

Ringing Alarm Bells Across Miles of Sea

No longer need the wireless operator be constantly on watch at sea

THE persistent clanging of a bell arouses the wireless operator from his sleep. In a moment he is at his instruments:

"*Gigantic* answering. Ready for message."

The purring radio sends the response out in rapid repetition. There is a pause for an answer. The alarm-bell stops clanging, and in its place comes:

"Steamship *Breton* calling. Sinking. Lat. 35 13 North; Long. 75 17 West. Hurry!"

A dash for the bridge, a quick consultation with the watch officer, and the *Gigantic* is off at full speed to the rescue.

It will be in some such setting as this that a new wireless invention will prove itself, making it possible for ships at sea to eliminate the expense of having a radio operator always on watch, and yet keep an ever open radio ear to calls of distress.

The device is in the nature of an attachment to existing types of ship radio equipment. Ships carrying it will have an automatic transmitting relay. Press a key, and it fires 180 dots a minute into the ether. The magnets of the relay are controlled by a special contact-maker. This is formed by a brass flywheel within

which is an iron bar. The wheel carries a brush for making contact with a stud, thus closing the battery current through the magnets of the transmitting relay. This contact is not normally open, the wheel being held in the proper position by a spiral spring. A pair of electromagnets act on the iron bar. If they are energized, the wheel turns still further away from the position in which contact is made. While so turning the spring winds up. The current to these electromagnets is controlled by the brush on its flywheel.

Now, suppose the wheel is turned by hand from its normal position until contact is made. Its electromagnets energize; the iron bar armature swings in the magnetic field, opening up the contact and winding up the spring. But opening the contact has de-energized the magnets. The spring now whirls the wheel back through its original position until contact is made again. And so the process repeats itself a number of times a second, depending on the inertia of the flywheel and the tension of the spring.

Each time the wheel turns so as to make contact, the transmitting relay operates, and a dot is sent out by the regular radio equipment of the ship.

Instead, however, of starting the contact-maker by hand, a short-circuit key is provided, which allows the coils to energize. Pressing the key causes the spring to wind up; releasing the key allows the contact-maker to operate as an automatic transmitter.

Such was the operation on the ship whose distress call the *Gigantic* had picked up. On the *Gigantic* the operator, before going to sleep, had left his receiving circuit in operating condition and had thrown a switch that connected a three-stage amplifier in place of the head receivers. This amplifier feeds into an automatic receiver which is built on the same principle as the transmitting contact-maker.

A dot energizes its magnets, turning a light flywheel until contact is made by its brush. During the interval following the dot, the spring whirls the wheel back, ready again for the next dot. Each time the brush makes a contact, it closes the same transmitting relay as is used in sending distress signals. But this relay is now hooked up to close the circuit of an alarm bell.

The receiving mechanism must be adjusted to have the same time of oscillation for its flywheel as the transmitter of a ship from which it receives.

Finding the Range in Miniature

"**U**P 50!" calls the officer. "Down 20!" he shouts again.

He is not gazing toward the open sea, but is merely looking down the deck toward a miniature target at which imaginary shots are being fired.

Officers in charge of a battery must be trained in the difficult art of range-finding. The miniature target practice helps to train the officer and make his work far more accurate when the actual firing at targets at sea is conducted under his charge.

At the end of a clear stretch of the deck is placed an exact miniature reproduction of the large targets used at sea. The officer who is to be taught an accurate judgment of distance looks toward the target through marine glasses. He lies flat upon the deck to bring his eyes in line with the target. The instructor who is to check the results of the observer stands near the target and places before or behind it a roll or wad of cloth which

is shaped in the correct proportion to represent a "splash" caused by the falling shell. Inches represent so many yards, and if the splash is between the observer and the target he will call "Up," and state the estimated number of yards short of the mark. If the splash is back of the target he calls "Down" and gives the number of yards beyond.



The officer being trained in observing the results of firing the big 14-inch guns. Miniature targets are observed through the glasses, the observer lying flat upon the deck to make observations



The targets are placed far down the deck from the observer. An officer standing near by checks the range as it is called by the observer, the shots being marked by an artificial splash made of cloth thrown up as they fall