April 28, 1942. R. G. LE TOURNEAU 2,281,507

LOAD CARRYING AND ERECTING IMPLEMENT

Filed Sept. 22, 1941 2 Sheets-Sheet 1

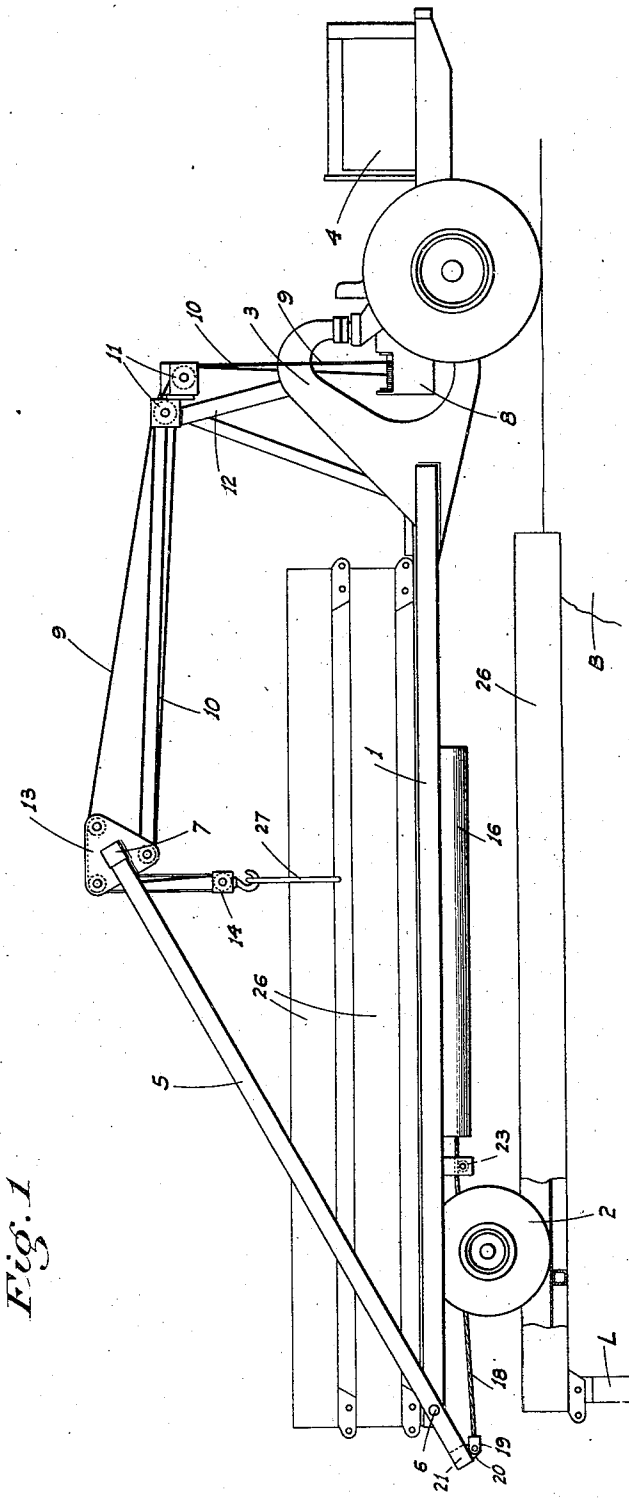


Fig. 1

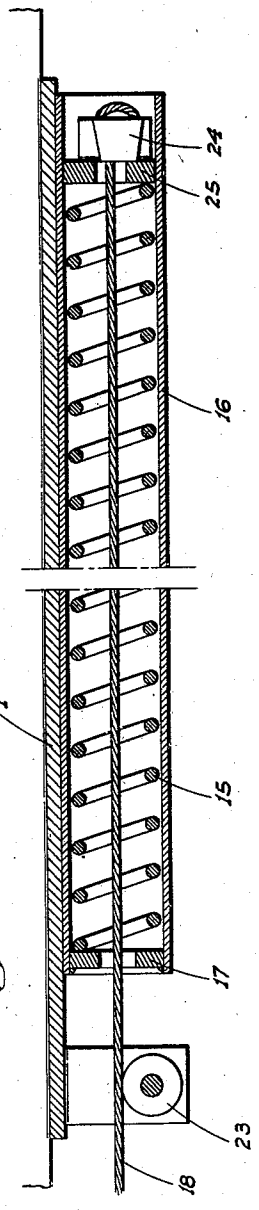


Fig. 4

INVENTOR
R. G. LeTourneau
BY
Webster & Webster
ATTYS

April 28, 1942. R. G. LE TOURNEAU 2,281,507

LOAD CARRYING AND ERECTING IMPLEMENT

Filed Sept. 22, 1941 2 Sheets-Sheet 2

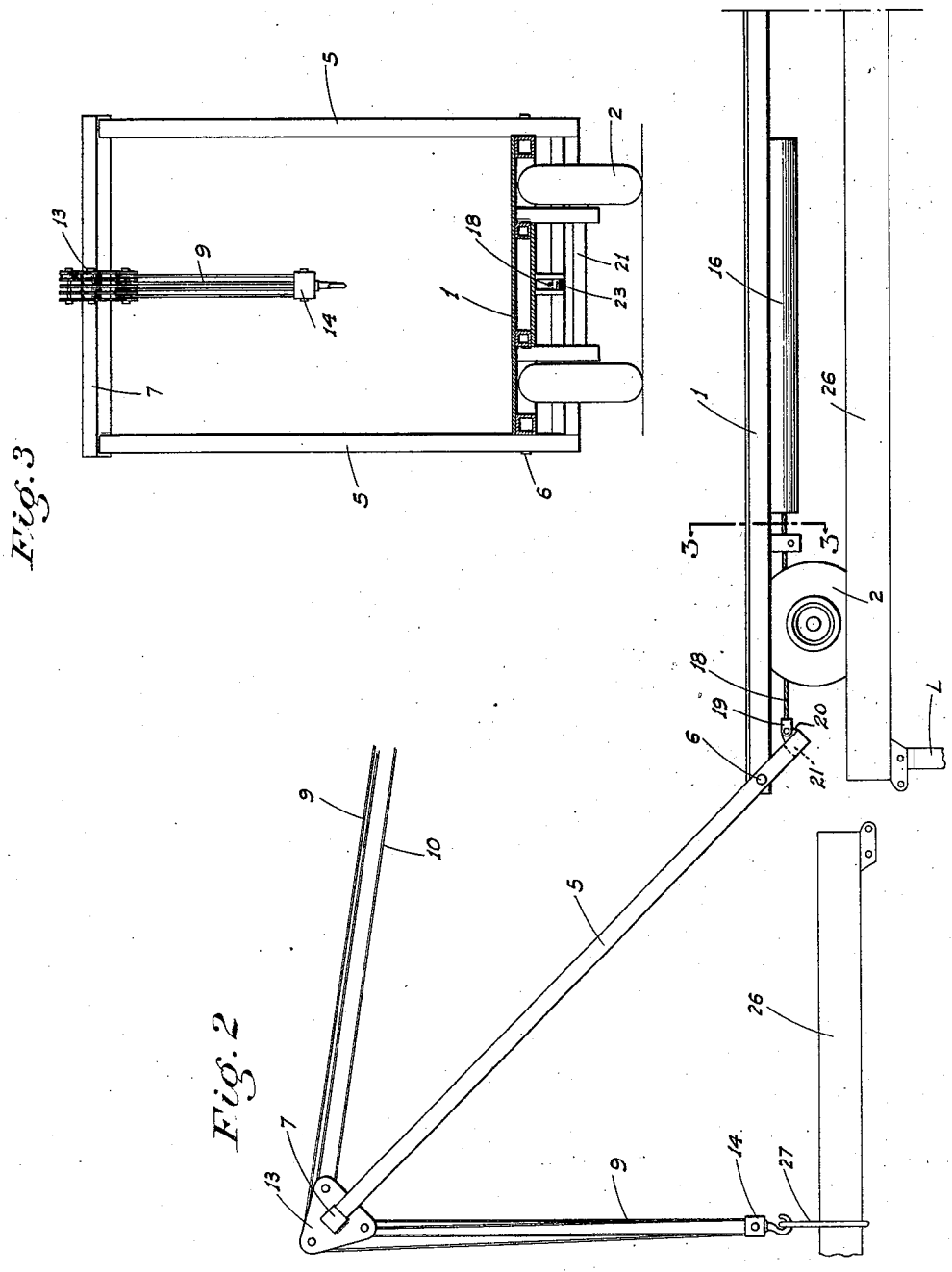


Fig. 3

Fig. 2

INVENTOR

R. G. LeTourneau

BY

Webster & Webster

ATTYS

Patented Apr. 28, 1942 2,281,507

UNITED STATES PATENT OFFICE

2,281,507

LOAD CARRYING AND ERECTING IMPLEMENT

Robert G. Le Tourneau, Peoria, Ill., assignor to R. G. Le Tourneau, Inc., a corporation

Application September 22, 1941, Serial No. 411,828

9 Claims. (Cl. 212—8)

This invention, which relates generally to a self-powered construction vehicle, is directed in particular, and it is the principal object to provide, a self-powered vehicle arranged to receive and transport a load of construction members; the vehicle incorporating a crane mechanism which is operative to lift the construction members individually from the vehicle and to swing said members to correct position for connection into the structure which said transported members are to form a part.

Another object of the invention is to provide a self-powered vehicle arranged to transport a plurality of portable bridge spans; the vehicle including a crane mechanism to lift such spans one at a time from the load, and to swing the spans one after another to position in the bridge being erected, the vehicle being adapted to move onto each span as erected and thus be in position to swing the next span into place.

A further object of the invention is to provide unique actuating means for the crane mechanism which is embodied in the implement.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Figure 1 is a side elevation of the vehicle, with the boom unit in overhanging relation to the load.

Figure 2 is a fragmentary side elevation of the vehicle with the boom unit projecting rearwardly from the bed of the vehicle and lowering a bridge span into place for connection.

Figure 3 is a cross section on line 3—3 of Fig. 2.

Figure 4 is an enlarged longitudinal sectional elevation of the spring assembly which swings the boom unit in one direction.

Referring now more particularly to the characters of reference on the drawings, the vehicle comprises a trailer including a flat bed 1 supported at its rear end by transversely spaced wheels 2. At its forward end and centrally of its side the bed 1 is provided with a forwardly projecting yoke 3, which is coupled at its forward end with the rear end portion of a two-wheel tractor unit, indicated generally at 4. The tractor unit 4 is coupled with the yoke 3 for relative horizontal turning movement and the tractor unit is of the type wherein steering is accomplished by relative change in speeds between the drive wheels.

The trailer, at its rear end, is provided with a boom unit which comprises relatively long, upwardly projecting side beams 5 disposed in parallel relation and pivoted, as shown at 6, above but adjacent their lower end to the sides of the bed 1 adjacent the rear end of the latter. At their upper end, side beams 5 are connected in rigid relation by a cross beam 7. It will be seen that by virtue of the above arrangement the boom unit does not obstruct the rear end of the trailer bed 1, and is capable of swinging movement from a forwardly and upwardly inclined position overhanging the bed, as shown in Fig. 1, to a rearwardly and upwardly inclined position overhanging the area rearwardly of the vehicle, as shown in Fig. 2.

The tractor unit 4 at its rear end and between the upper and lower arms of the yoke 3 is provided with a conventional two-drum power control unit 8, each drum of which is selectively controlled by the operator and driven from the tractor engine. Separate cables 9 and 10 lead upward from the power control unit 8 and pass over corresponding direction changing sheaves, indicated generally at 11, mounted on the upper end of rigid supporting posts 12 which project upwardly from the yoke 3.

The cable 9 leads rearwardly from sheaves 11 to a multiple sheave block 13 mounted on cross beam 7 centrally of the ends of the latter. From sheave block 13 cable 9 runs back and forth between said block and a depending multiple sheave block and hook unit 14, thus forming a block and tackle assembly. The cable 10 extends rearwardly from sheaves 11 as multiple reaches which cooperate with other sheaves of block 13 and is dead-ended adjacent one of said sheaves 11.

A relatively long heavy-duty compression spring 15 is housed in a tubular member 16 mounted lengthwise beneath the bed 1 of the trailer ahead of the rear wheels 2 and centrally between the sides of said bed. Such spring engages against an annular seat 17 secured in the rear end of tubular member 16. A flexible cable 18 is secured by a clevis 19 to an ear 20 projecting centrally from a cross member 21 which extends in rigid relation between the lower ends of side beams 5 of the boom unit. From clevis 19 the cable 18 extends forwardly between the wheels 2, over a lead pulley 23 disposed immediately rearwardly of the rear end of tubular mem-

ber 16, and thence passes into said tubular member, through spring 15, and to a termination ahead thereof. An anchor head 24 is secured on the forward and free end of cable 18, and this head seats against an annular collar 25 slidably disposed in tubular member 16 between head 24 and the adjacent end of compression spring 15. The length of cable 18 is such that regardless of the position of the boom unit, the spring 15 is loaded to a certain extent and the spring is not at any time wholly relieved of tension.

When the vehicle is in load-carrying position the cable 10 is drawn in to an extent to cause the boom unit to be swung forwardly about its pivot 6 until said boom unit extends forwardly at an upward incline in an overhanging relation to the bed 1, the hook unit 14 then being suspended above the load. When the boom unit is so disposed the cable 18 has been drawn rearwardly, further loading the spring 15.

The vehicle above described, while capable of many uses, has been designed particularly to transport and erect portable bridge spans. Such spans, indicated at 26, are stacked for transport on the bed 1 of the vehicle in the manner shown in Fig. 1. To unload such spans one at a time and to swing the same to a position rearwardly of the vehicle, the boom unit is actuated as follows:

A suitable sling 27 encircles the uppermost span 26 intermediate its ends and hook unit 14 is engaged with such sling, and cable 9 is drawn in by the power control unit until said span is lifted clear. Then the cable 10 is permitted to run out, which permits the boom unit to swing rearwardly about pivot 6 under the influence of spring 15 until it reaches a rearwardly projecting and inclined position, such as shown in Fig. 2. When the boom unit is in this latter position the supported bridge span is clear of the rear end of bed 1. The suspended span is then lowered, by holding back on cable 10, and secured in place. After an initial span, such as is shown in Fig. 1, has been set in place with one end supported by a stream bank B, for example, and the other end supported by a leg unit L, the span transporting and erecting vehicle may back onto such initial span and place the next following span in the bridge structure. It will thus be seen that as the portable bridge structure is erected, the vehicle moves from span to span supplying and positioning the next following span.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

1. In combination with a vehicle having a bed, a boom projecting above said bed, means pivoting the boom intermediate its ends but adjacent its lower end for swinging movement lengthwise of the vehicle between a forwardly inclined position and a rearwardly inclined position, load supporting means depending from the upper end of the boom, pull cables connected to said boom on opposite sides of its pivot, and extending forwardly therefrom, and separate means applied to each cable to pull the same forwardly; one such means comprising a loaded spring.

2. In combination with a vehicle having a bed, a boom projecting above the bed, means pivoting the boom intermediate its ends but adjacent its lower end for swinging movement lengthwise of the vehicle between a forwardly inclined position and a rearwardly inclined position, a pull cable connected with the boom above its pivot and extending forwardly therefrom, said cable being adapted for connection with a control means, another cable connected with the boom below its pivot and extending forwardly therefrom, and a pull spring mounted on the vehicle ahead of said boom pivot and connected with said last named cable.

3. A structure as in claim 2 in which said pull spring comprises a compression spring; a tubular longitudinally extending housing in which said spring is disposed, and an annular seat for the spring in said housing at its rear end, said last named cable extending through said seat and said spring, and anchor means applied to the forward end of said last named cable engaging the forward end of the spring.

4. In combination with a vehicle having a bed, a boom unit including transversely spaced side beams connected by a top beam, said side beams being pivoted intermediate their ends but adjacent their lower ends on the sides of the bed adjacent its rear end, said boom unit projecting upward some distance above the bed and being adapted for swinging movement lengthwise of the vehicle between a forwardly inclined position and a rearwardly inclined position, load-supporting means depending from the top beam intermediate its ends, a pull cable extending forwardly from said top beam, said cable being adapted for connection with a control means, a cross beam connecting the side beams below said pivots, another pull cable extending forwardly from said cross beam, and a loaded pull spring mounted beneath the bed of the vehicle and connected to the forward end of said other pull cable.

5. In combination with a vehicle having a bed, a boom unit including transversely spaced side beams connected by a top beam, said side beams being pivoted intermediate their ends, but adjacent their lower ends on the sides of the bed adjacent its rear end, said boom unit projecting upward some distance above the bed and being adapted for swinging movement lengthwise of the vehicle between a forwardly inclined position overhanging said bed and a rearwardly inclined position overhanging the area rearwardly of said bed, a block and tackle depending from the top beam substantially centrally of the ends of the latter, the lower block of said block and tackle including a load-supporting hook, one reach of said block and tackle extending forwardly from the upper block and adapted for connection with a control means, a separate pull cable extending forwardly from the top beam and adapted for connection with a separate control means, a cross beam connecting the side beams below said pivots, another pull cable extending forwardly from said cross beam, and a loaded pull spring mounted beneath the bed of the vehicle and connected to the forward end of said other pull cable.

6. In combination with an implement including a trailer having a bed, and a tractor connected in draft relation to the trailer, the tractor including a two-drum power control unit; a boom unit including transversely spaced side beams connected by a top beam, said side beams being

pivoted intermediate their ends but adjacent their lower ends on the sides of the trailer bed adjacent its rear end, said boom unit projecting upwardly some distance above the bed and being adapted for swinging movement lengthwise thereof between a forwardly inclined position overhanging the bed and a rearwardly inclined position overhanging the area rearwardly of the bed, a block and tackle suspended from said top beam substantially centrally of its ends, the lower block of said block and tackle including a load-supporting hook, one reach of said block and tackle extending forwardly from the upper block, and being operatively connected with one drum of said power control unit, a separate pull cable extending forwardly from said top beam and being operatively connected with the other drum of said power control unit, a cross beam connecting the side beams below said pivots, another pull cable extending forwardly from said cross beam, and a loaded pull spring mounted beneath the bed of the vehicle and connected to the forward end of said other pull cable.

7. A combination as in claim 6 including a rigid upstanding post adjacent the forward end of the trailer bed, and direction changing sheaves mounted in connection with the upper end of said post; the forwardly extending reach of the block and tackle, and said first named pull cable extending over said direction changing sheaves and thence passing downwardly to the drums of the power control unit.

8. In combination with an implement including a trailer having a bed, and a tractor connected in draft relation to the trailer, the tractor including a power driven cable drum; a boom pivoted on the trailer and projecting above the bed, said boom being arranged for swinging movement between a forwardly inclined position overhanging the transverse plane of the bed and a rearwardly inclined position overhanging the area immediately rearwardly of the bed, a pull spring mounted on the trailer, a connecting element between the pull spring and the boom, said spring being operative to swing the boom to said rearwardly inclined position, a forwardly extending pull cable connected at one end to the boom and at the other end to said cable drum whereby when the cable runs onto said drum the boom is swung forwardly to said forwardly inclined position and against the urge of said spring.

9. A combination as in claim 8 in which the tractor includes another power driven cable drum, a block and tackle suspended from the upper end portion of said boom, the lower block of the block and tackle including a load-supporting hook, and one reach of said block and tackle extending forwardly from the upper block to said other cable drum.

ROBERT G. LE TOURNEAU.