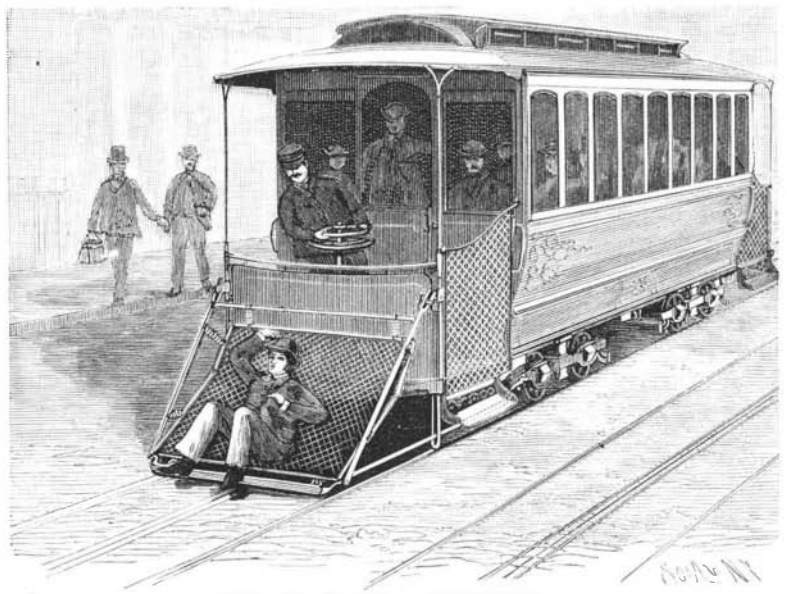
plug, the main opening cuts off the train pipe and coupling hose, and at the same time moves the port in register with the coupling hose, the main opening then standing with one end in register with an outlet pipe in one side of the casing. This outlet pipe connects with the interior of an auxiliary valve casing in which is a valve seat adapted to be closed by a valve held to its seat by a spring. The stem of the valve slides in a screw screwing in the casing and supporting its cap, the lower end of the spring also resting on an internal flange of the screw, while the other end of the spring presses against the under side of the valve to hold it normally to its seat. In the auxiliary casing is an outlet leading to the outer air, through which air passes when the auxiliary valve is opened, by which air is released from the train pipe, so that the brakes are applied in the usual manner. When sufficient reduction of air has taken place in the train pipe to equalize the pressure of the spring in the auxiliary valve the latter again closes, retaining a certain amount of air pressure in the train pipe after the brakes have been applied, assisting in the release of the brakes when the stop cock is again opened.

### THOMAS' CAR FENDER.

The recent extensive introduction of power-driven street cars in cities has made imperatively necessary some means for protecting foot passengers from danger of being run over. The car fender illustrated constitutes an appliance which provides a catch net with a frame, which bends inward as a heavy body falls into it, forming an effectual receiver. Our cut shows the fender in actual operation. The fender is preferably secured to the grip frame in the case of cable roads or to a supplemental frame carried by the axles on other cars. The striking bar at the front lower edge may be covered by padding. The net, with its flexible frame, is held in position on a diagonal plane by wire helical springs. The thrust of the padded striking bar is received by the fixed frame. Then, as a person is struck, he inevitably falls toward the car and drops upon the net. This at once yields, the side members of the frame bend, the springs stretch, and the net forms a purse or bag, securely holding the person and protecting him from further injury, such as might be incurred by rolling off were the net inflexible.

The inventor, Mr. Charles F. Thomas, Buckeystown, Md., may be addressed for further particulars.



THOMAS' CAR FENDER.

### A FUNERAL ON THE RIVER SPREE.

About fifty miles south of Berlin, in the Spreewalde, on the borders of Bohemia, funerals on the ice are of no uncommon occurrence. Here, says the *Graphic*, is one of the few districts still inhabited by the Wends, a branch of the Slavic population of Lusitania, who yet retain their distinct language, costume, and national characteristics. The numerous ramifications in which the Spree penetrates the woods and forests of this country before reaching Berlin are in the winter securely frozen over, when they take the place of roads, and are used as such even for funeral processions. Every one is, of course, perfectly at home on skates. So the young men, skating, take the ropes attached to the sleigh on which the coffin is borne, the old men, women, and children follow, skating, behind. The skates used are old-fashioned in character, tied with string. The men wear black coats and hats on such occasions, but the women vary their costume with white hoods, scarfs, and aprons.

BOHEMIA—A FUNERAL PROCESSION ON THE ICE.

### Skeleton Leaves.

E. D. Bartlett, in the *Optical Magic Lantern Journal*, reminds us of having in the long, long ago employed with much success skeleton leaves as lantern slides. The lantern is now much more than then used for educational purposes, and a set of skeleton leaves would form a valuable addition to an educational collection of slides. Mr. Bartlett recommends taking the green leaf from the tree, soaking it in rain water in a warm place till fermentation has destroyed the soft parts, and washing by a gentle stream of water till the fibrous network is clean. Heating in a suitable solution of caustic soda will very much shorten the operation. In fact, quite a number of skeletons may in that way be made in a single evening.

### The Emotions of Animals.

Dr. Gibier has reported some valuable observations upon the physiological influence of the emotions in animals. The observations go to establish, as foreseen, that these effects of the emotions are identical with those of similar emotions in man. None the less is the demonstrative proof of this forecast both valuable and important. Its special importance is that in studies upon the lower animals, prosecuted with a view to ameliorating the condition of man, allowance must henceforth be made by all observers for moral effects. It seems that Pasteur, enlightened by the quickness of his sympathy with animals, has always made this allowance; but it is doubtful if all of his disciples have done so. Or, rather, it is not doubtful that often they have not. The evidence now adduced by Dr. Gibier being of a sort that appeals to their understanding, will avert one source of error that might vitiate their conclusions.

Darwin investigated the expression of the emotions in man and animals, demonstrating that similar impulses affected identical nerves, producing identical visible muscular phenomena. Dr. Gibier's demonstration merely extends the area of these observations, showing that those secondary effects recognized as morbid or disease effects are also identical in the different animal orders. Sir John Lubbock has added systematically to the immemorial observations that establish the reasoning faculty as existing in the lower orders. In all of these there is nothing essentially new. On the contrary, the substance of it all is old as the human record itself. Man has always, at least from his earliest records, recognized the essential kinship between himself and the rest of the animal kingdom. Indeed, the less sophisticated his own mind by his advance in civilization, the more distinct and frank is this recognition.

The knowledge, it appears, is lost only by a race that lapses from civilization to barbarism, carrying with it the sophistication of the higher state without recovering its clarity of vision. Thus when the Apostle Paul had to enforce spiritual truths on the acute generation of his day, he found it needful to impute to man a faculty or quality apart and additional to those shared with him by his "poor cousins" of the animal creation. Hence the words addressed by him to the Thessalonians, speaking of man as possessed of a threefold nature—spirit, soul, and body, the English words assigned as equivalents to those he used. "Spirit," here, is held to express an immortal nature capable of conceiving what is called an "abstract" right and wrong and God. "Soul" as here used means, according to the Rev. Lyman Abbott and the Rev. J. T. Conant, D.D., the lower or animal nature which man has in common with those whom he calls the brutes.

During his dark ages, European man lost sight of these earlier metaphysical distinctions, as he lost all other higher insight. In such an age, his natural vision closed to the natural facts plainly visible at one end of the human scale, to the savage in direct contact with nature, and no less plain at the other end to the enlightened mind, whether this repose on the observations of a pagan Pliny or the minuter researches of a Darwin, a Lubbock, a Pasteur, and a Gibier. Yet the attitude is that of ignorance merely, not of any dogmatic teaching, for the kinship is equally clear to a Paul, learned after the learning of the Greeks, and to an Abbott, learned after the learning of eighteen centuries later. The last, to express the facts of intelligence as common to man and animals, adheres to the English word assigned to this use by the translators of the Greek Scripture, "soul." To designate a different set of concepts, of attributes which both assign to man to the exclusion of all other animal orders, Dr. Abbott equally adheres to the translators, and uses the word "spirit."

The distinction is one essential to all intelligent expression on the subject, since its function is to discriminate the domains of verifiable and unverifiable knowledge. Unless this distinction be maintained in thought and speech, all converse on perhaps the highest and most interesting subject to which the human understanding can devote itself is reduced to vain babble of words.—*N. Y. Sun.*

### The Steffens Process.

Many have inquired as to the object and operation of the Steffens process to be put in at the sugar factory here next summer. James G. Oxnard and N. R. Cottman have courteously furnished us with the following description, which will prove interesting:

Steffens' "Auscheidung" (extraction) process is a process patented by Mr. Carl Steffens for the purpose of extracting the sugar remaining in the molasses after the ordinary process now in use.

It consists in mixing fine powdered lime with the molasses in such quantities and under such conditions of temperature as will effect a chemical combination between the sugar and the lime by which a saccharate of lime is formed. This saccharate of lime precipitates from the solution in a solid form, and is recovered by passing the mixture through filter presses, the saccharate of lime remaining as a solid and the impurities of the molasses running off in a liquid form. This saccharate of lime is then dissolved in water or the beet juice and treated with carbonic acid gas, $C O^2$. The carbonic acid gas breaks up the chemical combination between the lime and the sugar, forming a carbonate of lime, which precipitates as a solid and liberates the sugar, which goes into solution. This mixture is again passed through the filter presses the carbonate of lime being caught in the presses, and the sugar, in the form of a solution, running off.

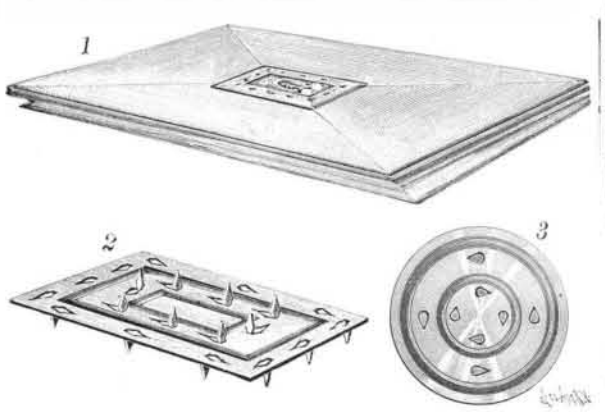
By this means we see we have first separated the sugar in the molasses from its impurities by combining it with the lime, then separated it from the lime by means of carbonic acid gas, giving us a comparatively pure sugar solution, from which we are enabled to extract the sugar by means of the vacuum pan and centrifugal machine. The molasses, while lime is being added to it in small quantities, has to be in iron vessels surrounded by cold water, as the chemical combination will only take place when it is at a very low temperature.—*Chino Champion.*

### Jamaica Ginger.

Hidden away in a little official journal issued by the Jamaican government, which is probably seen by few but botanists, there is some interesting information about one of the chief export articles of the island—ginger. The Jamaican government has been somewhat troubled about the irregularity of the prices realized by this drug, and has set its tax collectors to inquire why the average price of the rhizome from the Manchester parish should be 16*s.* 8*d.* and that of the Westmoreland parish 60*s.* per cwt. The answers are generally that the want of care in the curing of the root is responsible for the low rates realized by much of the product. The green ginger, after scraping, should be kept from moisture, and daily exposed to the sun until it is perfectly hard: but these precautions are often neglected, the drug being dried while still immature, and put away damp into hags. Ratoon ginger is generally mildewed because it is harvested early in the season, when there is not yet enough constant sunshine available to enable the rhizome to be cured properly. The sharp, thin, narrow-bladed knives used for scraping—or, rather, paring—and peeling the ginger are specially imported for that purpose, and are known as ginger knives. When the rhizome has been scraped and peeled it is washed once or twice, and then dried on mats. In the Manchester district two varieties of ginger are grown—viz., yellow and blue—the former being the better grade. The name of "ratoon" ginger, which often puzzles dealers in this country, is applied to the root produced from the same piece of land after the first year's harvest has been garnered. These pieces of ginger (ratoons) left in the ground after the harvest are again dug up, season after season, until their market value falls below 16*s.* per cwt. locally, when they are no longer remunerative. The use of lime juice in washing ginger is condemned, as it is said invaribly to cause mildew. An expert in ginger culture describes the industry as a curse to the island, which should be abandoned—the sooner the better. Virgin soil is in constant demand for ginger growing, but the exhausting effects of the crop on the soil and the wholesale destruction of valuable timber in forest land (fire being the only agent for cleaning up) can only be realized by visiting growing districts and observing the dried-up streams, the clearance by fire of thousands of pounds' worth of timber, and the impoverished soil, which will only grow ferns afterward. A howling wilderness marks the progress of ginger culture in every direction and £20 worth of ginger is the outcome of ten times the value of other material destroyed.—*Chemist and Druggist.*

### A METALLIC SEAL FOR ENVELOPES, ETC.

The device shown in the illustration affords an effective locking means whereby the contents of an envelope and the stamp may be so secured to the envelope that the latter cannot be opened or the contents tampered with without injury thereto. It has been patented by Mr. George F. Lemmon, of No. 32 N. Cleveland Avenue, Canton, Ohio. Fig. 1 shows the application of the improvement, and Fig. 2 one of the fastening plates, Fig. 3 representing another form of such plates, which are preferably made of aluminum or some light metal. Each plate has a series of prongs struck up and bent in reverse directions, the prongs at the outer edges projecting downward and an inner

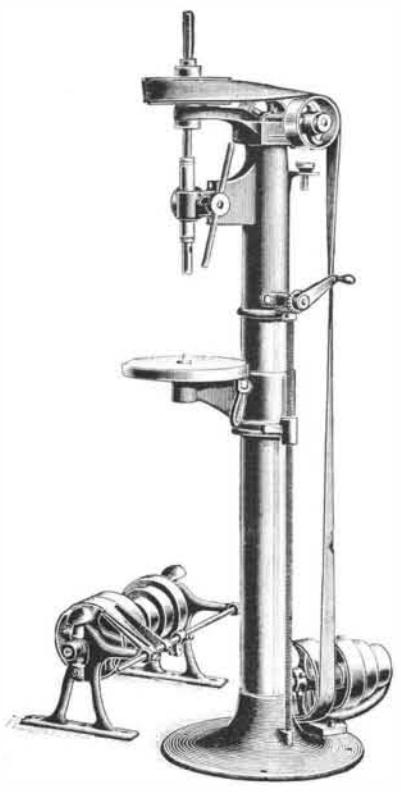



LEMMON'S FASTENER FOR ENVELOPES, ETC.

series projecting upward, while there are grooves inside of each series of prongs. The prongs preferably have serrated edges, and the plates are usually employed in sets or pairs, two plates being clamped together, but having their prongs and grooves so arranged as to be alternately disposed when laid together. The inner plate is first secured by its prongs to the letter, and the latter with the outer prongs projecting is inserted in the envelope, to the rear side of which the prongs are clamped. The flap is then folded down, the other plate laid over the folded edge and in register with the inner plate, the stamp forced over the center outwardly projecting prongs, and the whole compactly pressed together in any suitable handpress. The plates thus used do not mar the face of the envelope, and the use of sealing wax, gum, etc., may be dispensed with.

### BURNHAM'S 13 INCH DRILL PRESS.

Prominent among the many strong features of this excellent drill, which is made by the George Burnham Company, of Worcester, Mass., is the center shaft independent of and belting to the base of the drill, doing away with all jar or shaking caused by unevenness in the belt. This system imparts a perfectly steady motion to the spindle, and the belts being long, give great power while running quite loose. The tension of the belt is never on the spindle. The table can be brought to desired position by the screw, as shown in cut. The screw is No. 3, double thread, and



13 INCH DRILL PRESS.

gives a rapid motion to the table, which is free to swing either way. A bell center is provided for center drilling and reaming. The capacity and dimensions are as follows: Will drill a ⅝ inch hole to the center of a 13 inch circle, 4½ inches deep, without moving the table. Greatest distance from spindle to table, 36 inches. Table is 11¾ inches in diameter. The drill has steel rack and pinion. The spindle is made of the best crucible steel and is reamed with Morse taper No. 1. Spindle is counter-balanced with a coiled spring which can be adjusted to any degree of sensitiveness. The column, which is 4½ inches in diameter, has a center line the entire length, and a pointer on the table arm will bring the center of the table exactly under center of spindle. They also manufacture a two spindle drill having two heads 10 inches apart, the size of the table being 12×22 inches; and a three spindle drill with three separate heads 10 inches apart. The two outer spindles will drill to the center of a 22 inch circle and the middle one to the center of a 13 inch circle. The table is 12×32 inches.

### Two Kinds of Memory.

From careful observation and deliberate reflection upon the facts observed, the writer is convinced that there are at least two radically different forms of memory, neither of which is convertible by effort or education into the other; and that these forms of memory are seldom present in like degree in the same individual, one form in fact being often very feebly marked where the other is unusually prominent. In the early years of school life the child awakens to the fact that some members of his class have great facility for learning by rote; yet experience shows that these members are often distanced in the final examinations by competitors whose power of learning by rote is very slight; and still greater experience will often prove that these pupils of "rote" memory do not become the most useful or successful citizens. Every medical school, perhaps, boasts its professor whose "wonderful memory" enables him to roll out great strings of complicated therapeutical formulæ ort o tell with a flourish on what side of a particular page and how far down its column a statement quoted is to be found. Yet this professor is very probably inferior in breadth of thought and in originality of practice to some colleague who occasionally in lecturing forgets even simple formulæ and confesses that names of authorities often slip his memory most unexpectedly.

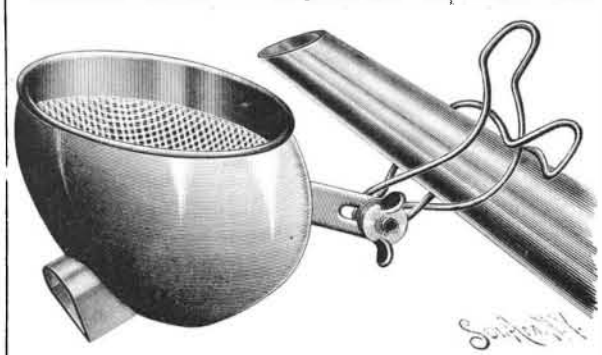
It has been the fashion among educators, and with the public as well, to honor greatly the former sort of memory, giving prizes to the pupil who can learn by rote with the greatest facility. In fact, the histories and geographies of thirty years ago seemed to be specially constructed for showing off the merits of this form of memory. Even now the public feel a grudge toward the man who does not recognize the casual acquaintance of a week ago when he passes him on the street. As far as can be judged by one who possesses this former sort of memory in very feeble degree, it is dependent upon a process, somewhat akin to photography, by which the details of objects presented to either the physical or the mental eye are fixed in outline upon the sensorium. Recollection consists in turning the mental gaze upon the photograph thus recorded. It is said of a certain artist, famous as an illustrator of books, that after driving through a park he could at will picture to himself the grouping and individual outlines of the trees which he had passed. The writer knows a little boy who, when about five years of age, would draw from memory a picture of a railway locomotive with details of outline which would be doubted by his elders until investigation proved that they represented minor portions of the engine. Other instances of the development of this "photographic" memory *pari passu* with the earliest unfoldings of a child's perceptive powers will occur to the observant reader.

The second form of memory may be termed "logical." It appears less brilliant to the casual looker-on. It is apparently developed later; not because it is not, like the other, inborn in the structure of the mind, but because the reasoning faculty is developed more slowly than physical sight. Compared with "photographic" memory, it has *color*, which sometimes obscures detail of outline. The possessor of "logical" memory places little value upon naked facts or figures, but appropriates such as have important bearings, which can be perceived, upon other facts of known value. In moments of leisure his mind is engaged, not in roving at random over the impressions of the past, but rather in working out the relations between certain isolated things observed and deducing conclusions from these relations. These abstract processes of thought make him inattentive to many details in his present surroundings which would be impressed upon a "photographic" memory. As reflection is a higher faculty than observation, so the "logical" must be superior to the "photographic" memory. This becomes evident also if we compare the man of "logical" memory, who has well founded opinions of his own, with the man of "photographic" memory who can give only the opinions of other persons, or the mature historian with the small-talk conversationist.

Both varieties of memory should be cultivated, for the best memory is that in which both are present in due proportion; but the average mind does not, in its original constitution, embrace both in equal degree. It is obviously unfair to punish the school child who possesses a well developed "logical" memory because he has not equal "photographic" perceptions; and it is unjust to brand the man of "logical" memory, who offers fine reasoning powers and stores of well-ordered facts of value, as one who has "a miserable memory," simply because he occasionally overlooks unimportant details.—*N. Y. Med. Jour.*

### IMPROVED TEA AND COFFEE STRAINER.

The simple little device shown in the illustration has many points to recommend it, and its usefulness cannot fail to be recognized at a glance. It is attached to the spout of a tea or coffee pot by simply pressing the thumb pieces together, and can be readily adjusted upon a spout of any size. It does not drip to soil the linen, and its sieves are easily removed for cleaning. The clamp for coffee or pitcher nose spout is a slight variation from the one shown in the illustration, and these novelties have been patented. They are manu-



IMPROVED TEA AND COFFEE STRAINER.

factured by the Standard Strainer Company, No. 36 Maiden Lane, New York City, in nickel and silver plate and in solid silver.

### The Pasteur Institute.

The annals of the Pasteur Institute for the year 1893 have just been published. They show that last year 1,648 persons were treated for hydrophobia, and that only six of them died of that disease. Of the number mentioned, there were 1,470 French people and 178 foreigners. Among the foreigners were 43 Spaniards, 35 Greeks, 23 English, 22 Belgians, 18 Egyptians, 14 British subjects from India, 9 Swiss, 9 Dutch, and 6 Portuguese. Since M. Pasteur commenced to practice his inoculations against hydrophobia 14,430 persons have been treated by his method, and 72 have died of the disease.