DETACHABLE MILK CAN REFRIGERATOR.

On the upper part of the milk can fits a case, the lower edge of which is recessed to receive the handles. Hinged to the top of the case is a cover, which is raised by a spring and held closed by a spring catch, as shown in the engraving. By pressing upon a properly arranged knob the catch may be disengaged, when the cover will be instantly raised by the spring. The case is held in place by bolts, which may be placed across the recesses, so as to be below the handles on

DOUGLAS' DETACHABLE MILK CAN REFRIGERATOR.

the can. When in use, the case is filled with ice, which keeps the upper part of the can cold. As the ice melts the water escapes through the loose joint between the case and can, and runs down the can body, which is thereby kept cool. When not in use, the case can be detached and laid aside.

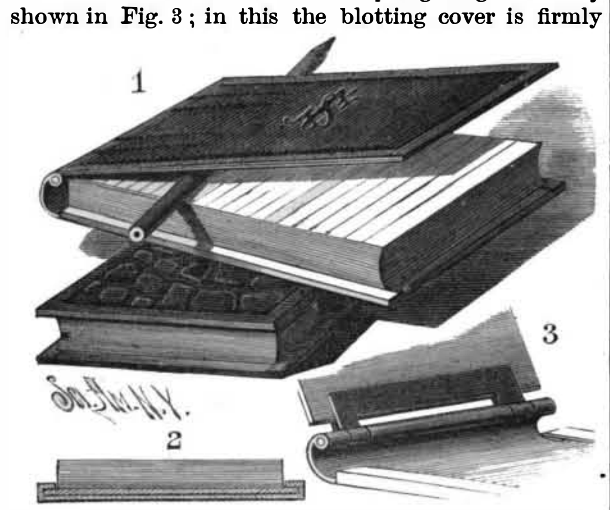
This invention has been patented by Mr. James Douglas, of Cornwall-on-the-Hudson, N. Y.

Examination of Mixed Tissues and Yarns.

The author determines actual solids on 2·5 grms. by drying at 100° in a special apparatus. The fat is obtained by extracting 15–20 grms. of the sample, gently dried, with the purest petroleum ether, evaporating, and weighing the residual fat. Soaps, resin, alkali, pigments, etc., are obtained by extracting the sample freed from fat, first with boiling water and then with a mixture of two parts absolute alcohol and one part ethylic ether. The residue is dried at 100° and weighed. To determine wool, this residue is steeped for 12 hours in a cold acid containing 60 per cent of sulphuric anhydride, carefully transferred to three times the volume of cold water, filtered, perfectly washed with hot water, and weighed as wool. The difference is cotton, linen, hemp, or silk waste.—*A. Gawalowski.*

WRITING TABLET.

The engraving represents a tablet for receiving and holding paper for writing purposes, which is the invention of Mr. Clarence Selah, of Ewing, Neb. The two side edges of the metallic back are folded, as shown in Fig. 2, to form a recess to hold a lining of paper or other flexible material suitable for a pad to write upon when a single sheet of paper is used, and upon which to place a quantity of paper. One end of the back is folded over and inward to receive a wire which stiffens it, and serves as a journal to receive the spring hinge clamps which hold the blotting cover. The action of the hinges is such as to adjust the blotter to the various thicknesses of paper, from one to a number of sheets. One construction of the spring hinge is clearly shown in Fig. 3; in this the blotting cover is firmly



SELAH'S WRITING TABLET.

held in position, and is not liable to injury, as the entire edge is clamped.

How to Remove Rusty Screws.

A Russian plan is to heat a flat iron bar to a cherry red and press it in the head of the screw for a couple of minutes, after which the screw becomes loosened, and is easily extracted with a screw driver.

Oleomargarine.

As noted in our last issue, Congress passed, and the President has signed, the bill aimed to cripple the oleomargarine industry by imposing a special tax of two cents a pound on the article, while all other food products go free. Says the American *Analyst:* In 1884, when the oleomargarine bill "to prevent deception in the sale of dairy products" was pending in the New York Legislature, the opinion of the Hon. William M. Evarts was sought as to the constitutionality of the proposed law. He declared unequivocally that it was not constitutional. The following is an extract from his opinion rendered two years ago:

"If this act shall be construed, not as protecting the public against 'deception in sales of dairy products,' but as protecting dairy producers in a monopoly of human food, against the manufacture and sale of the genuine products of other oleaginous substances suited as wholesome human food, in greater or less degree, to compete with or take the place of dairy products, I am of opinion that such legislation is repugnant with our Constitution. Legislation in this sense no longer adheres to the protection of guaranteeing a lawful product against simulation and deception, or protecting the public against fraud and imposition, but stands upon the avowed and unlimited discrimination in favor of monopoly, to the injury of other honest and useful producers and the oppression of the public. It is quite plain that the moment this legislation departs from the theory and justification of this act as limited, to 'prevent deception in sales of dairy products,' no proscription, on the mere ground of protective monopoly, of one industry can be limited by any rule of discretion in this line and style of discrimination. Hitherto, until recently, the maxims and instincts of public liberty have discountenanced all such methods of legislation. I am unwilling to tolerate the pretension that the provisions of our constitution offer no barrier to such an innovation upon freedom and equality as the creation of monopolies at the discretion of the Legislature."

Forgetful, apparently, of his strong language of 1884, Mr. Evarts, a few days ago, in the United States Senate, made a strong speech in favor of a bill, not framed merely to protect the public from deception, but imposing a restrictive tax upon oleomargarine, intended to protect dairy producers in a monopoly of human food such as he denounced so vigorously in the extract above quoted. To show the inconsistency of Mr. Evarts' attitude in the premises, we give the following brief extract from his recent senatorial speech:

Mr. Evarts described the condition of alarm into which the dairy interests of the country had been thrown by the introduction of oleomargarine, and said he would have supposed that, on the mere statement of that existence of things, everybody would have sympathized with this interest, so vast, so simple, so necessary, and so historical. The question was whether one good and honest product, one good and honest trade, one good and important element of foreign commerce, was—in its body and substance—to be attacked by fraud, and reduced, not only in its gain, but threatened in its existence. He argued that, within the eye of the law, the bill was constitutional. The Senate was now to confront the question whether this mischief, this injury, this stigma, this danger to trade abroad and at home, should be suffered to exist because of a difference between the two houses as to the amount of the tax. He himself should forego his own judgment as to what the tax should be, and would accept the bill as passed by the House. In conclusion, he made a strong appeal for sympathy in behalf of the great class of dairy farmers.

The "attack by fraud" upon the dairy interest is a gratuitous assumption by Mr. Evarts. The oleomargarine interest, sustained by Professor Atwater and the entire scientific skill of the land, is strongly in favor of the adoption of the severest measures, if needful, for protecting the public against fraud and deception; but they maintain, as Mr. Evarts also did so earnestly in 1884, that the legislation now sought for stands—to use his own words—"upon avowed and unlimited discrimination in favor of monopoly, to the injury of other and honest producers, and the oppression of the public."

The Attractiveness of M. Eiffel's Proposed Tower.

The iron tower which is to form the chief attraction of the Paris Exhibition of 1889 is already beginning to fill the Parisian mind with apprehension; and a savant explains in the *Moniteur* the curious phenomena which will be produced by this immense mass of iron rising to a height of 300 meters. He says that the enormous blocks of iron running north and south will become polarized, and that this polarization will soon invade the whole column. Then who knows whether the four lifts with their continual friction will not increase the magnetic influence a hundred fold? In this case, all articles for a mile around will be attracted to the tower, and will adhere to it as a needle does to a magnet. If the troops quartered in the Ecole Militaire, hard by, be called out to drill, it will be all in vain for the commanding officer to shout "*En avant,*" if they are paraded with the column behind them; they will irresistibly be drawn to the rear, with exception of the drummer, who does not carry a rifle. All the houses in Paris will suffer from a St. Vitus's dance, and, gradually attracted toward the Champ de Mars, will finally find themselves stuck to the tower. As for locomotives entering Paris, it will be found impossible to stop them at the various termini; they will rush through Paris, and dash themselves to pieces against the center of attraction. These and other evils, we are told, will follow the erection of the great Eiffel tower; but then the *Moniteur* is opposed to the anniversary of the capture of the Bastile being observed, and may have exaggerated the consequences.—*St. James' Gazette.*

PROTECTIVE GARMENT.

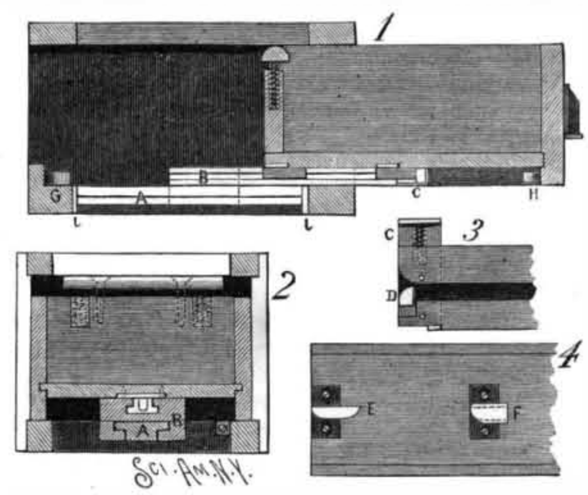
This garment, the invention of Mr. G. W. Hill, of 388 Pearl Street, New York city, is designed to protect parts of the body from the influences of cold and moisture. It consists of one or more pockets, B, open along one edge, D. In these, waterproof paper, E, is placed. As shown in the engraving, the pockets are to be worn for the protection of the chest and back, and are connected by shoulder straps. The paper is of approximately the same form as the pocket, and being rendered waterproof in any suitable way, will be unaffected by perspiration and will not be permeated by water from without. It also effectually excludes cold, and protects the body from sudden changes of temperature.

A Bee in a Telephone.

The experience of telegraph operators, inspectors, and linemen brings them into close acquaintance with all sorts and conditions of faults in connection with their work; the variety of these faults is wonderful, many stranger than fiction. One of the most curious in connection with telephony which we (*Mechanical World*) have ever known has just happened within the last few days at a place called Moss Bay. The lineman's attention was called to the circuit in question, as hearing was difficult; on listening at the telephone, he heard a "sort of booming which came on intermittently, very much resembling the distant roll of the tide, and which rendered speaking and transmission of work almost impracticable." Having satisfied himself by the usual methods that the instrument was right and the line free from induction, and that it was not picking up vibrations, the conclusion was arrived at that the fault must be in the general office, Moss Bay. An examination of the telephone apparatus disclosed a novelty. A huge bee was inside the telephone, and in trying to make good its escape, it had become fixed between the sounding board and the microphone, and it had hummed to the extent of interfering with the human organs on that circuit. How the bee came there the lineman cannot say, whether by accident or design he knows not, but the bee was the cause of the fault. In concluding his report, the lineman candidly states: "I have met some very tedious and technical faults in connection with various telephone apparatus, but I never was done with a bee before."

DRAWER CHECK AND SUPPORT.

In our issue of July 31 we described and illustrated



FRAZER'S DRAWER CHECK AND SUPPORT.

a drawer check and support, the invention of Mr. S. J. Frazer, of 69 Worthen Street, Lowell, Mass. In Fig. 3 of the engraving there was an error, which, although apparently slight, most materially affected the operation of the drawer. The stop, D, was there shown square, but one corner should have been well rounded, as here drawn, so as to admit of the drawer going in in the usual way.

The Treatment of Pneumonia.

About a half a century ago, Mr. Samuel McEvatt, now of Paterson, N. J., was cured of pneumonia by a very simple course of treatment, which not only restored him to health, but left him with unimpaired lungs. He has since made use of the same treatment in a number of cases, several of which were unusually severe and had been given up as hopeless. In all of them, however, he met with entire success, and consequently desires to publish the remedy, in the hope that it will be a benefit to others.

Leeches, fomentation, and linseed poultices are the three necessary elements in this course of treatment. If the case is severe, and great difficulty in breathing is experienced, six leeches are used, but ordinarily four will be found sufficient. These are applied on the back, as close as possible to the shoulder blade. The patient should be sitting up and leaning slightly forward, in order to support the leeches. The skin under the shoulder blade is first washed with a little sweetened milk. The leeches are then placed in a glass about two and a half inches wide, which is carefully turned upside down over the spot indicated. It is well to have the glass touch the shoulder blade, and be held a little toward the spine. It may be removed when the leeches have once taken hold. As soon as they drop off, flannel cloths dipped into boiling water are applied to the wounds, and this process of fomentation kept up for half an hour. During this time the water from which the cloths are taken must be maintained at almost a boiling heat. This part of the treatment removes more blood than the leeches. Two or three linseed poultices are then applied to the wounds in quick succession.

The patient will be extremely weak from the loss of blood, and some simple and easily digested nourishment should be administered. The impeded respiration, Mr. McEvatt states, will soon give place to an easy breathing. He has had an opportunity of treating a number of cases, and has met with such constant success that he believes himself justified in saying that if these simple directions are faithfully carried out, the patient will be quite safe. We feel obliged, however, to add a word of caution. Pneumonia is a disease of so serious a nature that wherever possible it would be much wiser to consult a physician, and permit him to decide whether the patient could safely be subjected to this course of treatment. It is one of the recognized modes for strong, healthy persons to give them a single full bleeding; but where the patients are feeble or well advanced in years, the loss of any considerable amount of blood would not be admissible. In case of emergency, when no physician is available, or where he has made a careful examination of the patient, and decides that the system can stand the strain of losing so much blood without injury, we have reason to believe, from the evidence submitted, that the method of treatment here recommended would prove very beneficial, but like all other treatments it must be employed with discretion.

Papaine.

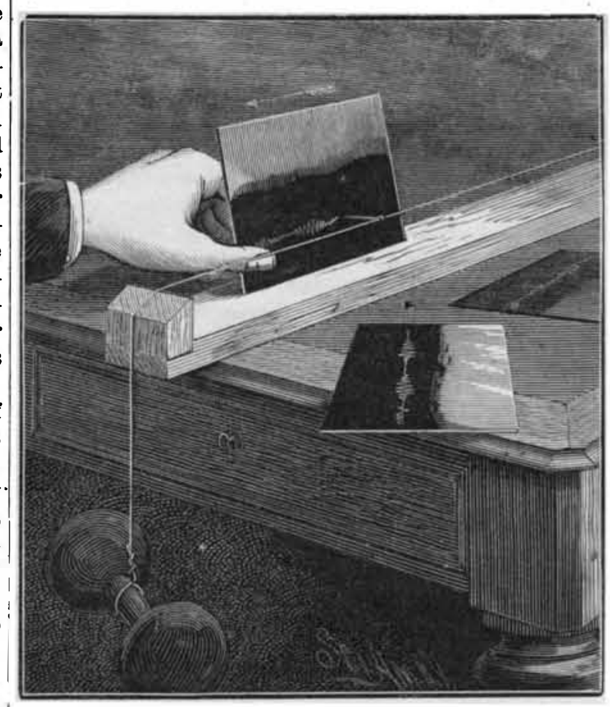
Papaine, obtained both in the form of a white powder and of a dried juice from the fresh milk of the fruit of *Carica Papaya*, is known in this country commercially as *Papaine-Christy*. Under the name of *Papaine-Finkler* also two preparations are known in commerce, and there is one by Merck, of Darmstadt (*J. Soc. Chem. Ind.*, 1885, 571, and 1886, 390). A chemist residing on the Papaw plantations prepares the article from the milk for Mr. Thos. Christy, of London.

Papaine, which, from its chemical nature, is considered to belong to the peptones, is capable, according to Professor Finkler, of Bonn, of dissolving in pure water 1,000 times its weight of fibrin. Experiments show that the papaine preparations are ferments which dissolve albumen; that this solvent action occurs under very different conditions; that it is possible with a very small quantity of the ferment to dissolve a large quantity of albumen. The action is not one of simple solution, but the albumen is changed into peptone. Papaine dissolves albumen best in water, but almost equally well in a slightly alkaline solution, but less readily in dilute HCl. Experiments were made in these three directions with 30 grm. fresh fibrin, 0·03 grm. papaine, and 100 c. c. water, 100 c. c. of 0·1 per cent HCl or 50 c. c. of 0·1 per cent KOH. After 72 hours the fibrin in all cases was completely dissolved. This action goes on between wide ranges of temperature. A higher temperature, 40° to 50°, has an accelerating influence. The author finds from experiment that 1 part of *Papaine-Finkler* dissolves 1,000 parts of fibrin. It has been repeatedly observed that 8 grm. hard boiled albumen were dissolved by 0·01 grm., and even by 0·001 grm. of papaine. Finkler states that it dissolves very rapidly the membranes of diphtheria and croup, and that not a single patient he has treated in the University Hospital or in private practice has died, but that all recovered. In each case the membrane was dissolved by painting it with papaine about five times per diem. He further adds that since papaine can be applied with salicylic acid, which increases its action, there is no other drug known equally powerful for the purpose named. Finkler found that when the membrane was dissolved, the fever disappeared. In the *Berliner Klinische Wochenschrift* (1885) it is stated that Dr. Schoffer, who had tried most of the remedies recommended for diphtheria, obtained the best results with papaine. In the summer of 1884 he treated forty-seven cases of this deadly complaint with a 5 per cent solution of it. The treatment was commenced as soon as possible, and the patches were to be painted every five or ten minutes; in a few hours the membranes are said to be removed, and the fever meanwhile disappears.—*Chem. Zeit. and Christy's New Commercial Plants and Drugs.*

EXPERIMENTS IN SOUND.

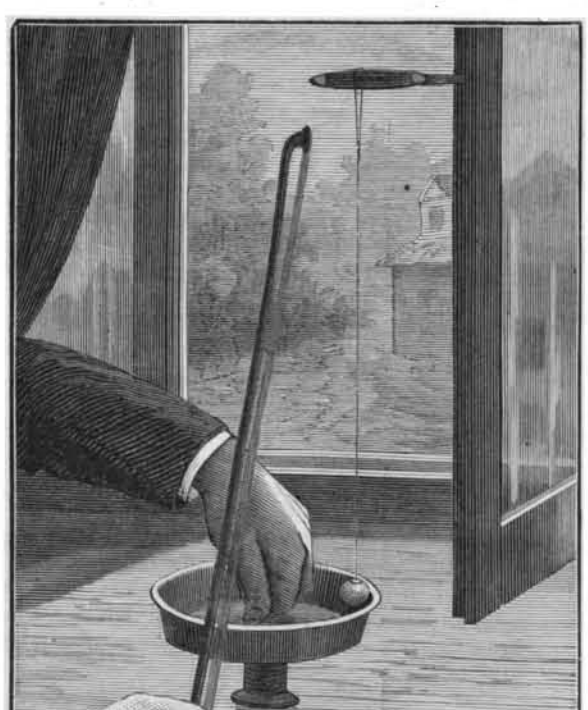
T. O'CONOR SLOANE, PH.D.

By means described in the last number of this journal, we have seen some of the laws that govern the vibrations of strings experimentally examined. Loops and nodes were produced, and their existence proved by the use of riders. Next, by Melde's experiment, they were made visible to the eye. So far, one thing will have been noticed: that all sounding bodies so far experimented with are in actual physical motion. In the experiments to be now spoken of, this motion is to be still further studied.



GRAPHIC SOUND WAVES.

It has been found that sound is always produced by a body in actual motion. This motion must be rapidly repeated. It is doubtful if one motion could produce sound, properly so called. If the motion is rapid enough in actual rate to affect the air, and is repeated rapidly enough, and not too much so, then sound is produced. The range of repetition that can be thus defined extends at the utmost from nine vibrations to forty-one thousand per second, or over twelve octaves. But these are extreme limits, and for ordinary ears and ordinary types of sounds they must be curtailed about one octave at the base and one at the highest range. As soon as sixteen thousand vibrations per second is passed, the ear can no longer place the notes musically. The next fact to be observed in this connection is that by delicate enough means the air can always be proved to be in corresponding motion when sound is transmitted. When a body is made to vibrate in a vacuum, no sound is produced. Hence the conclusion is reached that air is the bearer of sound through space.



VIBRATIONS OF SOUNDING VESSEL.

Very extraordinary results of calculations founded on this principle may be deduced. A sphere of air, one mile in diameter, contains seventy-seven French billions of cubic feet of air, weighing five billions of pounds, or three millions of tons. Yet a slight sound may be heard at a distance of half a mile, and therefore has possessed power enough to throw this vast weight of air into motion. The vocal organs of a bird or even insect may do this. This calculation, or parallel ones, has been used to throw discredit on the air theory of the transmission of sound, but we cannot refuse to believe it under our present limitation of knowledge.

To find the character of vibrations producing sound, the first experiment may be carried out. A pin is secured to the tightly stretched wire of the monochord. To do this, the head and upper end of the pin is bent around the wire, and the pin sustained in a horizontal position until a drop of sealing wax is melted on the pin and wire, and has cooled. Then the support may be withdrawn, and the wire be left free.

Some pieces of glass are next to be provided. They are smoked on one side over a candle or a partly full gas flame. A full flame does not deposit lampblack so freely, and is more apt to crack the glass. The string is set in very strong vibration, and one of the slips of glass is rapidly drawn past the vibrating pin, and barely in contact with it. The wave motion of the cord is delicately developed on the glass as an elegant wave line, diminishing rapidly in altitude of its sines. This forms a very pretty lantern slide. If it were possible to move the glass at the rate of one thousand feet a second (more accurately 1,093), a correct graphic representation of the phases of the air wave would be reproduced. If it were known just how long the glass was in contact with the pin point, the number of vibrations per second would be known. This under the circumstances is impossible, of course. But an accurate ear could place the note given by the string, and the number of its vibrations per second could be ascertained from the text-books, and then, by counting the number of waves marked on the glass, we could determine the period of contact. This last principle is often of great use. A tuning fork can be, and frequently is, used as one of the most delicate and accurate measurers of time, by precisely such a method. The oscillations may run up to 1,100 per second, and, marked on a slip of smoked glass, divide a second to this extent. These three illustrations show what value may attach to this line of work in physics. It may be recurred to in future articles of this series.

The line drawn by the pin point being a true wave line, without angles above or below, shows that the wire is at rest at the beginning and end of its beat, and that from this rest it gradually attains its quickest transverse motion, and loses it in the same way.

Knowing the velocity of sound and the number of waves per second, we may by simple division ascertain their length. It varies from seventy feet to a fraction of an inch.

Other bodies than strings may be made to vibrate, to produce sound, and the vibrations made to produce visible effects. A violoncello bow can be made to draw musical notes from the most unpromising objects. A common stamped metal pan is shown in the cut, held firmly upon the upper end of a spool. From it pure notes can be drawn by a bow manipulated as shown. To prove that it vibrates, a marble is suspended in contact with one of its sides. The thread is attached to a piece of leather cemented to the marble by gum tragacanth. As soon as the true note is struck, the marble starts into motion, being repelled from the side of the pan over and over again as long as the sound continues. The marble must be so placed as to rest in good contact with the metal; the thread should not be in a vertical line, but should be inclined slightly away from the dish.

By using thin wineglasses or goblets containing a little water, very beautiful waves may be produced on sounding them with a violoncello bow or with the wet finger drawn around their upper edge. By using a spool and bow as shown, dinner plates, small tea trays, and other objects may be made to yield notes of great purity.

It is most interesting in thus experimenting to find from how many objects notes can be drawn. By similar manipulation, Chladni's plates may be simply experimented with, which will be more fully explained hereafter.