States Geological Survey, to make his famous exploration of the great cañons of the Colorado.

When the war broke out he was elected a member of the U. S. Sanitary Commission, and was instrumental in extending the work of the commission throughout the Western States. After the war was over, he was called to fill a chair of geology and paleontology in the then recently established School of Mines of Columbia College, on the duties of which he entered in the autumn of 1866. In this capacity he continued until December, 1890, when a sudden stroke of paralysis compelled him to relinquish work. A year's leave of absence was promptly granted him, but at the expiration of this term he was unable to return, and he was made professor emeritus.

He was appointed paleontologist to the United States geological survey in 1884, and assigned to the charge of certain portions of fossil botany and fishes, concerning which he reported on the "Fossil Fishes and Fossil Plants of the Triassic Rocks of New Jersey and Connecticut Valley" (Washington, 1888), and on "The Paleozoic Fishes of North America" (Washington, 1889). Material on the fossil plants of the cretaceous and tertiary rocks of the far West was for some time in his possession, but had not been sufficiently completed for publication up to the time of his death.

Of honors he had many. In 1867 the degree of LL.D. was bestowed on him by the Western Reserve College, and in 1888 the Geological Society of London conferred upon him its Murchison medal, which was the first time this honor had been bestowed upon an American geologist. It was then well said of him that "He is a geologist after Murchison's own heart—keen of eye, stout of limb, with a due sense of the value of detail, but with a breadth of vision that keeps detail in due subordination."

In his death science loses one of its masters, for he was rich in those accumulated experiences which we call wisdom. Humanity loses a friend, for seldom has a life been spent in more active philanthropy; but his influence cannot die, and will live to

"Reach thro' nature, moulding men."

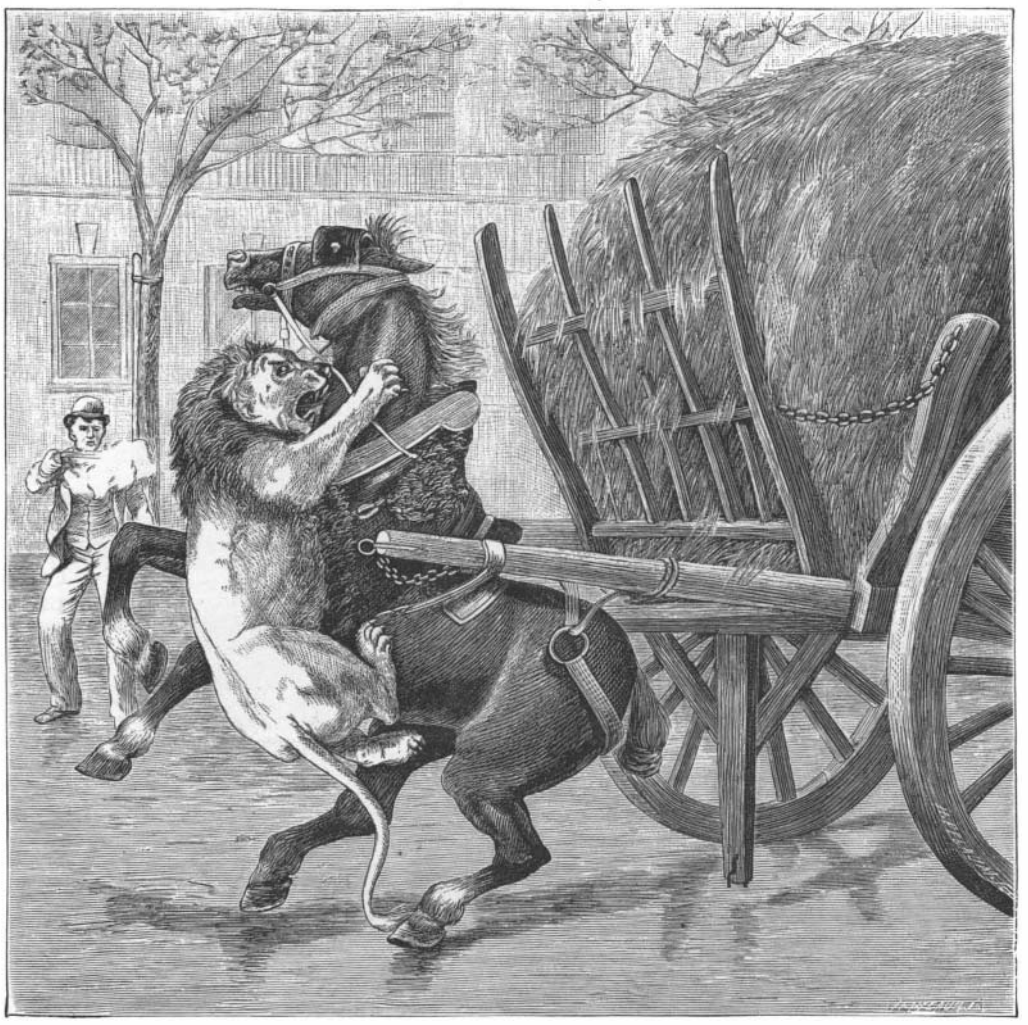
—M. B.

Draining of Lake Angeline.

Lake Angeline, in the Marquette Range, was a little lake near Ishpeming, Mich. The Cleveland Iron Mining Company and the Lake Superior Iron Company owned together about four-fifths of the area of the lake. The rest was owned by the Pittsburg and Lake Angeline Company. The lake was a beautiful sheet of water nearly a mile long, one-third of a mile wide, and about forty-five feet deep in a number of places. Its average depth was 20 feet. The operations of the mining companies have for some time extended beneath its bed, and it was determined by the mining companies to drain it. Operations were begun last spring, the contract being awarded to C. B. Howell, of this city. The work began with sinking a crib and putting in operation a centrifugal pump, with 20 inch suction and 22 inch discharge, and a capacity of 15,000 to 20,000 gallons per minute. The water was discharged into the Carp River. A few days ago the work was brought to a successful culmination. The lake, of 800,000,000 gallons estimated capacity, was emptied, and a handsome profit is expected as the result of the operation.

A LION AT LARGE.

The accompanying illustration represents an incident which lately occurred in the streets of Bordeaux. A traveling menagerie had taken up its quarters on the Boulevard de Cauderon, on the outskirts of the city near the Parc et Jardin d'Acclimatation, and, during feeding time, one of the lions managed to evade the keepers and escape from his cage. The wild beast tore down the spacious boulevard to the consternation of the passers by, and suddenly turned into a by street. Here he observed, outside a tavern, a sleepy cart horse harnessed to a hay cart, and evidently awaiting the return of its driver from the *estaminet*. Although pursued by his keepers and a crowd of police, the lion at once flew at the horse and fixed his jaws into its neck. The poor beast plunged and kicked, but it was of no avail, and while he neighed piteously the police began firing with their revolvers at the struggling pair. The firing does not seem to have injured the lion, for as soon as he had had his fill of horse flesh he turned to continue his promenade. At this moment a young man proposed to attempt to lasso the beast, and covered by the revolvers of the *gens d'armes*, he made the attempt. After many futile efforts, the noose eventually fell about the neck of the lion, and, being pulled tight by the excited crowd of pursuers, the animal was dragged, half-strangled, back to his den. It was fortunate that the cart horse was the only victim of this unusual excursion.—*Daily Graphic.*



AN ESCAPED LION ATTACKS A DRAY HORSE.

Antiquity of the Saw.

The saw is an instrument of high antiquity, its invention being attributed either to Dædalus or to his nephew Perdix, also called Talos, who, having found the jaw of a serpent and divided a piece of wood with it, was led to imitate the teeth in iron. In a bass-relief published by Winckelmann, Dædalus is represented holding a saw approaching very closely in form to the Egyptian saw. St. Jerome seems clearly to allude to the circular saw, which was probably used, as at present, in cutting veneers. There are also imitations of the use of the center bit, and even in the time of Cicero it was employed by thieves. Pliny mentions the use of the saw in ancient Belgium for cutting white building stone; some of the oolitic and cretaceous rocks are still treated in the same manner, both in that part of the Continent and in the south of England. In this case Pliny must be understood to speak of a proper or toothed saw. The saw without teeth was then used just as it is now by the workers in marble, and the place of teeth was supplied, according to the hardness of the stone, either by emery or by various kinds of sand of inferior hardness. In this manner the ancient artificers were able to cut slabs of the hardest rocks, which consequently were adapted to receive the highest polish, such as granite, porphyry, lapis-lazuli, and amethyst.

Carrying Capacity of Wires.

The safe carrying capacity of a wire is that current which it will convey without becoming painfully warm when grasped in the closed hand. In reference to this it must be remembered, says the *Electrical Age*, that this test cannot safely be made with the wires carrying currents for arc lights, and it is intended to be applied only with reference to the conductors of incandescent lights. These may be handled without risk; but with the conductors of the arc lights, where, as is usually the case, there are a number in series, a severe shock may be experienced on touching the wire, and if a ground connection existed by chance elsewhere, and some other conditions were present by which the full force of the current passed through the body, this shock might be fatal.

RECENTLY PATENTED INVENTIONS.

Railway Appliances.

METALLIC TIE.—Andreas Mattijetz, Giddings, Texas. This tie is made of U-shaped channel iron, with inverted U-shaped cross plates secured by their sides to the sides of the channel iron, flanged lugs secured to the cross plates being adapted to engage the bases of the rails to lock them in position on the cross plate, while flanged vertically extending plates are passed through slots in the ends of the channel iron. The tie is designed to be cheaply manufactured and very durable, preventing the spreading of the rails and displacement of the ties, especially on curves.

RAILROAD FROG.—John S. McAdams, Ashland, Pa. A pivoted point is by this invention formed of two rails with an intervening throat piece bolted together and pivoted at the juncture of the switch rails and the rails of the main track, and connected with a pivoted letter, the arrangement being such that a train passing over the frog has a continuous bearing, and jar and noise are avoided. As the wheels have a full bearing, with trains moving in either direction, on the main truck or turn-out, the wear and tear are reduced to a minimum.

ROD STRAIGHTENER.—Patrick McCann, St. Ignace, Mich. This is an improved clamp for straightening metal rods, bars or braces, and more particularly for straightening sliding switch rail rods or braces on railroads. The improvement consists of a screw clamp with attached turning or pressure foot, which can be readily employed by one man, and without removing the rods or braces from the rails, or necessitating any stoppage of trains.

Electrical.

ELECTRIC GAS LIGHTER.—Lucien M. Kilburn, Council Bluffs, Ia., and Scott Van Etten, Omaha, Neb. This invention relates to automatic lighting and extinguishing burners in which an oscillating gas valve in the gas tube is opened and closed by armatures and levers operated by magnets, a sparking device igniting the gas when it is turned on. The improved burner is designed to have greater efficiency, capacity, and certainty than has heretofore been afforded by such burners, while obviating all danger of leakage of gas through the valve and burner.

LIGHTNING ARRESTER.—William R. Garton, Keokuk, Ia. An armature is arranged to slide in a solenoid having at one end a guide rod which receives a flexible conductor, and at the opposite end a carbon rod, while a pair of serrated plates are arranged with their faces near each other, one of the plates being connected with the ground and the other normally in contact with the carbon carried by the armature. A closed chamber, nearly airtight, incloses the upper surface of the lightning arrester plate and the carbon carried by the armature. This improvement is designed to protect all electrical apparatus connected with the lines, and the dynamos and lamps upon the lines.

Mechanical.

WRENCH.—Daniel C. Wiest, Mohrsville, Pa. This is a simple, strong, and durable ratchet wrench, readily adjustable to nuts of various sizes, and which can be conveniently operated. It is provided with improved means for changing the ratchet, so that the wrench may be used either as a right or left hand wrench. It has a revoluble jaw-holding nipple, held to turn in an interior aperture of the wrench head, assisting the action of the jaws.

BOX MACHINE.—Charles W. Roberts, Lawrence, Kan. Box blanks may, by the machine provided by this invention, be rapidly and accurately shaped and held in place until they are fastened by nails or otherwise. Upon a suitable support is a stationary form, below which are vertically movable and pivoted jaws and a pivoted bottom plate, in combination with means for simultaneously operating the bottom plate and jaws. The machine is especially adapted to make berry and other light boxes, such as are usually formed of wood veneers, paper board, etc.

BELT HOLDER.—William F. Cleveland, Rounthwaite, Canada. This is a simple and readily applied device, more especially designed for use on thrashing machines, etc., where driving belts are exposed to the wind, the device holding the belt in proper place and preventing displacement by the wind. The device rises and falls with the ordinary vibration of the belt, thus lessening the friction, and it also serves as a belt tightener.

DIFFERENTIAL HOISTING MACHINE.—Charles F. Cliff, Durham, Canada. In this construction a fixed and a revoluble internal gear wheel are employed, a wheel receiving motion from the fixed wheel and imparting motion to the other wheel, there being two sets of intermediate gearing, with which also the driving shaft is connected. The differential gearing is very simple and compact in construction, and prevents any accidental backward motion of the drum shaft when the drum is heavily loaded.

Agricultural.

CULTIVATOR.—James Birch, North Ontario, Cal. This is a light and durable cultivator for orchard use, provided with a suitable riding frame for the driver. The cultivator frame can be readily raised or lowered while the machine is moving in a straight line or rounding curves, and the various shovels and scrapers employed can be quickly and easily attached to and detached from the cultivator frame. The riding frame may be detached, if desired, and the machine used as an ordinary cultivator.

STUMP PULLER.—Adams C. French, Rapid City, South Dakota. The frame of this device carries an upright shaft, formed with conical large and small cylindrical portions, to which the bore of the main drum is conformed, having at its upper end a tenon-like portion on which is journaled a second drum, above which, on the upright shaft, is journaled a sweep, pins on the sweep being movable into and out of engagement with the main drum or the second drum. In addition to its use in stump pullers, this drum may be used with advantage in derricks and other hoisting machines.

Miscellaneous.

LUMBER DRIER.—John W. Piver, Americus, Ga. A lumber support is arranged in a drying room of a house warmed by a heater, and is composed of an inclined side support and a base support formed of a series of step-like blocks having their upper surfaces approximately at a right angle to the side support, whereby lumber may be piled in an edgewise inclined position, without the use of racks having

separate seats for each row of boards, and without requiring the boards to be set endwise into the pile.

APPARATUS FOR CONDENSING FUMES.—Albert F. Schneider, St. Louis, Mo. This apparatus comprises a cooling chamber having a flue inlet at one end and a discharge at the other end, a perforated horizontal partition near the bottom on which pipes are mounted endwise, spraying nozzles delivering into the chamber, and means for collecting the condensed material beneath the perforated partition. It is designed to condense and collect the fumes, gases and dust of shaft, roasting and reverberatory furnaces, and is especially adapted to furnaces used in silver, lead, gold and copper ore smelting and milling works, and in refineries treating the metal products and by-products.

ACCOUNT KEEPING DEVICE.—William W. Maxwell, Champaign, Ill. This device consists of a number of movable flies mounted in a suitable frame, each fly having an index arm, while account sheets made in the form of endless belts are held to turn on the middle portions of the flies. The device is designed for use by banks and large mercantile firms, to take the place in a great measure of journal, ledger and balance books, enabling the bookkeeper to make his entries easily and quickly and readily prove the accuracy of his work.

REIN HOLDER.—George W. Thompson, Sag Harbor, N. Y. This device is designed to hold the reins in such a manner that the horse cannot easily throw his tail over them. The device has a base with a recess to receive the hip strap, a wedge-shaped slide being dovetailed into the recess, the outer portion of the slide having a curved horn or guide. By this improvement the reins when slack are prevented from dropping down over the horse's sides. The device is readily fastened to the hip straps of the harness.

HORSE COLLAR.—William Murr, Fountain City, Wis. This collar is designed to preserve its shape at all times, and is adapted to be readily opened and closed at the throat, having a flexible top which serves as a hinge to conveniently swing the sides apart. The stuffed sides of the collar have each a plug fastened in their lower ends, the inner ends of the plugs being beveled and curved rods secured flatwise upon them and extending upward in the middle of the stuffing.

SHAFT TUG.—John A. Lesh, Markelsville, Pa. An inner loop is fitted and movable in the main loop of this tug, there being side guides in the main loop alongside the inner loop and a connecting piece at the bottom extending through the inner loop. This construction prevents any twisting of the inner loop and relieves both loops of wear, while the back strap may be connected with the main loop without forming any protuberance at the back of the latter.

SNAP HOOK.—Samuel Brown, Quincy, Ohio. The hook proper, according to this invention, has a bifurcated nose portion, within which is pivoted and works a hook-shaped latch, also provided with a closing nose piece and backwardly extended saddle-like projection having a snapping or catching lip for engagement with the shank of the hook proper. The improvement dispenses with a spring for closing the latch, and there is no liability of the snap hook being opened either by its own play or movement or that of the usual ring or fastening held by it.

ROAD CART.—Alexander D. Curry, Istachatta, Fla. This invention provides a connection between the axle and thills, which permits the thills to rock without communicating any of the motion to the axle or the rigid portion of the connection, providing also a novel form of supports which can be quickly and easily adjusted. The construction affords a cheap and simple easy running cart, designed to entirely avoid horse motion.

FENCE POST AND HOLDER.—George W. Schofield, Jacksonville, Ill. The holder is tubular, preferably of earthenware, and with a base flange forming a support for a metal post, having a two-part lower end, both extremities of which project outward in opposite directions under the lower edge of the holder. The improvement is designed to afford a post of great strength and stability, especially adapted for corner or end posts, on which the pull or strain comes when tightening up the wires of wire fences.

COLLAR BUTTON.—David O. Parks, Denver, Col. Two spaced disks are connected together by a shank, a collar-receiving stud projecting from the outer disk, to which disk is hinged a plate adapted to be swung up in front of the stud to hold a collar on. It is a simple form of button, easily attached to the neck band, and not readily pushed or pulled out, by means of which the collar may be readily secured in place without pushing a button through the button holes of the collar.

LAMP HANGER.—George Albee, Susquehanna, Pa. This is a simple device for suspending electric lamps or lanterns, to be manipulated by a suspension rope. It comprises a pulley block, with a suspension loop pivoted upon and depending from the axis of the pulley, a lamp-supporting hook engaging the lower end of the loop, in connection with a releasing lever pivoted on the shank of the hook and an operating cord or cable.

DENTAL PLUGGER.—Henry R. Kline, Ashtabula, Ohio. The hammer tube of this device has the usual hammer and pneumatic connections, and there are projecting stay rings secured to the hammer tube, a tubular socket sliding in the stay rings and having shoulders to engage them, in connection with a fastening device to fix the plugger in the socket. The device is adapted to hold any of the usual hand pluggers, and is so constructed that the air tube cannot accidentally close to interfere with the working of the hammer. It has a pair of air bulbs, so that sufficient force may be given to the hammer by a slight pressure of the foot.

DENTAL SEPARATOR.—Benjamin Simons, Charleston, S. C. This is a device for forcibly separating two adjacent teeth to give access to cavities difficult to reach. It consists of two pairs of gripping claws to clutch the adjacent teeth to be separated, and two right and left screw shafts geared together by cog wheels, the shafts being tapped through the shanks of the claws, and when rotated forcibly separating the teeth.

GAME BOARD.—John S. Williams, Trenton, N. J. This board has three circular walls connected by straight walls, the circular walls each having an inward opening on the common inclosure. The game is played with white and black marbles, put together in one circle, and to be separated and rolled into the other two circles, the white marbles into one and the black ones into the other, by simply tipping the board, without touching the marbles.

DISINFECTING DEVICE.—John W. Bowerbank, Jersey City, N. J. A receptacle is provided with a depending metallic drip tube and inner rubber lining tube, the metallic tube being compressed transversely, thereby compressing the rubber tube and forming its bore into a narrow slit through which the liquid is adapted to drip. The device is inexpensive and designed to exactly control the dropping escape of the fluid to places where contagious exhalations may escape.

DESIGN FOR BICYCLER'S BAG.—Stephen B. Gilhuly, Long Branch, N. J. This bag has the form of a truncated scalene triangle, the wide and narrow ends being parallel, and the angle of the lower edge being considerably greater than that of the upper edge, while all the lines are straight.

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.

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3. A colonial residence at Newton Highlands, Mass. Perspective view and floor plans. J. W. Beak, architect, Boston. A picturesque design.
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7. A residence in the "Colonial" style of architecture, erected at St. David's, Pa. Perspective view and floor plans. Cost complete $5,800. F. L. & W. L. Price, Philadelphia, architects.
8. A residence on Golden Hill, at Bridgeport, Conn. Perspective elevation and floor plans. D. R. Brown, architect, New Haven, Conn. An excellent design.
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(4626) M. asks: 1. Does the Mississippi River run up hill, as it is said that its mouth is three miles higher than its source? A. Water never runs up hill. The Mississippi a thousand miles from its mouth is about 300 feet above the sea level for the difference of the two latitudes. The spheroidal form of the sea level is fixed by gravity, and all water above that level gravitates toward the sea or down hill, although it may be running farther from the earth's center. 2. If the earth in going around the sun in its orbit makes one day in a year without turning, how many times does it turn on its axis to make 365 days? A. The days, as ordinarily reckoned, are solar days of 365¼ in 1 year, but 366¼ revolutions on its axis. 3. If you increase the speed of the crosshead of an engine so that it is no longer on the point where it changes its direction than it would have been if it had not changed, does it stop any more in one case than in the other? A. Reciprocating motion stops at the end of the stroke, under any possible speed. 4. As it is farther over a half circle than across the base, why does it not take more board to make a tight fence over than across? A. If the boards are vertical, the chord or straight line is at right angles to their edges, and their width is their measure. While on the vertical curve the measure is at an angle equal to the angle of the curve, which is greater than the chord measure. This is readily demonstrated by a diagram. 5. When the earth cooled down wasn't the climate tropical at the poles a long time before it became frigid? A. The polar regions are supposed to have been tropical in the early geological ages, when the sea was warm and rain prevailed at the poles, or possibly the polar axis may have gradually changed its position.

(4627) F. K. W. writes: Suppose that to a car having four wheels we apply four brake shoes, but not with pressure enough to slide any wheel. Also to another car of same kind under same conditions we apply two shoes, with force enough to slide two wheels dead. Which will stop quicker? Will not the car with wheels sliding be stopped just as quick as the distance covered by the inertia of the car's motion? In other words, two wheels running loose against two locked, the loose wheels will have no propelling power, will they? A. The car with the four brakes will stop the car quicker. There is less friction in a sliding wheel than with a rolling wheel held by a brake, up to near its sliding resistance. The relation of the momentum of the car and the sliding friction of its wheels is an uncertain amount, depending upon the condition of the surface of the track and wheels.

(4628) S. A. D.—Luminous paint can be applied to cardboard without any previous preparation. SUPPLEMENT No. 497 contains an article on luminous paint.

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Cable crossing, W. Bowers	488,262
Calendar, J. Wallin	488,461
Camera and photograph exhibitor, combined, W. V. Esmond	488,331
Can body forming machine, R. D. Hume	488,476
Can labeling machine, F. X. Gaudrie	488,273
Can labeling machine, Wright & Rogers	488,346
Car brake, H. Hinckley	488,314
Car brake adjuster, L. T. Knowles	488,359
Car coupling, C. B. Martin	488,339
Car coupling, H. Schaeffer	488,507
Car coupling, J. A. & L. R. Williams	488,490
Car coupling and buffing mechanism, H. C. Buhoup	488,496
Car draw gear, railway, T. A. Bissell	488,326
Car fender, S. I. Crafts	488,396
Car fender, Gamage & Schmidt	488,353
Car fender, street, G. T. Hall	488,276
Car, railway dumping, G. Talbot	488,295
Car safety attachment, R. L. Lynch	488,477
Car sand box, S. Crory	488,387
Car spring, G. Gibbs	488,474
Car starter, W. Weaver	488,462
Car trolley stand, electric, E. M. Bentley	488,179
Cars by steam, device for heating railway, J. E. Howard	488,202
Carbons, uniting broken pieces of arc light, N. P. Stevens	488,256
Carding engine, G. A. Ayer	488,177
Carpet cleaning apparatus, A. A. Pyle	488,323
Cartridge magazine for breech-loading small arms, C. Schnippering	488,456
Ceiling plate, metallic, L. L. Sagendorph	488,254
Chair. See Auditorium chair.	
Check, baggage, A. A. Glisson	488,334
Chocolate cutter, Aebby & Seybold	488,493
Chopping knife, A. B. Schofield	488,289
Chords, instrument for drawing, W. H. Brown	488,327
Clamp. See Rope clamp.	
Cleaner. See Broom corn cleaner.	
Clutch, H. Bunker	488,383
Coal loading apparatus, P. Best	488,304
Coal separator, E. F. Long	488,211
Coal washing machine, Gallacher & Lang	488,429
Cockle separator, A. G. Miller	488,443
Coin-operated device, M. B. Goodkind	488,196
Color chart, J. White	488,375
Colter, W. E. Sefton	488,457
Column, metal, J. H. Gray	488,274
Combination lock, J. D. Craig	488,518
Compound engine, H. C. Reagan, Jr.	488,250
Concentrator, W. P. Ogden	488,528
Confectionery machine, T. Robertson	488,404
Conveyer, G. H. Tench	488,460
Cooler. See Water cooler.	
Cotton to gins, apparatus for feeding seed, S. D. Murray	488,446
Coupling. See Car coupling. Thill coupling.	
Crimping machine, A. Rotte *et al.*	488,252
Cultivator, A. Cowart	488,270
Cultivator, listed corn, A. Woolstoncroft	488,345
Current motor, alternating, C. S. Bradley	488,306
Currents, system of distribution for polyphase alternating, C. S. Bradley	488,307
Currycomb, C. J. & W. Schweim	488,291
Cycle stand, W. M. Justice	488,395
Diaphragm meter, J. B. Knickerbocker	488,504
Dice thrower, coin-controlled, C. C. Clawson	488,328
Drill. See Rock drill.	
Drill and eccentric chuck, H. W. Buckland	488,382
Drill, clearance cutting machinery for twist, O. Parpart	488,218
Dye, basic yellow, Gnehm & Schmid	488,430
Dyeing apparatus, R. Nickles	488,216
Dynamo regulator, C. J. Bogue	488,261
Electric lights, device for raising or lowering suspended, F. P. Welsh	488,298
Electric motor, C. S. Bradley	488,305
Electrical distribution box, W. H. Hart	488,198
Electrical switchboard, J. W. Lyon	488,532
Elevator operating mechanism, C. E. Moore	488,526
Elevator safety attachment, L. W. Butler	488,424
Embalming, T. Martin	488,338
Engine. See Carding engine. Compound engine. Gas engine. Rotary engine.	
Extension table, J. F. Wiggers	488,465
Eyeglasses, B. A. Gilbert	488,312
Fans, supporting frame for rotary, S. D. Shepperd	488,293
Faucet, F. S. Owells	488,401
Feed water heater and purifier, J. MacDonald	488,524