UNITED STATES PATENT OFFICE.

DANIEL RUGGLES, OF FREDERICKSBURG, VIRGINIA.

METHOD OF SIGNALING AT SEA.

SPECIFICATION forming part of Letters Patent No. 382,056, dated May 1, 1888.

Application filed December 28, 1887. Serial No. 259,242. (No model.)

To all whom it may concern:

Be it known that I, DANIEL RUGGLES, a citizen of the United States, residing at the city of Fredericksburg, in the county of Spottsylvania and State of Virginia, have invented a Method for Maritime Signaling upon the Surface of the Seas, as well as submerged beneath in the depths of the seas, lakes, and rivers by the explosive sonorous projectile force of field-guns in combination with sonorous metallic bells as receivers of sound, at all times, day or night, calm or storm—illuminated by insulated electric light—for signaling by sound to prevent collisions between ships at sea, upon lakes, rivers, and all navigable waters.

To signal by sound at sea I propose to employ smooth-bored and rifled field-guns—breech-loaders preferred—from a ship's deck on the surface of the seas, as well as submerged by block and tackle from a ship's bulwarks in the depths of the seas, in combination with sonorous metallic bells as receivers of sound.

To submerge guns they should be suspended in substantial frames to revolve freely on their trunnions, with their muzzles slightly elevated to expel atmospheric air before adjustment in position. Before submergence, guns should be charged with or without cylindrical shot, shell, torpedoes, or rockets for accelerated flight, all charged with dynamite and other explosives, and primed with the time-fuse for detonation during flight from field-guns.

The field-guns submerged in the depths of the seas, as well as those on shipboard above the surface of the seas, are to be fired through a copper wire or other electric cable connection with an electric battery or engine. As auxiliaries, I propose to employ sonorous metallic bells upon the surface for signal service, as well as submerged by block and tackle from a ship's bulwarks in the depths of the seas, to revolve on their trunnions in a vertical plane for adjustment as receivers of reverberating echoes from field-guns for transmission to the ship's helm. At times gongs may be substituted for bells and the voice of the foghorn and the scream of the steam-whistle, the sound being conveyed through pneumatic tubes on the surface of the seas, and through hydraulic tubes when submerged, to be made available in the vicinity of coasts, ports, lighthouses, and life-saving stations, equipped for reciprocating signals.

For the prosecution of the important objects of this invention it will be expedient to equip the ships of war and of the commercial marine of the dominant commercial nations in a corresponding manner for the prevention of collisions at sea, shipwreck, loss of life and property, the destruction of the commerce of the seas, and all impending maritime disasters.

In its practical development this invention is intended for the discovery of breakers, reefs, rock-bound and shallow coasts, ships in fogs and in distress, icebergs, and other marine dangers by sending, receiving, and exchanging signals during calms, storms, fogs, night or day, against wind and waves, and at all times.

I assume that explosives consist of chemical bases—solid, liquid, fluid, and gaseous—in which magneto-electric force condenses an equilibrio. By firing field-guns upon the surface and in the depths of the seas, projecting cylindrical shot, shell, torpedoes, &c., for detonation by the time-fuse, while the projectiles in their flight revolve resounding rhythm and reverberating echoes like rolling thunder from the storm-cloud, their trajectory conforms to imponderable laws during the prolongation of their range of electric flight. When this resounding echo ceases or is obstructed on the surface of the seas, by timing the returning echo the distance traversed is disclosed by the atmospheric law for the velocity of sound, of eleven hundred and forty-two feet per second, during its flight; and if the reverberating echo from the explosion of the submerged guns, as well as the detonation of projectiles in the depths of the seas, ceases or is obstructed by impedimenta, the intervening distance can be at once determined by the law of transmission of submarine sound, of forty-five hundred and sixty-eight feet per second of its flight. In this connection, as an aid for the discrimination of echoes of sound, I propose the employment of glass and sonorous metallic lenses for converging and magnifying the rays of sound in a manner analogous to the action of glass on light.

What I claim as my invention, and desire

to secure by Letters Patent of the United States, is—

1. The method hereinbefore described for maritime signaling by sound and the reverberating echoes of sound upon the surface of oceans as well as submerged beneath in the depths of seas, lakes, and rivers by the explosive sonorous projectile force of field-guns, in combination with sonorous metallic bells on the surface and submerged, as receivers of sound, and the echoes of sound, by day or night, in calm or storm, and means for illuminating by electric light for signaling between ships at sea, or between ships and shores, and for similar purposes, substantially as described.

2. The method of signaling by the explosion of field-guns from a ship's deck, either on the surface of the seas or submerged beneath in the depths, in combination with sonorous metallic bells, as hereinbefore described, to trace the range of the explosive sonorous projectile, reverberating echoes as well as that of shot, and of shell, torpedoes, &c., exploded by the time-fuse during flight, to mark the time of obstruction or of exhaustion of sound on the line of the prolongation of the trajectory of the flight, substantially as and for the purpose described.

Fredericksburg, Virginia, May 8, 1887.

DANIEL RUGGLES.

Witnesses:

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JOHN F. SCOTT.