the tube be broken when the combination of the gases takes place? A. If the tube be a strong one, and has large openings at the mouths, it will not.

How can I make a paste or mucilage which will dry quickly, and not make the paper curl up? A. Use a solution of pure gum arabic in warm water, and mix a little refined sugar with it.

(28) G. A. Z. says: I am working an improvement on the common smoking pipe, and have to use some metal inside the bowl, in contact with the burning tobacco. Would brass be injurious to the smoker? Would nickel be more suitable? A. Nickel or nickel-plated brass would be the better for this purpose.

(29) G. B. B. asks: In your formula for amalgam for silvering hollow glass vessels, etc., what qualities of lead and tin are meant? A. Melt together 1 oz. clean lead and 1 oz. fine tin in a clean iron ladle, then immediately add 1 oz. bismuth. Skim off the dross, remove the ladle from the fire, and before it sets add 10 ozs. quicksilver. Now stir the whole carefully, taking care not to breathe over it, as the fumes of the mercury are very pernicious. Pour this through an earthen pipe into the glass globe, which turn repeatedly round.

(30) R. S. S. asks: Is there any advantage in having the brake block in front of a wheel, or would it have as much power over the wheel if placed behind? A. There would be little, if any, difference.

(31) B. C. & Co. ask: How can I separate tin from dross? A. The tin is melted and the temperature raised very considerably in order to render the slag as liquid as possible, so that it may not retain too much tin with it. It is also necessary to stir the melted mass in order to facilitate the separation of the tin. The clay is then raked out, and the melted tin run into a cast iron pan: where it is allowed to remain for some time, in order that any slag may rise to the surface; after which it is skimmed, and poured into cast iron molds.

(32) E. F. H. asks: 1. Which are the best metals for large stencil plates? A. Thin hard brass is the best for this purpose. 2. Can acids be successfully used for this purpose? A. No.

(33) S. R. C. asks: In dyeing with aniline colors, what can we use to set the dye on cottons, woolens, and silks? A. Perkin uses tannin as a mordant for fixing the colors upon cotton and calicoes, working in an acid solution of the coloring matter. A basic lead salt may also be used as a mordant. In calico printing, the colors are usually mixed with albumen, which, by coagulation with steam heat, fixes the color on the fiber. Wool takes aniline dyes from their aqueous (but not acidulated) solutions readily at a temperature of 120° to 140° Fah. In the case of silk, all that is necessary is to steep it in the solution (the solvent being either alcohol or wood spirit) until the desired color is obtained.

(34) A. B. R. says: I have had 750 barrels of old cider on hand for three years. How can I turn it into vinegar? A. Add to each barrel a little fermenting substance, such as yeast or mother of vinegar.

(35) W. C. R. asks: I want to make oxygen gas in an iron quicksilver bottle. I want to screw on to it a cock and a nipple, and put a certain amount of chemicals into it, set it on the fire, and make the gas without letting it out of the bottle. In other words, I want to make a self-condensing gas cylinder. What amount of pressure will one of those bottles stand? Will 1 lb. chlorate of potash and 4 ozs. manganese yield too heavy a strain? I put in just half of the above quantities and screwed on the bottle a steam gage. It brought the gage up to 170 lbs., and would have gone higher, but I felt a little timid, and unscrewed the gage, and allowed the gas to escape. The bottle is 12 inches high and 5 inches in diameter, and about half an inch thick, outside measurement. A. As the volume of a gas is inversely as the pressure to which it is subjected, your bottle, with a pressure of 240 lbs. to the square inch, would hold a little over 2¼ cubic feet. The question is not what pressure the bottle will stand when cold, but with the bottom (in this case) necessarily heated nearly or quite to full redness. And as the rigidity of iron decreases rapidly as its temperature is raised, we are unable to give you the required figures. Your experiment was a very rash one, as many serious and some fatal accidents have occurred, to our knowledge, from like experiments. Besides, so small a quantity of gas (if used for the lime light) would last only a very short time.

(36) G. K. says: I want a cement that will harden in 48 hours or less, to be of the consistence of molasses. It is to be used to cement sandstone under salt or fresh water. A. Use Portland cement.

(37) E. E. S. asks: 1. What should be the relative diameters of the wheel on crank shaft, the pulley on saw arbor, and of the saw, in order to obtain the best effects in a foot power circular saw? A. We could not tell without knowing more particulars: but you will find a number of such machines in use, and you can observe their proportions. 2. Is there any advantage in placing a fly wheel on the saw arbor? A. The use of a fly wheel is advisable with such a machine. To your other question, there is a loss of power in the device you describe.

(38) G. L. N. asks: How can I deodorize kerosene oil? A. Digest it with chloride of calcium. This will leave it with a pleasant ethereal odor.

(39) L. D. M. asks: What can I size paper with, to prevent lard oil from striking through? A. Try dammar varnish.

1. What are the extra currents of electricity? A. If a closed circuit traversed by a voltaic current be opened, a scarcely perceptible spark is obtained, if the wire joining the two poles be short. Further, if the observer himself form a part of the circuit by holding a pole in each hand, no shock is perceived unless the current is very intense. If, on the contrary, the wire is long, and especially if it makes a great number of turns, so as to form a bobbin with very close folds, the spark, which is inappreciable when the circuit is closed, acquires a great intensity when it is opened, and an observer in the circuit receives a shock, which is the stronger as the number of turns of wire increases. 2. What causes the electric light, and why can it not be used for illumination? A. The heating of the poles is due to the great resistance which the electric current encounters at these points, the carbon composing which is converted into vapor by the intense heat, forming a conducting bridge across the gap, over which the luminous transfer of electricity takes place. 3. How does the core of an induction coil affect the induction current? A. It induces a current contrary to that passing in the primary wire at every breaking of the latter, which comes under the head of extra currents, explained above. 4. Has there ever been patented an automatic repeater with simply two relays? A. We think not.

(40) E. A. W. asks: What is absinthe? A. A cordial of brandy, flavored with wormwood.

(41) R. G. asks: Can you give me a practical recipe for manufacturing potash? A. Caustic potash is generally procured by the action of caustic lime in a boiling solution of carbonate of potash. The lime unites with the carbonic acid of the potash, forming insoluble carbonate of lime, which subsides. The clear liquid, containing the potash in solution, is then drawn off and concentrated by evaporation. If the heat be continued to a point little short of redness, the liquid flows without ebullition, and may then be run into molds, where it solidifies on cooling, forming the small, grayish white sticks of commerce. The vessels used are either iron or silver.

(42) T. S. R. asks: Does it require more power to run a four-blade propeller than a two blade, the size being the same? A. Yes.

What is the best for an engine making 300 revolutions per minute, the propeller being 28 inches in diameter, and the engine 3½x5 inches? A. The four-bladed screw will utilize most of the power.

(43) W. M. asks: What ingredients will prevent the explosion of coal oil, and not impair the light when used in lamps? A. We can give you no better recipe than that of distilling off the lighter portions of the fluid until the specific gravity of the remaining portion is about 0·75 to 0·80.

1. How can I clean and polish window panes, mirrors, etc.? A. Take a small soft sponge, well washed from everything gritty, just dip it into water and squeeze it out again, and then dip it into some spirit of wine. Rub it over the glass, which immediately dust over with whiting sifted through muslin; rub it lightly and quickly off with a cloth, then take a clean cloth and rub it well again, and finish by rubbing it with a silk handkerchief. 2. How can I clean lacquered frames? A. Use a soft sponge and warm water. For paints, use soap and water. 3. How can I clean plated ware? A. Clean with hot water, followed by a solution of equal parts of spirits of ammonia and turpentine; and after this, if necessary, prepared chalk, whiting, magnesia, or rouge.

(44) F. E. M. asks: 1. What proportion to the periodic time of the heavenly bodies would be the time in which they would fall to the center of force, supposing the tangential force suddenly destroyed? A. The planets will reach the sun with the same velocity spirally as if they fell direct. 2. If two masses, each of which would attract to its center a body in one second at the distance of one foot, be placed two feet apart, would they meet in one second? A. No; they would meet in two seconds. 3. Professor Tait in *Good Words* speaks of the tridimensional character of space, and he mentions that mathematicians have speculated upon a fourth dimension. What mode is alluded to? A. This speculation reaches to serene hights where mathematics become lost in metaphysics and fog.

(45) M. C. R. asks: 1. How can I make an electromagnet? A. Wind insulated copper wire around the two ends of a bar of soft iron, bent into the form of a horseshoe. 2. About what weight would a magnet made of 10 lbs. wire be capable of raising, and what size of wire is the best? A. Coarse wire is the best for making magnets if the object is to raise heavy weights. The question as to how much a magnet containing 10 lbs. wire would be capable of raising could not be properly answered without stating how much battery is to be used.

(46) D. L. M. asks: 1. What is the difference between clock time and mean solar time, and why is there such a marked difference at particular times? A. The equation of time is the difference of the sun's true right ascension and mean longitude. 2. Is the direction of the earth's axis to its orbit always in the same direction? A. The direction of the earth's axis is nearly uniform.

(47) L. E. O. asks: Will an anode composed of nickel five cent pieces answer for nickel plating on a small scale? A. Yes.

(48) G. C. P. Jr. asks: 1. What is the best way to make a solution of rubber? A. By far the best solvent for rubber is bisulphide of carbon. 2. Is it safe to heat naphtha over a spirit lamp to boiling heat? A. No; the naphtha may be heated by immersing the vessel containing it in hot water or hot sand. This had better be done in the open air.

1. What is the best method to adopt in order to polish amber tortoiseshell? A. Use putty powder. 2. When is is faded, can it be restored to its natural color? A. It cannot.

Of what is fool's gold composed? Is it of any value? A. It is a compound of iron and sulphur, FeS_2, and is of considerable value as a source of sulphur in the manufacture of sulphuric acid.

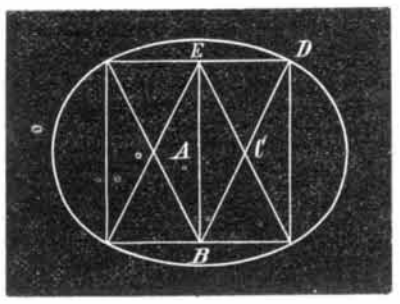
(49) C. D. H. asks: 1. In the construction of an induction coil 3 feet long, is it better to use a number of iron wires or a bar of iron for the core? A. Use a bundle of iron wires. 2. How large should it be? A. As long as the coil. 3. What size of copper wire should be used in the primary and secondary coils respectively? A. No. 4 in primary and 36 in secondary. 4. How should each be insulated? A. Cotton for primary and silk for secondary. 5. What is the best material for ends of the coil? A. This is immaterial. 6. What amount of battery would be required for a specific length of spark? A. Six cells will give a ten inch spark. 7. Would it do for an electric light? A. No.

(50) C. W. asks: 1. How can I make water colors in small cakes? A. Mix the colors into a thick paste with hot water containing a little gum arabic, and press into molds. 2. How can I make plumbago or black lead into cakes? A. Where pieces of sufficient size are obtainable, they may be sawn into the required shape. When in powder, it may be incorporated with a very small quantity of melted sulphur, or moistened with water and subjected to great pressure, when it coheres.

(51) W. L. D. asks: How can I make the linking rings which sleight of hand performers use? A: We are not acquainted with the manner in which these tricks are executed.

Can a person charge himself with electricity? A. Yes, by means of an electrical machine.

(52) H. C. N. says: I believe that the following method of drawing an oval is superior to many, and it draws a perfect oval. Take any



square, bisect it, and draw diagonals in the halves of the square. Describe the oval with the compass, using A, C, B, and E as centers.

(53) E. O. M. says: If N. P. B. will use the tang of an old mill saw file, he can turn his grindstone off true. When one side of the tang wears out, turn it over.

(54) T. W. D. says, in reply to J. H., who asked for a process in which to dye the skins of small animals, such as muskrat, mink, etc.? The green hull of the European walnut is turned to account in Europe for dyeing furs black, and the hull of our black walnut could probably be similarly employed. The walnut hull is crushed and the juice squeezed out from the pulp, with the addition of a little water. A small quantity of lime is added, and the dye is ready for use. The color is extremely difficult of extraction, and attaches itself very readily to any kind of hair, and it is used extensively as a hair dye. The coloring matter consists essentially of a soluble alkaloid lately investigated and known as regianine.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

F. F. H.—The tin has been acted upon by nitric acid of proper strength. The mineral is iron pyrites.—E. P. C.—It is black oxide of iron, mixed with quartz. It has too small a percentage of iron to be used as an ore.—G. S.—It is graphite or plumbago.—R. W. T.—It is iron pyrites, and (unless you find it in large quantities) cannot be made use of.—Y. M.—It is mispickel, and contains arsenic 46 per cent, sulphur 20 per cent, and iron 34. If you heat it strongly, the arsenic will be driven off with a disagreeable smell, and a piece of magnetic oxide of iron will remain.—A. E. J.—It is a secretion of carbonate of lime, and has no value.—J. D. B.—It is iron pyrites.—F. A. M. and O. E. F.—No. 1 is altered scapolite. No. 2 is white talc. No. 3 is aragonite. No. 4 is marcasite, or white iron pyrites. No. 5 is galena. No. 6 is asbestiform talc. No. 7 is a variety of talc. It may be used as a lubricant orto extract grease, or (when soft enough) as a French chalk. No. 8 is compact talc. No. 9 is talc. No. 10 is tremolite. No. 11 is ferruginous quartzite. No. 12 is chrysolite imbedded in volcanic tuff. No. 14 is iron pyrites in granite. No. 16 is an altered and decomposed pyroxene. No. 17. It is difficult from so small a fragment to decide whether it is pyrite or cobaltite. No. 18 is cupiferous amygdaloid. No. 19 is yellow oxide of iron. No. 20 is compound crystals, containing the cube, octohedron, and rhombic dodecahedron of iron pyrites.—I. F. D.—Nos. 1 and 2 contain some sulphuret of mercury, along with iron pyrites. From Nos. 3 and 6 we obtained no indications. No. 4 contained some iron pyrites in quartz; whether anything else were present could not be determined from the smallness of the amount.—G.C.R.—Both samples consist mostly of silex, with some alumina. The darker specimen was colored with oxide of iron. They both contained phosphoric acid, No. 2 having the larger percentage; and any fertilizing qualities which they possess are due to the presence of this constituent.—J. O'B.—No. 1 is magnetite, with some vitreous quartz, soda, felspar, and magnetic oxide of iron. No. 2 is lime, magnesia, and garnet. No. 3 is orthoclase. No. 4 is oligoclase. No. 5 is hornblende.—D. K.—Nos. 1 and 4 are sulphuret of iron in quartz and pyroxene. No. 2 is not an iron ore. It is a silicate of alumina, lime, and magnesia, with some oxide of iron, but not sufficient for extraction. No. 3 shows shining scales of biotite, a variety of mica, and the remainder is a mixture of quartz and felspar. No. 5 is not metal, as you say. It is a partly reduced sulphuret of iron, exceedingly brittle from presence of excess of sulphur.—H. W. F.—It is pyrrhotite or magnetic iron pyrites, and contains 39 per cent sulphur, 60 of iron, and traces of manganese and nickel.—F. M. S.—It is galena or sulphuret of lead, and contains 85 per cent of metallic lead.—E. J. M.—These specimens consist of carbonate of lime, and may have come from the skeleton or shell of some animal.

COMMUNICATIONS RECEIVED.

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

On a New Numerical System. By F. E.
On the Sun's Orbit. By J. H.
On Stationary Engines. By J. C. G.
On the Currant Worm. By C. T.

Also enquiries and answers from the following.

F. P. M.—R. H. S.—J. T.—F. H. W.—N. B. D.—R. K. W.—J. T. P.—N. F.—R. S. W.—N. W. H.—F. H.—N. K.

HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of enquiries analogous to the following are sent: "Who makes good washing machines? Whose is the best knife-cleaning machine? Who sells battery carbons? What are the prices of terrestrial globes? Whose is the best hominy mill? Who sells the best bone-crushing mill?" All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were Granted in the Week ending

April 6, 1875,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

Alarm register, fire, F. H. Field	161,676
Axle skein, J. A. Ellis	161,603
Bag holder, J. A. Budlong	161,589
Bale tie, J. W. Philp	161,819
Basket, S. Weinstock	161,846
Bed bottom, J. L. Decker	161,765
Bee hive, E. Gerry	161,606
Beer cask, P. Knüdson	161,796
Bird cage, A. B. Hendryx	161,788
Boiler covering, A. Leydet	161,801
Boiler explosions, preventing, G. Selden	161,709
Bolt, door, W. C. Hurd	161,684
Bolt, king, C. G. Lazear	161,799
Book case, J. J. Crandall	161,669
Book clamp, J. B. Boyce	161,743
Boot and shoe, Meyer & Freiburg	161,809
Boot clamp for boot blacks, C. Collier	161,593
Boot screw wire, A. Van Wagenen	161,842
Box heads, machine for cutting, E. Hersey (r)	6,367
Brewer's mash machine, J. Schafhaus	161,708
Broiler, G. D. Dudley	161,601
Bronzing machine, H. Battermann	161,734
Brush and mop holding device, R. C. May	161,805
Buckle, turn, G. H. Spencer	161,832
Burial vault, L. K. Dutton	161,673
Burner, gas, A. G. Bayles	161,735
Burner, laboratory gas, C. D. Cheney	161,666
Burner, vapor, C. H. Prentiss	161,685
Calcimine, M. P. Church	161,591
Can, sheet metal, J. A. Wilson	161,848
Can flanged lids and collars, J. M. Patterson	161,684
Car brake, railway, G. Hiller	161,789
Car coupling, L. L. Baker	161,586
Car coupling, J. Yeagly	161,850
Car replacer, S. I. Gates	161,605
Car seat, T. West	161,646
Car, stock, J. R. McPherson	161,807
Carding machine, Higgins & Whitworth	161,613
Carriage axle, J. Kline	161,618
Carriage bodies, hanging, S. N. Beecher	161,738
Carriage spring, C. G. Lazear	161,800
Carriage top, E. P. Stedman	161,857
Carriage running gear, H. Dibel	161,767
Cartridge-loading implement, H. L. Hepburn	161,682
Cartridge-loading implement, W. G. Rawbone	161,666
Cattle support, F. H. Relph	161,825
Centrifugal hydro-extractor, C. C. Webber	161,719
Chair, invalid, W. Burch	161,748
Chair rounds, tenoning, G. W. Parker	161,818
Chair seat, H. A. Moore	161,699
Chair, tilting, W. T. Doremus	161,671
Chimney cowl, A. J. Robinson	161,704
Chuck for making swelled tenons, A. D. Ruff	161,706
Churn, T. B. Jewett	161,794
Churn, C. W. Patton	161,633
Cigar mold, R. Appleby	161,651
Cigar press, Svoboda & Luxa	161,715
Clock, pendulum, F. Eckel	161,674
Clocks, calendar movement of, T. H. Mott	161,813
Cloth-friezing machine, G. G. Bishop	161,588
Clothes frame, C. F. Whipple	161,646
Clothes wringer, I. F. Brown	161,662
Coal separating slate mf o, Broadbent *et al.*	11,744

Coal, separating refuse from, S. Thomas..... 161,840
Cock, stop, J. C. Meloon..... 161,698
Collar ends, folding and pasting, C. Spofford..... 161,853
Comb, E. Brown..... 161,661
Condenser, ferrule, T. H. Savery..... 161,707
Cooler and cheese vat, milk, C. W. Grannis..... 161,608
Cooler and refrigerator, water, J. K. Korff..... 161,797
Cooler, lard, F. C. Pray..... 161,703
Copying press, W. U. Fairbairn (r)..... 6,365
Corkscrew wire, W. B. Clough..... 161,755
Corn dropper, J. Jackman..... 161,685
Corn stalk cutter, C. B. Sights..... 161,880
Corset, I. Ulman..... 161,841
Corset box, M. K. Bortree..... 161,741
Counter press, I. Frechette..... 161,774
Curry comb, J. O. Berry..... 161,654
Curry comb, G. Hall..... 161,787
Cutlery, securing handles to, E. C. Carlton..... 161,752
Damper, J. Stewart..... 161,714
Door safe, J. Farrel..... 161,675
Door hanger, J. Lumbert..... 161,619
Drawers, J. J. FitzPatrick..... 161,773
Drill chuck, N. W. Horton..... 161,616
Drill, steam rock, Nutting & Githens..... 161,631
Elevator, scuttle, F. A. Smith..... 161,641
Emery wheel truing rest, E. Thomas..... 161,717
Engine, compound steam, F. E. Sickels..... 161,711
Engines, regulating device for, A. D. Beaumont. 161,764
Engine valve, compound, S. B. Greacen..... 161,779
Envelope cutting machine, J. F. Ellis..... 161,604
Equalizer, draft, W. M. McClelland, Sr..... 161,623
Eyeglass frame, M. C. Brackett..... 161,658
Fan, automatic, Gilliford & Hoffman..... 161,776
Fan, table, C. Good..... 161,777
Faucet, self-closing, P. W. Doherty..... 161,768
Faucet, ventilating, W. C. North..... 161,630
Fence, farm, L. E. Hogue (r)..... 6,368
Ferrule for tool handles, E. C. Denio..... 161,598
Fertilizer, S. Seitz..... 161,827
Fire arm, revolving, F. W. Hood..... 161,615
Fire escape, M. F. Eldredge..... 161,602
Fish, preparing, D. W. & S. H. Davis..... 161,596
Fruit press, filter, and funnel, G. A. Newsham... 161,816
Furnace, revolving, J. Manes..... 161,620
Galvanizers' dross, purifying, Spear & Richards.. 161,831
Game apparatus, C. Metz..... 161,627
Gas generator, carbonic acid, O. Zweifusch..... 161,728
Gas, manufacture of, I. N. Stanley..... 161,836
Gas retort lid, S. A. Thomas..... 161,716
Gate, farm, L. S. Cohn..... 161,756
Gate, farm, L. W. Noyes..... 161,817
Glass, etc., ornamenting, J. H. & C. W. Crane... 161,760
Grain drills, feed wheel for, B. Kuhns..... 161,688
Grate bar, A. W. Cram..... 161,758
Gyrator, aerial and marine, P. B. Fernandez..... 161,772
Harrow and roller, A. M. Stratton..... 161,838
Harvester rake, W. N. Whiteley..... 161,723
Hay slide, A. J. Reed..... 161,657
Heater, feed water, E. B. Bennett..... 161,587
Heel stiffeners, etc., feeding, S. & G. F. Moore... 161,811
Hinge, self-supporting, S. Adams..... 161,729
Hitching clasp or thimble, J. C. Covert..... 161,757
Hoof spreader, T. Armstrong (r)..... 6,364
Hook, snap, A. J. Vaughan..... 161,843
Horse collar fastening, V. M. Beamer..... 161,736
Horse power, G. E. Burt..... 161,663
Hose nozzle, M. S. Curtis..... 161,763
Hydrant, adjustable, G. D. Blocher..... 161,740
Incubator, C. C. Weston..... 161,722
Injector, W. H. Newell..... 161,815
Ironing apparatus, J. G. Crawford..... 161,594
Journal and bearing, G. A. Chapman..... 161,665
Ladles, stopper for, H. Swank..... 161,644
Lamp attachment, T. C. Lawrence..... 161,718
Latch for doors, etc., F. D. Robinson..... 161,705
Latch, reversible, W. T. Munger..... 161,700
Life-preserving stool, H. E. Crosswell..... 161,670
Liquors, aging, J. G. Spier..... 161,692
Lock, combination, C. O. Yale..... 161,727
Locking device, Marsh & Crane..... 161,695
Loom, G. Crompton..... 161,595
Loom shuttle, J. M. Peckham..... 161,702
Lounge, camp, G. T. Barker..... 161,733
Lubricator for piston rods, S. Hoffmaster..... 161,614
Lumber, W. E. Brock..... 161,746
Materials, testing, L. A. Beardslee..... 161,653
Measure, liquid, J. McInnes..... 161,625
Meats, preserving and packing, W. J. Wilson (r). 6,370
Mechanical power, E. Cary..... 161,733
Meter, liquid, H. S. Maxim..... 161,621
Miter box, T. C. Lawrence..... 161,690
Molding machine, T. F. Hammer..... 161,784
Musical instrument key board, W. H. McChesney 161,806
Nailing machine, box, A. E. White..... 161,650
Napkin holder, W. Clark..... 161,667
Oil cup, Hallas and Weeden..... 161,783
Oiler, I. Levy..... 161,693
Oleaginous seeds, crushing, A. B. Lawther..... 161,691
Ore separator, T. B. McConaughey..... 161,697
Ore washers, shaft for, Kittoe & Brotherhood.. 161,687
Ox shoes, making, J. Hall..... 161,732
Packing, piston, J. L. Sherman..... 161,710
Paper bag machine, W. Webster..... 161,720
Paper, filling fibers of, Goodwin and Seaverns... 161,778
Pen holder, J. Boyd..... 161,657
Petroleum, decolorizing, H. Dubbs..... 161,672
Pinking machine, T. Hagerty..... 161,780
Pitcher, ice, L. Evans..... 161,769
Plane, bench, T. Hagerty..... 161,609
Plane, bench, J. E. Norwood..... 161,701
Planing machine, C. and G. F. Buss..... 161,749
Planing machine, G. E. Woodbury..... 161,726
Planter, seed, J. T. Carr..... 161,664
Plow and cultivator, gang, W. Clements..... 161,592
Plow riding attachment, J. T. Wells..... 161,645
Plow standard fastening, G. B. Birmingham..... 161,745
Plow, sulky, J. Fay..... 161,770
Pocket, safety, J. C. Iden..... 161,617
Pot, coffee, C. B. Smith..... 161,640
Press, baling, P. K. Dederick..... 161,766
Press, cotton, W. W. Knowles..... 161,795
Press, cotton, W. W. Louis..... 161,802
Press, cotton and hay, B. J. Wilson..... 161,847
Press, cotton bale, E. L. Morse..... 161,812
rees, filter, and funnel, fruit, G. A. Newsham. 161,816
Press, screw and toggle lever, R. Butterworth... 161,751
Quilting frame, Simmons and Franz..... 161,639
Radiator, steam, J. Mason..... 161,804
Railway rail joint fastening, J. B. Tapscott..... 161,839
Rake, horse hay, A. Bugbee..... 161,590
Refrigerating table, P. Libert..... 161,694
Refrigerator, J. A. Meeks..... 161,626
Rein holder, C. Hutchings..... 161,732
Rivet setting machine, M. Bray..... 161,659
Riveting machine, M. Bray..... 161,660
Rocker, seesaw, and chair, J. A. Crandall..... 161,759
Rolls, three-high, Harris and Ayer..... 161,786
Roofing, A. Cummings..... 161,781
Roofing composition, fireproof, E. Kinzendorf... 161,689
Rope molding, making, O. P. Doray..... 161,600
Rowing exercise, machine for, G. W. Moore..... 161,629
Ruler, G. W. Crosscup..... 161,761
Sacks, shaping block for fur, J Glass..... 161,607
Saddle, riding, C. H. Harris..... 161,785
Saddle, riding, R. Reiman..... 161,824
Sash fastener, S. D. Arnold..... 161,652
Sash fastener, Buechley and Thorn..... 161,655
Screw cutting die plate, H. Griffing..... 161,679
Seeding machine, broadcast, Buist and Allen..... 161,747
Sewing machine caster, J. Ewen..... 161,624
Sewing machine wheel journal, G. Rehfuss..... 161,823
Sewing machine, shoe, T. L. Miller..... 161,628
Sewing machine embroiderer, C. H. Palmer..... 161,632
Sheep shearing chair, C. H. and J. H. McCall..... 161,622
Shovel lifting attachment, F. M. Gardner..... 161,678
Skate, J. Lovatt (r)..... 6,369
Slate frame, J. H. Barbarick..... 161,732
Soda fountain, F. W. Wiesebrock..... 161,845
Spark arrester, M. B. Mason..... 161,803
Spooling machine, J. W. West..... 161,647
Sphygmoscope, E. A. Pond..... 161,821
Steam brake, Fouts and Planck..... 161,677
Steel welding compound, Anthony and Beadle... 161,730
Stone dressing machine, J. J. Squire..... 161,835
Stove grate, A. N. Houssee..... 161,790
Stove, heating, Hatch and Fuller..... 161,611
Stove, summer, E. Hawks..... 161,612
Stud and button fastening, B. Clayton..... 161,668
Table, folding, H. Butman..... 161,750
Table, folding, W. Decker..... 161,597
Tea caddy, W. T. Sherer..... 161,829
Telegraph switch, fire alarm, S. Weeks..... 161,721
Telegraph transmitter and receiver, A. G. Bell.. 161,739
Tenons, etc., relishing, J. H. Millspaugh..... 161,810
Testing machine, L. A. Beardslee..... 161,737
Thill coupling, C. Robinson..... 161,826
Tobacco hanger, S. C. Shelton..... 161,828
Tongue support, E. Spears..... 161,713
Toy, aerial, P. B. Fernandez..... 161,771
Track clearer, C. G. Waterbury..... 161,718
Trap, fly or insect, H. G. Nelson..... 161,814
Truss, D. King..... 161,686
Turpentine pan, W. W. Clements..... 161,754
Twine holder, J. Hill..... 161,683
Tyre setter, D. Squier..... 161,834
Tyre tightener, J. and C. M. Lesher..... 161,692
Tyre upsetting machine, H. S. Vinton..... 161,844
Umbrella rib tip holder, A. S. Hubbell..... 161,791
Under waist and skirt supporter, Frost & Phelps 161,851
Valve, steam, Dewey and Palmer..... 161,599
Valve, steam, J. Hare..... 161,610
Vegetable slicer, Winne and Kent..... 161,849
Vehicle tongue support, J. McCarter..... 161,696
Ventilation, hearth attachment, W. S. Winfield.. 161,724
Vessels, discharging water from, C. M. Gearing. 161,775
Vise, M. and W. Picken..... 161,820
Vulcanizing apparatus, W. J. Birdsall..... 161,656
Wagon hound and tongue, C. F. Whipple..... 161,648
Warping machine, J. S. Richard..... 161,638
Washing machine, A. Israel..... 161,793
Washing machine, boiler, J. D. M. Armburst... 161,731
Watch case, S. B. Simon..... 161,712
Watch, stem winding, C. V. Woerd..... 161,725
Watches, cannon pinion for, S. Ramey..... 161,822
Water raising regulator, electrical, J. H. Guest.. 161,680
Water wheel, J. H. Staples..... 161,743
Weaving mats, mechanism for, D. M. Harman... 161,681
Whiffletree, Bots and White..... 161,742
Whiffletree coupling, B. H. Merriman..... 161,808
Wringer, A. W. and A. E. Hall..... 161,781
Yoke attachment, neck, B. Foltz (r)..... 6,386

DISCLAIMERS FILED.

17,798.—HARVESTER.—J. P. Manny, Rockford, Ill.
26,013.—GIRT BUCKLES.—L. C. Chase, Boston, Mass.
159,895.—IRON COLUMNS.—J. B. Cornell, New York city.

DESIGNS PATENTED.

8,257.—TOY MONEY BOX.—T. Bailey, Philadelphia, Pa.
8,258.—CARD CLIP.—G. W. McGill, New York city.
8,259.—BOOT TREAD.—F. Shaw, Braintree, Mass.

TRADE MARKS REGISTERED.

2,338.—PIG IRON.—Bay State Iron Co., Boston, Mass.
2,339.—PLATE METAL.—Bay State Iron Co., Boston, Mass.
2,340.—BAKING POWDER.—G. Gantz, New York city.
2,341.—SEWING MACHINES.—Grover & Baker Co., Boston, Mass.
2,342.—MOTH-PROOF FABRIC.—Hall *et al.*, New York city.
2,343, 2,344.—BITTERS.—W. H. Knoepfel, New York city.
2,345.—SPRING BEDS.—W. Lathers, New York city.
2,346.—SOAP.—C. Lipps, Baltimore, Md.
2,347.—SOAP.—McKeone & Co., Philadelphia, Pa.
2,348.—COLLARS.—Medberry *et al.*, Ballston Spa, N. Y.
2,349.—TOBACCO.—C. R. Messinger, Toledo, O.
2,350.—COD LIVER OIL.—P. Möller, London, England.
2,351.—COTTON SHEETINGS.—Monohansett M'f'g Co., Putnam, Conn.
2,352.—RUBBER GOODS.—National Rubber Co., Bristol, R. I.
2,353.—OINTMENT.—Ostrander & Son, Watsonville, Cal.
2,354.—MUSTARD.—A. A. Plastridge, Chicago, Ill.
2,355.—GRAY CLOTH.—L. Pomeroy's Sons, Pittsfield, Mass.
2,356.—MEDICINE.—W. Renne & Sons, Pittsfield, Mass.
2,357.—SHIRTS.—Stern & Co., New York city.
2,358.—MEDICINE.—J. D. Watties, New York city.
2,359.—SUSPENDERS, ETC.—J. W. Wattles, Canton, Mass.
2,360.—COOKING STOVES.—Fuller & Co., Troy, N. Y.
2,361.—OIL.—Simons & Bro., Philadelphia, Pa.

SCHEDULE OF PATENT FEES.

On each Caveat..... $10
On each Trade mark..... $25
On filing each application for a Patent (17 years)..... $15
On issuing each original Patent..... $20
On appeal to Examiners-in-Chief..... $10
On appeal to Commissioner of Patents..... $20
On application for Reissue..... $30
On filing a Disclaimer..... $10
On an application for Design (3½ years)..... $10
On application for Design (7 years)..... $15
On application for Design (14 years)..... $30

CANADIAN PATENTS.

LIST OF PATENTS GRANTED IN CANADA, APRIL 1 to 9, 1875

4,558.—J. Borer, West Flamboro, Ont. Cultivator. April 1, 1875.
4,559.—W. S. Tarrie, Moncton, N. B. Soap. April 5, 1875.
4,560.—F. Rourk, Montreal, P. Q. Ventilating sewers and mines. April 5, 1875.
4,561.—Wm. T. Root *et al.*, Ingersoll, Ont. Boiler magazine. April 5, 1875.
4,562.—G. McEwan, Derby, Vt., U. S. Milkpan discharge tube and stopple. April 5, 1875.
4,563.—G. A. Beidler, Philadelphia, Pa. U. S. Lamp burner. April 5, 1875.
4,564.—W. H. W. Sheppard, Newmarket, Ont. Heating stove. April 5, 1875.
4,565.—J. W. Beaumont, Petrolia, Ont. Artificial coal. April 5, 1875,
4,566.—F. P. Peace, Marysville, Tenn., U. S. Breech-loading fire arm. April 5, 1875.
4,567.—L. M. E. Raveaud *et al.*, New Orleans, La., U. S. Heating stove. April 5, 1875.
4,568,—W. J. Wilson, Chicago, Ill., U. S. Preserving and packing cooked meat. April 5, 1875.
4,569.—L. Coté, St. Hyacinthe, P. Q. Heel stiffener shaping machine. April 5, 1875.
4,570 —G. W. McCready, Petitcodiac, N. B. Perpetual calendar and pen holder. April 5, 1875.
4,571.—F. M. Willson *et al.*, Hamilton, Ont. Lamp holding attachment for sewing machine. April 5, 1875.
4,572.—A. Woods *et al.*, Liverpool, England. Life saving appliance for sea use. April 5, 1875.
4,573.—J. Forsyth, Dundas, Ont. Mower and reaper lifter and clutch. April 5, 1875.
4,574.—I. R. Hayes *et al.*, Manchester, England. Self-adjusting umbrella. April 5, 1875.
4,575.—S. S. Arnold, Dresden, Ont. Combination bed lounge. April 5, 1875.
4,576.—H. Taylor, Richmond Hill, Ont. Lamp. April 5, 1875.
4,577 and 4, 578.—C. D. Bigelow, Brooklyn, N. Y., U. S. Screw soling machines. April 6, 1875.
4,579.—H. Wandby, Toronto, Ont. Gypsum kiln and baker's oven. April 6, 1875.
4,580.—J. B. McCormick, Armagh, Pa., U. S., *et al.* Turbine water wheel. April 6, 1875.
4,581.—C. W. Clements, Yarmouth, N. S. Clip-jib hank. April 6, 1875.
4,582.—J. Dryland, Hamilton, Ont. Anti-gresse attachment for cooking stoves. April 6, 1875.
4,583.—S. K. Paige *et al.*, Henniker, N. H., U. S. Box machine. April 6, 1875.
4,584.—J. T. McNally, Brooklyn, N. Y., U. S. Bran picker and duster. April 6, 1875.
4,585.—J. S. Bonter, Blairton, Ont. Quilting frame. April 6, 1875.
4,586.—E. Horsey, Kingston, Ont. Pump. April 8, 1875.
4,587.—P. Nicalle, Lindsay, Ont. Beehive. April 8, 1875.
4,588.—B. H. Davis, Foxcroft, Me., U. S. Stump and rock lifter. April 8, 1875.
4,589.—T. N. Egery, Bangor, Me., U. S. Water wheel. April 8, 1875.
4,590.—S. J. Lundy, Uxbridge, Ont. Plow protecting draw clevis. April 8, 1875.
4,591.—E. D. Reynolds *et al.*, Brockton, Mass., U. S. Bag. April 8, 1875.
4,592.—F. Dagenais *et al.*, Montreal, P. Q. Rock drill. April 8, 1875.
4,593.—J. Battersby, Ingersoll, Ont. Portable steam boiler. April 8, 1875.
4,594 and 4,595.—A. Dick *et al.*, Hamilton, Ont. Signal light and head lamp for railways. April 9, 1875.
4,596.—D. McLellan, Charlottenburgh, Ont. Sap evaporator. April 9, 1875.
4,597.—A. V. M. Sprague, Rochester, N. Y., U. S. Combination ice tool. April 9, 1875.
4,598.—G. P. Simmons *et al.*, Cambridge, Mass., U. S. Quilting and mat frame. April 9, 1875.
4,599.—F. M. Goodhue, Freeport, Ill., U. S. Windmill. April 9, 1875.
4,600.—A. Bowman, Blair, Ont. Railway. April 9, 1875.
4,601.—Wm. McKay, Ottawa, Ont. Si cated metallic paint. April 9, 1875.
4,602.—R. D. Van de Carr, Rochester, N. Y., U. S. Clock caddy or case. April 9, 1875.
4,603.—S. Snell, Watertown, N. Y., U. S. Straw and barley fork. April 9, 1875.
4,604.—A. H. Hornsby, Chicago, Ill., U. S. Extension arm chair. April 9, 1875.
4,605.—T. Hawks, Rochester, N. Y., U. S. Brewing process. April 9, 1875.
4,606.—Wm. Ascough, Buffalo, N. Y., U. S. Wrench. April 9, 1875.
4,607.—Wm. A. Lyttle, Hammersmith, London, England. Manufacture of iron, steel, etc. April 9, 1875.