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ENGINEERING ABSTRACTS

DAYLIGHT SIGN DEvised

Just recently a new advertising device made its appearance before the public in the form of a sign public service. Lecture courses are also given, these being the most important part of WEAO's ing unbiased information to the radio public.... program. Each year the importance of providing that uses daylight as the source of illumination. It consists of a special pebbled glass upon which an advertisement is painted, a reflecting glass, and the metal box that supports them. This device is so arranged that the light enters the top of the box through the grained surface bearing the slogan. The slogan is formed by blocking out the space around the letters of the legend with opaque paint. The light passing through the unpainted sections is then focused upon a mirror placed at a forty-five degree angle which projects the rays out through the front of the box. Signs may be made of all colors and combinations of colors by using stained glass. As there is no halo formed around the letters they can be distinguished for much greater distances than ordinary electric lights. Another feature is that there is practically no expense other than the purchase price and installation. Especially is this novelty adapted to automobiles, trucks, store windows, and road signs. At present experiments are being made in illuminating the grained glass so that the same effective results may be accomplished at night as in the daytime.—*Popular Mechanics*.

AMERICAN CERAMIC EXPOSITION

The American Ceramic Exposition, which will be held at Chicago February 4 to 9, 1929, is the first step in a movement which promises to be far-reaching in its scope and one which will probably promote the sale of ceramic products made in this country.

The Ceramic Exposition, which will be held in conjunction with the annual convention of the American Ceramic Society and other organizations touching on the ceramic field, will show the public the extent and variety of the ceramic products of this country. The purpose of the entire affair is to create in the minds of the public a better understanding of what the term ceramic includes and to educate them on American-made ceramic products.

The displays will include art pottery, stoneware, tile, dinner ware, and sanitary ware in the pottery field; table glassware, art, and novelty glassware, lighting fixtures, and class containers in the glass division; stoves, refrigerators, and kitchen ware in the enamel-ware division. In addition to these exhibits, there will be the heavy clay products which include the terra cotta, brick, and tile family, as well as the equipment and machinery developed in this country to produce ceramic products.—*The Clay Worker*.

WORLD'S LARGEST SUSPENSION BRIDGE

Construction of the \$26,000,000 Detroit-Windsor Ambassador Bridge has progressed so rapidly that all of the cable work was completed by the

end of the first week in December, according to Robert MacMinn, chief engineer in charge for McClintic-Marshall Company. Fabrication of the stiffening trusses in the central, over-river span, which is 1,850 feet in length, was begun before January first and will be completed by April first. On the Canadian side, 17 bays of the 29 bays of steel approach have been completed, and work on the Canadian side approach, including concrete, is about 75 per cent completed. On the American side work on two trusses each 140 feet in length, which will bridge Fort Street, Detroit, was begun the last week in November on the ground. When assembled these trusses will be hoisted into place whole, without disturbing traffic on Fort Street. When it is completed about July 1, 1929, the Ambassador Bridge will be the largest suspension bridge and will have the longest span of any bridge in the world.—*The Iron Age*.

DIAMOND PRODUCTION NOW MORE WIDELY DISTRIBUTED

Before the war, out of a world's production of about 6,600,000 carats of diamonds, the South African mines produced about 76 per cent; of the remainder, 3 per cent was from South African alluvials, 19 per cent from German Southwest Africa, and 2 per cent from the rest of the world. But the record for 1927 is radically different; out of a total production of nearly 7,000,000 carats the South African mine production was only 34 per cent; South African alluvials accounted for 33 per cent; other African production was 30 per cent; and the rest of the world 3 per cent. All of this change in the South African alluvials has come within the last two or three years, but the change on the other African production has been gradual. The output of Southwest Africa has never been as large since it came under British jurisdiction as it was under German, but this drop has been more than balanced by new production from other localities, particularly the Belgian Congo, beginning in 1913, Angola in 1916, the Gold Coast in 1920, and Tanganyika in 1925. In other words, instead of being divided into four parts, of which the South African mines supplied three parts and the rest of the world one part, the diamond production is now divided into three parts, one each for the South African mines, the South African alluvials, and the rest of the world; and of this last part 90 per cent comes from other parts of Africa outside of the Union of South Africa.—*Engineering and Mining Journal*.

A SUCCESSFUL TRUE ALTITUDE INDICATOR

An instrument which measures instantly and accurately true altitude up to 100 feet has been perfected, after four years of work on the device, by Dr. Ross Gunn, a young physicist and inventor.

The altimeter, which becomes more sensitive as it approaches the ground, tells the pilot when he is within 100 feet of the ground, by means of a dial which indicates every foot of the descent below this level. Below 15 feet, where a mistake

in judging height is likely to smash a plane landing at speeds of 40 miles an hour or more, it is possible to read the altitude to within a few inches.

The invisible measuring rod which this altimeter uses is the earth's electrical "capacity." Those who tune radios are familiar with "capacity" effects, whereby occasional squeals are heard, the tone of which varies with the position of the operator's hand when brought near the radio set.

In Dr. Gunn's instrument the flying airplane is the hand and the earth is the radio set, but instead of a squeal Gunn gets the altitude. Actually two hands are used in the ship, the plane itself being one and the other a wire or plate mounted on the under side. The closer the ship comes to the ground the greater the capacity between these two "hands." It remains only to indicate this change of capacity on an altimeter of some sort which can be calibrated in feet.

The problem has been made extraordinarily difficult by the fact that the changes at higher altitudes are extremely small, compared to inherent capacities on the plane. It is just like putting a 150-pound man on the scales and trying to weigh accurately a penny which you hand him, by noting the increase in his weight.

The entire apparatus in its present state weighs only 12 pounds.—*Columbus Dispatch*.

UNIVERSITY OF MINNESOTA FIELD HOUSE

The new Field House recently erected for the University of Minnesota, at a total cost of \$630,000, is the second large structure made necessary by the rapid growth of the University. The Field House, a structure 440 feet long, 236 feet wide, and 100 feet high in the center, will provide ample space for indoor workouts the year around for football, baseball, and track events. It will also provide for the large attendance at basketball games and indoor space for military drill.

The building has enclosing walls of brick. The end walls, 104 feet high, terminate in a segmental arch. The side walls are 53 feet high. The foundations are of concrete. The segmental shape roof is supported on 14 three-hinged arch trusses, spaced approximately 30 feet apart. On each side of the interior of the building, double-decked balconies, supported on the main steel trusses, extend out from the side walls approximately 35 feet. At the present time 9 bays of balconies are built on each side. At one end of the building there is a full-width balcony 32 feet deep, on the same tier as the lower side balcony, supported on columns.

When entirely completed the permanent seating capacity will be approximately 15,000, which can be increased to 30,000 by the addition of temporary seats.—*The American Architect*.

CASTINGS TESTED FOR FLAWS BY "GAMMA" RAYS

Using radium rays to test for hidden flaws in large castings is one of the latest accomplishments of the Russian State Radium Institute.

The apparatus is very simply constructed. A tiny glass capsule with a radium preparation is inserted into a deep hole bored in a large lead ingot. This ingot stops all rays, except a narrow strong beam that goes along the bore. This beam

pierces the casting and encounters two filaments charged with electricity and enclosed with a copper cage. Between the filaments and the cage there is an air space which normally acts as a perfect insulator, allowing no electric current to pass through it. But as soon as gamma rays enter the cage they ionize the air and turn it into a conductor.

Current from a battery flows from the filaments to the cage and from it through a galvanometer and then back to the battery. As the intensity of the rays changes with the thickness of metal pierced by them, the rate of ionization varies accordingly. Therefore the flow of current exactly mirrors the shape and condition of the subject under test. Any deviation at once shows that some imperfection is present.—*Science Service*.

AN AIR-DRIVEN PORTABLE HANDSAW

The Ingersoll-Rand Company, 11 Broadway, New York, are introducing an automatic portable handsaw operated by compressed air. It is said that this saw can do as much work as five men can do using ordinary handsaws. This saw, it is claimed, will reduce saw cost anywhere from 50 to 75 per cent. By a mere shift of blades, the saw can be used in sawing wood, soapstone, Bakelite, wall board, cables, copper and other materials. It is powered by a three cylinder type of air motor and has a Crowe safety saw guard. The upkeep of this saw is said to be very small. It is made in three sizes, to take 6-, 8-, and 12-inch blades. This saw is very light, size 8 weighing only 23 pounds.—*Contractor's and Engineer's Monthly*.

THE NEW BIRNING CAR

This is a new type of street car, incorporating both old and new principles by automotive design, in its construction. The car, which weighs only one-half that of the old type, is mounted upon two trucks of two wheels each. Each set of wheels is driven by a 50 H. P. motor that is located on its truck. Power is transmitted to the wheels through a propeller shaft that is connected to a differential drive. It has four wheel brakes of the internal expansion type. The wheels are so fixed that they turn relative to the axle which eliminates "squealing," which occurs upon making short turns. The drum of the wheel is separated from the flange by raw rubber, which eliminates excessive jarring and chattering. The entire chassis is separated from the body by raw rubber cushions. All wiring and control apparatus is concealed in the car framework. Two control levers are exposed in the motorman's cab. Safety devices so fix this that if he lets go of either control the car automatically stops. This car is one-man operated.

From an artistic standpoint the car is better looking than the typical street car. The only part of the chassis exposed is the wheels and the cradle. The windows are of the one-piece unbreakable-glass type with weatherstrip molding. The seats are deep spring cushioned with leather upholstery. The car is built very low; a step of only 13 inches from the street puts you in the car. This car is the very latest in mechanical design; it is able to attain a speed of 20 m. p. h. in five seconds from a standstill.—*Electrical Journal*.