April 28, 1936. E. H. WILLETTS 2,038,975

SEMITRAILER

Filed Feb. 23, 1933 2 Sheets-Sheet 1

Fig. 1.

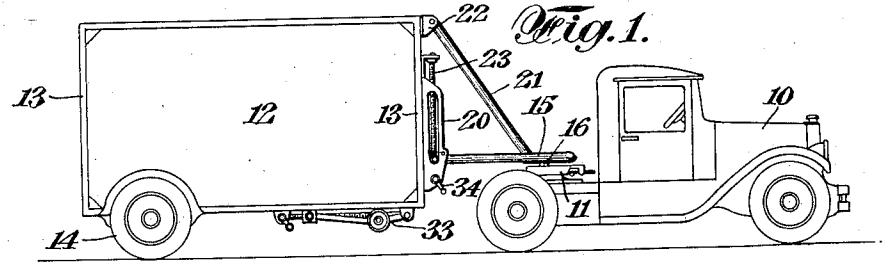

Fig. 2.

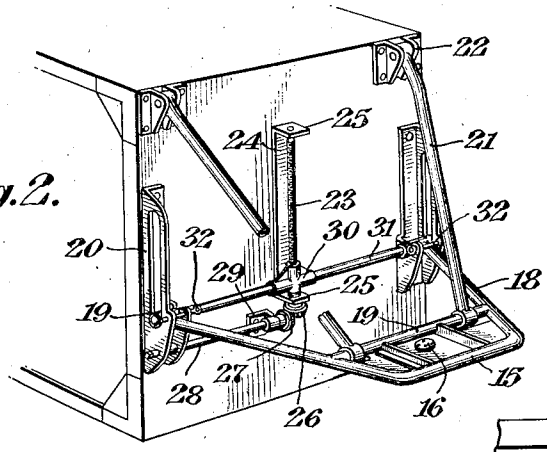

Fig. 3.

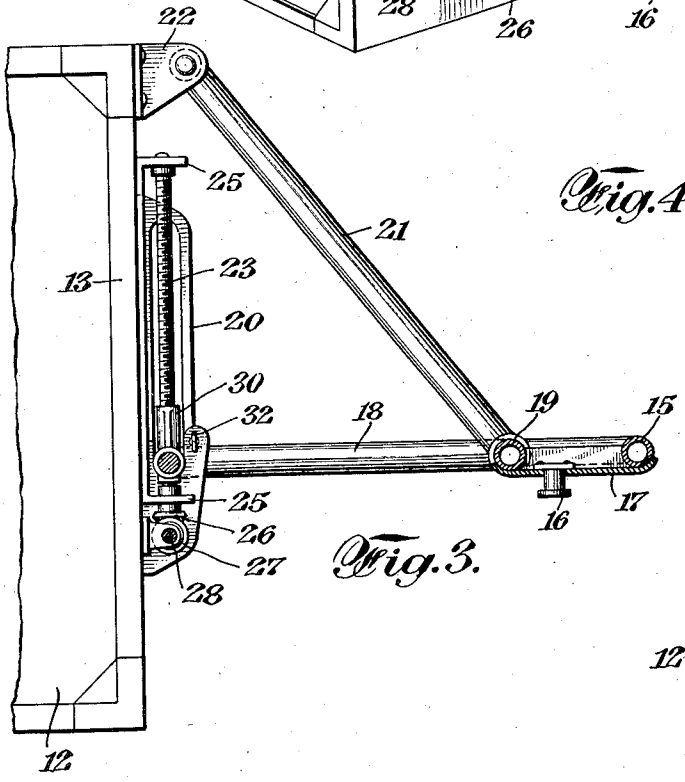

Fig. 4.

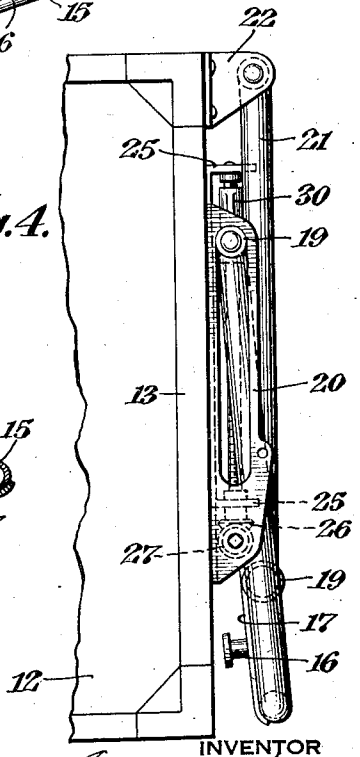

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Fig. 5.

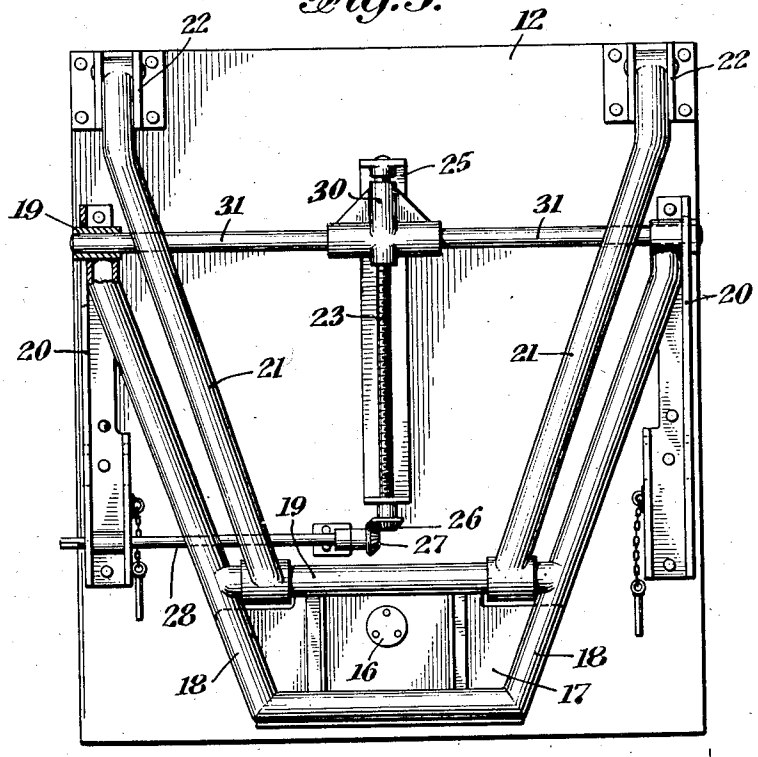


Fig. 8.

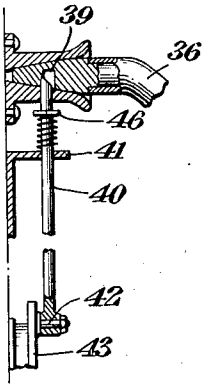
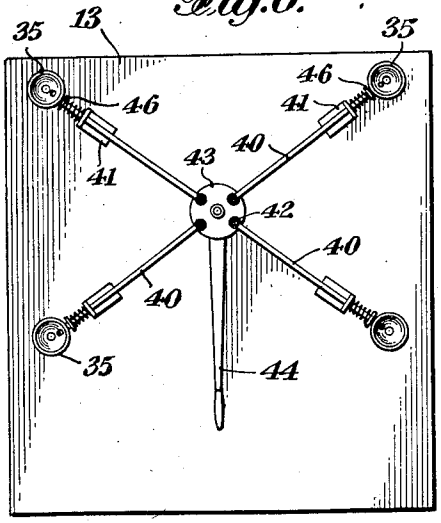


Fig. 6.



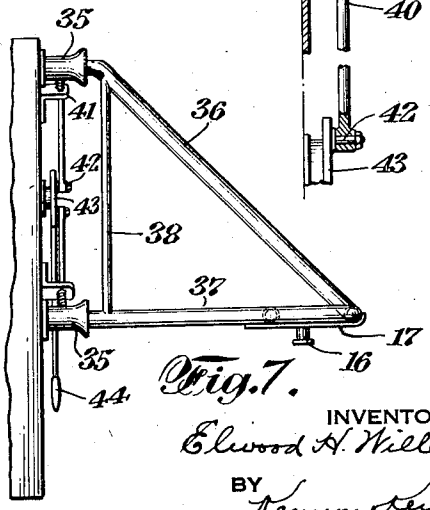


Fig. 7.

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SEMITRAILER

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Application February 23, 1933, Serial No. 658,103

22 Claims. (Cl. 280—33.1)

This invention relates to semi-trailers for use with tractors. The common type semi-trailer comprises a body portion supported at its rear end by wheels and provided at its front end with a coupling member supported by and pivotally connected to the rear end of a tractor. The bottom of the body portion may be at a lower level than the top of the rear wheels of the tractor and the coupling member projects from the front end of the body portion at a sufficient height to clear the tractor rear wheels, thereby permitting free pivotal movement of the semi-trailer and tractor relative to each other. When the semi-trailer is detached from the tractor, the front end of the body portion is supported by means other than the coupling member which then serves no useful function, but by projecting from the front end of the body portion requires a considerably larger space than the size of the body portion for storage or shipment of the semi-trailer.

An object of the present invention is to provide a semi-trailer with a coupling member attached to the body portion for movement into and out of operative position, thereby decreasing the amount of space required for storage or shipment of the semi-trailer.

In one embodiment of the invention, the coupling member is so mounted on the body portion that it can be folded substantially flat against the front end of the body portion. In another embodiment of the invention, the coupling member is detachably mounted on the front end of the body portion so that it may be completely removed from the body portion when not in use. In both of these modifications, the coupling member is movable into and out of operative position, thereby permitting storage or shipment of the semi-trailer in a space only slightly larger than the size of the body portion. It is apparent that a coupling member which is movable into and out of operative position is of decided advantage as space is thereby conserved and a larger number of semi-trailers may be stored in a given space than would be possible with fixed coupling members or a single semi-trailer may be stored in a smaller space than otherwise.

Other objects, novel features and advantages of this invention will be apparent from the following specification and accompanying drawings, wherein:

Fig. 1 is a side elevation of a tractor connected to a semi-trailer embodying one form of the invention;

Fig. 2 is a perspective view of the front end of said semi-trailer;

Fig. 3 is an enlarged side elevation of the coupling member in operative position;

Fig. 4 is a similar view with the coupling member in inoperative position;

Fig. 5 is a front view of the semi-trailer with the coupling member in inoperative position;

Fig. 6 is a front view of a semi-trailer embodying a modified form of the invention;

Fig. 7 is a fragmentary side elevation thereof, and

Fig. 8 is a fragmentary section.

Referring now more especially to Fig. 1 to 5 inclusive, the tractor 10 is equipped with a fifth wheel member 11 of any standard type of such construction which is arranged near the rear end of the tractor and at a level slightly above the top of the tires of the rear wheels. The semi-trailer 12 consists of a body or frame portion 13 supported at its rear end by wheels 14 and adapted to be supported at its front end either by a tractor, or, when the semi-trailer is disconnected from the tractor, by supporting or "landing" wheels 33.

A coupling member 15 is attached to and projects from the front end of the body portion 13, the coupling member being provided at its front end with a fifth wheel member adapted to cooperate with the fifth wheel member 11 of the tractor 10 to pivotally connect the coupling member to the tractor, the coupling member also serving to support the front end of the semi-trailer. Either of said fifth wheel members may be provided with a king-pin 16 while the other fifth wheel member is provided with a socket for the accommodation of said pin.

The coupling member 15 comprises a plate 17, constituting the fifth wheel member carried by said coupling member, and in the construction shown carrying king-pin 16, a frame having legs 18 and a cross bar 19, the plate 17 being supported by the frame and cross bar. The legs 18 are provided at their inner ends with sleeves 19' arranged in the vertical slots of guide members 20 attached to the front end of the body portion, the sleeves 19' being adapted for up and down movement in the slots.

Struts 21 are connected at their outer ends with the bar 19 and at their inner ends are pivotally supported in brackets 22 attached to the front end of the body portion. A screw 23 is supported for rotation in a vertical position by a supporting member 24 attached to the front end of the body portion. The lower end of the screw is provided with a bevel gear 26 which meshes with a bevel gear 27 mounted on the inner end

of the shaft 28 having one end rotatably supported by the lower portion of a guide member 20 and having its other end rotatably mounted in a supporting member 29 attached to the front end of the body portion 13.

A feed head 30 is mounted on the screw 23 and has threads cooperating with the screw 23 so that rotation of the screw 23 feeds the head 30 upwardly or downwardly depending upon the direction of rotation of the screw 23. Arms 31 are carried by the head 30 and extend through the sleeves 19 to the arms 18. Pins 32 are mounted in the lower portions of the guide members 20 and overlie the inner ends of the arms 18.

The coupling member is readily movable from its operative position with respect to body portion 13 shown in Figs. 1, 2 and 3, into its inoperative position shown in Figs. 4 and 5, the coupling member being folded substantially flat against the front of the body portion when in inoperative position. With the coupling member disengaged from the tractor and with the front end of the body portion supported by the supporting or landing wheels 33 attached to the body portion 13 and swingable from the position shown in Fig. 1 into a substantially vertical supporting position and with the pins 32 removed, the coupling member may be folded against the front end of the body portion by turning the shaft 28 through the medium of a crank 34 which may be readily placed on or removed from the end of the shaft. Rotation of the shaft 28 effects rotation of the screw 23 through the bevel gears 27 and 26. The head 30 is thereupon moved upwardly carrying the arms 31 which in turn lift the sleeves 19' upwardly in the slots in the guide members 20, thereby lifting the inner ends of the arms 18. The coupling member rotates about the sleeve 19' as an axis and the rod 19 also swings inwardly toward the front end of the body portion, thus bringing the coupling member into the position shown in Figs. 4 and 5, in which position, the pins 32 may be again placed in position to lock the coupling member in inoperative position. In this position, the coupling member takes up no substantial amount of space and permits storage of the semi-trailer in a space only slightly larger than the body portion. The coupling member may readily be returned to operative position by rotation of the shaft 28 in the reverse direction to cause downward movement of the head 30.

In the modification disclosed in Figs. 6 to 8 inclusive, socket members 35 are mounted on the front end of the body portion 13 and detachably receive the inner ends of the frame members 36 and 37 which support the plate 17 carrying the king-pin 16. The frame members 37 are arranged substantially horizontally while the frame members 36 are arranged at an angle with respect to the frame members 37 and struts 38 are provided between the ends of the rods 36 and 37 adjacent the front end of the body portion. The ends of the rods 36 and 37 fit snugly in the sockets 35 and are provided with recesses 39 into which project locking bars 40. The locking bars 40 are slidably mounted in supporting members 41 attached to the front end of the body portion 13 and projecting through apertures in the sockets. One end of each locking rod 40 is pivotally attached by a pin 42 to a rotatable head 43 provided with an operating handle 44. Springs 45 are interposed between the supporting members 41 and collars 46 on the locking rods 40, these springs tending to project the locking rods 40 into the recesses 39.

The coupling member is detachably supported by the sockets 35 and may be readily moved to and from operative position with respect to the semi-trailer. In order to move the coupling member 36 out of operative position with respect to the semi-trailer, as by demounting it therefrom, the handle 44 is swung in either direction, thereby pulling the locking rods out of the recesses 39, whereupon the coupling member may be pulled away from the body portion. When the handle 44 is released, the springs 45 return the locking rods to their original position. With the coupling member thus removed, the space required for storage or shipment of the semi-trailer is only slightly greater than the size of the body portion 13. The coupling member may be mounted on the body portion merely by inserting the ends of the frame members 36 and 37 in the sockets 35. As the ends of the frame members move into the sockets they engage the bevel faces of the locking rods 40 causing them to move into inoperative position against the action of the spring 45, but as soon as the sockets 39 come into register with the locking rods 40, the latter are snapped into locking position by the springs 45. The coupling member 36 is detachably connected to body member 13 in rigid relation thereto; and it may be detachably or permanently connected to a trailer in pivotal relation thereto. Thus, coupling member 36 may be attached to or disconnected from a body member either separately or while permanently or detachably connected to a tractor. In the latter case the body member and a tractor carrying the coupling member, are so moved relatively that the desired connecting or disconnecting of the body member and coupling member are effected.

Although the semi-trailer has been shown as provided with a single pair of supporting wheels 14, it is to be understood that the invention contemplates as well the use of a double set of wheels for supporting the rear end of the trailer. Also, it is to be understood that various modifications may be made in the form of the parts and in the structural arrangement above described, without in any way departing from the spirit of the invention as defined in the appended claims.

The above described arrangement of coupling member is of particular utility and advantage in connection with the shipment of semi-trailers in freight cars where the available space is limited. Semi-trailers provided with coupling members embodying the present invention may be arranged in a freight car without having to make provision for the coupling member and thus allowing more compact arrangement of the semi-trailers on or in a freight car than would otherwise be the case.

In present practice, and in the construction above described, the co-operation of a fifth wheel member provided with a king-pin and carried by either the tractor vehicle or the trailer vehicle with a fifth wheel member provided with a king-pin socket and carried by the other vehicle, causes the trailer to be attached to the tractor and usually causes the weight of the front of the trailer to be borne by the tractor but may in some cases act to hold the front of the trailer from rising vertically from the tractor.

I claim:

1. A semi-trailer comprising a body portion, supporting wheels therefor, a coupling and supporting member projecting horizontally from said body portion for attachment to a tractor, means for attaching one end of said coupling member to said body portion for vertical movement, and

strut means pivotally connected at one end to the outer portion of said coupling member and pivotally connected at the other end to said body portion.

2. A semi-trailer comprising a body portion, supporting wheels therefor, a coupling and supporting member projecting horizontally from said body portion for attachment to a tractor, means for attaching one end of said coupling member to said body portion for vertical movement, means for positively moving said end upwardly and downwardly, and strut means pivotally connected at one end to the outer portion of said coupling member and pivotally connected at the other end to said body portion.

3. A semi-trailer comprising a body portion, supporting wheels therefor, a coupling and supporting member projecting horizontally from one end of said body portion, strut means pivotally connected at one end to the outer portion of said coupling member and pivotally connected at the other end to said body portion, guide means supported by said body portion, and means on said coupling member cooperating with said guide means to effect up and down movement of the end of the coupling member adjacent the body portion.

4. A semi-trailer comprising a body portion, supporting wheels therefor, a coupling and supporting member projecting horizontally from one end of said body portion, strut means pivotally connected at one end to the outer portion of said coupling member and pivotally connected at the other end to said body portion, guide means supported by said body portion, said coupling member having portions slidably connected with said guide means, and means for effecting up and down movement of the portion of the coupling means slidably connected to said guide members.

5. A semi-trailer comprising a body portion, wheels therefor, a coupling and supporting member projecting horizontally from the end of said body portion for attachment to a tractor, said coupling member consisting of a frame having two legs connected by a cross bar, strut means pivotally connected at one end to said cross bar and pivotally connected at the other end to said body portion, and vertical guide members attached to said body portion and having the ends of said frame legs slidably connected thereto for up and down movement.

6. A semi-trailer comprising a body portion, wheels therefor, a coupling and supporting member projecting horizontally from the end of said body portion for attachment to a tractor, said coupling member consisting of a frame having two legs connected by a cross bar, strut means pivotally connected at one end to said cross bar and pivotally connected at the other end to said body portion, vertical guide members attached to said body portion and having the ends of said frame legs slidably connected thereto for up and down movement, and means for effecting up and down movement of the inner ends of said frame legs.

7. A semi-trailer comprising a body portion, supporting wheels therefor, a coupling and supporting member projecting horizontally from the end of said body portion for attachment to a tractor, strut means pivotally connected at one end to said coupling member and pivotally connected at the other end to said body portion, vertical guide means attached to said body portion and having the inner end of said coupling member slidably connected thereto for up and down movement, and a rotatable feed screw for effecting up and down movement of the inner end of said coupling member.

8. A semi-trailer comprising a body portion, supporting wheels therefor, a coupling and supporting member projecting horizontally from the end of said body portion for attachment to a tractor, strut means pivotally connected at one end to said coupling member and pivotally connected at the other end to said body portion, vertical guide means attached to said body portion and having the inner end of said coupling member slidably connected thereto for up and down movement, a rotatable vertical feed screw supported by said body portion, a head mounted on said feed screw, and connections between said head and the inner end of coupling member.

9. A semi-trailer comprising a body portion, supporting wheels therefor, a coupling and supporting member extending horizontally from one end of said body portion, members attached to said body portion and having vertical guide slots, projections at the inner end of said coupling member extending into said slots, struts pivotally connected at one end to said coupling member and pivotally connected at the other end to said body portion, and means for effecting up and down movement of said projections in said guide slots.

10. A semi-trailer comprising a body portion, supporting wheels therefor, a coupling and supporting member extending horizontally from one end of said body portion, members attached to said body portion and having vertical guide slots, projections at the inner end of said coupling member extending into said slots, struts pivotally connected at one end to said coupling member and pivotally connected at the other end to said body portion, a vertically movable head and connections between said head and the inner end of said coupling member.

11. A semi-trailer comprising a body portion, supporting wheels therefor, a coupling and supporting member extending horizontally from one end of said body portion, said coupling member consisting of a frame having two legs connected by a cross bar, members attached to said body portion and having vertical guide slots, projections at the ends of said frame members extending into said slots, struts pivotally connected at one end to said cross bar and pivotally connected at the other end to said body portion, a rotatable vertical feed screw supported by said body portion, a head mounted on said feed screw, and means connecting said head and the projections on the ends of said frame members for effecting up and down movement thereof in said guide slots.

12. A semi-trailer comprising a body portion, supporting wheels therefor, a coupling member having one end connected to said body portion for vertical movement and adapted to be connected to and supported by a tractor for pivotal movement relative thereto, and a strut pivotally connected at one end to said coupling member between the point of connection of the coupling member to the tractor and the point of connection of the coupling member to the body portion, said strut being pivotally connected at its other end to said body portion.

13. A semi-trailer comprising a body portion, supporting means for said body portion, a coupling and supporting member projecting horizontally from said body portion for attachment to a tractor, means for pivotally connecting said coupling member to said body portion for move-

ment between horizontal position and a substantially vertical position, and means for moving said member from one position to the other and holding it in either position against movement.

14. A semi-trailer comprising a body portion, supporting wheels therefor, a coupling and supporting member, coupling means carried by said member adjacent one end thereof, means attaching one end of said member to said body portion for vertical movement, and a strut pivotally connected to said member between said coupling means and said attaching means and pivotally connected to said body portion.

15. A semi-trailer comprising a body portion, supporting wheels therefor, a coupling and supporting member, coupling means carried by said member adjacent one end thereof, means attaching one end of said member to said body portion for vertical movement, a strut pivotally connected to said member between said coupling means and said attaching means and pivotally connected to said body portion, and means for limiting the downward vertical movement of the end of said member attached to said body portion.

16. A semi-trailer comprising a body portion, supporting wheels therefor, a coupling and supporting member, coupling means carried by said member, a strut member pivotally connected to said member, means connecting one of said members to said body portion for vertical movement relatively thereto, and means for pivotally connecting the other of said members to said body portion.

17. A semi-trailer comprising a body portion, supporting wheels for said body portion, a coupling and supporting member having one end attached to said body portion for linear movement, and strut means pivotally connected at one end to said member and at the other end to said body portion.

18. A semi-trailer comprising a body portion, supporting wheels for said body portion, a coupling and supporting member having one end attached to said body portion for linear movement, and means connecting said coupling and supporting member to said body portion for movement into and out of projecting relation with respect thereto.

19. A semi-trailer comprising a body portion, supporting wheels for said body portion, a coupling and supporting member having one end attached to said body portion for linear movement, strut means pivotally connected at one end to said member and at the other end to said body portion, and means for holding said member in projecting relation to said body portion for attachment to a tractor.

20. A semi-trailer comprising a body portion, supporting wheels for said body portion, a coupling and supporting member having one end attached to said body portion for linear movement, strut means pivotally connected at one end to said member and at the other end to said body portion, and means for holding said member either in projecting relation for attachment to a tractor or in collapsed position against the front of said body portion.

21. A semi-trailer comprising a body portion, supporting wheels for said body portion, a coupling and supporting member having one end attached to said body portion for linear movement, means connecting said coupling and supporting member to said body portion for movement into and out of projecting relation with respect thereto, and means for holding said member in projecting relation for attachment to a tractor.

22. A semi-trailer comprising a body portion, supporting wheels for said body portion, a coupling and supporting member having one end attached to said body portion for linear movement, means connecting said coupling and supporting member to said body portion for movement into and out of projecting relation with respect thereto, and means for holding said member either in projecting relation for attachment to a tractor or in collapsed position against the front of said body portion.

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