

Underframe for a cart, in particular for a trolley, and a cart provided with such an underframe

The invention relates to an underframe for a cart, comprising a baseplate
5 with two longitudinal sides and two transverse sides, four castors which are fixed to the
baseplate by means of a fixing element, along each longitudinal side at least one castor
being provided with a brake which has a spring pawl for blocking the rotation of the
castor, and comprising at least one pair of pedals along one of the transverse sides, and
10 two control elements which run along the longitudinal sides and are each connected to a
respective brake and a respective pedal, the control elements near at least one of the
transverse sides being interconnected by means of a swivel arm which is pivotable about
a shaft situated at right angles to the baseplate.

An airline trolley provided with such an underframe is manufactured by the
Swiss company Bucher and is described in EP-A-0,678,438.

15 When a trolley is being moved along the aisle of an aircraft or the corridor
of a train, the brakes are blocked while the trolley is stationary, in order to prevent the
trolley from moving. For this purpose, a first pedal is foot-operated and the swivel arm
is rotated, so that a first control element, in the form of a strip running in the lengthwise
direction of the trolley, is moved towards the transverse side, while at the same time the
20 second control element is moved away from the transverse side by rotation of the swivel
arm. The strip-shaped control elements run alongside the castors in this case. An arm
which rotates an annular brake mechanism of the castors is connected to each strip-
shaped control element. The annular brake mechanism is provided with a cam and with a
separate lip which, through rotation of the ring with the cam, is brought into engagement
25 with a spring pawl of the castor brake. The lip is pressed against the spring pawl by the
upgoing side of the cam, and the rotation of the castors is blocked.

When the second pedal is depressed with the foot, the swivel arm is rotated
in the opposite direction and the strip-shaped control elements move in an opposite
direction. This causes the annular brake mechanisms to rotate in the opposite direction,
30 and the spring pawl of each castor is released, so that the trolley can be moved again.

A disadvantage of the known device is that the coupling between the control
strips and the brake of each castor is relatively fragile. The same applies to the coupling
of the swivel arm to the control strips. Since carts, such as trolleys, are exposed to very

rough treatment while they are being loaded into and unloaded from aircraft or trains and while they are being cleaned in an automatic wash, the underframe must be of a very sturdy design. It is therefore an object of the present invention to provide an underframe in which a minimum of moving parts is used, which is very simple in design, is very lightweight and takes up very little space at the underside of the underframe. It is a further object of the present invention to provide an underframe which is very reliable in operation and is maintenance-free.

To this end, the underframe according to the present invention is characterized in that the control elements are situated above the castors, the control elements being provided with a cam which on operation of a first pedal can be taken above the spring pawl and by operation of the second pedal releases the spring pawl. A very compact design with relatively few parts is obtained by guiding the control elements along the top of the castors and providing them with a cam which can act upon the spring pawl of the castors. In this case, by contrast with the known design, no moment is exerted on parts of the brake, so that the latter cannot be damaged as a result. The brakes according to the invention are operated and released by a simple to and fro movement of the strips. Owing to the fact that the strips are confined between the fixing plate of the castors and the baseplate of the underframe, separate fixing brackets are not necessary, and there is no need to fit a separate section in the baseplate, in order to retain and guide the control elements. The device according to the invention can be made very light and produces a considerable weight saving compared with the present underframe of applicants. This is of very great importance, in particular if the underframe is being used for airline trolleys, in which case a large quantity of fuel can be saved by the weight reduction of the underframe.

It should be pointed out that an airline trolley in which control strips for the brakes of the castors run along the top of the castors is known per se from US Patent No. 5,579,871. In the design described therein the control strips are moved to and fro by two central rods, each connected by their ends to a respective pedal. Situated parallel to these central rods are the control strips, which are connected to the rods by means of a central swivel arm provided with two wings. The known device again comprises a relatively large number of parts and has a relatively great susceptibility to faults. Moreover, the control strips are subjected to compressive stress during the to and fro movement, which again can lead to the occurrence of faults.

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In one embodiment of an underframe according to the invention the control elements are each provided with a transverse arm which extends along a transverse side to the swivel arm, which transverse arms are connected by their ends to the swivel arm. With this design, a simple and sturdy connection of the control elements to the swivel arm situated near the pedals is obtained. In this case the control strips and the transverse arms are situated near the edges of the underframe, and the strips and the transverse arms are protected by the edges. The central part of the underframe of the trolley according to the invention is free, so that the risk of contact with objects lying on the ground, and of damage occurring in the process, is avoided.

In one embodiment the transverse arms are connected to the swivel arm by means of a slit, in which a pin of the swivel arm is situated. In a preferred embodiment a swivel arm and a pair of pedals are situated on each transverse side of the underframe. In the case of such a design a closed loop is formed by the swivel arms and the control elements, the control elements moving in the opposite direction when one pedal is operated. The control elements here are subjected to a pull force, so that accurate and fault-free guidance along the top side of the castors is possible.

An embodiment of a trolley with an underframe according to the present invention will be explained with reference to the appended drawing, in which:

Figure 1 shows a perspective view of a trolley with an underframe according to the present invention;

Figure 2 shows a bottom view of the underframe of the trolley according to Figure 1; and

Figures 3 and 4 show a cut-away partial side view of an underframe according to the present invention, in the released position and in the blocked position, respectively.

Figure 1 shows a cart or trolley 1 according to the present invention which is suitable for applications in air travel or in trains. The trolley 1 comprises an underframe 2 and a body 3 placed thereon. The underframe 2 is formed, for example, by an aluminium baseplate 4, on which four castors 5, 6, 7 and 8 are fixed. The body 3 is made of aluminium sections with panels of a laminated material of foam and aluminium in between. Supporting ribs 9 are fitted against the wall panels in the inside of the trolley, in order to support serving trays with food.

As can be seen from Figure 2, the underframe 2 is provided with

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longitudinal sides 10, 10' and transverse sides 11, 11'. A pair of pedals 12, 13; 12', 13' is fitted along both transverse sides 11, 11'. The castors 5-8 are released by operating the pedal 12 with the foot, and the rotation of the castors is blocked by depressing the pedal 13 with the foot.

5 As can be seen clearly from Figure 2, the castors 5, 6, 7 and 8 are fixed on the baseplate 4 by means of a fixing plate 15, 16, 17 and 18. Two control strips 19 and 20 run between the fixing plates 15-18 and the baseplate 4. The control strips 19 and 20 are connected to swivel arms 25, 25' by means of transverse arms 21, 22, 23 and 24. The swivel arm 25, 25' is rotatable about a shaft 26 situated at right angles to the
10 baseplate 4. At each end the swivel arm 25, 25' comprises a pin 27, 28, which is accommodated in a slit on the end of each transverse arm 21-24 in such a way that it can slide to and fro. The transverse arm 24 can be drawn towards the transverse side 11 by operating the pedal 12. In this process the swivel arm 25, 25' tilts about the shaft 26 to the position shown in Figure 2. This causes the control strips 19 and 20 to be moved
15 in a direction opposite to the direction of the arrows shown on the strips 19 and 20 in Figure 2. By operation of the pedal 13, the transverse arm 21 is drawn towards the side edge 11, and the swivel arm 25 is tilted. As a result, the control strips 19 and 20 will move in the direction of the arrows, as shown in Figure 2.

 The swivel arm 25' is connected to pedals 12' 13' in the same way as the
20 swivel arm 25, and is situated underneath a protection cap, so that this swivel arm is not visible in the figure.

 As shown in Figures 3 and 4, the castor 8 is rotatably connected to the fixing plate 18 by means of a bearing 30. This means that the castor 8 can rotate freely about a central axis formed by a spring pawl 31. The spring pawl 31 is provided at its
25 end with a brake disc 32, for acting upon the running tread of the castor 8. A wedge-shaped plastic cam 33 is situated at the end of the spring pawl 31. A chamfered cam 34, which can move along the plastic cam 33 and interacts with the plastic cam 33, is fitted on the control strip 20. The strip 20 is provided at its end with a lip 35 which is situated at right angles to the strip. The pedal 12 is rotatable about a shaft 36 which runs
30 substantially parallel to the transverse side 11. A transverse arm 37 is connected to the pedal 12 and acts upon the lip 35 of the control strip 20. When the pedal 12 is depressed, the result is that the control strip 20 is moved to the left by the transverse arm 37, and the spring pawl 31 is released, as shown in Figure 3. In this process the pedal 13

is taken by the swivel arm 25 into its position shown by a dotted line, and the lip of the control strip 19 is moved to the right relative to the lip 35, to a position shown by a dotted line.

When the pedal 13 is operated, as shown in Figure 4, the transverse arm 21 of the pedal 13 moves to the left, and the control strip 20 in Figure 4 is drawn to the right by the swivel arm 25. This takes the cam 34 above the spring pawl 31, which is consequently pressed down, so that the brake disc 32 is pressed against the running tread of the castor 8. As a result, the rotation of the castor 8 is blocked. When pedal 12 is operated again, as shown in Figure 4, the control strip 20 is moved to the left again, and the spring pawl 31 is pressed upwards under the action of the spring force of the spring 37, so that the castor 8 is released again, as shown in Figure 3.

Although the invention has been described with reference to an embodiment of an underframe which is provided with four pedals, the invention, however, also relates to an underframe in which a pair of pedals 12, 13 is present at only one transverse side.

Further variants of the underframe according to the invention will be clear to the person skilled in the art and fall within the scope of the appended claims.



Claims

1. Underframe (2) for a cart (1), comprising a baseplate (4) with two longitudinal sides (10, 10') and two transverse sides (11, 11'), four castors (5, 6, 7, 8) which are fixed to the baseplate (4) by means of a fixing element (15, 16, 17, 18), along
5 each longitudinal side (10, 10') at least one castor being provided with a brake which has a spring pawl (31) for blocking the rotation of the castor, and comprising at least one pair of pedals (12, 13; 12', 13') along one of the transverse sides (11, 11'), and two control elements (19, 20) which run along the longitudinal sides and are each connected to a respective brake and a respective pedal (12, 13; 12', 13'), the control elements (19,
10 20) near at least one of the transverse sides (11, 11') being interconnected by means of a swivel arm (25, 25') which is pivotable about a shaft (26) situated at right angles to the baseplate (4), characterized in that the control elements (19, 20) are situated above the castors (5, 6, 7, 8), the control elements (19, 20) being provided with a cam (34) which on operation of a first pedal (13, 13') can be taken above the spring pawl (31) and by
15 operation of the second pedal (12, 12') releases the spring pawl (31).
2. Underframe (2) according to Claim 1, characterized in that the control elements (19, 20) are each provided with a transverse arm (21, 22, 23, 24), the transverse arms (21, 22, 23, 24) extending along a transverse side (11, 11') to the swivel arm (25, 25') and being connected by one end to the swivel arm (25, 25').
- 20 3. Underframe (2) according to Claim 2, characterized in that the transverse arms (21, 22, 23, 24) are provided at their end with a slit, or a pin which interacts with a pin (27, 28) or a slit of the swivel arm (25, 25').
4. Underframe (2) according to Claim 2 or 3, characterized in that each transverse arm (21, 22, 23, 24) is provided at its end with a lip (35) extending at right
25 angles to the baseplate, the pedals (12, 13; 12', 13) being swivellable about a shaft (36) situated in the direction of the transverse sides (11, 11') and comprising an arm (37) which rests against the lip (35) of the respective transverse arm (21, 22, 23, 24), in order to exert a pull force on the lip (35).
5. Underframe (2) according to one of the preceding claims, characterized in
30 that a swivel arm (25, 25') and a pair of pedals (12, 13, 12', 13') are fitted on each transverse side (11, 11').
6. Cart (1) provided with an underframe (2) according to one of the preceding claims.

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fig- 1

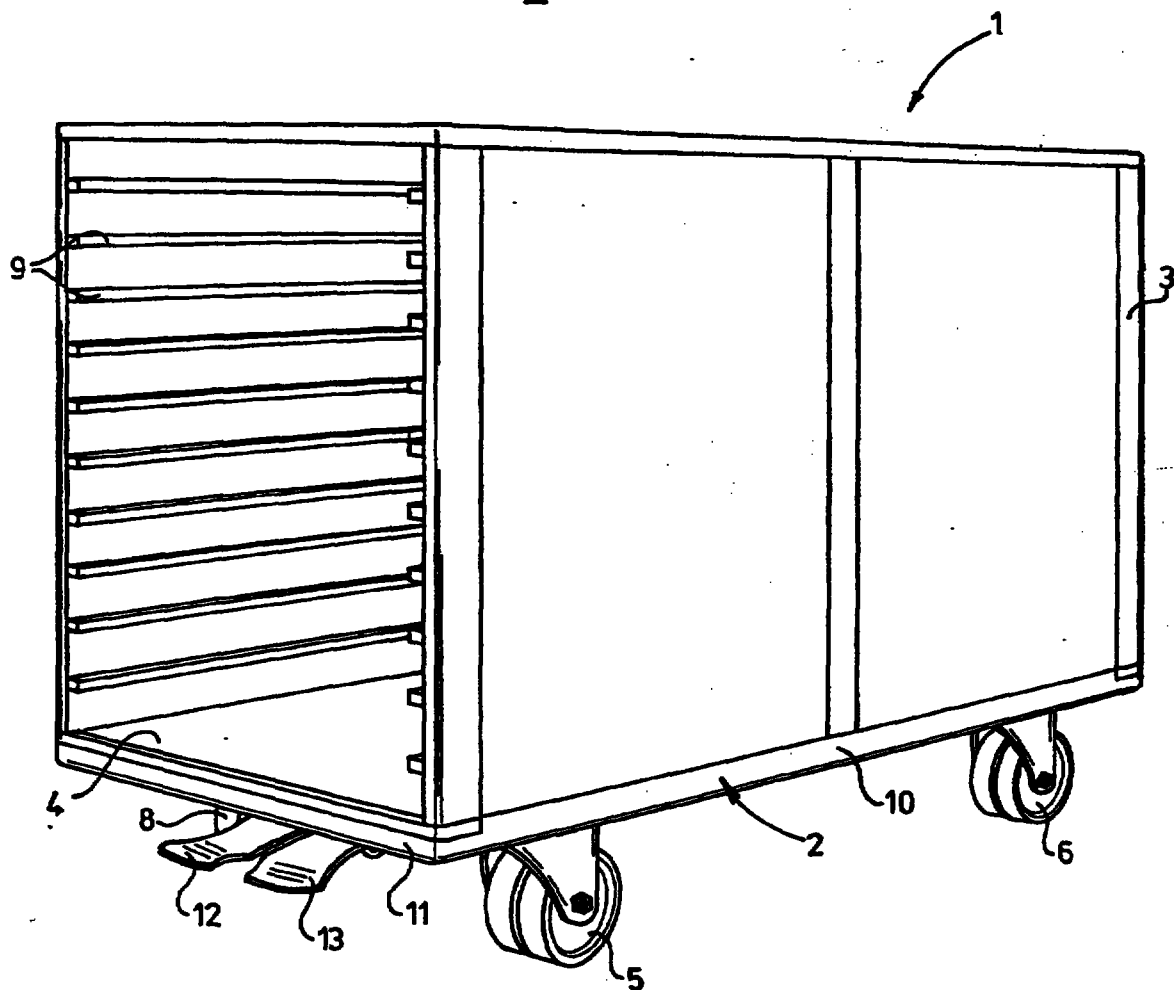
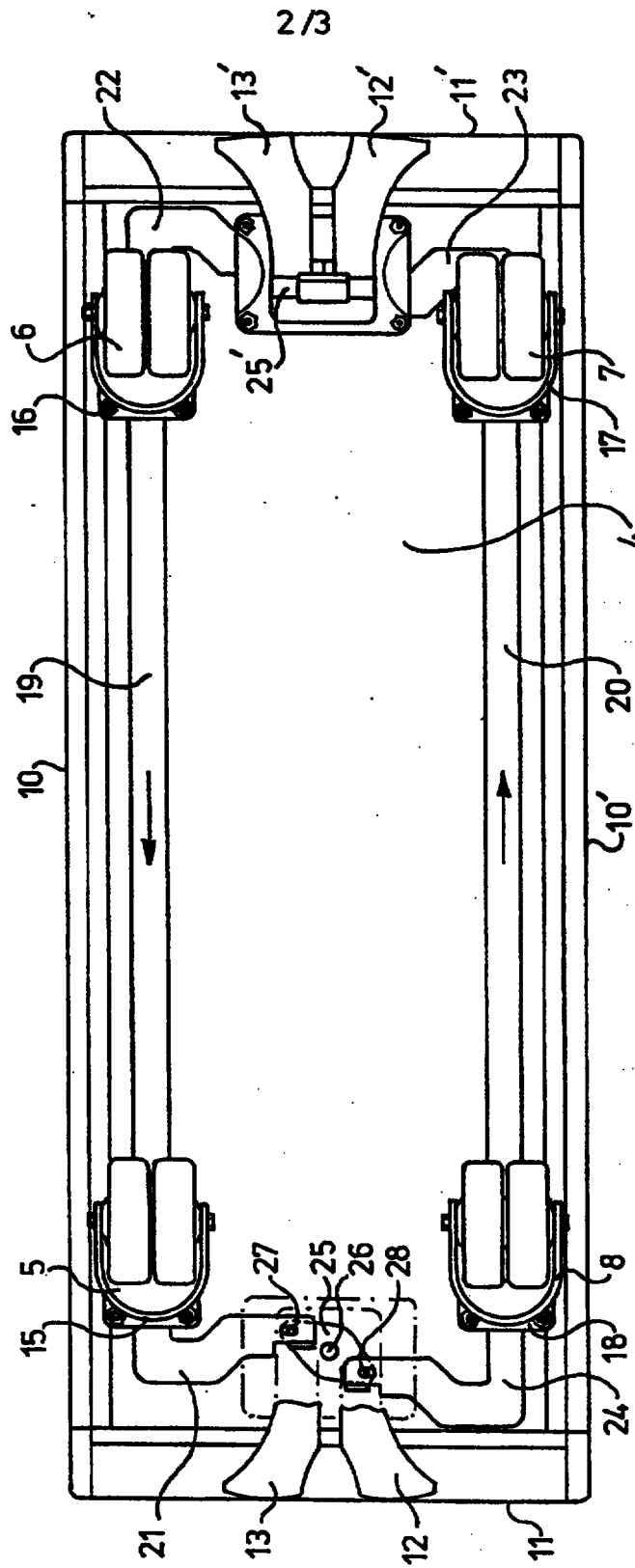
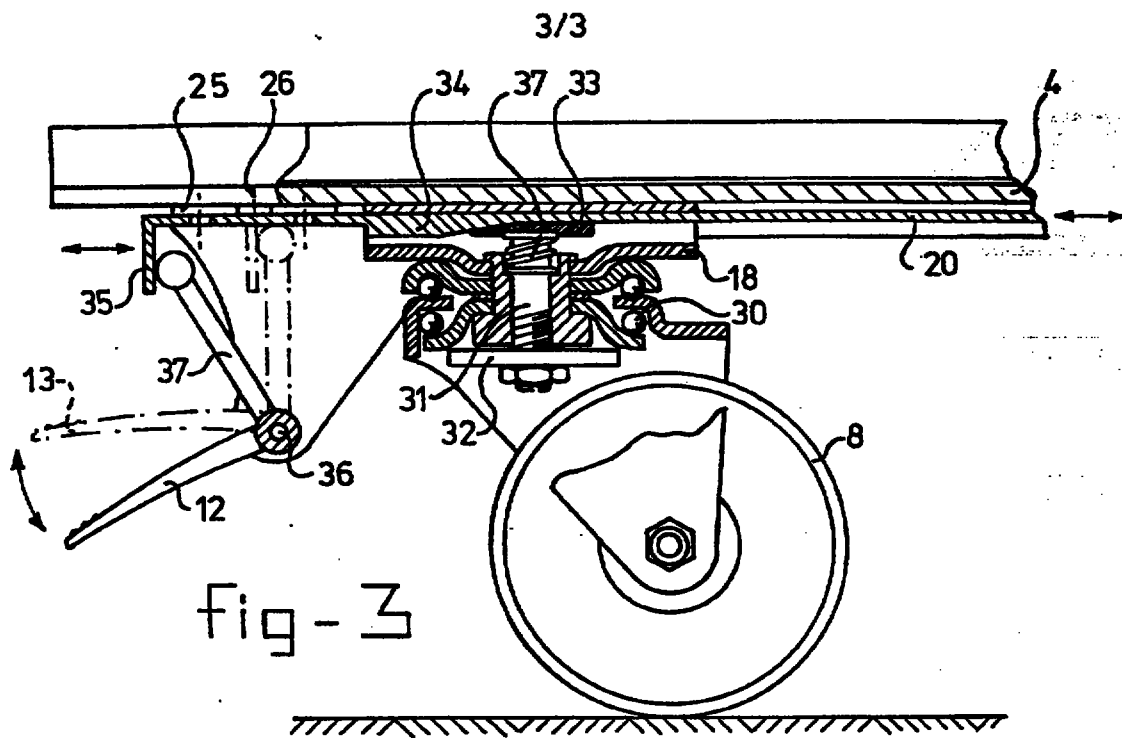


fig- 2





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The invention relates to an underframe for a cart, comprising a baseplate with
5 two longitudinal sides and two transverse sides, four castors which are fixed to the
baseplate by means of a fixing element, along each longitudinal side at least one castor
being provided with a brake which has a spring pawl for blocking the rotation of the castor,
and comprising at least one pair of pedals along one of the transverse sides, and two control
10 elements which run along the longitudinal sides and are each connected to a respective
brake and a respective pedal, the control elements near at least one of the transverse sides
being interconnected by means of a swivel arm which is pivotable about a shaft situated at
right angles to the baseplate, wherein the control elements are situated above the castors
and are provided with a cam which on operation of a first pedal can be taken above the
spring pawl and by operation of the second pedal releases the spring pawl.

15 An airline trolley provided with such an underframe is manufactured by the
Swiss company Bucher and is described in EP-A-0,678,438.

When a trolley is being moved along the aisle of an aircraft or the corridor of a
train, the brakes are blocked while the trolley is stationary, in order to prevent the trolley
from moving. For this purpose, a first pedal is foot-operated and the swivel arm is rotated,
20 so that a first control element, in the form of a strip running in the lengthwise direction of
the trolley, is moved towards the transverse side, while at the same time the second control
element is moved away from the transverse side by rotation of the swivel arm. The strip-
shaped control elements run alongside the castors in this case. An arm which rotates an
annular brake mechanism of the castors is connected to each strip-shaped control element.
25 The annular brake mechanism is provided with a cam and with a separate lip which,
through rotation of the ring with the cam, is brought into engagement with a spring pawl of
the castor brake. The lip is pressed against the spring pawl by the upgoing side of the cam,
and the rotation of the castors is blocked.

When the second pedal is depressed with the foot, the swivel arm is rotated in
30 the opposite direction and the strip-shaped control elements move in an opposite direction.
This causes the annular brake mechanisms to rotate in the opposite direction, and the spring
pawl of each castor is released, so that the trolley can be moved again.

A disadvantage of the known device is that the coupling between the control
strips and the brake of each castor is relatively fragile. The same applies to the coupling of

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the swivel arm to the control strips. Since carts, such as trolleys, are exposed to very rough treatment while they are being loaded into and unloaded from aircraft or trains and while they are being cleaned in an automatic wash, the underframe must be of a very sturdy design.

5 From figures 11a and 11b of EP-A-0,678,438 an embodiment is known wherein the control element directly engages with a brake above the castor. Although this is a more sturdy construction, the swivel arms connecting the control means are abutting against the end faces of the control means or project into a recess at the end of the control means, which forms a relatively vulnerable construction.

10 It is therefore an object of the present invention to provide an underframe in which a minimum of moving parts is used, which is very simple in design, is very lightweight and takes up very little space at the underside of the underframe. It is a further object of the present invention to provide an underframe which is very reliable in operation and is maintenance-free.

15 To this end, the underframe according to the present invention is characterized in that the control elements are each provided with a transverse arm, the transverse arms extending along a transverse side to the swivel arm and being connected by one end to the swivel arm.

With this design, a simple and sturdy connection of the control elements to the
20 swivel arm situated near the pedals is obtained. According to the invention, the longitudinal strips and the transverse arms of the control elements are situated near the edges of the underframe, and the strips and the transverse arms are protected by the edges. The central part of the underframe of the trolley according to the invention is free from moving parts so that the risk of contact with objects lying on the ground, and of damage occurring in the
25 process, is avoided.

Because no moment is exerted on parts of the brake, the latter cannot be damaged as a result. The brakes according to the invention are operated and released by a simple to and fro movement of the strips. Owing to the fact that the strips are confined between the fixing plate of the castors and the baseplate of the underframe, separate fixing
30 brackets are not necessary, and there is no need to fit a separate section in the baseplate, in order to retain and guide the control elements.

The device according to the invention can be made very light and produces a considerable weight saving compared with the present underframe of applicants. This is of very great

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importance, in particular if the underframe is being used for airline trolleys, in which case a large quantity of fuel can be saved by the weight reduction of the underframe.

It should be pointed out that an airline trolley in which control strips for the brakes of the castors run along the top of the castors is also known from US Patent No. 5,579,871. In the design described therein the control strips are moved to and fro by two central rods, each connected by their ends to a respective pedal. Situated parallel to these central rods are the control strips, which are connected to the rods by means of a central swivel arm provided with two wings. The known device again comprises a relatively large number of parts and has a relatively great susceptibility to faults. Moreover, the control strips are subjected to compressive stress during the to and fro movement, which again can lead to the occurrence of faults. In one embodiment the transverse arms are connected to the swivel arm by means of a slit, in which a pin of the swivel arm is situated. In a preferred embodiment a swivel arm and a pair of pedals are situated on each transverse side of the underframe. In the case of such a design a closed loop is formed by the swivel arms and the control elements, the control elements moving in the opposite direction when one pedal is operated. The control elements here are subjected to a tensile force, so that accurate and fault-free guidance along the top side of the castors is possible.

An embodiment of a trolley with an underframe according to the present invention will be explained with reference to the appended drawing, in which:

Figure 1 shows a perspective view of a trolley with an underframe according to the present invention;

Figure 2 shows a bottom view of the underframe of the trolley according to Figure 1; and

Figures 3 and 4 show a cut-away partial side view of an underframe according to the present invention, in the released position and in the blocked position, respectively.

Figure 1 shows a cart or trolley 1 according to the present invention which is suitable for applications in air travel or in trains. The trolley 1 comprises an underframe 2 and a body 3 placed thereon. The underframe 2 is formed, for example, by an aluminium baseplate 4, on which four castors 5, 6, 7 and 8 are fixed. The body 3 is made of aluminium sections with panels of a laminated material of foam and aluminium in between. Supporting ribs 9 are fitted against the wall panels in the inside of the trolley, in order to support serving trays with food.

As can be seen from Figure 2, the underframe 2 is provided with



Claims

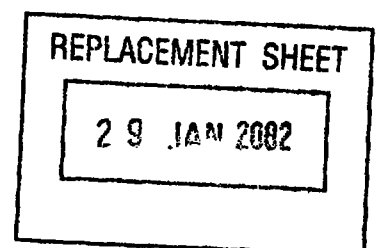
1. Underframe (2) for a cart (1), comprising a baseplate (4) with two longitudinal
5 sides (10, 10') and two transverse sides (11, 11'), four castors (5, 6, 7, 8) which are fixed to
the baseplate (4) by means of a fixing element (15, 16, 17, 18), along each longitudinal side
(10, 10') at least one castor being provided with a brake which has a spring pawl (31) for
blocking the rotation of the castor, and comprising at least one pair of pedals (12, 13; 12',
13') along one of the transverse sides (11, 11'), and two control elements (19, 20) which run
10 along the longitudinal sides and are each connected to a respective brake and a respective
pedal (12, 13; 12', 13'), the control elements (19, 20) near at least one of the transverse
sides (11, 11') being interconnected by means of a swivel arm (25, 25') which is pivotable
about a shaft (26) situated at right angles to the baseplate (4), wherein the control elements
(19, 20) are situated above the castors (5, 6, 7, 8), and are provided with a cam (34) which
15 on operation of a first pedal (13, 13') can be taken above the spring pawl (31) and by
operation of the second pedal (12, 12') releases the spring pawl (31), characterised in that
the control elements (19, 20) are each provided with a transverse arm (21, 22, 23, 24), the
transverse arms (21, 22, 23, 24) extending along a transverse side (11, 11') to the swivel
arm (25, 25') and being connected by one end to the swivel arm (25, 25').
- 20 2. Underframe (2) according to Claim 1, characterized in that the
transverse arms (21, 22, 23, 24) are provided at their end with a slit, or a pin which
interacts with a pin (27, 28) or a slit of the swivel arm (25, 25').
3. Underframe (2) according to Claim 1 or 2, characterized in that each transverse
arm (21, 22, 23, 24) is provided at its end with a lip (35) extending at right angles to the
25 baseplate, the pedals (12, 13; 12', 13) being swivellable about a shaft (36) situated in the
direction of the transverse sides (11, 11') and comprising an arm (37) which rests against
the lip (35) of the respective transverse arm (21, 22, 23, 24), in order to exert a tensile force
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4. Underframe (2) according to one of the preceding claims, characterized in that
30 a swivel arm (25, 25') and a pair of pedals (12, 13, 12', 13') are fitted on each transverse
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5. Cart (1) provided with an underframe (2) according to one of the preceding
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the swivel arm to the control strips. Since carts, such as trolleys, are exposed to very rough treatment while they are being loaded into and unloaded from aircraft or trains and while they are being cleaned in an automatic wash, the underframe must be of a very sturdy design.

5 From figures 11a and 11b of EP-A-0,678,438 an embodiment is known wherein the control element directly engages with a brake above the castor. Although this is a more sturdy construction, the swivel arms connecting the control means are abutting against the end faces of the control means or project into a recess at the end of the control means, which forms a relatively vulnerable construction.

10 It is therefore an object of the present invention to provide an underframe in which a minimum of moving parts is used, which is very simple in design, is very lightweight and takes up very little space at the underside of the underframe. It is a further object of the present invention to provide an underframe which is very reliable in operation and is maintenance-free.

15 To this end, the under frame according to the present invention is characterized in that there is provided a baseplate underframe for a cart, comprising a baseplate with two longitudinal sides and two transverse sides, four castors which are fixed to the baseplate by means of a fixing element, along each longitudinal side at least one castor being provided with a brake which has a spring pawl for blocking the
20 rotation of the castor, and comprising at least one pair of pedals along one of the transverse sides, and two control elements which run along the longitudinal sides and are each connected to a respective brake and a respective pedal, the control elements near at least one of the transverse sides being interconnected by means of a swivel arm which is pivotable about a shaft situated at right angles to the baseplate, wherein
25 the control elements are situated above the castors, and are provided with a cam which on operation of a first pedal can be taken above the spring pawl and by operation of the second pedal releases the spring pawl, characterised in that the control elements are each provided with a transverse arm, the transverse arms extending along a transverse side to the swivel arm and being connected by one end
30 to the swivel arm.



With this design, a simple and sturdy connection of the control elements to the swivel arm situated near the pedals is obtained. According to the invention, the longitudinal strips and the transverse arms of the control elements are situated near the edges of the underframe, and the strips and the transverse arms are protected by the edges. The central part of the underframe of the trolley according to the invention is free from moving parts so that the risk of contact with objects lying on the ground, and of damage occurring in the process, is avoided.

Because no moment is exerted on parts of the brake, the latter cannot be damaged as a result. The brakes according to the invention are operated and released by a simple to and fro movement of the strips. Owing to the fact that the strips are confined between the fixing plate of the castors and the baseplate of the underframe, separate fixing brackets are not necessary, and there is no need to fit a separate section in the baseplate, in order to retain and guide the control elements.

The device according to the invention can be made very light and produces a considerable weight saving compared with the present underframe of applicants. This is of very great

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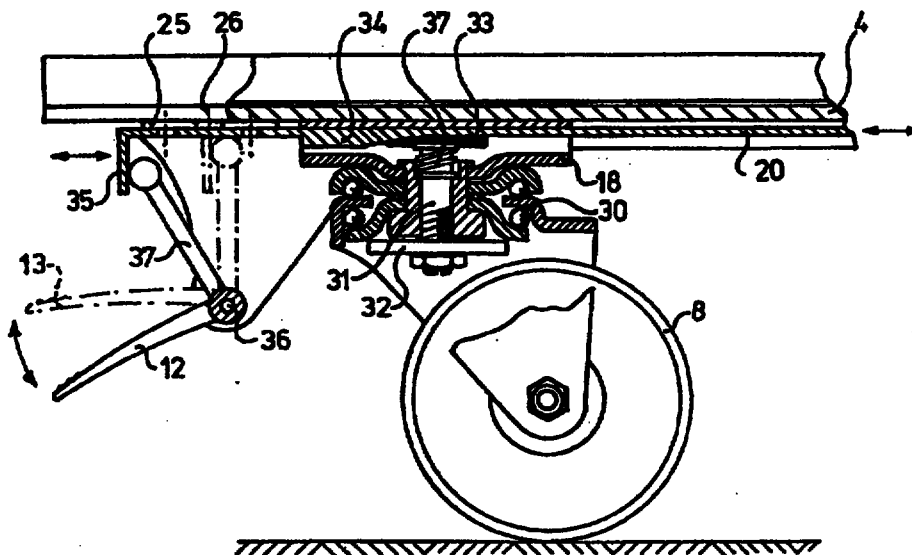
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(21) International Application Number: PCT/NL98/00432 (22) International Filing Date: 29 July 1998 (29.07.98) (30) Priority Data: 1006682 29 July 1997 (29.07.97) NL (71) Applicant (for all designated States except US): DRIESSEN AIRCRAFT HOLDING B.V. [NL/NL]; P.O. Box 28, NL-1770 AA Wieringerwerf (NL). (72) Inventors; and (75) Inventors/Applicants (for US only): VAN LOON, Laurentius, Petrus, Joseph [NL/NL]; Langeweg 85, NL-1774 AK Sloodorp (NL). PORTGIES, Cornelis, Petrus, Maria [NL/NL]; Ham 29, NL-1679 VD Midwoud (NL). (74) Agent: DE BRUDN, Leendert, C.; Nederlandsch Octrooibureau, Scheveningseweg 82, P.O. Box 29720, NL-2502 LS The Hague (NL).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published With international search report. In English translation (filed in Dutch).

(54) Title: UNDERFRAME FOR A CART, IN PARTICULAR FOR A TROLLEY, AND A CART PROVIDED WITH SUCH AN UNDERFRAME



(57) Abstract

The present invention relates to an underframe (2), in particular for trolleys, having a baseplate (4) and four castors (5, 6, 7, 8) mounted on said baseplate. Two pedals (12, 13) are fitted along the transverse side (11) of the underframe, each pedal being connected to a control strip (19, 20) situated above the castors and running along the longitudinal side. A brake of at least one castor is connected to each control strip. The control strips are interconnected by means of a swivel arm (25). The control strips run through underneath the fixing plates of the castors and comprise a cam (33) which can act upon a spring pawl (31) of the brake system of the castors. Such a design produces a very sturdy and lightweight brake system which has the minimum of parts and is very reliable in operation.