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Power

FEBRUARY 1951 • VOLUME 95 NUMBER 2



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PEARL HARBOR will always be a meaningful name to Americans. Now, as we start along a path strangely like that of nine years ago, it is perhaps fitting that a new power plant at Pearl should stand as a symbol of a nation rearming in time of danger.

Like forward-looking utilities all over the U. S., Hawaiian Electric Co is expanding to meet mobilization demands. Waiau Station, pictured on our cover, now boasts two 40,000-kw 850-psi 950-F units. The second was dedicated in 1950.

Next month . . .

■ Big package for March is Part I of the new POWER HANDBOOK. First published in 1943, it turned out to be one of our most popular special sections. It ran through two reprintings, left us unable to meet a continuing demand. So we're bringing out a completely revised edition—bigger, better, easier to look at and use. Part I will cover: (1) weights and measures (2) practical math (3) math tables (4) mechanics and mechanisms (5) materials (6) fundamentals of heat (7) steam tables (8) practical electricity (9) hydraulics and pumping (10) piping, flow, tanks.

■ This month, pp 114-117, you get basic facts on using hot-lime-soda process in combination with zeolite. In March we follow through with a case history of a plant that's operated this combination, knows what it can do. Watch for their experience report.

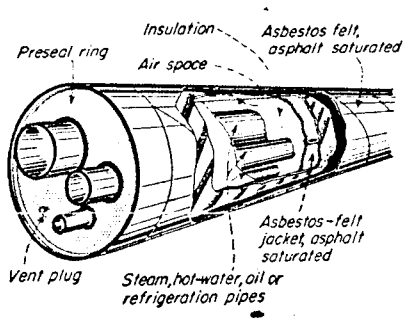
■ Liquefied petroleum gas (LPG for short) has gone a long way from the days when it was only a way to run a gas range out beyond the mains. Now that it's finding wide industrial use, power engineers need to know how to handle, store and burn it. You'll find the answers in March.

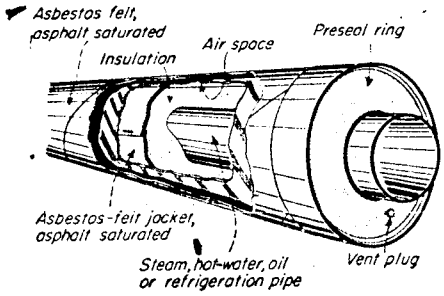
. . . and future months

■ A topnotch series on maintaining centrifugal refrigeration compressors kicks off in March with a quick review of the way these machines operate. Then come down-to-earth articles on operation and maintenance procedures.

Insulation Handbook: Part 6

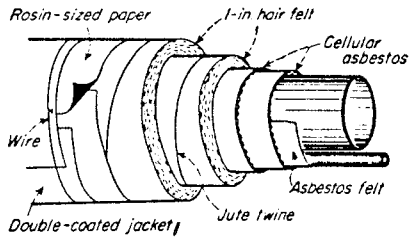
Tough Heat-Insulating Job? Here Are Some Answers

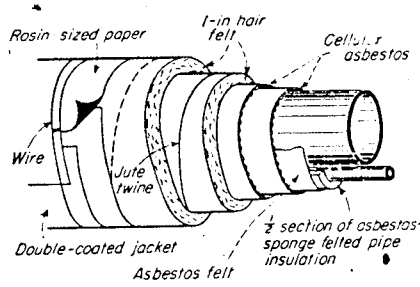




PREFABRICATED UNITS

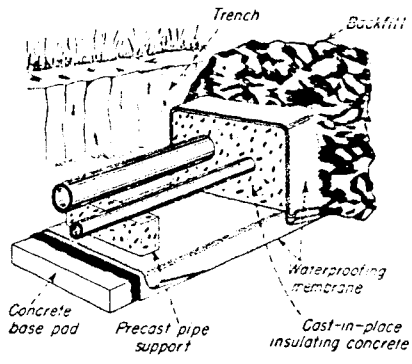
Factory-prefabricated insulated-pipe units built to any specifications for single or a combination of pipes. Good for steam, hot water, oil and other fluids. Pipe may be steel, iron, brass or copper, any size, ends beveled for welding or threaded. Standard length is 21 ft, odd lengths made as needed. Install underground or overhead. Little field work needed





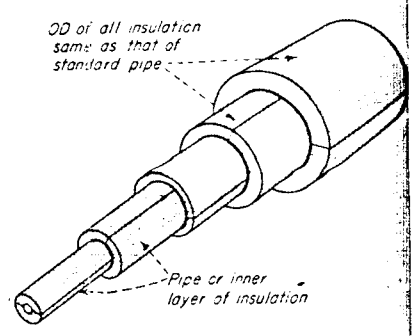
BUILT-UP HAIR FELT

For hot-oil, air or water pipes that may freeze, built-up hair felt combined with cellular asbestos does good job. Left sketch is standpipe with steam tracer; right, hot-oil line with steam tracer. Asbestos or asbestos-sponge felt used around tracer, depending on fluid conveyed. Be sure to insulate all exposed pipe and fittings that may freeze



UNDER SOIL, CAST-IN-PLACE

Cast-in-place insulating concrete good for fast, permanent insulation of underground pipes. Rot, vermin, rodent and fireproof. Install on structural concrete base for support. Precast blocks under pipe carry its weight. Parting medium, corrugated paper or special grease on pipe prevents bonding by cement. Waterproof membrane or concrete covers insulation



NESTED PIPE COVERING

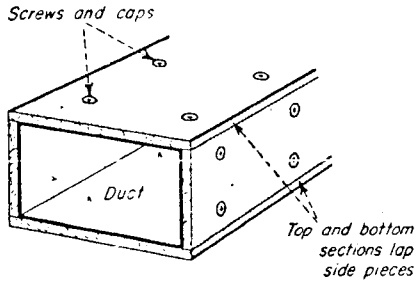
OD of each size same as OD of a standard pipe. So insulation is nestable. Increase thickness without removing original layer. Made sectional and segmental; single-layer standard thicknesses to 3 in. Double layers vary with pipe size, follow usual practices. Lightweight calcium silicate, K is 0.41, 0.54, at 100 and 500 F mean temperatures. Use at 200 to 1200 F and install like other pipe insulations. Work is easy; stock-sizes are few. Moisture and steam resistant

Run over these insulations for a quick picture of a few good ways to cut heat losses. These aren't the only types available, but they give an idea of what can be done today. Cutting heat losses is easy if you match insulation to job

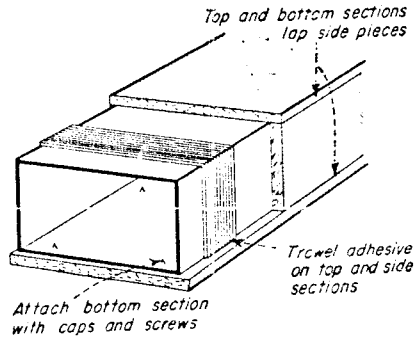
By PHIL SWAIN, *Editor*

COATED DUCT INSULATION

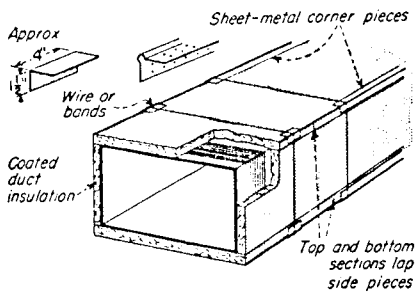
Made of glass fibers, insulation is lightweight, fire safe, won't absorb water. Not for duct exteriors exposed to weathering unless the insulation is protected with a waterproof cover. Usual limit is 450 F. Attach insulation in any of four ways shown. Similar material is flexible, can be put on circular ducts or other parts. Use manufacturer's instructions for applying. Sketches give general details only. They are not to be used for actual construction. Coated duct insulation can also be used on duct interiors. Here it combines thermal and acoustical insulation in one layer. K is 0.23 at 75 F mean temperature



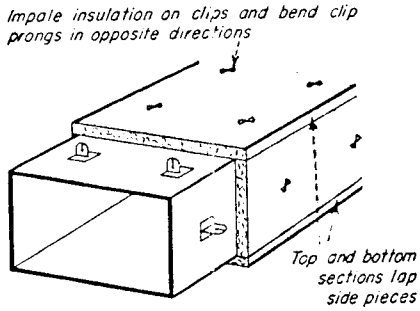
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SCREW AND ADHESIVE



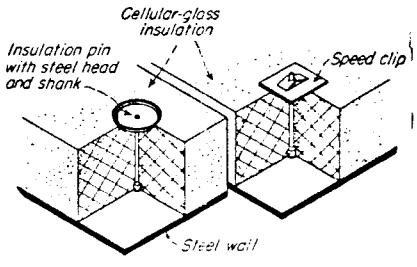
METAL EDGE AND ADHESIVE

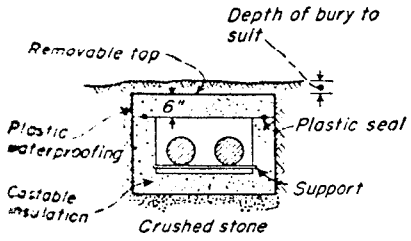


MECHANICAL CLIP

CELLULAR GLASS

Has millions of tiny sealed cells, each filled with dead air. Good from −350 to 800 F. Use on tanks, pipes, fittings and other hot or cold power equipment. Canvas or asphalt base paint finishes give smooth exterior. Factory-wrapped pipe insulation needs no additional finish. Tank, duct and breeching fastenings shown in sketch

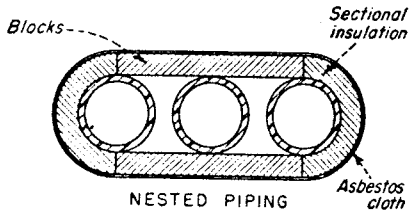




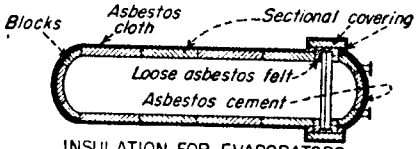
FOR CARRYING LOADS

Insulating concrete has cold crushing strength of 525 psi, can carry pipe loads. Suitable for all underground pipes. For large heavy pipes standard concrete base carries load. Insulating concrete is then used for tunnel interior. Plastic waterproofing material around exterior protects tunnel

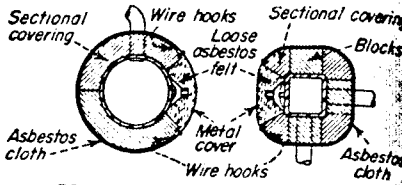
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NESTED PIPING



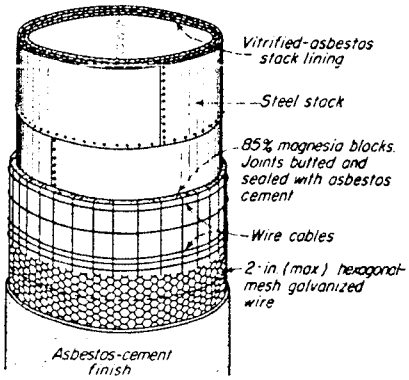
INSULATION FOR EVAPORATORS, CONDENSERS, FUEL-OIL HEATERS, ETC



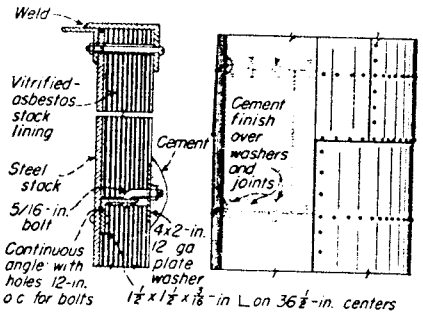
ROUND HEADER SQUARE HEADER

AMOSITE ASBESTOS MOLDED PIPE COVERING

Insulation good for pipes to 1200 F. Made in half sections and cylinders to 24 in. dia, quadrants to 44 in. on special order. Material is highly fibrous amosite asbestos. Single-layer construction, felted square edges, permits easy installation, removal. Thickness to suit pipe size and temperature. Insulation has good structural strength, is water and moisture resistant. Pipe expansion is easily absorbed in an expansion joint without harming insulation



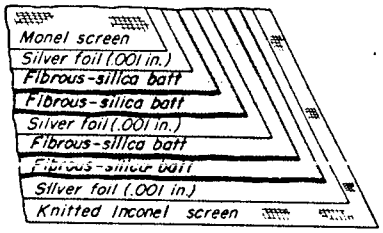
STACKS INSIDE BUILDINGS



STACKS OUTSIDE BUILDINGS

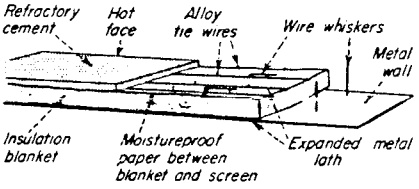
VITRIFIED-ASBESTOS SHEET

Asbestos-felts, corrugated and built up to form cellular sheets, are one of many asbestos insulations good for a variety of jobs. Sheets shown are processed and vitrified, have high moisture and temperature resistance. They make good stack and flue linings at temperatures up to 700 F. Made flat or curved, weight is about 1.8 lb per sq ft per in. thickness. Steel angles support stack lining



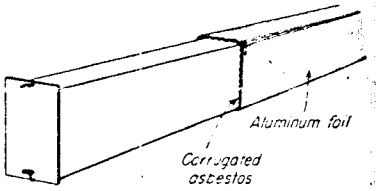
HIGH-TEMPERATURE BLANKET

Good for above 1000 F, lightweight fibrous silica has several thicknesses with various materials to cover blanket. The sketch shows one type. Use only for work above 1000 F; below this, less expensive insulation is good. Easy to install and remove. K is 1.3 to 2.4 at 1600 F mean temperature for 9 to 3 lb per cu ft blankets. Some blankets are good for continuous work to 2000 F and intermittent short-duration jobs over 2000 F. Fuses at about 3100 F



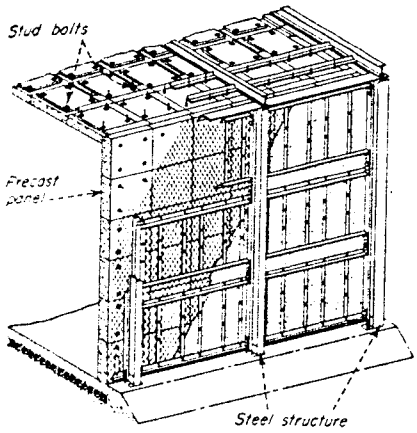
REFRACTORY DUCT LINING

Protects metal ducts from high temperatures, stops big heat loss from hot-air or gas ducts. Refractory and insulation layers are combined in one lining. Sketch shows the castable-refractory cement on duct interior. Mineral wool or other fibrous insulation is used in the blanket. Good for gases up to 950 F. Use for flues, hot-gas mains and other units conveying hot air or gas. Force insulation against metal surface so the whiskers pierce. Bend whiskers flat over the lath to hold insulation in place



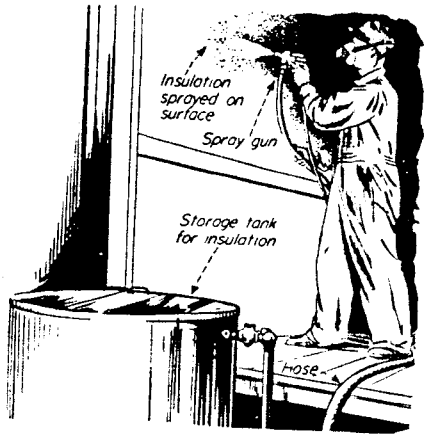
REFLECTIVE ASBESTOS

Aluminum foil and ¼-in.-thick corrugated asbestos has high insulating efficiency, low emissivity. By reflecting 95% of radiant heat and by reducing conduction and convection losses, insulation is good for boilers, hot-water heaters, pipe and ducts. Use where light weight, low cost, high efficiency are important. Plain corrugated asbestos may be in direct contact with inside or outside jackets of unit insulated. So foil face is turned toward or away from the heat source



PRECAST PANELS

Refractory insulations are precast for easy assembly into many shapes. When precalcined refractory fireclay-base insulation is used, temperatures to 1800 F are allowable. The user can also cast panels; mix dry material and water. K is 0.30 at 500 F, 0.84 at 1500 F. Above 1800 F and to 2500 F plastic insulating concrete is used



SPRAYED INSULATIONS

Easily, quickly applied. Spray with high-pressure air or use trowel. One type is 65 to 75% granulated cork in matrix of gilsonite and asphalt with some inorganic fillers. Insulates, waterproofs, rustproofs, prevents condensation and resists fire. Thickness of ⅛ to ¼ in. reduces heat loss through metal 60 to 65%. Greater thickness may be costly. K is about 0.36. Good for tanks, pipes, ducts

Tips on Insulating Hot Equipment

► This article gives only a bird's-eye view of hot insulations. Constant research for better insulators in all temperature ranges permits wider selection than ever before. Today you can usually find a low-cost insulation to do your job well. Let's look over a few modern ones:

High Temperatures. Continued drive for high-output, low-cost production in all industries usually means higher operating temperatures. Insulation to cut heat loss must be used. So we find materials like calcium silicate and fibrous silica being studied for high-temperature applications. These do a good job without charring or breaking down during use.

Castable insulations with some structural strength serve moderate and high-temperature operating demands. Simple to apply, they cut costs by replacing usual enclosures around pipe and other equipment. Prefabricated insulated units for underground or overhead service are packed with any insulation specified for a given job. Machinery manufacturers march toward increased temperatures and pressures but insulation keeps right up with them. Witness gas turbines with ultra-high temperatures but fitted with good insulation for safe, dependable operation.

Simplified Dimensions. Chief complaint against insulation was never that it cost too much. Instead, people complained about installation cost. Much handwork increased job costs, required large stocks of spare insulation for emergencies. But that problem is being licked today.

Precision-made, nested insulation now fits standard pipe sizes snugly and permits adding more layers at minimum cost. Original layer needn't be removed to install second layer. Watch for more advances in this field as the idea catches on.

Installation is being studied to reduce time, effort and job costs. With today's rates for skilled labor this is mighty important when you have miles of insulated piping as found in many central and industrial stations. Aluminum foil insulations, to take just one example, can be put in with simple long-lasting staples on walls and ceilings.

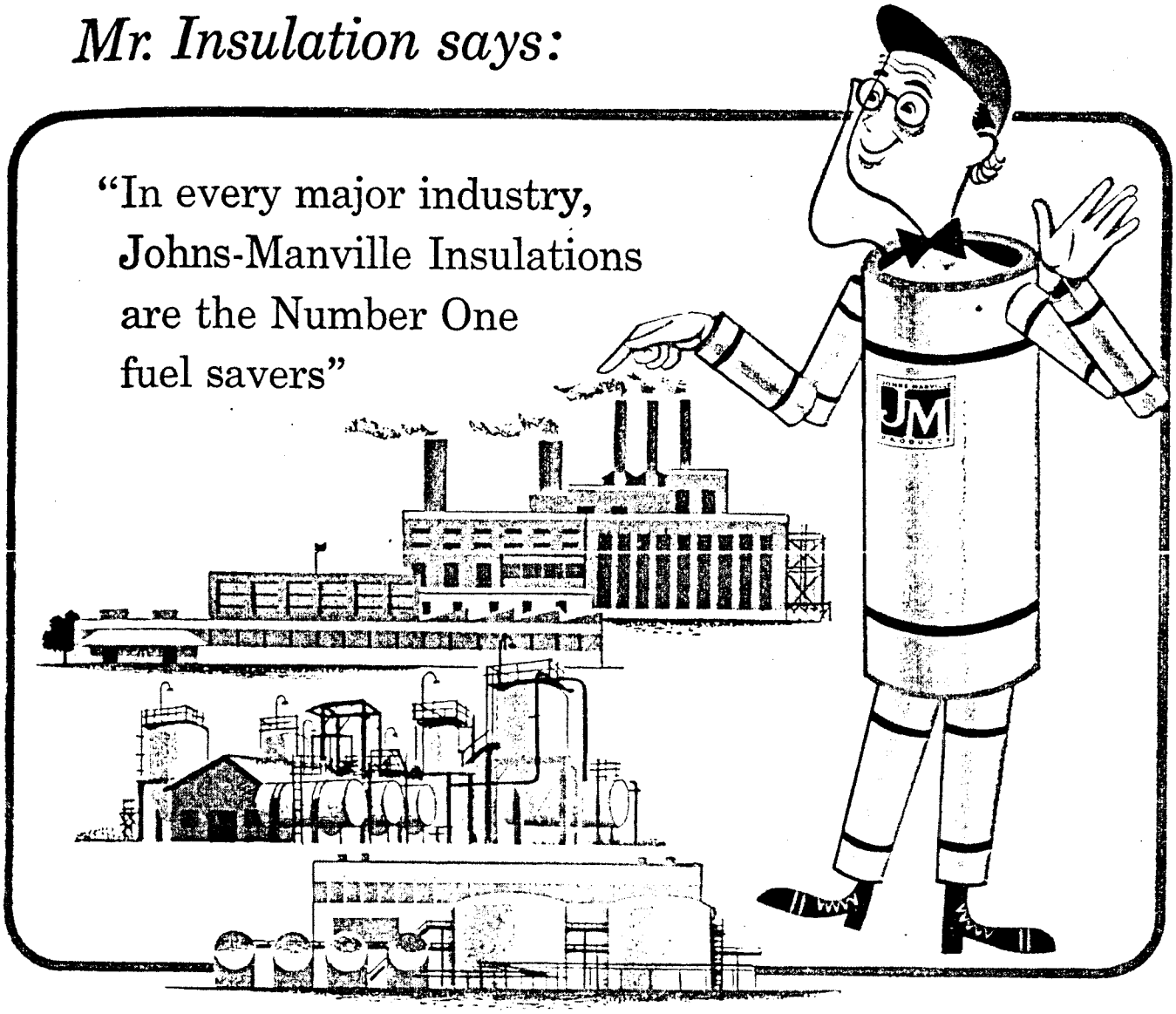
How to Find It. Biggest problem today is not so much whether there is an insulation that will do a given job but where it can be found. Manufacturers' catalogs and magazine articles are the two best sources of information. Give your problem to a manufacturer; if he can't solve it he'll name someone who can.

Keep a file of new equipment items and catalogs to tell you who makes a particular insulation. Supplement these with a good book on heat transfer and insulation. It will guide you when making calculations for all usual jobs and many unusual ones. And don't forget government pamphlets giving standards for various types of insulation. They're mighty handy. Of course, POWER will keep you up to date on many insulations, both old and new. But remember we can't cover all.

Get Most From It. After buying an insulation, find how it should be installed and see that it's properly done. Follow instructions carefully and don't skimp. You must live with an insulation a long time and a poorly installed job is a headache.

Once it's in, see that your operating and maintenance crew treat it well. Insulation saves plenty of money and so rates topnotch treatment. Given proper care, heat insulation lasts many years, a silent but efficient way to put dollars in your pocket.

Mr. Insulation says:



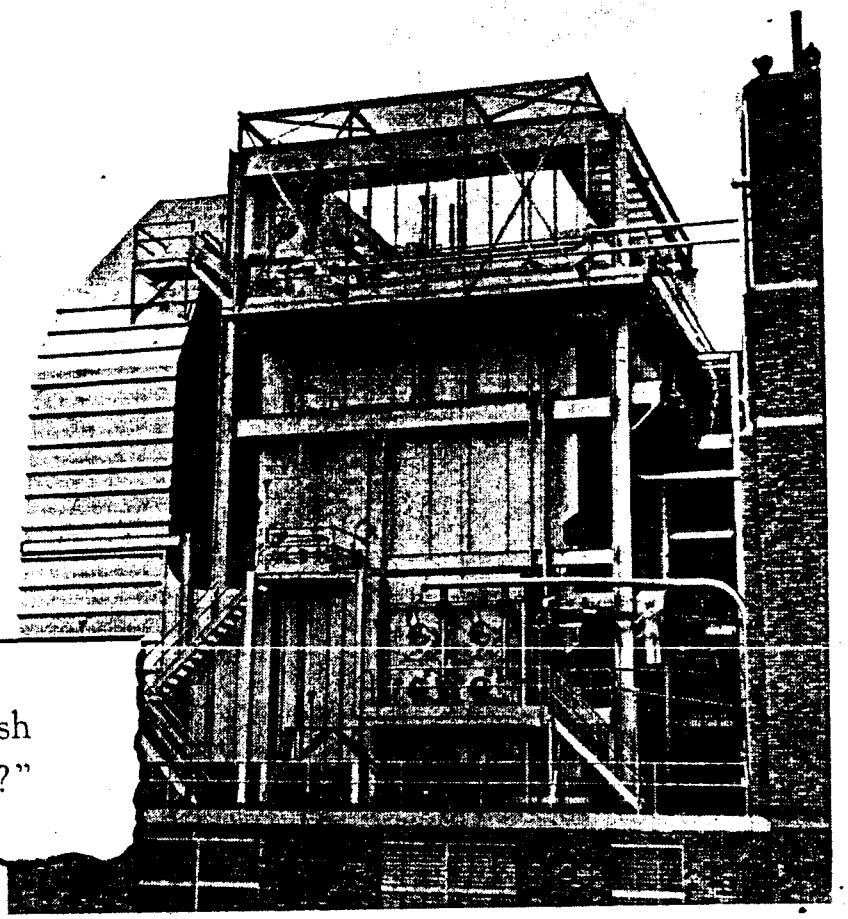
IN PLANTS with stacks or stills, tanks or towers, the story is the same—"Insulation by Johns-Manville" means the maximum return on your investment. There are two good reasons for this:

1. YOU GET THE RIGHT *MATERIALS*—From asbestos and other selected raw materials, Johns-Manville manufactures a wide range of industrial insulations for service from 400F below zero to 3000F above. If you need engineering advice in determining exactly the right one for your job, you can get experienced and authoritative assistance from your local Johns-Manville insulation engineer.

2. YOU GET THE RIGHT *APPLICATION*—Even correctly selected insulation needs proper application to permit it to serve at peak efficiency through the years. Here you can always count on J-M Insulation Contractors and their highly skilled mechanics. These organizations are trained in Johns-Manville application methods, and have generations of insulation experience behind them.

Why not get the complete picture? Call on insulation headquarters when your next job is in the planning stage. Just write Johns-Manville, Box 290, New York 16, N. Y.

Johns-Manville *first in* **INSULATIONS**



WE HAVE BEEN ASKED:

"What is the best finish for an outdoor boiler?"

A letter we received recently stated:

"We plan to install our new boiler outdoors, and we have a question about the best finish to use. The boiler will be insulated with 85% Magnesia Block. What type of finish would you recommend, taking into consideration both cost and durability?"

We advised two coats of Armstrong's Insulmastic as a finish for this boiler because it is less expensive than many other finishes that are suitable for outdoor applications. Also, it does not crack in cold weather or soften in summer's heat and has unusual durability under wind, rain, and snow. It requires only periodic painting with aluminum or Armstrong's No. 3 Asphalt Paint. However, for best results the Insulmastic must be applied properly.

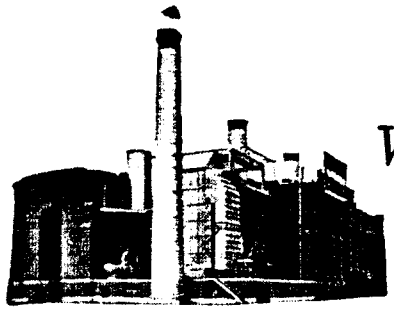
After the Magnesia Block has been installed, a layer of hexagonal mesh should be secured in place, and one coat of asbestos cement troweled on to an even surface. Next, a second layer of mesh is applied over the plaster and two coats of Insulmastic troweled on to a smooth, even finish. Should the boiler be in a busy area where it might be subjected to damage, it's wise to erect bump rails for protection.

Almost every job presents problems that must be well thought out if the insulation is to be truly effective. Armstrong's engineers are ready to help tailor your insulation specifications to meet your requirements. In addition to the advice of highly trained engineers, Armstrong offers a complete Contract Service with skilled workmanship and highest quality materials.

IF YOU HAVE ANY QUESTIONS on the construction of high-temperature or low-temperature equipment, please do not hesitate to write to us. We'll do our best to give you a practical answer. Just address a letter or post card to Armstrong Cork Company, 7002 Maple Avenue, Lancaster, Pennsylvania.

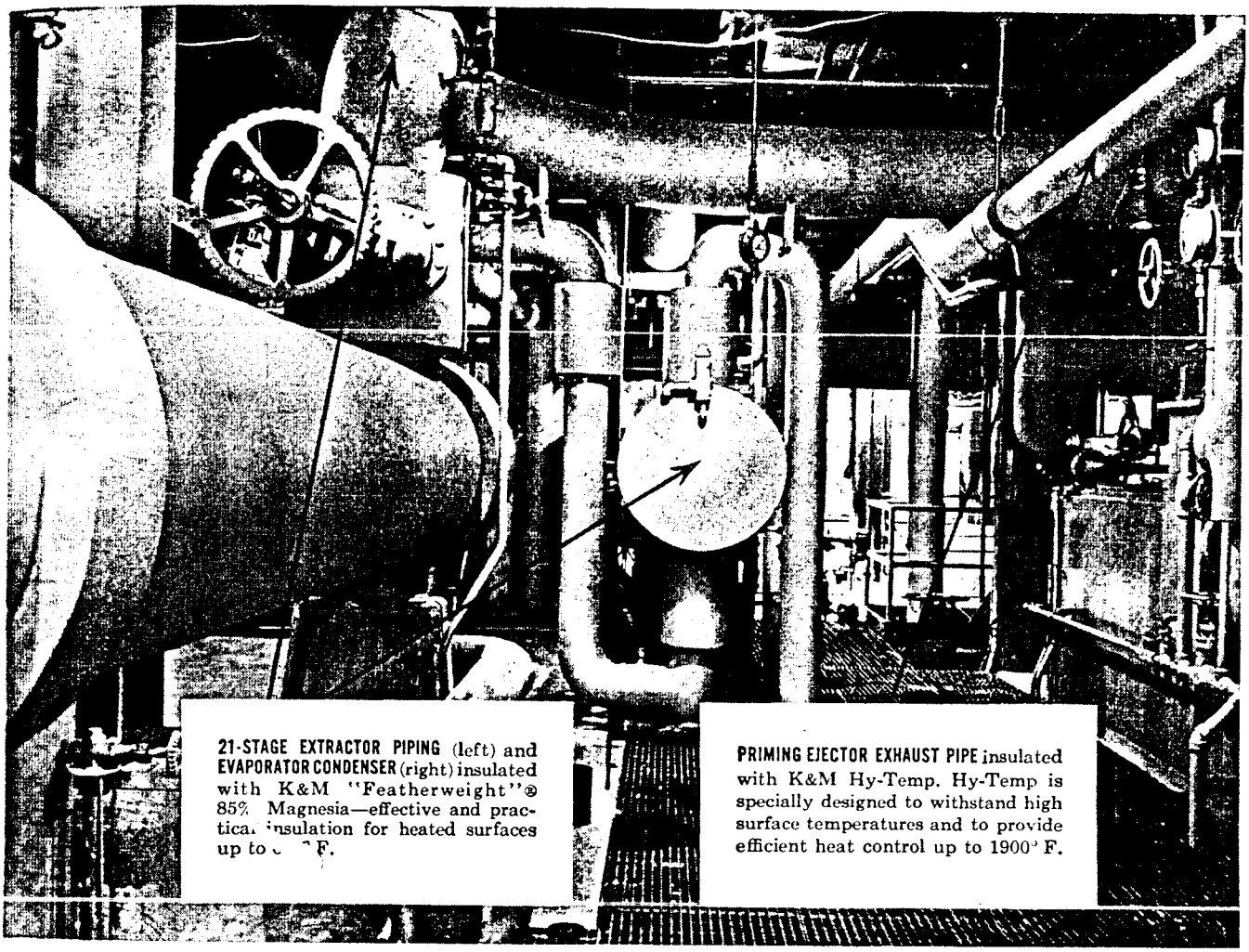
ARMSTRONG'S INDUSTRIAL INSULATIONS

FOR ALL TEMPERATURES FROM 300° F. BELOW ZERO TO 2800° F.



Where the best in insulation is a must

Public Service Co. of Oklahoma uses
K&M Insulations in Weleetka Power Station



21-STAGE EXTRACTOR PIPING (left) and **EVAPORATOR CONDENSER** (right) insulated with K&M "Featherweight"® 85% Magnesia—effective and practical insulation for heated surfaces up to [illegible] F.

PRIMING EJECTOR EXHAUST PIPE insulated with K&M Hy-Temp. Hy-Temp is specially designed to withstand high surface temperatures and to provide efficient heat control up to 1900° F.

Insulation Contractor: Armstrong Cork Company

These K&M insulations keep steam hotter—longer—at less cost!

In power stations, oil refineries, chemical plants, factories, steamships, hospitals—in fact, wherever exacting steam control is a must—you'll find K&M "Featherweight" 85% Magnesia and K&M Hy-Temp Insulations. These two K&M products give you highly efficient, cost-cutting insulation in every service temperature range. And, for especially difficult heat control situations, the advantages of both are combined in K&M Hy-Temp Combination Insulation.

Your Keasbey & Mattison Distributor—who is an experienced applicator—will be glad to give you complete information on these or any K&M Insulations. Or, write us.

Nature made Asbestos...
Keasbey & Mattison has made it serve mankind since 1873

K&M Best in asbestos

KEASBEY & MATTISON
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