

Oct. 11, 1966

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3,277,595

THERMALLY CONTROLLED DRIVE MECHANISM

Filed Jan. 2, 1964

3 Sheets-Sheet 1

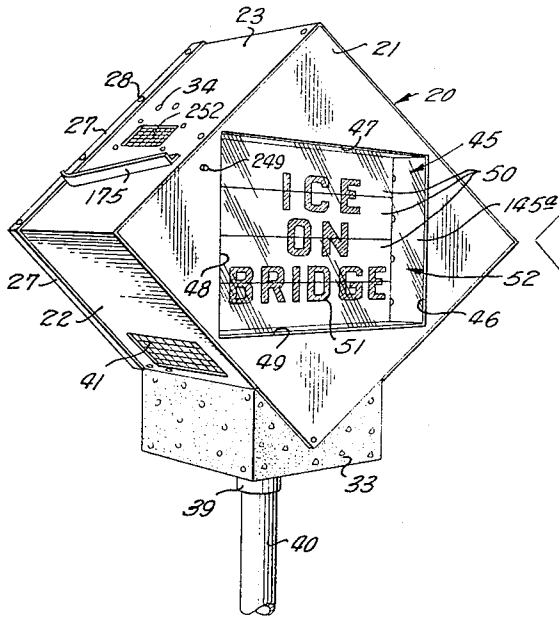


Fig. 1

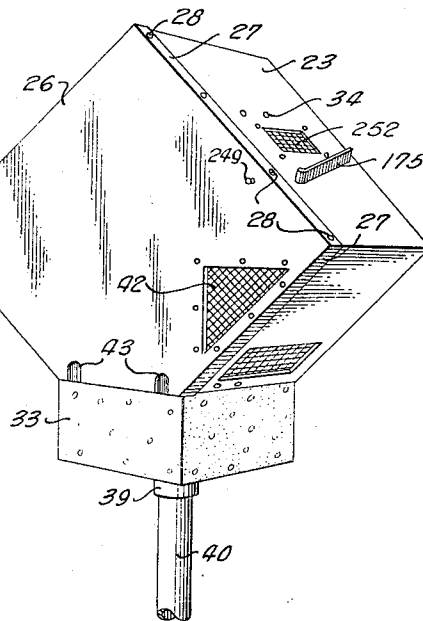


Fig. 2

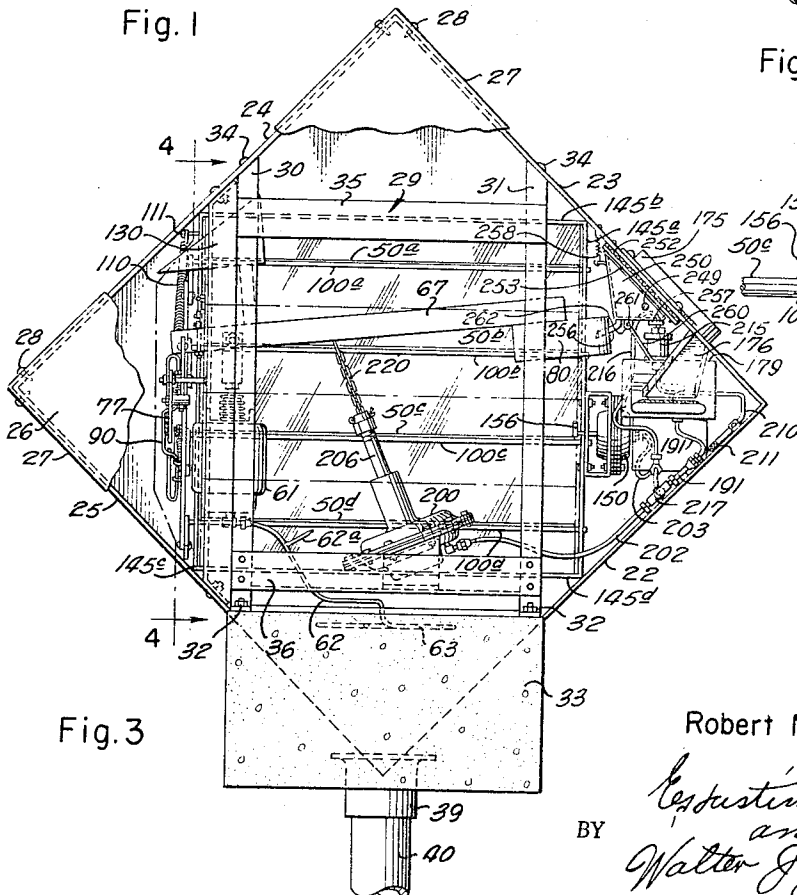


Fig. 3

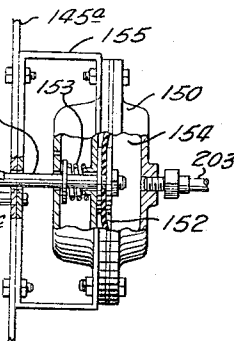


Fig. 7

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3 Sheets-Sheet 2

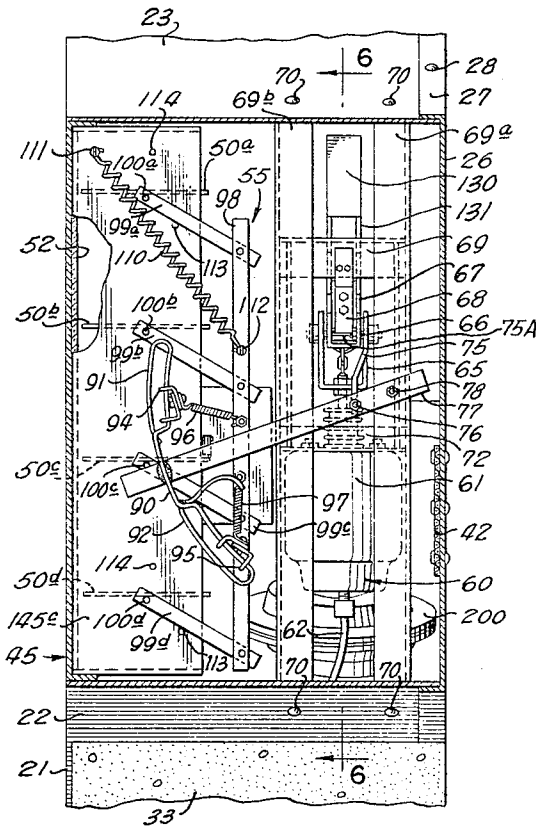


Fig. 4

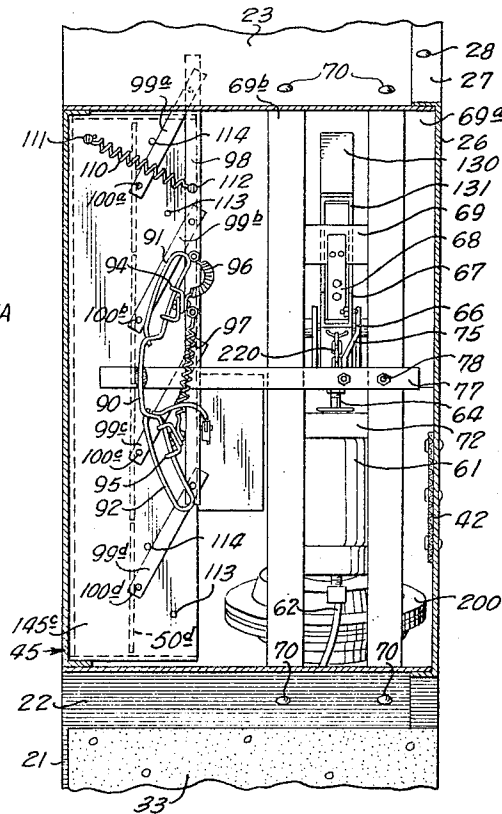


Fig. 5

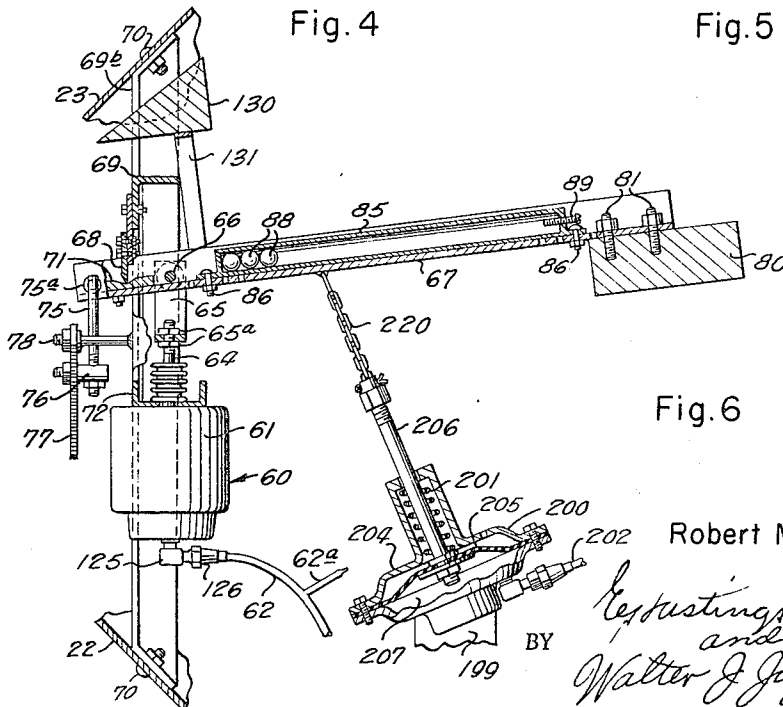


Fig. 6

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3 Sheets-Sheet 3

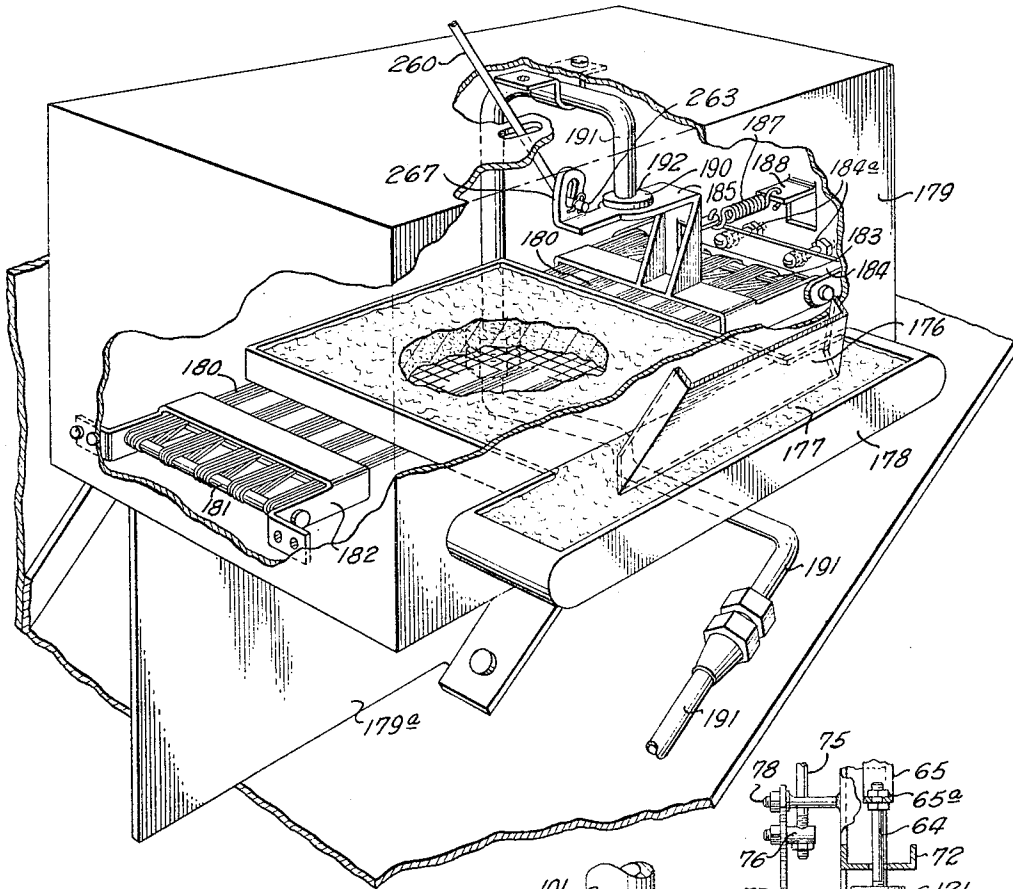


Fig. 8

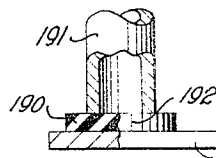


Fig. 9

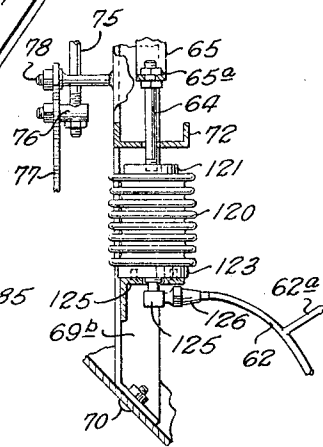


Fig. 12

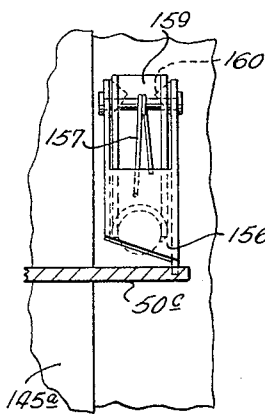


Fig. 11

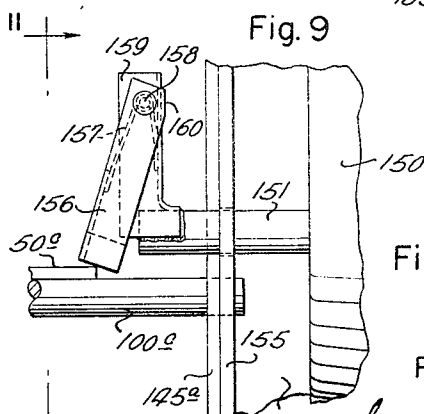


Fig. 10

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1

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THERMALLY CONTROLLED DRIVE MECHANISM

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28 Claims. (Cl. 40—37)

This invention relates to new and useful improvements in temperature and moisture controlled drive mechanisms.

One object of the invention is to provide a drive mechanism which is sensitive to temperature and moisture conditions to actuate a mechanism.

A particular object of the invention is to provide a temperature and moisture responsive operating mechanism for signs or signalling devices.

A further object of the invention is to provide an operating mechanism for signs or signalling devices which actuates the sign or signal by means of a temperature responsive mechanism.

Still another object of the invention is to provide a device of the character described wherein the actuation of the signaling device by means of the temperature responsive mechanism is further controlled by a moisture sensitive mechanism.

An important object of the invention is to provide in a mechanism for operating the sign or signal, means for actuating the same which comprises a sensing mechanism, a fluid pressure charged system and a diaphragm or bellows operator for operating a mechanical mechanism to actuate the signalling device.

Still a further important object of the invention is to provide in a device of the character described a moisture sensitive element and mechanism which prevents actuation of the signalling device or sign by the temperature sensitive system until predetermined conditions of ambient moisture exist.

Still another object of the invention is to provide, in a sign or signalling device of the character described, an improved mechanism for actuating a shutter type sign having indicia imprinted thereon which when in closed operative position presents suitable legible sign or intelligence and which when in normal parallel inoperative position presents no signal or visible intelligence.

Still another important object of the invention is to provide a signalling device or sign of the character described which is self-contained and which does not require an independent source of power or energy and which may be left at a remote spot for actuation by the atmospheric conditions of temperature and moisture over long periods of time with minimum service, and all of which is accomplished automatically in response to the ambient atmospheric conditions.

Additional objects and advantages of the invention will be readily apparent from the reading of the following description of a device constructed in accordance with the invention, and reference to the accompanying drawings thereof, wherein:

FIGURE 1 is a perspective view of the front and one side of a sign constructed in accordance with the invention;

FIGURE 2 is a similar perspective view of the rear of the sign;

FIGURE 3 is an enlarged view of the sign, partly in elevation and partly in section, taken from the rear;

FIGURE 4 is a view taken on the line 4—4 of FIGURE 3 and showing the sign in the normal, illegible or inoperative position in which the shutters are open and the indicia imprinted thereon is invisible, not legible or concealed;

FIGURE 5 is a view similar to FIGURE 4 showing the mechanism for operating the sign panels in the operative position in which the sign panels are closed and the indicia thereon displayed;

2

FIGURE 6 is a view taken on the line 6—6 of FIGURE 4;

FIGURE 7 is an enlarged view partly in elevation and partly in section of the moisture latch mechanism for the sign;

FIGURE 8 is an enlarged perspective view of the moisture sensing mechanism of the sign;

FIGURE 9 is a still further enlarged view of the valve mechanism of the moisture control system of FIGURE 8;

FIGURE 10 is an enlarged view of the latch member of the mechanism shown in FIGURE 7;

FIGURE 11 is a view taken on the line 11—11 of FIGURE 10, and;

FIGURE 12 is a fragmentary view, similar to FIGURE 6, of a modified preferred form of pressure sensing device incorporated in the panel operating mechanism.

In the drawings, the numeral 20 designates a sign housing having a front panel 21, side panels 22, 23, 24 and 25 and a rear cover 26, the housing being substantially rectangular in configuration and having its diagonal dimensions disposed horizontally and vertically, as best shown in FIGURES 1 through 3. The rear cover 26 of the sign has projecting flanges 27 which overlie and are secured by means of bolts or metal screws 28 to the adjacent side panels of the housing.

Within the housing is a frame 29 formed of two sets of vertical uprights 30 and 31, respectively, which are secured by bolts 32 at their lower ends to the upper surface of a concrete block 33 forming the base of the sign. The upper ends of the uprights 30 and 31 are secured by means of bolts 34 to the upper side walls 23 and 24 of the housing. Vertically spaced horizontal cross members 35 and 36 are welded, riveted, bolted or otherwise rigidly secured to the vertical uprights 30 and 31 and rigidify the frame to hold the side walls of the housing fixedly in the rectangular shape. A coupling or socket 39 is molded in the bottom of the concrete block 33 and provides a means for connecting an upright column 40 thereto, whereby the sign may be erected at a desired elevation above the ground or secured to any other suitable type of support or base member. The front panel 21 of the sign extends downwardly below the upper end of the concrete block 33 to provide the usual diamond shaped traffic sign, such as is illustrated in FIGURE 1. The lower portion of the side wall 22 is cut away to provide a screened inlet opening 41 and the rear wall or cover 26 is provided with a similar screened opening or aperture 42 therein for permitting access of the ambient atmospheric conditions to the interior of the sign for purposes which will be hereinafter more fully explained, while preventing ready entry of insects, animals or the like to the interior of the sign. Similarly, small access holes, drain holes or finger holes 43 are provided in the lower surface of the rear cover plate 26 whereby the same may be installed and removed from its position on the sign and moisture accumulating therein may drain off. The face panel 21 of the sign is provided with a large rectangular framed aperture 45 having side walls 46, 47, 48 and 49 therein, and this framed aperture provides a mounting for louver or shutter type pivoting sign panels 50 having signal indicia 51 provided thereon for indicating temperature and moisture conditions of structures with which the device is connected. It is desirable that a sheet of transparent plastic or glass 52 or the like be secured by suitable retaining clips or the like within the face plate or panel 21 of the sign covering the aperture 45 to prevent birds, animals and the like from entering the aperture and interfering with the operation of the sign.

The louver members 50 are shown in FIGURE 1 as disposed substantially vertically in a common plane with their edges closely adjacent each other. The louvers are turned by a crank mechanism 55 from the vertical

3

position shown in FIGURES 1 and 5, wherein they lie in a common plane, to a horizontal position shown in FIGURE 4 in which only the edges of the louvers are visible and the indicia thereon is illegible, concealed and not visible. The crank mechanism 55 is operated by a temperature sensitive pressure charged system 60 within the housing 20.

The temperature sensitive pressure charged element or system 60 includes a diaphragm member 61 connected by a fluid conduit 62 with a sensing chamber 63 which is shown as buried within the concrete block 33 of the sign, and this element functions to operate the linkage or the crank mechanism 55 which swings the louvers 50 from the horizontal normal inoperative position to the vertical common plane operative position.

The pressure charged sensing member 63, the fluid conduit 62, and the diaphragm member or operator or booster 61 are filled with highly expansible and contractible fluid, such as Freon, sulphur dioxide, ammonia or the like. The fluid confined within the system between the usual diaphragm in the diaphragm member 61 and the charged sensing member 63 is expansible and contractible with the temperature of the surrounding medium, so that the pressure of the fluid contained within the sensing member 63, the tube 62 and the diaphragm member 61 effects and controls the actuation of a plunger rod 64 which is connected with the diaphragm member and is movable thereby. As the pressure within the closed system 60 is increased, the volume of gas in the system will increase and the plunger rod 64 connected with the diaphragm member will be forced vertically upwardly. As the temperature acting on the sensing mechanism or member 63 is reduced, the volume of gas confined within the sensing member 63, the tubing 62 and the diaphragm member 61 will be reduced, and the plunger 64 will be retracted downwardly by the diaphragm in the diaphragm member. Thus, vertical longitudinal movement of the plunger or rod 64 is controlled by the temperature acting on the closed system 60 containing the fluid under pressure between the diaphragm 61, the sensing member 63 through the pipe or conduit 62. Ordinarily, this fluid will be highly expansive temperature sensitive fluid such as Freon or the like, which changes in volume substantially in response to small changes in temperature.

The actuating rod 64 is connected with a link member 65 by means of a pair of nuts 65a threaded on the upper end of the rod 64 and connecting the same positively with the connecting member 65. The upper end of the link 65 is connected by means of a pivot member 66 with an elongate channel shaped operating rod or power lever arm 67 which is pivotally mounted under a knife-edged pivot member 68 carried by a cross member 69 extending between a pair of vertically extending upright support members 69a and 69b secured by means of bolts 70 to the upper side panel member 24 and the lower side panel member 25 of the housing. A concave surfaced bearing member 71 is fixed in the channel shaped lever arm 67 and the knife edged pivot member 68 engages in the concave surface of the bearing member, whereby the lever arm swings about the knife edge of the pivot member. A lower channel shaped cross member 72 also extends horizontally between the upright members 69a and 69b and supports the housing of the diaphragm member 61, as clearly shown in FIGURE 6, the upper end of the housing for the diaphragm being secured in the usual manner to the underside of the cross member 72 and held against movement thereon, whereby the rod 64 extending upwardly out of said diaphragm member is movable by the diaphragm contained within the housing of said member.

The elongate power lever arm 67, being pivotally mounted beneath the pivot member 68, is connected at its inner end to a vertical link member 75 which is connected at its lower end by means of a lateral bearing arm 76 with an elongate swingable arm 77, by means of which the

4

louver operating mechanism 55 is actuated to swing the louvers from their normal open position to their closed position. One end of the lever arm 77 is pivotally mounted on a fixed pivot pin 78 which is carried by the upright member 69a and is pivotable about such pivot member 78. The inner swingable shorter end of the lever member 67 is loosely movably connected to the link member 75 by a loose rollable bearing or pivot pin member 75a and the lever member is connected on the opposite side of the pivot bearing 71 by means of the bolt or pivot member 66 to the link member 65 connected with the pressure sensitive system 60 by the actuating rod 64. The lever arm 67 is elongated outwardly beyond the connection of the same with the link 65 and is provided at its outer end with a weight member 80 which is adjustably secured to the lever arm by means of suitable bolts and nuts 81 extending through the arm into the weight member. A trough or guide chute 85 is adjustably secured on the lever arm 67, by bolts 86 and may be positioned at various longitudinally different positions with respect to said lever arm. Within the trough or chute 85 are positioned a plurality of balls 88 which roll freely within the trough from one end to the other. An adjusting screw 89 is mounted in the outer end of the trough 85 and provides means to adjust the position at which the balls 88 are stopped when they reach the outer end of their travel in the trough or chute member.

The actuation of the linkage or crank mechanism 55 is controlled by the movement of the elongate lever arm 67, which is actuated by the temperature sensitive system 60 through the link 65 connected with the shaft 64 which is directly connected with the diaphragm within the housing of the diaphragm member 61. The lever arm 67 is pivoted in substantially the same manner as a scale beam against the downwardly facing fixed pivot 68 and a movable bearing member 71 carried on the web of the lever arm 67. Changes in the volume of the charge of gas confined within the system comprising the temperature sensitive member 63, the tubing 62 and the diaphragm member 61, acting through the shaft 64 and the link 65 moves the lever arm 67 upwardly or downwardly about the pivot member 68. The lever arm is shown in FIGURE 6 in its uppermost position wherein the elongate actuating lever 77 is held in its lower position shown in FIGURE 4. The link 75 which is pivotally connected at its upper end to the short arm of the lever arm 67 holds the actuating lever in such lower position. Since the weight 80 acts downwardly on the long arm of the lever arm 67, and since the lever arm is pivotally connected by the pivot member 66 to the upper end of the link 65, the bearing member 71 on the web of the lever arm is constantly biased upwardly against the knife edged pivot member 68, and the lever arm will swing about such pivot member. Obviously, movement of the lever arm 67 will cause movement of the track member 85 and the movable weights or balls 88 confined therein.

As the lever arm 67 is swung by the weight member 80 and the balls 88 therein about the pivot member 68, the inner end of the lever arm is swung upwardly and will lift the pivot pin 75a upwardly and the link 75 will likewise be lifted upwardly thereby. Upward movement of the link 75 will lift the bearing arm 76 and the actuating lever arm 77 upwardly. Upward movement of the actuating arm 77 will lift the spring slide member 90 carried thereby upwardly. The slide member has on its opposite ends spring slide loops 91 and 92, respectively, which receive spring slides 94 and 95, respectively, which are slidable longitudinally on the spring slide loops. Springs 96 and 97 are each connected at one end to one of the spring slide members and at the opposite end with the vertically movable operating bar 98 which serves as the operating member for the crank mechanism 55 for actuating the louvers 50. The elongate operating bar 98 is connected to the outer free ends of each of a plurality of pivotally mounted crank arms 99a, 99b, 99c and 99d, each of which is rigidly

5

connected by a shaft 100a, 100b, 100c and 100d, respectively, with a corresponding one of the indicia bearing section or louver members 50. The shafts 100a, 100b, 100c and 100d are disposed centrally of and are positively connected to the central portion of such lever member rearwardly of their exposed faces and extend outwardly through the vertical frame sections 145a and 145c of the frame members 145a, 145b, 145c and 145d forming the frame of the aperture 45 in the face or front panel 21 of the sign housing. Thus, as the operating bar 98 is moved vertically the crank arms 99a, 99b, 99c and 99d are swung simultaneously and, by virtue of their connection with the louver sections 50 by means of the shafts 100a, 100b, 100c and 100d, swing the louver sections about the shafts between the normal horizontal position shown in FIGURE 4 to the position shown in FIGURE 5 wherein the louver sections are disposed in a common vertical plane displaying the indicia thereon.

An elongate overcenter latch spring member 110 is connected at one end 111 with the vertical wall member 145c of the frame of the aperture and at its opposite end 112 with the vertically extending operating bar 98 of the crank mechanism 55, whereby the spring may act to bias the bar 98 upwardly and thereby swing the crank arms 99a, 99b, 99c and 99d upwardly from the position shown in FIGURE 4 toward the position shown in FIGURE 5.

It will be noted, however, that when the crank mechanism 55 is in the position shown in FIGURE 4, the lower end 112 of the spring 110 is disposed in a position in which the spring is below the center of the shaft 100a on which the upper louver 50a is mounted. Thus, the spring acts to tend to swing the crank arm 99a downwardly. However, suitable stops 113 on the vertical frame member 145c engage the crank arms 99a, 99b, 99c and 99d to limit the downward swinging movement of the arms. When the operating bar is moved upwardly moving the lower end 112 of the spring upwardly therewith until the spring is disposed in a line above the axis of the upper shaft 100a, the spring exerts its force on the linkage of the crank mechanism 55 to bias the operating bar 98 upwardly and thereby to swing the several crank arms connected therewith upwardly toward the position shown in FIGURE 5. The spring, therefore, acts as an over-center latch spring which biases the mechanism toward the two positions shown in FIGURES 4 and 5. Upward movement of the crank arms 99a, 99b, 99c and 99d is also limited by suitable stop means 114 provided on the vertical side wall frame member 145c of the frame aperture.

The actuating operation of the hinge mechanism 55 is effected by means of the springs 96 and 97 connected to the operating bar 98 and to the slide members 94 and 95, respectively, which are in turn slidable on the slide loops 91 and 92 of the time delay slide member 90 carried on the outer swingable end of the actuating lever arm 77. The end of the spring 96 which is connected to the operating bar 98 is connected at a point at which the spring acts to lift the operating bar when the lever are 77 is lifted and the slide member 94 is at the lower end of the slide loop 91. When the actuating lever arm 77 is in the lower position shown in FIGURE 4, the spring 96 assumes the foregoing positions. Similarly, the end of the spring 97 which is connected to the operating bar 98 is so connected that the spring slide member 95 is free to slide on the lower loop 92 when the actuating lever arm is in the lower position. However, when the actuating lever arm is swung upwardly from the position shown in FIGURE 4, toward the position shown in FIGURE 5, the slide member 94 moves downwardly on the lower loop 91 until it is disposed in the lower portion of the loop. The spring 96 will permit some upward movement of the actuating lever before the spring acts on the operating bar 98 to lift the same. This time delay permits swinging movement of the actu-

6

ating lever arm through an arc which permits the elongate power lever arm 67 to be swung downwardly past a horizontal position so that the ball weight members 88 disposed in the chute or track 85 may roll (to the right in FIGURE 6) in the track toward the stop 89 and increase the weight leverage acting on the power lever arm by such shifting their position with respect to the pivot point of the arm. This provides an additional force acting through the linkage members 75, 76 and 77 and will overcome the resistance to movement of the crank mechanism 55 upwardly.

The spring 96 will lift the operating bar 98 until the spring 110 is disposed in a line above the axis of the shaft 100a, whereupon the spring 110 and the spring 96 coact to further lift the operating bar until the crank arms are swung upwardly to the position shown in FIGURE 5. In this position, the spring 96 is relaxed and the slide 94 is free to slide on the upper slide loop 91. However, as is clearly seen in FIGURE 5, the lower spring 97 has now been placed under tension, since the slide member 95 has been lifted upwardly to the upper end of the slide loop 92. However, the spring 110 and the force acting on the linkage through the power lever arm 67 tends to firmly hold the crank mechanism in the position shown in FIGURE 5 in which the louvers are disposed in a common plane, in which position the indicia on the face of the louvers is exposed through the aperture 45.

When the arm 67 is lifted by means of the temperature sensitive system 60 back toward the position shown in FIGURE 6, the actuating lever arm 77 is swung downwardly from the position shown in FIGURE 5 toward the position shown in FIGURE 4. The spring 97 being already under tension and the slide member 95 being at the upper end of the loop, downward movement of the actuating lever arm and the time delay slide member 90, thereon pulls the operating bar 98 downwardly until the spring 110 is disposed in a line below the axis of the shaft 100a, whereupon the spring 110 coacts with the spring 97 to bias the crank mechanism to the normal position shown in FIGURE 4, in which the louvers are disposed in horizontal planes.

It will thus be seen that the sliding movement of the slide members 94 and 95 on the loops 91 and 92 of the time delay slide member 90 permits a time delay in the movement of the operating bar 98, which permits the actuating lever arm 77 to be swung upwardly by the power lever arm 67 from the position shown in FIGURE 4 toward the position shown in FIGURE 5, until the outer end of the elongate power lever arm 67 is swung downwardly sufficiently to permit the movable weight members or balls 88 to move outwardly in the chute on the power lever arm, and thus act to increase the weight leverage applied to the power lever arm to overcome to some degree the resistance to movement of the crank mechanism 55.

The temperature sensitive power system 60, comprising the diaphragm member 61, the sensing member 63 and the conduit 62 connecting the diaphragm member to the sensing member, is charged with Freon (dichlorodifluoromethane) or other highly expansible gas which is introduced into the conduit 62 through a filler tube 62a. As has already been explained, the gas used in the pressure sensitive power system may be of several different types, but a gas in which the change of condition of the fluid from gaseous to liquid state occurs at about thirty-two (32°) to forty (40°) degrees is preferred. This type of fluid results in a substantial change in volume for each degree of temperature change and permits a substantial reduction in volume particularly at the freezing point, a condition desirable in the apparatus of this invention.

It will be seen that when the system 60 is charged with the fluid and the ambient temperature of the surrounding medium or the temperature of the monitored substance,

such as a high bridge, roadway or the like, in which the sensing element 63 is disposed, is above freezing, the volume of the fluid in the system is expanded substantially as the liquid is vaporized, and the pressure resulting therefrom acts on the diaphragm member 61 to move the rod or plunger 64 connected to the diaphragm (not shown) in the diaphragm member to move such plunger longitudinally upwardly. Such upward force applied to the plunger 64 moves the link 65 upwardly and, by virtue of the pivotal bearing connection 66 with the elongate power lever arm 67, moves the power lever arm upwardly, overcoming the downward force applied to the power lever arm by the weight 80 and the movable weights 88 acting thereon in opposition to the upward force exerted by the diaphragm member through the rod 64 and the link 65. Thus, so long as the pressure in the temperature sensitive system 60 remains sufficiently great because of the elevated temperature producing the volume of gaseous fluid in the system, the power lever arm 67 will remain in its upper position, as shown in FIGURE 6.

However, when the temperature of the monitored substance to which the sensing element 63 is exposed becomes sufficiently low, approximately freezing, the gaseous fluids in the system are condensed and liquefied and volume of fluids present in the system reduces, so that the pressure acting on the diaphragm member 61 is reduced and the rod or plunger 64 is moved downwardly by the leverage of the weights 80 and 88 acting through the power lever arm 67 on the pivot bearing 66 to which the link 65 is connected. As the pressure in the system decreases because of the reduction of volume of fluids as a result of the liquefaction of the gases, the power lever arm 67 is swung downwardly, forcing the diaphragm (not shown) in the diaphragm member 61 downwardly and swinging the shorter end of the power lever arm upwardly to lift the link 75 and the bearing arm 76 upwardly, and thereby to lift the elongate actuating lever arm 77 to effect actuation of the crank mechanism, as has already been described.

Thus, it will readily be seen that the temperature to which the temperature sensing element 63 is exposed will effect a change in the volume of fluids in closed temperature sensing power system 60 and result in actuation of the diaphragm element in the diaphragm member 61 which causes longitudinal movement of the plunger or rod 64 extending upwardly therefrom. This actuation of the rod 64 actuates the power lever arm 67 in response to the temperature conditions sensed by the sensing element in the substance being monitored, and therefore effects actuation of the crank mechanism 55 to shift the indicia bearing louvers in the manner explained hereinbefore. Thus, the temperature sensitive power system is operable in response to changes in temperature to effect movement of the power lever arm and to actuate the other elements of the system.

While the temperature sensitive power system 60 has been heretofore described as comprising a diaphragm member 61 in which an elongate cup-shaped resilient diaphragm of the usual well known type is sealed in the housing and confines the fluids under pressure in the system and is connected to the operating rod 64 for movement by the diaphragm as the pressure conditions in the diaphragm member change in response to changes in temperatures, it is believed readily apparent that a metallic bellows such as is shown in FIGURE 12 may be used equally as well. The bellows 120 is a low spring rate resilient cylindrical bellows member having the usual convoluted walls with a closure 121 at one end to which the plunger rod 64 is connected and having a head 123 at its opposite end connected to an angular cross member 125 secured between the upright supporting members 69a 69b. The conduit 62 is connected by means of an elbow 125 and a coupling member 126 to the head 123 of the bellows, and the pressure fluid in the system acts on the inside of the bellows and tends to expand the bellows longitudinally to move the rod 64 longitudinally similarly

to the manner in which the rod was moved by the diaphragm element in the diaphragm member 61 of the form first described. This type of bellows is relative impermeable and is less subject to leak, will stand higher temperatures and provide some resilience and longer life without requiring attention or service.

It is also desirable that a bell crank weight member 130 be mounted on an elongate upright U-shaped arm 131 and disposed above the elongate power lever arm 67 as shown in FIGURES 3 and 6. The weight 130 is so positioned with respect to the pivot bearing 66 that as the elongate power lever arm 67 is swung downwardly, the weight moves outwardly with respect to the pivot bearing 66 toward the weight member 80 and adds its force to the leverage force tending to swing the power lever arm downwardly. This weight will overcome to some measure the resiliency present in the bellows or diaphragm member, particularly the bellows of FIGURE 12. The action resulting from the swinging movement of the weight on its elevated arm above the pivot bearing 66 also produces a gradual increase in the force exerted on the power lever arm swinging the same downwardly, and also results in a gradual reduction in the force applied to the arm as the arm is moved upwardly, since the weight is swung counter clockwise as shown in FIGURE 6 to overlie the pivot member 67 and the pivot bearing 66. This weight member 130 therefore substantially counterbalances the bellows spring rate as the bellows is compressed and assists the movable weights or balls 88 in their function of increasing the leverage force exerted on the power lever arm 67 in producing actuation of the crank mechanism 55.

Further, in a sign indicating icing conditions, such as has been previously described herein, it is desirable that the system have means provided therein for preventing actuation of the indicia bearing louvers until there is a sufficient moisture in the ambient atmosphere to produce icing conditions when the temperature is reduced to the freezing point.

Therefore, for preventing actuation of the louvers 50 by the power lever arm 67 through the linkage connected with the crank mechanism 55 until the moisture conditions of the surrounding atmosphere are proper to produce a condition conducive for ice formation, a latch mechanism such as is shown in FIGURES 7, 10 and 11, is mounted on the vertical side wall 45a of the frame of the aperture 45 and includes a normally retracted spring actuated diaphragm latch operator 150 having a latch rod 151 connected to the diaphragm 152 in said diaphragm latch operator. A spring member 153 normally biases the diaphragm 152 and the latch rod 151 toward the right in FIGURE 7, but fluid under pressure in the chamber 154 of the diaphragm latch operator 150 acts against the spring to hold the latch rod 151 in the outwardly projecting position, as shown in FIGURE 7. The rod extends through an aperture in the frame 155 by means of which the diaphragm latch operator is mounted on the vertical side wall frame member 145a and through a matching aperture in such side wall frame member. On the outer end of the rod is a spring catch 156 biased toward engaging position as shown in FIGURES 7 and 10 by a spring 157 looped around a hinge pin 158 carried on the upright arm 159 at the outer end of the shaft 151. The catch member 156 engages over the inner or rear edge of the louver member 50c and holds the same against swinging movement from the horizontal position to the vertical position. When the actuating rod 151 is moved to the right in FIGURE 7 by the spring 153, the catch 156 is moved therewith toward the vertical side wall frame member 145a, the catch being prevented from further swinging movement by an intumed ear 160 on the upper end of the catch engaging the upright arm 159 whereby the catch is drawn toward the right with the rod 151 and is disengaged from the louver member 50c to permit the same to be swung by the shaft 100c. Since

all the louver members are connected by their lever arms with the operating bar 98, the latch mechanism which prevents movement of one of the louver members simultaneously prevents movement of all and positively holds the louver members in their normal horizontal positions. It will be readily apparent that, due to the swingable mounting of the catch 156 on the shaft 158, the lower end of the catch will swing inwardly to permit the louver member to pass below the lower end of when the louver member is swung back from vertical position to a horizontal position to reengage the louver beneath the catch.

The moisture sensing system for controlling actuation of the latch assembly shown in FIGURES 7, 10 and 11 is clearly illustrated in FIGURES 3, 6 and 8. Precipitated moisture in the area of the sign housing is caught by means of the downwardly inclined flanged trough member 175 and directed through an aperture in the upper side wall 23 of the housing into a downwardly inclined trough 176 secured to the underside of the upper housing wall 23 and extending downwardly therefrom. Thus, moisture falling on the sign is directed by the trough 175 through the aperture in the side wall of the housing into the trough 176 by means of which it is conducted to a pad or mat 177 carried in a frame 178 above a plurality of moisture sensing hairs, filaments, or threads 180 forming a part of the humidity sensing mechanism mounted in a moisture sensing housing 179 supported by a supporting flange 179a on the side wall 22 of the sign. The hairs are stretched between a rod 181 mounted on a supporting frame member 182 carried by the housing 179 and a rod 183 carried by a U-frame support 184 carried by the housing. As the hairs are moistened they will lengthen and sag. As the hairs sag, a valve arm 185 is permitted to pivot about the rod 183 until a sealing element 190 carried by the valve arm is moved away from the lower open end 192 of a conduit 191 to open the conduit to atmosphere. The pressure of fluid contained in the conduit 191 will therefore escape, since the valve seal member 190 is permitted to move downwardly by the stretch or sagging of the hairs or filaments 180 resulting from the moisture conducted thereto by means of the pad 177. A spring 187, connected to a lip member 188 formed in the housing at one end and at its other end to a valve arm 185, resiliently biases the valve arm upwardly to normally hold the valve seal member 190 in engagement with the open end 192 of the conduit 191. However, the pressure of the spring is not sufficient to resist the pressure of fluid present in the conduit under conditions to be hereinafter more fully explained and will permit the fluids in the conduit to escape.

Mounted on a bracket 199 secured to the frame cross member 36 is a diaphragm pump or motor 200 having a diaphragm member 205 therein which is actuated by a spring 201 within the diaphragm pump or motor housing 204 is connected by means of a conduit 202 with a conduit 203 connected to the normally retracted diaphragm latch operator 150 and to the conduit 191 which has its open end closed by the valve seal member 190. Thus, when the diaphragm 205 of the diaphragm motor is moved to the position shown in FIGURE 6 against the force exerted thereon by the spring 201, air is drawn inwardly through an inlet conduit 210 having a strainer inlet opening 211 at one end and connected to an intake check valve 215, which may be of the oil seal type, which will permit air to enter through the inlet 211 and conduit 210, pass through the check valve 215 and the conduit 216 to a T-shaped conduit connector or coupling member 217 communicating with the conduit 202 and with the conduit 191. It will be seen, therefore, that when the operating rod 206 of the diaphragm motor is moved upwardly against the force of the spring 201 the diaphragm 205 is moved upwardly and creates a suction in the chamber 207 of the diaphragm motor housing which draws air into the inlet 211, through the conduit 210, past the check valve 215, through the conduit 216 and through the

T coupling member 217, into the conduit 202 and thence into the chamber 207. Likewise, this results in trapping air in the conduit 191 whose open end 192 is closed by the seal member 190. Therefore, since a charge of atmosphere is present in the various conduits, and because of the pressure exerted thereon the spring 201 acting through the diaphragm 205, the diaphragm 152 of the diaphragm latch operator 150 is actuated against the spring pressure 153 to bias the latch rod 151 outwardly into position to permit the catch 156 to engage the louver 50c to hold the same against movement from horizontal to vertical positions.

However, when the hairs or moisture sensitive threads or filaments 180 sag, the valve arm 185 may be forced downwardly by the pressure of the air in the system to move the seal member 190 away from the open end 192 of the conduit 191 sufficiently to permit the air trapped in the system to escape. When this occurs the diaphragm latch operator 150 is actuated by the spring 153 to withdraw the catch 156 from engagement with the louver 50c to permit all the interconnected louvers 50 to turn. It will be seen, therefore, that the moisture sensing system and moisture latch provides means for latching the louvers against movement which is operable in response to the presence of moisture in the atmosphere to release the catch 156 from latching engagement with the louvers and to permit all the interconnected louvers to be actuated.

However, it is also desirable that moisture alone not be permitted to actuate the louvers. Therefore, so long as the temperature is above freezing, the pressure sensitive system 60 will not cause downward swinging movement of the power lever arm 67, and the louvers will not be moved even though the moisture latch is freed. Conversely, if the temperature drops sufficiently below freezing and there is no moisture present, the moisture latch prevents actuation of the louvers by the temperature sensitive power system 60 and the sign remains in the normal position with the louvers horizontal and the indicia thereon concealed. It is only when both predetermined moisture and temperature conditions are present in sufficient degree that the louvers may be actuated to an operative indicia exposing position.

For moving the diaphragm pump or motor 200 to the position shown in FIGURE 6, a flexible link member or chain 220 is provided between the shaft or rod 206 and the elongate power lever arm 67. Thus, when the power lever arm is swung upwardly to the position shown in FIGURE 6 by an elevated temperature condition acting on the charge of fluid within the closed temperature sensitive power system 60, as has already been explained, the power lever arm will, by means of the chain 220 connected at one end to the power lever arm and at its opposite end to the shaft 206, pull the shaft outwardly of the housing and thereby move the diaphragm 205 upwardly to the position shown in FIGURE 6 to draw air or atmosphere into the moisture sensing mechanism operating system conduits as has been explained. The diaphragm 205 is normally held in the position shown in FIGURE 6 by the chain or flexible link member 220 connected to the power lever arm 67 and to the shaft 206, so that the moisture sensing system remains charged with air at all times. When the power lever arm 67 is moved downwardly as a result of reduction of ambient temperature, the flexible chain or member 220 permits such downward movement without causing movement of the shaft 206 connected to the diaphragm 205 of the diaphragm motor 200. However, the hairs or filaments being dry and taut, the hairs together with the spring 187 prevent swinging pivotal movement of the valve arm 185 and thus hold the seal element 190 in engagement with the end 192 of the conduit so that the system remains closed and the latch operator remains in position holding the catch 156 in engagement with the louver 50c. Therefore, the temperature sensitive system 60 which would otherwise actuate the power lever arm and the crank mechanism 55 to

swing the louvers 50 into the vertical common plane displaying the indicia thereon may be moved in response to changes in temperature without moving the louvers because the moisture latch mechanism remains engaged with the louvers to prevent their swinging movement.

Similarly, the moisture sensing apparatus may be actuated by moisture deposited thereon through the trough 175, and may as a result of the action of moisture on the hairs or filaments 180 permit the valve arm 185 to sag or swing downwardly away from the open end 192 of the conduit 191 opening the system to atmosphere. However, though the hairs or filaments may sag, since the flexible link element or chain 220 holds the shaft 206 of the diaphragm motor 200 against movement and the spring prevents pivotal movement of the valve arm 185, the pressure in the moisture sensitive system remains constant and the diaphragm latch operator is not actuated. Nevertheless, should the latch be released, the louvers will not be swung to the vertical common plane position unless the temperature sensing power system is operated by a reduction in temperature to actuate the elongate power lever arm 67 and the actuating lever arm 77 to actuate the crank mechanism 55 and to rotate the louvers on the shafts on which they are mounted.

It will thus be seen that a temperature sensitive power system has been devised which senses changes in temperature and is operative to actuate a desired mechanism without an outside power source. The system may, therefore, be remotely installed and is self contained and operated by the ambient conditions of the atmosphere, and is temperature and moisture controlled by the conditions present in the monitored structure. It is also believed readily apparent that the monitored structure may be a separate structure simulating another structure. For example, the sign may be used at a location some distance from a concrete roadway bridge to indicate conditions existing at the bridge. If the bridge has a concrete deck the concrete block 33 would be located at approximately the same elevation as the bridge deck and would simulate conditions prevailing at the bridge. Of course, if desired, the sensing element 63 may be actually located in the monitored structure and the conduit 62 extend therefrom to the diaphragm member 61 at the sign.

It will also be seen that the gaseous fluid used in the closed temperature sensitive system 60 should be a fluid which is sensitive to slight changes in temperature and produces a large change in the volume of the fluid at the critical or reference temperature and reference pressure. If the system is set so that it requires a pressure of 35 pounds per square inch acting on the bellows or diaphragm member of the pressure temperature sensitive system to actuate the elongate power lever arm 67, the gas must be one which will quickly change from a gaseous condition to a liquid condition or state at approximately 32° to 34° Fahrenheit so that the volume in the gas in the system will maintain the power lever arm in an elevated position until the lower critical or reference temperature is closely approached at the sensing element of the temperature sensitive system. When the temperature at the sensing element of the system reaches the critical or reference point the fluid rapidly changes from the gaseous to the liquid state and the rate of condensation is such that the volume in the system decreases and the diaphragm or bellows is permitted to move downwardly to permit the weight to cause the power lever arm 67 to move downwardly. When the lever arm passes the horizontal position, the weight balls 88 move outwardly in the chute 85 and increase the force acting downwardly on the diaphragm or bellows and increase the rate of condensation of the fluid in the system thereby increasing the action of the lever arm and overcoming any frictional resistance to movement of the actuating mechanism or of the parts of the sign.

Conversely, when the pressure in the temperature sensitive system increases due to a rise in temperature at the

sensing element causing vaporization of gas in the system, the volume of gas in the system will increase and the diaphragm or bellows will lift the power lever arm 67 until it passes the horizontal position and the weight balls 88 will move inwardly in the chute 85 to decrease the force acting downwardly on the lever arm and on the diaphragm or bellows and permit a rapid expansion of gas and a quick and powerful movement of the lever arm, and will thus produce a positive action on the actuating mechanism linkage and the sign elements. Such upward movement will also readily lift the rod or shaft 206 against the force of the spring 201 and reset the moisture sensitive latch mechanism.

If a higher pressure is required in the closed temperature sensitive system 60 in order to produce a desired result, a different fluid may be confined therein to produce the desired reference pressure at the desired reference temperature to effect proper operation of the device.

It is likewise believed readily apparent that, if desired, the moisture sensing mechanism may take the form of a trough, tray or receptacle 250 pivotally mounted on a shaft 249 mounted in the housing 20 between the front wall 21 and the rear wall 26. The trough or receptacle 250 is disposed beneath an opening 251 in the upper side wall 23 of the housing, which opening is covered with a large aperture wire mesh or hardware cloth 252 secured by screws extending through a frame 253 supporting edges of the hardware cloth in the aperture. The aperture permits snow, sleet or other frozen precipitation to pass through the aperture and fall on the trough which is disposed therebeneath. It will be noted that the sides of the trough 250 are inclined and one end wall extends upwardly into substantial contact with the upper walls 23 of the housing to retain the frozen precipitation trapped therein. In addition, the bottom of the trough is provided with an aperture 255 through which the snow or sleet may pass as it melts, there being a disposal spout 256 connected to the bottom of the trough for conducting the moisture away from the other operative portions of the mechanism. The trough is counter-balanced by a weight 257 or spring 258 whereby the trough is normally held in the upper position shown in FIGURE 3.

An elongate connecting link member 260 has an arm 261 formed at its upper end which is connected by means of a clip 262 to the trough 250 and has a similar arm 263 at its lower end which extends through the upper end of the housing 179 and is connected by means of a slotted lost-motion lip 267 to the outer end of the valve arm 185 whereby downward movement of the valve arm as a result of deflection thereof by the fluid pressure in the conduit 191 permits the arm to swing downwardly without operatively engaging and moving the arm 263 of the link 260. However, when a sufficient accumulation of snow or sleet is trapped or caught in the trough 250, the weight thereof depresses or pivots the trough downwardly about the pin 249 and moves the link 260 downwardly to move the valve arm 185 downwardly, thus moving the valve seal member or closure 190 away from the open end 192 of the conduit 191. This permits the latch operator member 150 to withdraw the latch member 156 from engagement with the indicia bearing sign louvers 50. The force holding the trough in the upper position for receiving snow or sleet is very slight and will be overcome by the deposit of a weight of the order of three to five ounces of snow or sleet in the trough. The weight or spring counterbalance merely provides sufficient force to hold the trough in the upper position to receive the frozen precipitation deposited thereon. Likewise, it is believed obvious that the spring 187 will assist in maintaining the valve arm 185 and the link 260 in the upper position against undesired downward movement thereof until sufficient weight of snow, sleet or the link is actually deposited on the trough.

The screen prevents animals or birds or the like from entering the housing and resting on the trough to release

the latch member. It will therefore be seen that the mechanism is adapted for actuation by the weight of frozen precipitation trapped on the trough as well as by the actual moisture deposited on the felt pad 177 prior to freezing. It will also be seen that the moisture sensing mechanism includes not only means for detecting or sensing liquid precipitation; and, that each sensing device may operate independently of the other. It is also believed obvious that the trough 250 may be used to trap water or liquid precipitation to actuate the valve arm 185 to open the conduit 191, if desired.

The foregoing description of the invention is explanatory only, and changes in the details of the construction illustrated may be made by those skilled in the art, within the scope of the appended claims, without departing from the spirit of the invention.

What is claimed and desired to be secured by Letters Patent is:

1. A temperature responsive power mechanism including: an elongate lever member pivotally mounted intermediate its ends; means on one arm of said lever member for connecting the same to a mechanism to be operated thereby; and pressure charged closed expandable chamber temperature sensitive means connected with the opposite arm of said lever member for moving the same in response to temperature conditions sensed by said temperature sensitive means, said temperature sensitive means comprising a fluid which changes state from gas to liquid when the temperature falls below a predetermined value to cause operation of said power mechanism.

2. A temperature responsive power mechanism including: an elongate lever member pivotally mounted intermediate its ends; means on one arm of said lever member for connecting said arm to a mechanism to be operated thereby; a pressure charged closed expandable chamber temperature sensitive means connected with the opposite arm of said lever member for moving the same by changes in volume of said means produced in response to variations in temperature sensed by said temperature sensitive means, said temperature sensitive means comprising a fluid which changes state from gas to liquid when the temperature falls below a predetermined value to cause operation of said power mechanism; and weight means on said opposite arm of said lever member controlling the conditions under which said temperature sensitive means operates said arm.

3. A temperature responsive power mechanism including: an elongate lever member pivotally mounted intermediate its ends; means on one arm of said lever member for connecting said arm to a mechanism to be operated thereby; a pressure charged closed expandable chamber temperature sensitive means connected with the opposite arm of said lever member for moving the same by pressure exerted thereon by changes in volume of the charge in said expandable chamber produced in response to variations in temperature sensed by said temperature sensitive means; weight means on said opposite arm of said lever member controlling the pressure conditions under which said temperature sensitive means operates said arm, said weight means including weight means shiftable in position relative to the pivotal mounting of said lever member for varying the force applied to said opposite arm of said lever member and controlling the actuation of such lever member by said temperature sensitive means.

4. In combination with the device of claim 3, means sensitive to ambient moisture adjacent the temperature sensitive means and operatively engageable with said mechanism to be operated by said lever member for further controlling actuation of said mechanism to be operated by said lever member in accordance with variations in the moisture present adjacent said temperature sensitive means.

5. A temperature sensitive mechanism for controlling the actuation of a device to be actuated thereby and including: an elongate lever member pivotally mounted intermediate its ends and having means on one arm of

said lever member adapted to be connected to the mechanism to be operated thereby; a closed system temperature sensitive means connected to said other arm of said lever member and including a variable volume chamber member operatively connected with said lever member and a sensing member having fluid pressure communication with each other, said chamber member and said sensing member being charged with fluid under pressure, whereby temperature sensed by said sensing member causes variations of the pressure of the fluid contained in said closed system and varies the volume of said chamber member, such variations in volume of said chamber member causing movement of said other arm of said lever member to actuate the mechanism connected with said one arm of said lever member said fluid changing from gaseous to liquid state when the temperature thereof decreases to a predetermined value to cause movement of said other lever member.

6. A sign including: a housing; movable indicia bearing sign means carried by said housing; an elongate lever member mounted on said housing and having one arm operatively connected with said movable indicia bearing means whereby movement of said lever member moves said indicia bearing means; pressure sensitive means connected with the opposite arm of said lever member for actuating the same to move said movable indicia bearing member in response to movements of said lever member; said pressure sensitive means including a variable volume chamber member mounted on said housing and having an operative connection with said opposite arm of said lever member whereby variations in volume of said chamber member moves said lever member, and a temperature sensing member having fluid communication with said variable volume chamber member and forming therewith a closed temperature sensitive system, and a charge of fluid under pressure in said system, whereby temperature sensed by said sensing member causes variations in the volume of the fluid contained in said closed system, and variations in the volume of fluid in said system causes variations in volume of said variable volume chamber member to move said lever member and actuate said movable sign means in response to variations in temperature, said fluid changing from gaseous to liquid state when the temperature of said fluid drops below a predetermined value to cause actuation of said movable sign means.

7. A sign including: a body; indicia bearing movable means carried by said body and movable between a position exposing said indicia and a position concealing said indicia; means connected with said indicia bearing means and sensitive to variations in temperature for moving said indicia bearing means between an indicia exposing position and an indicia concealing position; and moisture sensitive means carried by said body and operatively engaging said indicia bearing means for preventing movement of said indicia bearing means by said temperature sensitive means until a predetermined condition of moisture is sensed by said moisture sensitive means.

8. A combined temperature sensitive and moisture sensitive mechanism for controlling the actuation of a device to be actuated thereby and including: an elongate lever member pivotally mounted intermediate its ends and having means on one arm of said lever member adapted to be connected to a mechanism to be operated thereby; a closed system temperature sensitive means connected to said other arm of said lever member and including a variable volume chamber member operatively connected with said lever member and a sensing member having fluid pressure communication with said chamber member, said chamber member and said sensing member being charged with fluid under pressure, whereby variation in temperatures sensed by said sensing member cause variations in the pressure of the fluid contained in variable volume chamber in said closed system and varies the volume of said chamber member, such variations in volume of said chamber member causing movement of

said other arm of said lever member to actuate the mechanism connected with said one arm of said lever member; and moisture sensitive latch means also connected with said mechanism and preventing movement of said mechanism by said lever member until released from such connection therewith, said moisture sensitive means being actuated in response to moisture conditions present adjacent said temperature sensing means actuate said latch means to release said mechanism for movement by said lever member.

9. In combination with the sign of claim 6, means sensitive to ambient moisture adjacent the temperature sensing member of said closed temperature system; latch means mounted on said housing, said latch means having an operative engagement with said movable indicia bearing means to prevent movement of said indicia bearing means by said lever member; and means operatively connecting said moisture sensitive means with said latch means for actuating said latch means in response to moisture conditions sensed by said moisture sensing means to release said latch means from operative engagement with said indicia bearing means to permit said indicia bearing means to be operated by said elongate lever member.

10. A temperature responsive power mechanism including: a frame; a pivot member carried by said frame; an elongate power lever member pivotally engaging said pivot member intermediate the ends of said lever member; a variable volume chamber member carried by said frame and having an operative connection with one arm of said lever member; means carried by said frame including an actuating lever arm pivotally mounted on said frame and having means providing an operative connection with the opposite arm of said lever member; a temperature sensing member having fluid communicating connection with said variable volume chamber and disposed at a preselected point spaced from said chamber member, said sensing member and said chamber providing a closed temperature sensitive system; a charge of fluid under pressure in said chamber and said sensing member and the fluid communicating connection between the same; said means on said variable volume chamber connecting the same with said lever member moving said lever member in response to variations in volume of said chamber member; said temperature sensing member being responsive to temperature changes whereby the fluid under pressure in said closed system changes in volume in response to temperature changes and varies the volume of said variable volume chamber member to move said lever member; and weight means on said one arm of said lever member opposing movement of said lever member by said variable volume chamber member, whereby a predetermined force must be applied to said lever member by said variable volume chamber member to move the lever member against the force exerted on said lever member by said weight, said weight overcoming the force applied to said one lever arm by said fluid pressure charge in said variable volume chamber member when the temperature sensed by said sensing member reduces the volume of the charge confined in said closed system, said weight sliding on said one arm of said lever member away from said pivot member upon movement of said lever member to actuate said mechanism.

11. In the device of claim 10, movable weight means carried by said one lever arm movable from a point adjacent said pivot to a position spaced outwardly of said one arm from said pivot to increase the force applied to said one lever arm by said weight means against the force exerted on said lever arm by said charge of fluid under pressure in said closed system as said lever arm swings, whereby the lever arm is swung downward with a greater force as the weight means shifts outwardly from said pivot point.

12. In a mechanism of the character set forth in claim 10, an overcenter operator mechanism connected with

said actuating arm connected with said opposite arm of said lever member for operation thereby, said overcenter operator mechanism being connected to a sign means to be moved by said operating mechanism in response to movement of said operator mechanism by said actuating lever arm.

13. A sign comprising: a housing having an aperture therein; a plurality of horizontally extending shafts mounted on said housing and extending transversely of said aperture; a plurality of planar indicia bearing members, one mounted on each of said transverse shafts and movable thereby from a horizontal position in which the members lie parallel in vertically spaced relationship to a vertically disposed position in which the members lie in a common vertical plane; a plurality of lever arms, each pivotally connected at one end to said housing adjacent said aperture, each lever arm being connected at its opposite end to one of said transverse shafts; an operator bar connected to the swingable ends of said lever arms for moving said lever arms simultaneously; a spring connected at one end with said housing and at its opposite end with said operator bar and movable between a position in which said spring is disposed in a line below the pivotal connection of the adjacent lever arm with said housing and a position in which said spring is disposed in a line above said pivotal connection of said adjacent lever arm with said housing whereby mid spring provides an overcenter biasing means for moving said operator bar and said lever arms connected therewith between upper and lower positions respectively; said planar indicia bearing members being disposed in said horizontal position when said spring is in said lower position and being disposed in said common vertical plane when said spring is in said upper position.

14. In a sign of the character set forth in claim 13, an elongate lever member pivotally mounted on said housing and operatively connected at one end with said operator bar, and having temperature sensitive pressure actuated means connected with the opposite arm of said lever member for swinging the same, whereby said temperature sensitive means actuates said lever member and said operator bar connected therewith to move said indicia bearing members between said horizontal and said vertical positions.

15. In combination with the sign set forth in claim 13, a temperature responsive power mechanism including: an elongate lever member pivotally mounted on said housing intermediate its ends; means on one arm of said lever member connecting the source to said operator bar for moving said operator bar; and pressure charged closed expansible chamber temperature sensitive means connected with the opposite arm of said lever member for moving the same in response to temperature conditions sensed by said temperature sensitive means to move said lever member and thereby move said indicia bearing members between said horizontal and said vertical positions.

16. In combination with the device of claim 15, means sensitive to ambient moisture adjacent the temperature sensitive means operatively engageable with said indicia bearing members for controlling actuation of said indicia bearing members in accordance with variations in the moisture present adjacent said temperature sensitive means.

17. A temperature responsive power mechanism including: a frame; an elongate lever member pivotally mounted on said frame intermediate its ends; means on one arm of said lever member for connecting the same to a mechanism to be operated thereby; means connected to said one arm of said lever member for operatively connecting the same to a mechanism to be operated thereby; and pressure charged closed expansible chamber temperature sensitive means connected with the opposite arm of said lever member for moving the same in response to temperature conditions sensed by said temperature sensitive means, and wherein said closed expansible chamber com-

prises a closed diaphragm member having a movable diaphragm therein connected with said lever arm and exposed on one side to the pressure in said closed chamber.

18. A temperature responsive power mechanism including: a frame; an elongate lever member pivotally mounted on said frame intermediate its ends; means on one arm on said lever member for connecting the same to a mechanism to be operated thereby; means connected to said one arm of said lever member for operatively connecting the same to a mechanism to be operated thereby; and pressure charged closed expansible chamber temperature sensitive means connected with the opposite arm of said lever member for moving the same in response to temperature conditions sensed by said temperature sensitive means, and wherein said closed expansible chamber comprises a metallic corrugated bellows having one end connected with said lever member and its opposite end secured to said frame and movable by the pressure of the charge of fluid contained within said chamber to move said lever member.

19. In a sign of the character set forth in claim 13: a temperature sensitive mechanism for controlling the actuation of the indicia bearing members including: an elongate lever member pivotally mounted on said housing intermediate its ends and having means on one arm adapted to be connected to the operator bar for operating the same; a closed system temperature sensitive means connected to the other arm of said lever member and including a variable volume chamber member operatively connected with said housing and with said lever member and a sensing member having fluid pressure communication with said chamber member, said chamber member and said sensing member being charged with fluid under pressure whereby variations in temperature sensed by said sensing member causes variations in the pressure of the fluid contained in said closed system and varies the volume of said variable chamber member, such variations in volume of said variable chamber member causing movement of said other arm of said lever member to actuate the indicia bearing members between the horizontal and vertical positions thereof.

20. In a device of the character set forth in claim 13; means connected with said indicia bearing members and sensitive to variations in temperature for controlling movement of said indicia bearing members between said horizontal and vertical positions, said means comprising moisture sensitive means; and latch means carried by said body and operatively engaging said indicia bearing members for preventing movement of said indicia bearing members said latch means being releasable by said temperature sensitive means when a predetermined condition of moisture is sensed by said moisture sensing means.

21. In combination with the sign of claim 15, means sensitive to ambient moisture adjacent said temperature sensitive means; latch means mounted on said housing, said latch means having an operative engagement with at least one of said movable indicia bearing members to prevent movement of said indicia bearing members by said lever members and said operator bar; and means operatively connecting said moisture sensitive means with the latch means for actuating said latch means in response to moisture conditions adjacent said temperature sensitive means.

22. A device of the character set forth in claim 20, wherein: said moisture sensitive means comprises a plurality of elongate filaments sensitive to moisture adapted to be elongated by the presence of moisture; and valve means including a valve closure member having an operating arm operatively engaging said filaments and movable by said filaments into valve closing position by said

filaments when the same are dry and movable to valve opening position when said filaments are wet; and means for adjusting the tension on said filaments.

23. A sign of the character set forth in claim 18 wherein: said variable volume chamber member comprises a closed diaphragm member having a movable diaphragm therein connected with said lever arm and exposed on its opposite side to the pressure in said closed chamber.

24. A sign of the character set forth in claim 18 wherein: said variable volume chamber member comprises a closed metallic corrugated bellows having one end secured to said housing and its other end connected with said lever member and movable by the pressure of the charge of fluid contained within said chamber to move said lever member.

25. In combination with the temperature responsive power mechanism of claim 1, means for detecting precipitation by weight of the precipitated substance and operatively engageable with said mechanism to be operated by said power mechanism for controlling actuation of said mechanism to be operated by said power mechanism in accordance with the variations in precipitation adjacent said temperature sensitive means.

26. A sign including: a body; indicia bearing movable means carried by said body and movable between a position exposing said indicia and a position concealing said indicia; power means connected with said indicia bearing means and sensitive to variations in temperature for moving said indicia bearing means between an indicia exposing position and indicia concealing positions; and latch means having means sensitive to precipitation in the area of the temperature sensitive means and operatively engaging said indicia bearing means for preventing movement of said indicia bearing means by said temperature sensitive means until a predetermined condition of precipitation is sensed by said precipitation sensitive means.

27. A sign of the character set forth in claim 26, wherein the precipitation sensing latch means includes a receptacle for receiving snow, sleet or water precipitated adjacent the sign and wherein the weight of the precipitated material received in said receptacle releases the operative engagement of the latch means with said indicia bearing means to free said indicia bearing means for movement to an indicia exposing position.

28. A sign including: a body; indicia bearing movable means carried by said body and movable between a position exposing said indicia and a position concealing said indicia; temperature variation sensitive means in said body and operatively connected with said indicia bearing means; and moisture sensitive means in said body and operatively connected with said indicia bearing means; said temperature sensitive means and said moisture sensitive means being operative for controlling movement of said indicia bearing means between an indicia exposing position and an indicia concealing position in response to predetermined conditions of moisture and temperature is sensed by said moisture sensitive means and said temperature sensitive means.

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