# United States Patent [19]

**Willis**

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[45] **Mar. 25, 1975**


[54] **RADIO CALL UNIT**


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[73] Assignee: **Solid State Technology, Inc.,** Wilmington, Del.



[22] Filed: **Sept. 24, 1973**

[21] Appl. No.: **399,927**

[52] **U.S. Cl.** ..... **290/1 E,** 290/52, 60/325, 60/477, 340/136, 340/307

[51] **Int. Cl.** ..... **H02p 9/04**

[58] **Field of Search** ..... 60/325, 330, 477, DIG. 10; 290/1 E, 1 R; 340/136, 294, 308, 307



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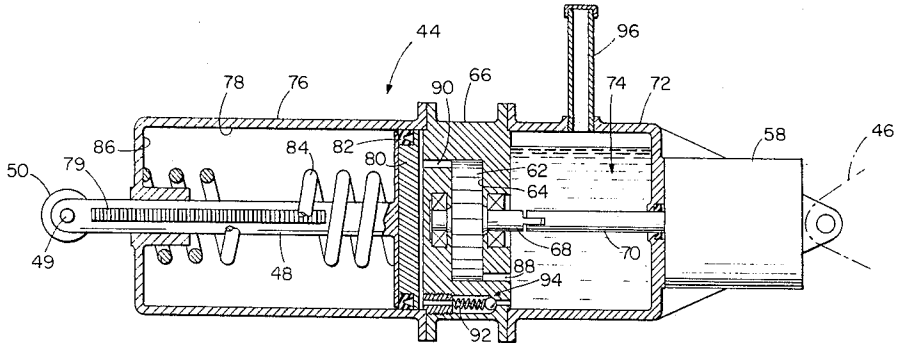
*Primary Examiner*—Edgar W. Geoghegan



[57] **ABSTRACT**

Improvements are provided in a radio call box which comprises a signal generator and a power source for driving the generator. According to the improvements, the power source comprises a bladed rotatable member, first means linking the rotatable member to the generator for driving the generator, and second means operative to cause flow of a fluid against the blades of the rotatable member to produce rotation thereof.


**10 Claims, 5 Drawing Figures**



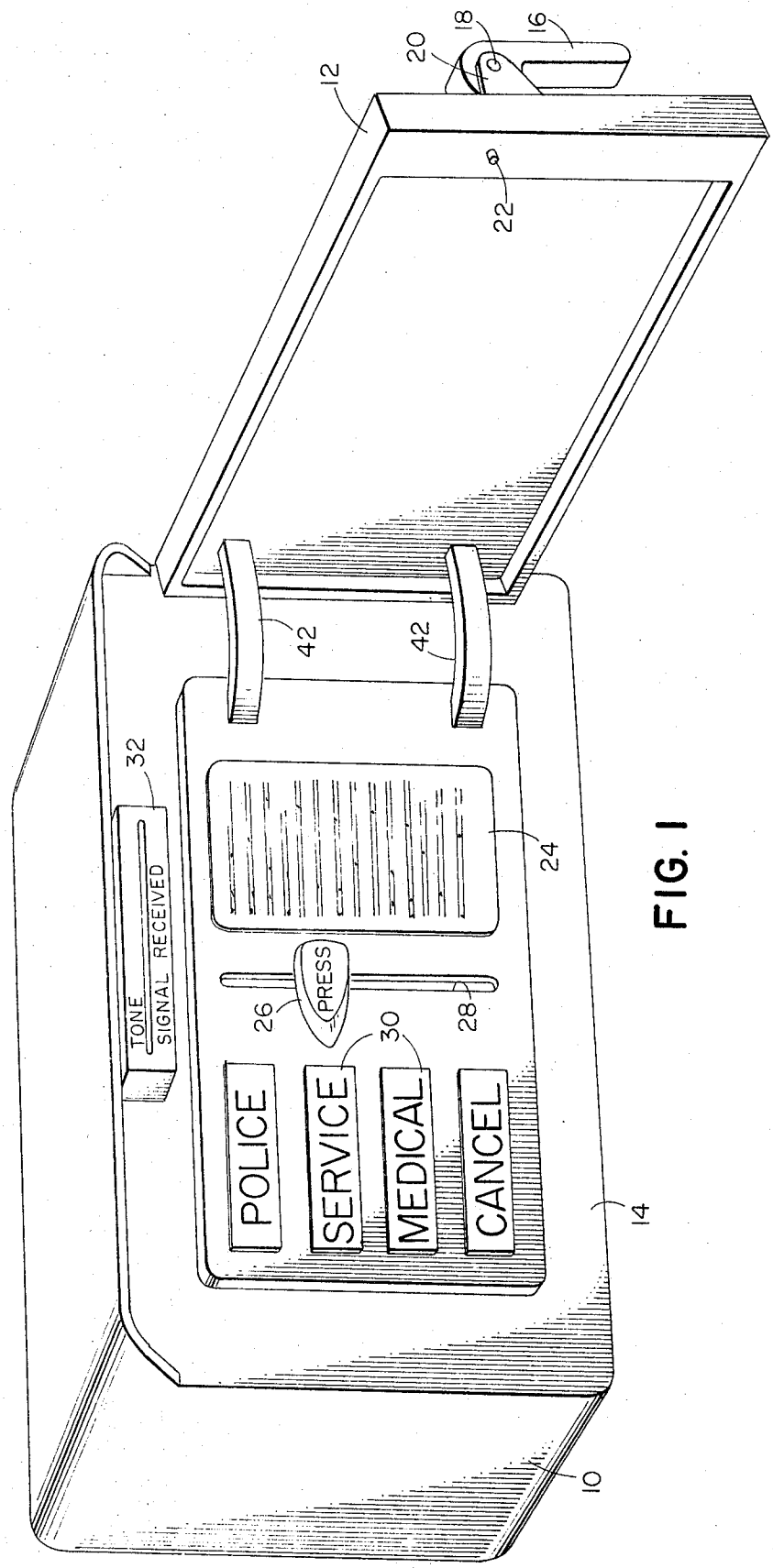

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TONE
SIGNAL RECEIVED
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PRESS
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POLICE
SERVICE
MEDICAL
CANCEL
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FIG. 1

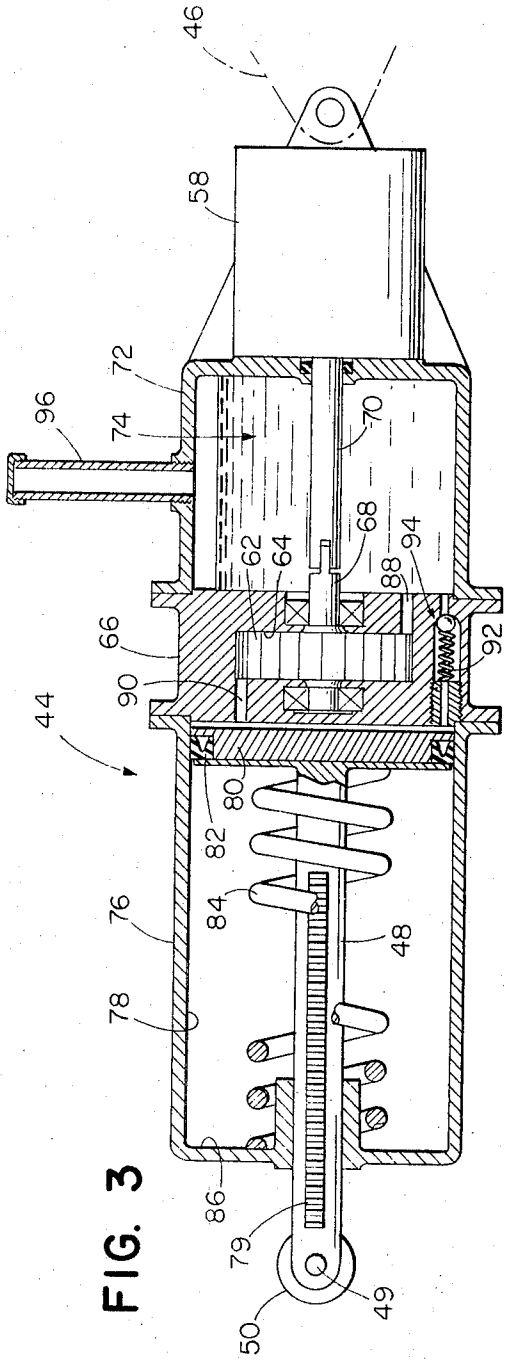

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FIG. 3

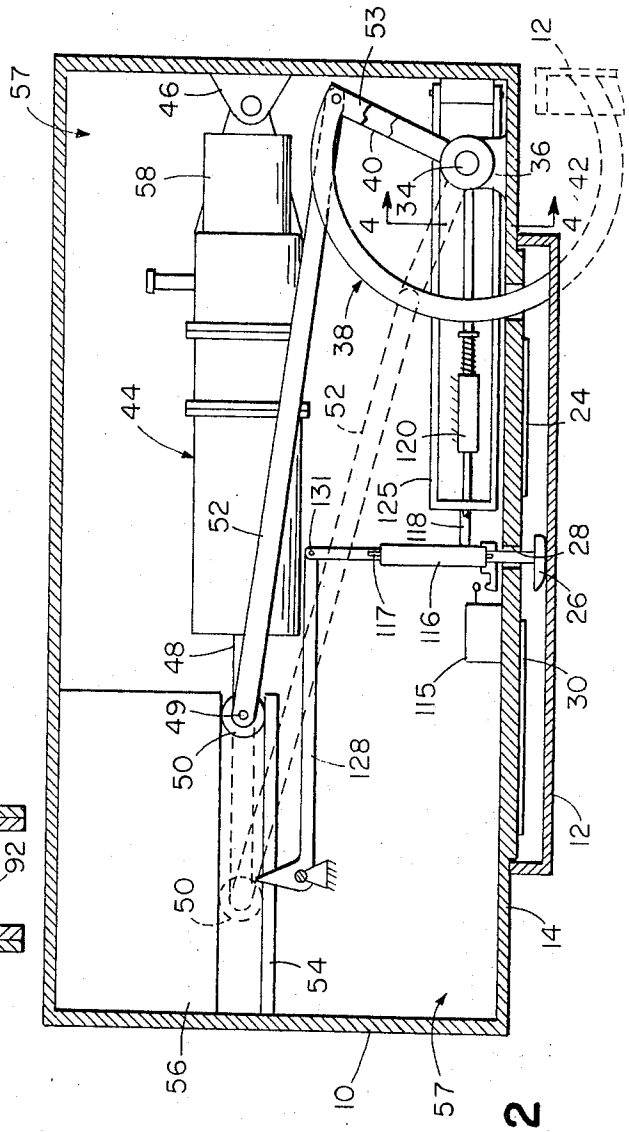
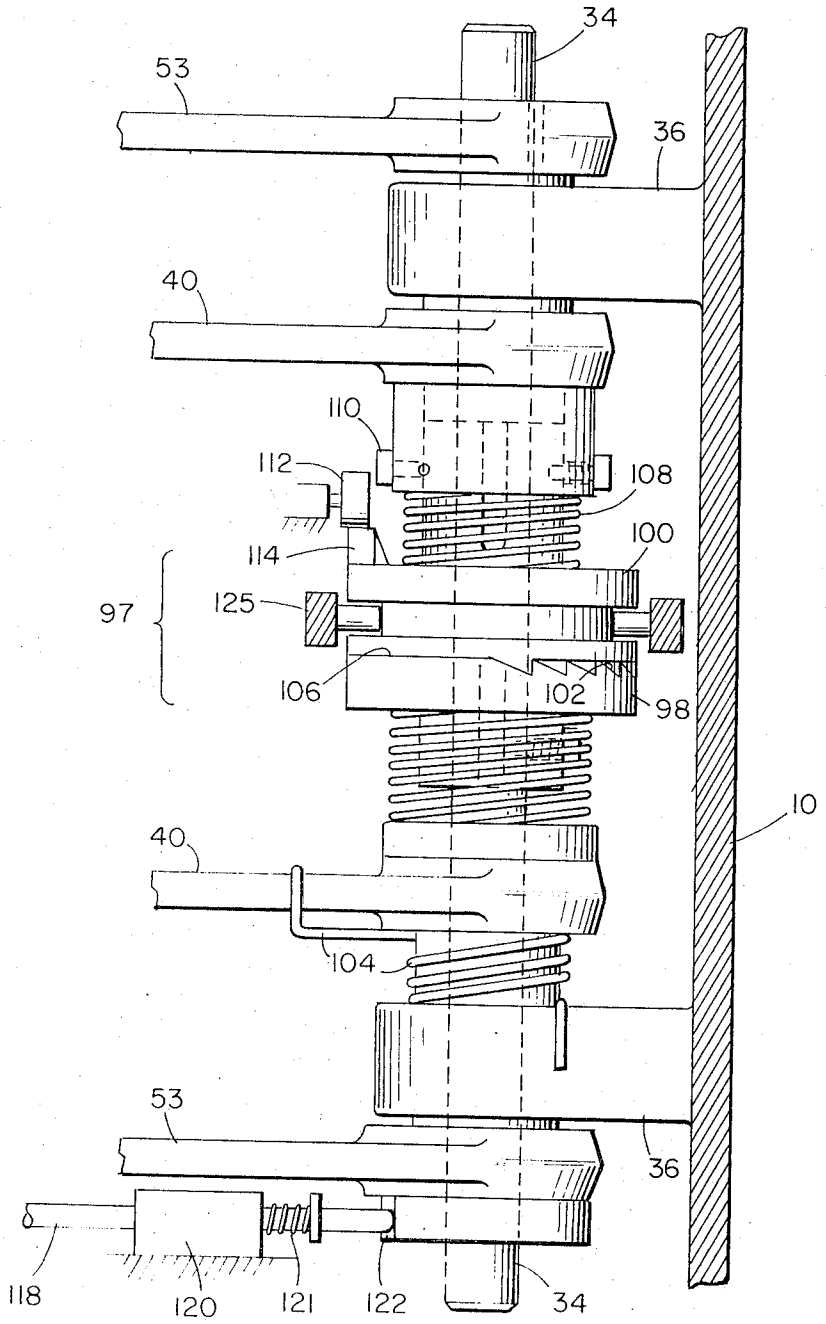

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FIG. 2

FIG. 4


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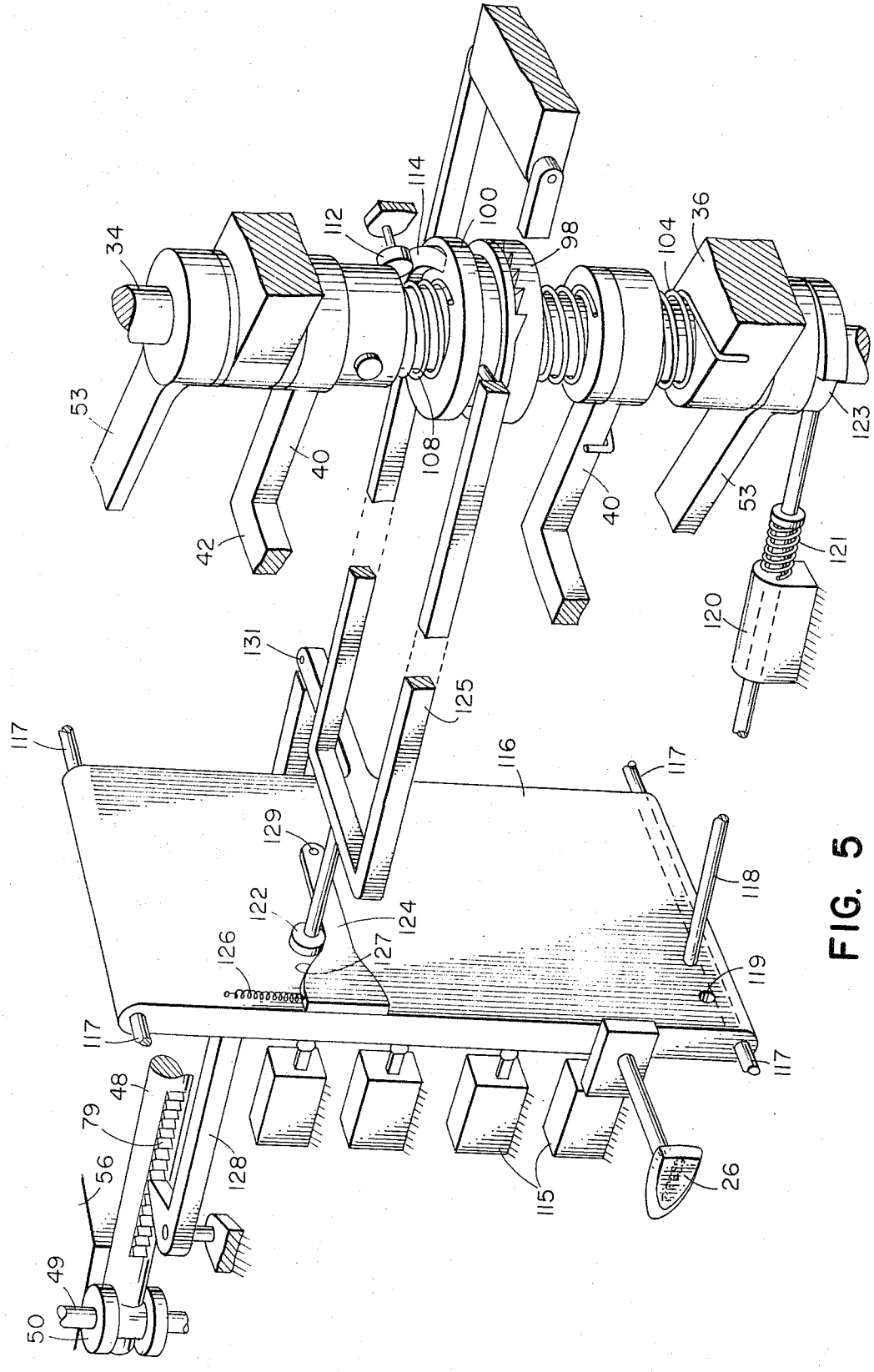

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115
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FIG. 5

# RADIO CALL UNIT

## BACKGROUND OF THE INVENTION

This invention relates to a radio call box such as is suitable, for example, for installation at locations along a highway and by means of which a motorist may request assistance.

To provide maximum benefit, such radio call boxes should include their own source of power for producing the radio signal which indicates the user's need for assistance. Furthermore, the source of power should not be subject to a decrease in power generating capacity by passage of time, variations of temperature, etc.

## SUMMARY OF THE INVENTION

In view of the foregoing, it is a principal object of the present invention to provide in a radio call box an improved power generating system.

A radio call box constructed according to the present invention comprises a signal generator and a power source for driving the generator. The power source comprises a bladed rotatable member, first means linking the rotatable member to the generator for driving the generator, and second means operative to cause flow of a fluid against the blades of the rotatable member thereby causing rotation of that member. In preferred embodiments of the invention the second means comprise a cylinder having a fluid outlet near one end, a piston disposed for sliding movement in the cylinder, and biasing means which bias the piston toward that end of the cylinder. Preferably, the second means further include a fluid reservoir and a closed fluid path from the reservoir to the blades and back to the reservoir; the fluid path comprises a first fluid conduit means connecting the reservoir and the cylinder, valve means in that conduit permitting flow from the reservoir to the cylinder, and second fluid conduit means connecting the cylinder and the reservoir, the blades being disposed to engage fluid flowing in the second conduit means.

## BRIEF DESCRIPTION OF THE DRAWINGS

Other objects, features, and advantages of the invention will appear from the following description of a preferred embodiment, taken together with the accompanying drawings. In the drawings:

FIG. 1 is a perspective view of a radio call box constructed according to the invention;

FIG. 2 is a somewhat schematic plan view of the call box of FIG. 1 illustrating the relationship between various components of the radio call box;

FIG. 3 is a sectional view of the power source of the radio call box of FIGS. 1 and 2;

FIG. 4 is a view taken at 4—4 of FIG. 2; and

FIG. 5 is a perspective view of a portion of the transmission mechanism of the illustrated radio call box.

## DETAILED DESCRIPTION OF A PARTICULAR PREFERRED EMBODIMENT

Referring to FIG. 1, the call box includes an enclosure 10 (e.g., of aluminum or plastic) inside of which is the radio signal producing, encoding, and transmitting apparatus. A side- opening door 12 is provided on the front 14 of enclosure 10 and includes a handle 16 pivotally mounted as at 18 in a bracket 20 on the front surface of door 12 and attached to a pin 22 which is slidably mounted in an opening provided through the door 12. When the door is opened, as in FIG. 1, there is exposed an instruction panel 24 and a moveable selector 26 which is slidable in a channel 28 to positions adjacent labels 30 which indicate the type of signal to be transmitted in the given position of the selector 26. As will be described in further detail below, when the selector is in the proper vertical position for the type of signal desired to be transmitted, pressure against the selector 26 is operative to produce and transmit the radio signal.

A tone generator 32 is disposed on the enclosure 10 in a location so as not to be covered by the door when the door is in the closed position. This device receives a return signal from the help dispatch facility and emits an audible tone in response thereto which indicates to the user of the box that his signal actually has been received at the decoding console at the help dispath facility.

As best seen in FIG. 2, the door 12 is mounted for rotational motion about a shaft 34 which is supported by brackets 36 on the inside surface of enclosure 10. A linkage 38 is disposed between the door 12 and the shaft 34 and comprises a radial portion 40 projecting from the shaft 34 and a circumferential portion 42 integral with the radial portion 40. A generally cylindrical generator and power source subunit 44 is disposed within the enclosure 10 and is pivotally secured at one end to a bracket 46 integral with the enclosure 10. A piston rod 48 projects from the other end of the unit 44 and is secured to a shaft 49 which serves as an axle for spaced upper and lower guide wheels 50. A bar 52 extends between the arm 53 splined to shaft 34 and the shaft 49, being pivotally attached to each. The guide wheels 50 are each confined within a channel defined by upper and lower structural member 54 and member 56 within the enclosurre 10. Open areas 57 within the enclosure 10 may house the conventional circuitry found in radio call boxes.

Referring to FIG. 3, the power source includes a bladed rotatable impeller 62 mounted for rotation in a recess 64 in impeller housing 66. Impeller shaft 68 is coupled to shaft 70 which is secured to the conventional rotational portions of generator 58. A housing 72 is secured to the impeller housing 66 on one side and defines a fluid reservoir 74 therein. A housing 76 is secured to the other side of impeller housing 66 and defines a fluid-tight cylinder 78. A piston 80 is disposed within cylinder 78 for sliding motion therein and is secured to piston rod 48, the latter having a longitudinally extending series of notches 79 in its surface. A resilient material 82 is provided around the circumference of the piston 80 to provide a fluid-tight seal between the cylinder and the piston. Biasing spring 84 is disposed between the piston 80 and the back surface 86 of cylinder 78. Fluid channels 88, 90 are provided in the housing 66 and connect recess 64 with reservoir 74 and cylinder 78, respectively. An additional fluid conduit 92 is provided in housing 66 and provides a direct communication of the reservoir 74 with the cylinder 78. A one-way ball valve 94 is provided in the conduit 92 to permit flow only from reservoir 74 to cylinder 78. A filling tube 96 is secured in an opening in housing 72.

Referring to FIG. 4, a clutch 97 is provided on the shaft 34 and comprises a toothed lower portion 98 which is keyed to the shaft 34 and an upper portion 100 which is secured for rotation with the upper of linkage arms 40 and which includes a single tooth 102. Arms

53, which are connected to bar 52 (see FIG. 2), are also keyed to the shaft 34. A return spring 104 bears against one of the linkage arms 40 to bias the door to a closed position.

Thus, as the door 12 is opened, torque is applied through the arms 40 to the upper portion 100 of the clutch and then by means of the teeth on the lower portion 98 of the clutch, the torque is applied to the main shaft 34 and ultimately arms 53. This causes bar 52 to withdraw piston rod 48 against the bias of spring 84. When the door is closed either by the operator or the return spring 104, the lower portions 98 of the clutch will force the upper portion 100 to rise up on the inclined surface of the last tooth of the lower portion and ultimately to rest on a non-toothed surface 106 of the lower portion 98. This allows the door to open or close without affecting the drive mechanism. As will be seen in greater detail below, if the selector button 26 has been pressed, the upper portion 100 of the clutch will be forced to rise against a spring 108 and engage a detent 110 and will remain in that position. The upper portion of the clutch is connected by keys to the power source in unit 44 and will now remain in the detent 110 until the power source is almost completely run down and has driven the generator for a specified period of time. Just before the end of that specified period of time, a fixed roller 112 engages a ramp 114 on the upper portion 100 of the clutch and drives that portion out of the detent and back to its original position.

The operative of the selector and transmission button 26 may be described with reference to FIG. 5. As discussed above, the selector 26 can be moved vertically to the required help function indicator. At each such position there is an electrical contact 115 and pressure against the selector 26 will complete an electronic circuit as is well known in the art. A spring-loaded carriage 116 is mounted on guide rods 117 within the enclosure 10 behind the button 26 so that pressure on the button 26 will force the carriage toward the rear of the enclosure 10. A retainer pin 118 disposed adjacent a surface of the carriage 116 is vertically aligned with a hole 119 in that surface of the carriage. The pin slides in guide block 120. The pin is urged toward carriage 116 by a cam 123, on lower arm 53 (see FIG. 4). Spring 121 is then compressed to accept the force of cam 123 after the pin engages the side wall of the carriage. The rearward movement of the carriage (as selector 26 is depressed) brings the pin and the hole into alignement. The pin is withdrawn from the hole only at a predetermined orientation of the arms 53 (and thus cam 123) as the power source runs down.

The rearward motion of the carriage 116 causes roller 122 which is secured to clutch yoke 125 to roll up surface 127 of spring-loaded lifting member 124, the member 124 being pivotally attached to carriage 116 at 129. (The spring 126 provides override for the occasion when the upper portion 100 of the clutch will not disengage because the operator of the call box is still applying force to the door. As this force is removed from the door the spring 126 will lift the member 124 and thus, through roller 122 riding on surface 127, the yoke 125. The clutch portions are thus disengaged and the upper portion 100 engages detent 110 as discussed above.) The movement of the carriage 116 will also cause the disengagement of a pawl 128 pivoted at 131 which otherwise engages notches 79 on the piston rod 48 thereby allowing the power source to run down. As mentioned above, at a predetermined point cam 123 on the arm 53 causes the withdrawal of pin 118 from the hole 119 and the carriage 116 will be urged to its original (forward) position under the influence of its biasing spring (not shown). The orientation of the pawl 128 and the notches 79 on piston rod 48 are such that there are no notches adjacent the pawl when the piston rod is in a position which corresponds to the point in which the power source is run down when the pin 118 is withdrawn from the hole 119.

In the operation of the radio call box, as the user opens the door 12, torque is transmitted from the arms 40 through the clutch 98, 100 and shaft 34 ultimately to the arms 53. The rotational motion of the arms 53 is transformed by the bar 52 and the structures 54, 56 into a linear motion of the piston rod 48. The piston 80 is thus withdrawn in the cylinder 78 against the influence of a biasing spring 84. This causes the flow of fluid from the reservoir 74 through the conduit 92 and into the portion of cylinder 78 between the retreating piston 80 and the impeller housing 66. As the selector button 26 is pushed, the movement of carriage 116 causes yoke 125 to lift the upper portion 100 of the clutch so as to disengage it from the lower portion 98. The pawl 128 is also disengaged from notches 79. There is nothing then to restrain the force exerted by the biasing spring 84 on the piston 80 and the forward motion of the piston forces the fluid through conduit 90, against the blades of impeller 62, and through conduit 88 back to the reservoir 74. The single direction valve 94 prevents the reverse flow of fluid through the conduit 92, which flow would by-pass the impeller 62 and thereby be lost as a driving force. The rotation of the impeller drives the signal generator 58 through the rotational linking of the shafts 68 and 70. Conventional encoding and transmitting apparatus (not shown) are interconnected with the generator 58 to provide for the actual transmission of the radio signal.

At a predetermined position in the return motion of piston rod 48, the cam 123 on arm 102 causes the withdrawal of pin 118 from the hole 119 in carriage 116 and permits the forward motion of the carriage 116 and the attendant reengagement of the clutch portions 98, 100.

While a particular preferred embodiment has been illustrated and described in detail, other embodiments are within the scope of the invention and the following claims.

I claim:

1. In a radio call unit comprising a signal generator and a power source for driving said generator, the improvement wherein said power source comprises a bladed rotatable member, first means linking said rotatable member to said generator for driving said generator, and second manually operable means operative to cause flow of a predetermined volume of fluid against the blades of said rotatable member to cause rotation thereof for a predetermined period of time.

2. Apparatus as claimed in claim 1 wherein said second means comprises a cylinder having a fluid outlet near one end, a piston disposed for siding movement in said cylinder, and biasing means which bias said piston toward said one end of said cylinder.

3. Apparatus as claimed in claim 2 wherein said fluid is a liquid and said second means further includes a fluid reservoir and a closed fluid path from said reservoir to said blades and back to said reservoir.

4. Apparatus as claimed in claim 3 wherein said fluid path comprises a first fluid conduit means connecting said reservoir and said cylinder, valve means in said first conduit means permitting flow of fluid in one direction only in said first conduit means, and second fluid conduit means connecting said cylinder and said reservoir, said blades being disposed to engage fluid flowing in said second conduit means.

5. Apparatus as claimed in claim 4 wherein said valve means permits flow from said reservoir to said cylinder and said second conduit means comprises said fluid outlet.

6. Apparatus as claimed in claim 5 wherein said biasing means comprise a spring.

7. A radio call unit comprising

a signal generator;

a bladed rotatable member linked to said generator for driving said generator; and

manually operable means operative to cause flow of a predetermined volume of fluid against the blades of said rotatable member to cause rotation thereof for a predetermined period of time, said means comprising

a cylinder having a fluid outlet near one end,

a piston disposed for sliding movement in said cylinder,

biasing means which bias said portion toward said one end of said cylinder,

conduit means extending between said fluid outlet and a location adjacent the blades of said rotatable member,

an exposed swinging door, and

linking means connecting said door to said piston, whereby swinging motion of said door causes said piston to slide in said cylinder against the biasing influence of said biasing means.

8. A radio call unit comprising



a signal generator;

a bladed rotatable member linked to said generator for driving said generator; and

means operative to cause flow of a fluid against the blades of said rotatable member to cause rotation thereof, said means comprising

a cylinder having a fluid outlet near one end,

a piston disposed for sliding movement in said cylinder,

biasing means which bias said portion toward said one end of said cylinder,

conduit means extending between said fluid outlet and a location adjacent the blades of said rotatable member,

an exposed swinging door, and

linking means connecting said door to said piston, whereby swinging motion of said door causes said piston to slide in said cylinder against the biasing influence of said biasing means, said linking means comprising means to disconnect said door from said piston when said door is in a substantially fully opened position and to re-engage said piston and said door when said door is in a closed position and said piston has returned to its reset position under the influence of said biasing means.

9. Apparatus as claimed in claim 8 further including means to maintain said piston in the position it assumes with respect to said cylinder upon the completion of the swinging open of said door and to release said piston at a time chosen by the operator of the radio call box.

10. Apparatus as claimed in claim 9 wherein said fluid is a liquid and said unit further includes a fluid reservoir and a closed fluid path from said reservoir to said cylinder to said blades and back to said reservoir.

* * * * *

# UNITED STATES PATENT OFFICE

# CERTIFICATE OF CORRECTION

PATENT NO. : 3,873,844

DATED : March 25, 1975

INVENTOR(S) : John G. Willis

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Col. 2, line 36, "enclosure" is misspelled;

Col. 3, line 10, "rod" should be --bar--;

Col. 3, line 12, "portions" should be --portion--;

Col. 3, line 30, "operative" should be --operation--;

Col. 4, line 61, "siding" should be --sliding--;

Col. 6, line 25, "reset" should be --rest--.

Signed and sealed this 17th day of June 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents
and Trademarks

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