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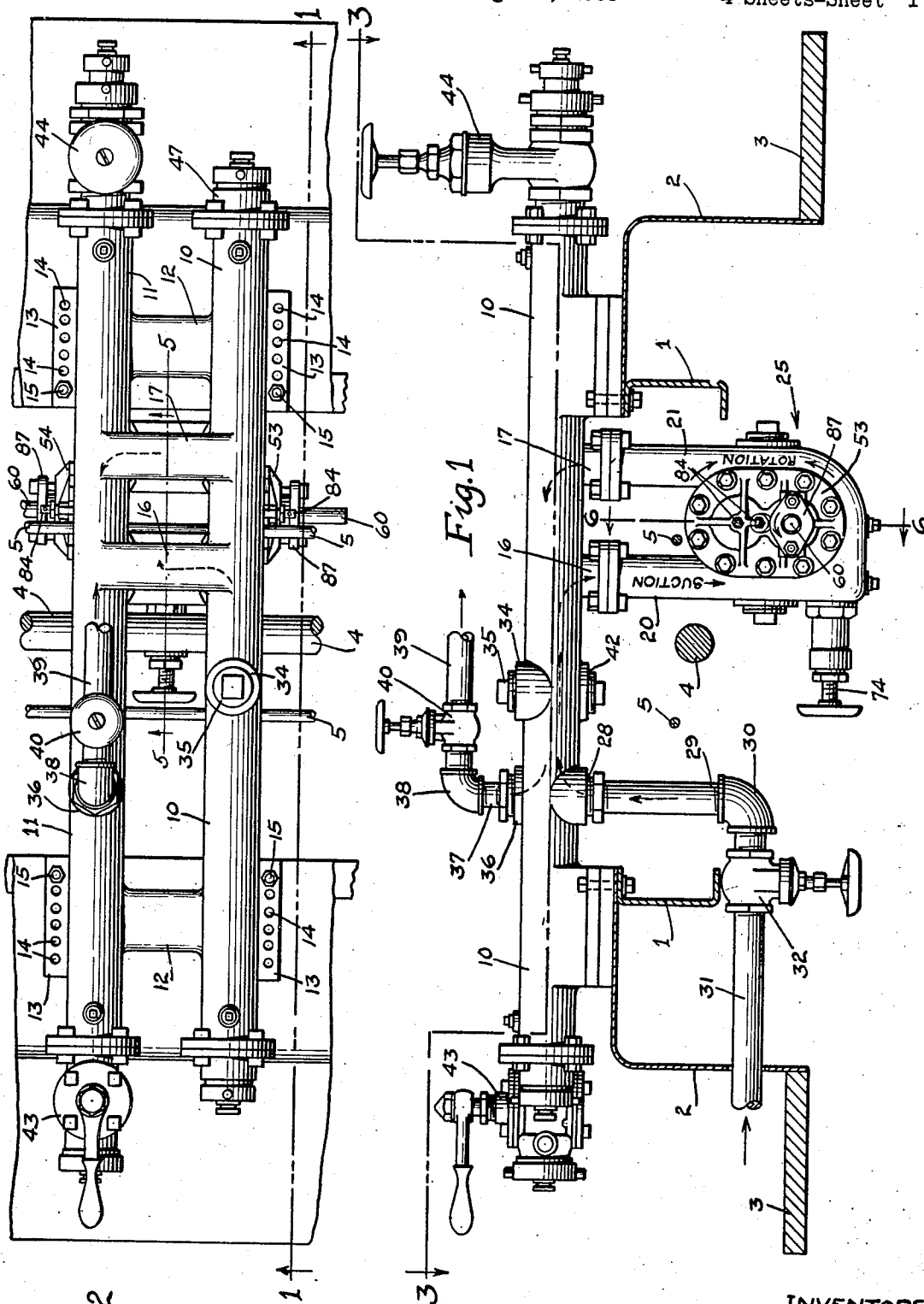
F. A. WATEROUS ET AL

2,013,260

PUMP AND PUMP ASSEMBLY

Filed Aug. 10, 1933

4 Sheets-Sheet 1



INVENTORS
FREDERICK A. WATEROUS
RALPH R. BOYLES
By *Paul R. Routh & Moore*
ATTORNEYS

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F. A. WATEROUS ET AL

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4 Sheets-Sheet 2

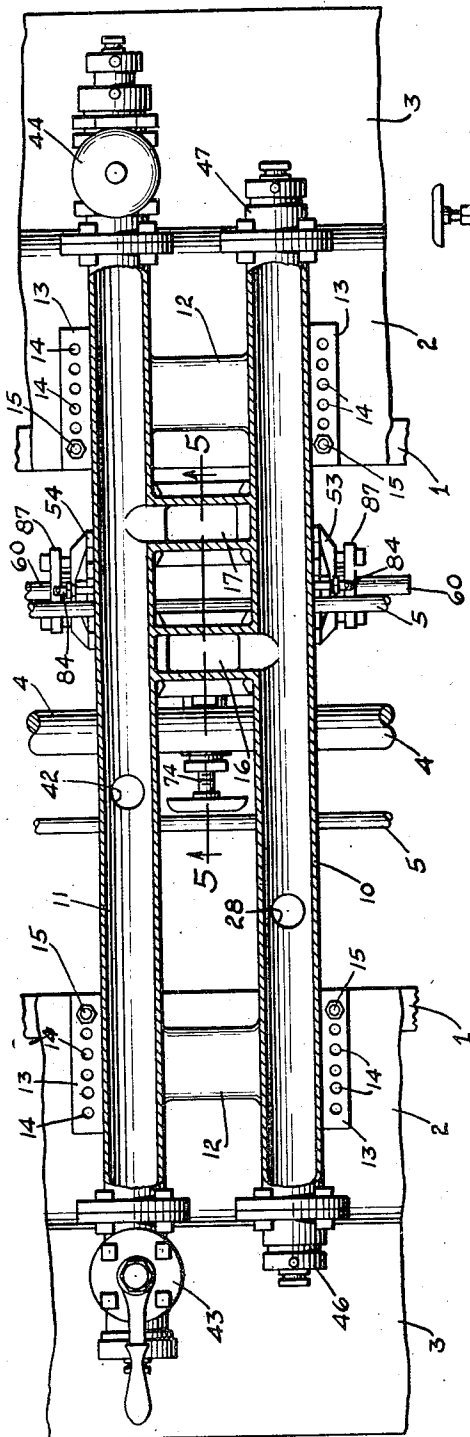


Fig. 3

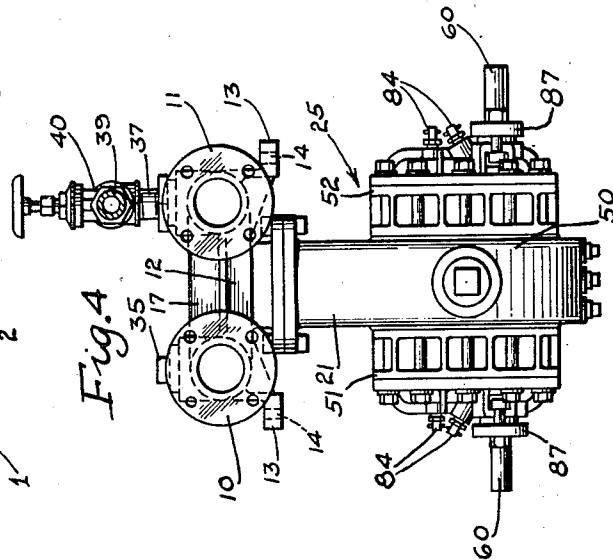


Fig. 4

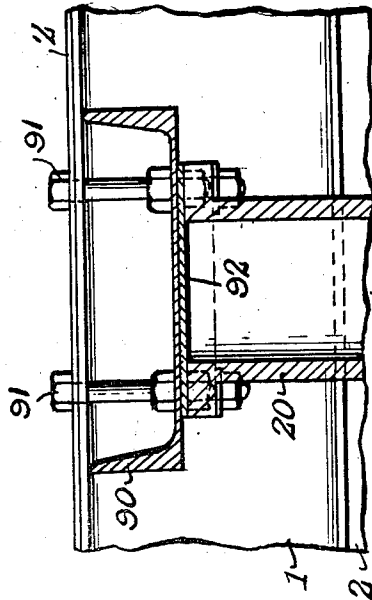


Fig. 5

INVENTORS
FREDERICK A. WATEROUS.
RALPH R. BOYLES
By *Reel, Reel & Mease*
ATTORNEYS

Sept. 3, 1935.

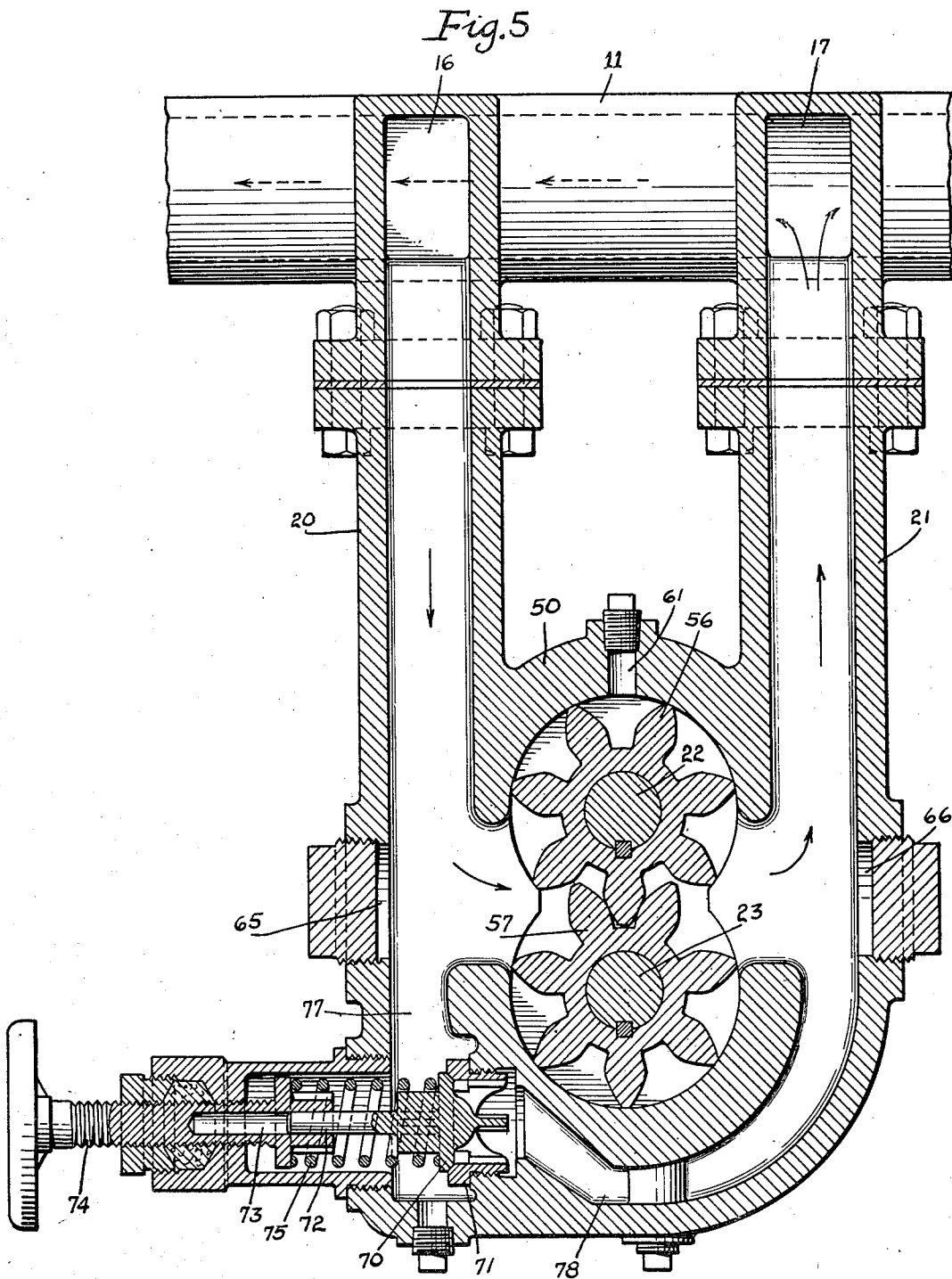
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4 Sheets-Sheet 3



INVENTORS
FREDERICK A. WATEROUS
RALPH R. BOYLES

By *Paul, Paul & Moore*
ATTORNEYS

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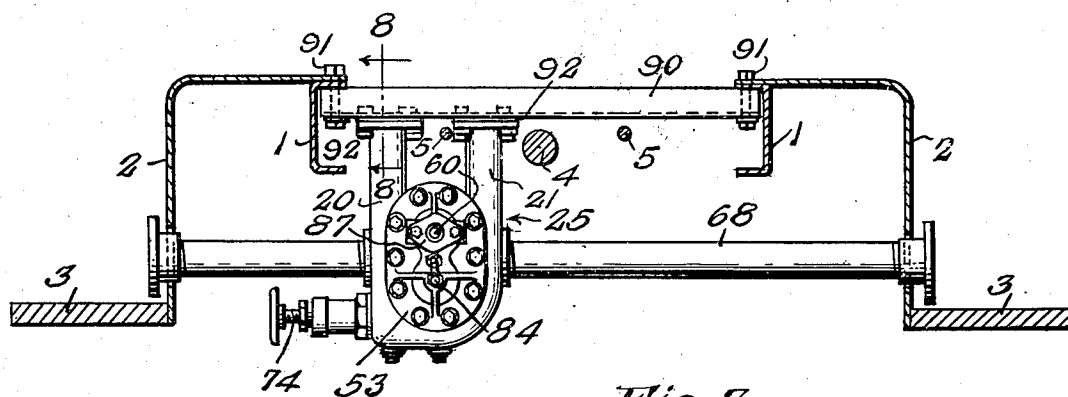
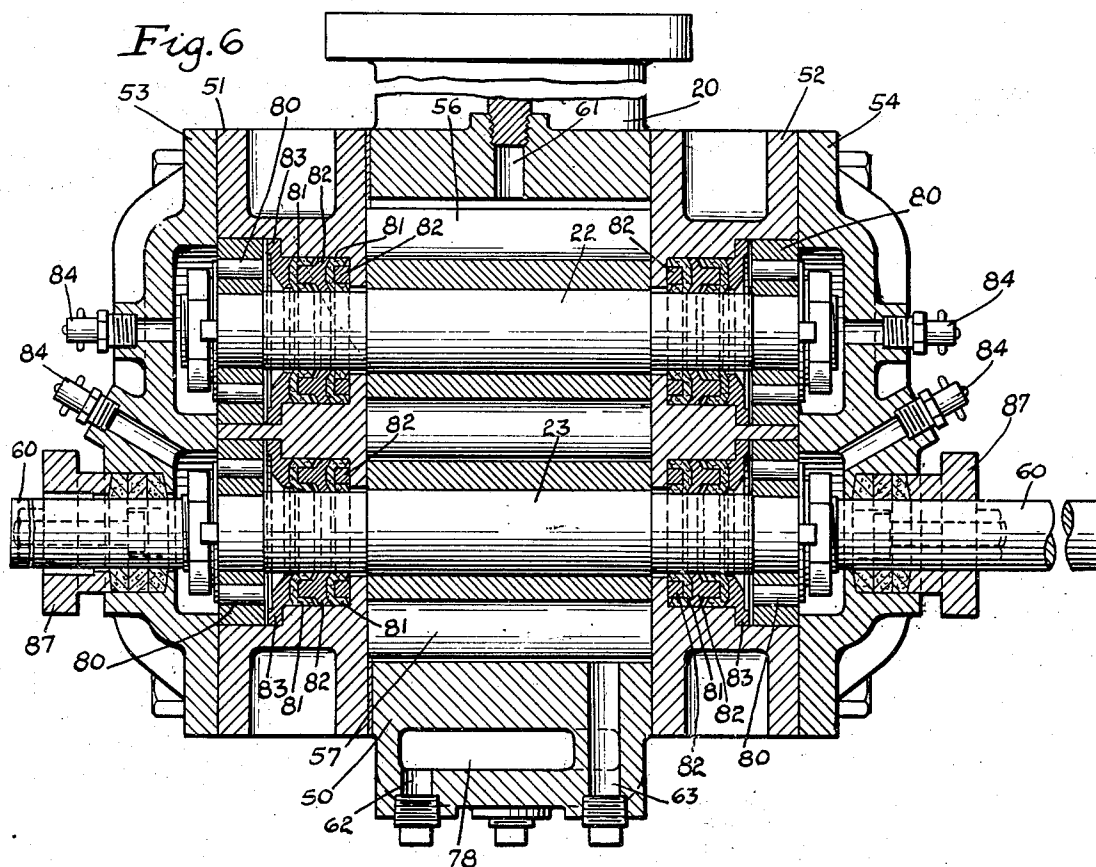
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4 Sheets-Sheet 4



INVENTORS
 FREDERICK A. WATEROUS
 RALPH R. BOYLES
 By *Paul, Paul & Moore*
 ATTORNEYS

UNITED STATES PATENT OFFICE

2,013,260

PUMP AND PUMP ASSEMBLY

Frederick A. Waterous and Ralph R. Boyles, St. Paul, Minn., assignors to Waterous Company, St. Paul, Minn., a corporation of Minnesota

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15 Claims. (Cl. 103—126)

This invention relates to improvements in pumps, particularly adapted for use on automobile fire engines, in which the pump is supported by the chassis and is operated by the automobile engine.

An object is to provide a pump of maximum pumping capacity which can be connected to any make of automobile, in various positions, in a manner not to interfere with any portion of the running gear, and so that proper pumping connections can be easily made.

Another object is to provide a pump construction which facilitates alignment of the drive connections between the pump and the power take-off on the transmission case.

Another object is to provide a pump which has two pairs of intake and discharge passages, one pair connectible with cross piping supported upon the top of the chassis, and another pair with which straight piping is connectible, to extend horizontally laterally of the automobile, below the chassis and either above or below the running board. Other objects are: to provide a pump which has parts which can be interchanged or reversed, so that the driving shaft can be located at different levels at the front or rear of the pump, and either for clockwise or counter-clockwise rotation, and so that the pump can be attached at either side of the rear drive housing of the automobile.

Features include: the elongation of vertical intake and discharge passages in a direction lengthwise of the chassis, and the narrowing of these passages in a direction transversely of the chassis and their transverse spacing to provide for maximum clearance for brake rods and other parts of the running gear and at the same time to provide for a maximum pumping capacity; the vertically superposed arrangement of the axes of rotations of the gears so that the driving gear and its shaft can be located at different levels to facilitate alignment of the driving connection with the power take-off of the automobile; the use of a transversely arranged pair of intake and discharge pipes as supporting means for the pump, which pipes are cross-connected by tubular elements which correspond to and with which the vertical suction and discharge passages of the pump are operably connected; the arrangement for supporting the pump by a bracket extending crosswise of the chassis, which bracket acts to cap one of two sets of intake and discharge passages of the pump; the arrangement of the vertical and horizontal intake and discharge passages of the pump to open into

the gear chamber laterally of both gears in opposition to the gear teeth; pump constructions allowing the drive shaft to be located at different levels, and at the front or rear, and to operate in clockwise or counter-clockwise direction of rotation, and with the pump at the right or left hand side of the drive shaft casing of the automobile; the details of construction of the pump; and the arrangement of the pump on an automobile.

Objects, features and advantages of the invention will be set forth in the description of the drawings forming a part of this application, and in said drawings

Figure 1 is a vertical transverse section on line 1—1 of Figure 2 through an automobile chassis, showing the invention applied thereto with the pump supported by transversely arranged chassis-supported piping and connected to control flow through such piping;

Figure 2 is a plan view of Figure 1;

Figure 3 is a plan section on line 3—3 of Figure 1 through the piping;

Figure 4 is an end view showing the pump connected to the piping, but with the assembly disconnected from the chassis;

Figure 5 is a vertical section of the pump and pipe taken substantially on line 5—5 of Figure 2;

Figure 6 is a vertical section of the pump taken on line 6—6 of Figure 1;

Figure 7 is a vertical transverse section showing the pump supported by a chassis-supported member which closes the vertical delivery passages of the pump, and showing the use of the horizontal intake and discharge passages, with piping attached; and

Figure 8 is a vertical section on line 8—8 of Figure 7 showing how one of the vertical passages of the pump is capped by its supporting member.

In the drawings, the numeral 1 designates the side rails of an automobile chassis. To the side rails are attached the usual sheet metal elements 2, to which the running board 3 is attached. The rear drive shaft is indicated at 4 but no housing has been shown. The brake rods are indicated at 5. The transmission casing is not shown, but it will be understood that the usual automobile transmission, with the usual auxiliary power take-off for the pump, is employed.

Although all the constructional details of the pump are features of the invention, an important feature is the manner of attaching and supporting the pump in operative position. The pump

is so constructed that it can be attached in various positions to any make of automobile, in such manner as not to interfere with the rear drive housing or any elements of the under gearing, and so that the brake rods can pass between two elements or extensions in which are formed the suction and discharge passages of the pump.

In the form of the invention shown in Figures 1 to 4, the pump is supported by a pair of pipes arranged transversely of and supported upon the tops of the side rails of the chassis. One of these pipes is indicated at 10 and the other at 11. The construction of this pipe assembly is a feature of the invention, and in conjunction with the pump it provides means by which a variety of alternate pumping connections can be made, in accordance with the varying requirements, particularly in the fire engine art.

The pipes 10 and 11 are cross-connected by solid cast members 12, and these members are provided with feet 13. Each foot has a series of vertical openings 14, through any one or more of which suitable fastening devices 15 pass to attach the pipes to the side rails of the chassis. By use of a series of openings 14, the pipes can be attached in a desired transversely adjusted relation to the chassis.

Tubular elements transversely connect the pipes and extend in a direction longitudinally of the automobile, and form part of the fluid circulating system. Referring to Figure 3: One of these tubular elements is indicated at 16 and the other at 17. Tubular element 16 communicates with pipe 10 and with one of the passages of the pump, but not with pipe 11, and tubular element 17 communicates with pipe 11 and the other passage of the pump but not with pipe 10. It is noted that the elements 16 and 17 are elongated in direction longitudinally of the automobile or of the chassis and are narrowed in a direction transversely to the chassis and are spaced, a substantial distance apart in a direction transversely of the chassis. This elongation, narrowing and spacing corresponds to similar elongation, narrowing and spacing, see Figure 1, of vertical tubular extensions 20—21 of the pump, generally indicated at 25.

These tubular extensions, see Figures 1 and 5, rise well above the top of the pump casing and are spaced a substantial distance apart in direction transversely to the gear axes, and form inlet and discharge passages for the pump at opposite sides of the gears and in opposition to the toothed faces of the gears. It will be noted that the shafts or rotative axes of the gears respectively designated 22—23 are vertically superposed so that the driving gear and its shaft can be located at different levels, to facilitate alignment of the driving connection with the power take-offs of different makes of automobiles. This feature is later referred to in conjunction with the description of the details of construction of the pump.

The pipes 10 and 11, see Figure 1, are provided at top and bottom with screw-threaded suction and discharge orifices for the connection of corresponding suction and discharge pipes. The pipe 10 has a tubular extension providing an orifice 28 and with said extension is connected the piping of a suction line including elements 29—30—31. The pipe 31 passes laterally outwardly through an opening in the sheet metal element 2. The pipe 31 is provided with a suitable valve 32. The pipe 10 also has an upwardly directed extension 34 providing a threaded orifice closed by plug 35, when not in use. Pipe 11, see also

Figure 2, has a tubular extension 36 providing a threaded orifice which is connected with a discharge line including elements 37—38—39. Discharge pipe 39 has a valve 40. Pipe 31 connects with a water supply tank, not shown, used when no other water supply is available and generally mounted on the chassis. This tank is known as the booster tank. To pipe 39, a suitable hose, not shown, is generally connected.

As shown in the drawings, pipe 31 is the intake pipe and pipe 39 is the discharge pipe. The circulation of the liquid in this instance is indicated by the arrows, the liquid entering the pipe 10 from pipe 29, passing downwardly through the tubular elements 16 and 20, thence through the pump gears, then upwardly through the tubular extensions 21 and 17, into pipe 11, and thence outwardly by pipe 39. The pipe 11, see Figure 1, is also provided with a tubular element 42.

A suitable quick opening gate valve is indicated at 43, and a gate valve of the ordinary type is indicated at 44, both in this instance being attached to the pipe 11. It will be seen that both ends of both pipes 10 and 11 are flanged, and that suitable valves or pipe sections can be connected thereto. Hose-connecting elements are indicated at 46—47 on pipe 10. It will be understood that various combinations in regard to circulation can be had by interchanging the pipes, and changing the position of the pump.

Referring to Figures 5 and 6: the pump body is indicated at 50. The rear head is indicated at 51 and a front head at 52, see Figure 6. The rear cover is indicated at 53 and the front cover at 54. The upper gear is indicated at 56 and the lower gear at 57. It is noted that the shafts or axes 22—23 of the gears are vertically superposed. The construction of the pump is thus such that drive shaft 23 which is shown in the drawings at the bottom can occupy an upper position while the shaft 22 now shown at the top may be made to occupy the lower position. This is a valuable feature of the invention since it facilitates connection of those portions 60 of the drive shaft 23 which extend beyond the pump casing, with the power take-off of transmission cases of different types of automobiles.

It is noted that the shaft 23 has drive extensions 60 at each end. By this means the gears can always be driven in the proper direction, and drive from either end of the pump can be had, without interchanging the parts, except when the drive shaft 23 is to be arranged at the upper level. To connect one or the other of extensions 60 with the drive, the pump casing can simply be reversed by motion about a vertical axis. The heads of course are suitably detachably bolted to the body and can be transferred from one side to another, and can be reversed, end for end, for the purpose of arranging the drive shaft at an upper or lower level. Oil is introduced through the passage 61 and water drain openings are indicated at 62—63 respectively.

The pump is provided with two pairs of intake and discharge passages, both having full pumping capacity, one pair being indicated at 20—21 and the other pair being indicated at 65—66. By means of the passages 65—66 straight piping 67—68 is connectible as shown in Figure 7 to extend horizontally and laterally of and below the chassis frame member 1, and either above or below the running board. In this instance, the pipes 67—68 pass through openings in the sheet metal elements 2, and suitable flanges are pro-

vided for connection with other piping, not shown.

It is noted that the tubular pump-attaching passage-forming extensions 20—21 have a quasi-tangential relation to the gears and pump casing, one at each opposite side thereof, and in opposition to the toothed faces of the gears, and that they are in communication at their lower ends with the gear chamber at the level of a horizontal line passing through the meshing point of the gears. The passages 65—66 are also at the level of this line. The axes of the gears are vertically superposed and lie substantially in a vertical plane parallel with and mid-way between the extensions or tubular elements 20—21.

An important feature is that the passages of elements 20—21 are elongated cross-sectionally and horizontally in direction of the axes of the gears and of the chassis, and are narrowed in a direction transversely to the axis of the gear and of the chassis, to obtain a maximum transverse space consistent with such a cross-sectional area of the passage of each extension as will allow of a maximum pumping volume. In this way clearance for the elements of the running gear is obtained, and yet a pump having a maximum pumping volume is obtained.

The pump is also provided with a relief valve indicated at 70 seating on a removable valve seat bushing 71. The valve has a stem 72, slidable in bore 73 of the adjusting stem 74 threaded and passing through suitable packing shown. Spring 75 urges the valve to its seat and the degree of tension of the spring is controlled by rotation of the threaded stem 74. The relief passages are indicated at 77—78.

The pump shafts are provided with roller bearings 80 suitably held in the heads, and the shafts 22—23 are provided with suitable packing indicated at 81—81. Packing spacer rings are indicated at 82 and packing retaining rings are indicated at 83. Suitable greasing fittings are indicated at 84. Grease retainer glands are indicated at 87, operating against suitable packing.

Another feature of the invention is shown in Figure 7, wherein the pump is positioned at the left side of the drive shaft 4. In this assembly, the upper ends of the elements 20 and 21 are capped, and the pump is supported by a channel member 90. Figure 8 shows more clearly how capping of the upper ends of the tubular elements 20—21 is accomplished. The channel 91 is secured beneath and to the upper flanges of the side rails 1 as at 91, suitable sealing gasket 92 being interposed between the upper end of each element 20—21, and the lower surface of the web of the channel 90. The cross-sectional length of the extensions 20—21 is about equal to the "axial" width of the pump gears.

We claim as our invention:

1. A pump comprising a casing having meshing pump gears therein, and having substantially parallel tubular extensions projecting well beyond the casing and spaced a substantial distance apart in direction transversely to the gear axes and forming inlet and discharge passages for the pump, and cross-sectionally elongated in direction of the gear axes, and cross-sectionally narrowed in a direction transverse to said gear axes.

2. A pump comprising a casing having meshing pump gears therein and having substantially parallel tubular extensions projecting well beyond the casing and spaced a substantial distance apart in direction transversely to the gear axes

and forming inlet and discharge passages for the pump, and cross-sectionally elongated in direction of the gear axes and cross-sectionally narrowed in a direction transverse to said gear axes, said extension having a quasi-tangential relation to the gears.

3. A pump adapted to be suspended beneath the chassis of an automobile and comprising a casing having meshing pump gears therein said pump having separate vertical tubular extensions rising well above the top of the casing and spaced a substantial distance apart in direction transversely to the gear axes and forming inlet and discharge passages for the pump at the opposite sides of the gears and in opposition to the toothed faces of said gears, said extensions forming suspending means for the pump and the rotative axes of the gears being vertically superposed, whereby when the pump is suspended beneath an automobile with the gear axes extending longitudinally of the chassis the space between the tubular extensions provides for the free passage of a part of the under-gearing of the automobile.

4. A pump adapted to be suspended beneath the chassis of an automobile and comprising a pump body having meshing pump gears therein and having vertical tubular extensions rising well above the top of the body and spaced a substantial distance apart in direction transversely to the gear axes and forming inlet and discharge passages for the pump at the opposite sides of the gears, and in opposition to the toothed faces of said gears, each extension having means for operably securing it to other parts of the pumping system of the automobile; the rotative axes of the gears being vertically superposed and lying substantially on a line parallel with the extensions and midway therebetween, each extension having an orifice in its wall opposed to the gears at their meshing point for attaching inlet and discharge pipes, the areas of said orifices being sufficient to handle the full pumping capacity of the pump and means for each orifice by which a capping means or a pipe can be operably connected thereto, said orifices being aligned on an axis perpendicular to the gear axes and perpendicular to the tubular extensions.

5. A pump comprising a casing having meshing pump gears operatively associated therewith, said casing having vertical tubular pump-attaching extensions spaced apart in a direction transverse to the gear axes and extending well above the top of the pump casing and forming intake and discharge passages for the pump, said tubular extensions and passages thereof being elongated cross-sectionally and horizontally in the direction of the rotative axes of the gears and being cross-sectionally narrowed in a direction transverse to the axes to obtain a maximum transverse spacing between the extensions and allow for a maximum pumping volume.

6. A pump comprising a casing having meshing pump gears operatively associated therewith, with their rotative axes so arranged as to have horizontal vertically superposed relations when the pump is operatively positioned, said casing having vertical tubular pump-attaching extensions spaced apart in a direction transverse to the gear axes and having a quasi-tangential relation to the gears, one at each opposite side thereof, and extending well above the top of the pump casing, and forming intake and discharge passages respectively to and from opposite sides of the gears, said tubular extensions and passages thereof being elongated cross-sectionally and

horizontally in the direction of the axes of the gears and being cross-sectionally narrowed to obtain a maximum transverse spacing between the extensions, consistent with such a cross-sectional area of the passage of each extension as will allow of a maximum pumping volume.

7. A pump adapted to be suspended beneath the chassis of an automobile and comprising a casing having meshing pump gears operatively associated therewith with their rotative axes so arranged as to have horizontal vertically-superposed relations when the pump is in operative position, said casing having vertical tubular pump-attaching extensions spaced apart in a direction transverse to the gear axes and having a quasi-tangential relation to the gears one at each opposite side thereof, and extending well above the top of the pump casing and forming intake and discharge passages respectively to and from opposite sides of the gears, said tubular extensions and passages thereof being elongated cross-sectionally and horizontally in the direction of the axes of the gears to obtain a maximum transverse spacing between the extensions, consistent with such a cross-sectional area of the passage of each extension as will allow of a maximum pumping volume, means by which each extension can be operatively connected to a conduit element or to means for sealingly capping the tops of the extension passages, the wall of each extension having an orifice in opposition to the teeth of the gears substantially at the level of their meshing point, and adapted for the connection of horizontal intake and outlet pipes and capable of being closed by capping means and being of a cross-sectional area to provide full pumping volume, said orifices being aligned on an axis which is substantially perpendicular to the gear axes and the long axes of said pump attaching extensions, whereby full volume pumping connection can be made at different levels conformably to varying requirements of various automobile constructions and without interference by the side rails of the chassis of the automobile.

8. A pump comprising a casing having meshing pump gears operatively associated therewith, with their rotative axes so arranged as to have horizontal vertically superposed relations when the pump is operatively positioned, said casing having vertical tubular pump-attaching extensions spaced apart in a direction transverse to the gear axes and having a quasi-tangential relation to the gears one at each opposite side thereof, and extending well above the top of the pump casing, and forming intake and discharge passages respectively to and from opposite sides of the gears, said tubular extensions and passages thereof being elongated cross-sectionally and horizontally in the direction of the axes of the gears to obtain a maximum transverse spacing between the extensions, consistent with such a cross-sectional area of the passage of each extension which will allow of a maximum pumping volume, the cross-sectional length of said extensions in direction of the gear axes being substantially equal to the axial width of the pumping gears.

9. In combination with an automobile a pair of pipes arranged transversely of the chassis, tubular members cross-connecting the pipes and cross-sectionally elongated in direction of the long dimension of the chassis and cross-sectionally narrowed in direction transverse to said long dimension of said chassis, and spaced apart a substantial distance in direction of narrowing,

a pump arranged below the pipes and comprising a casing having meshing pump gears therein and having vertical substantially parallel tubular extensions cross-sectionally elongated, narrowed and spaced to correspond to the dimensions of the cross-connecting tubular members, and operatively connected therewith, said extensions rising well above the top of the pump casing and being spaced apart in direction transverse to the gear axes, the passages of the pump and pipes being so arranged that fluid entering one of the pipes passes through the pump and outwardly into the other pipe.

10. In combination; a pair of spaced substantially parallel tubular members cross-connecting the pipes and cross-sectionally elongated in direction transverse to the long dimension of the pipes and cross-sectionally narrowed in direction of said long dimension, and spaced apart a substantial distance in direction of narrowing, a pump comprising a casing having meshing pump gears therein and having tubular substantially parallel extensions cross-sectionally elongated, narrowed and spaced in correspondence to the cross-connecting tubular members and operatively connected therewith, said extensions projecting well beyond the pump casing, and being spaced apart in direction transverse to the gear axes, the passages of the pump and pipes being so arranged that fluid entering one of the pipes passes through the pump and outwardly into the other pipe.

11. In combination a pump comprising a casing having meshing pump gears having tubular extensions rising well above the top of the casing which are spaced in direction transversely to the gear axes, and which form inlet and discharge passages for the pump at opposite sides of the gears and in opposition to the toothed faces of said gears, the horizontal axes of the gears being vertically superposed, a pair of pipes having transversely arranged hollow connecting elements, the hollow connectors communicating at one side with one pipe and having a blind connection with the opposite pipe, the cross passages of the pipes and the passages of the pump being so related that when the pump is operating fluid is sucked into the pump from one of the pipes and forced out of the pump into the other pipe.

12. A pump comprising a casing having meshing pump gears therein and having substantially parallel tubular extensions projecting well beyond the casing and spaced a substantial distance apart in direction transversely to the rotative axes of the gears and forming inlet and discharge passages for the pump and cross-sectionally elongated in direction of the gear axes and cross-sectionally narrowed in direction transverse to said axes, shafts for said gears at least one of which projects beyond the casing at each end for connection with power, said shafts having bearings in elements which are detachably connected to the pump casing, said elements being interchangeable from one side to the other of the casing and being capable of reversal so that the projecting shaft can be disposed either directly above or directly below another gear shaft.

13. A pump comprising a casing having meshing pump gears therein and having separate substantially parallel vertical tubular extensions projecting well above the casing and spaced a substantial distance apart in direction transversely to the gear axes and forming full capacity inlet and discharge passages for the pump, a by-pass connecting said passages and arranged be-

neath the lowermost gear, and a valve controlling said passage.

14. A pump comprising a casing, having mesh-
ing pump gears therein, and having separate sub-
stantially parallel tubular extensions projecting
well above the casing and spaced a substantial
distance apart in direction transversely to the
gear axes and forming full pumping capacity in-
let and discharge passages for the pump, and
adapted to suspend the pump, and to occupy a
vertical position when the pump is operatively
suspended, the outermost wall portion of each
extension having a horizontally disposed thread-
ed opening opposed to the gears, said openings be-
ing aligned on an axis perpendicular to the gear
axes, and to the axes of the tubular extensions
and also forming full capacity inlet and outlet
passages.

15. A pump comprising a casing having mesh-

ing pump gears therein and having separate sub-
stantially parallel tubular extensions projecting
well above the casing and spaced a substantial dis-
tance apart in direction transversely to the gear
axes and forming full pumping capacity inlet and
discharge passages for the pump and adapted to
suspend the pump and to occupy a vertical posi-
tion when the pump is operatively suspended, said
extensions being cross-sectionally elongated in
direction of the gear axes and cross-sectionally
narrowed in direction transverse to said gear
axes, the outermost wall portion of each extension
having a horizontally disposed threaded opening
opposed to the gears, said openings being aligned
on an axis perpendicular to the gear axes and
to the axes of the tubular extensions and also
forming full capacity inlet and outlet passages.

FREDERICK A. WATEROUS.

RALPH R. BOYLES.