

The cylinder walls of the new engine are of chrom-molybdenum steel, and are only one-sixteenth of an inch thick. The engine parts are all stamped from thin metal sheet and tubes crimped together, then braced into a single piece by melting pure copper into all the joints by an hour's baking in a hydrogen or gas furnace. The entire engine is thus precision-formed, machined to exact dimensions and is ready to go to work. Its cost is a small fraction of that of a standard engine, it is claimed.

The low fuel consumption of the new

engine, the makers state, is a direct result of the thin walls which permit efficient cooling of the cylinders. It operates at the high speed of 5,000 revolutions a minute. Its four cylinders are only two and one-half inches in diameter with a two-and-a-quarter inch stroke. The pistons are cast of aluminum alloy and the crankcase is an aluminum casting. The cooling system holds but five quarts of water, but the pump forces 12 gallons of water through the system every minute.

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trail wide enough for a line of tanks to move forward without danger of enemy land-mines. A "snake" is shown on the front cover of this SCIENCE NEWS LETTER.

This type of mine destroyer is a long metal trough, loaded with two parallel linear explosive charges encased between corrugated aluminum plates, bolted together to form a rigid assembly which can be towed or pushed by a light or medium tank. It is 400 feet long, 14 inches wide, five inches high, and weighs about 9,000 pounds, approximately half of which is its load of high explosives.

ELECTRONICS

Throat Microphone

Highly sensitive to throat vibrations and insensitive to sound waves in the air, it is particularly suitable for use in noisy surroundings.

► THROAT MICROPHONES, that reproduce speech by picking up the vibrations of the larynx instead of sound waves from the mouth, are particularly suitable for use in machine shops, airplanes, warships and other places with noisy surroundings, members of the American Institute of Electrical Engineers were told by L. G. Pacent of the Pacent Engineering Corporation and E. H. Greibach of the Sonotone Corporation.

The throat microphone is a discriminating type of microphone, they said, because it is highly sensitive to vibrations transmitted to it by bodily contact with the sound-producing throat, but is quite insensitive to sound waves transmitted by air. It is comfortable to wear, does not shift out of position, and permits normal conversation to be carried on unrestricted to a degree not approached by any other form of microphone, they declared.

Throat microphones can be built on different principles, it was explained, according to the method used for the conversion of acoustic into electrical energy, such as carbon chambers, crystal microphones, and electromagnetic systems. Of these three kinds of elements, the scientists stated, the electromagnetic system is especially well suited to provide a high-articulation throat microphone.

The paper presented by Mr. Pacent and Mr. Greibach dealt technically with the theory and design of magnetic inertia throat microphones. Especial attention was given to the treatment of sound power and high-articulation throat instruments. Because they operate while pressed against the human body, it is

necessary to enclose their working mechanism within a rigid housing to prevent external forces from affecting the air gap. For the same reason, they said, it also becomes desirable to use the inertia principle in the design of such microphones.

Testing Bone Receivers

At the same meeting Mr. Greibach explained laboratory methods for the objective testing of bone receivers and throat microphones. The problem of building an artificial ear, he said, is relatively simple compared with that of constructing an "artificial mastoid" for testing bone conduction receivers, or an "artificial throat" for testing throat microphones.

The artificial throat must have a vibrating platform capable of imparting a velocity to a throat microphone through a filter simulating the layer of skin. The platform must be large enough, he stated, to make the microphone response independent of small changes of position of the microphone on its surface.

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MILITARY SCIENCE

"Snakes" Cleared Trails Of Mines for Allied Tanks

See Front Cover

► DETAILS were revealed by the War Department concerning one type of the rumored Army "snakes" that were used in the European theater to cut wires and detonate enemy mines ahead of advancing Allied forces. The snake cleared a

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The snake has a pear-shaped nose that guides it along and assures its passage over rough land. The nose is flexible enough to guide the snake over rocks.

Special elliptical explosive cartridges, used with the snake, were placed in the trough at intervals of about two and a half feet. They were exploded by an impact fuze which was detonated by machine-gun fire from the propelling tank.

These snakes were used mostly at night in order that they would not be destroyed by the enemy. They were assembled in the field, carefully camouflaged with grass and protected with sandbags, and pushed forward in the hours of darkness when the pushing tanks would be difficult to see. The snakes moved forward at a rate of about two miles an hour.

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AERONAUTICS

Long-Range Research For Aerodynamics

► A LONG-RANGE research program has been started by the Army Air Technical Service Command at Wright Field, looking forward to both peacetime flying and air warfare of the future. It will be in such fields as the aerodynamics of supersonic speed, means of aiding the human body to stand the forces of such speeds, development of propulsive forces capable of supersonic flight and pilotless aircraft, the push-button warfare forecast for the future.

Devices to control robot bombs and other guided missiles from ground installations comprise another project in the present program. Still another is research to bring about a change in the "molecular structure of suspended moisture in icing clouds" so that this moisture, gathering on an airplane, can be turned into snow and thus add to safety and speed of flight.

Radio and radar equipment for traffic and landing will be included. Radio control mechanisms for pilotless planes, rockets and guided missiles, will receive special attention.

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It is roughly estimated that 10% of American crops are destroyed by insects.

The drying and curing of rubber by *electronic heating* is six times faster than conventional processes, and turns out better products because heat is generated uniformly throughout the material.

ENGINEERING

Naval Vessels Preserved

Scientific methods include dehumidification and the use of film preservatives. Will be ready for quick return to duty.

► SCIENTIFIC METHODS will preserve naval ships on an inactive list, yet allow them at any time to make a quick return to duty, the American Society of Civil Engineers was told by Rear Admiral John J. Manning.

Preservation procedure now being followed, he told the engineers, "would insure beyond question that inactive vessels will be susceptible of quick recommissioning when necessary."

The modern techniques for preservation of ships include dehumidification, protection with film preservatives and plastics and other similar measures, he stated. The imperative necessity of maintaining inactive vessels in a much higher degree of preservation than was possible heretofore, he declared, was demonstrated by our experience in attempting to recommission hastily the World War I vessels which were loaned to Great Britain.

Admiral Manning explained that the Navy now plans to divide its postwar fleet into three basic groups. First would

be an active fleet, manned about 70% of war complement; a reserve fleet, manned at 30% of war complement and rotated periodically with the active fleet; and, third, an inactive fleet, to be fully decommissioned and placed in a state of preservation such that it can be reactivated when necessary. In addition, he said, a considerable number of obsolete combat vessels, surplus auxiliaries and landing craft will be disposed of.

Waste Land Reclamation

► THE RECLAMATION of millions of waste acres, particularly in 17 arid or semi-arid western states, offers the opportunity to provide much-needed, fertile fields for the production of food required to keep pace with growing world needs, Kenneth W. Markwell of the U. S. Bureau of Reclamation declared at the same meeting.

There is a great need for rebuilding the soil, bringing under cultivation new



BEFORE AND AFTER—At the left the "Snake" is in position for clearing a path through a jungle mine field. Right: results of detonation of the "Snake." Official U. S. Army photographs.