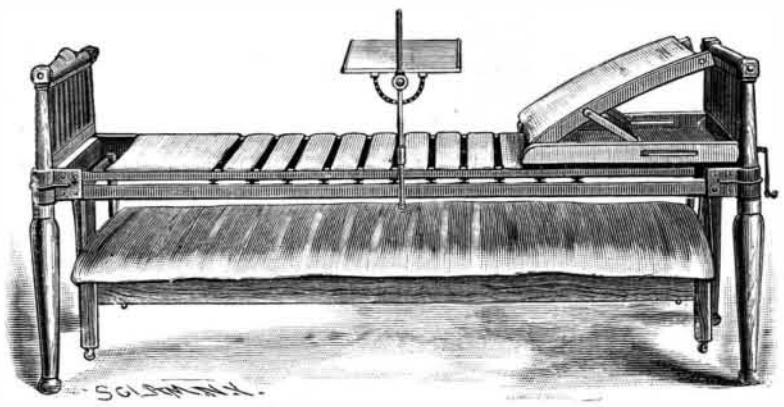
THE CROSBY INVALID BED.

In the care of the sick and injured there is nothing so much dreaded, both by nurses and doctors, as moving the patient when change of bedding or clothing is necessary.

The invalid bed which we illustrate in this connection was invented a number of years ago by Dr. Josiah Crosby, of Hanover, N. H., and is manufactured by the Invalid Furniture Co., of Nashua, N. H., which under the efficient management of G. W. Whittemore, who has remodeled the bed, retaining little more than the principle of Dr. Crosby's invention. As will be seen by the accompanying illustration, the mattress lies on a trundle bed, which is attached to the frame of the bed



THE CROSBY INVALID BED.

by lifting bands, which, by turning a crank at the head of the bed, enables the mattress to take the full weight of the patient, allowing the cross bands to lie loosely upon the mattress, so that the patient can have the entire elasticity of the bed.

The cross bands are adjusted by the pins through the loops in them so as to give equal pressure to all parts of the body when the mattress is lowered; and when it becomes necessary to take out one or more of the bands, or to take them up to ease the patient, it should be done while the mattress is up and the weight of the patient rests on the mattress.

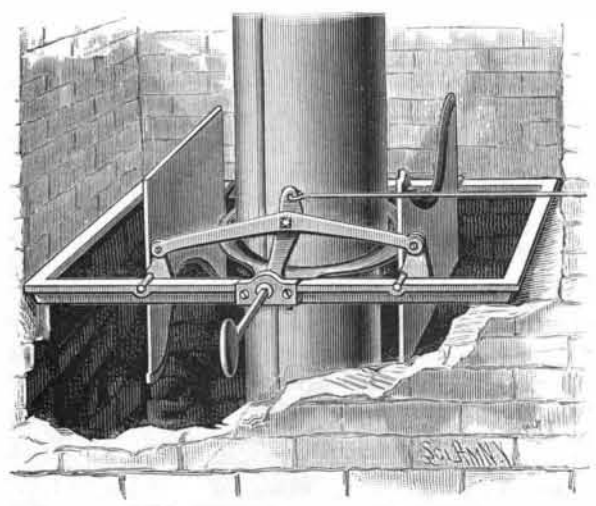
The adjustable head rest is also an important feature, as it enables the nurse to raise the patient to any position up to sitting posture without touching the patient, and the little table shown attached to the upright rod at the side of the bed can be adjusted to any height or angle desired, and form at will a small table or book rest.

One person is able to change the bedding without exertion or assistance. The trundle bed is smaller in every way than the frame of the bed, which permits it to be moved out under head, foot, or either side of the bed.

These beds are largely used, and the fact that among all the varieties offered this one was selected by President Garfield's physicians shows in what estimation it is held by the leading members of the medical profession.

AN IMPROVED HOT AIR REGISTER.

A device designed to be placed in the chimney, just above the fireplace heater, whereby the heat from the stove may be readily thrown out altogether into the room, or be partially conducted into an adjoining room or into chambers above, is illustrated herewith, and has been patented by Mr. William F. Rossman, of Hudson, N. Y. An open frame, of shape best designed for the flue, is placed above the heater, the frame having



ROSSMAN'S HOT AIR REGISTER.

a central integral ring, and valves being journaled in its upper face designed to completely close the opening between the sides of the frame and the ring. Integral with one side edge of each valve are lugs, to which an upwardly curved bar is pivotally attached, this curved bar being pivoted in a slot centrally of a rocking bar, the lower end of the rocking bar being made cylindrical, and having a square aperture, in which is a key for opening or closing the valves. In an aperture at the top of the rocking bar is a rod extending a convenient distance, affording facility for operating the valves without approaching the heater. The upper section of pipe is supported by a collar held in connection with the under side of the ring, so that the heater may be detached and replaced without disturbing the length of pipe passing up the flue, and the damper may be made either round or square, the construction affording a close and tight register, while providing a passage for the smoke pipe without interfering with the free operation of the valves.

Soap Bubbles.

At a recent meeting of the Physical Society, London, Mr. C. V. Boys described and performed some experiments on soap bubbles, and by their aid demonstrated in a remarkable manner the phenomena of surface tension, diffusion, and the magnetic properties of gases. By blowing one bubble inside another he showed that there is no electrical force inside a closed conductor. A peculiar property of soap bubbles is their refusal to come into contact when knocked against each other. They may receive violent shocks and still remain separate. If, however, an electrical body be brought in the vicinity, they immediately coalesce. So sensitive are they to electrical attraction, that a potential difference due to one Leclanche cell between the two bubbles causes them to unite. They may thus serve as a very delicate electroscope. Many other beautiful and extremely interesting experiments on liquid films of different shapes were performed in a masterly manner.

AN IMPROVED CLOTH CUTTER.

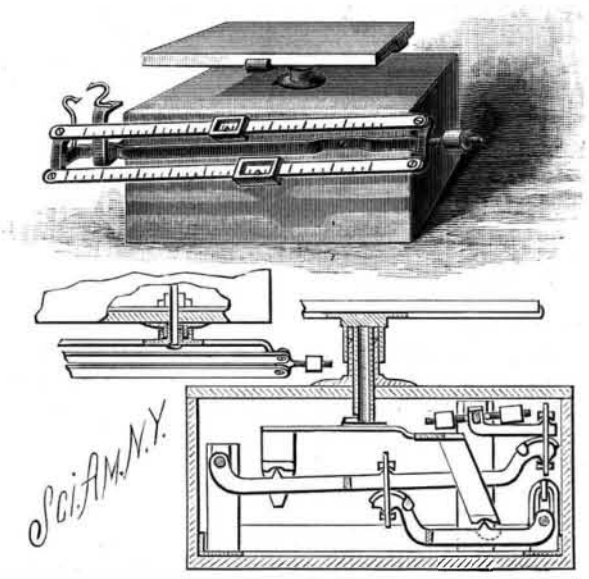
A simple and effective device for cutting cloth, in which the knife will always be in convenient position

RIES' CLOTH CUTTER.

for use, is illustrated herewith, and has been patented by Mr. George A. Ries, of Poplar Bluff, Mo. It consists of an arrow, slotted casing adapted to be secured to a counter or table, and having at one end a circular receptacle for holding a wheel or roller having a retracting spring, a cord being wound upon the wheel and secured to the ring of a knife holder extending diagonally through the slot. The knife holder has rubber rollers above and beneath the slot, and is formed with a ring at its outer end for the insertion of a finger. The piece of cloth to be cut being placed over the casing and held in position by pins projecting therefrom, the knife is drawn straight and square across, the rubber roller of the knife holder on the top of the slot pressing down the cloth firmly as it is cut, and both rollers serving as friction rollers, facilitating the quick and easy movement of the knife, as it is drawn forward by the operator or backward by the retracting spring.

AN IMPROVED COUNTER SCALE.

A scale which is provided with a secure housing of the levers, while allowing the free vertical movement of the scale plate, rendering it impossible for dust or moisture to enter the case in which the levers are disposed, has been patented by Mr. John B. Butenschon, of No. 72 Sheridan Street, Portland, Oregon, and is illustrated herewith. The scale frame, at one end, within the case, has vertical standards which support the cross shaft of a main lever formed with cross arms rigidly connected to the shaft, while at the other end of the frame are vertical standards from which is supported a shaft with rigidly secured secondary lever extending outward beneath the main lever, and provided with a knife edge bearing. In connection with these levers, and at equal distances from the cross shafts at either end of the frame, are formed knife edges upon which is placed a four-armed spider provided with an upwardly extending vertical standard which projects beyond the cover of the case. A sleeve surrounds the standard and extends downward from the plate frame, a second sleeve connected to the case cover extending upward about this sleeve, while a third sleeve extends downward from the plate frame about the second sleeve, perfectly protecting the mechanism of the scale. The main beam and the light weight beam are rigidly

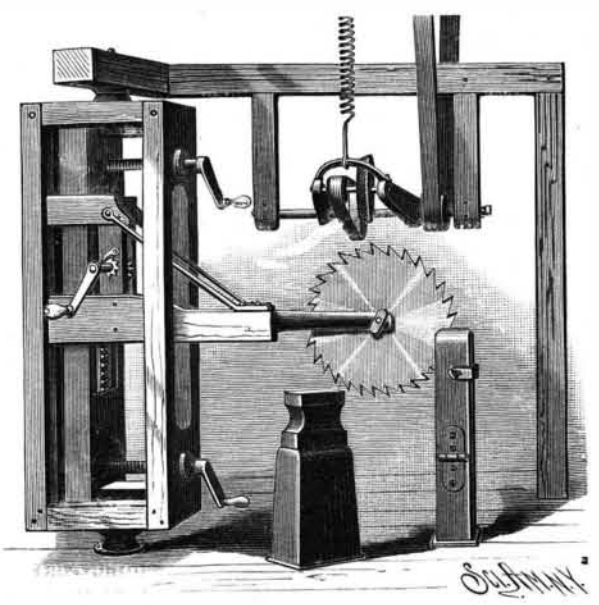


BUTENSCHON'S COUNTER SCALE.

connected to a third beam that is rigidly connected to a cross bar, formed with knife edges, the cross bar passing out of the case through a flanged opening and annular groove, to prevent the entrance of moisture and dust, and on its inner portion being connected through links and knife edges with the main and secondary levers of the mechanism. The beam carries a pointer in connection with an indicator, and a counterbalance weight for general adjustment of the scale, the original adjustment being obtained by weights within the casing.

AN IMPROVED CIRCULAR SAW HOLDER.

A device for holding circular saws firmly in position while hammering, gumming, swaging, and filing them is illustrated herewith, and has been patented by Mr. John Slater, of Parthenia, Pa. A frame is mounted to turn on spindles, the top one of which may have its bearing in the cross beam of a ceiling or other suitable stay, and within the top and bottom of the frame are guideways on which a post is mounted to slide longitudinally, the post being moved by crank handles near the top and bottom operating screw rods which have their bearings in the frame. On the post is a rack into which meshes a gear wheel mounted on a vertically sliding frame, with crank arm, ratchet wheel and pawl, to adjust the frame in any desired position; and mounted on this vertically sliding frame is a shaft turning in suitable bearings, with a projecting end in the form of a fork carrying an arbor in which is held the circular saw to be operated on. Upon a shaft above the saw, operated by a belt receiving power from any source, is secured a swinging frame carrying a grinding wheel for sharpening the saw teeth, and operated by the shaft, the swinging frame being held in its uppermost position by a rope connected with a



SLATER'S CIRCULAR SAW HOLDER.

spring. An anvil is placed near, for hammering the saw when necessary, and in front is a vise with a fixed jaw on which is hinged a swinging jaw, enabling the saw to be clamped between them for swaging or filing purposes, the two jaws being held in closed position by a U-shaped clip. With this construction the saw can be quickly placed in position to be operated on by the grinding wheel, or clamped in the vise for filing or swaging, or placed with either of its faces on the anvil to be operated on with a hammer or other tool.

An Early Inventor in Electric Lighting.

The Rev. G. H. Staite, vicar of Sutton Cheney, Hinckley, writes to the *Pall Mall Gazette* as follows:

"Knowing your love of fair play and readiness to ventilate hidden grievances, I venture to ask the insertion of this letter, in the belief that if the facts were known, some among your many readers would be inclined to entertain the claims of the family of a man who spent his life and fortune on a recognized public work of the greatest importance. My father was the originator of electric lighting, his exhibitions extending from 1847 to shortly before his death in 1854. During that interval he expended a considerable fortune, and left his family penniless. There are at the present time his widow, aged eighty, two daughters, and myself. That our claims to recognition are not unfounded will be seen from the following testimony: Prof. Tyndall, 'Fragments of Science,' Vol. II., p. 424: 'To keep the carbons at the proper distance asunder regulators were devised, the earliest, I believe, by Staite.' Haydn's 'Dictionary of Dates,' later editions, 'Electric Light': 'Apparatus for regulating the electric light were devised in 1846 and shown by Staite and Petrie in 1848.' Urquhart, 'Electric Light,' edited by Webb, 1880, p. 161: 'Staite and Edwards patented an electric regulator based upon the heating and expansion of metals by the current to be regulated. This idea, beautiful in itself, is really the original of the regulators used to-day, and the self-same principle is employed by Mr. Edison.' And 'Dr. Siemens,' page 173: 'Staite as early as 1847 patented a lamp in which the lower carbon is controlled by a movable soft iron core acted on by a hollow electro-magnet.'

"Fontaine and Du Moncel gave similar testimony. The priority of the principle of automatic regulation, the *sine qua non* of electric lighting, was decided in my father's favor by the French Academy of Sciences, as recorded in *Le Courrier Francais*, February 4, 1849. Of his many patents and improvements no use could be made by his family; practically, as far as they were concerned, they died with my father, although they were and are still available for subsequent workers in the same field. His family feel that they have entirely lost their fortune through his public enterprise. All their money, consisting of thousands of pounds, was sunk, and by the premature death of the inventor in his forty-second year his and their hopes of any pecuniary return were irretrievably lost. It is this combination of facts which induces me to write this appeal, every point of which I shall be most glad to substantiate should any one be kindly induced to notice it."

What Flowers will Grow in the Shade?

The question, "What flowers will grow in the shade?" is put to me every spring, says the editor of the *Horticultural Times*, by scores of city people whose little garden, which they wish to devote to flowers, is so walled up by neighboring houses that the direct rays of the sun never touch it. But few plants will develop their flowers there, and none will do it so well as if it were lighted up by sunshine a part of the day. Fuchsias, pansies, forget-me-nots, violets, lobelias, lily of the valley, hollyhocks, phloxes, and other herbaceous plants whose native habitat is a shady wood, will do best, but even these languish if denied all direct sunlight. The best effect in such situations is produced by ornamental leaved plants, the beauty of which is not dependent upon their flowers. Among these may be ranked the gold and silver variegated leaved geraniums, achyranthes, alternantheras, begonias, caladiums, centaureas, coleuses, etc., which, if planted so as to bring the various shades in contrast, produce a pleasing effect, which continues during the entire summer months, and is not surpassed by any display of flowers. The cultivators of flowers in rooms should understand the necessity of sunlight to plants that are to flower, and endeavor to get these as close as possible to a window having an eastern or southern aspect. The higher the temperature, the more plants suffer from want of light. Many plants might remain semi-dormant in a temperature of forty degrees—in a cellar, for example—away from direct light, for months, without material injury; while if the cellar contained a furnace keeping a temperature of seventy degrees, they would all die; such would particularly be the case with plants of a half hardy nature, such as monthly roses, carnations, fuchsias, geraniums, etc. In our greenhouse culture of flowers, direct sunlight is an all important consideration, and a spell of sunless weather in midwinter is often a loss to us of hundreds of pounds, by preventing the development of flowers. Hence we use every means at command to dispose the plants to secure the greatest amount of light. The debilitating effects of want of direct light on plants are well illustrated by taking a vigorous plant in full foliage and flower, that has been growing in the direct light of our greenhouse benches, and placing it under the bench. If the temperature is high—say seventy degrees—in forty-eight hours the sickly signs showing want of light will be apparent to an experienced eye, in a week its condition would be such as to indicate sickness to the most common observer, and in a month it would, most likely, be dead.

EXPERIMENTS IN STATIC ELECTRICITY WITH THE INCANDESCENT LAMP.

BY ELMER E. E. EMMONS.

The incandescent lamp is generally classed among the applications of dynamic electricity, and, practically speaking, it properly belongs there, but many who are interested in science may be interested to know that the incandescent lamp may also be classed with the apparatus for studying the phenomena connected with static electricity.

With an Edison lamp, two or three suspended pith balls, some fragments of light material, and a silk handkerchief, the two fundamental laws of static electricity may be demonstrated.

The lamp should be held by the small end and the glass bulb rubbed with the handkerchief and then presented to the substance experimented upon. The bulb should be heated slightly to dry it.

Now, if a lath is balanced on a point on the bottom of a round-bottomed bottle, it can be made to revolve by holding the rubbed bulb near one end. (Fig. 1.)

Fig. 1.

In fact, any experiment that can be made with a glass rod or stick of sealing wax can be made with the lamp.

If, in the dark, the lamp is held by one hand and the bulb rubbed with a piece of cloth, the interior becomes filled with a bluish white light. (Fig. 2.)

I find that the hand is as good as anything for the above experiment, for if the hand be moved rapidly up and down, striking the bulb a glancing blow as it passes, the glow may be made to fill the entire globe, and, after stopping, if the hand is placed against the glass, the interior will be immediately lighted up, and it may be repeated several times without more rubbing.

When a barrel of lamps is opened and the lamps gently stirred, the same glow spreads through the whole mass of lamps disturbed.

In the above experiments the carbon filament may be entirely destroyed, and for the experiments in attraction and repulsion the lamp would be somewhat improved thereby.

Fig. 2.

It is, however, as a condenser that the lamp excels.

If the lamp is held by the bulb, and the metal piece connecting with the carbon presented to the prime conductor of an electrical machine, it will become charged, that is, if the person holding it is standing so as to be "grounded."

The lamp can also be charged by an electrophorus, or from a running belt if the latter is charged.

If, when the lamp is charged, the holder touches the metal with his free hand, he will receive a smart shock. If another person touches the metal on the lamp, they both will receive a shock, the circuit being completed through the ground.

If the lamp is held long enough, the time depending on the quantity of electricity to be derived from the charging device, the lamp will finally discharge itself, the spark jumping from the metallic portion of the lamp to the hand of the holder, and the holder is made aware of the fact by the loud snapping sound and a pretty heavy shock. (Fig. 3.)

Fig. 3.

By watching, the spark may be seen as it jumps the interval.

By taking hold of the lamp well down toward the end of the bulb, the spark can be made to jump the whole distance between the ferrule and the hand, a distance of three inches or more.

It is really astonishing what a heavy shock one can get from a 16 candle lamp; and if the original inventors of the Leyden jar had been holding a healthy incandescent lamp in their hands instead of the historic phial of water at the time they received their first shock, it is probable that they would never have ventured near enough to have taken another, judging from the fright the phial caused.

To make a first-rate Leyden jar the lamp should have tin foil pasted over it to within 1½ inches or 1¾ inches of the ferrule. It may then be held in any convenient way suitable for experiment.

With a lamp so arranged, all the experiments usually made with Leyden jars can be performed.

The foil is, of course, to be connected with the earth. Running a wire to the floor is usually sufficient.

I have taken with the foil on it, suspended it near a running belt, connected the foil to "ground" by running a wire from it to the floor and then run a wire from the metal connection to within a few inches of the belt. So arranged, the lamp will become charged very rapidly and discharge, the spark leaping through the air between the ferrule and tin foil and close to the glass. (Fig. 4.)

Fig. 4.

During the time of charging, the space inclosed by the carbon filament is filled with a pale blue light, and at discharge the whole globe is illuminated, the light being due to discharge in vacua, and not to the carbon being heated.

If the carbon is broken in two, it works just as well, so that burned-out lamps may be obtained and used. Any one who has ever tried to make a Leyden jar knows the difficulty in getting good glass, but the lamp is perfect in that respect.

Artesian Wells in New York City.

In a paper on the geology of Manhattan Island, read by Mr. James F. Kemp, before the New York Academy of Sciences, we find the following: Efforts have been made since the beginning of the century to obtain water from wells, both surface and artesian. Dr. Elwyn Waller informs me that over a thousand exist at present. Within the last ten or fifteen years, very many artesian wells have been sunk by the oil well methods and the diamond drill. Many of the large breweries, malt houses, and manufactories demand an abundant supply of water, and have found it advantageous to sink wells in preference to paying the city water rate. Sometimes they are successful in striking a wet spot and a good supply is obtained, but, as there is no certainty from the nature of the formation, they quite as often yield very little. Still, the straitened capacity of reservoirs and the small head allowed consumers have greatly quickened the well industry. They are drilled by the methods perfected in the petroleum districts, and, indeed, one can hardly journey very far around the city without seeing the tall derrick and hearing the creak of the bull wheel and the thud of the drill. The wells are sunk by contract at from $6 to $12 per foot, the contractor fixing his price on his estimate of the hardness of the rock. Much difficulty is experienced on account of this varying hardness, as the drill tends to glance and make a crooked hole. Ordinarily the progress is 20 feet in 24 hours. The drillers say they are obliged to go down from 400 to 1,000 feet to strike water. The following facts have been obtained by inquiring of the drillers, and may not be very exact:

	Feet.	Daily.
Schaefer's Brewery	640	5,000 bbls.
63d Street Malt House	414	2,700 "
Third Ave. and 67th Street	1250	10,000 gals.
Sixth Ave. and 59th Street	730	10,000 "
Field's Building, 1 Broadway	400	57,000 "
Foot 58th Street, Hudson River	700	Unsuccessful.
Munic. Gas Co., 11th and 45th, 2 wells	500 each	30-45,000 gals.
Tenth Ave. and 39th Street	468	40,000 "
W. 41st Street, No. 529	585	20,000 "
Foot W. 39th Street	550	90,000 "
Sterns, Third Ave. and 42d Street	600	8,000 "
11th Ave. and 48th Street	600	30,000 "

99th Street and Second Avenue, 7 wells, 38 feet each in drift, total of 216,000 gallons per day.

The Last Herd of Buffalo.

Mr. Clinton A. Snowden, of the Chicago *Times*, is the originator of a scheme to save bisons that still remain on the plains. It has been ascertained that of the millions which once roamed on the prairies of the West only seventy-five or a hundred remain, and these are located in the extreme southwestern portion of Texas. An expedition is soon to start for Texas to round up there for buffalo. The leading purpose is to perpetuate a species of animal which is thoroughly typical of American animal life; one of the controlling ideas of the trip being to kill none of the animals while corraling them or after their capture. News of the work of the expedition is to be sent to the *Times* by carrier pigeons.

It is to be hoped this laudable expedition will succeed. It would seem as if Congress might do something to promote and encourage the preservation of this wonderful breed of animals.