

PHONY TALK UNDER THE SEA

Prospects for Talking Over the Ocean Cables.

TALL CLAIMS OF INVENTOR

Notable Results of Eleven Years of Work and Experiment—Many Obstacles Are Overcome.

To talk by telephone from New York to London, St. Petersburg, Peking, Bombay, Melbourne, Cape Town, Valparaiso or any other city that can now be reached by cable telegraph, will be as easy within a few years as it is now to talk with Montreal, Chicago or Baltimore. Give me the use of a cable and I will attach an instrument to it that will enable you to do it today.

So says Dr. Giuseppe Musso, an electrical engineer and inventor, who has spent \$50,000 and eleven years of his life in perfecting the instrument that is to work this revolution. He is positive he can prove it. In his laboratory at 59 Maiden lane, New York, Dr. Musso has an "artificial cable," a gigantic instrument that represents exactly 2,000 miles of such cable as is used for transmitting messages under the ocean, and to this he attaches the instrument he has invented. You go into a telephone booth in a room and someone else goes into a similar booth in an adjoining room. The phones in these booths are connected by this "artificial cable" and you can talk with each other as freely as if you were telephoning from one part of St. Louis to another. The "artificial cable" has been carefully tested by the electrical testing laboratory and pronounced by its experts to be equivalent to 2,000 miles of cable.

Present Telephone Distance.

It is practical now to telephone about 1,000 miles, but this is over an open wire and not over a cable. Few persons who are not electricians know that there is a great difference between open wire and cable telephoning or telegraphing. The open wire circuits run overhead and are usually set on poles. Their wires are bare and are sustained on glass or porcelain insulators to prevent the electric current from leaking out and passing to the ground by way of the poles. The cable circuits are wires covered with insulating material and twisted together to form a rope, which is wrapped over again with insulating material for external protection. Cables are sometimes stretched overhead, but more generally are laid underground or under water. In the case of crossing the ocean it is, of course, impossible to use anything else but cable.

When an electric current is sent into them these wires that are assembled to form the cables behave very differently from the open wires. To understand this difference in behavior it is necessary to use two technical terms: Resistance and electrostatic capacity. If you want to know exactly what these mean look them up in an electrical handbook; there is no space to explain them here; suffice it to say that resistance is measured in ohms and electrostatic capacity in microfarads.

Now, every electrical circuit has both resistance and electrostatic capacity. If we could eliminate either one of these long distance telephony would now be ancient history. But they both are present simultaneously, combined and distributed along the whole line. We say that a certain telephone circuit has so many ohms resistance and so many microfarads capacity per mile. It is just here that the difficulty of telephoning to a long distance arises. For, although these forces are uniformly distributed over the wire forming a circuit, the difficulty increases not in numerical proportion to the length of the wire, but in geometrical proportion. For example, this difficulty may be four times as great in one wire as in one of half its length.

Imagine two telephone circuits exactly the same length, made of the same kind and size of wire, but one of them "open," the other enclosed in a cable laid underground; the resistance of one is exactly the same as that of the other, but the electrostatic capacity of the wire in the cable is much greater than that of the open wire, perhaps ten times as great. Yet the wires are exactly the same. To what, then, is the difference due? It is the insulating material around the cable wire that so greatly increases its electrostatic capacity. To give a general idea of the amount of this difference it may be said that the efficiency of a mile of standard cable wire circuit is equal to the efficiency of fourteen miles of standard open overhead wire line. It is this fact that makes 500 miles the limit within which it is possible to telephone satisfactorily over a cable, while with open wires it is easy to telephone up to 50 miles, and up to 1,500 miles with heavy wire and the addition of certain intensifying instruments.

Experiments with open wires have established the possibility of telephoning up to 2,000 miles, but it is still doubtful if a commercial service could be made profitable at such a distance, for it is necessary to use wire four times as heavy—wire weighing 50 pounds per loop mile, for example—and to add many "loading coils" to it; these latter being expensive to install and to maintain. Moreover, these experiments are possible only by the use of what electricians call a "phantom circuit," that is to say, a third circuit made out of two complete circuits. In other words, two lines (four wires) must be used to do the work of one line (two wires).

Thirty miles is the present limit of telephoning over a submarine cable, because under the sea it is not possible to use such a heavy wire or to add "loading coils" at frequent intervals. No wonder, then, that the engineers have almost given up trying to solve the problem of telephoning under the Atlantic, where 2,000 miles of cable must be used.

Dr. Musso, however, realizing that the limit of improving the line had been reached, determined to try to improve the current. He imagined the electrostatic capacity neutralized by a current specially prepared beforehand for this specific purpose, and he set about to find the means of treating the current to produce this effect. The result is the apparatus for which three patents have been granted by the United States patent office.—New York World.

MAN SAVING MANY FROM DROWNING IS MURDERED

CHICAGO, Ill., March 25.—Peter De Rock, a fisherman on the north shore, who is credited with having saved more than fifty persons from drowning, was killed tonight in a saloon when he attempted to restrain a rowing man. According to witnesses, the slayer, who escaped, was Edward O'Donnell, brother of John O'Donnell, president of the Building Trades' council, and son of a former police captain.

PARTIAL CONTENTS

Here are a few titles of old favorites from this complete collection. See how many of these songs you can find in any other similar book:

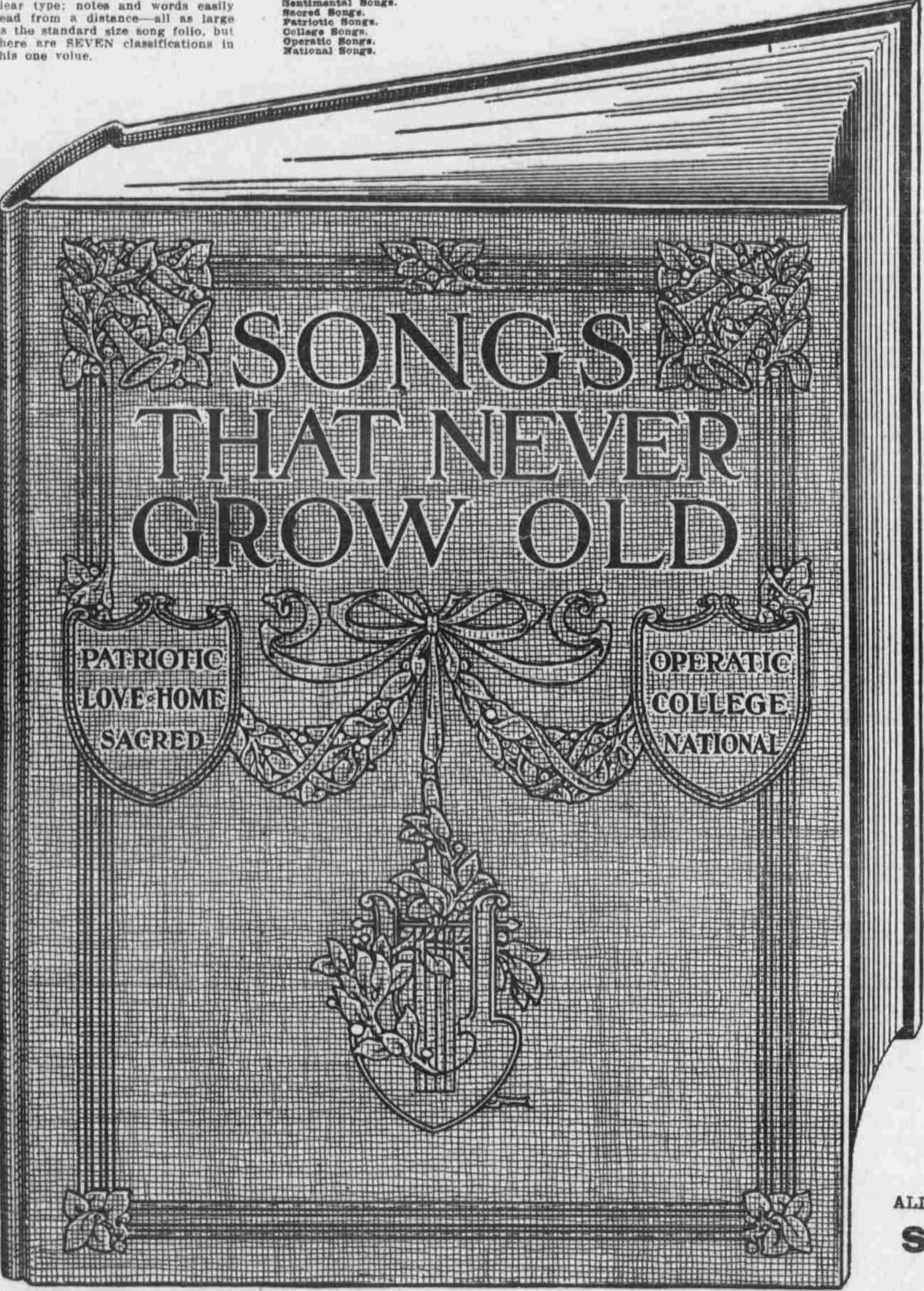
- America.
- Old Lang Syne.
- Aura Lee.
- Austrian National Hymn.
- Battle Cry of Freedom.
- Beauty's Eyes.
- Ben Bolt.
- Bingo.
- Blue Austrian Mountains.
- Bine Bells of Scotland.
- Bonhuku.
- Bonnie Doon.
- Bridge, The.
- Campeles Are Coming.
- Cause, My, My.
- Choclette.
- Come and Be Faithful.
- Come Back to Aris.
- Come, Holy Spirit.
- Come, Ye Disciples.
- Comin' Through the Rye.
- Contra Altum.
- Darby River.
- Darby and Joan.
- Dearest Nellie Gray.
- Dearest Spot Is Mine.
- Dear Old Home.
- Do They Miss Me at Home?
- Dough, Tender and True.
- Stream Faces.
- Edging.
- Bring to Me Only With Thine Eyes.
- Evening Star.
- Ever to Thee.
- Give Our Union Forever.
- Flag of the Free.
- Forty-nine Bottles.
- French National Song.
- Future Mrs. Arkins.
- German National Song.
- Girl I Left Behind Me.
- Glory, Glory, Galilee.
- Good-Bye, Sweetheart.
- Good-Night, Ladies.
- Hail, Columbia.
- Kaleidoscope Chorus.
- Mark, Mark! My Soul.
- May That Once Through Tara's Halls.
- Heart Bowed Down.
- Holland's National Hymn.
- Holy Night.
- Homes, Can I Forget Thee?
- Homes, Sweet Homes.
- Home, That Was.
- How Can I Leave Thee?
- I Cannot Sing the Old Song.
- I Dream I Dwell in Marble Halls.
- In Old Madrid.
- In the Gloaming.
- Italian National Hymn.
- It Was a Dream.
- I Was a Soldier.
- Jerusalem, the Golden.
- Jesus, Lover of My Soul.
- Johnnie's Song.
- John Anderson, My Jo.
- Justa.
- Kathleen Mavourneen.
- Kiss Dances.
- Killarney.
- King Christian.
- Last Rose of Summer.
- Lead, Kindly Light.
- Listen to the Ocean Wave.
- Listen to the Mocking Bird.
- Little Brown Jug.
- Love's Song Ago.
- Lordly.
- Lost Chord.
- Love's Old Sweet Song.
- Low-Sacked Car.
- Lullaby (Brahm's).
- Maid of Athens.
- Maidie Lead, Forever!
- Marching Through Georgia.
- Marcelline.
- Maryland, My Maryland.
- Mamma's in de Cold, Cold Ground.
- Marching Pipe.
- Maymaid, The.
- Minstrel Boy.
- My Bonnie.
- My Country, 'Tis of Thee.
- My Last Glimpse.
- My Old Dutch.
- My Old Kentucky Home.
- Nancy Lee.
- Ninety and Nine.
- No, Sir!
- Now the Day Is Over.
- Put-Brown Maiden.
- Put in the Shilly Night.
- Old Arm Chair.
- Old Black Joe.
- Old Cabin Home.
- Old Folks at Home.
- Old Oaken Bucket.
- Our Sweetest Solomon Thought.
- Only a Face at the Window.
- O, the Land That We Love.
- O, Paradise.
- O, Thou Joyful Day.
- Our Banner.
- Paloma, La.
- Polish Hymn.
- Polly Wolly Doodle.
- Portuguese Hymn.
- Red, White and Blue.
- Rig-a-Jig.
- Robin Adair.
- Rock in the Cradle of the Deep.
- Rock Me to Sleep, Mother.
- Rock of Ages.
- Roll on, Silver Moon.
- Rosalia.
- Ruse Britannia!
- Russian National Hymn.
- Sailing.
- Sally in Our Alley.
- Scotch National Song.
- Scotch National Song.
- Serenade (Schubert's).
- Sleep, Gentle Mother.
- Soldier's Farewell.
- Soldier's Life.
- Soldier's Levi.
- Some Day.
- Spanish National Hymn.
- Spring, Gentle Spring.
- Stare of the Summer Night.
- Star-Spangled Banner.
- St. Patrick's Day.
- Strangers Yet.
- Sun of My Soul.
- Suwanee River.
- Swedish National Song.
- Sweet and Low.
- Take Back the Heart.
- Then You'll Remember Me.
- There Is a Happy Land.
- There's Music in the Air.
- Thine Eyes No Blue and Dreaming.
- Three Fishers.
- Through the Leaves.
- You-Be-Be River.
- Wait for the Wagon.
- Wagon Wheel, A.
- Watch on the Rhine.
- Wearing of the Green.
- Wary.
- Woe Better Bide a Wee.
- Welsh National Song.
- We Sat by the River, You and I.
- When Jack Comes Home Again.
- When the Corn Is Waving.
- When the Swallows Homeward Fly.
- Who Is Mr. Little Doe Goss?
- Within a Mile of Edinboro.
- Woman Is Fickle.
- Woodman, Spare That Tree.

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