HISTORICAL PHOTOGRAPH FROM THE SEA OF JAPAN.

In the national art galleries are to be found many notable paintings depicting critical scenes in the decisive battles of the world. As these paintings were made from descriptions furnished by eye-witnesses, they are in the nature of things largely imaginative, and therefore may be no nearer the reality than the scene which is conjured up by any one who reads an account of the episode in any authentic history.

The advent of the camera, however, has made it possible for the contemporary public and all future posterity to look upon decisive events in modern warfare with the very eyes, as it were, of the participants; and the late war has furnished not a few thrilling pictures of this kind.

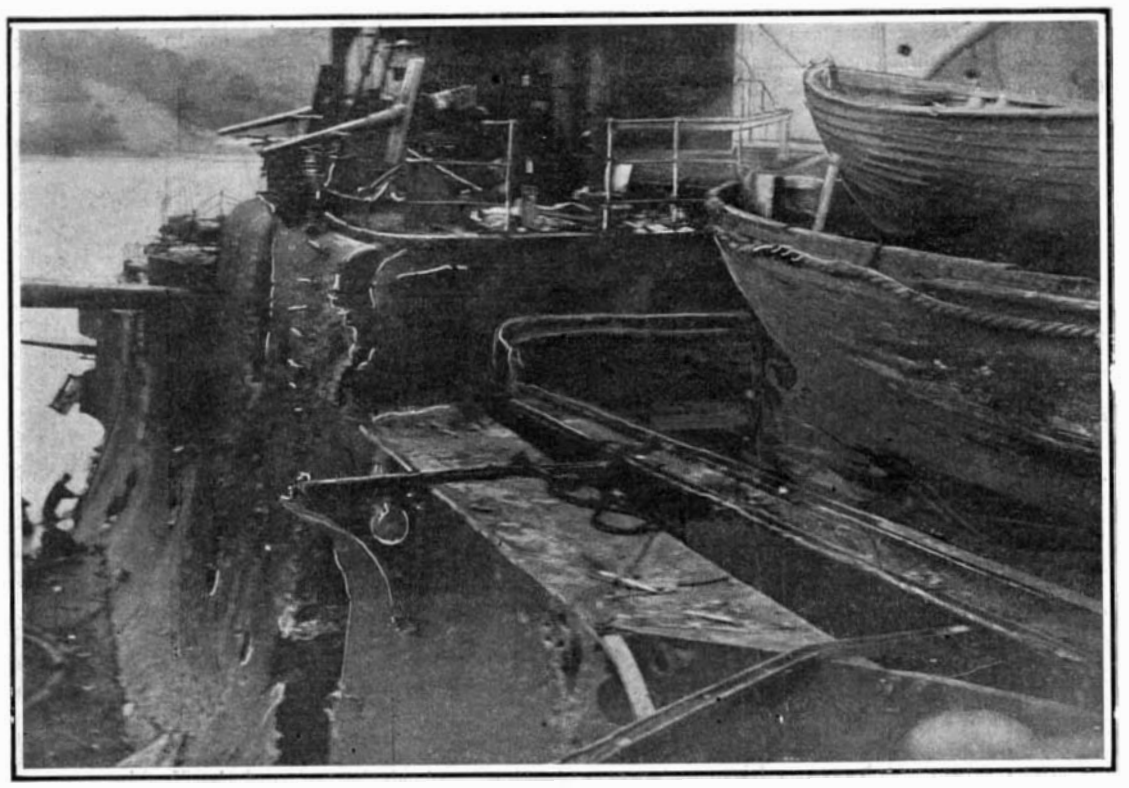
Unquestionably the most striking of these is the snapshot of the momentous surrender which closed the great naval battle of the Sea of Japan. Thanks to the presence of mind of the chief engineer of the Japanese battleship "Asahi," we are enabled to publish the accompanying remarkable photograph of the final act of the drama, in which the four surviving Russian ships were enveloped by twenty-seven warships under Admiral Togo. The date of this event is May 28, 1905, and the place near the Liancourt Rocks in the Sea of Japan.

We are indebted for this historic photograph and the views of the work of high-explosive shell on the "Orel" to Mr. Saito Tsunetaro, of Tokio, who writes as follows: To the Editor of the SCIENTIFIC AMERICAN:

Being a constant reader of your admirable magazine, it has been my fortune to know that you have always paid particular attention to the course of the Russo-Japanese war. In your articles on the war, which never failed to arouse a keen interest in your Japanese readers, you occasionally, or rather often, accompanied them with beautiful illustrations, which greatly enhanced their interesting features. Hence it has occurred to me that although the war has been brought to a close by the noble effort of your great President, yet a few accompanying photographs, relating to the last stage of its naval operations, may not be out of place in your magazine. This is the reason why I have been induced to submit them to you.

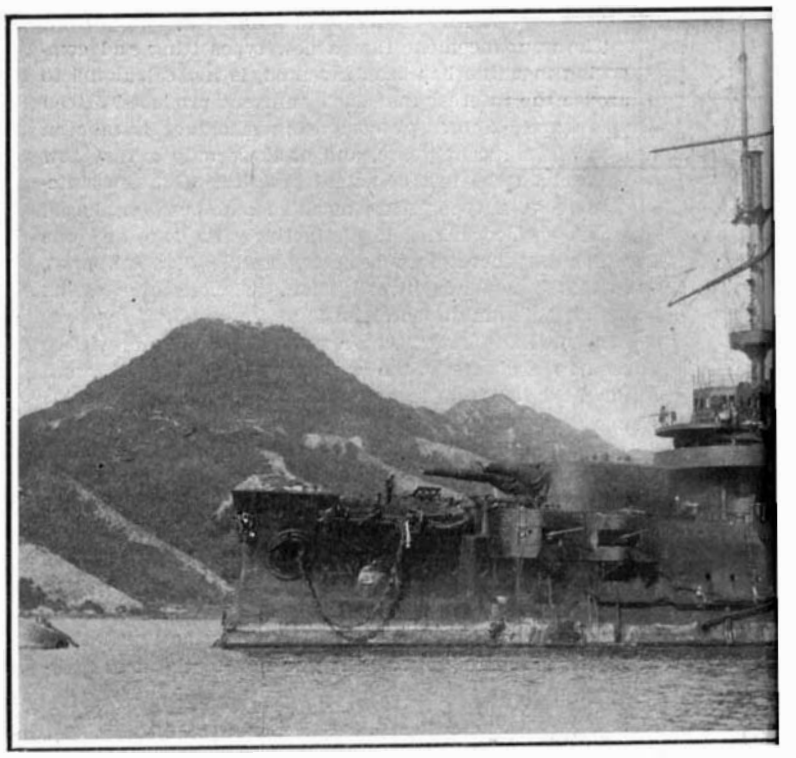
One of the photographs represents the battleship "Iwami" (formerly the "Orel") in the naval port of Maizuru. She is one of the four Russian warships that surrendered off the Liancourt Rocks on the 28th of May. She was hit by forty large shells above the water-line, and sixty smaller projectiles; while the superstructure, upper works, and upper decks are riddled by shell, steel fragments, and splinters. The port forward 12-inch gun is smashed ten feet from the muzzle by a shell. The fragment of the gun went over the bridge, smashing the rail and carrying away the breech of a 12-pounder, finally burying itself in the signal locker From the main-deck upward the condition of the ship is terrible. The steel partitions are smashed, the gangway is broken, the stanchions are wrecked, and gear of various kinds litters the decks and alley-ways.

Although the battleship "Iki" (formerly the "Nikolai I.") had her forward bridge shattered, one of the main guns in the fore-turret so much damaged as to be of no more use, and the fore port side received several shots, her general condition is not so terrible as that of the "Iwami." She took part in the great naval review with some other captured ships such as the "Sagami" ("Peresviet"), the "Tango" ("Poltava"), the "Mishima" ("Apraxine"), the "Okinoshima" ("Seniavin"), etc., on the 13th instant in the Bay of Tokio. But on the whole, the "Iki" will not make a very valuable addition to the Japanese navy, unless it is thoroughly reconstructed. One of her officers told me that it will cost a great deal to make her of any use for fighting purposes, and also to make her fit for our crew to live in. The



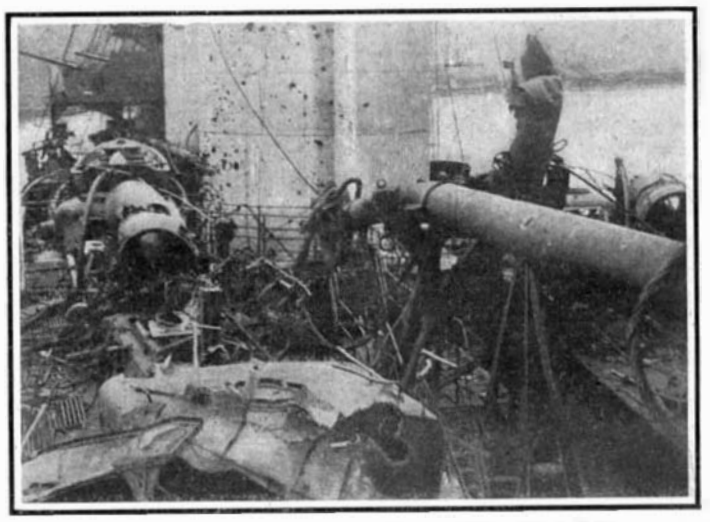
Note huge hole made by Shimose explosive shell.

Port Side and Boat Deck of the "Orel."

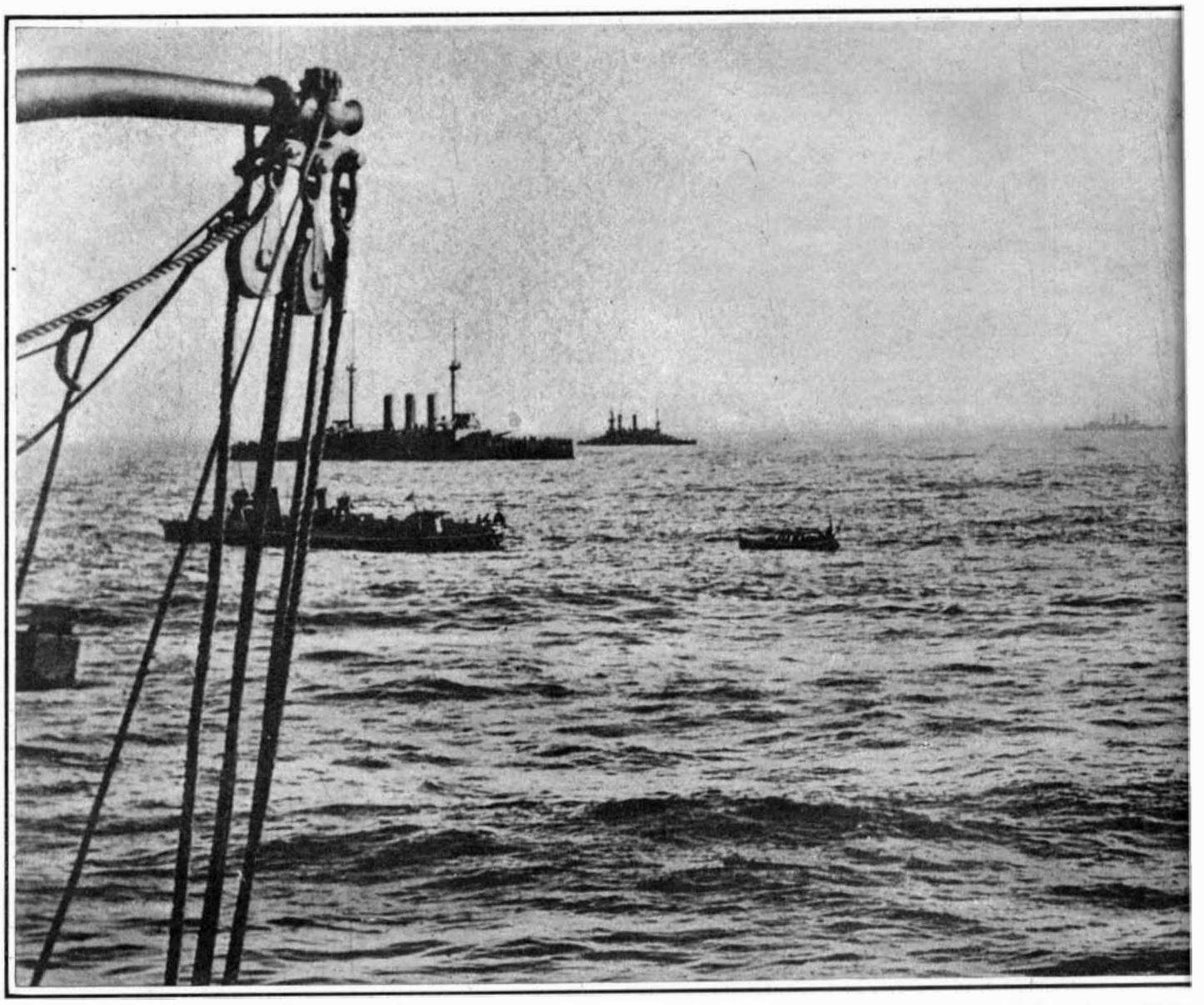


Note the broken chase of forward 12-inch rifl

Battleship "Orel" (Now the "Iwami



Wreckage on the Bridge Deck of the "Orel."



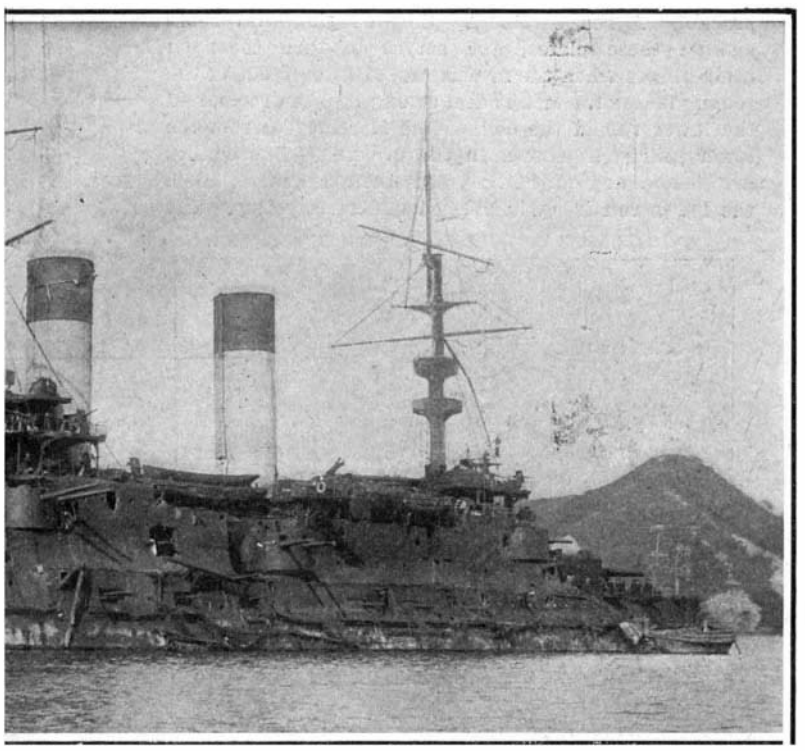
Japanese battleship "Shikishima."
Japanese destroyer "Kamome."

Russian coast-defense vessel "Apraxine"
Small boat carrying Nebogatoff to Togo.

Japanese armored cruiser "

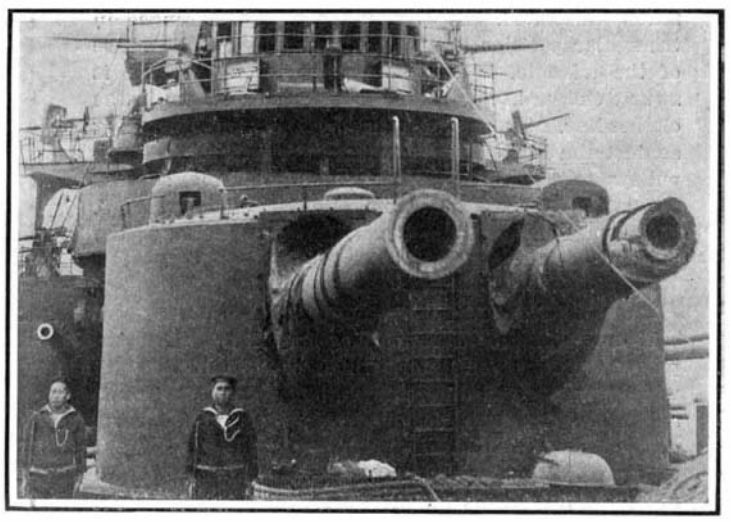
This Extraordinary Snapshot Was Taken by Chief Engineer Sehi, of the Battleship "Asahi," a Davit of Which Ves

THE FINAL SCENE IN THE



and the large holes made by high-explosive shell.

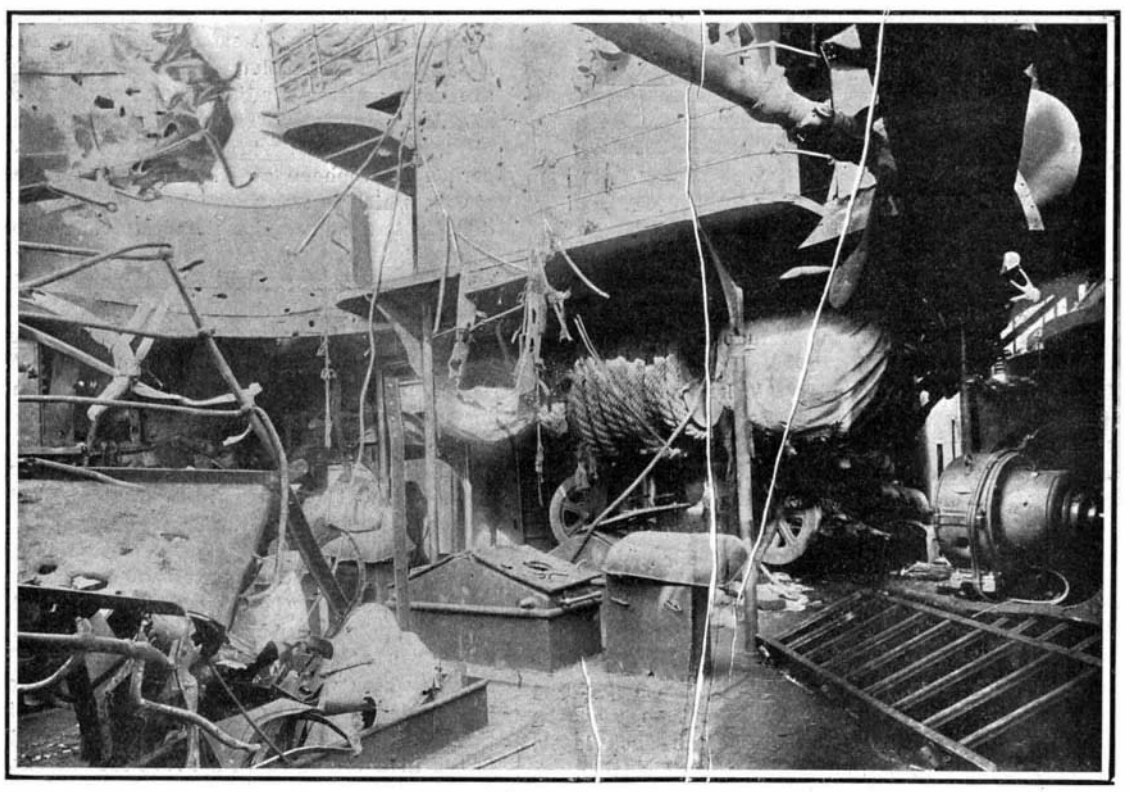
in the Japanese Naval Port of Maizuru.



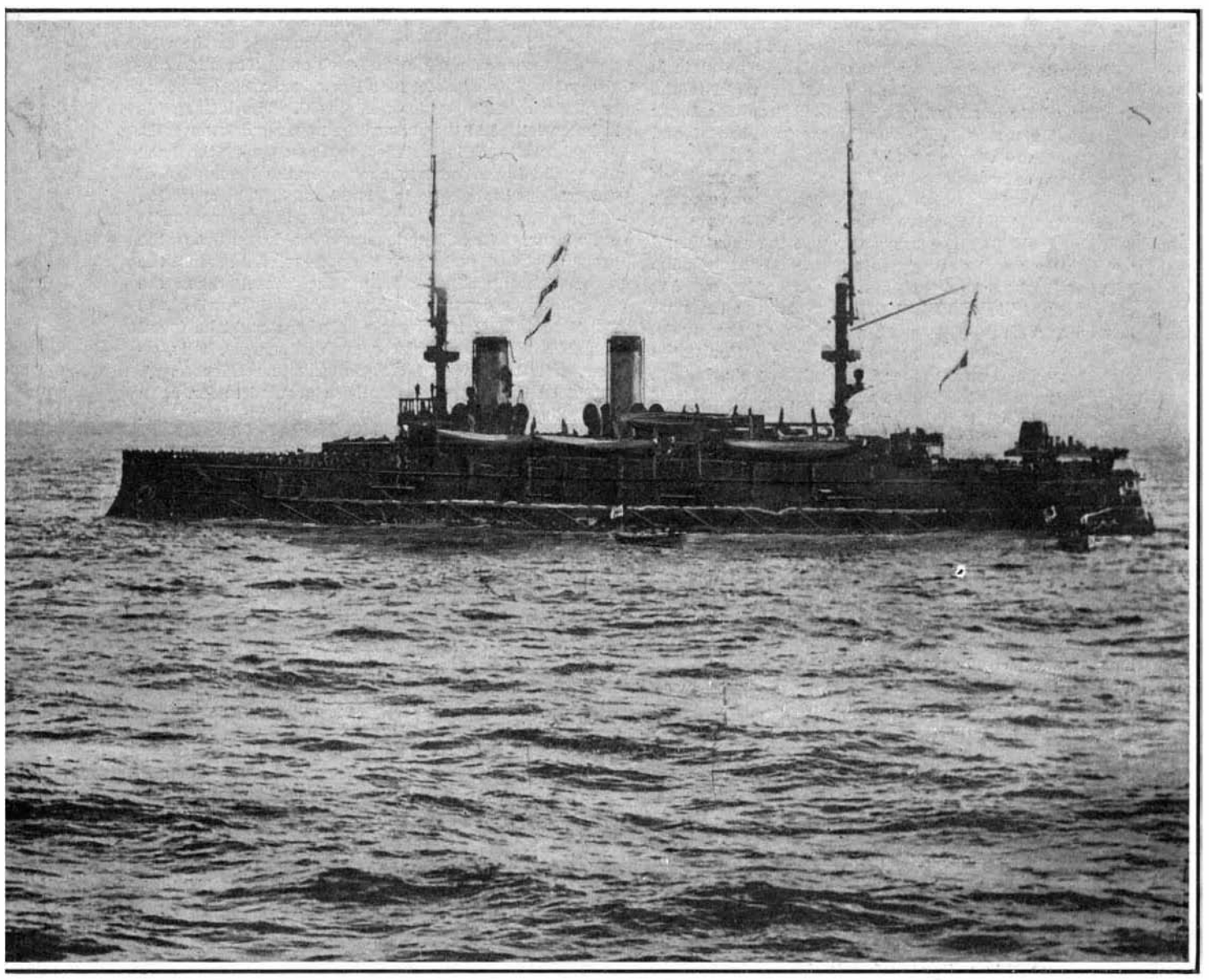
Front View of Fore Turret of "Orel," Showing 12-Inch Rifle Broken Off 10 Feet from Muzzle.

ship is remarkable for want of accommodation for the blue-jackets, while it furnishes spacious and comfortable quarters for the officers. That she had been overladen with coal is clearly demonstrated by the water-line. The photograph which represents a part of the boat-deck of the "Iwami," gives an idea of how deadly is the effect of the Shimose explosive. Another photograph gives a view of some big holes made on the port side of the "Iwami," and it also shows a part of her boat-deck. Of great interest is the photograph which gives the front view of the fore-turret of the "Iwami," showing one of her 12-inch guns smashed ten feet from the muzzle.

The largest photograph was taken at the time when Admiral Nebogatoff surrendered on the 28th of May, by Chief Engineer Seki of the "Asahi," a davit of which is visible on the left of the photograph. The first-class Japanese torpedo-boat "Kamome" is nearest to the "Asahi." Farther on to that side of the "Kamome," and almost parallel to her, is the battleship "Shikishima," with her three funnels. To the right of the "Shikishima," but farther on, is the "Apraxine." Almost in a line ahead of the "Kamome" is the small boat in which Admiral Nebogatoff and his staff are making for the "Mikasa," to confer with Admiral Togo in regard to the terms of surrender. In the middle of the picture, and fading in the distance, is the armored cruiser "Asama." The most conspicuous ship on the right of the picture is Admiral Nebogatoff's flagship "Nikolai I.," from the mainmast of which is fluttering the signal of surrender. As this was not noticed at first by the Japanese, the Russian sailors hoisted the ensign of the Rising Sun over that of Russia on the mainmast. Over the stern of the "Nikolai I." is seen the Japanese torpedo-destroyer "Shinonome." This picture is, therefore, to be looked upon as an integral part of the scene where the four Russian ships, the "Orel," the "Nikolai I.," the "Apraxine," and the "Seniavin," were enveloped by twenty-seven



View on Upper Deck of the "Orel," Showing Wrecked Gangways, Ladders and Boats.



sama."

Admiral Nebogatoff's flagship "Nikolai I." with Japanese ensign flying over that of Russia from the gaff in token of surrender.
Japanese destroyer "Shinonome."

el is Seen at the Left of the Picture, as Admiral Nebogatoff Was Proceeding to the "Mikasa" to Arrange Surrender.

ATTLE OF THE SEA OF JAPAN.

Japanese warships under Admiral Togo.

SAITO TSUNETARO.

The Imperial Fisheries Institute, Etchujima, Tokio, November 18, 1905.

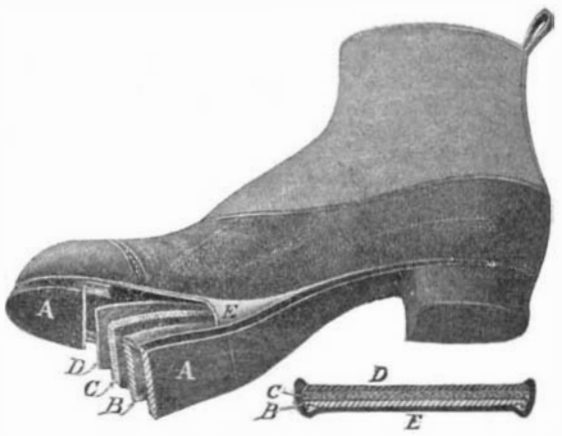
Turbine Blades.

In a paper on the construction of turbines read to the Institution of Engineers and Shipbuilders in Scotland recently by Mr. E. M. Speakman, it was stated that the material of which blades are usually made is a mixture of cheap brass containing 16 per cent of copper and 3 per cent of tin. Alloys containing zinc are extremely unreliable for high temperatures, but blades containing about 98 per cent of copper have been found very satisfactory for use with high superheats. More recently a material containing about 80 per cent of copper and 20 per cent of nickel has been adopted, and this is undoubtedly the best blading material existing. Steel blading, drawn in the same way as the usual brass section, has been used in the United States with fairly good results. The process of drawing turbine blades gives an extremely tough skin to the metal used, not only increasing the tensile strength, but greatly decreasing the chances of erosion. It seems probable that the usual calking piece now adopted will be discarded in favor of a machine-divided strip into which the blades may be fitted and instead of the slotting, wiring, lacing and soldering process at the tip, a similar machine-divided shroud will be used. This will give a far stronger construction and will enable finer clearances and better workmanship to be obtained, at the same time considerably reducing the cost of manufacture and the risk of blade stripping. The chief causes of the latter may be set down to bad workmanship in fixing the blades, defective blade material, excessive cylinder distortion—this probably the most fruitful cause and a serious one, being due to bad design—whipping of turbine spindles (also due to bad design or bad balancing), wear of bearings, which is very remote, and the introduction of extraneous substances such as

water or grit. In fact, blade stripping may be said to occur generally from preventable causes. Small vibrations of very high frequency occasionally set up an action in certain rows of responsive length that fatigue the blade material and cause the loss of blades without any fouling at all.

IMPROVED CUSHION SOLE FOR SHOES.

Pictured in the accompanying engraving is an improved cushion sole for shoes which avoids the prin-

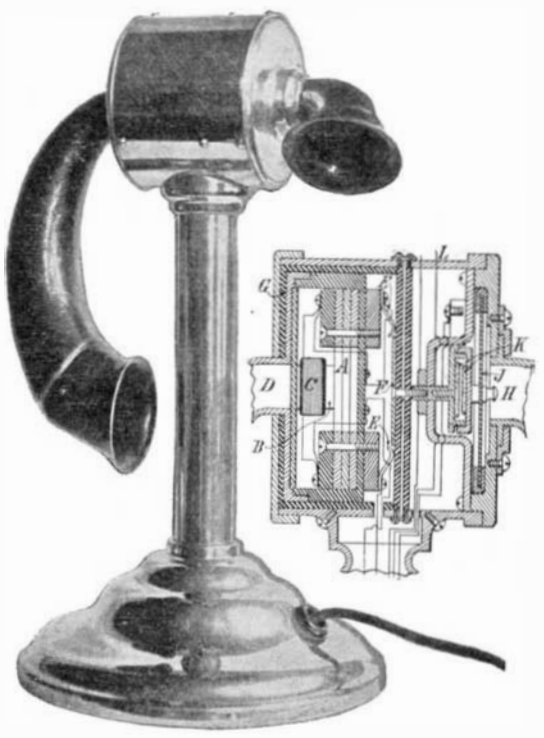


IMPROVED CUSHION SOLE FOR SHOES.

cipal faults of cushion soles as heretofore made, namely, the wrinkling or puckering of the sock lining along the edges, or the forming of troublesome seams. At the same time all the valuable features of a cushion sole shoe are preserved. Dampness does not penetrate the sole, and the foot is kept perfectly dry, thus preventing colds, pneumonia, and kindred sicknesses. The sole also yields to the various movements of the foot, giving a soft, comfortable tread, reducing friction, and thus effecting a saving of the stockings, as the surface on which the foot rests is perfectly smooth, owing to the very ingenious process by which the cushion sole is made. The improved sole comprises a sock lining, consisting of an upper layer of duck and a lower layer of leather cut to the shape of a shoe sole and sewed along their edges. The duck layer is slit along the center line and the sock lining turned inside out so that the leather layer, *D*, is uppermost and the duck layer, *E*, laps under with the seams turned inside. A cushion sole, *C*, and an insole, *B*, with the usual lipped or channeled edge, are slipped in between the layers *D* and *E*, as shown in the cross-section view. The welt and the upper are now sewed to the insole through the layer *E*, thus securing the sock lining to the shoe. The lining, *E*, is raised to allow the stitches to be located in the channel at the insole. The channel flap is then trimmed in the usual way, cutting off the surplus portion of the lining, *E*, after which the outsole, *A*, is secured to the welt. The Cummings Company, of Worcester and Boston, Mass., owns the patent on the process of making the sole.

AN IMPROVED FORM OF TELEPHONE INSTRUMENT.

A great fault of the telephone as commonly constructed is the fact that one must hold the receiver to the ear with the hand, thus interfering with one's freedom and hampering the taking of notes, jotting down memoranda, etc. Furthermore, if the conversation is long, or if there is any material delay in making connections, as in long-distance communication, it becomes very tiresome to hold the receiver to the ear. In the accompanying engraving we illustrate a telephone instrument of improved construction, which aims to overcome these objectionable features. Both the transmitter and the receiver are combined in a single instrument, the receiver being provided with a horn that can be brought to operative position against the ear, in which position it will remain without being held by the hand. The act of raising the horn connects the instrument with the line circuit. Our engraving shows a section through the upper part or head of the instrument. At *A* is a permanent composite magnet which carries a core *B*. On the latter is the coil *C*, which operates the receiving diaphragm. The receiving horn is secured to a shell in which the magnet is incased. A pair of contact fingers *E* are carried by the shell. When the horn is swung up to the receiving position the shell is turned, bringing the fingers into contact with the plate *F*, and thereby completing the electrical circuit of the coil *C*. To prevent vibration of any sort from affecting the receiver, the entire shell which carries the magnet and diaphragm is inclosed in a casing of soft rubber *G*. This is particularly important in long-distance instruments, which are very delicately adjusted and are affected by the slightest vibrations. The mouthpiece of the transmitter is shown at *H*, with the diaphragm at *J*, and the carbon microphone at *K*. The wires *L* lead to the ringer, which is not shown here, but may be attached directly to the instrument, if desired. The mouthpiece *H* may be turned to any angle to suit the convenience of the user. The principal advantage of the instrument will be found in the fact that it is not necessary to apply the ear directly to the receiving horn; for the latter, owing to its form, concentrates the sound waves, projecting them in a single direction. In calling up a number one need merely remain in the vicinity of the horn, and after the connection has been made he may carry on a conversation over the telephone without holding his head at any set position, and with his hands perfectly free to handle papers or take down notes. If the conversation is private, he may apply his ear directly to the horn. The outer end of the horn, it may be observed, is formed with a swiveled section, which will adjust itself closely against the ear. Owing to the use of a horn, that muffling of the sounds which results when a receiver of the ordinary type is held tightly against the ear, is avoided. Mr. S. P. Levenberg, 4388 Park Avenue, New York city, is the inventor of this improved instrument.



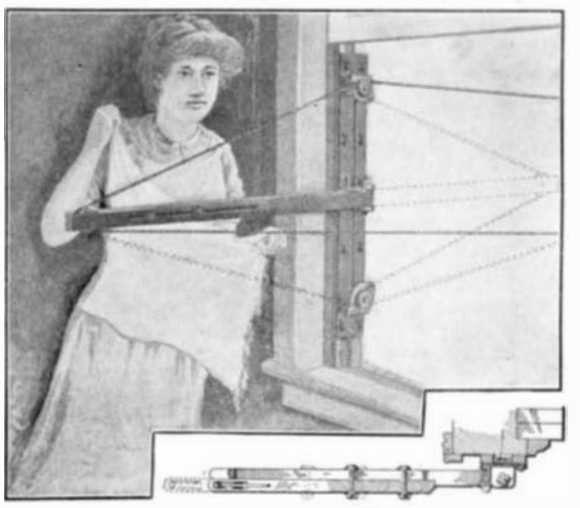
AN IMPROVED TELEPHONE INSTRUMENT.

Brief Notes Concerning Patents.

The invention of a means for preventing the habit of snoring appears ingeniously handled in a recent device which consists of a flexible plate or mouthpiece adapted to be held between the lips and in contact with the teeth and gums when sleeping. The plate is provided with a check-valve adjusted to regulate the amount of air admitted to or expelled from the lungs through the mouth. The mouthpiece is elliptical and conformable to the shape of the mouth, and is formed of rubber, canvas or cloth. The plate is furnished with a flap-valve, which normally closes an opening formed therein, the valve being adapted to prevent ingress of air into the lungs through the mouth and to permit a small quantity to be expelled through the opening in the act of exhaling. By the valve opening outwardly air is compelled to enter through the nose passages, thereby preventing vibration of the uvula. If for any cause nose breathing is too difficult, the plate may be reversed, thereby admitting air, but an amount insufficient to cause vibration. The device if successful in obviating harsh nasal sounds, will be credited also with keeping the mouth from becoming dry and parched, cleansing the nasal passages and maintaining proper purification of air and its correct temperature. Mouth breathing entails a loss of forty per cent of that warmth so highly essential to the lungs.

CLOTHES-LINE SUPPORT.

An improved clothes-line support has just been invented which is so arranged as to permit a person to hang clothes without having to reach out of the window. The device, which is conveniently attached to the window frame, is swung into the room while the clothes are being hung on or removed from the line, after which the support may be swung out of the window, permitting the latter to be closed. The invention comprises a bracket formed with bayonet slots, which engage screws in the window frame. It can thus be readily removed or applied, as desired. Pivoted on this bracket, at the center, is an arm which swings horizontally. The arm is preferably formed of two pieces, which are adjustably secured so that the device may be extended, as desired. A pulley is mounted at the outer end of the arm, and the clothes-line passes over this pulley, and extends out to another pulley on a post or other suitable support arranged in the yard. The clothes-line also passes over two pulleys journaled on plates, which are hinged to the main bracket. A rod carried by the swinging arm bears against these plates, and serves to turn them on their hinges when the arm is moved into or out of the room. In use the arm is first swung into the room, and the lower run of the clothes-line is removed from the lower pulley, as shown in the drawing. The clothes are then strung on the line, and when the line is filled, the lower run is again slipped under its pulley. The

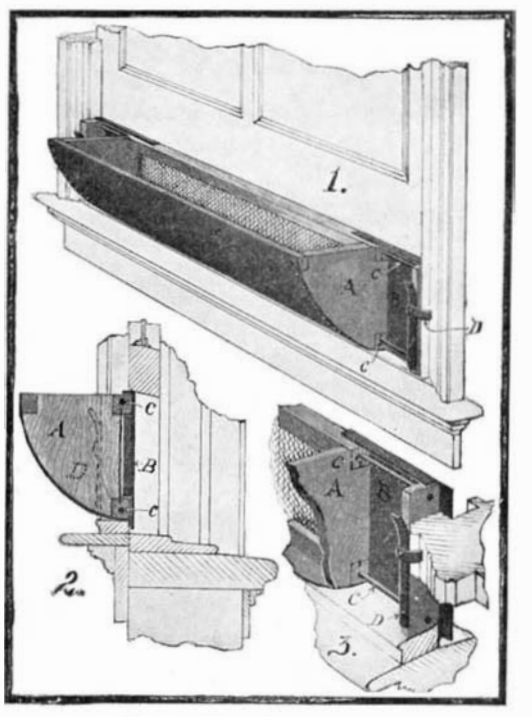


CLOTHES-LINE SUPPORT.

arm is now swung out of the window to the dotted position illustrated. By having the pulleys arranged in triangular position, with the arm pivoted in the base of the triangle, it is evident that when the arm is swung outward, very little, if any, slack occurs in the clothes-line. The rod carried by the arm, by acting against the hinged plates, causes the upper and lower pulleys to follow the pull of the clothes-line, so that the latter is prevented from slipping off. Mr. P. J. Sloan, of 19 West 10th Street, Bayonne, N. J., is the inventor of this improved clothes-line support.

ADJUSTABLE WINDOW VENTILATOR.

Pictured in the accompanying engraving is an improved window ventilator, which can be adjusted to window casings of different widths. The ventilator is a box-like structure, designed to project into a room from underneath the lower window sash. The frame of the ventilator consists of two end boards, as shown at *A*, and three rails which connect these boards at the corners. A strip of sheet metal nailed to the frame forms a curved front wall. The rear side of the frame is covered with a wire screen, and the upper side is left open. Drain holes are drilled in the lower rail to permit escape of any water that may enter the ventilator. The ventilator is made adjustable to the window by means of a slide *B* at each end. The slide consists of a plate of sheet metal provided with a wooden head piece which carries the pins *C*. The latter slide in holes drilled in the ends of the upper and lower rails. A spring clip *D* is fastened to the edge of the head piece, and is designed to hook over the inner edge of the jamb, as best shown in Figs. 1 and 3. The operation of inserting the ventilator in the window opening is quite clear. The sliding members are drawn out to the proper distance, and the ventilator inserted against the sash, with the clips engaging the jambs. Then the sash is drawn down until it meets the upper rail of the ventilator. This improved ventilator should be found valuable in all public places, such as schools, halls, offices, and the like, and also in private residences. A patent on this invention has been granted to Mr. John L. Meeks, 367 Tompkins Avenue, Brooklyn, New York.



ADJUSTABLE WINDOW VENTILATOR.