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## ELECTRICALLY-FIRED GATLING GUN.

We illustrate in the present issue a new application of the electric motor, in which it is caused to operate a Gatling gun. This well known type of mitrailleuse has been placed on many of the U. S. naval vessels, and represents a very powerful weapon for repelling attacks and for general fighting work at close quarters.

Hitherto the Gatling gun has not been automatic. The loading is effected by turning a crank attached to the breech mechanism of the piece. As this causes the barrels to rotate, they are discharged one at a time. Ten barrels are comprised in the piece, so that for each revolution ten shots are delivered. While one man turns the crank, a second man holding the tail stock or lever may be employed in directing and aiming the piece, if continual change of direction is needed. While this character of manipulation is often required, and is that by which rapid-firing guns should perform the greatest execution, it has attendant difficulties. The turning of the crank inevitably causes the piece to oscillate and adds a second disturbing element to the vibration due to the recoil.

The Crocker-Wheeler Motor Company, of this city, were invited by the U. S. Navy Department to arrange an electric firing mechanism for the Gatling gun. Several requirements had to be kept in mind in producing the design. The apparatus had to be attached to the barrel of the gun so as to move with it. It had to be out of the sighting line, and it was necessary to dispose of it so as not to interfere with elevation or depression of the gun. The motor finally had to be adapted for operation by the electric lighting plants as installed upon the ships of war. The drawings show clearly how the problem has been attacked.

Upon the left hand side of the breech of the gun an open frame of generally rectangular outline is secured. Within it is placed the motor. This is a specially wound motor, adapted for an electro-motive force of 80 volts, and a current of 3 to 3½ amperes intensity. This, it will be seen, represents the absorption of a

little over ¼ electric horse power. The efficiency of the motor is placed at over 80 per cent. The spindle of the armature, which in general terms runs horizontally and at right angles to the axis of the gun, carries a pinion which engages a large gear wheel. The latter is inclosed in the cylindrical or disk-like case which is seen next to the motor by the side of the breech. The spindle of the large gear wheel is prolonged across the end of the gun barrel, and carries a worm at its end. This gears into a worm wheel on the working spindle of the gun.

This double reduction of speed causes the operation of the gun at about 150 revolutions per minute, giving 1,500 discharges. This rate is rather high for general practice and can be considerably reduced.

A small switch is provided for turning the current on and off. The artillerist, after starting the motor, is free to swing the piece in any direction. This he can do without interference from a second operator and the gun is undisturbed by the shaking due to the turning of the crank.

Between the motor and the large gear wheel is a clutch by which the motor can be connected or disconnected from the breech mechanism. The crank by which the piece is worked by hand under the former conditions is arranged for rapid disconnection or reconnection. This provides for injury to the electric apparatus. If the latter becomes disabled or if its connections are severed, the clutch can be thrown open and the handle connected, when the gun will be ready for operation by hand. This change takes only a few seconds. This application of electricity is of special interest as bringing the Gatling gun into the rank of automatically fired artillery.

## Dr. Koch's Cure for Consumption.

A Berlin correspondent of the *Pacific Medical Journal*, writing about the recent medical congress held in that city, says: Following Sir Joseph Lister came Prof. Dr. Robert Koch, who was enthusiastically received.

His paper had reference to a cure for consumption

with which he was experimenting. Dr. Koch was shrewd enough not to name his "cure," so we did not learn much from the distinguished director of the Hygienic Institute of Berlin. The rest of Prof. Koch's address was a *resumé* of bacteriology. He said, "Public opinion was at first against the germ theory, and it is necessary to prove in all cases that the disease and the micro-organism in question appear *together*, and that the germ does not appear in any other disease, and that the same micro-organism, propagated outside of the body through several generations, *always* produced the same identical result if it got into the system."

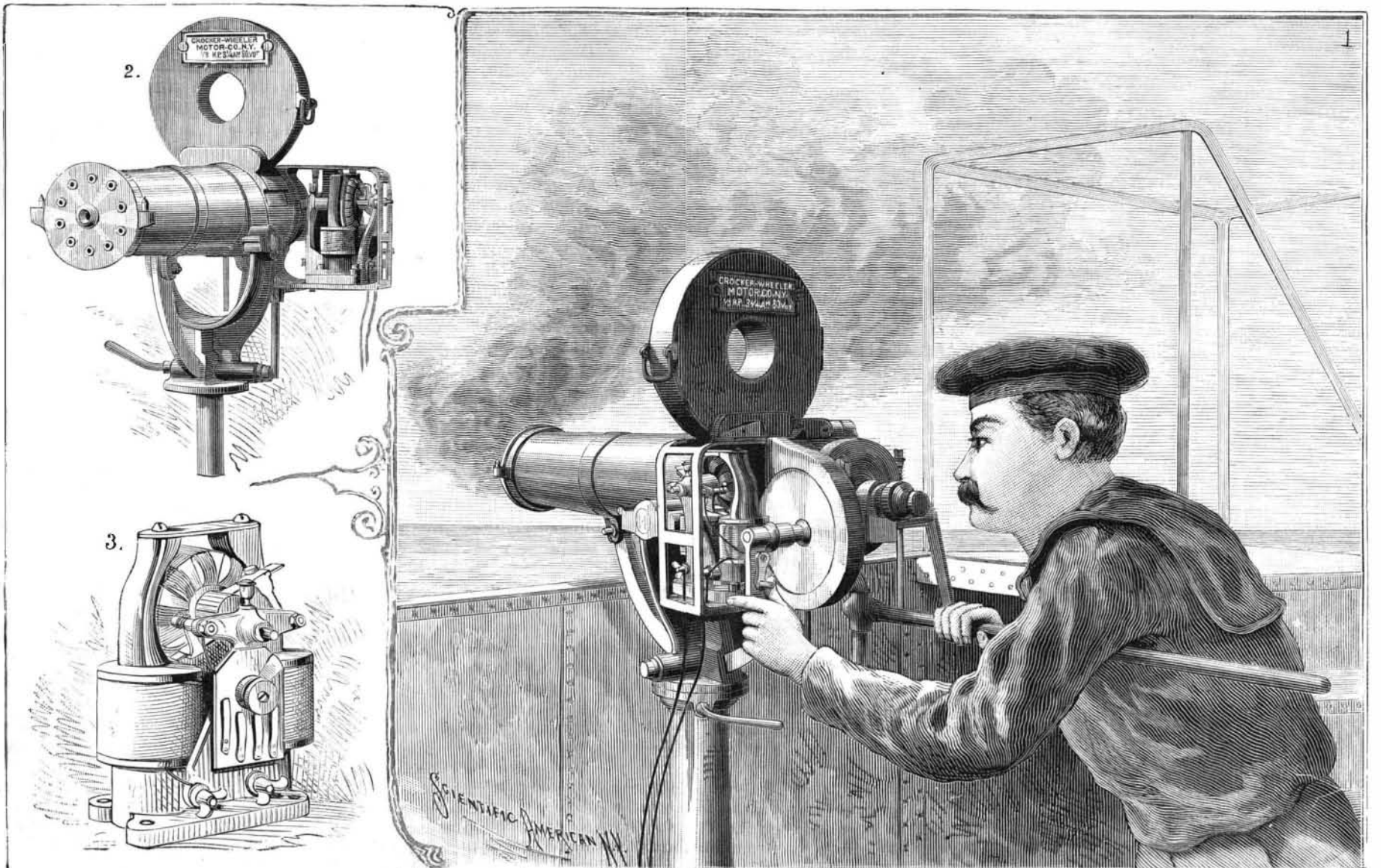
"This had been proved in anthrax, tuberculosis, and erysipelas. But it has still to be proved in the case of typhoid fever, ague, leprosy, diphtheria, and Asiatic cholera; nor had the specific bacterium been proved in scarlet fever, smallpox, yellow fever, cattle plague, pleuro-pneumonia, influenza and *hydrophobia*." Prof. Koch then mentioned that the most recent discovery in bacteriology was the poisons excreted by the bacteria. These poisons were now regarded as the immediate cause of death.

For years past Prof. Koch has been seeking a cure for consumption. He began by pure cultivation of the bacillus, and found ethereal oils, tar pigments, mercurial vapors, salts of gold and silver, and especially cyanide of gold efficacious in destroying the germ, *but this could not be done in the body of animals without also destroying the animal.*

"I continued my search, however," he continued, "and at last found *what I sought!* Susceptible as the guinea pig is to the tubercle bacillus, it proved *non-inoculable* when treated with the substance in question. Even when the disease was *far advanced* it could be brought to a standstill by this means."

This fact may give occasion to search for similar effective remedies in other infectious diseases also, and here lies the field for an international contest of the highest and noblest kind.

After prolonged and enthusiastic applause the meeting adjourned.



1. The gun in operation. 2. The gun and electrical attachment. 3. The Crocker-Wheeler motor.

## FIRING GATLING GUNS BY ELECTRICITY.