...cashion' pattern
...precise casting.
...page 8

lead

LEAD INDUSTRIES ASSOCIATION, INC.

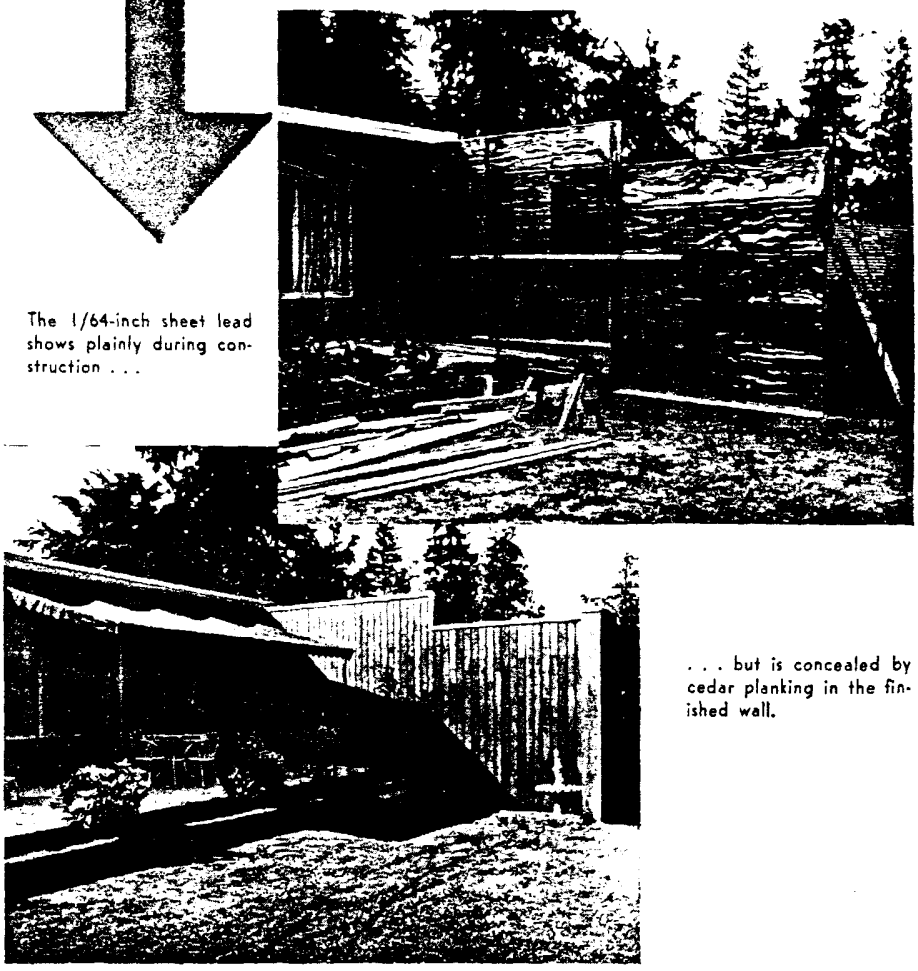
292 MADISON AVENUE, NEW YORK, N.Y. 10017

A QUIET TRIUMPH

Problem: To enjoy quiet relaxation on a patio overlooking a neighbor's large swimming pool about 10 ft. below the patio level and frequented by crowds of screaming, visiting children.

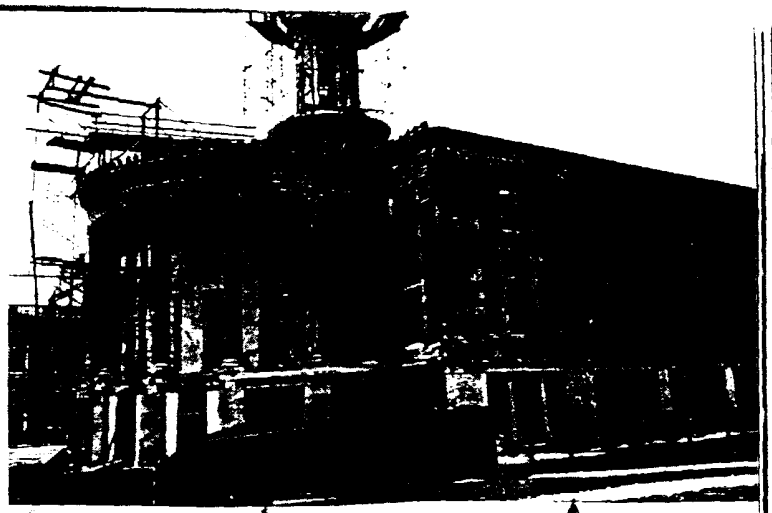
Solution: A barrier wall was erected between patio and swimming pool consisting of a wood framework to which 1-lb. sheet lead was applied with a staple gun. This was finished with vertical 4-in. tongue-and-groove cedar with a lead-lined reflecting pool at the base for appearance.

Result: According to the owner, "Since the installation of the barrier we have had almost complete silence. The voices can be heard but seem to be away off in the distance." No barrier, under these conditions, could be perfect because of leakage over and around the wall. However, a massive barrier will change the character of the noise reaching the patio by eliminating much of the high frequency noise. Other types of barriers, such as solid masonry of equal or greater mass, could produce the same results, but lead employed as in this instance offers a simple, relatively inexpensive baffle with attractive appearance which is easy to install with a minimum of mess and disturbance.



The 1/64-inch sheet lead shows plainly during construction . . .

. . . but is concealed by cedar planking in the finished wall.



RESTORING THE HISTORIC MERCHANTS EXCHANGE

Destruction to our architectural heritage is often realized, but too late. Not so in the City of Philadelphia where the Federal Government for some time past, through the National Park Service has been engaged in preserving and restoring historic landmarks. Independence National Historical Park is a project now underway. One of the finest of these buildings being restored by the National Park Service is the old Philadelphia Exchange Building built in 1832.

Regarded by many as one of the great creations of American architecture, the Exchange was built at a time when the pattern of American civilization as we know it today was being established. Industrialism was just emerging in an agricultural society and the change was reflected in this building. It was one of the first to provide a single meeting place where financiers and merchants could conduct business.

Like many similar buildings with lengthy histories, it passed through various vicissitudes of ever dwindling fortune until it ended as a produce exchange with wooden sheds attached to what had been a beautiful semi-circular colonnaded rotunda, visible in the accompanying photograph. These excrescences have now been erased. The original interior was completely remodeled in 1901 and has now been adapted for modern office use. The marble was cleaned and repaired, and the entire building generally renewed and refreshed to recall the glory it once knew.

Many of the changes wrought in the old building are today hard to explain. For example, changing the paving of the balcony under the rotunda on the second floor level which was originally paved with marble. For some inexplicable reason, at some time in the past, this paving was removed and asphaltus and ornamental pebbles were substituted. Later the pebbles were removed and repaved with asphalt at a date unknown. The paving has been removed recently and the marble paving restored.

Though no records remain, there is precedent for the assumption on the part of the National Park Service architects that sheet lead underlayment may have provided waterproofing protection for the original offices under the portico. Accordingly, before the new marble paving matching the original was laid, 3-lb. antimonial sheet lead was laid over the lightweight fill and under the cement setting bed to provide the base for the new stone floor. Photographs show how this membrane was handled with all joints soldered and the entire surface of each sheet sloped toward drains at the outer perimeter of the balcony. These drains in turn were connected to leaders concealed in the piers below and eventually weeped into a drain.

The original architect was William Strickland. Architectural work for the restoration was by the Eastern office, Design and Construction of the National Park Service, the General Contractor was Perry J. Goldman Construction Company, and the lead work was handled by the J. Edward Linck Company, all of Philadelphia.

View of portico balcony floor showing installation of lead sheet membrane.

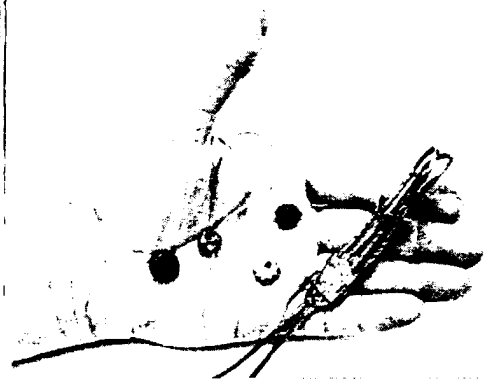
LIA26438

LEAD

One of the most commonplace applications of lead, that of safety seals, rests almost entirely on the metal's softness and ability to retain any shape it is mashed into.

Once you start looking for them, lead seals seem to be everywhere. The little lead buttons clamped onto twisted wires guard almost all public utility gas and water meters, fire extinguishers, postage meters in offices, milk and cream cans from dairies, valves in factories, drums of valuable or dangerous chemicals in plants and laboratories and many other uses.

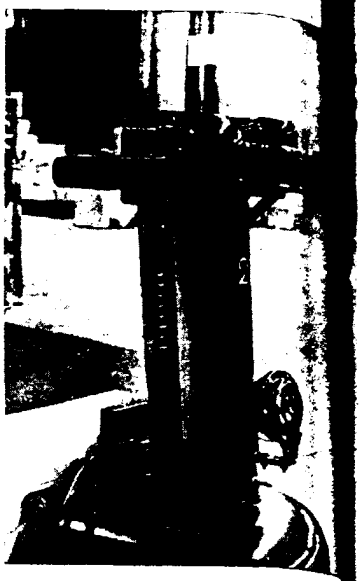
Other types of lead seals have more exotic applications: for parachutes, aerial bomb fuses, post office mail bags and coin bags widely used by banks and express companies.



Some 2000 kinds of seals are made by the E. J. Brooks Company, Newark, N.J. There, seal production is a straightforward casting process. First, two wires of the proper gage are twisted together and cut into the desired length. Then a pair of wires is positioned in each cavity of a multi-cavity mold. Lead is poured directly into the mold and the buttons are cast around the wires. Some twenty seals at a time are made by this method. A single seal button weighs less than one ounce. Officials of the Brooks Company estimate that they consume about 400 tons each year of soft lead in seal production.

When mashed, lead member in this coin bag seal secures cords after they are drawn tight around bag top.

When the seals are installed by an inspector, the free end of the twisted wires is threaded back through a second hole in the seal. The lead button is then clamped with pliers or a special tool until it securely grips the wire. Then the seal or wire must be broken to open the container being protected and the tampering becomes obvious.

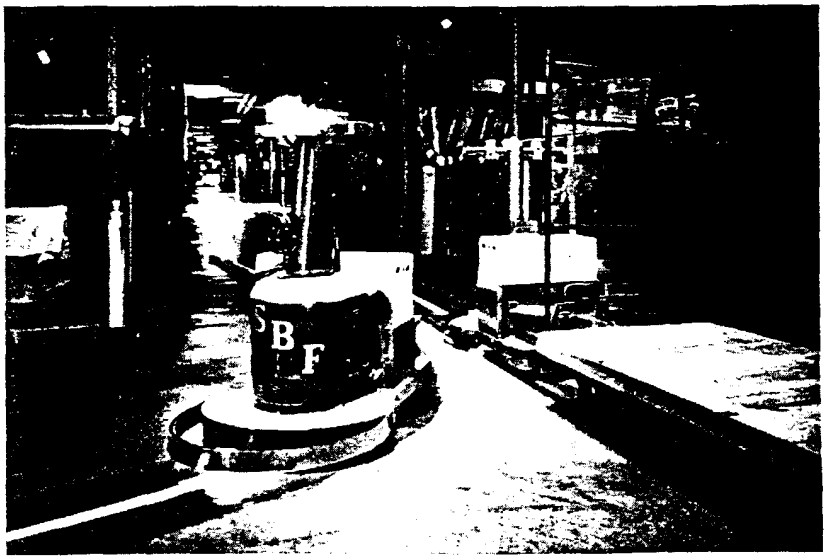


"Beep! Beep! Beep! Beep!" traffic jam in mid-town Manhatt Or rush hour on a Los Angeles f way? Wrong on both counts. A ally, you are in the mammoth w house service center of Stix, Baer Fuller, St. Louis, and traffic is w under control. The "beeping," co trary to the usual, indicates a plann traffic pattern as an electronically co trolled, lead-acid battery power truck signals for a stop.

Stix, Baer & Fuller, an affiliate Associated Dry Goods Corporati serves the St. Louis metropolitan ar through three super outlets: W Roads, River Roads, and Downtow Here in suburban Pagedale the se vice center not only receives and di penses thousands of quality items the retail stores, but also acts as t dispatching point for customer d liveries of everything from detergen to yard goods to lawn furniture. St more, wrapping, packing, assembl and repairs are carried on by skille workers in appropriate areas usi the most modern methods and equi ment.

The entire system operates in t 420,000 square foot complex arou

...ng tower" control center of ...ic truck showing program ... switches, flashing red ... and signal horn.



Empty float heading down Loop 3 for a pick-up passes truck turning on Loop 2. Tape-sensing light is clearly visible here.

Hands Handling

hree loop center," as described by rill Montgomery, warehouse su-ntendent. The loops are oblong "tracks" laid out with white, t-sensitized tape glued to the floor. erless, battery powered trucks ing 4 wheeled floats, follow the s, stopping at pre-selected sta-s for loading or unloading, and tinuing their journeys for about shifts before their batteries need charge.

oops 1 and 3, on the outer perim-s, primarily handle bulk merchan-received from manufacturers for king. Electric fork trucks unload box cars and trailers at receiving ks, shunt loads to roller tracks, ich in turn accommodate the three ps to stock.

Loop 2, in the center, is the main , so to speak. Although it handles ne receiving merchandise it is ger than Loops 1 and 3 and ex-ds from receiving through the en-building to the delivery docks. us, it can handle a dispatch di-tly from receiving to the delivery a by-passing stock altogether, in lition to its usual tasks of handling lers from stock to delivery. This loop also serves the repair and pack-ing areas previously mentioned.

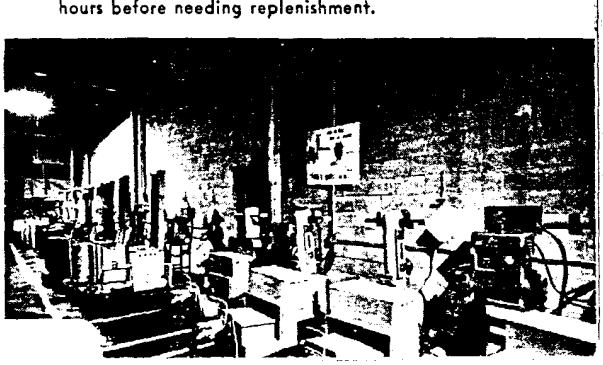
The lead-acid battery trucks used in the S-B-F operation are marvels of electronics. Sixteen station selections are possible on the control panels, and stockmen and routers can select stop or by-pass switches as circumstances dictate. Stop stations are activated in the truck by short strips of the tape glued at right angles to the running track.

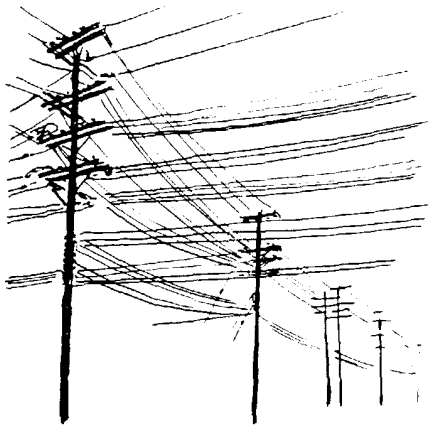
A red warning light flashes constantly when the vehicle is in motion, and the "beeping" is timed to warn stockmen of the approach of the truck even though it may still be out of sight. A spring steel bumper extending around the front of the truck stops it instantly if it strikes an object in its path, thus assuring that no accidents take place.

Says Merrill Montgomery, "With single-floor warehouses exploding in size this type of equipment is becoming more and more popular. We like the flexibility and the fact that our manpower can be used more effectively. Maintenance is so minor that one man handles it along with other duties."

Stock order heads into delivery dock area on Loop 2. Pre-selection switch will stop truck at proper station.

Electronics and rider types line up for recharge of lead-acid power plants. Trucks operate up to 12 hours before needing replenishment.





HERE'S HIGHWAY BEAUT

Of all the so-called "twin cities," Bristol is undoubtedly one of the most authentic. It lies astraddle the Virginia-Tennessee state line and to all appearances is a single, typically American city of 40,000 people. But the center line of the main street is also the invisible state line.

In community effort the line, more often than not, is truly invisible. It was when the two electricity suppliers, the Bristol Virginia Utility Board and the Bristol Tennessee Electric System, joined forces to go underground with their downtown electrical distribution facilities. Actual planning began in 1958, a consultant was engaged, and through careful design and calculated stages of cutover from overhead to underground distribution, with a minimum of service interruptions, the installation is now 98% complete.

Beautification was certainly a major consideration, and practicality and necessity were prime factors, too. To quote Managers W. E. Rutherford (Virginia) and E. W. Doggett (Tennessee), "there was simply no place left to go in the narrow, congested streets and alleys." The unsightly "trees" of multiple-arm poles and web of wires cluttered the airways in all directions. There was no room for the additional facilities so badly needed in a growing community.

From a power supply delivered by the Tennessee Valley Authority to the Shelby Street Substation the new underground installation accommodates a 12.5 KV primary network and secondary at 216/125 volts. The primary cables are paper insulated, lead covered, neoprene jacketed, for the following reasons given by the engineering consultant and power authorities:

Why Cable Was Used

1. For long term economy this is the most inexpensive cable that can be purchased.

2. It has the same or even greater current carrying capacity than any other cable available.

3. The lead is absolutely waterproof, which makes it superior to any rubber or rubber-like compound.

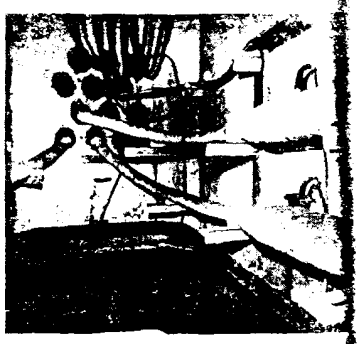
4. A neoprene serving, or jacket, was utilized to prevent corrosion and galvanic action and it also provided a smooth surface for pulling in the cable.

The main cables in duct lines were three-conductor 350 MCM with three single conductor 350 MCM cables leading to transformers. All cables used were copper conductor.

On the Virginia portion of the project, the secondary circuits consisted of four single-core 500 MCM cables per phase from the transformers to the network itself and three single-core 350 MCM ca phase between manholes. Th nessee system was installed so later and utilized a new im cable with higher operating te ture (90°c). Three conducto phase of 500 MCM were use the transformers to the manho three conductors per phase MCM between manholes. T ondary connections to tran moles, and at limiter cor were all taped so that the entir tem is waterproof. This was important because this area i ject to occasional floods risin 2 feet above the pavement.

The concrete lining for and floors of manholes and va poured in one operation, for suspended from the street. It termined that this method

Underground cables replaced the



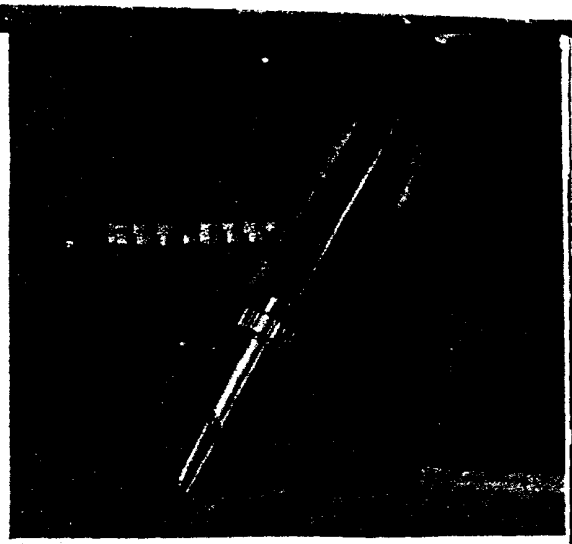
CATION

...re expensive than doing it in sec... and also was the most water-...of. The inside was coated with ...erproof paint so that the only ...ter coming in is seepage through ... manhole cover or small amounts ...rough the ducts. This minor ...ount is easily handled by sump ...mps discharging into the sewer ...tem.

Transformers are mounted two feet ...f the vault floor which allows for ...ter accumulation without exposure ... rust. A secondary voltage outlet ... available in vaults and manholes ... permit lighting and utilization of ...nd tools for maintenance.

The ducts are cement asbestos com... ...sition and are poured with ap... ...proximately 3 inches of cover and 3 ... ...ches of separation between the ...ucts themselves. Sufficient ducts are ...ft in each instance to provide for ...uture loads. In the sidewalk areas ...inimum width excavating was done ...djacent to the curb which allowed ...edestrian and auto traffic to flow ...interrupted during construction.

The major portions of the system ...ave now been in operation for sev...ral years and both utilities agree that ...eir choice of design was a wise ...ne. Outages and resultant customer ...nconvenience have been practically ...nonexistent, and this, in the final ...analysis, is the true test.



The Westinghouse Positerm soldering tool. These cool soldering tips point to more efficient use of lead alloy solders.

COOL TIPS ...for Soldering

Burnt fingers and "cold" joints are not likely with a new soldering tool developed recently at Westinghouse Electric Corp. Production line operators aren't complaining either about the ease with which the new tool, called Positerm®, operates with one hand.

Eager to chop soldering costs—and at the same time improve solder joint reliability—engineers at Westinghouse took a look at existing techniques and decided a new approach was necessary. It was that or avoid soldering to get the needed gains.

The result was a complete departure from the usual electric soldering tool which later tests showed could reduce average soldering time by 38%. Rather than heating a tip which in turn heats the workpiece, the new tool puts the heat where it counts—right at the joint.

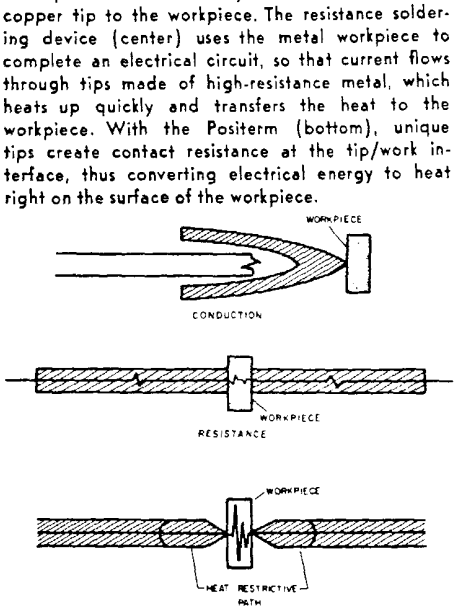
Like resistance soldering equipment, it uses the workpiece to complete an electrical circuit. However, there the similarity ends.

The difference lies in Positerm's cool tips. They are metal blades which cut through surface oxides and make positive contact with the metal workpiece. This completes an electrical circuit. The actual area of contact is tiny, however, which creates high electrical resistance in the workpiece. The same tiny contact area restricts heat flow back towards the tips which remain cool.

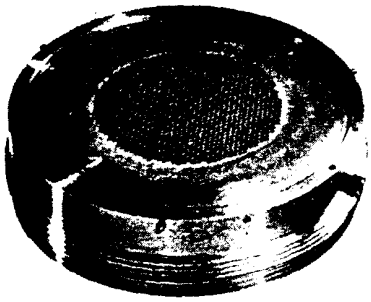
Numerous engineering studies, as well as production-line tests went into the tool's development. Burnt insulation was no longer a problem, and a solder feed mechanism was made a part of the tool. This allows soldering with one hand. The self-locating action of the two blades tends to position the solder correctly from joint to joint.

Westinghouse found the new Positerm tool so successful on their own production lines that the decision was made to offer the unit commercially. As one Westinghouse official put it, "This new equipment reduces the human element in producing a joint, improves the likelihood of making a good joint, and still retains the versatility that has made soldering such a popular process."

Three common types of soldering "irons". The tool at top transfers heat by conduction from the copper tip to the workpiece. The resistance soldering device (center) uses the metal workpiece to complete an electrical circuit, so that current flows through tips made of high-resistance metal, which heats up quickly and transfers the heat to the workpiece. With the Positerm (bottom), unique tips create contact resistance at the tip/work interface, thus converting electrical energy to heat right on the surface of the workpiece.



Scanning radiation from a patient's kidney. The collimator is at the lower end of the moveable scanning head.



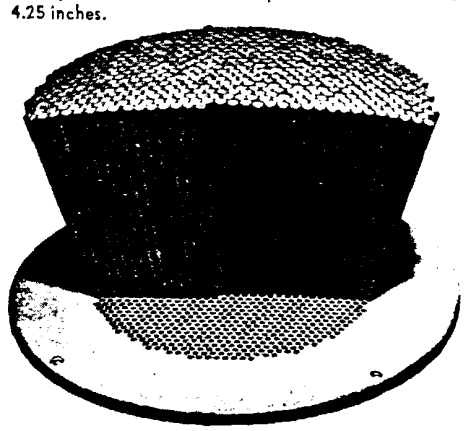
The finished collimator.

Lead Casting Solves Hole Problem

Scientists at the Brookhaven National Laboratory were recently faced with a highly unusual lead fabrication problem. They needed a number of lead discs about one inch thick and 4 inches in diameter through which 1040 holes 0.054 inch in diameter were crowded into a 3 inch circle. These holes, separated from each other by walls only 0.015 inch thick also had to converge on a point some 3.5 inches from one face of the disc.

The discs are to serve as collimators to screen unwanted gamma radiation from a source such as some organ in a patient's body during radioactive tracer diagnosis. Use of the collimator enables an organ to be examined point by point rather than as a whole.

Base plate half loaded with pins. Base diameter is 4.25 inches.



When scientists of the Hot Laboratory Division of Brookhaven's Nuclear Engineering Department began to design the collimator it was immediately obvious that the discs could not be drilled; the thin lead walls could not stand up to successive drillings. Consequently the engineers decided on an unusual vacuum casting technique.

Each disc is formed by casting lead around 1040 special tapered pins that are graphite coated and mounted in a brass base plate or "pin cushion." The base plate is prepared by drilling and tapering holes in successive hexagonal arrays until the circular area of 1040 holes is completed. Two angles determining the direction of each hole were calculated by a computer.

The specially tapered pins made of cold rolled steel were commercially made to Brookhaven specifications on precision screw machines. The head of each pin holds the proper alignment of the pins at the top, while holes in the base plate hold the alignment at the bottom. Each pin is coated with a thin film of graphite to assist separation from the completed casting.

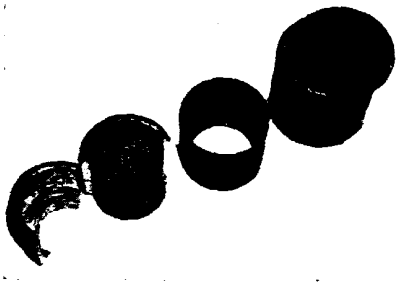
The fully loaded base plate is then surrounded by a special casting of 4% antimonial lead. The base-plate-pins assembly and lead are placed in a cup which, in turn, is placed in a pot from which almost all the air can be evacuated.

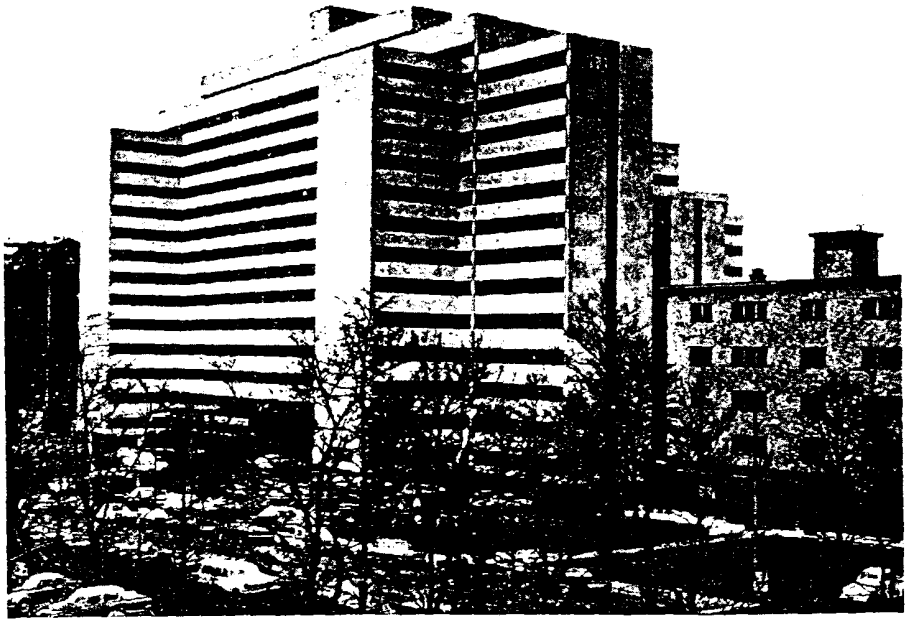
The assembly is heated in a furnace to a temperature well above the melting point of lead and maintained at temperature for approximately two hours. Vacuum casting is essential to assure the flow of lead through all of the small clearances between pins.

The assembly is cooled and the base plate and casting is removed from the cup. The lead is then melted away from the tops of the pins with a hand torch. The pins can then be driven from the base plate and the casting from the bottom. Both the base plate and the pins are reuseable many times.

The lower end of the disc is in a finished condition as cast. The large end is carefully machined until the plate is the desired thickness. Small machining burrs are removed from the holes with a tapered reamer.

Set up for casting operation. From left: half of the lead supply casting, other casting half positioned around pin-base assembly, melting cup, and vacuum pot.





Panel Fabricator:
Plasteel Products Corp.
Washington, Pennsylvania

Porcelain Enameler:
Porce-Alum Company
Alliance, Ohio

Leaded Porcelain Saves a Hospital's Skin

Peeling skin can be a problem—especially when it's made of more than one-and-a-half million bricks. That was the problem on the Veterans Administration Hospital in the Jamaica Plains district of Boston.

The 16-story hospital was completed in 1953, and shortly thereafter the brickwork began to bulge, crack and loosen. After nine years of failing repair efforts, the VA gave up and called in consulting engineers Weiskopf & Pickworth of New York City for advice on what to do.

Weiskopf & Pickworth's engineers recommended that the building be sheathed in a metal skin—mostly leaded porcelain enamel on aluminum. Because of the deteriorating situation with the bricks, it was suggested that they be removed first.

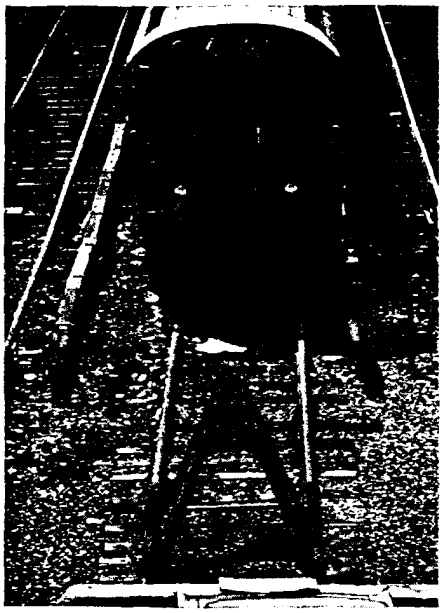
Just acquiring enough metal scaffolding for the job required a three-city search. When it was erected, the general contractors, Gevyn Construction Co., of White Plains, N.Y., under the direction of the Corps of Engineers, began removing bricks from the top down.

Once the removal operation was completed, workmen could proceed with the metal skin grafting task. Leaded porcelain enameled panels were chosen for this job as they are for so many renovation jobs—because they provide a quick, lightweight, and permanent exterior finish at a labor- and time-saving cost.

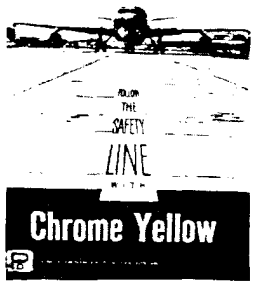
Attesting to the fact that such face-liftings with leaded porcelain panels need not be disruptive, the Jamaica Plains hospital was in full use the whole time. In fact, some workmen had to wear sterile robes while fastening in window frames to the new metal skin.

"Flexibility is another big feature in working with these leaded porcelain enameled aluminum panels, too", says Mrs. June Thomas, General Manager of Porce-Alum Co., Alliance, Ohio, the enamelers. "Colorful panels with this durable glass finish can be both sawed and drilled right at the job site without fear of spalling or later unsightly corrosion stains forming. These features offer the contractor considerably more latitude when working on a building of this size, and can mean a real cost savings."

Some of the 140,000 square feet of porcelain enameled panels used to dress the hospital. Face-lifting such as this is becoming increasingly popular as a solution to the problem of high-cost rebuilding.



Numerous proper applications for chrome yellow are depicted in the brochure, FOLLOW THE SAFETY LINE WITH CHROME YELLOW, recently published by the Lead Industries Association, Inc. Suggested formulations for yellow metal enamels and for yellow traffic marking paints are included in the brochure. To obtain a copy, or for further information on lead paint systems, write Pigments Department, Lead Industries Association, Inc., 292 Madison Avenue, New York, New York 10017.



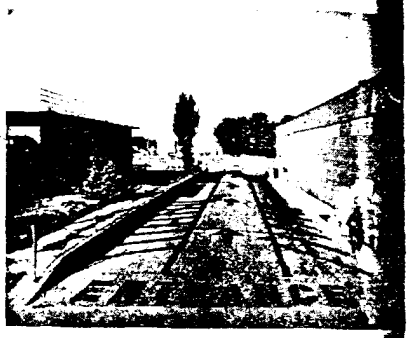
COLOR ME SAFETY
with chrome yellow paints

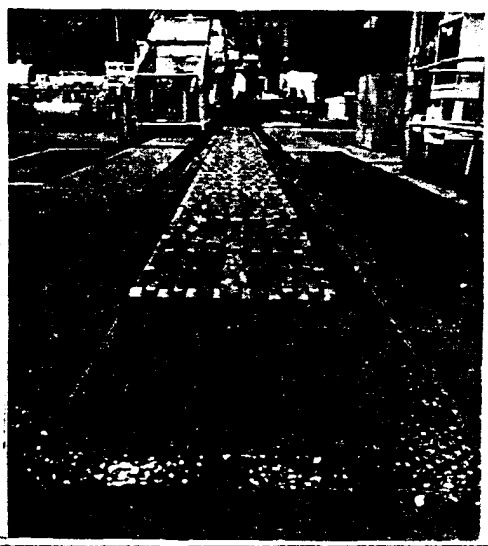
Regardless of how much an employer cautions workers to be careful, there are certain instances when it would have paid to have had a constant reminder there to shout "CAUTION", and so save a life or prevent an injury.

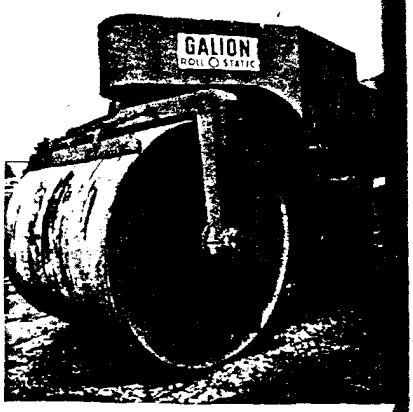
Such "silent watchmen" are available. They don't always prevent an accident—but there is ample proof that they are doing a good job. Chrome yellow paints have been widely used to mark physical hazards for many years in industry.

Many prominent bodies concerned with public safety have recommended yellow for specific plant hazards. One of the most widely respected of these is the American Standards Association, Inc., which lists *lemon chrome yellow* as the standard color for yellow safety marking paints suggested in its "Safety Color Code for Marking Physical Hazards and the Identification of Certain Equipment."

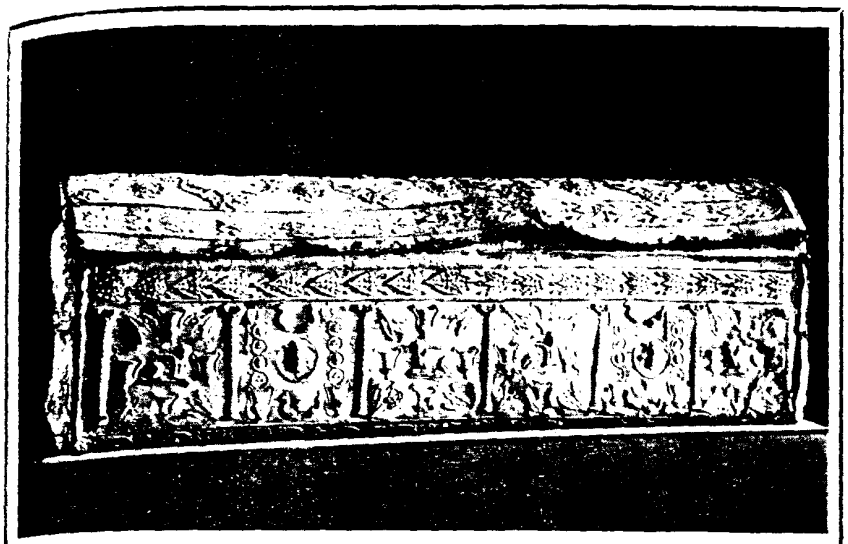
Outside the plant, the U. S. Department of Commerce, Bureau of Public Roads in its "Manual on Uniform Traffic Control Devices" recognizes yellow's safety value too. Double yellow barrier lines on roads and highways from coast to coast caution motorists not to pass—and numerous other applications for safety yellow are suggested in the "Manual." Of course, chrome yellow pigments most easily match the "highway yellow" color prescribed by the Bureau.







Interesting Odds 'N' Ends about Lead



This lead sarcophagus was made in about 200 AD, probably in Tyre, Lebanon. It resides today in the Montreal Museum of Fine Arts in Canada. Note how the fine detailed working (for scale, the casket is 66 inches long) has survived. The analysis of the lead used is fairly good and, except for high tin and bismuth content, it is comparable to lead sold today (see analysis). The decorations include Corinthian columns, winged sphinx, and Medusa Heads.

Analysis of Lead

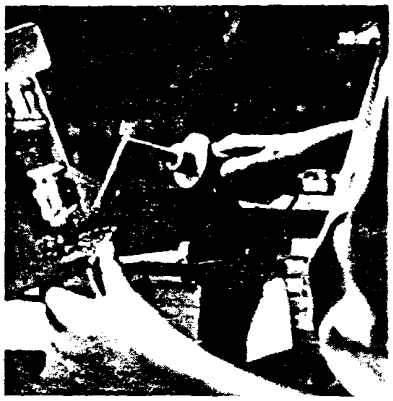
	Casket Alloy	Chemical Lead
Silver	0.01%	0.02% max.
Copper	.07	.08 max.
Antimony	.004	.002 max. together
Arsenic	less than .005	
Tin	.2	
Zinc	less than .001	.001 max.
Bismuth	.01	.005 max.

Old soldiers never die but a new generation of kids is discovering the joy of the *old*-fashioned *die* casting of lead *soldiers*. A recent *Wall Street Journal* article cites a "surge" of sales in lead soldier casting sets and surmises this may mark a rebellion by kids against intricate toys that break up in play.

Beeps and barnacles! In July of 1963 the Navy's Underwater Sound Lab lowered a sonic navigation aid into 13,000 feet of water near Bermuda. Power for the beeping marker comes from decaying radioisotopes and is converted to electric power by lead telluride thermoelectric generators. This Snap-7E power plant was built for the AEC by the Martin Co. At last reports the novel marker is beeping loud and lusty.

Hot lead in your roof gutter—Roof gutters, of course, are supposed to be full of rain water when it rains. But sometimes they freeze solid. That's where the hot lead comes in: General Electric, polishing up an old idea, is now offering an improved heating cable sheathed in lead. It is suggested for frozen gutters, process piping, and pipe line heating. The new cable described in a news release now appearing in the industrial magazines, is offered in three sizes, is 20 per cent smaller in diameter and 40 per cent lighter in weight than its predecessors.

If you've ever had the feeling, when soldering, that every connection was behind some part, or in a corner, this new soldering iron by Western Electric is for you. Actually, they developed it to fit women's hands and habits in production line work.



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