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A Peruvian Infernal Machine.

On the 3d of July the Chilean transport steamer *Loa* was destroyed in Callao Bay by an ingenious and effective torpedo boat. A Peruvian officer took an ordinary fruit boat, put a torpedo in the bottom, and over this he placed a false bottom, resting on springs kept down by the weight of the cargo. He then loaded it with a very choice assortment of camotes, yucas, chirimoyos, grandillas, fowls, turkeys, green vegetables, etc., and, towing it toward the blockading squadron before daylight, set it adrift.

After floating about for some hours the torpedo boat was seized by the Chileans and brought alongside the *Loa*. As the weight on the false bottom was diminished by the transference of the cargo, the machinery in connection with the torpedo was set free, and in a moment 300 pounds of dynamite were exploded and the *Loa* was almost lifted out of the water. The effect, as described by those who were watching the operation from the shore, was awful in the extreme. Every house in Callao was shaken to its foundations, and every ship in the bay shivered as though a fearful earthquake had spent its fury beneath them. The fated ship appeared

as enveloped in one mass of flame, which resolved itself into dense clouds of black smoke. When this cleared away she seemed not to have suffered, but suddenly she was seen to sink at the stern, while her bows went high in the air, and the *Loa* disappeared forever.

Boats from neutral vessels picked up about 40 of the *Loa*'s crew; the rest, to the number of 150 or more, perished.

The *Loa* was an English built iron steamer. She was armed with one long range seventy-pounder and four smaller pieces, and at the time of foundering had on board two long range seventies, which were to have been mounted on the iron clad *Blanco Encalada*, 140 tons of shot and shell, and a miscellaneous cargo for the fleet.

ELECTRIC LIGHT FOR MARINE USE.

The unprecedented number of disastrous and terrible accidents that have occurred from collisions of steam vessels in fogs, during the last six months, have created a great deal of speculation and provoked much discussion in mechanical and scientific circles as to the best means of averting such disasters. It is generally conceded that among all the

devices and appliances proposed for this purpose there is nothing that promises so well as the electric light. It is not only the strongest artificial light, but the smallness of the point from which the light emanates renders it singularly well calculated for projecting a concentrated or parallel beam, and makes it possible to get one hundred times more light exactly in the focus of a reflector than by any other means.

Fog is simply a supersaturated atmosphere, an atmosphere whose transparency is affected by a surcharge of vapor. A slight rise in the temperature dissipates it. The sun raises the temperature of the air, and the air absorbs the water and becomes transparent. The quantity of solid or liquid matter required to give a foggy appearance to the air is surprisingly small, and the heat required to dissipate it is not very great. The electric beam, owing to its great heat, warms up all opaque bodies in its path, and, as it might be said, cuts out a way for itself through the fog; thus giving it an unobstructed path for a considerable distance. To produce this result, however, the beam of light

[Continued on page 130.]

Fig. 2.

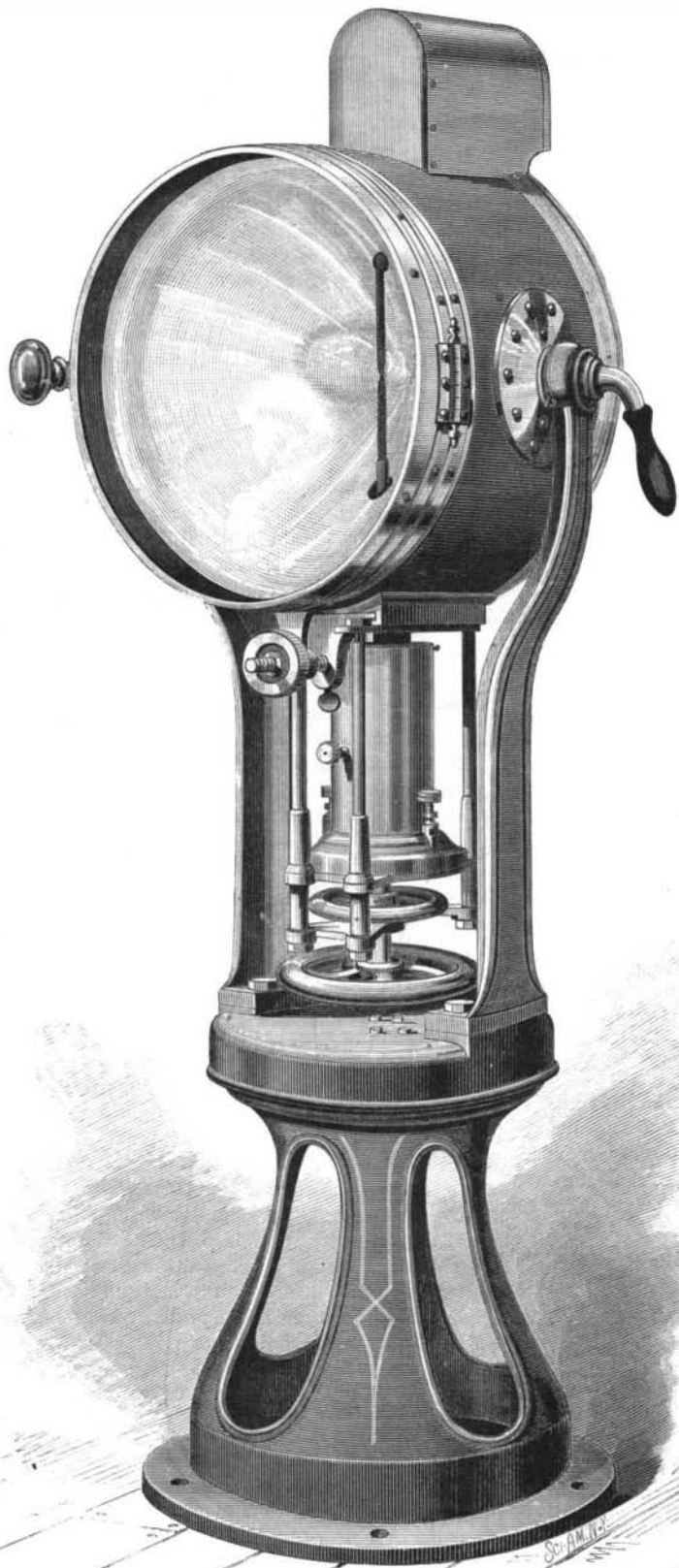
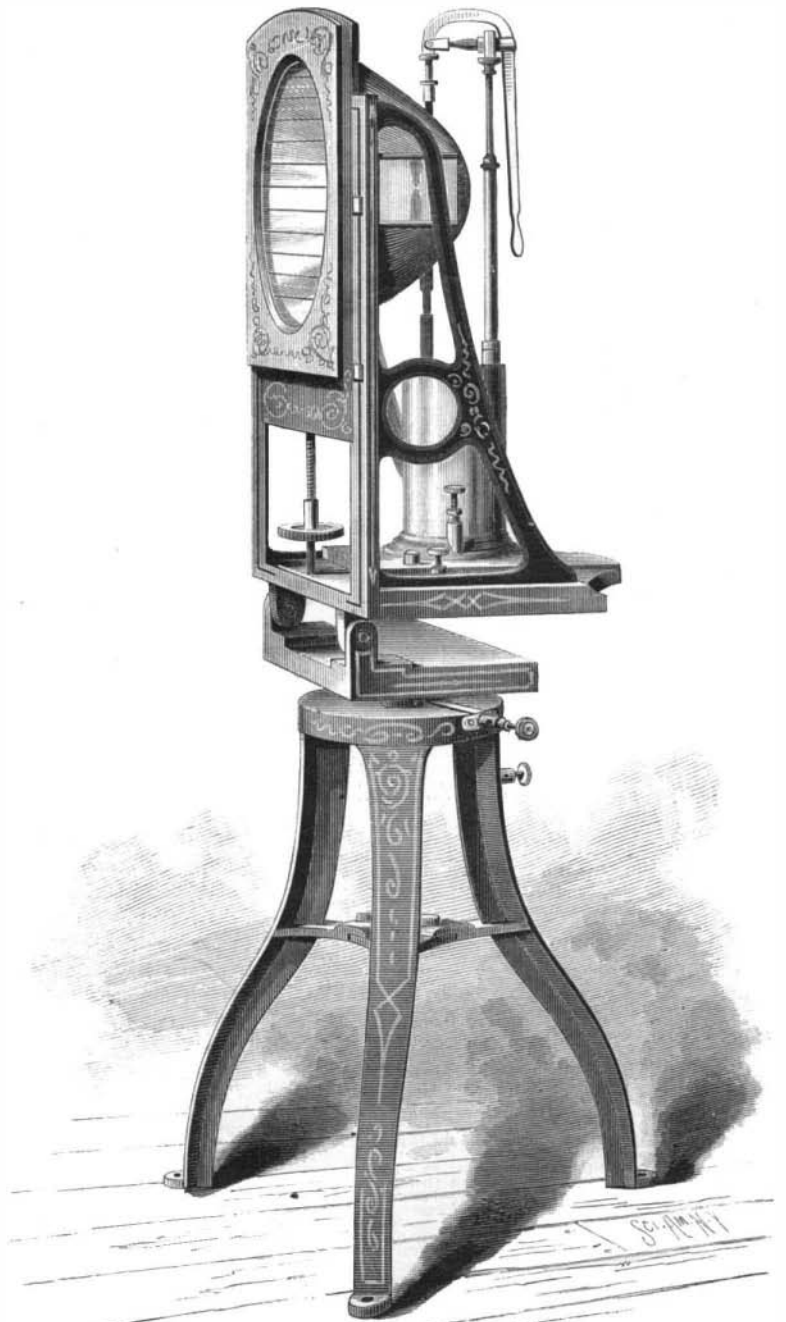


Fig. 3.



MAXIM'S ELECTRIC LIGHT PROJECTORS FOR LAND AND MARINE PURPOSES.

FIRE IN A PENNSYLVANIA COAL MINE.

A fire which threatens to be one of the most disastrous in the history of American coal mining, broke out August 9, in the Keely Run Colliery, at Shenandoah, Pa. No lives were lost, and all the mules and portable machinery had been safely brought to the surface before the fire became fully developed. Mine Inspector Parton and Ex-Mine Inspector Edmunds attribute the fire to spontaneous combustion in a quantity of coal waste which had been dumped into a break leading into the mine. A breast had been worked up to the surface not far from the breaker, and the opening had been used as an economical receptacle for dirt, slate, and other mining refuse. The natural oxidation of this stuff caused an outflow of "white damp" into the mine, and the efforts made to ventilate the mine only served to force more air through the heated and inflammable matter, resulting in its general combustion and the threatened destruction of the entire mine.

The Keely Colliery is in the mammoth vein, and its workings connect with those of the Kohinoor Colliery and with those of Colliery No. 3. The situation is a critical one, as the Keely Run Colliery cannot be flooded without drowning others; while if it is not flooded the fire must spread to and ruin a number of very valuable properties.

ELECTRIC LIGHT FOR MARINE USE.

[Continued from first page.]

must be a very strong one, and concentrated to its smallest possible dimensions, in order that the volume of air operated upon may be very small.

We give herewith engravings of electric light apparatus designed by Hiram S. Maxim, M.E., the electrician of the United States Electric Lighting Company, for projecting a strong parallel beam for marine and other uses.

Fig. 1 (on this page) represents the dynamo-electric machine for producing the electric current. This machine has an armature of soft iron rings, with the wire wound parallel to the axis, both plates and wires being so arranged that a free circulation of air through the armature prevents any dangerous heating, even if the machine is run on a short closed circuit—a test that would soon destroy many of the best foreign machines. The armature is so built up in sections that no current is induced in anything except the wires which generate the current for use. The magnets are of soft iron bars with spaces between.

The commutator is large and heavy, with the sections curved in a right and left hand spiral, so that no break in the current is possible.

The whole forms a neat and compact piece of machinery, admirably built and well calculated for the purpose intended. It may be driven with a belt from any source of power, or a small high speed engine which has been especially designed by the same inventor may be applied directly to the spindle, thus completely obviating the annoyance and vexations accompanying the use of belts in a damp atmosphere.

Fig. 2 represents the projector for throwing the light. It consists of a strong brass cylindrical case mounted on trunnions, so that it moves freely in any direction. The lamp used in this projector is the same as described in these columns some months ago (Maxim's patent). It is a focusing lamp, that is, one that feeds both carbons in proportion to their consumption, thus keeping the luminous points always in the same place. To enable the operator to bring the carbon points exactly in the focus of the reflector, regulating screws are provided. The lamp may be raised or lowered at will, or moved forward or backward with equal facility. A small lens placed in the side of the reflector throws an inverted image of the carbon points on a ground glass screen, so that their action and position may be observed without any danger or inconvenience to the eyes of the operator. The silvered reflector is eighteen inches in diameter, and in form is a perfect parabola. The apparatus is highly finished and presents a fine appearance on the deck of a ship. It is inclosed so that a heavy sea cannot interfere with its perfect working. When it is desired to cut off all light in the foreground, and illuminate only distant objects, a long funnel-shaped bonnet is fastened to the front, thus removing all except the small central beam.

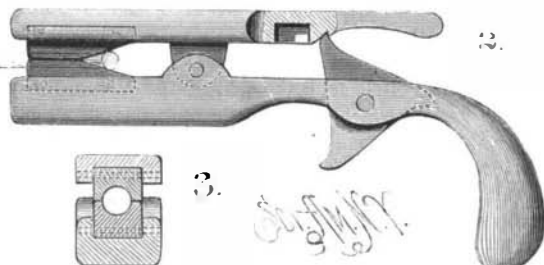
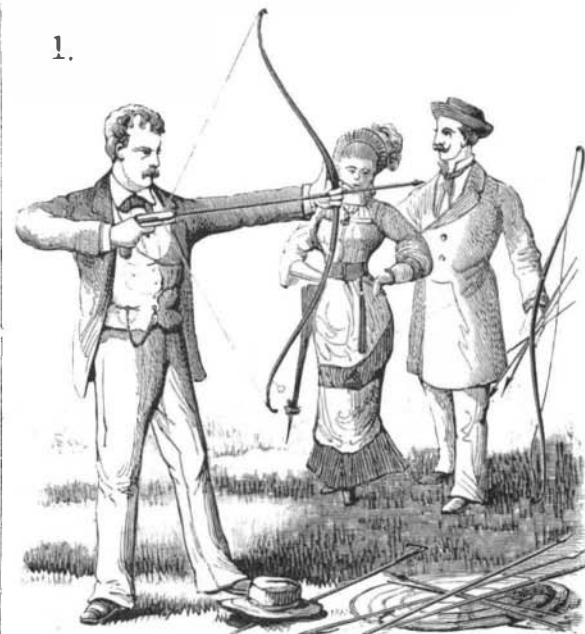
Fig. 3 represents a cheaper form of projector, which may be used on land or on river steamers. It has all the movements and will produce the same results as the more expensive type, shown in Fig. 2. The front glass is in strips to prevent breakage, due to the intense heat evolved. Either of these projectors will throw a beam of light strong enough to read by, at a distance of five miles on a clear night and many hundred feet in a dense fog.

Further information may be obtained by addressing the United States Electric Lighting Company, 120 Broadway, New York.

The great Corliss engine of the Centennial Exhibition now drives the machinery of the San Francisco Mint.

CLUTCH FOR BOW STRINGS.

A novel arrow holder, which holds the arrow and the string while the bow is being drawn, is shown in the annexed engraving. It is designed to be held in the hand like a pistol, and it clamps the arrow as well as the bow string, and when the string is strained to the required tension, it may be instantaneously released by simply pulling the trig-



BEARD'S CLUTCH FOR BOW STRINGS.

ger, and without the relaxation of the muscles of the archer's arm. The manner of using the device is shown in Fig. 1, while the clutch is shown on a larger scale in Fig. 2. Fig. 3 is a cross section near the end.

This invention was recently patented by Mr. C. M. Beard, of Elroy, Wis.

A Plucky and Intelligent Dog.

Recently a number of soldiers went from Fort Craig to the Rio Grande for a bath. Among them was Captain Jack Crawford. After being in the water about three quar-

and although there was not more than two feet of water where he stood, yet the current was so strong that it would carry him down should he lose his footing. He kept splashing water on those who had been tickling him, and bantering them to come on after him, when suddenly he made two or three desperate efforts to get back, but failed. Yet he said not a word, or the others might have joined hands and reached for him. No one dreamed for a moment that he was trying to extricate himself from the quicksand. All at once he went down like a piece of lead.

The next instant Jack's dog Hero, a beautiful St. Bernard, was seen swimming toward his master, while he set up a howl that seemed to say "I'm coming." Jack came up about twenty-five yards below where he went down, and right in the center of a terribly swift current, near where the river made a quick, sharp turn. He was almost exhausted when the sand broke from under him, and, striking a whirlpool, he could make little or no headway, and had to use all his strength to keep from being caught in the suction. Hill, a soldier, as soon as he saw the dog go for Jack, also sprang in the current, but Hero got to Jack first, just as he was going down the second time, and, taking him by the hair of the head, brought him above water. Jack, who never lost his presence of mind, caught the dog by the back just above the hip, and the faithful Hero brought him safe to shore, almost a mile below where he first went down. This was a narrow escape, as an officer and five soldiers went down nearly in the same place a few years ago and were never seen. A wagon and team of mules disappeared in the river two years ago and have not turned up yet.

An old Mexican brought Jack over from the opposite shore in a boat, while Hero never ceased licking his hands and face until he came out of the boat.—*Denver (Col.) Tribune*

MECHANICAL INVENTIONS.

Mr. Herbert Symonds, of Detroit, Mich., has patented an improved hooded coal hod, which is so constructed that the coal cannot fall off at the sides and back while being emptied, and so that they cannot have their discharge aperture clogged while being filled.

An improved folding attachment for sewing machines has been patented by Messrs. James S. Foley and George W. Comee, of Waseca, Minn. The object of the invention is to fold the cloth once before it is hemmed, and it consists in a combination which cannot be clearly described without engravings.

Mr. Joseph Langlois, of St. Johns, Quebec, Canada, has patented an improvement in heel trimming machines, which consists of novel devices for holding, tightening, raising, lowering, centering, and otherwise adjusting the trimming knife, and for holding and releasing the boot or shoe operated upon, and of other novel auxiliary parts.

An improved attachment for sewing machines which will fold down the seam immediately in front of the needle, so that the basting and ironing will not be required, has been patented by Mr. Johann F. Schroeder, of Brooklyn, E. D., N. Y.

An improved portable elevator which is to take the place of ladders has been patented by Mr. Horace H. Barnes, of Dryden, Mich. It is simple and convenient, and it consists of a central post provided with a number of pivoted braces, and surrounded by a sliding box platform provided with a windlass, the rope of which passes over suitable pulleys and is fastened to the central post, so that by winding the rope on to the drum of the windlass the platform and the person on it are raised to any desired height, and may be held there by a pivoted brake pawl.

A simple and effective double action lifting jack has been patented by Mr. James F. McCormick, of Louisville, Ky. The invention consists of a hollow rack toothed column, in which moves a vertical working bar that carries pivoted on its head a bifurcated lever, within each end of which lever are pivoted curved swinging pawls that engage alternately with the rack teeth of the column as the lever is operated, and thereby elevate the working bar.

Mr. Charles H. Shippee, of Wickford, R. I., has patented an improvement in car couplings, the object of which is to permit of coupling the cars automatically and avoid danger to life and limb; also to construct couplings so that they will couple with the Miller coupling and with a common link to any usual form of drawhead.

Mr. Charles Seymour, of Defiance, O., has patented an improved hub turning lathe, the object of which is to obtain a more rapid reduction of the hub block than can be obtained by the ordinary means; also to dispense with complicated and rapidly wearing parts, and simplify the mechanism for shifting the cutters.

Mr. Albert F. Pflughaupt, Jr., of Brooklyn, N. Y., has patented an improved device for preventing the entrance of sewer gas into buildings. This device is so constructed as to operate automatically to discharge the sewage into the sewer.

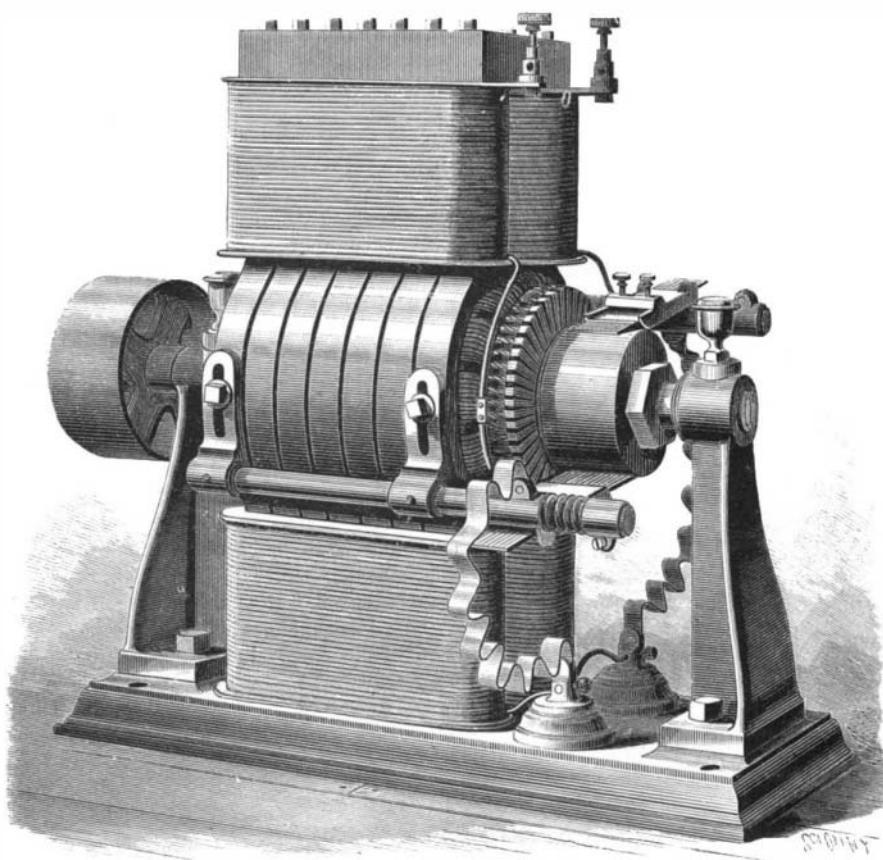


Fig. 1.—MAXIM'S DYNAMO-ELECTRIC MACHINE.

ters of an hour Captain Jack started to cross toward the other side of a sand bar, on which the water was only from six inches to a foot deep. Several of the others followed Jack, and they had considerable fun tripping each other and rolling over in the water, while two of the boys got Jack down in the shallow water and tickled him in the ribs until he was nearly exhausted with laughter, being very ticklish. In order to get away from his tormentors Jack rolled over toward the deep water on the lower edge of the bar, and when he got up on his feet he kept backing down stream,