United States Patent

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[54] **FLUID INVENTORY CONTROL SYSTEM**
3 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **222/27,** 222/37, 222/75, 222/76
[51] **Int. Cl.** **B67d 5/08**
[50] **Field of Search** ..... 222/14, 36–37, 27, 75, 76; 194/DIG.18 UX

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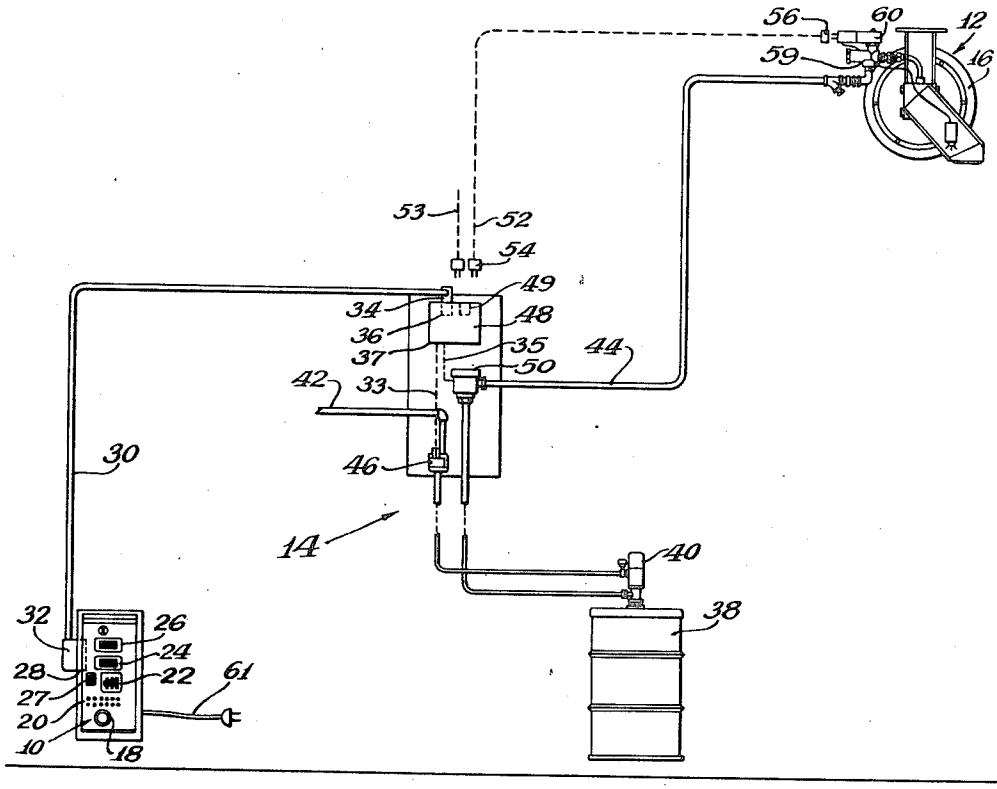
ABSTRACT: A fluid inventory control system is manufactured in modular sections and interconnected by single, multiwire cables having plugs attached to either end for the purpose of cooperating with plug receptacles incorporated with each section of the fluid inventory control system.



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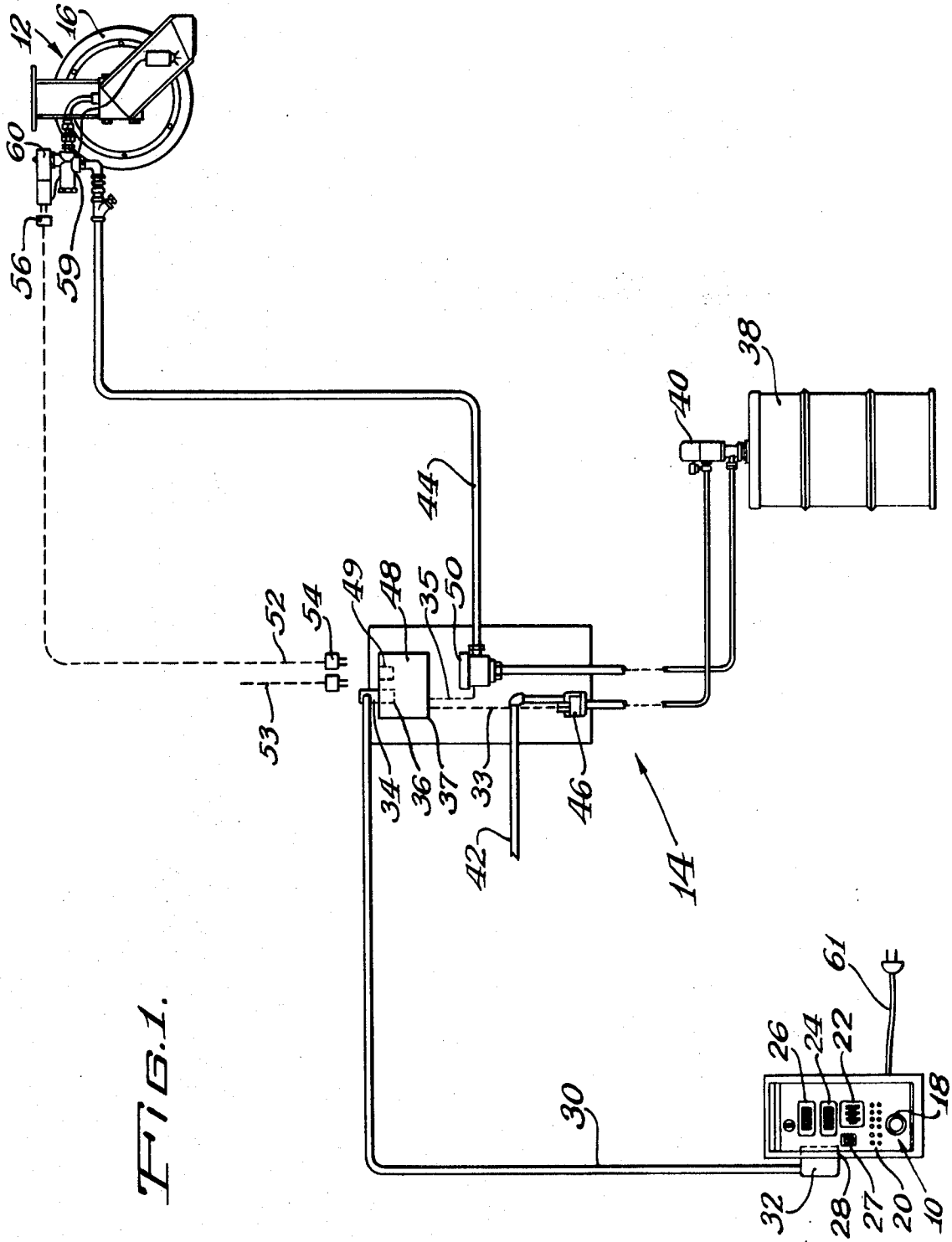

FIG. 1.

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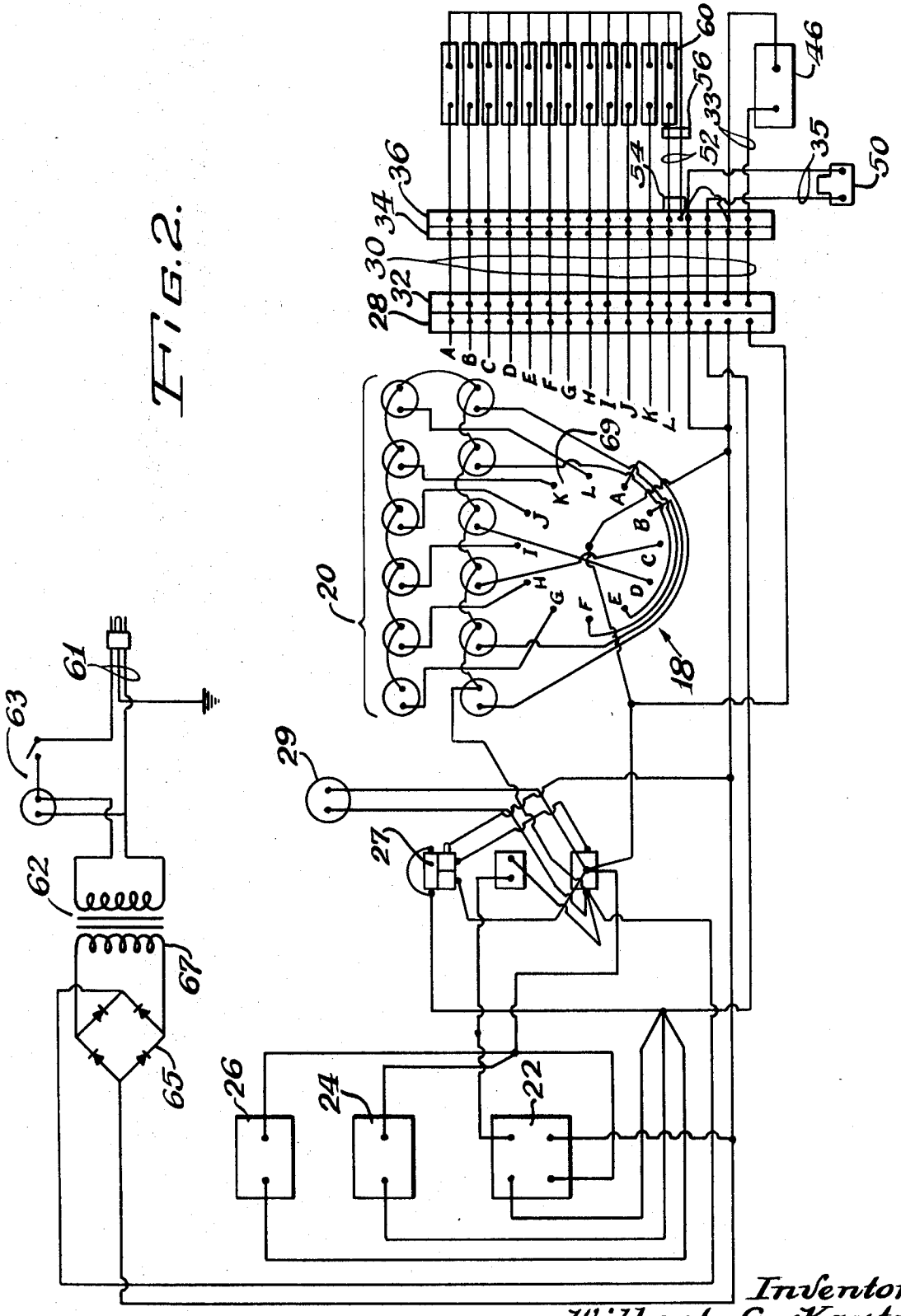
FIG. 2.



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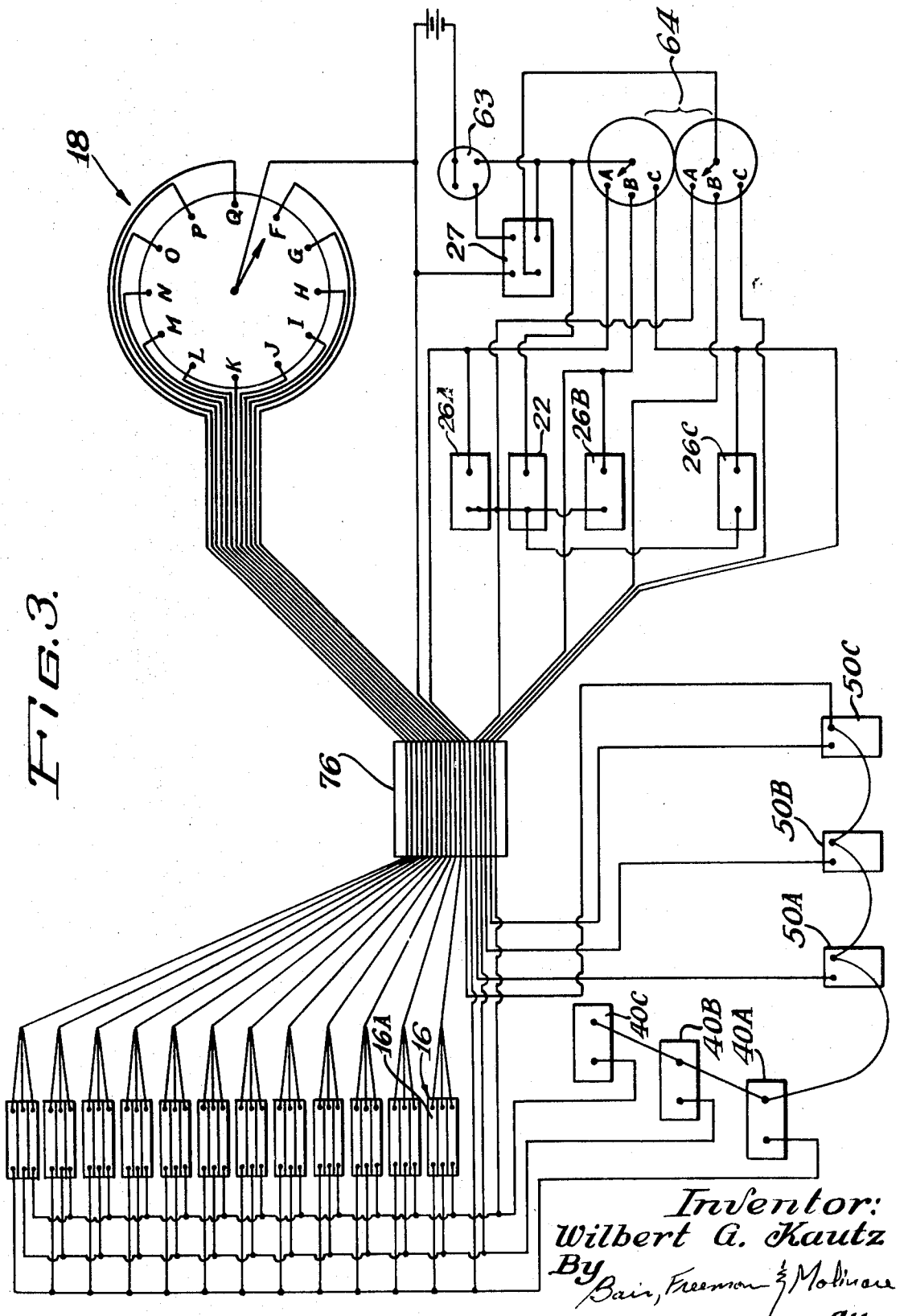

Fig. 3.

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FLUID INVENTORY CONTROL SYSTEM

BACKGROUND OF THE INVENTION

This invention relates to an improved fluid inventory control system.

In the past it has been the practice to provide custom made fluid inventory control systems for automobile repair shops, garages and the like. For example, a number of reels for dispensing a certain weight of oil are stationed throughout a service area of a garage. A control panel from which a garage manager can monitor an amount of oil passing or dispensed from a storage drum to a particular reel is stationed at a central location in the garage. The interconnecting control wiring between the control station, the dispensing station and the storage area is provided by a contractor or electrician and, of course, varies in accordance with the number of reel and station locations in the garage.

In the past such arrangements have resulted in a high labor cost necessitated by the planning and connecting of the control wires between the stations by an electrician or electrical contractor. The labor and time involved is often wasted since such installations are complex and errors can easily be made. A single error in the wiring of such an installation will most likely cause the entire system to be inoperative.

SUMMARY OF THE INVENTION

The fluid inventory control system of the invention is comprised of a separate control station, a separate dispensing station and a separate fluid supply station, the stations each being interconnected by means of prefabricated, multiwire cables which cooperate by means of plugs with plug receptacles at the various stations to provide a fully integrated fluid inventory control system.

It is thus an object of the present invention to provide an economically constructed, improved fluid inventory control system.

It is a further object of the present invention to provide a fluid inventory control system which can be easily assembled and installed in a garage or service station without the necessity of a professional electrician or contractor.

These and other objects, advantages and features of the present invention will be set forth in greater detail in the description which follows.

BRIEF DESCRIPTION OF THE DRAWINGS

In the detailed description which follows, reference will be made to the drawings comprised of the following Figures:

FIG. **1** is a schematic representation of the improved fluid inventory control system of the present invention;

FIG. **2** is a wiring diagram of a first embodiment of the invention; and

FIG. **3** is a wiring diagram of a second embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring first to FIG. **1** there is shown a portion of a typical fluid inventory control system of the invention. The system is comprised of three stations, a control station **10**, a dispensing station **12**, and a supply or storage station **14**. Control station **10** includes a selector switch **18** which may be rotated to indicate the dispensing reel, for example, reel **16**, of the dispensing station **12** which is to receive a programmed order of fluid such as oil. A group of lights **20** indicates which reel at station **12** has been selected. For purposes of illustration, only one reel **16** is shown at station **12**. In practice numerous reels are positioned about the garage all together comprising the dispensing station **12**.

The amount of material to be dispensed at the reel **16** is set on the product countdown or setting counter **22**. A second counter **24** is provided to count up the amount of fluid dispensed on each dispensing operation. A third counter **26** gives the total amount of fluid dispensed through the fluid inventory control system.

FIG. **1** also shows a plug receptacle **28** provided for control station **10**. A factory assembled cable **30** with a keyed jack **32** connects with the plugged receptacle **28**. The cable **30** is comprised of a plurality of wires, each wire connected to an appropriate terminal of the jack **32**. The opposite end of the cable **30** terminates at a second keyed jack **34**. Jack **34** mates with a plug receptacle **36** of a terminal board or junction box **37** at supply station **14**. Supply station **14** includes a fluid storage receptacle, in this case a drum or barrel **38** of the fluid e.g. oil, which is to be dispensed.

An air motor pump **40** is provided for the drum **38** driven by air provided through a line **42** from an air compressor (not shown). A control solenoid **46** is provided in the air line **42** which leads to the pump **40**. The solenoid **46** is connected through the terminal board **37** by cable **33** to the control station **10**. The fluid is pumped from the drum **38** into a material line or conduit **44** leading to the dispensing station **12**. A meter **50** provides a signal through cable **35** indicative of the amount of fluid passing through line **44**. The signal of meter **50** also passes to the control station **10** via terminal board **37**.

A cable **52** having jacks **54** and **56** at its opposite ends interconnects receptacles, e.g., a receptacle **49** of terminal board **37** with a receptacle **51** of reel **16** in the bank of reels comprising the dispensing station **12**. Upon the appropriate electrical signal through cable **52**, a solenoid **60** opens an appropriate valve **59** from the fluid line **44** to the reel **16**. Additional cables as at **53** also connect the terminal board **37** with each separate reel of the station **12**.

The cables **30** and **52** come in uniform lengths and are fabricated at the factory along with the other components of the system thereby eliminating the necessity for having an electrician or electrical contractor connect individual wires between the various stations comprising the system. The system also may be inspected for correct operation before leaving the factory.

FIG. **2** is a circuit diagram for the system illustrated in FIG. **1**. The various components of this system of FIG. **1** are correspondingly numbered in FIG. **2**. A 110-volt AC powerline **61** is provided to supply power through a transformer **62** to the control station **10**. A switch **63** operated by a key opens or closes the circuit to make the system operable. The system operates on 24 volts DC which is picked off from a rectifier **65** attached to the secondary coil **67** of the transformer **62**.

As described before, the first step in the operation is to set the station **10** for that reel which is to dispense the fluid. Assume then that the station **10** is set to dispense fluid through reel **16**. In that case a double wafer switch **69** is set in position L. The amount of material to be dispensed is then set on the counter **22** and a start button **27** which includes a switch light is depressed to initiate opening of the appropriate valves and starting of the pump **40** by opening the air solenoid **46**.

Simultaneously, the appropriate signal through cable **52** causes valve **59** to be opened. Thus when the dispensing hose from reel **16** is unwound and the hand trigger on the hose depressed, oil or fluid passes from the hose in a measured amount. The valve **59**, valve **46** and air motor **40** all cease operation simultaneously when the correct amount of fluid has been dispensed from the hose of reel **16**. The next order of fluid may then be processed. A bypass key switch **29** is also provided to short out the controls and permit uncontrolled dispensing of material from the reels of the system.

Referring now to FIG. **3**, there is shown an alternative circuit for a fluid inventory control system. In this alternative arrangement, an additional selector switch **64** is provided. The selector switch **64** has a first or A position, a second or B position and a third or C position, each position being indicative of a separate fluid product which may be dispensed through one of three separate product reels at a three reel station, for example reel station **16**. Thus, if the three reel station **16** corresponds to reel outlet station selector position F in FIG. **3** and the selector switch **64** is set in the product A position and the

amount of fluid to be dispensed from that particular reel is set on the countdown counter **22**, the solenoid for the reel **16A** is actuated. This allows a metered amount of fluid to pass through the dispensing reel **16A** in accordance with the setting on the counter **22**. The amount of fluid-type A which is dispensed is totaled on totalizer **26A**.

The counter **22** is activated by the feedback signal from the meter **50A** for the product A pump **40A**. Thus, as can be seen from the description, the dispensing of three products can be monitored through a single control console. Once again, and very importantly, the interconnections between the control console and the dispensing and supply stations are provided through a single multiwire cable having jacks adapted to engage receptacles as schematically illustrated at **76**.

The advantages of this construction are that the device may be pretested before installation to insure that there are no incorrect connections in the installation. This guarantees that the installation will be operative immediately upon installation. In addition, it is considerably easier to install such a system and much more economical since an electrician is not required. Finally, the modular cable sections as at **30**, **52**, **54** and **76** are provided in fixed lengths. Additional lengths may be joined to provide a modular fluid inventory control system for any size of garage with any desired span of separation between the stations comprising the system.

What is claimed is:

1. In a fluid inventory control system of the type having

a. a fluid-dispensing station with means for discharging amounts of fluid from said station, each said means for discharging including an electrically controlled valve operable to open a fluid discharge path through said means for discharging,

b. a fluid station including fluid conduit means for connecting means of fluid supply to said means for discharging fluid from said fluid-dispensing station, said fluid supply station also including means for pumping fluid through said fluid conduit means, electrical control means for said means for pumping and electrical metering means for measuring the amount of fluid flowing through said conduit means, and

c. a quantitative control and fluid meter station including electric counters and controls for counting and indicating measured volumes of fluid, and direct current power supply means for said control system, the improvement comprising,

i. a plug receptacle at said fluid meter station, said receptacle having at least three contacts, said plug receptacle being electrically connected to the electrical components and controls included as part of said meter station, said receptacle being keyed to receive a keyed plug,

ii. a second plug receptacle at said supply station, said second plug receptacle being electrically connected to the electrical components and to third plug receptacles included as a part of said supply station, said second receptacle being keyed to receive a keyed plug, and including the same number of contacts as said plug receptacle at said fluid meter station,

iii. at least one modular cable segment, said segment having at least the same number of wires as the number of contacts at said supply station receptacle, said cable segment including a keyed plug attached at each end, said plugs connectable with said supply station second plug receptacle and said fluid meter station plug receptacle to provide a complete control circuit between said control station and said supply station, and

iv. a plug receptacle for said electrically controlled valves of said dispensing station and at least another one modular cable segment having keyed plugs at each end, said another one cable segment connecting said plug receptacle of said dispensing station with said third plug receptacle of said supply station.

2. The improved fluid inventory control system of claim **1** including a plurality of uniform length and connected cable segments between said fluid meter station receptacle and said supply station receptacle.

3. The improved fluid inventory control system of claim **1** including a plurality of uniform length and connected cable segments between said dispensing station receptacle and said supply station receptacle.