taper is injured on the end and don't fit without filing, and lastly it cannot be extended as the straight round shanked drill can. By this we mean that sometimes a drill is just an eighth or one-fourth too short to go through the work with all the screw that can be got. If a taper round-shanked drill is used the workman must either get another or else derange his work to block it up higher; but if we have a straight shank we may put a piece of round iron in the spindle and let the end of the shank bring up against it, and thus attain the end with but little trouble. Thus the straight round shank appears to have decided advantages over any of the other plans.

This article concludes the series under this head, but we shall at an early date present some views of the latest turning tools in connection with those formerly used, so that the new and the old may stand side by side for a verdict from the impartial.

Another article entitled "How to lay up an eight strand gasket," fully and completely illustrated, so that any person can make one as easily as a child braids its hair, will be given in an early number. This will be a useful article to engineers and they should not hesitate to avail themselves of it.

The Sunken Monitor "Comanche" at San Francisco.

Many of our readers are aware that the vessel which carried out the California monitor-battery sunk alongside the dock in San Francisco with the battery on board, in pieces. It seems there was not skill enough in California to raise the ship, and they are now working at her contents piecemeal; the progress made is thus recorded by the *Bulletin* of San Francisco :——

"The wrecking party has been working most successfully in recovering the portions of the *Comanche* stored in the between-decks of the *Aquila*. Their operations have resulted thus far in getting about 350 tuns of iron work, and it is believed that the whole between-decks will be cleared out in a week. All the most important parts of the *Comanche's* machinery have been recovered, as well as the turret plates, pumps and attachments. When the present deck is cleared of cargo, the same programme of operations will be gone through with in the lower hold, the work of discharging to be commenced aft, and thence forward. This action on the part of the wreckers is made necessary on account of the position of the ship, the stern being the highest part. Captain Merritt thinks that the 15-inch guns will be got out in about 20 days from date, by which time he will have worked from aft up to the main hatch, where the guns lie. It is Capt. Merritt's intention, if possible, to discharge the *Aquila* entire, with the exception of boilers, before attempting to raise her, for which purpose he is now having made 8 large air-tight wooden boxes or camels. These 'camels' are made of heavy timbers, strongly bolted, which are covered on the bottom and top with 4-inch and on the sides with 3-inch planking the whole being thoroughly caulked and pitched. They are to be 32 feet long, 12 feet broad, and 7 feet 3 inches wide, and are estimated to have a lifting capacity of over 80 tuns each. To each of these camels two heavy chains drawn under the wreck are to be attached, the strength of which is deemed sufficient to lift the *Aquila*. In addition, considerable lifting power is expected from the boilers, which are in the lower hold. These boilers are represented to be very large, and to have been placed in the ship's hold completely air-tight.

Pure Copper Paint.

A new pigment, calculated at the same time to increase the resources of the decorative painter, and to afford a ready means of preserving iron and other metals, has recently been introduced at Paris by M. L. Oudry of the Auteuil Electro-Metallurgic Works. He first obtains a pure copper by throwing down the metal by the galvanic process ; he then reduces the precipitate to an impalpable powder by stamping. This powder is then combined with a particular preparation of benzine, and used in the same way as ordinary paint; beautiful bronzed effects are produced upon it by means of dressing with acidified solutions and pure copper powder. The articles painted with the new material have all the appearance of electro-bronze, whilst its cost is less than one sixth; it will last from eight to ten years. Mr. Oudry also proposes to substitute benzine oil for linseed and other oils, over which he states it possesses great advantages.

Correspondence

The Comparative Efficiency of the Screw and the Paddle.

Messrs. Editors :—Seeing on page 67, current volume of the Scientific American, a notice of a trial of speed between the paddle-wheel steamship *Asia* and the screw steamship *City of Edinburgh*, in which the paddles came off victorious, perhaps I will be excused for making the following communication on the subject of screw propulsion—a subject of interest to many.

Perhaps the screw-propeller has arrived as near perfection as it ever will. English engineers, as a rule, seem to prefer a short pitch of screw, while American engineers appear to like a long pitch ; the efficiency of each form depends mostly on the sort of craft to be propelled—if for freight, a short pitch is the best ; if for speed, a long pitch is preferable. This has been established by experiment with different wheels on the same boat ; but the question of speed with similarity of model for screws and side-wheels has never been decided by actual experiment since the screw has arrived at its present perfection. Such experiments were made in the early days of using the screw as a propeller ; they are recorded by Bourne in his "Treatise on the Screw Propeller," the last of them were made in 1849, since which time the screw propeller has been much improved. In those experiments the paddle-wheel steamer did not run so fast as the screw, except when indicating more power; with the same indicated power on both, the screw was the faster. If such experiments could be made *now*, it would settle the question for a long time to come, at least until one or both are further improved.

Great improvements have been made in the engines for propellers, and there is room for still further improvement ; but to get as good speed, screw vessels must have as fine "lines" as the paddle ships. Screw steamers are seldom made so sharp, and never, I think, with so much engine power, every thing else being equal, as those with side wheels. When this is done, screw steamers will have better speed than side-wheel ships built for the same carrying capacity. The steamer *Water Witch*, lost on Lake Huron last Fall, was the only one ever built on the lakes with as fine lines as side-wheel ships commonly have. Her model was made for side wheels ; she was 170 feet long and 26 feet beam, was propelled by a Loper wheel, 9 feet diameter and 18 feet pitch, making 75 to 80 turns per minute; this was driven by a beam engine, set athwart-ships, and geared to the propeller shaft. Her speed and seaworthiness were remarkable ; she made as good passages and carried more freight than side-wheel boats of the same tunnage ; and it is believed, by those familiar with such things, that had she been fitted with paddle-wheels, with the same engine, her speed would have been much less with the same load.

It is not possible, perhaps, to apply as much power to one screw wheel as to two side wheels with advantage ; but two wheels, one under each quarter, have been used with much success on the lakes for a long time, and with separate engines. There was an account published in the London *Illustrated News*, dated Nov. 29th, 1862, of a screw steamer with two wheels and independent engines ; that being the first of the kind ever built in England, and they seem to have been used on our own coast but a few years ; while it is nineteen years or more since such arrangements were used on the lakes.* A propeller was built in 1845, at Malden, C. W., of about 300 tuns, fitted with two wheels and separate engines ; for a long time she was a first-class propeller. She was originally called the *Earl Cathcart ;* but her name has since been changed to the *F. W. Backus.* She is now in existence, and ran last summer on the "Chicago and Lake Superior Line."

If two vessels were built from the same lines and the same power applied to both, say to two screws, if they were light draft of water, let both be loaded the same, and when indicating the same development of power, I think the screw would run the faster. Side-wheel boats are the best for river and light-draft navigation ; but for 10 feet draft and over, screws will demonstrate in time their superiority over paddles.

J. W. C.

Sugar Island, Mich., Feb. 22, 1864.

[*The *Quinebaugh*, an old propeller running to Norwich, Conn., some years ago, had two screws driven by one engine. It was built by C. H. Delamater in—we think—1848; certainly as long ago as that. English engineers have made so much ado over twin screws, claiming precedence among one another for the idea, that one would think they had invented them; but after twenty years use in this country they are just found to be novel and advantageous in England.

The Drill and its Office.

Messrs. Editors :—On page 181, present volume of the Scientific American, in your article on Drills, I noticed some excellent remarks ; but in the engraving of the "twist drill," the construction is wrong—the lips are flat like the common drill, and would cut no better. The twist should continue to the extreme edge of the lip. I believe a twist drill properly made, and of the right temper, in the hands of a workman who knows how to use it, will drill more inches without sharpening than any flat one can be made to do. The only reason why the twist drill feeds easier is because the angle of the lip is more acute than the flat one. The flat-lipped drill will feed as easy as the twist, the angle of cut being the same. I think it important that the pod or shank be evenly finished, but quite as important that the twist should be irregular, or a "gain" twist. I find in practice that the best twist is about one turn in two inches at the point, and gain to one turn in three inches at six inches from the point, that is for drills of one-half inch and upwards. Smaller drills require a finer twist in proportion. The serrated "tit" on the counterborer would spoil the tool for a good work man. To get a good hole and countersink, the first tools should be rimmed to fit the "tit," and the tit should be rounded, then you would have a perfect hole. The manufacture of twist drills by machinery has been in progress for some two years in two places —South Bridgewater, Mass., and Newark, N. J. The manufacturers, I believe, make any size ordered ; but I think that there are none so good as the hand-made ones.

A. M. W.

New York City, March 28, 1864.

[We are very glad to receive such sensible criticisms as the one above, and we take pleasure in publishing them even though they conflict with our own views, for every man has a right to be heard. Our correspondent must bear in mind, however, that all men are not accomplished mechanics ; and while the use of the serrated tit would be objectionable in *standard fine work*, in common jobs it is not only useful but indispensable, as in drilling many holes for the tit, some of them will be smaller than the others, even if the drill is never ground, for the wear of the sides is a considerable item; then it is that the serrated tit is useful, for it cuts its way through whether the hole be small or not. There is this objection to continuing the twists to the very tip of the drill—it makes the edge too thin, so that it is more like a wood-cutting tool than one for iron. Such a drill may work well for a few holes ; but in the long run and with men of average intelligence, the drill we illustrated is really better to be straight for a quarter of an inch at the end than to have the twists run to the edge, for in drilling down a quarter or half an inch no drill clogs, and after that distance the twists take hold of the chips and raise them. A "gain" twist may be better than a regular turn; but it strikes us that our correspondent's figures are too quick in the pitch, and that in long holes the sharp pitch would hardly effect the object.—Eds.

Do Ladies appreciate Science ?

Messrs. Editors:—I hope you will excuse me for occupying your time while you read this, as I have really nothing of importance to say, except to fulfill the desire I have long entertained of expressing to you my high appreciation of your paper, which I have weekly perused, with a greater satisfaction that any other journal, for several years past. I find that the Scientific American is not only acceptable to mechanics as a promoter of their interests, but it is attractive to the *ladies* in the highest degree. My wife would sooner give up the "picture papers," lov

stories, and all, than lose the SCIENTIFIC AMERICAN, and my lady patients (I am a dentist), while waiting in my office, express their estimation of it by choosing it, generally, from among several others—journals of "light literature," illustrated papers and magazines.

C. G. D.

New Bedford, Mass., March 28, 1864.

The India-rubber Patent Controversy.

MESSRS. EDITORS:—I have read, with very great satisfaction, your determined opposition to the further extension of the Goodyear rubber patents. [See pages 152, 169, 185, 201, and 216, present volume of the SCIENTIFIC AMERICAN.] It is quitetimethe interests of the public should be considered. The late Mr. Goodyear and his family, have collectively received immense sums from those patents. The plea of poverty is not, or ought not to be, a valid one. Great stress was laid, in Goodyear's last application, upon his early struggles and necessities; but this, you know, is thehard lot and experience of most inventors in humble circumstances. The large amount that Mr. Goodyear received and expended in forwarding his invention, and his private expenditures, were not prominently brought forward. With Mr. Goodyear's private (and some think his extravagant) disbursements, the public would have nought to do, if it was not that "poverty" is the plea for *further* extension! It is not right to establish the precedent, that the duration of a patent should depend altogether upon whether an inventor, with ample means, has or has not provided for the future of his household.

Again; you are doubtless aware that Mr. Goodyear's family have but a minor interest in this application. In all probability, in this case as on the last extension, the *licensees* contract to bear all the expenses of the application, and to pay a certain stipulated sum contingent upon success; the sum agreed to, upon the former occasion, was $100,000. Who are the parties most concerned in wishing to defraud the public? A body of millionaires—men of great wealth accumulated under the protection of these patents, and some also of the most prominent lawyers in the United States. I name Mr. H. Durant, of Boston, who resigned a lucrative practice to become president of a rubber company; Mr. E. N. Dickenson, son of Judge Dickenson, largely interested; Mr. Jencks, of Rhode Island, chairman of the Congressional Committee on Patents, (before whom these applications must come), who is also either president or director of one of the large rubber companies. To those who have peeped "behind the scenes," on former occasions, this is, to say the least, a *most curious coincidence*. Newspaper reports say that this gentleman will not sit as judge on his own case; does he authorize or confirm that report?

It is currentlyspoken of, as a fact that the licensees intend spending one million of dollars to force the patents through Congress; this amount is not large, compared with their means and the vast interest at stake. I know that formerly there existed a secret agreement between the companies, by which a certain per-centage was set aside as a "law-fund," to scare all interlopers from the track, whether they had rights or not; possibly it is in existence now—but no matter! Truly the SCIENTIFIC AMERICAN needs all its courage and persistency—it must buckle on its armor and burnish up its weapons of truth and justice, if it intends to do battle with this huge Giant Monopoly in defense of the public.

There is another class interested, whose consistent champion the SCIENTIFIC AMERICAN has ever been; I allude to the "operative mechanics." There are men who, like myself, toiled at the birth-throes of that great invention, the "vulcanizing" of rubber—men whose zeal and perseverance surmounted difficulties which staggered even the inventor, and who have waited patiently but wearily for 24 long years for the field to be open, when their turn might come. You know and understand the merit due to many workmen in "licking crude ideas into shape." This invention did not spring forth perfect from the first inventor's brain. It has been stated on oath, by experts, that they could not have manufactured merchantable articles of vulcanized rubber by the light of Goodyear's original patent. The art has been perfected in different factories, at various times, by many hardworking and intelligent men—men whose improvements are recorded in the patents of their employers; the value of these improvements being demonstrated by the dividends declared in the directors' parlor. What chance have these in opposition to money, corruption, and legal subtlety?

I fear I have trespassed too much upon your valuable time. We working-men know that the SCIENTIFIC AMERICAN is potent in every good cause; "give the word," then, and testimony will come forward abundantly, with active and persevering opposition to unjust claims, if we are guided by your counsel and experience.

H. G. TYER.

Andover, Mass., March 21, 1864.

Diamonds for dressing Mill-stones.

MESSRS. EDITORS:—I take the liberty of forwarding you the following for insertion in your valuable paper, if you think it merits the favor. In Volume X, number 9 (new series), "E. F.," of Wisconsin, inquires respecting the durability of the diamond for dressing mill-stones. I have been using one for this purpose about three months, and dress my burrs once in five days. My plan of dressing (say a four-foot stone) is to crack with the diamond from the periphery or skirt 8 or 9 inches toward the eye, and thence to the eye I dress with the pick; this leaves the faces in the best possible condition to perform the desired operation. Now in regard to durability I say, after having used a diamond for three months, I am not able to detect the slightest indication of injury, or defect in its cutting qualities. My theory is that, if a man is satisfied with the manner in which the dressing is done by the diamond, as a question of economy, the advantages of this instrument for the purpose specified are beyond cavil or doubt. A run of four-foot stones may be dressed with this tool in from two to four hours, whereas with the pick twelve hours is the usual time they are kept up; this gives a saving at least eight hours in time, and at the usual profits of this business, would pay for a twenty-five dollar diamond in three or four dressings.

H. A. ANDERSON.

Elmwood, Ill., March 24, 1864.

Cause and Preventive of "Interfering" of Horses' Feet.

MESSRS. EDITORS:—If any reader of the SCIENTIFIC AMERICAN has a "cutting" horse and wishes him cured (which doubtless he does), permit me to say that if he will add twenty-five per cent. to the *quantity* of his food—supposing it to be good food, such as oats or corn, corn-meal, hay, &c.—he will most probably correct the evil. This is very simple; it may be expensive, but yet it is economical. Symptoms of fatigue, in either man or beast, are nearly always first visible in the raising of the feet; and a horse of a certain formation about the shoulders and haunches will first exhibit this weakness in striking the inner forward portion of the hoof against the neighboring fetlock joint, which action is termed "cutting" or "interfering." I have tried the correction frequently and it has never failed me; but the owner must not be content with the theory; he must see that his horse actually gets the feed. A "cutting" horse is frequently cured by taking him away from a livery stable and feeding him at home. This experiment is easily tried.

R. H. A.

Baltimore, Md., March 22, 1864.

A Suggestion in regard to the Metrical System.

MESSRS. EDITORS:—I am pleased to find by the notices which appear in your excellent paper from time to time, that you are in favor of the adoption of the metrical system of measures in this country. Your suggestion that Congress should pass an act legalizing the new system will most likely be carried into effect ultimately; therefore, in the meantime, would it not be wise to recommend that rules be made with the French measures on one side and the English on the other? By this means mechanics and others would become gradually acquainted with the new system; and I believe it is only necessary for this new measure to be *understood*, to be universally adproved. Although I have been but a few months a reader of the SCIENTIFIC AMERICAN, I am satisfied you are a sound advocate of every substantial improvement; and that the new measures, founded upon a simple and universal system, will receive the powerful aid of your influence in the mechanical world.

F. S. DAVENPORT.

Jerseyville, Ill., March 21, 1864.

P. S.—I have received my Letters Patent, and beg to offer you my thanks for having conducted my case to a successful issue, and for the promptness with which you have replied to all my communications.

F. S. D.

Armor-plated Frigates for the Austrian Navy.

THERE are now in course of construction, at private yards near Trieste, two Austrian iron-clad frigates, designed by Herr Romako, and named the *Hapsburg* and the *Archduke Ferdinand Max;* both vessels being of the same dimensions, and the features in their construction also being the same, viz.:

	ft.	in.
Length between perpendiculars	262	4½
Beam	52	6
Depth of hold	23	6
Draught forward	20	9
Draught aft	25	8
Tunnage	3,065.85-90 tuns.	
Displacement	5,200	,,
Midship section area	894	sq. ft.
Area at water line	9,900	,,

The plating commences at 4 feet below the water line, extends the whole length of the vessel, and is 5⅛ inches thick, tapering fore and aft to 3¾ inches; the tapering commencing about 25 feet from the stem and the stern; the wood backing is from 12 inches to 14 inches thick. The port sills are 7 feet above the water line.

The bow is formed "tumbling home"; the bowsprit is withdrawable. She has a bow battery or turret on the forecastle, with two heavy guns pivoted, to be used as broadside guns; the forecastle, looking aft, is plated with 1½ inch plate, and provided with boats, guns to sweep the deck, and crenelations for riflemen. The plating at stem allows of the vessel being used as a ram. The coal bunkers are carried up to the lower deck, but a passage is left between them and the ship's sides. The after deck has a suitable deck-house for the accommodation of the captain and officers. The rudder shaft is protected by armor plating 2½ feet below the water line. The vessel is formed very fine aft, being designed for a high speed.

The ventilation of the vessel is provided for by longitudinal passages with vertical openings fore and aft, and having communications with the cabins, &c.

The armanent is proposed to consist of 32 pieces, 130 pounders (23 lbs. charge); but perhaps fewer and heavier guns (muzzle-loading rifled) may be adopted.

The engines are 800 horse-power nominal, the cylinders are horizontal, 82½ inches diameter; 4 feet stroke. The tubular boilers, six in number, proportioned for 1,000 horse-power nominal, have 34 furnaces. The screw proposed is a non-lifting Griffiths, 19 feet, 10 inches in diameter; pitch variable from 26 to 30.

Mowing off Strawberry Vines.

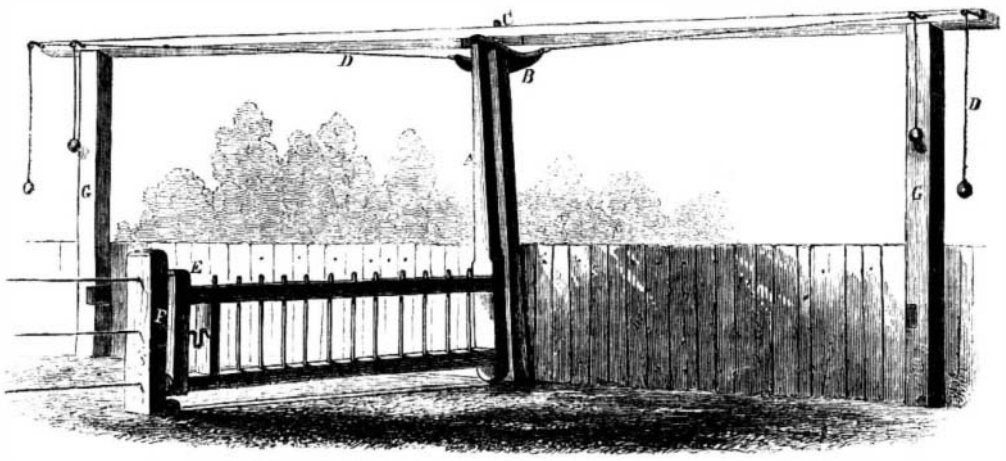
At a late meeting of the Waltham (Mass.) "Farmers' Club," Dr. O. D. Farnsworth said he had been trying a new experiment with his strawberry beds. After his bed had ceased bearing, he mowed it closely and raked off all the vines, put on a little guano, and the result was that the ground was literally covered with the finest fruit. The bed which he experimented with is now five years old, and he intends to continue this course with it. He thought it would not be well to pursue this course if there were many weeds, as in that case it would be easier to set out a new bed. In setting a bed, he would trench 1½ feet deep and manure highly. The rows should be 3½ feet apart, and the plants 8 inches apart in the rows. Paths should be dug from 18 inches to 2 feet apart, and filled with meadow hay.

NEWSPAPER STATISTICS.—There are now published in the United Kingdom, 1,250 newspapers, distributed as follows:—England, 919; Wales 37; Scotland 140; Ireland 140; British Isles, 14. Of these there are 46 daily papers published in England; one ditto Wales; nine ditto Scotland; 14 ditto Ireland; one ditto British Isles.

PREVENTING INCRUSTATION OF STEAM BOILERS.—Mr. John Travis, of Royston, Lancashire, proposes the use of Irish moss, or silicate, arseniate, or phosphate of soda, to prevent incrustation of steam-boilers. From 6 lbs. to 8 lbs. per week, usually suffices for a 40 or 50 horse-power boiler.

Improved Self-opening Gate.

Our engraving illustrates a new and improved method of operating heavy gates; it is intended to dispense with the annoyance of alighting from vehicles or leaving a horse in the road while the gate is being opened. It will be seen, by referring to the engraving that the upper end of the gate post, A, has its bearings in a segment, B, which moves easily on a center at C. This segment has arms to which the cords, D, are fastened, said cords running to the side of the fence or any point conveniently reached by the traveler. It is easy to see that when the cords are drawn the segment is moved on its center; this throws the top of the gate beam out of the perpendicular, and also raises the outer end, E, clear of the sliding catch, F, so that the gate swings quickly around to the side post, G, where it is held fast and leaves the passage way open. The velocity of the movement can be easily controlled by the several cords, as it is only necessary to draw on either one alternately to make the gate move fast or slow. The gate may be made to open from either side, afterthe traveler has passed through he can close the opening by pulling on the cords on the opposite side. The sliding catch is merely a simple bolt which can be withdrawn by hand, as the outer end of the gate is elevated by pulling the cord; this is unnecessary when it has to be opened from carriage or horseback. There are also two stops near the segment, which prevent it from being drawn over too far. This gate works very well in the model before us, and will doubtless be popular with those who have use for them.

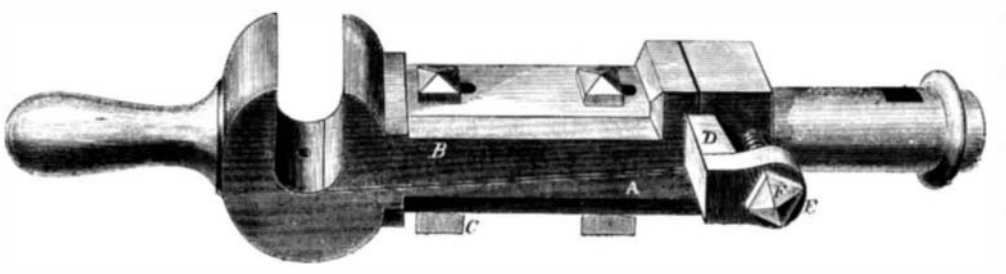


COOL'S SELF-OPENING GATE.

It was patented by Reuben R. Cool, of Millen's Bay, N. Y., through the Scientific American Patent Agency, March 1, 1864. For further information address the inventor as above, or Charles Warren, St. Lawrence, N. Y.

Improved Cam Rod Hook.

This invention is intended to compensate for the wear which takes place in the hooks of eccentric rods of steam engines, &c., and to obviate the bad effects of the lost motion resulting from the same. The engraving explains itself to the mechanical reader, as it may be seen that the body of the hook, A, has a slide, B, fitted to it, said slide being connected by bolts, C, to the hook aforesaid; this slide has slots in it so that it can move back and forth to a certain distance. The key, D, is fitted into a key-way which is cut at the end of the slide and it has a tapering form from one end to the other. There is also a lug, E, on this key, so that when the bolt, F, which passes through it is screwed up, the key will be forced in. By this arrangement it is easy to see that the notch in the rod may be closed up at any time, either when the engine is in motion or not. It is not confined to steam engines alone, but maybe used equally well on all other kinds of machinery where this detail is employed.



HAYCOCK'S CAM ROD HOOK.

The invention was patented Jan. 12, 1864, through the Scientific American Patent Agency, by B. A. Haycock, of Richland, Iowa. For further information address the inventor at that place.

Double-Cylinder Expansive Steam-Engines.

This variety of the steam-engine finds much more favor abroad than in this country. English engineers have been and still are experimenting with marine and stationary engines upon this principle, and it is claimed by them that most excellent results are obtained. We append a report of the performance of one ship fitted with these engines. The consumption of coal is stated to be only 1 pound per horse-power per hour; while the figures given make the actual consumption over 2½ pounds per horse-power per hour, which is low enough certainly, if it is correct. The account is taken from the March number of the London *Artizan*:—

"The *Quito*, another of the vessels recently constructed and engined for the Pacific Steam Navigation Company, by Messrs. Randolph, Elder and Co., left the Mersey on the 27th January, on her first outward voyage for her station on the South Pacific, and made a most satisfactory run to St. Vincent's, being the fastest, we believe, for that passage which has yet been recorded, viz., 7½ days from Waterford, which she left on the 28th of January, and where she landed her pilot—and 8 days 4 hours from Holyhead. On the run she averaged from 12½ to 13½ knots, on a consumption of about 2 cwt. per knot, Welsh coal. She arrived at Madeira on the 1st ult., and reached St. Vincent's at 6 A.M. on the 5th ult.

"The engines (Messrs. Randolph, Elder and Co.'s patent double-cylinder) are of 320 horse-power nominal, and appear to have averaged 1,250 horse-power indicated, and to have developed about a horse-power for every pound of coals. The two large cylinders are each 90 inches diameter, and the small cylinders, 45 inches diameter; 5 feet stroke; steam-jacketted; and fitted with surface condensers. The boilers are two in number, tubular, fired from both ends, they are loaded to a pressure of 35 lbs., contain about 4,400 feet of heating surface, and 190 feet of fire-grate surface; the shells are cylindrical, 11 feet diameter, 16 feet long, and ½ inch thick, double-rivetted. The furnaces are twelve in number, each 2 feet 8 inches wide, and there are four superheating up-take chambers."

A Picture of the Solar System.

Herschel says:—"Let the Sun be represented by a globe 3 feet in diameter. The nearest planet, Mercury, will be about as large as a pepper-corn ⅓th of an inch in thickness, at a distance of 40 yards. Venus will be 78 yards distant and ⅓d of an inch in diameter—a little larger than a pea. At the distance of 107 yards will be the Earth, very little larger than Venus. About 9 inches from the Earth will be the Moon, the size of a mustard seed. Mars, at a distance of 160 yards, will have about half the diameter of the Earth; and the smaller planets (Vesta, Hebe, Astrea, &c.), at a distance of from 250 to 300 yards from the Sun, will resemble grains of sand. Jupiter and Saturn, 500 and 1,000 yards from the center, will be represented by oranges 4¾ inches in diameter. Uranus, the size of a nut of one inch in diameter, will be 2,000 yards distant; and Neptune, as large as an apple 2¼ inches in diameter, will be about half a mile away from the Sun. From Neptune to the nearest fixed star will be more than 2,000 miles!"

The First Steamboat.

A recent reference in the London *Times* to a statement that "three centuries ago Blasco de Garay attempted to propel a boat by steam in the harbor of Barcelona," called forth a counter-statement from a correspondent, who has had access to the original letter from Blasco himself, written in A. D. 1543, which contains the evidence often cited by the Spaniards for this assertion. This letter describes minutely a vessel propelled by paddles worked by two hundred men, but there is not a word about steam in the whole document. The first well-authenticated instance of a steamboat actually used is found in the manuscript correspondence between Leibnitz and Papin, in the Royal Library at Hanover, where Papin relates his experiments with a model steamboat on the river Fulda, in the year 1707. This may all be correct enough; but the "correspondent" should have been more explicit and given his name and *status* when writing about such a subject.

Curious Detection of a Criminal.

Not long ago there occurred in Prussia, one of those cases of detection of crime by scientific means which interest a large and intelligent class of readers. A quantity of gold, packed in boxes, was dispatched by a railway train. On arrival at its destination it was discovered that the gold had been stolen from some of the boxes, which were refilled with sand to make up for the deficient weight. Measures were at once taken for the discovery of the thief, and that no chance might be lost, Professor Ehrenberg was requested to make a microscopic examination of the sand. The Professor (who is a member of the Academy of Sciences at Berlin, well known for his researches into minute objects, and his comparison of volcanic dust from all parts of the world) asked that a quantity of sand from every station by which the train had passed should be sent to him. Examining these one after another, he at last came to a sand which was identical with that found in the gold boxes. The name of the station whence this sand had been collected was known, inquiries were set on foot at that station, and among the persons there employed the thief was detected. The incident is one which an expert novel-writer might make use of with effect.

Surnames.

The use of surnames was not general in England till after the Reformation. Washington's ancestors settled first at Herbert, and the individuals were known as John de Herbert, that is John of Herbert, Thomas de Herbert, &c. Afterward one branch of the family moved to Wessington, when they were known as "of Wessington," or "*de* Wessington," and this becamc corrupted into the family name of Washington. So late as the beginning of the 18th century some families of Yorkshire had no fixed surnames. Even at this day it is said that few of the miners of Staffordshire bear their fathers' names, but are only known by some sobriquet. Nicknames are in general use, and a man whose real name is Peter Jones may be known to his neighbors, and even to his wife and children, only as "Soaker," "Nosey," "Lumper," or some similar designation.