

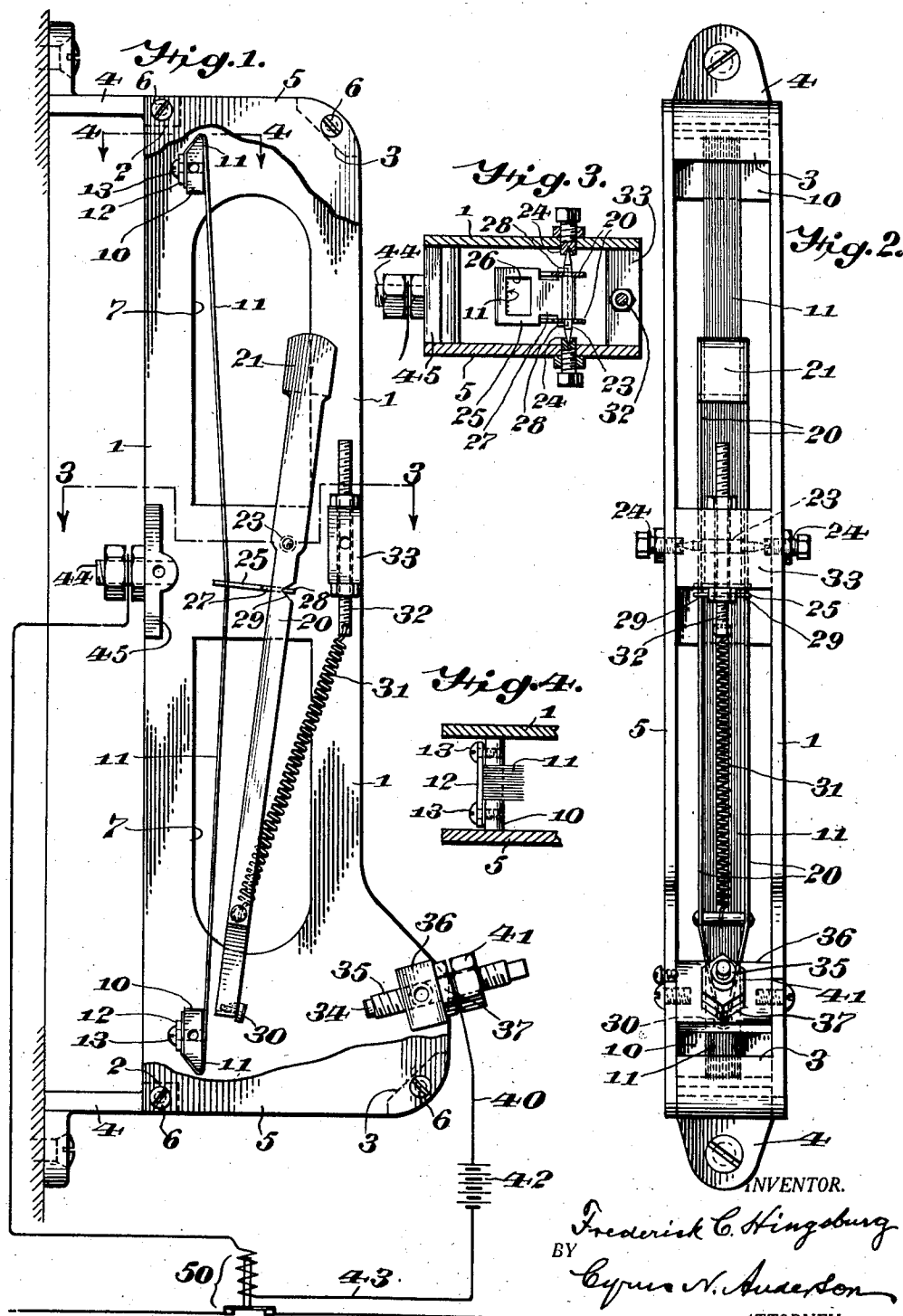
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HUMIDITY RESPONSIVE CIRCUIT CLOSING DEVICE

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HUMIDITY-RESPONSIVE CIRCUIT-CLOSING DEVICE.

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Certain materials are sensitive to moisture and expand when exposed to increasing amounts of moisture and contract when exposed to decreasing amounts of moisture. I have discovered or invented means whereby this phenomenon may be employed or made use of for the purpose of controlling apparatus of various kinds, but more particularly apparatus located in the open air and subjected to atmospheric conditions. In such case the variations of the moisture in the atmosphere is manifested in the said material by the expansion or contraction thereof whereby means is operated for performing such functions as those for which the apparatus embodying such means may be adapted. It is well known that the humidity of the atmosphere varies from zero to a maximum at which precipitation is manifested in the form of rain, snow or the like.

As a practical example of an apparatus wherein my invention may be employed I may mention automatic fog signals which in the absence of such control as would be afforded by my invention would operate continuously, but if provided with my invention would operate only when the humidity of the atmosphere should be such as to indicate fog, rain or snow or conditions of low visibility due to an excess of humidity or moisture in the atmosphere.

It is apparent that if fog signaling apparatus be provided with means whereby it is operated or sounded only when necessary for the direction and control of traffic great saving in the cost of operation as well as a lengthening of the service time of such apparatus would be effected.

A more specific object of my invention is to provide means whereby the expansion and contraction of the sensitive element of an apparatus, as above described, may be operated to open or close an electric circuit or conduit which, either directly or through a relay is adapted to put into or out of operation a sound signal; or to operate a valve to open or close a conduit through which gas or other fluid is adapted to flow.

It will be apparent that my invention not only is applicable to apparatus of the character specifically indicated but also may be employed for the operation of apparatus of

any other kind provided the control thereof is to be determined by the degrees of the moisture or humidity present in the atmosphere within which the apparatus is situated.

Other objects and advantages of my invention will be pointed out in the detailed description thereof which follows or will be apparent from such description.

In order that the invention may be readily understood and its practical advantages fully appreciated reference may be had to the accompanying drawing in which I have illustrated one form of mechanical embodiment thereof. However, it will be understood that changes in the details of construction may be made within the scope of the claims without departing from the said invention.

In the drawing:

Fig. 1 is a view in side elevation of an apparatus embodying my invention, portions of one side being broken away in order that the operative parts may be more clearly disclosed;

Fig. 2 is a view in front elevation of said apparatus;

Fig. 3 is a transverse sectional view taken on the line 3—3 of Fig. 1; and

Fig. 4 is a transverse sectional view taken on the line 4—4 of Fig. 1.

Before proceeding with the detailed description of the invention by reference to the drawing it may be noted that various materials, such as flax and hemp fibres, cat gut, horse and human hair are sensitive to moisture or humidity, but thus far I have obtained the best results by the use of human hair.

Referring now to the drawing: 1 designates a side plate provided with inwardly extending lugs 2 and 3, the former being situated at the upper and lower ends of the rear edge of the said plate and the latter at the upper and lower ends of the front edge thereof. The lugs 2 are provided with integral rearwardly extending brackets 4 having feet by means of which the said plate with the parts attached thereto and supported thereby is adapted to be supported upon a post, wall or other like support, not shown. A plate 5 is secured by means of screws 6 to the outer ends of the lugs 2 and 3. The plate 1 is provided with elongated openings, as indicated at 7, and the plate 5 likewise is provided with openings, not shown. The upper and lower

ends of the space between these plates is open. It will be seen, therefore, that the atmosphere has free and unimpeded access to the space between the said plates so that any element or part of the apparatus which may be sensitive to moisture which may be present in the said space is fully and freely exposed to the atmosphere so that the full effect of the moisture thereon may be had. The plate 1 is provided with additional inwardly extending lugs or projections 10 which are situated near the opposite ends thereof and the outer ends of which may be connected to the plate 5 by means of screws if desired. The lugs 10 constitute the supports for the controlling element 11 which is adapted to expand with increasing moisture or humidity of the atmosphere and to contract when such humidity or moisture decreases. The element 11 consists preferably of human hair, as already indicated, but may consist of other materials, such as flax or hemp fibres, horse hair, cat gut or the like. The opposite ends thereof are bent around the upper edges of the lugs 10 and are clamped underneath clamping plates 12 which are clamped against the rear sides of the said lugs by means of screw bolts 13. The strand of hairs 11 are arranged in a manner similar to that of the hairs upon the bow of a violin. They are drawn taut and the opposite ends thereof are clamped underneath the clamps 12 so that they may be permanently held in place. The placing of the hairs or other material upon the lugs 10 should be effected in a dry atmosphere; that is, when in a dry state.

As a means for opening and closing a conduit, shown in the present construction as an electric circuit or conduit, I have provided a member 20 which consists, in the construction shown, of two opposite side plates connected at their lower ends by a bend and at their upper ends by a counterbalance weight 21 to which the said upper ends are secured. The said member 20 is provided at a point intermediate its ends, nearer its upper than to its lower end, with a pin 23, the opposite ends of which are pointed and engage in seats therefor upon the inner ends of bolts 24 adjustably secured in the sides 1 and 5 of the apparatus. The pivoted member 20 is operatively connected with the sensitive strand of hairs 11 by means of a flat link member 25 having an opening 26 there-through through which the said hairs extend and against one side of which they contact, as shown in Fig. 3. The link member 25 is provided with a reduced portion 27 which extends between the opposite sides of the member 20 and is provided with outwardly extending projections 28, the inner edges of which are seated in notches 29 in the front edges of the opposite sides of the swinging member 20. The link 25 engages the strand

11 of hairs at a point substantially midway between the opposite ends thereof. The lower end of the swinging member 20 is provided with a contact 30 secured thereto in any suitable manner, as by soldering.

For the purpose of tending to cause and of causing outward swinging movement of the lower end of the swinging member 20 upon the expansion of the controlling strand 11 I have provided a coiled spring 31 which is constantly under tension and the lower end of which is connected to the member 20 at a point near the lower end of the latter while the upper end thereof is connected to the lower end of a screw-threaded rod 32 adjustably supported in a lug or projection 33 upon the innerside of the outer edge portion of the plate 1 near the center of the latter. The spring 31 exerts a pull at all times upon the member 20 tending to cause outward swinging movement of the lower end thereof. Upon expansion of the strand 11, whether the same be human hair or some other material, under the influence of moisture or humidity in the atmosphere the lower end of the member 20 swings outwardly under the influence of the spring 31 and the contact 30 contacts with a contact 34 upon the inner end of a rod 35 which is supported upon a block 36 of insulating material which in turn is supported upon the side 1 of the frame structure. The rod 35 is adjustable and may be adjusted inwardly and outwardly and is adapted to be held in its adjusted position by means of the lock nut 37. A conducting wire or lead line 40 is connected to the member 35 by means of a binding nut 41. The opposite end of the said conductor or lead line is connected to one side of a battery 42. A second lead line or conductor 43 is connected at one end to the opposite side of the said battery and its opposite end is connected to a post 44 secured to a projection 45 upon the plate 1. The conductor or lead line 43 is connected, in the construction shown, with a relay, as indicated at 50, the operation of which is well understood.

When the apparatus is placed outdoors where it is subjected to the usual atmospheric conditions the expanding and contracting element 11 expands as the moisture or humidity in the atmosphere increases and as it expands the wire 31 contracts to cause outward swinging movement of the lower end of the pivoted member 20. As a result of such outward movement the contact 31 contacts with the contact 34 upon the rod 35 to complete the circuit through the wire 40, the battery 42, the wire 43 and the frame structure so as to operate the relay at 50. The passage of current through the circuit of the relay may be caused to operate a fog signal or any other device or apparatus.

It will be apparent that the conductors or lead lines having connection with the battery

42 may be connected directly with the part to be operated or actuated without the intervention of a relay.

It will also be apparent that the member 20 may be caused to contact with a valve or the like to operate the same directly to open or close a conduit without the intervention or employment of electricity. In the latter case it is obvious that the electric circuits, relays and the like would be omitted.

The essential feature of my invention is the provision of means whereby the expansion and contraction of an element due to the increase or decrease of moisture in the atmosphere may be caused to perform or effect any particular function for or to which the apparatus in which my invention may be embodied is adapted.

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

1. In apparatus of the character described, the combination of a strand of human hair, supports spaced from each other to which the opposite ends of said strand are secured, an electric circuit including a contact and a member which member is pivoted intermediate its ends the upper end of which is provided with a counterbalance weight and the lower end of which is adapted to swing back and forth between the said strand and the said contact to open and close said circuit, a connection between the portion of said member below its pivot and the said strand, and yielding means tending to cause movement of the lower end portion of said member away from the said strand toward the said contact.

2. In apparatus of the character described,

the combination of a strand of hair, supports spaced from each other to which the opposite ends of said strand are secured, an electric circuit including a contact and a member which member is pivoted intermediate its ends the upper end of which is provided with a counterbalance weight and the lower end of which is adapted to swing back and forth between the said strand and the said contact to open and close said circuit, a connection between the portion of said member below its pivot and the said strand, and yielding means tending to cause movement of the lower end portion of said member away from the said strand toward the said contact.

3. In apparatus of the character described, the combination of means which is adapted to expand and contract with increasing and decreasing atmospheric humidity, supports spaced from each other to which the opposite ends of said means are secured, an electric circuit including a contact and a member which member is pivoted intermediate its ends the lower end of which member is adapted to swing back and forth between the said means and the said contact to open and close said circuit, a connection between the portion of said member below its pivot and the said expanding and contracting means, and yielding means tending to cause movement of the lower end portion of said member away from the said expanding and contracting means toward the said contact.

In testimony that I claim the foregoing as my invention, I have hereunto signed my name this 27 day of November, A. D., 1922.

FREDERICK C. HINGSBURG.