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LEAD-SHEATHED CABLE ON A BARGE READY TO BE LAID UNDER THE DETROIT RIVER TO FORM AN
INTERNATIONAL TELEPHONE LINK BETWEEN DETROIT AND WINDSOR, ONTARIO

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Air-conditioned Trains the Latest Contribution to Passenger Comfort

FOLLOWING in the footsteps of the development of the storage-battery oil-electric locomotive, lead batteries have again proven their usefulness to railroads in air-conditioned cars. During the summer of 1929 air-conditioning of railroad cars was first tried experimentally in a Baltimore & Ohio coach. As a result of these experiments, a Baltimore & Ohio diner and a Santa Fé diner are both now equipped with air-conditioning apparatus and have been in regular service for some time. Early this summer the Baltimore & Ohio's crack New York-Washington train, the *Columbian*, was entirely equipped with air-conditioning equipment, including chair cars, observation and lounge cars and individual seat coaches, as well as diner, and has been operated with this equipment since May 24. The ever-increasing patronage enjoyed by this train is a testimonial to the added comfort its passengers enjoy.

This air-conditioning equipment provides circulating clean air at controlled temperatures and humidities. At present in cold weather cars may be heated, but the new method provides for cooling in hot weather. It permits of keeping all windows tightly closed at all times, thus prohibiting the entrance of dust, cinders and noise into the car. Air



There is cool, clean air within an air-conditioned diner when stifling heat prevails outside

is drawn into the car over cooling-coils and is also mechanically filtered or washed to remove dirt. It is then distributed by means of fans through ducts running the length of the car at the ceiling and is admitted to the car through louvres in the half deck at intervals. Exhaust fans take care of the removal of old air.

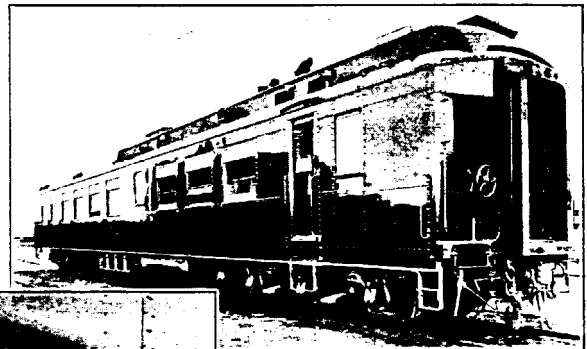
The mechanism necessary for the operation of such a system, including refrigerant compressor, pumps, fans, etc., is supplied with electric motive power derived on certain cars from axle-driven generators in combination with a storage-battery

and in certain other instances from gas engine driven generators in combination with strong batteries and axle-driven generators.

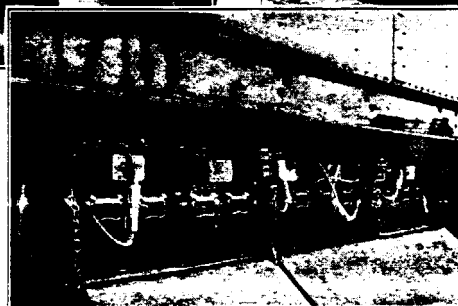
Except in one installation, the storage-batteries supply the energy for operating a portion of the air-conditioning equipment when the car is at rest or operating below about twenty miles per hour and where such car is equipped only with axle generators as the primary source of electric power. If all of the air-conditioning equipment is supplied with energy from the storage-battery while the car is at rest or operating below about twenty miles per hour, the size of the battery already on the car for lighting purposes is increased.



*Sun-room observation car on the *Columbian*, the B. & O.'s crack New York-Washington train, the first air-conditioned train in railroad history*



A Santa Fé air-conditioned diner



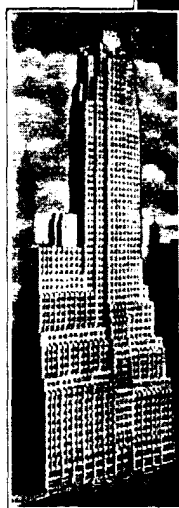
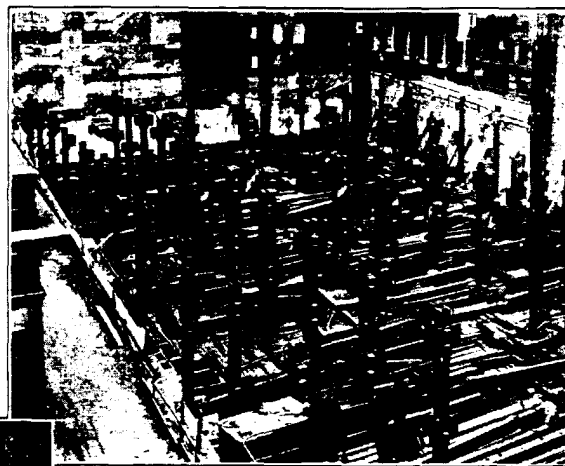
Storage-battery compartment of an air-conditioned car

Cities Service Building Uses Lead Paint and Waterproofing

THE Cities Service Building is another of the long line of great structures whose steel skeletons have been protected from rust and corrosion by metal-protective lead paints. All the structural steel received coats of blue basic lead sulphate or Sublimed Blue Lead paint, which can be counted upon to exclude moisture and corrosive gases from the steel work effectively. This pigment is a blue basic sulphate of lead made by a sublimation process. Its great basicity is a decided advantage as it neutralizes the acidic electrolyte which causes corrosion. Even after the oil film has failed, allowing moisture to penetrate to the metal, this lead paint, because of its chemical quality, reacts in such a manner as to give an extended protection against rust. This paint has a very pleasing blue-gray color and, due to the method of manufacture, it is extremely fine and has unusual hiding power.

In painting exposed steel work, such as bridges and tanks, the importance of using lead paints, the best protectors, has long been recognized, for inferior paints only mean an excessive amount of repainting will be required or the steel will rust and corrode. It is just as important to use lead paint on the steel frames of buildings even though they will ultimately be encased in masonry and concrete, for in this case it is impossible to repaint if necessary at a later date, and porous stone or concrete is no assurance that moisture and gases will be excluded from the framework.

The towering Cities Service Building will use lead as a protector in another way. All slop sink closets and shower baths will have a floor lining of bituminous coated sheet lead, extending six inches up the walls, and installed in the manner described in the May, 1931, issue of LEAD, pages 4 and 5. This practice is almost standard for waterproofing shower baths, but the slop sink closets of the Cities Service Building present an interesting development. Mop trucks will be used for cleaning the floors. These are wheeled trucks about 2 ft. by 4 ft. on which are two open tanks, one for clean and one for dirty water. Over the dirty water tank is a mop wringer. The clean water tank is filled from a wall fixture in the slop sink room, the floors mopped and the mop wrung out into the dirty water tank. The



Starting the steel work for the new Cities Service Building, New York, and, at the left, the skyscraper as it will appear when completed

truck is wheeled back to the closet when cleaning is finished and the tanks emptied through outlets under the tanks directly onto the floor. The water runs out through a floor drain as in a shower stall, which explains the absolute necessity for a lead lining under the floor. These closets average about 4 ft. by 6 ft. and occur on each floor of the building. They also contain wall slop sinks.

Sheet lead has certain distinct advantages for waterproofing. It is extremely permanent and unaffected by moisture if installed correctly, is easily shaped to the desired form and will dress down evenly without springing up.

A Suggestion for Users of Molten Lead and Its Alloys

AT the Dominion Coal Company mine at Spring Hill, Nova Scotia, molten lead had to be used a mile from the mouth of the mine. No fire could be used underground. J. H. Mann, master mechanic, had a box constructed, 14 in. square and lined with blocks of J-M 85 per cent Magnesia two inches thick. The lead was melted in the shop and the container of molten lead placed in the box for transport underground. This lead was still fluid three hours later. "The Power Specialist" suggests that this idea may be of use to many who pour much lead and solder.

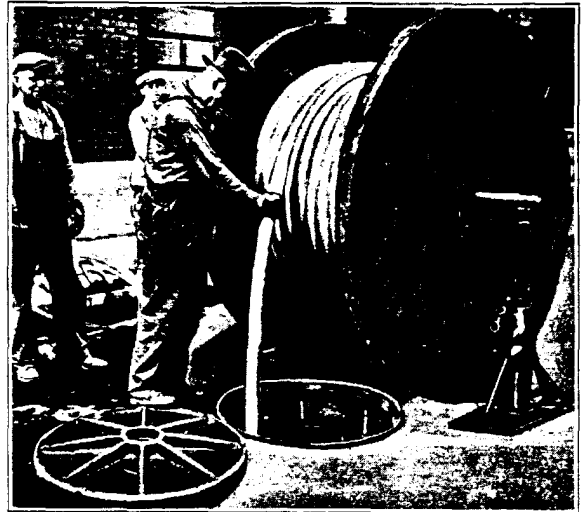
Lead in Canadian Communication Systems

LEAD has always been one of the basic metals in telephone plant construction. It contributes largely to the composition of solder with which thousands of intricate switchboard connections are established to produce the flow of voices from telephone to Central and on to the receiving instrument. Lead is particularly useful in the plates of telephone storage-batteries which retain the power that at any moment may be called into use to speed your voice through local or long distance talking channels. Lead forms the protective sheathing of hundreds of thousands of cable-encased telephone circuit miles of wire. Those cables may be stretched on pole lines overhead; may burrow through long miles of conduit beneath city streets, or lie dormant in the bed of a river. Regardless of their position, telephone cables of lead are the sleeve of an animated arm with its hundreds of tingling arteries through which there courses the communication lifeblood of nations. Truly, lead and its alloys are modern conveyors of communication.

With the current progress that is leading up to the completion, before the end of this year, of the Trans-Canada Telephone System of all-Canadian voice-paths, linking Halifax, Nova Scotia, with Vancouver, British Columbia, lead is continuing to play a major rôle in important parts of various links that will soon form a chain of telephone channels from coast to coast across the neighboring Dominion.

From Montreal to DeBeaujeu in the Province of Quebec, for example, there is lead cable stretching 44 miles between the Montreal Toll Centre and the De-Beaujeu repeater station. Again, between Toronto and Oshawa, Ontario, a similar cable conveys certain of the Trans-Canada circuit wires over a distance of 34 miles. In each of these parts of the all-Canadian System in Ontario and Quebec, where the Bell Telephone Company of Canada had prepared the central loops of the Dominion-wide network, some of the cable is underground, and the remainder is of aerial construction.

Several other cable projects by the Bell Telephone Company of Canada in the Province of Onta-



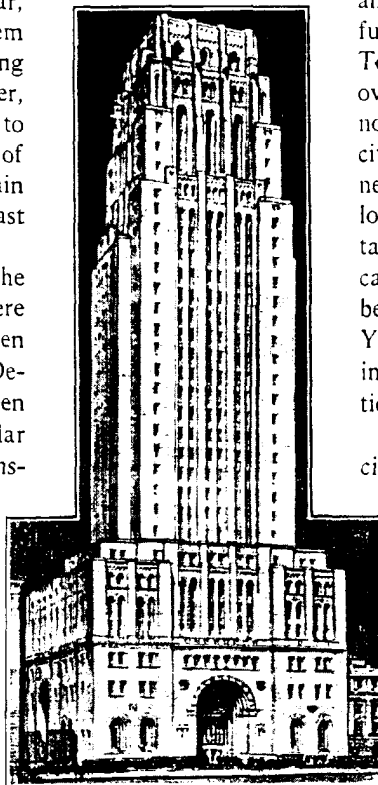
Lead-covered cable goes under Canadian city streets

rio are under way and are consuming large quantities of lead-sheathed cable. Most important among these are the long distance cables now operating between Toronto and Kitchener and between Toronto and London, which are scheduled for future extension west to Windsor; a Toronto-Hamilton cable now operating over the lake-shore route; a second cable now being completed between the same cities and running inland through the new repeater station at Hornby, and a long cable stretch from Hamilton, Ontario, to Buffalo, New York. This latter cable is the result of co-operative effort between the Bell of Canada and the New York Telephone Company, and is making splendid progress toward completion.

Entrance cables, where the groups of circuit wires are brought into the telephone central offices or other equipment centres, are always of lead or of an alloy in which lead is a component part.

On December 31 last, the Bell Telephone Company of Canada had in service 3,108,905 miles of wire, of which 2,127,201 miles—70 per cent—were in underground and submarine cables.

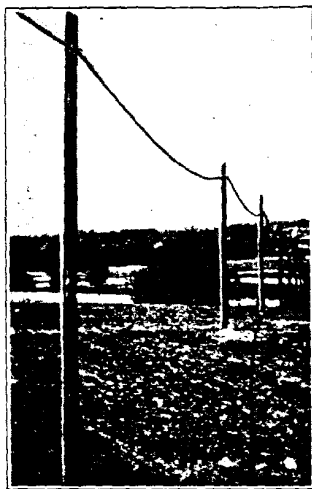
There is lead even in the modest, black telephone instrument that is such a necessity at home



Over a mile and a quarter of lead-covered telephone cable serves the occupants of the new Canadian Bank of Commerce Building, Toronto

and in your office or other place of business today. Lead again appears in the soldered connections within the compact bell and battery box that your telephone installer has been careful to keep as much out of sight as possible.

Probably it is more difficult to list modern appliances without lead content today than it is to tabulate the everyday things we use in which lead is prominent.



Lead-sheathed toll cable crossing Canadian farm land

Certainly lead is a leader among the score or more metals that contribute to the modern efficiency of telephone service; and the

greater the distance over which your telephone conversation passes, the larger the amount of lead at your command among the thousands of dollars worth of equipment that is brought into personal use when you talk over local or long distance lines.

Waterproof Sandpaper Eliminates Dust Hazard for Painters

RUBBING down painted surfaces preparatory to repainting has always been both an unpleasant and unhealthy occupation because of the dust which is raised. There is now no necessity for this situation to exist as waterproof sandpaper is on the market which makes it possible to rub down a surface that has been wetted and from which no dust will arise. No longer is there any reason for a painter to take the risk and suffer the discomfort of dry sandpapering, and it is up to the master painter to see that his workmen are not subjected to this hazard.

Wet rubbing down is a simple procedure. The surface to be sandpapered is first gone over with a wet sponge which is followed by rubbing with the waterproof sandpaper while it is still thoroughly wet, and then the finished surface is sponged off. The additional time involved is slight and is well worth the added factor of safety and comfort, which will more

than make up in increased efficiency for the time lost in the first sponging.

This waterproof sandpaper is a garnet paper which is superior to ordinary sandpaper and has a longer useful life. It is obtainable in a number of degrees of fineness. The Minnesota Mining and Manufacturing Company of St. Paul are producers of Wetordry Garnet Paper, and it may be obtained from practically all stores where interior decorators' and industrial finishers' supplies are sold.

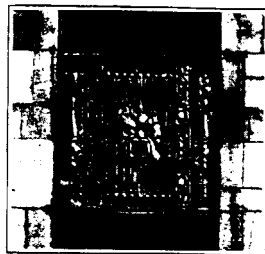
Solder, an Indispensable Alloy

SOLDER, modern "Black Magic," has an influence on almost every industry. Public utilities, radios, automobiles, tin cans require vast quantities of this useful lead alloy. Solder compositions vary, depending upon the use, running from as much as 95 per cent lead, through well-known wiping solder containing from 58 to 62 per cent lead, and ordinary half-and-half solder, to the lowest melting solder, the eutectic containing 37 per cent lead and 63 per cent tin. The picture below shows that solder is even indispensable to one of our newest industries, aviation.



Some last-minute soldering on the Pangborn-Herndon round-the-world plane before its take-off

Lead Favored on American Bankers Insurance Building



The American Bankers Insurance Building, Chicago, with a close-up of the main entrance surmounted by a lead grille and one of the hard lead spandrels



THE ornamental leadwork of Europe is greatly prized and for a number of centuries has been one of the most highly developed of the building arts. That there is no lack of such exquisite work in America is evidenced by a number of fine buildings, among them being the American Bankers Insurance Company Building in Chicago, designed by Childs & Smith, architects. Although such leadwork is of much more recent development here, it has a firm footing based on the use of this traditional metal abroad. Leading architects have found a chance in this country to do something new with an old and tried material by adapting it to modern buildings, as well as continuing its old uses where feasible.

The hard lead spandrels illustrated here are an excellent example of this situation. Their design is admirably suited to the material, the soft, but well-

defined modeling of the design being readily apparent. Yet the metal which has had its greatest ornamental development abroad for leader-heads, crestings and work of that type is adapted to our modern tall buildings in a new use—spandrels.

As opposed to this is the traditional use of lead for ornamental grilles and delicate tracery of all sorts. Thus the beautiful grille over the entrance to this same building is wrought of lead. This shows how well lead is suited to use for all types of open grilles over radiators, ventilators and other openings where a dignified metal that will blend with other materials is desired.

The grille over the entrance to the American Bankers Insurance Company Building was made by the Linden Company of Chicago, and the hard lead spandrels installed by the Harry G. Knisely Company of the same city.

Lead Foil to Protect the Delicate Flavor of Tea

MARTIN GILLET & COMPANY of Baltimore have been importers of tea for more than 100 years. They are famous for their He-No, House of Lords, and other fine teas. This firm was the first to put up tea in small packages of a pound, half pound and quarter pound sizes more than half a century ago. These packages, similar to those pictured here,

caused a great deal of amusement among other importers, who called them "Gill's Sausages," after the heads of the firm. But "Gill's Sausages" proved their worth and were soon widely known.

The tea is wrapped in lead foil .0015 in. thick, which is in turn enveloped in the outer paper wrapper. Says Martin Gillet & Company: "When the

designers of the package were working it out they took their cue from the Chinese and Japanese, who shipped all their tea across the ocean in chests lined with heavy lead foil, as they had discovered this was the most practical method of keeping the dampness and varying flavors of the ship's hold from affecting their tea. We have found that lead foil as a liner in a tea package is practically perfect as it keeps out moisture, protects the tea from sunlight, and will not give it the slightest trace of taste or smell which would affect the tea adversely."

This clearly sets forth the reasons for the wide use of lead foil as a protection for that most delicate of commodities, tea. The same reasons apply to its general use as a wrapper for tobacco, cigars, cigarettes, gum and other products that are easily affected by light and moisture. The destructive action of light on foodstuffs and other articles is frequently overlooked nowadays with the advent of several varieties of transparent or translucent wrappings. Lead foil is an ideal metal protective agent on account of its softness and consequent pliability, its low cost and its remarkably high resistance to corrosion and the passage of light rays. Lead foil is commonly tinned on one or both sides to provide added metallic lustre and to prevent direct contact between lead and the material wrapped. To make the foil thin slabs of lead and tin are rolled in juxtaposition and gradually reduced to foil thickness, which may be as low as .001 of an inch and less. The foil described in this article is manufactured by the Standard Rolling Mills, Brooklyn, New York.



These tea packages are lined with lead foil as a protection for the tea. One package is torn open, revealing the protective foil lining

Lead Resists Corrosives Used in Rayon Plants

THE Skenandoa Rayon Corporation of Utica, New York, in common with other rayon companies, is a large user of lead and lead-lined equipment. Corrosive chemicals, notably sulphuric acid, which must be handled in the manufacture of this comparatively new product, require this resistant metal. In the accompanying photograph some of the lead

*Lead-covered
pot spinning
machine
and
hard lead
pipe
and
valves
in a rayon
plant*



equipment is well illustrated. The spinning machines are entirely covered with lead and most of the pipe and valves in the picture are made of antimonial lead. All of this lead work was installed by O. G. Kelley & Co., of Everett, Mass., and New York.

Rayon is artificial silk made from cellulose derived from wood pulp or cotton linter. Most of it is manufactured by the viscose process, which is used by the Skenandoa Rayon Corporation. The wood pulp or linter is soaked in caustic soda solution forming soda-cellulose. This compound is reduced to fine particles, aged at a constant temperature, and treated with carbon bisulphide. Water-soluble cellulose xanthate is thus formed and dissolved in water, giving "viscose." This is the material that is pumped to the lead-covered spinning machines, where it emerges through platinum spinnerets containing small holes into a precipitating bath of sulphuric acid. Here the thin streams of "viscose" solution are converted into fine fibres. These filaments are then washed and twisted into skeins of rayon yarn.

Lead Covered Anti-Vibration Pads for Laundry Machinery



Washing machines in a large new hospital

LAUNDRY machinery, in common with other kinds of machinery, sets up vibration when it is in operation. Vibration not only has a harmful effect on machines and the structures in which they are installed, but if the building is not devoted exclusively to machinery, vibration transmitted from the machines may be extremely annoying to other occupants of the building.

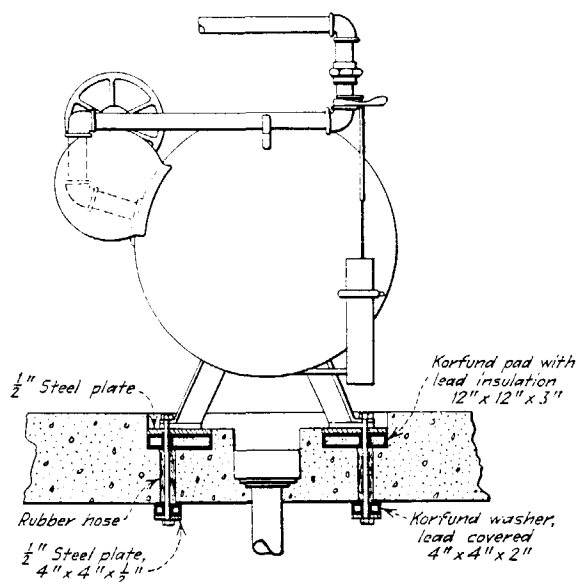
The Troy Laundry Machinery Company has recognized this difficulty and taken adequate steps to insulate its installations against the transmission of vibration. It is particularly important in this case, as much of the machinery is installed in hotels and other types of buildings where the comfort of guests



A washing machine installation in a hotel. The wet floor shows the necessity for lead-encased anti-vibration pads

and tenants must be closely guarded. The company uses Korfund pads, a cork composition, under the legs of its machines as vibration insulation.

As water, particularly water that is slightly acid or alkaline, such as waste water from washing machines, may have a deleterious effect on Korfund, the pads must be protected when used under washing machines or any apparatus that is a source of water or other liquors. In such cases the Troy Laundry Machinery Company uses Korfund mats completely sheathed in envelopes of 4 lb. lead. The seams of the lead envelope are burned so that they are absolutely water-tight. If the machines must be bolted down, they are bolted right through the mats, holes being provided in the mats and lined with lead so that moisture cannot reach the cork from this source. Lead-covered Korfund washers are used



Method of installing washing machines on lead-covered Korfund pads

on the bolts and the bolts surrounded with rubber hose where they pass through the concrete foundations, so that no vibration is transmitted through them. When the lead is in direct contact with the concrete, it is advisable to coat the lead with asphaltum to preclude the possibility of lime corrosion. A typical installation is illustrated in the accompanying sketch. Among the many buildings in which the Troy Laundry Machinery Company has made this type of installation recently are the Lord Baltimore Hotel in Baltimore, the Adelphia Hotel in Philadelphia, and the Aetna Life Insurance Company building in Hartford.