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BROADCASTS

Radio News of the Week

(Editors: In this news report, Science Service is able to give you an illustrated radio feature. It will interest all who want to snatch music and speech from the ether. It will enable many to become radio fans who could not enjoy radio without these reliable and tested instructions, prepared by the radio laboratory of the Bureau of Standards, with the cooperation of the Bureau of Markets of the Department of Agriculture.

This story is particularly timely now because the great interest in radio has created a heavy demand for radio sets, and many electrical factories are months behind in their orders. This is the first of a series to be included in the bulletin. Later articles will tell how to improve this basic receiving set.)

HOW TO MAKE AT HOME AN EFFICIENT, SIMPLE RADIO RECEIVING SET FOR $6.00

(By Science Service)

Washington, March 00.- For $6.00 you can construct your own radio receiving set that will enable you to listen to both radio code messages and to music and voice broadcasting that fill the ether practically every night.

The radio experts of the Bureau of Standards of the Department of Commerce have prepared detailed instructions for making an amateur receiving station that will hear the messages sent from medium-power transmitting stations within an area about the size of a large city, or to hear high-power stations within fifty miles, provided those stations use wavelengths between 600 and 200 meters, that is, wave frequencies between 500 and 1500 kilocycles per second.

They say that the cost of the apparatus can be kept down to $6.00, or if a specially efficient outfit is desired, the cost may be about $15.00.

By following carefully these instructions and diagrams that Science Service is able to furnish, the boy, business man, farmer, and others who have been attracted by wireless will be able to construct an entire apparatus that will receive the market and weather reports sent out by the Bureau of Markets of the Department of Agriculture, the music and entertainment that fills the ether and the dots and dashes of code wireless.

Parts of Receiving Station

There are five essential parts: the antenna, lightning switch, ground connections, receiving set, and phone. The received signals come into the receiving set through the antenna and ground connection. In the receiving set they are converted into an electric current which produces the sound in the "phone". The phone is either one or a pair of telephone receivers worn on the head of the listener.

The purpose of the lightning switch is to protect the receiving set from damage by lightning. It is used to connect the antenna directly to ground when the receiving station is not being used. When the antenna and the connection to the ground are properly made and the lightning switch is closed, an antenna acts as a lightning rod and is a protection rather than a source of danger to the building.

The principal part of the station is the "receiving set". In the set described herein it is subdivided into two parts, the "tuner" and the "detector", and in more complicated sets still other elements are added.

Antenna and Ground

The antenna is simply a wire suspended between two elevated points. Wherever there are two buildings, or a house and a tree, or two trees with one of them very close to the house, it relieves one of the need of erecting one or both antenna supports. The antenna should not be less than thirty feet above the ground and its length should be about 75 feet. See Fig. 1. While this illustration indicates a horizontal antenna, it is not important that it be strictly horizontal. It is in fact desirable to have the far end as high as possible. The "lead-in" wire or drop-wire from the antenna itself should run as directly as possible to the lightning switch. If the position of the adjoining buildings or trees is such that the distance between them is greater than about 85 feet, the antenna can still be held to a 75 foot distance between the insulators by increasing the length of the piece of rope, D, to which the far end of the antenna is attached. The rope, H, tieing the antenna insulator to the house should not be lengthened to overcome this difficulty, because by so doing the antenna "lead-in" or drop-wire, J, would be lengthened.

Antenna Parts

A and I are screw eyes sufficiently strong to anchor the antenna at the ends.

B and H are pieces of rope 3/8 or 1/2 inch in diameter, just long enough to allow the antenna to swing clear of the two supports.

D is a piece of 3/8 or 1/2 inch rope sufficiently long to make the distance between E and G about 75 feet.

C is a single-block pulley which may be used if readily available.

E and G are two insulators which may be constructed of any dry hard wood of sufficient strength to withstand the strain of the antenna; blocks about 1½ x 2 x 10 inches will serve. The holes should be drilled as shown in Fig. 1 sufficiently far from the ends to give proper strength. If wood is used the insulators should be boiled in paraffin for about one hour. If porcelain wiring cleats are available they may be substituted instead of the wood insulators. If any unglazed porcelain is used as insulators, it should be boiled in paraffin the same as the wood. Regular antenna insulators are advertised on the market, but the two improvised types just mentioned will be satisfactory for an amateur receiving antenna.

F is the antenna about 75 feet between the insulators E and G. The wire may be No. 14 or 16 copper wire either bare or insulated. The end of the antenna farthest from the receiving set may be secured to the insulator, E, by any satisfactory method, being careful not to kink the wire. Draw the other end of the antenna wire through the other insulator, G, to a point where the two insulators are separated by about 75 feet, twist the insulator, G, so as to form an anchor as shown in Figure 1. The remainder of the antenna wire, J, which now constitutes the "lead-in" or drop-wire should be just long enough to reach the lightning switch.

K is the lightning switch. For the purpose of a small antenna this switch may be the ordinary porcelain-base, 30 ampere, single-pole double-throw battery switch. These switches,as ordinarily available, have a porcelain base about 1 by 4 inches. The "lead-in" wire, J, is attached to this switch at the middle point. The switch blade should always be thrown to the lower clip when the receiving set is not actually being used and to the upper clip when it is desired to receive signals.

L is the ground wire for the lightning switch; it may be a piece of the same size wire as used in the antenna, of sufficient length to reach from the lower clip of the lightning switch, K, to the clamp on the ground rod, M.

M is a piece of iron pipe or rod driven 3 to 6 feet into the ground, preferably where the ground is moist, and extending a sufficient distance above the ground in order that the ground clamp may be fastened to it. Scrape the rust or paint from the pipe before driving in the ground.

N is a wire leading from the upper clip of the lightning switch through the porcelain tube, O, to the receiving set binding post marked "antenna".

O is a porcelain tube of sufficient length to reach through the window casing or wall. This tube should be mounted in the casing or wall so that it slopes down toward the outside of the building. This is done to keep the rain from following the tube through the wall to the interior.

RECEIVING SET PARTS

P is the receiving set which is described in detail below.

N is the wire leading from the "antenna" binding post of the receiving set through the porcelain tube to the upper clip of the lightning switch. This wire, as well as the wire shown by Q, should be insulated and preferably flexible. A piece of ordinary lamp cord might be unbraided and serve for these two leads.

Q is a piece of flexible wire leading from the receiving set binding post marked "ground" to a water pipe, heating system or some other metallic conductor to ground, except M, Fig. 1. If there are no water pipes nor radiators in the room in which the receiving set is located, the wire should be run out of doors and connected to a special "ground" below the window, which shall not be the same as the "ground" for the lightning switch. It is essential that for the best operation of the receiving set this "ground" be of the very best type. If the soil near the house is dry it is necessary to drive one or more pipes or rods sufficiently deep to encounter moist earth and connect the ground wire to the pipes or rods. This distance will ordinarily not exceed 6 feet. Where clay soil is encountered this distance may be reduced to 3 feet, while in sandy soil it may be increased to 10 feet. If some other metallic conductor, such as the casing of a drilled well, is not far away from the window, it will be a satsifactory "ground".

Tuner, Detector, and Phone.

The detector and phone will have to be purchased. The tuner and certain accessories can be made at home.

The tuner, R, shown in Fig. 3, is a piece of cardboard or other non-metallic tubing with turns of copper wire wound around it. The cardboard tubing may be an oatmeal box. Its construction is described in detail below.

The crystal detector, S, in Fig. 3 may be of very simple design and quite satisfactory. The crystal, as it is ordinarily purchased, may be unmounted or mounted in a little block of metal. For mechanical reasons the mounted type may be more satisfactory, but that is of no great consequence. It is very important,

however, that a very good tested crystal be used. It is probable also that a galena crystal will be more satisfactory to the beginner. The crystal detector may be made up of a tested crystal, three wood screws, short piece of copper wire, a nail, set-screw type of binding post, and a wood knob or cork. The tested crystal is held in position on the wood base by three brass wood-screws as shown at 1 in Fig. 3. A bare copper wire may be wrapped tightly around the three brass screws for contact. The assembling of the rest of the crystal detector is clearly shown in Fig. 3.

For the phone, T, in Fig. 3 it is desirable to use a pair of telephone receivers connected by a head band, usually called a double telephone headset. The telephone receivers may be any of the standard commercial makes having a resistance of between 2000 and 3000 ohms. The double telephone receivers will cost more than all the other parts of the station combined but it is desirable to get them, especially if one plans to improve his receiving set later. If one does not care to invest in a set of double telephone receivers a single telephone receiver with a head band may be used, although it gives results somewhat less satisfactory.

The binding posts, switch arms and switch contacts may all be purchased from dealers who handle such goods or they may be quite readily improvised at home. There is nothing peculiar about the pieces of wood on which the equipment is mounted. They may be obtained from a dry packing-box and covered with paraffin to keep out moisture.

Details of Construction

The following is a detailed description of the method of winding the coil, construction of the wood panels, and mounting and wiring the apparatus.

Constructing the Tuner

See the tuner, R, Fig. 3. Having supplied oneself with a piece of cardboard tubing 4 inches in diameter and about ½ pound of No. 24, or No. 26, double cotton covered copper wire, one is ready to start the winding of the tuner. Punch two holes in the tube about ½ inch from one end as shown at 2 on Fig. 3. Weave the wire through these holes in such a way that the end of the wire will be quite firmly anchored, leaving about 12 inches of the wire free for connections. Start with the remainder of the wire to wrap the several turns in a single layer about the tube, tightly and closely together. After 10 complete turns have been wound on the tube hold those turns snugly while a tap is being taken off. This tap is made by making a 6 inch loop of the wire and twisting it together at such a place that it will be slightly staggered from the first tap. This method of taking off taps is shown quite clearly at U, Fig. 3. Proceed in this manner until 6 twisted taps have been taken off at every 10 turns. After these first 70 turns have been wound on the tube then take off a 6 inch twisted tap for every succeeding single turn until 10 additional turns have been wound on the tube. After winding the last turn of wire anchor the end by weaving it through two holes punched in the tube much as was done at the start, leaving about 12 inches of wire free for connecting. It is to be understood that each of the 18 taps is slightly staggered from the one just above, so that the several taps will not be bunched along one line on the cardboard tube. See Fig. 3. It would be advisable, after winding the tuner as just described, to dip the tuner in hot paraffin. This will help to exclude moisture.

Making Panel and Base

Having completed the tuner to this point, set it aside and construct the upright panel shown in Fig. 2. This panel may be a piece of wood approximately 1/2 inch thick. The position of the several holes for the binding post, switch arms and switch contacts may first be laid out and drilled. The "antenna" and "ground" binding posts may be ordinary 1/8 inch brass bolts of sufficient length and supplied with three nuts and two washers. The first nut binds the bolt to the panel, the second nut holds one of the short pieces of stiff wire, while the third nut holds the antenna or ground wire as the case may be. The switch arm with knob shown at V, Fig. 3, may be purchased in the assembled form or it may be constructed from a thin slice cut from a broom handle and a bolt of sufficient length equipped with four nuts and two washers together with a narrow strip of thin brass somewhat as shown. The switch contacts, W, Fig. 3, may be of the regular type furnished for this purpose or they may be brass bolts equipped with one nut and one washer each or they may even be nails driven through the panel with an individual tap fastened under the head or soldered to the projection of the nail through the panel. The switch contacts should be just close enough that the switch arm will not drop be-

tween the contacts but also far enough apart that the switch arm can be set so as to touch only one contact at a time.

The telephone binding post should preferably be of the set screw type as shown at X, Fig. 3.

Instructions for Wiring

Having constructed the several parts just mentioned and mounted them on the wood base, one is ready to connect the several taps to the switch contacts and attach the other necessary wires. Scrape the cotton insulation from the loop ends of the sixteen twisted taps as well as from the ends of the two single wire taps coming from the first and last turns. Fasten the bare ends of these wires to the proper switch contacts* by binding them between the washer and the nut as shown at 3, Fig 3. A wire is run from the back of the binding post marked "ground", Fig.3, to the back of the left-hand switch-arm bolt, Y, thence to underneath the left-hand binding post marked "phones". A wire is then run from underneath the right-hand binding post marked "phones" to underneath the binding post, 4, Fig. 3, which forms a part of the crystal detector. A piece of No. 24 bare copper wire about 2½ inches long, one end of which is twisted tightly around the nail, the nail passing through binding post 4, the other end of which rests gently by its own weight on the crystal 1. The bare copper wire which was wrapped tightly around the three brass wood-screws holding the crystal in place is lead to and fastened at the rest of the right-hand switch arm bolt, V, thence to the upper left-hand binding post marked "antenna". As much as possible of this wiring is shown in Fig. 3.

Directions for Operating

After all the parts of this crystal-detector radio receiving set have been constructed and assembled the first essential operation is to adjust the little piece of wire, which rests lightly on the crystal, to a sensitive point. This may be accomplished in several different ways; the use of a miniature buzzer transmitter is very satisfactory. Assuming that the most sensitive point on the crystal has been found by method described in paragraph below, "The Test Buzzer", the rest of the operation is to get the radio receiving set in resonance or in tune with the station from which one wishes to hear messages. The tuning of the receiving set is attained by adjusting the inductance of the tuner. That is, one or both of the switch arms are rotated until the proper number of turns of wire of the tuner are made a part of the metallic circuit between the antenna and ground, so that together with the capacity of the antenna the receiving circuit is in resonance with the particular transmitting station. It will be remembered that there are 10 turns of wire between each of the first 8 switch contacts and only 1 turn of wire between each 2 of the other contacts. The tuning of the receiving set is best accomplished by setting the right-hand switch arm on contact 1 and rotating the left-hand switch arm over all its contacts. If the desired signals are not heard, move the right-hand switch arm to contact 2 and again rotate the left-hand switch arm throughout its range. Proceed in this manner until the desired signals are heard.

It will be advantageous for the one using this radio receiving equipment to find out the wave frequencies, wave length, used by the several radio transmitting stations in his immediate vicinity.

The Test Buzzer

As mentioned previously, it is easy to find the more sensitive spots on the crystal by using a test buzzer. The test buzzer is used as a miniature local transmitting set. When connected to the receiving set as shown at Z, Fig. 3, the current produced by the buzzer will be converted into sound by the telephone receivers and the crystal, the loudness of the sound depending on what part of the crystal is in contact with the fine wire. To find the most sensitive spot connect the test buzzer to the receiving set as directed, close the switch, 5, Fig. 3, and if necessary adjust the buzzer armature so that a clear note is emitted by the buzzer, set the right-hand switch arm on contact point No. 8, fasten the telephone receivers to the binding posts marked "phones", loose the set screw of the binding post slightly and change the position of the fine wire, 6, Fig. 3, to several positions of contact with the crystal until the loudest sound is heard in the phones, then tighten the binding post set screw, 4, slightly.

*INSERT AT STAR ABOVE THE FOLLOWING: as shown by the corresponding numbers in Fig. 3. One should be careful not to cut or break any of the looped taps. It would be preferable to fasten the connecting wires to the switch contacts--etc.

Approximate Cost of Parts

The following list shows the approximate cost of the parts used in the construction of this radio receiving station. The total cost will depend largely on the kind of apparatus purchased and on the number of parts constructed at home.

For antenna: 100 to 150 feet of copper wire, bare or insulated, No. 14, about 75 cents; 3/8 or 1/2 inch rope, 2 cents per foot; 2 porcelain insulators, 20 cents; 1 pulley, 15 cents; 30 ampere battery switch, 30 cents; 1 porcelain tube, 10 cents.

For ground connections: 1 clamp, 15 cents; 1 iron pipe or rod, 25 cents.

For receiving set: 1/2 pound #24 copper wire double cotton covered, 75 cents; 1 cardboard box; 2 switch knobs and blades complete, $1.00; 18 Switch contacts and nuts, 75 cents; 3 binding posts, set screw type, 45 cents; 2 binding posts, any type, 30 cents; 1 crystal, tested, 25 cents; 3 wood screws, brass,3/4 inch long, 3 cents; wood for panels, from packing box; 2 pounds paraffin, 30 cents; lamp cord, 2 to 3 cents per foot; test buzzer, 50 cents; dry battery, 30 cents; telephone receivers, $4.00 to $8.00; total, $11.00 to $15.00.

If nothing but the antenna wire, lightning switch, porcelain tube, crystal, telephone receiver, bolts and buzzer are purchased this total can be reduced to about $6.00.

RELAY MESSAGE FROM
GOVERNORS TO PRESIDENT

(By Science Service)

Hartford, Conn. March 00.- On the evening of March 6, 7 and 8, a radio message from the governor of each of the states will be started by radio to President Harding at Washington over the radio relay chains of amateur stations that are organized by American Radio Relay League.

The messages start on the following schedule, eastern standard time, P.M., on all three evenings: 10:00, Louisiana and Ohio; 10:05, Wisconsin and Florida; 10:10, Illinois and South Carolina; 10:15, Arkansas and West Virginia; 10:20, Missouri and Virginia; 10:25, Iowa and Kentucky; 10:30, Minnesota and Tennessee; 10:35, Texas and North Carolina; 10:40, Oklahoma and Indiana; 10:45, Kansas and Georgia; 10:50, Nebraska and Michigan; 10:55, South Dakota and Alabama; 11:00, North Dakota and Mississippi; 11:05, New Mexico and Maryland; 11:10, Colorado and Pennsylvania; 11:15, Wyoming and Delaware; 11:20, Montana and New Jersey; 11:25, Arizona and New York; 11:30, Utah and Connecticut; 11:35, Idaho and Rhode Island; 11:40, Nevada and Massachusetts; 11:45, Washington and Maine; 11:50, Oregon and New Hampshire; 11:55, California and Vermont.

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RADIO CONFERENCE CONSIDERS REVISION
OF RADIO LAWS 10 YEARS OLD

(By Science Service)

Washington, Feb.00- The radio conference now meeting in Washington (convenes Feb. 27) is engaged in the task of re-alloting the wavelengths of radio so that the advances made in wireless science and new uses of such communication during the last ten years can be accomodated. The international convention and the federal laws that now govern the traffic in the ether were drafted in 1912.

Representatives of various organizations and firms interested in the control and development of radio telephony have been asked to testify before the committee appointed by Secretary Hoover, and after hearing the various plans proposed, the committee will thrash out the matter and make recommendations for legislation.

One scheme which is favored by the amateurs of the country is the requiring that all commercial phone broadcasting be done on wavelengths between 800 and 1800 meters, leaving the lower wavelengths free for amateur and other use. This would necessitate removing the monopoly that the army and navy now have on the wavelengths between 600 and 1600 meters.

The conference committee is composed of: Dr. S. W. Stratton, Chairman, Director of Bureau of Standards, Department of Commerce; Major General George O. Squier, War Department; Capt. Samuel W. Bryant, U. S. N., Navy Department; J. C. Edgerton, Supt., Radio Service, Post-Office Department; W. A. Wheeler, Bureau of Markets and Crop Estimates, Department of Agriculture; Representative Wallace H. White, Jr. of Maine; R. B. Howell of Omaha, Nebr.; Dr. Alfred N. Goldsmith, Secretary, Institute of Radio Engineers, New York, N.Y.; Hiram Percy Maxim, President, American Radio Relay League, Hartford, Conn.; Prof. L. A. Hazeltine, Stevens Institute of Technology, Hoboken, N. J.; Prof. C. M. Jansky, Jr., University of Minnesota; Senator Frank B. Kellogg of Minnesota; Edwin H. Armstrong, Columbia University, New York, N. Y.

SECOND ASSAULT ON MOUNT EVEREST

London, March 00.- (Science Service) This year's Mount Everest expedition is already in movement. By the end of this month, all of the members of the expedition that will again attempt to conquer this 29,000 foot peak in the Himalayas, will have arrived at Darjeeling in India, and a start will be made in time to reach the base camp near Mount Everest early in May.

NEWS OF THE STARS

Sunspots and Magnetic Storms

By Isabel M. Lewis,
of U.S. Naval Observatory,
(Science Service)

A close connection has frequently been found to exist between the appearance of sunspots and magnetic storms on the earth. As a result the advent of an unusually large sunspot is likely to be taken as a forerunner of auroral displays and other forms of magnetic disturbances.

Though there is, undoubtedly, a direct connection between the two phenomena in some instances, there are other times when sunspots come and go without, apparently, the slightest effect on the earth's magnetism. At the present time there is an unusually large group of sunspots visible and no magnetic effects due to the presence of this group have been observed as yet, although the group has been visible long enough to make its presence felt.

The severe magnetic storms that attended the appearance of the great sunspot group of May, 1921, on the other hand, were the direct result of the unusual solar activity that accompanied the appearance of this group. The passage of this remarkable group over the sun's central meridian was attended, moreover, by a brilliant auroral display that was visible over the greater part of the northern hemisphere.

Why some sunspot groups are attended by magnetic storms on the earth while others are not is a question. If magnetic storms, earthcurrents, auroral displays and kindred phenomena are produced as a result of the penetration of the earth's atmosphere by a stream of electrified particles shot off from sunspot areas on the sun, then it is evident that the earth will not be affected unless it chances to come within range of this stream of electrons which rotates with the sunspot region as it is carried around by the sun's rotation on its axis. The earth would be unaffected by the presence of a large group of spots unless it chanced to be in a position to intercept the shaft of electrified particles emanating from the sunspot area.

Dr. L. A. Bauer, director of the Department of Terrestrial Magnetism of the Carnegie Institution of Washington, who has made an extensive study of sunspots in their relation to terrestrial magnetism and atmospheric electricity for over twenty years, finds a close connection between the amount of the variation in sunspottedness and magnetic phenomena for the earth. This agreement is noticeable from month to month as well as from year to year, and shows how directly dependent such terrestrial

phenomena are upon variations in the activity of the sun as indicated by the appearance and disappearance of sunspots.

Dr. Bauer has also found that the sunspot records covering a period of 172 years show that the earth is in turn exerting a slight electrical effect upon sunspots, that is, the earth is sending back to the sun, as well as into space, some of the electrified particles that it originally received from the sun. This earth-effect for sunspots varies with the time of year. It is greatest in the equinoctial months of March and September when magnetic disturbances and auroral displays are strongest and it is least in the solstitial months of December and July when these phenomena are least noticeable.

SCIENCE OF GROWING THINGS

Agricultural News of the Week.

HOGS FLOURISH ON CAT-TAIL DIET

(By Science Service)

Las Cruces, N. M., March 00.- Will hogs thrive on an exclusive diet of cat-tails?

Experience of a local farmer operating in the Rio Grande project of the United States Reclamation Service started a controversy that reached all the way to Secretary of the Interior, A. B. Fall, and brought in expert testimony from the Department of Agriculture before it was closed.

Hog raisers generally and hog raisers in particular whose ranches contain tule, typha, will be interested.

Last winter a Las Cruces farmer, finding himself short of desirable pasture, cast about for ways to carry his herd over the spring months. Cat-tails grew abundantly in swampy places on his farms and he tried the pigs on cat-tails. The pigs were immensely pleased with their new diet. So a patch of ten acres was fenced and sixty head of hogs were given the run of the swamp continuously for three months. The only additional feed they received was a small amount of corn every evening to bring them in so they could be counted. At the end of 90 days not a single cat-tail stalk showed above the surface of the pasture. All the pigs, young and old, were in good flesh. Not once during the entire time did any of the animals show any signs of indigestion or other ailments. They ate both the green flag or stem and also the root.

An old-timer living on the Shoshone reclamation project read all about this in

the official publication of the reclamation service and soon after saw Secretary Fall, to whom he spoke in incredulous terms about the pigs among the cat-tails.

Followed investigation. Result:

The cat-tail is a perennial with large underground root stalks or rhizomes, originating from a single plant, spreading in all directions for from 1 to 3 feet and then suddenly coming up to form other stalks. The center of the rhizome consists of a core of almost solid mass of starch. One acre would yield a total dry weight of 10,792 pounds of rhizomes.

Agronomists in the federal bureau of plant industry reported satisfactory gains by hogs pastured on swamp plants similar to the typha. Muskrats thrive on it. Some Indians use the plant for food. Coarse flour, made by running cat-tail rhizomes through a meat grinder and then sifting through an ordinary fine-mesh sieve, has approximately the same protein as is found in rice and corn flours. Substitutiong this for as high as 50 per cent in bread and corn-starch puddings will give a pleasing and palatable flavor.

Moreover, in the United States, exclusive of Alaska, there are 139,855 square miles of swamp land, of which thousands of acres are cat-tail marshes.

DODO, DEAD OVER 300 YEARS,
HAS HIS NAME CHANGED

(By Science Service)

Washington, March 00.- The famed dodo, extinct since 1681, must now be known by another name, Raphus. This pigeon that lived on the Island of Mauritius, east of the Island of Madagascar, off the coast of Africa, was not named until 79 years after the last of its race had disappeared.

In 1766, Linnaeus, the famous Swedish naturalist, gave it the name of Didus, which is Latin for Dodo. The bird has been known by this name ever since.

Recently, however, British ornithologists began to compile a Systema Avium of the world and a check list of the birds of Africa was sent Dr. T. S. Palmer, secretary of the American Ornithologists' Union, which is cooperating in the work.

The Dodó's change in name was noted in this list. The explanation is that in 1760, six years before Linnaeus' christening, Brisson, the French naturalist who later became a famous physicist, had named the pigeon, Raphus.

HOW SCIENCE SERVICE COVERED THE ROMA DISASTER

Science Service helped the New York Evening Post prepare a follow story on the Roma disaster. The Post received the flash and condensed story on the disaster through its telegraphic service Tuesday afternoon. In its files was the clipping of the Science Service story in Science News Bulletin No. 22, sent out in August, just after the wreck of the ZR-2. This story gave exclusive details of the Roma, which, because of the ZR-2 disaster, became the capital airship in America's forces, and compared the Roma and the ZR-2. This Science Service story was the backbone of the Post's story that appeared Tuesday on page one just below the wire news.

In this issue, we have below another prompt and exclusive story, timely because of the Roma wreck.

ZR-1 WILL BE
AMERICA'S NEXT AIRSHIP

(By Science Service)

Washington, Feb. 00.- With the destruction of the Italian-built semi-rigid, the Roma, the United States is left without lighter-than-air craft larger than non-rigid "blimps".

Within a month, however, the actual erection of the ZR-1, an American designed dirigible, will be begun in the large hangar at Lakehurst, N.J., and in a year it is expected that this ship will be ready to take the air. About a third of the structural members or frame of the ZR-1 have been fabricated, and a large percentage of the gas cells have been made.

The ZR-1 in name only is a sister ship to the ill-fated ZR-2, built in England. ZR is the designation given by the Navy to all dirigibles. The ZR-2, or R-38 as she was called by the English, was built according to a new design and was distinctly a British creation.

The Zr-1 is modeled after the L-49, the German Zeppelin, that came down in France during the war practically intact. This airship was closely studied by the French who sent our government the result of their observations. Lessons were also learned from the L-72, the latest German large rigid airship.

The ZR-1 will be 675 feet long and 78½ feet in diameter. It will contain gas cells that are about 33 feet long and will contain one large cell in the center of the ship that, taken alone, will contain about 200,000 cubic feet and be larger than the largest non-rigid airship now in this country. The gas volume of the ZR-1 will be 2,130,000 cubic feet. It will have six engines, and is designed to normally operate with one or two engines idle. A speed of 70 miles an hour under best conditions is expected.

The ZR-1 is, however, primarily a war craft, intended to operate at high altitudes, and in this respect it differs from the airship that will probably be built in Germany for the United States Government. It is hoped that this ship will be built on commercial lines for high speed at low elevations and designed after the latest German type.

TWO PAGES OF FILLERS OR A DAILY FEATURE

DO YOU KNOW THAT -

Current used in ringing telephones in the depths of mines is capable of igniting gas and bringing about disastrous explosions.

Gasoline sold during the last three years in winter has been markedly uniform in quality, but that sold in the summer has varied from year to year.

Eight or ten pinches of sodium fluoride powder dusted over the head and body of poultry is a good remedy for lice.

Kudzu is a rank growing perennial legume that has been known to yield four or five tons of excellent forage to the acre.

DO YOU KNOW THAT -

Experiments made in Birmingham, England support the claim that in heat value one ton of fuel oil is equal to two tons of coal.

Pismo clams, which grow on the southern coast of California, are nearly as easily killed by cold weather as some subtropical fruits and vegetables.

Ordinary temperatures in kitchen ovens vary from 290 degrees for meat pies to 340 degrees for puff pastry and bread.

Waves often carry great energy. Invisible vortex rings in the air can be sent across a room in such a way as to blow out a candle.

DO YOU KNOW THAT -

A snow that came after a draught in Kansas early this winter was called a $10,000,000 snow because it saved the hard winter wheat.

Vitamines have recently been found to stimulate the growth of certain molds. Other molds are either able to do without them or else are able to manufacture them for themselves.

Contrary to the condition in the United States, alcohol imported in Greece cannot be denatured only in case of official approval.

A process has recently been patented in Japan for the production of a fiber resembling artificial silk from China grass, or ramie.

DO YOU KNOW THAT -

It is believed that shellfish and fish are responsible for the bulk of London typhoid fever during the past twenty-five years.

Detroit's building records show that for the past five years there was a tendency for the single dwelling type, while prior to the war, the tendency was for the two-family and multiple dwelling.

The Bureau of Agricultural Defense of Uruguay has made the destruction of the large thistle obligatory under penalty of fines.

Twice the usual mileage could be obtained if a tellurium compound were added to the gasoline and motors were charged to higher compression.

DO YOU KNOW THAT -

Chlorophyll, the green coloring matter of plants, appears green by transmitted light but red by reflected light.

A new wild life preserve of one hundred acres of bog land has been established near McLean, N. Y. It will be maintained in its natural state for study by naturalists. No hunting will be allowed.

Recent research seemingly shows conclusively that endemic goiter is due to deficient supply of iodin in drinking water.

A new German chemical product will render wool moth proof, according to claims.

DO YOU KNOW THAT -

The "sand" which settles out of newly made maple sirup is an impure lime salt of malic acid. Malic acid, as is well known, is also found in apples.

The number of hours of fog along the Atlantic Coast is greater toward the north, and has amounted to as many as 1600 hours per year.

Corn oil and a hydrogenated oil, in addition to a cotton seed oil, can be successfully used for frying sardines.

In the vast majority of outbreaks of food infections, the food is not noticeably altered in either appearance, taste or smell.

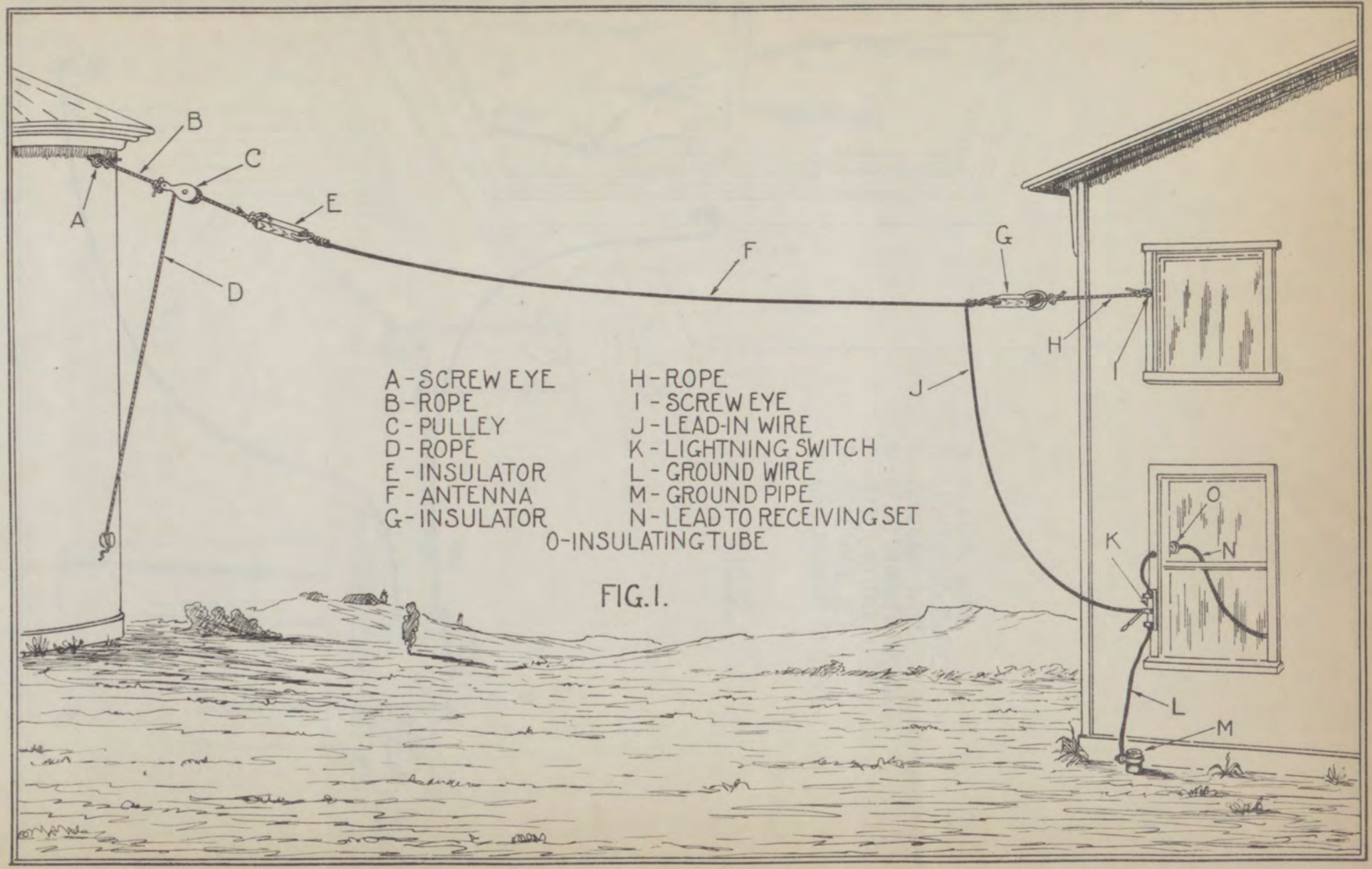

A - SCREW EYE
B - ROPE
C - PULLEY
D - ROPE
E - INSULATOR
F - ANTENNA
G - INSULATOR
H - ROPE
I - SCREW EYE
J - LEAD-IN WIRE
K - LIGHTNING SWITCH
L - GROUND WIRE
M - GROUND PIPE
N - LEAD TO RECEIVING SET
O - INSULATING TUBE

FIG. 1.

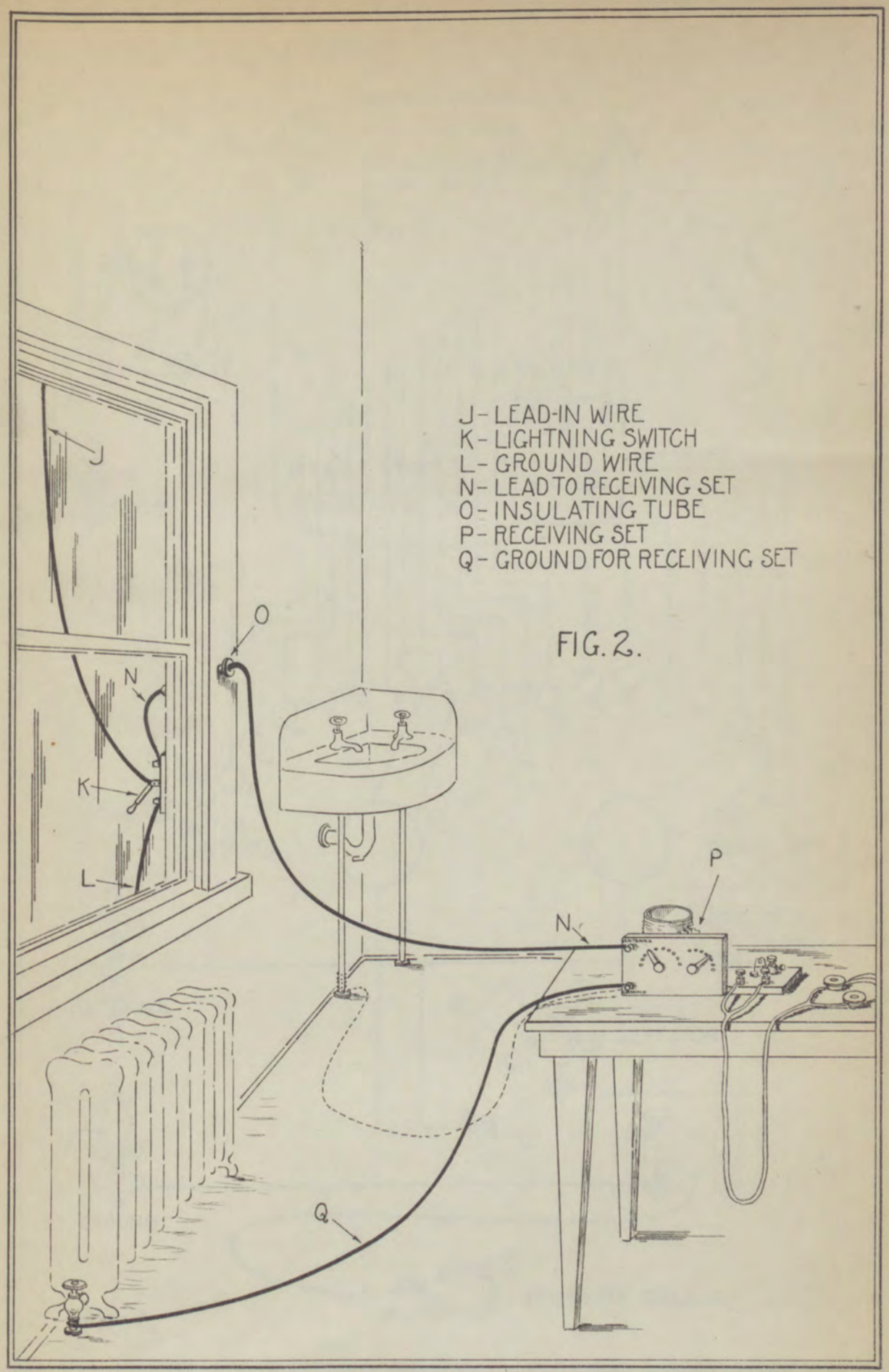
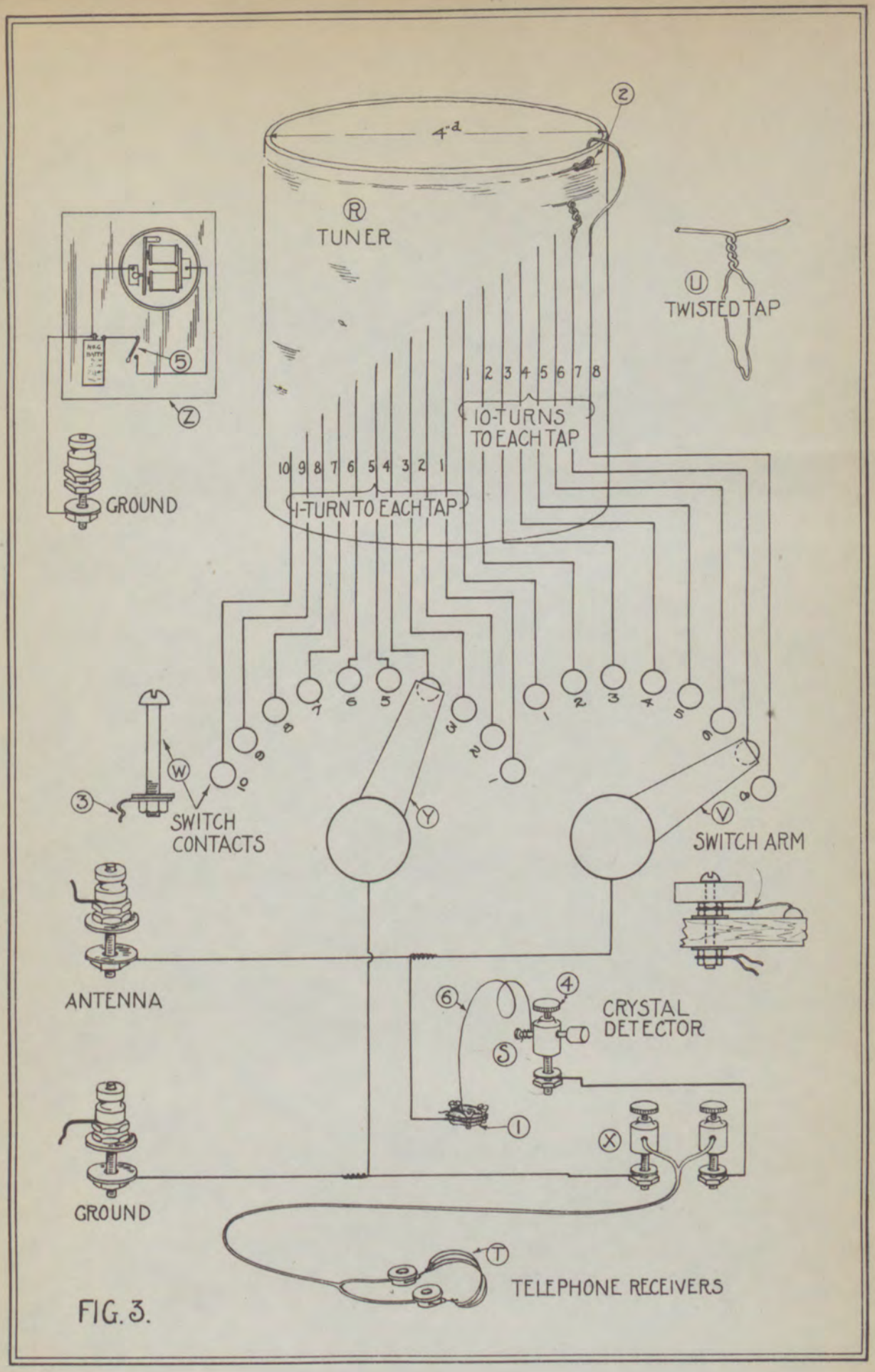

J - LEAD-IN WIRE
K - LIGHTNING SWITCH
L - GROUND WIRE
N - LEAD TO RECEIVING SET
O - INSULATING TUBE
P - RECEIVING SET
Q - GROUND FOR RECEIVING SET
J
O
N
K
L
P
N
Q

FIG. 2.


4"d
2
R
TUNER
U
TWISTED TAP
1 2 3 4 5 6 7 8
10-TURNS
TO EACH TAP
10 9 8 7 6 5 4 3 2 1
1-TURN TO EACH TAP
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Z
GROUND
W
3
SWITCH
CONTACTS
Y
V
SWITCH ARM
ANTENNA
6
4
S
CRYSTAL
DETECTOR
1
X
GROUND
T
TELEPHONE RECEIVERS

FIG. 3.