

in all. The cost of the smaller experimental lamps is £19 1s. each per year, and of the larger £41 2s. 6d., or £777 2s. 6d. in all. The new system, therefore, is nearly three times more costly than the old. The general result, therefore, is that the new system gives nearly $4\frac{1}{2}$ times as much light as that in general use, and costs about three times as much. It should be added that the experiment is being conducted at the sole cost of the company.

Correspondence.

An Invention Called For.

To the Editor of the Scientific American:

There is one invention which is very much needed by the farmers of America, one which would add millions to their income, millions to the commerce of our country, and one which, if it can be invented and successfully operated, will make the inventor a millionaire. It is some kind of a machine by which the loss in the wheat crop will be reduced to, say, one fifth of the crop.

I will give you an idea of the loss in the crop by stating an experiment which I have tried this summer to test the loss. A neighbor had a field of 85 acres near my house, which was judged to make 10 to 20 bushels per acre. When fully ripe I selected one square yard, which I was sure was less than an average of the field, cut, dried, and rubbed it out very carefully. It weighed 6 oz. Calculating from that datum, the field made 2,571 bushels. When the crop was cut it was saved as clean as is usual, and was as cleanly thrashed as any I ever saw; and yet he only got 1,050 bushels, which shows a clear loss of 1,521 bushels; in other words, he saved about two fifths and lost three fifths of the crop.

I have never known more than one half of a crop saved even by the most careful management. It seems to me that one fifth, or 500 bushels, in 2,500 would be a heavy loss, but when it is 1,500 in a crop of 2,500, it is unbearable.

I think if you will present this subject, through the SCIENTIFIC AMERICAN, to the inventive geniuses of our country, that some of them will probably invent machinery by which this tremendous loss will be at least greatly reduced. It may be proper to say that the wheat was cut with cradles, and cut very clean, the field thoroughly raked, and it was thrashed by an A No. 1 steam thrasher. Will the farmers who see this try similar experiments next harvest and note their losses?

Very respectfully,

F. W. CONNOR.

King George Co., Va., July 29, 1879.

[The foregoing is suggestive, to say the least; and we should be glad to hear of further experiments to determine the amount and the occasion of the discrepancy described. The loss of ripe grain by the depredation of birds, squirrels, rats, mice, and other vermin, is unquestionably considerable. There is a further loss by wastage in the process of harvesting, especially when any portion of the crop is over-ripe, due to tardy harvesting or to irregular ripening. But the assertion that three fifths of an entire crop—the actual returns of which exceeded the farmer's expectation—should be lost in harvesting, or that more than half our annual wheat crops are regularly lost that way, is simply incredible. We fear—no, not that; we are glad to believe—that our correspondent has but added another illustration of the too common habit of drawing sweeping conclusions from slender observation. One square yard is too small an area on which to base a judgment of the yield of over 400,000 square yards; as a test for the probable loss on millions of acres its value is inappreciable.—Eds.]

The Inductive Action of Lightning.—A Note from Professor Mayer.

To the Editor of the Scientific American:

The following account of experiments on the inductive actions of lightning, may be interesting to your readers, when viewed in connection with the remarkable experiments of Mr. George M. Hopkins, which were described in the July 19 number of the SCIENTIFIC AMERICAN, under the title "The Telephone as a Lightning Indicator."

These experiments of mine were made at my mother's residence, in the northwestern portion of the city of Baltimore, during the summer of 1863. The account of them here given is taken from a review of Professor Rood's investigations on the time of duration of the electric spark, written by me for the New York Evening Post of September 8, 1871.

Astonishing as is the fact of the concentration of the power of a lightning flash into such a minute interval, yet, as wonderful is the extent of the earth's surface affected by it; as will be seen from the following experiments of the writer, never before published: A galvanometer consists of a delicately suspended magnetic needle surrounded by a coil of copper wire, through which a current of electricity can pass; whenever this passage takes place the needle rapidly turns around its point of suspension. This being understood, I connected one end of the wire coil of the galvanometer with the water pipes of Baltimore, while the other end of the wire coil was joined to a gas pipe of the house which is situated in the northwestern part of the city. Thus a vast system of metallic wires stretched away three miles to the northwest, to the reservoir, and also extended to the gas works, distant two to three miles to the southeast.

A thunder storm was raging at the time, at so great a distance in the north that only the illumination of the clouds told when a flash occurred. Yet, whenever that flash took place, the needle of the galvanometer was instantly deflected

through 10 to 20 degrees. The two occurrences were simultaneous, apparently, for I could detect no difference in the instant of their manifestation. Indeed, so sure an indicator of the flash was the galvanometer, that when I shut myself up in a dark room, signaling to an observer of the storm when the needle moved, and receiving from him a signal when a flash of lightning occurred, our signals were simultaneous. The next day it was ascertained that the storm was twelve miles distant to the north; therefore, at least five hundred square miles of the earth's surface had its electrical condition changed at each flash of the lightning.

ALFRED M. MAYER.

South Orange, N. J.

Swift's Comet of 1879.

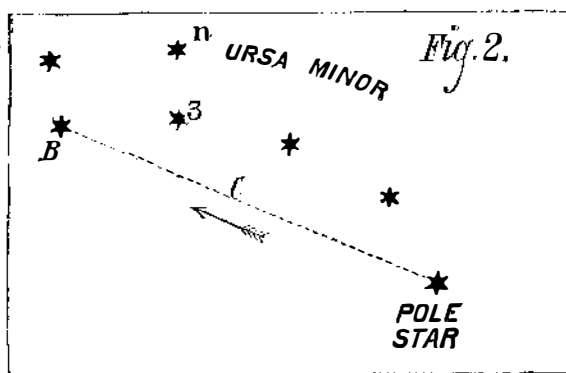
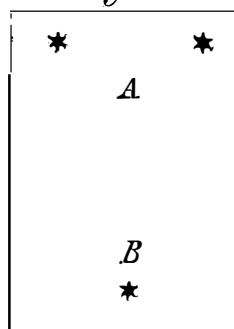
To the Editor of the Scientific American:

It has been my pleasure to obtain several excellent observations of Dr. Swift's comet of 1879.

Observations have been made with a Newtonian reflecting telescope of 5 inches aperture and 50 inches focal length, with B and C ordinary Huyghenian eyepieces, giving powers of 40 and 60 diameters respectively. One of the most interesting observations was made on the night of the 16th and 17th inst., when the comet was between three and four degrees to the left and slightly upward (at midnight) from Polaris or the Pole Star. Although a faint, misty object it was nevertheless quite conspicuous and unmistakable. For a comet it bears magnifying well, as it was much more satisfactorily seen with a power of 60 than 40 diameters. Later in the evening I applied a "solid" E eyepiece, giving a magnifying power of 140 diameters. This eyepiece, owing to the absence of reflections, which take place in the ordinary negative eyepiece, gives an intensely dark field, the sky appearing an almost jet black, and under this power the nucleus was quite bright and sparkling, although much of the outer, more hazy part was lost. The comet was also visible in a reflector of only two inches aperture, with powers of 30 and 45; and in clear weather I think no one could fail to see it with this aperture if possessed with keen eyesight, although I consider it a severe test with ordinary eyepieces.

During the three hours in which I had the comet under observation (with only occasional rests to render the eye more sensitive to details) I had a most beautiful and awe-inspiring view of its motion among the stars. The observations extended from 10 o'clock P.M. to 1 o'clock A.M. When first seen it formed, with three faint stars, a rather condensed Y, the comet being at the center or fork, but at 1 o'clock it had moved to the foot of the same, thus: A (Fig. 1) shows its first position and B at the close of observations. This was the inverted or telescopic appearance. During its passage from A to B the comet passed over a very faint star, which, although somewhat dimmed thereby, could still be seen through the hazy body of the comet. On the morning of the 23d inst. and this morning very interesting observations were made from about midnight until 1 o'clock. It has moved some distance from its position first referred to, and is now on a line drawn from the Pole Star to Beta Ursa Minor, and pointed at by Zeta and Eta of the same constellation (see Fig. 2). C shows the present position of the comet. It was first discovered 5° north

Fig. 1.



of the Great Cluster in Perseus, moving toward the north celestial pole of the heavens, over which it almost directly passed between the 13th and 14th of the present month. Its direction of motion is indicated by the dotted line and arrow in Fig. 2. It is moving a little more than 1 degree daily, and by taking C for its present position (25th of July) any reader with moderate telescopic aid and careful search may find it.

It is somewhat oval in form and with slight condensation, which to me does not appear central but nearer the forward or preceding limb. It is also my impression that under large apertures like the Washington telescope a somewhat blunted tail must be visible, the same cut away in the center, in other words double.

WILLIAM ROBERT BROOKS.

Red House Observatory,
Phelps, N. Y., July 25, 1879.

ELECTRICAL LETTER BOXES.—Among the recent applications of electricity is an attachment to street letter boxes, so arranged that if an attempt is made to rob the box an alarm will be instantly sounded at the nearest police station.

MISCELLANEOUS INVENTIONS.

Mr. Edwin N. Cowdery, of Kalamazoo, Mich., has invented a windmill having its wheel and vane hung upon horizontal trunnions, so that the wheel will be balanced normally by the vane, and may be swung to present the edge of the wheel more or less to the wind. A weighted arm is connected to the vane-staff so as to move with the staff and wheel, and balance the parts in whatever position they may be turned by the wind.

A device for preventing saws when they are in motion from deviating from their proper course, and thereby producing boards of irregular thickness, has been patented by Messrs. I. N. Kendall, of Buckingham, and R. Hall, of Gatineau Mills, Quebec, Canada.

An improved cigar-box has been patented by Mr. Charles Heylmann, of Chicago, Ill. This invention relates to an improved construction of cigar-boxes, by which the cigars may be more advantageously exhibited for retailing, and the boxes arranged without any loss of space or inconvenience in the show-case.

Mr. William H. Allen, of No. 18 West 11th Street, New York city, has patented an improved automatic grain weigher and register for weighing grain, flour, and other similar substances as they flow from a spout into a hopper or receiver. The apparatus is so constructed as to deliver the substance in exact and uniform quantities and accurately register the quantity delivered. The invention consists in an arrangement of an open bottomed suspended vessel having a pivoted partition and supported upon a scale beam of peculiar construction. The relation of the supply spout and pivoted partition is such that the latter is held in position by the former until the vessel contains the required amount, when the downward movement of the vessel releases the pivoted partition, the grain escapes, and the recording mechanism is operated. The parts automatically regain their normal position and the vessel again fills and discharges.

Mr. Emanuel J. Trum, of Brooklyn, N. Y., has patented an improved calendar, which will display two successive months and days of the week in their proper order opposite figures indicating the days of the month. The invention consists in placing the figures of the calendar on a card, and above and below these strips of paper or card, on which are printed the month, year, and days of the week, one strip indicating the month last past and the other the current month.

Mr. William Wilmington, of Toledo, Ohio, has patented improvements in the moulds used in casting car wheels. The invention consists in inclosing the outer periphery and a portion of the bottom of the chill in a suitable ring, while a portion of the top of the chill is embraced by the bottom of the cope, provided with mechanical devices that will retain the chill in place when moulding the wheel, and at a later period will permit the chill to expand freely during the operation of casting.

Mr. Henry R. Robbins, of Baltimore, Md., has patented an improved letter box of the kind ordinarily located upon lamp-posts, which indicates the time of the collection of the mails throughout the day, provides an increased security for the letters, and keeps the letters and papers separate from each other.

Mr. Zelotes McKinley, of Camden, Mich., has invented an improvement in the class of washboilers constructed so that when placed over a fire a circulation of water is induced through the clothes, the hot water from below being raised by the steam and poured over the clothes in a stream or cascade to again find its way back to the chamber in the bottom of the boiler. The invention consists in the peculiar construction of the false bottom of the boiler.

An improvement in the class of middlings purifiers, in which an air blast passes through a sieve or screen for the purpose of carrying off the dust, fuzz, and light particles of bran, has been patented by Mr. Jacob Fitz, of Hanover, Pa. It relates to the construction and arrangement of parts, which cannot be readily described without an engraving.

A device adapted for attachment to a churn for the purpose of catching the cream that escapes through the dash opening and returning it to the churn, has been patented by Mr. Homer A. Noe, of Republic, Mo. The invention consists in a trapping device that is placed upon the dash rod and rests on the churn cover.

Mr. Fredrique R. Lewis, of Troy, N. Y., has invented an improvement in water coolers, which consists in furnishing a water cooler with a central water tube or chamber, the upper end of which is carried to the side wall of the cooler, and communicates through an aperture in the inside lining with a box provided with a filter and connected with a water supply pipe. The space between the walls of the cooler and the water chamber receives the ice. The water passes from the supply pipe through the filter to the water chamber, is cooled by the surrounding ice, and drawn off through a faucet in the bottom.

Mr. August Witte, of Kansas City, Mo., has invented an improved device for holding a door open, which consists in the combination of a base plate provided with lugs, a pawl provided with an arm and a hook, and a catch-plate provided with the flange, the parts being arranged so that the device may be readily operated by the foot.

In an improvement in extension stovepipes, patented by Mr. Robert R. Pattison, of Terre Haute, Ind., the inventor makes use of pipe in lengths, fitted together to move telescopically upon each other, and fitted with a spring catch of peculiar construction, whereby the pipes are held securely in any position to which they are adjusted.

Mr James W. Winn, of Haverhill, Mass., has invented an improved boot and shoe protector, which saves the sole of the shoe from wear, as it does not allow it to come in contact with the ground at all. It prevents mud, gravel, dirt, etc., from getting in the seam between the upper and sole, and thus protects the seam from the cutting and wearing action; and it protects the lower part of the upper and the toe from rubbing against the gravel, stones, etc.

Mr. James Robertson, of East Cambridge, Mass., has invented an improved hook for securing and controlling animals for slaughter and for other purposes. It is so constructed that the struggles of the animal to escape after being secured will only cause the device to hold with more certainty.

Mr Ephraim S. Morton, of Plymouth, Mass., has patented an improvement in bows, which consists in making the bow in two parts and connecting these parts by a hinge joint, so that when the bow is bent the hinge is opened, and held in that position by the string.

Messrs. Robert B. and Henry H. Russell, of Orange, Tex., have patented an improved method of packing shingles, consisting in arranging them in alternate longitudinal and transverse layers, so as to create air spaces throughout the pack. The pack is secured together with two crossbars, of wood, drawn tightly upon its center by tin or sheet iron bands.

Mr. Henry A. Robertson, of Haskins, Ohio, has devised an elastic prop or bearing for carriage tops for supporting them when turned back; and the object of the improvement is to preserve the framework of the top.

An improvement in gates has been patented by Mr. George W. Addis, of Clarkston, Mich. The improvements relate to the class of gates which are fitted to roll back part way and then swing at right angles. The gate is inexpensive and durable; there is but little liability of sagging or racking, and it is easily operated.

Mr. John P. Simons, of San Francisco, Cal., has invented an improved gun-wiper, which consists of a helical spring, the fixed end attached to a metal stock that screws into the end of the ramrod. To the spring is attached the cloth forming the swab, so that when entered into the barrel the spring refracts, but at the same time exerts a continued pressure, and thus causes the swab to take up and remove all accumulations. When used as a scraper the swab is removed, and the free knife edge of the spring acts on the surface of the barrel and takes off the lead.

A tablet designed for the use of penmen, engravers, and all persons who have lettering to do, is the invention of Mr. Herbert W. Kibbe, of Utica, N. Y. It is a self-instructor in lettering. Every letter in the alphabet can be formed complete with it, and with no more skill than is required in the use of a common ruler.

Mr. Amand Van De Wiele, of Brussels, Belgium, has invented an improved combined open grate and blower. The object of this invention is to modify or increase the draught in open fire grates by a movable blower that may be lowered upon the basket of the grate or elevated out of sight by simply turning a button attached to the front of the grate.

An improved camp chair, which is so constructed that it may be readily adjusted in an erect position, or at any desired inclination, which may be so compactly folded as to require no more space than the thickness of one of its frame timbers, is the invention of Messrs. William H. Gifford and William M. Bates, of Poughkeepsie, N. Y.

An improved device for attachment to windows to serve as a guard to the window when open to prevent children from falling out through it, has been patented by Mr. Solomon Weinhandler, of New York city. It is so constructed that it will rise out of the way when not required for use.

Mr. Charles A. J. Campbell, of Brooklyn, E. D., N. Y., has patented an improved detachable shoe for horses that may be attached as a temporary substitute in case a horse casts a shoe while on the road; they may be changed in width to suit any sized foot.

Mr. George W. Swain, of Brooklyn, N. Y., has patented an improved nursery chair, adapted to be used as a high or low chair, or as a carriage. It is readily changed from one form to the other, and is complete when used as a high or low chair.

Mr. James L. McKeever, of New York city, has patented an improved bed or cot, having parallel sides and rounded ends, and in a hinged cover of wire or other netting supported by a frame which is similar in form to the frame of the bed. The object of the invention is to construct a light strong bed having a protective covering of wire netting, to be used in hospitals and sick-rooms for the protection of patients against flies and other insects. It is also intended for use as an outdoor bed in warm countries.

Mr. Amandus Getzschmann, of Omaha, Neb., has patented an improved device for stopping runaway horses, which consists of a movable sleeve sliding on two guide rails that project from the sides of the carriage or wagon pole. The sleeve is held in position by a stout hook that is pivoted in a slot in the pole, which engages in the corresponding hole in the sleeve. This hook is also provided with an eye, to which a strap is attached. This strap is led to the seat of the driver, so that he can at any moment unhook the sleeve and allow it to slide freely on the pole. Should the horses attempt to run away, the driver will pull the line, the sleeve is unhitched and slides forward, and a strap is drawn in the opposite direction, causing the bit straps to operate on the bits and bring the horses to a standstill.

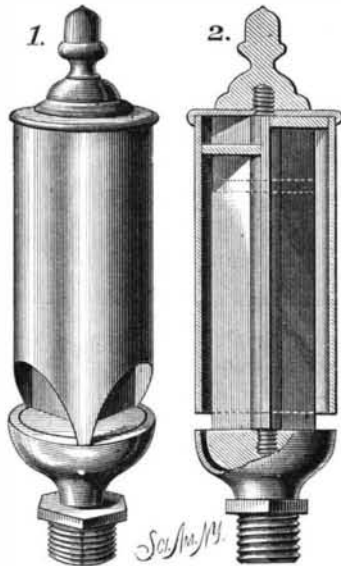
Mr. Frank Imhof, of New York city, has patented a paper box for banjos, violins, guitars, and other similar instru-

ments. The improvement consists in making the bottom and top and also the sides in separate parts, so as to avoid the trouble and difficulty of bending the sides around the edges for the whole length of the box.

Mr Augustus B. Wood, of Fountain Hill, Ark., has patented an improved matchbox or case for carrying matches in the pocket, which is so constructed that the matches may be forced out one at a time, as required, and at the same time ignited.

IMPROVED STEAM WHISTLE.

The whistle shown in the accompanying engraving is divided longitudinally into three or more compartments of different lengths, each compartment being provided with an aperture for receiving steam and with the usual mouth. The object is to produce three or more sounds simultaneously. The usual way of doing this is to attach three or

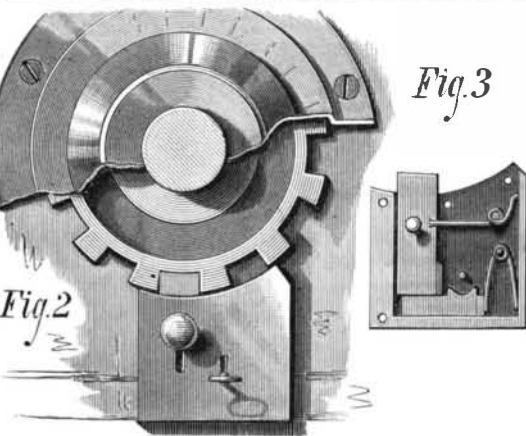
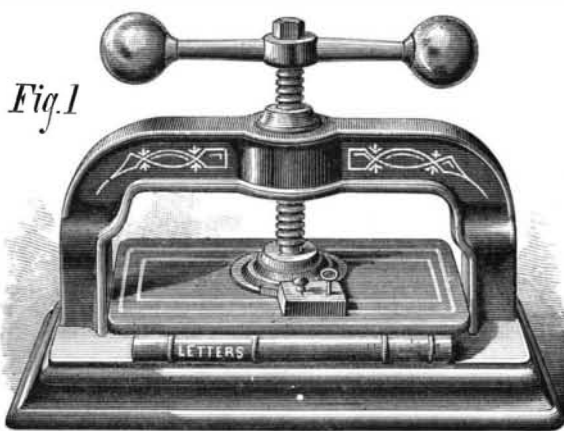


EINIG'S STEAM WHISTLE.

more steam whistles to a single pipe and admit steam to them all through a single valve, but this incurs the expense of three whistles and wastes an appreciable quantity of steam. The whistle shown in the accompanying engraving costs but little if any more than one of ordinary construction. More or less than three compartments may be formed in the same shell or tube, and the whistle may be made in either of the forms shown in the engraving. This whistle was recently patented by Mr. John Einig, of Jacksonville, Fla.

LOCK LETTER PRESS.

The letter press represented in the engraving secures letter copy books against abstraction and the curiosity of meddlers employed in or frequenting business offices. A toothed



HILL'S PATENT LOCK LETTER PRESS.

wheel is attached to the lower end of the screw, and to the platen is secured a lock the bolt of which enters between the teeth of the wheel on the screw.

When the platen is screwed down upon the letter book and the bolt of the lock is projected into the wheel on the screw as before indicated it will be impossible to turn the screw so as to release the book. The lock is so constructed that by pressing against a knob the press will be locked without the use of a key; but to unlock it a key is required.

The details of the lock are shown in Figs. 2 and 3. The operation of the lock is as follows: The inner spring presses

the main bolt away from the gear, while the outer spring presses the supplemental bolt against the side of main bolt. When the main bolt is pressed into a recess in the toothed wheel the supplementary bolt at once springs past the end of the main bolt, and the press is locked. To unlock it, the key is inserted and the supplemental bolt is pressed away from the outer end of the main bolt, when that bolt instantly disengages itself by the action of the inner spring, and so remains unlocked until pressure is again applied to the key when it is desired to lock it.

This improvement is simple and inexpensive, and commends itself to any one having use for such an article. The patent was obtained July 9, 1878. For further information address the inventor, Mr. John Hill, of Columbus, Georgia.

Petroleum.

When we are told that at the present time over 1,800,000 gallons of petroleum or earth oil are brought to the surface every day in the oil regions of Pennsylvania alone, the mind is staggered by the contemplation of the magnitude of this comparatively new industry. So lavish is Mother Earth of her hidden stores of oil that it is sent to the surface much faster than it can be taken care of, or stored, and at the present time 300,000 gallons, at the lowest estimate, run to waste every day. The great United Pipe Line, and other methods of conveyance, utterly fail to convey the oil to markets, and the enormous tanks for storage are full to overflowing. There are tanks owned by companies which hold 5,000,000 barrels of oil, and all of them are full. The wooden tanks owned by individuals and private concerns amount in their aggregate capacity to as large a number of barrels, and these also are full.

Thus it will be understood that there are great lakes of oil above ground, as well as below; but there is good reason to believe that the subterranean deposits may with greater propriety be called oceans rather than lakes. The oil workers are evidently pumping from inexhaustible supplies in the rock chambers below, and what are called the "spouting wells" deliver their vast currents with the same impetuosity as when the drills first tapped the pent-up stores. An interesting inquiry arises as regards what becomes of the oil that cannot be secured; into what does it flow, and where is its final resting place? Any one who has visited the oil regions will know of the nature of the country, and readily understand that much of the oil flows into brooks or small rivers, and in time finds its way into the large rivers, and is lost ultimately in the Gulf of Mexico or the Atlantic Ocean. Still larger quantities are absorbed by the earth in ravines and marshy places, and thus it is lost to view. In the famous district one is led to exclaim, "Oil, oil everywhere, and no undistinct water to drink." There is oil in the soil; oil in the springs; oil on the bushes and trees; oil in the atmosphere, apparently; oil on the clothing, and in the mouth, eyes, and hair of the workmen; the bread and coffee of the region have the odor of oil, and the beds are saturated with it.

How wonderful is all this! Well do we remember when the first vial of "rock oil" fell into our hands. It was called "Seneca oil," and it was claimed to be a most efficacious remedy for a variety of ills to which the human body is subject. The statement that it flowed spontaneously from a spring in Pennsylvania was received at first with much incredulity, as that was regarded as impossible; but in a short space of time the truth was known, and the oil was no longer regarded as a mixture devised by human hands.

American petroleum oil is now used as a source of artificial illumination in nearly all parts of the world. It goes along with rum, powder, and muskets to the savage tribes of Africa, and the mud houses on the banks of the rivers of the interior are illuminated by its combustion; it is found in the interior of the Turkish Empire, in Persia, in Egypt, in Palestine, in China, in Japan, and in the remote islands of the sea. For the paltry sum of fifteen cents we can purchase a gallon of the clear refined oil, and the cost of the light afforded, in comparison with gas as furnished at the lowest cost in cities, is as one to twenty in its favor. It is just now the most formidable antagonist of gas, and we can scarcely hope in the utilization of electrical force in the future, to secure light at a lower expense.—*Boston Journal of Chemistry.*

A 1,500 Horse Power Hoister.

The new hoisting machinery for the Yellow Jacket shaft, now being constructed in San Francisco, will be surpassed by nothing of the kind on the Comstock. It will be a double cylinder, directacting hoist. Each engine will have a stroke of eight feet, cylinders 28 inches in diameter, and will be of a non-condensing character. They are to work at a steam pressure of 120 lb. to the square inch, and at 50 revolutions per minute will have a piston speed of 800 feet. While hoisting from a depth of 4,000 feet each will exert 1,500 horse power. A flat steel rope, 7 inches wide, 1/2 inch thick, and 4,000 feet long, will be used in hoisting. The Union shaft is now supplied with hoisting works, and will soon be furnished with pumping machinery superior to any now in use on the Comstock. The new pumping engine will be of the compound condensing style, the initial cylinder being 64 inches in diameter, with a stroke of 7 feet. The expansion cylinder is 100 inches in diameter and 8 feet stroke. It will have 8 strokes a minute and 136 feet of piston speed in the same time, and will exert about 1,500 horse power. It will operate a double line of 14 inch pumps, having a stroke of 10 feet.—*Virginia Enterprise.*