

MR. VANDERBILT'S ESTATE, BILTMORE.

Mr. Vanderbilt's estate, Biltmore, is about six miles from Asheville, North Carolina. Access to the grounds may be had by procuring a pass from the resident manager. The tract of land upon which this modern castle is built consists of nearly one hundred thousand acres (more than one hundred and eighty square miles), one portion of which touches the limits of the city of Asheville, from which point it stretches over mountain and valley so far that it is possible for the owner to ride thirty-five miles straight as the bee flies from his chateau without leaving his own property.

The only private estate larger than this in America is that of Dr. Seward Webb, at Ne-ha-sa-ne, in the Adirondacks, which covers two hundred and fifty thousand acres of virgin forest, streams and lakes; which is surrounded by ninety miles of

nine foot wire fence and which contains within its limit over fifty highland and lowland ponds and lakes. Dr. Webb preserves an immense number of trout, salmon, deer, bear, foxes and smaller feathered game within his cordon of wire. Mr. Vanderbilt began four years ago to construct his immense chateau, and, although several hundred skilled workmen have been employed thereon constantly, it is not yet quite completed. There is nothing of particular interest on the road to Biltmore, which winds through romantic defiles, crosses streams, and plunges through fragrant groves of transplanted firs. After crossing the Swannanoa one sees row upon row of trees in regular marshaled lines. These are Mr. Vanderbilt's private nurseries. They consist of from sixty to seventy acres of land and have been laid out and developed under the artistic eye of Frederick Law Olmsted, the world renowned landscape gardener.

It is intended solely as a source of supply for the requirements of Biltmore. One million plants for the sides of the many woodland roads are turned out of these nurseries annually, and two million plants are now growing which will be used to replenish the denuded hill sides. The total number of plants raised in these nurseries up to date

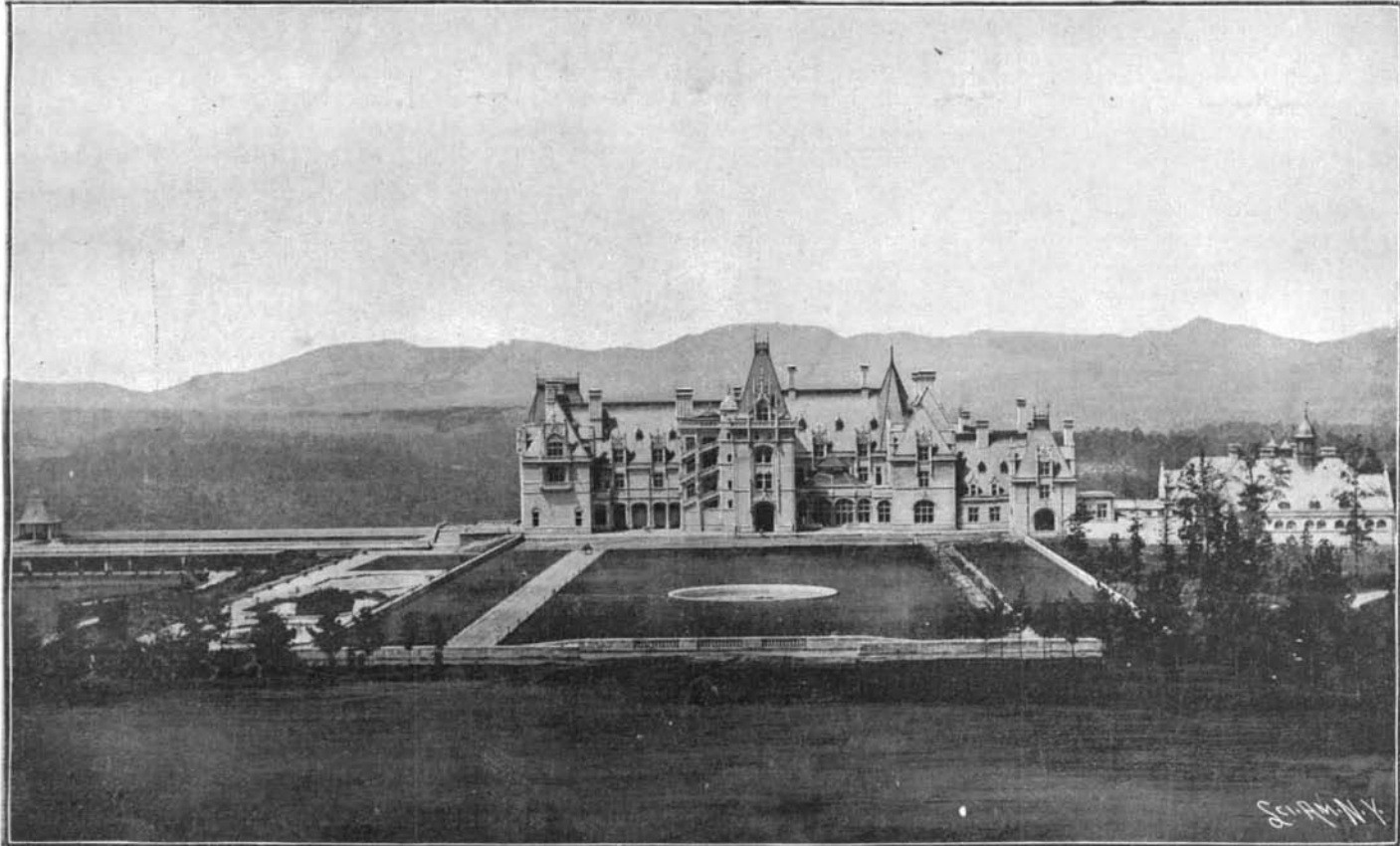
is not much short of five million. The propagating houses show great beds planted thick apparently with toothpicks—small slips of endless varieties of trees and plants.

Mr. Vanderbilt has photographs at Biltmore of all the celebrated arboretums in the world. His plant and tree nursery will exceed all the others in size and extent. When completed they will constitute an im-

mense museum of living trees and shrubs laid out in the form of a winding road twelve miles in length, traversing all kinds of soil. This variety of soil is necessary, for the plants are from all parts of the world. The different soils are analyzed at frequent intervals, so as to find adequate reasons for failures or successes in trees and plant raising. The road in the

Its retaining wall of stone, 16 feet in thickness at the base and rising in places to the height of 40 feet, is the most remarkable feature of the esplanade. The retaining wall around this bowling green is surmounted at the south end of the house by a breast-high coping of dressed stone. This bowling green was originally intended for the tennis court. Outside of

the esplanade and at the foot of its encircling wall are the great sheds for the stone cutters and builders, and the tracks of the railroad which Mr. Vanderbilt constructed from Asheville. The outside walls of the house measure 375 by 192 feet. From the windows there are views of surpassing loveliness. The French Broad flows below and winds away in both directions. On either side the river lie luxurious green valleys, and in them the stream narrows into pebbly rapids or widens into placid lily



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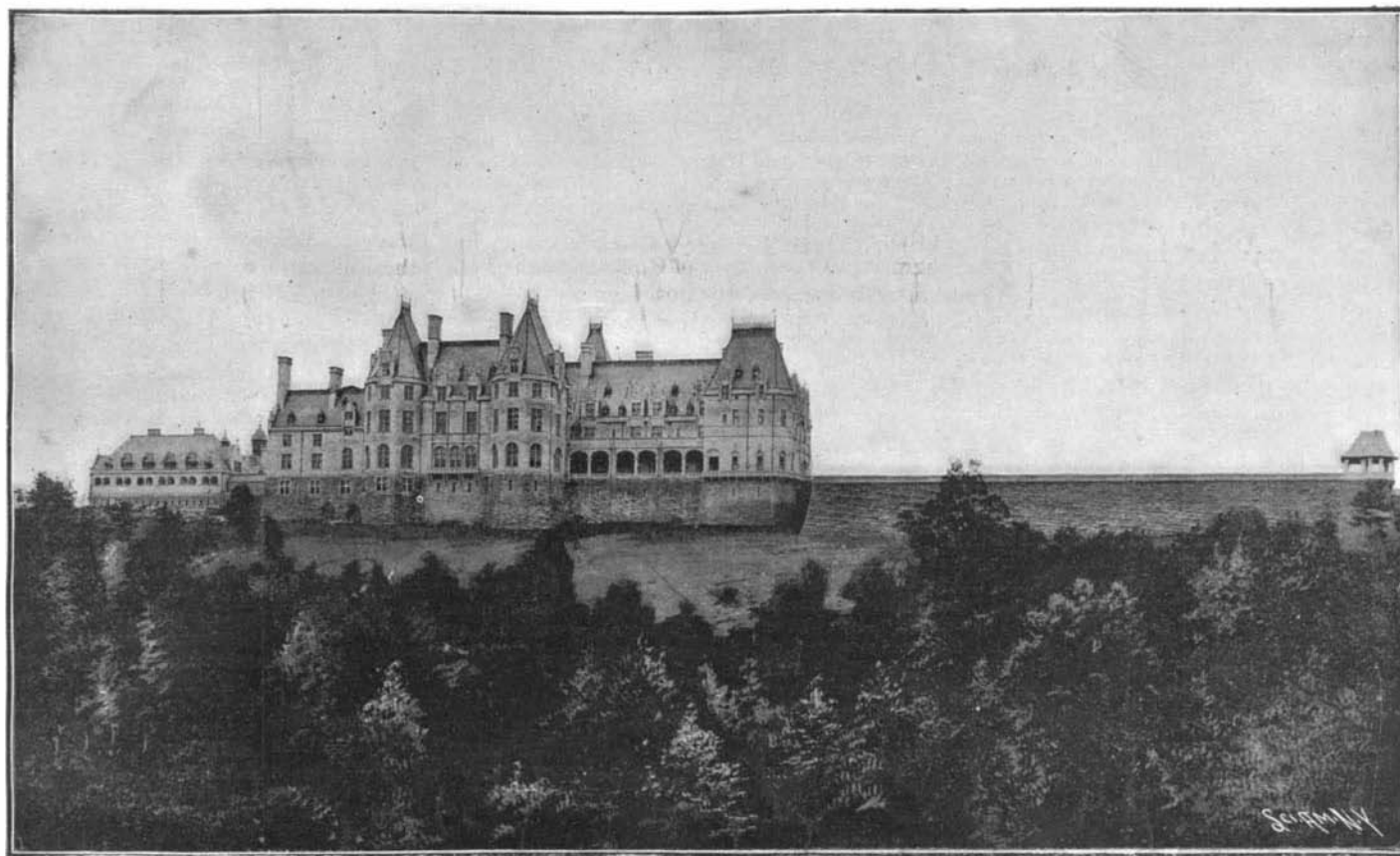
BILTMORE MR. GEORGE VANDERBILT'S ESTATE AT ASHEVILLE, N. C.

near vicinity of the house not only leads through the wildest and most picturesque mountain scenery, but each side of it is as highly cultivated as a rose garden. And yet the random profusion and extravagance of nature is so perfectly imitated that one would not suspect the interfering hand of man. Small evergreens and trailing vines render the ground a carpet of unbroken verdure. Ram Branch (of happy moonshiner melody) is frequently crossed on viaducts ranging in cost from \$8,000 to \$10,000 each. From the woods, the traveler emerges upon immense clover meadows and rolling paddocks. The roads through these flock-strayed valley lands lead in all directions from the "Castle," and amount in all to some sixty miles in

padding lagoons. Beyond the valley rises the sharp, symmetrical cone of Pisgah; and the line of summits rising constantly from it ends in the six thousand feet of Balsam Mountains. Far away are the misty peaks of the Great Smoky Range. To the northeast extends the valley of the Swannanoa all the way to the famous Black Mountain Chain. To the right the valley is flanked with the high and graceful Swannanoa Mountains. In the far distance lies the Swannanoa gap, through which the railroad enters the mountain defiles. Toward the south, where all is gentle, peaceful and in charming color, the mountains withdraw to a distance, leaving an open country dotted with farms, until far away the hazy curtain

made by the indistinct forms of the Blue Ridge is drawn around the scene along the South Carolina border. This is the very heart of the fabled abode of the primitive North Carolina "cracker" and "moonshiner," the home land of Mrs. Burton Harrison's heroine. It is unnecessary to state that game preserves will be plenty, and that in time hundreds of deer will roam at will through forest and meadow.

This palatial residence was built under the direction of the late R. M. Hunt, of New



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VIEW OF BILTMORE FROM BELOW THE TERRACE.

length. The "Castle" is reached after three miles of this delightful wayfaring. It looks very much like a dream fabric standing out as it does from the hazy blues and greens of sky and mountain.

The mansion itself fronts east and is situated upon a level esplanade 700 by 300 feet. This level space has been artificially made by cutting off the summit of a mountain and filling up the surrounding depressions.

York City. The style is French Renaissance and the material used is Bedford stone; the motive of the building seems to have been taken from the chateau at Blois.

The exterior of the chateau is very picturesque, as the sky line is broken by towers, mullioned windows, statues and gargoyles. On a nearer approach, the eye is attracted by the large amount of fine stone carving.

Probably the most pleasing feature of the eastern façade is the winding stair tower, which is at the left of the main entrance. This tower is very suggestive of that in the museum at Nuremberg. The building is really divided into six sections; in one is the library, in the second the private study of Mr. Vanderbilt and the picture gallery, in the third is the music room, salon, breakfast room, kitchens, etc. In the fourth section is the main entrance, the great living hall, and, of course, other rooms in the upper stories. Under the main entrance is a large swimming pool and lounging room. The other sections contain a winter garden and great banquet hall, the bachelors' quarters, billiard and smoking rooms, gun rooms, offices, etc. The banquet hall is the most imposing room in the entire building. It is 72 by 42 feet, and the ceiling is 65 feet high. It has a most elaborate marble mantelpiece. The ceiling of the library is decorated by a painting by an old master. The mantel is made of green marble from Japan, and the fireplace is so constructed that the stairway leading from the guests' chambers above is built down the middle of the chimney to the mantelpiece. The breakfast room is wainscoted with Numidian marble. The winter garden is a charming place. The marble floor is sunk three feet lower than the rest of the first story, so that one might look into this garden from nearly all of the principal rooms on the ground floor, the sides being of plate glass. In the center of the garden is a beautiful fountain. Even the roof is of French plate glass, nearly an inch thick. Mr. Vanderbilt's private apartment is finished in Louis XIV style. The mantel in the smoking room is a very old mantel, and indeed the whole house is being filled with fine objects of art collected by its cultured owner. A colonnade leads to the sunken garden, which is a very beautiful feature of the grounds. The columns are already covered with ivy, the gardener having planted it at both the top and bottom of the columns. There is a largest terrace in front of the house, and in the esplanade is a fountain with a basin 30 feet in diameter.

Dotting the margin of the ascent to the house are nine drinking fountains. The idea of this picturesque ascent was suggested by an old castello in Italy. It is hard to tell where house ends and stable begins, for the latter is joined right on to the house and is beautifully built. The interior of this stable is finished with white enameled brick, such as most people are glad to have round their fireplaces. During his periodical trips to Asheville, Mr. Vanderbilt lives entirely in his

private car, which is replete with all the luxuries of home.

The Color of Atoms, Ions, and Molecules.

This obscure but fascinating subject has recently been studied by M. Carey Lea, who contributes to the American Journal of Science perhaps the most interesting paper which has yet appeared on it. The method of investigation pursued bears a resemblance to that adopted by Mendelëef when compiling his celebrated table, and which has been so lucidly described by Lothar Meyer in his *Modernen Theorien*. It seems that when the elements are divided into two series, one containing those whose atoms show color in combination, the other those whose atoms in certain cases, or in all cases, show no color, it is seen that this classification corresponds very closely to the chemical properties of the elements. Ewan has shown that the color of a copper sulphate solution is not due to the free ions or to the molecules, but must be due to the atoms, whether they be present as ions or combined with another ion to form an electrolyte.

Lea states that in an electrolyte which gives a colorless solution in water, both cathion and anion are colorless. There is no connection between the color of an atom and the color of the element formed by a combination of atoms. In an electrolyte which gives a colored solution in water when the anion is a single atom, the color is due to the cathion, for all elementary anions are colorless. Even if an anion is a complex one and is colorless, the color of a solution of an electrolyte containing this anion is to be referred to the cathion. The color, or lack of color, of the atom of an element is a function of its atomic weight.

Elements with atomic weights, 1-47 have only colorless ions, 52-59 colored, 65-90 colorless, 103-106 colored, 112-139 colorless, 145-169 colored, 192-196 colorless. Elements which have atomic weights between these groups have both colorless and colored ions. Lea has arranged the elements in a periodic system, on the basis that no element which in all its combinations shows colored ions can be combined in the same natural group with elements which have colorless ions. Those which have colorless ions can be arranged in nine horizontal groups, in which each element falls naturally into its proper place. The division of the elements contains all those whose ions can act as anions.

Elements which have only colored ions can be arranged similarly in five vertical series; this division

contains elements whose ions can only act as cathions. Eleven other elements remain whose ions are either colored or colorless. In the whole series of all the elements, these elements come between a group of elements which have colorless ions and one of elements which have colored ions. There is no case in which an element with only colorless atoms falls in the periodic series between one of these eleven elements and an element with only colored atoms; and also an element with only colored atoms never comes between one of these eleven elements and one with only colorless atoms. The conclusion is that the color of the elementary atoms is a function of their atomic weights.

Cement for Leather Belting.

The importance of suitable cement for making joints in leather driving belts has led the Society of Chemical Industry to indorse the following formula: First, equal parts of good hide glue and American isinglass, softened in water for 10 hours, then boiled with pure tannin until the whole mass is sticky, the surface of the joints to be roughened and the cement applied hot; second, one kilogramme of finely shredded gutta percha digested over water bath with 10 kilogrammes of benzol until quite dissolved, when 2 kilogrammes of linseed oil varnish are stirred in; third, 1½ kilogrammes of finely shredded India rubber are completely dissolved in 10 kilogrammes of carbon bisulphide by heating, and while hot 1 kilogramme of shellac and 1 of turpentine are added, and the solution heated until the two latter ingredients are also dissolved; fourth, 1 kilogramme of best glue is dissolved at a moderate heat in 1½ kilogrammes of water, and thickened to the consistency of sirup. One hundred grammes of thick turpentine and 5 grains of carbolic acid are carefully stirred in while hot; the mixture to be poured into flat tin pans and allowed to cool, then cut into pieces and dried in the air. The cement is made liquid with a little vinegar and applied to the joint with a brush; this being done, the two ends of the joint are properly placed together and thoroughly pressed between two iron plates heated to a temperature of about 86° Fah.—*Railway Review*.

The longest telegraph line in the world above ground and without a break has just been completed in Australia. It runs from Rockhampton, in Queensland, to Broome, in Western Australia—a total length of over 6,000 miles.

RECENTLY PATENTED INVENTIONS.

Railway Appliances.

CAR FENDER.—James B. Morrow and Franklin C. Robertson, Oxford, Md. This is a simple and inexpensive device, readily attachable to and detachable from the front of a car, and which can be raised or lowered at pleasure from the platform to catch and support any one caught in the course of a moving car. The fender is hinged at its center to the car, and has hinged arms fitted to slide on the under side of the platform at each side, a bar being connected to the arms and a cranked operating shaft. The fixed section of the fender carries a sliding spring-pressed section, and the fender turns curves without projecting too far to one side.

SIDE BAR FOR OPEN CARS.—John R. Gathright, Louisville, Ky. To prevent passengers getting off a car in front of a moving car on another track, this inventor provides a side bar that may be removed by reversing the seat backs at the ends of the line. A series of bars across the side openings is pivoted at one end of each bar to a fixture of the car, each bar being connected with the seat back forward of that bar, so that the reversing of the seat back will raise the connected bar and open the passage to that seat.

Electrical.

RELEASING DEVICE.—Stewart H. Reynolds, San Jose, Cal. This is a device for use in stables, engine houses, etc., to release horses in case of fire. It consists of a perforated casing having a chamber to receive the end of the halter, a spring-actuated bolt sliding in the casing, in which also is pivoted a latch to engage and move the bolt, the other end of the latch being engaged by a notch in a spring-actuated armature lever connected with an electro-magnet.

Mechanical.

ROLLER FEED MILL HOPPER.—Arthur Wyker, Philadelphia, Pa. To regulate, in a simple and inexpensive manner, the supply of material to the rollers in the mill this inventor provides a regulating roller conveniently adjustable to and from the feed cylinder. A directing board forms a section of the hopper bottom and leads to the rollers, there being a feed cylinder within the hopper above the board, and the regulating roller being located above the feed cylinder. The feed cylinder and regulating roller retard the material as desired in its passage from the hopper proper to the rollers.

SELF OILING BOX.—David L. Altman, Eau Claire, Wis. To distribute a lubricant properly and evenly on a revolving shaft, without the possibility of the entry of dust, the journal bearing is made with a central and inclosed oil well communicating with the journal, and there being at each side of the well a dust chamber, the dust chambers having their walls in closed contact with the journal. It is immaterial in which direction the shaft is run, and the lubricant may be used continuously from two to four weeks without cleaning the well or refilling it.

COTTON CLEANER AND FEEDER.

—Martin L. Moore, Forney, Texas. This is a machine having a vacuum box with a screen and a separating drum at one side of the screen, a vacuum and a suction pipe entering the vacuum box at opposite sides, one supplying the cotton and the other removing the dust, while an endless carrier beneath receives the cotton, there being a feed belt at the end of the carrier moved by contact of the moving cotton. The machine is designed to clean, shred, or separate cotton and deliver it to one or more gins.

Agricultural.

PLOW.—William H. Bradshaw, Orange, N. J. This is a machine in which the plow blades are attached to an endless carrier operated by a sprocket wheel across the rear of the machine, motion being communicated from the axle through a worm wheel shaft to the sprocket wheel as the plow is drawn along, and means being provided for conveniently raising or lowering the plows, and holding them in any desired position.

HEDGE TRIMMING.—Edward C. and Alphas M. Gordon, Chetopa, Kansas. This is an improvement on a formerly patented invention of the same inventors, providing a cutting apparatus for a horse power hedge trimmer that will need no costly driving gear, but can be secured to the shoe of a grass mower, and operated by the driving gear as if it had been made for that sole purpose. The cutter is readily adjustable to cut either side of the hedge from top to bottom, or to cut across it from side to side, making a hedge fence of any desired height or width.

Miscellaneous.

ADDING MACHINE.—Albert L. Crowson, Sparta, La. This machine has number wheels with laterally projected pins, combined with a tilting key having integral upturned and curved inner end movable in the arc of a circle, and links connect the lever with curved racks, a stop limiting the downward movement of the rack with relation to the key. The machine is of great durability and simplicity, can be rapidly operated, adding whole numbers and fractions with absolute accuracy. The arrangement of number wheels and carrying devices is novel, and may be used with any suitable key mechanism.

DENTAL HAND PIECE ATTACHMENT.—Christian M. Meister, Allentown, Pa. This is a holder adapted as a chuck or head for small drills or other boring tools, in which a drill may be conveniently placed, firmly held, and readily removed. The device may be used as a brace or in connection with a dental engine, the holder being made in adjustable sections, whereby the drill may be placed and locked at any angle to the shank or stem communicating the power.

WAGON BRAKE.—Laurens S. Wheeler, Tyro, Kansas. Levers and rods at each side of the vehicle, according to this improvement, are connected with brake shoes in position to bear on the wheels and adapted to be operated by a brake lever, a wedging action being exerted on the shoes to force them against the wheels with considerable force when the brake lever is only

slightly moved. The improvement is especially designed for use on heavy vehicles, when it is necessary to secure the greatest possible pressure on the wheels.

FORE CARRIAGE.—James Duncan, Adelaide, South Australia. According to this improvement, circular wheel plates or fifth wheels are dispensed with, and in their place are used bosses or bosses and collars with stays, which connect with the carriage body and the turning part of the fore carriage to evenly distribute the strains. The stays connecting the fixed collar and boss to the carriage body, and those connecting the turning collar and boss to the turning part of the fore carriage, may be made of any curve or shape adapted to the style and details of each vehicle.

HEEL SPRING.—Frank McDonald, Malden, Mass. To cushion the step of one in walking this inventor has devised a specially constructed spring plate held to the shank of a shoe and projecting over the heel, where an auxiliary spring is employed on its under surface, next to the top lift of the heel. The improvement is especially adapted for use by railroad men, who are subjected to the incessant jar and vibration of a moving train.

CURTAIN FIXTURE.—Fred. L. Watts, Springfield, Mo. A ratchet mechanism, according to this improvement, is so connected with the spring roller that the spring can be tightened or loosened without handling the curtain, and the spring gear can be quickly thrown out of gear to permit of an easy movement of the curtain when used in connection with the usual pulley clamp and cord devices to pull the curtain up or down.

COAL DELIVERY IN DWELLINGS.—Charles S. C. Rock, New York City. To enable a tenant to automatically fill a bucket with coal from a coal bin in the cellar, and hoist the bucket to the floor on which the coal is to be used, this improvement comprises a double acting gate in the chute of the coal bin, the gate being actuated by a lever connection, as the bucket or other receptacle is lowered sufficiently to receive a duly measured quantity of coal.

LATCH.—Charles E. Whipple, North Charlestown, N. H. This improvement relates to gate fasteners of the gravity latch type, a winged latch block being pivoted in a casing from which extends a bracket arm adjacent to the block, a locking dog being pivoted near one end of the arm with its other end engaging between the wings of the latch block, while a transverse lever is mounted to rock and lift the end of the locking dog. The device is strong, durable, and inexpensive.

LOCK.—William E. Winters, White Lake, N. Y. This is a lock requiring no key, the door being locked on the inside by turning the knob, and the lock being arranged not to unlock from the outside. The improvement comprises a bolt adapted to receive a sliding motion from one knob spindle and a swinging motion from the other knob spindle, a keeper with a partition forming a rest for the bolt.

QUILTING FRAME AND TABLE.—Robert L. Burns, Trenton, Texas. A base and standards are, according to this improvement, adjustably and pivotally

connected, and quilting frame end blocks are adjustably connected with the standards, removable side bars connecting the end blocks, and a lower removable tie bar connecting the centers of the end blocks, while a tension device connects the standards. The frame may be adjusted for use as an ironing or cutting table, and may be folded to occupy but small space.

PHOTOGRAPHIC DISPLAY CABINET.—Henry W. Pottelger and William A. Kohman, Reading, Pa. This is an improvement on a formerly patented invention of the same inventors, the cabinet having a series of pivoted leaves with vertical movement, each leaf having a rearwardly extending arm engaged by a spring locking bar connected with a push rod. The cabinet has but few pieces, which may be made so strong as to prevent disarrangement by ordinary usage.

UMBRELLA RACK.—Alexander H. Davison, Athens, Ga. This rack has vertical standards on which are movable collars carrying bearings, in each pair of which revolves a shaft or axle, there being pairs of pulleys on each shaft, each carrying an endless slatted belt with clasps. The rack forms a vertical frame with an endless belt on which a large number of umbrellas may be carried in convenient position for their display.

COUNTER STOOL.—This is a further invention of the same inventor, providing a movable stool readily adjustable along the front of a counter, enabling a seated customer to conveniently move along without rising. In the front of the counter are upper and lower tracks in which move wheels on the ends of a telescopic body section, and from this section extends a bracket which supports a seat.

ROTARY CABINET.—James E. Stephens, Ochlochner, Ga. This cabinet is adapted to hold fibrous fabric in rolls and permit the removal of a desired quantity of the goods from any roll. It is especially adapted for lace and embroidery, there being in the walls of the cabinet delivery apertures corresponding to the separate pivoted rolls, through which the goods may be withdrawn, the portions on the rolls being protected from light, dust and detrimental handling.

SPORTSMAN'S CABINET.—George Porteus, Guelph, Canada. This is a cabinet having spaces to receive fishing rods, guns, revolvers, hunting knives, etc., and receptacles for ammunition shells and devices used in connection therewith. The cabinet is also provided with a folding table which may be readily brought into position for working purposes, and which may be folded out of the way without being disconnected from the cabinet.

Designs.

GLOVE.—Peter Chatelain, Boston, Mass. Two design patents have been granted this inventor for gloves having a slit at the side from the back edge along the wrist portion, while a flap or flaps extend along the wrist portion at the opening, the flaps terminating short of the hand portion.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.