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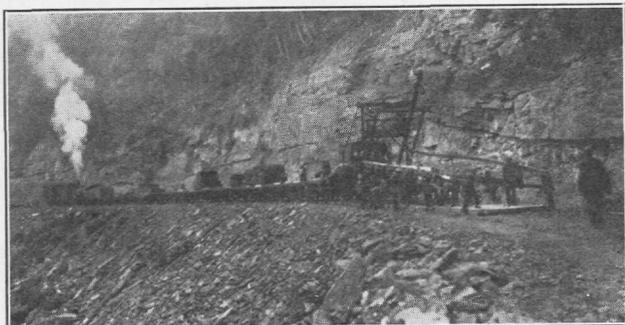
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ENGINEERING ABSTRACTS

A TRACK LAYING MACHINE

When railways were young, rail weighed only about 40 pounds per yard and most of the laying was done by hand. As rails grew heavier and more track was being laid, cranes came into use. It was awkward to lay new track even this way since it could not be put down until the ties were down and the train could not bring either ties or rails in except by laying as it went. However, the crane is now used almost entirely for relaying rail. For some time track laying machines have been in existence, but only recently have they become efficient on curves. Such a machine as this is at its best where large amounts of relatively straight track is being laid. The picture shows the machine on a nine degree curve. On this line were several other nine degree curves, one eleven degree curve and two tunnels. The machine was used through the entire line.



Track Laying Machine

The machine consists of a crane and train of flat cars with endless chain conveyors on each side the length of the train. The ties are placed on one of the conveyors and carried about 25 feet in front of the crane where they make a right angle turn and are dropped in the approximate position of use. At the same time rails are being put on the other conveyor, and angle bars are already bolted to one end. The rails are carried to the crane where they are lifted and bolted to the rail already in place. Tie plates are put down and every fourth or fifth tie is spiked. Following the train is a gang which puts in the rest of the spikes and bolts and gages the track. Another gang puts in the ballast and lines up the track.

A mile of single track requires 204 tons of 130 pound rail, 270 angle bars, 6,000 tie plates, 48 kegs of spikes, 15 kegs of bolts and 3,000 ties. The material costs \$22,000 and the labor \$6,000.

W. B. Bucher.

THE BRUMSTEAD SUN COMPASS

The sun compass, invented by A. H. Brumstead of The National Aerographic Society, furnishes true or geographic north as compared to magnetic north furnished by the magnetic and earth inductor compasses.

The instrument is used in place of a magnetic compass whose faults are common knowledge.

As the name indicates, the sun is the main factor in the use of this instrument, and if you do not know the date, the instrument is subject to error. The compass was originally designed for Byrd's Arctic Expedition, and it was used again on the Antarctic Expedition.

—*Aero Digest*.

DEEP SEA DIVING

The "bathosphere" is a spherical steel diving tank designed by J. H. J. Butler and Otis Barton. The tank used by the thirteenth expedition of the department of tropical research of the New York Zoological Society, had walls of more than 1½" in thickness and was 4' 9" in diameter; it weighed about 5,000 pounds.

Access to the sphere is gained through a door in the rear secured with ten long bolts. This door when packed with white lead was entirely waterproof at a test submersion of 2,400 feet.

The sphere has internal lights and a 150-watt spot light, the latter casting a beam 700 feet long. The windows are of fused quartz 8 inches in diameter and 3 inches thick.

—*Scientific American*.

GROUND WATER AS A SOURCE OF SUPPLY

Ground water is usually free from bacteria but as a rule contains much mineral matter which often renders it unfit for use. Ground water is found in most parts of the United States but as a source for cities over 100,000 it is impractical.

An inch per month of water entering the ground is equivalent to 580,000 gallons per day per square mile. At Des Moines, Iowa, the water is drawn from pipes about 200 or more feet from the river's edge; this develops about 300,000 gallons per day.

Often the water is located below the bed rock and from 50 to 2,000 feet below the surface. This water is pumped from wells by either centrifugal or suction pumps.

—*Engineering News-Record*.

MOORING DIRIGIBLES MECHANICALLY

Nearly 300 men are required to ground and moor an airship the size of the *Los Angeles* by man power alone, but the new mobile stub mast uses only 60 men. The mast has variable height around 69 feet which accommodate different ships. When used as an anchor, the mast is set in the center of a large circular railway track. On this track runs a car to which the stern of the ship is tied, thus making a wind vane of the ship and reducing the danger of destruction by wind.

At present the mast is towed by a tractor, but a self propulsion system is contemplated. The mast has worked well under 20 mile per hour winds with both the *Los Angeles* and the *Graf Zeppelin*.

Scientific-American