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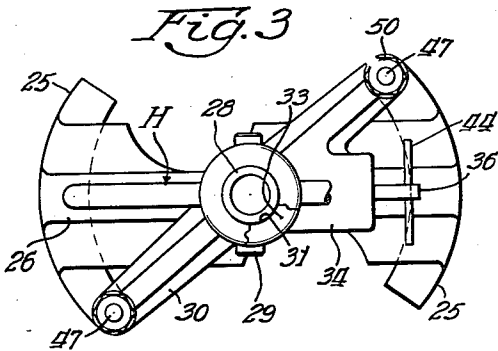
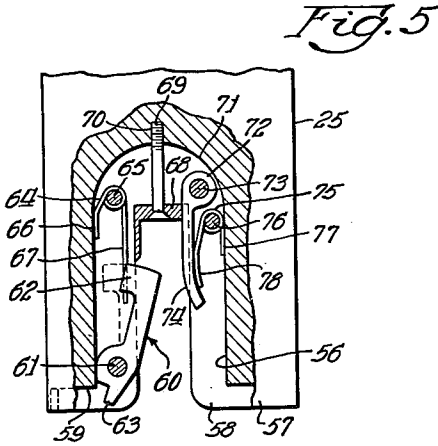
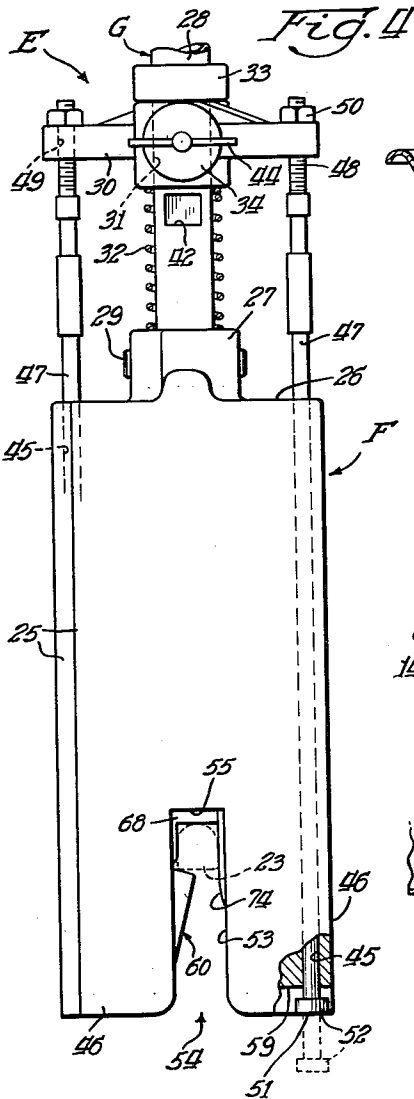
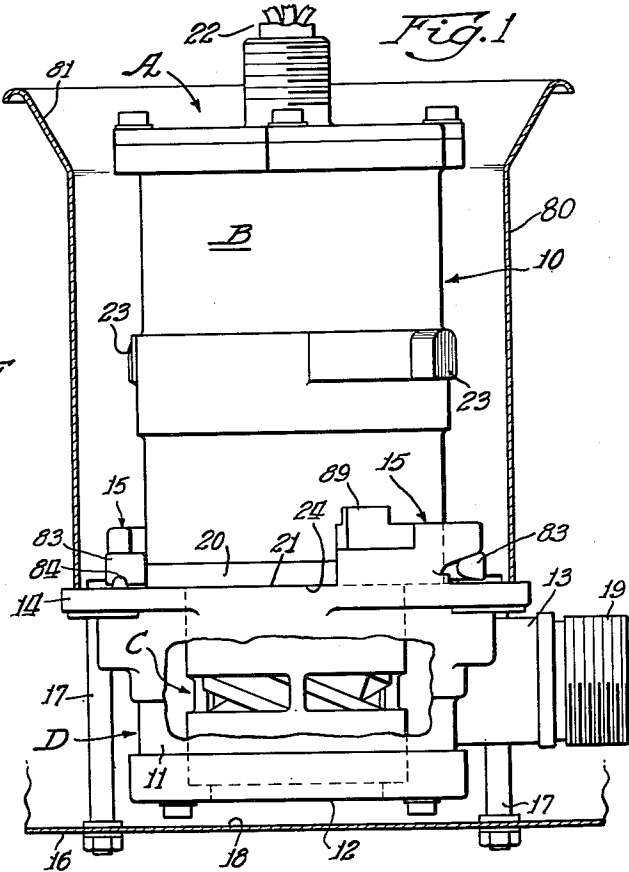
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3,064,340

DEVICE FOR REMOVING A MOTOR AND IMPELLER ASSEMBLY
FROM A LIQUID BOOSTER PUMP ASSEMBLY MOUNTED
WITHIN A LIQUID SUPPLY TANK

Filed Dec. 23, 1957

2 Sheets-Sheet 1



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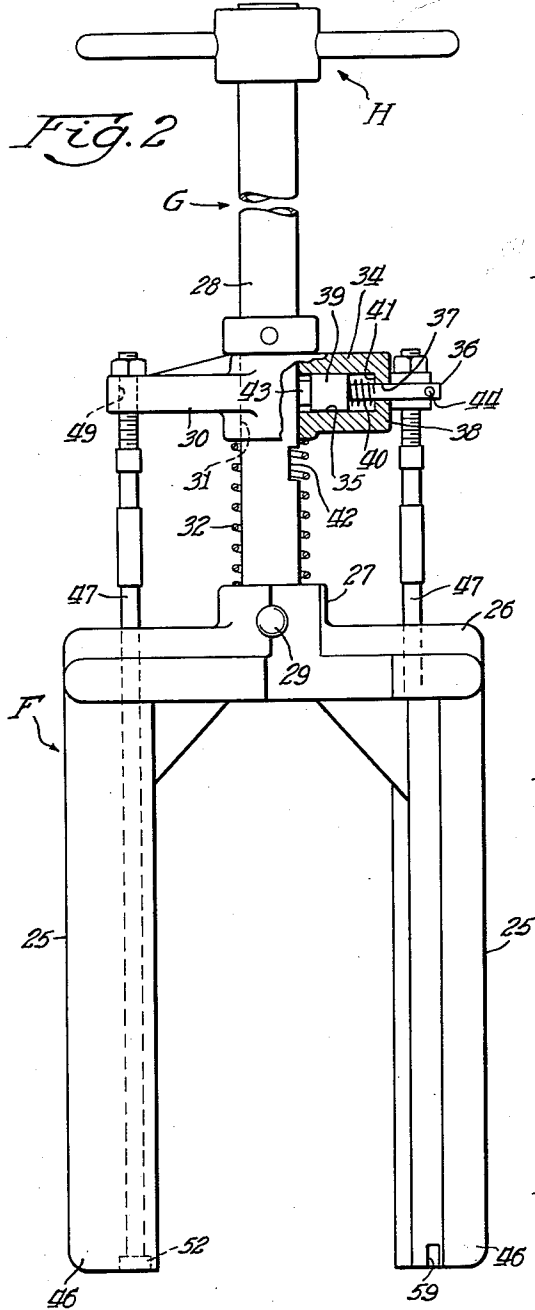
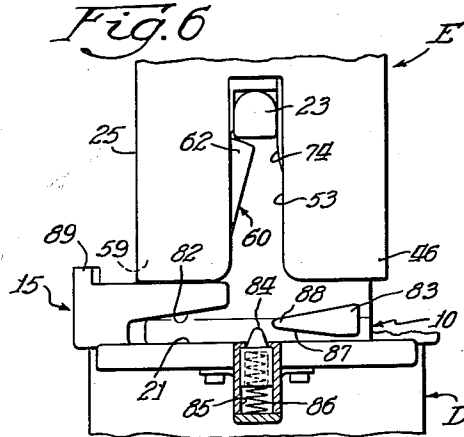
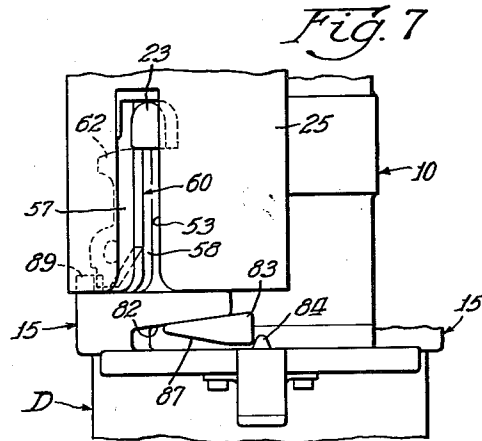
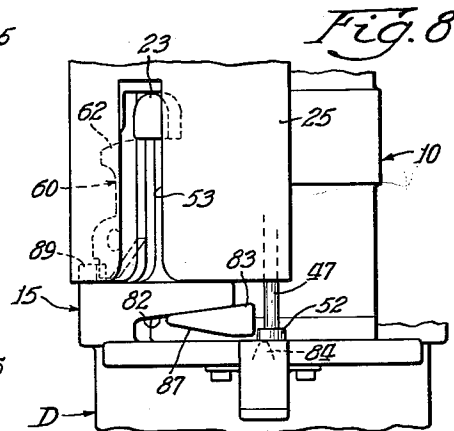
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DEVICE FOR REMOVING A MOTOR AND IMPELLER ASSEMBLY FROM A LIQUID BOOSTER PUMP ASSEMBLY MOUNTED WITHIN A LIQUID SUPPLY TANK

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2 Claims. (Cl. 29—240)

This invention relates to a tool for fastening and/or unfastening a first part from a second part and in particular to a tool adapted to fasten and/or unfasten a motor and impeller assembly from a pump scroll or shroud mounted within a fuel tank.

In aircraft, fuel booster pumps are normally mounted within a fuel tank located remote from the aircraft engines and are adapted to force a flow of fuel from within the fuel tank through the pumping means thereof, which increases the fluid pressure of the fuel, to an outlet line leading to another fuel pump mounted adjacent the particular engine which is to be supplied with the fuel. Since it is desirable to have the booster pump assembly mounted within the fuel tank where the inlet to the booster pump assembly is maintained at the lowest possible position within the fuel level of the tank, access means must be provided to the interior of the fuel tank when repairs or normal time inspections are to be made on the booster pump assembly. In normally constructed booster pumps the impeller assembly is usually formed integrally with the motor assembly forming a separate impeller and motor assembly or cartridge which is adapted to be telescopically received within a pump scroll or shroud assembly and fastened thereto by a plurality of bolts whereby the impeller portion of the assembly is suitably disposed within the pump scroll or shroud. The pump scroll or shroud is provided with the inlet and outlet means of the pump assembly. Since the impeller and motor assembly contain the majority of moving parts of the booster pump assembly and repairs are normally needed therefor rather than for the scroll, the pump scroll or shroud is mounted within the interior of the fuel tank and the cartridge or impeller and motor assembly is fastened thereto in such a manner that the impeller and motor assembly can be unfastened therefrom and removed for the necessary repairs and/or inspection. Another impeller and motor assembly is fastened to the pump scroll permitting use of the aircraft while the necessary repairs are being made on the replaced cartridge.

As previously stated, the cartridge or motor and impeller assembly is bolted to the pump scroll or shroud and when it becomes necessary to remove the motor and impeller assembly the fuel tank must be drained of fuel or at least have the liquid level thereof lowered below the bolt fastening means whereby the mechanic or workman will be able to see what he is doing when reaching through the access opening in the fuel tank to release the bolt fastening means. The access opening is either formed in the top of the fuel tank or in the side thereof. Obviously, if the access opening is formed in the side of the fuel tank, the fuel therein must be drawn off below the level of the opening. It can readily be seen that there are many disadvantages to this prior arrangement not only in the time involved in draining the liquid fuel from the fuel tank and storing same, but also in unfastening several bolts which are located in very awkward or hard to get at places.

Therefore, it is an object of this invention to provide a fluid pump assembly where the impeller and motor assembly is easily unfastened or fastened to the pump scroll assembly mounted within a liquid storage tank.

It is another object of this invention to provide a fluid

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pump assembly where the impeller and motor assembly is easily fastened to or unfastened from a pump scroll or shroud mounted within a liquid storage tank without emptying the liquid contained therein.

A further object of this invention is to provide a device or tool adapted to insert an impeller and motor assembly of a fluid pump within a fuel tank and fasten the assembly to a pump scroll or shroud mounted within the fuel tank.

It is still another object of this invention to provide a device or tool adapted to insert an impeller and motor assembly of a fluid pump within a fuel tank and fasten the assembly to a pump scroll or shroud mounted within the interior of the fuel tank without emptying the liquid contained therein.

Another object of this invention is to provide a device or tool adapted to unfasten an impeller and motor assembly of a fluid pump from a pump scroll or shroud mounted within a liquid storage tank and remove the assembly from the tank without emptying the liquid contained therein.

A further object of this invention is to provide a device or tool so constructed and arranged that a first part may be fastened to the tool and be released therefrom upon the predetermined placement of the first part relative to a second part whereby the first part is fastened to the second part.

It is still another object of this invention to provide a tool so constructed and arranged that the tool is adapted to be fastened to a first part attached to a second part and retained thereto by retaining means whereby the tool effects the releasing of the retaining means and the unfastening of the first part from the second part.

Another object of this invention is to provide a tool for fastening and unfastening an impeller and motor assembly of a booster pump, where the impeller and motor assembly has externally mounted tongue portions, from a pump scroll or shroud having grooved portions formed thereon which are adapted to receive the tongue portions and retain the tongue portions within the grooved portions by detent means whereby the tool is adapted, when it is desired to fasten the assembly to the pump scroll, to attach the impeller and motor assembly thereto by attaching means carried by the tool that releases the assembly upon the predetermined placement of the tongue portions within the grooved portions thereby permitting the detent means to retain the tongue portions within the grooved portions effecting suitable attachment of the motor and impeller assembly to the pump scroll; and is adapted, when it is desired to unfasten the assembly from the pump scroll, to release the detent means carried by the pump scroll and attach the impeller and motor assembly thereto by attaching means carried by said tool so that the tongue portions may be withdrawn from the grooved portions, thereby unfastening the motor and impeller assembly from the pump scroll.

Further and more particular objects, uses, and advantages of this invention will become apparent from a reading of the following detailed specification taken in connection with the accompanying drawings forming a part thereof and wherein:

FIGURE 1 illustrates a booster pump assembly according to this invention mounted within the interior of a fuel tank shown in fragmentary cross section thereof.

FIGURE 2 is a side view illustrating a device or tool adapted to fasten and unfasten the parts of the booster pump assembly illustrated in FIGURE 1.

FIGURE 3 is a top view of the tool illustrated in FIGURE 2.

FIGURE 4 is a side view of the tool illustrated in FIGURE 2 illustrating in particular the attaching means thereof.

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FIGURE 5 is a fragmentary and partially broken away view of FIGURE 4 showing the particular structure of the attaching means thereof.

FIGURE 6 illustrates the initial step in attaching an impeller and motor assembly to a pump scroll by means of the tool illustrated in FIGURES 2 through 5.

FIGURE 7 illustrates the final step in fastening the impeller and motor assembly to the pump scroll of FIGURE 6.

FIGURE 8 illustrates the unfastening of the impeller and motor assembly from the scroll by means of the tool depicted in FIGURES 2 through 5.

Reference is now made to the drawings wherein like reference numerals are used throughout to designate like parts, and particular reference is made to FIGURE 1 where there is disclosed a booster pump assembly according to this invention. The booster pump assembly, generally indicated by letter A, comprises a motor portion B, an impeller portion C, and a pump shroud or scroll portion D, the motor portion B and the impeller portion C being formed integrally to comprise a substantially cylindrical housing cartridge 10. The impeller and motor assembly or cartridge 10 is adapted to be detachably fastened to the pump scroll D in a manner hereinafter to be described.

The pump scroll or shroud D comprises a substantially hollow cylindrical portion 11 having an opening or inlet 12 at one end thereof and a hollow line or outlet pipe 13 connected substantially tangentially to the side of the cylindrical portion 11 thereby interconnecting the interior of the pump scroll D with the interior of the outlet pipe 13. The pump scroll D is provided with a plurality of outwardly extending flange portions 14 which are adapted to suitably mount attaching grooved members, generally indicated at 15, to be later described. The flanges 14 are also adapted to be utilized for mounting the pump scroll D in its desired position.

As shown in FIGURE 1, the pump scroll D is mounted inside a fuel tank 16 (only a portion of the tank being shown in cross section) by a plurality of studs or bolts 17 connected at one end thereof to the interior of the fuel tank 16 and at the other end thereof to the flanged portions 14 of the pump scroll D. It should be noted that the pump scroll D, as mounted, has the inlet 12 thereof spaced from the interior surface 18 of the fuel tank 16 thereby permitting fuel to flow into the inlet 12. The outlet pipe 13 is adapted to pass through a suitable bore (not shown) in the side of the fuel tank 16 and may be suitably fluid sealed therewith. The outer terminal end of the fuel pipe 13 may be threaded as at 19 to provide a coupling means for a fuel line leading to a fuel pump or other utilization device.

The impeller and motor assembly 10 is adapted to be telescopically received within the hollow pump scroll D and is limited to the extent of disposition therein by a flange portion 20 formed intermediate the ends of the cartridge 10 which abuts a complementary flange portion 21 formed on the pump scroll D. In this manner the impeller portion C is completely disposed within the interior of the pump scroll D. The cartridge or impeller and motor assembly is adapted to be fastened to the pump scroll D in a manner hereafter to be described.

As it is well known in the art to construct a pump or booster pump assembly which is adapted to be completely submerged within the liquid or fluid to be pumped thereby, the particular details of the operation and structure of the booster pump A need not be described. It is sufficient to merely state that the booster pump A has the motor portion B so formed as to be adapted to operate while submerged in fluid and is adapted to be suitably connected to an electrical power source (not shown) by the electrical lines indicated generally at 22.

Although the entire fuel tank structure 16 is not shown, there is, nevertheless, provided an access opening therein in any suitable portion thereof which is adapted to permit

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the passage of the cartridge assembly 10 therethrough in addition to the special tool device attached thereto later described. The access opening is provided with a suitable access plate cover to provide a sealed closure therefor. The preferred position of the access opening would be in the top of the fuel tank at a point substantially coaxial with the axis of the pump scroll.

The impeller and motor assembly 10 is provided with a pair of opposed abutment portions 23 intermediate the ends thereof disposed at a predetermined distance from the end 24 of the flange portion 20. These abutments 23 are so formed as to be complementary to the fastening and unfastening device or tool now to be described.

As shown in FIGURES 2 to 5, the fastening and unfastening tool, generally indicated by the letter E, comprises an attaching portion F, a handle or holding portion G, and a grasping and turning portion H. The attaching portion F comprises a pair of arcuately-shaped side members 25 connected at one end thereof to an end section 26 whereby the side sections 25 are maintained substantially parallel and spaced one from the other with the concave sides thereof facing each other. The side sections 25 and end section 26 may be formed of metal or any other material having properties suitable for this use. Further, the end section 26 and side sections 25 may be formed integrally, such as by casting, or in separate pieces and rigidly secured together as previously described.

The end section 26 is provided with an outwardly extending flange portion 27 at substantially the center of the end section 26 and is centrally bored and adapted to receive one end of the shaft or handle 28 which is retained therein by a pin or rivet 29 passing axially through the flange portion 27 and the handle 28. The other end of the handle 28 may be provided with the grasping or turning member H.

A cradle or telescoped member 30 is centrally bored at 31 and is adapted to be telescopically disposed about the handle 28. A helical spring 32 is disposed about the handle 28 and has one end thereof engaging the flange portion 27 of the end section 26 and the other end thereof engaging the telescoped member 30 whereby the spring 32 tends to maintain the telescoped member 30 spaced from the end section 26 at a predetermined distance against a stop member 33 suitably fastened to the handle 28. In this manner the telescoped member 30 is urged against the stop 33 by the spring 32 for a first position thereof. The telescoped member 30 is adapted to be movable relative to the handle 28 toward the end section 26 of the attaching means F in opposition to the force of spring 32. An outwardly extending flange portion 34 formed integrally with the telescoped member 30 is provided with a bore 35 adapted to house a latching pin 36 which passes through a counterbore 37 formed in the end 38 of the flange portion 34. The pin 36 is provided with an enlarged portion 39 intermediate the ends thereof which is disposed completely within the bore 35. A spring 40 is telescoped about the pin 36 within the bore 35 and has one end thereof engaging the enlarged portion 39 and the other end thereof abutting the end wall 41 of the bore 35 thereby tending to urge the pin 36 toward the handle 28. The handle 28 is provided with a counterbore or notch 42 at a predetermined point therein which is adapted to receive the end 43 of the pin 36 when the telescoped member 30 is moved a sufficient distance toward the end section 26 of the attaching portion F. In this manner when the telescoped member 30 is so positioned relative to the handle 28 in opposition to the spring 32, the end 43 of the pin 36 is urged into the counterbore 42 by the force of spring 35, thereby maintaining the telescoped member 30 in a second position thereof. If it is desired to return the telescoped member 30 against the stop 33, the end of the pin 36 is provided with a cross pin 44 which is adapted to be pulled to the right to retract the end 43 from the counterbore 42 and

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the spring 32 moves the telescoped member 30 from the second position to the first position thereof against the stop 33.

Each side section 25 is provided with a longitudinal bore 45 passing through the left portion thereof from the fixed ends thereof through the free ends 46 thereof. A shaft 47 is disposed within each bore 45 and has the upper end 48 thereof suitably threaded and adapted to pass through a bore 49 formed in one of the outer ends of the telescoped member 30 and be suitably fastened thereto by a retaining nut 50. As illustrated in the figures, the tool E is shown as having only two side sections 25 and, therefore, only two shafts 47, one for each side section 25. However, any number could be provided.

The free ends 51 of the shafts 47 are provided with an enlarged button portion 52 and are so formed that when the telescoped member 30 is in its first position against stop 33 the free ends 51 of the shafts 47 are substantially adjacent the free ends 46 of the side sections 25. When the telescoped member 30 is moved to its second position, shafts 47 are adapted to have the free ends 51 thereof project a predetermined distance beyond the free ends 46 of the side sections 25 depending upon the distance the telescoped member 30 is moved toward the end section 26. This position of the shafts 47 is shown in dotted lines in FIGURE 4.

Each side section 25 is provided with an elongated slot 53 at the free ends 46 thereof. The slots 53 have an opened end 54 adjacent the free ends 46 thereof and a closed portion 55 intermediate its ends.

Reference is now made to FIGURE 5 illustrating the particular attaching means adapted to cooperate with the slots 53 to provide an attaching means, the purpose of which will be later described. As shown, the side sections 25 are each provided with a cut out portion or chamber 56 which is substantially larger than the slot 53. In this manner the cut out portion 56 is overlapped by front and back portions, 57 and 58 respectively, of the side section 25 which portions define the slot 53. The free ends 46 of the side sections 25 are also provided with cut out portions 59 throughout the entire arcuate width thereof. The cut out portions 56 thereby provide chambers within the interior of the side sections 25. In each chamber or cut out portion 56 a pivotal latch member 60 is mounted on the overlapping back portion 58 and overlapping front portion 57 by means of a rivet or pin 61 passing therethrough in such a manner that the distance from the pivot 61 to the end 62 thereof is substantially greater than the distance from the pivot 61 to the other end 63 thereof. The end 62 of the latch member 60 is normally urged to the right, as viewed in the drawings, by means of a wire spring 64 coiled about a rivet or pin 65 having one end 66 thereof abutting against the side of the cut out portion 56 and the other end 67 thereof engaging the end 62 of the latch member 60.

The closed ends 55 of the slots 53 each have a bearing plate 68 fastened between the front and back portions 57 and 58 thereof by means of a screw 69 passing through a bore in the plate 68 and being suitably threaded into the side section 25 at 70, thereby closing off the chambers 56 at the closed ends 55 of the slots 53 from the ends 71 of the chambers 56. Each of the side sections 25 is provided with a second latch member 72 that is pivotally mounted to the front and back overlapping portions 57 and 58 by means of a pin or rivet 73 and has an elongated curved portion 74 disposed adjacent the sides of the slot 53. Each second latch member 72 is urged to the left by a wire spring 75 coiled about a rivet or pin 76 whereby the end 77 thereby abuts the edge of the chamber 56 and the other end 78 thereof engages the second latch member 72. It should be noted that the latch members 60 have the ends 62 thereof spaced from the bearing plates 68 and are normally exposed within the slots 53. The purpose for the attaching means in the

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side sections 25 comprising the slots 53 and latch members 60 and 72 will now be described.

Reference is now made to FIGURES 6 through 8 which illustrate the particular utilization of the tool E in combination with the booster pump assembly A previously described. The arcuate and spaced side sections 25 of the tool E are adapted to be telescoped about the cylindrical cartridge or impeller and motor assembly 10 whereby each opposed abutment 23 thereof is adapted to be telescoped by a respective slot 53 in the side sections 25 upon the telescoping of the tool E about the assembly 10. As the side sections 25 are passing over the cartridge 10, the abutments 23 thereof cam the latch members 72 and 60 against the urging of their respective springs to the right and left respectively, thereby permitting the abutments 23 to engage the bearing plates 68. Upon engagement of the plates 68 by the abutments 23, the latch members 60 are free to pass under the abutments 23 by moving to the right under action of the springs 64, thereby suitably attaching the cartridge 10 between the side sections 25. It should be noted that the telescoped member 30 is in its first position whereby the free ends 51 of the shafts 47 are substantially adjacent the free ends 46 of the side sections 25.

As shown in FIGURE 6, the cartridge 10 has been attached to the side sections 25 by means of the slots 53 and latch members 60. When it is desired that this cartridge 10 be fastened to a pump scroll D mounted within a fuel tank 16, the mechanic takes hold of the handle G at the grasping end H thereof and inserts the tool and attached cartridge 10 through the access opening in the fuel tank and lowers the cartridge 10 through the liquid contained therein, if present, into a position relative to the scroll as shown in FIGURE 6. It should be understood that by merely rotating the tool E and cartridge 10 relative to the pump scroll D, the particular positioning of the impeller and motor assembly 10 relative to the pump scroll D may be obtained without the necessity of visual inspection by the workman as the pump scroll D and cartridge 10 are so designed that the cartridge 10 will only assume the position illustrated in FIGURE 6 before the cartridge 10 may be fastened to the pump scroll D. If, in the initial telescoping of the cartridge 10 within, the pump scroll D assumes any other position than that illustrated in FIGURE 6, the workman, in rotating the tool E clockwise and subsequently its cartridge 10, causes the cartridge 10 to assume the position as in FIGURE 6, whether he realizes it or not, and further rotation of the cartridge 10 causes the cartridge 10 to become fastened to the pump scroll D in a manner to be described.

It may be desired to provide some guide means to assure that the cartridge 10 is being placed in the desired position relative to the scroll D, and such means are illustrated in FIGURE 1. A substantially cylindrical member 80 made of sheet metal or other suitable material is concentrically disposed about the pump scroll D permitting the passage of the tool E and cartridge 10 therethrough. The outer end 81 of the cylindrical guide member 80 may be flared outwardly to further facilitate its guiding purpose.

The grooved portions 15 of the scroll D generally referred to heretofore will now be described. The grooved portions 15 comprise an arcuately-shaped member, formed either integrally with the pump scroll D or separately and rigidly attached thereto at the outer edge of the flange portion 21 thereof, each having a substantially tapering horizontal slot 82 formed therein. These slots 82 are each adapted to complementarily receive an external tongue portion 83 formed on the exterior of the cartridge 10 at the flange portion 20 thereof. As shown in the drawings, only two grooved portions 15 are illustrated and therefore only two tongue portions 83 are illustrated.

As shown in FIGURE 6, when the cartridge 10 has

been placed within the pump scroll D, the free ends 46 of the side sections 25 of tool E are positioned just above the grooved portions 15, and the tongue portions 83 of the cartridge 10 are in a position where, upon clockwise rotation of the cartridge 10, the tongue members 83 are adapted to be received in the grooves 82. The flange portion 21 of the pump scroll D is provided with a plurality of detent means each of which comprises a bullet-shaped pin 84 disposed in a bore 85 formed in the flange portion 21 and is adapted to project above the flange portion 21 at a point adjacent the opening of the slot 82 by means of a spring 86 acting against the pin 84. The spring 86 is disposed within the bore 85 formed within the flange portion 21 of the pump scroll D and engages the pin 84 at one end thereof and engages the bottom of the bore 85 at the other end thereof. The detent pin 84 is adapted to be telescopically received within the bore 86 when sufficient force is applied at the projecting end thereof overcoming the opposition force of the spring 85.

The tongue portions 83 are so formed that they have tapering side portions 87 at the forward end 88 thereof which provide camming surfaces on the tongue portions 83. In this manner when the cartridge 10 is placed in the position as shown in FIGURE 6 and upon clockwise rotation thereof to the position shown in FIGURE 7, the camming portions 87 of the tongue portions 83 cam the detent pins 84 into their respective bores 85 so that the tongue portions 83 may enter and substantially fill the respective grooves 82 of the grooved portions 15 of the pump scroll D.

Arcuate actuating members 89 are suitably positioned and fastened to the grooved portions 15 on the upper sides thereof. Upon clockwise rotation of the tool E, from the FIGURE 6 position to the FIGURE 7 position, the actuating members 89 are adapted to enter the cut out portions 59 of the side sections 25 and abut against the ends 63 of the latch members 60, thereby causing the latch members 60 to rotate about the pivots 61 to the left moving the latching ends 62 from under the abutments 23 of the cartridge 10. In this manner the tool E is adapted to be released from the cartridge 10, untelescoped therefrom, and removed from the fuel tank 16. The impeller and motor assembly 10 is thus securely fastened to the pump scroll D by the pins 84 which now project above the flange portion 21 and retain the tongue portions 83 of the cartridge 10 in the grooves 82 of the grooved portion 15 of the pump scroll D.

When it is desired to remove the cartridge 10, fastened to the pump scroll D in the above described manner, the mechanic or workman moves the telescoped member 30 to its second position, and the latching pin 43 retains the telescoped member in this second position in the manner previously described whereby the free ends 51 of the shafts 45 are extended and project a predetermined distance from the free ends 46 of the side members 25. The tool E is inserted within the fuel tank 16 and, as shown in FIGURE 8, the attaching portion F of the tool E is telescoped about the fastened cartridge 10. If the slots 53 in the side sections 25 are not in alignment with the abutments 23 of the cartridge 10 in the initial telescoping of the tool E about the cartridge 10, the workman in rotating the tool E causes the slots 53 to come into that alignment. This alignment condition, obviously, does not require visual inspection by the workman nor any particular skill thereof as the workman, in the unfastening of the cartridge 10 from the pump scroll D, must rotate the tool counterclockwise anyhow. The abutments 23, being telescoped by the grooves 53 formed in the side sections 25, cam the latch members 60 to the left and the latch members 60 are retained in the left position by the actuating members 89 when the attaching portion F of the tool E is in its fully telescoped position as shown in FIGURE 8. In this fully telescoped position, the button portions 52 of the shafts 45 are in such a position that the detent pins 84 are telescoped

within the bores 85 of the pump scroll D whereby the tongue portions 83 of the cartridge may be withdrawn from the grooves 82 of the grooved portions 15 of the scroll D upon counterclockwise rotation of the tool E and cartridge 10. As the tool E and cartridge 10 are rotated counterclockwise, the latch members 60 are permitted to be pivoted to the right under urging of springs 64 as the ends 63 thereof become disengaged from the actuating members 89. The end portions 62 of the latch members 60 moving to the right suitably retain the abutments 23 within the slots 53. When the cartridge 10 has been sufficiently rotated counterclockwise so that the tongue portions 83 are completely withdrawn from the grooves 82, the cartridge 10 may be withdrawn from the fuel tank.

As can be seen from the above description, there has been disclosed a tool that permits relatively easy fastening and unfastening of a motor and impeller assembly to or from a pump scroll, where the scroll is mounted within a fuel tank, without requiring the lowering of the liquid level contained therein to permit observation thereof by the person desiring to fasten or unfasten the assembly.

Further, this invention provides a unique arrangement whereby a motor and impeller assembly is adapted to be fastened and unfastened to a scroll with a minimum of time and effort.

While reference has been made to right and left positions, clockwise and counterclockwise rotation, and upper and lower positions of the various parts of this invention, it is to be understood that this is only for the purpose of facilitating an understanding of the specific embodiments illustrated in the drawings and referred to in the above detailed description and is not intended to provide any limitations to this invention.

Further, while this invention has been described in connection with certain specific embodiments thereof, it is to be understood that this is by way of illustration and not by way of limitation, and the scope of this invention is defined solely by the appended claims which should be construed as broadly as the prior art will permit.

What is claimed is:

1. A tool for removing a pump unit from the bottom of a fuel tank wherein said tank has an opening in the top thereof substantially coaxial with said pump for providing access to said pump, and wherein said pump has a plurality of circumferentially spaced projections thereon, and wherein said pump is attached to a base portion fixedly attached to the bottom of said fuel tank, and further wherein said base portion has at least one groove and said pump has at least one corresponding tongue for rotatable engagement with said groove, and wherein detent means is provided locking said tongue in said groove to thereby lock said pump to said portion, said tool comprising rotatable grappling means having spaced side sections and an end section connecting said side sections at one end thereof to form a pump receiving recess therein, slots in each of said side sections receiving the circumferentially spaced projections of said pump, and detent means carried by each of said side sections and associated with said slots for retaining said projections and said pump in the recess of said grappling means.

2. A tool for removing a pump unit from the bottom of a fuel tank wherein said tank has an opening in the top thereof substantially coaxial with said pump for providing access to said pump, and wherein said pump has a plurality of circumferentially spaced projections thereon, and wherein said pump is attached to a base portion fixedly attached to the bottom of said fuel tank, and further wherein said base portion has at least one groove and said pump has at least one corresponding tongue for rotatable engagement with said groove, and wherein detent means is provided locking said tongue in

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said groove to thereby lock said pump to said base portion, said tool comprising an attaching member having spaced side sections and an end section connecting said side sections at one end thereof to form a pump receiving recess therein, a handle connected to said end section, a telescoped member disposed about said handle and movable relative thereto, resilient means disposed between said end section and said telescoped member, means defining a longitudinal bore in each of said side sections, a shaft disposed in each of said bores, each of said shafts having one end thereof connected to said telescoped member and having a free end thereof adjacent the free end of said side section said resilient means tending to maintain said telescoped member and said shafts in a first position wherein said shafts do not extend beyond the free end of said side sections, slots carried by the side sections of said tool for engaging the spaced projections on said pump, latching means as-

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sociated with said telescoped member and adapted to set said shaft in a second position whereby the ends of said shaft extend beyond the free ends of said side sections so that the detent means may be depressed by the end of said shaft to permit withdrawal of the tongue from the groove by rotation of said handle.

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