

(19)



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(11)

EP 0 743 408 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
07.10.1998 Bulletin 1998/41

(51) Int Cl.⁶: **E04G 21/10, E04F 21/24**

(21) Application number: **96870064.1**

(22) Date of filing: **20.05.1996**

(54) **Machine for striking off poured concrete**

Abziehvorrichtung für Betonschichten

Dispositif de lissage de béton coulé

(84) Designated Contracting States:
BE DE FR IT NL

(30) Priority: **19.05.1995 BE 9500456**

(43) Date of publication of application:
20.11.1996 Bulletin 1996/47

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EP-A- 0 469 687 **DE-C- 3 704 697**
US-A- 5 039 249

EP 0 743 408 B1

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Description

The present invention relates to a machine for striking off poured concrete composed of frame parts which carry the elements for striking off the concrete and the control members thereof, which frame parts are equipped with wheels, at least some of which are drive wheels.

Upon construction of monolithic concrete floors, the concrete surface is mostly struck off manually with vibration beams or struck off strokes. If it concerns larger surfaces, it is already possible to strike off the concrete surface by means of machines which are provided with vibration beams and instruments pertaining thereto. To enable to strike off an as large as possible surface, these machines are provided with a telescopic arm to which the striking off means are applied. This was realised for always enabling to strike off a distance as large as possible. These machines are always set up out off the poured concrete and operate from a stationary position.

When, as it is very usual, these concrete floors are applied into pilots, factory buildings and the like, operating these machines is seriously hampered by the presence of obstacles such as for example pillars, high lying sewer systems, too low ceilings, too small passages, and the like.

In European patent application EP-A-0 469 687, a device is i.a. described which is equipped with cage wheels for enabling to move through the poured liquid concrete. In this document, a wheeled device is shown which is provided with two cylindrical cage wheels, although the possibility is suggested to divide at least one of these cage wheels in two parts. When only two cage wheels are provided, which cage wheels provided with cylinders have a width corresponding to this device, it is not possible to rotate these cylindrical cage wheels without damaging the mostly used plastic foil or the clay cloth which is spread over the bedding and onto which the liquid concrete is poured.

Even when at least one of both cage wheels is divided in two halves, it is possible that the underlying plastic foil or the clay cloth tears or that the naked bedding is damaged, when the cage wheels are turned.

A second clear drawback is the pressure which is exerted by the weight of the machine through the intermediary of the rods of the cage wheels onto a plastic foil or a clay cloth. The often used plastic foils or clay cloths onto which the liquid concrete is poured, are in the widths used therefor, never resistant to the pressure exerted by the cage wheels, while the rotation of these cage wheels over these foils or cloths regularly tears the foil material.

An object of the invention is therefore to provide a machine which enables to achieve striking off concrete floor surfaces under all circumstances on a very flexible manner, without damaging the foil materials described hereinabove.

To achieve this according to the invention, said

wheels are equipped with tires having a tire width of substantially 18 cm.

Other details and advantages of the invention will become apparent from the following description of a machine for striking off poured concrete according to the invention.

This description is only given by way of example and does not limit the invention. The reference numerals relate to the figures annexed hereto.

Figure 1 is a schematic side view of the machine according to the invention.

Figure 2 is a schematic top view of the machine in a position wherein both frame parts and the arm connected to the first frame part are directed according to one and the same centre line.

Figures 3 and 4 are, on a smaller scale, two schematic views of different arrangements of the arm with respect to the first frame part and of the support beam with a striking off unit connected to the arm.

Figure 5 is, on an enlarged scale, a schematic side view of the first frame part and of the support and transverse beams mounted thereon.

Figure 6 is a schematic front view of the support beam with the striking off unit mounted thereto.

Figure 7 is a view similar to the view according to Figure 6, but with respect to an alternative.

Figures 8 and 9 are, on a smaller scale, two schematic views of the machine such as represented in Figures 3 and 4, but with respect to an alternative.

The machine, illustrated by these figures, consists in the embodiment described herein by way of example, of a first frame part 1 and a second frame part 2 which are hingedly connected to each other at the vertical hinge axis 3.

The first frame part 1 carries the required instruments for striking off the poured concrete while the second frame part is equipped with the different mechanic and hydraulic control members of the machines.

Very characterising for this embodiment of the invention is the presence of each time two narrow wheels 4 as well on the first as on the second frame part. The diameter of the wheels 4 and the thickness of the tires 5 which equip these wheels are calculated in such a manner that the machine can be moved without problems through the poured concrete. With the words "without problems" it is meant :

1°) that only an insignificant trace of rut is created in the concrete which is entirely levelled by striking off the concrete if necessary;

2°) with the expression "narrow wheels", wheels equipped with or without tires with a track width of substantially 18 cm at the most are intended.

The presence of wheels on a machine for striking off poured concrete is a very characteristic feature for the way according to which the machine can be deployed under all possible angles and under the most

thinkable circumstances for striking off concrete.

From experiments, it has been found that in freshly poured concrete, wheels which meet to the just described definition form tracks in the concrete which disappear entirely of their own or in each case upon striking off. This is thanks to the compact and light structure of the machine. Also the much discussed foil material remains undamaged.

Handling the machine occurs on a technically very reliable manner by mounting a hydraulic cylinder 6 between the first frame part 1 and the second frame part 2. This hydraulic cylinder with hinge point 7 on the first frame part and 8 on the second frame part is illustrated with a dotted/dashed line in Figures 1, 3 and 4. By using a hydraulic cylinder 6, a simple and light control of the machine is rendered possible and the first frame part 1 and the second frame part 2 can be set up under very different angles with respect to each other. This is illustrated i.a. in Figures 3 and 4.

On the first frame part, an arm 9 is mounted with the possibility to turn. The arm 9 is mounted with respect to the first frame part through the intermediary of a rotary ring 10. Here also, use is made of a hydraulic cylinder. This cylinder 11 has its first hinge point 12 on the rotary ring 10 and a second rotation point 17 on the first frame part. This second hydraulic cylinder 11 permits to set up the arm with respect to the frame part under a plurality of angles with respect to each other. Also this is very clearly illustrated in Figures 3 and 4.

The arm 9 which can be turned on itself with respect to the first frame part in the horizontal plane is, approximately at free end height thereof, provided with a second rotary ring, which is illustrated Figures 2, 3 and 4 with reference 13.

To this rotary ring 13, the transverse beam 14 is fixed. To this transverse beam 14, the support beam 24 is fixed and this through the intermediary of a number of parts which will be explained further in detail. The turning of the transverse beam 14 with respect to the arm 9 is realised here by a hydraulic cylinder 15, with a first hinge point 16 on the transverse beam and a second hinge point 17 on the rotary ring 13.

It is also possible to slide away laterally the transverse beam by means of a guide 32 wherein the transverse beam can slide laterally left- or rightwards with respect to the arm. This movement is realised by a hydraulic cylinder 31 which is fixed at one extremity to the guide 32 and a second extremity is fixed to the transverse beam 14. This hydraulic cylinder 31 is illustrated in Figures 7, 8 and 9 by a dotted/dashed line. The possible movements are illustrated in the Figures 7, 8 and 9. This guide 32 can replace the rotary ring 13 if necessary.

From the present, it seems that the arm 9 can be turned with respect to the first frame part 1 and the transverse beam 14 with respect to the arm 9 by means of technically reliable means. This is actually illustrated in Figures 3 and 4 showing schematically the machine ac-

cording to the invention in a top view.

On the transverse beam 14, a hollow column 18 is mounted each time on its extremity. This hollow columns serve to guide tubes in up- and downwards direction. For this movement, hydraulic cylinders 20 are mounted parallel to these tubes, on the one hand to the tubes and, on the other hand, to the transverse beam. The sensors 21 act on a laser beacon, as known, which has not been illustrated in the figures.

The support beam 24 is suspended to the tubes 19 by means of a knee joint 23. To this support beam 24, a scraper 25 is fixed. A roller 26 is also fixed to the support beam, the rotation direction of which is opposite to the direction wherein the machine moves. Finally, the support beam 24 serves also as suspension point of a vibration beam 27 which is driven by vibration motor 28.

Small hydraulic cylinders 29 are hingedly connected, on the one hand with the support beam 24 and are connected, on the other hand, with an arm 30 at the bottom of the tubes 19. The object is to be allowed to modify the horizontal position of the support beam and thus to adapt it to the local or temporary requirements.

From the just given description of the machine according to the invention, it thus clearly appears that it shows hitherto never reached flexibility upon striking off poured concrete. It is further also possible, thanks to the use of wheels with the appropriate diameter and band width, to move the machine through the poured concrete without causing any problems upon striking off the concrete afterwards.

The machine shows, as it appears from the description and the figures annexed hereto, a very compact and light structure. The required means for striking off the concrete can be set up and used under very different angles, as it appears from these figures.

Thanks to the light construction, the machine can be provided with wheels equipped with tires, which solves hitherto very inconvenient problems.

Claims

1. A machine for striking off poured concrete composed of frame parts (1,2) which carry the elements for striking off the concrete and the control members thereof, which frame parts are equipped with wheels (4), at least some of which are drive wheels, characterised in that said wheels (4) are equipped with tires (5) having a tire width of 18 cm at the most.
2. A machine for striking off poured concrete according to claim 1, characterised in that it is composed of two frame parts (1, 2) hingedly connected to each other according to a vertical axis (3), the first frame part (1) of which carries the elements for striking off the concrete, while the second frame part (2) comprises the control members of the machine, each frame part being further equipped with wheels.

3. A machine according to claim 2, characterised in that said frame parts (1, 2) are connected to each other by means of a hydraulic cylinder (6) which permit said frame parts (1, 2) to hinge with respect to each other. 5
4. A machine according to any one of the claims 1 to 3, characterised in that said elements for striking off the poured concrete consist of a scraper (25), a rotating roller (26) and a vibrating beam (27). 10
5. A machine according to claim 4, characterised in that said scraper (25), roller (26) and vibrating beam (27) are mounted on a support beam (24), the height of which is adjustable by means of sensors (21) with respect to a laser beacon. 15
6. A machine according to claim 5, characterised in that said support beam (24) is suspended at both of its extremities to a tube (19), which tube is guided in hollow columns (18) fixed to a transverse beam, which tubes (19) are further equipped at the top with sensors (21) and are displaced up- and downwards in function of the laser beam detection, while said transverse beam (24) can be turned with respect to an arm (9) which is a part of said first frame part (1). 20 25
7. A machine according to claim 6, characterised in that said support beam (24) is suspended to said tubes through the intermediary of a knee joint (23). 30
8. A machine according to either one of the claims 6 and 7, characterised in that said tubes (19), to which said support beam (24) is fixed, are connected at the bottom to said support beam (24) through the intermediary of hydraulic cylinders (29), in such a manner that the angle under which the support beam (24) extends with respect to the horizontal plane can be adjusted. 35 40
9. A machine according to any one of the claims 6 to 8, characterised in that a hydraulic cylinder (15) is mounted between said first frame part (1) and said transverse beam (14) to ensure turning of said transverse beam (14) with respect to said arm (9) pertaining to said first frame part (1). 45
10. A machine according to any one of the claims 3 to 6, characterised in that a hydraulic rotary ring (13) is mounted between said arm (9) and said transverse beam (14) to ensure turning of said transverse beam (14) with respect to said arm (9). 50
11. A machine according to any one of the claims 6 to 10, characterised in that said arm (9) has a guide (32) provided thereon through which said transverse beam (14) can be moved laterally in both directions by means of a hydraulic cylinder (31). 55

Patentansprüche

1. Vorrichtung zum Abziehen von gegossenem Beton, die sich aus Rahmenteilen (1, 2) zusammensetzt, welche die Elemente zum Abziehen des Betons und deren Steuerungsteile tragen, wobei die Rahmenteile mit Rädern (4) versehen sind, von denen zumindest einige Antriebsräder sind, dadurch gekennzeichnet, daß die Räder (4) mit Reifen (5) versehen sind, die eine Reifenbreite von maximal 18 cm aufweisen.
2. Vorrichtung zum Abziehen von gegossenem Beton nach Anspruch 1, dadurch gekennzeichnet, daß sie aus zwei Rahmenteilen (1, 2) besteht, die gelenkig miteinander an einer vertikalen Achse (3) verbunden sind, wobei der erste Rahmenteil (1) die Elemente zum Abziehen des Betons trägt, während der zweite Rahmenteil (2) die Steuerungsteile der Vorrichtung trägt, wobei jedes Rahmenteil mit Rädern versehen ist.
3. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß die Rahmenteile (1, 2) mittels eines Hydraulikzylinders (6) miteinander verbunden sind, der ermöglicht, daß die Rahmenteile (1, 2) in Bezug zueinander lenkbar sind.
4. Vorrichtung nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die Elemente zum Abziehen des gegossenen Betons auf einem Abziehelement (25), einer rotierenden Rolle (26) und einem schwingenden Träger (27) bestehen.
5. Vorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß das Abziehelement (25), die Rolle (26) und der schwingende Träger (27) aus einem Stützträger (24) angebracht sind, dessen Höhe mittels Sensoren (21) in Bezug auf eine Laserstrahlmarkierung einstellbar ist.
6. Vorrichtung nach Anspruch 5, dadurch gekennzeichnet, daß der Stützträger (24) an seinen beiden Endabschnitten an einem Rohr (19) aufgehängt ist, das in hohlen Säulen (18) geführt ist, die an einem Querträger fixiert sind, wobei die Rohre (19) an der Oberseite mit Sensoren (21) versehen sind und in Abhängigkeit der Laserstrahlerfassung auf- und abwärts verlagert werden, während der Querträger (24) in Bezug auf einen Arm (9), der ein Teil des ersten Rahmenteils (1) ist, gedreht werden kann.
7. Vorrichtung nach Anspruch 6, dadurch gekennzeichnet, daß der Stützträger (24) an den Rohren mittels eines Kniegelenks (23) aufgehängt ist.
8. Vorrichtung nach einem der Ansprüche 6 oder 7, dadurch gekennzeichnet, daß die Rohre (19), an

denen der Stützträger (24) fixiert ist, an der Unterseite mit dem Stützträger (24) unter Zwischenschaltung von Hydraulikzylindern (29) so verbunden sind, daß der Winkel, unter dem der Stützträger (24) in Bezug auf die horizontale Ebene verläuft, eingestellt werden kann.

9. Vorrichtung nach einem der Ansprüche 6 bis 8, dadurch gekennzeichnet, daß ein Hydraulikzylinder (15) zwischen dem ersten Rahmenteil (1) und dem Querträger (14) angebracht ist, um eine Drehung des Querträgers (14) bezüglich des Arms (9), der zu dem ersten Rahmenteil (1) gehört, zu gewährleisten.

10. Vorrichtung nach einem der Ansprüche 3 bis 6, dadurch gekennzeichnet, daß ein hydraulischer Rotationsring (13) zwischen dem Arm (9) und dem Querträger (14) angebracht ist, um eine Drehung des Querträgers (14) bezüglich des Arms (9) zu gewährleisten.

11. Vorrichtung nach einem der Ansprüche 6 bis 10, dadurch gekennzeichnet, daß der Arm (9) eine Führung (32) darauf aufweist, durch die der Querträger (14) seitlich in beiden Richtungen mittels eines Hydraulikzylinders (31) bewegt werden kann.

Revendications

1. Machine pour égaliser du béton coulé composée de pièces de châssis (1, 2) qui supportent les éléments pour égaliser le béton et les organes de commande de ceux-ci, lesquelles pièces de châssis sont équipées de roues (4), dont au moins certaines sont des roues d'entraînement, caractérisée en ce que lesdites roues (4) sont équipées de pneus (5) ayant une largeur de pneu de 18 cm tout au plus.

2. Machine pour égaliser du béton coulé suivant la revendication 1, caractérisée en ce qu'elle est composée de deux pièces de châssis (1, 2) reliées par articulation l'une à l'autre suivant un axe vertical (3), dont la première pièce de châssis (1) supporte les éléments pour égaliser le béton, tandis que la seconde pièce de châssis (2) comprend les organes de commande de la machine, chaque pièce de châssis étant en outre équipée de roues.

3. Machine suivant la revendication 2, caractérisée en ce que les pièces de châssis (1, 2) susdites sont reliées l'une à l'autre au moyen d'un cylindre hydraulique (6) qui permet à ces pièces de châssis (1, 2) de s'articuler l'une par rapport à l'autre.

4. Machine suivant l'une quelconque des revendications 1 à 3, caractérisée en ce que les éléments pré-

cités pour réaliser le béton coulé se composent d'un racleur (25), d'un rouleau rotatif (26) et d'une poutrelle vibrante (27).

5. Machine suivant la revendication 4, caractérisée en ce que le racleur (25), le rouleau (26) et la poutrelle vibrante (27) sont montés sur une poutrelle de support (24), dont la hauteur est ajustable au moyen de détecteurs (21) par rapport à une balise laser.

6. Machine suivant la revendication 5, caractérisée en ce que la poutrelle de support (24) est suspendue à ses deux extrémités à un tube (19), lequel tube est guidé dans des colonnes creuses (18) fixées à une poutrelle transversale, lesquels tubes (19) sont de plus équipés à l'extrémité supérieure de détecteurs (21) et sont déplacés vers le haut et vers le bas en fonction de la détection du faisceau laser, tandis que la poutrelle transversale (24) peut être orientée par rapport à un bras (9) qui fait partie de la première pièce de châssis (1).

7. Machine suivant la revendication 6, caractérisée en ce que la poutrelle de support (24) est suspendue aux tubes précités par l'intermédiaire d'une articulation coudée (23).

8. Machine suivant l'une ou l'autre des revendications 6 et 7, caractérisée en ce que les tubes (19), auxquels la poutrelle de support (24) est fixée, sont reliés à l'extrémité inférieure à ladite poutrelle de support (24) par l'intermédiaire de cylindres hydrauliques (29), d'une manière telle que l'angle sous lequel la poutrelle de support (24) s'étend par rapport au plan horizontal puisse être ajusté.

9. Machine suivant l'une quelconque des revendications 6 à 8, caractérisée en ce qu'un cylindre hydraulique (15) est monté entre la première pièce de châssis (1) et la poutrelle transversale (14) pour assurer la rotation de la poutrelle transversale (14) par rapport au bras (9) appartenant à la première pièce de châssis (1).

10. Machine suivant l'une quelconque des revendications 3 à 6, caractérisée en ce qu'un anneau rotatif hydraulique (13) est monté entre le bras (9) et la poutrelle transversale (14) pour assurer la rotation de la poutrelle transversale (14) par rapport au bras (9).

11. Machine suivant l'une quelconque des revendications 6 à 10, caractérisée en ce que sur le bras (9) est prévu un guide (32) grâce auquel la poutrelle transversale (14) peut être déplacée latéralement dans les deux directions au moyen d'un cylindre hydraulique (31).

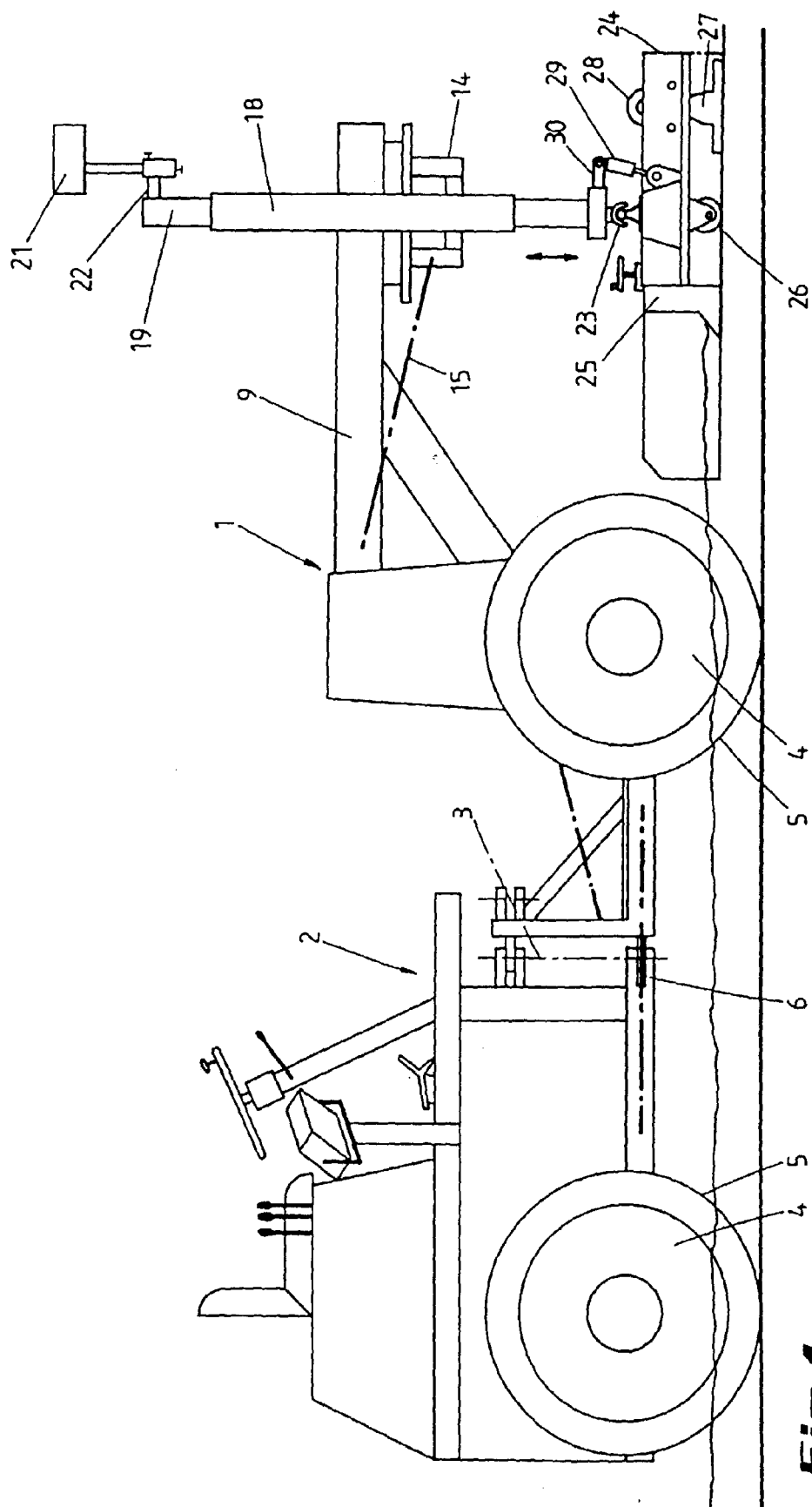


Fig. 1

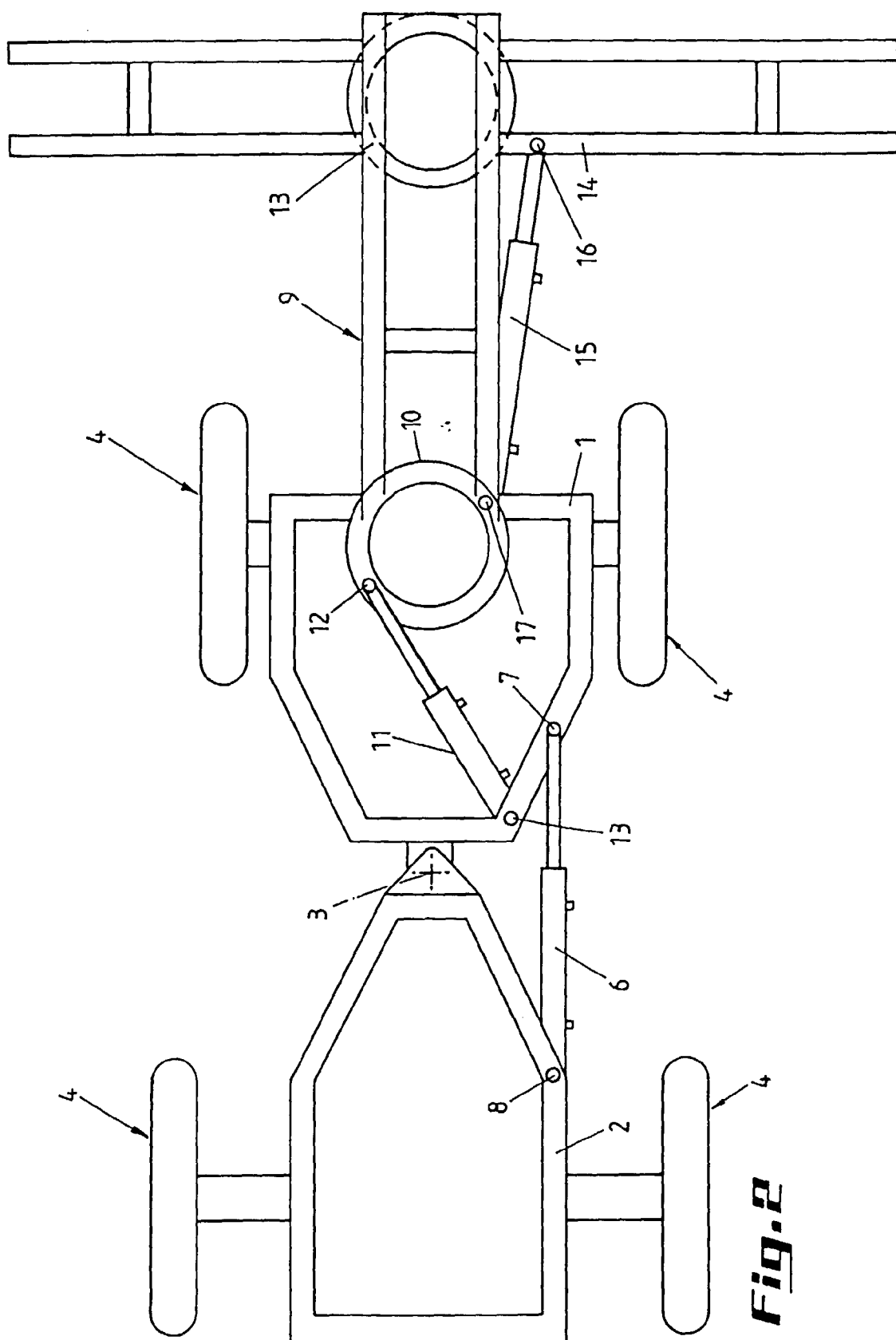


Fig. 2

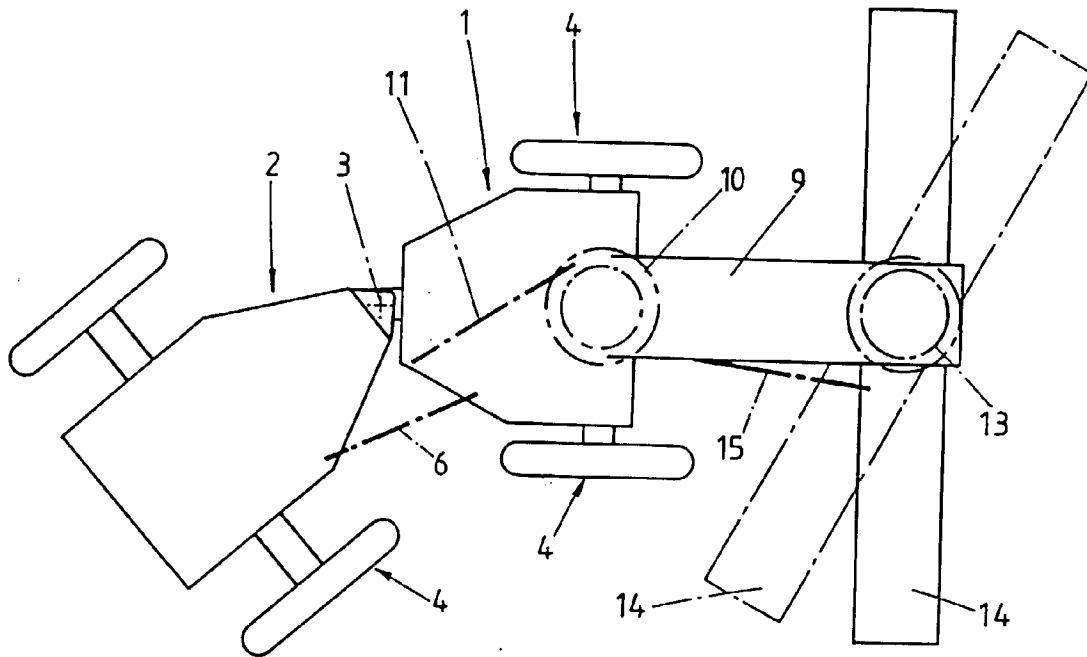


Fig. 3

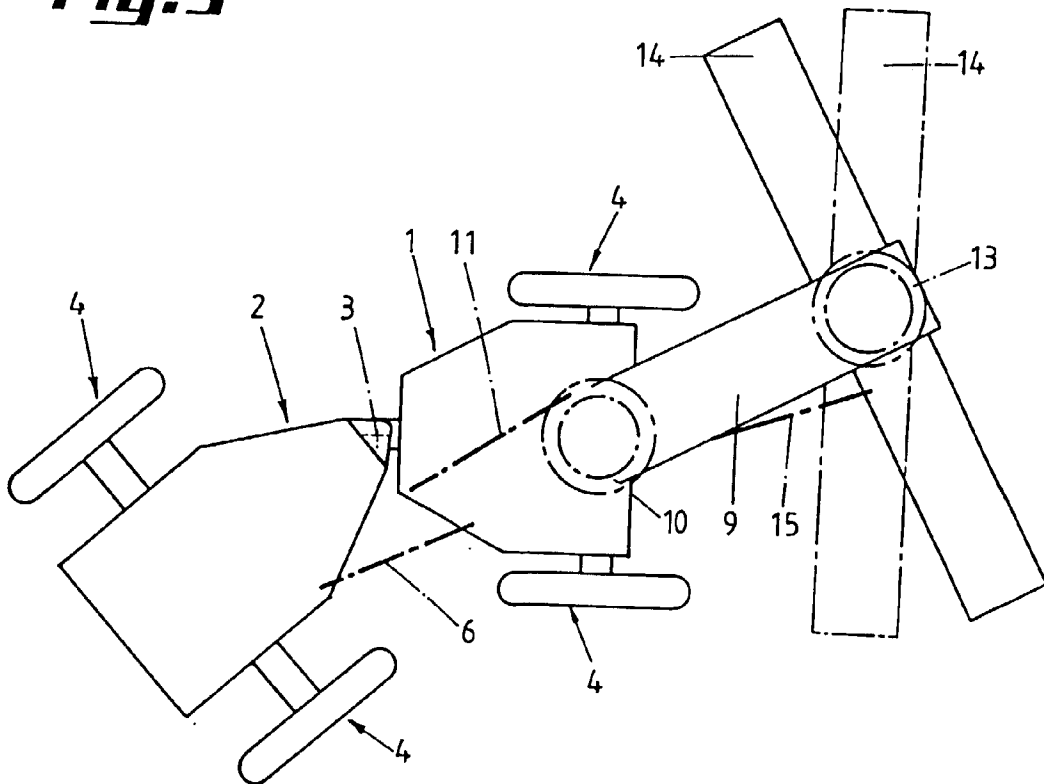
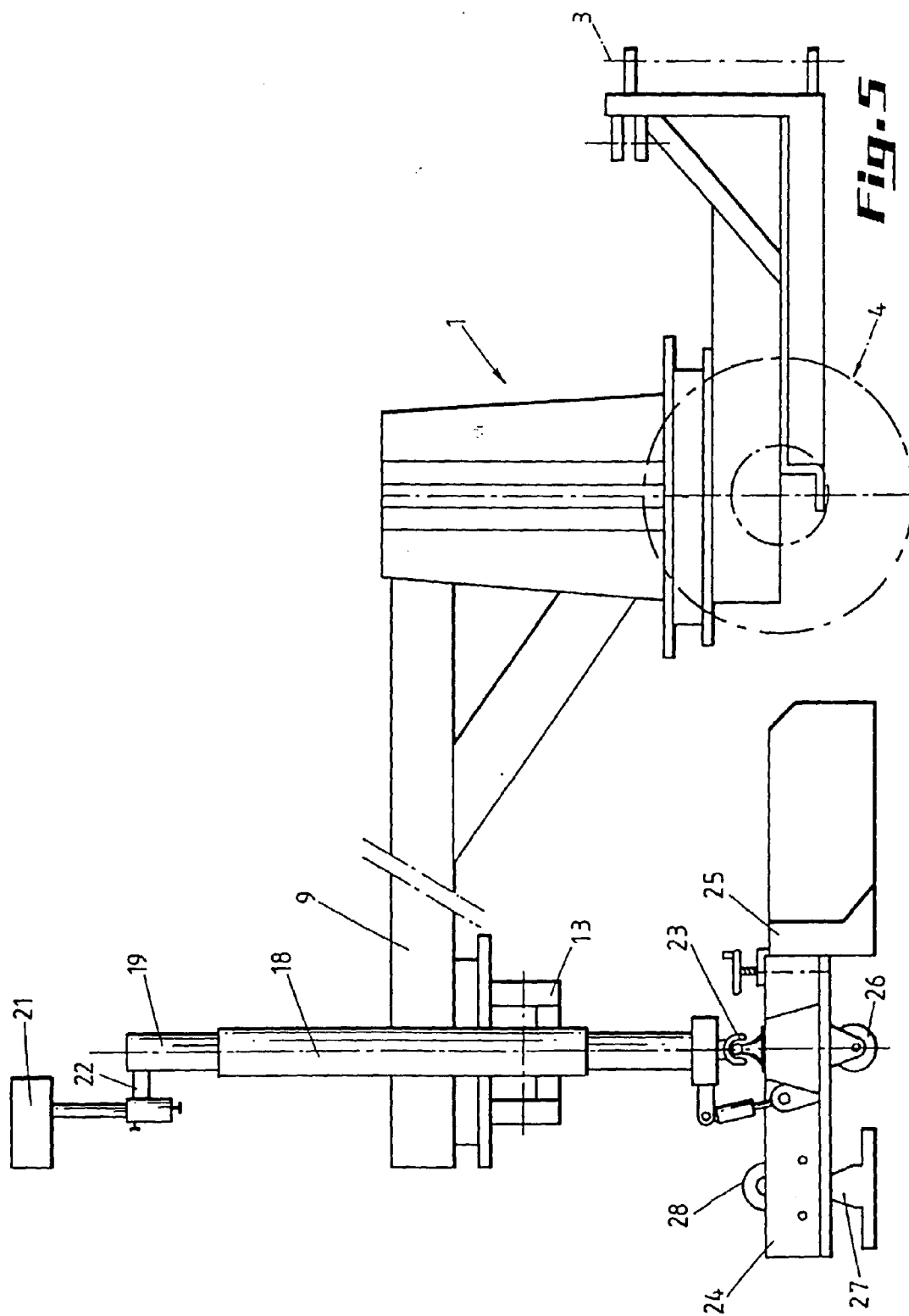
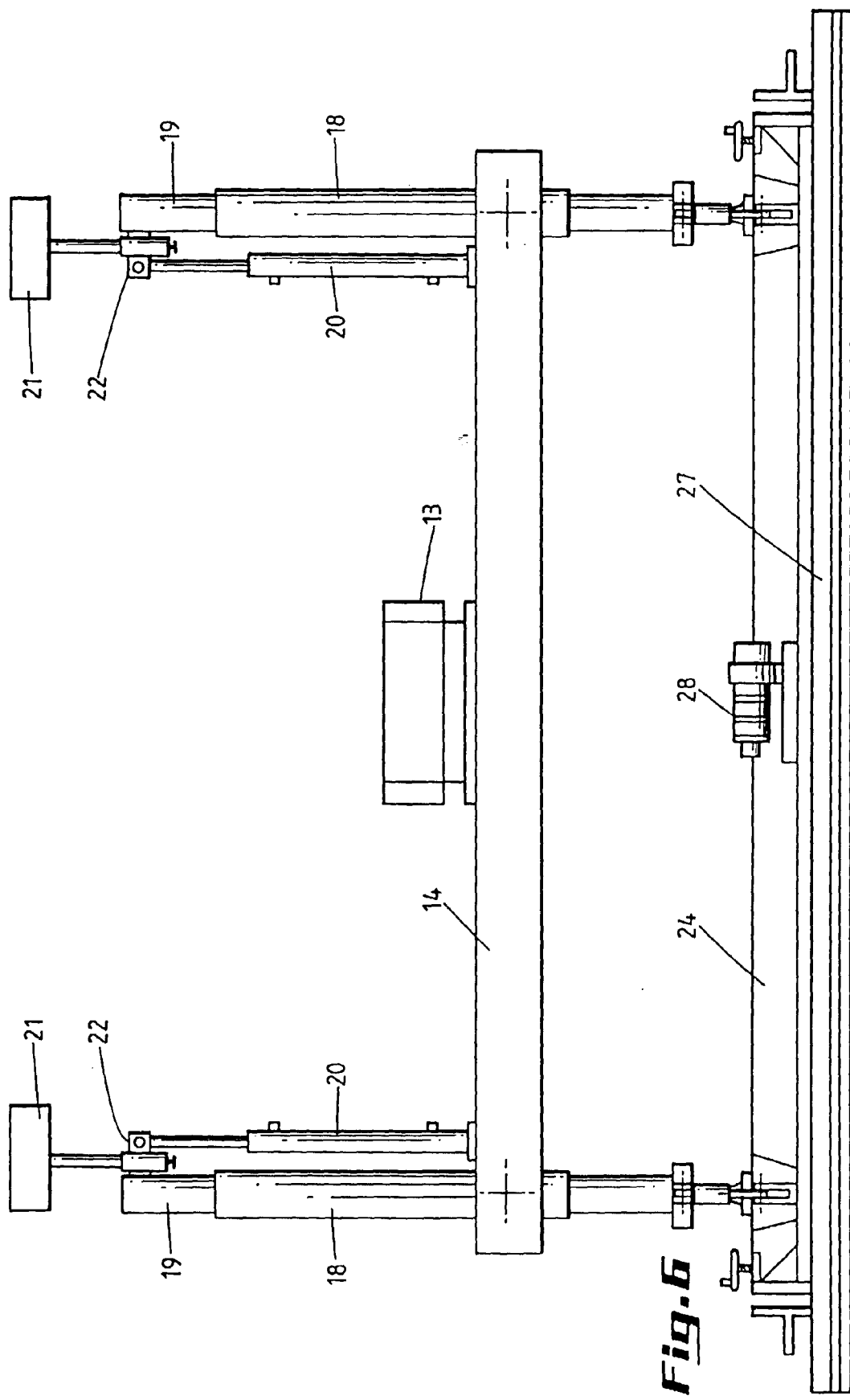
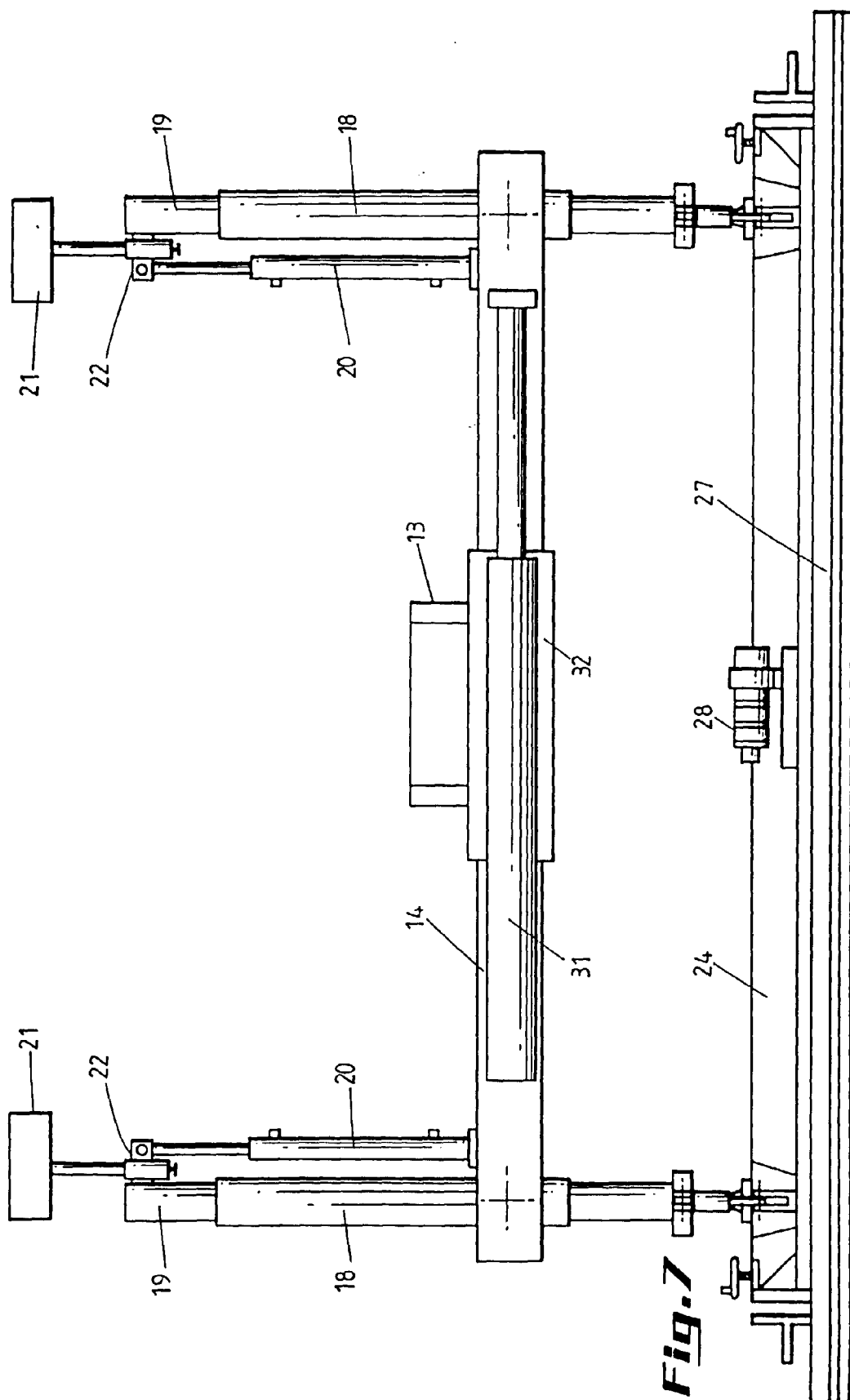


Fig. 4







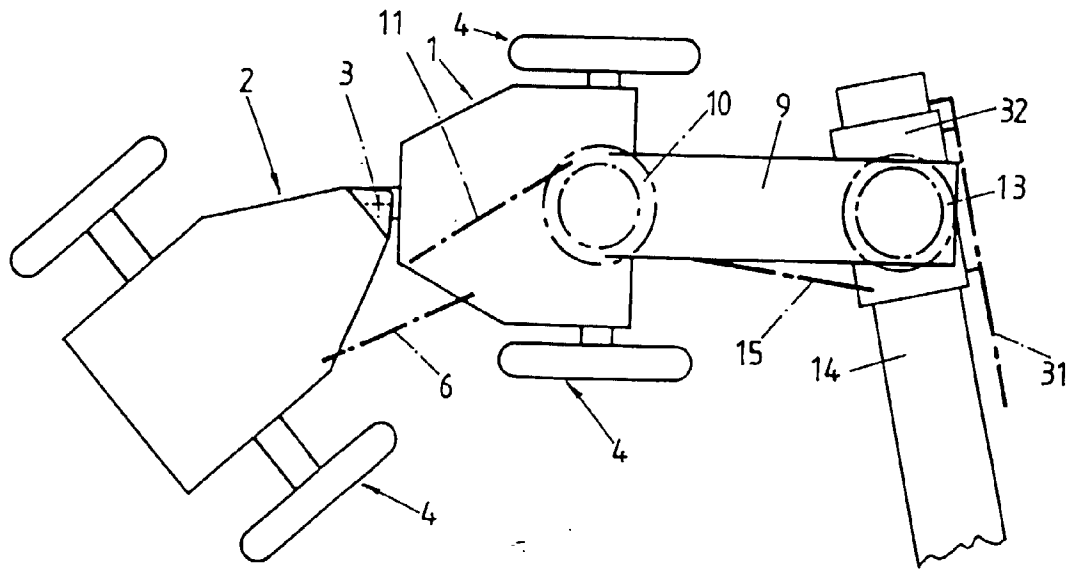


Fig. 8

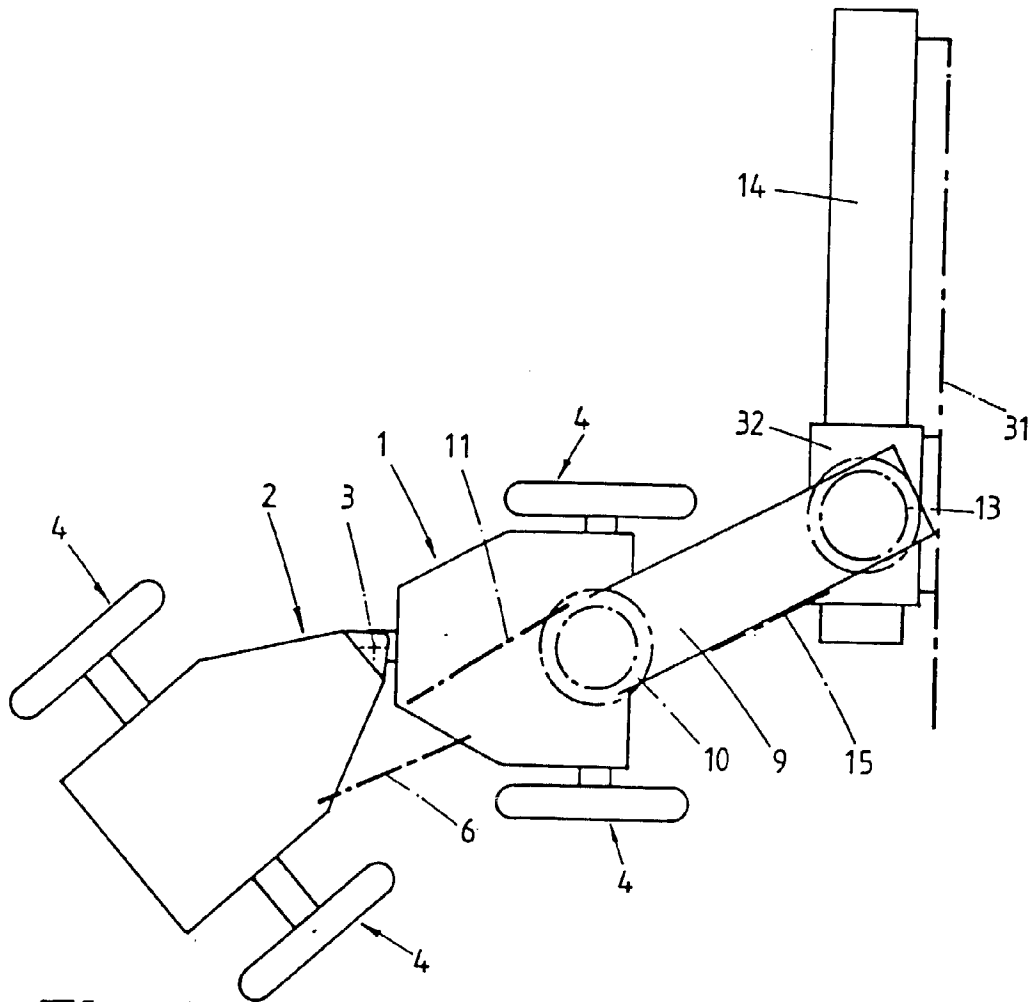


Fig. 9