

TECHNOLOGY

Navy Foils Magnetic Mine

Magnetic mines menacing the Navy's metal ships can be cleared by wooden minesweepers with non-magnetic nails, engines and crews.

By ALLEN LONG

► THROUGH TWO world wars and a "police action" in Korea, submerged and floating mines have lurked in American military sea lanes to blow ships, cargo and men sky-high.

Unless actually hit, the mines at first were harmless to ships. But then human ingenuity created the formidable magnetic mine with which the Germans seeded the oceans during World War II. It did not have to be struck to explode. The steel of the ships set it off by a magnetic effect.

Turning the tables on the magnetic mine, the U.S. Navy has blueprinted non-magnetic ships and has ordered them into production. They are to clear "cabbage patches" from the seas so that other ships may sail through safely.

The non-magnetic minesweepers are especially designed to have no mine-triggering magnetic field. Regular iron-hulled ships are like big permanent magnets. They become magnetized to various degrees while being built.

The degree of the magnetism they pick up while under construction depends somewhat upon the way the ships are oriented with respect to the earth's magnetic field. Iron hulls also might be magnetized in scattered spots by heavy current-carrying wires running nearby to electric welding outfits.

Magnetic Field Is Trigger

When such a magnetized ship wanders too near a magnetic mine, the invisible magnetic field surrounding the ship reaches out to the mine and "squeezes" the trigger.

The tremendous force of underwater blasts has ripped out the bottom of many a vessel. And the magnetic mine's submarine victims are said to flatten out like a pancake under the impact.

During World War II, the Navy countered the menace of magnetic mines by "de-gaussing" its metal ships. Named after Karl Gauss, a German mathematician who contributed to the knowledge of magnetism, the de-gaussing system got rid of about 80% of the ship's magnetic field.

It did this through a girdle-like contraption of wire coils strapped to the hull. Current was sent flowing into the coils as the ship entered a mine field. The girdle minimized the ship's magnetic field so that chances of exploding a magnetic mine were greatly, though not entirely, reduced.

However, the amount of de-gaussing had to be checked periodically. When the vessel

sailed from one part of the world to another, the current fed into the electric girdle had to be adjusted, for the magnetic field of the earth varies from spot to spot. If the precaution were not taken, this variation might affect the ship's safety around magnetic mines.

With technology raising the sensitivity of magnetic mines from day to day, the Navy has turned toward completely non-magnetic ships. The *Navy Times* reports that the Navy's "first non-magnetic minesweeper since World War II" was launched at the Fulton Shipyard at Antioch, Calif., in February, 1953.

The ship is one of 125 minesweepers of various sizes, shapes and descriptions ordered by the Navy since August of 1951.

Called the *Conflict*, the minesweeper has a laminated wooden hull that sports no magnetic field. The *Conflict*, and its unnamed sister ship now under construction, is 165 feet long and is manned by five officers and a crew of 69 enlisted men.

At Stamford, Conn., the Luders Marine Construction Company recently launched the *USS Aggressive*, one of the nation's

greatest wooden fighting ships. It is the first in a class of seven 173-foot minesweepers.

Fashioned largely of laminated white oak, it is the largest, sturdiest sweeper of its type ever built. Not only is it reasonably elusive to the magnetic mine, but also it is said to be equipped with many secret electronic weapons of its own. The instruments, presumably used to detect magnetic mines, are said to be rendered all the more effective by the ship's wooden hull.

Non-Magnetic Engines

Iron, the "bugaboo metal" for non-magnetic minesweepers, is conspicuously absent from the Navy's specifications for non-magnetic ships. The new wooden hulls are fastened with bronze or aluminum nails unaffected by magnetism. Some minesweepers are to have nailless plastic hulls.

General Motors is building non-magnetic engines at its Cleveland Diesel plant to power the ships. The engines, similar to diesels ordinarily used on marine craft, are fashioned of bronze, copper, aluminum and stainless steel to minimize the chance of setting off a magnetic mine inadvertently. Although iron is in stainless steel, the finished metal ordinarily is non-magnetic.

It is even said that the crew is outfitted with nailless shoes and, furthermore, that it



BABY WOODEN MINESWEEPER—The salty little craft shown in the foreground is the Navy's new 57-foot MSB 5. The large reel amidship carries heavy electric cable for magnetic minesweeping operations. The baby minesweeper can be manned by seven enlisted men who will spend most of their time aboard a larger ship still in design stages.

is prohibited from carrying pocket knives and other metallic objects that might influence the sensitive instruments carried aboard the ships.

However, a Navy ship designer in Washington said it sounded to him as though that was "going overboard a bit on this non-magnetic business."

The magnetic mine is, perhaps, the most dreadful member in the family of underwater ship-killers. Unlike anchored mines that explode upon contact with a ship, the magnetic mine lurks in shallow waters on the ocean or river bottom.

Mine-Sweeping Methods

Such mines cannot be swept clear by ordinary methods. Instead they require special magnetic methods.

When the British first learned that magnetic mines were being used against them during World War II, they outfitted Wellington bombers with a large wire-filled hoop. The hoop encircled the plane's engines, nose and most of the fuselage.

A special generator carried in the plane created current that was fed into the hoop. The device then became a flying electromagnet. When the futuristic-looking aircraft flew near enough to a magnetic mine for the hoop to be effective, the mine exploded. The blast rocked the airplane and jarred the crew, already nauseated by fumes from the auxiliary engine powering the generator.

Special Cable Proposed

At that time, methods of exploding magnetic mines were discussed at length in British pubs and restaurants as well as in defense quarters.

William Dubilier, inventor of the mica condenser widely used in radios, suggested that a cable be strung across Britain's rivers. Powerful electric generators would pump surges of current into the cable periodically. The idea was to explode the magnetic mines inside the German submarine before the mines could be laid. This not only would "take care" of the mines but the sub and its crew as well.

However, since even magnetic mines are outfitted with a safety device that keeps them from becoming "armed" until desired,

it is questionable whether such a scheme would work.

Minesweepers ordinarily clean out "cabbage patches" by snipping the anchor wires of the mines. The mines leap to the surface and can be exploded by rifle fire. To cut the wires, minesweepers often work in pairs with a big loop of cable trailing between them.

A British device permitted the minesweeper to work independently. The mines were thrust aside of the ship by a cable arrangement which guided them to a clipper. The clipper snipped the mine anchor wire.

Americans watched for mines with radar. Spotted mines were reported immediately to military authorities and were charted so that other ships could look out for them.

In addition to the magnetic mine, the Nazis were reported to have a host of other special-purpose mines. One such mine was tuned to the sounds emitted by ship propellers as they beat against the water. It exploded when a vessel throbbed overhead.

A drifting mine, like a huge death-laden egg, was laid on the incoming tide. Slowly it settled into place in a harbor or river mouth, then sent down its anchor and be-

came "armed." But scientists, noting the difficulty of suspending objects in water, questioned the validity of reports describing the drifting mine.

Another vicious mine reported during World War II was called the Leon. This devilish device made waters unsafe for submarines crawling along the ocean bottom as well as for troop carriers skimming along the surface. The mine, reportedly propeller driven, slowly rose and fell like a yo-yo along an imaginary string. It was particularly hard to clear from waters because it had no anchor line.

As one side brings out new weapons against the other, it seems that an effective defense is quickly found. One answer to the menace of the magnetic mine is the non-magnetic minesweeper equipped with mine-finding instruments. When this defense becomes so effective that the magnetic mine no longer worries the enemy, then something new must be created.

The next thing for military scientists to figure out seems to be what sort of mine will supersede the murderous magnetic monster.

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PSYCHOLOGY

Blind Child Needs Time

➤ WHEN A baby is born blind, it is a great shock and grief to his parents. But the baby himself does not know what seeing is, so he does not know what he is missing. So he is as content as other babies.

By the time he realizes that he cannot see, he can have grown into a happy person able to meet life as well as any child.

Whether or not he does grow this way depends largely on how his parents handle him. Other children in the family, aunts and uncles and grandparents and friends and the neighbors all can help, too. Ways in which they can help are given in a booklet published by the U. S. Children's Bureau, called "The Preschool Child Who Is Blind" (see SNL, Aug. 15, p. 108).

The first and last lesson for the parent of the blind child, according to this booklet, is:

Believe in him and have confidence that he can have a good life. Give him love, affection, good health. See to it that he is taught the skills and has the experiences that will develop his many abilities.

Blind children are mentally about like other children. They can learn to do things such as feeding themselves, dressing themselves, helping mother with the dishes and so on, at about the same age as other children. Blind children may be slower, take longer to do and to learn. This does not necessarily mean they are less bright.

The child who can see and hear sees his mother drop a toy into a box, for example, and hears it drop in. He imitates what he sees and hears. The blind child only hears, so unless mother lets him feel what she is doing as she tells him and does it, he will be slower learning to do it.

Blind babies enjoy play and attention just like seeing babies. Pick up the blind baby often, dance him on your knee, romp with him. He will laugh and dimple and coo just like a seeing baby. Remember, however, to let him know when you are going to pick him up, because since he cannot see you come to him, he may be frightened if he does not get some warning.

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INVENTION

Patent Given to Ultrasonic Dishwasher

➤ SAMUEL BAGNO of Astoria, N. Y., has told patent office officials that he is able to cleanse dishes without hot water, soaps, or even abrasives such as ordinary scouring powders. Furthermore, he reported he could attain a "relatively high degree of sterilization even when using domestic cold water."

He was describing his ultrasonic dishwashing method, now protected by patent No. 2,647,846.

Mr. Bagno's dishwasher consists of a tank that discharges to a drain. Water is fed into the bottom of the tank through a tube running to a faucet. The water is turned off and on at a rate of 20,000 to 40,000 times a second by a special device. This sets up tiny pressure waves in the tank that snatch food away from the utensils. The dishwasher makes no noise because the water flow is interrupted so rapidly that human ears ordinarily cannot hear it.

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