Oct. 13, 1959 C. DISPENZA 2,908,165

RAIN RECORDING APPARATUS

Filed Dec. 10, 1957

Fig. 1.

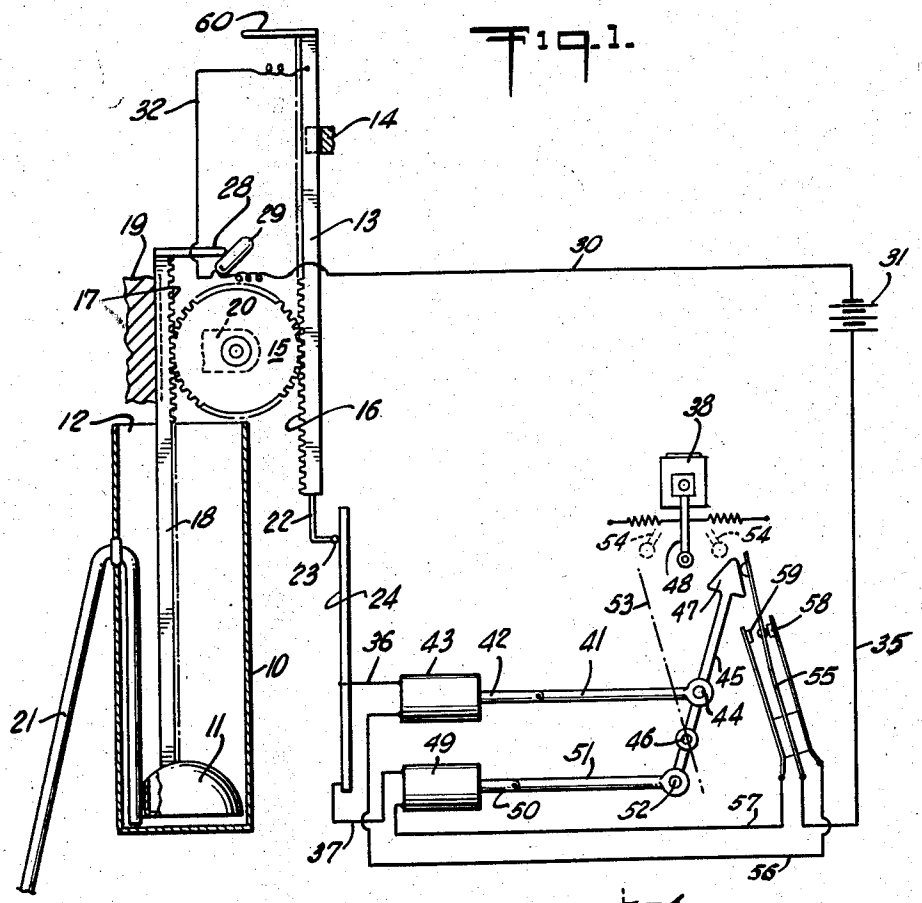


Fig. 2.

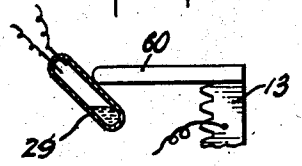


Fig. 3.

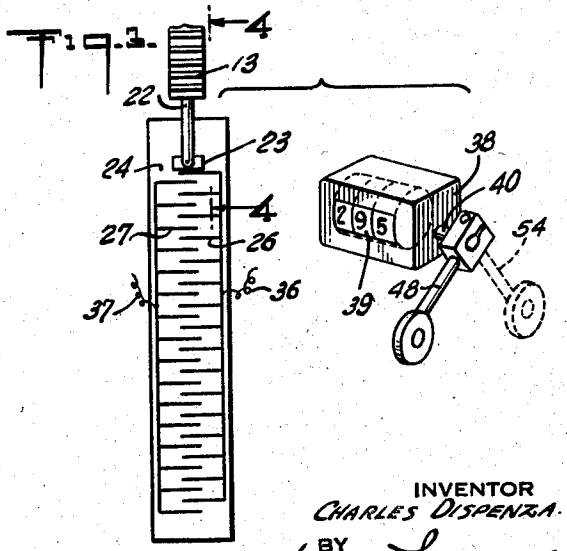
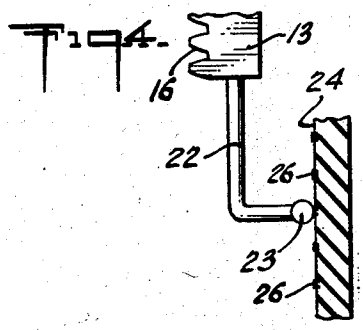


Fig. 4.



INVENTOR
CHARLES DISPENZA.
BY
ATTORNEY

United States Patent Office 2,908,165 Patented Oct. 13, 1959

2,908,165

RAIN RECORDING APPARATUS

Charles Dispenza, Maplewood, N.J.

Application December 10, 1957, Serial No. 701,865

1 Claim. (Cl. 73—171)

This invention relates to a rain recording apparatus which is completely automatic in operation and incorporates novel means for telemetering measurement of rainfall to a location which may be remote from the point of collection of the rainfall and for so recording the rainfall as visible numbers eliminating the necessity of charts, pen arm and clock driven mechanism.

Examples of practical devices embodying the invention are described below and in the accompanying drawings; the invention is not limited thereto, but covers all other forms coming within the scope or purview of the disclosure herein.

In the drawings:

Fig. 1 is a partly diagrammatic, partly sectional, elevational view of an apparatus embodying the invention,

Fig. 2 is a fragmentary, elevational view of the upper end of the slide arm which may be used in carrying out the invention, shown opening a switch connecting the electrical actuator member of the invention with the power source, to thus disconnect the mechanism until reset,

Fig. 3 is a partly fragmentary, front elevational view of a contact plate which may be used in carrying out the invention, showing the lower end of the slide arm in the position of the parts shown in Fig. 1, ready for automation operation, showing also, in perspective, a counter unit which may be used in carrying out the invention, and

Fig. 4 is an enlarged, fragmentary, sectional view taken on line 4—4 of Fig. 3.

The invention may be carried out with an apparatus such as shown in the drawing, including a tank **10** for collecting rainfall, and a float **11** in said tank for vertical movement therein responsive to filling and emptying of the tank by rainfall which may fall into said tank either through the open end **12** thereof or through an independent or separate conduit means. An elongated counterbalancing rack **13** is reciprocably mounted in the apparatus, as for example, by mounting it in a guide support **14** and means are provided for connecting the float and rack for reciprocating the latter responsive to and in unison with the vertical movement of the float as the tank is filled and emptied. Said means may comprise, as shown in the drawings, a pinion or gear **15** which may be rotatably mounted on a support **20** meshing with a gear face **16** of the rack **13** and with a similar gear face **17** on an elongated stem **18** fixed to the float **11**, the stem **18** being reciprocably mounted in a suitable guide support **19**. A syphon tube **21** may be provided, corresponding with the syphon tube 64 of my Patent 2,735,298. A slide arm **22** may be fixed to the lower end of the rack **13**, the end **23** of said slide arm contacting the face **24** of a plate on which a plurality of contacts **26, 27**, such as a right and left hand series arranged in staggered relation (Fig. 3) are printed or otherwise provided. The relative proportions and arrangement of the parts described will be such that the slide arm **22** will be disengaged from the contacts **26, 27** while float **11** is at the bottom of the tank as shown in Figs. 1 and 3. At that

position of the float, a finger **28** at the upper end of the float stem **18** engages a tiltably mounted mercury switch **29** which connects the wire **30** from power source **31** and wire **32** fixed to slide arm **22** (or, as shown in Fig. 1, wire **32** may be fixed directly to the rack **13** or to a conductive portion thereof connected with the slide arm **22**). Thus, when the switch **29** is closed (the tank **10** being empty) the apparatus is ready for operation.

When float **11** rises, responsive to rainfall collected in tank **10**, rack **13** will be moved downwardly, slide arm **22** will close on a contact such as **26** or **27**. A counter **38** is provided in the apparatus and may be located at any desired point remote from tank **10**, said counter having a plurality of number discs rotated responsive to reciprocation of shaft **40** of said counter.

Suitable electrically actuated means are provided for actuating the counter shaft **40** on wiping of the end **23** of slide arm **22** on contacts **26, 27**, thus automatically recording and indicating at **39** the precise extent of rainfall collected in the tank **10**. As the rack **13** moves downward it slides the end **23** of contact arm **22** over the sets **26, 27** of stationary contacts, insulated from each other (Fig. 4) alternately spaced downward and graduated to any desired subdivisions of units of rainfall. Each of the two sets of stationary contacts is connected as by wires **36, 37** in series with its respective solenoid **43, 49** in the power supply, so that as the sliding contact **23** which is also connected in series to the power supply **31**, moves downward over the stationary contacts **26, 27** the solenoids (**43, 49**) are alternately energized, causing operation of a reciprocating cam **47** actuating numerical counter **38**. The number of stationary contacts traversed by the sliding contact arm are numerically indicated on the counter. Also in series with each solenoid circuit is a switch (**55, 58, 59**) which opens immediately after each solenoid has been energized, in order to avoid continued passage of current through the solenoid after it has completed the desired operation. Thus, for example, the switch arrangement may be that shown in Fig. 1 wherein the solenoid **49**, on actuation, rotates cam arm **45** to the full line position shown moving the counter arm **48** to the right of the center dotted line **54**; arm **45** then rests on switch **55—58—59** as shown in Fig. 1. Thus, the circuit to solenoid **49** is opened by separation of contact **55** from contact **59** for solenoid **49**, and contacts **55—58** are pressed together, closing the circuit to solenoid **43** which is thus made ready for operation when the slide mechanism (Fig. 3) completes the circuit for solenoid **43**. Solenoid **43**, when energized, moves the cam arm **45** to the **53** dotted line position shown in Fig. 1, wherein the cam arm **45** is moved off the switch, allowing the switch arm **55** to close on contact **59** for solenoid **49**. Thus, the end of the operation each solenoid moving the cam arm **45** one stroke, cam arm **45** opens the circuit to that solenoid, cutting it off. Thus the solenoid has current flowing therethrough only until it has moved the cam arm **45**; the current is then cut off. The electrical circuit and arrangement just described and shown in Fig. 1 is exemplary of mechanisms useful for the purpose mentioned. The specific electrical mechanism for translating the wiping of end **23** of slide arm **22** on the contacts **26, 27** into numbers **39** in counter **38** may be any suitable means such as the electromagnetic arrangement shown in the drawings and below described, including the means **45** for reciprocating arm **48** of counter **38**, and may include switch means such as shown at **55, 58, 59** for opening the circuit immediately after movement of arm **48**. Examples of devices suitable to that end are shown in the drawings.

Link **41** is actuated by solenoid arm **42** and connected as at **44** with the cam arm **45** for reciprocating arm **48** of

counter 38, arm 45 being pivoted at 46. Cam 47 of arm 45 is in effect a cam engaging rod 48 keyed to the counter shaft 40. The second solenoid 49 has an arm 50 connected to a link 51 pivotally connected at 52 to arm 45. Thus reciprocation of the arm 45 to the full line position shown in Fig. 1 or to the dotted line position 53 there shown is attained responsive to actuation of links 41, 51, moving the counter rod 48 to the dotted line positions shown at 54 in Figs. 1 and 3, alternately responsive to movement of arm 45 on engagement of slide arm 22, with the contacts 26, 27. A switch 55 connects the wires 56, 57 of the solenoids 43, 49 with the power source wire 35 and said switch is so disposed that as shown in Fig. 1, it will close on the contact 58 for the wire 56 of solenoid 43 with the arm 42 of solenoid 43 extended, and when the arm 50 of solenoid 49 is extended, moving arm cam 45 to the dotted line position 53, switch 55 will close on the contact 59 for wire 57 of solenoid 49.

The upper end of the rack 13 is provided with a finger 60 (Fig. 1) which (Fig. 2) will engage the switch 29 to move the same to its inoperative position when rack 13 is at its lowermost position (Fig. 2) cutting the mechanism off until it is re-set by the operator (Fig. 1) on emptying the tank.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

In a rain recording apparatus, a slide arm movably disposed in said apparatus, means in said apparatus to move the slide arm responsive to the extent of rainfall, slide contacts disposed in said apparatus for selective engagement on such movement of the slide arm, a recorder operative, on movement, to record the extent of rainfall, an arm pivotally mounted in the apparatus relative to the recorder and adapted on pivotal movement to engage and move the recorder, thus recording the extent of rainfall, electrically operable members engaging said arm at opposite points of the pivotal mounting of the arm, and means electrically connecting said members with said slide contacts so that said members will be selectively electrically energized to alternately engage and move said pivotally mounted arm only for a limited distance and being then automatically de-energized electrically.

References Cited in the file of this patent

UNITED STATES PATENTS

828,570	Regan	Aug. 14, 1906
1,079,229	Fitzgerald	Nov. 18, 1913
1,179,486	Wight	Apr. 18, 1916
1,285,169	Hess	Nov. 19, 1918
1,387,022	Stuber	Aug. 9, 1921
2,202,452	Hildabrand	May 28, 1940
2,735,298	Dispenza	Feb. 21, 1956