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SOURCE METHOD EXEMPTION 3B2B
NAZI WAR CRIMES DISCLOSURE ACT
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Transmission of Command Signals by Light over Long Distances

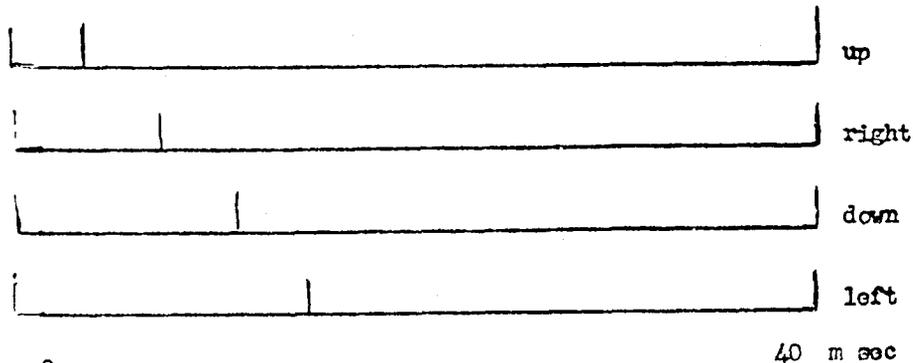
1. Following are the details dealing with an invention to control the operation of missiles and the explosion of torpedoes by means of light signals over a large distance, operating on the principle of the Stroboscope:

Missiles

a. By means of a gaseous discharge lamp of quartz containing primarily Argon at 3 to 5 atmosphere pressure and operating on the principle of the Stroboscope, intense light flashes of short duration were obtained. The secret of obtaining the high intensity is to a slight extent in the lamp, but primarily in the circuits which results in the spark resistance being equal to the aperiodic limit resistance. The intensity of the resulting light flash was 10^{11} candle power or 10^{11} Lux. The intensity at 10,000 meters was theoretically therefore $10^{11} \times 10^{-8}$ or 100 Lux. Due to atmospheric absorption and other effects, the intensity was about 10 Lux at 15,000, and sufficient to actuate the photo cell. The peak of the flash was obtained in 10^{-7} seconds and the useful wave-lengths were in the 3000-3800 A° region with the maximum intensity between 3500 and 3600 A° . In this region the effect of solar radiation was about 1 Lux in spite of the fact that the intensity of the light from the sun was about 50,000 Lux. As long as the effect of impulses from the transmitter were 5 or 6 times that of the effect of the sun in the photocell, command signals could be transmitted.

b. To direct the beam a mirror of a 35 cm diameter was used. (A photo of similar equipment with a mirror of 25 cm is enclosed as Attachment B. As the equipment shown is a stroboscope, the box nearest the light source and reflector is unnecessary in the control equipment.)

c. Command signals were given by means of three impulses with the differences between signals determining the command. For example, command would appear as follows:



Time _____

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d. The receiver is an ordinary type photo-tube 10 cm in diameter and with angle of view of 140° . If desired, filters can be used on the transmitter and receiver.

e. The experimentation was concerned only with the method of transmitting command signals by means of light over large distance. No work has been done with the ballistics of the missile or the means of converting the signals to effective commands, or with the actual control of the missile in flight. The equipment could be used in either a glide bomb or an anti-aircraft missile. Naturally, with the use of light, the transmitter must be kept directed on the missile at all times.

Torpedo Exploder

f. The torpedo exploder operates on the same general principle but with either ultra-violet or infra-red radiations. The transmitter using a much smaller mirror than the 35 cm used in the plane with the glide bomb is located in the forward part of the torpedo and sends out intense flashes upward and slightly to the rear. The receiver located in the after-portion of the torpedo watches upward and slightly forward. Activation of the exploder can be made dependent upon a definite number of flashes being reflected, and so give the torpedo some powers of discriminating the beam of target ships. Depending upon water composition, the device is effective from 6 to 12 meters below the hull of the target ship. Out of about 1000 test firings with the exploder device, it functioned satisfactorily 100% of the time after the first several tests.

2. It is requested that TGS ascertain as quickly as possible whether the US Navy and/or Air Force would be interested in obtaining further information on the subject. If further information is desired and we are notified soon enough, arrangements can be made for its procurement.

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