

wheel. The tension of the belt is regulated by means of a vertically-adjustable idler, attached to the seat-post. This machine is manufactured by the E. R. Thomas Motor Company, of Buffalo, N. Y. The Auto-Bike built by the Holley Motor Company, Bradford, Pa., is another rear-driven motor cycle, which differs materially from the one just mentioned in having a very much longer wheel base. The motor is carried in the lower bifurcated half of the seat-post, and a chain drive, located on the left hand side of the wheel, is used, an ordinary chain gear actuated by the pedals being carried on the right hand side, as in the common bicycle.

We present illustrations of an interesting type made by the Fleming Manufacturing Company, of this city. It differs from those already mentioned in the fact that the motor is carried upon a frame in front of the steering head, and that the drive is direct to the front wheel, power being transmitted by a five-eighths half-round leather belt which allows of much flexibility and large bearing surface. The belt is tightened by an adjustable ratchet lever, which allows the wheel to be started with the belt somewhat loose, the belt being tightened up after the wheel is in motion. There is an advantage in this arrangement in the fact that the momentum of the wheel and rider enables the motor to be started with ease without any extra exertion on the pedals. The connection with the battery is made by means of the left-hand grip. After the machine is started, the belt can be slackened somewhat by taking off the extra friction on the idler. The speed can be regulated by advancing or retarding the timing device, which changes the time of ignition in the cylinder. The speed can also be regulated by throttling the mixture before it enters the cylinder. The gasoline tank holds two quarts, which is sufficient for a continuous journey of from 50 to 60 miles. The tank is carried over the front wheel, but if desired an auxiliary tank is provided which is placed above the rear wheel of the machine and holds one gallon of gasoline. The frame which carries the motor forms practically part of a specially constructed front fork, and it is so designed as to materially add to the strength of the latter. Not merely the motor, but practically the whole of the motor equipment, is carried on the front forks, only the induction coil and battery being hung from the top tube of the bicycle frame. It is claimed that there is convenience in this form of construction, arising from the fact that a complete motor and front fork may be provided by the makers, which is capable of being attached to any good, strong bicycle frame, in any reputable repair shop, the only work necessary after assembling the front fork to the frame being to hang the coil and battery case to the frame, for which purpose clips are provided. The exhaust muffler is carried down in front of the supply tank, so as to insure warm gasoline at all times, and also insure that the burnt gases will be discharged below the forks, and as near the ground as possible.

ELECTRICAL ENGINEERS IN SOUTH AFRICA.

The war in South Africa brought electrical engineers into prominence by the rôle they played in many interesting military operations. The services of the electrical engineers were freely tendered and accepted and special equipment was gotten together and shipped. Traction engines, dynamos, arc and search lights, twenty bicycles provided with reels for paying out telephone wire, were among the things shipped by a transport. The first work after arrival was a temporary electric light installation on the Bethulie road bridge. Six arc lights were operated by current obtained from a dynamo driven by a traction engine. The field telephone was first put into use across this bridge. Field telephones were also used to maintain communication with the flying column, copper wire No. 22 B. W. G. being used. The freight yard and locomotive shops at Bloemfontein were lighted with arc and incandescent lamps. The work of the electrical engineers was of this general class, arc and incandescent lights were installed at many places, the search lights were used for various purposes, telegraphic communication was restored, and they also assisted in the work of repairing bridges, relaying track, etc. The engineers were also in a number of engagements, in which they showed that though volunteers, and volunteers of a special class, they were good soldiers as well.

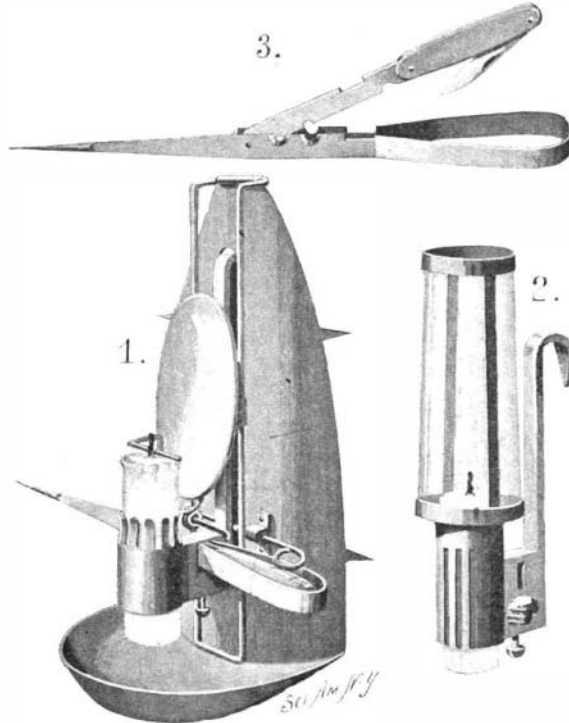
When Pretoria was reached, there was plenty of work in fitting up electrical apparatus which had been wrecked by the Boers. Elaborate construction work

was carried on at this city, and the authorities had the advantage of expert advice.

The reel shown in our engraving can be carried either on the frame of the machine or the back of the rider. Normally the wire was payed out directly on the ground, but for more permanent use posts were used.

A COMBINED MINER'S CANDLESTICK AND TOOL.

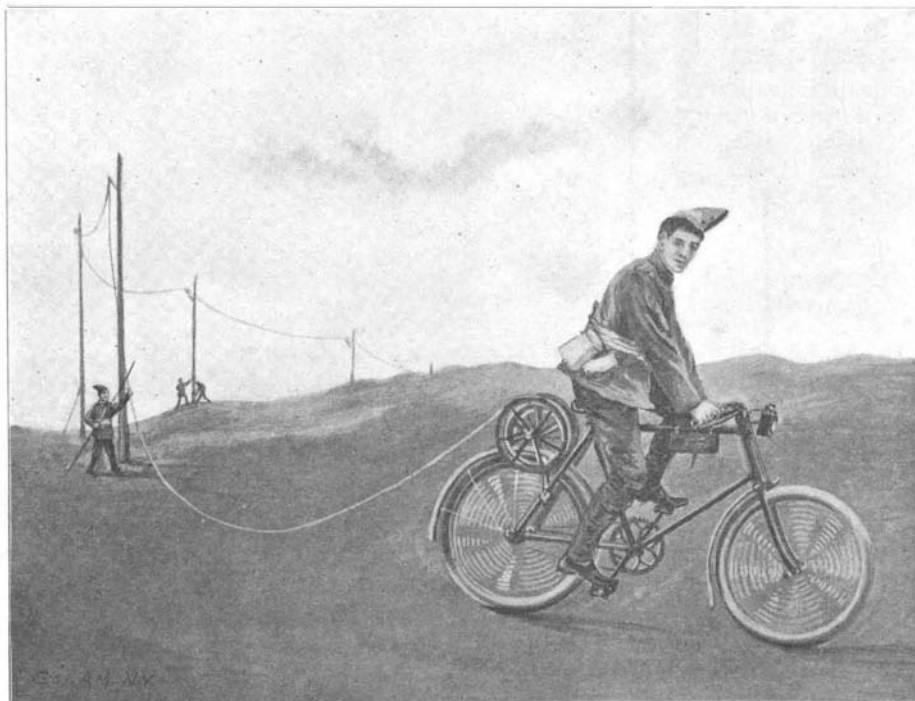
The invention which we illustrate in the three figures presented herewith is a combined miner's candlestick and tool devised by Charles H. Cornell and Felix



COMBINED TOOL AND MINER'S CANDLESTICK.

J. Troughton, of Victor, Colo. In the invention a fuse-cutter, cap-primer, knife, fuse-splitter, hat-shield, reflector, and candle-holder are incorporated.

The candlestick comprises a shield, a drip-cup carried by the shield and a candle-holder mounted on a supporting bar, the upper hook end of which passes through an opening in the upper part of the shield. The supporting-bar is locked to the shield by a bent wire turning in suitable bearings. In an opening formed by the supporting-bar a tool is received (Fig. 3) which is held in place by a coiled spring and which comprises a body-bar pointed at one end and provided with a looped handle adjacent to which are parallel members. Each of these parallel members is provided with a recess designed to register with recesses



PAYING OUT TELEPHONE WIRE IN SOUTH AFRICA.

in the cutting edge of a lever fulcrumed on the body bar so as to enter the space between the parallel members. The lever is provided with a clasp knife. The point of the body bar may be inserted in crevices, so that the lamp can be supported from the looped handle. The cutting edge of the lever serves the purpose of splitting a fuse; and the coacting recesses in the lever and body-bar doubly crimp the miner's caps. The uses of the knife are obvious.

On vertical guide-rods secured to the shield a slide is mounted, carrying a reflector and a bent wire which bears on and follows the candle as it burns away, thus

serving to adjust the position of the slide relatively to the burning candle so that the reflector will always be located behind the flame. In connection with the candle-holder a chimney support is employed which has a tubular base made to slip over the candle-holder and its supporting bar. The tubular base carries a mica chimney (Fig. 2) which is detachably held between upper and lower clasp-rings connected by metal straps.

A Pneumatic Tube Service.

A complete and exhaustive expert investigation has been made into the cost, operation, etc., of the pneumatic tube postal service, with a view to determine whether the service should be owned, leased, extended, or discontinued by the government. The committee fully sustains the pneumatic method of mail transportation as a valuable and mechanically successful system, and in the great cities can no more be discarded than the fast mail train. For New York the joint committee discusses a proposition for the installation of eighteen miles of new line. The proposition involves the connection of twenty-one stations and the main office. The annual rental proposed is \$398,500. The present service of 5.18 miles cost \$167,100. There will, of course, be a large reduction of wagon service, elevated railway service and incidental savings, which are reckoned at \$101,052. It is proposed to reduce the charge for special delivery if the service is extended. For Brooklyn 13.5 miles of new tubes are proposed with seven new connections at a cost of \$172,097. All proposals included the continued operation of the existing system. The House Committee on Post Offices and Post Roads has completed its appropriation bill, but there is no provision for the continuance of the pneumatic tube service. This will probably be added later in the discussion of the bill.

Helen Keller Makes a Speech at Radcliffe College.

Helen Keller, who was once deaf, dumb and blind, can no longer claim the second infirmity. She recently made a speech at the freshmen's luncheon at Radcliffe College, Cambridge, in which she is a student. Her words were heard clearly throughout the hall, and her little speech was met with long and enthusiastic applause. She is now taking, besides history, French and German and an English course that includes daily themes. In the last course her productions are most remarkable. In the lectures Miss Sullivan translates to her what the lecturer says. This is all that is necessary, for it is not needful for her to take any notes. Her style shows great individuality.

The Current Supplement.

The first page article in the current SUPPLEMENT, No. 1308, is devoted to "Recent Excavations in the Roman Forum," and is illustrated by engravings made from photographs obtained especially for the SUPPLEMENT. "Archæology in the Past Century" is by Prof. Flinders Petrie, and is the commencement of a most important and interesting article by a great authority. "Saturn's Rings" is by Prof. Harold Jacoby, of Columbia University. "Meteorological Instruments" is by Prof. Hans Hartl, and is accompanied by a number of engravings. "Recent Science" is by Prince Kropotkin and is the second installment of this paper. "Anatomy and Physiology of Insects" is a lecture delivered at the Academy of Natural Sciences at Philadelphia by Dr. Henry Skinner. "Prehistoric Ostriches" is a curious article. "The Steam Turbine: Steam Engine of Maximum Simplicity and Highest Thermal Efficiency," by Prof. R. H. Thurston, is concluded in this issue, and is one of the most important articles on mechanical engineering which has appeared for a long time. "Dr. Pupin's Improvements in Long-Distance Telephony" is by Herbert T. Wade, and is referred to elsewhere. "New Wind-Recording Apparatus" describes some new instruments. The usual consular and trade notes are given.

Contents.

(Illustrated articles are marked with an asterisk.)

| | | | |
|--|----|--|----|
| Airship Kress..... | 50 | Locomotive with auxiliary driving axle*..... | 49 |
| Automobiles, gasoline..... | 51 | Notes and queries..... | 50 |
| Automobile news..... | 54 | Oil well, Texas..... | 52 |
| Beer cooling mixtures, prize for..... | 51 | Patent conference..... | 50 |
| Candlestick, miner's*..... | 58 | Property, industrial protection of..... | 50 |
| Clockwork, wonderful*..... | 52 | Runner for vehicles*..... | 52 |
| Draft, forced..... | 50 | Sailing vessel, twentieth century..... | 51 |
| Electrical engineers in South Africa*..... | 58 | Science notes..... | 51 |
| Engineering notes..... | 55 | Stars, orbits of revolving double..... | 51 |
| Heat rays, carbon responsible for transparency of..... | 54 | Supplement, current..... | 58 |
| Inventions recently patented..... | 59 | Telephone, long distance..... | 50 |
| Irrigation farming in the Southwest*..... | 53 | Trade mark conference..... | 50 |
| Keller, Helen, makes speech..... | 58 | Tube expander*..... | 52 |
| | | Tube, pneumatic..... | 58 |
| | | X-rays, injury by the..... | 52 |