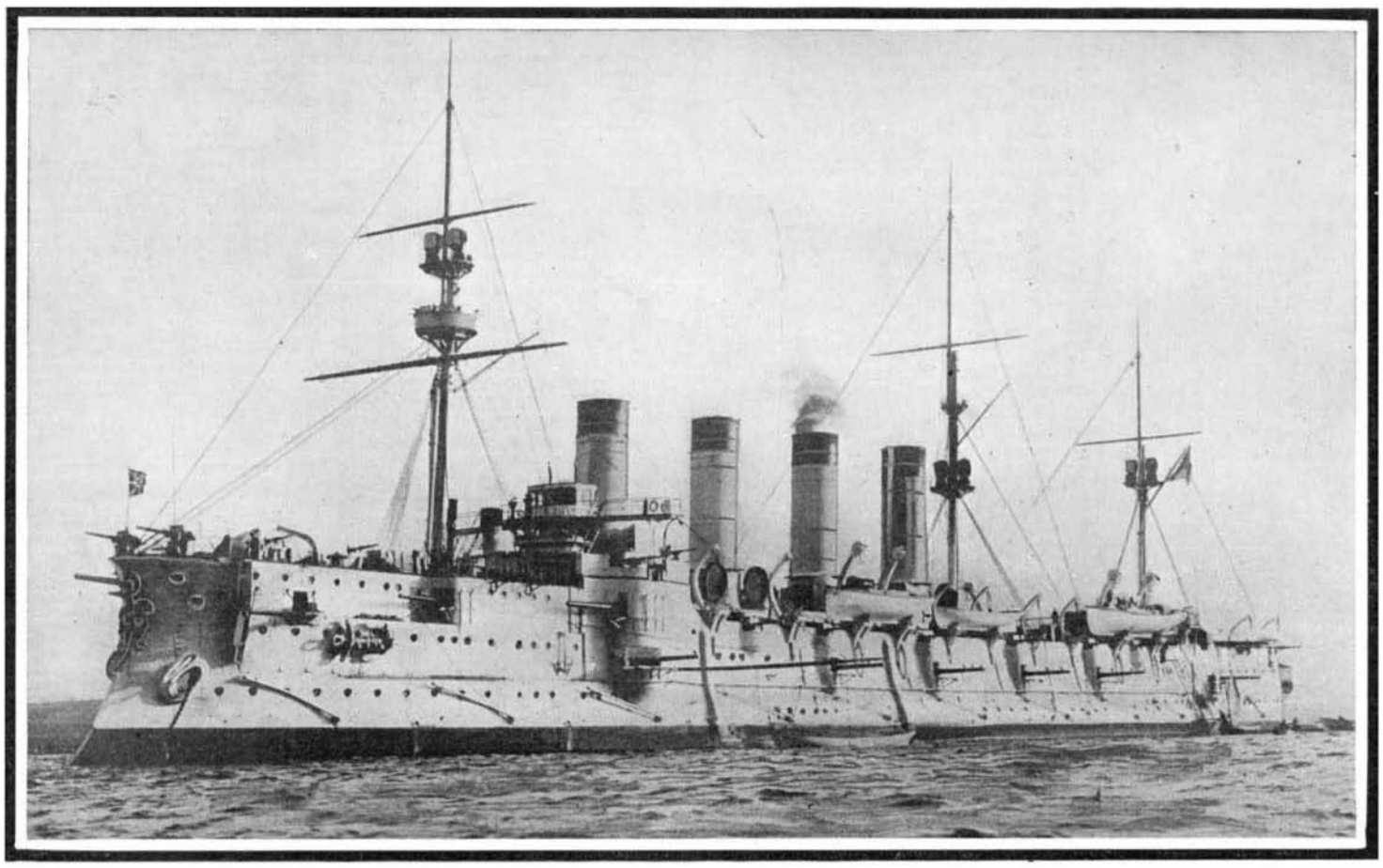
casemates, the Russian cruisers carried but few of their guns in casemates, most of the pieces depending upon gun shields for protection. The Japanese, in this fight as in that off Port Arthur a few days before, elected to make the conflict a battle between gunners. They appear to have remained at long range (though the reports of the Japanese and Russian admirals do not agree on this point), and trusted to their superior pieces and better gunnery to disable the enemy at the cost of a minimum amount of damage to themselves. This was obviously the proper course for the Japanese. Such fighting would have to be done mainly by the 8-inch and 6-inch guns, and of the 8-inch Russia possessed but twelve guns against sixteen carried by the Japanese; moreover four of those twelve were the short 30-caliber pieces of the "Rurik," whose velocity and range were very limited. Hence, in the earlier stages of the fight, the Japanese must have been able to reach the Russian ships with about twice the number of 8-inch pieces that the Russians could hope to make effective upon the Japanese ships. In the 6-inch pieces, the Japanese had a tremendous superiority, carrying fifty-four against the sixteen mounted by the "Gromoboi." The "Rossia" and the "Rurik," it is true, mounted sixteen 5.5-inch guns apiece; but the one-half inch drop in caliber means a big drop in striking energy and carrying power, and it is doubtful if the 5.5-inch guns were able to do much effective work in this long-range fight.

It is a question as to which squadron had the advantage in the matter of speed. For although the Japanese ships were credited with from 21 to 22 knots trial speed, they were not sheathed, and for some months they have been tied closely to the task of watching the Straits to prevent a junction of the Port Arthur and Vladivostock squadrons; hence their bottoms were probably very foul, and their speed not much better than that of the "Rurik," or, say, about 15 knots an hour. The immense advantage of sheathing and coppering was shown at the close of the fight, when the "Gromoboi" and "Rossia," which should have been captured or sunk by the victorious Japanese, were able to draw away and make good their escape to Vladivostock.

There is no new lesson taught by the fight. We simply see the accepted theories of construction and tactics once more strongly verified. That the speed of the fleet is governed by the speed of the slowest ships was proved by the fact that the slower "Rurik" dropped behind and became the target for a terrific concentrated fire from the four Japanese cruisers; and although the two faster Russian ships repeatedly returned to her assistance, they were themselves so hard hit in doing this that they were forced to leave the "Rurik" to her fate. The superior armor carried by the newer Russian ships showed its value in protecting the water line from vital injury. The softer and less extensive water-line belt of the "Rurik" presented a weak point which the Japanese were quick to take advantage of. She was evidently so badly hulled that her ultimate sinking was only a question of time.

The two sheathed cruisers which escaped to Vladivostock present an interesting problem for the Japanese to solve. With their copper bottoms and with the large Vladivostock drydock available for cleaning, unless their engines have been seriously disabled, they can prey upon commerce without any fear of being captured for many months to come. For it is doubtful if there are any Japanese ships that can be put into condition to match them in speed. There can be little doubt that the experience of these ships will go far to enhance the value of the copper bottom in future warship construction.



Displacement, 12,367 tons. **Speed,** 20 knots. **Coal Supply,** 2,500 tons and liquid fuel. **Armor,** belt, 6-inch; deck, 2-inch; secondary belt. 4-inch; casemates, 6-inch. **Armament,** four 8-inch; sixteen 6-inch; twenty 3-inch; twenty-four small guns. **Torpedo Tubes,** four. **Complement,** 800.

ARMORED CRUISER "GROMOBOI," SEVERELY DAMAGED IN KOREA STRAIT ENGAGEMENT.

THE NEW BALDWIN AIRSHIP.

BY J. MAYNE BALTIMORE.

Capt. T. S. Baldwin, of Oakland, Cal., is the recent inventor and constructor of what proves to be a very successful dirigible airship.

The first and initial trial of the craft was made from Idora Park, Oakland. Since then several other trials have been made, all of which proved very satisfactory.

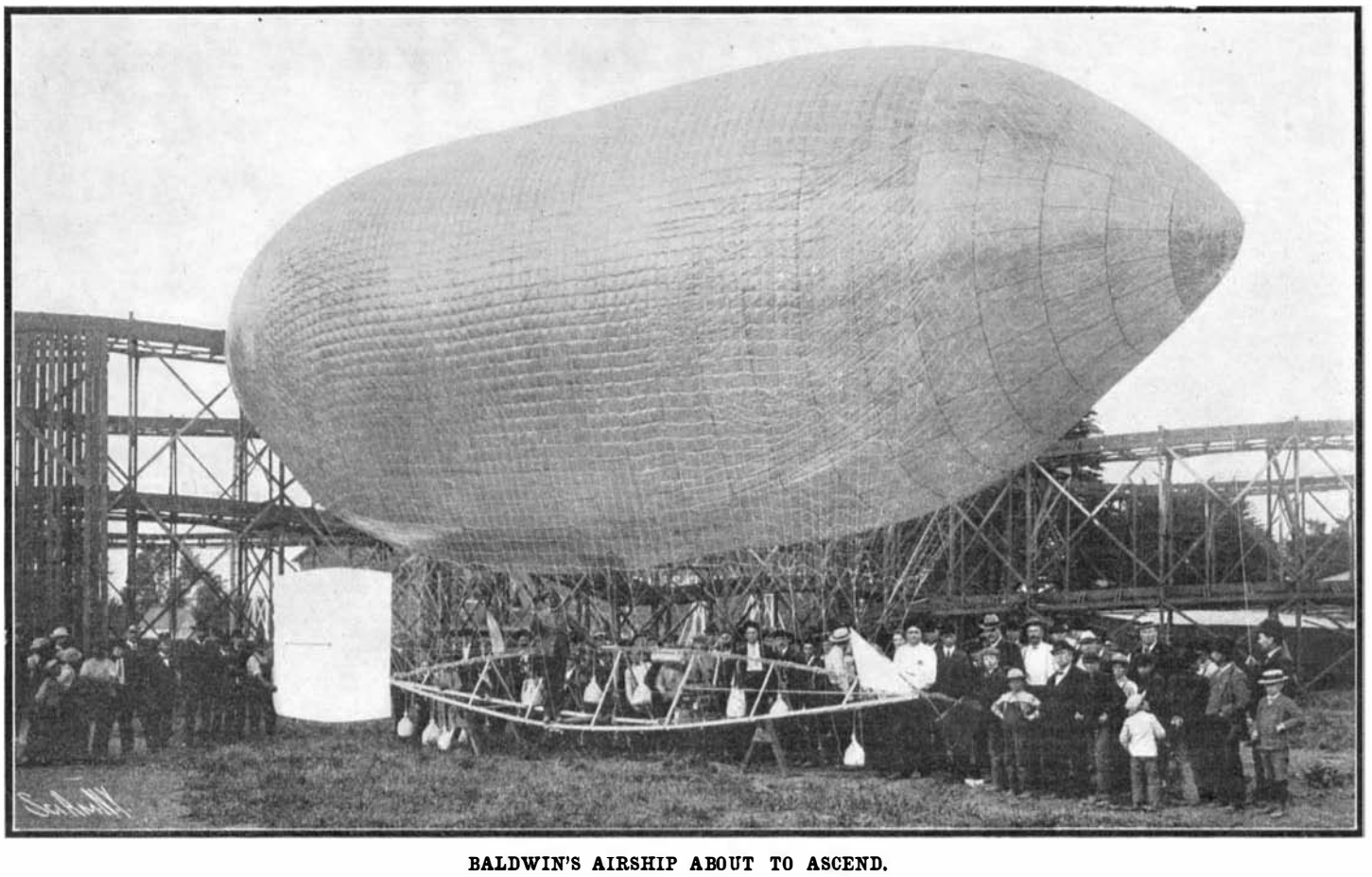
No high altitude was attained by the new airship. Capt. Baldwin's principal aim was to determine if the movements of his ship could be controlled. He ascertained that this could be done quite easily.

At a height of about 700 feet, he circled several times clear around the large park, going both against and with the wind, and moving at various angles. After being up nearly an hour, Capt. Baldwin brought his ship back to the starting point, and safely descended to earth. These trials were witnessed by great crowds of spectators.

Subsequent trials have also been made, when it was demonstrated that in every revolution of the large propeller, and in every move of the steering gear, and of the weights which raise or lower the vessel at will, the plans of the inventor have been carried into effect. The large propeller, having two metallic blades, and nearly 6 feet in diameter, instead of being placed at the stern, is located at the bow of the frame or car, as in most recent airships of this type. In this manner the airship, instead of being pushed through the air, is pulled. This facilitates the steering as well as raising or lowering the ship.

The balloon, by means of which the whole machine is raised, is somewhat blunt cigar-shaped. It measures 54 feet in length and is 17 feet in diameter in the middle. The balloon is constructed of a very fine quality of silk, extremely strong and flexible, and with the reticulated netting which attaches it to the car, weighs only 90 pounds. The balloon is inflated with hydrogen gas, and at an ordinary distension pressure contains 8,000 cubic feet.

To this balloon is attached the frame which supports the propelling and steering mechanism. This frame, which is made of



BALDWIN'S AIRSHIP ABOUT TO ASCEND.

strong, light wood, is triangular in shape, the three ends uniting at a center at each extreme. This frame is 48 feet long, and is very securely braced and lashed. It has been thoroughly tested and will support 1,400 pounds with safety.

The engine which drives the propeller is one of the ordinary gasoline type, furnishes 7 horse-power, and weighs 60 pounds. The transmitting mechanism is so adjusted and geared as to cause the propeller to make 150 revolutions per minute. Just what speed can be obtained under ordinary conditions, has not yet been definitely determined by the inventor.

The frame, or car, is placed directly below the balloon—about 12 feet—and weighs 65 pounds. The total weight of the airship is 220 pounds, while its buoyancy will lift nearly 500 pounds. The rudder, which is rectangular in shape, 5 x 3½ feet, is very easily manipulated from any part of the car; and the engine is regulated by a steel lever. One person can very easily navigate this airship. The aeronaut can sit about midway of the frame, or he may move about freely if necessary without disturbing the general equilibrium to any extent.

A weight, which can be shifted from bow to stern, or *vice-versa*, permits the airship to be raised or lowered at will, a feature borrowed from Zeppelin's craft. Capt. Baldwin intends soon to construct another frame that will be 6 feet longer and 15 pounds lighter. He thinks it will increase the speed and facilitate the steering.

So confident is the inventor and builder of success that he has already entered his airship in the $1,000,000 prize competition at the World's Fair. Capt. Baldwin expects to start soon for St. Louis with his aerial machine.

In working the ship, the propeller may be reversed at pleasure, thus pushing the vessel backward, whenever the same is necessary or desirable. The trials showed that the ship very readily obeyed her helm.

RECENTLY PATENTED INVENTIONS.

Electrical Devices.

THIRD-RAIL SYSTEM.—T. JENKINS, New York, N. Y. In this case the invention relates to the third-rail system for the propelling of cars, its principal objects being to furnish an effective protecting-cover for the rail and a convenient support for the contact-shoe which will permit the shoe to be moved into and out of the cover and coaction with the rail.

ELECTRIC TROLLEY.—G. ONDO, Delancey, Pa. The invention has reference more especially to what are technically known as "trolley-finders," and one of the principal objects thereof is to overcome numerous disadvantages and objections common to many other structures hitherto devised for a similar purpose. The means employed guide the device to assume the proper relation with the conductor and retained in such relation and the same separated entirely from the conductor when desired.

Machines and Mechanical Devices.

FRICTION-CLUTCH.—C. SEYMOUR, Defiance, Ohio. The object of the invention is to provide a new and improved clutch arranged to hold a movable part under ordinary conditions in position, to allow a limited yielding movement of the said part when under an ordinary strain, and to permit the parts to move any desired distance when under an excessive strain. It is a division of the application for Letters Patent of the United States for a band-saw, formerly filed by Mr. Seymour.

Prime Movers and Their Accessories

WINDMILL.—J. J. MCLEAN, Moose Jaw, Canada. In this patent the invention has for its object to render the construction of windmills more simple, durable, economic, and effective than ordinarily and to provide a means whereby when the windmill is not in use the wind-wheel will be housed and perfectly protected and whereby more or less wind may be directed to the wheel as occasion may require. Means are provided, acting always to keep the blades perfectly facing the wind, which blades are a fixture in the construction of the wind-wheel.

FUSIBLE-PLUG VALVE.—J. L. DOWNS, North Bergen, N. J. Mr. Downs' purpose is to provide a means whereby in the event the water in a boiler should become so low that the heat from the fire-box melts the fusible plug in the crown-sheet a valve may be quickly brought into action to close the receiver for the plug, and thus prevent steam from entering the box and extinguishing the fire, and also enabling the fire under such conditions to be properly attended to or drawn or banked without undue peril to the stoker or fireman.

Railways and Their Accessories.

HAND-STRAP FOR CARS.—J. S. PAXTON, New York, N. Y. The purpose of the invention is to provide a strap for cars having a panel in which an advertisement may be inserted and removed at will, which advertisement may be made to appear upon one or both sides of the panel. Another is to provide a frame for the panel, into which the panel may be readily introduced or from which it may be quickly removed, and also to provide a strap in two sections, upper and lower, the upper having a swivel connection with the frame of the panel and the lower a flexible connection with the frame.

Designs.

DESIGNS FOR A STOVE.—J. P. QUERBACKER, Louisville, Ky. The design in this patent is a stove ornamented throughout its side by an attractive scroll work which gives a pleasing ornamental effect and provides a graceful and artistic panel in the middle of the oven door which may be utilized for any desired purpose.

NOTE.—Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of the invention, and date of this paper.

Business and Personal Wants.

READ THIS COLUMN CAREFULLY.—You will find inquiries for certain classes of articles numbered in consecutive order. If you manufacture these goods write us at once and we will send you the name and address of the party desiring the information. **In every case it is necessary to give the number of the inquiry.**

MUNN & CO.

Marine Iron Works. Chicago. Catalogue free.

Inquiry No. 5897.—For manufacturers of parts for gasoline engines.

AUTOS.—Duryea Power Co., Reading, Pa.

Inquiry No. 5898.—For the manufacturers and the British agent for the "Bliss" log.

"U. S." Metal Polish. Indianapolis. Samples free.

Inquiry No. 5899.—For puzzles for advertising purposes.

Perforated Metals, Harrington & King Perforating Co., Chicago.

Inquiry No. 5900.—For makers of steam or hot water heating apparatus for greenhouses.

Handle & Spoke Mchy. Ober Mfg. Co., 10 Bell St., Chagrin Falls, O.

Inquiry No. 5901.—For machines for weaving straw hats.

If it is a paper tube we can supply it. Textile Tube Company, Fall River, Mass.

Inquiry No. 5902.—For a captive balloon to raise 6 persons 300 feet high.

Sawmill machinery and outfits manufactured by the Lane Mfg. Co., Box 13, Montpelier, Vt.

Inquiry No. 5903.—For manufacturers of spring motors.

American inventions negotiated in Europe. Wenzel & Hamburger, Equitable Building, Berlin, Germany.

Inquiry No. 5904.—For makers of gas stoves and gas heaters.

Patent No. 658,853, "Safety Device for Elevators" for sale. Address H. S., 265 Orange Street, New Haven, Conn.

Inquiry No. 5905.—For parties to turn out a new form of gasoline mantle burner in large quantities.

In buying or selling patents money may be saved and time gained by writing Chas. A. Scott, 340 Cutler Building, Rochester, New York.

Inquiry No. 5906.—For machines for planting young onions.

The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Machine Company Foot of East 138th Street, New York.

Inquiry No. 5907.—For makers of tool handles and small articles of walnut.

Patented inventions of brass, bronze, composition or aluminum construction placed on market. Write to American Brass Foundry Co., Hyde Park, Mass.

Inquiry No. 5908.—For makers of lathes between jewelers' and foot lathes.

We manufacture anything in metal. Patented articles, metal stamping, dies, screw mach. work, etc., Metal Novelty Works, 43 Canal Street, Chicago.

Inquiry No. 5909.—For makers of high-speed steam engine castings to generate 12 to 16 candle power.

Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, machinery and tools. Quadriga Manufacturing Company, 18 South Canal Street, Chicago.

Inquiry No. 5910.—For makers of laundry machinery.

Inquiry No. 5911.—For makers of gage rods, hydrometer jars, etc.

Inquiry No. 5912.—For makers of carpet-cleaning machinery.

Inquiry No. 5913.—For machines for making old carpets into rugs.

Inquiry No. 5914.—For machinery for making apple jelly, etc.

Inquiry No. 5915.—For makers of power lace machines.

Inquiry No. 5916.—For makers of machine for making copra, or for taking meat from the cocoanut.

Inquiry No. 5917.—For manufacturers of wood-carving machinery.

Inquiry No. 5918.—For makers of flywheels for engines of 20 to 50 h. p.

Inquiry No. 5919.—For makers of pins, hair pins, combs, hooks-and eyes, etc.

Inquiry No. 5920.—For makers of furnaces for smelting lead, tin and Babbitt dross.

Notes and Queries.

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.

Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(9445) R. G. P. asks: Could two sets of storage batteries be put into a vehicle so that one set will be running the vehicle and the other will be charged by the same vehicle; and how fast has a dynamo got to run to make electricity? A. If a storage battery is doing the work of running a vehicle it will not have any power left with which to charge another battery strong enough to run the same vehicle. It would not be economical to use a storage battery for the purpose of charging another storage battery. There is always a percentage of loss in transforming electricity from one form to another. A dynamo may be built to run at various speeds up to several thousand turns per minute.

(9446) LeG. L. W. asks: I am in want of information how to make small spark or induction coils, etc. Where may I find same? A. You will find in our SUPPLEMENT No. 160, which we send for ten cents, full instructions with all needed illustrations and drawings for making an induction coil which may give a spark from 1 inch to 1½ inches in length. SUPPLEMENT No. 1124, price ten cents, treats in a similar way a coil giving a spark 6 inches long. In Norrie's "Induction Coils," price $1, you will find details of coils giving sparks from ½ inch to 12 inches in length. Among these you can surely find what you want. We shall be pleased to receive your order for the books you wish.

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