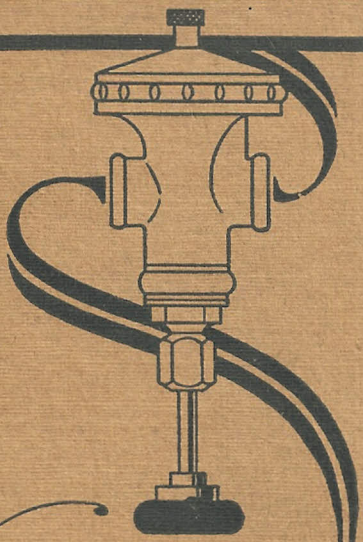
DUNHAM SPECIALTIES



C. A. DUNHAM CO.
MARSHALLTOWN, IOWA.

BULLETIN No. 11

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C. A. Dunham Company

MARSHALLTOWN, IOWA

NEW YORK CHICAGO SAN FRANCISCO

Branch Offices in All the Principal Cities

(This Bulletin supersedes all information covering same subject heretofore published by us.)

SUBJECT

The Dunham Vapor System

OTHER BULLETINS WHICH MAY BE HAD ON APPLICATION ARE

BULLETIN No. 1—The Dunham Vacuo Vapor System of Heating—What it is—How it Operates.

BULLETIN No. 2—Advantages of Steam for Heating—Why the Dunham Vacuo Vapor System is Superior.

BULLETIN No. 3—How to Install the Dunham Vacuo Vapor System of Heating.

BULLETIN No. 4—How to Operate the Dunham Vacuo Vapor System of Heating.

BULLETIN No. 5—The Dunham Radiator Trap and its Application.

BULLETIN No. 6—The Dunham Blast Trap and its Application.

BULLETIN No. 7—The Dunham Air Line Valve and its Application.

BULLETIN No. 8—Dunham Traps for High Pressure Service.

BULLETIN No. 9—The Dunham Reducing Pressure Valve and Vacuum Pump Governor.

BULLETIN No.10—Some Buildings where the Dunham Systems of Heating are now Installed.

THE DUNHAM VAPOR SYSTEM

Definition of Heating. The C. A. Dunham Company proposes in this bulletin to describe the Dunham Vapor System *It is a system entirely different from the Dunham Vacuo Vapor System.*

The Dunham Vapor System of Heating, as the name implies, is a system that utilizes steam at very low pressures above atmosphere for a heating medium.

By VAPOR is meant steam at very low pressures. You have noted, no doubt, the steam that escapes from the surface of a pan of water that is boiling on the stove. Well, that is the kind of steam that is called Vapor, and is the kind utilized in the Dunham Vapor System.

Utility of Vapor as a Heating Medium

Vapor, that is, steam at a few ounces of pressure, is an ideal medium for heating purposes. It can be produced easily and quickly; it circulates readily and is easily regulated. It has a distinct advantage over hot water in that it responds more quickly and will not freeze. For instance, on a cold morning or when the house has been unoccupied for some time, vapor can be produced quickly and one does not have to shiver for an hour or so waiting for the radiators to warm. Then too, if you have a Dunham Vapor System in your house and want to shut up your house in the winter time, all you need to do is to draw the small quantity of water out of your boiler, a job requiring possibly ten minutes time. With hot water you are obliged to drain the entire system and refill it again upon returning. If you have ever done this you will appreciate what a difficult job it is.

Another advantage of vapor heating over hot water lies in the ability to shut off any radiator or radiators without the fear of their freezing. This point is especially important in apartment buildings where an apartment may be vacated in midwinter. With a hot water system, should the radiation in that apartment be shut off, freezing might follow. With a vapor system such radiation can be shut off and the fuel cost lessened proportionately.

Growth of Vapor Heating

Vapor Heating is not new, yet its great advantage has only been generally recognized within the past few years. The reason for its recent rapid advancement is due to the new devices that have been created for handling it. For

years and years, and even back in the Colonial days, the practicability of vapor for heating purposes was recognized by some, but its use has been limited because of the unreliable devices heretofore used in connection with it. For instance, earlier systems required sizzling, property-destroying air valves on radiators—*the Dunham Vapor System absolutely does away with the necessity of having any air valves on radiators*—pounding in pipes—*Dunham Vapor System is absolutely noiseless*—poor control of pressure in boiler—*Dunham System positively controls the pressure in boiler*—rumbling noises in boiler—*Dunham System is absolutely noiseless and it is impossible to overheat water in boiler as with a hot water system*—high fuel cost—*Dunham System wastes no steam and all the water of condensation is carried back to the boiler for re-heating; therefore, there is no possible chance for promiscuous loss of heat units. Every heat unit absorbed by the water in the boiler is utilized.*

The elimination of all these annoying features which were so evident on former systems has brought vapor heating back to its own, and when the public learns of this, other forms of artificial heating of residences and apartment buildings will become obscure.

Attractive Features of Vapor Heating

Consider for a moment the ideal system of heating, and you will be surprised how closely the Dunham Vapor System approaches it.

Think what it means to have a heating plant in your home which, with almost human intelligence, keeps the temperature at the proper degree during the day, and at night after you have retired, automatically permits it to run down to 55 or 60 degrees, only to be raised again to 70 degrees an hour or so before you awake in the morning.

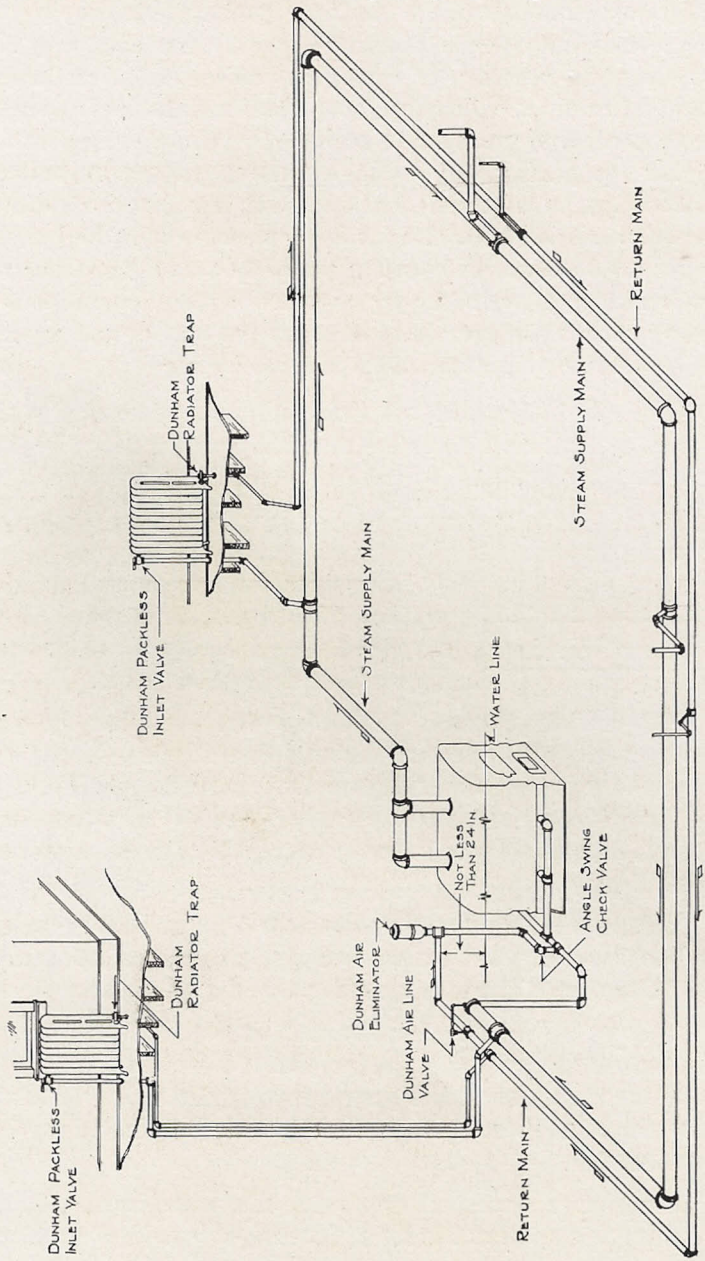
This is what the Dunham System does in that noiseless, yet positive way that leaves nothing to be desired, and it does it, too, with the least possible amount of coal.

It is the only system on the market that will do this, and what is more surprising is the fact that it is far less complicated in construction than other systems which do not even claim to accomplish those things that are accomplished by the "Dunham."

A perfectly governed apparatus has been brought about by our having applied the art of "cutting-across-lots" to secure

results without complicated mechanism, which has value only in confusing the public.

We have only to refer to the following description to substantiate our claim of simplicity and practicability of



every part of the Dunham Vapor System. The Dunham slogan in all the years gone by has been "Simplicity," and we propose to stick to that good old policy in the years to come.

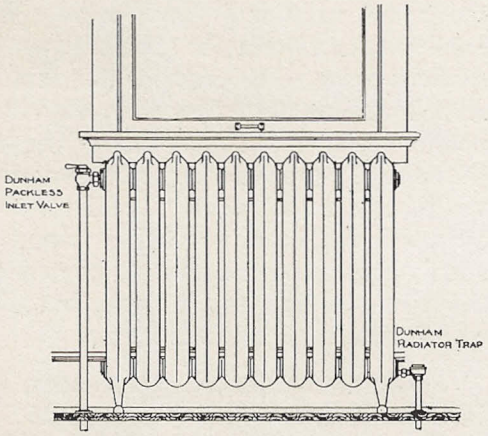
References Any user of a Dunham Vapor System will gladly tell you his opinion of it. We have a list of some hundreds of users from which we can select a few names of customers in your territory to whom you can call or write if you desire.

General Description The Dunham Vapor System is shown in simple diagram by cut, page 4. From that diagram you note that the supply piping from the boiler is run about the building in the most direct fashion. Likewise the return pipe which carries the condensation and air out of the radiators is simply planned and comes back to the boiler directly. Because of the Dunham Vapor System utilizing the well known Dunham Radiator Trap on the return from each radiator, thereby eliminating the possibility of vapor getting into the return pipe, there is no necessity of having any complicated mechanism in the boiler room to get the air out of the system. All we place on the return pipe in the boiler room is a check valve (See cut page 4) and a Dunham Air Eliminator (See cut page 4). With other vapor systems using a ball check, water seal elbow, or other makeshift device on the return from the radiator, it is almost impossible to keep the vapor out of the return pipe. Vapor in the return pipe hampers the radiators from being quickly vented of air, and when a radiator is not entirely freed of air it will not heat up. Other vapor systems try vainly to supply devices on the return pipe near the boiler to get rid of the vapor in the return pipe, but such devices only add complication and extra expense.

With the Dunham Vapor System the application of the Dunham Radiator Trap (See page 10) causes the vapor to be held in the radiator where it belongs. Nothing is discharged into the return line but the water of condensation and air. The air so discharged is vented to the atmosphere by the Dunham Air Eliminator and the water is delivered back into the boiler to be heated over again. Thus you see there is no loss of water in the Dunham Vapor System. The same water is heated over and over again. And again, there is no loss of vapor. Every bit of it is held in the radiator until it gives up its heat and changes back to water.

From what has already been said you can see that the Dunham Vapor System is the acme of simplicity. Piping plan is simple and the devices used in connection with it are few and very simply constructed. *Any fitter who knows how to install piping can install the Dunham Vapor System.*

So far in our general description (and farther on we will describe more in detail the specific devices which make possible the Dunham Vapor System) we have dwelt in length upon the simplicity of the Dunham Vapor System in the boiler room. Now let us carry our discussion to the rooms to be heated. In the rooms to be heated are the radiators. (See cut of radiator connections below.) These radiators should be of the hot water type (a steam type radiator can be used but we recommend the hot water type as being much better). The supply valve to each radiator is placed at the top where it is convenient. This valve is of the Dunham make, absolutely leak-proof and packless and has a lever handle. A simple movement of the lever handle permits the amount of heat given off by the radiator to be varied to suit the occupant of the room. On the opposite end of each radiator at the bottom is the Dunham Radiator Trap. This trap automatically keeps the vapor in the radiator until it is condensed, but allows all air and water in the radiator to pass out into the return line. *No air valves are used on the radiators.* All the air is passed into the return line and carried to the Air Eliminator in the basement where it is discharged. Thus you see that every possible precaution is taken to make the radiators in the rooms so thoroughly sealed that air, vapor or water cannot get out on the floors, walls or rugs. Nothing short of a broken pipe or radiator could cause this to take place.



Distinguishing Features

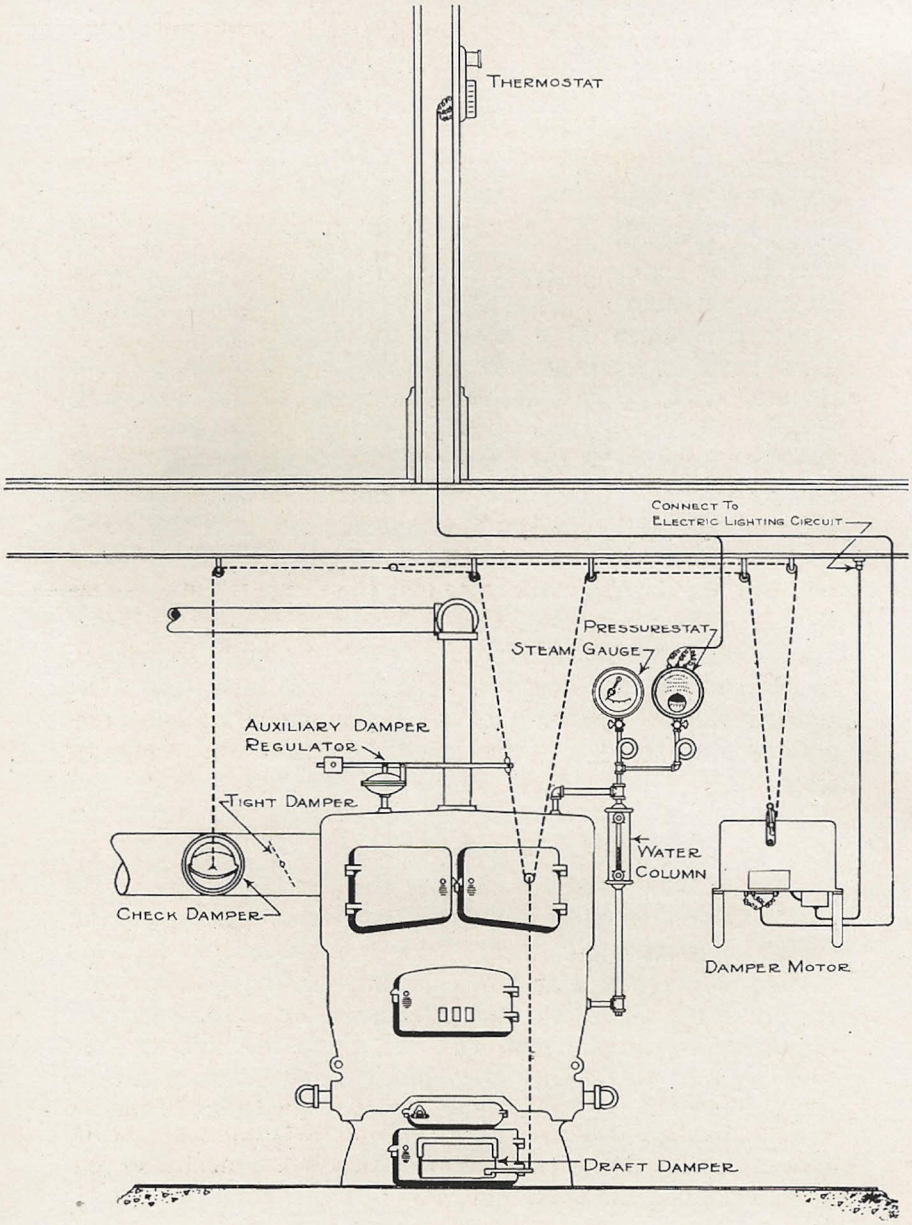
Now we come to the notable and distinct feature of the Dunham Vapor System. It is the Pressurestat and Damper Motor that control the pressure on the boiler. The Pressurestat and Damper Motor are designed so that in addition to controlling the pressure on the boiler they will, by

the simple addition of a Thermostat, (See cut page 12) regulate the temperature in the rooms above. The Pressurestat is placed on the boiler (See cut page 8) and when the pressure in the boiler rises to, say, six ounces, it trips the Damper Motor which in turn closes the draft damper on the boiler. (When we speak hereafter of the draft and boiler dampers being closed we mean that the draft damper is closed and the check damper at the rear of the boiler is open.) Then when the pressure in the boiler falls, say, two ounces, the Pressurestat trips the same Damper Motor again and in turn the draft damper opens. (The points of tripping can be varied by a simple adjustment of the Pressurestat.)

You probably wonder how this mechanism can also govern the temperature of the rooms above. This is easy. In a room above is located a Thermostat (See cut page 8). When the temperature runs up to, say, 72 degrees, this Thermostat trips the same Damper Motor that is connected to the boiler dampers and the draft dampers on the boiler are closed. When the room temperature drops to, say, 70 degrees, the Thermostat trips the Damper Motor again and the draft damper opens. (The points of tripping can be varied by a little thumb nut and dial on Thermostat.) Even if the room temperature above is not up to the point where the Thermostat will trip, the dampers will close just the same, if the pressure rises to the point where the Pressurestat is set. This is a precaution in behalf of safety, for it might require some time for the room to get up to temperature and in that time the pressure on the boiler might run up. So the Dunham Pressurestat regulates the pressure on the boiler and keeps it from running too high, while the Thermostat controls and regulates the temperature of the room. Have we made the above perfectly plain? We believe we have.

Refer to cut, page 8. You see the Thermostat placed in the room above. You see the Pressurestat located on the boiler. You see the Damper Motor in the boiler room. (This Damper Motor is the little mechanism which opens and closes the draft and check dampers on the boiler. It is operated either by electric dry cell batteries, or by the lighting current in the house. When the lighting current is used a small transformer is furnished.) The Thermostat trips the Damper Motor when the temperature in the room rises or falls to certain points. The Pressurestat trips the Damper Motor when the pressure on the boiler rises or falls to certain points.

You probably wonder how the Thermostat and Pressurestat trip the Damper Motor. Refer again to cut below. See the connection from the electric lighting circuit to the Motor through the transformer. This electric current passes from the Motor through cables to both the Pressurestat and Thermostat.



When the Thermostat or Pressurestat reach certain points where you want the boiler dampers to close, an electric circuit is completed which in turn actuates a little magnet in the Damper Motor and the Motor operates.

What will happen if the electric current should give out when you are out of the house, do you ask? You still have the auxiliary damper regulator (See cut page 8) left and it will take care of your boiler until you get new batteries (batteries last, at least, one season and are very inexpensive to replace) or until the current in your house comes on again. Remember right here, too, that other systems on the market only supply a damper regulator similar to the one that we use as an auxiliary, so from this you can readily see that our apparatus is as fool-proof as it is possible to make it. The trouble with most damper regulators is that they are not sensitive enough and this is the detriment we absolutely overcome by use of the Pressurestat which can be set to operate the dampers at one ounce of pressure on the boiler.

Keep in mind that the points at which the Pressurestat will operate the dampers can be varied to suit weather conditions. In the early fall or late spring when less heat is required the vapor pressure on the boiler can be held at two or three ounces. In cold winter weather the pressure can be increased to eight or ten ounces. This is a very important feature, and one that means a big saving of fuel. No other system ever marketed permits of such delicate yet definite adjustment.

Another thing, too, for you to remember is that the points at which the Thermostat will operate the dampers can be varied. (See page 12).

The Dunham Vapor Specialties

The specialties furnished by the C. A. Dunham Company and that make possible the Dunham Vapor System are as follows: Dunham Radiator Traps, Dunham Packless Inlet Valves, Dunham Air Eliminator, Dunham Damper Motor, with Cable, Pulleys and Batteries or Transformer, as required, Dunham Pressurestat, Dunham Thermostat, and Dunham Check Damper.

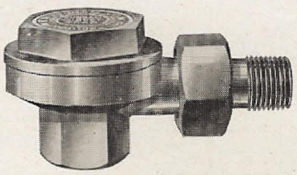
Sufficient wire to fully connect the entire apparatus is furnished with the above, also wiring and installation diagrams with full instructions, so that even the most inexperienced layman can connect everything up.

Before going further, however, let us say that if you prefer not to install the Thermostat you need not buy that article and the system will not cost so much. All the other apparatus is necessary.

We will now proceed with a description of each of the above specialties.

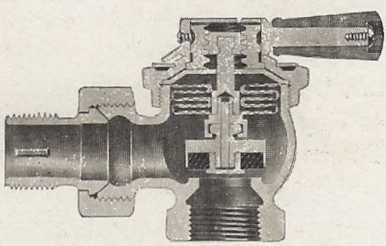
Dunham Radiator Trap

The Dunham Radiator Trap is the little device that is connected to the bottom of the return end of each radiator for the purpose of letting all water and air out of the radiator without loss of steam. Its function is so important that it becomes a necessity when attempting to make any vapor system operate successfully. This is the little device that has made the great reputation of the C. A. Dunham Company. The Dunham Radiator Trap is a standard the country over and hundreds of thousands of them are in use in some of the finest and most imposing buildings on this continent. It revolutionized the principle of radiator trap manufacture. After it came on the market it gave such splendid results that every competitor attempted to copy it. An article of merit sufficient to convince competitors, we believe should commend itself to the most fastidious buyer, particularly so when it has stood the test of so many years of service. This trap will be furnished nickel plated if desired.

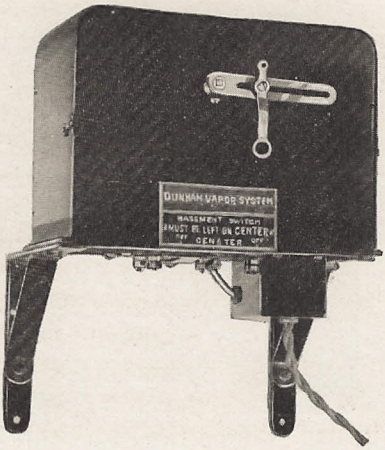


Dunham Packless Inlet Valve

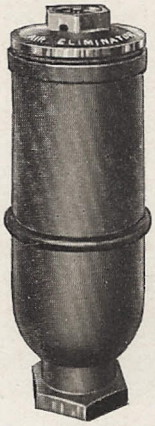
The Dunham Packless Inlet Valve is for use in turning the steam on and off the radiator. Note its construction. It has no stuffing boxes, like other valves, that are likely to leak. It is constructed of the very best of steam metal and comes regularly nickel plated all over with polished trimmings. This valve has a lever handle and is installed at the top of the radiator where it is convenient. Seven-eighths turn of the handle entirely opens or closes this valve.



Dunham Damper Motor



The Dunham Damper Motor is operated by electricity or by a stout spring, as is preferred by the user. The Damper Motor operates the boiler dampers in response to the directions of the Thermostat and Pressurestat, which set it in motion. It is durably built, positive in action and has been in successful use for many years on temperature controlling devices.

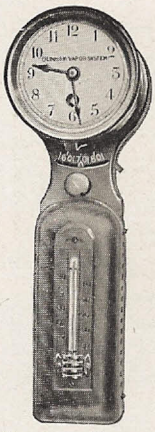


Dunham Air Eliminator

The Dunham Air Eliminator is used on the junction of the return lines in the boiler room. (See cut page 4.) Its mission is to discharge all air from the system. It is constructed so that the presence of water around the float will close a little valve to prohibit water from getting out in the basement. It isn't probable that water will get into the valve, but in case it does, such as where the boiler primes badly, the Air Eliminator keeps any water from getting out on the basement floor.

Dunham Pressurestat

The Dunham Pressurestat is nothing more or less than a sensitive pressure gauge. It is connected directly to the boiler. You will note two little pegs or stops in the segment traversed by the gauge hand. When the gauge hand comes in contact with the right hand stop an electric contact is made which in turn trips the Damper Motor and the boiler drafts are closed. Then when the pressure on the boiler falls and the gauge hand touches the left hand stop the Damper Motor is tripped again and the boiler dampers are opened. The device is very durably built and is positive in its operation. The Pressurestat does not indicate the pressure on the boiler except between the two points at which it is set.



Dunham Thermostat

The Dunham Thermostat is supplied with an eight-day clock that automatically "sets back" at night and "up" in the morning. By "sets back" and "sets up" we mean that a certain time in the evening, say ten, eleven or twelve o'clock, it closes off the boiler drafts and permits the house to gradually cool down to fifty-five degrees; then in the morning at four, five, six or seven o'clock it automatically opens the boiler drafts and permits the house to gradually heat up to seventy degrees. The hour of "set back" and "set up" can be varied to suit the occupant of the house.

The Thermostat is only nine and one-fourth inches high over all; is finished in "sand-blast" brass and is very ornamental in appearance.

The Thermostat is hardly applicable to buildings occupied by more than one tenant. This would apply to such buildings as apartments, double store buildings, or double residences. The reason for this lies in the fact that one occupant might not be satisfied with the temperature desired by another. *And two Thermostats cannot be applied to one heating system.*

In buildings occupied wholly by one tenant the Thermostat should be placed about five feet from the floor on an inside wall and in a room (preferably living room) having an average temperature. Care should be exercised to avoid placing it near chimneys, radiators, hot pipes (exposed or concealed), near windows or where it will be exposed to cold drafts. Neither should it be placed where there is not a free circulation of air, as behind doors. The most convenient place is usually beside the casing of an inside door on the side where it will not be hidden when door is open.

Dunham Check Damper

This special Check Damper is supplied in order that the boiler may be more easily regulated in response to the closing of the draft damper. It checks the combustion by lowering the chimney temperature and reducing the draft.