

### Vigilance Necessary in Building.

The difficulty of getting a house built to one's satisfaction is well illustrated in the experience of a Chicago gentleman, as related in the *Sanitary News*, who has just completed a comfortable home. He gave his architect most definite instructions, but he soon found that hardly anything was being done as he had directed. Nobody employed about the building seemed to manifest the slightest interest in his work, and bricks and boards were put together with the utmost disregard of the fitness of things. Lumber was wasted as though it were to be had for the handling. The gentleman came to the conclusion that it would be advisable to stay about the premises, and he did so most of the time, watching as many of the movements as he could. The result was that each day usually opened with tearing down or pulling apart the work of the day previous. For example, he thought he saw something wrong in the laying of the main drain for the sewerage. He reported to the architect, who was to be held responsible for defects. The workmen insisted that everything had been done just exactly as it should have been. The drains were dug up, nevertheless, and it was found that no connection had been made with the street sewer at all. The last section of the pipe had been too short by several inches, and to the crafty drain layer, who was interested in saving time and material, it was not considered necessary to lengthen it. The fresh air duct leading to the furnace had been ordered built of unusual capacity, for the reason that the owner wanted none of the common difficulty about getting sufficient air to ventilate as well as warm his house. He watched the work on this air duct very closely and was congratulating himself that it was well made, but, at last, discovered that the workman narrowed the inlet by drawing in each succeeding course of bricks as he neared the top. When remonstrated with, he said he thought he was doing the proper thing, as the duct wouldn't let in so much cold air if smaller. So in everything done about the house—the workmen had no more conception of the purpose which a healthy, comfortable, and convenient house was to serve than the tools which they used. By hiring an architect to watch them, and then watching the architect himself, he succeeded at length in getting a house in which he takes some pride; but it was at the expense of extra funds, much valuable time, and patient waiting.

### The Lay Torpedo.

Colonel Lay has recently submitted his torpedo to a severe test in the Bosphorus by discharging it over a course of a mile at a target only 60 feet long. The path of the projectile was crossed by three distinct currents, of which two flowed slowly upward, and one strongly downward. In addition to this the sea was very lumpy, especially at the junctions of the currents. Yet in spite of the difficulties of the course, the torpedo was steered without trouble through the space separating the boats which represented the target, and after passing them was caused to turn round and return to the spot where the examining committee, among whom were Woods Bey, and Frost, Hassan, and Hobart Pashas, was stationed. In the Lay torpedo the steering is effected by electricity transmitted through a cable, carried in the body of the torpedo and paid out as it runs. Thus the line does not require to be dragged along, and forms no hindrance, either to the speed or the manipulation of the projectile. The course is followed by means of two small sight rods, which project above the surface of the water, and can be seen for a mile or so by aid of a good glass. These are the only parts of the apparatus that are visible when the torpedo is in motion. At rest it projects about an inch above the surface, but immediately it starts it buries itself completely, and if the sight rods be lost it is difficult to again find them. At night the rods carry lamps that direct the light backward, and are invisible to the enemy. The torpedo experimented upon is not of the latest pattern; it is a cigar shaped boat 26 feet long, and 24 inches in diameter at the largest part, and weighs when fully prepared for action, with 90 pounds of dynamite, one and a half tons. In the more recent examples the speed has been increased to  $12\frac{1}{2}$  knots, and the disturbance of the water lessened by the use of twin propellers, while the change of explosive has been augmented to 150 pounds.

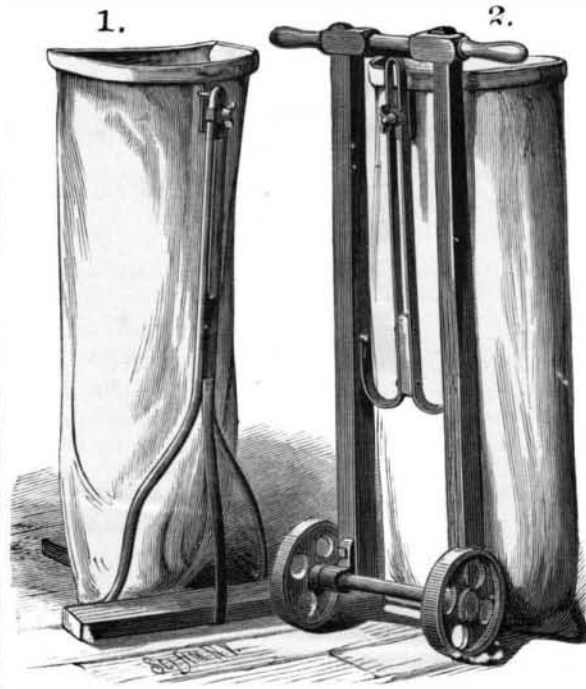
Engineering says that the results of the trial were so satisfactory that a contract was prepared between the Ottoman government and Messrs Lay and Nordenfent. At the last moment, however, this fell through, owing to the request of the United States minister that no decision should be come to until the Berdan torpedo could be tried also. It is claimed for this latter that it will break through the steel wire netting that is used in the English navy, and which is believed both here and in Turkey to offer a good defence to both the Whitehead and the Lay torpedo.

ACCORDING to the *Journul des Fabricants de Sucre*, the production of beet root sugar in Europe this year amounts to 1,920,000 tons, an increase of 137,500 tons over last year. Germany is still the greatest producer, heading the list with 675,000 tons; Austrian-Hungary ranks next with 450,000 tons; France third, with 410,000 tons; Polish Russia fourth, 275,000 tons.

### NEW BAGHOLDER.

A convenient and inexpensive device for holding bags while being filled and for moving them about is shown in the engraving. The holder may be used separately or applied to the truck, or it may be attached to platform scales so that the bag can be filled and weighed at the same time. It can be readily attached and detached, and while it saves the labor and wages of one man it does the work better.

It is made entirely of wrought iron and is very light and readily managed. It is manufactured in various sizes to adapt it to bags in ordinary use. It is adjustable up and down on its support, and the hoop to which the bags are applied adapts itself to bags of various sizes. The construction will be readily understood by reference to the engraving. All thrashermen, millers, warehousemen, farmers,



BAG HOLDER AND BAG WAGON.

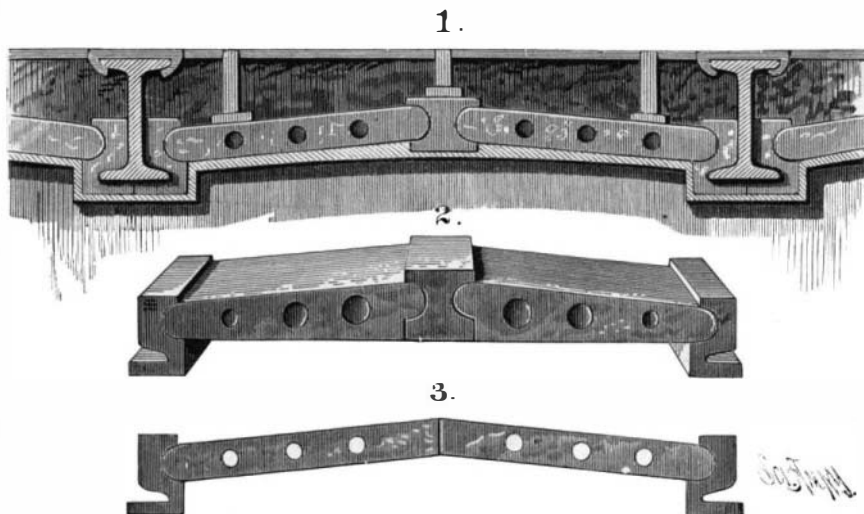
and others who have use for an article of this class will appreciate its advantages at a glance.

Further information in regard to this useful invention may be obtained by addressing the manufacturer, Mr. C. F. Dinkle, Carlisle, Pa.

### NEW FIREPROOF FLOOR AND CEILING.

The frequent recurrence of disastrous fires in which scores and often hundreds of lives are sacrificed to improper construction and inflammable building material, demands the universal adoption of fireproof construction wherever there is the slightest question as to the safety of occupants.

Walls of brick, iron, or stone, beams of iron, and floors and ceilings of incombustible material are the usual elements of fireproof construction. While the walls and the beams are much the same in all fireproof structures, the filling between the beams differs. We give an engraving of one of the latest and best forms of filling, which consists of but-



CAMPBELL'S FIREPROOF FLOOR AND CEILING.

tresses planted against the beams resting on the lower flanges and extending partly across the lower edge of the beam, and struts which with a central or key piece form a toggle arch between the beams. The engraving shows three forms of this filling. In Fig. 1 the struts are flat, with rounded ends fitting in corresponding bearings in the buttresses and in the key piece. The device shown in Fig. 2 is nearly the same, the only difference being the horizontal face on the under surface of the arch. Fig. 3 shows an arch in which the key is dispensed with, the struts abutting in the middle.

The floor is laid on strips placed on the struts or buttress blocks and key, and the spaces between its strips and above the struts are filled with concrete. The under face of the arch is finished in any desirable way. The great advantage of this system is that the arch can be placed without the use

of scaffold or stages of any kind, thus greatly cheapening the construction. A pair of buttresses and a pair of struts with the key are placed, then other buttresses are placed on the beams, and another pair of struts placed in position with their ends resting on the buttress and on the rebate and key projecting from the first pair of struts, the buttresses being arranged to break joints with the struts. Another pair of buttresses is now inserted, then another pair of struts placed, and so on. This filling adjusts itself automatically to its bearings, and is strong and well calculated to perfectly insulate one floor from the effects of heat in another. To make the filling as light as possible without impairing its strength, it is apertured lengthwise. This device is the invention of Mr. Andrew J. Campbell, of 552 to 558 W. 33d St., New York city.

### Pure Bred, Thoroughbred, and Full Blood in Stock Raising.

The three principal designations of stock are: 1, pure bred; 2, thoroughbred; and 3, full blood.

1. A pure bred animal is one descended from a pure or original race without intermixture of other blood. The Devons are a pure race of cattle. The wild cattle of Chillingham may be called a pure race. The buffalo is a pure race. The true Arabian horse is a pure race. Wild animals are pure races.

2. A thoroughbred is an animal originally of mixed lineage, but which has been interbred so long without recourse to foreign sources that the progeny comes true, or nearly true, to the type established. The Short-horns and Herefords among cattle and the racers among horses arising from a mixed lineage are thoroughbreds. That they have not yet ceased the endeavor to improve these breeds, through the careful selection of sires and dams, always carefully within the line of the oldest and well defined blood of the varieties from which they originally sprang, is proof that breeders do not believe that their ultimate excellence has been reached.

3. The term full blood indicates neither purity of blood nor thorough breeding, except relatively. An animal of the common blood of a country may be bred indefinitely to a pure blood, and yet never reach purity. The first cross would be one-half blood; the second cross, three-quarters blood; the third cross, seven-eighths blood; the fourth cross, fifteen-sixteenths; the fifth, thirty-three thirty-fourths of the pure or the thoroughbred blood, if none other has been used in the cross. Yet the resulting progeny would always contain a fraction of the original or pure blood. Yet oftenseven-eighths, and especially those fifteen-sixteenths bred, show the characteristics to so great a degree that none but experts can distinguish from outward observation between the full blood and the pure or thoroughbred type. Hence seven-eighths or fifteen-sixteenths bred animals are by courtesy sometimes called full bloods.

A grade is an animal containing some pure or thoroughbred blood. A seven-eighths grade is sometimes called a high grade.—*Prairie Farmer*.

### How the Pictures in the Louvre are Cleaned.

A correspondent of the *Philadelphia Evening Bulletin* has taken the pains to find out how the galleries and the pictures in the Louvre are kept clean. On Mondays the palace is closed; it is then that the weekly cleaning takes place. The first thing done is to cover the floor with damp sawdust to the depth of an inch or so. Oak sawdust is used for the boards, and elm dust for the marbles. This is allowed to remain some time and is then removed, and with it goes every particle of dust or dirt which may have adhered to the floor. Then the men buckle on to their feet large stiff brushes, and, armed with a stout stick, to one end of which is fastened a great piece of prepared beeswax, they first rub the floor with wax, then skate over it with their brushes, and finally give it the finishing polish with a great woolen cloth made expressly for this purpose. The same cloth is passed daily over the floor before the opening of the museum, which is all that is required until the following Monday. In this way no dust arises, and the pictures need rarely to be cleaned. When this becomes necessary, which happens about once in four or five years, the museum is closed for several days. No one is allowed to touch a picture unless the "Conservateur du Musee" be present. The pictures are taken down, and it is the "Conservateur" himself who places a thick sheet of clean wad-

ding over the painting, pressing it down gently in such a way that every particle of dust adheres to the wadding. After this is done, a thin coat of oil or some mixture which replaces it is rubbed on, and the picture is not again touched until the next general house cleaning.

### An Extensive Irrigating Project.

There has just been opened in the Punjab, India, the Sirhind Canal, one of the greatest works of the kind in the world. The canal is over 500 miles long, with subsidiary channels measuring some 2,000 miles more. The canal is designed to irrigate an area of over 1,200 square miles. It is fed by the Sutlej River, and great and numerous engineering difficulties were overcome in its construction. Three-quarters of a million acres will be brought under cultivation by means of this gigantic work.

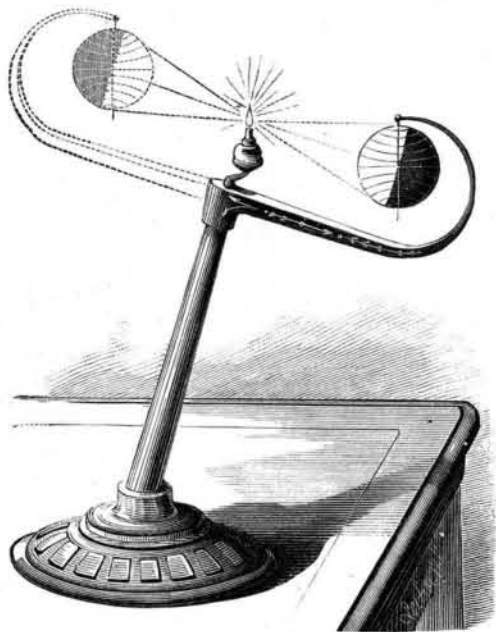
**Easy Deception of the Senses.**

The ease with which persons fall under hallucinations of special sense is illustrated as follows by M. Yung (in a recent communication to the Helvetic Society of Sciences): The operator places eight cards on a table, in positions corresponding to forehead, eyes, ears, nose, mouth, and chin; he pretends to "magnetize" them, and also some person in the company, and then goes out, while the magnetized person is required to touch any one card. The operator, having returned, notes the action of a confederate, who scratches a part of his head corresponding to the card touched. Then he commences an innocent comedy, passing his hand carefully over the cards, and on reaching the touched card, seeming to experience a strong shock. The observers are surprised, of course. One of them is asked to go out and repeat the experiment. It is assumed that a certain card has been touched. Passing his hand over the cards, he indicates, in nine cases out of ten (M. Yung says), a particular card as giving him a shock, and if the company be instructed to support his idea of that being the "correct card," he is confirmed in his illusion, which may be successfully repeated. Of 85 persons tried, M. Yung found only 9 who refused to indicate a card, not having experienced any sensation; 53 said they had exactly the sensation announced, and 23 described some different sensation.

**NOVEL TELLURIAN.**

We give an engraving of a very simple instrument for illustrating the causes of day and night and of the seasons, which is free from defects common to tellurians generally. As tellurians are made, ordinarily, the earth is represented as moving in an orbit the plane of which is at right angles to the sun's axis. Consequently the earth has to be tipped or tilted toward and away from the sun in order to show the changes of the seasons. In this improved instrument this difficulty is avoided by causing the earth to move in an orbit the plane of which is at an angle of twenty-three and one-half degrees to the axis of the sun, which is about the angle that the "equator" and the "ecliptic" make with each other, the globe which represents the earth being suspended at a point that corresponds with the north pole, and depends upon its gravity for keeping its axis vertical or parallel with that of the sun during its entire revolution around the sun. By this mode of suspension and by the inclination of the plane of the earth's orbit, no manipulation to tip or tilt the earth in different directions in order to show the changes of the seasons is necessary, and the globe representing the earth may be readily turned on its own axis to indicate its diurnal motion.

Thus the figure in the engraving indicates, on its right hand side, the rays of light as falling twenty-three and one-half degrees beyond the north pole or point of the earth's suspension. This represents the position of the earth in summer. On the other hand, when, by the motion of the earth in its orbit, the rotating arm, with its suspended globe, reaches the position indicated by dotted lines at the left hand of the figure in the drawing, the rays of light as falling on the earth will indicate summer in the southern hemisphere. In this way, as the arm carrying the suspended earth is revolved, the light will fall upon the earth in such

**SPICER'S TELLURIAN.**

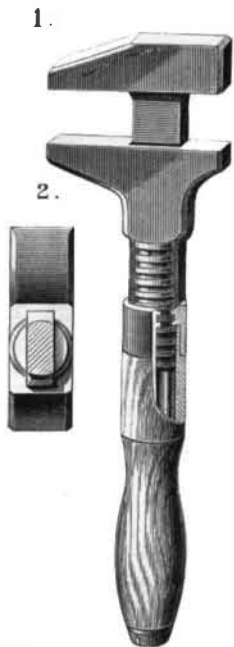
manner as to show the different seasons and their intermediate changes.

Of course, in an instrument of this simple construction all the natural or true conditions of the earth and sun relatively to each other are not shown, and the earth should be made to move in an elliptic instead of a circular orbit; nor is there any special provision for rotating the earth on its own axis three hundred and sixty-five times and a fraction each revolution it makes around the sun; but the manner in which the earth is carried admits of its being turned at intervals to illustrate its diurnal motion and the changes of day and night, as the rays of the sun fall upon a constant varying half of its surface, leaving its varying remaining half in the shade.

This simple scientific instrument has been patented by Mr. Jeremiah Spicer, of Taylor's Island, Md.

**IMPROVED WRENCH.**

The engraving represents a very simple, strong, and inexpensive monkey wrench recently patented by Mr. W. A. Bradford, of Goshen, Ind. It is composed of but three parts: the main jaw having a squared shank rounded at the end; a movable jaw having a squared bearing fitted to the shank of the main jaw, and provided with a split screw a portion of which lies on each side of the shank of the main jaw; and a handle fitted to the rounded part of the shank of the main jaw, and provided with a nut that engages the screw of the movable jaw. By turning the handle the movable jaw is moved quickly out or in, and may be clamped tightly on a nut, so as to hold it with a vise like grip if desirable.

**BRADFORD'S WRENCH.**

The simplicity of this wrench, the facility with which it may be manufactured, the quickness and convenience of its adjustment, as well as strength and durability, will recommend it to both manufacturers and users.

Further information in regard to this invention may be obtained by addressing the inventor as above.

**The Harvesting of Ice.**

The season has again come round when large quantities of ice are collected and stored with a view to its being used during the summer months in connection with our food supplies. Some of it is actually mixed with foods and drinks, more still is brought into close contact with such articles of diet as fish, poultry, butcher's meat, etc., in order that it may act as a preservative. Unfortunately, however, but little regard is had to the sources whence the supply is derived, and after every frost carts laden with ice which has been collected from the surface of ponds, canals, and streams which would be studiously avoided as water supplies, may be seen passing along our streets to the shops of tradesmen dealing in articles of food and drink. That the use of such ice for the purposes to which it is put is not without risk has been shown both in this country, says the London *Lancet*, and more especially in America, where, in the warm weather, ice enters largely into the list of table requisites; indeed, it has been further proved that ice has acted as the vehicle of disease germs capable of conveying enteric and scarlet fever, and its use has also been associated with conditions of ill health which have much resembled these and other specific fevers. The carelessness which has obtained in selecting sources for the collection and storage of ice has been largely due to the fact that there is a very general opinion that in the act of crystallization water practically rids itself of all its injurious qualities, however offensive it may be in its liquid state, and acting on this view, it is notorious that ice for domestic use has been, and still is, collected from streams receiving sewage, ponds that are offensive in summer time with decomposing vegetable growth, and similar sources.

There is also a sufficient amount of truth in the general opinion as to the process by which noxious and foreign matters are eliminated from water during the act of freezing to lead to some lack of caution on the part of the uneducated, but recent experience has clearly shown that the process of purification is only a partial one. In connection with this subject, the *Lancet* copies from Dr. Wight's "First Annual Report to the Board of Health of Detroit," which includes a copious reference to certain recent experiments by Mr. C. P. Pengra, an analytical chemist. In the first instance, urea, as a representative of the crystalloids, was mingled with water, which was then frozen; and it was found that whereas 100 cubic centimeters contained 0.83 gramme before freezing, they still retained 0.50 gramme when in the form of ice. Very similar results followed in experiments made with urea as found in urine, and with other substances, such as grape sugar.

The next experiment was with the colloids; albumen, both from the egg and from a case of albuminuria, being taken as a sample, and it was shown that the amount retained in the frozen mass was greatest at its under and least at its upper surface. Thus 50 cubic centimeters from the lower third contained 6.87 grammes, the same quantity from the middle

and upper thirds containing 4.19 grammes and 3.0 grammes respectively.

Other experiments with the same material showed that the purification which did take place amounted to about twenty per cent of the total admixture. The results would, doubtless, vary according to such circumstances as the rapidity of freezing, but since in all the instances recorded the specimens were frozen naturally, they amply suffice to show, as the author contends, that pure ice can only be procured from water free from impurities, and that ice for domestic purposes should never be collected from ponds or streams which contain animal or vegetable refuse or stagnant and muddy contents.

**Station Building on the C. P. Railroad.**

When the building superintendent of the Canadian Pacific commenced the work of erecting stations on July 1, the track layers were over 100 miles in advance of him, but at the close of the year the last station will be built at the end of the track. During the season he has constructed twelve stations, twelve section houses, eleven permanent water tanks, and sixteen temporary ones. He has had a force of 250 men in his employ, and his pay roll has amounted to \$16,000 per month. His plan of operations has been similar to that employed in track laying. One gang of men would be detailed to erect the frame of a station house, and then sent on to the next point, while their places would be filled by the next carpenters, roofing in the building, putting in the floors, etc., who would in turn be superseded by the joiners and plasterers. This course was followed throughout the season, four or five buildings being in process of construction at the same time, thus avoiding delay.

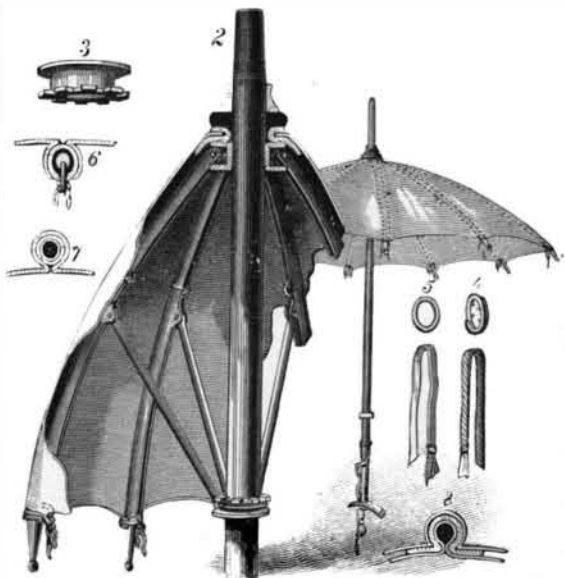
**IMPROVEMENT IN PARASOLS AND UMBRELLAS.**

The great item of expense in parasols and umbrellas is the frame, and, as every one knows, a good frame always outlasts the cover. For this and another reason to which we shall refer, it is desirable to have the cover of an umbrella removable. The engraving shows an improvement in umbrellas which accomplishes this very desirable end.

The ribs of this umbrella are of U-form in cross section, except at the points when they are round.

Fig. 1 shows the invention complete; Fig. 2 shows the method of fastening the cover to the ribs; and Fig. 3 shows the notch plate in which the upper end of the ribs are secured; Figs. 4 and 5 show the fastening rings and the ties. Fig. 6 is a sectional view of the cover, rib, and tie, showing the fastening at the middle of the rib. Fig. 7 is a transverse section through the end of the rib at the lower edge of the cover, and Fig. 8 shows a modification of this fastening.

One of the interchangeable covers adapted to fit a single frame is slipped over the top of the stick of the frame, the aperture in the cover passing over the end of the stick being re-enforced with a ring of leather. This ring fits down upon the notch plate and is held in place by means of a rubber ring, which is sprung into place and confined under a metallic collar upon the stick, so as to bear firmly upon the ring of the cover, as shown in Fig. 2 in the engraving. The ring of the cover is kept from turning upon the handle by

**LOCKLING'S IMPROVED UMBRELLA.**

means of short points projecting up from the notch plate. When the cover is thus secured upon the stick, it is secured to the ribs either by means of cord strings or of split rings sewed to its under side to spring into eyes or loops upon the ribs, about midway of their length and at the ends thereof.

A lady provided with one of these umbrellas will be able to have at a small expense a cover corresponding with each change of suit. The time required to make the change of covers is very little. The importance of this improvement will be appreciated by such as are obliged to purchase expensive parasols for each style or color of dress, and also by those who are accustomed to throw away sound frames when the cover is spoiled.

This invention has been patented in this and foreign countries by Mr. Theodore D. Lockling, of Panama, United States of Colombia.