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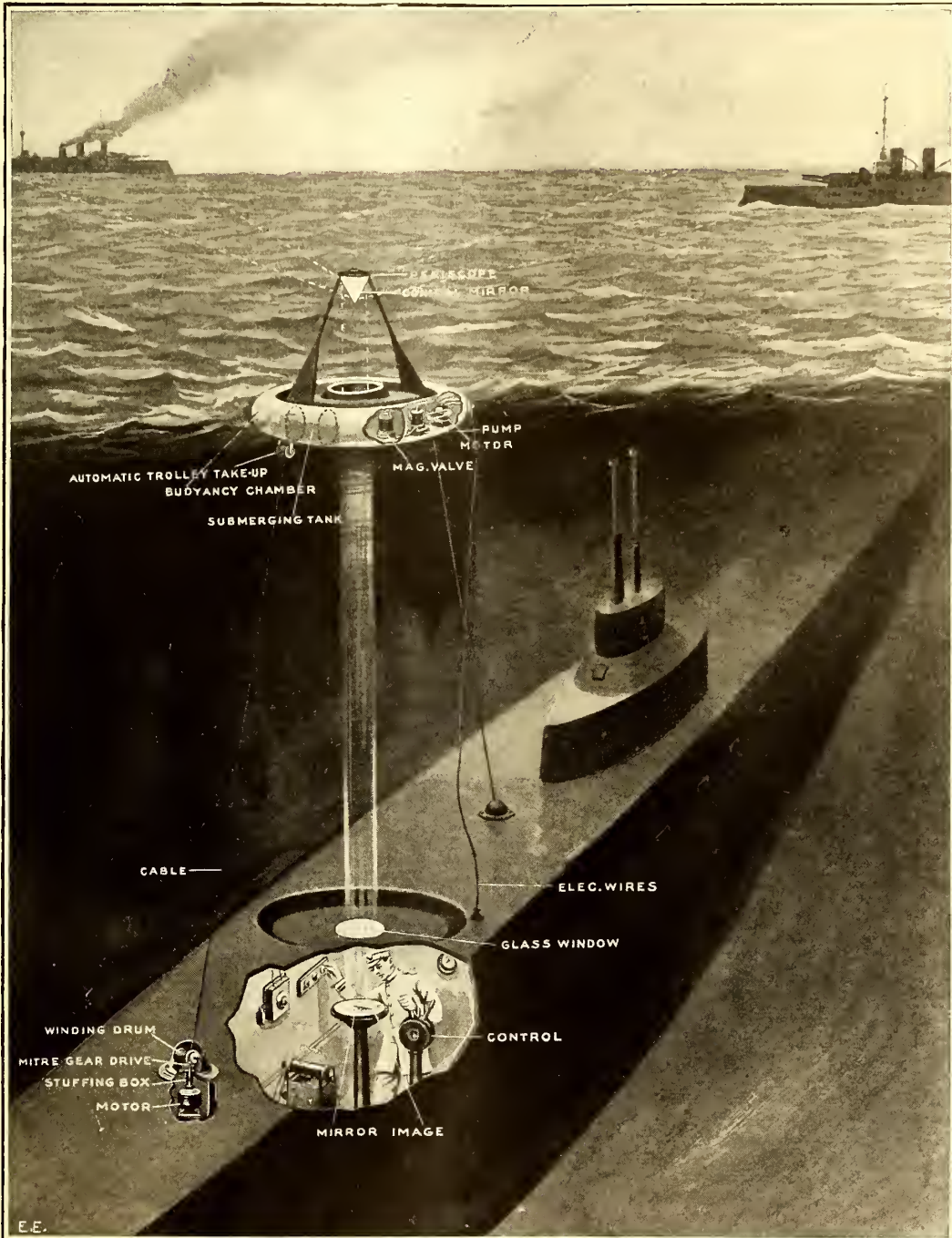
## An Auxiliary Periscope for Submarines

THE most vulnerable part of the present submarine is its periscope. When running submerged with the periscope below the surface of the water, the submarine is "blind," in other words its commander does not know what goes on above the water. If he is not very cautious he runs two separate risks when rising to the surface. One is that the periscope immediately becomes the target for the enemy's shell fire, if his vessels are near the spot where the submarine rose. The other is that frequently the periscope collides with the hull of another vessel, either enemy or friendly. In both cases the result is disastrous, for, as far as its utility is concerned a "blind" submarine though otherwise intact, ceases to exist for the enemy. Of course, the submersible could scuttle a way under the water, without coming to the surface even though its periscope had been shot away. This is known as *running it blind*. However, the difficulty is not that it cannot get away in the manner described, but usually, and possibly in most all cases, there is considerable damage ef-

fects aside from that to the periscope. In other words, it is not the loss of the periscope that endangers the under-sea boat as much as it is the probable damage to

the thin steel hull. An extra periscope is undoubtedly available for such contingencies on most foreign submarines. But this is of no avail if the vessel becomes leaky.

With this and other objects in mind Mr. H. Gernsback, of New York City, has devised a separate, *auxiliary periscope* for the use of submarine warfare. The illustration brings out the idea in detail. There is provided a floating air tank of circular form, on which is mounted a conical mirror. This mirror reflects an image of the entire horizon downward through the water on a second (flat) mirror located within the submarine as the illustration clearly shows. In this way no danger from shell-fire is incurred, as far as the hull of the craft is concerned. If the auxiliary periscope is destroyed by the enemy, the submarine may be navigated submerged or it may remain in the location, venturing upward cautiously after an hour or so, and the usual periscope now comes into play. It is possible also to equip each submarine with this apparatus designed by Mr. Gernsback. The submarine's chances of foiling the enemy are increased a hundred-fold.



Gernsback Auxiliary Periscope for Submarine Use in Reconnoitering. The Image Is Reflected Downward Thru a Glass Window in the Shell of the Submersible.