

SENSITIVE MECHANISM OPERATES WITH SUPERHUMAN ACCURACY

A mechanical device so sensitive to pressure that the breath of a child directed into a funnel can release enough power to lift many tons of weight, and so sensitive to temperature that the heat coming from a man's hand held near a metal strip will effect the same result, has been perfected in Sweden after three years of experimentation and through tests in actual use.

This remarkable multiplication of power is, however, only an incidental feature of the apparatus, which takes the place of a man in an industrial establishment opening and shutting all sorts of regulating valves automatically and with an accuracy that no human being could ever achieve. The new apparatus can, for example, keep the temperature of a room within a quarter of a degree of the value desired, and can keep steam pressure from changing more than two ounces per square inch. It can also regulate electric current, speed, dampness or dryness, density of liquids, viscosity, and vacuum.

This new regulator, which was invented by the Swedish engineer, Ragnar Carlstedt, is based on one of the simplest of all mechanical principles, namely the harnessing of a flowing current of water. In other words, if it is desired to open or shut the valve of a steam radiator in a room, this work is done by turning on water pressure from one of the water pipes of the house, instead of turning the valve by hand.

But how does the regulator know when and how to turn this valve? The operation of the apparatus may be explained as follows: A thin strip of ebonite, which contracts or expands under the slightest change of temperature is so mounted that any change in its length moves a lever up or down. Meanwhile a jet from the water current already referred to is constantly playing against the moving end of the lever, which really acts as a lid over the jet, hindering its free flow more or less. If the jet is completely stopped, for example, the water backs up in the pipe until the pressure is strong enough to open a little valve, and this little valve sets free a current of water sufficiently strong to work the valve of the steam radiator. This final work is accomplished through a simple piston and cylinder mechanism. Even though the playing jet of water be not completely stopped, but only hindered in the slightest degree, it will set into operation a corresponding degree of power, thus regulating the steam radiator valve just enough to raise or lower the temperature of the room as little as desired.

Whatever use the regulator is put to its main operating mechanism remains the same, while the so-called impulse receiver is adapted to the force or condition which is to be regulated. For steadying temperature the impulse receiver, as we have just explained, is a strip of ebonite. For maintaining an even amount of dampness in a tobacco factory, for example, a band of cotton threads takes the place of the ebonite, and, by contracting or being extended under the changes of humidity works the lever which hinders the jet of water, etc. For regulating steam pressure in a power plant the impulse receiver is a cylindrical copper bellows which is connected with the steam pipe in which the pressure is to be regulated.

Tests of zinc roofings, conducted by the U. S. Bureau of Standards, show that they fail not by breaking but by bending slowly under load, the material taking a permanent set.
