through the exhaust pipe. The exhaust steam itself lowers in temperature as its pressure decreases, and the live steam on the back of the valve is comparatively constant in temperature: as a result, then, the valve is continually changing in form from the expansion due to the high temperature of the exhaust steam during the early part, and the lower temperature during the latter part, of the exhaust. Now comes another and more important question, and that is: How far will the spring of the valve, from the pressure of the steam upon its back, affect the fit to its seat, and will it so spring as to permit of a fine film of steam finding its way beneath the wings of the valve, thus relieving, to a certain extent, the amount of its pressure to its seat?

If we take a pair of the plates shown in Fig. 1, and get them so closely together that it requires, say, 340 lbs., to slide one upon the other, and then take hold of the plates by the handles, as shown in our engraving, we can pull them apart by exerting a force of about 130 lbs.; in other words, it will require but little more than one third as much power to pull them apart, in this manner, as it requires to slide one upon the other. In thus pulling them apart, we have, upon the back, whatever weight of the atmosphere the fineness of the fit leaves unbalanced, and, in addition, whatever amount of adhesion the perfect contact of the surfaces may induce. Hence, allowing a co-efficient of friction of 0·15, we should have 2,276 lbs. holding the plates together; and while allowing a co-efficient of 23·7, we should have 1,440 lbs. resisting the effort to pull the plates apart. The fact, therefore, that 130 lbs. will actually, under the conditions shown, pull the plates apart, appears at first sight not a little singular. The solution, however, is simple enough. The plates spring from the pressure placed by the hands upon them, and hence they unlap and come apart just as if we took two sheets of paper, placed together and soaked with water, and then took hold of two corresponding corners and pulled them apart. The plates are $\frac{1}{2}$ inch thick in the body, and the ribs are each $\frac{7}{16}$ inch thick and $2\frac{3}{8}$ inches high; and yet 130 lbs. applied as shown will spring them sufficiently to let the air get in between them. Let us in the light of this fact examine the shape and pressure upon a slide valve (assuming for the nonce that the pressure is the unbalanced area in contact multiplied by the steam pressure), and ascertain whether it is reasonable to suppose that the pressure of the steam upon the valve springs the wings, and permits the steam to find its way beneath them.

In Fig. 2 is shown an ordinary locomotive slide valve, the ports being $1\frac{1}{4}$ x 17 inches, the bridges between ports 1 inch wide, the cylinder exhaust port $2\frac{1}{2}$ inches wide, and the valve having 1 inch of steam lap, covering the ends of the cylinder ports 1 inch at each end. When the valve is in the position shown, it will be noted that there is a very large proportion of the area of the valve unsupported by the seat; the area of this portion will be in this case $5\frac{3}{4}$ inches, as marked in the engraving, one way, and 17 inches the other =97·75 inches. Now supposing the steam pressure to be 130 lbs. per inch: then 97·75 × 130 = 12,707 lbs., the assumed pressure of the valve to its seat, tending to spring the flanges or wings in the direction denoted by the dotted lines, E and F, respectively. What have we to offset this amount? The area of one bridge equals 17, the area covered under the valve flange at D equals 11 inches, and the amount of the valve flange overlapping the ends of the steam ports equals 15·5; total 43·5 square inches, which, multiplied by the steam pressure, would give 5,855 lbs. as the pressure tending to spring the valve wings in the direction marked. There will, it is true, be a pressure placed on the underneath side of the valve by the exhausting steam, the area thus acted on being, in the position shown, 97·79 square inches; but it can scarcely be advanced that this pressure can be sufficient to relieve the valve from its liability to spring from the 5,855 lbs. on the other side.

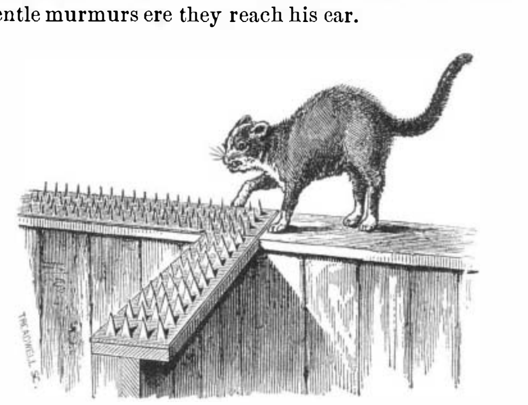
Theoretically, a valve will spring of its own weight; and that it will spring from the pressure which a man can put upon it with his hands, I have often found in facing valves up. For example, if, in trying the valve on the surface plate, the former is pressed in the middle by the hands to make the plate mark the face plainly, and the valve is fitted under these conditions to a practically perfect fit, the surface plate marks showing equally all over, we may then let the valve lie upon the plate of its own weight only, and the marks will show (after of course moving the valve back and forth) at and near the edges of the valve only, showing that the pressure of the hands sprung it. There are plenty of instances of metal in the most solid of forms springing of its own weight: witness the Morton Poole rolls, which, though of chilled cast iron and 12 inches in diameter, spring and bend by the insertion between them of a piece of gold leaf $\frac{1}{5000}$ inch thick. There is yet another part of this question, however, which is found in practice to be of the utmost importance, and that is (as a visit to any locomotive repair shop will demonstrate, by the engines that come in to be repaired), that the valve wears out of truth, and so does the seat. In my experience, I have chipped a full $\frac{1}{16}$ inch off valve seat faces without cutting the worn grooves out. I have examined, or had come under my observation, at least 400 slide valves, and I never saw one that was, after working three months, of a sufficient fit to its seat to require 1 lb. more than its own weight to lift it from its seat; whereas, if such a valve as is shown in Fig. 2 were of a practically perfect fit, it would require, when in mid-position, some 800 lbs. to lift it vertically, taking hold of the ribs outside the arch. The fact is that the bridges wear hollow lengthways, and hollow, as denoted by a straight edge, over the seat and across the bridges. Then there usually wears in the seat face a groove at right angles to, and close to, the edges of the ports. To remedy this, a practice sprung up in England, in about the year 1865, of drilling, in the face of the valve and in a line with the exhaust port edge, a hole in each wing; and this hole may be found mentioned in recent engine specifications published in this city. Now just so soon as a valve face loses its smoothness, though the grooves may be only the one hundredth of an inch deep, or like coarse file marks, it becomes impracticable to exclude the surrounding air at atmospheric pressure, let alone steam at a high pressure, from between the surfaces.

I have a plate of the same size as those shown in Fig. 1, which has been planed and not fitted in any way. The planer marks are all intact. By placing a finished true plate upon it, the partial vacuum between the two will lift the planed one; but in about ten seconds it will fall, because the weight of the plate causes it to sag, and the air travels along the fine planer marks until there is not sufficient vacuum to sustain the weight of the plate, which is about 20 lbs. Now since the planed plate can be lifted by the vacuum, it is at least as good a fit as an ordinary slide valve, and under a steam pressure would undoubtedly be steam-tight, although the steam, like the air, would find its way along the planer marks, and thus counterbalance a large proportion of the pressure placed by the steam on the back of the valve. How much the elements of warping from expansion, changing form from irregular temperature, and counterbalancing from steam finding its way beneath the valve, will affect the pressure of a valve to its seat whether these causes act either in concert or partly counteract each the other, will depend upon the shape, size, strength, etc., of the valve. Isaac Walton said, in giving instructions how to cook a trout, "first catch your trout;" so it may be justly said, in calculating the friction of a slide valve, first find your pressure.

New York city. JOSHUA ROSE.

THE CAT TEASER.

No one who in the chill midnight air has hurled improper language and miscellaneous toilet articles at feline vocalists chanting on the back fence can afford to remain in ignorance of the merits of the ingenious little device represented in our engraving. It prevents cat concerts, simply by preventing the cats from prowling on the top of fences; and it compels them to take refuge on the fences of one's neighbors. Distance then lends enchantment to their howls, and the thoughtful man who has provided himself with the cat teaser "may wrap the drapery of his couch about him and lie down to pleasant dreams," lulled by the distant wauls, mingled with the profanity of some one several doors away, both reduced to gentle murmurs ere they reach his ear.



The cat teaser consists of a strip of sheet metal in which V-shaped cuts are made. The pointed pieces of the metal are then bent upward so as to stand perpendicularly; and the strips are tacked on the top of the fence. It is not necessary to surround an entire back fence with the device, because, if the fence at the rear end of the yard, and for a short distance adjoining on each side, is covered, cats cannot jump into the yard from the adjoining fences. It is impossible for a cat to walk on the points, nor can she insert her paws between them. Not only fences but roofs may thus be protected, while the device may also be used for keeping cats away from flower beds.

Practical tests of the invention have shown that it is discouraging to cats in a high degree. Tom cats of exceptional intelligence, who have long treated with contempt such trivial obstacles as spikes and broken glass, have retreated baffled before the teaser. As a means of preventing chickens roosting on unauthorized fences, the device has also proved very useful, and carries far deeper conviction to the mind of the average hen than does throwing stones at her after she is comfortably settled for the night.

Persons who value slumbers unbroken by feline melodies should address the inventor, Mr. C. L. Topliff, P. O. box 773, New York city.

A Silk-Spinning Fish.

There is a mollusk—the *pinna* of the Mediterranean—which has the curious power of spinning a viscid silk which is made in Sicily into a textile fabric. The operation of the mollusk is rather like the work of a wire-drawer, the substance being first cast in a mould formed by a sort of slit in the tongue, and then drawn out as may be required. The mechanism is exceedingly curious. A considerable number of the bivalves possess what is called a *byssus*, that is, a bundle of more or less delicate filaments, issuing from the base of the foot, and by means of which the animal fixes itself to foreign bodies. It employs the foot to guide the filaments to the proper place and to glue them there; and it can reproduce them when cut away. The extremity of the thread is attached by means of its adhesive quality to some stone; and this done, the *pinna*, receding, draws out the thread through the perforation of the extensile member. The material when gathered is washed in soap and water, dried, straightened, and carded—1 lb. of coarse filament yielding about 3 ozs. of fine thread, which, when made into a web, is of burnished golden brown color. A large manufactory for this material exists in Palermo.

Ross Winans.

Mr. Ross Winans, one of the many inventors who have amassed colossal fortunes, recently died in Baltimore, Md., at the age of 81 years. Mr. Winans began life as a merchant's clerk, but laid the foundation of his fortune by rearing horses. His first invention was a plow, that had a large sale. In 1830, he became interested in the building of rolling stock for the Baltimore and Ohio Railroad Company; and for the succeeding thirty years of his life he devoted himself to the designing of railroad cars and locomotives. The heavy freight engine known as the camel-back is his invention; and he also claimed to have originated the modern eight-wheeled passenger car. His shop became famous, and he built a large number of locomotives, and in this way accumulated the greater part of his wealth. During the war, he devised a steam gun for the Southern army, but it was captured by the Federal forces almost immediately, and thus never used. It was not a formidable weapon. Since his withdrawal from locomotive building, Mr. Winans has tested plans for improved working men's dwellings with much success. Thirty years ago he was offered the management of the Russian railways by the Czar, but this he declined in favor of his sons, who brought much ability to the work. Recently, Mr. Winans has resided on his model farm near Baltimore.

Blocking the Straits of Belle Isle.

In this city a kind of mild war is chronic between the Harbor Commissioners on one hand and the police authorities on the other, the subject being the disposition of ashes and solid refuse of all kinds, not susceptible of utilization, which if thrown into the bay tends to fill up channels and otherwise to obstruct navigation. At present, this material is carried out to sea in large scows, and there dumped. A new engineering scheme, rather startling in its magnitude, has recently been advocated, which, as a daily contemporary suggests, if ever seriously regarded, will afford an outlet for all the ashes, etc., New York and all other Atlantic coast cities can furnish. The project is to block up the Straits of Belle Isle, the object being to divert the ice which comes down every year from Baffin's Bay, through the Straits, and which makes the shores past which the icebergs float many degrees colder than those to the eastward, which face the ocean and get the benefit of the Gulf Stream. It is believed that, if this project could be accomplished, the climate of Anticosta and of the Gulf of St. Lawrence would be greatly modified, and navigation through the neighboring waters could be kept open during the whole year. In the narrowest portion, the width of the Straits is $8\frac{1}{2}$ miles.

Whole Ox Soup.

In Australia, where the horned stock has increased of late in a more rapid ratio than the population, the supply of meat is much greater than the demand; and at the present time the price of cattle is commonly quoted "at boiling rate;" that is, the animals will fetch no more from the butchers than can be realized for their hides, horns, hoofs, tallow, etc., for exportation. In large establishments devoted to preparing these utilizable portions of the bullock, there was of course an immense waste when the ox went into the melting pot; but this loss is now in a great measure avoided by boiling the animal at once into soup, or concentrated extract of beef. After the head, horns, hoofs, etc., are removed, the meat is cut into convenient sized pieces and conveyed to immense steam-tight double cylinders capable of holding upwards of fifty bullocks at a time. In seven hours, during which they are subjected to a pressure of steam of 15 lbs. per square inch, the bones and meat are reduced to a pulp. The steam is then condensed, and the tallow, which floats on the surface, drawn off. The pulp is removed and placed in a powerful press, which squeezes out the soup. The latter is, however, not yet sufficiently concentrated; and to render it so, it is placed in a peculiarly constructed boiler, there reduced by evaporation, and finally run off into bladders. When cold, the essence is semi-transparent, of a rich reddish brown color, and sweet to the smell and taste, almost like confectionery. A whole bullock, after being thus treated, yields but 20 lbs. of soup.

Telephonic Music.

At a recent telephonic concert in Washington, it was stated by the lecturer that the electric waves of sound sent through a single wire are frequently conveyed, indirectly, by other wires running parallel with it on the same poles, although entirely disconnected from it. This statement was verified in the Washington office of the Associated Press, where a number of the tunes played in Philadelphia, and conveyed electrically to Lincoln Hall in Washington, were distinctly heard on the relay used in the Press office, which had no connection with the wire that was attached to the telephone. The tones thus conveyed, although not loud, were stated to be audible at a distance of several yards from the instrument.

Canceling Postage Stamps.

Every year, in something over 30,000 offices, the Post Office department cancels a thousand million postal stamps of one sort and another. It was really a little more than this last year—1,049,767,507—but a few thousand more or less make small difference. The thousand million give work enough. One third, the stamped envelopes and the postal cards, cancel themselves, in a sense. No one can use them twice. The stamps nobody has yet been able to cancel fairly and completely, and within the past month the department closed two years of experiment no wiser than it began.

A new ink is generally the stronghold of canceling genius, and to the fat inks—printers' and metallic inks—writing fluid, the three principal acids, caustic potash, and a drug shop of other chemicals have been added by genius at work on a letter stamp. There is a sulphuric acid ink there which came from Cincinnati, warranted to cancel a stamp, and which eats a hole through the envelope into the bargain. There is one of caustic potash, backed by a distinguished chemist, which blisters a man's fingers at touch, and has its effects on the glass bottle which holds it. Nitric acid is at the bottom of another ink, and fills the air as it is used with the fumes familiar to laboratories. All these inks do too much. Most of them too little. Your average inventor never tests his invention.

There are other ways to cancel stamps, by genuine *cancellæ*. They have all been invented—a good many separate times. There is one ingenious contrivance which brings a disk down with a half turn at the stamping—a slanting slot does the work—and rips half the features off G. W. or Franklin. Somewhere along the ten-thousandth letter this dulls and takes a blow like a sledge hammer to do its work. The New York Post Office cancels two million of stamps a year, and the New York clerk takes more kindly to the firm, light tap of a wooden stamp. No invention has displaced that any more than the ink.

So the department has given over the attempt to cancel. Gets three cents for a good many stamps, and carries six or nine cents mail matter under the stamp. Is it not a profitable operation? "'Do they have this bother in England?' I asked. 'Oh, no; they black their stamps up so thoroughly.' 'Why can't we?' 'Well, our postmasters are not so careful, and in England they make a row with a man if a stamp is not properly canceled. We can't do that. The department doesn't have enough control, and can't get at a man so sharply.' 'Then this whole loss is simply a question of a civil service, efficient or not?' 'Well, yes; about that.'"—*New York World.*

Spring Ailments.

The remedy for spring diseases, says *Hall's Journal of Health*, by whatever name, is: Eat less. We do not mean that you shall starve yourself, or that you shall deny yourself whatever you like best, for, as a general rule, what you like best is best for you; you need not abandon the use of tea or coffee, or meat, or anything else you like, but simply eat less of them. Eat all you did in winter, if you like, but take less in amount. Do not starve yourself, do not reduce the quantity of food to an amount which would scarcely keep a chicken alive, but make a beginning by not going to the table at all, unless you feel hungry; for if you once get there, you will begin to taste this and that and the other, by virtue of vinegar, or mustard, or syrup, or cake, or something nice; thus a fictitious appetite is waked up, and before you know it you have eaten a hearty meal, to your own surprise, and perhaps that, or something else, of those at table with you.

The second step towards the effectual prevention of all spring diseases, summer complaints, and the like, is: Diminish the amount of food consumed at each meal by one fourth of each article, and to be practical, it is necessary to be specific; if you have taken two cups of coffee, or tea, at a meal, take a cup and a half; if you have taken two biscuits, or slices of bread, take one and a half; if you have taken two spoonsful of rice, or hominy, or cracked wheat, or grits, or farina, take one and a half; if you have taken a certain or uncertain quantity of meat, diminish it by a quarter, and keep on diminishing in proportion as the weather becomes warmer, until you arrive at the points of safety and health, and they are two: 1. Until you have no unpleasant feeling of any kind after your meals. 2. Until you have not eaten so much at one meal, but that, when the next comes, you shall feel decidedly hungry.

Supplies being thus effectually cut off, that is, the cause being first removed, Nature next proceeds to work off the surplus, as the engineer does unwanted steam; and as soon as this surplus is got rid of, we begin to improve; the appetite, the strength, the health return by slow and safe degrees, and we at length declare we are as well as ever.

Hurry and High Pressure.

It is the pace that kills; and of all forms of overwork, that which consists in an excessive burst of effort, straining to the strength, and worrying to the will, hurry of all kinds —for example, that so often needed to catch a train, the effort required to complete a task of head work within a period of time too short for its accomplishment by moderate energy —is injurious. Few suffer from overwork in the aggregate; it is too much work in too little time that causes the breakdown in nineteen cases out of twenty, when collapse occurs. Most sufferers bring the evil on themselves by driving off the day's work until the space allotted for its performance is past, or much reduced. Method in work is the great need of the day. If some portion of each division of time was devoted to the apportioning of hours and energy, there would be less confusion, far less hurry, and the need of working at high pressure would be greatly reduced, if not wholly obviated. A great deal has been written and said of late, to exceedingly little practical purpose, on the subject of "overwork." We doubt whether what is included under this description might not generally be more appropriately defined as work done in a hurry, because the time legitimately appropriated to its accomplishment has been wasted or misapplied. Hurry to catch a train generally implies starting too late. High pressure is, says the *Lancet*, either the consequence of a like error at the outset of a task, or the penalty of attempting to compensate by intense effort for inadequate opportunity. If brain is bartered for business in this fashion, the goose is killed for the sake of the golden eggs, and greed works its own discomfiture.

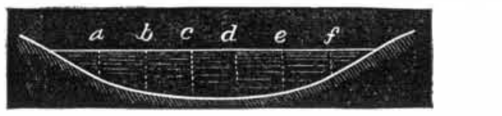
Stream Power and its Utilization.

Almost every man has about him in his daily walk sufficient apparatus for a tolerably accurate estimate of the quantity of water flowing in any stream. A walking stick, a jack-knife, and a watch, provided the walking stick is just three feet long, are all the tools necessary for the purpose. With these simple appliances, says *The Millstone*, the power may be measured in the following manner:

Take a section of the stream as uniform in breadth and depth as possible, and measure off upon its bank some definite length, say from one to four hundred feet, according to the rapidity of the water; set a stake close to the water at each end of this section, then throw into the water, opposite the upper stake, a green twig or limb of a tree or other object of such specific gravity as to nearly but not quite sink, and of such size that one portion shall remain at the surface while another portion nearly touches bottom, the object being to get the average speed of the water. The resistance caused by the bed and banks of the stream necessitate some care in this part of the experiment.

Note accurately the time the object is passing from stake to stake, and repeat the operation several times and at as many points towards the opposite shore; the sum of the several times divided by the number of points at which the speed was taken gives the average speed of the water.

Now measure the depth at several equidistant points across the stream, *a*, *b*, *c*, *d*, *e*, *f*, (the diagram showing a cross section of the stream).



The sum of these depths divided by the number of points at which the depth was measured gives the average depth; this average depth multiplied by the breadth of the stream gives the area of the cross sections; this area, multiplied by the length of the section, gives the cubic contents of body of the water embraced in the section. Thus we have the quantity and its velocity, which are elements necessary to show the value of a stream for manufacturing purposes, provided it has sufficient fall anywhere to render it available.

Allowing 62 lbs. for each cubic foot of water, and a supply of 1,000 cubic feet per minute, and a fall of 10 feet, we have 1,000 multiplied by 62, equals 62,000 lbs.; 62,000 multiplied by 10 equals 620,000 lbs. momentum; 620,000 divided by 33,000 equals 18·7 horse power. One fifth at least must be deducted for friction and loss, making in this case about 15 horse power.

Velocity of Electricity.

Dr. Sabine has devised a method of measuring the contour of electric waves passing through telegraph lines. It is probable that in this sense alone electricity may be said to have a velocity. The early experiments on the time elapsing, between starting electricity into one end of a conductor and receiving it at the other end, gave totally contradictory results. This interval would depend on the electromotive force employed, the resistance and capacity of the conductor, and the sensitiveness of the receiving instrument. It would therefore by no means be proportionate to the length. By the following method the electrical condition of any point of the line may be examined quantitatively at intervals of 0·001 of a second or less after starting the electric impulse. It thus becomes possible to measure the form and speed of a wave. Suppose one end, A, of a conductor, A B, is placed to earth, and that the other, B, is connected with one pole of a battery whose second pole is put to earth. Then any point of the conductor, as C, will assume a potential which will be proportional to the resistance of A C. This potential may be measured by connecting C for an instant with a condenser or accumulator, and then discharging the latter through a delicate galvanometer. When the circuit is first closed, a minute interval of time is required before C will attain its full potential measurements made of the relation of these quantities, showing the form of the electric wave passing the point, C. The only mechanical difficulty is to construct a chronograph which will allow C to be connected with the condenser, a small but accurately determined time after A is connected with the battery. A heavy wheel of brass is set in motion by a steel spring so that it shall revolve exactly twice a second. The interval through which the spring acts being always the same, a nearly constant velocity is always imparted. The disk is divided into 500 equal parts. A movable index serves to regulate the angle through which the disk turns between the two connections to be recorded. The time of revolution of the disk was first determined by noting the figures read in succession under the film of a small telescope, when the disk was illuminated by half-second flashes of an induction coil. The force of the spring and the position of the trigger releasing it were adjusted until the right velocity was obtained. Recently a condenser was discharged through a known resistance for some interval indicated by the disk, and the time calculated, according to the leakage formula, from the initial and final readings of the galvanometer. If the two do not agree, the spring is altered until they do; but its action is found to be very constant and not to need alteration, except after taking the apparatus to pieces for alteration. Several series of experiments are given, and the results show the delicacy and accuracy of the method. —*Philosophical Magazine.*

NEW BOOKS AND PUBLICATIONS.

ELEMENTS OF GEOMETRY. By G. M. Searle, C.S.P. Price $1.50. New York city: John Wiley and Sons, Publishers, 15 Astor Place.

The author's principal object in the preparation of this work has been the desire to reduce what is supposed to be self-evident to the smallest possible amount, and thus to make the science more strictly logical. There are several peculiarities about the treatise, notably the avoidance of definitions until the thing to be defined has been shown to be possible, the omission of the theory of proportions and substitution of the equality of fractions therefor, besides various other minor points, which tend to render the work conformable to the author's general plan. The volume as a result is rendered much smaller than the ordinary school geometry, and therefore, while giving the student a more logical and connected view of the science, will, it is believed, enable him to master the same in shorter time.

STRENGTH AND DETERMINATION OF THE DIMENSIONS OF STRUCTURES OF IRON AND STEEL. By Dr. P. J. J. Weyrauch. Translated by A. Jay Du Bois, Ph.D. Price $2. New York city: John Wiley and Sons, Publishers, 15 Astor Place.

"More attention to just such facts as are here set forth and worked into a general method of dimensioning—facts which have long been at disposal, but never before properly set forth in a shape to meet the daily wants of the practising engineer and constructor—would make such sad disasters as that at Ashtabula impossible" (Translator's preface). True, so far as the facts are concerned, but not so as regards this book. When authors attain that happy facility of producing works with say seventy-five per cent less formulas and heavy mathematics, then (and not until then) will their books "meet the daily wants of the practising engineer." If all practising engineers were scientists of the rank of Dr. Du Bois or Dr. Weyrauch, we do not doubt but that this book would be just the thing needed. But we venture to assert that not one practising engineer in fifty would take the time to stop in the middle of his work and pore over this volume to find out what the formulas mean and how they are to be applied. Literature for the study may be as theoretical and as abstruse as the authors choose to make it; but where it is meant for practical purposes, it cannot be too clear and simple. For an illustration of our meaning, we refer to the pages of this journal, where many a subject, which has appeared elsewhere buried in calculus and the Greek alphabet, is elucidated in plain English and by simple computation. Professor Thurston adds an appendix on his strain diagrams, all of which is old and has been repeatedly published in substance elsewhere.

Inventions Patented in England by Americans.

From March 9 to March 22, 1877, inclusive.

ANIMAL PULP.—L. Coburn, Worcester, Mass.
BOILER FURNACE, ETC.—B. Hershey, Erie, Pa.
CANCELLING STAMPS, ETC.—W. Morris, Richmond, Va.
ELECTROPLATING WIRE.—W. Wallace, Ansonia, Conn.
FISH PLATE, ETC.—J. Eno, Council Bluffs, Iowa.
GAS RETORT PROCESS.—W. Karr, Frostburgh, Md.
HORSESHOE BARS.—W. M. Greenwood *et al.*, Cincinnati, Ohio.
LATHE.—W. S. Cooper, Philadelphia, Pa.
LIME KILN FLUE, ETC.—W. S. Sampson, New York city.
MAKING ICE, ETC.—E. A. Gillet, New York city.
MAKING STEEL.—S. Barker, Knoxville, Tenn.
RIBBON HOLDER, ETC.—H. V. Dempster, Washington, D. C.
RULING MACHINE.—W. O. Hickok, Harrisburgh, Pa.
SACK-SEWING MACHINE, ETC.—W. Webster, San Francisco, Cal.
SMELTING FURNACE, ETC.—G. H. Moller *et al.*, Plainfield, N. J.
STOP VALVE.—E. Russell, New York city.
TRAMWAY CAR.—J. Stephenson, New York city.
WASHER, GASKET, ETC.—Vulcanized Fibre Company, Wilmington, Del.

Recent American and Foreign Patents.

NEW MISCELLANEOUS INVENTIONS.

IMPROVED METHOD OF ATTACHING KNOBS TO SPINDLES.

William De Courcy May, Baltimore, Md.—The object of this invention is to provide a means for preventing the loosening and loss of the screw that fastens the knob of a door to its shaft. The improvements relate to the use of a band, ring, or sleeve, made to encompass the socket portion of the knobs so as to cover the screw, and consist, first, in constructing such band, or sleeve, with a transverse slit to permit the same to be opened and be sprung laterally upon the socket or shank of the knob; and, secondly, in constructing such band, or sleeve, with one or more tongues which enter the nick of the screw and prevent it from turning.

IMPROVED SADDLE.

Henry Ruwart, Jefferson City, Mo.—This invention embodies certain improvements in saddletrees designed to render the saddle convertible at will into either a gentleman's saddle, a lady's saddle, or a "muly" or harness saddle. The improvement consists in constructing the tree at its front end, opposite the cantle, with a key and a locking bolt, and the pommel, horns, or cap with a bottom plate provided with a slot corresponding to the key, and a perforation or recess for the locking bolt; so that when the pommel, or its equivalent, is placed upon the tree and turned around to a given position it is securely attached to the saddletree.

IMPROVED THILL COUPLING.

John L. Crist, William E. Crist, and George H. Smith, Sacramento, Cal. —This coupling, for thills or shafts of vehicles, consists of a spring for connecting each of the shafts with a clamp or clip attached to the axle, and upon the lower end of the said spring a nib is formed that engages with the clip when the end of the spring is clamped by a set screw in the clip. The spring is sufficiently rigid to support the thills, while it is also sufficiently flexible to permit of the required latitude of motion. All rattling and noise are obviated by the improvement, and the thills are readily attached and removed. To afford additional security, a ring may be added for receiving a strap that is attached to the thills.

NEW MECHANICAL AND ENGINEERING INVENTIONS.

IMPROVED AUTOMATIC WAGON BRAKE.

Charles T. Warren, Atlanta, Ga.—This improved brake for vehicles is so constructed that it will be applied to the wheels by the operation of holding back, and at the same time will allow the vehicle to be backed without its being thrown into action. The construction is simple and ingenious, rendering the device excellently adapted to its purpose.