Nov. 27, 1945. W. H. DE LANCEY 2,389,900

MOUNTING FOR EXPLOSION PROOF MOTORS

Filed Oct. 15, 1943

Fig. 1.

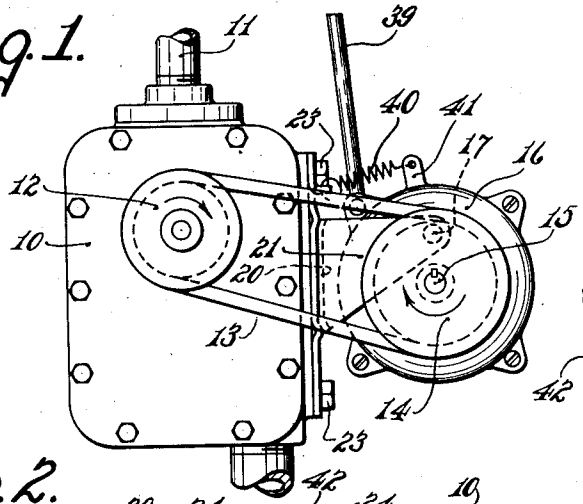


Fig. 4.

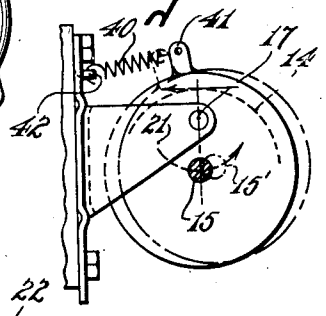


Fig. 2.

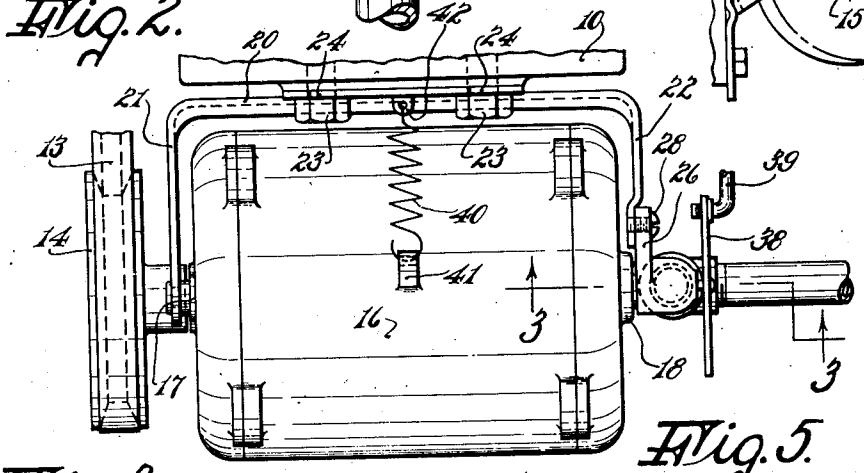


Fig. 5.

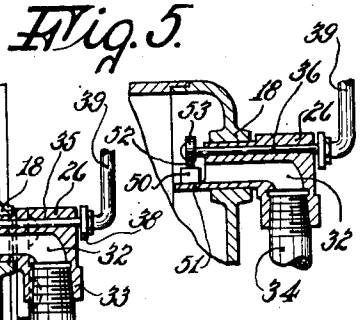


Fig. 3.

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MOUNTING FOR EXPLOSIONPROOF MOTORS

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Application October 15, 1943, Serial No. 506,438

1 Claim. (Cl. 172—36)

My invention relates to an improvement in dispensing pumps for gasoline and the like and more particularly to an improvement in the power drive for such pumps.

A gasoline dispensing pump is a highly integrated unit including, in a usual form, a pump for drawing the gasoline from a supply tank, an electric motor for driving the pump, a flexible hose with a valve controlled discharge nozzle, a meter driven by the gasoline flow for registering the amount of gasoline dispensed and means to reset the meter after each dispensing operation.

Experience has shown that certain interlocking or interdependence in the operation of the various controls of the elements of the combination is desirable. Thus in one common arrangement the controls are so integrated that the operator cannot start the motor without removing the dispensing nozzle from its supporting hook; he cannot replace the nozzle on the hook until he has stopped the motor; he cannot start the motor unless he has reset the register of the meter to zero. Various other interlocks are or might be used but those mentioned are sufficient to indicate the integrated character of the various controls. Because of the explosion hazard in the handling of gasoline it is highly desirable to use an explosion proof type of motor in which the motor parts including the motor control switch are enclosed in a tight casing and the motor feed wires are conducted into the casing through a rigid explosion proof conduit.

For efficient operation it is desirable that the belt tension be increased when and as the torque increases. The rigid connection of the feed wire conduit to the motor casing and the similar fixed relation of the switch control linkage to motor casing has prevented automatic adjustment of the belt tension. Once the motor has been installed any subsequent adjustment of its position has required that both the rigid metal pipe conduit in which the motor wires are encased and the exterior switch control linkage be disconnected and refitted to the new adjusted position of the motor.

The principal object of my invention is to provide an explosion proof power plant for gasoline pumps, using a belt transmission and providing an automatic increase in belt tension when the torque is high as at start of the dispensing operation or when the torque increases in the course of the dispensing operation, as occurs when the dispensing nozzle is partly closed, all without interfering with the present close integration of the pump controls and the explosion proof features of the installation.

A further object is to secure the above advantages and at the same time permit the use of a temporary contact type of switch for the motor control if desired.

Other and further objects will be made apparent in the following specification and claim.

In the accompanying drawing which illustrates one embodiment of my invention.

Fig. 1 is an end elevational view of a gasoline pump and power plant embodying my invention;

Fig. 2 is a plan view, on a larger scale of the motor and its connections;

Fig. 3 is a front elevational view of the structure shown in Fig. 2, parts being shown in section substantially on line 3—3 of Fig. 2;

Fig. 4 is a diagrammatic view showing the adjusting movement of the motor, and

Fig. 5 is a detail view showing the manner in which a momentary contact switch may be employed.

Referring to the drawing, 10 indicates the housing of a pump connected in the gasoline supply line 11. The pump operating pulley is shown at 12 and is connected by belt 13 to the drive pulley 14 secured on the drive shaft 15 of an electric motor enclosed in an explosion proof casing 16. According to my invention I provide the casing 16 with trunnion bearings 17 and 18 positioned on an axis parallel to the axis of the drive shaft 15 of the motor and offset therefrom a distance less than the radius of pulley 14. At least one of said bearings, as 18, is open ended.

A bracket 20, having outstanding arms 21 and 22, is secured to the pump housing 10 by bolts 23 passing through slots 24 in the bracket, permitting vertical adjustment of the bracket. The bracket arm 21 carries a trunnion 25 engaging in trunnion bearing 17 of the motor casing. Arm 22 supports a member 26, secured to the arm by machine screws 28 and provided with a trunnion 30 which engages in the trunnion bearing 18 of the motor casing. The trunnion 30 is preferably formed integral with the member 26 and a passageway 32 extends through the trunnion 30 and the body of member 26 terminating in a coupling 33 to which the end of the rigid conduit or pipe 34 is tightly connected. A second passageway 35 extends through the trunnion 30 and member 26, the axis of passageway 35 being parallel with the axis of the trunnion. The motor feed wires, not shown are encased in the conduit 34 and are carried through passageway 32 to the motor in an explosion proof manner. Passageway 35 forms

a bearing for a shaft 36 connected at its inner end to the motor control switch, indicated at 37. The outer end of shaft 36 is rigidly connected to a lever 38 one end of which is pivotally connected to a link 39 through which the switch is remotely controlled. By the arrangement just described the motor casing 16 may be swung on its eccentric supporting trunnions to move the drive pulley 14 of the motor toward or away from the driven pulley 12 of the pump without in any way disturbing or requiring adjustment of the wire conduit 34 or the remote switch control mechanism 36—38—39 and the other control devices integrated with it. All of the adjustments needed are, as later described, made by movement of the motor about the axis of the eccentric trunnions through which all the connection to the motor pass.

The action of gravity tends to keep the motor in a position in which the axis of the motor shaft 15 and the axis of the motor trunnions 17 and 18 are in the same vertical plane. The belt is driven in the direction of the arrows in Fig. 1 with the driving tension in the upper run of the belt. Since the radius of the pulley 14 is greater than the distance between the axis of the trunnions and the axis of the motor shaft, upon which pulley 14 is mounted, the driving tension in the upper run of the belt applied through the leverage of the pulley tends to swing the motor and pulley 14 to the right in Fig. 4 and away from pulley 12. A tension spring 40 is connected between a lug 41 formed on the motor casing and a stationary lug 42 formed on bracket 20. Spring 40 is under an initial tension to supply the desired tension in the belt to accommodate the starting torque. Any increase in the operating torque, causing an increase in the pull on upper run of belt, acts through the leverage of the pulley to swing the motor on its trunnions to increase the distance between the pump and motor pulleys to increase the belt tension as the torque increases. Thus an automatic adjustment of the belt tension is maintained without interfering with the explosion proof features of the installation or the integration of the pump controls.

It will be seen that my novel mounting arrangement makes it possible to make the explosion proof installation in a standard manner and then make the desired fixed adjustment of initial spring tension and motor position to secure the desired starting and automatic running adjustments. These initial adjustments can subsequently be changed if desired to meet changed operating conditions, and such adjustments and the constant automatic adjustments are all made without disturbing the rigidly installed wire conduit or the remote switch control mechanism.

The switch control shaft 36 is mounted in a fixed bearing and therefore the motor control switch cannot be mounted on the motor or motor casing since the movement of the motor and its casing in maintaining the belt tension would change the position of the switch relative to its control shaft 36. In Fig. 3 the switch 37 is shown as a mercury switch secured directly to the shaft 36 and directly operated by the oscillatory movement of the shaft. In some cases it is preferable to use a temporary contact switch, that is a switch in which the contacts are normally held apart by spring action and the circuit remains closed only so long as pressure is maintained on the switch button to overcome the spring pressure. My arrangement permits the use of such a switch as indicated at 50 in Fig. 5. As there shown, a bracket 51 is secured to the fixed trunnion 18. By mounting the switch 50 on a bracket thus fixedly supported the operating button 52 of the switch is maintained in fixed relation to the shaft 36 and may be operated, in an obvious manner, by a cam 53 secured to the end of shaft 36. In the use of either the direct connection of switch 37 or the cam connection of switch 50 the flexibility of the wire connections, not shown, permit the necessary relative movement of the motor with respect to the switch.

What I claim is:

A motor of the type which is mounted for pivotal movement about an axis eccentric to its drive shaft, an explosion proof casing enclosing and carrying said motor, a motor switch inside the casing, aligned bearings eccentric to the motor shaft formed in said casing, rigid fixed trunnions engaging in said bearings and supporting the casing, one of said trunnions having a conduit passage from within the casing to an end outside the casing and adapted at the outside end to make a tight pipe union connection to a rigid fixed outside wiring conduit, and one of said trunnions having an opening extending from the inside to the outside of the casing, and a rigid switch operating rod extending through such opening from the outside to the inside of the casing making a close but slidable fit with said opening, and affording actuation of the switch by a predetermined movement of the rod regardless of any change of position of the casing with respect to its supporting trunnions.

WARREN H. DE LANCEY.