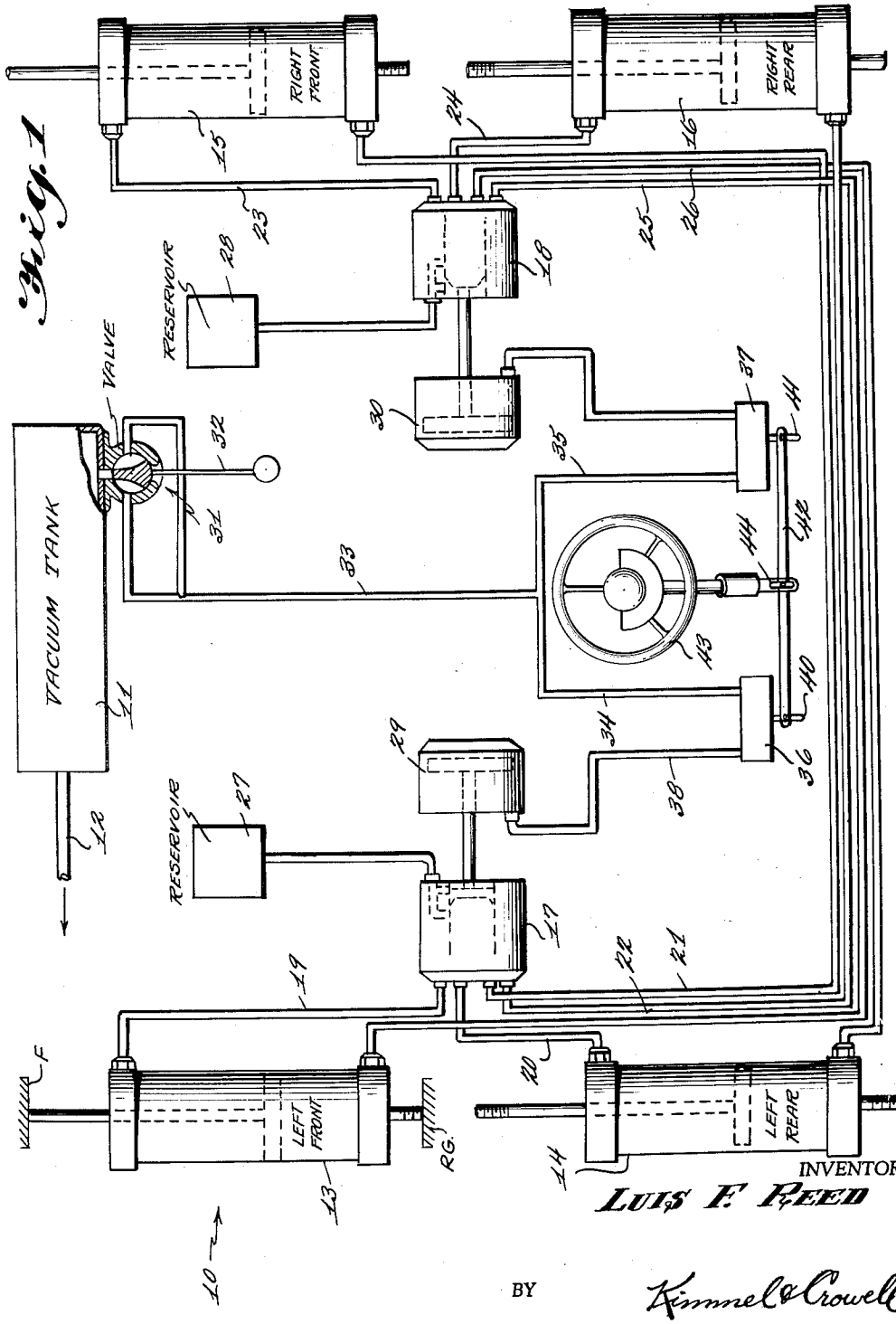
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MOTOR VEHICLE STABILIZING DEVICE

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Fig. 1



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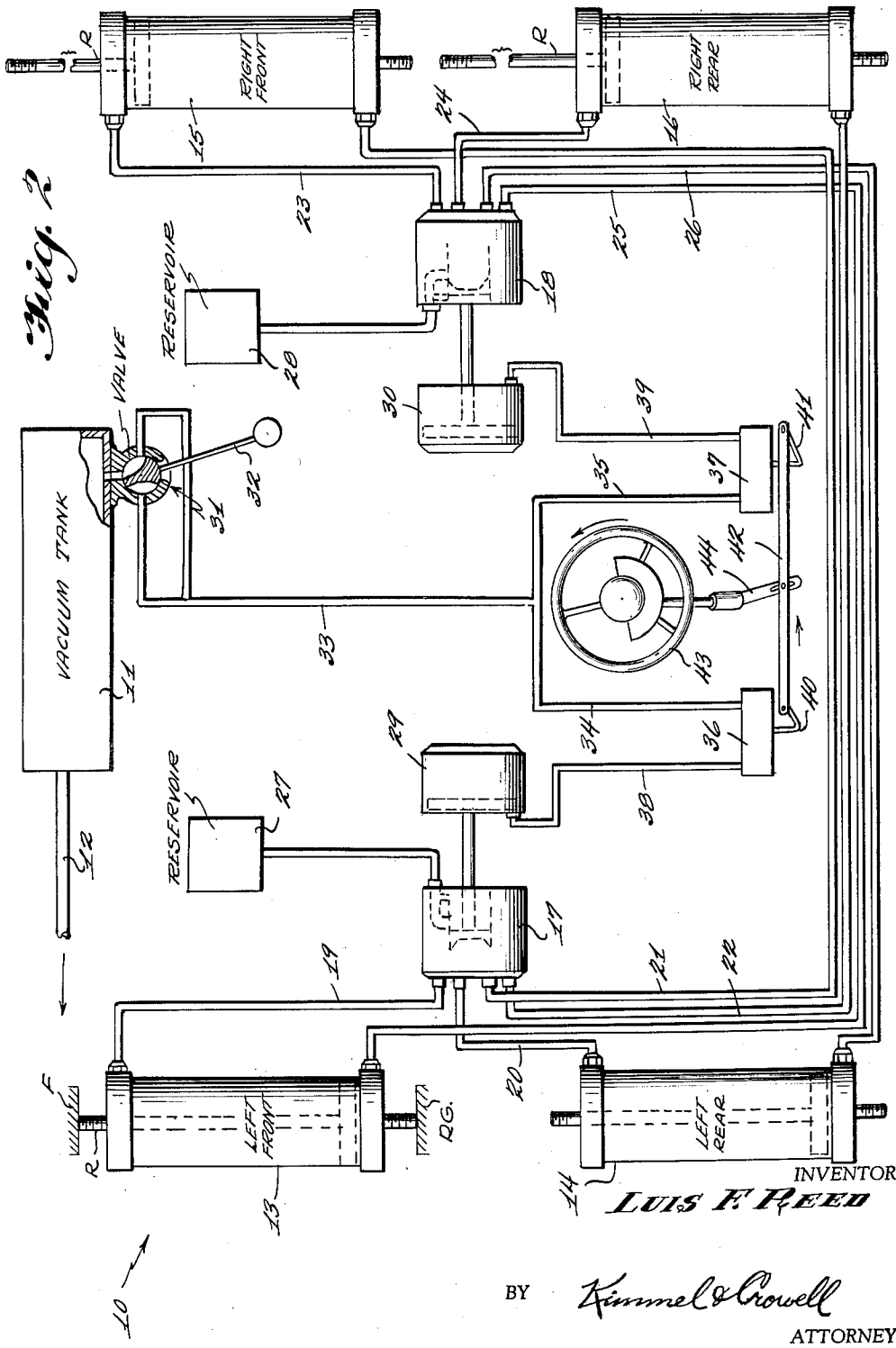
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Fig. 2



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MOTOR VEHICLE STABILIZING DEVICE

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3 Claims. (Cl. 280—112)

The present invention relates to motor vehicle stabilizing devices and particularly devices for stabilizing the motor vehicle when taking a curve.

The primary object of the invention is to provide a device for stabilizing the motor vehicle when taking a curve so as to counteract the effects of centrifugal force acting upon the vehicle.

Another object of the invention is to provide a device of the class described above wherein the vacuum of the intake manifold of the engine is utilized in stabilizing the vehicle.

A further object of the invention is to provide a stabilizing device of the class described above wherein the motor vehicle is tilted oppositely of the centrifugal force acting thereupon, thus counteracting the effects of the centrifugal force.

A still further object of the invention is to provide a stabilizing device of the class described above which is inexpensive to manufacture, simple to install and which is completely effective in counteracting the effects of centrifugal force acting on the motor vehicle.

Other objects and advantages will become apparent in the following specification when considered in light of the attached drawings, in which:

FIGURE 1 is a semi-diagrammatic view of a motor vehicle stabilizing system constructed in accordance with the invention, illustrating the elements of the invention in one position; and

FIGURE 2 is a view similar to FIGURE 1, illustrating another position.

Referring now to the drawings in detail wherein like reference characters indicate like parts throughout the several figures, reference numeral **10** indicates generally a motor vehicle stabilizing system constructed in accordance with the invention.

The system **10** includes a vacuum tank **11** connected by a conduit **12** to the intake manifold of an internal combustion engine (not shown). The motor vehicle is provided with a double acting hydraulic ram **13** on the left front corner and a similar double acting hydraulic ram **14** on the left rear corner. A double acting hydraulic ram **15** is provided on the right front corner and a double acting hydraulic ram **16** is positioned on the right rear corner of the vehicle. Each ram is shown as comprised of a cylinder element having therein a double acting piston and rod element R extending through a sealed opening in one end thereof. One element of the ram is fixed to the frame F of the vehicle in any desired manner, and the other element is likewise attached to the running gear RG of the vehicle, as schematically shown in FIG. 2 for ram **13**. While the connections are illustrated for only one ram, it is to be understood that all four of the rams are to be likewise set up.

A pair of oppositely disposed hydraulic piston pumps **17, 18** are mounted on the motor vehicle with the pump **17** connected by conduits **19** and **20** to the upper ends respectively of the rams **13, 14** and by conduits **21, 22** to the lower ends respectively of the rams **15, 16**. The pump **18** is connected respectively to the upper ends of the rams **15, 16** by conduits **23, 24** and to the lower ends respectively of the rams **13, 14** by conduits **25, 26**. Operation of the pump **17** in one direction being effective to lower the rams **13, 14** and raise the rams **15, 16** so the left side of the car is lowered and the right side raised simultaneously.

A hydraulic supply reservoir **27** is coupled with the pump **17** and a second hydraulic supply reservoir **28** is coupled with the pump **18**. A vacuum motor **29** is connected to the pump **17** and a second vacuum motor **30** is connected to the pump **18**. A valve generally indicated at **31** is actuated by a pendulum arm **32** to connect the vacuum tank **11** with a conduit **33** on either right hand or left hand movement of the pendulum arm **32**. By controlling flow through line **33**, pendulum valve **32** assures that the stabilizer system will be operated only when the vehicle acquires sufficient centrifugal force or becomes inclined to the vertical enough to make stabilization desirable. Since pendulum **32** responds both to the centrifugal action of the vehicle, as well as where the tilt increases, the flow through line **33**, and fluid pressure in the stabilizer system, will build up in accordance with said centrifugal force or the degree of tilt of the vehicle. Thus the speed of operation of the stabilizer normally will vary with the suddenness with which the tilt of the vehicle occurs. Immediate control of the stabilizer system is governed by valves **36** and **37** operated from the steering wheel **43** as will hereinafter appear. The conduit **33** branches into a pair of conduits **34, 35** which are connected respectively to valve boxes **36, 37**. The valve in each box **36, 37** is of the conventional two-way type, whereby when the vacuum line **33** is cut off from either motor chamber **29, 30**, that chamber is vented. The valve box **36** is connected by a conduit **38** to the vacuum motor **29** and the valve box **37** is connected by a conduit **39** to the vacuum motor **30**. The valve boxes **36, 37** have valve stems **40, 41** respectively extending outwardly therefrom and connected by a bar **42**. A steering wheel **43** has a steering arm **44** associated therewith connected to the bar **42** so that upon steering movement of the steering wheel **43** the valves **36, 37** will be oppositely actuated, the valve **36** being on when the valve **37** is off, and the valve **37** being on when the valve **36** is off. The valves **36, 37** may be mtaintained in a neutral off position by maintaining the steering wheel **43** in straight ahead position. By action of the vacuum from the vacuum tank **11** on the vacuum motor **29**, when the pendulum arm **32** is in the position illustrated in FIGURE 2, and the valve **36** is opened by action of the steering wheel **43** is such that the pump **17** is forced to the left or outwardly, moving hydraulic fluid through the conduits **19, 20** to lower the left front and rear rams **13, 14** and through the conduits **21, 22** to raise the right front and rear rams **15, 16**. Obviously, by reversing the position of the steering wheel **43** the valve **37** will be opened and the valve **36** closed so as to reverse the action of the rams **13** through **16**.

When the motor vehicle has completed taking the curve and is again on a straight stretch, the valves **36, 37** will be positioned neutrally and the springs of the motor vehicle will act to return the motor vehicle to a level position by placing back pressure on the rams **13, 14, 15** and **16** and returning a portion of the hydraulic fluids to the reservoirs **27** or **28**.

It should be understood that the rams **13, 14, 15** and **16** are connected at the four corners of the vehicle between the running gear and the frame of the vehicle much in the manner as the normal shock absorbers of the vehicle are mounted.

It is to be understood that the operation of the system may be controlled by other means (not shown) than the steering gear, such as a pendulum, electric switches and relays, acting on corresponding solenoid valves of conventional design.

Having thus described the preferred embodiment of the invention, it should be understood that numerous

structural modifications and adaptations may be resorted to without departing from the scope of the appended claims.

What is claimed:

1. A vehicle stabilizing system comprising a double acting hydraulic ram vertically disposed at each corner area of a motor vehicle, said rams each comprised of a cylinder element and a piston element, one element being connected to the vehicle running gear and the other element to the vehicle frame, a pump having connections to each of said rams, said connections to the pair of rams on one side of the vehicle being to the lower portion thereof to raise said side of the vehicle, while the connections to the pair of rams on the opposite side of the vehicle is to the upper portion thereof, for simultaneously and positively raising the one side and depressing the other side of the vehicle frame, a second pump having a connection to each of the rams, said connections of said second pump to the pair of rams on the opposite side of the vehicle being to the lower portion thereof to raise the latter side of the vehicle, while the connections to the pair of rams on said one side of the vehicle is to the upper portion thereof for simultaneously and positively raising said opposite side and depressing said one side of the vehicle frame, power means for operating said pumps selectively, means actuated by and upon turning of the vehicle steering wheel beyond a set point in either direction for controlling power to one or the other of said last-named means, and inertia means responsive to predetermined minimum centrifugal force of the vehicle in making a turn for rendering effective said means actuated upon turning of said steering wheel.

2. The apparatus of claim 1 wherein said means for operating said pumps comprises for each pump a chamber and reciprocable piston therein, and said means actuated upon turning of said steering wheel is comprised of spaced valves, one to control each of said pumps, said valves being actuated by and upon said turning of said steering wheel in opposite directions.

3. The apparatus of claim 1 wherein said means for operating said pumps comprises a fluid operated motor means, and said means actuated upon turning of said steering wheel is comprised of valves, one to control operation of each of said pumps by said motor means, a common pressure line leading to said valves, and a pendulum operated valve in said line for rendering said first named valves effective only upon the centrifugal force of the vehicle exceeding an established minimum.

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