July 7, 1959 H. SCHEUERPFLUG 2,893,502

VEHICLE WITH MOTOR MOUNTED ON SWINGABLE ARM

Filed Feb. 15, 1956 2 Sheets-Sheet 1

Fig. 1

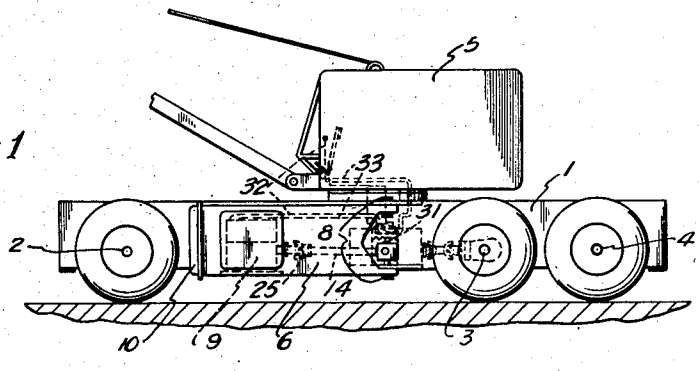
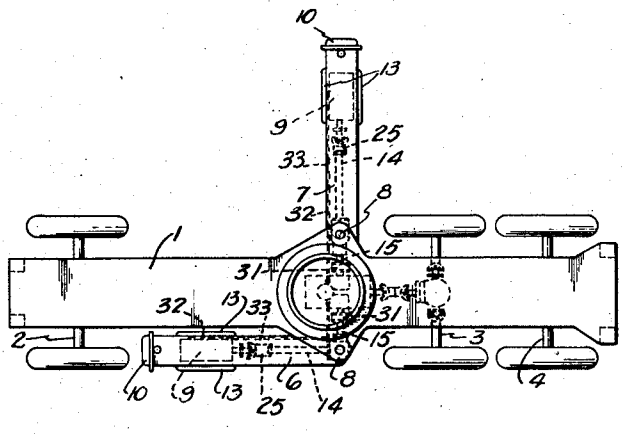


Fig. 2



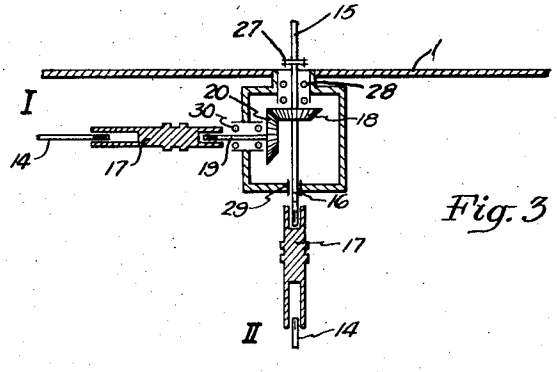


Fig. 3

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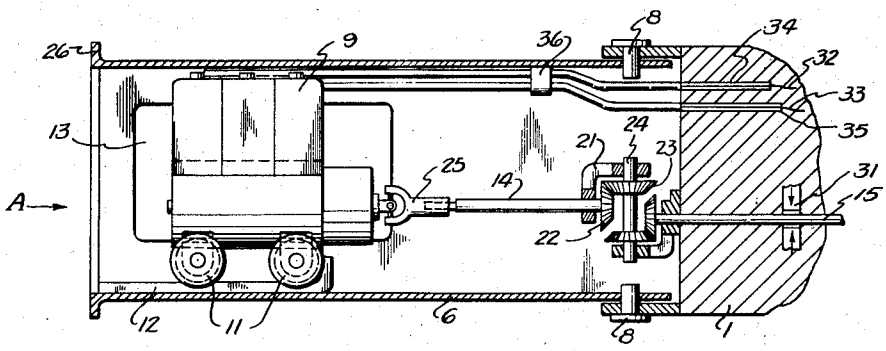


Fig. 4

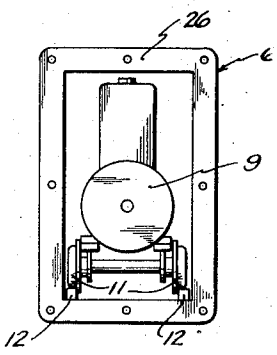


Fig. 5

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VEHICLE WITH MOTOR MOUNTED ON SWINGABLE ARM

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Application February 15, 1956, Serial No. 565,722
Claims priority, application Germany February 18, 1955
8 Claims. (Cl. 180—64)

This invention relates to a portable or vehicle-mounted rotary crane of the type including means for additionally supporting the crane on the ground. Such supporting arms as known per se are swung out to the two sides of the crane in its operative position for supporting the same against lateral tipping. In rotary cranes of the type referred to, it is known to arrange the driving engine in or on the vehicle or carriage on which the crane is mounted.

It is an object of the invention to provide an arrangement permitting easy access to the driving motor or motors without the necessity of providing any apertures or recesses weakening the steel construction of the lower carriage which is subjected to high stresses. Another object of the invention is to arrange the motor or motors in such a way that the upper carriage of the crane is not hindered in its free motion, more particularly where a low total height of the crane is required.

With these and further objects in view according to the present invention the driving motor, more particularly a Diesel engine, is accommodated on or in one of the supporting arms of the lower carriage. Where several motors are provided, each of the supporting arms may be arranged for accommodating one of the motors. If the supporting arms have the per se known hollow box cross section, apertures may be provided in the wall of the boxes and fitted with means in the form of lids or flaps or the like for installing, observing, attending, and removing the motor. Preferably the motor is mounted on a slide or wheeled carriage for facilitating its movement.

The motor power is transmitted to the crane through a slidable sleeve coupling of per se known type. Since in many instances only the two end positions are important in practical operation, coupling of the driving shafts is effected in these two positions only, e.g. through a bevel gear if the arm is disposed parallel to the longitudinal axis of the vehicle (inward position) and directly if the supporting arm is arranged transversely to the axis (outward position).

By way of alternative, a bevel gear may be arranged in such a way that the gear wheels roll off on each other as the supporting arm is swung outwards or inwards. In this case, the swinging may be effected by engine power, by driving the driving bevel wheel and stopping the driven bevel wheel.

The engine, for instance a Diesel engine, may be controlled in per se known manner, for instance through a Bowden control cable in a flexible steel conduit.

This accommodation of the engine in the supporting arms offers considerable advantages. The hollow spaces in the box beam cross section of the supporting arms in most instances are so large that only a slight enlargement thereof is necessary in order to accommodate for instance a multi-cylinder-in-line diesel engine. Moreover, the accessibility of the engine is greatly improved compared to the known arrangement of the engine in or on the crane carriage, since the supporting arms are freely

accessible in a swung-out position, so that the engine is also accessible from two sides, similar to the engine of a motor truck.

Owing to the fact that the engine is not installed in the steel construction of the lower carriage, the same can be constructed in a more favorable manner. A further advantage results from the fact that at least to some extent the insertion of weights from scrap-loaded concrete or the like in the supports which is necessary in many instances in order to obtain a better distribution of the wheel pressure of the crane vehicle when changing over from the operative or outward position into the travelling or inward position, can be saved. The engine substitutes a part of this additional weight and the total weight of the crane is thus also reduced.

Other and further objects, features and advantages of the invention will be pointed out hereinafter and appear in the appended claims forming part of the application.

In the accompanying drawings several now preferred embodiments of the invention are shown by way of illustration and not by way of limitation.

Fig. 1 is a side view of a crane having the invention applied thereto,

Fig. 2 is a plan view thereof,

Fig. 3 is a fragmentary plan view, partly in section, showing one coupling arrangement in the two end positions of the supporting arm,

Fig. 4 is a fragmentary sectional view of a modification, and

Fig. 5 is an end view thereof.

Similar reference numerals denote similar parts in the different views.

Referring now to the drawings in greater detail and first to Figs. 1 and 2 which apply for both embodiments, it will be seen that the lower carriage or bogie 1 of the crane is carried on three axles 2, 3, 4. Swivel-mounted on the lower carriage 1 is the rotary upper carriage 5. A pair of supporting arms 6 and 7 are pivoted to the lower carriage 1 by means of pivot pins 8. Fig. 2 shows one of the supporting arms 6 in its inwardly swung or travelling position and the second supporting arm 7 in its outwardly swung or operative position. A diesel engine 9 is accommodated in each of the box-shaped hollow supporting arms 6, 7 whose open end is closed by a cover 10 each which is secured to the end flange 26 of its arm by screws and can be removed therefrom for installing and removing the diesel engine. The engine 9 is provided with wheels 11, Fig. 4, and thus can be easily displaced in its supporting arm on rails 12. Lateral lids or covers 13 permit easy access to the diesel engine 9 even without removal thereof.

The transmission of power from the engine 9 to the lower carriage is effected by means of a gear which in the embodiment of Fig. 3 is constructed in such a way that power can be transmitted only in the end positions I and II of the driving shaft 14 of the engine 9 which is not shown in Fig. 3. The driven shaft 15 mounted in the lower carriage 1 is coupled with a shaft 16 by a fixed coupling 27. If the supporting arm is swung out, the driving shaft 14 is in the position II, Fig. 3. In this case the driving shaft 14 can be coupled with the intermediate shaft 16 by means of a slidable sleeve coupling 17. On the other hand, if it is intended to swing the supporting arm inwards, the coupling 17 is disengaged and the supporting arm is swung inwards by hand until the driving shaft 14 comes into the position I, Fig. 3. In this position a driving connection can be achieved by means of a bevel wheel 18 mounted on the shaft 16 and a bevel wheel 20 meshing therewith and fixedly secured on a further intermediate shaft 19 which in this position of shaft 14 can be coupled therewith by the axially slidable cou-

pling 17. The shafts are mounted for rotation in ball or roller bearings 28, 29, 30, as shown.

In the modification shown in Fig. 4, the driven shaft 15 which is mounted in the lower carriage 1 meshes with the driving shaft 14 of the engine through a bevel gear mechanism 21 in such a way that contrary to the embodiment of Fig. 3 power can be transmitted from the engine 9 to the lower carriage in any position of the supporting arm 6. In order to swing the supporting arm 6 about the pivot pin 8, the driven shaft 15 is stopped by a brake 31, in such a way that the bevel wheel 22 of the bevel gear mechanism 21 in case of a rotation of the driving shaft 14 rolls on the stationary bevel wheel 23, whereby the entire supporting arm 6 is swung about the shaft 24 which is coaxial with the pair of pivot pins 8.

The engine 9 is connected to the shaft 14 by means of a universal joint coupling 25. By means of the wheels 11 the engine 9 can easily be installed in, or removed from, the supporting arm 6 on the rails 12 on removal of the end cover 10, whereat the universal joint coupling 25 engages the shaft 14.

An electric control cable 32 and a Bowden control cable in a flexible steel conduit 33 passed through ducts 34 and 35 in the lower carriage 1, Fig. 4, and fastened to the inner wall of the box-shaped grider 6 by means of clips 36 serve to operate the engine 9 from the driver's seat (not shown).

While the invention has been described in detail with respect to certain now preferred examples and embodiments of the invention it will be understood by those skilled in the art after understanding the invention that various changes and modifications may be made without departing from the spirit and scope of the invention and it is intended, therefore, to cover all such changes and modifications in the appended claims.

I claim:

1. A vehicle having a rotary crane mounted thereon comprising pivoted supporting arms pivotally secured to said vehicle for movement for driving the vehicle to an outward position for supporting the crane on the ground, at least one supporting arm carrying a driving engine, and means for establishing driving connection between the engine and the vehicle in either position of the respective supporting arm.

2. A vehicle having a rotary crane mounted thereon comprising a lower carriage, hollow space box-shaped supporting arms swivel-mounted on the lower carriage, at least one supporting arm carrying a driving engine accommodated in the hollow space in one of the supporting arms, at least one opening in an arm permitting access to and removal of the engine, and means for establishing driving connection between the engine and the vehicle at least in the two end positions of the supporting arm respectively parallel and at right angles to the longitudinal axis of the vehicle.

3. A vehicle having a rotary crane mounted thereon comprising a lower carriage, hollow space box-shaped supporting arms swivel-mounted on the lower carriage and including rails at least on its bottom wall and a detachable end cover, at least one supporting arm carrying a driving engine accommodated in the hollow space in one of the supporting arms, means mounting said engine on said rails for permitting its displacement on the rails for moving into and removing it from the supporting arm, and means for establishing driving connection between the engine and the vehicle at least in the two end positions of the supporting arm respectively parallel and at right angles to the longitudinal axis of the vehicle.

4. A vehicle having a rotary crane mounted thereon comprising a lower carriage including a driven shaft, hollow space box-shaped supporting arms swivel-mounted on the lower carriage, at least one supporting arm carrying a driving engine accommodated in the hollow space in one of the supporting arms, at least one opening in an arm permitting access to and removal of the engine, and means including a slidable sleeve coupling for establishing driving connection between the engine and the vehicle at least in the two end positions of the supporting arm respectively parallel and at right angles to the longitudinal axis of the vehicle.

5. A vehicle having a rotary crane mounted thereon comprising a lower carriage including a driven shaft, hollow space box-shaped supporting arms swivel-mounted on the lower carriage, at least one supporting arm carrying a driving engine accommodated in the hollow space in one of the supporting arms, at least one opening in an arm permitting access to and removal of the engine, and means including a driving shaft operatively connected to the engine, a bevel gear with one gear mounted on the driving shaft, one gear mounted on the driven shaft, and at least one gear inserted therebetween and mounted for rotation about the swivel axis for establishing driving connection between the engine and the vehicle in any position of the supporting arm.

6. A vehicle having a rotary crane mounted thereon comprising a lower carriage including a driven shaft, hollow space box-shaped supporting arms swivel-mounted on the lower carriage, at least one supporting arm carrying a driving engine accommodated in the hollow space in one of the supporting arms, at least one opening in an arm permitting access to and removal of the engine, means including a driving shaft operatively connected to the engine, a bevel gear with one gear mounted on the driving shaft, one gear mounted on the driven shaft, and at least one gear inserted therebetween and mounted for rotation about the swivel axis for establishing driving connection between the engine and the vehicle in any position of the supporting arm, and means for selectively preventing rotation of the driven axis in such a way that the supporting arm can be swung into the desired position by rotation of the driving shaft.

7. A vehicle having a rotary crane mounted thereon comprising a lower carriage including a driven shaft, hollow space box-shaped supporting arms swivel-mounted on the lower carriage, at least one supporting arm carrying a driving engine accommodated in the hollow space in one of the supporting arms, at least one opening in an arm permitting access to and removal of the engine, means including a driving shaft operatively connected to the engine, a bevel gear with one gear mounted on the driving shaft, one gear mounted on the driven shaft, and at least one gear inserted therebetween and mounted for rotation about the swivel axis for establishing driving connection between the engine and the vehicle in any position of the supporting arm, means for selectively preventing rotation of the driven axis in such a way that the supporting arm can be swung into the desired position by rotation of the driving shaft, and flexible cable means permitting control of the engine from the carriage.

8. A vehicle having a rotary crane mounted thereon comprising pivoted supporting arms pivotally secured to said vehicle for movement from an inward position for driving the vehicle to an outward position for supporting the crane on the ground, at least one supporting arm carrying a driving engine, and means for establishing driving connection from the engine to the vehicle and control connection from the crane to the engine in either position of the respective supporting arm.

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