

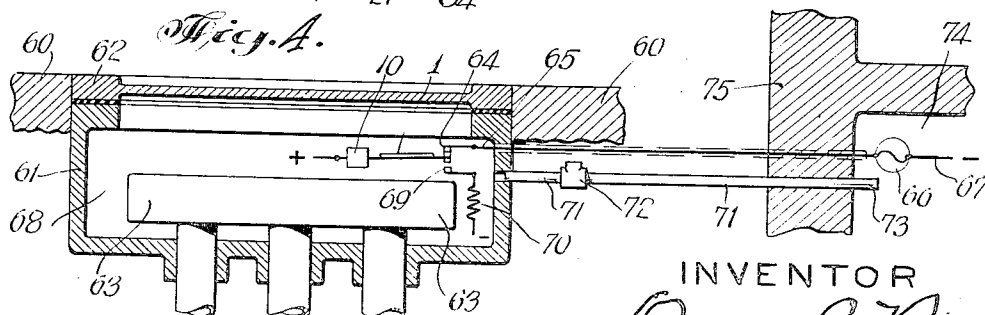
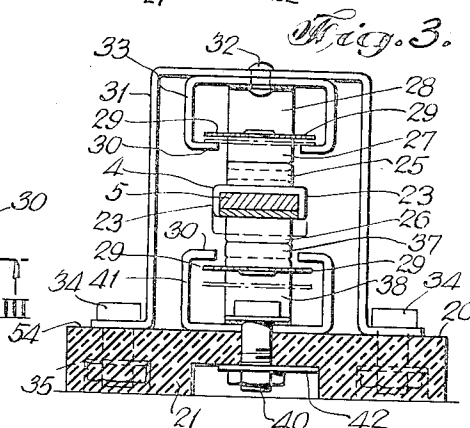
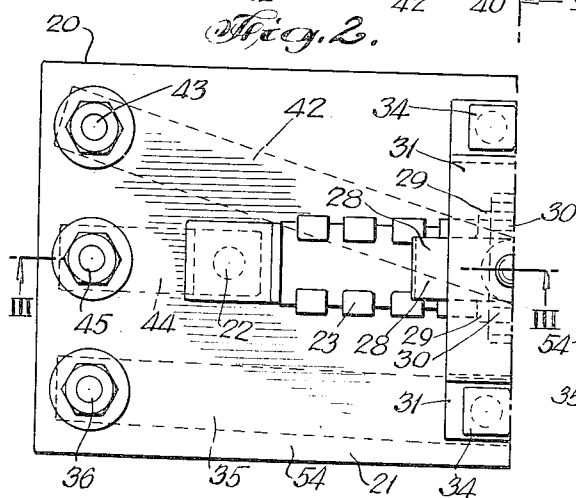
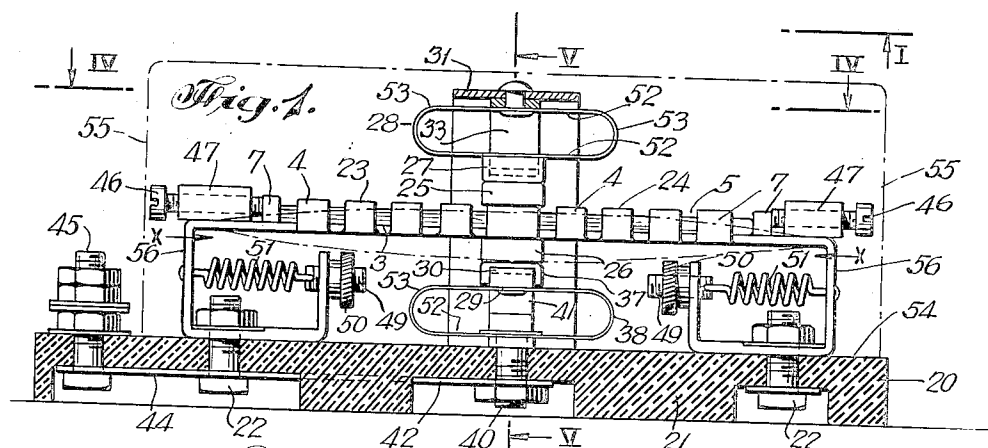
March 16, 1937.

O. A. ROSS

2,073,808

CIRCUIT CONTROLLER

Filed Aug. 9, 1923



INVENTOR
Oscar A. Ross.

UNITED STATES PATENT OFFICE

2,073,808

CIRCUIT CONTROLLER

Oscar A. Ross, New York, N. Y.

Application August 9, 1928, Serial No. 298,437

12 Claims. (Cl. 200—52)

This invention refers to hygrostats.

The prime object of this invention is to provide means for automatically controlling the degree of humidity in a closed space.

Another object is to produce circuit closers controlled by a hygrostat or other variable element control device, as for example, a thermostat, wherein a quick break as well as a quick make of contacts obtains.

Other objects and advantages will appear as the description of the invention progresses, and the novel feature of the invention will be pointed out in the appended claims.

This invention consists in the novel construction and arrangement of parts hereinafter described, delineated in the accompanying drawing, and particularly pointed out in that portion of this instrument wherein patentable novelty is claimed for certain and peculiar features of the apparatus, it being understood that, within the scope of what hereinafter thus is claimed, divers changes in the form, proportions, size and minor details of the structure may be made without departing from the spirit of, or sacrificing any of the details of the invention.

In describing the invention in detail, reference is had to the accompanying drawing, wherein I have illustrated embodiments of my invention, and, wherein like characters of reference, designate corresponding parts throughout the several views, and in which:—

Fig. 1 is a part plan part sectional view taken on line 3—3 of Fig. 2, and Fig. 2, is a top plan view of a portion of the device shown in Fig. 1, and is taken on line 4—4 thereof, and Fig. 3, is a sectional view taken on line 5—5 of Fig. 1, and Fig. 4, is a part sectional part diagrammatic view of a closed space to which applicant's improved hygrostat has been applied.

Referring to Figs. 1, 2, and 3, illustrating a preferred form of quick make and break circuit closer 20 rendered operative by a change of the saturated condition of the atmosphere or other gases by which it may be surrounded, secured to base 21, by bolts 22—22, is hygrosopic member 23 having deflecting portion 24, comprising hygrosopic flexing member 5, supported by plate portion 3 having allocating lugs 4—4, and to each side of which is secured contacts 25 and 26, contact 25 being arranged to engage contact 27 secured to resilient support 28, having stop lugs 29—29 arranged to impinge on abutments 30—30 when contacts 25 and 27 are separated, the resilient support 28 being secured to bracket 31 by

rivet 32, abutment member 33 being interposed therebetween.

Bracket 31 is secured to base 21 by bolts 34—34, one of said bolts forming electrical connection to conductor 35 extending to terminal post 36.

Contact 26 is arranged to engage contact 37 secured to resilient support 38 having stop lugs 29—29 arranged to impinge on abutments 30—30 of bracket 41 when contacts 26 and 38 are separated, said resilient support 38 being secured to base 21 by bolt 40, bracket 41 being clamped therebetween, said bolt also forming electrical connection between contact 37 and conductor 42 terminating in terminal post 43.

Contacts 25 and 26 are electrically connected to terminal post 45, by conductor 44 connected to bolt 22.

The saturation content at which hygrosopic flexing member 24 operates is determined by the adjustment of screws 46—46 adjustably supported by members 47—47 secured to plate portion 3, said screws adjustably positioning stops 7—7 impinging on ends 15 and 16 of hygrosopic member 5. The aforesaid action is also determined in part by the positioning of screws 49—49 by adjustment of nuts 50—50, said screws acting to increase or decrease the tension of springs 51—51, an increase of said tension requiring a higher saturated condition of the surrounding air, or gas for operation thereof and a lowering of said tension, a lower saturated condition of said air, or gas, for said operation.

The resilient contact supporting members 28 and 38 are preferably made from spring metal and comprise flat spring portions 52—52 and semi-cylindrical spring portions 53—53.

All the parts secured to base 21 above the surface 54 except terminal posts 36, 43 and 45 may be covered by a grated cover, as 55 shown dotted.

The various metal parts are preferably electroplated or otherwise protectively covered by a material substantially impervious to the hygrosopic fluid with which the air or gas may be more or less saturated, and the recesses in the bottom of said base may be filled with a suitable wax, or other current filler material.

Referring to Fig. 4, showing one application of applicant's improved hygrostat 20, in pavement 60 is supported service manhole 61, having gasketed cover 62, supporting fuse block and conductor terminals 63—63, also conveniently located within said service manhole is a hygrostat unit, as 1, or 20, arranged to be effected by the moisture content of the air within said man-

hole. Said unit is also arranged to control two circuits as follows: from positive energy through hygrostat 1, contact 64, wire 65, indicating lamp 66, wire 67, to negative energy, this circuit being energized when the moisture content in space 68 is less than the prescribed maximum permissible.

The other circuit is established when said moisture content in said space becomes excessive, and is formed as follows:—from positive energy as before, hygrostat 1, contact 69, and heater 70 to negative energy. When this circuit is established heater 70 is energized, thereby heating space 68 and driving the moisture from said space through conduit 71, leaving check valve 72, said conduit extending to the interior 74, of a building 75 or other convenient space where is also located lamp 66 whereby they may be periodically inspected.

If on inspection it is found that the lamp 66 is extinguished thereby indicating excess moisture content, a hygroscope of known form may be attached to the end 73 of said conduit whereby the amount of moisture discharged thereby may be determined.

Operation

Referring to Figs. 1, 2 and 3, showing a quick make and break circuit closer 20 of the hygrostatic type, said circuit closer is shown as being in operation, the flexing portion 24 of hygroscopic member 23 being substantially in mid movement and is assumed to be moving downwardly in rapid motion, finally arresting in the dotted position shown in Figs. 1 and 2. The downward movement of contact 27 however is arrested by lugs 29—29 impinging on abutments 30—30 before the completed downward movement of portion 24 and therefore a separation of contacts 25 and 27 obtains this separation being comparatively rapid, in this manner preventing the forming of an arc therebetween. The final downward movement of deflecting portion 24 of member 23 causes contact 37 to be moved downwardly to the dotted position shown in Fig. 3, whereby lugs 29—29 thereof are moved a substantial distance away from abutments 30—30. Brackets 56—56 are biased inwardly as indicated by arrows $x-x$ thereby tending to cause a bowing of portion 24 whereby it is normally restrained to the dotted positions shown, springs 51—51 assisting to more prominently effect said bowing.

Assuming that the moisture, or other fluid content affecting hygroscopic flexing member 5 has been reduced and said fluid absorbed by said member has been evaporated whereby said member is reduced in longitudinal dimension, the normal bias of plate portion 3, of member 23 will restrain deflecting portion 24 upwardly, said action at first being slow due to the comparatively larger sine of the angle of maximum deflection of said portion. However as said portion approximates the mid position and contact 25 approximates contact 27, the sine of the angle becomes almost negligible and therefore the effect of brackets 56—56 together with springs 51—51 become inversely greater and therefore deflecting portion 23 will move rapidly causing a rapid make of contacts 25 and 27 and subsequently a rapid break of contacts 26 and 37.

The movement of deflecting portion 23 during the making and breaking periods of said contacts, is so rapid its movement cannot be readily detected by the naked eye. Such rapid movement is desirable in the opening and closing of elec-

tric circuits to prevent arcing of the contacts for the control thereof.

What I claim is:—

1. In a quick acting circuit breaker, a contact operating member having an inherently operated bi-material flexing portion, means for rigidly securing the ends of the member for initially effecting movement of the flexible portion for a period of comparatively slow movement followed by a period of comparatively rapid movement after passing through a critical stage therebetween, the movement being in response to changes in the condition of the gases surrounding the member, a primary contact supported by the flexing portion arranged to be moved therewith, a resiliently supported secondary contact arranged to normally engage the primary contact and move therewith through both the comparatively slow and rapid movements thereof, and means abruptly arresting the movement of the secondary contact during the comparatively rapid movement thereof for effecting a quick opening of the contact.

2. In a quick acting circuit breaker, a contact operating member having an inherently operated bi-material flexing portion, means for rigidly securing the ends of the member for initially effecting movement of the flexible portion for a period of comparatively slow movement followed by a period of comparatively rapid movement after passing through a critical stage therebetween, the movement being in response to changes in the condition of the gases surrounding the member, a primary contact supported by the flexing portion arranged to be moved therewith, a secondary contact supporting member having a fixed portion and a resiliently moved portion, a secondary contact supported by the resiliently moved portion arranged to engage the primary contact and be moved therewith through both the comparatively slow and comparatively rapid movements of the flexing portion, a fixed arresting member having a stop portion positioned in the path of the resiliently moved portion of the secondary contact supporting member arranged to abruptly arrest the movement of the resiliently moved portion during the comparatively rapid movement of the flexing portion for effecting a quick opening of the contact.

3. A quick acting switch comprising, a pair of movable supporting members having contact portions formed thereon, said members being arranged to hold said contact portions in engagement at a substantial pressure during the movement of the members over a common range, means for imparting movement of said members at high velocity over a substantial portion of said common range, and means for abruptly arresting the movement of one of said members during the movement thereof over said common range while permitting the other member to continue its movement, the movement of the arrested member being effected after the members have attained a high velocity of movement thereof.

4. A quick acting switch comprising, a pair of movable supporting members having contact portions formed thereon, said members being arranged to hold said contact portions in engagement at substantial pressure during the movement of said members over a common range, atmospherically affected means for imparting a high velocity movement of said members over a substantial portion of said common range in response to predetermined changes in the condition of the atmosphere, and means for abruptly arresting the movement of one of said members

while permitting the other member to continue its movement, the movement of the arrested member being effected after the members have attained a high velocity movement thereof for quickly separating the contact portions.

5. In a hygroscopic circuit breaker, a hygroscopic member having an inherently operated flexing portion, means for rigidly securing the ends of the member for initially effecting movement of the flexing portion for a period of comparatively slow movement thereof followed by a period of comparatively rapid movement after passing through a critical stage therebetween, the movement of the flexing portion being in response to changes in the moisture content of the gas surrounding the member, a primary contact supported by the flexing portion arranged to be moved therewith, a resiliently supported secondary contact arranged to normally engage the primary contact and move therewith through both the comparatively slow and rapid movements thereof, and means abruptly arresting the movement of the secondary contact during the comparatively rapid movement thereof for effecting a quick opening of the contact.

6. In a hygroscopic circuit breaker, a hygroscopic member having an inherently operated flexing portion, means for rigidly securing the ends of the member for initially effecting movement of the flexing portion for a period of comparatively slow movement thereof followed by a period of comparatively rapid movement after passing through a critical stage therebetween, the movement of the flexing portion being in response to changes in the moisture content of the gas surrounding the member, a primary contact supported by the flexing portion arranged to be moved therewith, a secondary contact supporting member having a fixed portion and a resiliently moved portion, a secondary contact supported by the resiliently moved portion arranged to engage the primary contact and be moved therewith through both the comparatively slow and comparatively rapid movements of the flexing portion, a fixed arresting member having a stop portion positioned in the path of the resiliently moved portion of the secondary contact supporting member arranged to abruptly arrest the movement of the resiliently moved portion during the comparatively rapid movement of the flexing portion for effecting a quick opening of the contact.

7. In a circuit breaker, a base, a bridge secured thereto extending thereacross spacedly between the ends thereof, a contact supporting member including an inherently operated flexing portion extending under the bridge, the ends of the member being secured to the base for normally effecting a flexed position of the flexing portion, contacts supported by the flexing portion arranged to be moved therewith, a resilient member supported by the base having a resiliently moved portion supporting a primary contact arranged to engage one of the contacts supported by the flexing portion, another resilient member supported by the base having a resiliently moved portion supporting a secondary contact arranged to engage the other contact supported by the flexing portion, and stops for limiting the movement of the resiliently moved portions for effecting separation of the primary and secondary contacts during their engagement with the contacts supported by the flexing portion.

8. In a circuit breaker, a base, a substantially rigid bridge secured thereto extending there-

across spacedly between the ends thereof, a contact supporting member including an inherently operated flexing portion extending under the bridge spacedly therefrom, the ends of the member being secured to the base for normally effecting a flexed position of the flexing portion, a primary contact supported by the flexing portion arranged to be moved thereby, a resilient member supported by the bridge having a resiliently moved portion supporting a secondary contact arranged to engage and move with the primary contact supported by the flexing portion and an arresting member secured to the bridge arranged to arrest the movement of the resiliently moved portion of the resilient member for abruptly arresting the movement of the secondary contact during the engaged movement thereof with the primary contact.

9. In a circuit breaker, a base, a bridge having a contact supporting portion positioned spacedly above the base, supporting portions on the bridge at each end of the contact supporting portion extending to the base for positioning the bridge on the base, a downwardly facing contact resiliently supported by the contact supporting portion of the bridge, an upwardly facing contact resiliently supported by the base under the bridge, a fluid variation affected contact operating member supported by the base having an inherently moved portion extending under the bridge spacedly therebetween and the base, stops normally fixing the non-contacting position of the resiliently supported contacts, and contacts supported by the inherently moved portion of the contact operating member arranged to engage and disengage the contacts supported by the bridge and the base.

10. In a circuit closer, a base, a bridge secured thereto, extending thereacross spacedly between the ends thereof, a contact operating member having the end portions thereof secured to the base spaced inwardly from each end thereof, an intermediate inherently operated contact supporting portion on the operating member extending under the bridge spacedly therebetween and the base, a contact resiliently supported by the base under the bridge, another contact resiliently supported by the bridge on the under side thereof, contacts supported by the intermediate portion of the operating member arranged to alternately engage and move the contacts resiliently supported by the bridge and base, and stops supported by the bridge and base respectively for limiting the movement of the resiliently supported contacts during the movement thereof by the contacts supported by the intermediate portion.

11. In a quick acting circuit breaker, a base, a contact operating member comprising an inherently actuated intermediate flexing portion having contacts supported thereby arranged to be moved therewith, downwardly extending wall portions joined to each end of the intermediate portion for positioning thereof spacedly parallel over the base, allocating wall portions joined to the lower end of the downwardly extending wall portions arranged to be clamped to the base for securing the operating member thereto, the allocating wall portions being substantially parallel to the intermediate portions, and contacts supported by the base arranged to be engaged and disengaged by the contacts supported by the intermediate portion during the inherent movement thereof.

12. In a contact support for quick acting cir-

cuit breakers, a bridge member having top and side wall portions, the wall portion having outwardly extending clamping portions for securing the members to a base, a contact supporting
5 member having a fixed portion secured through the top wall of the bridge and a resiliently moved portion supporting a contact, the resiliently

moved portion being normally urged away from the top wall, and an arresting member secured to the bridge having stop portion arranged in the path of the resiliently moved portion for positioning the contact at a pre-determined distance below the top wall of the bridge. 5

OSCAR A. ROSS.