THE ACME AUTOMATIC SAFETY ENGINE.

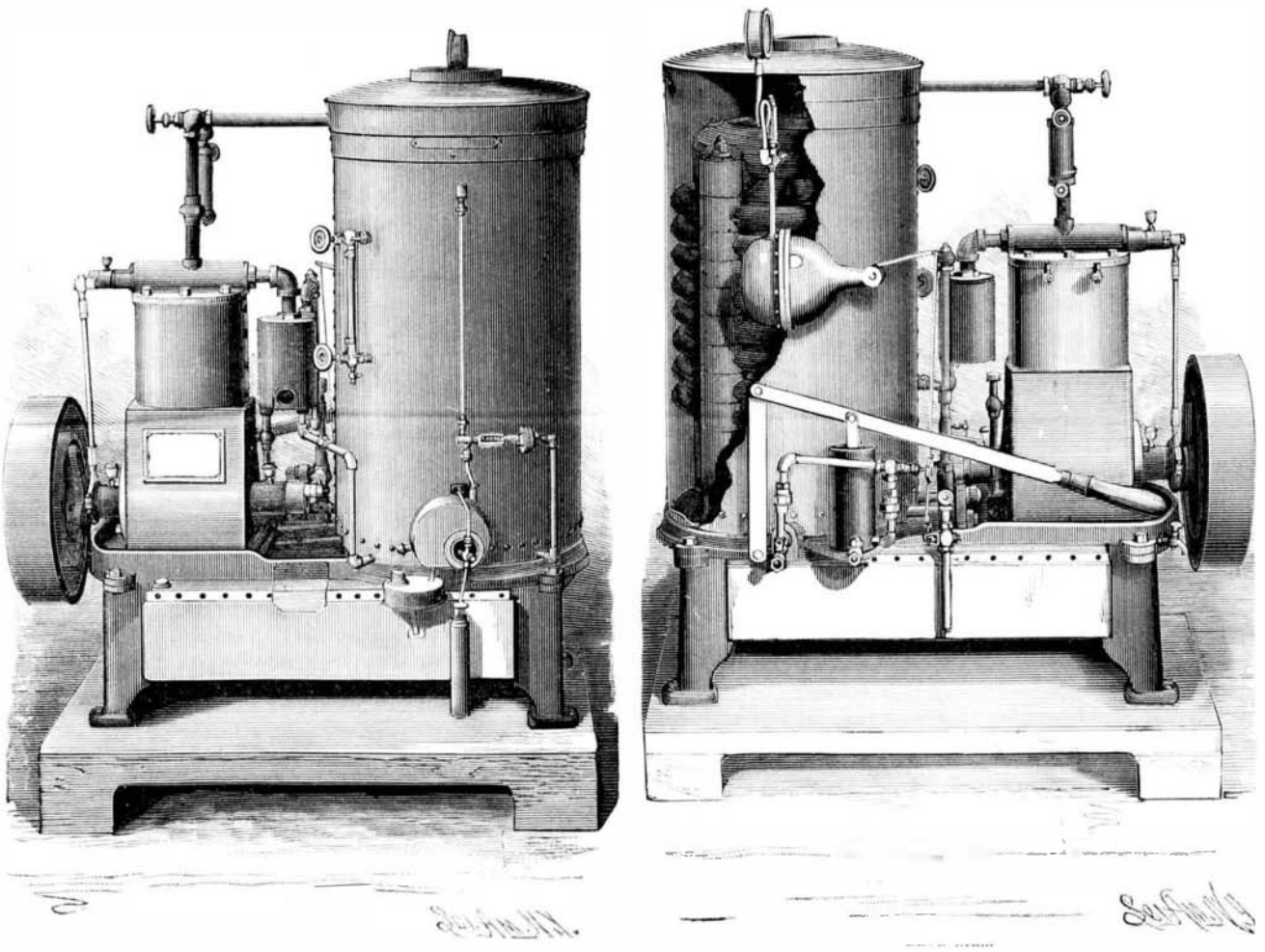
The engine herewith illustrated is adapted to all purposes where a small power is required, is noiseless in operation, easy to manage, and safe. The parts are so designed and arranged as to insure economy, efficiency, and durability.

There are two single-acting cylinders, the pistons in which, being one and one-half times the stroke in length, form their own guides. The cylinders are directly over the center of the shaft, so that the engine may be run either way as may be required. The steel cranks are placed 180° to each other, and are of large size, both in diameter and length. The valve is of the balanced rocking type, has extra large and long bearing surfaces, and is placed on top of the cylinder, the valve case forming the cylinder head; this allows long ports, that give quick admission and release, and make the action of the cut-off governor sensitive to the slightest change in speed or load. Within the periphery of the flywheel is the automatic governor, which regulates the admission of steam to suit the varying loads by changing the throw of the eccentric.

The eccentric rod strap and bearing, and the outer bearing of the valve stem, are the only bearings not constantly flooded with oil while the engine is running. This important characteristic is accomplished by carrying in the crank case a mixture of oil and water, into which the cranks dip at every revolution, thereby not only flooding themselves, but throwing the oil to every part of the inside of the case, the wrist pins and lower part of the cylinders getting a plentiful supply at each stroke. As this oil cannot escape, it is used over and over, and the oil furnished to the main bearings is all caught and returned to the crank case at last.

The boiler is a quick and economical steam generator, and has a very rapid circulation—increased in its rapidity by the intensity of the fire; and all sediment is deposited in the water space below the fire, where it can be readily removed or blown out. The construction of the boiler will be understood from the accompanying engraving. The water is carried in a series of rings connected by inclined tubes that break joints, so that the fire is compelled to reach every part in its passage through them. On top of the boiler is a ring or dome for insuring an ample supply of well dried steam. A double jacket prevents loss of heat by radiation. A pump, worked directly from the main shaft, forces the water through a coil heater, where it is subjected to the effect of the exhaust steam before entering the water leg of the boiler; by this means the water is heated to near or above the boiling point before being introduced into the boiler, without in the least choking the exhaust. The supply of water is regulated by a ball float, attached to the boiler, which by means of levers controls the amount delivered at each revolution of the engine, and may be adjusted to maintain the desired water level under all conditions.

The fuel is kerosene oil, which is atomized by a steam jet and controlled by an automatic fire regulator that reduces or cuts off entirely the supply of fuel when the steam pressure reaches the limit at which the regulator is adjusted. This fire gives a most intense heat, is easily controlled, and makes an even and constant supply of steam. No dust or smoke is produced when the fire is properly adjusted, and this fuel is cheaper than coal.



THE ACME AUTOMATIC SAFETY ENGINE, WITH BRYANT'S PATENT BOILER.

At the present time, two sizes of these engines—for which great success in incandescent electric lighting is claimed—are manufactured by the Rochester Machine Tool Works (Limited), of Rochester, N. Y. The one horse power has cylinders 2⅛ in. bore by 2½ in. stroke, makes 500 revolutions per minute, and the boiler is tested to 500 pounds hydraulic pressure and the regulator is set to carry 110 to 120 pounds steam. The second size is two horse power, having cylinders 3 in. bore by 3½ in. stroke and making 400 revolutions per minute. The engines are capable of a higher power than their rated duty, as the nominal power is computed on a basis of 70 pounds steam pressure.

A NEW LONG DISTANCE TELEPHONE SYSTEM.

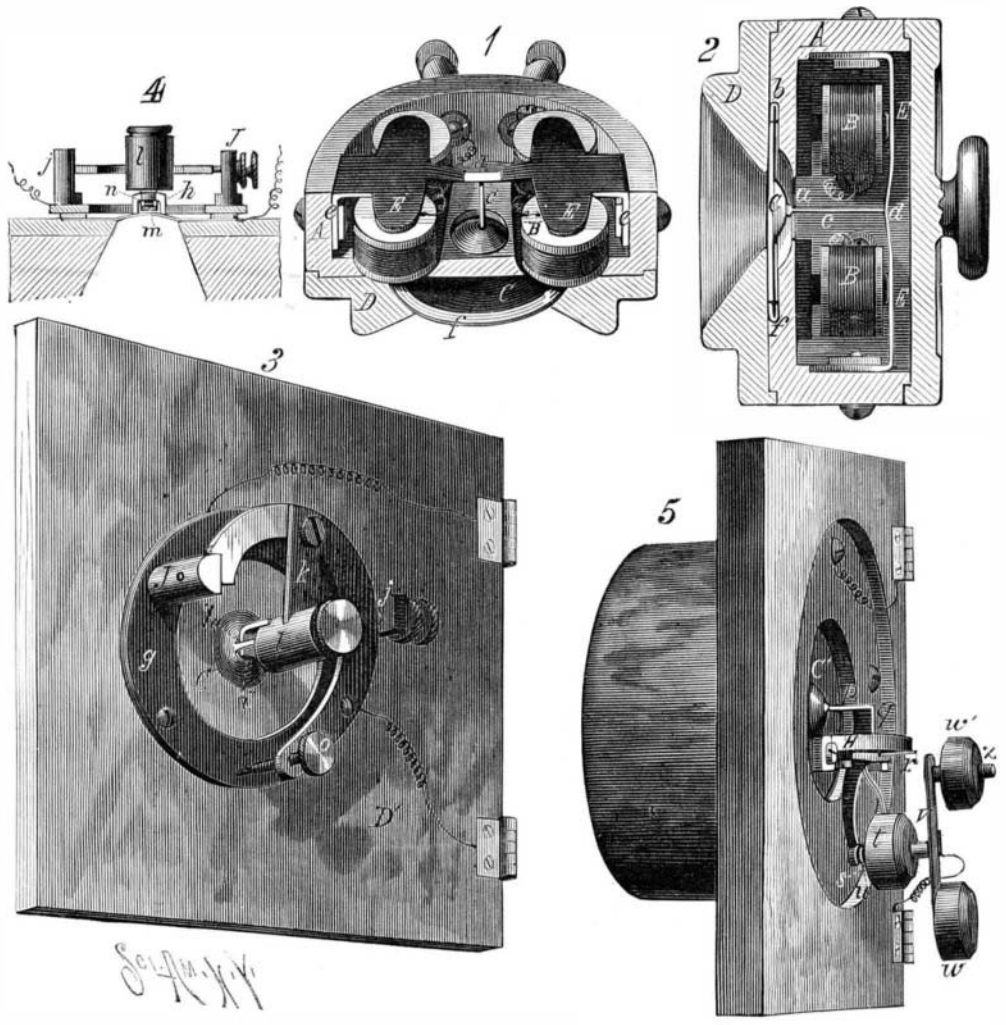
The transmission of articulate speech by means of broken electric currents has been considered impossible by telephone experts, and, as is well known, it has been disclaimed by Bell in his patent.

The transmission of articulate speech by means of interrupted or pulsatory electric currents has been a matter of great difficulty, so great, indeed, that it is supposed by many electricians to be impossible to secure any practical results by means of such currents; but, on the other hand, it is admitted that the nearer the transmitter can approach to interrupting the current, the more distinct will be the articulation, and the greater the volume of sound.

Proceeding on the supposition that a properly manipulated interrupted current would prove far more efficient in the transmission of speech than an undulatory current, Messrs. Dann & Lapp, of Honeoye Falls, N. Y., have devised a telephone system consisting of a transmitter and a receiver, which they claim is a refinement of the Reis system, and in which the intermittent currents are produced and used successfully in the transmission of articulate speech.

Fig. 1 is a perspective, sectional view of the receiving instrument; Fig. 2 is a diametrical section of the receiving instrument; Fig. 3 is a rear view of one form of the transmitter; Fig. 4 is a transverse section; and Fig. 5 is a perspective view of another form of the transmitter.

These various members of the telephone system are detached from their supports, and arranged to show their working parts as clearly as possible.



DANN & LAPP'S LONG DISTANCE TELEPHONE.

The telephone receiver shown in Figs. 1 and 2 is provided with a casing, A, which incloses two electro-magnets, B, arranged parallel with each other on opposite sides of the center of the casing, and with their yokes secured in front of the casing. In the front of the casing there is an opening, *a*, also a recess, *b*, for receiving the diaphragm, C. The diaphragm is clamped in place by a mouth piece, D, of the usual form. The central portion of the diaphragm, C, is made inwardly convex, and connected by a wire, *c*, and elastic cross piece, *d*, with the spring armatures, E. Each armature is provided with an arm, *e*, which is bent at right angles and bolted to the side of the casing, A. It will thus be seen that the poles of the electro-magnets, B, are not in proximity to the diaphragm, as in other forms of receiver, the diaphragm being arranged to receive its motion through the wire, *c*, from the spring armatures, E. By making the central portion of the diaphragm convex, it is rendered rigid, so that the vibrations transmitted by the wire, *c*, are distributed over a greater surface, thus insuring superior results. To render the action of the diaphragm free, its edges are inclosed in an elastic band, *f*. The receiver is connected with the line, so that the current passes through the two magnets in series.

The transmitters shown in Figs. 3, 4, and 5 are substantially alike in principle, but different in form. That shown in Figs. 3 and 4 is provided with a diaphragm, C', which is made and mounted