Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors. PUBLISHED WEEKLY AT

No. 361 BROADWAY, NEW YORK.

A. E. BEACH.

TERMS FOR THE SCIENTIFIC AMERICAN.

One copy, six months, for the U.S. or Canada...... One copy, one year, to any foreign country belonging to Postal Union, 4 00 Remit by postal or express money order.

Australia and New Zealand .- Those who desire to receive the SCIENTIFIC AMERICAN, for a little over one year, may remit 21 in current Colonial bank notes. Address

MUNN & CO., 361 Broadway, corner of Franklin Street, New York.

The Scientific American Supplement

is a distinct paper from the SCIENTIFIC AMERICAN. THE SUPPLEMENT is issued weekly. Every number contains 16 octavo pages, uniform in size with SCIENTIFIC AMERICAN. Terms of subscription for SUPPLEMENT, \$5.00 a year, for U. S. and Canada. \$6.00 a year to foreign countries belonging to the Postal Union. Single copies, 10 cents. Sold by all newsdealers throughout the country.

('omblord Rates.-The Scientific American and Supplement will be sent for one year, to any address in U. S. or Canada, on receipt of

The safest way to remit is by draft, postal order, express money order, o repletered letter.

Australia and New Zealand. The SCIENTIFIC AMERICAN and SUPPLEMENT will be sent for a lattle over one year on receipt of £2 current Colonial bank notes.

Address MUNN & CO., 361 Broadway, corner of Franklin Street, New York

NEW YORK, SATURDAY, NOVEMBER 3, 1888.

Contents.

(Illustrated articles are marked with an asterisk.)

Adulteration as defined in law 281 Boat, ferry, new type, launch of 272 Boaks and publications, new 282 Books and shoes, old, commer cal value of 283 Borters for lamps 283 Business and personal 280 Cement, good, for various purbants, good, for various purching, code, effect et 280 Collexians vs. apprentices 286 Composition, mean 282 Condiments, adulteration of 281 Conduit for electric wires 275 Couting, car, Weaver* 275 Cruiser, dynamite, Vesuvius* 275 Engines and winding gear of Brimingham cable railway* 275 Extinguisher, the automatic, the Mackey* 275 Guns. big, tiring, risk in 276 Holder, book, Harbundh's* 275 Holder, soa, fuld, Blundell's* 275 Holder, soa, fuld and 275		
Boats and publications, new. 281 Boots and publications, new. 281 Burners for lamps. 280 Business and personal. 282 Cement, good, for various purposts and personal. 282 Content, good, for various purposts and personal. 282 Collexians vs. apprentices. 286 Composition, mean. 283 Conduit for electric wires. 287 Conduit for electric wires. 287 Councied for electric wires. 288 Condiments, adulteration of . 288 Notes and queries. 282 Notes and queries. 282 Notes, and the moods. 282 Notes, and the moods. 282 Retecrological onces. 223 Meteorological onces.	Adulteration as defined in law 281	Inventions, agricultural 282
Books and publications, new. 281 Boots and shoes, old, commer cial value of. 281 Burners for lamps. 282 Business and personal. 282 Cement, good, for various purposes. 283 Coffee, effect of. 285 Collegians vs. apprentices. 265 Collegians vs. apprentices. 265 Composition, mean. 282 Condiments, adulteration of. 281 Conduit for electric wires. 273 Counting, car, Weaver 273 Coupling, car, Weaver 274 Counting, car, Weaver 274 Engines and winding gear of Burmingham cable railway 274 Engines and winding gear of Burmingham cable railway 275 Flour, barrel, made into bread. 273 Fruel supply, our. 280 Guns, big, firing, risk in 275 Holder, soan, ld, Blundell's 275 Holder, soan, ld, Blundell's 275 Holder, soan, Macke, American, and Bruss Inventions, index of . 232 Machine, new for making ecelsion 276 Manatee, Florida* 278 Manatee, Florida* 278 Moistener, letter envelope gum. 292 Movement, mechanical, itanie; **274 Neves, the, and the moods. 276 Neves, the, and the moods. 276 Notes, microscopical* 281 Projectiles, small caliber. 272 Projectiles, small caliber. 273 Sand, sonorous. 283 Sand, sonorous. 281 Sibnon, snake. 280 Spring, Suratoga, over 3,000 feet deep. 272 Telephoning, long distance. 275 Tiger, how kills and eats. 277 Tool in solid coal. 273 Tool in solid coal. 273 Tool in solid coal. 273 Train, fast. English, record. 281 Words, good, from our contemporaries.	Boat, ferry, new type, launch of, 272	
Boots and shoes, old, commer cial value of. 281 Burners for lamps. 280 Business and personal. 282 Cement, good, for various purposses 282 Conference 280 Conference 280 Conference 280 Conduction was vs. apprentices. 2.6 Composition mean. 281 Conduit for electric wires. 274 Conduit for electric wires. 274 Cotton fabric a substitute for jute. 281 Conduit for electric wires. 274 Cotton fabric a substitute for jute. 287 Coupling, car, Weaver* 275 Coupling, car, Weaver* 275 Cuping, car, Weaver* 275 Engines and winding gear of Brimingham cable railway* 277 Exitinguisher, the automatic, the Mackey* 277 Five, causes of 277 Five, causes of 277 Five, causes of 277 Five, causes of 277 Guns, big, firing, risk in 276 Guns, big, firing, risk in 275 Holder, book, Harbauch's* 275 Holder, scandd, Blundell's* 275 Holder, scandd, Blundell's* 275 Holder, scandd, Blundell's* 275 Industries, American, and Brussels exhibition 275 Instruments torgathering micro*		Inventions, index of
cial value of. 281 Burners for lamps 280 Business and personal 280 Cement, good, for various purply second content of the composition, mean 280 Collegians vs. apprentices 260 Composition, mean 281 Conduit for electric wires 273 Coudingents, adulteration of 281 Conduit for electric wires 273 Coupling, car, Weaver* 273 Coupling, car, Weaver* 273 Coupling, car, Weaver* 273 Engines and winding gear of Brimingham cable railway* 273 Extinguisher, the automatic, the Mackey* 274 Flour, barrel, made into bread 275 Flour, barrel, made into bread 275 Holder, soan, lift, risk in 276 Guns, big, firing, risk in 276 Guns, big, firing, risk in 276 Holder, soan, lift, lift, risk in 276 Holder, sean, and Bruse 277 Holder, sean, and Bruse 277 Triger, how kills and eats 277 Tool, annealing 281 Words, good, from our contemporaries.		
Burners for lamps. 280 Business and personal 282 Cement, good, for various purposes 282 Confee, effect ef 280 Confee, effect ef 280 Condiments, adulteration of 281 Conduit for electric wires 274 Cotton fabric a substitute for jute. 281 Couleyians, car, Weaver 275 Cotton fabric a substitute for jute. 282 Coupling, car, Weaver 275 Coupling, car, Weaver 275 Engines and winding gear of Brimingham cable railway 277 Exitinguisher, the automatic, the Mackey 277 Five, causes of 277 Five, causes of 277 Five, causes of 277 Guns, big, firing, risk in 276 Guns, big, firing, risk in 275 Holder, book, Harbauch's 275 Holder, scanfuld, Blundell's 275 Industries, American, and Brusc Instruments torgathering micro	oial value of	
Business and personal		
Cement, good, for various purposes 1913 (1914) Confect of 1914 (1914) Collezians vs. apprentices 256 Composition, mean 281 Condiments, adulteration of 281 Condiments, and trements of 282 Condiments, and trements, and trements of 281 Condiments, and trements, adulteration 282 Condiments, and trements and queries. 282 Condiments, and queries. 282 Condiments. 282		
Doises Coffee, effect of Composition, mean Composition, mean Conduit for electric wires Conduit for electric wires Conduit for electric wires Coupling, car, Weaver* Coupling, car,		
Coffee, effect •f. 280 Collexians vs. apprentices. 2:6 Composition, mean. 281 Condiments, adulteration of. 281 Condiments, adulteration of. 281 Condiments, adulteration of. 281 Conton fabric a substitute for referred of the substitute for remiums or gifts with sales. 273 Cruiser, dynamite, Vesuvius* 271, 277 Engines and winding gear of Birmingham cable railway* 271 Extinguisher, fire, automatic, the Mackey* 274 Fire, causes of. 275 Fiver, barrel, made into bread. 273 Fiver, barrel, made into bread. 273 Fiver substitute for remiums or gifts with sales. 273 Fiver substitute for remiums or gifts with sales. 273 Mexico 272 Sand, sonorous. 280 Spring, Saratoga, over 3,000 feet deep. 272 Fiver substitute for remiums or gifts with sales. 273 Fiver substitute for remiums or gifts with sales. 273 Fiver substitute for remiums or gifts with sales. 273 Fiver substitute for remiums or gifts with sales. 273 Fiver substitute for remiums or gifts with sales. 273 Fiver substitute for remiums or gifts with sales. 273 Fiver substitute for remiums or gifts with sales. 273 Fiver substitute for remiums or gifts with sales. 273 Fiver substitute for remiums or gifts with sales. 273 Fiver substitute for remiums or gifts with sales. 273 Fiver substitute for remiums or gifts with sales. 273 Fiver substitute for remiums or gifts with sales. 273 Fiver substitute for remiums or gifts with sales. 273 Fiver substitute for remiums or gifts with sales. 273 Fiver substitute for remiums or gifts with sales. 273 Fiver substitute for remiums or gifts with sales. 273 Fiver substitute for remiums of gifts with sales. 273 Fiver substitute for remiums of gifts with sales. 273 Fiver substitute for remiums of gifts with sales. 273 Fiver substitute for remiums of gifts with sales. 273 Fiver substitute for gifts with sales. 273 Fiver substi	Cement, good, for various pur-	
Collexians vs. apprentices. 2.66 Composition, mean 281 Condingents, adulteration of 281 Conduit for electric wires 273 Coulous for electric wires 274 Cotton fabric a substitute for jute 287 Coupling, car, Weaver* 275 Coupling, car, Weaver* 275 Engines and winding gear of Brimingham cable railway* 273 Extinguisher, thre automatic, the Mackey* 274 Five, causes of 275 Five, causes of 275 Fivel supply, our 280 Guns. big, firing, risk in 276 Guns. big, firing, risk in 275 Holder, scanfold, Blundell's* 275 Holder, scanfold, Blundell's* 275 Holder, scanfold, Blundell's* 275 Industries, American, and Bruss sels exhibition 275 Instruments tor gathering micror		
Composition, mean 28, Condiments, adulteration of 28, Coupling, car, Weaver* 27, Cruiser, dynamite, Vesuvius* 27, Cruiser, dynamite, Vesuviu		
Condiments, adulteration of. 281 Conduit for electric wires. 273 Coupling, car, Weaver* 275 Cruiser, dynamite, Vesuvius* 271 Engines and winding gear of Birmingham cable railway* 275 Extinguisher, thre automatic, the Mackey* 276 Flour, barrel, made into bread. 273 Fluel supply, our. 280 Guns. big, firing, risk in 276 Guns. big, firing, risk in 276 Holder, book, Harbauch's* 275 Holder, scanfold, Blundell's* 275 Holder, scanfold, Blundell's* 275 Holder, scanfold, Blundell's* 275 Industries, American, and Bruss sels exhibition 276 Instruments torgathering micror 127 Notes, microscopical* 281 Protent office the friend of the inventor. 272 Premiums or gifts with sales. 272 Projectiles, small caliber. 273 Railway, cable, Birmingham*279, 280 Sand, sonorous. 281 Siphon, snake. 281 Siphon, snake. 281 Telephoning, long distance. 276 Tiger, how kills and eats. 277 Tool in solid coal. 273 Tool in solid coal. 273 Tools, annealing. 281 Train, fast. English, record. 281 Words,good,from our contemporaries. 277		
Conduit for electric wires		Notes and queries 282
Cotton fabric a substitute for jute. 287 Coupling, car, Weaver* 275 Cruiser, dynamite, Vesuvius* 271, 277 Engines and winding gear of Brimingham cable railway* 275 Extinguisher, thre automatic, the Mackey* 276 Flour, barrel, made into bread 277 Flour, barrel, made into bread 277 Flour, barrel, made into bread 277 Fluel supply, our 280 Guns, big, firing, risk in 276 Guns, big, firing, risk in 275 Holder, soanfold, Blundell's* 275 Holder, scanfold, Blundell's* 275 Holder, scanfold Blundell's* 275 Holder,	Condiments, adulteration of 281	
Jute. 281 Coupling, car, Weaver* 275 Cruiser, dynamite, Vesuvius* 271, 277 Engines and winding gear of Brimingham cable railway* 279 Extinguisher, fire, automatic, the Wackey* 279 Fire, causes of 277 Fire, causes of 277 Five, causes of 277 Five, causes of 277 Five, causes of 277 Holder, book, Harbaugh's* 279 Guns, big, firing, risk in 276 Guns, big, firing, risk in 275 Holder, coand, Blundell's* 275 Holder, candid, Blundell's* 275 Holder, searbild, Blundell's* 275 Holder, searbilder, searbild, Blundell's* 275 Holder, searbild, Blundell's* 275 H	Conduit for electric wires 274	Patent office the friend of the
Jute. 281 Coupling, car, Weaver* 275 Cruiser, dynamite, Vesuvius* 271, 277 Engines and winding gear of Brimingham cable railway* 279 Extinguisher, fire, automatic, the Wackey* 279 Fire, causes of 277 Fire, causes of 277 Five, causes of 277 Five, causes of 277 Five, causes of 277 Holder, book, Harbaugh's* 279 Guns, big, firing, risk in 276 Guns, big, firing, risk in 275 Holder, coand, Blundell's* 275 Holder, candid, Blundell's* 275 Holder, searbild, Blundell's* 275 Holder, searbilder, searbild, Blundell's* 275 Holder, searbild, Blundell's* 275 H	Cotton fabric a substitute for	inventor
Coupling, car, Weaver* 275 Cruiser, dynamite, Vesuvius* 271, 277 Engines and winding gear of Birmingham cable railway* 277, 276 Extinguisher, tire, automatic, the Mackey* 277 Flour, barrel, made into bread. 273 Flour, barrel, made into bread. 273 Flour, barrel, made into bread. 273 Fluel supply, our. 280 Guns. big, firing, risk in 276 Holder, book, Harbauch's* 275 Holder, scafold, Blundell's* 275 Holder scafold scafold coal. 273 Holder scafold scafold coal. 274 Holder scafold scafold coal. 273 Holder scafold scafold coal. 274 Holder scafold scafold scafold coal. 274 Holder scafold scafold scafold scafold coal. 274 Holder scafold		
Cruiser, dynamite, Vesuvius* Engines and winding gear of Brmingham cable railway* 273 Extinguisher, dre, automatic, the Mackey* 274 Fire, causes of 277 Four, barrel, made into bread. 277 Fuel supply, our. 289 Guns. big, firing, risk in. 276 Holder, book, Harbauch's* 275 Holder, coand, Blundell's* 275 Holder, scand, Blundell's* 275 Holder, scand, American, and Brus- Industries, American, and Sus- Instruments torgathering micro- Issue 277 Railway between U. S. and Mexico. 273 Railway between U. S. and Mexico. 273 Railway, cable, Birmingham 279, 280 Railway, cable, Birmingham 279, 280	Coupling car Weaver* 275	
Engines and winding gear of Birmingham cable railway*. 273 Extinguisher, thre automatic, the Mackey* 274 Flour, barrel, made into bread. 273 Guns. big, tiring, risk in 276 Guns. big, tiring, risk in 276 Holder, book, Harbaudh's*. 275 Holder, scanneld, Blundell's*. 275 Holder, scannell, Scannell, Scannell, Scannell, Scannell, Scannell, Scannell, Scannell's Scannell,	Cruiser dynamite Vesuvius*	
Engines and winding gear of Brmingham cable railway* 279 Extinguisher, tre, automatic, the Mackey* 274 Fire, causes of 272 Flour, barrel, made into bread. 273 Fuel supply, our. 289 Guns. big, firing, risk in. 275 Guns. big, firing, risk in. 275 Holder, book, Harbauch's* 275 Holder, scandd, Blundell's* 275 Holder, scandd, Blundell's* 275 Holder, scandd, Blundell's* 275 Industries, American, and Bruse Base exhibition 275 Instruments torgathering micror	271. 277	
Birming ham cable railway*. 273 Extinguisher, dire, automatic, the Extinguisher, dire, automatic, the Fire, causes of		
Siphon, snike. 280	Dismingham cable sailwas 970	
Mackey*		
Fire, causes of 272 deep. 272 Flour, barrel, made into bread. 273 Fuel supply, our. 280 Guns, big, tirine, risk in. 276 Holder, took, Harbaugh's*. 275 Holder, scafold, Blundell's*. 275 Holder, took, Harbaugh's*. 275 Holder, scafold, Blundell's*. 275 Holder, scafold, Blundell's*		
Flour, barrel, made into bread. 273 Fleegraphy, dynamo 274 Fuel supply, our 280 Guns, big, firing, risk in 276 Holder, book, Harbuuch's* 275 Holder, scafold, Blundell's* 275 Holder, scafold, Blundel	Mackey	spring, Saratoga, over 5,000 feet
Fuel supply, our. 280 Guns. big, trink, risk in 276 Guns. big, trink, risk in 276 Holder, book, Harbaugh's* 275 Toad in solid cost. 273 Industries, American, and Brussels exhibition 275 Instruments tor gathering micror		W-1
Guns. big, firing, risk in 276 Holder, book, Harbauch's* 275 Holder, scanold, Blundell's* 275 Holde		
Holder, book, Harbauch's*	Fuel supply, our	Telephoning, long distance 275
Holder, sca.Joid, Blundell's*. 25 Industries, American, and Brus- sels exhibition	Guna. big, hilny, risk in 276	Tiger, how kills and eats 277
Industries, American, and Brussels exhibition		
sels exhibition		Tools, annealing
Instruments for gathering micro- raries 277	Industries, American, and Brus-	Train, fast. English, record 281
Instruments for gathering micro- raries 277	sels exhibition 275	Words,good, from our contempo-
scopic objects*	Instruments torgathering micro-	raries 277
	scopic objects*	Words, power of

TABLE OF CONTENTS OF

SCIENTIFIC AMERICAN SUPPLEMENT

No. 670.

For the Week Ending November 3, 1888.

Price 10 cents. For sale by all newsdealers.

- I. ASTRONOMY.-A New Planimeter.-By Prof. HELE SHAW.-A new spherical planimeter, with mathematical development of its principles.—An Important advance in experimental and demonstrative astronomy.—4 illustrations. II. CIVIL ENGINEERING .- Covered Reservoirs .- By CHARLES H.
- WAN .- Conclusion of this valuable paper, with the discussion which followed its reading before the New England Water Works
- Work.-By ROBERT H. THURSTON.-The conclusion of this elabor-III. ELECTRICITY.—A Basis from which to Calculate Charges for Electric Motor Service.—By H. C. LUFKIN.—An attempt to show
- that a general average controls the use of the machinery likely to bearranged on electric circuits.-The determination of a power curverepresenting the approximate service of electric motors in connection with several classes of work..... The Central Telegraph Office, Paris - A graphic description of
- the telegraph work in Paris, with illustrations of the main offices. IV. MECHANICAL ENGINEERING.-Note on Hardening Steel..... 10699
- Shrinkage Allowance for Railway Tires.-The Master Mechanics Association allowances for different sizes
- V. MtSCELLANEOUS.-The Emin Pasha Relief Expedition.-Scenes at Stanley Falls in the Congo region of Africa.—14 illustrations.... 10709
- VI. NAVAL ENGINEERING .- On the Propulsion of Ships by Air Propellers.—By H. C. VOGT.—One of the most remarkable contributions of recent times in the subject of marine propulsion, a detailed statement of experiments, with figures of the results obtained by the use of an air propeller...... The Solomiac Torpedo Nets.-A remarkable system of defense

against torpedoes, a net set by hydraulic power within a space of

- War Ships of the Future.-A lengthy investigation of the fighting ship of the future, including a discussion of Admiral Albini's design for a battle ship.-7 illustrations.....
- VII. PHOTOGRAPHY -Photographic Objectives.-By EDWARD BAUSCH.-Facts and fallacies regarding the all-important weapon of photography, by a practical worker.....
- VIII. PHYSICS.-The Bistory of a Scientific Doctrine.-By S. P. LANGLEY.-The conclusion of Professor Langley's memorable paper on the history of the undulatory theory of light 10707
- IX. TECHNOLOGY.-Irish Flax Culture.-By H. Monie, Jr.-Details of the culture and treatment of flax from which the famous lrish lawns and linens are made, with comparative statistics.-1

the following excellent doctrine:

The rules of the office, particularly rules 68 and 139, point out that at all times in the investigation of an application, and in the progress of appeals, it is the wheels. The smaller forward wheel forces currents of duty of each tribunal having jurisdiction of the case to see to it that the inventor shall secure a patent for whatever patentable matter may be shown in his application. As has been frequently stated by me in decisions, the office must put itself in the attitude of a friend, and not of a litigant with the applicant, and see that he secures every right that belongs to him. Not only is this true of the rules cited, but Congress has seen proper to take especial pains to provide that whenever an applicant, in consequence of any inadvertence or mistake in the framing of his specification or claim, has failed to secure that to which he is entitled, or his patent is inoperative or invalid either by reason of having claimed too much or too little, he may have the proper correction made by a reissue, which will secure him the precise invention to which he is entitled.

"Now, unquestionably, if under rules 68 and 139 it is the duty of the Examiners-in-Chief and the Commissioner to suggest and recommend, in order that an applicant may receive letters patent for subject matter not involved in the appeal, it must be the duty of the Primary Examiner in the examination of thecase made by him to point out and recommend the same thing. I do not mean by this that it is the duty of the Examiner to become an agent or an attorney for the applicant; but I think in all cases when he is satisfied or believes that the application contains patentable matter which is not claimed, but which he has reason to believe the applicant is seeking to cover, it is his duty to advise the applicant briefly and specifically, precisely as the Examiners-in-Chief and the Commissioner are authorized to do, as above stated. By acting upon this principle, all of the tribunals of the office become friendly to the applicant, and enable him to clearly see and understand the views of the office as to the nature and patentability of the invention described. Such or their counsel and the office."

LAUNCH OF A NEW TYPE OF FERRY BOAT.

On Thursday, October 25, a double-ended propeller, designed for service on the Hoboken and New York ferries, was launched at the ship yards of Thos. C. Marvel & Co., Newburg, N. Y. While not in all The drill was put down to the depth of 500 feet. At respects a novelty, the boat marks a distinctly new this depth an abundant supply of water was found departure in naval engineering. Hitherto all the flowing from a crevice in the rock bottom. A few ferry boats in these waters have been driven by side days ago, to assure, himself of the depth of the spring, double-ender propulsion, it being practically immaterial as regards the perfection of their action whether they drive the boat in one direction or the other.

In the new boat the motive power of the screw has been adopted, and has been applied to the same type of vessel. A shaft is carried the entire length of the hull, emerging at each end. To each of the ends a screw, both of identical pitch and diameter, is secured. In advance of each screw a rudder is placed, provided with the usual pin for holding it fixed when made to constitute the bow end of the boat. As seen from the outside, each end of the vessel appears precisely like the stern of an ordinary propeller.

A single engine is provided to drive the screws. Both, therefore, have to rotate together and at exactly the same speed. They propel the boat by the pulling action of the leading wheel and the pushing action of the rear one.

By their use several important results are achieved. these features of construction, the central deck house springs here. will be two feet narrower than the usual ones and about two-thirds of their length. The cabins will be unobstructed by the paddle boxes. The narrow gangand thirty-five per cent for passengers.

the river by her after screw.

This is not the first boat of her class, if the term is

THE PATENT OFFICE THE FRIEND OF THE INVENTOR. that of the new ferry boat. The Detroit vessel's after In the recent case of Donovan, on appeal, the Hon. wheel is larger than the forward wheel, and each is Benson J. Hall, Commissioner of Patents, laid down driven by independent engines. Normally both are turned in the same direction. When ice is encountered the forward wheel is reversed, and the vessel is propelled by the differential action of the larger and small water out from the bow that clear the ice so effectually that the boat can go steadily through a field of considerable thickness. Double-screwed boats, with independent engines for forward and after screws, have also been used on the Mississippi. These were not double-enders. They were found to injure the levees, and were finally discarded from regular service, and were used to clear the channels in the carrying out of Col. Eads' successful project.

Thus the new vessel is of distinct type. As seen on the ways, her model was characterized by fine lines, her ends being very sharp, giving good entrance and run. She is two hundred feet long, sixty-two feet over the guards, thirty-two feet width of hull, seventeen feet deep, and will draw from nine and a half to ten feet of water. She is of steel throughout. She is to have two tubular boilers, eight feet diameter by twentythree feetlong, to work at 160 lb. pressure. Her engine is of twenty-four inch stroke, triple expansion, with eighteen and one-half, twenty-seven, and forty-two inch cylinders. The shaft varies from 81/4 to 83/4 inches. The screws are of eight feet diameter and nine and one quarter feet pitch. They are alike on both faces, so as to cut both ways with equal efficiency. She was christened the Bergen.

Col. E. A. Stevens and Capt. C. W. Woolsey, of the Hoboken Land and Improvement Company, were the originators of the idea, and anticipate a better winter service from the Bergen than any vessel now affoat can render. Our thanks are due to them for their courtesy in giving us all the information attainable about their new and yet unfinished vessel.

A Saratoga Spring over 3,000 Feet Deep.

A dispatch from Saratoga says: A company has purchased the Seltzer Spring and will utilize its waters practice would undoubtedly tend to lessen the corre- for the purpose of liberating and storing, in liquid spondence and conflicts which arise between applicants form, the carbonic acid gas with which it abounds. To do this, extensive arrangements are being made upon a large amount of invested capital. The establishing of the plant is under the supervision of Mr. Oscar Brunler, a German expert.

This Seltzer Spring, located on Spring Avenue, was developed by Dr. Haskins less than three years ago. wheels. These lend themselves very perfectly to Mr. Brunler sounded it with a line and plummet; but instead of resting at 500, the weight sank the whole length of the line, 900 feet. Other soundings have since been made, the weight used being a piece of inch gas pipe filled with lead and weighing thirty-four pounds, until a depth of 3,300 feet has been reached, and yet without touching bottom or any obstacle. No further soundings will be made until instruments expressely designed for the purpose can be procured.

Prof. Brunler admits it as possible that the line and weight could have been carried away by some powerful current, but he holds to his original belief in the existence of a subterranean sea of greater or less extent, and that there is undoubtedly some connection between it and the water of the ocean. In other words, that Saratoga is over a vast water-filled cavern, the roof of which is about 500 feet thick. He also thinks it probable that at a given depth and temperature carbonic acid gas may be found in a liquid form. The specific gravity of the liquid gas is about nine degrees The most obvious ones relate to the increased deck lighter than water, which would readily cause the room. Her engines will be entirely under deck, a water to climb 300 feet above the ocean level. Should space of two feet intervening between their highest the existence of a subterranean sea be established, it parts and the deck planks. The smoke stack is to be would put to flight many theories and scientific specuelliptical in section, to save width. On account of lations as to the source and course of the many mineral

Causes of Fire.

In regard to spontaneous combustion, the fires of way leading fore and aft will be disposed of, and the the year in Boston have furnished some new observaarea will be clear of encumbrance from front to rear. tions of considerable importance. In one case, says These changes, it is calculated, will give an increase of the American Architect, a quantity of feather dust in capacity of twenty per cent for trucks and carriages a bedding manufactory took fire without apparent reason. It was found, however, that a piece of thick It has been found by experience that a tug boat can glass had been lying on the feathers, and the sun's cope quite effectually with the ice that packs in the rays, concentrated in some way by the glass, had set ferry slips, and one has often been used for the purpose fire to them, although the day was a cold one in the of clearing them of ice. The new boat will, it is antici-month of March. In another case, a number of tarpated, prove most effectual in this regard. Paddle paulin hats were lying, packed together, in a window. wheels can only drive ice about twenty feet, but screws. The high temperature, with, perhaps, the close packare far more effectual. As the new vessel enters a ing of the hats, caused them to burst into a blaze. slip, her forward screw will start currents of water that | Two other fires were caused by putting paraffine paper, will carry the ice past her sides, to be driven out into such as candy is wrapped in, into a refuse barrel which contained a little sawdust; and a third, which destroyed twenty thousand dollars' worth of property, broadly interpreted. A single ended boat, with bow was occasioned by putting greasy paper, which had and stern screw, has been recently put in use at De- been used to wrap lunches in, into a wooden refuse