M. J. C. asks: How is steel wire tempered for making springs, and how can the temper be taken out of steel wire so that it will not break? What is the best way of tempering steel tools? A. Steel is tempered by being heated and then suddenly cooled in water or oil. The temper can be drawn out by heating the steel, and allowing it to cool slowly.

S. L. B. says: In your issue of February 14, M. M. asks: "If I hang a rope over a loose pulley and put my feet in a loop in one end and take the other in my hands to elevate myself, what proportion of my weight do I pull down with my hands? My friend says I have no advantage over a single rope, I say I gain nearly half. Which is right?" Suppose M. M.'s feet are in the loop and his hands on the other end of the rope, there is obviously the same weight on each end of the rope, for if one end were more heavily loaded than the other it would of course (after overcoming the friction of the pulley) draw the lighter end over the pulley. M. M.'s weight then must be just evenly balanced between the two ends. If he weighs 200 lbs., then each end of the rope supports just 100 lbs. To support himself then he must pull down with his hands just 100 lbs., and to raise himself he must pull enough more than 100 lbs. to overcome the friction and leave a slight excess of weight on his hands. Of course with a single rope he would pull the whole 200 lbs., and, equally of course, by the pulley and loop, etc., would gain, as stated, nearly one half his weight. A. It is a settled fact in philosophy that power is indestructible, and can neither be created nor destroyed by man. This being so, there can be no gain of power by the man, whatever arrangement he uses to elevate himself, the work done being the weight raised multiplied by the distance through which it was lifted. In the case of the loose pulley, if the man raises himself with half the force required where a single rope is used, he exerts the force through twice the distance that would be necessary in the case of the single rope. Moreover, there is some additional work required, on account of the friction of the pulley and the rigidity of the cordage. Notwithstanding this, it may be a convenience to use the loose pulley, for the same reason that other mechanical devices are frequently employed.

J. F. F. asks: What is the difference between a 3 foot wheel with 4 discharges, that will use 300 inches of water under 8 feet head, set in a flume, and one of 4 feet diameter with 8 buckets, with scroll on top of wheel, using same amount of water? Will the one in the flume run any faster than the other, if both wheels are of the same size? A. This is a matter that can best be determined by experiment.

G. B. asks: 1. How many barrels of cement will it take to build a house 60 feet long, 23 feet wide, and 25 feet high, the walls to be as thick as they ought to be in your judgment? A. The thickness of the walls should be adjusted to suit the length of the wall as well as the hight, independent of the weight of floors, etc., which they will have to support. If you have a cross wall at the center of your building, and the concrete be properly made, the walls may be 12 inches thick, for an ordinary load on the floors, etc.; but without the cross-wall, 16 inches would be little enough for their thickness. The concrete should be composed of one barrel of Portland cement to 13 barrels of broken stone, gravel, and clean sharp sand; the proportion of cement therefore, is equal to one thirteenth of the entire wall—for it is lost in the interstices of the stone and gravel. If 25 feet of hight includes the foundation (which should extend at least 4 feet deep into the ground if you have no cellar), then your wall, if 12 inches thick, will contain 4,050 cubic feet, but if 16 inches thick will contain 5,400 cubic feet; one thirteenth of these amounts is 311 7/13 and 415 1/2 respectively. A barrel of cement when slacked will make about 4 cubic feet; the 12 inch wall, therefore, will take 78 barrels, and the 16 inch wall 104 barrels. 2. Is common mortar as good as cement for building concrete houses? A. No; it is the most economical to use the best cement.

F. O. C. H. asks: How can a patch be put on a boiler with bolts, so as not to leak? We have tried lead, iron, and hemp with white lead, but neither would do. A. It should have a lip turned all around it, so that a good quantity of cement may be introduced. The cement should be made of red and white lead and iron borings, and should be very stiff.

P. D. F.—1. A siphon can only operate when its discharge orifice is lower than the level of its supply. 2. The lantern for showing paper pictures instead of glass transparencies, is constructed like any magic lantern, but the picture is placed where the light usually stands, and the light is placed at one side, so as to illuminate the picture. To work well a very strong light is required. The mineral specimen looks like a fossil plum. The width of the Gulf Stream is about 50 miles.

D. G. says: 1. Can the insulators ordinarily used on wires be coated, with lead, tin, or some other material that will protect the insulating material from decay? A. They can be coated with gutta percha. 2. What is "static induction"? A. The influence of an electrified body upon a body which is not in contact with it. 3. If copper is a better conductor than iron, is it necessary that a telegraph wire made of copper should be as large as one made of iron? A. No. 4. What size is the smallest copper wire which is sufficiently large for ordinary telegraphing, tension not considered? A. It will depend upon the current. It is only necessary that it should be large enough not to become unduly heated. 5. In your paper of January 31, p. 71, the writer on sumac speaks of an acre producing not less than three tuns; does he mean green sumac or dry? A. Dry. 6. How can I obtain the Commissioner's report spoken of there? A. Write to the Commissioner of Agriculture, Washington, D. C.

M. J. C. asks: I. How is brass wire tempered for making springs? A. By hammering or rolling. 2. Is there any way of hardening brass so that it cannot be filed? A. We do not know of any method.

M. J. C. asks: 1. How can cast iron be soldered? A. By first tinning it. 2. How is cast iron hardened so that it cannot be filed? A. By chilling it in the mold. 3. Can cast iron be welded? A. No.

C. W. K. asks: 1. What are the improvements needed in rotary engines? A. Some means of preventing wear. 2. Is the unequal balance in the revolving cylinder a serious objection? A. This is obviated in some forms. 3. As there can be no shock in this style of engine, would you consider a variable cut-off of any use? A. It will be useful in cases where the load is variable.

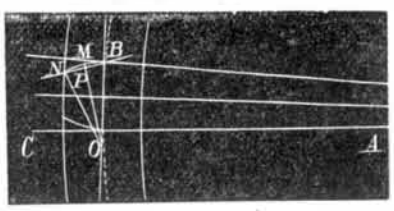
W. W. McK. asks: What is the best to do with cast iron borings? Can I melt them in a cupola? Will not the fan or blast blow them out? How would it do to put a small portion in each ladle of hot iron? Do you think they would melt sufficiently to make a good sound casting? A. Your best plan will be to melt them first in a crucible.

G. P. H. asks: Is there any invention used for the purpose of detecting mineral substances in the earth, as, for instance, silver? A. No.

W. F. W. says: When we speak of the power of the lever, three things are to be understood, the power applied, the resistance, and the fulcrum. Some people believe that a large water wheel is more powerful than a small one for the same reason that a long lever is better than a short one. In two overshot or breast wheels, one 10 and the other 20 feet in diameter, with buckets of equal size holding 200 lbs. water each, the segment to be on or near the outside of the wheel, with pinion attached on a level with wheel shaft, the power and resistance will be at the same point. Where is the fulcrum? Now suppose it takes 200 lbs. water (1 bucketful) to start the machinery. If one bucket, at the pinion on the small wheel, be filled with water, the machinery will start. Will any less weight of water start the machinery on the large wheel? A. You refer, as we understand you, to the supposed gain of power by the use of a long lever. This, of course, is a delusion. What the long lever accomplishes is to make a little force available; and in this way it is sometimes a convenience.

S. G. C. says: Your answer to W. F. W., February 28, as to the lever principle applied to the overshot water wheel may be correct if only applied to the turning of the wheel; but when the power of the wheel is applied to the driving of machinery, I assert that there is no lever principle applicable. One whee will start just as much machinery as the other, but the larger wheel will continue the power twice as long as the smaller wheel, for the reason that the water would remain twice as long on the larger wheel. I claim that the power of an overshot water wheel, when applied to driving machinery, is just the weight of the water it contains less the friction, without any advantage of lever purchase. Am I right? A. You have the correct idea on the subject. No well informed person imagines that there can be any gain of power by the use of a lever or other mechanical device. The object of the mechanical device is to make the power available.

F. L. L. asks: How can I draw the curves on teeth of gears? I send you a copy of a drawing from Armengaud's "Practical Draftsman's Book," but I do not understand it. His rule is: As draftsmen are generally satisfied with representing the epicycloidal curves by arcs of circles, which almost coincide with them and nearly fulfil the same conditions, such arcs must be tangential to the radial sides of the teeth at their points of intersection with the pitch circle. They are determined in the following manner: Through the point of contact B, draw a tangent, B O, to the pitch circle; then bisect



the chord, B N, which passes through the extremities of the curve by a perpendicular, which will cut the tangent, B O, in the point, O. This is the center of the arc, B M N, which very nearly coincides with the epicycloidal curve. The same arc is repeated for each side of all the teeth of the pinion, the radius, B O, being preserved throughout. How can I find the point, O, and how can I draw the chord, B N? If the point, O, is known, what is the use of drawing the chord, B N, and how far from the point of contact should the point O be? A. The points B and N are given. Connect them by a straight line. Draw P O perpendicular to B N at its middle part, and mark the point, O, in which it cuts the tangent. Draw the arc, B M N, with the radius O B or O N.

H. H. C. says: A friend of mine says that powder can be exploded in an ordinary gun, with an ordinary charge, without report, by oiling the barrel tube and cap. I think not. Which is right? A. It is best to settle so simple a matter by direct experiment.

T. L. asks: How can I set a locomotive eccentric which has slipped? A. It can be done by trial, placing the engine at each end of the stroke, and trying the cylinder cocks.

J. P. asks: How can I season a wooden screw made of green hardwood timber, so that it will not crack in seasoning? A. Your best plan will be to place it in some position so that it will become seasoned very slowly; but even with this precaution, it is doubtful if you can prevent cracking.

P. H. B. asks: 1. How can I make a calcium light for an experiment? A. A cheap modification may be made by forcing a current of air, by means of a blowpipe, into a flame of common illuminating gas, and directing the flame against a piece of chalk. You do not send sufficient *data* as to your other query.

G. A. asks: I. In spinning copper, how is the work fastened in the lathe? A. With a clamp. 2. Should metal or wood tools be used? A. Very hard material is necessary for the tool. 3. Which is the best wood for models? A. Mahogany.

A. N. R. asks: Is there any instrument for enlarging or contracting drawings? A. Yes. See engraving and directions for use and manufacture in *Science Record* for 1874.

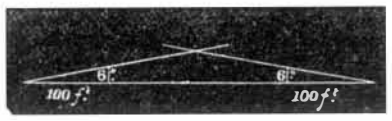
C. & P. ask: Can you give us a recipe for hardening cast steel mold boards of plows? We harden with prussiate of potash, sal ammoniac, and black oxide of manganese, but these, we find, only harden on the surface. A. You should harden the steel by the ordinary processes of tempering, which have been of late frequently described in our columns. A few experiments will show you the best heat.

A. H. D. asks: How many feet board measure are there in a scantling 2½ inches square at one end, and 3½ inches square at the other, and 11 feet in length? A. The ordinary rule of finding the contents, in board measure, of a piece of timber, is to multiply the breadth in inches by the depth in inches, and by the length in feet, and divide the product by 12. Where the timber tapers regularly, the center breadth and depth are used. In the given case, the piece of timber is the same as one having a breadth and depth of (26+38)÷2=32. Hence the contents in board measure will be (32×32×11)÷12=938·6+

G. W. A. asks: How do you calculate the number of square inches of a safety valve, and how large should the pea be? A. The following formula will enable you to determine any part of a safety valve, if you know the others: Pressure of steam in pounds per square inch × area of the valve in square inches × lever arm of valve = weight of ball × lever arm of ball + weight of lever × lever arm of lever + weight of valve and stem × lever arm of valve

P. T. B. says that an experience of 24 hours will convince C. R. M. that his potato vines would all be dead, if arsenic were used instead of Paris green.

R. A. B. says, in reply to E. B. who asked by what means was accurate alignment of the Hoosac tunnel attained: "I can answer this, as I did it myself. In the first place, a line was run over the mountain and tested several times to see that it was exactly straight. Then the working lines of the tunnel diverged northerly



six inches in every one hundred feet from each end This was to prevent the possibility of passing in the center without meeting."

H. M. P. says that G. S. D., who gives a method for finding the weight of a person's head without cutting it off, must try again, for two reasons: 1. This method assumes that the body, including the head, is of the same specific gravity as water. 2. It assumes that the head is of the same specific gravity as the rest of the body. The method can easily be tested by an experiment with an india-rubber-headed doll, first weighing with the head filled with air, and then with it filled with shot; but the simplest test of the principle would be to fill one end of a block of wood with lead, and to weigh it with the ends alternately immersed in water. The weight will be found the same, whether the light or the heavy half is above the surface.

J. H. W. says, in reply to many readers, who ask how to make flour paste that will not sour: Take 2 lbs. of flour and 4 pints of water, mix part of the water slowly with the flour, rub up all the lumps, continue to add the remainder of the water till all is added, then strain through a napkin or colender and cook slowly; stir frequently to prevent scorching; when it comes to a boil, take it off. It is sufficiently cold. Then stir in half an ounce of nitro-muriatic acid and put into an earthen vessel to keep. A small piece of alum, the size of a chestnut, broken up and dissolved in the water, has a tendency to whiten the paste. Paste required to be made white should be cooked, if acid is used, in a porcelain vessel. Cooking paste too much has a tendency to destroy its adhesive property.

S. K. W. says, in reply to F. H. M. who asked for the best way to wash flannels: Supposing this inquiry to mean without fulling or turning them yellow, I will give a *modus operandi*, which I have found satisfactory: Shave a little white soap into a pail, and pour on it water nearly boiling hot to dissolve it, adding, if you choose, a tablespoonful of spirits of ammonia. Pour the hot suds upon the flannels in a tub, and use a good pounder or a machine, as the water needs to be of too high a temperature for the hands. Wring the flannels, and put them into a second water, like the first except with less soap, and use again the pounder or machine. Rub the soiled spots in the suds as hot as you can bear; but never rub soap on the spots. Wring the flannels as dry as you can with a good wringer, and put them on a line in a brisk, drying air. The hotter they are when wrung, and the sooner they dry, the better. Their color may be improved by a little bluing; and if they are well ironed before getting quite dry, fulling is prevented.

B. W. says, in reply to M. S. W.'s three questions as to contraction of the horse's hoof: The contraction of the hoof is brought on by cutting the frog, and by ignorance in setting the shoe, by carrying the seating or bevel of the upper side of the shoe so far back that the heel rests on the slope of the seating, otherwise on two inclined planes; so that every step presses the heel together. The frog, having been cut, loses its elasticity and resistance. The heel should rest on a flat surface, and the shoe set flush with outer shell of hoof all round, and the frog should seldom, if ever, be cut. Nature has made ample provision for throwing off all superfluous frog. Contracted hoof operates on no part of the leg above the fetlock joint. The coffin joint is most affected. Your correspondent can experiment on the sensation produced in contracted hoof by putting the feet into a pair of boots that are two sizes too small and three sizes too narrow on the bottoms, and walking 10 miles per day for 30 days, then standing in them all of the next day on a hard floor. This will give him a better idea of what causes the lameness than can be described.

J. W. P. says: 1. I have a quantity of beeswax that has been used for dental purposes; it has become mixed with plaster of Paris, gutta percha, and the dirt from the laboratory. How can I separate the pure wax from the mixture? 2. Can old and brittle gutta percha be made over again, so as to work like new? J. J. J. asks: Is there a compound that will force the beard to grow faster than it will of itself? E. F. G. asks: Is there any way of photographing a positive picture on glass directly, so as to answer for a magic lantern slide? Is there any way of changing a negative into a positive?—A. E. C. asks: Which can be drawn more easily, a large or small axled wagon? Most farmers claim that a wooden axle in a pipe box can be drawn more easily, on bad or rough roads, than an iron axle, because it is larger.—G. J. asks: Can any one give the formula for the enamel used on engineers' instruments, which is called the bronze finish?—A. B. D. asks: In what manner should a common mouth blowpipe be applied to the flame and work to get the best effect in soldering (hard and soft) and in assaying and experimenting with ores and metals?—C. D. M. asks: Does the rapidity in which the temperature of steel is changed have a tendency to detemper it, providing the temperature is not raised above 225° Fah.? For illustration, take a razor at a temperature of 10° and plunge it into boiling water. Will this detemper it to an injurious extent? Does it injure a razor at all to put it into boiling water? What is the *rationale* of the detempering of steel? Is it effected by a rearrangement of molecules, or is it a decarbonization?—W. E. S. asks: Can any one start and stop a 20 horse power engine by telegraph? If so, how?—M. J. M. asks: How are clocks finished, and what kind of varnish is used?—C. L. asks: How can I construct a microscope (with two lenses) strong enough to see distinctly the animalculæ in water? 2. Why is a glass can protected from bursting, when being filled with hot fruit, if a knife or spoon is placed upright in the can?—W. E. S. asks: What is the best and most durable whitewash known, for outdoor work?—N. L. F. asks: If a vessel of water is revolved so that the contents will be elevated at the outside, and a series of endless chains, provided with floats, arranged over pulleys in such a manner that they will ascend at the outside and descend near the center of motion, where the water is considerably lower, will the unequal hight of the columns in which the chains are mersed impart motion to the chains, and if not, why is the buoyant effect o the liquid in this case different from what it is when a rest?

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 Ball dropped into the Earth, etc. By J. L. B.

On an Aerial Electric Ship. By C. W. W.

On the Hanging Rope and Pulley. By M. M., by C. B. T., and by N. P. M.

On Large and Small Water Wheels. By G. P.

On a Crooked Stick. By A. A. C.

On a Gasoline Accident. By W. L. W.

Also enquiries from the following:

P. A. T.—J. M.—M. P. C.—T. C. H.—G. C. H.—A. H.—J. M. M.—G. B. & P.—H. H.—N. R.—J. T.—H. G. J.—G. & A.

Correspondents in different parts of the country ask Who sells a plow that will scour as well in black prairie land (Texas) as in a sandy soil? Who makes sawing machines for felling trees? Who makes magnets to order? What is the best protector for wood work exposed to the weather? Who makes cork cutting machinery? Who makes machines for packing coffee, etc., in paper? Who makes furnaces for restoring spent alkalies? Who makes twist drills, of different kinds? Who has a patent plan for building lime kilns? Who makes iron slat blinds, suitable for brick-fronted buildings? Who makes portable paper boats? Makers of the above articles will probably promote their interests by advertising, in reply, in the SCIENTIFIC AMERICAN.

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 3, 1874,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

Acid, making acetic, L. Brumlen	148,031
Addressing machine, L. Bailey	148,103
Agricultural implements, teeth for, J. King	148,218
Alarm, fire, A. F. & F. B. Johnson	148,215
Altitude instrument, H. Linton	148,222
Auger, earth, G. M. Filstead	148,199
Awl haft, T. Harrington	148,053
Awning, C. L. Barnes	148,105
Bag-holder, J. Mayell	148,078
Bale tie, cotton, J. R. Kennedy	148,068
Bark from logs, removing, G. Ames	148,161
Barrel head, P. H. Griswold	148,209
Bath tub plug, etc., A. C. Brownell	148,172
Bedstead for woven wire mattress, J. G. Smith	148,254
Bench plane, Q. Rice	148,090
Billiard table chalk box, H. W. Collender	148,181
Billiard table design, N. Stoll (r)	5,779
Blind and sash fastener, W. O. Pond	148,188
Boilers, etc., covering for steam, J. N. Colby	148,190
Bolt, seal, J. Kinzer	148,219
Boot and shoe insole, Teague & Clark	148,044
Boot soles, squaring, J. R. Reed	148,213
Bottling and corking machine, J. & D. Fergus	148,198
Butter worker, A. J. Dibble	148,191
Caliper, E. Horton	148,065
Camera, portable, C. A. Agren	148,019
Can, milk transportation, G. W. Fluke	148,114
Candlestick, D. Bourland	148,106
Car axle journal bearing, J. McGee	148,231
Car brake, automatic, W. V. Robbins	148,092
Car brake mechanism, C. H. Hadley	148,210
Car coupling, R. Gilchrist	148,205
Car coupling, M. B. Marcum	148,227
Car coupling, W. Michael	148,233
Car, dumping, E. M. Hesselbom	148,059
Car ventilator, railroad, G. E. Crutchfield	148,183
Card teeth, setting, S. E. Guild	148,051
Cargo, preventing shifting of, R. Quintavalle	148,140
Carriage curtain fastening, Bannihr & Rhodes	148,104
Carriage safety strap, J. Farris	148,048
Carriage spring, J. W. Gosling	148,208
Caster for trunks, M. Schwerin (r)	5,776
Casting mold boards, chill for, J. Oliver	148,236
Casting mold boards, chill for, J. Oliver	148,237
Chair, folding, G. McAleer	148,230
Chimney sweeping apparatus, J. M. Curless	148,184
Churn, rotary, O. Cary	148,176
Cigar boxes, revenue guard for, W. Wohltmann	148,159
Clamp, book, D. Seawright	148,249
Clamp, rope, J. P. Smith	148,148
Cloth, etc., apparatus for stretching, I. E. Palmer	148,082
Cloth shearing, A. Brown	148,171
Clothes pin, Reid & Berry	148,088
Clutch, machinery, A. B. Bean	148,165
Cooler, milk, Porter, Foster, & Eaton	148,241
Corn crib, J. M. Wilt	148,271
Cotton gin, E. Bucklin, Jr	148,175
Culinary vessel, G. R. Moore	148,130
Cultivator, B. D. Tabor	148,261
Cultivator, B. D. Tabor	148,262
Cultivator, cotton, E. M. Hesselbom	148,060
Cultivator, hand, W. Marsh	148,226
Digger, post hole, N. W. Gay	148,204
Ditching machine, A. M. Nelson	148,080
Door, glass screens, W. Tunstill	148,153
Door check, H. Cope	148,037
Drilling machine, rock, E. S. Winchester	148,278
Ear ring, C. F. Pierce	148,086
Ejector, J. A. Cudlipp	148,111
Ejector, W. J. Sherriff	148,251
Elevator, hay, D. N. Webster	148,267
Elevator, hydraulic, Johnson & Thursby	148,123
Elevator, windlass water, N. B. Vosburgh	148,266

Engine cylinder lubricator, C. B. Truesdell	148,265
Engine, direct acting steam, T. Hanson	148 052
Engine piston balance valve, S. Maltby	148,075
Engine stop valve, etc., G. C. Howard	148,214
Equalizer for vehicle springs, E. P. Carter	148,033
Eye glass, A. Serin	148.147
Feather renovator, C. Seaman	148.146
Fence, portable, J. M. Wallis	148,156
Fire escape, H. P. Bell	148,166
Fire extinguisher, W. C. Bruson	148,178
Fish hatching apparatus, N. W. Clark	148,035
Flour chest and bread table, J. M. Jones	148,067
Fog signal, G. C. Pattison	148.084
Fuel, burning liquid, M. Williams	148,270
Furnace, J. F. Belleville	148,167
Furnace doors, governor for, A. C. Norcross	148,132
Furnace, reverberatory, J. O. Stewart	148 096
Furnace, gaseous fuel, W. & G. H. Sellers	148,250
Gas from coal, etc., making, D. Davison	148,188
Gas, making coal, D. Davison	148,187
Gas, purifying. St. John & Rockwell (r)	5,777
Gas, purifying, W. H. St. John (r)	5,778
Gas stove, Witteck & Steinmetz	148,158
Gate, automatic, M. M. Kenney	148,217
Gate, farm, G. Van Riper	148,155
Gear, running, W. H. Hathaway	148,118
Gearing, stone sawing, J. D. Husband, Jr	148 055
Glass in oval frames, cutting, G. Helfrich	148,119
Grain meter. J. Hemingway	148,120
Gun lock, A. Spaulding	148,150
Hammer, nail, G. Peck, Jr	148,240
Harvester dropper, J. F. Black	148.169
Harvester dropper, D. Whitmore, Jr	148,101
Hog ringer, G. Stevenson	148,256
Hook, hoisting, J. Tappan	148,263
Hook, snap, S. Reynolds	148 241
Horses, detaching, I. Thompson	148,152
Horseshoe machine, C. H. Perkins	148,085
Hose, hydraulic, E. A. Street	148,258
Hydrant stop box, Williamson & Hornung	148,102
Hydrocarbons, burning, C. J. Eames	148,042
India rubber articles, making, E. R. Bart	148,164
Insect gun, W. Kennish	148 069
Iron, apparatus for puddling, J. Davies	148,112
Jewelry, pin fastening for, Lyons & Abrahams	148,223
Lamp. J. F. Marsh	148,076
Lamp chimney holder, H. T. Sanford	148,144
Latch and lock combined, C. Roberts	148,091
Lathe, J. Moessinger	148,234
Last block fastening, L. S. Wright	148,275
Liquid measure, Eller & Goetz	148,197
Lock for doors, etc., D. Wolf	148,274
Loom harness, J. Sladdin	148,253
Loom harness, making, J. Sladdin	148,252
Loom selvage guard, J. Clayton	148,036
Loom shuttle, W. M. Parker	148,134
Loom shuttle, W. M. Parker	148,135
Lubricator, W. S. Gillen	148,206
Match care or splint, J. E. Coffin	148,109
Measuring silk in spools, J. D Cutter	148,185
Medical compound, P. & L. Prass	148.139
Millstone driver, M. Holden	148.061
Molding strips, sheathing curved, B. F. Gale	148,115
Monument, M. A. Richardson	148,245
Motion, preventing retrograde, W. Cloud	148,179
Mower. lawn, J. C. & C. J. Sturgeon	148,260
Music leaf turner, G. Sweatt	148,151
Musical intervals, indicating, S. D. Tillman	148,097
Nail plate feeder, J. R. Finney	148,200
Neck tie, O. Kueppers	148,221
Nut machine, P. Eley	148,195
Offal, treating, W. P. Johns	148,107
Oil tank fitting, H. F. & A. S. Snyder	148,095
Oiling apparatus, pulley, C. E. Helmes	148.062
Organ stop action, T. Winans	148,272
Overseaming machine, etc., E. Cornely	148,182
Pail, milk, E. Gates	148,045
Pan, baking, J. D. Mason	148,228
Paper hanging machine, R. H. Miner	148,129
Paper pulp digester, H. J. Labousse	148,125
Photograph mount, J. H. Fitzgibbon	148,201
Photographs, burnishing, E. R. Weston (r)	5,780
Photograph plates, preparing, Wenslawski *et al.*	148,269
Pick handle, T. H. B. Correll	148,088
Pipe, molding, F. Shickle	148,094
Pitman, R. H. Kerr	148,124
Planing machine, W. C. Horton	148,213
Planing shingles, W. J. Gordon	148,207
Planter, corn, C. F. L. Risch	148,246
Planter, cotton seed, J. Dana	148,186
Plasterer's hawk, J. B. Glazier	148,046
Plow, cultivator, and chopper, J. J. Watrous	148,157
Plow, three wheel riding, W. Snow	148,149
Plows, chilled moldboard for, J. Oliver	148,255
Press, cotton, E. L. Morse	148.079
Press, wine and cider, J. Clark	148,034
Printing press, G. P. Gordon	148,049, 148,050
Propeller, marine, W. D. Smith	148,255
Pump, steam, Douds & Hartsuff	148,041
Purifier, middlings, C. S. Fuller	148,202
Purifier, middlings, J. J. Mayers	148,229
Purifier, middlings, G. & E. Walker	148,099
Railroad curves, turning, J. V. De Noailles	148,196
Railroad frog, Thomas & Miller	148,264
Railroad, street, T. J. O'Toole	148,238
Railroad switch, Adams *et al.*	148,160
Railroad switch, C. H. Kock	148,220
Railroad track, G. Potts	148,242
Railroad trestle, J. N. Becker	148,038
Register, hot air, E. D. Norcross	148,133
Regulator for fluids, W. L. Horne	148,212
Revenue guard for cigar boxes, W. Wohltmann	148.159
Roof, metallic, J. S. Balfour	148,022
Sausage stuffer, J. L. Haven	148,211
Saw, J. W. Branch	148,027
Saw guide frame, D. J. Parmele	148,136
Saw hanger, gang, H. C. Butler	148,032
Saw, wood, P. Painter	148,239
Sewing last, De Coursey *et al.*	148,189
Sewing machine, G. C. Bishop	148,024
Sewing mach. hemmer, etc., H. C. Goodrich, 148,047, 148,048	
Sewing machine winder, M. & M. G. Cook	148,110
Sewing machine motor. G. W. Manson	148,225
Sewing machine threader, Doolittle *et al.*	148,192
Sewing machine shuttle, J. Knox	148,072
Sewing machine tucker, E. Bouillon	148,025
Shafting, hanger and box for, C. E. Holt	148,063
Shirt bosom, A. F. Chase	148,177
Shirt cuff, A. F. Chase	148,178
Shoe shave, T. Harrington	148,054
Shoe tip, etc., detachable, M. H., L., & A H. Levett	148,126
Shovel, snow, C. L. Marsh	148.077
Shovel, wooden scoop, J. Valley	148,154
Shutter worker, W. Adams	148,018
Sifter, ash, S. B. Sexton	148,093
Slates, etc., composition for, G. W. M. Bookwalter	148,170
Sled, S. N. Stewart	148,257
Soapstone, ornamenting, J. B. T. Baker	148,161
Soda water, etc., fountain for, R. M. Green	148,116
Spark arrester, W. Phillips	148,137
Spinning ring, A. J. Daniels	148,040
Spoon engraving chuck, Fifield *et al.*	148,118
Stalk cutter, E. M. Hesselbom	148,058
Stencil plate, S. W. Reese	148,087
Stove, gas, Witteck & Steinmetz	148,158
Stove platforms, C. Brownell	148,028, 148,029, 148,030
Sugar, manufacturing cube, A. F. W. Partz	148,083
Sugar, cutting cube, H. Schnitzpan	148,145
Suspenders, W. Dunbar	148,198
Suspenders, S. W. Johnson	148,216
Swing, circular, M. L. Reynolds	148,141
Table, game, C. Buckley	148,174
Tanning, G. W. Hatch	148,056
Tanning reel suspension staple, A. S. Riggs	148,142
Target, O. Schneeloch	148,248
Thill coupling, J. R. Little	148,127
Tobacco pipe, G. Aymard	148,162
Tool handle, S. Henry	148,057
Tool handle, W. McNiece	148.232
Trap, animal, F. J. Eldred	148.194
Tyre-bending machine, S. Hoobler	148,122
Tyre-setting machine, M. D. King	148,071
Tyre-upsetting machine, M. D. King	148,070
Vault cover, A. Schatz	148,247
Vehicle axle, G. Hopson	148,064
Vehicle pole and shaft, J. Maguire	148,224
Vehicle running gear, H. Crooks	148,039
Vehicle wheels, hub for, W. S. Bishop	148.168
Vehicle spring equalizer, E. P. Carter	148,033
Ventilator, car, O. E. Crutchfield	148,183
Vessels, construction of, S. J. Mackie	148.074
Wagon. dumping, C. Campbell	148 109
Wagon, dumping, H. Hart	148,055
Wagon seat, A. W. & J. C. Miller	148,128
Washing machine, A. S. Babbit	148,021
Water closets, siphon for, J. Anderson	148,020
Water closets, valve for, A. Tyler	148,098
Water meter, J. E. Boyle	148,026
Water meter, Leonard & Dennison	148,073
Welts, cutting, J. H. Gardiner	148.203
Whiffletree, D. R. Elkin	148,196
Windmill, G. A. & C E. Myers	148,131
Windmill, F. C. White	148,100
Window frame, S. Hare	148,117
Window guard, C. F. Roechmann	148,143
Window pulley, R. H. Norris	148,081
Window sash, D. N. Webster	148.268
Woven fabrics. etc., stretching, W. Henderson	148,121
Wrench, pipe J. L. Ripley	148,089
Wrench, pipe, H. C. Stouffer	148,259

APPLICATION FOR EXTENSION.

Applications have been duly filed and are now pending for the extension of the following Letters Patent. Hearings upon the respective applications are appointed for the days hereinafter mentioned:

23,633.—MARKING CLOTH.—H. W. Fuller. May 20.

EXTENSIONS GRANTED.

27,357.—TABLE CUTLERY.—J. W. Gardner.

27,392.—FOLDING AND PASTING MACHINE.—G. K. Snow.

27,403.—STEAM AND FIRE REGULATOR.—J. Woodruff.

DESIGNS PATENTED.

7,208 to 7,211.—CARPETS.—T. Barclay, Lowell, Mass.

7,212.—BURIAL CASKET.—F. W. Biele, New York city.

7,213 to 7,221.—CARPETS.—R. R. Campbell, Lowell, Mass

7,222 to 7,224.—CARPETS.—J. Hamer, Lowell, Mass.

7,225.—CARPET.—C. S. Lilley, Lowell, Mass.

7,226.—CARPET.—D. McNair, Lowell, Mass.

7,227 and 7,228.—BIRD CAGE.—G. R. Osborn *et al.*, N.Y. city

7,229 and 7,230.—TYPES.—W. H. Page, Norwich, Conn.

7,231 and 7,232.—RUCHES.—E. C. Wooster, New York city.

TRADE MARKS REGISTERED.

1,651.—HARD SOAP.—Buffalo Soap Co., Buffalo, N. Y.

1,652.—COLORS.—T. Buswell, Solon, Me.

1,653.—SHIRTS.—H. Christensen, Chicago., Ill.

1,654.—LUBRICATING OIL.—Loomis & Co., Pittsburgh, Pa.

1,655.—WELDING COMPOUND.—H. Schierloh, J. City, N.J.

1,656.—WATCHES.—National Watch Co., Elgin, Ill.

1,657.—MEDICAL COMPOUND.—H. A. Tilden, New Lebanon, N. Y.

1,658.—CHEESE.—A. H. Turner, Brooklyn, N. Y.

1,659.—TOBACCO.—Weil & Co., New York city.

1,660.—ALES.—A. W. Wickes. N. Y.

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 application for Extension of Patent	$50
On granting the Extension	$50
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, FEBRUARY 24 to MARCH 3, 1874.

3,169.—Wm. C. Shipherd, Cleveland, Cayuhoga county, O., U. S. Improvements on whiffletree stubs, called "Shipherd's Improved Whiffletree Stub." March 5,1874.

3,170.—Wm. McKean, Toronto, York county, Ont. Improvements in meat cutters, called "McKean's Meat Cutter." March 5, 1874.

3,171.—J. W. Meaker, Detroit, Wayne county, Mich., U. S. Improvements in self-closing doors for hatchways, called "Meaker's Self-Closing Doors for Hatchways." March 5, 1874.

3,172.—A. Muhleisen, Ottawa, Putnam county, O., U. S. Improvements on hounds for vehicles, called "Muhleisen's Bent Hounds for Wagons, etc." March 5, 1874.

3,173.—R. C. Margeson, Halifax, Halifax county, N. S. Medicine for cure of the stone, gravel, and other diseases of the urinary organs, called "Calculifuge." March 5, 1874.

3,174.—J. A. Tupper, Ottawa, Carleton county, Ont. Improvements on washing machines," called "Tupper's Washing Machine." March 5, 1874.

3,175.—D. Mack, Barnesville, Bourbon county, Kan., U. S. Improvements on garden cultivating implements, called "Mack's Garden Cultivating Implements." March 5, 1874.

3,176.—G. Casey, Ottawa, Carleton county, Ont. Improvements on a machine for washing clothes, called "Casey's Improved Washer and Wringer." March 5, 1874.

3,177.—G. J. and J. R. Wilson, Ottawa, Carleton county, Ont. Machine for washing clothes, called "Wilson's Common Sense Washer." March 5, 1874.

3,178.—J. A. Knight, Auburn, Androscoggin county, Me., U. S. Improvements on tables, called "Knight's Improved Drawing or Writing Table." March 6, 1874.

3,179.—T. A. Norris and C. Lockman, Hamilton, Wentworth county, Ont. Apparatus for sifting coal cinders without dust. called "Norris & Lockman's Improved Coal Cinder Sifter." March 6, 1874.

3,180.—S. F. Cowles, Coventry, Vermont, U. S. Improvement on apparatus for cooling and preserving milk, called "Cowles's Milk Preserver." March 6, 1874.

3,181.—G. Morton, Orwell, Elgin county, Ont. Improvements on a machine for burnishing photographs, called "Morton's Improved Burnisher." March 6, 1874.

3,182.—S. W. Emery, Portland, Cumberland county, Me., U. S. Improvements on four wheel railway cars, called "Emery's Improved Four Wheel Railway Safety Car." March 6, 1874.

3,183.—W. R. Jolley, North Repps Rectory, Norfolk county, England. Improvements in life rafts, called "Jolley's Life Raft." March 6, 1874.

3,184.—A. MacKay and G. Jones. Montreal, P. Q. Process for preventing and neutralizing sour beer, stout, ale, and other malted liquors, called "MacKay & Jones's Preservative and Neutralizer of Beer, Ale, Stout, and Finings." March 7, 1874.

3,185.—Jas. Morrison, Toronto, Ont.—Improvements on check valves, called "Morrison's Combined Adjustable Check and Globe Valve." March 7, 1874.

3,186.—Jas. Morrison, Toronto, Ont. Improvements on water gages for steam boilers, called "Morrison's Improved Adjustable Water Gage for Steam Boilers." March 7, 1874.

PATENTS

The publishers of the SCIENTIFIC AMERICAN have acted as solicitors of patents in the United States and foreign countries for more than three quarters of a century. More than FIFTY THOUSAND inventors have availed themselves of their services. All patents secured through this agency receive a special notice in the SCIENTIFIC AMERICAN, which frequently attracts purchasers for the patent.

Inventions examined, and advice as to patentability free

Patents obtained in the best manner, and with as little delay as possible.

Caveats prepared from either model or drawings, and filed in the Patent Office at short notice.

Special examinations as to the patentability of inventions made, at the Patent Office, on receipt of model or drawing and description; cost for this search and report, $5.

Trade Marks.—The necessary papers for securing protection to manufacturers and merchants in this country and abroad are prepared at this office.

Design Patents, for protecting artists and designers of any new ornamental work, are quickly and cheaply obtained through this office.

Copyrights obtained.

Foreign Patents are solicited in all countries where patent laws exist. Pamphlets, containing the cost and full particulars, mailed on application.

Canada Patents.—Canada is one of the best countries for patents. The cost depends upon the length of time for which a patent is desired. Full particulars by mail on application.

We shall be happy to confer with inventors, examine their models and drawings, and advise with them as to obtaining patents without consultation fee. For every kind of information pertaining to patents, at home or abroad.

Send for pamphlet, 110 pages, containing laws and full directions for obtaining patents. Address

MUNN & CO.,
Publishers SCIENTIFIC AMERICAN,
37 Park Row, N. Y.

BRANCH OFFICE—**Corner F and 7th Streets,** Washington, D. C.

Advertisements.

Back Page - - - - - - - - $1.00 a line.
Inside Page - - - - - - - 75 cents a line.

Engravings may head advertisements at the same rate per line, by measurement, as the letter press. Advertisements must be received at publication office as early as Friday morning to appear in next issue.