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V. T. should send further particulars as to the sewing machine motor, and also his name and address.—J. A. S. will find directions for tinning small articles of iron on p. 378, vol. 29.—W. W. will find directions for soldering all metals on p. 251, vol. 28.—B. A. H. will find directions for building houses on pp. 52, 96, vol. 28.—R. S. can mold rubber by following the directions on p. 283, vol. 29.—C. B. L. M. can cut glass bottles by the process described on p. 399, vol. 26.—L. N. L. will find that the effect of the variation of temperature on cast iron is discussed on p. 304, vol. 29.—C. L. M. S. will find a recipe for making parlor matches on p. 75, vol. 29.—C. L. M.'s musical queries are not suited to our columns.—M. G. P. will find directions for making vinegar on p. 69, vol. 30.

J. E. D. says: I have a lot of type metal which has passed through the fire. Can I use it as lead is used for fastening iron into stone? If not, how can it be freed from other material so as to be used for such purpose? A. No doubt you can use it for the purpose you mention; but it is probably of more value to a type founder than for any other purpose.

J. H. P. asks: What transparent varnish or other substance can I apply to polished tin or brass to preserve its luster? A. Pale lacquer will probably serve your purpose. Take 1 gallon methylated spirit, 5 ozs. shellac, 4 ozs. gum sandarac, 1 oz. gum elemi; mix in a tin flask, expose to gentle heat for a day or two, strain off, and add 1/2 gallon of spirit to the sediment.

J. B. says: The edges of the leaves of several of my books have been, as it were, eaten away by an insect, or some agent that is as yet invisible. Some leaves have been eaten as deep as one inch and a half from the edge. What do you think the insects are, and what means shall I adopt to save my books from destruction? A. The leaves have been torn. There is no insect which eats paper to such an extent or in such a manner as these leaves would indicate. Acids also could not have produced it, because more or less of a stain would remain; and, moreover, acids eat paper in such a way as to leave a square and cleanly cut edge, that is, they eat through the entire thickness of the paper, while in this case the edge is feathery. Moreover, only half the thickness of the paper (to the depth of 1/2 to 3/4 inch from the edge) is taken away, sometimes on one side, sometimes on the other. The "invisible agent" in this case is some mischievous person.

F. H. D. asks: 1. What population have France and Germany respectively? A. By the last census, Germany 38,500,000, France 38,000,000. 2. Of what nationality was the late Professor Agassiz? A. He was born in Switzerland. 3. Is there a drink known as Mum? A. Mum is beer made from wheat malt, and its use is chiefly confined to Germany, and especially to Brunswick.

S. H. B. asks: 1. What is the article used by glass blowers to prevent glass from burning or staining while being heated in the lamp? A. The staining is due to the oxide of lead present in the glass, and to prevent it a glass free from lead must be used. 2. What are the chemical elements of coal ashes? A. Principally silica, alumina, sesquioxide of iron, lime, and magnesia. Sometimes there are also found potash, soda, sulphuric and phosphoric acids.

R. E. S. asks: What can I use for dipping brass to give a dark blue color, also a black? A. We do not know of a blue dip for brass, but a blue japanned surface is produced as follows: Bright Prussian blue or smalts should be washed and ground with one sixth its weight of starch, dried, and tempered with mastic varnish. Lay on the brass, and varnish with 5 or 6 coats of: Seed lac 2 ozs., gum animé 3 ozs., reduced to coarse powder and dissolved in 1 quart alcohol. For black, dip your articles in aquafortis till bright, then in the following till black: Hydrochloric acid 12 lbs., sulphate of iron 1 lb., pure white arsenic 1 lb. Take out, rinse in cold water, and lacquer with green lacquer.

C. H. A. asks: 1. Can you tell me of some books on the distillation of coal tar? A. "The Manufacture of Phenolic or Hydrocarbon Oils from Coal and other Bituminous Substances," by T. Antisell, "Treatise on Coal, Petroleum, and other Distilled Oils," by A. Gesner. 2. What are the ingredients of black varnish, used on roofs and outdoor iron work? A. Two lbs. tar oil, 1/2 lb. asphaltum, 1/2 lb. pounded rosin. Mix hot, in an iron kettle, taking care to prevent ignition. Use cold. 3. Will boiling coal tar act on galvanized iron? A. No.

A. B. L. asks: What is the diminution in bulk of snow when melted? A. Freshly fallen snow weighs from 5 to 12 lbs. per cubic foot. As to your fish-hook question, apply to a dealer.

G. M. asks: 1. Are any instruments in existence by which we can determine to what extent (if any) the light and heat of the sun are of electric origin? A. It has been determined that the heat of the sun is due to combustion, and its principal source is burning, glowing hydrogen gas. 2. Is the all-pervading ether a perfect conductor of electricity? A. Electricity passes readily through space deprived of atmospheric air; and if we suppose this space to be filled with an imponderable ether, we can believe it to be a conductor of electricity. 3. Is the fact generally known that iron and steel possess magnetic polarity, when the force shaping them proceeds in a given continuous direction? For instance, most of the common cut nails, and nearly all iron and steel tools, are magnetic; the head of the nail is the negative or south pole, and the other end is the positive or north pole, and so with all tools where the machine shaping them operates in a given direction, or where the iron or steel is forced through the machine in a given continuous direction. A. It is known that hammering steel or iron induces magnetism, and this method has been recommended for inducing magnetism in steel bars. Such magnetism, however, is feeble compared with that induced by other highly magnetized bars, or by the electric current.

W. K. asks: Is there any chemical solution which will renew the color of bronze stenciling upon iron? A. Dissolve the covering of varnish by alcohol or spirits of turpentine, and then rub with a strong solution of oxalic acid; then dry and revarnish.

C. R. asks: In what form is platinum used in the nickel plating bath? A. The solution used in the nickel plating bath consists of the double sulphate of nickel and ammonia, so as to obtain a plating of nickel. When platinum is required to be deposited, the double chloride of platinum and potassium, dissolved in a solution of caustic potash, is used as the bath.

W. L. L. says: I have a house standing north and south with addition on north side and chimney on east side of addition. When the wind is in the northeast, the stove will not draw well; the smoke blows down the chimney. What is the best thing that I can put on it to prevent this? A. The most complete remedy would be to rebuild your chimney within the main house, at the center of the north end, to terminate above the ridge of the roof. If you cannot do this, you might construct a rectangular flue of galvanized iron, and attach it to the outside of main house at the center of north end, to terminate well above the main ridge, and constructed and painted to imitate a chimney; the side towards the house should be made double, with an air space of two or three inches between the sheets for safety. This pipe or tube could be extended to the ceiling of the interior, and the stove pipe conducted to it, the tube being also made double below where it enters the roof.

N. J. W. says: It has recently been stated that, in the Turkish baths in New York, patients are treated with vapor at a temperature of 240° to 260°. This statement seems incredible in view of the popular belief that water boils at 212°. Can you explain? A. In the Russian bath, where the vapor of water is employed, the ordinary heat of the bath of vapor is from 120° to 140° Fah. Steam at 240° or 260° would scald or burn the skin and would have to be superheated besides. In the Turkish bath, however, where hot air is used, a much higher temperature can be employed on account of the rapid evaporation from the surface of the body. With moderately dry air, a temperature of from 200° to 270° Fah. has been borne.

R. J. P. asks: How is compressed yeast made? A. One mode of preparation is as follows: Previously malted barley and rye are ground up and mixed, next put into water at a temperature of 65° to 75°; after a few hours the saccharine liquid is decanted from the dregs, and the clear liquid brought into a state of fermentation by the aid of some yeast. The fermentation becomes very strong; and by the force of the carbonic acid which is evolved, the yeast globules are carried to the surface of the liquid, and, forming a thick scum, are removed by a skimmer, then placed on cloth filters, drained, washed with a little distilled water, and next pressed into any desired shape by means of hydraulic pressure, and covered with a strong and well woven canvas. It keeps from eight to fourteen days, according to the season, and is excellent.

W. L. T. asks: 1. How much wire will it take to make a helix for magnetizing steel bars 6 inches long? How long should the coil be and of what diameter? A. A helix an inch in inside diameter, and made out of 20 feet of copper wire, will answer. 2. What should be the size of the cups for a Grove battery, and how many cups should I need? A. Use from two to six cups of six inches diameter and 8 inches high, according to the rapidity and amount of charge desired.

L. A. G. says: 1. What is the melting point of platinum? A. It is above 4,000° Fah. How much has not been certainly determined. 2. What is the greatest artificial cold which can be made? A. By mixing liquid nitrous oxide with bisulphide of carbon, and placing the bath in a vacuum. The lowest temperature thus obtained is -220° Fah. 3. Is there any difference between a square foot and a foot square? A. No.

G. B. asks: Is the difference between soft brass and spring brass (sheet and wire) a difference of composition or of manufacture? A. A difference of composition, principally.

G. E. S. asks: Will a body projected vertically upward into the air return to the earth with a great velocity as it had on leaving the earth? A. No.

B. G. asks: How is chloride of calcium prepared? I have tried to dissolve chalk in muriatic acid, but could not succeed. A. There must have been something wrong in the acid you employed. Powdered chalk is added to muriatic acid until the effervescence entirely ceases. The liquid thus obtained, which is a solution of chloride of calcium, yields the solid body on evaporation.

A. M. Y. asks: 1. What is the acknowledged opinion as to the comparative merits of vessels with turrets, such as the Monarch, compared to the class of the Hercules? Does the fact of the Captain turning out a failure alter the high opinion previously held of such a system of construction? A. Opinions are about evenly divided on these points. 2. What vessel do you consider represents the type upon which all modern improvements have been successfully applied? A. The Ark.

J. C. asks: Of what horse power will an engine of the following dimensions be: Cylinder 1 1/2 inches in diameter, stroke 2 1/2 inches, steam 60 lbs. pressure, and cut-off at half stroke, running at 90 revolutions a minute? A. Multiply the mean effective pressure per square inch (probably between 40 and 45 pounds) by the area of the piston in square inches (78.54), and by the piston speed in feet per minute (210), and divide the product by 33,000.

T. S. P. asks: 1. Will a gun scatter as much with a bore larger at the muzzle than at the breech? A. Yes. 2. What kind of oil is the best to oil gun stocks with? A. Olive oil. 3. How many cells are there in the battery of the miniature telegraph? A. One. 4. Has it a recording apparatus with it? A. No.

E. C. C. asks: 1. Will there be any advantage in the application of a continuous stroke of a steam engine to the face of a cogged wheel or wheels, 2 feet in diameter, instead of using a 12 inch crank, applying the power at the most available point? It requires three strokes of a twenty-four inch engine to perform one revolution of the wheel or wheels; it only requires two strokes with the crank. I use a self-acting or double clutch for regulating the movements. A. We do not think that any advantage will be derived from this arrangement. 2. I claim to be the projector of an invention lately sent to the Patent Office by certain parties in this vicinity, to one of whom I confidentially divulged my device, making it so plain as to enable him and his partners to contrive an exact model of it, which they did without my knowledge. He admits that I told him of it, but claims to have conceived the idea long before, the contrary of which I think I am able to sustain. How shall I proceed? A. Make application for a patent, and produce your proofs of priority of invention.

C. E. M. says: A contends that it would be simply impossible for modern brains and appliances to move a 40 foot cube of granite 10 feet in any limited time, and that it never has been done except by the ancients. B. thinks that there is nothing impossible in accomplishing the work in a comparatively short time. Has anything of the kind ever been done? A. A 40 foot cube of granite would weigh 10,500 tons, nearly. Modern appliances would, we think, be found equal to the task of moving such a weight. Perhaps one of the most recent jobs of the sort was the movement of the Great Eastern steamer, from shore into the water, at the time of her launch, a distance of 150 feet. This was done by means of hydraulic rams. The weight of the hull was between 7,000 and 8,000 tons.

S. W. W. asks: 1. If the size of the second cylinder in a compound engine could be changed at will, would it be the same as a variable cut-off in other engines, and would it be an advantage? A. We do not think there would be any advantage. 2. What advantages would a rotary engine have over other kinds, provided it could be as well packed? A. Cheapness, lightness, compactness.

J. H. D. asks: Can an office 10 feet x 20 feet be sufficiently warmed by the exhaust from a 10 horse engine, situated about 100 feet distant, the pipe to pass underground? A. Yes. 2. How large a conducting pipe would be required, and of what metal should it be made? A. Iron pipe, 1 1/2 inches in diameter.

J. M. asks: What size is necessary for the square bar of iron to make a specified size of half round iron. A. Make the side of the square bar 0.62665 of the diameter of the half round piece.

V. C. says: I am running four stationary boilers all connected together, and I am troubled with the scale gathering over the bridge wall and causing the boilers to burn. What is the cause and how can I prevent it? The boilers are level, and I have them cleaned every two weeks. A. Probably it will be necessary for you to change the feed water, or use some scale preventive. It is difficult, however, to give a definite opinion without knowing more of the case. It is quite common for scale to form on the crown sheet of a boiler, when the circulation is bad in that part. This can sometimes be remedied by changing the position of the feed pipe, and arranging an internal pipe so as to cause a circulation of the water.

C. F. S. asks: Does the principle that wheels, chains, beams, cranes, and other iron structures (after being long subjected to blows or to distinct jarring of any kind) at length break without adequate cause, hold true in regard to the wire cables of suspension bridges? If so, ought not the cables to be renewed every few years? A. Engineers are divided in opinion on this matter, but many think that a possibility of such action is a serious objection to suspension bridges.

G. E. C. asks: Can small articles punched out of common scrap tin be silver plated? What is the best process? Will it be necessary to re-tin the pieces in order to have the edges plated? A. It would be difficult to silver them well without first giving them a layer of copper by means of the battery, and a bath of sulphate of copper. Then a bath is used, consisting of two parts of cyanide of silver and two parts of cyanide of potassium dissolved in 250 parts of water.

A. H. asks: After ice is formed, perhaps to some feet in thickness, does a vapor pass from the water through the ice, and congeal on the top of it, or is the thickness of the ice increased by the water freezing underneath? A. In still water, as in ponds, lakes, and rivers generally, ice having formed on the surface, its thickness increases according to the intensity and duration of the cold from the surface downward, by the cold layer of ice above abstracting the heat from the water below, the ice formed being reduced below the freezing point by the cold exterior atmosphere, and acting like any other solid.

A. L. K. asks: 1. What is the best treatise on prehistoric nations? A. Lyell's "Antiquity of Man" also "The Stone Age, Past and Present," by E. B. Taylor, and No. 3 of Estes & Lauriat's "Half Hour Recreations in Popular Science." 2. Is there a treatise on the mound builders separately? A. We know of none.

L. P. S. says: In a factory a 3/4 inch pipe was placed against the wall, and above a tank in which acids were kept for dipping the bronze work.

C. Y.—Your boat seems to be well proportioned. Your engine should make from 250 to 300 revolutions per minute, giving a speed of from 8 to 10 miles an hour.

G. B. M. asks: 1. How can oxygen gas be generated, and can it be kept for inhalation? A. There are several methods of preparing oxygen.

A. S. asks: In testing milk, what is the relative proportion of cream and milk? If I pour 5 inches of milk into a test tube and let it remain in a moderately warm place till the cream all rises to the top, how thick ought the cream to be?

J. P. H. asks: If a siphon whose vertex is 50 feet above the level of a reservoir be closed at each arm with a stopcock, and both branches be then filled with water at its vertex, after which it be made airtight and both ends be opened, will the water flow through the siphon, or will the formation of a vacuum be made of its vertex?

G. R. J. says: 1. When a light is applied to a perforated cork in a bottle containing oxygen and hydrogen gases, an explosion takes place, driving the cork with great force out of the bottle.

H. C., H. E. W. and others: You need entertain no doubt as to the possibility of making sugar and sirup from sawdust, rags, and paper. In order to effect this change, shreds of linen, paper, or sawdust are submitted to the action of strong sulphuric acid in the cold.

E. C. H. asks: 1. Which has the greatest driving power, a balance wheel 3 feet in diameter or one 4 feet in diameter, the weight being the same in each wheel?

C. says: Will carbonic acid gas completely extinguish fire when it exists at a dead red heat, or are its virtues confined simply to a blaze? A. We once tried some experiments with carbonic acid gas as a fire extinguisher with the following results: The gas used was compressed in an iron reservoir, to from 200 to 300 lbs. per square inch, so that a stream of gas of any desired force could be obtained.

distance of 5 or 6 feet, the effect was lost, the fuel burning more fiercely than before, from the fact of the stream of gas spreading and carrying with it so much oxygen from the air.

H. S. asks: 1. What will force the beard to grow? A. Nature and time are the most powerful auxiliaries. Frequent shaving seems to stimulate the growth to some extent. 2. How can I make nitrate of ammonia? A. Saturate nitric acid diluted with three or four times its weight of water with sesquicarbonate of ammonia, evaporate by a gentle heat and crystallize.

W. H. S. asks: 1. At what cut-off does an engine give the most power? A. At full stroke. 2. Which gives the most power, a short or a long stroke engine, both using the same amount of steam?

T. C. O'B. asks: How can a straight avenue of fifteen yards wide and two hundred yards long best be lighted up brightly? We have tried some glass reflectors, but they are entirely inadequate.

M. E. D. says, in reply to our correspondents who asked as to washing flannels: Take soft water, as warm as you can bear your hands in. Make a strong suds, well luted. In washing fine flannels, wet but one piece at a time; soap the dirty spots and rub with the hands, as washboards full the flannels.

L. M. R. says, in answer to J. B. V., who asks how he may remove green moss from his brown stone stoop: Carbolic acid will effectually accomplish it. A solution containing one per cent of the acid in water should be applied to the plants, which will kill them, although it will not alter their appearance.

C. W. Y. says, in reply to F. O. C. H., who asked as to patching a boiler: Take off all warped and twisted parts of the boiler plate; have your patch large enough to cover the hole nicely, then bolt it on firmly with boiler bolts, bevel the patch on the outer corner, or, in other words, thin the patch; then, with a calking tool, upset the iron all around the patch close to the boiler.

A. W. W. says: C. W. B. asks, on p. 202, if there is any better way to make a house warmer than the usual weatherboarding and plastering. Let me give him my ideas of how a frame house should be built. After the frame is up, cover the outside with rough one inch boards, then put on a covering of tar roofing felt (which will not cost over twelve or fifteen dollars for a medium sized house) and put the clapboards on top of that, then go inside and lay a course of brick on the underpinning up to a level with the top of the sills; this will make the cellar much warmer; now take some strips about one inch square and saw them off to a length of the distance between the studs, nail them on to the outside boarding between the studs, lath on to them, letting the lath run up and down, then put on a good thick rough coat of plaster; then lath and plaster the inner wall as usual.

J. H. W. says, in answer to M. V. D.'s question as to condensation: I will say that a worm 4 feet in diameter, 8 coils deep, and 2 1/2 inches diameter of pipe, if kept cool by a continuous stream of cold water, will condense easily 2,000 gallons of proof spirit per day.

H. W. G. replies to W. P. S. P.'s query as to the area visible from an elevation of 400 feet: The night you mention gives a range of 20-25 miles all around giving a surface of, in round numbers, 1,280 square miles.

H. W. G. replies to R. H. D.'s query as to the sinking of the 1,000 feet tower: A sinking of 1/4 inch on one side would throw it out of perpendicular 4-90 inches at top. Settling 1/2 inch on one side and raising 1/4 on the other would throw it 9-98 inches away at top.

G. W. says, in answer to C. W. B., who asked for a cheap and efficient method of building a house, which will make it warmer and drier than any other plan in use: Put the studs one foot apart, and board perpendicularly (outside and inside) with 1 1/2 inch stock boards, making the joints on the center of the studs.

M. G. P. asks: How can I render a pair of buckskin gauntlets impervious to water?—A. D. asks: How can I prepare gelatin for molds to cast plaster of Paris undercut work?—A. B. asks for a formula for obtaining the force of the wind at different velocities.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects:

- On the Regulation of Patent Monopolies. By G. H. K.
On a Mathematical Problem. By H. M.
On Polishing a Parabolic Mirror. By W. B. C.
On Reclaiming the Colorado Desert. By R. D' H.
On Steam Engines and Turbine Wheels. By J. H.
On Drying Lumber by Steam. By H. G. B.

Also enquiries and answers from the following: A. W. M.—F. G. H.—F. R.—E. B. W.—C. J. T.—N. A. W.—J. P. F.

Several correspondents request us to publish replies to their enquiries about the patentability of their inventions, etc. Such enquiries will only be answered by letter, and the parties should give their addresses.

Correspondents who write to ask the address of certain manufacturers, or where specified articles are to be had, also those having goods for sale, or who want to find partners, should send with their communications an amount sufficient to cover the cost of publication under the head of "Business and Personal," which is specially devoted to such enquiries.

[OFFICIAL]

Index of Inventions

FOR WHICH

Letters Patent of the United States

WERE GRANTED IN THE WEEK ENDING

March 24, 1874,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

Aerial steering and propelling, C. B. Wainwright 149,012
Alarm, burglar, B. Fischer 148,943
Alarm, burglar, J. H. Thorp 149,001
Alarm telegraph, fire, J. F. Kirby 148,833
Axe clips, die for forging, Clapp et al. 148,973
Bale band and buckle, F. M. Logue 148,890
Bedstead, wardrobe, E. E. Everitt 148,940
Beehive, Armstrong & Gillet 148,914
Belt tightener, W. B. Cleves 148,808
Blower, fan, G. C. Hawkins 148,951
Bolt and rod cutter, J. G. Hitzel 148,954
Boiler regulator, feed, M. S. Vosburgh 149,011
Boilers, etc., covering, C. M. O'Hara 148,972
Boot screw-nipping device, C. Tyson 149,010
Boots, manufacture of, S. S. Hall 148,918
Boots, screwing uppers, C. Tyson 149,007, 149,008, 149,009
Bottle for perfumery, etc., Whiting et al. 149,018
Bottle, perfume, W. D. Whiting 149,017
Bottles, capsuling, J. Paterson 148,976
Bottles, etc., capsuling, J. Paterson 148,977
Brick machine, P. Harnist 148,882
Brick machine, G. E. Noyes 148,971
Bronzing compound, A. Towne 149,004
Burner, gas, J. R. Wigham 148,909
Buttons, threading, W. F. Brennstuhl 148,805
Canal boats, construction of, N. Jackson 148,957
Car brake, J. Grove 148,820
Car coupling, Condon & Clem 148,934
Car coupling, D. P. Dow 148,813
Car coupling, D. B. Reed 148,847
Car for single track railways, T. M. Rankin 148,846
Car, railway, G. H. Howard 148,825
Car replacer, A. Kissel 148,834
Car, safety, S. W. Emery 148,815
Car spring, C. T. Schoen 148,991
Cars, bending links for, G. H. Weaver 149,016
Carriage clip blank die, Clapp & Van Patten 148,873
Carriage tip, children's, H. W. Warner 149,014
Churn, Brown & Ross 148,922
Clod crusher, H. Feenders 148,879
Coach pad, P. Burns 148,925
Cock, stop, G. R. Moore 148,969
Coffee roaster, A. B. Jones 148,832
Cooler, water, S. J. Chapman 148,928
Cotton cleaner, T. Taylor 148,932
Coupling and elbow, union, T. J. Trapp 148,805
Cultivator, W. D. Miller 148,839
Cutlery handle, Scaver & Milligan 148,900
Dental drill and lathe, W. G. A. Bonwill 148,920
Ditching machine, B. J. C. Howe 148,955
Dolls, hands and feet for, J. Lacmann 148,835
Dovetailing machine, W. F. Moody 148,840
Dovetailing machine, J. M. Seymour 148,855
Drawer pull, J. C. McClellan 148,898
Drill, grain, W. Wusthoff 148,906
Drill, rock, J. A. Beamler 148,917
Drilling machine, rock, Brydon et al. 148,924

Drilling machine, valve, J. B. Waring 149,013
Ear ring, G. D. Stevens 148,996
Eaves trough hanger, J. F. and L. Hess 148,952
Eggs, apparatus for cooking, H. Fowler 148,817
Elevator, J. Bernhard 148,802
Engines, reversing gear for, B. Chambers 148,807
Equalizer, draft, A. March 148,837
Faucet and air vent combined, J. Hellbronn 148,823
Faucet bush, G. S. Collis 148,810
Fire brick, J. D. Jones 148,887
Fire place, A. E. Smenner 148,993
Furnace grate, W. Brown 148,923
Furnace, steam boiler, W. H. Phelon 148,981
Furnace, straw burning, Head et al. 148,822
Game apparatus, H. C. Griffin 148,881
Game board, J. D. Spang 148,995
Gas check, gravitating, P. Keller 148,962
Gas retort charger, P. Munzinger 148,941
Gear wheel patterns, making, J. L. Hewes 148,834
Glass mold, S. G. Swain 148,859
Governor, M. Andrade 148,913
Grain dryer, Coe & Holmes 148,931
Grain dryer, P. B. Hunt 148,886
Grate for fuel magazines, G. S. Horn 148,885
Hammer, drop, L. L. Whitlock 148,867
Harness maker's clamp, J. Smith 148,901
Harvester rake, T. G. Glover 148,947
Heating drum, G. H. Pedlar 148,978
Heating dwellings, J. J. Johnston 148,831
Hinge, G. Doane 148,939
Hinge for doors, spring, J. Peyer 148,979, 148,980
Hoisting attachment, H. N. Prout 148,845
Hook and clevis, W. Warner 148,905
Hook, trolling, M. V. B. Cahoon 148,926
Horseshoes, manufacture of, R. Austin 148,916
Indicator, station, G. A. Brown 148,871
Indicator, train, J. H. Parsons 148,844
Inkstand, C. W. Belts 148,804
Inkstand, A. Teyssonière 148,999
Iron moldboards, hardening, J. S. Robinson 148,819
Kiln, brick, J. and J. K. O'Neal 148,843
Knitting machine, G. W. Cummings 148,937
Lamp, F. A. Taber 148,903
Lamp and gas lighter, H. W. Pray 148,983
Lantern, T. Langston 148,961
Lantern, R. Nutting 148,842
Lantern or lamp cap, reflecting, T. H. Braisted 148,921
Latch, locking knob, P. Lamb 148,963
Lathe for irregular forms, C. H. Morgan 148,895
Lathe, metal shaft turning, A. Wood 149,020
Lathes, chuck for metal, G. W. Jopson 148,961
Lead, manufacture of white, Tuttle et al. 148,862
Leather, machine for pricking, J. H. Walker (r) 5,803
Lifting apparatus, portable, L. L. Whitlock 148,866
Lock for doors, etc., A. J. B. Berger 148,803
Locomotive, Harris & Bogardus 148,930
Locomotive water feeder, M. N. Lynn 148,892
Loom picker, G. Crompton 148,926
Magnesia, hydrate of, L. Reid (r) 5,808
Meat scraps, pressing, S. Booth 148,870
Mechanical movement, H. C. Work 148,911
Meter, fluid, Swann & Connell 148,994
Meter, fluid, Ball & Fitts (r) 5,806
Mitten, knit, O. F. Tripp (r) 5,802
Mosquito screen, J. P. Miller 148,894
Motion, reversing, L. L. Whitlock 148,865
Nail and bolt making tool, hand, W. F. White 148,907
Neck tie holder, E. A. Johnson 148,830
Newspaper file, A. L. Whitehall 148,908
Nut lock, J. Ellenberger 148,814
Oakum, manufacture of, M. Howe 148,826
Oil tank, J. Robinson 148,820
Ornamenting enamel, F. W. Rhinlander 148,986
Paint compound, H. C. Metcalf 148,838
Pantaloons, shaping, E. B. Viets 148,863
Pantaloons, pressing, G. F. Pond 148,897
Paper barrels, head for, G. A. Houston 148,824
Paper collar die, J. E. Crisp 148,812
Paper file, H. W. D. Dunlop 148,878
Pavement block, J. C. Goodrich, Jr. 148,818
Photographic plates, drying, T. M. Saurman 148,990
Piano attachment, C. P. Zoncada 149,021
Pipe for reservoirs, receiving, J. Osborn 148,974
Pipe tongs, A. Kotzum 148,889
Pistol barrels, drilling, etc., Johnson & Bye 148,960
Planter, hand corn, J. Riebe 148,899
Plow colter, J. and G. Armstrong 148,915
Plow, reversible, J. P. Daxheimer 148,877
Polishing machine, R. Balthone 148,981
Printers' roller composition, I. L. Jackson 148,829
Printers' rules, dressing, A. Neilson 148,896
Printing press, B. F. Allen 148,912
Printing press, R. Clay, Jr. 148,929
Pruning shears, A. P. Betterworth 148,918
Pruning shears, T. J. Secor 148,854
Pulley, expanding, W. C. Margedant 148,968
Pump, D. N. B. Coffin, Jr. 148,809
Pump filter, J. Christman, (r) 5,804
Pump, steam, R. J. Gould 148,819
Pump, steam vacuum, W. E. Prall (r) 5,809
Punch, conductor's, J. Sangster 148,939
Purifier, middlings, G. W. Dellinger 148,876
Railway cattle guard, Cleveland & Beal 148,874
Rail joints, fastening, Tift & Cobb 149,002
Rake, horse hay, L. Litchfield 148,966
Razor stop, C. C. Reeves 148,818
Respirator, S. Barton 148,888
Rivet holder, range, M. Adler 148,789
Roof, fireproof, M. H. Fowler 148,914
Saddle tree, gig, H. H. Hedrick 148,938
Saddle, safety stirrup for, T. Harris 148,921
Sash fastener, S. G. Blackman 148,919
Sash fastener, A. Iske 148,828
Sash holder, G. B. Smith 148,857
Sash holder, E. Stouffer 148,858
Saw jointer, G. S. Prince 148,899
Saw set, M. E. True 148,861
Saw, feed roller, J. Muttly (r) 5,805
Sawing machine, S. G. Rosenberger 148,811
Scaffold clamp, J. R. Crockett 148,875
Scoop and sifter combined, J. Baker 148,800
Scraper, S. Rossmann 148,987
Scraper, road, C. Fisher 148,816
Sewing machine, J. H. Smith 148,902
Sewing machine attachment, A. F. Comings 148,933
Sewing machine gatherer, A. Johnston 148,959
Shank laster, J. H. Bean 148,801
Sheet metal blanks, cutting, E. P. Sherwood 148,992
Shingles, edging, J. E. Austin 148,799
Shoe sole, expansion last, B. J. Tayman 148,998
Shoes, fastening, T. P. West 148,864
Spinning jack, self-acting, Thompson & Orr 148,800
Stamp, hand, W. P. X. Smith 148,856
Still, oil, W. J. Brundred 148,806
Stove, E. A. Osborne 148,975
Stove, portable, E. Moore 148,970
Stove, cooking, W. H. H. Larduskey 148,836
Stove, fire box, W. Tinsley 148,860
Stoves, etc., grate for, Salt & Cavanaugh 148,853
Swing, revolving, W. A. Lowery et al. 148,891
Table, folding, E. B. Francis 148,945
Table, ironing, Filing & Land 148,945