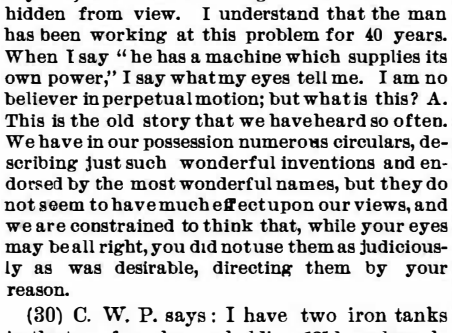
A. The principal difference will be that, in the first case, the steam will be condensed more rapidly: so that, using the same size of pipe and steam pressure in each case, the water will be heated the most, in a given time, in the first case.

(28) H. C. F. asks: 1. How can I make a solution for plating with a battery out of old gold rings? A. Add one volume of nitric to three of muriatic acid and dissolve the rings in the menstruum so formed. When this has been done, drive off any free acid that may remain by gently heating the whole. No yellow powder should result from the operation; if it does, a drop or two more of acid must be added to redissolve it. The solution should then be much diluted, and cyanide of potassium added as long as any precipitate is formed. Separate this from the liquid, wash, and redissolve it in cyanide of potassium, and the solution is ready for use. About half an ounce of the precipitate to a gallon of the cyanide (water and cyanide) is a good working strength. One Smee cell is sufficient to cause the deposit. The solution should be heated to about 130° Fah., and pure fine gold is needed for the anode. By properly regulating the battery power and heat, the color of the gold may be considerably modified. As cyanide of potassium is a deadly poison, too much care cannot be exercised in handling it. 2. Can I plate articles that have been nickel-plated with such a solution? A. Yes. 3. Would 5 cells Daniell's battery be sufficient? A. Five cells of Daniell's battery would probably cause the evolution of gas, which is to be carefully avoided. One cell in good condition would do well.

(29) S. A. T. says: In an old building in Philadelphia resides a man about 75 years of age, who has been at work on a machine composed of levers, without springs or weights, for years. He is very eccentric, lives alone, and no person knows who he is or whence he came. The machine is nearly all composed of wood; it is completed, and has been running for weeks. He is now building one very much larger, from which he intends deriving power. The man is not a man to deceive any one, and there is nothing about the machine hidden from view. I understand that the man has been working at this problem for 40 years. When I say "he has a machine which supplies its own power," I say what my eyes tell me. I am no believer in perpetual motion; but what is this? A. This is the old story that we have heard so often. We have in our possession numerous circulars, describing just such wonderful inventions and endorsed by the most wonderful names, but they do not seem to have much effect upon our views, and we are constrained to think that, while your eyes may be all right, you did not use them as judiciously as was desirable, directing them by your reason.

(30) C. W. P. says: I have two iron tanks in the top of my house, holding 125 barrels each. One is for soft water, the other for drinking purposes. What is the best paint or composition to coat them with to keep them from rusting? White lead will not do. A. Trautwein says: "White lead applied directly to the iron requires incessant renewal, and probably exerts a corrosive effect. It may, however, be applied over the more durable colors when appearance requires it. Red lead is said to be very durable, when pure. An instance is recorded of pump rods, in a well 200 feet deep, near London, which, having first been thus painted, were in use for 45 years, and at the expiration of that time their weight was found to be precisely the same as when new; thus showing that rust had not affected them." A slate paint is sometimes used to coat the interior of tanks. Iron, well cleaned and washed with hot linseed oil, will sometimes be thus preserved from rusting.

(31) N. G. W. says, in commenting on M. W. W.'s answer to the question why a given load can be moved up a given incline on a small wheeled truck with less power than would be necessary to move the same load up the same incline on a large wheeled truck: Let P=power, W=weight, R=radius of wheel, b=angle of inclination of road=E C G, a=angle made by line of traction, D C, with road=F E C. E is the center of moments. The



power, P, acts to raise the weight, W, over the point, P; the weight, W, resists the action. F E, the lever arm of P=R sin. a. G E, the lever arm of W=R cos. b. Writing out the equation by moments, we have P R sin. a=W R cos. b, or (reducing) we have P sin. a=W cos. b, that is, the power multiplied by the sine of the angle made by the line of traction with the road is equal to the weight multiplied by cos. angle of inclination of the road. The angle, a, varies inversely as R: hence, as the wheel becomes smaller, the angle, a, increases, as is shown in the figure. The sine of an angle varies directly as the angle, consequently, as a increases, sin. a increases. Resuming the last equation: Considering the weight constant and the angle of inclination of the road also, it would follow, to keep up the equality, that, as the diameter of the wheel is diminished, less power would be required to move a given weight up a given incline.

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

J. N. D.—Both are argillaceous shale, containing a small amount of micaceous red oxide of iron.—E. McD.—No. 1 contains iron and manganese, along with silver and alumina. No. 2 is galena with a small percentage of iron. It is not arsenical. No. 3 is plumbago with silex and lime. No. 4 is silica and alumina, iron in small amount, and lime.—J. H. P.—The smaller piece contains galena, pyrite, talc and quartzite. The larger is galena in limestone rock.—E. W. W.—No. 1 is iron pyrites which has lost a part of its sulphur and been partly converted into oxide of iron. No. 2 is excellent iron ore. It contains neither black lead nor quicksilver.—H. L. C.—They are of two kinds. The glossy kind is quartz, the waxy variety is chalcedony. Tampa Bay, Fla., has long been celebrated for the chalcedony found near it.—R. W. Z.—No. 1 is zinc ore. No. 2 is willemite. No. 3 is mica schist, containing a small amount of red hematite. No. 4 is calamine. No. 5 is strontianite. No. 6 is calamine. —C. H. P.—It is probably a siliceous scoria, its density being only 2·14. Besides silex, of which it is mostly composed, it contains iron, lime, and carbonaceous matter.—J. J. F.'s specimen, supposed to contain silver, did not arrive.—C. A. W.—The clay contains silica, alumina, lime, iron (as sesquioxide), magnesia, potash, and traces of soda. The above ingredients are arranged in order of the amounts as existing in the specimens sent.—W. H. G.—We find none of the precious metals present. It is a deposit of carbonate of lime and magnesia upon quartz. It contains about 10 per cent of sesquioxide of iron.—C. W.—It is a fossil belemnite. These curious fossils vary in size and form; some are small, delicate, transparent like amber; others are opaque, and from ten to twelve inches in length. They are very common, having been met with in all ages and countries, and giving rise to much speculation as to their real character.—C. B. K.'s and D. M. S.'s minerals did not come to hand. —A. M. D.—No. 1 is a handsome chrysolite, which is a silky variety of fibrous serpentine. No. 2 is hornblende. No. 3 is beryl.—J. L.—The water has been examined. It has taken up alumina, lime, and organic matter. The latter is to be dreaded; and it would be safer to boil the water before using.—A. B. P.—Nos. 1, 2, 3, and 4 (both hard and soft) are varieties of shale rock containing an amount of oxide of iron. By fluxing, No. 1 gives a black slag. They are not entitled to the name of iron ores. The paints are ochers of inferior quality. No. 5 is impure iron alum.—A. B. P.—The two bottles labeled No. 1 and those marked Nos. 2 and 3 contain lime and alumina with organic matters. In No. 3, the two latter substances are in considerable quantity, and there is likewise present a large percentage of iron.

COMMUNICATIONS RECEIVED.

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

On Large and Small Wagon Wheels. By M. G. P.
On the Tides in the Gulf of Mexico. By W.
On a New Explosive. By E. G. A.
On Steam Boiler Phenomena. By L. M. K.
On State Laws regarding Patents. By W. W.

Also inquiries and answers from the following:

A. G.—J. W. D.—P. S.—C. L.—D. F.—A. L.—J. B.—F. J. C.—J. R. N.—A. W.—E. J. N.—S. M. S.

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 inquiries analogous to the following are sent: "Whose is the best process of making gas from petroleum? Who publishes working drawings of steam engines? Whose is the best steam siphon valve? Whose is the best machine for reducing sand and small gravel to a fine powder?" 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

September 14, 1875,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

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DESIGNS PATENTED.

8,647.—Medal.—W. B. Cunningham *et al.*, Phila., Pa.
8,648.—Pianoforte Leg.—C. E. Hoffmeister, N. Y. city.
8,649.—Casting.—A. P. Reger, Philadelphia, Pa.
8,650.—Gridirons.—W. P. Warren, Troy, N. Y.
8,651.—Caps.—M. Isidor *et al.*, New York city.
8,652.—Waist Belt.—W. C. Shimoneck, Washington, D. C.
8,653.—Back Comb.—W. C. Shimoneck, Washington, D. C.
8,654.—Fan.—H. B. Sommer, 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, September 14 to 20, 1875.

5,178.—H. Bolton, Elizabethtown, Ont. Potato digger. Sept. 14, 1875.
5,179.—J. A. MacKinnon, Sandwich, Ont. Whiffletree. Sept. 14, 1875.
5,180.—W. R. Fenerty, Halifax, N. S. File and tool handle. Sept. 20, 1875.
5,181.—G. Keely, London, Ont. Feather-renovating machine. Sept. 20, 1875.
5,182.—J. W. Johnson *et al.*, Towanda, Pa., U. S. Grain separator. Sept. 20, 1875.
5,183.—G. H. Bliss, West Stockbridge, Mass., U. S. Culinary apparatus. Sept. 20, 1875,
5,184.—A. Cunningham, Milwaukee, Wis., U. S. Saw mill dog. Sept. 20, 1875.
5,185.—F. K. Kalbfleisch, New York city, U. S. Carrier for acids. Sept. 20, 1875.
5,186.—G. Walling, Port Henry, Ont. Suction meal and flour-saving fan. Sept. 20, 1875.