

A NEW TELEPHONE RECEIVER.

We illustrate a new telephone receiver, the action of which is due to the contraction of a spiral magnet core under the influence of the current traversing the bobbin. The spiral core is attached at one end to the diaphragm, and is connected at the other end with an adjusting screw. The spiral core is perfectly free to work in the helix, and the contraction or expansion of the spiral under the influence of the current from the transmitter acts on the diaphragm in much the same manner as though it was attracted by a magnet, the results being the same as in Bell's, Gray's, or Phelps' instruments.

A permanent magnet placed outside the bobbin magnetizes the "spiral core" by induction, so that the spiral is very sensitive, thereby making it sensitive to the influence of currents passing in the bobbin. The inventor expects to partially, at least, overcome the influence of induced currents in the receiver, and to obtain more distinct articulation.

The construction of the telephone will be readily understood by reference to the engraving, in which a portion of the instrument is broken away to show the internal parts. The diaphragm is mounted on a mouthpiece of the usual description, and the permanent magnet and bobbin with the inclosed spiral is placed in a small casing attached to the mouthpiece. The instrument is provided with the usual binding posts and flexible connections.

This receiver is the invention of H. S. Thornberry, of Winona, Minn., who may be addressed for further particulars.

The Legnophone.

According to the *Palestra Musicale*, of Rome, Signor Lasina has invented a new musical instrument, which he calls the "legnophone," resembling the *Madera y paya*, so well known in Spain. This instrument, on the perfecting of which Signor Lasina has worked for years, is in the shape of a triangle, and consists of forty-five small rods of white poplar wood, lying each one on six short straws standing on a plank of deal. The musician strikes these rods with two sticks, as if they composed the keyboard of a piano, and plays with ease and accuracy the most difficult pieces of music. Signor Lasina intends to give a series of public concerts to introduce his legnophone to the notice of amateurs.

NOVEL MOTOR.

The engraving represents a new motor which operates by the shifting of an inclosed volatile liquid in vacuo from one chamber to another and higher chamber. The casing forming the frame of the motor is open at the bottom and at each of its upper corners. A V-shaped partition, converging downward from the top of the casing toward the lamp, divides the calorific chamber into two diverging passages or apartments, one extending from the lamp to entrance *a*, and the other to entrance *a'*. On the top of this casing are two standards, which afford bearings for a sleeve, *D*, rigidly secured on the middle part of a tube, *E*. This tube has at its ends cylindrical receptacles, *E'* *E''*, and the tube and receptacles are exhausted of air and supplied with some easily-vaporizable liquid—for instance, alcohol—in sufficient quantities to partly fill them. Each end of the tube is also provided with a flanged cap, *F*, which extends over the adjacent receptacle and is adapted to fit about the entrance in the casing which receives the receptacle, so that when the receptacle, *E'*, descends into entrance *a*, as shown, its cap, *F*, entirely closes this entrance. The heat is thus prevented from escaping, and also is reflected upon the top of the receptacle.

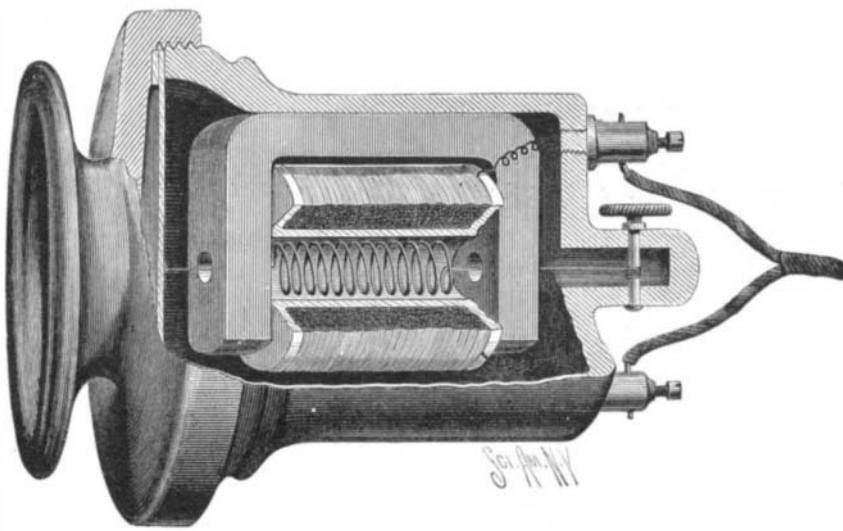
Trunnion, *c*, carries in front of its standard, *C*, a gear wheel, *G*, which meshes with two racks, *H* *H'*, formed on the upper ends of piston rods which operate the pumps. Of course any other form of mechanism may be operated instead of these pumps by said cog wheel and pinion, or by cranks or other suitable devices.

The other trunnion, *c'*, carries a crank arm, *k*, which is connected by a long rod or pitman to a crank arm, *l*, on a rock shaft, *L*, journaled in the front and rear walls of the casing. This rock shaft carries a depending gate, *M*, which vibrates from side to side as the tube, *E*, oscillates on its trunnions or transverse shaft. When receptacle, *E'*, is within the calorific chamber and receptacle, *E''*, at its highest point, the gate, *M*, is in position to direct the entire body of heated air against the former receptacle. The liquid in this receptacle becomes partly vaporized; but as the end of the tube, *E*, is extended nearly through this receptacle, the vaporized liquid drives by expansion the remainder of the liquid before it through the tube. This results in transferring bodily and almost instantly the whole supply of fluid from the lower receptacle to the upper one. The latter then preponderates, and therefore descends to become the lower in its turn. During

this descent the trunnion cranks and connecting rod or pitman above described cause shaft, *L*, to rock in the opposite direction, so that the gate, *M*, cuts off the hot air from entrance *a*, and allows it to flow to entrance *a'*. The receptacle, *E''*, is then brought under the influence of heat, when the operation just described is repeated. The inventors state that this machine is capable of operating very rapidly. Fig. 1 is a side elevation of the motor, and Fig. 2 is a vertical section. This device was recently patented by Messrs. Anthony and Albert Iske, of Lancaster, Pa.

Floating Soap.

A correspondent says that while passing through the Edgar Thomson Steel Company's Works recently his attention was attracted to the men washing themselves at the

**THORNBERRY'S TELEPHONE RECEIVER.**

large tubs arranged for that purpose. What attracted him particularly was the peculiarity of the soap they were using. When one of the men had soaped himself he would drop the soap into the water and it would "bob up serenely from below" like a cork, ready for the next man to pick it up. The advantage of this soap to millmen and mechanics, who in washing make the water very dirty, was manifest, for no time was lost in fishing around the bottom of the tub for the soap, as it floated on the top of the water like a white chip. The soap was called "ivory," presumably on account of being of a creamy white color like ivory. French soap-makers have from time to time made soaps that will float, but they lacked durability and strength sufficient to stand rough usage. The prime requisite for a floating soap is that it shall be made of oils, for oil may be converted into soap that will float as well as oil in its natural form, if the soap be free from adulteration. In fact, it must be a thoroughly clean,

publish these Readers cost 5 cents, 11 cents, 16 cents, 20 cents; the arithmetics, 5 cents and 20 cents. Comparing the publisher's cost with the price paid by the pupil, we find on the Readers a profit of 400 per cent., 318 per cent., 368½ per cent., 525 per cent.; on the arithmetics, 800 per cent. and 325 per cent. When the list includes all the text-books of the schools, and when it is understood that these school books are paid for at a per cent. varying from 400 to 971, it seems to be about high time for Mr. Dennis McCarthy, or anybody else, to enter a protest against this outrageous price for school-books."

More about the New Comet.

A communication to the *Herald*, dated Albany, March 22, says that the new comet is now in the constellation of the Lyre, near Vega. It will pass to the westward of that star, and about the 1st of April will stand within four or five degrees from it. It will continue on its journey up into Cepheus, when, in May, it will make an abrupt turn and go plunging in toward the sun.

The elements of the orbit of the new comet are: Perihelion passage, June 15; perihelion place, 49 deg. 35 min.; longitude of node, 206 deg. 40 min.; inclination, 74 deg. 47 min.; perihelion distance, 10,000,000 miles; motion direct.

This comet appears to have no analogue in the past, as no comet is known with elements sufficiently resembling these to constitute reasonable belief in identity. The elements of the comet of 1097 somewhat resemble those of the present comet, but the perihelion distance of the former is computed to be seven times as great as that of the latter.

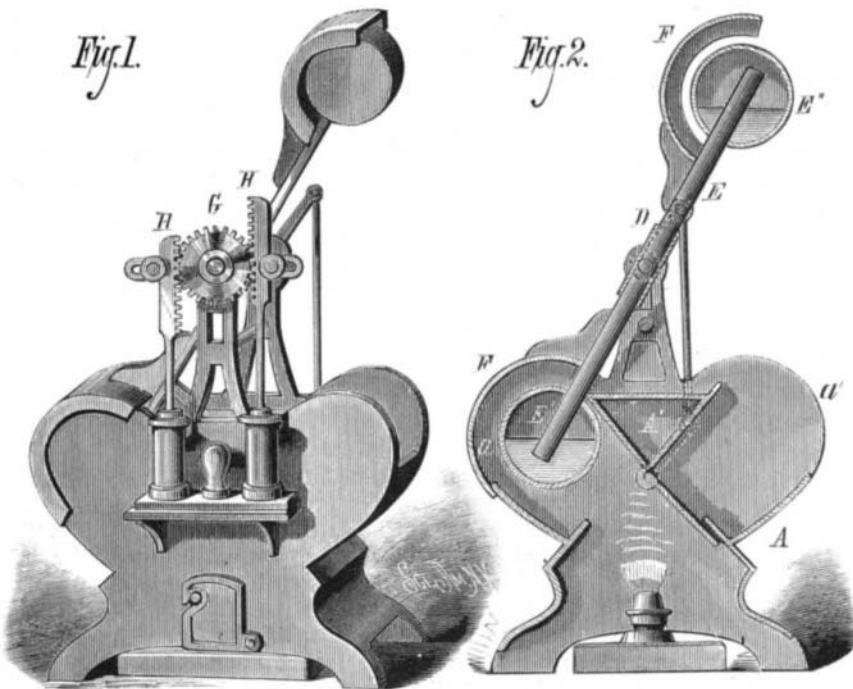
At present the comet is about 160,000,000 miles from the earth, and its distance from us will probably not be less than 80,000,000 at any time, though further calculations will be necessary to settle that point. It may be expected to make a fine display for a few days in the early part of June. The present extraordinary intensity of its light, which comes to us from the enormous distance of 160,000,000 miles, proves that it has plenty of material for future display, and it will probably show a long and nearly straight tail of enormous dimensions to our antipodes. How much it will give us is still problematical.

The Dangers of Ignorance.

One cannot judge from the brief accounts given what are the precise causes of such disasters, but there is reason to believe that ignorance is prolific; that many persons have only a vague knowledge of the qualities of nitro-glycerine, cannot recognize it when they see it, and are not acquainted with the various forms in which it is compounded, or with the peculiar dangers of handling it carelessly. Nitro-glycerine itself is a dense, yellowish liquid, but in order to diminish the danger attending its use, fine earth, ground mica, sawdust, or some similar powder, is saturated with it, and thus the various blasting powders known as dynamite, mica powder, dualin, rend-rock, etc., are formed. These compounds can be transported with comparative safety. But the nitro-glycerine easily drains off from the powder and oozes from any crevice in the vessel in which the compound is kept. Drops of it thus bedewing the edges of a box may very easily be mistaken for oil escaping, and if workmen ignorantly endeavor to nail the box tighter or to open it for examination there will be a disastrous explosion. Several have occurred in past years in this way. The victims knew, no doubt, that nitro-glycerine (or the compounds) may be exploded by a blow (contact with fire is not needful), but they did not suspect that the innocent-looking oil was nitro-glycerine.

Why should not youth be taught in the schools somewhat of the practical dangers of these substances which are coming into such common use? They would pursue the study with interest, especially if there were judicious experiments. A Missouri story is that a teacher confiscated a small metal box which a pupil was playing with in school hours, and, thinking it contained chewing gum, tried to break it open with a hammer. It was a dynamite torpedo of the kind used on the railroad track as a danger signal, and large bits of it had to be cut out of the lady's

cheek. Would it not have been well if she had known somewhat of the aspect of torpedoes? Was it not more important to the journeyman plumber who threw the lighted match into the pan of camphene, mistaking it for water, by which the great printing establishment of Franklin Square was burned some twenty-eight years ago, to know camphene by sight than to have memorized many of the matters prominent in a public school course? Surely workmen, especially "raw hands" in establishments where these things are used, should be systematically instructed in advance, and the courts are now enforcing this principle.—*Benjamin V. Abbott, in Popular Science Monthly.*

**ISKE'S MOTOR.**

pure article. Such a soap will make a soft creamy lather, easily rinsed off, not greasy or gummy, as is too often the case. We are pleased to note that Messrs. Procter & Gamble, of Cincinnati, have at last discovered how to make a soap that will float, and at the same time be durable and serviceable, and reasonably cheap.

High Price of School Books.

MR. R. M. STREETER, Principal of a school in Toledo, Ohio, makes some astonishing assertions with regard to the high price of school books. He says, in the *Boston Journal of Education*: "We are using four Readers of a series. To