Can we not, with perfect propriety, carry a larger wheel? Our present shaft is 5½ inches. If we enlarge the wheel, will it be necessary to enlarge the shaft? A. We think that you can safely increase the diameter of wheel to 8 feet, and that a 5½ inch shaft will be large enough.

(69) L. H. R. asks: 1. I heard a gentleman from Utica say, the other morning, that his mercury thermometer stood at −41° Fah. Is it not to be doubted? A. The thermometer could not quite indicate correctly, as mercury freezes at −39·5° Fah. 2. Has alcohol ever been frozen? A. No.

(70) J. D. S. asks: Why would not the rotary blower, described in the SCIENTIFIC AMERICAN of January 23, 1875, make a good steam engine by admitting the steam at D and exhausting at E? A. It would probably not be economical.

How much will a cubic inch of nitro-glycerin expand on explosion? A. About 13,000 times.

(71) C. S. A. says: The amount of rain that has fallen in this country for the past ten years will average about 46 inches. If a vessel is set to catch rain water, and the water allowed to stand in the vessel as it falls during the year, what percentage of the water will be in the vessel at the end of the year, allowing the water to escape only by evaporation? A. It will vary in different localities, and must be determined by experiment.

What is meant by dry steam? A. It is steam that has no water mingled with it, and is commonly produced in a well designed boiler.

What is the average cost of building a railroad embankment, 6 feet high, with upper base of 10 feet and lower base of 28 feet, of earth dug along the sides of the embankment? A. Your question is too indefinite. You will find some valuable estimates for different cases in Trautwein's "Engineer's Pocket Book."

Are the engineers now at work on the tunnel from Jersey City to New York? A. No.

(72) S. T. says, in reply to L. H. H., who asked what to do with belts that have become glazed and hard: Run the belt very slowly, and sponge with a warm water on both sides; then with a scraper take off the gum, and oil with neatsfoot oil. Attend to it once a month with the scraper and oil; the scraper should not be too sharp nor be straight on edge, but rounded a trifle. If your belt cannot be run slowly, take it off: but it is better to keep it on if possible.

(73) C. L. says, in reply to M. W. H., who asked if cherry tree gum is of any value for mucilage: Having made use of it for two years, I can answer, yes. It is darker, but I think fully as strong as gum arabic.

(74) H. A. H. says, in answer to several correspondents' inquiries regarding the power necessary to propel steam yachts, and the speed to be obtained by theuse of a definite amount of power: Assuming that we wish to give the vessel a moderate speed, we calculate the resistance from the greatest immersed section:

$V=\sqrt{\frac{KLH}{A}}$, and $H=\frac{V^3 A}{KL}$ where K = coefficient for speed and horse power, V = velocity in miles per hour, A = area greatest immersed section, H = horse power, L = length of boat on waterline. In words, the speed in miles equals the square root of the length on water line multiplied oy the horse power and by a coefficient, K, and divided by area of greatest immersed section in square feet. The second formula is: The horse power equals the square of the speed multiplied by the area of greatest immersed section in square feet, and divided by the length on water line multiplied by the coefficient. The coefficient mentioned above varies with the fineness of the lines, from 1·1 in very full lines to 1·9 in very fine lines. The above rules are found to agree very nearly with the performance of various steam yachts now constructed.

(75) H. M. W. says: It may perhaps interest F. C. G. and others to know of a method of taking off the tin from tinned plate without acid. I read a short account of it in the *Jahresbericht der Chemie*. It consists in boiling the scrap tin with soda lye in presence of litharge. This ought to pay, as there are plenty of objections to the use of acids, which unfit the iron for some uses.

(76) C. says, in answer to G. W. B., who inquires about removing clinkers from a stove: My experience is that if, when the stove is thoroughly hot, a few lumps of lime, or even oyster shells, are placed in the stove, as near the clinkers as possible, the latter will be softened or fluxed; and as the fire burns down, they may be scraped off with a poker or shovel.

(77) W. says, in reply to the question of A. B., asking the distance passed over by a fly on the rim of the driving wheel of a locomotive while the locomotive runs 50 miles, the driving wheel being 8 feet in diameter: The fly passes over a cycloid at each revolution of the wheel, and with such a wheel he will travel 32 feet at one revolution; and while the locomotive runs fifty miles, the fly will travel 63 miles, $3{,}494\frac{4}{10}$ feet.

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

J. F. W.—It is galena, a valuable lead ore.—A. B.—No. 1 is oxide of iron, with silex. No. 2 is copper pyrites, a valuable copper ore. No. 3 is black oxideof iron. Nos. 4 and 5 are talcose schist, not valuable. No. 6 is chlorite schist, not valuable. No. 7 is chlorite and micaceous schist. Nos. 8 and 10 are yellow oxide of iron in schist, not valuable. No. 9 is magnetite in steatite. No. 11 is red oxide of iron in schist. No. 12 is iron ore. No. 13 is copper pyrites, valuable. No. 14 is magnetic iron ore, good. No. 14 is mica schist, containing quartz, silex, and oxide of iron. No. 16 is mica schist. No. 17 is micaceous schist. Two other specimens are schist, somewhat stained with green carbonate of copper, not valuable.—J. M. H.—It is a carbonate of lime and magnesia, containing iron pyrites.—A. E.—No. 1 is clay, colored with hydrated oxide of iron. No. 2 is silicate of lime with augite. No. 3 is augite, a silicate of iron, manganese, lime, and magnesia. No. 4 is copper pyrites.—E. P. C.—It is bog iron ore, containing a large amount of insoluble silicious matter.—W. H. L.—It may be used as a polishing or cutting powder for metals and minerals.—G. S.—It is marcasite or white pyrites, and contains 47 per cent of iron and 53 of sulphur.—J. J. T.—It is composed of the same material as pure sand, which is used in glass making, etc., but it is too common to be of especial value. Finely crystallized pieces are prized as rock crystal. Some of the lower priced ornaments are sometimes cut from the last.—J. H. P.—The finer colored varieties of tourmalines are sometimes used as gems.—W. Y. T.—It is blende, and contains 67 per cent of zinc and 33 per cent of sulphur.—We have received, in a box without any address, 1 specimen of valuable hematite ore, 1 of trap rock, and 4 of a conglomerate containing red hematite, from Bucks county, Pa.

H. L. asks: What kind of a purchase is the best to pull up a drive well pipe with? I have used a chain and two jack screws, but it is a great deal of trouble and hard work to keep the chain from slipping.—C. W. J. asks: What is the best and speediest plant for a good, compact, and secure hedge?—G. W. W. asks: How can I pulverize mica very fine in large quantities?—W. E. C. asks: 1. Has chloride of aniline been successfully employed in the production of a good black on wool, more especially on felt hats? 2. Which is the best mode of dyeing a bright black on felt hats?—G. H. F. asks: What is the ornamental work on stove patterns made of? What will make it adhere to the wooden pattern?—A. J. H. asks: How is a silver gray color produced on fancy panel work, picture frames, etc.?—B. A. asks: Were any plants indigenous to the North imported into the South by means of our armies during the late war (see p. 131, vol. 32)?

## COMMUNICATIONS RECEIVED.

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

On Talking Ants. By W. C.
On Alkaloids by Synthesis. By R. B. W.
On Spiritualism. By T. B.
On a New Tempering Composition. By T. J. B.
On a Prolific Snake. By A. A. R.
On High Lakes. By S. T. W.
On Glycerin in Boilers. By W. F.
On Domestic Medicine. By G. H. J.
On Kaolin. By C. T. S.

Also enquiries and answers from the following:

J. M. S.—J. D. H.—A. O.—W. M.—C. B. L.—C. C.—T. B. G.—R. T. P.—E. A. M.—L. A. E.—O. K.—C. S. B.—T. F. M.—S. E. P.—O. M.—W. P.—S. S. A.—O. C.

## HINTS TO CORRESPONDENTS.

Correspondents whose inquries 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 sells aniline blue dyes? Who deals in manganese? Who makes wooden paper hangings? Who sells horse radish graters? Who sells giant powder? Who sells a substitute for cloth for billiard tables? Who sells the cheapest toy engine? Who sells boilers for heating large buildings? Who will sell a right to use a gold plating process?" 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

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**AND EACH BEARING THAT DATE.**

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## DESIGNS PATENTED.

8,180.—SHOW CARD.—J. Fuld, New York city.
8,181 & 8,182.—STATUARY.—J. Rogers, New York city.
8,183 to 8,185.—SHOW CASES.—L. Wiegel, Cincinnati, O.
8,186.—FOUNTAINS.—J. W. Fiske, New York city.
8,187.—VASE, ETC.—J. Hoare, Corning, N. Y.
8,188 to 8,190.—OIL CLOTHS.—C. T. Meyer *et al*.
8,191.—SODA WATER APPARATUS.—F. H. Shepherd *et al*., Lowell, Mass.
8,192.—CARPET.—T. J. Stearns, Boston, Mass.
8,193.—DENTAL STAND.—S. S. White, Philadelphia, Pa.

## TRADE MARKS REGISTERED.

2,262.—WASHING POWDER.—Corbett & Co., Chicago, Ill.
2,263.—WHEAT FOOD.—Durkee & Co., New York city.
2,264.—MEDICINE.—Gowdey & Co., New York city.
2,265.—PICKLES, ETC.—Heinz & Co., Pittsburgh, Pa.
2,266.—WATCHES.—J. W. Tucker, San Francisco, Cal.
2,267.—COTTON MACHINES.—R. H. Allen & Co., N. Y. city.
2,268.—LINIMENT.—C. Couch, New Haven, Coun.
2,269.—GLOVES.—Harris Brothers, New York city.
2,270.—POULTRY FOOD.—Sherwood & Co., Hartford, Ct.
2,271.—BONNETS, ETC.—S. C. Talcott, Ashtabula, Ohio
2,272.—FANS.—S. C. Talcott, Ashtabula, Ohio.
2,273.—HATS, ETC.—S. C. Talcott, Ashtabula, Ohio.
2,274.—FRUIT MILLS, ETC.—Higganum M'f'g. Co., Conn.

## 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**