In This Issue

UNCLE SAM EXPANDS DISTRICT HEATING SYSTEM IN WASHINGTON

DISTRICT HEATING AS AN AID TO AIR CONDITIONING

WHY IT PAYS TO BUY STEAM

DISTRICT HEATING AS A PROFITABLE MUNICIPAL UTILITY

WHICH TYPE EXPANSION JOINT?
and years after installation
original accuracy is retained

Continuous meter accuracy is an absolute essential whenever steam consumption regulates the fixing of steam costs.

That is why the inherent precision of ADSCO Rotary Condensation Meters and the ease with which this precision can be maintained is so important to the user.

Every ADSCO Rotary Meter is checked within 1% of absolute accuracy before it leaves the factory. Any variance from this accuracy can be quickly, easily corrected by adjusting the nozzle to compensate for any unusual temperature condition, or the natural wear that may have occurred in service.

When your steam costs are computed from the records of ADSCO Meters, you can depend upon it—those costs are correct!

Write for complete information

ADSCO
ROTARY CONDENSATION METERS

7 SIZES

ADSCO Rotary Condensation Meters are made in 7 capacities: 250, 500, 750, 1500, 3000, 6000, 12,000 pounds per hour. Among these sizes is one to meet your requirements with complete satisfaction.

IN 1905 the Federal Government made its first venture in District Heating with the installation of underground steam lines for supplying the Navy and Munitions Buildings and other buildings with steam from the Potomac Electric Power Company's generating plant.

In 1923 the initial experiment had proved so satisfactory that it was decided to supply steam to the White House from the boiler plant of the State Department buildings.

Anyone familiar with Government procedure need not be told that the engineering divisions watch any new activity in the engineering field with investigating eyes. Errors in judgment in Washington have too sharp
PROGRESS at WASHINGTON

These views give some idea of the size of the Washington project—one of the most important District Heating installations of 1932.

The Engineer's Offices on Location

12" to 18" lines being installed in tunnel.

Line of trench in Constitution Avenue, steel forms in position.

Tunnel excavation work on a main thoroughfare.

Cutting a trench through Monument Park.

an aftermath to allow any radical change to operate unobserved.

Therefore, with the recent decision to spend over a million dollars on extensions to the Washington District Heating systems, Uncle Sam emphatically subscribes to the economy and efficiency of centralized production and underground distribution of steam.

Credit for the design of the new District Heating extensions goes to United Engineers and Constructors, Inc., of Philadelphia. The construction contract was awarded the Northeastern Pipe & Construction Corporation, North Tonawanda, N. Y., on July 27th of last year. Ground was broken August 22nd. It is expected that work will be completed by August, 1933.

Some idea of the proportions of the installation can be gained from the aerial view at the bottom on this page which shows the districts to be supplied. The new system will serve an area containing eight completed Government Buildings as well as a number of structures being planned for the near future.

In lineal dimensions, the installation calls for 42,800 feet of underground steam and return lines, with approximately 19,500 feet of tunnel and conduit. Of this total, 8900 feet will be new reinforced concrete tunnel; 5800 feet of reinforced concrete conduit; and 4800 feet of main being carried in existing tunnels.

Steam will be distributed at 31 pounds working pressure through high pressure pipes ranging from 4 to 6 inches in size. Condensate return and drip mains will range from 1 1/4 to 4 inch.

Specifications call for 302 slip type and packless expansion joints, varying in length from 2 to 18 feet—several expansion loops—also a complete bill of miscellaneous steam line equipment—water heaters, steam flow meters, electric pumps at low points in tunnel or conduit to take care of any seepage or water.

Extra heavy brass pipe will be used where condensate return lines are in inaccessible places such as in conduit. As far as possible, all pipe joints throughout the entire job will be welded and all welds in steam lines will be annealed in special furnaces. Then, after

(Continued on page 56)
It is with deep regret that we report the passing of William D. Rees, oldest ADCO employee, and assistant to Birdsall Holly, ADCO's founder. Mr. Rees, who died on September 29th, was associated with the American District Steam Company since its inception in 1877.

PROPER humidification and air conditioning are being talked of and written about until almost everyone is familiar with the terms. Most laymen, however, think of these as things greatly to be desired but as yet almost impossible luxuries, not knowing that they may work out as an economy in actual reduced operating costs. From the standpoint of comfort and health they possess intangible though real advantages, and when they decrease actual heating bills, reduce work of house cleaning and make comfortable rooms that heretofore had been uncomfortable, real savings are produced.

An installation that does these things recently was made in Coatesville, Pa., by the Chester Valley Electric Company. A rather pretentious residence was originally heated by three oil burner installations. Or of these was on a hot water boiler supplying the hot water radiation system, the other two units being on combination air and hot water heaters. A coal-fired boiler supplied hot water for domestic needs. These were troublesome and noisy, and, worst of all, oil fumes and dirt were carried into the house, which destroyed expensive rugs, tapestries and paintings besides being otherwise objectionable and unhealthful.

The owner wanted, most of all, cleanliness, quiet and freedom from odors. Operating cost was not paramount, but was, of course, a factor. The steam heat engineers, whose business, of course, is to sell district steam heat, promptly offered the...
suggestions. As a result, two warm air units heated by steam with forced circulation of the air, humidifiers and air filters were installed to supplant the original hot air heating. Forced circulation of filtered and humidified warm air at reasonable low temperatures in winter, and of cold dehumidified air in summer was arranged. In moderately warm weather no precooling is expected to be necessary. Steam-generated hot water units were installed to take care of the hot water radiation. With the diversity obtained from these four units, thermostatically controlled from proper locations, even temperatures are obtained in every location.

The domestic hot water supply is taken care of by a hot water generator feeding into a large heavily-insulated storage tank, in which are installed electric heating elements for off-peak operation. The steam condensate from the whole system is used to temper or preheat the water going to the domestic hot water heaters, as an economy measure. The district steam heating system is not operated in the warm summer months, so the electric elements in the hot water storage tank automatically come into service when the steam supply ceases, the controlling thermostats on the electric heater limiting the electric use to those periods.


This installation points the way for thousands of home owners with dirty, inadequate hot air furnaces to economically convert them into clean, healthful, modern systems, useful in warm weather as well as in cold. And, even more clearly, it indicates the way for the future home builder to install ideal, modern heating and air conditioning systems at reasonable cost.

Nor is this particular installation an isolated example of the application of District Heating Steam Service to warm air heating.

In the October, 1930 issue of the "Sheet Metal Worker" appeared a lengthy article on the use of steam-heated warm air in Indianapolis homes.

That city is served by one of the largest District Heating systems in the country, which in addition to serving the business districts takes in an extensive residential area having several hundred homes equipped with warm-air heating plants of various makes.

Instead of allowing these plants to be displaced by radiator systems, a plan was evolved for employing steam from the central plant to serve in place of fuel in warm-air furnace installations, thus doing away with coal, oil or gas as fuel.

Home owners are rapidly learning that family health, comfort and cleanliness, demand thoroughly filtered, properly humidified air in their homes along with the necessary quota of heat.

If the rapid extension of district heating into residential areas is to continue, it must be able to meet the demand for this perfect air-conditioning service. Fortunately, extensive experience in other fields in the past may be called upon to furnish complete, specific data, on which collectively to base the particular method most desirable for this new household application of District Heating.

Warm air steam-heated by bias coils has been used for years in schools, theatres, commercial and industrial buildings. The performance of bias coils is well known, and the quantitie of air and heat and temperature may easily be calculated to meet coil requirements.

Practical air filtering or air cleaning methods have been thoroughly established for commercial and industrial purposes for years, and more recently in connection with warm air furnace in homes.

The forced circulation of air has been a subject of experimentation and technical development for many years in many fields of endeavor. Although there are several different schools of thought on just how best to move air it may be done easily and successfully in any one of several different ways.

The most important point in moving air satisfactorily in the home i
silence—lack of annoying or disconcerting noises. Quiet or silence may be obtained by increasing the blower size and reducing its speed for any given volume of air. Added size means added cost and requires additional space which may not always be available. Arbitration between quiet, absolute silence and its cost usually will determine a satisfactory blowing unit.

Humidification methods are well established at this time, and may be applied to the steam-heated warm-air installation, much the same as to any other system.

These various elements brought together in adequate sizes, properly arranged, make a simple and a very effective air-conditioning plant when connected with a central or district steam-heating system.

They also make it possible for people whose homes are already equipped with a warm-air plant that has not outlived its usefulness, to convert it by means of blast coils, fans and air filters, to economical and satisfactory use of steam from a District Heating plant, such as this one established in Indianapolis. This may be done in the average home at a not prohibitive cost and obtain a desirable cleanliness, not possible with use of coal as a fuel. It has the added advantage of supplying constantly changing, pure, filtered and properly humidified air. Health authorities are united in the claim that such air materially reduces risk of colds and other diseases, and illnesses caused by impure air.

This manner of heating homes is not new—it is just a domestic application of methods long in use in heating theatres, schools and industrial plants. When analyzed and impartially judged, it must be admitted however, that it is a correct answer to heating satisfactorily at reasonable expense. It is a heating method with which the most critical can find no complaint.

There are so many possible combinations of available tried and tested elements that may be assembled to accomplish the desired purpose that the problem resolves itself into one of selecting the particular combination that will perform most satisfactorily, be easily installed, cost the least, be free from noise, and in its operation be practically free of service demands.

The most important items necessary to convert an orthodox warm air heating system into a forced circulation, steam-heated warm air plant are of course, the blast coil, the fan or blower, and the temperature control system.

The main points to be observed in the selection of the blast coil are low-air resistance, high heat conductivity, non-corrosive metal, compactness; and what is of great importance, it must be designed and built so that the expansion and contraction of the heating elements (coils) can take place without changing the heat-conductivity or breaking the joints.

A fan of the propeller type, if oversized, may be used for installations requiring not to exceed 80,000 B.t.u. per hour. This type of fan may be used on larger installations, but the higher fan-speeds cause a “fan-noise” that may well be objectionable in many homes and buildings. For larger installations an enclosed blower of sufficient size to deliver the required volume of air at a speed of 300 to 400 r. p. m. will be found satisfactory and free from objectionable noise.

Complete temperature control may be obtained by a thermostat, properly located, to operate both the fan motor, and a motor-operated steam valve. This complete control has the disadvantage of requiring motor operation in extreme weather. So at this time it seems more desirable to control only the fan-motor with the thermometer and the steam valve by hand. Stopping the fan reduces the heat delivery from 75 to 90 per cent, according to the type of blast coil in use. 10 to 25 per cent of the rated capacity of the installation is delivered with the fan idle, due to the thermal connection. This modest amount of heat is usually all that is required during the many mild days of the heating season, and acts to reduce the total actual running time of the fan during the heating season.

A steam valve that can be operated by a damper chain from the first floor can be used to stop all heat completely during those spring and fall days when heat is necessary only for a short time during the morning and evening.

The steam consumption of this type of warm-air steam heating plant I found to be about 420 lb. of steam per square foot of radiation per year. That compares with 525 lb. of steam per square foot of radiation for similar installations heated with room radiators.

"FOR THE ASKING"

Once there was a Nabob who had spent many years unsuccessfully trying to find out how the ruler of a neighboring province made the dyes for coloring silks and wools.

Then at a great conclave of rulers, his desire to know the secret of the dyes burned him like a fire. Not knowing that the neighboring king stood near—he cried to a prince of his realm—"How shall I ever learn of those marvelous dyes? Years, have I given to experiment, yet I cannot make them like his!"

A hand touched his arm. He turned to see the man of whom he spoke.

This one smiled and said, "Gladly will I show you. Why haven't you asked me?"

If you or your engineers are ever perplexed by some problem related to the most efficient and economical installation of steam lines, do not wonder what method ADSCO would use or what type of equipment. Ask us! We'll give you an unprejudiced answer—based on our experience of over 50 years in designing and furnishing equipment for steam distribution lines.
I n writing of District Heating as a municipal utility service, I am glad to be able to write directly from our experience, here in Vermilion, where we have been operating a municipal heating system for five years. It will come as a surprise to many that this service can, unquestionably, be operated at a profit in towns as small as our own, as there seems to be a mistaken idea that District Heating must be confined to large cities.

In order that the situation might be thoroughly understood, let me review briefly the outstanding circumstances which must come under careful review by every municipality contemplating such undertaking. Vermilion, Alberta, is a town with a population fluctuating between 1500 and 1700 people. The town is scattered over an area almost a mile and one-half in length and a mile in width. Absolutely no thought was given to town planning or centralization in its early growth and development. As a result of this, the cost of construction and maintenance of public utilities is much higher than need be, had the town been planned and zoned in an orderly manner.

In order to prevent future wastefulness and error in this respect, our town council has had engineers prepare very complete maps of the town site on which are prescribed certain areas or zones. By-laws have also been passed, giving legal force and effect to the principles set forth. This action was designed to take care of future operation.

Existing conditions presented a concrete situation with which we had to deal. Our power station was equipped with obsolete machinery and was inadequate to meet the needs of the people. We were faced with the problem of either enlarging our power plant and installing new machinery or selling out to the utility interests. At this stage the power companies were unusually active and practically every town and city in the Province yielded to their overtures and permitted their utilities to pass into outside hands.

At this time (1928) the Council delegated me to make a survey of the whole situation and advise them with respect to electrical equipment and community heating. One of the large utility companies had made a proposition to buy our power plant. As a result of the survey which I made, I had no hesitation in advising against the offer.

Continuing my community heating investigation, in conjunction with our power station, I sought the advice of everyone who might be able to give me expert advice on the matter. Much to my disappointment I was advised on every hand that the venture was too hazardous. Federal Government engineers had just completed a two year study of this problem, both in Canada and the United States. A copy of their findings came into my hands. Their report stated very definitely that no city with a population of less than 10,000 should undertake such a venture and then only if their business section was compact and their power station conveniently located so that the distance between the power station and the customers would not be too great.

Judged accordingly, District Heating for Vermilion appeared to be entirely outside the bounds of possibility. Our customers were widely separated, our power station was not conveniently located, and we had a population of 1700 at the most.

However, continuing my investigation, I got in touch with the American District Steam Company of North Tonawanda, N. Y. Their representative came to Vermilion and made a careful study of the problem, returned to North Tonawanda and placed the data in the hands of their engineers. Blue prints, plans and specifications were then drawn up and submitted to us. The contract price for the complete job was twenty-five thousand dollars. The Council agreed to accept this offer provided we could get the consent of the Utility Commission.

In our application to the Commission we showed an estimated revenue of from six to eight thousand dollars per year, according to the severity of the weather. We already had nine thousand dollars in cash available which left only sixteen thousand to be borrowed. The Commission was very reluctant to grant permission, as they regarded the whole scheme as decidedly hazardous. Eventually, however, they consented to the issuance of sixteen thousand dollars in debentures, which were to be repaid in five equal annual installments. Accordingly, our money by-laws were prepared and submitted to the rate-payers, in order to obtain their permission to borrow money to cover this project, as well as the construction of a new power station, engines, generators, switchboards and boilers.

During our several studies, another large utility company sought the opportunity to present a proposition for the purchase of our electric plant and franchise. Meetings were held and questions debated until our citizens had a thorough understanding of the relative merits, in our case, of selling our electric utility to the large holding companies or retaining it and adding a community steam heating service under municipal operation. This latter service could not, of course be counted on if we sold out, as the power company would plan on the ultimate elimination of the local steam generating plant. There proved to be (Continued on page 10).
Do your processes
NEED A HEATER
LIKE THIS?

While the ADSCO Heater was designed primarily for heating water, its uses in industry are so diversified that it might be classed more correctly as a temperature converter for liquids.

Fluids of all kinds can be run through it for either heating or cooling; fluidity can be reduced or increased; two liquids can be equalized in temperature, and a number of other similar processes be handled with efficiency and economy.

The staggered arrangement of the tubes is unusually effective in transferring the B.t.u. content of steam to liquids—with corresponding economy of operation.

The entire heater is simple in design, built with the fewest possible parts, and is easily cleaned which means sustained service with a minimum of attention.

All parts are made of the very best materials—giving definite assurance of life-time service. The ends of the tubes are expanded into a steel head, making a permanently leak-proof joint.

ADSCO Heaters are available in twenty-one sizes, with capacities ranging from 28 gallons of water per hour at atmospheric steam pressure to 65,000 gallons per hour at 100 pounds pressure, depending on required temperature rise.

Get complete information on the ADSCO Heater. Decide from your own study of its design and construction, how well it is adapted to serve you.
Vermilion, Alberta, showing part of business section served by District Heating.

was immediately prepared and signed with the Canadian District Steam Company, Limited, Canadian subsidiary of the American District Steam Company, for the design and construction of the District Heating system, and other contracts concluded for improvements in the power plant. Everything possible was done to rush completion of these works.

By the first of January, 1929, everything was in operation. Business conditions at that time were exceptionally good, but before the first year had passed, depression overtook us and from then onward, right down to the present day, business conditions have dropped to the lowest level in our history. I submit that this is the most severe test that could possibly be applied to these undertakings and it is most gratifying to be able to say that, in spite of these unexpected and most trying circumstances, our utilities, and particularly our District Heating system are, each year, continuing to justify our faith and contribute generously to the comfort, convenience, safety and happiness of our community while providing municipal revenue for other purposes.

For five years prior to 1930 the municipality financed its affairs on current levies without having to borrow a dollar. Since 1930, due to the depression, we have had to borrow at certain seasons of the year. Our bankers have never hesitated to advance whatever funds were required. All our utilities and public services are operating today just as they were four years ago. There is only one reason why we are able to do this and it is because of the splendid performance of these utilities. It cannot be denied that our service is superior and our rates lower than in a great number of places of similar size and location.

While other towns have to remain in comparative darkness, due to their inability to pay for adequate lighting, Vermilion is gaily decorated with colored lights and an abundance of street lighting throughout the year. We are proud of our utilities and recognize that the District Steam Heating service, by which we deliver steam to the entire business section and a large number of residences, is one of our most valuable utilities.

During the present year the last payment due on the community steam heating system will be paid. During the five years of its operation the revenue from this utility has paid off its entire debenture indebtedness, all operation and maintenance charges, and in addition has paid several thousand dollars into the general revenue of the Town. There has not been a single interruption in the service. The cost of this service is slightly higher than the operation of individual heating plants, but when you take into consideration the advantages to be gained in the matter of stoking fires, shoveling ashes, dust, and the variations in temperatures, the small extra cost is hardly worth considering.

On account of the depression two or three of our customers returned to their former method of heating. One has since returned to our system and the others are faced with the alternative of returning to community heating or else looking for new tenants. The even temperature maintained in the buildings heated by our system is one of its most attractive features.

Another great advantage is that it has eliminated boiler trouble in our power station. The exhaust steam from our engines, with such live steam as may be required from time to time, is fed into underground steam mains running through the business section of the town, and connected to the heating systems of the various business houses. As the steam condenses in the radiators it is trapped through a meter which weighs the water and registers the amount.

Charges for service are based on the monthly meter readings. The water then passes into a return line and is returned to the power station by means of vacuum pumps and is again pumped into the boilers. In the process, all harmful substance which attacks the metal in boilers has been removed and the result is a continuous supply of distilled water.

This heating system was constructed by The Canadian District Steam Company, Limited. In my opinion it is a model of completeness. It has functioned perfectly, is giving satisfaction and will pay us handsome dividends for years to come. What more could anyone want? To any municipality which owns its own steam driven power station and has a compact business section not too far removed from its power plant, I say it is time to investigate the possibilities of District Heating—the construction of such plants offers immediate employment to your unemployed and the operation brings benefits and profits to your community. To all such, I have not the slightest hesitation in recommending that they immediately get in touch with the American District Steam Company of North Tonawanda, N. Y., the originators of District Heating, and let them advise you on any matter pertaining to community heating.

"One of the engines in the Vermillion City Power Plant."
AT YOUR COMMAND IN CANADA
OVER 50 YEARS EXPERIENCE IN DESIGNING AND INSTALLING STEAM LINE

In addition to having designed and installed several Canadian Steam District Systems, this Canadian company has the benefit of records and experience of more than fifty years specialization.

The parent company, American District Steam Company of North Tonawanda, New York, designed, installed and operated the first District Heating plant in 1877. Ever since then ADSCO has specialized in the design and construction of central, community and District Heating systems throughout Canada and the United States.

The Engineers' Service Department, which is maintained in North Tonawanda, New York, freely assists engineers and others interested in District Heating problems and welcomes the opportunity of providing helpful information.

A great number of cities and towns are looking to District Heating as an immediate means of relieving the unemployment situation and in this connection both the Canadian and American companies have pledged themselves to co-operate to the fullest extent. If your city does not have the benefit of a District Heating Service, this is a good time to give thought to its advantages.

Your inquiries will be promptly answered and interesting information will be mailed at once.

Canadian District Steam Co., Limited
HEAD OFFICE KENT BLDG., TORONTO, CANADA

Proposals gladly furnished on Industrial and Institutional piping installations.
WHY IT PAYS TO BUY STEAM

Should you buy steam or should you produce it yourself?—the assumption being that you now have that choice; or perhaps through the anticipated introduction of District Heating— you expect to have the choice.

Finding the answer to the query is comparatively easy. Reduced to the simplest mathematical comparisons your problem will involve the following computation of costs:

For District Heating:  
Your yearly steam consumption \times \text{steam rate} + \text{electrical consumption} \times \text{rate} = \text{yearly cost for steam and electricity.}

For your own Power Plant:  
Power plant depreciation + interest on investment + labor + fuel + maintenance + insurance + electricity costs (generated or purchased) = yearly cost for steam and electricity.

After these answers have been determined, you possess a basic comparison of primary costs for both systems; but to arrive at an actual equation, other factors in relation to District Heating must be considered. These factors may be generally outlined as:

1. Savings through smoke elimination.
2. Aid to traffic conditions.
3. Savings to new buildings through elimination of heating equipment.
4. Savings to old buildings by removal of heating equipment.
5. Income appreciation by utilization of boiler room and fuel storage space.

One of the gratifying features in presenting these plus-benefits of District Heating is that they have been proved by practical demonstration. They are just as clearly a part of District Heating economies as boiler depreciation is a part of boiler plant costs.

Even the most remotely beneficial of these influences—smoke elimination and traffic relief, can be reckoned in lowered costs.

Yearly, millions of dollars are lost to commerce through the damaging effect of smoke and soot. Authorities of three universities estimate that the cost of smoke and soot in Cincinnati alone is eight million dollars a year; ten million in Pittsburgh; fifty million in Chicago, and in the entire United States, half a billion dollars.

The large department stores of these cities each suffer smoke and soot losses estimated from twenty to fifty thousand dollars a year; hospitals, five to twenty thousand dollars; hotels, eight to twenty-five thousand, and office buildings, ten to thirty thousand dollars a year.

Where does this condition touch your pocketbook, or profits? Mark up the result in favor of District Heating.

Nor can the business executive divorce himself from the traffic problem. If traffic conditions are detrimental to his city, they are detrimental to him. Directly and indirectly, they affect the life of his business.

How much the use of District Heating can do in the relief of traffic troubles can be judged from the action of the Property Owners and Merchants Association, Inc., of New York City, which, after exhaustive study, urged the adoption of District Heating as the first step in the improvement of traffic conditions in the mid-town district. Grand Rapids, Michigan, has District Heating, and in an editorial, the Grand Rapids Press estimates that District Heating "saves the hauling through the streets of 3,350 truck loads of coal and 1,070 loads of ashes!"

But, however important the smoke and traffic situations may be, the remaining subjects are of greater dollar and cents concern to the business executive. First among these is the definite, measurable savings which come with the abolition of the heating plant in the construction of new buildings. Some examples may be cited from the records of one of the
country's most prominent consulting engineers; 

In a 26-story office building costing $1,900,000, by reduced excavation and eliminating the individual heating systems, a saving of about $80,000 was made in capital cost. A 13-story professional building cost $550,000. $20,000 in capital cost was saved by satisfied conditions and elimination of heating equipment. In a lengthy treatise on the subject, the R. P. Bolton Company, New York Engineers, states that a $240,000 saving was effected for the owners of one large building by the omission of power equipment, and further figures show savings ranging from $16,250 in buildings of medium size, to $140,000 in large buildings.

Another economy of particular importance to those contemplating the erection of buildings is the reduced importance to those contemplating the erection of buildings is the reduced cost of erecting these stacks. A survey of smoke stacks runs up to $300 per month per floor, depending upon the rental rate of floor space.

Even where boiler rooms, boiler room equipment and chimney are already installed, the definite economies and other benefits to be derived from the use of District Heating may justifiably abandoning them. In almost every instance, the space occupied by boilers, coal storage and ash disposal, when released from those uses, can be profitably utilized for sales purposes, restaurants, storage, or otherwise be rented. In large cities, it is not uncommon to find the rental from such space absorbing practically the entire heating cost.

In one instance, the owners of a department store declined an offer of $50,000 a year for space released by the removal of equipment following the introduction of District Heating. One large building, buying steam from the Kansas City Power & Light Company, more than pays for all the steam required during the year from the annual rental of basement space previously occupied by heating equipment.

Then, too, with the growing agitation for traffic relief, there is always the possibility of providing basement parking accommodations for customers.

(Continued on page 58)

### WHICH TYPE EXPANSION JOINT for best results?

**M**ost of the fittings used in the construction of a steam distribution system are fully covered by the several piping standards, so that a determination of the operating pressure will fix the type of tees, elbows, valves and anchorages fittings required. The several standards vary as to metal thicknesses, number and size of bolts in the flanges, and while entirely suited to the exact designation of fittings, do not fully cover the points which govern the choice of expansion joints for given conditions.

Naturally, the various steam line fittings are built to meet the requirements of the several standards as to metal thicknesses and drillings: but, in the choice of an expansion joint to meet established pressure conditions, the engineer must go beyond these points to insure maximum efficiency and economy. The choice of expansion joints he can, however, follow out the governing principles in the established standards for fittings.

It may be said that as the pressure and temperature of the steam increase, the severity of the service to which the expansion joint is exposed, likewise, increases. In a low pressure heating line the steam temperature comparatively low as the steam velocity, an as a result, the rate which temperature change occurs is negligible. On the other hand, in high pressure lines, velocities are high, the rate of temperature change increases and the service required of the expansion joint becomes more exacting.

In the low pressure service the packing gland need be drawn upon only moderately so that the resistance to movement of the slip is nominal; the rate at which temperature change occurs in the line is comparatively low and therefore the most simple types of expansion joints may be depended upon for efficient operation (Figures 1, 2 and 3.).

In higher pressure services the rate of expansion due to temperature change is much greater, the resistance to movement of the slip through the packing gland is greater as is the hazard of rupture in the line due to failure of anchorage. For these conditions, carefully guided types of expansion joints with dependable limit stops, are required.

In most industrial and utility development the trend is very noticeably...
towards distribution of steam at higher pressures and in view of this, the application of guided types of expansion joints is becoming more general. Secure guiding of the slip may be obtained through the use of the external guide, the internal guide or a combination of both. (Figures 4, 5, 6, 7.)

The external guiding is obtained by using a guide hood bolted to the body of the joint, through which a carefully machined guide flange moves to insure proper centering and alignment of the slip as it moves through the packing box.

Similar results are obtained in the internally guided joint by a fully machined internal body surface on which a bronze ring mounted on the internal end of the slip bears throughout its circumference and thus insures a true movement of the slip through the packing. Both types of guide may be combined to make the externally-internally guided joint, which provides complete circumferential support of both ends of the slip throughout its travels.

In the selection of guided joints, whether externally or internally guided, it is important to select a joint in which the friction of the guiding operation is removed from the surface of the slip itself. With the exception of the packing nothir should touch the slip that could possibly scratch or mar the highly polished surface. Any such scratches or burs in the surface of the slip tend to destroy the efficiency of the packing as the slip moves in and out of the packing box.

Thus far, the discussion has been only with slip type expansion joint. To complete the available selection for all purposes, the Packless Expansion type must be included. (Figure 8)

Instead of using a sliding sleeve to absorb the expansive and contractive movement of the line, the Packless Joint employs a series of metal diaphragms, securely enclosed and protected by a heavy metal body.

Because of their ability to render years of service without attention, Packless Expansion Joints have gained wide preference for all types of installations, but they are especially adaptable for those installations where steam mains must be buried underground and cannot be serviced. Packless Joints are made in both low and high pressure designs and should receive serious consideration in planning any steam piping installations.

Why it Pays to Buy Steam (continued from page 22)

and garage space for tenants. This plan has already proved successful in several cities, and is receiving the serious consideration of building owners in other metropolitan centers. "Adequate parking facilities" is an almost irresistible inducement to offer either a prospective tenant or a customer.

With the abolishment of the boiler room and fuel pile comes too the end of boiler room upkeep and depreciation, a reduction in the fire hazard, and almost invariably, lowered insurance rates. No coal or ash trucks block the entrance to your building or impede the flow of traffic outside. Gone are all your problems of heating, forgotten are your worries about fuel and labor. Heat is yours at the turn of a valve—as much or as little as you need—and with it, advantages, conveniences almost as valuable as the heat itself.

Study of your own buildings and problems of heating will enable you to fix a reasonable yearly value on the possible plus-benefits to be derived from the use of District Heating Steam Service. Deduct this figure from the cost of "purchased steam" and you have a fair basis for comparison.

The result will be overwhelming in favor of District Heating Service as clearly shown in the table of comparisons, on page 22.
the work has passed hydrostatic tests all welds will be provided with forged steel reinforcing sleeves welded into position over line welds.

Particular care was taken in the selection of expansion joints. On the steam line all expansion joints, both slip and packless (variator) type, have cast steel bodies of A.S.M.E. 400 lb. design. The slip joints are both externally and internally guided. The packless expansion joints (Variators) have special alloy steel diaphragms with heavy backing plates which transmit the internal pressure directly to the cast steel bodies of the joints. ADSCO slip joints and Multiple Diaphragm Variators as manufactured by the American District Steam Company, are being used.

It is estimated that from 40% to 50% of the cost of this job represents wages to labor. This is a high percentage and further indicates the desirability of District Heating installations at a time like the present, when costs are low and when labor is so urgently in need of employment.

Further details of this interesting District Heating installation will be presented in the next issue.

The new Washington District Heating System will serve these buildings:

11. Building to replace present Municipal Building 27. Land Office

List includes buildings now completed, those under construction, and others to be erected.

For over half a century ADSCO has been actively co-operating with engineers in the planning and equipping of steam lines from the simplest industrial aerial line to the complicated high-pressure underground system of major District Heating Companies.

That the knowledge thus acquired can be helpful to even the most experienced engineer is attested by the regularity with which leading Consulting Engineers make free use of the Service Department.

ADSCO places this experience at the command of every engineer engaged in planning or installing steam lines. Therefore, when you are faced with a perplexing steam line problem, ADSCO Engineers will consider it a privilege to work with you to find the best and most economical solution.

Write or wire when we can be of service.

ENGINEERS' SERVICE DEPARTMENT

AMERICAN DISTRICT STEAM COMPANY

Specialists in Steam Distribution for Over 50 Years
the work has passed hydrostatic tests all welds will be provided with forged steel reinforcing sleeves welded into position over line welds.

Particular care was taken in the selection of expansion joints. On the steam line all expansion joints, both slip and packless (variator) type, have cast steel bodies of A.S.M.E. 400 lb. design. The slip joints are both externally and internally guided. The packless expansion joints (Variators) have special alloy steel diaphragms with heavy backing plates which transmit the internal pressure directly to the cast steel bodies of the joints. ADSCO slip joints and Multiple Diaphragm Variators as manufactured by the American District Steam Company, are being used.

It is estimated that from 40% to 50% of the cost of this job represents wages to labor. This is a high percentage and further indicates the desirability of District Heating installations at a time like the present, when costs are low and when labor is so urgently in need of employment.

Further details of this interesting District Heating installation will be presented in the next issue.

The new Washington District Heating System will serve these buildings:

1. Commerce Department
2. Labor Dept. and Interstate Commerce with Conn Buildings
3. Post Office Department
4. Internal Revenue
5. Justice Department
6. Archives
7. Apex Building
8. Building to replace present Municipal Building
9. Treasury
10. Treasury Annex No. 1
11. New National Museum
12. Smithsonian and Misc Small Buildings
13. Freer Art Museum
14. Old National Museum
15. Army Medical Museum
16. Agriculture Department
17. Agriculture Extensible Building
18. Lodge
19. Auditors
20. Bureau of Engraving and Printing
21. Liberty Loan
22. Federal Warehouse
23. Municipal Center
24. Court House
25. Pension Building
26. Patent Office
27. Land Office

List includes buildings now completed, those under construction, and others to be erected.
In This Issue

UNCLE SAM EXPANDS DISTRICT HEATING SYSTEM IN WASHINGTON

DISTRICT HEATING AS AN AID TO AIR CONDITIONING

WHY IT PAYS TO BUY STEAM

Title: Adsco Advocate

First issued: 
Complete with: 
Ceased publication: 
Suspended publication: 
Out of print: 
Latest issue: 1933
Never printed: 
Name changed to: 
Superseded by: 
Authority for above: 
Publisher: 
Date: 13 Sep 1934