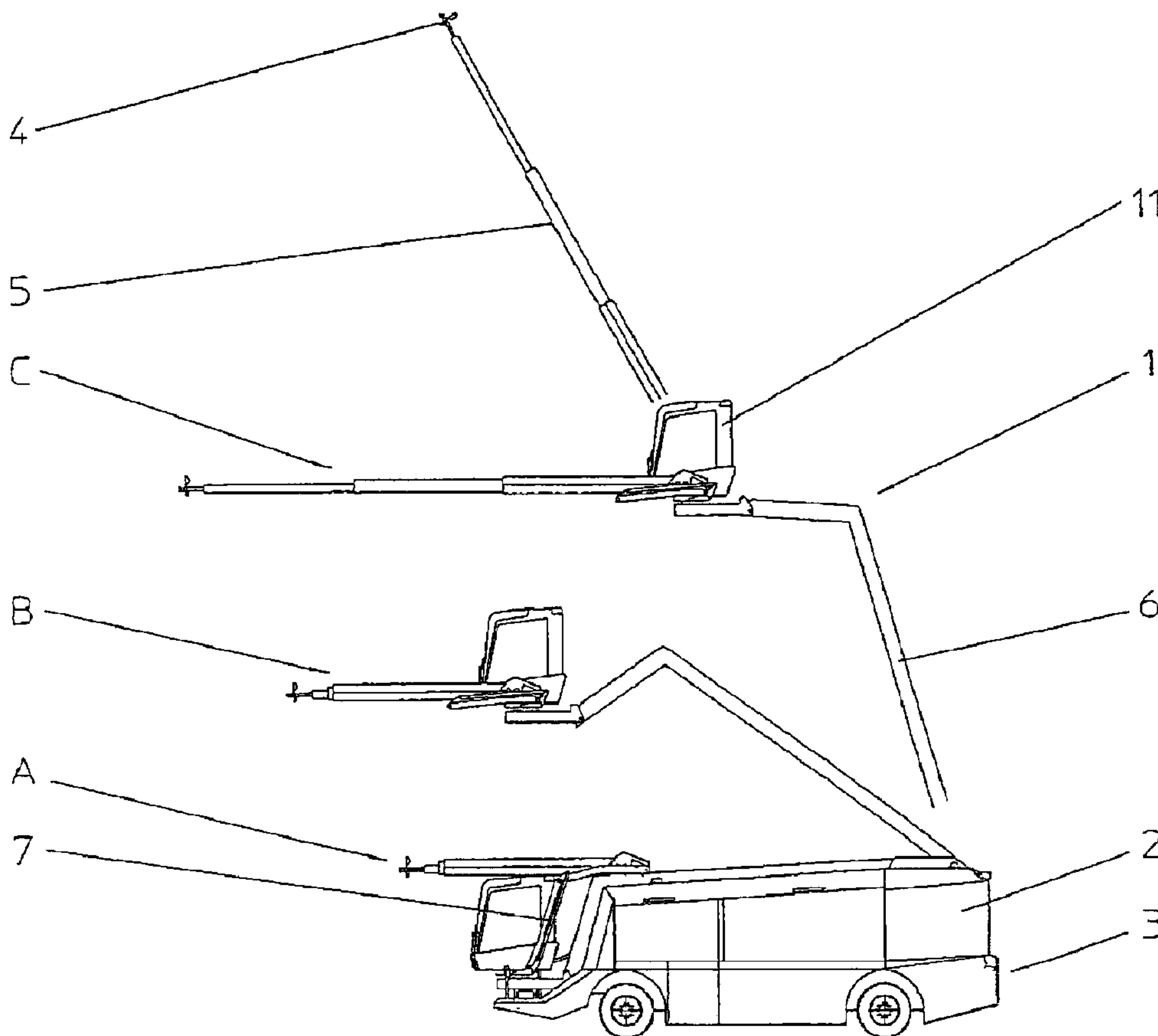




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(54) **Titre : INSTALLATION DE PULVERISATION**
(54) **Title: SPRAYING INSTALLATION**



(57) **Abrégé/Abstract:**

Spraying installation (1) on a chassis (2) of a truck (3), comprising a spraying nozzle (4) at the free end of a telescopic arm (5) attached to the chassis (2) via elevation means, characterized by the telescopic arm (5) being supported in a first position (A)

(57) Abrégé(suite)/Abstract(continued):

oriented along the length of the truck (3) and above the top of the truck, wherein the telescopic arm (5) is stowed in a horizontal transport position, and supported in at least one other, active position (B, C), whereby the telescopic arm stays in a horizontal position during the movement between said positions (A and B,C) in a space confined between the vertical planes of the two sides of the truck.

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SPRAYING INSTALLATION

ABSTRACT:

- 5 Spraying installation (1) on a chassis (2) of a truck (3), comprising a spraying nozzle (4) at the free end of a telescopic arm (5) attached to the chassis (2) via elevation means, characterized by the telescopic arm (5) being supported in a first position (A) oriented along the length of the truck (3) and above the top of the truck, wherein the telescopic arm (5) is stowed in a horizontal transport position, and supported in at least
- 10 one other, active position (B, C), whereby the telescopic arm stays in a horizontal position during the movement between said positions (A and B,C) in a space confined between the vertical planes of the two sides of the truck.

Figure 1 to be published with the abstract

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SPRAYING INSTALLATION

The invention relates to a spraying installation mounted on top of a chassis of a truck, the spraying applications being optional for de-icing and anti-icing of aircraft, depaint-
5 ing and fire fighting etc.

Prior art according to EP 1775218 shows a vehicle for de-icing of aircrafts in which a vehicle is provided with a telescopic boom having a cabin at its farther end, and with the cabin being provided with a telescopic arm having a spray nozzle attached to the
10 end thereof, and being shiftable between a vertical transport position and a horizontal active position.

US 5,746,396 describes a mobile deicer comprising a truck with an elevating boom, wherein a linkage is connecting said boom with an operator's platform, and the
15 platform is provided with a scissor boom extendible horizontally and carrying a nozzle on its distal end. The scissor boom lacks strength to extend the nozzle very far resulting in an unsatisfactory operating range.

This prior art constructions have limitations to the length of the nozzle-equipped arm, even before being extended, which is by its nature limited to extend from the cabin,
20 and this also creates the limit for how much forward of the cabin front the arm can be extended. It can often be problematic for the telescopic arm to carry its own weight.

It is the purpose of some embodiments of this invention to provide a spraying installation as mentioned above, whereby the limitations known from the prior art are dealt with in
25 such a way that the construction according to some embodiments of the invention makes it possible to use a stronger telescopic arm having a secure action range much larger than in the '218 and '396 patents, and that the positioning of the spraying installation in its transport position will require only a narrow space confined by the sides of the truck and
30 by a comparatively little height above the truck top.

In some embodiments, the purpose has been obtained by a spraying installation characterized by the telescopic arm being supported in a first position oriented along the length of the truck and above the top of the truck, wherein the tele-
35 scopic arm is stowed in a retracted, horizontal transport position, and supported in a second, active position, whereby the telescopic arm stays horizontal during the

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movement between said positions in a space confined between the vertical planes of the two sides of the truck.

5 The big advantage is that according to some embodiments of the invention, the space around the truck in which the telescopic arm moves is no wider than the truck, which enhances the maneuverability around the aircraft, while at the same time the telescopic arm could be kept longer than that of other competing spraying trucks due to its retracted pivot point.

10 Telescopic arms having a long main body would require fewer telescopic segments, thereby a more robust cross section for a specific range. The telescopic arm according to the invention would easily show a range of up to 10 m, which allows for a very efficient spraying installation.

15 In one embodiment of the invention, the elevation means comprises an elevation boom and a linkage system based on a parallelogram construction comprising at least one pair of parallel beams and at least one pair of brackets, the beams being connected at each end to at least one of the top and bottom brackets, the top bracket being rotatably linked to the telescopic arm, and the bottom bracket being rotatably linked to the elevation boom for movement of the telescopic arm by the linkage system between the transport position and the active position substantially in parallel with the ground.

20 In another embodiment of the invention, the upper end of the elevation boom is provided with an operator platform whereto the telescopic arm is attached by means of the bottom brackets of the linkage system.

25 The said parallelogram embodiment includes a bottom bracket comprising a bracket plate and a bracket foot to be attached to the operator platform by fastening means and having a throughbore for a pivot bolt to be inserted through a corresponding hole in the bracket plate, said bracket plate also having holes for pivot bolts to rotate the beams over a circular arc in a vertical plane, and wherein the top bracket comprises a bracket plate with pivot holes for attachment of the beams and the telescopic arm.

35 The telescopic arm having arrived at an active position B - determined by the elevation of the elevation boom - can be variably extended telescopically forward of the elevation boom to take up a position C, in which the telescopic arm can rotate horizontally

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and can advantageously tilt $+70^{\circ}/-10^{\circ}$; preferably $+60^{\circ}/-6^{\circ}$, relative to the horizontal level and in the operator's field of view, while in the transport position the telescopic arm is shifted backwards and above the platform out of the operator's field of vision.

One of the applications for which the spraying installation according to some
5 embodiments of the invention is useful is de-icing and anti-icing of aircraft. Other applications would be painting or removing paint or rust from surfaces, or firefighting to name a few.

Also, some embodiments of the invention provides a truck mounted with a spraying
installation as described above and being at the same time an operator's platform
10 and a fully functional driver's cabin, regardless of the elevation position of the platform/cabin.

Having followed the principles defined, we arrive at a spraying installation which
provides us with a truck that can be driven and operated from the same operator
position and that requires very little space in front of and above the sides of the truck,
15 thereby providing a great deal of maneuverability, as the truck operates around
aircrafts. Only when ready for action the spraying installation needs to be extended,
and for that situation the truck is supposed to be stationary, or driving at a low speed.

In one embodiment, the invention provides a spraying installation on a chassis of a
truck, the truck having a top, two sides defining two vertical planes, a front end and a
20 rear end defining a lengthwise direction of the truck between said front end and said
rear end, the spraying installation comprising: an elevation boom having a free end
and an opposite end attached to the chassis of the truck; a telescopic arm, having a
first free end and a second end attached to the free end of said elevation boom, the
telescopic arm being movable to be supported in a first essentially horizontal
25 transport position extending in the lengthwise direction of the truck and above the top
of the truck, the telescopic arm being movable to also be supported in at least one

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other, active position which is higher than the transport position; the telescopic arm being configured to stay essentially horizontal during movement between said first essentially horizontal transport position and said at least one other active position, said movement further being confined to a space between said vertical planes

5 defined by the two sides of the truck; a spraying nozzle, attached at the first free end of the telescopic arm; said elevation boom being attached to the telescopic arm by a linkage system, said linkage system comprising a parallelogram construction having at least one pair of parallel beams, a bottom bracket and a top bracket, each of said parallel beams being connected for rotation about an axis at one end to the bottom

10 bracket and about another axis at the other end to the top bracket, the top bracket further being rotatably linked to the telescopic arm for rotation of the telescopic arm about an axis parallel to the said axes of the connections of the beams to the brackets, and the bottom bracket further being rotatably linked to the elevation boom, such that movement of the elevation boom, acting through the linkage system, results

15 in a movement of the telescopic arm between said horizontal transport position and said at least one other, active position; and an operator platform attached to the bottom bracket of the linkage system.

Hereafter an exemplary embodiment of the invention will be described in detail with reference to the drawing, which shows in

20 Fig. 1 a truck with a spraying installation according to the invention and in three different positions, i.e. a transport position, a ready position with the elevation boom elevated, and an active position with the telescopic arm extended and tilted in the vertical plane, and in

Fig. 2 a detailed view of the parallelogram construction of the linkage system.

25 Fig. 1 shows a truck 3 having a chassis 2 and a spraying installation 1 mounted on the chassis.

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The spraying installation 1 comprises a spraying nozzle 4 attached to the free end of a telescopic arm 5, which is attached to the chassis 2 of the truck 3 via elevation means.

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The elevation means comprises an elevation boom 6 elevated about one end, while at the other end a linkage system 7 connects to the telescopic arm 5 and moves it between a transport position A along the top of the truck 3 via a ready position B to an active position C wherein the arm 5 can be extended to a variable range, and during
5 said movement the telescopic arm 5 is kept in a horizontal position.

Having arrived in the ready or active position, the telescopic arm is allowed to turn in a horizontal plane and to tilt over a circular arc in the vertical plane under supervision of an operator/driver.

10 This means that the truck according to the invention only requires much space when it is situated where the action is to take place.

The technical problem of having a long telescopic arm 5 which can be moved between a transport position A and an active position B, C, requiring a very modest space to do
15 this, is solved by means of the linkage system 7 according to the invention, which carries the arm 5 forward from a transport position A to an active position B, C in a sliding movement keeping the arm 5 horizontal during the whole movement, so when the operator needs to watch and guide the spray nozzle 4, it is moved into the spraying position by the linkage system 7 making a parallelogram movement to lower the arm 5 to
20 be level with the bottom of a platform 11.

The linkage system 7 is comprised of at least one pair of parallel beams 8 and at least one pair of brackets 9, 10, the beams 8 being connected at each end to at least one of the top and bottom brackets 9, 10, the top bracket being rotatably linked to the tele-
25 scopic arm 5, and the bottom bracket 10 being rotatably linked to the elevation beam 6 for movement of the telescopic arm 5 by the linkage system 7 between the transport position A and the active position B, C.

In a detailed explanation of the linkage system 7, it should be understood that in the
30 parallelogram construction of the linkage system 7, the bottom bracket 10 comprises a bracket plate 12 and a bracket foot 13 to be attached to the operator platform 11 by fastening means and having a throughbore for a pivot bolt to be inserted through a corresponding hole 14 in the bracket plate 12. Said bracket plate 12 also has holes 15 for pivot bolts to rotate the beams 8 over a circular arc in a vertical plane. The top
35 bracket 9 comprises a bracket plate 16 with pivot holes (17 and 18-19) for attachment of the telescopic arm 5 and the beams 8, respectively.

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In a currently preferred embodiment of the invention, the spraying installation 1 is mounted on the truck 3 in a laterally offset position relative to the main axis through the truck, so the installation is situated fully to the one side of the operator platform 11 making the mounting very compact.

10 List of references

- 1. spraying installation
- 2. chassis
- 3. truck
- 15 4. nozzle
- 5. telescopic arm
- 6. elevation boom
- 7. linkage system
- 8. beams
- 20 9. top bracket
- 10. bottom bracket
- 11. operator platform / driver's cabin
- 12. bottom bracket plate
- 13. bracket foot
- 25 14. pivot hole
- 15. pivot holes
- 16. top bracket plate
- 17-19 pivot holes
- 30 A. transport position
- B. active (ready) position, without telescopic extension
- C. active position, with telescopic extension.

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CLAIMS:

1. A spraying installation on a chassis of a truck, the truck having a top, two sides defining two vertical planes, a front end and a rear end defining a lengthwise direction of the truck between said front end and said rear end, the
5 spraying installation comprising:

an elevation boom having a free end and an opposite end attached to the chassis of the truck;

a telescopic arm, having a first free end and a second end attached to the free end of said elevation boom, the telescopic arm being movable to be
10 supported in a first essentially horizontal transport position extending in the lengthwise direction of the truck and above the top of the truck, the telescopic arm being movable to also be supported in at least one other, active position which is higher than the transport position;

the telescopic arm being configured to stay essentially horizontal during
15 movement between said first essentially horizontal transport position and said at least one other active position, said movement further being confined to a space between said vertical planes defined by the two sides of the truck;

a spraying nozzle, attached at the first free end of the telescopic arm;

said elevation boom being attached to the telescopic arm by a linkage
20 system, said linkage system comprising a parallelogram construction having at least one pair of parallel beams, a bottom bracket and a top bracket, each of said parallel beams being connected for rotation about an axis at one end to the bottom bracket and about another axis at the other end to the top bracket, the top bracket further being rotatably linked to the telescopic arm for rotation of the telescopic arm about an
25 axis parallel to the said axes of the connections of the beams to the brackets, and the bottom bracket further being rotatably linked to the elevation boom, such that

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movement of the elevation boom, acting through the linkage system, results in a movement of the telescopic arm between said horizontal transport position and said at least one other, active position; and

an operator platform attached to the bottom bracket of the linkage
5 system.

2. The spraying installation according to claim 1, wherein the operator platform comprises a front end and a rear end, the rear end being adjacent to the free end of the elevation boom, the direction from the rear to the front ends of the operator platform defining a direction relative to the operator platform, and wherein the
10 telescopic arm in its at least one active position is extendable in a variable range forward of the platform, and in its transport position the telescopic arm is in a retracted position above the top of the operator platform.

3. The spraying installation according to claim 1, wherein said telescopic arm including said spraying nozzle is mounted for full rotational freedom of movement
15 in a horizontal plane and for limited vertical movement, when said telescopic arm is in the at least one active position.

4. The spraying installation according to claim 3, wherein the limited vertical movement is a limited arc movement relative to a horizontal plane comprising a range of 70° up to 10° down.

20 5. The spraying installation according to claim 4, wherein the limited vertical movement comprises a range of 60° up to 6° down.

6. The spraying installation according to claim 1, wherein the telescopic arm can move into its transport position by moving horizontally backwards relative to the truck, and over the top of the truck.

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7. The spraying installation according to claim 1, wherein said operator platform further comprises a fully functional driver's cabin whether the telescopic arm is in the transport position or in the at least one other active positions.

8. The spraying installation according to claim 7, defining a main axis as
5 the axis extending along the lengthwise direction of the truck in the middle between the two sides of the truck, and wherein the spraying installation is mounted on the top of the truck in a laterally displaced position relative to said main axis and located to one side of the operator platform.

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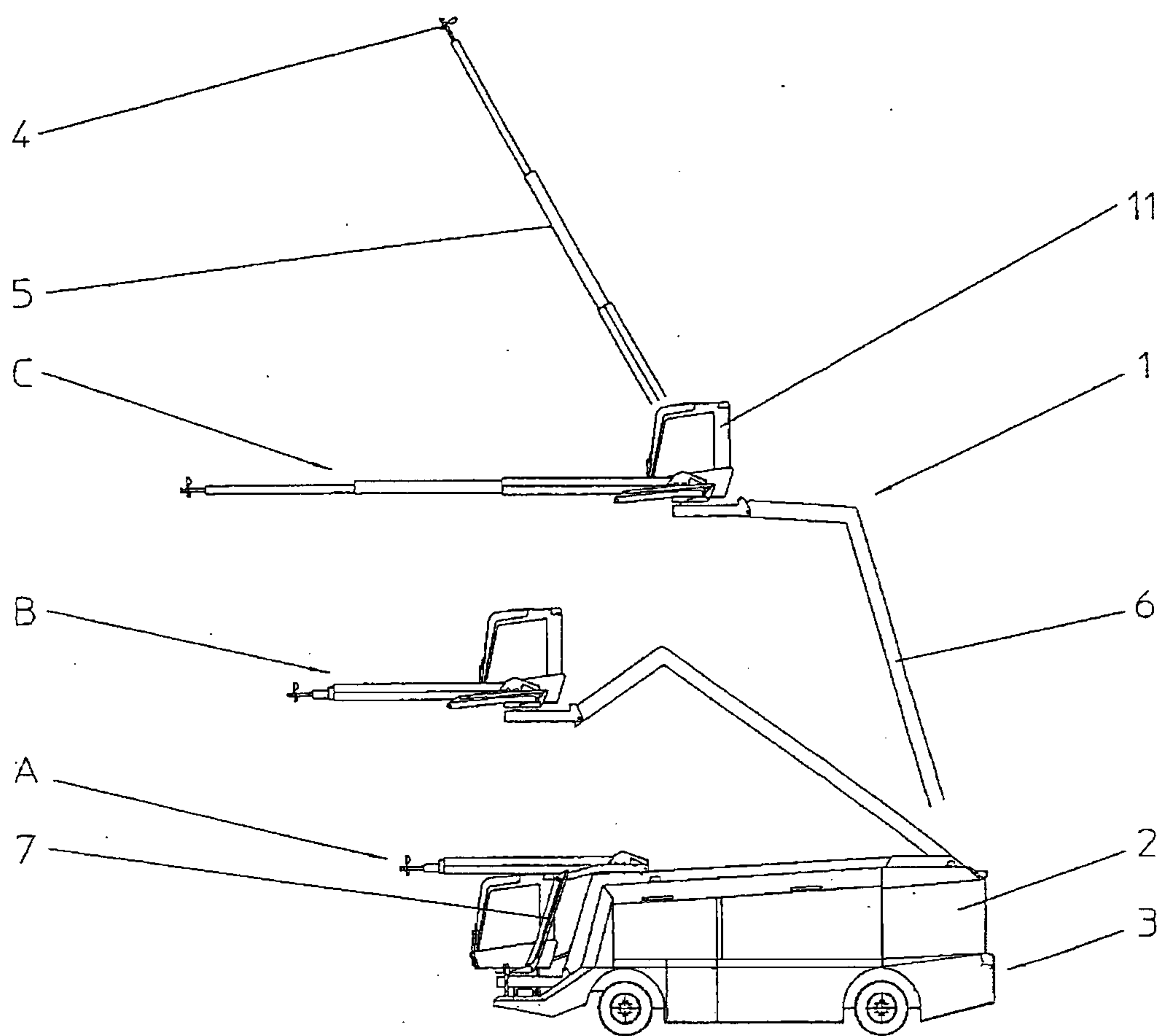


FIG. 1

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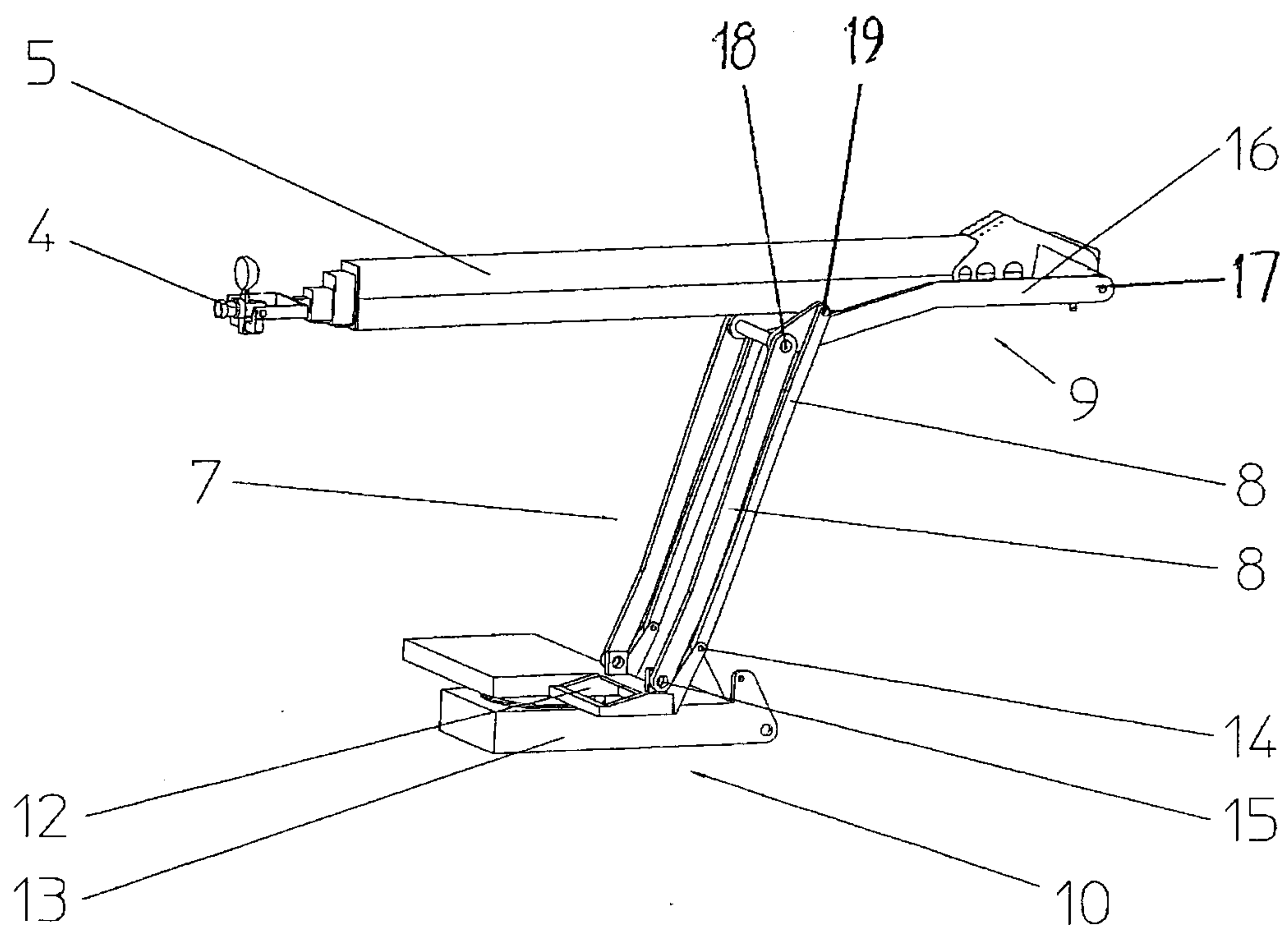


FIG. 2

