AUTOMATIC VENTILATOR.

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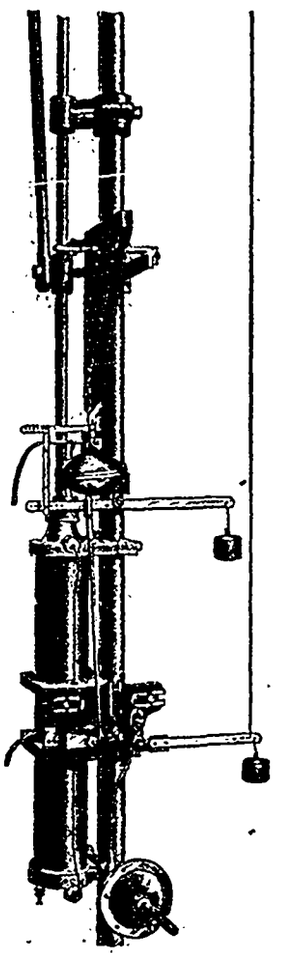
In the primitive ages of man, when genus homo was cold, he made a fire in the middle of the floor, the smoke and products of combustion escaping through a hole in the roof—thus the brain of man early worked on the now more intricate problems of heating and ventilation, his necessity being the mother of his invention. That did not require much invention, the reader may say. Well, try it by lighting a fire without the aid of a match or a neighbor to run to for assistance. The man who invented the process of making fire by rubbing two sticks together was one of the discoverers and geniuses of that age, but died without the reward of a patent office or the handing down of his name to posterity.

Having been kindly invited by the editor of THE CANADIAN ENGINEER to give a description of my new Automatic Ventilating Apparatus, probably the first question the reader will ask is "What is it?" It can



be best explained in this way: When the fire burns low, perhaps going out entirely while the occupant is asleep, the hole in the roof lets in the cold; again, when the fire burns bright and fresh, the hole in the roof is not large enough to let out all the smoke and surplus heat. It was a nice question to determine the correct size of that hole. Now, the needs of man require that it shall be continually changing its size, and that automatically, according to the internal changes of temperature; also if the temperature falls below a certain degree, it must be entirely closed, or above a certain degree, it must be entirely open, and to an abundant extent—here necessity again becoming the mother of invention, various devices are conceived and put in operation to operate ventilating shutters, dampers in cold and warm air tubes, smoke-pipes, ash-pits, etc., etc.; some of the more recent ones are operated by electricity. Thus a thermostat finger moving to the right or left, as change of temperature occurs, makes an electric contact or connection, either on one side or the other, to operate mechanism to open or close the desired ventilator, damper, etc., as the case may be. These (as pointed out to me some time ago) are open to objection. A friend of mine was using an imported machine to operate a continuous shutter in his greenhouse, or, in other words, say an opening 100 feet long by 2 or 3 feet wide; he was growing roses, etc., for sale as cut flowers during winter, to excel in which an even temperature and good ventilation are required. The operation of the ventilator was as follows: A fall in temperature would cause the thermostat finger to move to the closed position, and down would come the shutters; in a few minutes temperature became excessive, causing the thermostat finger to move to open position, and up would go the shutters to let in a blast of cold air again, chilling the thermostat to bring shutters to closed position again. This might be repeated under some conditions that would occur perhaps ten times in an hour. This resulted in anything but an even temperature, and something better was required. Thus another necessity appeared, followed by another invention being recorded in the patent office.

Referring to perspective cut, a triangular shaped double thermostat is seen suspended above the machine in a position to be most quickly affected by a change of temperature due from the raising or falling of the ventilating shutters; the finger of this thermostat engages with a bell crank lever of a very small valve, controlling water pressure, which is used in this case in preference to electricity; the ports in this valve are not much bigger than a good-sized needle, and the valve is accurately balanced and pivoted so as to move without undue friction. The action of this valve is to turn a fine stream of water on to, or allow water to escape from, a small diaphragm piston contained in the case shown below the thermostat; a rod from this diaphragm descends and connects with a bell crank lever operating a larger valve to turn water pressure on to one side or the other of a large piston of an hydraulic ram, that is used not only to open the shutters, but to forcibly pull them down and hold them down when closed. This latter is necessary in windy weather, and also to break away little icicles that will sometimes form on the edge of the shutters in cold weather. So that any individual portion of the ventilator shutters shall not receive undue strain in being pulled down against an obstacle, each section of shutter has a spring connection, allowing that portion of the hole to remain slightly open, with the tension of the spring tending to close it. It has been found that an ice obstacle under these conditions will gradually melt away till the shutter finally closes. Below the hydraulic ram, at base of cut, is seen a circular-shaped piece, which is simply the casing of a very fine strainer placed on the main supply pipe.

So far as described (less reference to bell crank levers) this apparatus would work to fully open or fully close the shutters as previously referred to; a perfect graded action is, however, obtained of almost unlimited power and sensibility by extending the area or stroke of the ram, which may be done indefinitely, and supplying suitable connections to operate.

This graded action will be understood by reference to Figs. 1, 2 and 3. *A* is thermostat finger; *B* handle of valve lever *C*; *D* one of the bell cranks referred to;