

# John Hays Hammond, Jr. Son of Famous Engineer Hopes to Revolutionize Warfare by Light Beams

**Believes His Dirigible Torpedoes, Operated by Teletomatics, Will Accomplish That End—Could Be Sent Effectively Against an Invading Fleet.**

NEW YORK, Dec. 12.—"Teletomatics," said John Hays Hammond, Jr., a couple of years ago. "will revolutionize warfare and, indeed, many phases of the busy days of peace. The term teletomatics was coined by Nikola Tesla, and aptly describes the power to direct or control from a distance mechanical movements by means of wireless waves.

"Indeed, I am so convinced of the great future of this modern infant of science that I purpose making the study of its phenomena and practical applications my life work. It is so secret, and the world will soon know it, that I have planned a giant dirigible torpedo by means of which I hope to add enormously to the defenses of our coasts."

Mr. Hammond has unquestionably made long strides toward fulfilling his promise, and the special board detailed by the war department to examine his device has expressed itself rather enthusiastically about this young inventor's achievements to date. What he has accomplished was demonstrated in the tests carried out last week. Mr. Hammond has equipped a laboratory at Gloucester, Mass., with generators, many costly mechanisms and a towering aerial that represent a tidy fortune, and with this plant he has been able to do things that struck the natives as but little short of wizardry.

If you have happened to be around Gloucester in the last year or two you may have seen in the harbor a net uncommon type of houseboat with two fairly tall masts that seemed to

have no reason for being, for they carried not an inch of canvas. Instead, there were only bare stays and, running from truck to truck to spreaders, weblike wires visible only at close range. That craft was John Hays Hammond, Jr.'s wireless controlled power-boat, and from his observatory, far above on the bluff, he was able to guide the evolutions of the vessel by means of Hertzian waves.

In all of this, spectacular as it was, there was nothing really new, because both the French and the Germans had been doing the same thing by means of Hertzian waves for a number of years; but special credit was due to Mr. Hammond because of the finer control which he was able to exercise, and in this he evidenced the advance in the art which his own cunning had made possible. But Mr. Hammond was not content, for he wanted to do something more than merely steer a houseboat propelled by a gasoline engine, and he desired at the same time to overcome a very practical objection to his whole scheme considered from a military standpoint.

Mr. Hammond realized that an enemy could interfere with his control of a boat or torpedo by sending out a continuous series of discordant or unequal wave lengths, and this meant ruin to his whole contemplated system of dirigible torpedo defense. How did Mr. Hammond overcome this obstacle? How did he make his present method possible? Here is where he was shrewd enough to profit by the

earlier experiments of other men and by combining the principles employed separately by them to evolve a virtually new device, free from possible hostile interference.

John Gardner, of England some years ago built a small submarine boat and made it just as obedient to his will as the craft at Gloucester has been subject to Mr. Hammond's dominance. Mr. Gardner employed sound waves transmitted through the water, where they travel much better and reach further than when dispatched through the air. Mr. Gardner used audible sounds, and he made the receiver on his submarine sensitive only to tones of a certain pitch.

He effected this by means of metallic ribbons or reeds which would vibrate sufficiently only when the right note reached them. You know how you can awaken a response by stinging into a piano. When this metal ribbon was vibrated with sufficient amplitude it completed an electric circuit, and started desired mechanical movements which, in their turn, were impelled by suitable sources of energy. You must understand that the sensitive receiver could not, itself, do any work. It played the part only of a messenger telling its capable associates when to act.

The success of any teletomatic installation hinges upon its degree of selectivity, that is response to certain arbitrary impulses made its controlling medium a complex one so that his receivers could be indifferent to other vibrations.

In the first place he used tuned, inaudible sound waves, and these operate in conjunction with the beams of a powerful searchlight so as to modify the degree of its intensity. The inaudible waves are superposed or laid as a blanket upon the light waves, thus producing a peculiar character of ether disturbance. The

result may be likened to the step of a man that has served a prison term and had to drag a ball and chain. His step is normal so far as its span is concerned, but there is a lag in a part of the movement which makes his gait noticeable. This is just what happened with the Hammond apparatus, and this is the key to the selectivity of his so-called system of light control of wireless.

In speaking of his invention, Mr. Hammond has said: "This system could be operated just as well in the daylight, as Ruchner has carried on light telephony very successfully during the daytime. Therefore, I would not be limited to use it merely for night purposes. Besides this, in the daytime the system is far more highly selective than is wireless, as the beam of light is absolutely concentrated."

Hertzian waves radiate in circles after the fashion of the ever-widening ripples from a stone dropped into a pond, and this is so even though the waves may be used for teletomatic purposes, and, therefore, these waves can be quickly detected by a foe and interfered with even though the direction of their source is not known. True, at night a searchlight can be detected and its origin found by the trace of the beams against the gloom. Of course its direction is instantly revealed when the light is thrown in one's face.

But in the daytime this is very much modified. The flash of a searchlight or a bit of looking glass catching the sun's rays can be seen only when the reflected beams come directly toward one, as there is no visible trace through illumined space of the light, as is the case at night. Therefore, by using a searchlight in the daytime Mr. Hammond can guide his beams upon a chosen path and effect his purpose with a very narrow range open to discovery. Indeed, an enemy would not be likely to understand the object of the flashes and might reasonably think them harmless and of an accidental origin.

The boat which the army board has just examined has been controlled by means of a 24-inch searchlight in con-

junction with a selenium cell of extreme sensitiveness aboard the craft. Mr. Hammond has used wave lengths of but 1-41,000 of an inch long, and the receiver in the vessel is responsive only when the properly tuned light beams have reached it. Then they complete the various circuits and are responsive to the impulses that set in motion the various mechanical functions having to do with the steering, &c., of the craft.

Now, what is the practical form this invention is to take as medium of coast defense? The biggest of modern automobile torpedoes carry not more than 100 pounds of explosive in their war heads. Even so, they have difficulties to combat which lessen their chances of reaching their mark. The torpedo can now travel quite 10,000 yards, the best of them starting upon their journeys at a speed little short of fifty knots an hour. But they are losing speed from the moment they begin their run, and it takes some minutes for them to travel their maximum distance. In the meantime the foe may be moving and the problem is to make allowance for this period of travel and the point at which the target will arrive coincidentally with the torpedo aimed at it.

Mr. Hammond aims to overcome the difficulty by making his torpedo subject to directional control at every stage of its run. To do this, he must have the weapon continually in view, and to that end either the body of the craft or a mast must rise above the surface of the sea. In the daytime this visibility is possible for a distance of nearly nine miles, provided the atmosphere is clear. At night the following rays of the directive searchlight will serve to keep the boat in view, but the same end can be made even more certain by carrying a light or combination of signal lights upon the mast of the craft so placed that they are visible rearward only. These are merely matters of detail.

In order to control his vessel in a navigational sense, Mr. Hammond employs the directional force of a powerful gyroscope which is made to grip the rudder and to hold it steady once the true path is determined. In

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**HERE'S THE REAL AND ORIGINAL TURKEY TROT**

**National Dinner Birds Dance to Music of Phonograph and Gobble for More.**

BOISE, Idaho, Dec. 12.—Pleasure seekers on the mesa recently witnessed a genuine turkey trot. One of a group of equestrians was Probation Officer Lowe, of the juvenile court.

One of Mr. Lowe's special duties is to see that turkey trotting is not permitted in the city, it being against the ordinance, but despite the fact that this turkey trotting was outside the city limits, Mr. Lowe concluded that he had better inspect it. He is now glad he did so, for he has come to the conclusion that the turkey is the most malignant bird on earth, that genuine turkey trotting is not vulgar in the least, but is quite a dignified pastime.

This particular turkey trot was held at one of the country homes in the mesa close to town. The house has a large loggia, which is screened in and extends across the entire side of the house. On this loggia was stationed a large phonograph, to the music of which a group of friends were dancing.

Crowded close to the side of the loggia was a flock of forty or more turkeys, sassy and sleek, in prime readiness for the table.

"The turkeys apparently were fascinated by the catchy ragtime music," said Mr. Lowe. "And they moved about in the funniest way imaginable. They would one-step to the right, then turn their heads, craning their long necks to see what the other fowls thought of their behavior. Then they would one-step to the left, again craning their necks, sometimes giving a little hitchy jump in between and an occasional 'cluck'."

"You can imagine," said Mr. Lowe, "the effect of some forty or fifty turkeys all going through these peculiar motions and the music of 'Too Much Mustard' and 'You're Here and I'm Here.' The minute the music would stop those turkeys would get up the greatest gobbling you ever heard and keep it up until the phonograph started again. I could imagine something of what they were saying, expressing their delight at the new style of music, I suppose."

**WILL PRESS TREATY.**

WASHINGTON, Dec. 12.—Administration leaders today determined to press for ratification by the senate of a safety at sea treaty drafted at London last year.

Opposition developed today when Senator Lafolette offered an amendment to give the United States authority to legislate against involuntary servitude of sailors and for other amelioration of the condition of seamen. Executive sessions on the treaty probably will be held daily.

Members of labor organizations sent floods of telegrams throughout the country today urging appeals to senators in favor of Senator Lafolette's position.

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