Jan. 14, 1969 S. BARKER ET AL 3,421,778

DUAL PURPOSE DOLLY FOR SEMITRAILERS

Filed Nov. 18, 1966 Sheet 1 of 4

FIG. 1.

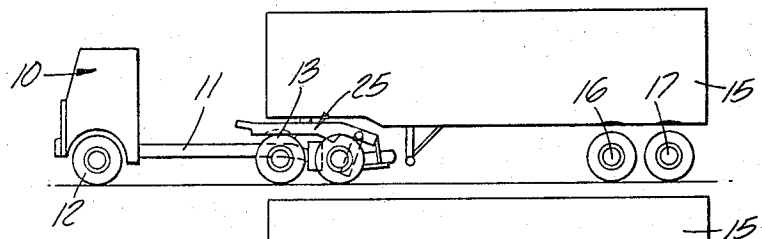


FIG. 2.

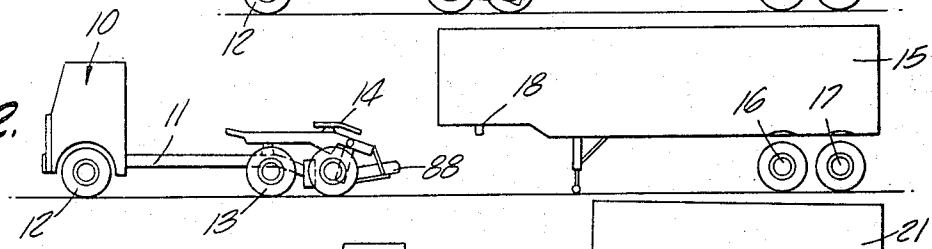


FIG. 3.

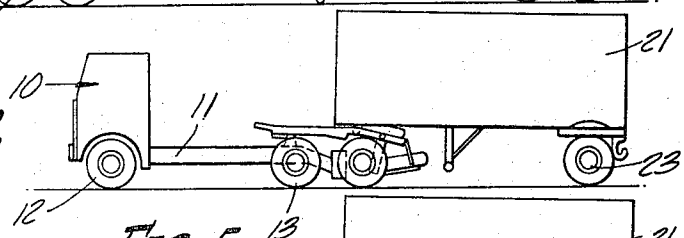


FIG. 5.

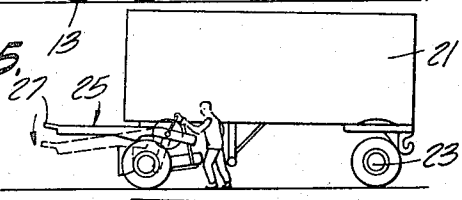
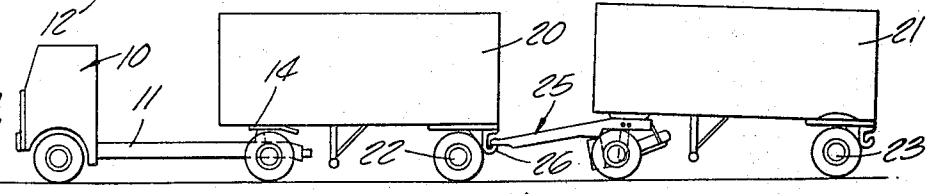


FIG. 4.

FIG. 6.



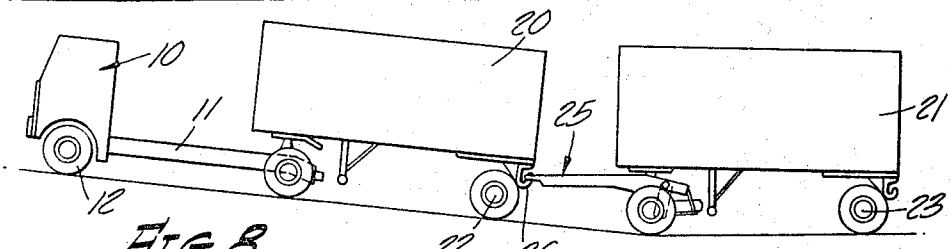


FIG. 8.

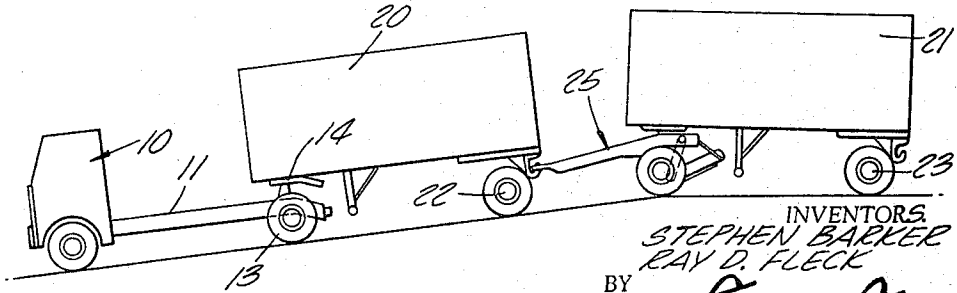
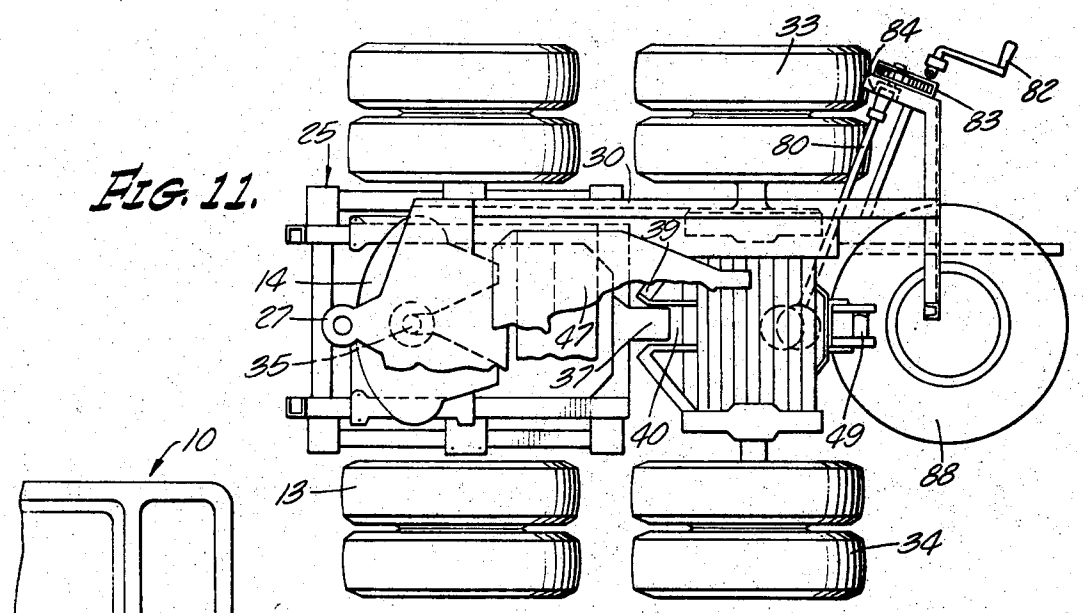


FIG. 7.

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DUAL PURPOSE DOLLY FOR SEMITRAILERS

FIG. 11.



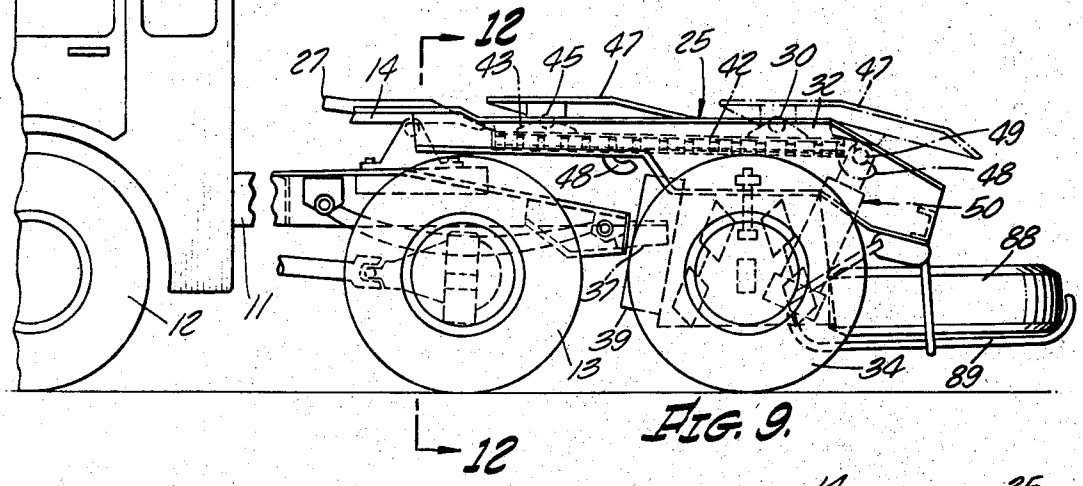


FIG. 9.

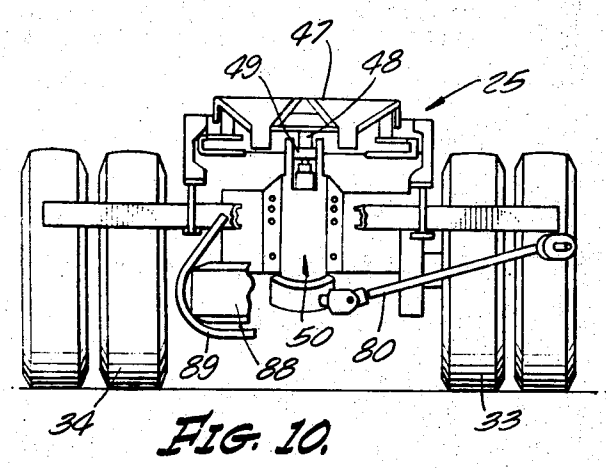


FIG. 10.

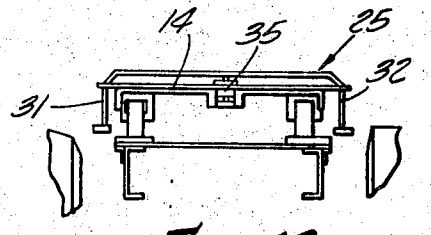


FIG. 12.

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DUAL PURPOSE DOLLY FOR SEMITRAILERS

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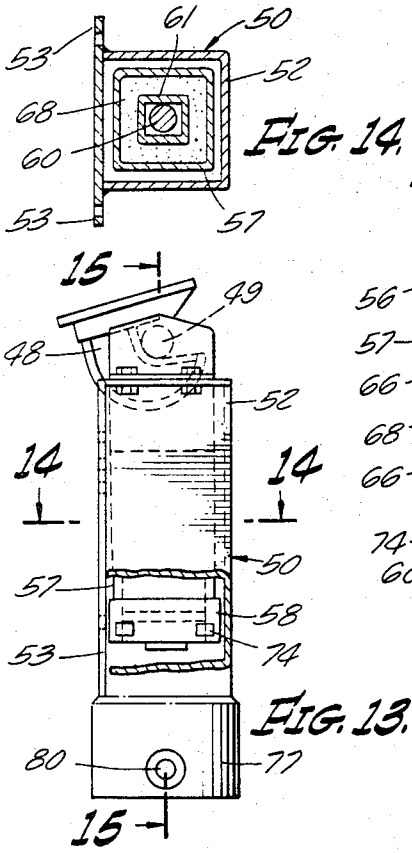


FIG. 14.

FIG. 13.

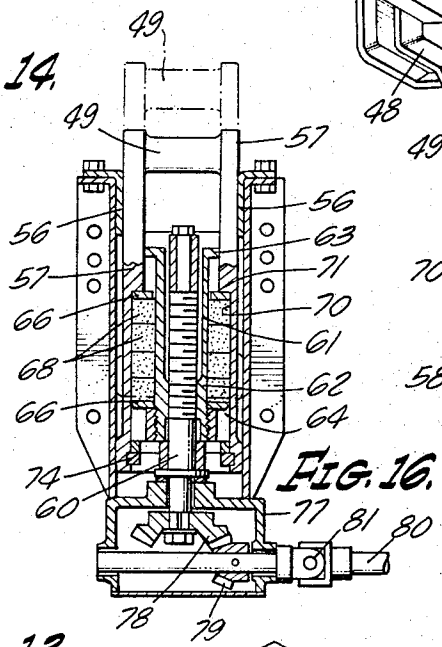


FIG. 16.

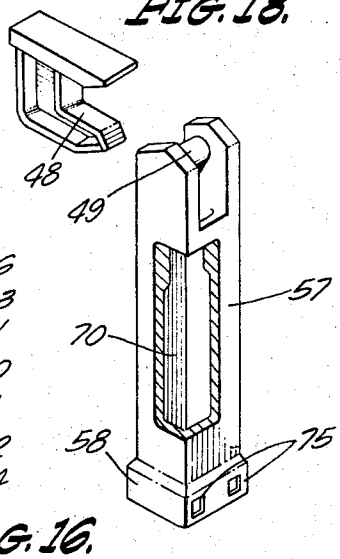


FIG. 18.

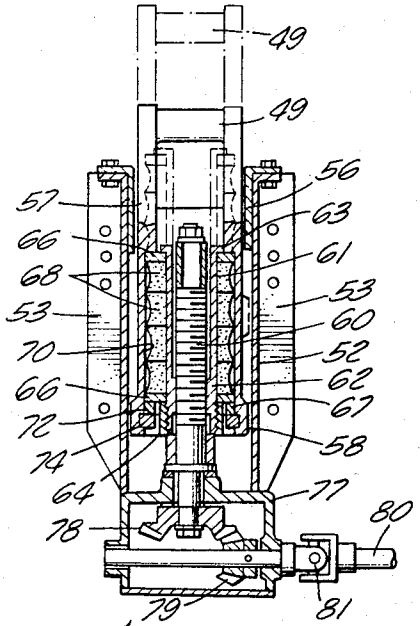


FIG. 15.

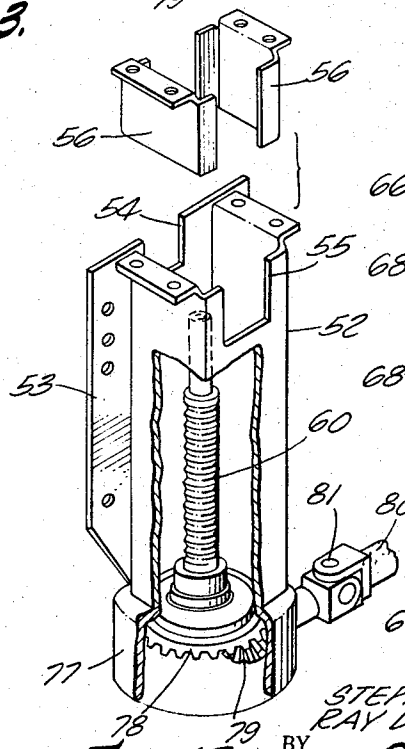
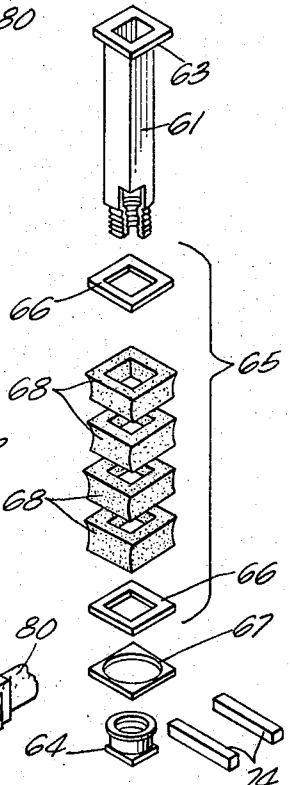


FIG. 17.



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FIG. 20.

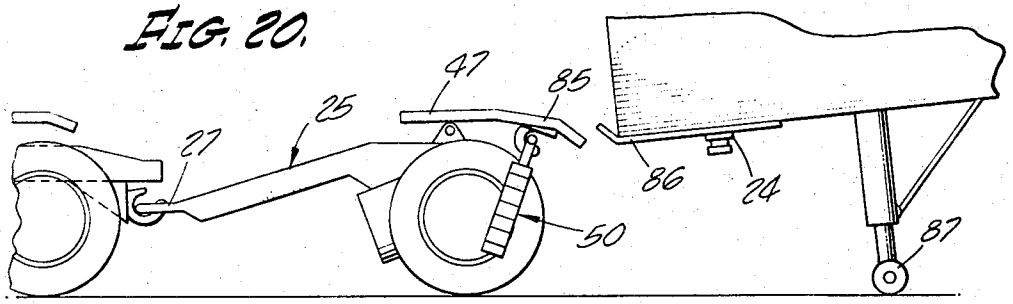
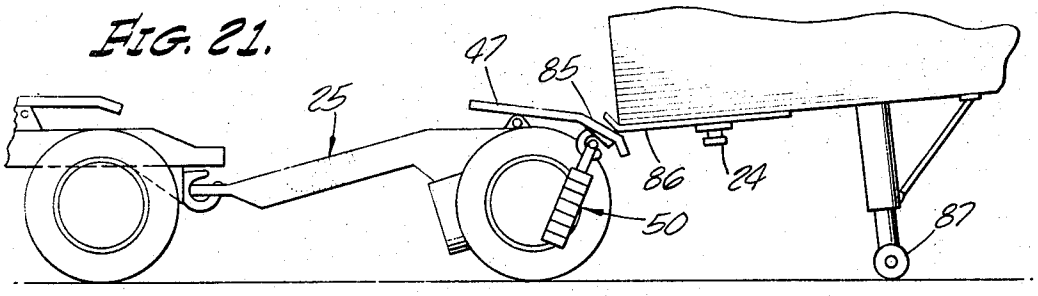


FIG. 21.



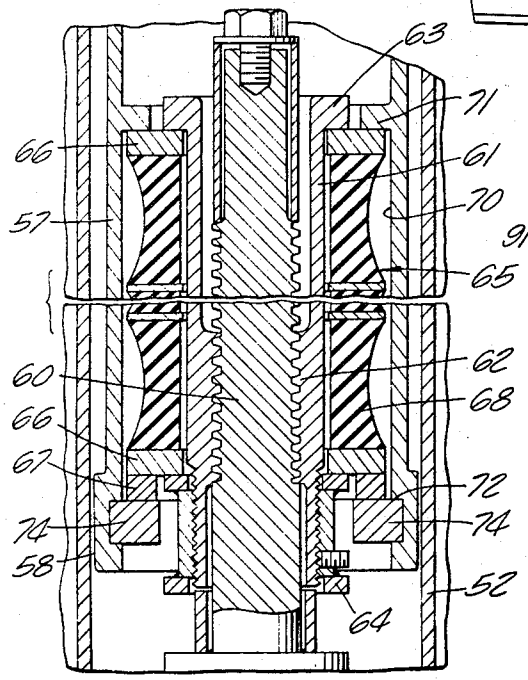


FIG. 19.

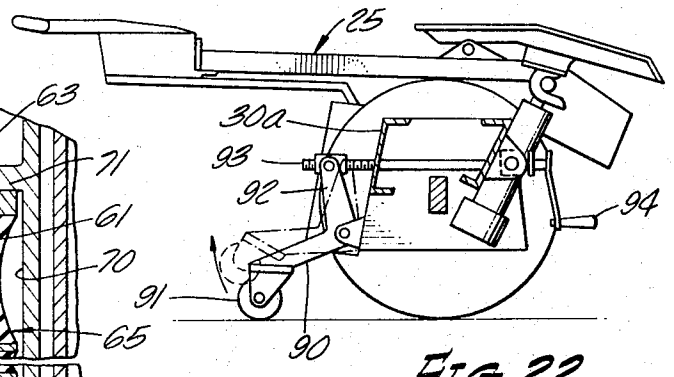


FIG. 22.

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United States Patent Office 3,421,778 Patented Jan. 14, 1969

3,421,778

DUAL PURPOSE DOLLY FOR SEMITRAILERS

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Filed Nov. 18, 1966, Ser. No. 595,443
U.S. Cl. 280—476 2 Claims
Int. Cl. B60d *1/04;* B60d *1/14;* B62d *53/06*

ABSTRACT OF THE DISCLOSURE

A wheeled dolly for use as either an auxiliary wheeled axle for a truck when towing a large semitrailer or as a towing connection between adjacent ends of two smaller semitrailers. The dolly includes a longitudinal frame with a hitch at its forward end for coupling a truck or a semitrailer and a fifth wheel device pivotable about a transverse axis and selectively longitudinally shiftable relative to the dolly frame to automatically engage a resilient snubber device at the rear of the frame for resisting pivotal movement of the fifth wheel device while permitting variation at its angular position.

This invention relates to transportation systems and is particularly directed to improvements in apparatus useful with tractors and semitrailers.

Auxiliary wheeled axles for tractors or trucks are well known, and they serve to provide additional ground wheels for supporting the forward end of a large semitrailer. A device of this type is shown in the Kirksey Patent No. 2,330,897 granted Oct. 5, 1943. Converter dollies are also well known for converting a semitrailer to a full trailer and are commonly used for towing a second semitrailer from a first semitrailer, the first semitrailer being towed by a tractor or truck. An example of such a converter dolly is shown in the Knox Patent No. 2,254,532 granted Sept. 2, 1941.

It is the principal object of the present invention to provide an improved dual purpose device which may be used either as an auxiliary wheeled axle for a truck or tractor, or as a converter dolly for a semitrailer. A dual purpose device of this type permits great flexibility in trucking operations. Thus, the same truck can be used, with the dual purpose device attached to the rear thereof, to pull a single large semitrailer, the weight of the forward end of the large semitrailer being carried on the truck wheels and also on the wheels of the dual purpose device, or the truck may be used to tow semitrailers in tandem, with the dual purpose device serving as a converter dolly for the second semitrailer.

Another object of this invention is to provide such a dual purpose dolly device which may readily be changed from an auxiliary wheeled axle device for a tractor or truck, to a converter dolly for the second of two tandem semitrailers, in a minimum of time and without danger to the operator. A more detailed object is to provide adjustable means for varying the angular position of the fifth-wheel device relative to its supporting frame, so that when the dual purpose dolly is supporting the forward end of a semitrailer the forward end of the frame may be raised or lowered as needed for connection to either the truck or to another semitrailer. Another object is to provide a resilient snubber of novel construction for resisting pivotal movement of the fifth-wheel device on the dolly relative to the frame of the dolly.

These and other objects of the invention are achieved by providing a dual purpose dolly having a longitudinal frame supported by ground wheels turning about a transverse axis. The frame carries a fifth wheel which may be moved forward on the frame for supporting the forward end of a large semitrailer when the dolly is being used as an auxiliary wheeled axle for the truck. The fifth wheel is moved to a rearward position on the frame when the device is being used as a converter dolly for the second of two tandem semitrailers. Adjustable means are provided for varying the angular position of the fifth-wheel device, when in its rearward position, in order to adjust the elevation of the forward end of the frame, while the dual purpose device is supporting the forward end of a semitrailer, thereby permitting the forward end of the frame to be connected either to the fifth wheel of the truck or to the draft hook at the rearward end of another semitrailer.

Other and more detailed advantages and objects will appear hereinafter.

In the drawings:

FIGURES 1 through 8 are side elevations in diagrammatic form, showing how a two-axle truck may be used with a dual purpose dolly of this invention for towing either a large single semitrailer or a pair of smaller semitrailers in tandem. Thus, FIGURE 1 shows the dual purpose dolly serving an an auxiliary wheeled axle for the truck and supporting the forward end of a large single semitrailer. FIGURE 2 shows the truck and dual purpose dolly being moved out from under the forward end of the single large semitrailer. FIGURE 3 shows the truck and dual purpose dolly being positioned under the forward end of a smaller semitrailer. FIGURE 4 shows the truck after being disconnected from the dual purpose dolly. FIGURE 5 shows the smaller semitrailer supported at its forward end by the dual purpose dolly, and shows how the operator may adjust the elevation of the forward extending portion of the frame of the dolly device. FIGURE 6 shows the truck towing the first of two smaller semitrailers and showing the dolly device supporting the forward end of the second semitrailer and connecting the two semitrailers for tandem operation. FIGURE 7 shows the action of the snubber on the dolly device and permitting relative angular movement of the dolly frame and semitrailer when the assembly passes over a high point on the road. FIGURE 8 is a view similar to FIGURE 7 showing the action of the snubber when the assembly passes over a low point on the road.

FIGURE 9 is a side elevation showing a preferred embodiment of this invention and illustrating the dual purpose dolly attached to the truck and serving as an auxiliary wheeled axle therefor.

FIGURE 10 is an end elevation of the device shown in FIGURE 9.

FIGURE 11 is a top plan view of the device shown in FIGURE 9.

FIGURE 12 is a transverse sectional view taken substantially on the lines **12—12** as shown in FIGURE 9.

FIGURE 13 is a side elevation partly broken away showing the snubber which connects the frame of the dolly to the fifth wheel on the dolly, when the latter is in its rearward position.

FIGURE 14 is sectional plan view taken substantially on the lines **14—14** as shown in FIGURE 13.

FIGURE 15 is a sectional view taken substantially on the lines **15—15** as shown in FIGURE 13.

FIGURE 16 is a view similar to FIGURE 15 but showing the snubber parts in a different position.

FIGURE 17 is a perspective view, partly broken away, showing a portion of the device of FIGURE 13.

FIGURE 18 is an exploded view of the remaining parts of FIGURE 13.

FIGURE 19 is an enlarged section detail showing a portion of FIGURE 15.

FIGURE 20 is a side elevation in diagrammatic form

showing movement of the dolly device toward position under a semitrailer.

FIGURE 21 is a view similar to FIGURE 20 and showing the action of the snubber in lifting the forward end of the semitrailer.

FIGURE 22 is a side elevation in diagrammatic form showing a modification.

Referring to the drawings, the tractor or truck generally designated **10** and shown in diagrammatic form in FIGURES 1–8 of the drawings, has a frame **11**, front wheels **12** which steer, and rear wheels **13** through which tractive power is applied. The frame **11** supports the conventional fifth-wheel assembly **14** (FIGURE 4). Two types of semitrailers are shown. The first type is a conventional large semitrailer **15** having a pair of wheeled axles **16** and **17** at its rearward end and having a conventional kingpin **18** (FIGURE 2) under its forward end. The second type comprises smaller semitrailers **20** and **21**, which may be duplicates, and have only one rear axle assembly **22**, **23**, and are adapted to be towed in tandem, as shown in FIGURE 6. The forward semitrailer **20** is connected to the fifth wheel **14** of the truck **10**, and the second semitrailer **21** has its forward end supported by the dual purpose dolly device generally designated **25**, which device also serves to provide a towing connection from the conventional hook **26** on the rearward end of the semitrailer **20**.

In FIGURE 1, the dual purpose device **25** serves as an auxiliary wheeled axle for the truck **10**, and in FIGURE 6 the device **25** serves as a converter dolly for the second semitrailer **21** connected in tandem to the first semitrailer **20**.

As best shown in FIGURES 9–12, the dual purpose dolly device **25** has a longitudinally extending frame **30** which includes a pair of parallel side rails **31** and **32** carried on side wheels **33** and **34** rotatable about a transverse axis. The frame **30** is supported on the side wheels **34** and this construction may take the form disclosed in the Barker Patent No. 2,995,383. Near its forward end the frame **30** is provided with a kingpin **35** which is gripped by a locking device in the conventional fifth wheel **14** mounted on the truck **10**. Means are provided for preventing lateral swinging movement of the dual purpose dolly **25** with respect to the truck frame **11**, and as shown in the drawings, this means includes the rearward projection **37** bolted or otherwise attached to the rear cross member of the truck frame, and a cooperating channel **39** provided on the dolly frame **30** and having a central slot **40** for sliding reception of the projection **37**.

Within the rails **31** and **32** there is provided a longitudinal track or guideway **42** for reception of a sliding support **43**. A latch (not shown) is provided for securing the sliding support **43** in any one of a series of positions along the length of the track **42**. Coaxial transverse pins **45** on the sliding support **43** pivotally support the fifth wheel **47**. This fifth wheel **47** on the dual purpose dolly device **25** is similar to the fifth wheel **14** on the truck **10** except that it is adjustable longitudinally of the dolly frame **30**, and further, that it is provided with a hook **48** on its under surface. The kingpin **18** on the single large semitrailer **15**, or the kingpin **24** on the smaller semitrailer **20** may each enter the slot in the fifth wheel **47** and be latched in position by conventional means. When the forward end of the single large semitrailer **15** is to be carried on the fifth wheel **47**, the latter is moved to its forward position relative to the truck frame **11** by sliding the support **43** to the forward end of its travel along the track or guideway **42**, and then latched in position. When the forward end of the smaller semitrailer **20** is to be supported on the fifth wheel **47**, the latter is moved to the rearward end of the guideway or track **42**, and in this latter position the hook **48** engages the crosspin **49** at one end of the snubber device, generally designated **50**. The rearward position of the fifth wheel **47** is shown in phantom lines in FIGURE 9.

The snubber or stabilizer **50**, best shown in FIGURES 13–19, acts through the crosspin **49** and hook **48** to afford a means of adjusting the relative angular position of the fifth wheel **47** and the dolly frame **30**, as well as to provide resilient means resisting such relative movement above and below the adjusted position. The shell **52** is provided with lateral flanges **53** bolted to the frame **30** of the dual purpose dolly. The shell **52** has aligned notches **54** and **55** provided in its front and rear walls, respectively, for clearance with the hook **48** fixed to the underside of the pivoted fifth wheel **47**. Guide shoes **56** are mounted on the upper open end of the shell **52** and provide sliding surfaces for contact with the movable plunger **57** mounted within the shell **52**. The upper projecting end of the plunger **57** carries the crosspin **49**. The cross-sectional shape of the plunger is similar to the cross-sectional shape of the interior of the shell. The lower end of the plunger **57** is enlarged at **58** for slidable reception in sliding contact with the inner walls of the shell **52**.

Means are provided for moving the plunger **57** lengthwise within the interior of the shell **52**, and, as shown in the drawings, this means includes a screw **60** projecting upward into the shell and plunger and engaged by a tubular nut **61** having an internally threaded portion **62** near its lower end. The tubular nut **61** may move axially within the interior of the plunger **57** but is prevented from turning therein by the noncircular flange **63** on the nut which slidably engages a noncircular bore within the plunger **57**. A threaded abutment flange **64** is mounted on the lower exterior portion of the tubular nut **61**. Positioned between the flange **63** and abutment **64** on the outer-surface of the nut **61** is a snubbing assembly, generally designated **65**, which includes a pair of noncircular metal washers **66** and a plurality of resilient blocks **68**. Another metal washer **67** having a circular aperture is positioned between the lower washer **66** and the abutment flange **64**. Each of the blocks **68** is formed of elastomeric material such as rubber, and each has a central opening for reception of the tubular nut **61**. Each block is concave on its outer surface, and each is received within the inner wall **70** of the plunger **57**. Opposite ends of this wall **70** terminate in inwardly extending abutments **71** and **72** on the plunger **57**. For purposes of assembly, the abutment **72** is provided by bars **74** which slide through aligned apertures **75** in the enlarged portion **58** of the plunger **57**.

The screw **60** extends into the gear chamber **77** at the lower end of the shell **52**, and bevel gears **78** and **79** are provided for turning the screw **60** in either direction by means of the shaft **80** and coupling **81**. The shaft **80** may be turned manually by means of a hand crank **82** (FIGURE 11) acting through a reduction gear assembly **83** and coupling **84**. The hand crank **82** is placed at a location readily accessible to the operator.

From this description it will be understood that rotation of the hand crank **82** is effective to turn the screw **60** within the tubular nut **61**, causing the latter to move longitudinally within the shell **52**, thereby raising or lowering the crosspin **49**. When the hook **48** is engaged with the crosspin **49**, the projection and retraction of the crosspin **49** through operation of the crank **82** is effective to shift the relative angular position of the fifth wheel **47** with respect to the dolly frame **30**. Moreover, since the snubber assembly **55** including the rubber blocks **68** is operatively interposed between the nut **61** and the plunger **57**, forces transmitted through the crosspin **49** in either direction are resiliently opposed by the rubber blocks. When the forces are sufficient to deform all of the rubber blocks so that they totally fill the available space between the nut **61** and the inside wall of the plunger **57**, the connection becomes "solid" without further appreciable resilient deformation.

When the forward end of the semitrailer **21** rests on the dual purpose dolly **25**, as shown in FIGURE 5, the support is a stable one because the fifth-wheel kingpin

24 is usually positioned slightly forward of the axis of the dolly wheels 33 and 34. By turning the crank 82, the operator may raise or lower the forward portion of the frame 30 of the dolly 25 so that the eye 27 at the forward end of the frame 30 can be positioned at the proper height to engage the draft hook 26 at the rear of the semitrailer 20, or so that the forward end of the frame 30 can be positioned to effect engagement of the kingpin 35 with the fifth wheel 14 on the truck 10. The relative angular position of the fifth wheel 47 and dolly frame 30 are not rigidly fixed, however, since the resilient movement afforded by the snubbing assembly 65 including the rubber blocks 68 permits limited relative angular movement in either direction from the adjusted position. This movement is necessary to permit the assembly to move over a raised portion on the roadway, as shown in FIGURE 7, or to move through a depressed portion of the roadway, as shown in FIGURE 8.

When the dual purpose dolly 25 is being installed in position under the forward end of the semitrailer 21, as shown diagrammatically in FIGURES 20 and 21, the snubber device 50 acts as a bumper or energy storage device. When the rearward surface 85 of the fifth wheel 47 strikes the forward lower corner 86 of the semitrailer, the snubber device 50 absorbs some of the shock and subsequently releases the energy which helps in the lifting of the semitrailer off its landing gear 87 and therefore makes coupling smoother.

A spare tire and wheel 88 may be supported on the dolly frame 30 by means of a bracket 89. The position of this spare tire and wheel serves to balance the forward projecting portion of the dolly frame 30 about the transverse axis of the wheels 33 and 34. Because of this balance the rather heavy device may readily be manipulated and rolled about by a single operator who grasps the eye 27. However, in the event that the truck operator should not require the provision of a spare wheel and tire on the dolly 25, a movable support leg 90 may be mounted on the dolly frame 30*a* as shown in FIGURE 22. This support leg may carry a castor wheel 91 at its projecting end and may be raised and lowered by means of a crank arm 92 operated by a nut cooperating with a screw 93 turned by means of the crank handle 94. In other respects the dolly device shown in FIGURE 22 is similar to that previously described.

We claim:

1. For use with a truck in towing either a single large semitrailer or two smaller semitrailers, a dolly adapted to serve as either an auxiliary wheeled axle for the truck when towing the large semitrailer or as a towing connection between adjacent ends of the two smaller semi-

trailers, the dolly comprising, in combination: a frame extending longitudinally in the direction of travel, side wheels rotatable about a transverse axis, means supporting the frame on the side wheels, a fifth-wheel device for detachable connection with an element of a semitrailer, support means movable longitudinally on the frame, means pivotally connecting said fifth-wheel device to said support means for pivotal movement about a transverse axis, the frame having a forward portion provided with means for establishing a towing connection with the truck or with one of the smaller semitrailers, adjustable means for varying the relative angular position of the fifth-wheel device relative to said frame when said support means is in a rearward position on said frame, said adjustable means including a resilient snubber, and means for automatically engaging said resilient snubber with said support means upon movement of the latter to its rearward position on said frame.

2. A dolly for use with a semitrailer, having in combination: a frame supported on coaxial side wheels, a fifth-wheel device for detachable connection to an element of the semitrailer, means on said frame supporting said fifth-wheel device for pivotal movement about an axis parallel to the axis of said wheels, a shell fixed to the frame, a resilient snubber device including a plunger guided for endwise movement relative to the frame, adjustable means including a screw and a nut for moving the plunger, said means including resilient means comprising a plurality of elastomeric elements within the shell and operatively interposed between the nut and the plunger, and means connecting said plunger to said fifth-wheel device, whereby said fifth-wheel device may have restricted pivotal movement relative to the frame from an adjusted angular position.

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3,312,479	4/1967	Cunha	280—415

LEO FRIAGLIA, *Primary Examiner.*

U.S. Cl. X.R.

280—407, 408, 415, 423, 439, 489, 475; 224—42.13