There are various adjustments attached to modern cameras which, although of little use in the hands of the beginner, will be found of great convenience to him when he is more advanced. These are chiefly a vertical and horizontal adjustment of the front on to which the lens is screwed, and what is called a "swing-back." This latter provides a means of varying to a certain extent the angle between the sensitive plate and the axis of the lens. A leather case into which the camera and the dark-slides fit, should be provided. A "single achromatic" lens of such a length of focus as to enable the largest plate which the camera will hold to be covered should be purchased. The lens should be bought direct from some reputed maker. The particular form of lens known as the "wide-angle landscape" is the best. The tripod stand calls for little special remark. The only requirements of the camera stand are that it should be light, should be easy to fit up and take down, and should be quite rigid when fixed up. The flat dishes or trays—or, as they are sometimes called, flat baths—are for use in the operations of developing, fixing, &c. Such dishes, made of so-called porcelain, can be had for a few pence each, and we should recommend that such be purchased for quarter-plate work. When the photographer advances to larger sizes, he may indulge in the more expensive and more convenient dishes made of ebonite and other light material.

NEW ACOUSTIC TELEPHONE.

We give an engraving of an improved telephone and telephone call signal, patented by Mr. John B. Bennett, of San Luis Obispo, Cal. This instrument may be placed in any desired position, and the line wire may extend in any required direction without making an angle at the instrument, and whichever way the instrument is turned the appearance will be the same. The great difficulty with other string telephones is that they are often incapable of being placed in the most convenient position. The curved speaking tube—which is also used for hearing—terminates flush with the front side of the case, and is so constructed that any sound-wave entering its mouth is focused directly on the centre of the diaphragm.

The instruments are furnished with a good and distinct automatic alarm, which is operated by turning a crank on the instrument, the operation being the same as that of operating a magneto bell. Turning the crank causes the hammer to strike rapidly and strongly against an eye in the diaphragm to which the line wire is attached, affording a loud and distinct alarm free from all the bother and expense of electricity. If wished for special purposes, a magneto call can be arranged within the case at slight expense in the place of the automatic call, and can be operated by the same crank.

These instruments are nicely finished, the mouth-piece, crank, and other parts being nickel-plated. This telephone for short distances less than a mile to a mile and a half, works clearly and satisfactorily. The inventor states that he has heard distinctly through a full mile and a half of line.

A new suspender has been devised by the same inventor by which the line is supported without interfering with its sound conducting qualities. It is also capable of turning angles in the line without material loss of sound.

This telephone has the advantages of great simplicity, and transmits speech naturally and loudly without the application of electricity and without the troubles attendant on its use.

For further information address the inventor as above.—*Scientific American.*

ELECTRIC MOTORS.

A writer in *Popular Science Monthly* has this to say regarding electric motors:

"The next and last branch of my subject is the transmission of motive power to a distance. I have shown you how currents of electricity are produced; also how they do work; how they produce electro-magnetism; how they generate heat; how they produce light; and now I want to show you that the whole thing is reversible. If, by the exertion of mechanical power, currents of electricity can be produced, those very same currents of electricity can, in their turn, produce mechanical power. If, instead of receiving currents of electricity from the dynamo machine, on the Thames embankment, we transmit currents of electricity to it, we should cause it to rotate, but in the reverse direction. I have here a small machine for the purpose of illustrating this to you; it is the invention of Mr. Griscom, who has supplied it to a large extent in America for turning sewing machines. The wires from the band dynamo machine are now attached to the Griscom motor, and when currents of electricity are generated by turning the handle of the dynamo, they are conveyed to the motor and cause it to revolve with the high rapidity you see. It is surprising that such a tremendous momentum should be produced by so small a strength of electric current. The wires connecting the two machines in this instance are short, but the effect would have been practically the same had the machine been miles apart. By changing the wires the direction in which the motor rotates is reversed, so that I not only get power transmitted, but can reverse its direction. In this case, as the electricity is generated by hand, its power is small; and, therefore, with my strength, (which is only about one-twelfth of a horse-power), I can stop the rotation of the motor; but, if steam power were employed to generate the electricity, the power transmitted would be beyond my control in that sense. This motive power was illustrated in many different forms at the Paris Exposition; for instance, from the commencement of the Champ-Elysees, to the Exposition Building, a tram car was propelled (sometimes at the rate of 25 miles an hour) upon rails laid down for the purpose, and during the time that the exposition was open, that car carried 75,000 to 80,000 people, who were conveyed to or from the building by motive power generated by steam in the exhibition and conveyed by wires to the further extremity of the track. An electric railway will form part of the Electric Exhibition at the Crystal Palace, and among the proposals to be laid before Parliament next session is a project for constructing an electric railway between Northumberland avenue and Waterloo Station. Again, at the Paris exhibition, an enterprising firm of agriculturists showed land plowing by electricity, and, in fact, the application of electricity to innumerable useful purposes was illustrated—rock boring, newspaper printing, driving sewing machines, embroidery, leather work, glass cutting, wood carving, lifts raised, ventilation assisted, etc."

PLOW FOR LAYING ELECTRIC CABLES.

Electrical communications are constantly multiplying, and this movement is seen every day increasing in rapidity. The invention of the telephone, and its more and more frequent applications, has necessitated the laying of very numerous conductors, and is constantly requiring a greater quantity of them. In such instances air lines will probably be in the majority, since they are economical, easily put up, and readily watched. But on another hand, they are exposed to the inclemency of the seasons and to being tampered with by malicious persons, and are subject to get out of order. It is certain, then, that in many cases subterranean lines will be employed. The principal drawback to these latter is particularly that of their greater cost. The cables need careful insulation, and putting them in place is quite a laborious operation. The latter offers particularly the inconvenience that, in addition to expense, it requires time. In certain cases, in war, for example, a great advantage would accrue from the use of subterranean lines, but it is rarely possible to lay them, since there is no time to do so.

Instruments adopted for facilitating and hastening the operation of laying underground cables have been invented, and these naturally present themselves under a form similar to that of a plow—the principal work being to open a sufficiently deep trench. This is the operation that is really onerous, and it is because of the cost of it that hitherto subterranean lines have been employed only in cases where several of them could be laid in the same trench. At the recent Electrical Exhibition there were shown two types of plows adopted for the purpose just indicated. One of these, in the German section, was light and incapable of reaching much depth. There is reason to believe that it was invented principally for military purposes, and that it was designed to quickly lay a temporary line. Such being the case, the utility of the instrument is not very great, for the chief object is to have an apparatus capable of laying a permanent line. And such is the object attained by the other plow that the Exhibition has shown us, and which is the invention of a French engineer, Mr. Jules Bourdin. We give a representation of the apparatus in the annexed figures. The manner in which it operates will be readily understood. A lenticular disk precedes the share, cuts the roots, and, in a word, opens the trench. The share is provided behind with a bent tube, and lays the cable at the very bottom of the ditch that the compressing roller in the rear afterwards closes. The machine carries a windlass frame designed for holding the coils of wire, and necessitates the attendance of but few men. The instrument is simple, strong, and well got up, and it ought to give good results. The inventor has taken care to reduce the