the strongest war vessel in the world. The most powerful ironclad vessel at present in existence is the Duilio, which was recently constructed by the Italian government. She is not yet entirely completed, and but one of the four 100 -ton Armstrong guns has been delivered. The general design of the vessel will be understood from the accompanying engraving. Her length is $331 \cdot 2$ feet, breadth at water line 58.4 feet, and depth of hold 25.2 feet. She has two turrets, which, instead of being in the center line of the ship, are placed toward the sides, so as to get a clear fore and aft fire from each turret. The inside diameter of each is about 26 feet, and the outside $3211 / 2$ feet, while the two turrets, with the armor plating and the two guns, will weigh about 6,720 tuns. Each turret makes one complete revolution in a minute, and when in position for firing is stopped by hydraulic locking bolts. The vessel is built in compartments, and is provided with a novel system of pumps, which discharge water from her in case her skin is pierced by a shot. There are no masts, and all the machinery and the rudder are entirely under water, so that the vessel exposes no vulner able portion.
The immense guns are loaded by hydraulic apparatus. Upon opening a valve, the ram head capped by a sponge advances rapidly into the bore of the gun, the latter being suitably depressed and the sponge rising at an angle from beneath the deck. When the sponge reaches the bottom of the bore, a valve in the head is opened, and a powerfu jet of water is brought to play in the powder chamber: thus at the same time aiding in cleaning the bore, and preventing any possibility of fire being left therein. After the sponge is withdrawn, the cartridge and shot are in turn raised by an hydraulic cylinder to their proper position in front, and on a line with the muzzle, this and the remaining operation being performed by one man without his moving from his seat beside the levers. Lastly the ram head advances and drives the shot home. Without machinery, it requires, in the United States navy, 24 men to manage an 11-inch Dahlgren gun, the shell fired by which weighs 135 lbs . With the hydraulic mechanism described, four men can serve a weapon which throws a shell weigning 2,000 lbs., or a shot weighing 2,500 lbs.
It has been calculated that the work developed by the immense projectile is equal to about 39,000 foot tuns; so that, if all four of the Duilio's guns were fired at once, her effective power would be equal to that exerted in raising 156,000 tuns one foot high per minute.

## A NEW STEAM CARRIAGE.

The novel steam carriage here with illustrated is provided with improved mechanism which enables it to be readily steered and conducted around curves. Fig. 1 is an elevation and Fig. 2 a view from beneath. The hind axle is revolved by a suitable steam or other motor, that is secured to the supporting platform, and connected by transmitting mechanism to the axle The hind wheels are placed loosely on the axle, and secured rigidly thereto by clutches, $\mathrm{C}^{1}$, that are forced by suitable springs into hub plates of the wheels. The clutch mechanism, $\mathrm{C}^{1}$, of each wheel may be readily withdrawn by a leverand swivel connection, $\mathrm{C}^{2}$, operated by levers arranged near the driver's seat. On turning ordinary curves in roads the clutch me chanism is arranged to allow the outer wheel to make a ing wells; and the fact that most of the pumping wells, refingreater number of revolutions than the inner one. On turning very short curves, by withdrawing the clutch from the inner wheel all the power is thrown on the outer wheel, and thereby the carriage allowed to turn easily on a space a little larger than its own length. The guide wheel, E , at the front part of frame, A, is connected by its axle, supports, and springs, with a horizontal turn table, F. The turn table
has a circumferential groove, and is connected by a belt with a pulley, $d^{\prime}$, and steering wheel, G, in front of the driver's seat. The hind wheels are further provided with suitable brakes, worked by a treadle.
The carriage, it is claimed, may be propelled at considerable speed, steered with facility, and carried readily around curves.
Patented through the Scientific American Patent Agency


THE ITALIAN IRONCLAD DUILIO. W. Va.
eries, and railroad lines are controlled by a single company which exacts high profits has probably much to do with the increase in the price.

Most persons have an idea that the Athantic telegraph that of a five cent piece.

## Lead Poison in Sewing Silk.

Invention and discovery have their evil no less than their beneficent aspects. A French contemporary, the Moniteur $d$ Hygiène, startles its readers with the revelation of an ingenious fraud, not generally known, but likely to be in the long run very dangerous to the health of tailors, sempstresses, and others who use silk thread in sewing. Nothing is more tantly, and yet it may be contantly intrcauced into the stom ach by those who use sewing authority, certain manufacturer have adopted the plan of soaking their silk thread, of all colors, in acetate or sugar of colors, xposing it ofter dryige and action of sulphurous vapor which vapor, it is said, trans forms the acetate into sulphate of lead, increasing the weight of the silk. The resulting gain may be imagined when we state tha ugar of lead is worth consid rably less than 25 cents a 1 b , whilst silk thread fetches from $\$ 10.00$ to $\$ 11.00$ a lb. in the market. It is alleged that some October 10, 1876, by Mr. Jacob M. Lauck, West Milford, samples of silk have been proved to contain as much as twenty-three per cent. of sulphate of lead
There is some mistake in the mode of stating the case, says the Sewing Machine Gazette, as the fumes of sulphur would certainly not convert the acetate of lead into the sulphate Nevertheless, on mentioning the statement to our tailor, he at once declared that the fact of lead impregnation in silk is well known; indeed, he said that the sugar of lead can be detected by the smell in some samples, and not only in silk, but also in other thread, which is also sold by weirht. Some adulteration, then, is practised, various matters being used to give weight to the articles; and as a consequence, all thread rap idly deterioriates on exposure to the air. On this account the best sewing silk is usually well wrapped in wash leather
It is easy enough to detect the adulteration by chemical process, and, although the result is not conclusive as to the presence of lead (as stated by the French writer), it proves, at any rate the presence of some metal. Put few pieces of silk thread at th top of a test tube filled with water containing a few drops of acetic acid or vinegar. As soon as the silk gets moistened, let fall into the test tube a few drops of solution of iodide of potassium. Then, if the silk contain Then, if the silk contain lead $r$ other metal, an iodide of th metal will be formed, sinkin with a violet tint into the tube. We have tested several sam ples of silk thread in this man ner. With the exception of one sample, all the fine sewicg silk was proved to be free from lead or other metal. But we found metal very abundant in what is called "tailor's twist" and "hat ter's twist," especially the latter. The fact is important if lead be the metal used for giving weight to silk. Lead acts very surrepti tiously on the system; it is essentially "a slow poison," and it is very difficult to combat its effects. It acts on the teeth and on the intestines, in which it produces paralysis, frequently followed by death. "We have seen," says the writer in the Moniteur d"Hugiene " amon Moniteur d'Hygiene, " among other cases, that of a lady wh keeps a large sewing establish ment, who, by the use of such silk thread, was, together with her workwomen, attacked by lead colic, some of them losing their teeth-the result of the habit of putting the ends of the silk into the mouth before passing it through the eye of the needle. Such is the way in which the lead poison is directly absorbed ng wells; and the fact that most of the pumping wells, refin-- whilst, by continually handling the silk, the fingers may
whilst, by continually handling the silk, the fingers may
retain a portion of the lead, to be indirectly introduced into the system with the food that may be touched by the hand. The poison may be avoided by refraining from putting the silk into the mouth-dipping it in gummed water insteadbut perhaps the best remedy will he found ly the large dealers refusing to buy silk thread by weight unless it is proved to be free from metallic adulteration.

According to a recent writer in the London Times, the " French dyers have attained such extraordinary skill, that hey can color up inferior qualities of silk so as to make them look far better than they are. In some cases they are able to charge the silk with lead and iron, which adds as much as one hundred or one hundred and fifty per cent. to the weight of it! All such artificial additions disappear when the tissue is exposed to any wear, however slight, and sometimes even when it is only exposed to the atmosphere. Let us admire and beware. Never have tissues looked so lovely as now; they charm the eye. But, also, never was beauty more deceitful; and, if our women cannot resist the temptation of lovely tints, let them at least take care to buy new silks from houses which are thoroughly to be trusted." If silk for dresses is open to this grave suspicion, how much more probable is the adulteration of sewing silk which is always sold by weight, although done up in skeins, or on bobbins and reels.


## NEW BOOKS AND PUBLICATIONS.

Bryant's Book-Keeping: a Treatise on the Science of Accounts, Elementary and Practical, containing a ThorDouble Entry Book-Keeping, adapted to the Use of Tiniversities, Business Colleges, etc.
. counts has enabled him to compile a work of the highest value for simpli-
city and practical value. The book isa thorough and complete treatise, written with clearness andillustrated with numerous specimen pages of account
books. We recommend it to all young men desirous of acquiring a knowbooks. We recommend it to all young men desirous of acquiring
ledge of the useful and indeed indispensable art of book-keeping.
Rural Hydraulics, a Practical Treatise on Rural Household Water Supply: giving a full Description
of Springs and Wells, Pumps, Hydraulics, etc. By W. Pa : Henry Carey Baird \& Co., 810 W alnut street. Pa. : Henry Carey Baird \& Co., 810 walnut street. abstruse phraseology
Notes on Life Insuldince. Witi Appendix. By Gusturky. Price $\$ 2.00$. New York city: D. Van Nostrand 23 hurray stref.
The subject of this volume is an inexplicable mystery to many, and we
think that the book will meet a great necessity. The author is evidently a think that the book will meet a great necessity. The author is evidently a
gentleman of great skill and knowledge; and the wise principles he lays gentleman of great skill and knowledge, and the wise principles he lays
lown so clearly willenable persons of limited educationto acquire sufficient
knowledge to judge for themselves as to the trustworthiness of the multitude of insurance companies which are now claiming the confldence of the public.

Elementary Architectural Drawing. Edited by Charles
Babcock, Professor of Architecture in the Cornell UniBabcock, Professor of Architecture in the Cornell Uni-
versity, Ithaca, N. Y. Nos. 1 to 8. New York city: versity, Ithaca, N. Ypploton \& Co., 549 and 551 Broadway.
Messrs. Appleton are now publishing Krusi's courses of examples in free
hand and mechanical drawing. Six series are announced, each edited by professor of well known ability and reputation. The eight parts of the professor of well known ability and reputation. The eight parts of the
architectural series, now before us, comprise an extended course of examples of great variety and excellence, calculated to form the taste as well as
train the hand and eye of the student The ocasional uee of train the hand and eye of the student. The occasional use of free hand
work in depicting the variousbuilding materials is singularly effective and The quarterly Journal of Inebriety. Published under the auspices of the American Association for the Cure
of Inebriates. T. D. Crochers, M. D., Secretary, Bing hampton, N. Y. Subscription $\$ 3.00$ per year.
The name of this new comer in the fleld of periodicals is rather puzzling.
By a parity of reasoning, a paper printed by a prison association might be called a journal of petty larceny-or bigamy-which would startle peop le.
This aside, the new magazine is an excellent and useful publication and we have no doubt, will do great goodin disseminating correct and scientifl views regarding the sad disease of drunkenness and its best mode of cure The frrst number contains Dr. Beard's excellent address on the Causes of Inebriety, which wehave already reviewed in full. There are besides the
proceedings of the Association above named, beside clinical notes and other interesting articles.

Inventions Patented in England by Americans. From November 21 to December 21, 1876, inclusive
Aerating Churn.-T. Simmons, Hartford, Conn
Air PUMP.-W. F. Garrison, Brooklyn, N. Y. Artificial Stoce.-L. L. Leathers, Oak land, Cal
Box Cover, ETC.-W. L. Hubbell, New York city. CAR Brake, etc.--L. O. Rost, East Mineapolis, Minn.
Car Coupling.-H. G. Russell et al, Lincoln, CAR Ceupling.-H. G. Russell et al., Lincoln, Il.
Cleansing CArPETs.-G. S. Norris (of Baltimore, Md.), London, England. Cleansing Fabrics. - W. Maynard, New York city. Embroiderer.-A. Mason, New York city.
Expiosive.-E. Judson, San Francisco. Cal. Flexible TUbing.-H. Wakeman, New York city Frying Pan.-J. E. Bardell et al., New York city.
GrANNIN Wood.-J. R. Cross, cleveland, ohio.
HARVESTER RAEE. -W. A. Wood, Albany, N. Y. Inkstand base, etc.-Rosenfeld \& Co., New York city OADING HAY, ETC.-J. W. Foust et al., Meadville, $\mathbf{P}$ Lock And KEY.-M. Runkel, New York city.
MAKIN ICEE ETC.-C. L. Riker New York city. Making Nut blanks.--S. s. Townsend, Philadelphia, Pa. making Ozone, etc.-H. Milsom, Buffalo, N. Y. MAKING TUBESS.-American Tube Works, Boston, Mass. NALL FEEDRGG DEvič.-W. H. Field, Launton, Mass.
PIPE Couphing.-L. Richardson, Brooklyn, N. Y PIpe Coupling.-L. Richardson, Brooklyn, N. Y.
Preserving Meat, ETc.-A. Montgomery, New York city RAELROAD Tir.--D. S. Whittenhall, Chicago, Ill. Reducing Ores.-T. S. Blair, Pittsburgh, Pa. Reversing Valve.-H. S. Maxim, New York city
Scouring Grain, etc.-W. P. Clifford, Flmore, Ill Spring Mattress.-Howe Spring Bed Company, New York city. Sprivg Motor.-R. Rhett, Baltimore, Md.
Stowing Cotton, ETc. - M. J. Walsh, New straigetening Wheri, etc.-W.h. Paine, Brooklyn, n. y. Umbrella, etc.-A. A. Valentine et at, I., New York city.
Unloading Grain.-G. Milsom, Buffalo, N. Y. VAlve.-N. C. Locke et al., salem, Mass.
VALVE, ETC.-E. Purvis, New York city. Ventilation, etc.-J., S. Linsley, New York city.
Water Gauge, etc.-W. Andrews, Lisbon, Me.

## zerent gumerican and forcign zatents.

## NEW HOUSEHOLD INVENTIONS.

improved center sliding gasalier.
Samuel B. H. Vance, New York city, assignor to Mitchell, Yance drawn down, a cord unwinds from a drum L, which turns the said drum, and coils up a spring. The tension of the spring and the weights of the square tube and its attachments so nearly balance each other that the cen-
ter light will be sustained in any position into which it may be adjusted, ter light will be sustained in any position
but may be raised and lowered with ease.

IMPROVED DESK
Ernest N.Doring, New York city.-When the lid of the table is thrown back pigeon holes attached thereto are exposed. To the lowest pigeon cline a dids is opened falls into an in IM
IMPROVED LAMP.
David Dickson, Raglan, Ontario, Canada.-The object of this invention is to do away with that portion of the chimney which is most liable to
fracture from unequal expansion, and substitute therefor a metallic top which may also answer the purpose of a reflector. The top shuts a small distance over the top of the glass cylinder, and is retained in place by the spiral springs, fastened to tubes which support the wick tube.

## IMPROVED GAS OVEN OR SUMMER RANGE

Benjamin Shourds, Philadelphia, Pa.-This embodies improvements in that class of ovens or summer ranges commonly known as gas ovens, be cause the draught, coal gas, etc., from the fire can be caused to pass through the oven when the lids in the bottom plate thereof are removea. The side
thirds of the top plate are inclined at an angle of about $45^{\circ}$, and its centralthird is fat, and is provided with an angular brick work. Upright openings and dampers formed in the upper parts of the side plates of a
summer range, above the lower edges of the inclined side parts of the to plate; and a flue is formed upon the rear plate. Dampers are provided in
platine

## NEW AGRICULTURAL INVENTIONS.

IMPROVED CULTIVATOR.
William B. Sturgis, Shelbyville, Ill.-The crank axies are secured in over tall plants. There are also new devices to enable the plow to be readily guided, to prevent the standard being broken when striking an obstruc tion and also to support the plows away from the ground when turning sing from place to place
improved guide for building ricks and staces. John Murdock and Henry Murdock, Poseyville, Incl.-This relates mainly to gates which travel on a vertical post being hoisted as the stack is buil up to them by means of a win lass. Chey are so and when the latter is nearly com
tract as the top of the stack is reached, and plete they may be altogether removed.

## NEW MISCELLANEOUS INVENTIONS.

improved process of preparing metal surfaces for PRINTING UPON.
.Joseph T. Commoss, New York city.-The object of this invention is to without any transfer process, and which will enable the plates, after being printed upon, to be struck up with dies, and otherwise manipulated with out cracking, chipping. or otherwise injuring said sarface. A mixture of pale boiled oil, Benguela varrish, turpentine, and white lead ground in oil
is first applied hot. The plates are then placed in an oven heated to is first applied hot. The plates are then placed in an oven heated to 125 Fah., after which they are powdered with a nixture of magnesia and soap
tone, and are then ready to be printed upon. We have seen some of the most beautiful samples of metal card printing in colors, by this process that have ever been executed. The work closely resembles chromo pictur printing in the perfection in which the colors are laid.
improved quilting frame.
Ira M. Hope, Morocco, Ind.-The quilt is fastened to muslin strips at-
Ined to rollers, at two sides, and secured to bars at the other sides by
cords. As the quilt is wound on therollers, the cords stretching it to bar are disconnected. When thus wound sufticiently the bars are altogether detached, and the rollers are put into benches and held by ratchet whecls
and pawlsto stretch the quilt between them, while the hooks stretch it in the other direction.

IMPROVED WATCH PROTECTOR.
Henry A. Rosenthal, Brooklyn, N. Y.-This is an improveddevice for connecting a watchchain and watch with each other, so constructed that it
may be set to prevent the watch from being withdrawn from the watch pocket by a thief. In a short tube, the upper end of which is closed, and the lower end of which is flared, is fitted a block, which slides up and down within it. The movement of the block is limited byascrew, inserted in it
and which passes through a longitudinal slot, formed in the side of the
tube. The slot at its upper end is extended at right angles with thelength tube. The slot at its upper end is extended at right angles with thelength of the tube, so that by turning the tube so as to bring the screw into the
lateral arm of the slot the block will be locked in the upper end of the said tube. When the tube has been pushed down to the cap and turned so as to bring the screw into thelateral arm of the slot the watch may be drawn from thepocketas readily as if the device were not there; but to guard against having the watch drawn from the pocket by a thief, the tnbe is turned to bring the screw into the upper end of the longitudinal arm of the slot; then, if the watchchain is drawn upon, the tube is drawn upward
upon the block, and springs force four or more or less hooks outward which catch upon the sides of the pocket and prevent the watch from being withdrawn from said pocket.

## NEW MECHANICAL AND ENGINEERING INVENTIONS

## IMPROVED WATER WHEEL

Lewis A. Struble, Salt River, Mich.-This waterwheel is provided with hinged buckets supported radially to the axis of the hub by projection that extend beyond heir pivols and rest on the revolving hub. The buck ets are the hus and the secure the grea
improved middlings separator.
John J. Haller, Ripley, N. Y., assignor to himself and John W. Baker, of same place.-In connection with the beating and screening cylinder a fai blower is arranged with air inlets at its head and a narrow longitudinal slit
at the side for spreading the blast in a thin sheet. Adjustable deflectors and a divider are provided, the latter serving to keep the flour that fall from the screen separate from the lighter particles that fall to the front of the case.
mproved compensating pendulum.
Eben M. Corwin, Barry, Ill.-In this invention the variations of the sated by placing between the bell and its supporting and regulating nut piece of hard rubber, which, being secured to the ball by a screw at one end, and resting upon the regulating nut at the other, keeps the center of gravity of the ball at a uniform distance from the point of suspension.

## mproved gas meter.

Julian I. Alexander, Baltimore, Md., administrator of John H. Alexan-
der, deceased.-This is an improved device that is claimed to measure the der, deceased.-This is an improved device that is claimed to measure the
gas accurately as it passes from the service pipe to the pipe leading to the burners. It consists in an improved gas meter formed by the combination of a box, a tubular armed wheel, a spindle, and a register In the rear sid of through which the gas escapes and by its reaction against the gas in the box, revolves the wheel, the number of revolutions of said wheel being recorded by the register, so that by calculating the quantity of gas that es capes at eachrevolution, and recording the number of revolutions of said wheel, the quantity of gas that passes through the machine can be accu rately known. It is very simple in construction.
improved metal car frame.
Frederick J. Kimball, Philadelphia, Pa.-This is a novel and simple con struction of a car frame of channel oars, angle bars, iron and wood corne pieces, and wood beams, whereby great strength is secured without exces
sive weight, and with economy in the cost. The side andend pieces of th bed frame are of channel iron, with the chat and filled with wood, except at the corners, where metal knee filling pieces are use to makestring joints by rivetingor oolting the pars to them. The back of one of the bars is also extended along the back of the other, and secured t it. Through these metal corner pieces longitudinal and transverse tensio rods or bolts are arranged, for straining the frame up tight. The wood filling serves for nailing the siding to. as well as tor stiffening the channe bars. Other channel bars are slighty curved outward, extending through
the middle portion of the bed frame from end to end, and are attached thereto by flanges and riveted to the end pieces, and stupported at suitable intervals. The latter bars are curved in a horizontal plane, because the shock whichoccurs when the cars come together comes mainly upon the
midde stringers, and when the strain is too great for the rods that pass through the thimbles the said pars will readily spread, and can be after ward easily drawn back into place. If not curved, they might bend up ward or downward
from the car frame
improved hutomatic brake.
Hugh McCalip, Hope, Bartholomew county, assignor to himself and Nor ton R. Champion, Shelbyville, Ind.-This invention is so constructed as
to be applied by the momentum of the cars as they run together when the traction power is checked, and to be withdrawn as the traction power is again applied. By pressing on the bumper the brakes will be applied on one set of wheels as long as the bumper meets with resistance on the forward motion. Durng this time the opposite brake wheels are held frmly in the straps, but motionless, while the axle revolves in them, the pawls being off. When it is desired to change the direction of the car, the
inner end of a push bar is changed from one lever to the other. When the pulling power of the engine iz checked, the brakes are automatically ap. plied to one set of wheels and the train is stopped. The reversal of the engine now will produce no effect upon the position of the brakes; but the
change in the direction of the rotation on of the axle releases the pawls from change in the direction of the rotation on of the axle releases the pawls from one set of wheels and causes them to take hold on the opposite ones, when
the train may be backed without further obstruction, the brakes remaining open as long as the pushing continues. When the pushing power of the engine is checked, the momentum carries the train away from it and the slack motion of bumper applies the b
braking backward as well as forward.
improved radial drilling machine.
Alfred Box, Philadelphia, Penn.-This is a contrivance of the devico comprising a radial drill, whereby the power is transmitted to the drill in nd shafting heretof, re employed.

## miproved baling press.

Willian B. Duncan, Huntingdon, Tenn., assignor to himself and A. F. Estes, of same plact--This is a new press for bailin,
cotton, hay, and other articles requiring to be compressed into ctton, hay, and other articles requiring to be compressed into
bales. The improvements are mainly in the construction of a nove pawl and ratchet mechanism in connection with the follower.
improved coupon nipper and ticket punch.
Frank Walker, Santa Barbara, Cal.-The operation of this device is a detaches it It is the forced arainst fingers causing a tumbter to tur until the coupon slips from between the fingers into a receptacle. The mbler being liberated, a spring returns it to its normal position, at the same time causing a hammer to strike the bell.

IMPROVED OILER FOR CAMS.
John Henry Beal, Canton, Mass.-This consists in the combination of a piece of oil-saturated felt, and its spring holder, with a cam. The cam, and thus keeps the said cam constantlyoiled.

## improved combined anvil and vise

William E. Canedy, Rochester, Minn.-This is a combined anvil and is secured to the anvil between projecting side guides by a fastening screv. and bears, by a lateral shoulder, on the top of tne anvil.

