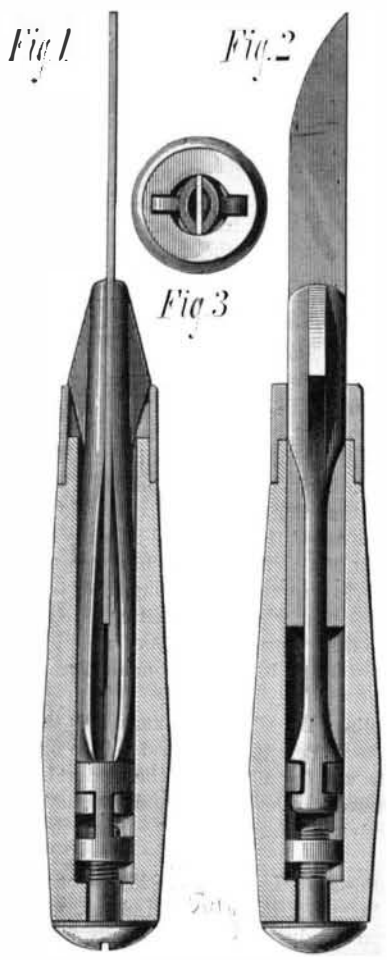
The Opium Traffic of Asia.

In a review of the British opium trade in India and China, Professor Christlieb, of Bonn, gives the following statistics showing the magnitude of the trade and its effects upon Indian agriculture:

Since the conclusion of the treaty of Tientsin, in 1860, the quantity of opium annually imported into China from the East Indies has increased to 80,000 chests. In 1875 as many as 85,454 chests, worth £10,000,000, were brought into the Chinese market, 8,943 of which were sent to Malacca, while the consumption of the drug for medicinal purposes in Great Britain in the same year reached only 165 chests. The progressive growth of the trade during the past eighty years is thus shown: In the year 1800, about 5,000 chests; in 1825, 12,000; in 1850, 50,000; and in 1875, 90,000. Among the most striking effects caused by the extension of poppy plantations in India are the diminution of the quantity of land available for other crops and the consequent curtailment of food products. In Benares and Behar, immense tracts of the finest and most fertile land in Northern and Central India have been gradually covered with poppy plantations. Quite recently 100,000 acres of the richest plains in Central India, and 55,000 acres in the Valley of the Ganges, which formerly used to produce corn, sugar, and indigo, have, to the impoverishment of the soil, been devoted to opium culture. The acreage devoted to that purpose to-day is estimated at 1,033,000 acres.

IMPROVED KNIFE HANDLE.

The annexed engraving shows an improved extension cutting blade handle, recently patented by Mr. Wilbur Webster, of East Jaffrey, N. H., Figs. 1 and 2 being longitudinal sections taken at right angles to each other, and Fig. 3 is an end view showing the shape of the jaws.



WEBSTER'S KNIFE HANDLE.

The invention consists of a handle containing two semi-tubular clamps, having their inner ends fitted to recesses in a movable block held by a screw in the end of the handle. The connection of clamps with the movable block is very simple and effective. The free ends of the clamps are provided with tapering projections that bear against the ferrule at the end of the handle as the clamps are drawn in by the action of the screw. The clamps are prevented from turning by slots cut in diametrically opposite sides of the ferrule for receiving the projections on the clamps.

This handle is adapted to a variety of tools, but it is more especially designed for flat cutting tools.

Further information may be obtained by addressing the inventor as above.

Statistics of Cotton.

According to the latest reports the great cotton spinning industry embraces throughout the world 71,250,000 spindles, of which 39,500,000 are in Great Britain. The United States have 10,050,000 spindles; France has 5,000,000; Germany, 4,800,000; Russia, 2,860,000; Switzerland, 1,870,000; Austria, 1,800,000; Spain, 1,775,000; Italy, 900,000; Belgium, 800,000; India, 1,275,000; Sweden and Norway, 310,000; Holland, 230,000; Greece, 36,000; and other countries (including Denmark and Portugal), 44,000 spindles. Britain has to every 1,000 of its inhabitants, 1,180 spindles; Switzerland, 675; United States, 218; France, 135; Germany, 108; Spain, 103; Holland, 57; Sweden and Norway, 48; Austria, 42; Russia, 30; Italy, 29.

SIMPLE TELEPHONE TRANSMITTER.

BY GEO. M. HOPKINS.

There are telephones and telephones, but in the host of instruments so named the successful ones may be counted

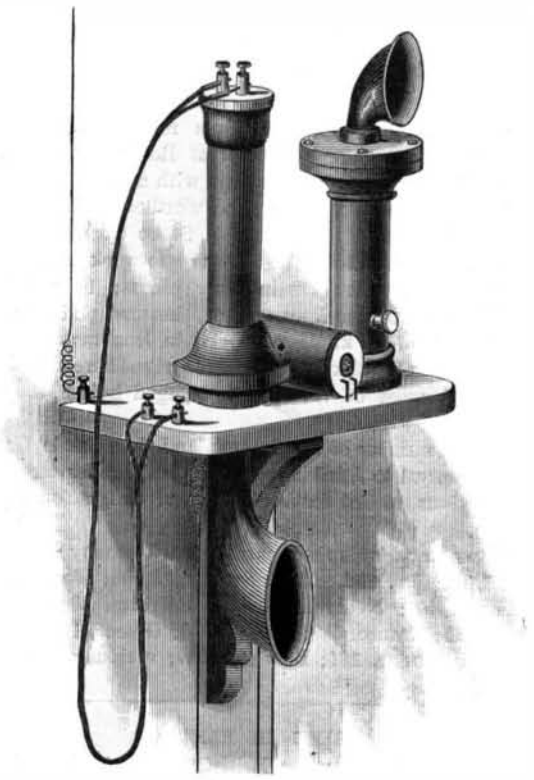


Fig. 1.—SIMPLE TELEPHONE.

upon the fingers of one hand. Of telephonic receivers it may as well be said there are but two, for there are only two principles involved in their construction. Of transmitters there are but two that have gained any notoriety and retained their foothold as useful instruments.

Having a chronic liking for telephonic research I have made it a point to try the various telephones as they have been made known to the public, and have found that with but few exceptions they are defective and useless as practical instruments, and interesting only at exceptional times when the conditions for experiment are favorable, and the adjustments delicately made.

In the course of these experiments the transmitter shown in the annexed engravings was devised, and it was subsequently developed into a usable instrument possessing all of the qualities requisite in a telephone. In the first place, it is so simple as to be capable of construction by the merest tyro, and never needs adjustment. It requires neither call bell, keys, nor switches when used in an ordinarily quiet place, with a closed local circuit.

Fig 1 is a perspective view, showing the relative arrangement of the transmitter and receiver; Fig. 2 represents the arrangement of the local circuit and line; and Fig, 3 is a vertical section of the transmitter.

The transmitter is fixed to the bracket and stands vertically, with its sound-collecting mouthpiece pointed in the direction whence the sound proceeds. The receiver, which is an ordinary Bell instrument, stands when not in use over a curved pendent resonator, the smaller end of which projects through the shelf of the bracket and just enters the hole in the center of the receiver mouthpiece.

Between the transmitter and the receiver there is a small induction coil, whose primary wire is connected with the local battery and the transmitter. One terminal of the secondary wire of the coil is connected with the receiving instrument and line, the other terminal is grounded. These connections will be understood by reference to Fig. 2. *a* and

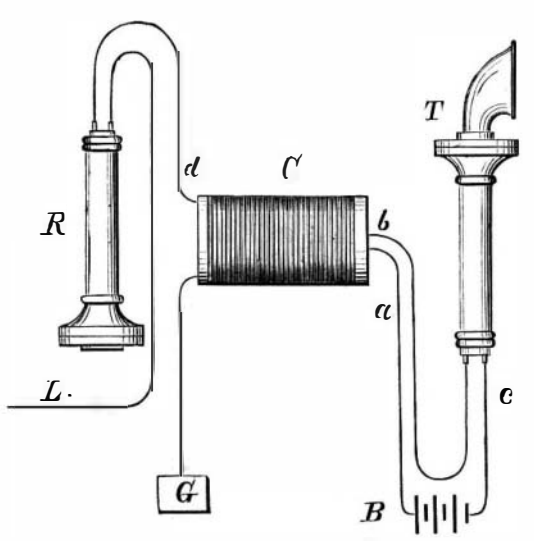


Fig. 2.—ARRANGEMENT OF TELEPHONE CIRCUIT.

b are the terminals of the primary wire of the induction coil, C. The terminal, *a*, connects with the battery, B; the terminal, *b*, runs to the transmitter, T, connected with the battery by the wire, *c*. One terminal of the secondary wire of the coil, C, is grounded; the other terminal, *d*, connects with one binding post of the receiver, R, the other binding post being in communication with the line wire, L. This arrangement is adapted to a closed circuit, one or two cells of gravity battery being connected with the transmitter. If an open circuit battery is used a switch is placed in one of the wires, *a*, *b*, *c*, so that the local circuit may be left open when the talking is done.

The construction of the transmitter will be seen in the vertical section, Fig. 3. The diaphragm, A, has attached to its center a small brass cup, B, containing a button of ordinary battery carbon three sixteenths of an inch in diameter and about the same thickness. This carbon projects beyond the brass cup, and is surrounded by a short paper tube, which projects beyond the face of the carbon one eighth inch. A piece of copper foil placed between the brass cup, B, and the diaphragm extends to the edge of the diaphragm, where it is pressed by a spring in the cell, C, which is in metallic contact with a wire extending downward through the lower end of the instrument.

The standard supporting the diaphragm cell is hollow, about five eighths inch internal diameter, and the height of the diaphragm above the bracket is four inches.

In the standard there is a bottle, D, of special form, supported by a ring, E, having a threaded stud extending through a slot in the standard, and provided with a milled thumb nut, by which it may be clamped at any desired height. The bottle, D, has a long narrow neck, about three sixteenths inch internal diameter, and a platinum wire blown in the lower end connects with the local circuit wire, which is coiled to admit of moving the bottle up or down. This wire extends through the base of the instrument, and is connected as shown in Fig. 2. The bottle, D, is partly filled with mercury, in which floats a pencil, F, of carbon of the kind used for electric lighting by incandescence. This pencil is one eighth inch in diameter, two and one eighth inches long, and is made slightly convex and very smooth at the

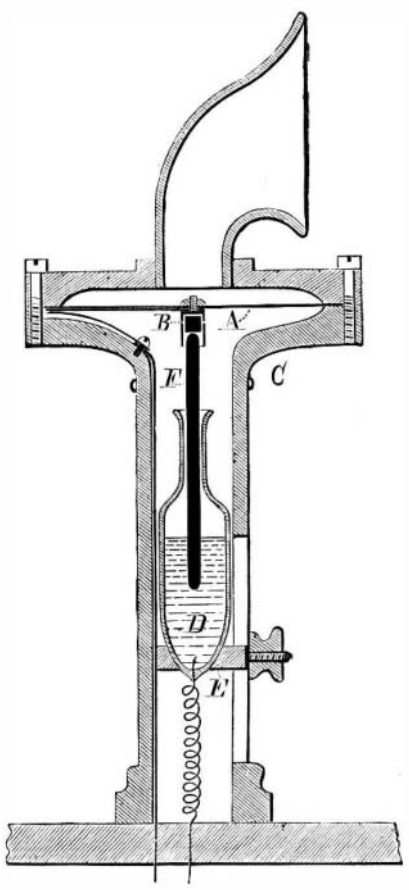


Fig. 3.—TELEPHONE TRANSMITTER.

ends. The mercury buoys the carbon up so that it is always kept in light and uniform contact with the carbon button, while it also forms part of the conductor in the local circuit. The carbon attached to the diaphragm is perfectly plane on its contact surface, and as smooth as it can be made by means of a fine file.

The diaphragm, which is of mica, has one and three-fourths inches free to vibrate. It is rather stiff, and is clamped firmly in its cell. The surfaces between which the diaphragm is clamped are perfectly true, and made of material not liable to warp. Wood well soaked in paraffine answers a good purpose, but vulcanite is far better.

The induction coil used with the instrument is of the ordinary form, two inches long, one inch in diameter, with a three-eighths inch core of No. 18 soft iron wires. The primary coil consists of three layers of No. 18 silk covered copper wire, and the secondary of No. 36 in sufficient quantity to fill the spool. One cell of Leclanche or Fuller battery will work the transmitter, but two will augment the volume of sound.

As to the efficiency of this instrument it will bear comparison with other transmitters, and in one or two points it seems to have an advantage. It will transmit speech clearly whether the speaker is within ten inches or as many feet of the instrument. Although a call bell may be used in connection with it, generally none will be required, as by saying o-o-o-o loudly in the mouthpiece a trumpet-like sound is heard in the receiver at the other end of the line, which, although not very loud, is sufficient to attract attention in a measurably quiet room.