Nov. 22, 1932. M. FERNANDEZ Y FERNANDEZ 1,888,262

LIQUID DISPENSING SYSTEM

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Fig. 1.

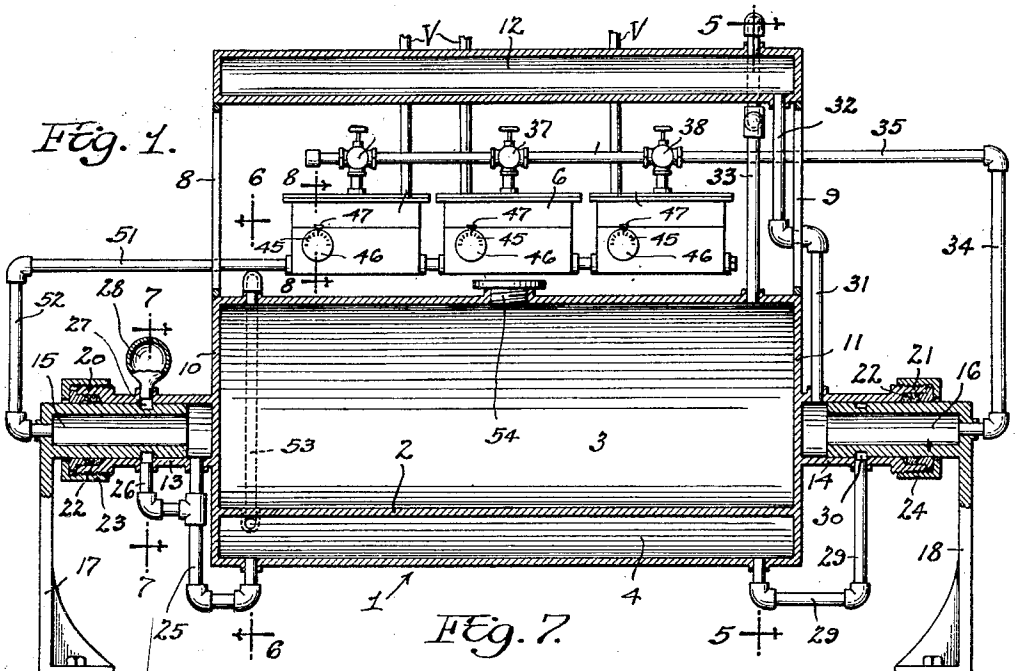
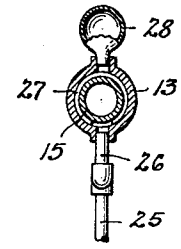


Fig. 7.



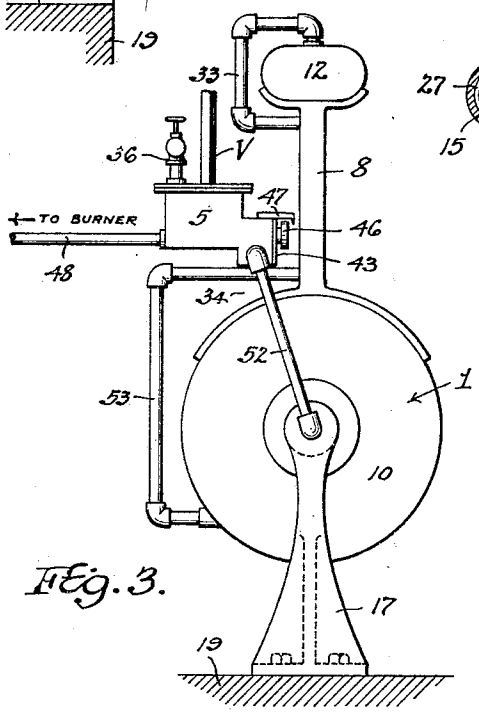


Fig. 3.

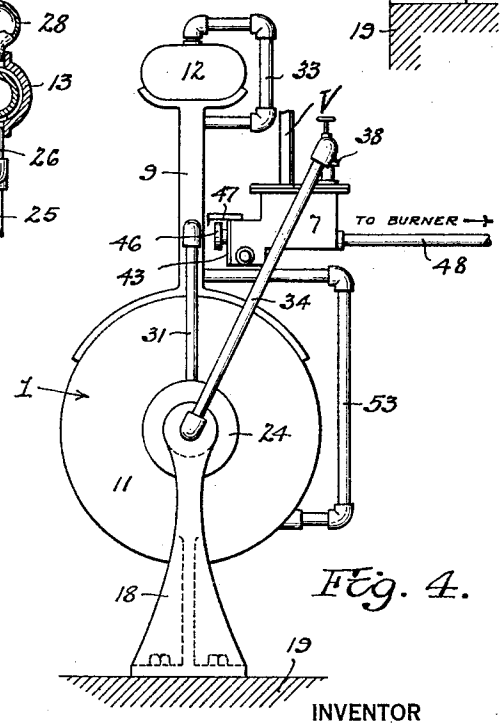


Fig. 4.

INVENTOR

MANUEL FERNANDEZ Y FERNANDEZ

BY

Mason Fenwick & Lawrence

ATTORNEYS

Nov. 22, 1932. M. FERNANDEZ Y FERNANDEZ 1,888,262

LIQUID DISPENSING SYSTEM

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Fig. 2.

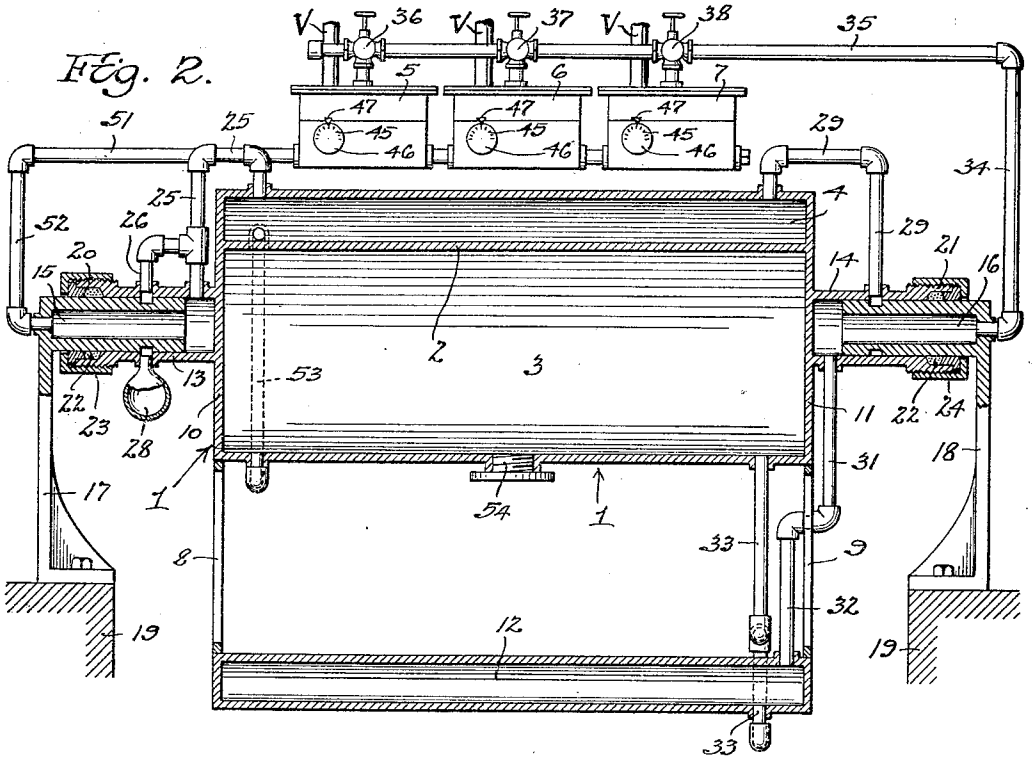


Fig. 6.

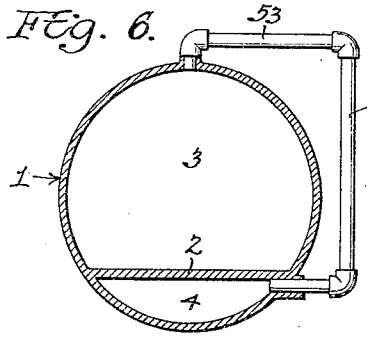


Fig. 8.

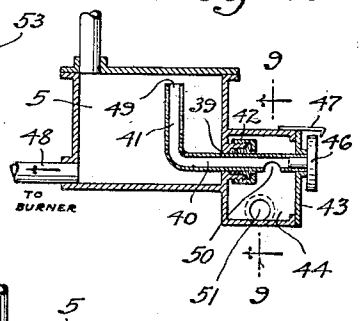


Fig. 5.

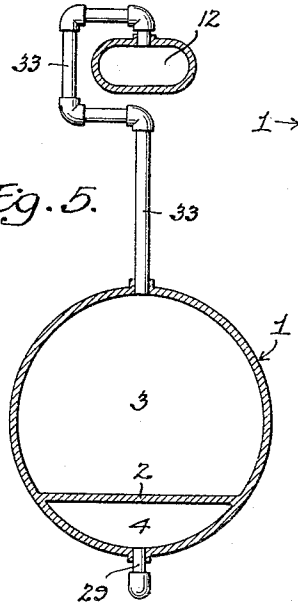
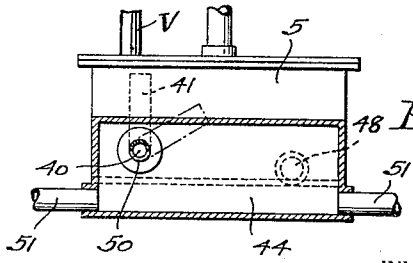


Fig. 9.



INVENTOR

MANUEL FERNANDEZ Y FERNANDEZ

BY

Mason Fenwick & Lawrence

ATTORNEYS

Patented Nov. 22, 1932 1,888,262

UNITED STATES PATENT OFFICE

MANUEL FERNANDEZ Y FERNANDEZ, OF NEW ORLEANS, LOUISIANA

LIQUID DISPENSING SYSTEM

Application filed June 12, 1931. Serial No. 543,951.

This invention relates to apparatus for feeding fuel from a main supply tank to one or more auxiliary reservoirs adapted to control the supply of fuel in measured quantities to one or more fuel burners.

The main object of the invention is to provide one or more of these auxiliary tanks with means whereby the quantity of fuel to be fed to a fuel burner may be minutely regulated so that for a given rate of consumption of fuel each burner will operate during a predetermined period of time.

Another object of the invention is to provide apparatus in which the auxiliary tanks for feeding fuel to fuel burners may be filled from the main supply tank pivotally mounted, either at the same level as the auxiliary tanks or below the auxiliary tanks, without necessitating the use of pumps or similar mechanism for forcing fuel from the main tank by pressure. This construction also avoids the necessity of mounting the main tank above the auxiliary tank in order to provide a hydrostatic head for feeding fuel to the said auxiliary tanks.

A further object of the invention is to provide the fuel burner auxiliary tanks with overflow conduits designed to return excess fuel from the auxiliary tanks to the main supply tank and to avoid the loss of fuel through leakage.

Other objects of the invention will become apparent as the description thereof proceeds.

In the drawings:

Figure 1 is a central longitudinal cross section through the main fuel supply tanks of the apparatus, the auxiliary tanks for supplying measured quantities of fuel to the fuel burners being shown in elevation;

Figure 2 is a section similar to Figure 1 but with the parts of the fuel supply mechanism shown in a different operative position;

Figure 3 is an end elevation of the apparatus looking from the right hand end of Figure 1;

Figure 4 is an end elevation of the apparatus looking from the left hand end of Figure 1;

Figure 5 is a vertical transverse section on the line 5—5 of Figure 1;

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

Figure 7 is a vertical transverse section on the line 7—7 of Figure 1;

Figure 8 is a vertical transverse section on the line 8—8 of Figure 1; and

Figure 9 is a transverse section on the line 9—9 of Figure 8.

As shown in the drawings, the apparatus comprises a main storage tank 1 divided by a partition 2 into compartments 3 and 4, the compartment 3 being the main supply tank and the compartment 4 forming a sump designed to receive excess fuel returned from the auxiliary tanks 5, 6 and 7 after certain overflow pipes have been adjusted in said auxiliary tanks to predetermine the quantity of fuel to be fed to fuel burners, as hereinafter described. Suitable vents V are connected to the tanks 5, 6 and 7.

The main tank 1 has a pair of standards 8 and 9 secured to the periphery thereof adjacent the ends 10 and 11, respectively, of the said tank. These standards 8 and 9 support a conveyor tube 12 at the upper ends thereof, and this tube is supported on the standards 8 and 9 diametrically opposite the sump 4.

A pair of bearing sleeves 13 and 14 extend from the opposite ends 10 and 11 of the tank 1 and are rotatably mounted on hollow bearing members 15 and 16, respectively, which extend laterally toward each other from the upper ends of standards 17 and 18 suitably supported on foundations 19. Bearing sleeves 13 and 14 terminate in externally screwthreaded enlargements 20 and 21, each of which is countersunk to receive packing 22 to be compressed by the screwthreaded caps 23 and 24 which are rotatably mounted on the hollow bearing members 15 and 16. These caps and packing constitute glands to prevent leakage of fuel from the apparatus. The sleeves 13 and 14 are arranged at the center of gravity of the tank 1 and the conveyor tube 12 connected thereto, in order that the whole tank structure may be rotated on its bearing with very slight effort. The sleeve 13 is provided with an aperture near the end 10 of the tank 1 and a pipe 25 extends from this aperture to the lower part of the sump

4. An elbow 26 connects the pipe 25 through a suitable aperture formed in the sleeve 13 to an annular groove 27 formed in the bearing member 15. A small cup 28 is secured to the sleeve 13 and communicates with the interior of said sleeve at a point diametrically opposite to the connection of the pipes 25 and 26 with the said sleeve.

At the other end of the tank, piping 29 connects the lower part of the sump 4 with the sleeve 14; and the connection between the piping 29 and the sleeve 14 is arranged in alinement with an annular groove 30 formed in the bearing member 16 in order to conduct any liquid leaking through the bearings back to the sump 4. At a point opposite both the connecting pipe 29 and bearing sleeve 14, there is connected a pipe 31 which is, in turn, connected by pipe 32 and suitable elbow connections to the lower part of the conveyor tube 12, as shown in Figure 1 of the drawings.

The upper part of the conveyor tube 12, as shown in Figures 1 and 5, is connected by piping 33 to the upper part of the main supply tank 3 in order to feed fuel therefrom to the conveyor tube 12 when the apparatus is inverted, as shown in Figure 2 of the drawings.

When the conveyor tube 12 is filled and is in the position shown in Figure 1, fuel flows therefrom through the pipes 32 and 31, the hollow bearing member 16 and through piping 34 to a pipe 35 which extends over the tops of the auxiliary tanks 5, 6 and 7 and communicates therewith through the valves 36, 37 and 38, respectively. Each of the auxiliary tanks 5, 6 and 7 is provided with means for regulating the quantity of fuel retained therein in order to feed the contents thereof to their respective fuel burners. Since all three of these auxiliary tanks are identical in construction it will be sufficient to describe the structural details of only one of them.

As shown in Figures 8 and 9, the tank 5 is provided with an aperture 39 in which is rotatably mounted an elbow pipe 40 having an overflow branch 41 extending at right angles to the axis of rotation of the pipe 40. The pipe 40 extends through a packing gland 42 and through a removable front plate 43 forming a closure for a fuel return chamber 44. The upper part of the chamber 44 has an indicator 47 secured thereto and extending over the periphery of a hand wheel 46 provided with graduations 45, calibrated to indicate the time during which the fuel in the tank 5 will last as supplied through a pipe 48 to a fuel burner. Of course, the scale 45 may be calibrated in terms of volume in the tank 5; but this is immaterial since the scale may be calibrated either way as desired. The contents of the auxiliary tank 5 is determined, of course, by rotating the handle 46 in order to vary the position of the mouth 49 of the overflow pipe 41 relative to the base of the tank 5.

When the tank 5 is filled from the conveyor tube 12, and the overflow pipe 41 is adjusted to any desired position indicated by the scale 45, the excess fuel in the tank 5 will flow through the mouth 49 of the pipe 41 and through the pipe 40 to an aperture 50 located within the return chamber 44.

Each of the tanks 6 and 7 is provided with return chambers and overflow controls similar to those of tank 5, described and illustrated in Figure 8 of the drawings. The return chambers 44 are each connected to a return pipe 51 connected by piping 52 to the end of the hollow bearing member 15. The sump 4 is connected by piping 53 to the main supply tank 3 so that when the parts are in the position shown in Figure 2 of the drawings, the excess fuel returned from the auxiliary tanks 5, 6 and 7 may flow from the sump tank into the main tank 3.

In operation, the tank 3 may be filled through any suitable aperture, closed by a detachable filling cap 54, when the tank structure is in the upright position shown in Figure 1. When this tank is filled initially, the auxiliary tanks 5, 6 and 7 are filled therefrom by the mere act of rotating the tank 1 about its bearings until parts 3, 4, and 12 reach the position shown in Figure 2, in which the sump 4 is above the tank 3 and the conveyor tube 12 is vertically below the tank 3. In this position fuel flows from the tank 3 through the piping 33 into the conveyor tube 12 to fill the latter. Of course, during the filling operation of the conveyor tube 12, the fuel rises in the pipe 32 and 31 to the hollow sleeve 14. The whole tank apparatus is then rotated about its bearings until it assumes the position shown in Figure 1. In this position the fuel flows from the conveyor tube 12 through the pipe 32, 31 the hollow sleeve 14, hollow bearing member 16, pipes 34 and 35, through the valves 36, 37 and 38 into the auxiliary tanks 5, 6 and 7, which have been previously adjusted by the handles 46 to predetermine the height of the mouth 49 of the overflow pipe 41.

The excess fuel flows through this overflow pipe into the return chambers 44 and thence through the pipes 51 and 52 to the hollow bearing member 15, sleeve 13 and pipe 25 to the sump 4. In the next inversion of the tank 1 to fill the now empty conveyor tube 12, the sump 4 empties into the tank 3 and any excess fuel trapped in the hollow bearing member 15 and sleeve 13 flows through the groove formed in this bearing member 15 into the cup 28 which returns the excess fuel to the sump 4 on the next inversion of the apparatus, shown in Figure 1.

It will be apparent from the description so far that regardless of how much the auxiliary tanks 5, 6 and 7 are adjusted, the excess

fuel resulting from this adjustment is not wasted but is returned to the sump 4 to be later fed into the main tank 3, upon inversion thereof into such position as will fill the conveyor tube 12. It thus appears that leakage or waste of fuel is avoided and that fuel may be fed as desired to the auxiliary tanks without necessitating the use of the pumps interposed between a main supply tank lower than the auxiliary tanks, and without necessitating the location of the main supply tank above the auxiliary tanks in order to provide a hydrostatic head for feeding fuel to the auxiliary heads.

The tank parts are so mounted and counterbalanced on the bearing members of the apparatus that extremely little effort is required to rotate the tank structure into the several positions necessary to effect the filling of the auxiliary tanks. It will be obvious that the invention is of extreme simplicity and may be very cheaply manufactured and readily used for the purpose described.

It must be understood, of course, that the auxiliary tanks 5, 6 and 7 are fixed in position, although the supports therefor are not illustrated herein. It will be evident that fuel is fed from the main tank 3 by gravity only, although this main tank 3 is located below the fixed position of the tanks 5, 6 and 7. This results from the rotatable mounting of the tank 3 and from the location of the conveyor tube 12 with respect to said tank, so that when the tank structure is rotated as a whole, the conveyor tube 12 in its lowest position is first filled by gravity with liquid from the tank 3, and then, upon rotation of the tank the tube is located above the tanks 5, 6 and 7 to provide the head necessary to cause flow of fuel into the tanks 5, 6 and 7. This means that the tank structure must be located relative to the auxiliary feed tanks 5, 6 and 7 so that the conveyor tube 12, in its elevated position, will always be above the said tanks 5, 6 and 7.

What I claim is:

1. A liquid dispensing system comprising a tank mounted to rotate about a fixed axis, a measuring container supported above the bottom of said tank, and means operated by rotation of said tank about said axis for transferring liquid from the tank to the container.

2. A liquid dispensing system comprising a tank mounted to rotate about a fixed axis, a measuring container supported above the bottom of said tank, a conveyor tube supported by said tank and adapted to be moved by the rotation of the tank alternately below and above the container, means for transferring liquid from the tank to the tube when the latter is below said container, and means for transferring liquid from the tube to the container when the tube is above the container.

3. A liquid dispensing system comprising a tank, means for mounting said tank to rotate about a fixed axis, a measuring container supported above the bottom of said tank, a conveyor tube supported by the tank to be moved by the rotation of said tank alternately below and above said container, means for transferring liquid from the tank to the tube when the latter is in its lowest position, means for transferring liquid from the tube to the container when the tube is located above said container, means for adjusting said container to regulate the quantity of liquid retained therein, and means for returning liquid in excess of the quantity retained to said tank.

4. A liquid dispensing system comprising a tank, a partition dividing the tank into a main compartment and a sump, a measuring container supported above the bottom of said tank, a conveyor tube supported by the tank, means for transferring liquid from the tank to the tube when the tube depends from said tank, means for transferring liquid from the tube to the container when the tube is located above said container, means for rotatably mounting said tank and tube to move said tube alternately into position below and above said tank and container, means for adjusting said container to regulate the quantity of liquid retained therein, and means for returning liquid in excess of the quantity retained to said tank.

5. A liquid dispensing system comprising a tank, a partition dividing the tank into a main compartment and a sump, a support, cylindrical trunnions mounted on said support and extending coaxially toward each other, sleeves connected to the ends of said tank and rotatably mounted on said trunnions to adapt the tank for rotation about the axis of said trunnions, a measuring container supported above the bottom of said tank, a conveyor tube supported by said tank to be moved alternately by the rotation of said tank into positions below and above said container, piping connecting the tank to the tube for conducting liquid from the tank through the tube when the latter is located below the container, piping connecting the tube to said container to transfer liquid from the tube to the container when the tube is located above the container, adjustable means in said container for predetermining the quantity of liquid to be retained thereby, and means for returning liquid in excess of said quantity from said container to the sump when the tube is located above said container.

6. A liquid dispensing system comprising a support, a structure rotatable on said support and including a tank, a sump and a tube carried by said tank on opposite sides of the axis of rotation of the structures, means for transferring liquid from the sump to the tank and from the tank to the tube when the struc-

ture is positioned with the tube suspended therefrom, and means for discharging liquid from the tube when the structure is positioned with the tube above the tank.

7. A liquid dispensing system comprising a support, a tank structure rotatable on said support and including a tank, a sump and a tube carried by said tank on opposite sides of the axis of rotation of said structure, a liquid measuring container, an adjustable overflow for predetermining the quantity of liquid to be discharged from said container, means for transferring liquid from the sump to the tank and from the tank to the tube when the structure is positioned with the tube depending therefrom, means for transferring liquid from the tube to the container when the structure is positioned with the tube thereabove, and means for returning the overflow from the container to sump when the structure is in the last named position.

8. A liquid dispensing system comprising a support, a tank structure rotatable on said support, a measuring and dispensing container, an overflow adjustable in said container to control the quantity to be dispensed by said container, means operated by the rotation of said tank for filling said container, and means for returning the liquid overflow of said container to said tank.

9. A liquid dispensing system comprising a support, a tank structure rotatable on said support, a measuring container adapted to dispense liquid therefrom and including an angularly adjustable overflow pipe, means for angularly adjusting said pipe, means for indicating the angle or adjustment thereof, means operated by rotation of said tank for filling said container from said tank, and means for returning the liquid overflow from said container to the tank.

10. A liquid dispensing system comprising a support, a tank rotatable about a fixed axis on said support, a measuring container adapted to dispense liquids therefrom, means in said container for determining the quantity of liquid to be dispensed therefrom, means operated by the rotation of said tank for filling said container, and means for returning the liquid overflow from said container to said tank.

11. A liquid dispensing system comprising a support, a tank rotatable on said support, a measuring and dispensing container, means to control dispensing of liquid from said container, an overflow pipe adjustable in said container to determine the quantity of liquid to be dispensed therefrom, means operated by the rotation of said tank for filling said container and for returning liquid in excess of said quantity from said container to the tank.

12. A liquid dispensing system comprising a support, a storage tank structure rotatable on said support, a measuring and dispensing container located above the bottom of said structure, means for predetermining the quantities of liquid to be dispensed by said container, and means operable by rotation of said structure alternately through an angle of one hundred and eighty degrees for transferring liquid from the tank of said structure to the container.

In testimony whereof I affix my signature.

MANUEL FERNANDEZ y FERNANDEZ.