

A PORTABLE WINDMILL.

Instead of using animal power in driving the various machines which are used on a farm, a western inventor, Mr. Amos Wallace, has conceived the idea of making the wind do his farm work for him. Stationary windmills are common enough, but a portable windmill is surely a novelty that merits more than passing notice. And a portable windmill it is that Mr. Wallace uses. The illustration of the windmill which we publish is so clear in its mechanical details that a lengthy description is hardly necessary. The contrivance is mounted on a low four-wheeled wagon which can be readily hauled to and from the field. On this wagon a stout framework is erected at each end. The upright frameworks are provided with bearings to receive the shafts of windwheels. It will be observed that the frameworks are stiffened and securely supported by a system of braces.

Each windwheel shaft carries a sprocket, connected by a chain with a small sprocket, journaled in a standard, which is carried in the center of the wagon. The central sprocket-shaft is fitted with a pulley which receives a driving belt. Obviously the belt can be slipped over the pulley of any farm machine which is intended to be driven.

The China Service of the White House.

Messrs. Josiah Wedgwood & Sons, the famous English pottery manufacturers of Etruria, Stoke-on-Trent, have been engaged to make the new service china to be used on state occasions at the White House. The design has been copyrighted, thus insuring its exclusive use at the President's residence. It is a simple gold Colonial pattern, with the great seal of the United States enameled in colors as the decorative feature. The set will consist of 1,296 pieces, and will be delivered in Washington next January. The ware for this china set will be composed of the best possible china body, and the decorations to be applied will be in the highest style of the art.

RUHMER'S OPTIC TELEPHONE.

Dispatches have been published in the daily press, which state that Ernst Ruhmer, who is not unknown to readers of the SCIENTIFIC AMERICAN, has successfully tested a wireless telephone apparatus of his own invention. A description of the apparatus used will probably not be without interest.

Instead of using the speaking or whistling arc light, Mr. Ruhmer employs a small acetylene flame, thereby avoiding a multiplicity of electrical circuits. The gas is produced in a small generator not unlike that of a bicycle lamp, and is led to the burner. If the diaphragm or membrane of the transmitter be spoken against, the acetylene flame flickers in accordance with the sound waves impelled against the diaphragm. Light impulses of corresponding fluctuating intensity are sent forth into space directly, and also indirectly by means of a small reflector, and encounter a sensitive selenium cell mounted in the rear wall of the instrument frame. If the selenium cell be connected with a source of electricity such as a primary or secondary battery and with two telephones, every word spoken into the transmitter can be distinctly heard in the telephone receiver. In order that the direct sound waves may not give rise to any disturbing sounds the optic telephones are in most instances placed in another room, or some distance away.

That the transmission of the sound waves is effected only through light oscillations can be easily enough proved by inserting between the acetylene flame and the selenium cell, an opaque body, such, for example, as a piece of pasteboard; it will be found that the transmission of the sounds is completely interrupted.

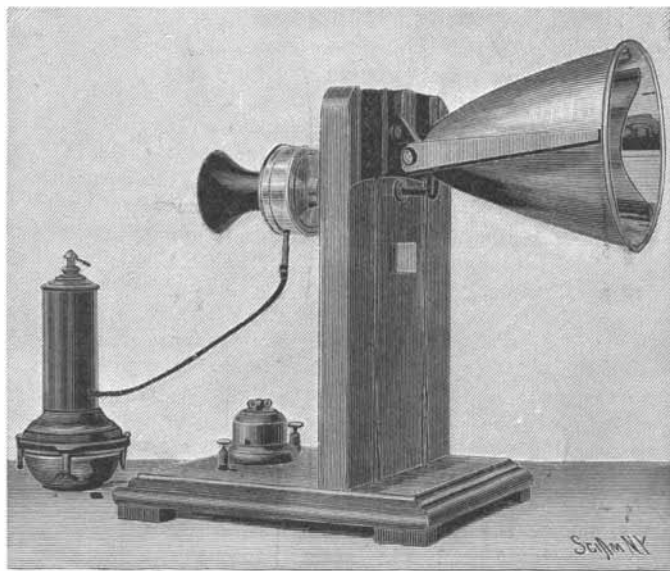
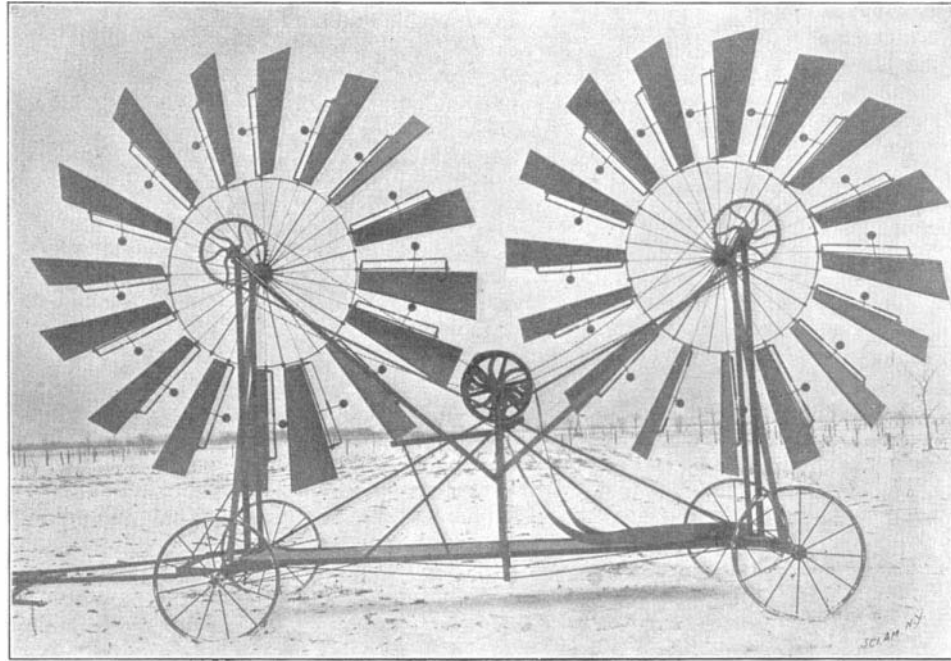


Fig. 2.—RUHMER'S LONG DISTANCE TRANSMITTER.

In carrying on experiments at fairly long distances, the selenium cell is detached from its mounting, and in its place a parabolic mirror (Fig. 2) is inserted, which serves the purpose of causing the pencils of light sent forth by the flickering flame to be emitted parallel to one another. It is a well-known optical principle that parallel light waves thus transmitted, travel great distances.

At the receiving station (Fig. 3) the light is col-



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lected by a condensing lens and concentrated upon a sensitive selenium cell, which is connected exactly in the manner before described, with a battery and two telephones. There is no particular reason why two telephones should be used—it is simply a German practice. Every public telephone station is fitted with two receivers in Germany.

Hamburg's Sea Traffic.

After many years of steady effort the German flag has at last won first place in Hamburg's sea traffic, overtopping the British flag, which for many years had held first place. In 1899 the German tonnage exceeded that of foreigners, and in the same year the Hamburg flag elbowed the British flag out of the first place and

forced it to take second rank in the shipping trade of the port. The statistics for 1901 show that the German flag with 4,500,000 register tons put all the other flags combined in the shade, and the flag of Hamburg with 3,600,000 tons maintained its superiority over the British flag, which was credited with 2,900,000 tons. The Hamburg and British vessels trading with the port monopolize between them such a large proportion of Hamburg's trade that they overtop the tonnage of Norway, which takes the third rank, twelve-fold and ten-fold respectively. The Norwegian tonnage last year was 296,000, the Danish 137,000, and the Dutch 116,000 register tons, and the share taken by the other countries—such as Sweden, Spain, France, Russia, etc.—was in every case under 100,000 tons, whereas the coal-laden ships alone from Great Britain totaled up to 774,763 register tons. Non-European and exotic flags are rare phenomena in Hamburg Harbor. Last year only four North American ships, with 5,984 tons, and two Argentine, with 3,180 tons, made their appearance there, and no Chilean or Brazilian vessels arrived there at all.

The network of regular lines spreading out from Hamburg over all the seas to every country on the globe shows the colors of the different maritime nations in about the same proportion and sequence. Connected with Hamburg are seventy-four regular lines under the German flag, thirty-seven under the British, eight under the Norwegian, six under the Danish, three under the Dutch, three under the Russian, two under the Swedish, two under the Spanish, one under the Belgian, one under the French, and one under the United States flag. Of the German lines, thirteen run between Hamburg and Great Britain and thirty-one to ports outside Europe. Hamburg ship owners maintain fifty-six lines between them, ten of which run exclusively between that port and Great Britain. Of the thirty-seven British lines using Hamburg Harbor, six run beyond European waters to America and Africa; and for voyages beyond Europe the boats of two lines partially under the Norwegian flag and one under the American flag also call at Hamburg. No less than 7,114 voyages from Hamburg (3,882 being under the German flag) were prosecuted last year by vessels of the regular lines, of which 969 extended beyond European waters.

Sham Battles With French Submarines.

Some interesting experiments similar to those which would be experienced in actual warfare have been carried out by the French submarine boats, "Gustave Zédé" and "Gymnote" in the naval sham fight off Hyeres in which the efficiency and utility of this fighting arm were strikingly shown. The two vessels were dispatched from Toulon to assist the French Squadron blockaded by the enemy in Hyeres roadstead. The submarines traveled the whole distance below the surface and on reaching the scene of the maneuvers the "Gustave Zédé" was ordered by Admiral Gervais to torpedo the battleship "Bouvet," which feat was accomplished. In the meantime the "Gymnote" having recharged her electric batteries with the help of Admiral Trehouart, advanced in spite of the enemy's torpedo boats, and torpedoed the battleship "Jau-reguiberry" and the cruiser "Admiral Charner." The "Gymnote" achieved this feat with only the top of her sighting tube about a foot above the water.

The crews of the two large vessels were unaware of the submarine's presence until the missiles struck home. The engine room staffs who had to work upon the submarines in a temperature never less than 100 deg. F. and often 104 deg. fulfilled all requirements; not the slightest breakdown occurred, and the men experienced no fatigue.

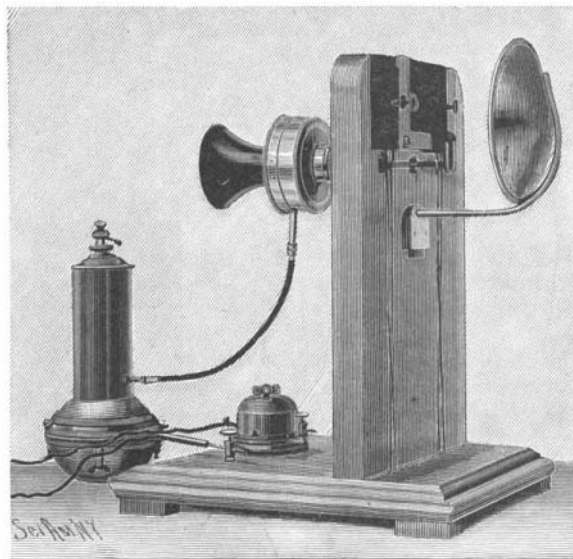


Fig. 1.—REFLECTOR TRANSMITTER OF RUHMER'S APPARATUS.

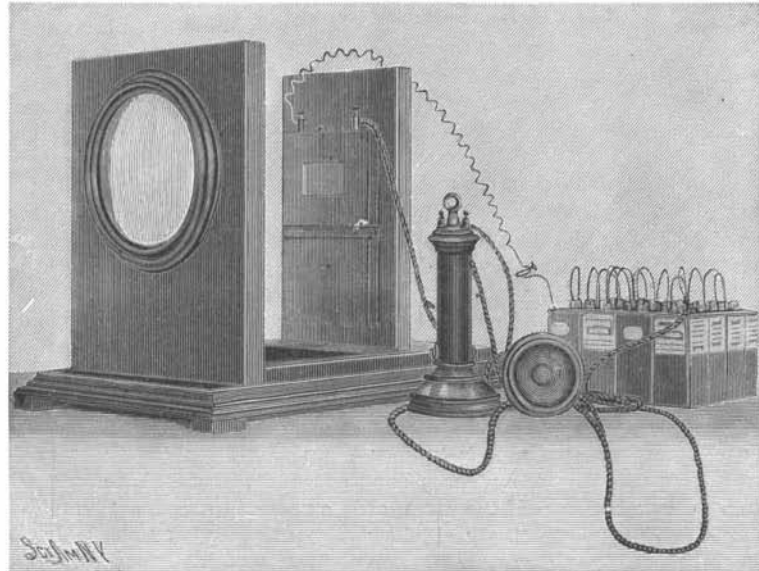


Fig. 3.—THE RECEIVER.