Sept. 29, 1931. J. W. HARVEY 1,824,887

MOTOR BOAT INSTALLATION

Filed Sept. 23, 1930 2 Sheets-Sheet 1

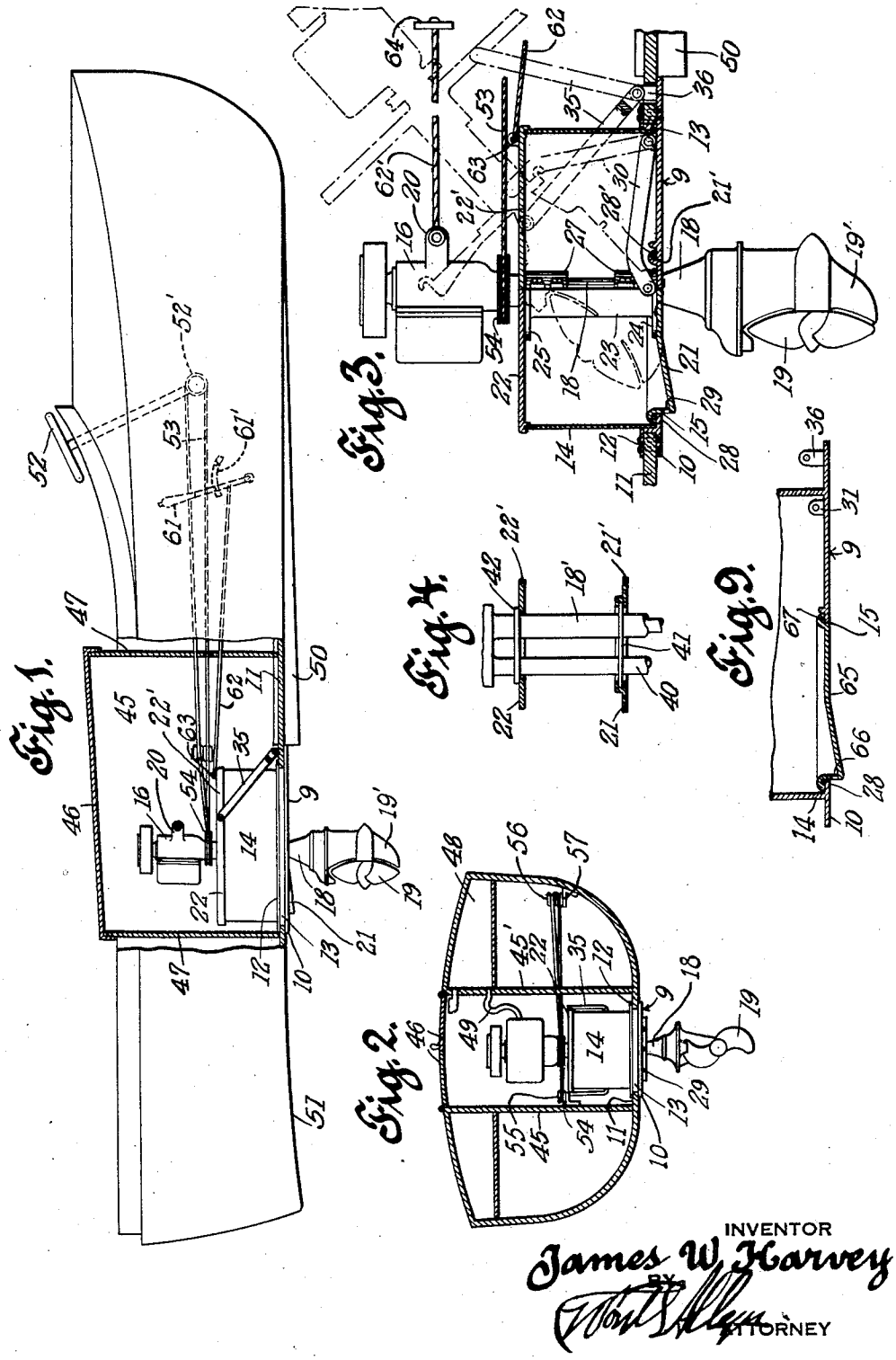


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 9.

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Fig. 5.

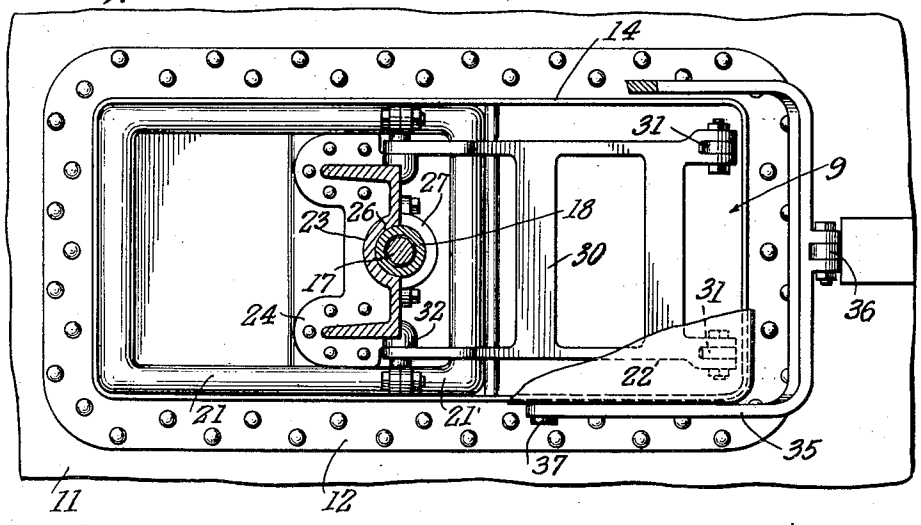


Fig. 6.

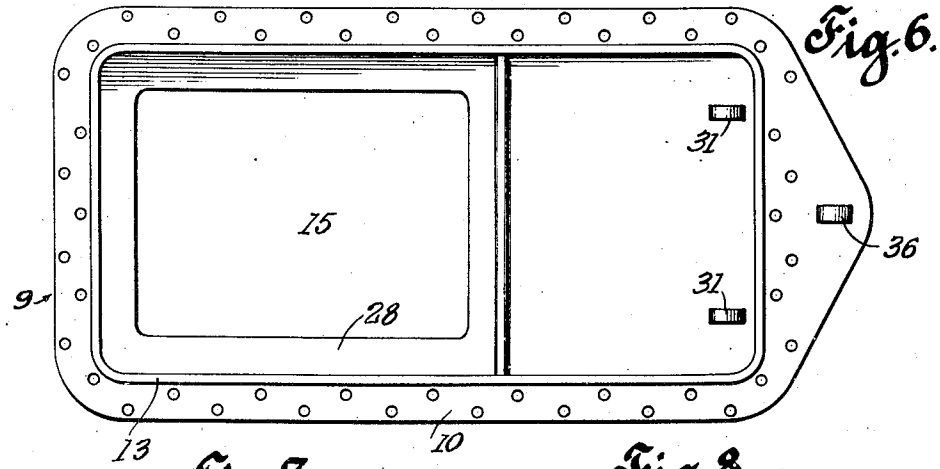


Fig. 7.

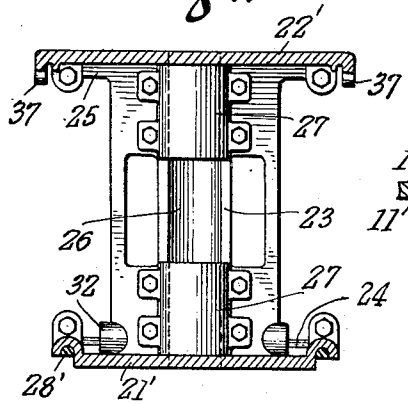
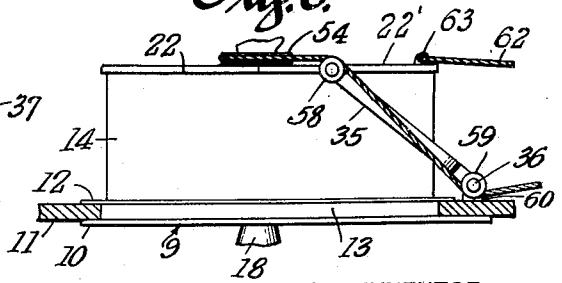


Fig. 8.



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UNITED STATES PATENT OFFICE

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MOTOR BOAT INSTALLATION

Application filed September 23, 1930. Serial No. 483,780.

My invention relates to improvements intended to adapt the use of what are commonly termed outboard motors in a more effective and stable manner and constituting improvements in the invention of my Patent #1,786,997 dated December 30, 1930. One object is to provide a simpler and less expensive method of mounting the motor in a boat. Another object is to provide a convenient method of support so that the propeller can be readily withdrawn from the water. Another object is to provide a construction in which the propeller is conveniently arranged for inspection and replacement when desired. Another object is to provide a strong and durable installation. Another object is to provide means for furnishing a greater supply of fuel than is customary with outboard motors. Another object is to provide for convenient manipulation of the motor for steering purposes without interfering with the retraction of the propeller. Another object is to provide a more suitable and effective method of propelling a boat by means of an outboard motor.

In carrying out the invention I provide a casing of special form which is secured in the bottom of the boat at a point aft of the center of the boat and considerably forward of the stern. This casing is open at the top and bottom for the introduction and removal of the motor and propeller unit. A special frame is provided for the motor which is secured to the main shaft housing. This frame is provided with bottom and top plates adapted to close the bottom and top openings in the casing. The motor is connected to the casing by two hinged arms so that when the motor rises it automatically swings on these arms into an inclined position.

A lever and cable may be provided for tilting the motor and frame so as to raise the propeller above the bottom of the boat. A steering wheel may be provided and connected to the motor by flexible cables so as to rotate the motor housing and propeller shaft for steering without interfering with the raising of the motor and propeller. By providing a keel forward of the casing and leaving the bottom of the boat practically free aft of the casing, it is possible to turn the boat quickly and still maintain stability. In some boat constructions it may be desirable to house the motor and casing and provide a stationary fuel supply in the boat connected by flexible conduit or pipe to the motor.

Fig. 1 is a side view and partial section showing one form of the construction embodying my invention with the motor unit in place.

Fig. 2 is a transverse sectional view of the same.

Fig. 3 is a longitudinal sectional view of the motor unit and casing on a larger scale.

Fig. 4 is a fragmentary sectional view showing a modification.

Fig. 5 is a plan view and partial section of the motor installation showing a fragment of the bottom of the boat.

Fig. 6 is a plan view of the bottom member or bed of the casing.

Fig. 7 is a transverse sectional view of the motor frame.

Fig. 8 is a side view of steering means.

Fig. 9 is a sectional view of a supplemental closure plate for the bottom opening.

The casing includes a bottom member or bed plate 9 which may be formed of a metal casting and provided with a bottom flange 10 adapted to be secured by screws or rivets to the bottom of the boat 11. Plates or strips 12 are mounted inside the boat and secured to the bottom flange 10 for fastening the base of the casing securely in place. This bottom member has a flange 13 which projects upwardly through an opening formed in the bottom of the boat and to this flange is secured a side wall 14 which may be cast integrally with the bed plate or formed of comparatively light sheet metal secured to it by a water tight joint.

The bottom of the bed plate 10 is provided with an opening 15 for the propeller and its housing.

The motor 16 may be of any suitable type having a vertical shaft 17 supported in a housing 18 and geared to a propeller 19 at its lower end in the customary manner. This motor unit can be of any suitable type, but preferably the housing carries the cooling

water and exhaust gases as is customary in certain types of motors. The motor may be provided with a handle 20 by which it may be grasped for rotating it for steering as is customary with certain types of motors.

The motor is supported in the casing by means of a framework consisting of a bottom plate 21, a top plate 22 and a post 23. The post is preferably in the form of a channel and provided with flanges such as 24 and 25 for securing it to the bottom and top plates respectively.

The post 23 is provided on the front face with a bearing 26 for the housing 18 of the motor shaft which is secured in place by a number of detachable caps 27—27. The bottom and top plates are also preferably divided or made in two parts 21 and 21′ and 22 and 22′ bolted together along the plane of the front edge of the bearing post 23 so as to permit assembly and removal of the motor unit in the frame.

The bottom plates 21 and 21′ are adapted to be supported on a flange 28 in the bottom member 9 of the casing, and to obtain a fairly tight joint I provide a gasket 28′ in the bottom plate. To permit the water to be drawn from the casing I provide one or more openings 29 in that part of the bottom plate which is below the flange 10 of the bed of the casing.

The top plates 22 and 22′ may be flanged over the upper edge of the wall 14 of the casing to give greater stability and security and it will be seen that the motor and the attached frame can be readily inserted into and removed from the casing and that the motor can be readily detached from the frame by simply dividing the bottom and top plates and removing the bearing caps 27—27.

I prefer also to provide for the tilting of the motor and its housing either automatically when the propeller housing strikes an obstruction or by hand and for this purpose provide a plate or arm 30 which is hinged at the front to two lugs 31 which project upwardly within the casing and may be integral with the base or bed of the casing.

The rear end of this arm is divided into two parts which are hinged to lugs 32 on opposite sides of the bearing post 23 of the motor supporting frame, so that when the motor is raised the propeller housing and shaft are obliged to rise and swing about the axis of the lugs 31.

I also prefer to provide other means for guiding the movement of the motor frame so as to tilt it as it is withdrawn. A simple means for accomplishing this includes another swinging arm 35 for guiding the motor frame. This arm may for convenience be provided with a single branch at its front end hinged to the lug 36 which projects upwardly through the keelson of the boat. The other end of the arm is divided and hinged at 37 to the opposite edges of the top plate 22′ of the motor supporting frame. This arrangement of the two arms acts as a modified parallel motion so that when the motor is raised it simultaneously tilts or inclines so as to maintain the parts in balance and permit access to the propeller and its housing and at the same time maintain a compact relation to the body.

These two arms 30 and 35 may be made of either cast or wrought metal and detachably hinged so as to permit removal of the motor frame when desired.

In the modification shown in Fig. 4, the motor exhaust is carried out through a pipe 40. This pipe together with the engine shaft housing 18′ is mounted in a rotatable disc 41 which is supported in the bottom members 21 and 21′. A similar disc 42 may be rotatably supported at the top members 22 and 22′ for supporting the upper part of the motor. This permits the exhaust from the motor to be carried down through a separate conduit or discharge pipe without interfering with the rotation of the motor for the purpose of steering in the usual manner.

In larger boats it is sometimes desirable to enclose the motor and casing in a special compartment such for instance, as shown in Figs. 1 and 2 where side walls 45 and 45′ protect the motor laterally and the hinged cover or hatches 46 enclose the motor at the top and suitable bulk heads 47 may be employed fore and aft.

Outboard motors as a rule are provided with fuel tanks attached to the motor housing and such tanks are of small capacity. I propose therefore to employ a stationary tank 48 which may be mounted alongside of the motor and connected to it by a flexible pipe 49. The motor is thus provided with much greater travelling radius without encumbering the motor itself or interfering with its rising or tilting action.

I have found that the stability of a boat may be greatly increased particularly in turning movements by providing a keel 50 immediately forward of the motor casing and leaving the stern at 51 substantially free of any keel.

The result is that when the propeller is turned on a vertical axis for the purpose of steering, a side thrust is provided which swings the stern in one direction while the fore part of the boat is held from side-slip by the keel 50. The boat thus banks naturally and takes the turn without danger of upsetting the boat even at high speeds.

For the purpose of steering I provide a wheel 52, a sprocket 52′ geared to it and a flexible cable 53 connected to the drum or pulley 54 on the engine shaft housing so that the motor or housing can be turned from side to side by simply rotating the steering wheel 52.

For this purpose the cable may be guided

by a pulley or guide 55 secured to the wall 45 and by the pulleys or guides 56 and 57 secured to the opposite side of the boat. The cable is wound around the drum 54 and crossed in front of the drum to the pulleys 55 and 56 and from pulley 55 back to pulley 57 and from pulleys 56 and 57 forwardly to the sprocket 52'.

It will be seen that this cable and drum connection is so arranged that it does not interfere with the rising of the propeller and motor.

In the arrangement of steering means shown in Fig. 8 the cable 53 is carried forward on both sides of the drum 54 to guide pulleys 58 mounted on the outside of the casing cover 22' with their centers in line with the hinges 37 of the arm 35. Passing over and downward from these pulleys the cable 53 is led under and forward around another pair of guide pulleys 59 mounted on bearing supports 60 on the bed of the casing or on the bottom of the boat in line with the hinge pin 36 of the arm 35 and spaced apart so that the cable 53 will not chafe on the arms. From these pulleys the cable leads to the steering wheel 52 in the usual manner. With this arrangement it will be seen that the rising and tilting of the motor, housing, top and bottom plates may be effected without slackening the steering cable and the latter will remain in position about the drum 54 insuring positive steering control immediately upon the return of the motor to normal running position.

For lifting the propeller I provide suitable means for applying a forward pull on the motor, for instance, I may provide a lever 61 connected by a cable 62 to a suitable fastening 63 on the top plate of the motor frame so that by throwing the upper end of the lever 61 forwardly the motor and its frame can be tilted to lift the propeller above the bottom of the boat. It will be seen that this action does not interfere with the steering actions above described. A ratchet 61' may be employed to hold the motor in the retracted position.

The motor may also be tilted by pulling forwardly on the handle 20 or by a cord or cable 62' (see Fig. 3) extended forwardly to a convenient point for that purpose and provided with a pull handle 64.

For maximum stability and ease in handling, I have found that the motor casing should be located in the rear of the center of the boat. The bottom of the boat at this point may be somewhat hollowed out fore and aft so that the bottom of the motor casing is somewhat above the main plane of the bottom of the boat. The propeller is preferably located in a plane which is approximately 1/3 the water line length of the boat forward of the stern of the boat.

This location may be varied somewhat and still maintain stability and ease of manipulation but the propeller should preferably be not more than 4/10 nor less than 2/10 the water line length forward of the stern for best effects.

A supplementary bottom plate such as 65 shown in Fig. 9 may be employed to close the opening 15 when the propeller is retracted. This plate may be imperforate or provided with drain openings 66 as desired, and may also be provided with a gasket 67.

The motor may be retracted and the supplementary bottom plate inserted in the bottom opening 15 so that the bottom of the craft presents a smooth surface in contact with the water, avoiding the resistance which would be caused by an opening in the bottom. This bottom plate may be held in place by any suitable means, as for instance by lowering the propeller guard 19' of the retracted motor unit upon it so that it serves as a convenient support for the motor.

The general construction disclosed in this invention is applicable to various types and sizes of craft using suitably proportioned removable motor units of the vertically mounted type commonly used. Heretofore it has been practically impossible to mount these units in boats not having square sterns. This invention provides a location for motors forward of the stern so that they can be mounted in boats with rounded or pointed sterns, such as canoes. Where current or depth conditions make it necessary to use poles or paddles to propel and steer a boat, maximum facility of control is afforded when the force of the stern pole or paddle is exerted close to the center line of the boat and can best be done when the stern is narrow or sharp. Therefore this invention can be used in craft unsuited to the ordinary outboard motor.

It should be understood that various other modifications may be made in details of construction and arrangement without departing from the spirit and scope of my invention as shown in the appended claims.

I claim:

1. A motor installation including a casing open at the top and bottom, a motor frame and two arms hinged to the lower part of the casing and to the upper and lower parts respectively of the frame.

2. A motor installation comprising a casing having a lower plate with an opening for a motor propeller, a supporting frame having a plate serving to close said opening, an arm hinged within the casing and connected to the lower part of said frame, and a second arm hinged outside of said casing and connected to an upper part of said frame.

3. A motor boat installation comprising a casing open at the top and bottom, a motor frame mounted in the casing and including a shaft and propeller housing movable in said casing and a forked arm having a central

stem hinged forward of the bottom of the casing and having side arms hinged to the sides of the motor frame above the casing.

4. A motor installation including a casing having opening in the top and bottom, a movable motor frame having top and bottom plates adapted respectively to said openings, a rigid post connecting said top and bottom plates and means for detachably clamping a shaft housing to said post.

5. A motor installation comprising a casing open at the top and bottom, a motor frame having a bottom plate and an upright post said plate being divided into two parts, means for detachably securing the parts together, bearings carried by said parts and a motor shaft housing rotatable in said bearings.

6. A motor boat installation comprising a cast metal bottom member having a main outer flange for attachment to the bottom of a boat and having a vertical flange, a sheet metal wall secured to said vertical flange, said bottom member having an opening surrounded by an inner flange, a motor frame having a bottom plate adapted to fit the inner flange, said bottom member having a hinge lug and an arm hinged to said lug and hinged to said motor frame to permit the motor frame to swing about said lug.

7. In a boat, a casing having a bottom horizontal opening substantially flush with the bottom of the boat and a top horizontal opening above the load water line level, a tilting frame having a closure for said opening, a power unit mounted in said casing carried by said frame and movable therewith, hinged arms within said casing coacting with said frame and power unit to move in an arc about a transverse axis within said casing forward of said power unit and hinged arms outside of said casing coacting with said frame and power unit to move in an arc about a transverse axis outside and forward of said casing.

8. A motor boat construction comprising a boat, a casing secured to the bottom of the boat and having an opening in the bottom in rear of the center of the boat, a keel extending forwardly from the casing and of greater depth than any substantial part of the boat aft the casing, a motor frame movably supported in the casing and including a bottom plate removably closing the opening in the bottom of the casing, a vertical shaft housing carried by the bottom plate and rotatable therein, and a propeller geared to the shaft and carried by the housing and located at distance approximately one third the water line length forward of the stern of the boat.

9. A motor boat installation comprising a stationary casing supported in the boat forward of the stern and open at the top and bottom, a motor unit and frame movably mounted in the casing and including a vertical shaft housing having a propeller at its lower end movable vertically through the opening in the bottom of the casing at the same time that the motor is movable in the upper part of the casing, a bottom plate for closing the opening in the bottom of the casing, a stationary fuel tank mounted in the boat and a flexible feed pipe connecting said tank with said motor.

10. A motor boat installation comprising a stationary casing open at the top and bottom, a motor unit including a propeller movable into and out of said casing and rotatable for the purpose of steering, a bottom plate for closing the bottom of the casing and flexible cables connected to said motor unit for steering, said connections being located so as to permit raising the propeller into the casing without disconnecting the cables.

11. A motor boat installation comprising a casing open at the top and bottom, a motor frame movably mounted in said casing and including a bottom plate closing the bottom opening in the casing and an upper member, a motor and propeller unit including a shaft housing rotatably supported by said frame, an arm hinged to said casing and to said frame to permit the frame to be raised to bring the propeller within the casing, additional means for guiding another part of the motor frame constructed and arranged to permit the propeller housing to tilt as it is raised and a flexible cable connected to the frame for lifting the frame and motor without interfering with the turning of the propeller housing.

12. A motor boat installation comprising a casing having a bottom wall and upwardly projecting side walls, the bottom wall having an opening in the rear end with a surrounding seat and closed at the front end, a motor frame having a bottom plate provided with a resilient gasket fitted to rest on said seat and to close said opening and a post secured to and projecting upwardly from the bottom plate, a motor unit having a vertical propeller shaft housing supported in said post, and having a propeller beneath the bottom plate, an arm within the casing having its front end hinged to an inner wall of said casing near the bottom and having its rear end connected to said frame to permit the propeller shaft housing to tilt and retract the propeller into the casing as the upper end of the motor unit swings forwardly.

13. A motor installation comprising a casing open at the top and bottom, a motor frame having a bottom plate adapted to fit said bottom opening and two arms hinged to said casing and hinged to said motor frame at different elevations to permit the motor frame to rise vertically and then tilt, the upper arm being hinged to the casing forwardly of the lower arm.

14. A motor installation comprising a casing open at the top and bottom, a motor frame

having a bottom plate adapted to fit said bottom opening and two arms hinged to said casing and hinged to said motor frame at different elevations to permit the motor frame to rise vertically and then tilt, the upper arm being hinged to the casing and to the frame forwardly of the lower arm.

JAMES W. HARVEY.