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Bridge-Laying Armoured Vehicle

The present invention relates to a bridge-laying armoured vehicle.

A bridge-laying vehicle with an associated bridge is described in German (Federal Republic) patent specification No. 16 58 604, wherein the vehicle is equipped with devices for supporting at least two bridge sections, which can be assembled into a bridge and during transport are mounted one above the other on the vehicle, and with devices for the assembling and laying of the bridge.

The two ends, which are to be connected together, of the bridge sections are constructed identically. Arranged at the vehicle is at least one cantilever girder, which can be displaced out in longitudinal direction of the bridge and which comprises means for connection with the end of the bridge section at the support side. The girder serves for the displacing and lowering of these sections.

German (Federal Republic) patent specification No. 20 17 489 discloses an arrangement of bridge halves, which are mounted one above the other on a transport vehicle and which, for use, are connected together fully automatically, in that claw couplings are arranged at the lower chords of the bridge halves and can be pushed vertically into one another. The head ends, which come into contact with one another, of the upper chords of the bridge halves have thrust strips.

The arrangement of the pivotable arm at an extendible girder of the transfer girder is disadvantageous in the case of the bridge-laying vehicles of the two above-mentioned specifications. Due to this arrangement it is required that the bridge sections are firstly coupled together into a bridge before the extendible girder members can be driven out in order to form the cantilever girder. Moreover, a very long flexible hydraulic lead is needed in order to actuate a piston-cylinder unit of the pivotable arm on the occasions when this functions as a lowerable support for the cantilever girder. Each cantilever girder part has supporting or running rollers over which the bridge moves.

In known bridge-laying equipment described in German (Federal Republic) patent specification No. 21 16 120, which consists of a



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tracked vehicle, there is arranged on the upper side of the vehicle a girder which extends in the longitudinal direction of the vehicle and is pivotable about an axis transverse to the vehicle longitudinal axis. The girder consists of several telescopically withdrawable girder parts. Two bridge sections, which can be assembled into a bridge and each have a couplable end and a free end, are mounted one above the other on the girder and extend in longitudinal direction. A coupling device is provided for connecting the bridge sections. A pivotable arm, which is pivotably mounted at the rear end of the girder as seen in travel direction of the vehicle, serves as the coupling device.

The drive of this tail arm is so constructed that during travel of the vehicle without a bridge the arm must either be pivoted rearwardly in order to form a lower overall height of the vehicle, which is disadvantageous for the overall length of the unloaded vehicle or be pivoted up forwardly, which is disadvantage during passing by low obstacles, for example, overhanging pylons.

German (Federal Republic) patent specification No. 41 23 092 describes bridge-laying equipment with a telescopic cantilever girder, which is pivotable about an axis, with overhead bridge sections which are mounted one above the other and which can be assembled into a bridge, the bridge sections being movably arranged on the girder. Accordingly, the base of the cantilever girder is constructed to be at least as long as the underframe and is displaced in a sleeve-like transfer beam. The transfer beam is only about half as long as the underframe and is arranged to project at the part of the underframe placed at the side of the obstacle to be bridged. The pivotability of the cantilever girder is achieved by a pivot mounting of the transfer beam with a raisable and lowerable support at the end thereof remote from that obstacle.

A bridge-laying armoured vehicle is disclosed in German (Federal Republic) patent specification No. 38 91 429 and is equipped for the laying of a bridge in free cantilever manner. A disadvantage with this vehicle is its large intrinsic weight, as the vehicle must provide a counterweight. A vehicle of that kind does not exist for every type of girder required, which may necessitate a new vehicle purchase or costly rebuilding. Moreover, the folded-up support leg



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or the support plate during travel, and the folded-down support leg during transfer, restrict the field of vision of the driver or operator of the vehicle. Moreover, the vehicle must always be set up in the direction of the bridge longitudinal axis. Additional alignment time and increased area are thus required at the bridge-laying location for the transfer operation.

The invention therefore has as its object the provision of bridge-laying armoured vehicle which can be based on, for example, a standard light tracked vehicle without the necessity of mounting additional parts, needed for the bridge-laying operation, externally on the hull of the vehicle.

According to the present invention there is provided a bridge-laying armoured vehicle provided with equipment for supporting bridges or bridge sections one above the other and for laying the bridges or bridge sections, the equipment being rotatably mounted on a turret ring of the vehicle by way of a carrier assembly and comprising a transfer girder pivotable about a substantially horizontal axis, a plurality of U-section girders arranged within the transfer girder to be telescopically displaceable out of the transfer girder and a drive arm mounted at the transfer girder, the upper edges of the U-section girders and upper edges of the transfer girder being arranged in substantially the same plane

Preferably, the vehicle comprises a respective support roller arranged at each of two side walls of the transfer girder in the region of an end thereof which is rearward with respect to a forward direction of travel of the vehicle. For preference, the arm is pivotable through at least 180° and is arranged in the region of said upper edges of the transfer girder at an end thereof which is rearward with respect to a forward direction of travel of the vehicle.

In a preferred embodiment the vehicle wheel or track system defines a ramp surface at each of the front and the back of the vehicle and the girders and the arm are disposed substantially within an area bounded by planes containing the ramp surfaces. When the vehicle is equipped with a bridge or bridge sections, the bridge or bridge sections are preferably disposed substantially within that area.



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In the case of vehicle embodying the invention, the upper choard edges of the U-section girders thus lie in the same plane as the upper chord edges of the transfer girder, so that guide wheels of the bridge or bridge sections can run thereover unhindered. It has proved that in equipment of the kind disclosed in German specification No. 41 23 092, with guide rails in the lower chord, disruptions frequently occur due to jamming and canting of the support rollers during the movement phase when the bridge reaches the individual support rollers at the end of the telescopic girders.

A further advantage is the use of a rotatably mounted carrier assembly at the turret ring of the vehicle. As a result the time-consuming alignment of the vehicle is reduced in time and a smaller area is needed for manoeuvring at the laying location than in the case of known vehicles with non-rotatable transfer equipment. Accordingly, it may be possible to lay the bridge in any desired setting of the vehicle and to take it up again.

A further advantage is the compact form of the transfer girder and the arrangement of the hydraulic cantilever at the tail of the transfer girder.

This arm, inclusive of drive, can be so constructed that in the case of travel of the vehicle without a bridge or bridge section a low overall height is achieved.

An embodiment of the present invention will now be more particularly described with reference to the accompanying drawings, in which:

Fig. 1 is a side view of a bridge-laying armoured vehicle embodying the invention;

Fig. 2 is a plan view of the vehicle; and

Fig. 3 is a side view similar to Fig. 1, but with two bridge sections mounted one above the other on the vehicle.

Referring now to the drawings there is shown in Fig. 1 a tracked bridge-laying armoured vehicle 1 equipped with a single transfer girder 2, which is pivotably mounted on a carrier ring assembly 10 on a turret ring 11 of the vehicle. The assembly 10 is connected to the girder 2 by way of a horizontal pivot bearing 18 and a fastening device 21. Pivotation of the transfer girder 2 is effected by a piston-cylinder unit 20, which is connected with the girder 2 by way



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of a further fastening device 21.

Arranged within the transfer girder 2 are several telescopic U-section girders 3.1 to 3.3, the upper chord edges 4.1 to 4.3 of which are disposed in the same plane as the upper chord edges 5 of the transfer girder. Mounted by flanges on each web plate outer side 6 of the transfer girder 2 is a thrust unit 7. At least one movably mounted support roller 8 is also arranged in each of the sides 6. An arm 9 pivotable through more than 180 degrees is mounted at the tail end of the transfer girder 2. The transfer girder is, as already mentioned, mounted on the assembly 10 by way of the bearing 18 and the assembly is in turn rotatably mounted on the turret ring 11. The telescopic girders 3.1 to 3.3 can be moved out from and back into the transfer girder by means of a cable winch 12 and cables.

It can be seen from Fig. 2, in plan view of the vehicle, how the flanged-on thrust unit 7 and movably mounted support rollers 8 are arranged at both sides on the transfer girder 2. Also evident are the pivot bearing 18, the rotatably mounted carrier ring assembly 10 on the turret ring 11 and the fastening device 21 of the piston-cylinder unit for pivotation of the transfer girder 2, the device 21 being secured to the outside of the web plates 6 of the transfer girder.

Fig. 3 illustrates the bridge-laying armoured vehicle 1 disposed in the transport state and carrying two track girder bridge sections 13, 14, which are mounted one above the other and which each have guide wheels 17 between ends shaped as drive-up ramps 22. In that case, during transport the transfer girder 2 inclusive of the retracted telescopic U-section girders 3.1 to 3.3, the pivotable arm 9 and the supported bridge sections 13 and 14 are disposed within the prolongations of the front and rear ramp angles 15 and 16 of the tracks of the vehicle 1.

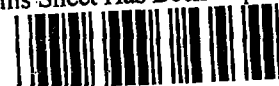
The bridge sections 13 and 14 are laid by way of the thrust unit 7, support rollers 8 and pivotable arm 9.



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CLAIMS

1. A bridge-laying armoured vehicle provided with equipment for supporting bridges or bridge sections one above the other and for laying the bridges or bridge sections, the equipment being rotatably mounted on a turret ring of the vehicle by way of a carrier assembly and comprising a transfer girder pivotable about a substantially horizontal axis, a plurality of U-section girders arranged within the transfer girder to be telescopically displaceable out of the transfer girder and a drive arm mounted at the transfer girder, the upper edges of the U-section girders and upper edges of the transfer girder being arranged in substantially the same plane.
2. A vehicle according to claim 1, comprising a respective support roller arranged at each of two side walls of the transfer girder in the region of an end thereof which is rearward with respect to a forward direction of travel of the vehicle.
3. A vehicle according to claim 1 or claim 2, wherein the arm is pivotable through at least 180° and is arranged in the region of said upper edges of the transfer girder at an end thereof which is rearward with respect to a forward direction of travel of the vehicle.
4. A vehicle according to any one of the preceding claims, wherein the vehicle wheel or track system defines a ramp surface at each of the front and the back of the vehicle and the girders and the arm are disposed substantially within an area bounded by planes containing the ramp surfaces.
5. A vehicle according to claim 4, wherein the vehicle is equipped with the bridges or bridge sections, the bridges or bridge sections being disposed substantially within said area.
6. A bridge-laying armoured vehicle substantially as hereinbefore described with reference to the accompanying drawings.



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ABSTRACT

A bridge-laying armoured vehicle (1) is provided with transfer equipment for bridges, or bridge sections, supported one above the other. The equipment comprises a single transfer girder (2) which is rotatably mounted on a carrier assembly (10) on a turret ring (11) of the vehicle and is pivotable about a horizontal pivot bearing (18), the pivoting being effected by way of a piston-cylinder unit (20). Arranged in the interior of the transfer girder (2) are telescopic U-section girders (3.1 - 3.3), the upper chord edges (4.1 - 4.3) of which are disposed in the same plane as the upper chord edges (5) of the transfer girder (2). Laying of the bridges or bridge sections is effected by a thrust unit (7), support rollers (8) and a pivotable arm (9) at the tail end of the transfer girder (2).

- Fig. 1 -

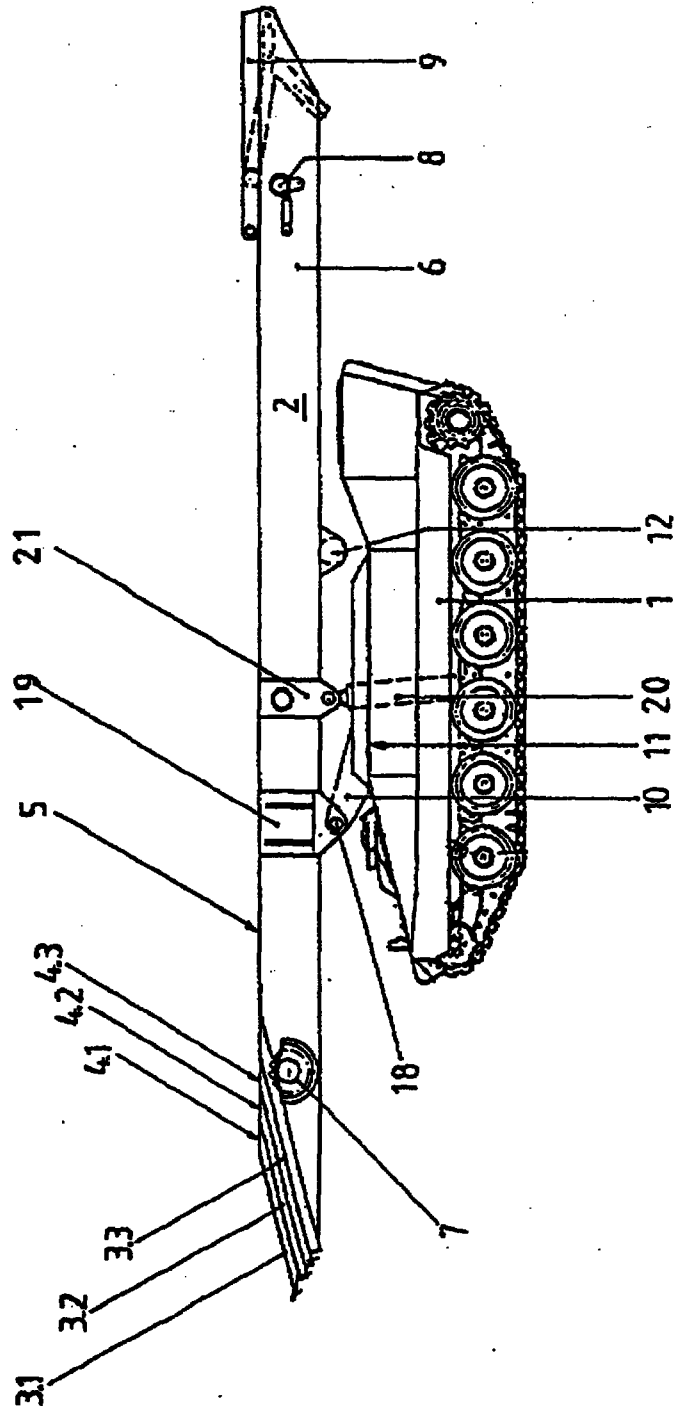


Fig. 1

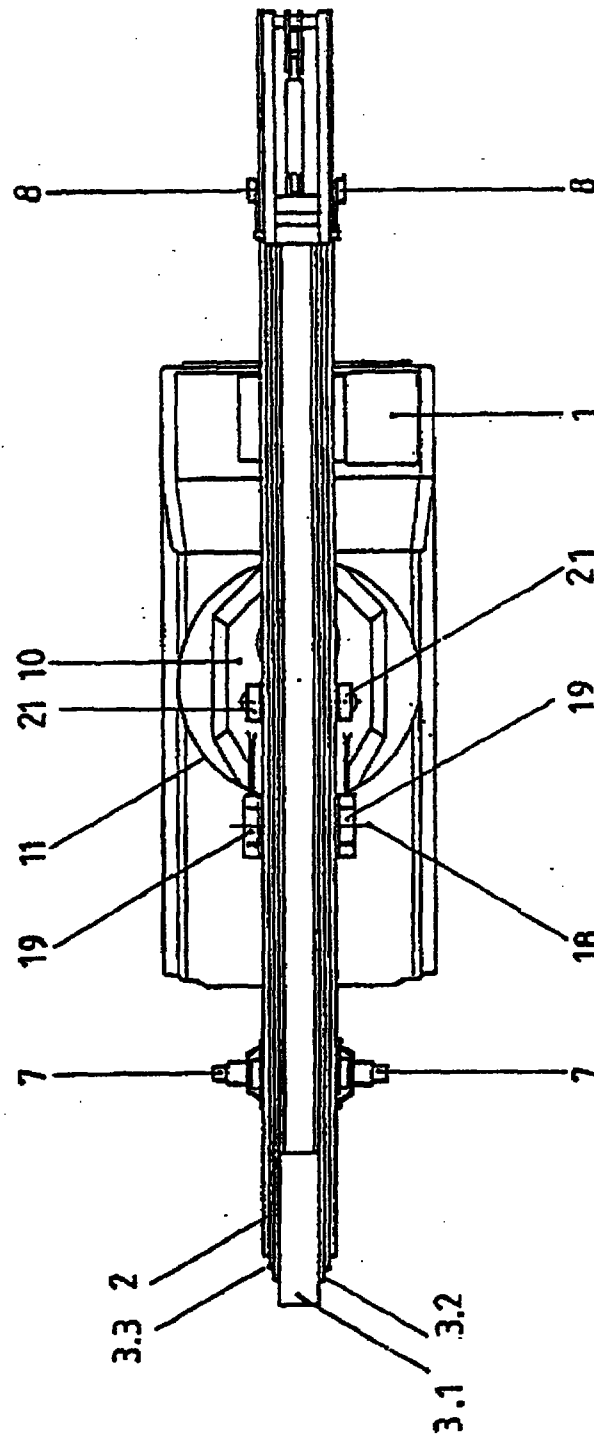
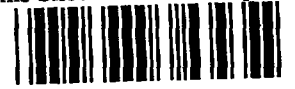


Fig. 2

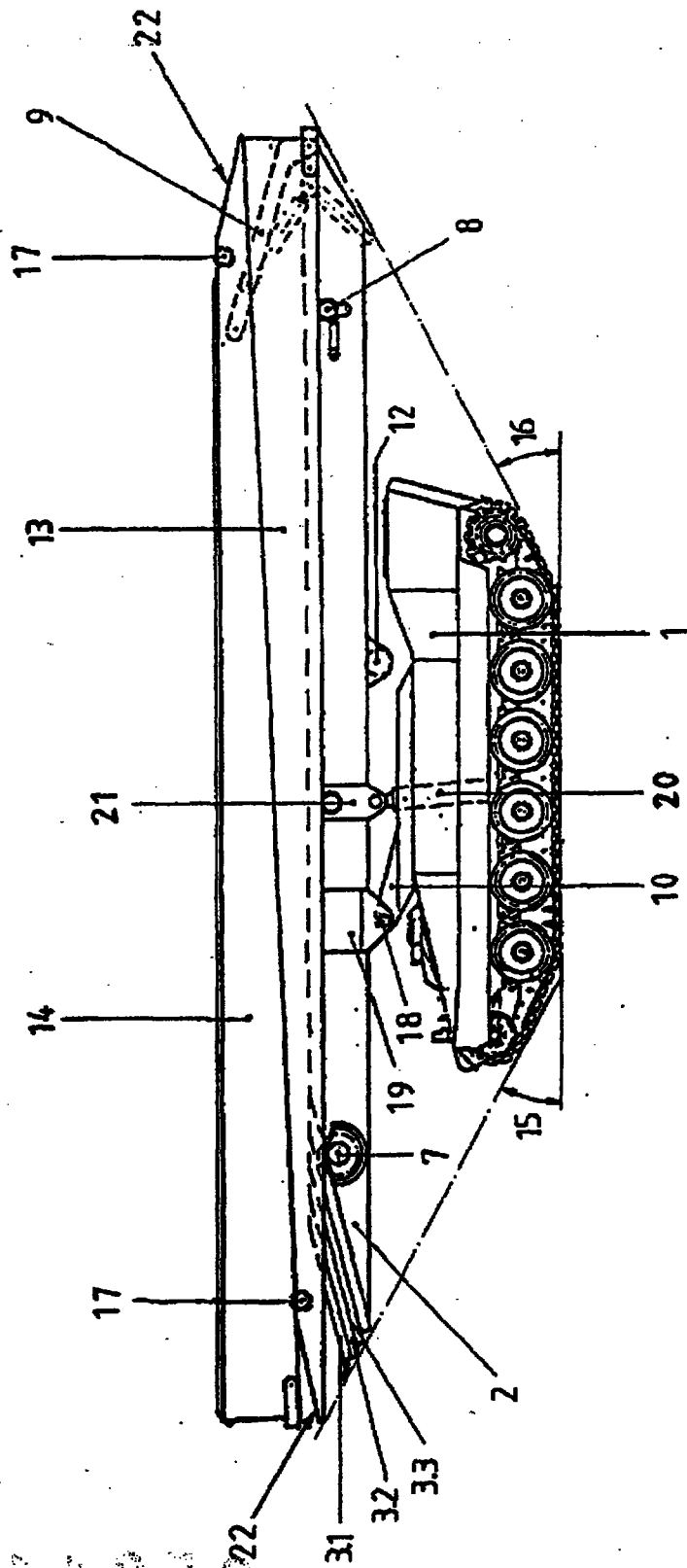
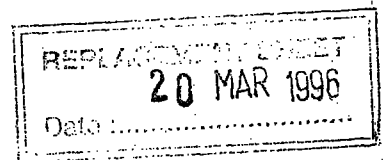


Fig. 3



Bridge-Laying Armoured Vehicle

The present invention relates to a bridge-laying armoured vehicle.

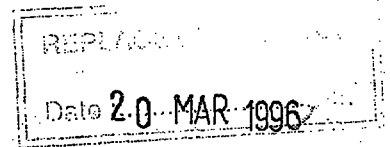
A bridge-laying vehicle with an associated bridge is described in German (Federal Republic) patent specification No. 16 58 604, wherein the vehicle is equipped with devices for supporting at least two bridge sections, which can be assembled into a bridge and during transport are mounted one above the other on the vehicle, and with devices for the assembling and laying of the bridge.

The two ends, which are to be connected together, of the bridge sections are constructed identically. Arranged at the vehicle is at least one cantilever girder, which can be displaced out in longitudinal direction of the bridge and which comprises means for connection with the end of the bridge section at the support side. The girder serves for the displacing and lowering of these sections.

German (Federal Republic) patent specification No. 20 17 489 discloses an arrangement of bridge halves, which are mounted one above the other on a transport vehicle and which, for use, are connected together fully automatically, in that claw couplings are arranged at the lower chords of the bridge halves and can be pushed vertically into one another. The head ends, which come into contact with one another, of the upper chords of the bridge halves have thrust strips.

The arrangement of the pivotable arm at an extendible girder of the transfer girder is disadvantageous in the case of the bridge-laying vehicles of the two above-mentioned specifications. Due to this arrangement it is required that the bridge sections are firstly coupled together into a bridge before the extendible girder members can be driven out in order to form the cantilever girder. Moreover, a very long flexible hydraulic lead is needed in order to actuate a piston-cylinder unit of the pivotable arm on the occasions when this functions as a lowerable support for the cantilever girder. Each cantilever girder part has supporting or running rollers over which the bridge moves.

In known bridge-laying equipment described in German (Federal Republic) patent specification No. 21 16 120, which consists of a

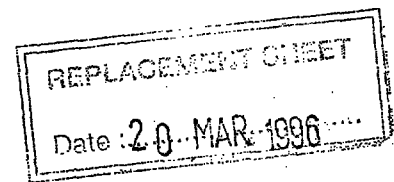


tracked vehicle, there is arranged on the upper side of the vehicle a girder which extends in the longitudinal direction of the vehicle and is pivotable about an axis transverse to the vehicle longitudinal axis. The girder consists of several telescopically withdrawable girder parts. Two bridge sections, which can be assembled into a bridge and each have a couplable end and a free end, are mounted one above the other on the girder and extend in longitudinal direction. A coupling device is provided for connecting the bridge sections. A pivotable arm, which is pivotably mounted at the rear end of the girder as seen in travel direction of the vehicle, serves as the coupling device.

The drive of this tail arm is so constructed that during travel of the vehicle without a bridge the arm must either be pivoted rearwardly in order to form a lower overall height of the vehicle, which is disadvantageous for the overall length of the unloaded vehicle or be pivoted up forwardly, which is disadvantage during passing by low obstacles, for example, overhanging pylons.

German (Federal Republic) patent specification No. 41 23 092 describes bridge-laying equipment with a telescopic cantilever girder, which is pivotable about an axis, with overhead bridge sections which are mounted one above the other and which can be assembled into a bridge, the bridge sections being movably arranged on the girder. Accordingly, the base of the cantilever girder is constructed to be at least as long as the underframe and is displaced in a sleeve-like transfer beam. The transfer beam is only about half as long as the underframe and is arranged to project at the part of the underframe placed at the side of the obstacle to be bridged. The pivotability of the cantilever girder is achieved by a pivot mounting of the transfer beam with a raisable and lowerable support at the end thereof remote from that obstacle.

A bridge-laying armoured vehicle is disclosed in German (Federal Republic) patent specification No. 38 91 429 and is equipped for the laying of a bridge in free cantilever manner. A disadvantage with this vehicle is its large intrinsic weight, as the vehicle must provide a counterweight. A vehicle of that kind does not exist for every type of girder required, which may necessitate a new vehicle purchase or costly rebuilding. Moreover, the folded-up support leg



or the support plate during travel, and the folded-down support leg during transfer, restrict the field of vision of the driver or operator of the vehicle. Moreover, the vehicle must always be set up in the direction of the bridge longitudinal axis. Additional alignment time and increased area are thus required at the bridge-laying location for the transfer operation.

The invention therefore has as its object the provision of bridge-laying armoured vehicle which can be based on, for example, a standard light tracked vehicle without the necessity of mounting additional parts, needed for the bridge-laying operation, externally on the hull of the vehicle.

According to the present invention there is provided a bridge-laying armoured vehicle provided with equipment for supporting bridges or bridge sections one above the other and for laying the bridges or bridge sections, the equipment being rotatably mounted on a turret ring of the vehicle by way of a carrier assembly and comprising a transfer girder pivotable about a substantially horizontal axis, a plurality of U-section girders arranged within the transfer girder to be telescopically displaceable out of the transfer girder and a drive arm mounted at the transfer girder, the upper edges of the U-section girders and upper edges of the transfer girder being arranged in substantially the same plane

Preferably, the vehicle comprises a respective support roller arranged at each of two side walls of the transfer girder in the region of an end thereof which is rearward with respect to a forward direction of travel of the vehicle. For preference, the arm is pivotable through at least 180° and is arranged in the region of said upper edges of the transfer girder at an end thereof which is rearward with respect to a forward direction of travel of the vehicle.

In a preferred embodiment the vehicle wheel or track system defines a ramp surface at each of the front and the back of the vehicle and the girders and the arm are disposed substantially within an area bounded by planes containing the ramp surfaces. When the vehicle is equipped with a bridge or bridge sections, the bridge or bridge sections are preferably disposed substantially within that area.

In the case of vehicle embodying the invention, the upper choard edges of the U-section girders thus lie in the same plane as the upper chord edges of the transfer girder, so that guide wheels of the bridge or bridge sections can run thereover unhindered. It has proved that in equipment of the kind disclosed in German specification No. 41 23 092, with guide rails in the lower chord, disruptions frequently occur due to jamming and canting of the support rollers during the movement phase when the bridge reaches the individual support rollers at the end of the telescopic girders.

A further advantage is the use of a rotatably mounted carrier assembly at the turret ring of the vehicle. As a result the time-consuming alignment of the vehicle is reduced in time and a smaller area is needed for manoeuvring at the laying location than in the case of known vehicles with non-rotatable transfer equipment. Accordingly, it may be possible to lay the bridge in any desired setting of the vehicle and to take it up again.

A further advantage is the compact form of the transfer girder and the arrangement of the hydraulic cantilever at the tail of the transfer girder.

This arm, inclusive of drive, can be so constructed that in the case of travel of the vehicle without a bridge or bridge section a low overall height is achieved.

An embodiment of the present invention will now be more particularly described with reference to the accompanying drawings, in which:

Fig. 1 is a side view of a bridge-laying armoured vehicle embodying the invention;

Fig. 2 is a plan view of the vehicle; and

Fig. 3 is a side view similar to Fig. 1, but with two bridge sections mounted one above the other on the vehicle.

Referring now to the drawings there is shown in Fig. 1 a tracked bridge-laying armoured vehicle 1 equipped with a single transfer girder 2, which is pivotably mounted on a carrier ring assembly 10 on a turret ring 11 of the vehicle. The assembly 10 is connected to the girder 2 by way of a horizontal pivot bearing 18 and a fastening device 21. Pivotation of the transfer girder 2 is effected by a piston-cylinder unit 20, which is connected with the girder 2 by way

of a further fastening device 21.

Arranged within the transfer girder 2 are several telescopic U-section girders 3.1 to 3.3, the upper chord edges 4.1 to 4.3 of which are disposed in the same plane as the upper chord edges 5 of the transfer girder. Mounted by flanges on each web plate outer side 6 of the transfer girder 2 is a thrust unit 7. At least one movably mounted support roller 8 is also arranged in each of the sides 6. An arm 9 pivotable through more than 180 degrees is mounted at the tail end of the transfer girder 2. The transfer girder is, as already mentioned, mounted on the assembly 10 by way of the bearing 18 and the assembly is in turn rotatably mounted on the turret ring 11. The telescopic girders 3.1 to 3.3 can be moved out from and back into the transfer girder by means of a cable winch 12 and cables.

It can be seen from Fig. 2, in plan view of the vehicle, how the flanged-on thrust unit 7 and movably mounted support rollers 8 are arranged at both sides on the transfer girder 2. Also evident are the pivot bearing 18, the rotatably mounted carrier ring assembly 10 on the turret ring 11 and the fastening device 21 of the piston-cylinder unit for pivotation of the transfer girder 2, the device 21 being secured to the outside of the web plates 6 of the transfer girder.

Fig. 3 illustrates the bridge-laying armoured vehicle 1 disposed in the transport state and carrying two track girder bridge sections 13, 14, which are mounted one above the other and which each have guide wheels 17 between ends shaped as drive-up ramps 22. In that case, during transport the transfer girder 2 inclusive of the retracted telescopic U-section girders 3.1 to 3.3, the pivotable arm 9 and the supported bridge sections 13 and 14 are disposed within the prolongations of the front and rear ramp angles 15 and 16 of the tracks of the vehicle 1.

The bridge sections 13 and 14 are laid by way of the thrust unit 7, support rollers 8 and pivotable arm 9.



REPLACEMENT SHEET
Date: 20 MAR 1996

CLAIMS

1. A bridge-laying armoured vehicle provided with equipment for supporting bridges or bridge sections one above the other and for laying the bridges or bridge sections, the equipment being rotatably mounted on a turret ring of the vehicle by way of a carrier assembly and comprising a transfer girder pivotable about a substantially horizontal axis, a plurality of U-section girders arranged within the transfer girder to be telescopically displaceable out of the transfer girder and a drive arm mounted at the transfer girder, the upper edges of the U-section girders and upper edges of the transfer girder being arranged in substantially the same plane.
2. A vehicle according to claim 1, comprising a respective support roller arranged at each of two side walls of the transfer girder in the region of an end thereof which is rearward with respect to a forward direction of travel of the vehicle.
3. A vehicle according to claim 1 or claim 2, wherein the arm is pivotable through at least 180° and is arranged in the region of said upper edges of the transfer girder at an end thereof which is rearward with respect to a forward direction of travel of the vehicle.
4. A vehicle according to any one of the preceding claims, wherein the vehicle wheel or track system defines a ramp surface at each of the front and the back of the vehicle and the girders and the arm are disposed substantially within an area bounded by planes containing the ramp surfaces.
5. A vehicle according to claim 4, wherein the vehicle is equipped with the bridges or bridge sections, the bridges or bridge sections being disposed substantially within said area.
6. A bridge-laying armoured vehicle substantially as hereinbefore described with reference to the accompanying drawings.

ABSTRACT

A bridge-laying armoured vehicle (1) is provided with transfer equipment for bridges, or bridge sections, supported one above the other. The equipment comprises a single transfer girder (2) which is rotatably mounted on a carrier assembly (10) on a turret ring (11) of the vehicle and is pivotable about a horizontal pivot bearing (18), the pivoting being effected by way of a piston-cylinder unit (20). Arranged in the interior of the transfer girder (2) are telescopic U-section girders (3.1 - 3.3), the upper chord edges (4.1 - 4.3) of which are disposed in the same plane as the upper chord edges (5) of the transfer girder (2). Laying of the bridges or bridge sections is effected by a thrust unit (7), support rollers (8) and a pivotable arm (9) at the tail end of the transfer girder (2).

Fig. 1

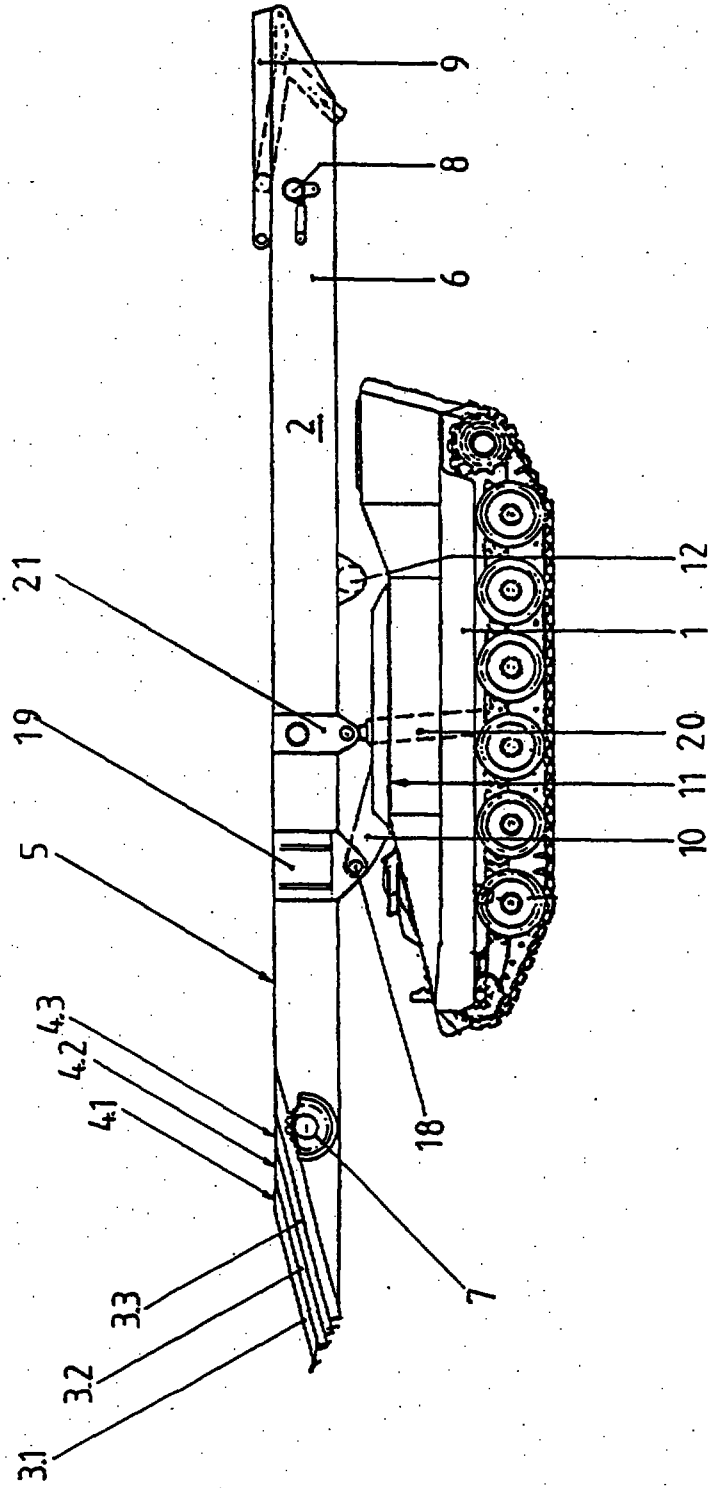


Fig. 1

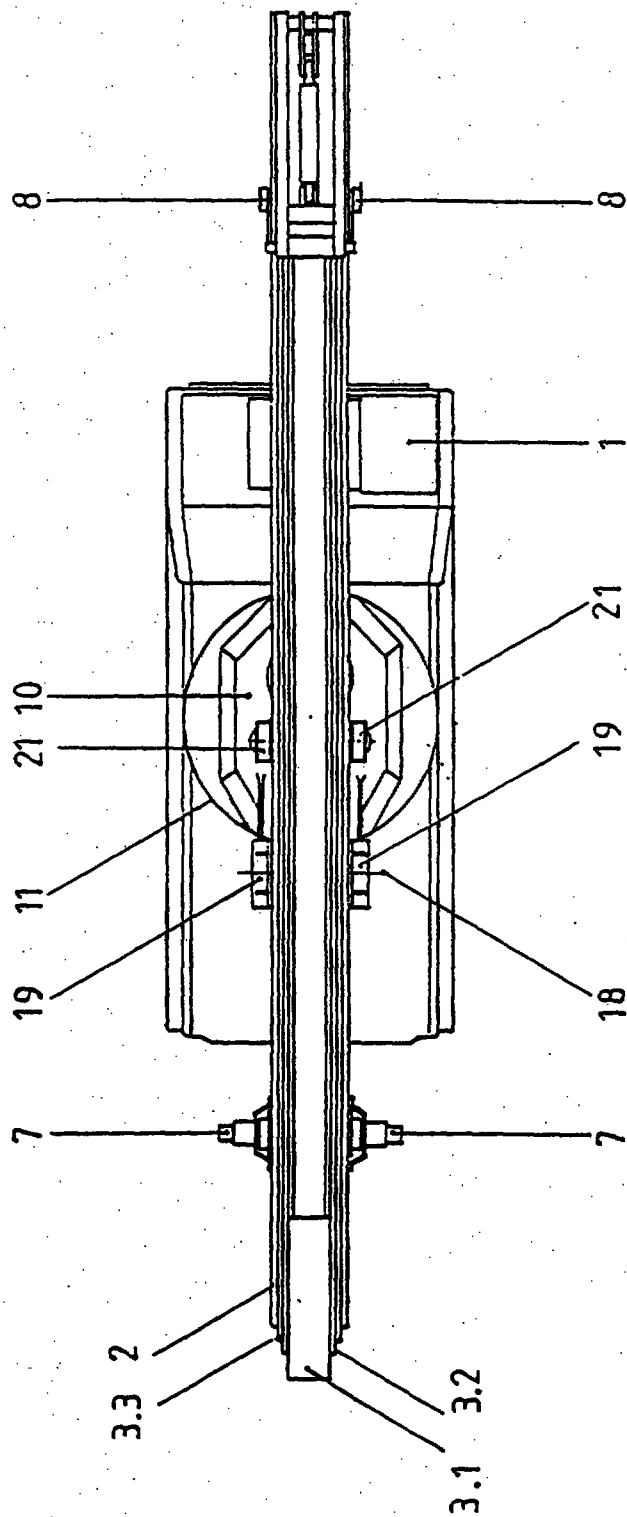


Fig. 2

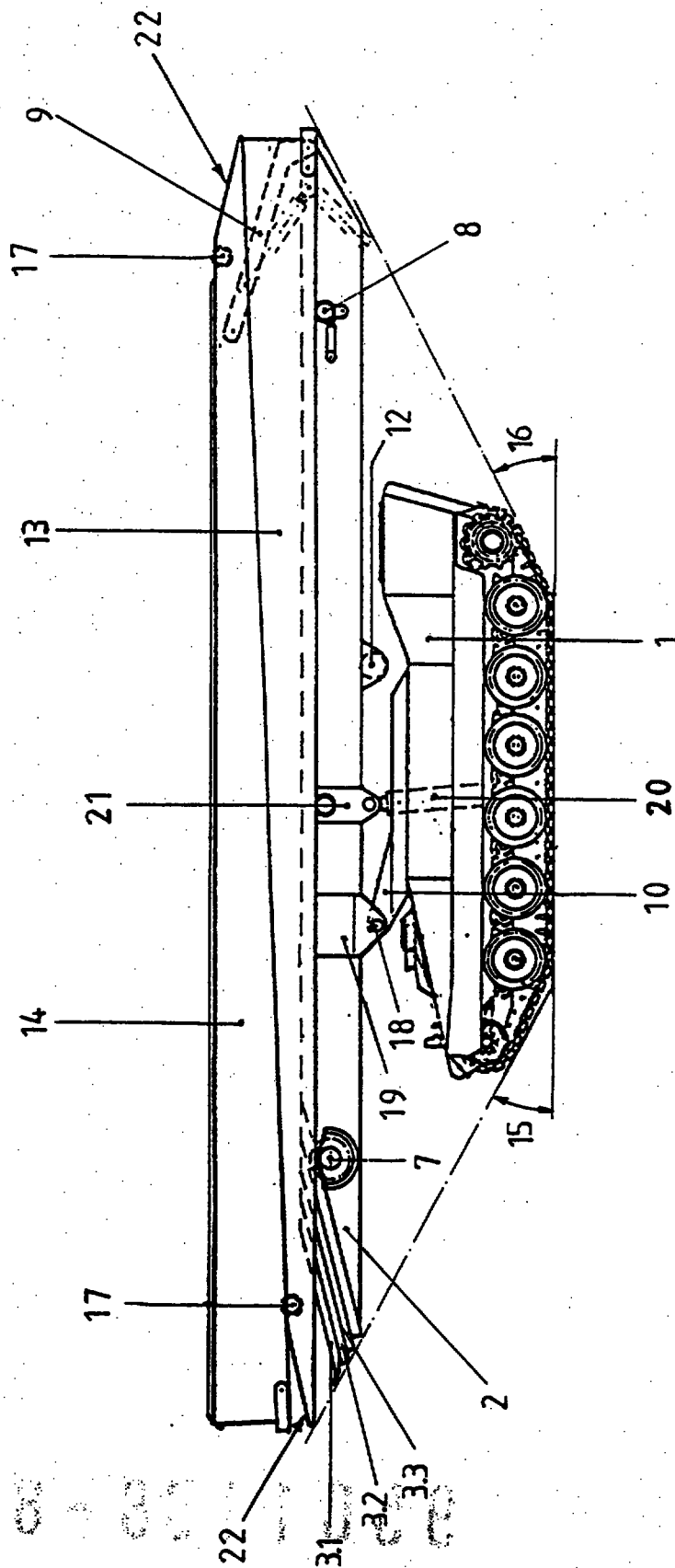


Fig. 3