March 14, 1944. J. L. CREVELING 2,344,287

PUMPING MEANS

Filed March 15, 1939 2 Sheets-Sheet 1

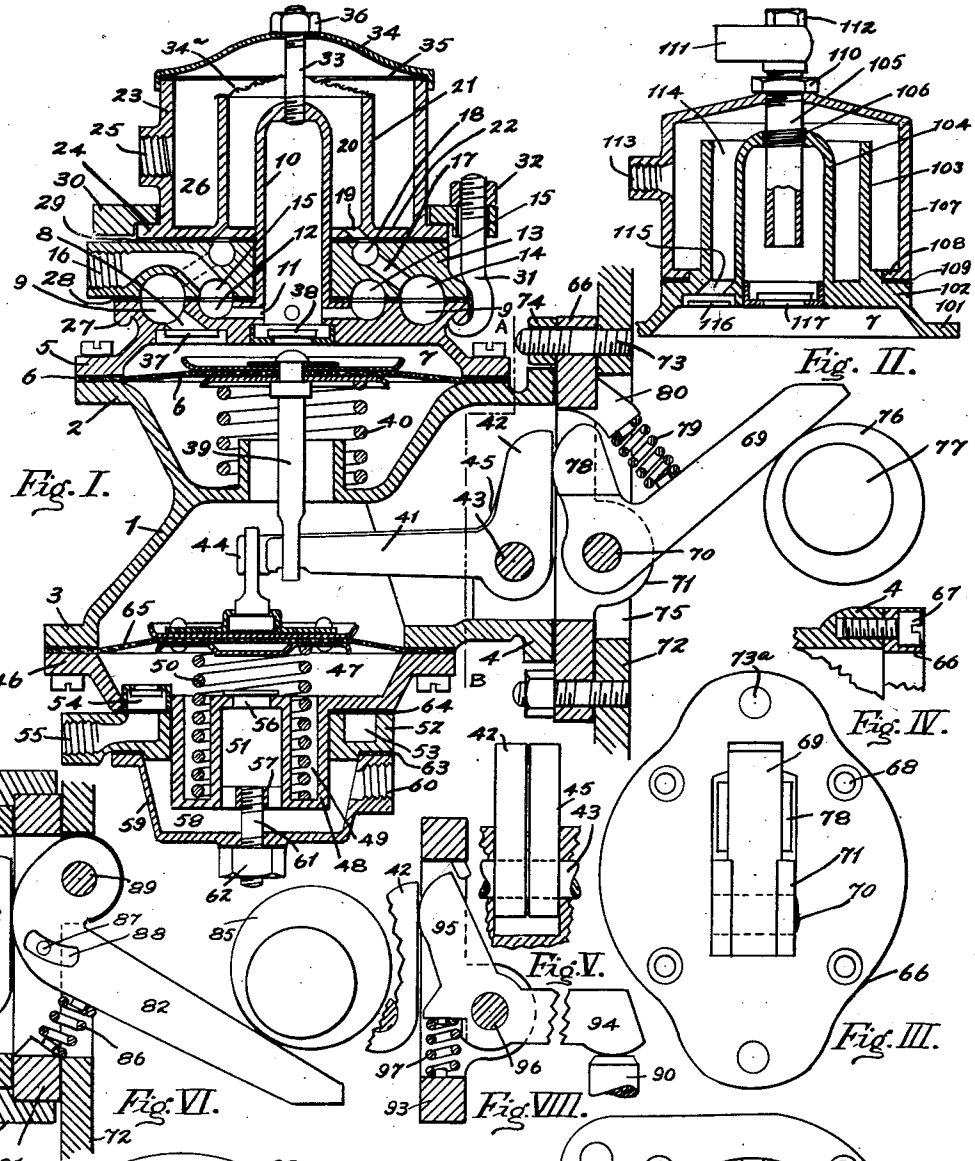


Fig. I.

Fig. II.

Fig. III.

Fig. IV.

Fig. V.

Fig. VI.

Fig. VIII.

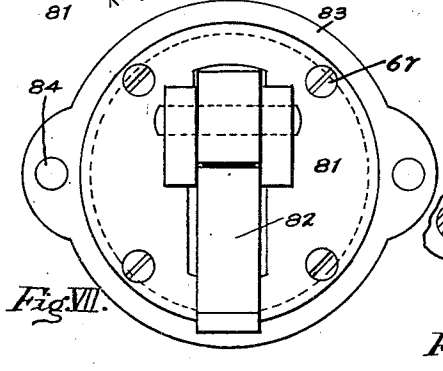


Fig. VII.

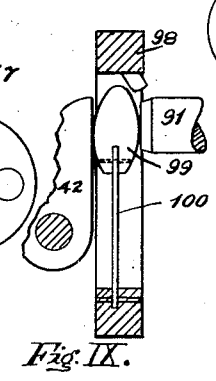


Fig. IX.

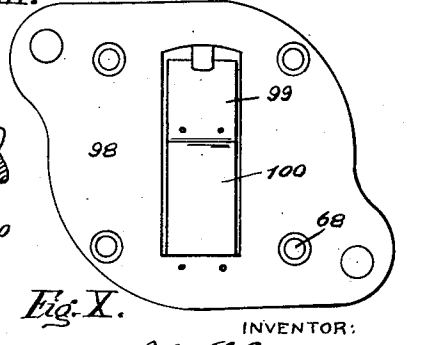


Fig. X.

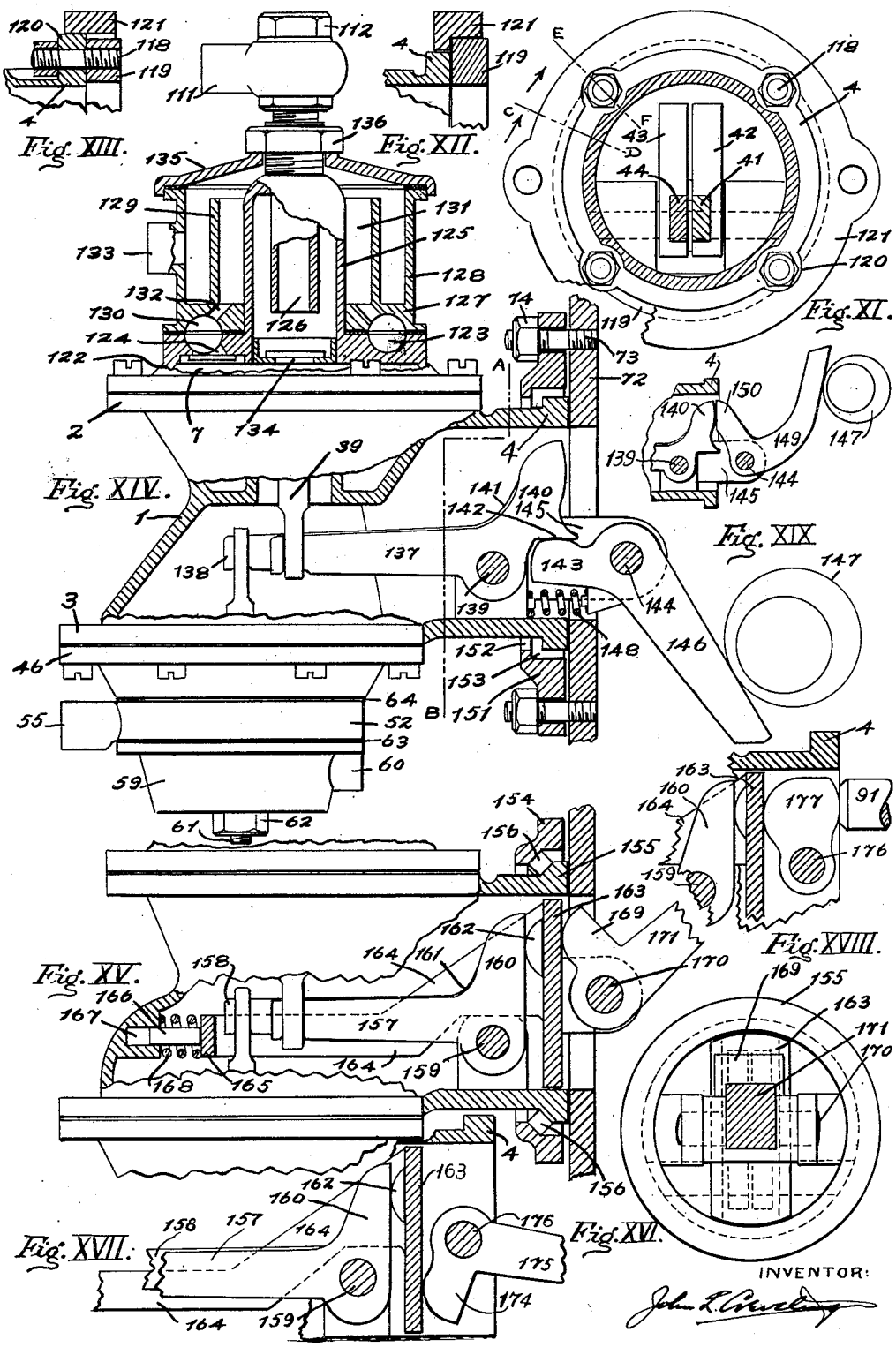
INVENTOR:

John L. Creveling

March 14, 1944. J. L. CREVELING 2,344,287

PUMPING MEANS

Filed March 15, 1939 2 Sheets-Sheet 2



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2,344,287

UNITED STATES PATENT OFFICE

2,344,287

PUMPING MEANS

John L. Creveling, Tucson, Ariz.

Application March 15, 1939, Serial No. 261,937

10 Claims. (Cl. 103—150)

My invention pertains to pumping means of a type which may be employed to maintain a substantially constant plus or minus pressure when driven from a suitable source of power and, as such means are particularly useful in connection with internal combustion engines as used in automobiles, my invention will be described with particular reference to an embodiment especially useful for this purpose.

Automobile motors are now usually provided with a pressure pump for supplying fuel and, as many also have a vacuum pump for assisting in operating the windshield wiper or other devices, my invention will be described with respect to a combined pressure and suction pumping means, although it will be obvious from the following that my invention may be used either for a plus or minus pressure device singly as well as for a combined structure.

As various engines or motors naturally vary materially in construction, it is now customary to design a pumping device for each type of engine. It is now common practice to fasten the pump to the side of the engine and drive it by means of a cam upon the usual cam-shaft which operates a lever or pushrod extending through the side of a portion of the engine and engaging a portion of the pumping mechanism.

While the most common types of pumping mechanisms are all quite similar, the locations of the cam-shafts in various engines differ considerably and the presence of other parts necessitates various positions of the pumps, requiring different types of connecting flanges, operating levers, etc., and requiring the inlet and outlet openings to face in different directions.

An object of my invention is to provide a pump which may have its inlet and outlet openings readily positioned at any angle within a given plane, so that the same can be readily connected to the usual piping.

Another object is to provide pumping means with readily changeable driving means whereby a single type of pump structure may be adapted to be applied to and driven by a variety of engines having their driving members, such as cams, etc., in various positions requiring different types of power transmitting means or connections.

Other objects will be plain in view of the following specification.

In the drawings, Fig. I is a section and partial elevation of a combined pressure and vacuum pumping means embodying one form of my invention, and indicated as attached to the side of a motor casing and driven by an arm or lever engaging the upper side of a cam within the engine or motor structure.

Fig. II is a section of a modified form of upper or fuel-carrying structure which may be used in connection with the other parts of the structure of Fig. I.

Fig. III is an elevation of the power transmitting means of Fig. I, with its carrying flange, as viewed from the right of Fig. I.

Fig. IV is a section of a part of the pump structure and a part of the flange of Figs. I and III, showing how they are united in Fig. I.

Fig. V is a section of a fragment of the body portion of the pump of Fig. I, and an elevation of the operating levers as viewed from the right.

Fig. VI is a section of a portion of the pump of Fig. I, and a modified means for attaching the pump to the motor, and an elevation of a lever arrangement adapting the pump to be driven by contact with the lower face of a cam within the motor structure.

Fig. VII is an elevation of the structure of Fig. VI, as viewed from the right, and omitting the portions of the motor structure.

Fig. VIII is a section of the flange to be attached to the pump structure as shown in Fig. I, and adapting the pump to be operated by a vertical push-rod within the motor structure.

Fig. IX is a section of a flange to be attached to the pump structure, and carrying means adapting the pump to be driven by a horizontal push-rod within the motor structure.

Fig. X is an elevation of the structure of Fig. IX, as viewed from the right.

Fig. XI is an elevation of a flange arrangement, of the general type shown in Fig. VII, and a section of the pump structure of Fig. I as viewed from the left, the sections being taken on the line A—B in Fig. I (corresponding to line A—B in Fig. XIV).

Fig. XII is a section of a portion of the structure of Fig. XI, taken on the line C—D and viewed in the direction of the arrow.

Fig. XIII is a similar section taken on the line E—F.

Fig. XIV is a section and partial elevation of a pump structure similar to that of Fig. I, and shows a modified form of upper portion of the pump structure, as well as a modified means for attaching the pump to the motor and a modified connection for driving the pump.

Fig. XV is a section and elevation of parts of a structure similar to that of Figs. I and XIV, but

indicating a modified type of driving connection, as well as a modified means for attaching the pump structure to the motor.

Fig. XVI is an elevation of a portion of the pump structure and driving means of Fig. XV, as viewed from the right.

Fig. XVII is a partial section and partial elevation showing a modification that may be made in the structure of Fig. XV.

Fig. XVIII is a partial section and partial elevation of a modification that may be made in the structure of Fig. XVII.

Fig. XIX shows a portion of the pump structure of Fig. XIV, both in section and elevation, having a lever adapted to operate the pump when driven in a direction opposed to that indicated in Fig. XIV.

Referring particularly to Fig. I, 1 indicates a body casting having the upper flange 2, lower flange 3, and side outlet flange 4 similar to those usually found in pumping devices of this character. The flanged member 5 is secured to flange 2 by screws, as shown, and clamps, between it and flange 2, the circular diaphragm 6. Member 5 is so formed as to define the cavity 7 having a port 8 connecting it with the annular channel 9, concentric with the upstanding hollow member or dome 10, the interior of which is connected as by ports 11 with the annular channel 12. The annular member 13 is passed over the dome 10 having the same central axis, and is provided with the annular channels 14 and 15 which register with the channels 9 and 12, respectively. Channel 15 communicates with the outlet member 16, while channel 14 is connected as by ducts 17 with the annular channel 18, which is connected by ducts 19 with the annular chamber 20, defined by the dome 10 and the annular wall 21, carried by the base member 22 having a concentric annular wall 23 and outer flange 24. The wall 23 carries the inlet member 25 communicating with the chamber 26. The member 5 is provided with an overhanging beaded flange 27, and a gasket 28 having openings registering with channels 9—14 and 12—15 is placed between members 5 and 13, while a gasket 29 with openings registering with the channel 18 is placed between member 13 and member 22. An annular ring 30 engages the flanged portion 24 of member 22, and is provided with three or more openings through which pass hooked members 31 engaging the beaded flange 27 and held in place by nuts 32. The top of dome 10 is provided with threaded rod 33 which extends through the cover 34 which is forced down upon the gasket 35 by nut 36. The cavity 7 has its communication with the inlet port 8 and with the dome 10 controlled by suitable valves, indicated merely by the discs 37 and 38, respectively. Such valves, in practice, are carried in suitable cages which also contain their operating springs; but, as the particular types of spring and cage structures form no part of my present invention, the valve discs only are shown for sake of simplicity, as this is all that is required to indicate the functional operation of the valves, which will be explained later. The diaphragm 6 is properly connected in the usual manner with its operating rod 39, and is normally pressed upwardly by the usual spring 40, and can plainly be operated in the usual manner common to such pumps by the lever having arms 41 and 42 and pivoted at 43.

The parts above described form a complete pumping device capable of operation by proper manipulation of the lever 41—42 and, as will later be brought out, the valves are so arranged as to cause it to be a pressure producing pump capable of supplying fuel to the carburetor of an internal combustion motor, but, as automobiles often require a vacuum pump as well, the lower portion of the structure of Fig. I is devoted to that purpose, so that both pumps can be operated by the same mechanical connection with the motor, while, of course, it is obvious that each could be driven separately, if desired.

The vacuum portion of the combined structures of Fig. I comprises an operating lever 44 with a vertical limb 45, similar to lever 41—42, and is also pivoted at 43, as more plainly indicated as viewed from the right in Fig. V. Lever 44 is connected in the usual manner, as indicated, with the diaphragm 65 clamped between the flange 3 and member 46 forming the chamber 47, and having the depending portion 48 defining the annular pocket 49, containing the spring 50, and the concentric chamber 51. The member 52 is provided with an annular channel 53 which communicates with the chamber 47 through the valve-controlled opening 54 and with the outlet connection 55. The chamber 47 communicates with the chamber 51 through the valved connection indicated at 56 and, through the openings in the spider 57, with the chamber 58 defined by the member 59, carrying the inlet member 60 communicating with the chamber 58. The spider 57 carries the threaded rod 61 passing through member 59 whereby the nut 62 may be used to draw the upper flange of member 59 and gasket 63 against the bottom of member 52 and thus force member 52 and gasket 64 against the lower face of member 46, the gasket 64 having an opening registering with outlet duct 54.

The flange 4 is attached to the adapter flange 66 as by screws 67, shown in Figs. IV and VII, which may be spaced as indicated in Figs. III, VII and X at 68. The adapter carries the rocker arm 69 upon the pin 70, passing through the lugs 71, and is shown as attached to a portion of the motor casing 72, as by studs 73 passing through holes 73* (Fig. III), and provided with nuts 74. The rocker arm 69 passes through the opening 75 in the engine casing and bears upon the upper side of the cam 76 carried by the shaft 77, which is usually a part of the motor structure as, for example, the usual valve cam-shaft. The arm 69 is provided with an upstanding portion 78, adapted to engage the members 42 and 45 to operate the levers 41 and 44, and is normally pressed against the cam 76 by the spring 79, held between its upper surface and the member 80 which by engaging the end of 78 may limit the movement of the rocker arms 69—78, at such times as 69 is not engaging the cam 76.

An operation of the structure of Figs. I, III, IV and V, is substantially as follows: If the nuts 32 be loosened, the member 13 may be rotated about the central dome 10 until the outlet opening 16 faces in the proper direction for the particular environment in which the pump is to be used, since the ring 30 and hooks 31 are both free to rotate about 10 as a center. The inlet portion 25 may then be rotated to face in the proper direction and, if the nuts 32 now be screwed down tightly, the entire structure above the diaphragm 6 will be firmly held in place and tight joints secured through the instrumentality of the gaskets 28 and 29. The cover 34 may also be drawn down tightly upon the gasket 35, as by nut 36, so as to seal the top of chamber 26. If

the nut 62 be loosened, the outlet member 55 and the inlet member 60 may be rotated into the desired positions of applicability and then held there by tightening the nut 62 which will secure tight joints by means of gaskets 63 and 64. The adapter flange is secured in place upon the flange 4 by means of screws 67, as above noted, and a thin gasket is ordinarily placed between the two flanges, as indicated. The rocker arm 69 is inserted through opening 75 in the side of the motor casing and placed upon the cam 76, and flange 66 is passed over the studs 73 and firmly secured in place by nuts 74 against a thin gasket, as indicated. If the outlet 16 be now connected to the carburetor, as usual, and the inlet 25 connected with the fuel supply and the pump properly primed, chambers 20 and 26 will be filled with fuel, as also will be the annular channels 9—14 and 18.

Now, if the motor be started, shaft 77 will revolve and cam 76 will raise lever 69 and cause lever 78 to rotate levers 42—41 and 45—44 in a counter-clockwise direction. This will cause the diaphragm 6 to be drawn downwardly against the effort of spring 40, and the diaphragm 65 to be forced downwardly against the effort of spring 50 until the cam 76 reaches its position of maximum throw, whereupon it will then approach the position of minimum throw, as shown in Fig. I.

The downward motion of diaphragm 6 will cause fuel to flow from channel 9—14, through port 8 and around valve 37 into chamber 7, and this fuel will be replaced in channel 9—14 from the supply in chamber 20, through ducts 19, annular channel 18, and ducts 17. This will be replaced by fuel from chamber 26 which, in turn, will be replaced by fuel entering the inlet 25 from the fuel supply tank, which is assumed to be open to atmospheric pressure. The lower portion of chamber 26 will serve to collect any solid particles of foreign matter that will be dropped by the incoming fuel and, if desired, a screen, as indicated at 34a may be placed over chamber 20 to further protect against foreign matter being drawn into chamber 7.

When the cam 76 revolves from its position of maximum throw into the position shown in Fig. I, spring 79 will cause the lever 69—78 to revolve in a clockwise direction, and lever 42—41 will tend to follow it under the influence of spring 40 and tend to force some of the fuel above the diaphragm 6 beyond the valve 38 and into the dome 10 where it will compress the air in the upper part of the dome and tend to flow out through ports 11, channel 12—15 and outlet 16, to the carburetor. As these pumps are designed to have a pumping capacity quite in excess of the fuel consumed under normal operating conditions, the back pressure due to the action of the carburetor valve will prevent the expulsion of much of the fuel above the diaphragm between revolutions of the cam 76, with the result that lever 42 only follows the lever 78 for a short distance during each revolution of the cam, with the outcome that the fuel is supplied to the carburetor at substantially constant pressure determined by the spring 40, in a manner now so well known in the art as to require no further explanation.

While the above operation is taking place, a similar operation is being brought about by lever 44—45 which operates the diaphragm 65 against the effort of spring 50. Upward movement of diaphragm 65 causes air to be drawn through inlet 60, chamber 58, chamber 51 and port 56 into chamber 47, from which return is prevented by the valve indicated over port 56; while downward motion of the diaphragm causes air to be expelled from chamber 47 through the valved port 54. Therefore, when the diaphragm 65 is operated, as explained with respect to the fuel diaphragm 6, a partial vacuum is maintained in the chamber 58 which may be utilized in a manner now well known in the art.

Prior to my invention, it has been the practice to make pumps of the character illustrated in Fig. I, with the operating arms, corresponding to lever 69, permanently arranged upon the same pivot as the levers corresponding to 41—42 and 44—45, and to operate the last-mentioned levers through a permanently arranged, lost-motion, connection with the levers or arms 69, all the parts being properly related and proportioned with respect to the location and throw of the cam 76, of the particular motor for which the pumping means was designed. It has also been the practice to provide the flange, corresponding to 4 in Fig. I, with permanent ears or extensions through which the studs 73 or suitable cap screws were passed. Thus, a pump was applicable only to a motor of the particular construction for which it was designed, or one having the same arrangement of pump-attaching and driving elements.

With the pump of Fig. I, it will be plain that the adapter flange 66 and parts carried thereby are all that have to be varied to meet the requirements of different motors, so that the same pump can be installed upon and operated thereby. Therefore, dealers or repair shops only have to carry one type of pump and suitable adapters to service a large variety of cars, whereas they have previously had to carry a large variety of complete pumps for the service.

With an adapter flange of the type shown in Figs. I and III, the lever 69 can, of course, be bent or ground so as to provide some adjustment to accommodate differences in location of the cam 76 and also, on account of the lost motion that may be caused between 42 and 78, to vary the proportion of the throw of the cam to be transmitted to the lever 42; but, with this particular type of solid flange, the holes 73a for the studs 73 have to be properly positioned for the particular location of the studs in the engine frame. Of course, complete flanges 66 with appropriate levers to fit most motors (another type of which is indicated in Fig. X, to be described later) can be carried in stock much more easily than complete pumps, and this arrangement is a vast improvement over present day structures.

However, a modified form of adapter is shown in Figs. VI and VII, wherein the flange 81 carrying the operating arm 82 is circular and provided with a ring or flange 83, which is provided with the holes 84 for engaging the studs on the motor casing. With this arrangement, only the ring flange 83 has to be changed to accommodate different spacing of the studs which, if properly spaced and diametrically opposite each other can be engaged, regardless of the particular diameter, as the ring 83 may be revolved about the flange 81.

In Figs. VI and VII, the studs are assumed to be on a horizontal diameter and, therefore, do not show in Fig. VI; while it will be obvious that drawing the ring flange 83 toward the casing 72, by means of the usual nuts upon proper studs, will clamp the flange 81 firmly against the motor casing 72 so as to hold the pump firmly in place,

a thin gasket usually being placed between the flange 81 and the case 72.

In Figs. VI and VII, the arm 82 is of the type employed for engagement with the lower face of the cam 85 against which it is held by the spring 86, while its limit of travel when disengaged from the cam is determined by the pin 87 in slot 88. With this arrangement, when the cam 85 is in the position of minimum throw, as shown in the drawings, the lever 42 of the pump is in the position indicated in Fig. I; and it will be plain that, as the cam moves to its position of maximum throw, it will rotate the arm 82 in a clockwise direction about its pivot 89, carried by the flange 81, and thus move the lever 42 to operate the pump, as explained with respect to Fig. I.

Besides motors requiring their pumps to be operated by arms engaging the upper or lower face of a cam, there are in use a great many motors having pumps operated by a vertical push-rod, as shown at 90 in Fig. VIII, and by horizontal push-rods as shown at 91 in Fig. IX. These push-rods operate in constant alignment and, in Fig. VIII, there is shown an adapter flange by means of which the pump of Fig. I may be operated by a vertical rod. The flange 93 may be attached to the flange 4 of Fig. I and properly held against the side of the motor, as shown in Figs. I and VI, and upward motion of the push-rod 90 will then cause the lever 94—95, pivoted at 96, to move the lever 42 to operate the pump, as described with respect to Fig. I. Spring 97 will keep the push-rod in contact with its cam.

In Figs. IX and X, the adapter flange 98 is shown as of the integral type illustrated in Figs. I and III, merely to indicate how this type may be varied for use with a different arrangement of studs upon the motor casing, and, of course, the type of ring flange shown at 81—83, in Figs. VI and VII, could be quite as well employed. With this arrangement, the member 99 is of such dimensions as to engage the end of the push-rod 91 and cause proper operative relation between the rod and lever 42, and is supported by the leaf-spring 100 which holds the rod 91 against its cam.

In Fig. II, the flange 101 corresponds to the flange 5 of Fig. I and carries disc 102, provided with the annular wall 103 and dome 104, which is provided with a central outlet tube 105 which extends to a point in the lower part of the dome and which may be secured thereto as by threads. as indicated at 106, which are preferably sweated in permanent position. 107 is a cap which is passed over the tube 105, and provided with bottom flange 108, adapted to engage the gasket 109 and form a tight joint with the member 102 when forced downwardly by nut 110 which is threaded upon the tube 105. The upper end of tube 105 is provided with a union of a well type having an outlet member 111 which is free to revolve about the axis of the tube 105 until cap nut 112 is firmly screwed down, when outlet member 111 is firmly held in place and in communication with the tube 105. 113 indicates an inlet opening corresponding to 25 of Fig. I. The chamber 114 communicates with the cavity 7, as by port 115, provided with a suitable valve, as indicated in its open position at 116. The interior of the dome 104 is connected with the cavity 7 as by the valved port 117.

It will thus be plain that, if flange 101 and the parts carried thereby be substituted in the structure of Fig. I for the flange 5 and parts carried thereby, and the diaphragm operated as described with respect to Fig. I, the operation of the pump will be substantially as described with respect to Fig. I, and that the inlet opening 113 may be faced in any desired direction in a horizontal plane and thus held by nut 110, and that the outlet 111 may also be positioned at any angle in a horizontal plane and held in place by nut 112.

In Figs. XI, XII and XIII, there is shown a flange arrangement similar to that shown in Figs. VI and VII, differing principally in that the flange 4 is attached to the adapter flange 119 by studs 118, which are fastened in the adapter flange 119, and which flange may be of the same character as the adapter flange 81 of Fig. VI and VII. The flange 4 is shown as provided with perforated lugs 120, through which the studs 118 pass, and the nuts serve to draw the flanges 4 and 119 together in place of the screws 67 of Figs. VI and VII. The ring flange 121 is shown as having grooves therein registering with the lugs 120, which may serve to hold the flange 4 from revolving in the flange 121, if desired.

In Fig. XIV, there is shown a pressure and vacuum pumping structure similar to that shown in more detail in Fig. I, and differing therefrom principally in that the upper or fuel supply portion differs in details of construction and in that the structure does not employ an adapter flange as used in the previously mentioned structures. This figure also shows another means for attaching the pumping structure to the motor. The parts here shown in elevation and bearing the same numerals as in Fig. I have the same internal arrangement as shown in section in Fig. I. In this figure, the flanged member 122 is provided with the annular channel 123 communicating with the chamber 7 through the valved port 124, and has the dome 125 and outlet tube 126 of such construction that they may be cast integrally therewith. The shell 127, having upstanding walls 128 and 129, has its lower portion provided with an annular channel 130 which communicates with the chamber 131, as by ducts 132. The wall 128 is provided with the inlet connection 133, and the dome is provided with a valved connection with the chamber 7, as indicated at 134. The hood 135 rests upon the top of wall 128 and may be drawn down tightly as by nut 136. The tube 126 is connected with the union 111—112, which is the same as shown in Fig. II, and the operation of the structure thus far described will be obvious from the description of the arrangement of similar parts of Figs. I and II.

In the structure of Fig. XIV, the levers 137 and 138 correspond to levers 41 and 44 of Fig. I, respectively, and operate the pumping devices in the same manner. Levers 137 and 138 are both pivoted at 139 and are provided with upstanding portions 140 and 141 and with like horizontal extensions, one only of which may be seen in the drawings at 142. The horizontal extensions are engaged by the lever 143, carried by the pivot 144, supported by lugs 145, which in turn are carried by the flange 4. Lever 143 is connected with arm 146 which is held in contact with cam 147 as by spring 148, so that revolution of the cam 147 operates levers 137 and 138 to operate the pumping structures, in a manner that will be plain in view of the description of the operation of the structure of Fig. I. With this structure, if it be desired to drive from a cam so positioned that it is necessary to place the driving arm upon the upper face, or in such position that the arm re-

ceives counter-clockwise movement for its operating stroke, the pin 144 may be withdrawn and the arm 146 replaced by an arm of the type shown in Fig. XIX at 149, provided with the extension 150 engaging the levers 140 and 141.

To adapt this structure for use with a vertical push-rod arrangement, as shown in Fig. VIII, it is only necessary to have a suitable arm which may be substituted for the arm 149—150, while the horizontal push-rod 91 of Fig. IX may operate the levers 140—141 directly. The means for holding the pumping structure against the motor casing, shown in this figure, comprises a ring flange 151 which is provided with suitable holes to engage the studs 73 in the casing 72, and with an opening 152 just large enough to pass over the flange 4. Then, if a proper flange 151 be selected to fit the studs, it simply has to be passed over the flange 4, and two half rings of the section indicated at 153 placed upon the flange 4, and the flange 151 drawn toward the right into the position shown in the figure, and the entire structure can then be held firmly against the casing 74, as by studs 73; it here being noted that the ring 153 is not shown in section as the half ring is assumed to show in elevation at the joint.

In Figs. XV and XVI, the flange 154 is of the same general type as that of Fig. XIV, but the flange 155 corresponding to 4 in the other figures, has one of its faces beveled so as to fit against one side of the ring of square section, the two ends of one-half of which are shown at 156, the flange 154, of course, having its inner face shaped to fit against the opposite face of the ring 156. Here, the levers 157 and 158 are similar to the levers 41 and 44 of Fig. I, and operate the pumping apparatus in the same manner. The levers 157 and 158 are pivoted at 159 and are provided with the upstanding arms 160 and 161 which engage the rocker 162, carried by the member 163, provided with parallel side members, one of which is shown at 164. The members 164 are united by the cross members 165 which is held in position by the tail rod 166, movable in the guide hole 167. The structure 162—163—164—165 is pressed toward the right by spring 168 into constant contact with the lever 169, pivoted at 170, and provided with the cam engaging arm 171, in such manner as to hold the arm in contact with its operating cam (not shown), in a manner plain from the description of the structures of Figs. I and XIV. The arm 171 may be of any type adapted to be moved by its cam in a counter-clockwise direction as, for example, those shown in Figs. I and VIII; and, if the pumping apparatus is to be driven by a cam moving its arm in a clockwise direction, it is only necessary that a proper arm be provided, as indicated in Fig. XVII at 175, which will have the arm 174 properly disposed below the pivot 170. With this structure, the member 163 may be caused to operate the pump by direct contact with horizontal push-rods, such as shown at 91 in Fig. IX.

In the structure of Fig. XVII, the parts bearing the same numerals are the same as in Figs. XV and XVI, but have a different location with respect to the flange 4. Here the lever 174—175 is pivoted between the flange 4 and the member 163, and is shown as of the type to be moved in a clockwise direction for its operating stroke by the cam (not shown). If the operating arm is to have its operative stroke in the opposite direction, it has simply to be reversed upon the pin 176 or an appropriate arm of the type indicated at 168—171, in Figs. XV and XVI, substituted in its stead.

If the structure of Fig. XVII is to be driven by a horizontal push-rod, as shown at 91 in Fig. XVIII, the pin 176 has only to be provided with a proper member, as indicated at 177 in the latter-named figure, or a push-rod of the proper length substituted for the rod indicated at 91.

I do not hereby limit myself to any of the details of construction or modes of operation herein given to illustrate embodiments of my invention, for it will be obvious that wide departure in the way of details, both in construction and operation, may be made without departing from the spirit and scope of my invention, which is as set forth in the following claims:

I claim:

1. Pumping means including fluid pressure varying means, a lever for operating said varying means, a pivot supporting said lever, an element extending upon opposite sides of said pivot adapted to transmit motion to said lever and causing said lever to move in a single direction when said element is moved by pressure applied to said element in the same linear direction on either side of said pivot.

2. Pumping means for use with driving means, including fluid pressure varying means, a lever for operating said varying means, a pivot supporting said lever, an element having portions upon opposite sides of said pivot adapted to transmit motion to said lever and causing said lever to move in a single direction when said element is moved by pressure applied to said element in the same linear direction on either side of said pivot, and means for operatively connecting said element with the driving means.

3. Pumping means for use with driving means, comprehending a readily attachable pumping unit including an operating lever, means for supporting said lever, a second lever for operating the first lever and engaging the driving means, and independent means provided with a pivot for supporting said second lever in operative relation to the first lever and a driving means.

4. Pumping means including a pump having inlet and outlet openings in portions of said pump which are in contact with each other and movable with respect to each other and the remaining portions of said pump combined with a common element simultaneously holding said portions in fixed relative positions.

5. Pumping means having a body portion including a pump, a portion having an inlet to said pump, a portion having an outlet from said pump, all said portions being movable with respect to each other, and a single element for holding all said portions in fixed operative relation and without removal permitting relative movement therebetween throughout a complete revolution.

6. Pumping means having a body portion including a pump, a portion having an inlet to said pump, a portion having an outlet from said pump, all said portions being movable with respect to each other, and common means extending through one of said portions for simultaneously clamping and holding all said portions in fixed operative relation.

7. In a device of the character described, a body portion including a pump, a member provided with an inlet opening in operative connection with said pump, a member provided with an outlet opening in operative communication with said pump, means permitting independent movement of each of said members into an indefinite

number of positions to facilitate connection of their openings with inlet and outlet piping, said last-named means being adapted upon manipulation to hold said members in fixed position with respect to said pump with their openings in operative connection with said pump and said piping, operating means for said pump carried by said body portion, separate readily attachable-detachable means for engaging the body portion and supporting the body portion and piping and provided with means for operatively connecting said operating means with a power driving means, whereby said last-named means may cause fluid to be drawn from said inlet piping and ejected through said outlet piping.

8. Pumping means for use with driving means, including a body portion carrying fluid pressure varying means and operating means for the varying means, combined with a readily attachable separate unit for supporting the body portion and including means for rockably and intermittently engaging the operating means and constantly engaging the driving means.

9. Pumping means for operation by engagement with a movable element serving as a prime mover, said means including a pump provided with inlet and outlet openings for connection with inlet and outlet piping, operating means for said pump comprising a lever, a pivot carrier by the pump for supporting said lever, readily removable means attached to said pump for supporting a second pivot, a second pivot supported by said last-named means, a lever removably supported by the second pivot for operatively engaging the first-named lever and the movable element whereby said lever may be replaced by any one of a number of interchangeable different levers, whereby the lever may be chosen with respect to the pumping device and the movable element and readily engaged by said pivot and held in operative position by said pivot.

10. Pumping means for use with a driving means, including fluid pressure varying means and a pivotal lever for operating the pressure varying means in constant operative connection therewith, combined with readily attachable means provided with a pivot and a lever upon said pivot for intermittently contacting and operating the first-mentioned lever and for constantly engaging a driving means.

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