NIKOLA TESLA'S LATEST INVENTION.

We have recently been informed by the public press in flamboyant rhetoric that Nikola Tesla has devised a boat which is destined to revolutionize the art of warfare. Apart from its value as an excellent subject for sensational newspaper articles, Mr. Tesla's invention presents certain aspects which are, perhaps, not uninteresting from a scientific point of view. We have therefore produced herewith diagrams of this vessel, from which it will be seen that, ingenious as the mechanism employed may be, no very decided advantage is presented over the dirigible torpedo.

Of the annexed diagrams, Fig. 1 is a plan view of Tesla's boat, presenting a general view of the apparatus employed, Fig. 2 is a sectional view of the Tesla system, and Fig. 3 is a longitudinal section of the boat showing the mechanism in side elevation.

Tesla claims that, in a broad sense, his invention differs from all other systems of controlling boats, in so far as he uses no intermediate wires, cables, or other form of electrical or mechanical connection with the object, save the natural media in space.

The boat itself is provided with a propelling mechanism comprising a screw propeller, *C*, secured to the shaft of an electric motor, *D*, driven by the storage battery, *E*. The vessel is steered by a rudder controlled by a steering motor, *F*. The apparatus by means of which the operation of both the propelling and steering is controlled, involves the use of a receiving circuit adjusted and rendered sensitive to the influence of the electrical waves or impulses emanating from a distant source, the adjustment being such that the oscillations of the circuit and of the source of disturbance shall occur in electromagnetic synchronism.

The receiving circuit consists of a terminal, *E'*, a conductor, an electric controller similar to that used in "wireless" telegraphy, and means by which the current may be led to the ground through the medium of the vessel's keel. The circuit in question forms part of a local circuit, in which are included a relay magnet, *a*, and a battery, *a'*, the electromotive force of which is so determined that although the dielectric layers in the electric controller are subjected to great tension, yet normally they withstand the strain, and no appreciable current flows through the circuit. When, however, an electric impulse reaches the dielectric layers, they are broken down, thus suddenly diminishing the resistance and permitting a current to pass through the relay magnet. The particular controller employed need not be described here, but is shown in side elevation over the motor, *D*, in Fig. 3. The relay magnet, *a*, is used to control the operation of the propelling engine and of the steering apparatus.

Placed in the circuit of the electric controller is a commutator, by means of which the direction of the current may be changed in order to influence one of the two relay-magnets, *K'* or *K''*, placed in the circuit of the battery, *k''*. While one relay, *K'*, for example, is in operation, its armature closes a circuit passing through the motor, *F*, in order to cause the rudder to be swung to port. The other relay, *K''*, causes the motor to throw the rudder to starboard. The steering apparatus, as shown in Figs. 1 and 3, consists, in addition to the steering motor, *F*, of a toothed wheel, *G*, engaged by a worm on the shaft of the motor, *F*. The wheel, *G*, controls the rudder, *F'*, through the medium of a sleeve, *b*, a toothed wheel, *H''*, and rod, *G'*. A fixed vertical rod, *H*, is mounted within the sleeve, *b*, and carries an insulating disk, *L*, to the under surface of which brushes are secured. The sleeve, *b*, surrounding the rod, *H*, and turned by the motor, *F*, carries a disk, *L'*, upon the upper face of which are secured two concentric circles of conducting contact plates interspersed with insulated plates. In certain positions of the disk, *L'*, the brushes are in electric connection with the contact plates. Conductors connect the contact plates with the terminals of the propelling motor, *D*; and the poles of the battery, *E*, are so connected with two of the brushes that when the rudder is in straight position or turned to either side, the current is conveyed through these two brushes and through the contact plates to the propelling motor, *D*. The steering motor is similarly driven by current taken from the battery, *E*, and conducted to two brushes of the plate, *L*. The motor, *F*, according to Mr. Tesla, may always be caused to rotate in one direction whatever may be the position of the rudder; and may be caused to rotate in either direction whenever the rudder is inclined less than 45° from the center position.

In addition to this mechanism the vessel carries a small auxiliary motor, *m* (Fig. 1), connected in series with the armature of the steering motor. By means of this auxiliary motor, lights on the ends of the standards, *g*, may be flashed in order to indicate the course of the vessel to the operator at night.

In Fig. 2, illustrating diagrammatically the operation of the system, *S* indicates any source of electrical wave energy controlled by a switch located in a box, *T*. The handle of the switch is movable in one direction only, and stops on four points, *t, t', u, u'*, so that as the handle passes from stop to stop, oscillations are produced during a very short interval. Tesla places the handle of the switch so that when arrested on the points, *t t'*, the boat is deflected respectively to the left or to the right from its course. The normal positions of the handle are *u u'*. The impulses sent forth from *S* are, according to Tesla, received by the terminal, *E'*, transmitted to the commutator, *j*, to influence one of the relays, *K' K''*, and to cause the motor, *F*, to act on the brushes to turn the rudder in whichever direction it may please the operator. The motion of the rudder causes the second set of brushes to act on the propelling motor to drive the vessel.

Whether, as Mr. Tesla claims, his apparatus, by reason of its certain and unlimited destructiveness, will tend to bring about and maintain permanent peace, is a question discussed elsewhere.

Fig. 1

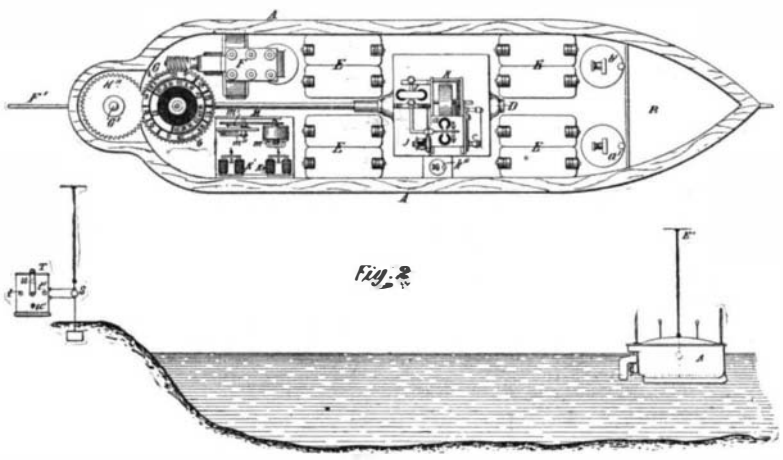

Fig. 2

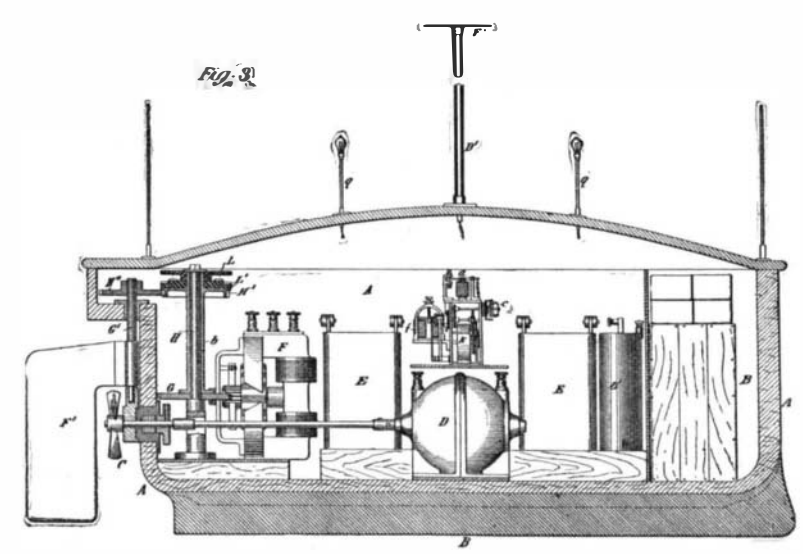

Fig. 3

TESLA'S DIRIGIBLE BOAT.

Cost of Living in the Yukon.

The last report of the United States consul at Dawson City, speaking of conditions in this most remarkable of all "mushroom cities," states that the large amount of supplies which have lately been brought in has had a tendency to reduce prices on a few commodities. What the higher prices must have been we may judge from the fact that a 50-pound sack of flour at the reduced rate cost, at the date of the consul's letter—August 31—$50. A hope is expressed that the price of hotel accommodations will be reduced, as none but the wealthy is able to command the luxuries of hotel accommodations, $6.50 per night being the price for a room containing a bed of straw and husks, with a candle for a light, and board costing the moderate sum of $12 per day. If the citizens of this metropolis of the frozen North prefer suburban to city life, they can rent a log cabin for $50 per month and upward, according to location and distance from the center of the town.

Meanwhile it is evident that the percentage of successful gold seekers in the Yukon is probably smaller than that in any previous gold excitement of magnitude, and the perils and privations are incomparably greater. The future of Dawson City is said to depend greatly upon new discoveries of gold being made during the coming winter. The cost of taking food up to the mining camps and the high price of labor render it so expensive to work the claims that they have to be rich in order to return any profit.

CHARCOAL absorbs the gases and relieves the distended stomach pressing against the nerves which extend from the stomach to the head.

Government Aid for Air Ship Experimenters.

The Board of Ordnance and Fortification has decided to institute an investigation of the possibilities of flying machines for reconnoitering purposes and as engines of destruction in time of war, and at the meeting of the Board, November 9, $25,000 of the fund at the disposal of the Board was appropriated for the purpose of experimenting. The subject of the use of airships in time of war has been a most attractive field for speculation during the past few years, and eminent men have expressed the opinion that, once the dreams of the believers in practical flying machines were realized, the whole scheme of war would be revolutionized.

But, whether the dream of the believers in the ultimate successful operation of an airship of weight-carrying power and under complete control is ever realized, the progress already made in that direction has induced England, France and Germany to test the possibilities of existing inventions and contrivances for war purposes.

So impressed were the authorities here with the advantages which might result from the employment of air machines during the operations of the late war, that Secretaries Long and Alger last summer selected a committee to report upon the subject. This fact is not generally known. The commission made a favorable report upon the desirability of experimenting, and that report was submitted to the Ordnance and Fortification Board, under whose general direction all such matters are investigated. Prof. Langley, of the Smithsonian Institution, the inventor of the aeroplane, appeared before the Board recently and gave his expert opinion in favor of experimentation.

The Board decided, after hearing Prof. Langley and reviewing the report of the commission, to expend $25,000, with a view, at present, to the perfection and use of some aerial contrivance for reconnoissance. The experiments will be conducted under the direction of Gen. Greely, of the Signal Corps, and Prof. Langley has agreed to give Gen. Greely the benefit of his devisings and advice, but with the distinct understanding that he does so without compensation.

The fact that the government is now in a position to encourage inventors by conducting experiments on this important subject is most gratifying. We do not doubt that many meritorious schemes have been allowed to lie dormant on account of the inventors not being in a position to carry on costly experiments, and doubtless many have not even secured proper protection under our patent laws, as they knew that they would be unable to carry on experiments.

Color Photography at Chicago University.

The McDonough process of color photography has been adopted by the University of Chicago as a part of its course of study. This has been after a careful investigation by the President and Faculty. A large factory is being erected in Chicago, in which color photography and the letterpress work following are to be carried out, and in this factory the students of the University will have their place of work and rooms for experimenting on the process. No attempt has been made as yet to put the process into commercial use.

Mr. Tripp has decided that the process should be carefully studied by the public until everyone had been satisfied that a secret has been discovered which will prove of almost incalculable value to the world. He is especially desirous that it should be used for experimental purposes in photographing the spectrum of the stars, X-ray work, geological work, archæological work, etc. He has also taken steps by which the best works of the old masters shall be reproduced, thus making them accessible to all. This will prove of great value in the furnishing of school rooms. A special press will be completed within the coming month, and an exhibition of the work will then be made. The patent, which has now been sustained, covers a transparent screen, for use in taking and viewing a photograph. A screen is provided with differently colored substances arranged according to regularly recurring patterns, the screen having on its surface red. blue, and green colored particles; a prepared paper is necessary in the process, which consists of making colored pictures, which are made by covering or obscuring, by means of a positive picture. the color upon a material prepared to correspond in color and to register in form and dimensions with the patterns of red, green, and blue colored glass acting upon a negative, whereby the colors corresponding to these do not act upon the negative, but will be obscured or covered, while such properties of colored patterns as correspond to the action of the colored lights upon a negative sensitive plate will be left visible.