

THE "K-M-C" VACUUM SYSTEM (Morgan Patents).

Fully protected by the U. S. Patents as follows: March 3, 1903, Morgan & Co., Chicago; August 9, 1905, Morgan & Co., Chicago. Other applications pending. Infringements will be prosecuted to the full extent of the law.

The "K-M-C" Vacuum System (Morgan Patents) is a scientific and practical adaptation of the vacuum principle to any ordinary low-pressure steam heating plant, whether an *old or new* installation, and can be applied to it without any alteration whatever in piping or boiler.

The "K-M-C" System does not aim to compete with other systems which require mechanical means to create a vacuum. The "K-M-C" System is an automatic one, and there is no expense incurred in the piping and radiators. We create a vacuum *without the aid of mechanical means* and simply by the condensation of steam. This vacuum enables us to heat the radiators and keep them hot long before the water in the boiler reaches a temperature of 212 degrees. In fact, the water will not reach this high temperature because it will boil at a much lower temperature (170 degrees), due to the reduced pressure resulting from the vacuum in the steam piping. Right at this point is where the economy in the use of fuel comes in. It is not necessary to heat water to such a *high* temperature to evolve steam at a *sufficient* temperature to successfully heat the building. The system is automatic and requires no machinery whatever. Its operation results in the saving of fuel of from 20 to 25 per cent.

The "K-M-C" vacuum appliances may be used with equal facility *on any style of boiler*. Old heating plants may be remodeled and made effective and successful by its use, and the result will be as economical as though the appliances were used on a system to be newly installed. The "K-M-C" appliances are simple and easily installed by any steamfitter. The operation, control, and regulation of the apparatus is remarkably easy, and the marvelous saving in fuel will soon repay the first cost many times over. Complete instructions for installing, covering all points, with full explanations and many illustrations, may be had of the above company.

The Vacuum System, by enabling the circulation of steam at lower temperature than the boiling point of water under normal conditions, results in a continuous supply of heat with the same fire, which, without the system, would cease to impart any heat to the radiators.

It is installed in two ways:

- (1) The Floating-check construction.
- (2) The Loop construction.

The specialties* furnished for either system consist of:

Retarder † for each of the Radiators.

A Retarder for each Steam Return, except the one to which the Regulator is attached.
Mercury Column, Mercury and Bracket.

A Damper Regulator, complete with Wall Brackets, Lever, Sliding Weight, 4 Pulleys and 12 yards of Chain.

A Vacuum Gauge.

A Thermometer.

A Swinging-Check Valve.

In addition to the above, an *Accumulating Tank* of proper size is furnished with either system, except the Loop construction, for a plant of twelve radiators or less.

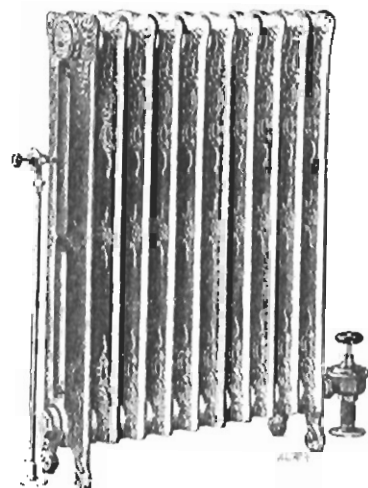
A Floating Check Valve is furnished for the Floating-check construction only.

NOTE. Do not use the ordinary steam damper-regulator, with its diaphragm, water bottle, weight and lever, or tri-cocks and safety valve ‡ usually furnished with a low-pressure boiler. These appliances are unnecessary and should be discarded unless an ordinance requires the use of a safety valve; then a good valve, one not likely to leak, should be used on the boiler.

* Prices on application.

† Open retarders are furnished.

‡ A special safety valve for use on the floating-check construction may be had. Prices on application.



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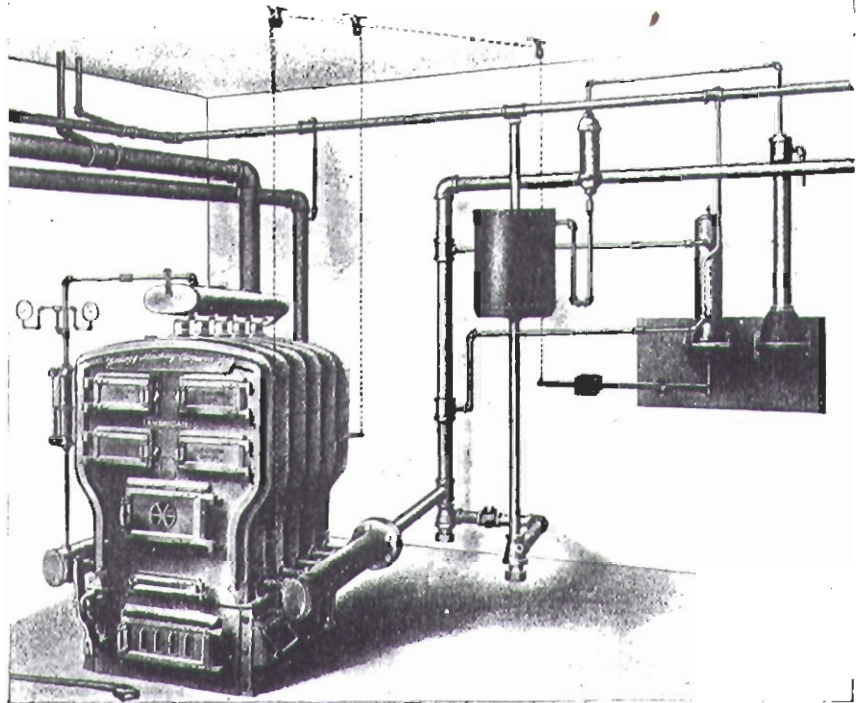
"K-M-C" KEWANEE RADIATOR

Equipped with "K-M-C" Packless Diaphragm Radiator Valve and Manual Retarder and showing method of reducing air pipe by a reducing coupling, after passing through floor.

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The Floating Check Construction. The accompanying engraving is intended to convey some helpful suggestions to the steam-fitter by showing the various appliances in their proper positions. Their arrangement can be changed to suit the conditions existing in different buildings.

The Air Main, composed of two 1-inch sections, is the highest pipe shown in cut; it pitches downward from the extremity of each section, about 1 inch in 15 feet, to the tee directly above the accumulating tank. The air return, of 1-inch pipe, continues from the bottom of tank through a swing check valve to the boiler.



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THE ATTACHMENT OF THE "K-M-C" VACUUM APPLIANCES on the Floating-check construction is here shown with one of our "American" Steam Boilers. Any other style of Boiler may be used.

The Swing Check Valve is placed in a position to prevent the water from leaving the boiler, and is protected by traps.

The Floating-Check is connected to the end of the long leg of the trap and a $\frac{1}{2}$ -inch pipe is run upward from its upper opening, thence downward to the mercury column attached to the wall, the side opening of which is well above the water line of the boiler.

An Air Vent Pipe is shown connecting the lower opening of the regulator to the air main. An air vent pipe is also shown connecting the vertical drop of the return from the shortest steam circuit to the air main above it.

The Regulator and chains are shown attached.

The Thermometer is placed in the top or front of the boiler, so its bulb is surrounded by steam.

The Steam and Vacuum Gauges are so piped as to be protected by traps from contact with the steam.

A Safety Valve is essential on this system. We can furnish one specially made. Prices on application.

The ordinary steam regulator and tri-cocks, usually furnished with the low-pressure boiler, have been discarded.

The Loop Construction—(Not Shown). In this construction, a loop between 30 and 50 feet high of one inch pipe up, and $\frac{1}{2}$ inch pipe down, is erected in a wall or an unused smoke flue. It replaces the floating-check. It is connected to the air main at its lowest point in its return to the boiler. It will prevent the escape of water and to a considerable extent will resist the efforts of steam to escape. The specialties furnished with the loop construction are given on previous page.

SPECIFICATIONS—In specifying these appliances, the following form may be used in connection with the regular steam heating specifications:

"The heating Apparatus to be equipped with "K-M-C" Vacuum appliances (Morgan Patents), each radiator to be properly connected up with retarder (state whether open, manual or automatic)."

"Also, each radiator to be properly connected with the air lines, mercury column and damper regulator, all to be connected as per manufacturers' instructions." Copies may be had on application.

Specify "K-M-C" Packless Diaphragm Radiator Valves; they are specially adapted for vacuum systems, but are good for use on any heating apparatus. Note the valve in illustration of equipped Radiator on previous page.