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NEW YORK. SATURDAY, AUGUST 24, 1895.

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# No. 1025.

#### For the Week Ending Angust 24, 1895.

Price 10 cents. For sale by all newsdealers.

I. AGRICULTURE.-The Sugar Cane.-By C. A. BARBER..... 16378

- 16377

THE UNITED STATES CRUISER COLUMBIA.

We recorded recently the rapid voyage of our new war steamer the Columbia, from Southampton to New York, the object being to ascertain the reliability and fastest speed the ship is capable of on an ocean voyage. The time made was seven days, less eleven minutes. This comes within a few hours of being as quick a passage as the best of the regular American liners in the merchant service, and is probably the Prof. Lugger's experiments seem to have been well infastest speed ever made by a war vessel of any class on a continuous voyage of the same length, about 3,000 miles.

We infer, however, from the official report of Capt. Summer, that the Columbia had a narrow escape from breaking down in her boilers, and probably another similar effort would use her up altogether.

The report says: With a smooth sea in the English temperature. Channel the ship made 18 to 19 knots an hour. With all the hatches on the forecastle down, considerable ance of one ohm, develops therein 0.24 heat unit per water came on board. The maximum roll was nine- second. teen to port and seventeen to starboard. The ship was steaming 17 to 19 knots an hour on an allowance of 200 tons a day. At 12:10 A. M., July 27, a tube blew out in No. 6 connection of boiler F. and the boiler was put out of use for seven hours.

Wednesday.-Fair weather for the most part, sea smooth and moderate. Leaky tube in top row, middle box No. 6 fire room, boiler E. 1t was plugged with wooden plug. Steam was sent through auxiliary main <sup>1</sup> British Association units to legal ohms, the numerical pipes. Other plugs were placed in leaky tubes. The values have to be reduced by about one-tenth per vacuum was poor and getting poorer, and the main cent. condensers appeared to be greasy.

In closing his report Capt. Sumner says: "It was not deemed practicable to make the last twenty-four hours run under forced draught, because of the unreliability of the boilers (we were blowing out tubes at 140 pounds pressure), the loose state of the engines from the long run, the great fatigue of the crew, and to unwind it. It is just as well to reverse the connecabove all the impracticability or getting a coal supply to the boilers with sufficient rapidity, as the coal was located at this stage of the run. The run involved times the diameter of the annature core, if of wrought excessive labor on the part of most of the ship's company. There were twelve volunteers from deck on figures are 1.25 and 2.3. duty in the fire rooms for the whole run, and fortyeight more men from deck have been employed below for some days in supplying the lower bunkers with the field increases the induction and the electro-motive coal from the wing passages."

She had on board on starting from Southampton, 1,862 tons, of which she consumed 1.474 tons, leaving 328 tons on board when port was reached.

### CHINCH BUG EXTERMINATION.

One of the destructive pests of the Westis the chinch bug, which, in certain years, does immense damage to the crops all over the grain regions. It was learned some time ago that there was a fungous growth, or disease, a white, powdery, dust-like substance, considerably like many of the fungous growths which visit plants, which, when applied to the chinch bugs, killed them.

At the State Experiment Station connected with the State University of Minnesota some very interesting experiments are being conducted, under the direction of Prof. Otto Lugger, of the chair of entomology of the station, in spreading this disease among the healthy bugs of the farms of Minnesota. The results attained are, so far, very satisfactory, and it is probable, from what has already been accomplished, that in the future the farmers will be able to very largely control the pest, and, it may be, totally eradicate it.

In any event, the investigations are proving that there is an important economic side to the work, and it is but fair to say that thousands of dollars will be saved to the farmers by the spreading of the disease. It is quite probable, too, that they will be able in the future to wholly control this, in some seasons, one of the most serious dangers besetting the crops.

In brief, the method employed is as follows:

The disease, which is known as the Sporotrichum globuliferum, is cultivated at the station in large 

was a deadly foe to the chinch bugs. This practical application of the knowledge is a distinct and important step forward in the way of utilizing interesting and thoroughly scientific information for the economic advantage of the farmers of a vast region of country. Complete ultimate success seems assured, and the several thousands of dollars appropriated by the Minnes•ta State Legislature last winter for the carrying on of vested. Mr. R. H. Pettit, recently of Cornell University, New York, is assisting Prof. Lugger in the work.



#### ELECTRICAL ITEMS WORTH REPEATING.

----

The conductivity of metals decreases and that of some bad conductors or insulators increases with the

A current of one ampere, flowing through a resist-

Printers' roll composition makes an excellent flexible mould, but in electrotyping it can safely be used only in a saturated plating solution.

A horseshoe magnet will lift a load three or four times as great as a bar magnet of the same weight will lift.

One legal ohm equals 1.0112 British Association units; hence, to transform resistances expressed in

Plumbago brushed over the face of a medal or other metallic object—an electrotype copy of which is desired in intaglio-will prevent the copper or other metal electrically deposited from adhering.

In winding an armature, if it is found a coil has been wound in the wrong direction, it is unnecessary tions with the commutator.

Field magnet cores, for ring machines, should be 1.66 iron, or 3 times if of cast iron. For drum machines the

In designing a dynamo, the field magnet should be as strong as possible. An increase in the strength of force, or what amounts to the same thing, permits of decreasing the length of the armature for a given voltage.

Gutta percha heated in hot water at about 100° F. becomes plastic, and will take a fine impression with slight pressure. When gutta percha is soaked for a few hours in benzole or naphtha, it becomes swollen, and if it is then dipped in hot water, it becomes so plastic that it may be used with safety on very fragile and delicate objects. Specially adapted to electrotyping.

In two pole dynamos the proportions of ring armatures vary from a length equal to one-half the diameter to a length equal to one and one-half diameters. It is common to make the length equal to the diameter. For drum armatures the length sometimes equals one and one-half diameters and sometimes three diameters. It is common to find the length equal to two diameters.

According to Hering, with a suitable field magnet, every foot of active wire on the armature of a dynamo will generate about 1.2 volts, when the velocity of the wire is about forty feet per second. As the wire which lies in the neutral part of the field is twenty to twenty-five per cent of the whole amount of wire on the cylindrical surface, the active part is seventy-five to eighty per cent of the whole. For 110 volts the length of active wire will be  $110 \div 1.2 = 92$  feet of active wire, which must be embraced by one pole piece. On account of the winding being in two halves, in multiple arc, the length of active wire on one-half of the armature surface will be  $92 \div 0.75 = 123$ , the whole length of active wire being 246 feet. The size of the wire will be determined by the allowable resistance.

#### A REMARKABLE HYDRAULIC POWER SUPPLY. city of

-----

	V ELECTRICITYStandard Electric Locomotives	dred quarts per week. The disease is put up in small	There has recently been inaugurated at the city of
	1638/	tin boxes, an inch or so in diameter, and then shipped	Glasgow a system of hydraulic supply works that pos-
	VI. GARDENINGCovered Waysof Hardy Fruit Trees1 illustra- tion	to the farmers. The farmers collect a large number of	sesses features of special interest. For many years
	VIT MECHANICAL ENGINEERING - Biovolo Coor - A voluchio	healthy bugs, put them in low, damp wooden boxes in	the hydraulic hoists and presses in the city have
	scientific article on the gears of bicycles, with tables	which wheat is growing, sprinkle the bugs liberally	derived their power from the mains of the common
	Hydraulic Copying PressA novel use of the well known	with the powder, and then set them adrift among the	city water supply, which carried a pressure of 50
	Pumping Water by Compressed AirAn account of the Pohle	healthy bugs.	pounds to the square inch. While this was a good
	system of raising water 1 illustration	The result is that the diseased bugs convey the dis-	pressure for ordinary domestic and municipal pur-
VIII. PHYSICS.—Apparatus for Verifying librum of the Wedge2 illustrations The Liquefaction of Gases	VIII PHYSICSApparatus for Verifying the Law of the Equi-	ease to the healthy ones, and, as one bug may convey	poses, it was a low pressure for hydraulic machinery,
	librium of the Wedge2 illustrations	the disease to many hundreds and each one of these	and entailed the use of large diameter cylinders and
TV	IX STEAM ENGINEERING _A Petroleum-Heated Multitubular	many hundreds may convey it to other hundreds, it is	cumbersome plant; and, as a result of the large vol-
	Boiler.—1 illustration	not long before the disease is spread to an enormous	ume of cylinders, there was a correspondingly large
	Works3 illustrations 16382	extent.	consumption of water. Following the lead of Man-
	X. TECHNOLOGYPreparation of Electrotype MouldsGives de-	A tiny portion of the disease, to start with, is placed	chester, it was decided in the new works to adopt
	tails of some of the less well known parts of the process of elec- trotyping, including information in regard to making the moulds	in a good medium for culture—agar-agar, corn meal,	the abnormal pressure of 1.120 pounds to the square
	Sizing Papers with Waste Sulphite Cellulose Liquors	and beef tea and ordinary potato being the mediums	inch, or one half an English, or "long," ton. This
	Sugar Refining in New York 16387	most in use-and then the disease spores develop with	was done on grounds of economy, with a view to
	XI. TRAVEL AND EXPLORATIONA Visit to BassaeAn in-	marvelous rapidity. All the instruments for breeding	reducing the heavy consumption of water at the
	Influence of Science on MountaineeringAn interesting and	the disease are of the most improved pattern and the	lower pressure. Water at 1,120 pounds pressure has
	science and how science has influenced mountaineering	sterilizing outfit is complete.	22 times the efficiency of water at 50 pounds pressure :
	wrought by the insurgents2 illustrations 16376	It has been known for several years that this disease	and to effect a certain unit of work there will be re-

quired only 1-22 as much water at the higher pressure. | meter and will be placed upon the highest part of the | upon the wheel with the aid of a torch, without dis-Against this is to be reckoned the cost and operation midway, 65 feet above the lake level, thus carrying mounting. It is a curious fact that one of his legs is of the powerful pumping engines, accumulators, etc., passengers nearly 200 feet above the general eleva- an artificial one. and the massive piping and plant, that is rendered necessary by the enormous pressure they develop; | ing view of all the buildings, the grounds and the sur- many has taken to cycling, and is having a track built and also the extra care and more costly maintenance rounding country. The wheel will be lighted by elec- in the neighborhood of Berlin, to which, however, thereby involved. These latter items, however, are tricity at night; its capacity will be about 250 people relatively insignificant compared with the vast saving | at each revolution. of water. This is shown by the figures of Mr. Gale, the water engineer of the city, who estimates that a customer whose bill is at present \$350 will receive the same power for \$200 under the new system.

It would appear that this system of hydraulic supply from a central station has long passed out of the general exhibits of patents, which Mr. Seymour will The reasons advanced for the proposed innovation are experimental stage. The first experiments in this direction were carried out in Dublin, Ireland, in 1802. The development, by Sir William Armstrong, of the lecture on "The Inventions of Women" on October hydraulic press led to the laying down of works at 21. Hull; and in 1882 to 1884 a large system was established in London, where it has proved a great benefit most interesting departments of the Exposition. to the public and a complete financial success. There are in London 75 miles of mains, carrying a pressure of 750 pounds. This operates no less than 2,300 machines, and yields a revenue of \$250,000.

The plant of the Glasgow works is housed in substantial stone buildings, on the top of one of which is a art. The work of picture hanging was begun August large iron tank of 200,000 gallons capacity. It consists 10, of four large Lancashire boilers, three sets of pumping engines of 200 horse power each, and two accumulators. Each engine will pump 230 gallons per minute against the accumulator pressure of 1,120 pounds. | bicycle thief. A steel spring runs down the rear post The accumulators have rams of 18 inches diameter and 23 feet stroke.

have branch 6 inch and 5 inch pipes serving the main a clicking noise which can be heard a long distance. streets.

Compared with other systems of power supply from and the spring falls against the inner wall of the post. a central station, this is probably the least known.<sup>4</sup> all been tested on a large scale, the pneumatic system A few drops of diluted aqua ammonia from the nozzle of swaging turns of twist into wire, and the defendin Paris and the other two in many places and on varying scales. As compared with steam or electricity. hydraulic power has the decided advantage that there clip upon the nozzle prevents the escape of the amis very little loss in transmission. The most careful monia. methods fail to prevent a considerable condensation in the piping of the steam supply, whereas the hydraulic system, when worked at such a high pressure, must at this reformatory makes his rounds within the prison show an almost inappreciable loss of head by friction proper through the main corridors, a distance of about in the pipes. As a result of the small volume of water one-half mile, on a bicycle, and we find it a very happy necessary for work at such high pressure, the flow in suggestion. His trips are swift and noiseless and he the pipes would be proportionately slow and the friction light.

There is no danger from rupture of pipes and escape of steam; and owing to the great thickness of the piping, its useful life will be proportionately long.

Compared with the electric supply system, the superiority of the hydraulic system isopen to question. pump is attached should be examined, as there is pro-It is freer from risk to the consumer, both in person and in property, and there is less loss in transmission; the tire is only labor lost. but the great facilities for transmission afforded by the use of electricity far outweigh the risk from fire that at present attaches to electrical wiring.

The relative difficulties and expense attached to the distribution of power through a building by heavy and massive piping, or by electric wiring, are vastly in favor of the latter.

There is one feature of a hydraulic supply system that should be mentioned as giving it special value, from a municipal standpoint, and that is that it furnishes a powerful supply for fire purposes. Water at New York City. The pedals, instead of acting on the one-half ton to the square inch, on tap at any point in wheel by means of a chain and sprocket wheel, are the streets of a city, constitutes a powerful fire protec- practically pump handles and force water to a water tion. Such water could be thrown to great heights, wheel attached to the rear wheel of the cycle. and distances, and, as any one who has watched the hydraulic mining of the West can understand, it bicycle manufacturing in the United States now have would tear its way quickly through walls and par- a capacity of 560,000 bicycles per annum. Many of themselves.

It is intended to utilize the Glasgow supply for \$25 to \$35. fire extinction. At the recent inauguration of the was thrown to unprecedented heights and distances. It has very low wheels. The tests were made in the presence of Sir William eminent engineers, and was considered highly satisfactory.

tion of the lake and plaza and giving a command-

Mrs. W. D. Grant has secured from the Commissioner of Patents an exhibition of inventions of women. This the revenues of the county, and the only reason why hibit of women's inventions ever made at an American other officers do not care to antagonize the large numexposition. It will be separate and distinct from the ber of wheelmen who are among their constituents. make in the United States Government building.

The Department of Colonial Relics will be one of the

The Art Department promises to be one of the best features of the Exposition. Mr. Horace Bradley, chief of the department, has returned from Europe with a long list of works of artists of distinction. Many of the leading artists of America will contribute works of

# Cycle Notes.

A new contrivance has been invented to spot the of the frame connecting with the small sprocket wheel: a key turns this spring, so that when the wheel is in The engines deliver into 7 inch main pipes, which motion the sprocket wheel hits against it, making When the owner wishes to ride, the key is turned back

> of the Ki-Yi gun will soon give the bicycle-chasing dog a lesson he will not be likely soon to forget. A small

> The general superintendent of the New York State Refermatory writes us: "The captain of the watch is thus able to detect any duty defect on the part of the under watchmen."

> M. Reviere covered 523 miles and 10.29 yards in twenty-four hours on the Humber bicycle.

When inflating a tire should the rod rebound from the air pump, the air valve in the tire to which the bably a leak somewhere and to continue pumping up

It seems pretty well agreed that next year tires will be larger than those now in use, more tires will be built 1% and 1% inches in diameter. It is probable that the bicycles will have larger tubing.

A convenient way of tightening the chain is to unscrew the nuts on the rear hub, to allow free moving the chain is to the desired tightness, then re-tighten the nuts on the rear hub.

A curious bicycle has been invented by a resident of

It is stated that the factories which are devoted to

affair 34 inches in length, and weighs about 50 pounds.

The Paris Figaro announces that the Emperor of Geronly members of the imperial family and their guests will have admittance.

In some places it is proposed to tax bicycles to add to will include about 125 models. It will be the first ex- they are not taxed is that the board of supervisors or that the extensive use of wheels has cut down the Mrs. Mary S. Lockwood has consented to deliver a business of liverymen and kindred lines, thereby reducing the taxable property to an extent which should be made up by the wheelmen.

> It is said that bicycles have seriously injured the sale of pianos in England,

#### DECISIONS RELATING TO PATENTS. United States Circuit Court of Appeals-First Circuit.

WRIGHT & COLTON WIRE CLOTH COMPANY VS. CLINTON WIRE CLOTH COMPANY.

Appeal from the Circuit Court of the United States for the District of Massachusetts.

Decided May 10, 1895.

Aldrich, J.:

Art of Weaving Wire Cloth.-The claim of letters patent No. 239,012, granted March 15, 1881, to G. F. Wright, for art of weaving wire cloth, should not, if sustained, be construed so broadly as to give a monopoly of all the means for straightening or swaging wire in the wire weaving industry.

Letters patent No. 239,011, granted March 15, 1881, to The "Ki-Yi," or cycle tourist's gun, is a very effective G. F. Wright, for a shuttle for weaving wire cloth, if it Steam power, pneumatic power and electricity have weapon against dogs which delight in worrying cyclers. | presents a patentable device, does not cover all means ant's device covered by letters patent No. 299,895, granted June 3, 1884, to G. F. Wright, for a shuttle for weaving wire cloth, in which old and well known means are employed, does not infringe.

> Under the doctrine that the patentee is entitled to all known and unknown uses to which his invention may be applied, the public is entitled to all uses of devices covered in expired patents, and the discoverer that old means will do a new work is not entitled to a monopoly.

> If patentable at all, a combination of old means with improvements adapting it to new and non-analogous material and use, a patent will be limited to the combination modified by the improvements.

#### Photography in Musical Research.

The motion of a pianoforte wire when struck has been recently investigated by Kaufmann, whose paper on the subject is accompanied by a set of interesting photographic records. By vibrating the wire in front of a luminous slit and throwing the image of it upon very sensitive paper rotating upon a cylinder, a white line is traced upon a black ground. This line, which is due to the interruption of the luminous slit by the of the rear upper brace, then pull the wheel out until opaque wire, exhibits all the motions of the particular point in the wire which is crossed by the slit. In order to bring the plane of the slit into exact coincidence with the wire, an image of the slit, produced by a lens with the aid of the electric arc, was thrown upon the wire itself. Since the hammer struck the point photographed, the motion of the wire was traced from the very first, the commencement of the vibration being the most interesting stage. Hard and soft hammers were tried, the latter corresponding to those actually used in the piano. It was found that the duration of titions, to reach concealed fires, more rapidly than the factories have more than doubled the size of contact is longer with feeble than with hard striking. any opening could be made for it by the firemen their plants within a few months. It is said that As the force increases, the duration of contact rapidly the cost of producing a first-class bicycle varies from approaches a limiting value equal to that of a hard hammer of equal weight. But the practically most There is a bicycle which is being introduced in Eng- important result was the proof that when a wire is works, couplings were made and a powerful stream land for elderly persons which is called a "bantam." struck at a point between one-seventh and one-ninth of its length, the fundamental tone has a maximum The latest thing for the army is a cannon mounted and the harmonics are very feeble. Hence a wire thus Arrol, the contractor for the Forth Bridge, and many on a twin bicycle. The cannon itself is a steel rifled struck gives its strongest and richest tone.-The Optician.

#### ..... Atlanta Exposition Notes,

The Chief of the Department of Public Comfort has arranged with the Pullman Sleeping Car Company for three hundred sleeping cars to be parked on the motive power. railroad sidings in and near Atlanta. These sleeping cars will accommodate between 7,000 and 8,000 people feet 6 inches in length, is now being made in Europe, A slender thread of brass wire is started in one end of and the berths will be rented for \$1 per night. The and will shortly be shipped to this country. Its prinlisting of rooms by the public comfort department has cipal use will be for pacing. been very satisfactory and includes apartments in some j Beware of a clicking sound in your machine. 'The of the handsomest residences in the city.

The gates of the Exposition have been closed and a 'bearing, and this demands immediate remedy. A new record for Great Britain was made at Putney, twenty-five cent admission is charged to keep off the England, on June 26, by Mr. Barden, who made a crowd during the period of installation.

One of the interesting features of the Exposition will mile in 1:50<sup>3</sup>/<sub>5</sub>. be the Phoenix Wheel, which will be 125 feet in dia- A lamplighter of Elizabeth, N. J., does his work interesting exhibits in the Machinery Hall.

and is swung between the rear wheels, resting upon the connecting axle, and is further supported from

above. The caisson containing the ammunition is carried on another duplex. Four artillerymen equip a 'Machinery Hall at the Cotton States and International battery. They furnish at once the gun crew and Exposition is a pin machine. It is in two parts, the

chances are that it is caused by the balls in a loose

# A Pin Machine.

Among the operative exhibits that will be shown in first of which makes pins and the second sticks them It is reported that a septuplette wheel, which is 15 in paper. This will be done in full view of the visitors. the machine. It is cut, pointed and the head put on, and the completed pin is dropped into a bath which plates it with white metal. From this receptacle the pins are dropped into a sifter, which carries them rapidly to the sticking machine, where they are stuck in regular rows in the paper, and a complete paper of pins is turned out. The mechanism of the machinery is delicately elaborate, and it will be one of the most