

On the Law of Evidence.*

Parties often enter upon their legal combats with a mistaken idea of their strength, on the supposition that they have ample evidence to prove their claims, only to find that much of the testimony they offer is objected to as "improper, incompetent, irrelevant and immaterial," and is ruled out by the court. All who engage in mercantile transactions involving those elements of uncertainty—misunderstanding of the contract, mistake as to financial responsibility, or changes in condition which may occur between an order and payment—that may lead to contests before the courts, either to establish the contract or collect the debt, should have a general knowledge of the rules of law applicable to the admissibility of testimony.

Testimony, broadly defined, is merely the declarations of the witness under oath, while evidence includes all the means by which any alleged matter of fact, the truth of which is submitted to investigation, is established or disproved; and proof is such an amount of it as shall lead to conviction and produce belief. Testimony may either be given in person or submitted by deposition, and evidence may be either oral testimony or written documents.

Whatever facts are necessarily involved in any transaction submitted to the court are said to be "in issue," and evidence as to their existence or non-existence is always relevant. Such facts may be proved by direct evidence or circumstantially. Direct is the testimony of persons who either saw or heard, or the production of the thing itself. Indirect evidence is proof by some other fact or facts, from which the one in issue may be inferred, as a probable consequence. All facts so intimately connected with the facts in issue as to form part of the same transaction or subject matter are relevant to it. So, also, proof of any facts which would be the natural and probable effect or result of the existence or non-existence of any fact in issue is admissible as relevant thereto. It follows that facts not directly in issue, or relevant, are not admissible.

Evidence as to character, hearsay statements, and opinions, are generally irrelevant, except in certain cases. The opinions of experts on matters requiring special study or experience are admissible, for the purpose of assisting the jury to arrive at a correct understanding of the matters submitted. Other derivative evidence, such as admissions, are admitted; for a

* Clothier and Furnisher.

party is bound by declarations which he has made against his own interest; by the declarations of those whose interests he represents; those jointly interested with him; those whom he has authorized to make admissions or those to whom he has referred for information.

Facts must be proved by the best kind of evidence obtainable. One cannot prove the contents of a letter by copy or oral testimony, unless it is first shown that the original is not in existence or unattainable; nor then if it has been destroyed by the party offering its contents intentionally. If lost, it must be shown that diligent search has been made for it, where it should be if in existence.

Ordinarily the most natural and satisfactory method of proving the existence or non-existence of a fact is by the direct oral testimony of witnesses who have perceived its existence or non-existence by the operation of their own senses; and therefore this is most generally resorted to for that purpose; except where it is a presumption of law; a matter of public record; embraced in a written contract, or by formal deed or document.

Oral testimony cannot be given to vary the terms of a written contract, where it appears that it was intended as a formal and binding statement between the parties, and which has been accepted by both sides. But oral evidence of the terms of a verbal contract is not excluded by the fact that there was a written memoranda, unless the latter was understood by both to embrace their agreement. This rule does not prevent a party from showing that a contract was obtained by fraud, duress, etc. And oral testimony may be introduced to explain what is uncertain, but never to contradict. Any distinct subsequent oral agreement to rescind or modify a written contract, provided the agreement is not invalid under the Statute of Frauds, or otherwise, may be admitted; it being a well recognized principle of common law that any obligation in writing, not under seal, may, in the absence of statutory interference, be either totally or partially dissolved or modified, before breach, by a subsequent oral agreement.

The burden of proof lies on the party substantially asserting the affirmative of the issue; as it is but reasonable that one who relies on the existence of a fact should prove it. In civil actions, of which we write, the party commencing the suit must make out his case by a preponderance of the evidence. This, however, does not require that he have more witnesses than the

other, though if he alone asserts a thing to be true, and the other denies it, the former will not recover unless he be supported by documentary proof.

Let merchants be forewarned, preserve their papers, and keep in mind and memory the facts that go to make evidence in courts—for

Thrice arm'd is he who knows what proofs to trust,
As well as he who has his quarrel just.

Ferrous Steel.

Thomas Doherty, of Sarnia, Ont., has discovered a new process for improving castings. The sample punching sent appears soft, like wrought iron, but not as strong. He writes:

"I inclose you sample of what I name ferrous steel. It is punched out cold from a top of an ordinary coal range. You can see the grain and sharp edges. It is so ductile that a strip 1½ inch wide, ¼ inch thick, 12 inches long, can be wound around a 2 inch gas pipe without breaking; at the same time is of great tensile strength, a ½ inch square bar 12 inches long bearing on the points will carry a load of 500 lb. without fracture. It is made from a mixture of 60 per cent common scrap and 40 per cent No. 2 pig iron. My process is to inject a steam jet into the tuyeres at cupola, which forms another element in combustion (hydrogen gas), giving out great heat; forming black oxide of iron on the iron at the point of charge, as it becomes red, magnetic oxide, and is so closely coherent and adherent that the absorption of sulphur from the coke is entirely prohibited on its course down through the furnace. The color of the gases is entirely changed. The molten metal is much more fluid and almost free from slag or dross and gives a casting of much smoother surface with a steely appearance. This process saves fully 10 per cent in fuel and has several other advantages of greater or lesser importance not stated here. It is being patented in all countries. The days of common cast iron are nearly ended."

Improved Grinders for Dressing Metal Rolls.

William E. Harris, of Niles, O., obtained two patents on March 26, 1895, for improvements in grinders for dressing metal rolls without removing them from their housings. Mr. Harris' idea is to form the grinder with a chamber and to connect pipes therewith, so that while the rolls are being dressed a stream of water may be caused to pass through the grinder to keep it cool. Mr. Harris sets forth different ways of doing this in his two patents.

RECENTLY PATENTED INVENTIONS.**Engineering.**

FURNACE.—Walter W. Waidright, Palestine, Texas. According to this invention a suction fan is located between the chimney or stack and the fire box, to draw the gases from the stack and force them into the fire box above the grate bars, thus insuring complete combustion and preventing the escape of smoke and obnoxious gases. When applied to locomotives the exhaust passes with the smoke and gases to the fire box, while in stationary boilers and engines the exhaust is passed directly into the throat of the suction pipe for the fan. The device also completely arrests all sparks.

Electrical.

SUPPLY SYSTEM FOR ELECTRIC RAILWAYS.—John M. Byron, New York City. This improvement relates to systems where a sectional trolley wire or rail is employed, the sections being insulated from each other and each supplied by a feeder with current from the main line. The improvement provides automatic means for switching the current successively through the sections of the trolley wire or rail, the parts being perfectly insulated and there being but few mechanical parts to get out of order, the mechanism being also arranged to facilitate repair, while the several switches are so devised that if a number of them are damaged the rest of the line will not be interfered with. The improved system is designed to supply the power economically and without danger.

Railway Appliances.

TRAIN ORDER BOX.—William A. Tucker, Dayton, Tenn. This is an improvement in boxes combined with the levers used for working semaphores or switches, the device automatically locking the semaphore-working lever when the operator takes his order blanks from the box, and automatically unlocking the lever when the order blanks are placed in the box, preventing accidents and mistakes, or the pulling of the signal until the train crew has received its orders. When the semaphores are in or clear for trains the box is closed and the blanks cannot be reached, and when the blanks are out of the box the signal must be at danger, and cannot be changed until the blanks are put back in the box.

SWITCH WORKING MECHANISM.—Edward J. Ill, Jersey City, N. J. For use in connection with an ordinary switch point, this inventor has devised a simple apparatus adapted to be operated by mechanism on a passing car to open or close the switch. It is a screw mechanism which positively moves the switch point, the screw shaft being turned in either direction by a sprocket wheel and chain, there being oppositely moving striking plates beneath the slots in the track bed.

Mining, Etc.

AMALGAMATOR.—Nathan L. Raber, Corvallis, Oregon. This patent is for an improvement on

formerly patented inventions of the same inventor, designed to avoid danger of breakage, as the mercury cup contains agents by the electrolysis of which the mercury is purified or cleaned. Step brackets formed with step risers extend between and are supported by the sides of the frame, the mercury receptacles being arranged above the steps. The step plates may be removed each independently of the other.

CLEANING RETORTS OF ZINC SMELTING FURNACES.—Herman Kaemmerling, Girard, Kansas. After the last draw of metal, and before charging the retort with fresh ore, it is cleaned of residuum, ashes, etc., according to this invention, by discharging jets of water under high pressure into the hot retort throughout its length, thus generating steam to loosen and force out the residuum, the discharge being continued until the residuum is cooled and washed out.

Mechanical.

WRENCH.—James G. Lowe, New York City. This wrench is especially adapted for use around a bicycle, being a quick-adjusting tool adapted for a wide range of work, and being easily and quickly manipulated with one hand. It has claws at the end of its handle designed to be useful in straightening a wheel and a pivoted hook arm for use, in connection with a projecting pin, in manipulating the ball casings.

DRILL CLAMP.—John F. Forsyth, Bloomington, Ind. Simple and effective devices for clamping the drill of stone channeling machines form the subject of this invention. The parts can be readily detached and assembled, and are manufactured at small cost. The head block has a slot straight at one end and tapering inward, a recess having similarly arranged end walls opening into the slot way, while a clamp member fitting in the recess has one end straight and the other tapering, there being also an intermediate clamp member and wedge plate.

MICROMETER.—Otto J. Ebert, Cleveland, Ohio. To cover and protect one of the bearings or screw points of the instrument is the special object of this improvement, which comprises a measuring gage well adapted for caliper screw bolts or other articles. A removable cap is provided for the lower bearing or screw point, the cap having a lengthwise slit and opposite lateral perforated lugs, and there being a screw for drawing the edges of the slit together and clamping the cap upon the screw.

Agricultural.

TRANSPLANTER.—Frederick Richards, Freeport, N. Y. This improvement comprises a receiving vessel, open at the top and bottom, and adapted to be forced into the bottom around a small plant in such way that on its removal the plant will also be taken up with the earth around its roots, there being used in connection with it a similar vessel to be forced into the ground at the place where the plant is to be again put down, to remove the earth for the replanting. The invention also provides for retaining plant runners in contact with the ground by a suitably bent wire rod.

Miscellaneous.

FILTER.—Joseph G. Sutton, West Newton, Pa. This invention relates to filters employing a porous block, and the patent is for a cheap and durable filter which may be readily cleaned by reversing the flow of water through it to carry a sponge back and forth through a serpentine supply passage, and also cause the water to permeate reversely through the pores of the filtering block, and thus release the foreign matter deposited by the inflow to the filtered water chamber.

OVERHEAD CONVEYOR.—Walter G. Berg, New York City. To facilitate the moving of packages, bales, etc., to and from warehouses, factories, and other buildings, this inventor has devised an apparatus in which an overhead rail is supported on hangers and extends through the building, the carrying chain being secured to a lever fulcrumed on the carriage traveling on the rail, so that by turning the lever a grappling device and the article held by it may be raised to the carriage. Locking means are provided to hold the grappling device in elevated position. Any number of carriages may be run on the rail, each one provided with a picking up and dropping device.

VENDING MACHINE.—Owensby H. Woodfill, Nevada, Mo. This is a machine especially adapted for dispensing weighty articles, and it is so constructed as to relieve the dispensing mechanism from the greater portion of the weight of the articles. The motor mechanism has a notched disk in engagement with which is held a coin-released brake when the motor is at rest, a number of pivoted arms having head portions forming seats for the support of the goods, and these arms being moved by a pitman connecting them with the disk of the motor.

SPROCKET CHAIN.—Charles E. Fanning, Keokuk, Iowa. A bicycle chain designed to reduce friction and wear and not liable to lengthen, has been devised by this inventor. Pintles unite the links and balls surround the pintles between the links, flanged sleeves fitting reduced ends of the pintles and entering the balls, spacing them from the pintles, while the flanges of the sleeves abut against the inner surface of the links. The links are braced against sidewise strain and lateral play is prevented, while the balls are moved on their axes by the sprocket teeth, freeing the chain of mud and dirt.

IRRIGATING DAM.—Hugh C. Magarrell, Trinidad, Col. According to this invention a main plate is adapted to form a central rigid cut-off, the plate having an opening and a slide gate, while wing members pivotally connected with the main plate are adapted to swing outwardly as they are moved vertically. It is a simple device for use in irrigating ditches, made of sheet metal in different sizes and adapted for readily shutting off the water partly or wholly, as desired.

PROCESS OF TREATING LEATHER.—Rosseter Owens, Olean, N. Y. To improve the appearance of hemlock leather, making it look equal to oak leather, and also to give increased weight, this inventor has patented a process for treating the leather after it has been tanned and dried in the usual manner with a solution of sal soda, then bleaching it in oxalic acid and

finally washing it with water, using first a strong gambier or other liquor in a wheel handler to give the increased weight.

COMPOUND FOR MAKING CIDER.—Philip Nickols, Albany, N. Y. This is a compound which includes burned apple peels, blackberries, sugar, tartaric acid, oil of apples in certain proportions and prepared after a stated manner, to make a cider which does not get sour or hard, and affords a delightful drink for summer and winter.

FLOWER PACKAGE.—Hubert Bailey, Brewster, N. Y. For conveniently packing and shipping flowers and blossoms without liability to injury, this inventor has devised an improvement consisting principally of a casing and an apertured plate removably connected therewith to carry the flowers. Means are also provided for attaching a moisture-carrying material in which the flower stems are embedded, so that they are kept in a healthy condition during transportation.

TABLE FORK.—Joseph Eros, Anniston, Ala. This is a patent for a new article of manufacture, comprising a table fork having a ridge upon the upper surface and along one edge of each of its tines, while one outer tine has its ridge on the outside and the other outer tine is widened and has a ridge on the inside, thus forming a scoop. With this fork children and others can more readily take up food from the plate and convey it to the mouth.

DISH CLEANER.—John H. Nolen, Jr., Columbus, Ohio. This invention relates to that class of dish washers in which the dishes are rotated in a wire cage in a water holder or pan. The dish holder proper consists of a cylinder having a perforated bottom and internal inclined wings oppositely arranged, adapted to support the dishes and take up water when the holder is rotated. The dishes may thus be thoroughly cleaned, and when afterward rinsed with boiling water are dried by the heat in a few seconds, so that they present a bright polished appearance.

WEATHER STRIP.—Philip W. Cassil, Garner, Iowa. This is a weather strip which, when used under doors, is arranged to pass over the sill to the outside when the door is closed, and stand clear of the carpet or floor when the door is opened. It has in one edge openings for screws with pivoted heads to be passed into the door, while a shedding strip secured to the door has its lower inwardly curved edge extending over the hinged edge of the strip. A guide rail on the floor and a pin at one side of the door frame act to hold the strip over the carpet when the door is opened and press it down to form a tight joint when the door is closed.

SASH HOLDER.—William Linden, Helena, Montana. This is a holder in which the clamping member is made entirely of rubber or other yielding material, and as the clamping surfaces become worn they may be readily and conveniently adjusted to renew positive contact with the surfaces engaged, the whole device being very simple and inexpensive and capable of attachment on any description of sliding window to hold it in the position desired.

CAROUSEL AND PANORAMIC APPARATUS.—Joseph Darling, Baldwin, Pa. This is a merry-go-round which has a wave motion in addition to the usual rotary motion, and designed to give to the rider the sensation of sailing or flying.

ROOFING COMPOSITION.—John A. Freeze, Mason, Texas. A new compound designed to be used with especial advantage as a roofing paint has been devised by this inventor.

PUZZLE.—Helen E. L. Fisher, Germantown, N. Y. This device has central concentric inclosures having gates for the passage of balls, while extending from the outer wall of the inclosures are channels, each having a dividing longitudinal partition and a receiving chamber at the outer end.

DESIGN FOR PENCIL TIP.—George A. Wieland, Duluth, Minn. This design consists of a hollow cylindrical body with radial imperforate points, as of a five pointed star, in the same plane.

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.

SCIENTIFIC AMERICAN BUILDING EDITION.

APRIL, 1895.—(No. 114.)

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2. Two perspective elevations and floor plans, showing a residence recently completed for George N. Tynor, Esq., at Holyoke, Mass. An elegant design in the Romanesque style of architecture. Mr. H. H. Gridley, Springfield, Mass., architect.
3. A cottage at Nutley, N. J., erected at a cost of about \$4,000. Perspective elevation and floor plans. Architect, Mr. E. R. Sifton, N. Y. A simple but tasteful design.
4. A Colonial residence at Orange, N. J., recently erected for John Hammond Bradshaw, M.D. A pure example of modern Colonial architecture. Two perspective elevations and floor plans. Messrs. Rossiter & Wright, New York City, N. Y., architects.
5. An attractive residence at Indiana, Pa., recently erected for Mr. Harry McCreary, at a cost of \$4,350 complete. Perspective elevation and floor plans. Architect and builder, Mr. E. M. Lockard, Indiana, Pa.
6. Two perspective elevations and floor plans of a handsome residence erected for Samuel S. McClure, at Armour Villa Park, Bronxville, N. Y. A good example of a square rigged house. Cost \$8,000 complete. Mr. Henry S. Rapelyea, architect, Mount Vernon, New York.
7. A cottage at Glen Ridge, N. J. An attractive residence in the Elizabethan style. Two perspective elevations and floor plans.
8. A carriage house at Orange, N. J., recently erected for John Hammond Bradshaw, M.D. The design is treated in the modern Colonial style to correspond with the architecture of his residence. Ground plan and perspective elevation. Messrs. Rossiter & Wright, architects, New York.
9. An elegant residence at Flatbush, L. I., recently erected at a cost of \$11,000 complete. Two perspective elevations and floor plans. Architect, J. G. Richardson, Esq.; builder, J. C. Sawkins, Esq., both of Flatbush, L. I. An attractive design.
10. A house at Park Hill, N. Y., recently erected for Messrs. Loreni & Morrow, at a cost of \$6,500 complete. Perspective elevation and floor plans. Mr. Edmund J. Maurer, architect, New York.
11. Miscellaneous Contents: Moderne Innen-Decoration.—The evolution of an old building, with 4 views.—Wood stains.—Wood finish chemically and microscopically examined.—A tubular frame house.—To destroy hothouse insects.—Venetian blinds, illustrated.—An improved spring hinge, illustrated.—Cement mortar.—A blind architect.—Frozen water closets.—An electrical mail box, illustrated.—The anchor fence post, illustrated.—Hardwood matching heads, illustrated.—Porcelain.—The Rider engines, illustrated.—The Security sash balance, illustrated.—Improved woodworking machinery, illustrated.

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Notes & Queries

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(6490) W. J. R. asks: 1. I have your SUPPLEMENT, No. 600, with instructions for building an eight light dynamo, and wish to build one equal to four lights; if I reduce everything from full to half size, will that be all right? A. No. Reduce to nine-tenths the size by lineal measurements. 2. What numbers of wire would be best for armature and field magnets? A. It depends on the voltage desired. Use one or two numbers finer wire than those specified.

(6491) S. B. asks: What will be the pressure due to an explosion of gasoline gas mixed with 10 parts of air? How many times will it expand with nominal loss of heat due to working an engine piston? What will the pressure be after it has expanded to 3 volumes and to 6 volumes? What part of the loss of pressure is due to loss of heat? Will the increase in pressure be greater or less if the mixture is compressed? A. Allow for an expansion to about 10 volumes, giving an initial pressure of 150 pounds per square inch. At 3 volumes allow 105 pounds, and at 6 volumes 60 pounds. The loss of pressure is accompanied by loss of heat, and as necessarily accompanied by it, may be said to be due to it. Compression gives a higher initial pressure, and consequently a higher average pressure.

(6492) F. C. W. asks: What is the temperature of the flame of an arc electric light one thousand volts, two thousand candle power? Is there any known material that will not crumble or melt under such a heat, and where can such a material be procured? A. It is questionable if any reliable record of this can be obtained. In the ordinary arc the temperature of the negative carbon is put at 3,000°-3,500° C. and that of the positive carbon at 4,000° C. Carbon neither crumbles nor melts in it.

(6493) G. E. M. says: Please inform me through your columns how I can brighten copper coins, so they will stay bright for a coin collection. A. Coins can be quickly cleansed by immersion in strong nitric acid, and immediate washing in water. If very dirty, or corroded with verdigris, it is better to give them a rubbing with the following: 1/2 ounce pure bichromate of potash; 1 ounce sulphuric acid; 1 ounce nitric acid. Rub over, wash with water, wipe dry, and polish with rottenstone or chalk. To keep them bright permanently they should be lacquered.

(6494) S. S. asks: 1. May an article upon which the patent has expired be made by any person, and by him sold under a name different from the one by which the invention is generally known? A. Yes. 2. May any one freely make and sell perforated maps, etc., which are made by the cheap electric pen, described in SCIENTIFIC AMERICAN of June 4, 1887? A. Yes. 3. What is the lowest temperature yet attained? A. See our SUPPLEMENT, Nos. 990, 996, 948, 973, 967.

(6495) W. M. asks: 1. Will a rifle shoot the same at an object on water as it shoots on land (without changing elevation)? A. It is probable that gravity may be slightly less on the sea than on the land and may cause a very small difference in the range. The amount is too small to appreciate in ordinary practice. 2. Will the accuracy of a rifle be changed by having a ring that is heavier on one side fitted tightly around the barrel near the muzzle. A. A gun barrel unbalanced as described will not recoil in the line of the bore, and will throw a bullet away from the center line of fire toward the light side.

TO INVENTORS.

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For which Letters Patent of the United States were Granted

April 9, 1895,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Table listing inventions and their patent numbers. Includes items like Advertising article, C. A. Montgomery; Air brake, A. P. Massey; Amalgamating and separating metals, H. M. Baker; Animal elevating and suspending apparatus, J. E. Penell; Arc rupturing device, E. Sperry; Auer, earth, H. & L. Iwan; Autographic register, Remson & Sboettel; Automatic gate, W. V. Salmon; Baz. See Toilet powder bag; Ballast, feeding machine for making, J. Stubbs; Bandage machine, J. E. Lee; Battery system, electric, Powell & Hall; Bearing for vehicle wheels, ball, M. J. Herbert; Bed, folding, P. H. & G. A. Mellon; Bicycle, J. M. Bell; Bicycle saddle, Wright & Crane; Bicycle shoe, T. O'Brien; Bicycle supporting brace, J. B. Gathright; Bicycle wheel rim, A. C. Fairbanks; Binder, J. C. Scheller; Blind & Newspaper Caster; Boat. See Submergible boat; Boiler. See Sectional boiler. Steam boiler; Boilers, device for preventing incrustation of, A. C. Bragonier; Bolt. See Nut locking bolt; Book duplicating memorandum or copying, W. H. Rodden; Bottle, J. H. Heslin; Bottle or egg carrier, C. M. Kimball; Box. See Fare box. Knockdown box. Patrol box. Street gate box; Box standing, C. W. White; Brake, See Vehicle brake. Wheel and rail brake; Brake beam, H. B. Robischung; Brush machine, L. Strickel; Bullock sampler, T. Krauss; Burner. See Kerosene burner; Burner, A. A. Hutchins; Bushing valve and faucet attachment for casks, W. W. Jackson; Button book attachment for shoes, gloves, etc., J. K. Rogers; Button, C. J. White; Cable grip and lock, combined, C. H. Notter; Can. See Sheet metal can; Can or box bead crimping machine, R. Ansell; Car attachment, P. M. A. Stemmler; Car bolster, C. J. Schen; Car, E. E. Collins; Car coupling, Easton & Dawson; Car coupling, C. S. Elliott; Car coupling, J. Timms; Car coupling, B. M. Whitlock; Car coupling, J. Feiser; Car coupling, automatic, M. M. Pease; Car draw bar, J. Timms; Car fender, E. D. Abbott; Car fender, G. Blakistone; Car fender, A. P. Cadden; Car fender, A. H. Koeller; Car fender, J. H. Gray; Car, self-discharging and convertible freight, J. W. Morse; Carding engine, E. Asbworth; Carding engine condensing roll, A. Hardwick; Carpenter's bench, E. M. Brown; Carpet, E. E. Collins; Carriage, adjustable time fuse, Judge & Chapman; Case. See Display case; Cash register, H. E. Allen; Cash register, Lowell & Humiston; Cash register, etc., key stop for, C. S. Trask; Cash pitching apparatus, H. Torchiani; Caster, W. T. Smith; Casting molds, L. J. Creeluis; Casts, moulding with molten wax for reproduction of, Le Bourc & Coise; Cementing apparatus for manufacturing hollow bodies of, J. F. Klein; Cheese making device, H. Ohl; Chenille fabric, apparatus for cutting, H. Lees; Chopper. See Meat chopper; Cigarette machine, J. N. Wood; Cistern cleaner, H. L. Gray; Clip. See Spring clip; Clock, alarm, F. Sharpe; Clock, electric, F. L. Gregory; Coal drill, M. Hardsong; Coal hod, S. B. Moody; Cook, half, C. Birken; Coin assorter and deliverer, S. D. Reynolds; Coin controlled apparatus, G. H. Eaton; Combination lock, H. C. Wayman; Commutator traversing apparatus, J. Pease; Conduit sections, method of and apparatus for making, S. E. O'Haran; Connecting rod, F. F. Maag; Core spindle, J. McAdams; Corn shucker, J. A. Shinn; Corroding pot, H. M. Gabel; Corset fastener, J. Landfield et al.; Cot or bed bottom, folding, Page & Cruzen; Coupling. See Car coupling. Trawl coupling. Water closet coupling; Cover lifter, J. J. Vernier; Cultivator, R. H. Avery; Cultivator, M. Sattley; Cultivator, tonnageless, R. H. Avery; Cup. See Ice cup; Curbing, metallic, I. L. Landis; Curtain pole, A. J. Kull; Curtain ring, M. Gair; Damper regulator, F. L. T. Carlman; Demagnetizer, Gooding & Scovell; Decorizing tinners' oils, C. Lossen; Derailing switch, O. J. Travis; Desk, school, W. L. Starkey; Die for manufacture of moulded articles, A. C. Estabrook; Dish cleaner, J. N. Moody; Door check, W. J. Tynon; Door check and closer, pneumatic, J. S. Strawder; Door, folding, A. Jorzensen; Door hanger, L. Coburn; Door hanger, W. J. Sumner; Door, hanging device, binding, J. M. Turen; Door, metallic, A. H. Bobb; Drawers supporter, T. J. Moore; Dredging and conveying apparatus, C. Upton; Drill. See Coal drill; Drills, spring break for hoe, W. F. Hoyt; Electric machine, ventilating apparatus for dynamo, Burton & Angell; Electrical conductors, cut-off or safety attachment for, J. Parkinson et al.; Electrical indicator, E. H. Johnson; Electrode, H. T. Barn et al.; Electrolysis, H. Blumenberg, Jr.; Elevator, S. B. Williams; Elevator guard, H. Walbaum, Jr.; End gate and shoveling board, combined, S. Fackler; End gate and shoveling board, combined, T. G. Mandl; Engine, gas, gas engine, gas engine or similar motor engine, Road engine; Engine cab, traction, J. J. Moore;

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White; Fork. See Hay fork; Fountain, L. Gommer; Furnace. See Garbage furnace. Iron heating furnace. Roasting furnace; Furnaces, apparatus for automatically controlling motive power for supplying air to, J. E. Beckman; Furnacer, coal dust feeder for, A. Friedeberg; Furnaces, valve for regenerative or other, F. Mills; Gage. See Heel gage; Galvanizing strips, apparatus for, T. V. Allis; Garbage crematory, R. Boulter; Garbage furnace, A. Brownee; Garment fastening, C. S. Franke; Garment protector, M. J. Foxworthy; Garment stretching frame, F. W. Gilroy; Gas burner or regulator, independent, J. Kraker; Gas engine, gas burning, H. G. & W. R. Dawson; Gas engine, C. V. Walls; Gas meter, H. H. Sprague; Gas meter, prepayment, D. Orme; Gas or similar motor engine, A. R. Bellamy; Gate. See Automatic gate. End gate; Gear, sprake, T. E. Dryart; Gears, machine for hobbing worm, V. W. Mason, Jr.; Generator. See Steam generator; Glass articles and apparatus therefor, cutting, L. Havaux; Glass, decoloring, J. M. G. G. G. G.; Glassware, means for ornamenting, J. Rovensky; Gold saving apparatus, B. M. Whiting; Gold separator, J. J. Payne; Governor, steam engine, H. C. Nichols; Grain cleaning and dust collecting apparatus, H. Simon; Grate, vertically adjustable, McNamara & Catron; Grinding and polishing parabolic or analogous curvilinear surfaces, machine for, Schuckert & Munker; Guns, cocking and ejecting mechanism for break-down, J. H. G. G. G.; Hammer guide, steam, W. H. Wood; Hammock, T. C. McPherson; Handle. See Wrench handle; Harrow, J. J. Callender; Harrow, O. K. O'Brien; Harrow and roller, combined, R. Willey; Harvester, corn, J. A. Boehler; Harvester, corn, E. E. Witter; Hay carrier, H. H. Durr; Hay fork, M. G. Grosscup; Hay loader and rake, combined, J. Hallaban; Heater. See Water heater. Steam and hot water heater; Heel gage for making heels, F. M. Goss; Heel or sole plate, E. W. Alsop; Hinge, coach, F. P. Pfeigbar; Hinged joint link for boxes or casings, O. Heintz; Hoisting apparatus, C. W. Hunt; Hook. See Snap hook; Hook and eye, J. Berkey; Hook picker, M. Mursa; Horseshoe, modification, J. Moloney; Horseshoe toe calks, machine for making, J. A. Trudeau; Hose and making same, B. L. Stowe; Hose bridge, adjustable truss, S. F. Sullivan; Ice pick, C. B. Darling et al.; Impact tool, T. H. Phillips; Indicator. See Electrical indicator. Station indicator; Injector, Eynor & Gamble; Insulating compound, A. C. Thompson; Iron heating furnace, sheet, W. E. Harris; Journal and box, L. Metzger; Journal bearing, self-adjusting, J. H. Van Houten; Journal bearing, self-adjusting, E. F. Van Houten; Journal bearing, self-oiling, H. S. Albrecht; Kerosene burner, F. P. Boland; Knob belts, forming, B. L. Stowe; Knob attachment, A. E. White; Knockdown box, H. Hawley; Ladder, store, J. Ebert; Ladders, etc., trolley support and guide for step, W. J. Sumner; Lamp, J. Kirby; Lamp, incandescent, C. A. Merritt; Lamp, incandescent, G. M. Huntington; Last block fastener, G. M. Huntington; Latch, A. A. Mandell; Latch, sliding door, C. C. Abbe; Lathing, metallic, G. Hayes; Leg, artificial, "Wright" Finckstein; Lifter. See Cover lifter; Liquid mixing machine, A. F. Cook; Lock. See Combination lock; Locking device, J. Schade; Locomotive bearing, J. L. Baker; Locomotive traction means for increasing C. Seiden; Loom double lift Jacquard mechanism, Briggs & Denton; Loom fly shuttle attachment, carpet, W. H. Kyett; Loom fly shuttle compound knit and woven gear, circular, B. L. & N. Stowe; Loom pile wire, R. E. Murphy; Loom shuttle, carpet, W. H. Kyett; Loom shuttle tension device, M. & F. Camagni; Lubricator, J. H. Smith; Mail bag catcher, A. Kimball; Mail pouches or bags, locking mechanism for, O. M. Chesney; Maps, manufacturing relief geographical, F. T. Burel; Measure, indicating tape, C. Stuart; Measure of calorific value, H. M. Griffith; Measure, tailor's, H. W. Scott; Measure, tailor's, J. R. Storey; Measuring apparatus, coal, C. W. Hunt; Measuring instrument, electrical, Hartmann & Braun; Meat chopper, J. H. Stiel; Metal, apparatus for electrically heating, G. D. Burton; Metal heating apparatus, electric, Burton & Angell; Metal heating apparatus, electric bath, G. D. Burton; Metal heating apparatus, electric bath, Burton & Angell; Metal heating, electric, G. D. Burton; Metal heating, method of and apparatus for electric, Burton & Angell; Metal, method of and apparatus for electrically heating, G. D. Burton; Metals by electricity, apparatus for brazing, Burton & Angell; Meter. See Gas meter. Water meter; Milk tester, D. W. Curtis; Milking machine, E. H. Hobe; Mill. See Fanning mill. Rolling mill; Milling and felling machine, S. & B. Preston; Mine trap door, G. J. Hotchkiss; Moisture absorbing device, A. I. Dexter; Moulding, building, A. M. Beinke; Motor, W. H. D. Laddow; Musical box case, H. & V. J. Riley; Nailing apparatus, M. Brock; Nailing machine filing apparatus, M. Brock; Non arcing switch, A. Wurts; Nut, axle, C. B. Bagley; Nut locking bolt, F. S. Standish; Oil and gas separator, J. W. Houzb; Oil cup, E. W. Long; Oiler, J. H. Halladay; Oiler tip for bottles or cans, C. S. Henderson; Paper folding machine, J. Aiken; Paper tubes, machine for, A. C. Lutz; Paper vessels, machine for manufacture of, Hutt & Phillips; Paste, etc., on strips of paper, machine for spreading, Saltzkorn & Nicolai;