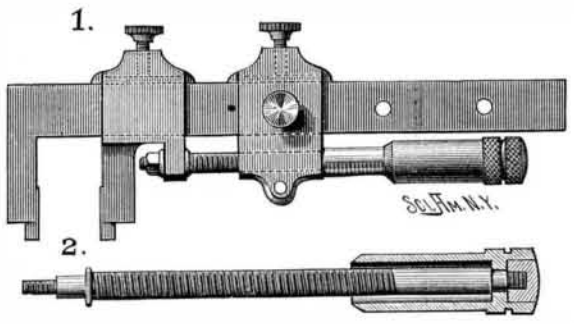
CALIPER GAUGE.

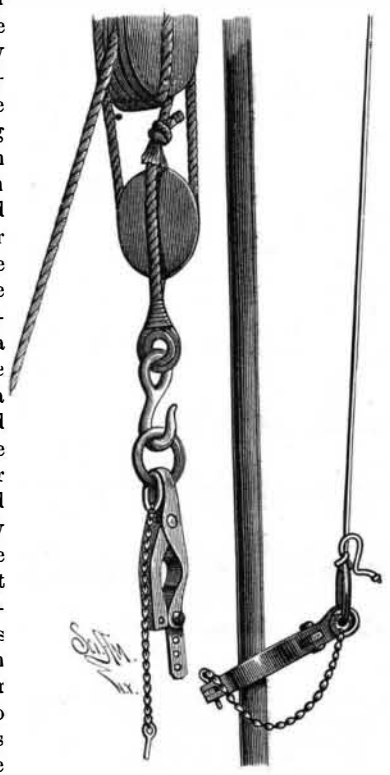
A caliper gauge arranged to be set by means of a screw and micrometer gauge graduations, whereby both internal and external measurements may be accurately made, has recently been patented by Mr. Eduard Sauter, of Hartford, Conn. One end of the beam is bent so as to form a right angle, and the inner end of the arm is reduced in size. A sliding jaw placed upon the long arm of the beam has an arm similar in shape to the first arm and placed parallel with it. A block or yoke also slides upon the long arm of the beam, but may be made fast to it by passing a pin through it and through either one of the holes in the beam, which are one inch apart. This permits the measurement of either long or short distances. To the rear edge of the yoke is secured a sleeve which is graduated and which forms the stationary graduation of the tool. The screw rod extends



through the sleeve, the yoke being tapped to receive the rod, whose front end is secured to the sliding jaw by a suitable nut and collar. On the other end of the screw rod is a revolving graduated sleeve, which, in connection with the sleeve on the yoke, constitutes the complete graduation of the tool. The sleeve on the screw rod surrounds the other sleeve and is clamped to the rear end of the screw by a nut (the construction will be readily understood from Fig. 2, which is a section through the screw rod), and is milled to facilitate turning for moving the jaw forward and backward. By the nut on the end of the rod, the rod may be adjusted while assembling the parts of the tool, or any wear occasioned by use may be taken up. The lower edge of the yoke is split and a screw inserted in order that the parts may be drawn together and clamp the screw rod, if this should be rendered necessary by wear. The jaw and sliding yoke are each provided with thumb screws by which they may be held fast to the beam. Fig. 1 is a side elevation of the gauge.

PIPE GRAPPLE.

The grapple under consideration is for use in raising and lowering pumps or well tubing, and for other work of similar character. The grapple is made with two jaws hinged together at one end, and provided with a link for their connection at the other end. The upper ends of the jaws are hinged together by a pin, one jaw extending beyond the hinge pin and being provided with an eye for connection with a hook and chain. The other ends of the jaws are slotted, and in one slot a link is permanently secured by a pin, and a movable pin carried by a chain is provided for connecting the link to the other jaw, so as to hold the two jaws firmly together, and at the same time permit of their disconnection. The two jaws are formed with concaves on their inner sides so as to allow the couplings on the pipes to be passed through without opening the jaws. In using the grapple two of them are necessary; one is attached to the pulley block for raising or lowering the pipe, and the other is suspended by a chain to some stationary beam, one or the other always being loose on the pipe. To use the grapple the pin is drawn from the one attached to the pulley, the grapple is opened, and the jaws passed around the pipe, when the pin is replaced.



As soon as a strain is put upon the hoisting rope, the grapple assumes an angular position with reference to the pipe and grasps it firmly, so that it may be raised or lowered. The other grapple is applied to the pipe directly under the one attached to the pulley block, and in the same manner. When the pipe has been raised or lowered to the desired position the ropes are slackened, so that the grapple may assume a right-angle position, allowing the coupling on the pipe to pass through freely. The stationary grapple holds the pipe while the other grapple is being shifted. The engraving represents one grapple attached to the pulley and the other in position on the pipe.

This invention has been patented by Mr. Elisha K. Green, of Los Angeles, Cal.

A Railroad in Palestine.

The first railroad in Palestine is being laid out, and the preliminary survey has been completed far as the Jordan. It is to run between Acre and Damascus, and it is called the Hamidié line, because it is named after his present Majesty, the Sultan Abdul Hamid, and probably one reason why the firman has been granted so easily lies in the fact that it passes through a great extent of property which he has recently acquired to the east of the plain of Esdraelon. The concession is held by ten or twelve gentlemen, some of whom are Moslems and some Christians, but all are Ottoman subjects resident in Syria. Among the most influential are the Messrs. Sursock, bankers, who own the greater part of the plain of Esdraelon, and who have, therefore, a large interest in the success of the line.

Starting from Acre, it will follow the curve of the bay for ten miles, in a southerly direction, at a distance of about two miles from the beach. Crossing the Kishon by a 60 foot bridge, it will turn east at the junction of a short branch line, two miles long, at Haifa. Hugging the foot of the Carmel Range, so as to avoid the Kishon marshes, it will pass through the gorge which separates that mountain from the lower ranges of the Galilee Hills, and debouch into the plain of Esdraelon. This plain it will traverse in its entire length. The station for Nazareth will be distant about twelve miles from that town; there may, however, be a short branch to the foot of the hills. So far there has only been a rise from the sea level in twenty miles of 210 feet, so that the grade is imperceptible. It now crosses the watershed and commences to descend across the plains of Jezreel to the valley of the Jordan. Here the Wady Jalud offers an easy incline as far as Beisan, the ancient Bethshan, and every mile of the country it has traversed so far is private property, and fairly cultivated.

At Beisan it enters upon a region which has, partly owing to malaria and partly to its insecurity, been abandoned to the Arabs, but it is the track of all others which the passage of a railway is likely to transfigure, for the abundance of the water, which is now allowed to stagnate in marshes, and which causes its unhealthiness, is destined to attract attention to its great fertility and natural advantages, which would, with proper drainage, render it the most profitable region in Palestine. Owing to the elevation of the springs, which send their copious streams across the site of Beisan, the rich plain which descends to the Jordan, 500 feet below, can be abundantly irrigated. There is a little bit of engineering required to carry the line down to the valley of the Jordan, here 800 feet below the level of the sea, which is then followed as far north as the Djisr el Medjâmieh.

Near this ancient Roman bridge of three arches, which is used to this day by the caravans of camels which bring the produce of the Hauran to the coast, the new railway bridge will cross the Jordan, probably the only one in the world which will have for its neighbor an actual bridge in use which was built by the Romans, thus, in this now semi-barbarous country, bringing into close contact an ancient and a modern civilization. After crossing the Jordan the line will follow the banks of that river to its junction with the Yarmuk, which it will also cross, and then traverse a fertile plain of rich alluvium, about five miles long and four wide, to the banks of the ridge which overlooks the eastern margin of the Sea of Tiberias. This is the extent to which the survey has been completed.

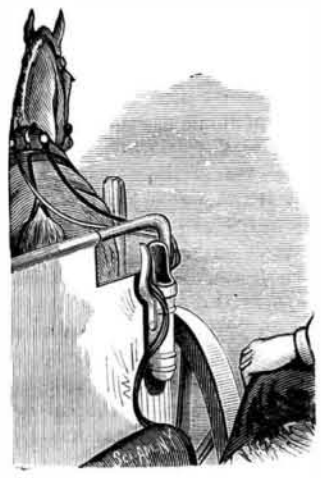
It is not decided whether to rise from the valley by the ridge which overlooks the Yarmuk, or to follow the east shore of the Lake of Tiberias to the Wady Semakh, which offers great advantages for a grade by which to ascend nearly 3,000 feet in about fifteen miles. This is the toughest bit of engineering on the line, and is in close proximity to the steep place down which the swine possessed by devils are said to have rushed into the sea. Once on the plateau, it will traverse the magnificent pasture lands of Jaulan and the grain growing country of Hauran, with probably a short branch to Mezrib, which is the principal grain emporium, and one of the most important halting places on the great pilgrimage road from Damascus to Mecca. It is calculated that the transport of grain alone from this region to the coast will suffice to pay a large dividend upon the capital required for the construction of the road, which will be about 130 miles in length. The grantees have also secured the right to put steam tugs upon the Lake of Tiberias, and under the influence of this new means of transportation the desolate shores will undergo transformation.—*Boston Advertiser.*

Burned by Melted Steel.

A very serious accident occurred during the meeting of the Iron and Steel Institute at Middlesborough, Eng., which painfully illustrates the danger incident to the visit of a large number of persons to industrial establishments. A number of members of the Institute visited the Northeastern Steel Works before the time appointed for their reception. When on the platform, on a level with the cupola top, one of the ladle buggies filled with molten metal stuck fast as it was pushed by a locomotive. The engineer backed up and tried to force the buggy over the obstruction by running against it. The shock broke the clutch, and the ladder began to swing around, slowly emptying its contents on the platform in the direction in which the visitors and a number of men were standing. All of them were covered with a spray of molten metal, a number were more or less injured, and one gentleman, Mr. Samuel Davison, of the Horbury Bridge Iron Works, near Wakefield, was so seriously burnt that he expired a few hours afterward.

COMBINED WHIP AND REIN HOLDER.

The whip socket may be made of wood, metal, leather, or any other suitable material, and can be secured to the dashboard or other part of the vehicle convenient to the driver. Its upper end is provided with a guide at the back for guiding the butt end of the whip down into the socket, which is a great convenience in putting away the whip while the carriage is in motion.



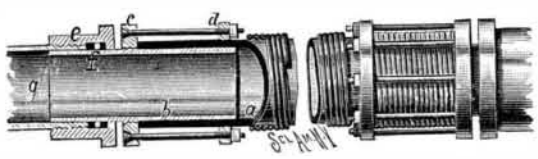
The device for holding the rein is a properly shaped flat spring, as shown in the engraving, secured to the side of the socket, with its upper end pressing against the outer surface of the socket or guide, so that the reins may be easily slipped between the spring and the socket, where they will be held by the pressure of the spring. The accompanying illustration shows the reins held by the spring. This invention has been patented by Messrs. Nathaniel Robertson and H. C. Doll, of Denver, Col.

Firemen Bothered by Iron Shutters.

At a fire in Lispenard Street, this city, on the 8th inst., the firemen lost considerable time in getting in the building, as the door and windows were guarded by iron shutters. As generally constructed, these shutters are rolled up by means of a crank or key upon the inside and cannot be raised or lowered from the outside. Upon this subject Chief Engineer Bates, of the Fire Department, said to a reporter: "Once inside the door the work is easy, though we have to fight for every inch of distance we raise them from the outside. They might just as well be made to work with the iron key of our hose carts, but they never are. The unnecessary delays to which firemen are subjected by such arrangements as these increase the aggregate loss from fires in this city from thirty to fifty per cent."

PIPE AND HOSE COUPLING.

The accompanying illustration of this coupling is a longitudinal elevation, parts being broken out and others shown in section. In each end of the rubber tube, *a*, is inserted a piece of metallic tubing, *b*, so that one-half of the latter projects from the end. At the end of the rubber tube, the metallic tube is threaded for the reception of a collar, *c*, against which the end of the rubber tube abuts. Wires are coiled firmly around the rubber tube to press it against the inner tube. A ring, *d*, rests against the other end of the coiled wire, and screw bolts having countersunk ends in the ring, *c*, pass through the ring, *d*, when by drawing the nuts up tightly the coiled wire will be pressed between the rings and against the rubber. Between the ends, the rubber tube



is wound with wire to strengthen it. The end of the metallic tube projecting from the rubber tube is provided with an annular ridge, *f*, between which and the adjoining ring, *c*, is the inwardly projecting end flange of a sleeve, *e*, which has its inner surface threaded to admit the end of the pipe, *g*. Packing rings are placed against both side surfaces of the annular ridge to insure a close joint. The pipe to be coupled is screwed into the collar, *e*, the end of the tube, *b*, passing into the end of the pipe, which rests against one of the packing rings.

This invention has been patented by Mr. J. Adolphe Perrottet, 413 Sixth Ave., New York city.

Resignation of Commissioner Marble.

The Secretary of the Interior has accepted the resignation of Edgar A. Marble, Commissioner of Patents, to take effect on October 31. Mr. Marble had tendered his resignation on three occasions during the present year, but it was withdrawn at the request of Secretary Teller. Several candidates for the commissionership have been considered, and the last rumor says the position has been offered to a Western ex Congressman, but the report needs confirming.

Fast Steam Navigation.

It is evident that next summer we shall see a very marked increase in the speed of ocean steamers. Already the Alaska and the City of Rome have crossed the ocean repeatedly in less than seven days. There are several other vessels the speed of which falls but little behind that of the two fliers just named, and it is quite possible, in view of the speed attained by the Aurania previous to the accident to her machinery, that she is as fast as, if not faster than, the Alaska and the Rome. The ocean passage having thus been cut down to a few hours less than seven days, the achievement of next summer will be the further shortening of the time to less than six days.

Of two steamers which will take their places on the Guion and the National Line, respectively, next spring, there is every reason to believe that they will greatly surpass the achievements of the fastest steamers now afloat. The new Guion steamer, the Oregon, has made two trial trips, and on each occasion has logged twenty knots an hour. This is equivalent to a speed of a little more than twenty-three miles an hour, or nearly three miles an hour more than the Alaska or the City of Rome has steamed. If the Oregon can maintain the same rate of speed when crossing the Atlantic she will make an average run of 550 miles a day, and will at that rate easily cross the Atlantic in less than six days. Of course, it is probable that her trial trips were made in the most favorable circumstances, and that a heavy head sea would reduce her speed. On the other hand, it must be remembered that her machinery is entirely new, and that after it has been in use for a few weeks her speed may reasonably be expected to increase.

The new National steamer, the America, is building in the same yard in which the Alaska, the Arizona, and the Oregon were built, and her builder guarantees that she shall have a speed of eighteen knots an hour. At this rate she can steam nearly 500 miles a day, and in all probability her speed will be above that which is guaranteed. At any rate, the America will be able to cross the Atlantic inside of six days, and will certainly be surpassed in speed by no steamer, unless it may be the Oregon.

Hitherto the National Steamship Company, which can boast of never having lost a passenger during the sixteen years of its existence—a boast which no other company can make except the Cunard Company—has not aimed at building fast steamers. Its managers have evidently now perceived that the time is close at hand when the freight and the passenger business must be separated. Of course, the slower steamers will continue to carry more or less passengers and the fast steamers will carry a small amount of freight; but in the near future it will be found profitable to build steamers mainly designed to carry passengers. The model of the America was recently exhibited at Liverpool, where it was awarded a gold medal for its excellence as a passenger vessel, and from the published descriptions it seems as if both the America and the Oregon will furnish accommodations as much superior to those of ordinary steamers as the accommodations of Pullman cars are to those of the ordinary model. Such vessels will always be crowded with passengers, at rates which will prove immensely profitable. Their success will stimulate efforts to build faster and, if possible, finer vessels, and there is no reason to doubt that within a very few years Mr. Pierce will accomplish his avowed purpose of building a steamer that will cross the Atlantic in five days.

Of Mr. Corbin's new steamers, which are to run between Montauk Point and Milford Haven, little is known except that the company is organized and that the vessels will be placed on the route next summer. It may be safely prophesied that as Mr. Corbin's original object was to shorten the Atlantic passage twenty four hours, he will not lose the advantage which his shorter route will give him, no matter how fast the Guion and National steamers may prove. If the latter make the passage within six days Mr. Corbin's steamers will have to make it within five days, a feat which can be performed even if his steamers should possess no greater speed than that of their Liverpool rivals.—*N. Y. Times.*

Steam Boiler Inspection.

Professor Thurston, in a communication to *Science* on the Riverdale boiler explosion, the particulars of which have been already published in these columns, censures the inspector, who had tested the boiler only two months previous to the explosion, for not having discovered its dangerous condition; and he adds, what every engineer knows to be a fact, that a steam boiler of the most ordinary and least dangerous type has stored within it an inconceivable amount of available energy in the form of heat, which may be at any moment transformed, in part, into mechanical energy with terribly destructive results, both to life and property; that this powerful agent for good or for evil can only be safely utilized when the utmost care, intelligence, and skill are employed in its application, and in the preservation of the vessel in which it is inclosed; that the present code of law relating to the care, management, and inspection of steam boilers, is entirely inadequate to insure safety; that the inspection of steam boilers, as at present practiced by the employes of the government, is not only liable to be inefficient, but is likely to prove worse than none, as it gives to the owner, and perhaps often to the man in charge, of the boiler, a feeling of security which is entirely without basis in fact, and which may therefore cause the neglect of that watchfulness which might otherwise prevent accident; that simple pressure produced by the test pump, as now provided for by the law, is not a sufficiently effective method of detecting weakness in the boiler, or to be relied upon to the exclusion of other better and well known methods of test.

The fact that the hydrostatic test is not conclusive as to the safety of a boiler has long been well known and admitted among intelligent engineers. The steam ferryboat Westfield met with precisely such an accident a dozen years ago; and it was shown at the coroner's inquest, at which the writer assisted that official in the examination of his expert witnesses, that the boiler had been inspected, and had been tested but a few weeks before, by the United States inspector, who applied a pressure considerably in excess of that at which the explosion took place. The cause of the accident, by which a large number of people lost their lives, was precisely that which caused the explosion of the Riverdale's boiler, and the method of rupture was the same. In either case, proper methods of inspection would have saved the lives of the sufferers.

It is undoubtedly true, as Professor Thurston states, that many of the inspectors are conscientious, experienced, skillful, and painstaking men, and do their duty in spite of the defects of the existing law; but it is also true that now and then a careless or incompetent inspector will neglect the simplest details of his work, and that we must expect occasional repetition of this sad experience, until the law is intelligently framed, and so administered that the passing of a defective boiler by the inspector shall become as nearly as possible an impossibility.

EVAPORATOR FOR REGISTERS.

We are all familiar with the disagreeable effects produced by the hot air coming from some furnaces and fireplace stoves. To overcome these difficulties the evaporator herewith illustrated was designed. It consists of a reservoir of water of suitable shape and size to be placed before the register as shown. A removable shield is so arranged that it

MEYER'S EVAPORATOR FOR REGISTERS.

deflects the heated air, which passes over the water, which it absorbs in its passage. It will be efficient in increasing the humidity of the air if placed over a floor register. The form permits of ornamentation, either elaborate or plain, according to the taste of the user. The evaporator was patented by Mr. John F. Meyer, of 28 N. Howard Street, Baltimore, Md., and Messrs. Southcomb & Bro., same address, are the sole agents.

Utilizing the Alligators.

A reporter for the New Orleans *Picayune* has been investigating the alligator, its uses, commercial value, etc. The following are some of his observations:

The edicts of fashion have sent hunters into the tropical forests of Borneo and Java to bring back the plumage of birds of paradise to decorate female head gear. To-day these same imperial edicts send the hunter to the swamps and jungles of Louisiana to procure the hide of the alligator for slippers to clothe the dainty feet of fair women and to make satchels and bags in which to carry their handkerchiefs and pocket money.

The most fashionable material for small valises, satchels, hand bags, portmonnaies, and the like, is the skin of the American alligator, and in all the Gulf States, from Florida to Texas, these saurians are hunted to supply the demand. This fashion has not been in vogue for a very long time, but for the past three years the slaughter of the alligator has been carried on with great activity.

A reporter desiring to make some inquiry as to the extent of the trade in the skins of these saurians, visited several dealers in hides and furs on Peters Street. A number of the dealers handle alligator hides quite largely, and they were found entirely willing to give information on the subject. At the warehouse of Messrs. B. F. Simms & Son, a lot of several thousand of these skins were seen in process of being packed for shipment to New York and Boston. The skins were in the state known to the trade as "green salted," the freshly gathered hides being pickled in salt and remaining soft and pliable. There were the skins of saurians, from those of youngsters not much more than a yard long to the hides of monsters that must have measured twelve to fifteen feet when alive. One skin, minus the tail and the snout, measured thirteen feet by the line, with a corresponding breadth. The integument freed from the bony scales, which, like massive plate and armor, cover the back and head of the animal, was as heavy and as thick as a bull's hide, of which stout sole leather is made.

Only the skin of the belly and sides is used, the back with its coat of mail being cut from the hide and thrown away as worthless. Of a blackish blue hue on the sides and bluish white under the belly, all the skins showed great uniformity of color, and each was curiously checkered in squares, which being separated by intersecting grooves and wrinkled, gave the peculiar checkered appearance seen in all alligator leather. The flat parts of the skin are used for bags and satchels, while those portions covering the knees and elbows of the monsters' legs are peculiarly suited for the fronts of shoes and boots.

The trade in these skins takes them of all sizes from four feet up, the average prices paid here for green skins ranging from ten cents each for the smallest to ninety cents for the largest. The skins most in demand are about seven feet long, which is perhaps an average of full grown alligators. Those from ten to fifteen feet long are classed as monsters.

Inquiry as to the number of these hides handled in this market during the present season elicited some variance of estimates among different dealers, but the figures may be put with a degree of accuracy at something like 50,000 skins. Three years ago 100,000 skins were handled here, and the next year the figures were reduced to 70,000. The further reduction to 50,000 for the present season caused inquiry, when it was learned that there is no lack of demand for the hides, but the alligators are actually growing scarcer as well as more difficult to find.

Besides the hides, there are other products of the alligator utilized for commercial purposes. The teeth, which are round, white, and conical, and as long as two joints of an average finger, are mounted with gold or silver, and used for jewelry trinkets and for teething babies to play with. All the teeth of the alligator are of this class of conical tusks, with no cutting or grinding apparatus, and hence the animal is forced to feed chiefly on carrion, which is ready prepared for his digestion.

The oil extracted from this creature has a high reputation among the swampers as a remedy for rheumatism, being given both inwardly and externally, and is produced to supply a limited demand.

The Lead Pencil.

There is no lead pencil; and there has been none for fifty years. There was a time when a spiracle of lead, cut from the bar or sheet, sufficed to make marks on white paper or some rougher abrading material. The name of lead pencil came from the old notion that the products of the Cumberland mines, England, were lead, instead of being plumbago, or graphite, a carbonate of iron, capable of leaving a lead-colored mark. With the original lead pencil or slip, and with the earlier styles of the "lead" pencil made direct from the Cumberland mine, the wetting of the pencil was a preliminary of writing. But since it has become a manufacture the lead pencil is adapted, by numbers or letters, to each particular design. There are grades of hardness, from the pencil that may be sharpened to a needle point, to one that makes a broad mark. Between the two extremes there are a number of graduations that cover all the conveniences of the lead pencil. These graduations are made by taking the original carbonate, and grinding it, and mixing it with a fine quality of clay in differing proportions, regard being had to the use of the pencil. The mixture is thorough, the mass is squeezed through dies to form and size it, is dried, and incased in its wood envelope.

Borax for Extracting Coloring Matters.

For isolating alizarin and purpurin from garancine, R. Palm digests in a solution of borax saturated in the cold until a deep blood-red solution is formed. The liquid is filtered and completely precipitated with sulphuric, hydrochloric, or acetic acid. The bulky violet-brown precipitate is boiled for a long time with a saturated solution of alum. From the filtered decoction alizarin is deposited on cooling and filtered off. The filtrate deposits alizarin on the addition of concentrated sulphuric acid. The author also applies borax for the extraction of santaline from sanders wood, and a violet coloring matter, not identical with carmine, from cochineal.—*Zeitschrift fur Anal. Chemie.*

Acknowledgment of Credit.

In the SCIENTIFIC AMERICAN for August 11, 1883, we gave illustrations of the Central Telephone Exchange of Paris, and by an inadvertence of our assistant, due credit therefor was omitted. We now take pleasure in saying that we were indebted for the engravings and particulars to our esteemed contemporary, *La Lumiere Electrique.*