(64) J. M. says, on the question of size of pump pipes: I put the air vessel or water chamber on to the suction pipe to the pump,as suggested by N. E. L.; and while the speed of the pump could be increased somewhat, the results were not near as good as prophesied by N. E. L. I amnow convinced that, where elbows or bends are used in the supply pipe to a pump, the diameter of the pipe should be much increased: this applies also to long pipes, and if the manufacturers of pumps would make their machines to receive pipes equal to the diameter of the pump cylinder, much better results would be obtained than are now accomplished. I am now putting up a pump exactly like the pump that I originally asked you about. The opening in pump is for a pipe six inches in diameter; but I intend to use a pipe eight inches in diameter to a point as near the pump as possible, and expect thereby to be able to run the pump faster and show better results than I have been able to with the pump on which I used the six inch pipe for the whole distance. My experience shows that it is not safe to be governed closely by the rules set down in the books on hydraulics. As no allowance is made for rough and uneven places found in almost all pipes, which retard the flow of water much more than is generally imagined, the only sure way that I know of is to use pipes large enough to furnish sufficient supply. In testing a fire pump recently, I found that the lining in a rubber-lined hose was torn in a few places, and hindered the flow of water so much that the power of the pump was diminished fully one quarter. The chamber of which N. E. L. speaks, on the suction pipe to a pump, is of much less use on a pump which takes in water at both strokes of the plunger or piston than on a single acting pump, as in the latter case this chamber has a chance to fill while the pump is making one stroke. [If this writer errs at all, it is certainly on the safe side.—EDS.]

(65) S. N. M. says, in reply to F. D. N., who asks: What is the rule by which paper can be cut so as to cover a globe? A globe can be covered with spindle-shaped slips, each in length equal to half the circumference, laid from pole to pole; the narrower the slips the more neatly they will fit, say 10° wide at the center. Calculate the linear width. Draw a straight line equal to ½ the linear circumference, and bisect it. Through the center point draw a perpendicular indefinitely on each side. Take points on this perpendicular, each side at a distance from the central point, equal to ½ the linear width of the slips. Through these two points and the ends of the first line, draw arcs of a circle. The figure thus drawn is the exact pattern of the required slips. To find the diameter of the circle on which these arcs are to be drawn, divide the square of ¼ the circumference of the globe by ½ the linear width of the slips; add the quotient to the divisor, and the sum will be the required diameter. Example.—Let the diameter of the globe be 12 inches; its ½ circumference will be 18·849 inches. Let the slips be 10°, and their linear width will be 1·047 inches. The diameter of the required circle will be 14 feet, 2·17 inches; radius 7 feet, 1·08 inches. In practice, take a rod for a radius, with an awl for a center pivot, and a small sharp-pointed knife at the other end to cut out the slips.

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

J. E.—It is litharge or the oxide of lead, and is formed whenever melted lead comes in contact with the oxygen of the air. It can be reduced to metal again. Argentiferous galena is sulphuret of lead containing a small percentage of silver.—E. P. C.—It is quartz, and has no especial value.—W. McC.—No. 1 is a calcareous earth, containing the remnants of fossil shells and a small amount of organic matter. On certain kinds of land, it might be used with benefit. No. 2 is clay and earth impregnated with bitumen, which could be obtained by proper treatment, and used for heating and illuminating purposes.—R. T. P.—They are earthy magnesian limestones, one of them containing a considerable percentage of bituminous matter; another is colored by a green earth.—O. S.—The brilliant metallic particles are pyrites, not gold, of which there are no external indications; although it is possible that, if the rock were properly crushed and assayed, it might be found to be auriferous.—S. W.—It is fluoride of calcium, or fluorspar. It fuses readily in a blowpipe flame, and is faintly fluorescent. Its specific gravity is 3·05. By further search, you will probably find well formed cubical crystals, of which we should be glad to have specimens.—W. S. V.—Send pieces large enough, and we will determine them. These fragments are too minute.

H. L. N. asks: How can I clean a knife from rust formed by perspiration, so as to make the knife look as though it had just come from the works?—W. H. B. asks: From what point does steam press equally in all directions? Does it not press equally in all directions from a certain center? Is not that center the mathematical center of the vessel in which it is, of whatever shape the vessel may be?

## COMMUNICATIONS RECEIVED.

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

On Steam Boiler Explosions. By M.
On Honing Razors. By ●. W. D.
On Exhaust Steam. By J. F. S.
On Combustion. By C. W.
On Ants. By H. L. A. C.
On a Calculating Machine. By E. K. W.
On a Phenomenon Explained. By A. S. H.
On the Transit of Venus. By D. W. de F.
On Flying Machines. By A. B. B.
On Counting Money. By J. W. C.
On a Man-Eating Tree. By F. H. H.
On Finding Lost Property. By H. W. S.
On Shifting Passengers from Cars. By B. F. L.
On the Occult Sciences. By J. B.
On Amalgam Fillings. By F. H. H.
On the Sewing Machine Monopoly. By L. M. H.
On Mathematical Facts. By M. P.
On Boulders. By D. B.

Also enquiries and answers from the following:

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

## 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 picture frame mitering machines? Who makes engineers' and surveyor's instruments? Who publishes a book containing a list of all the mines in the United States? Who buys black walnut knots, etc.?" All such personal enquiries 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**

**February 2, 1875,**

**AND EACH BEARING THAT DATE.**

[Those marked (r) are reissued patents.]

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| Water meter, N. W. Knowlton | 159,419 |
| Welding bars, device for, J. Sutter | 159,468 |
| Wrench, pipe and nut, F. Kohler | 159,420 |

## EXTENSIONS GRANTED.

31,030.—SAUSAGE STUFFER.—A. Nittinger.
31,082.—MIXING DOUGH.—W. Hotine.
31,084.—CREASING STRAPS, ETC.—W. McK. Thornton.
31,102.—CAR SPRING.—T. F. Allyn.
31,128.—HOIST.—E. G. Otis. Three patents.
31,133.—CULTIVATORS.—D. S. Stafford.

## DISCLAIMERS FILED.

31,133.—CULTIVATOR.—E. T. Conklin.
37,991.—ROLLING LEATHER.—J. Whitney.

## DESIGNS PATENTED.

8,036.—SCREW HEADS.—J. S. Ray, East Haddam, Conn.
8,037 & 8,038.—SCREW HEADS.—R. H. Burr, West Meriden, Conn.
8,039.—HANDLE SOCKETS.—R. H. Burr, West Meriden, Ct.
8,040.—GRAVE COVERINGS.—I. G. Lunday *et al.*, Hickory Flat, Ala.
8,041.—LAMP BRACKET.—F. R. Seidensticker, West Meriden, Conn.
8,042 & 8,043.—CHANDELIERS.—F. R. Seidensticker, West Meriden, Conn.
8,044.—COOK STOVE.—G. A. Wells, Troy, N. Y.

## TRADE MARKS REGISTERED.

2,197.—CIGARS.—Ch. H. Brenaman & Co., Baltimore, Md.
2,198.—TEA.—R. Cunningham, San Francisco, Cal.
2,199.—CIGARS.—Feldman *et al.*, Allentown, Pa.
2,200.—WHISKIES.—O. Jackson & Brother, N. Y. city.
2,201.—CIGARS.—M. Stachelberg & Co., New York city.
2,202 & 2,203.—TEAS.—Williams & Co., San Francisco, Cal.
2,204.—COTTON CASSIMERES.—Bliss *et al.*, N. Y. city.
2,205.—CIGARS.—F. Dittmer, Detroit, Mich.
2,206.—STARCH.—C. Gilbert, Buffalo, N. Y.
2,207.—BITTERS.—Schmidlapp & Co., Cincinnati, Ohio.
2,208.—CIGARS.—Seidenberg & Co., Key West, Fla.
2,209.—CIGARS, ETC.—Consol. Tobacco Co., Gilroy, Cal.
2,210.—SILVER PLATED GOODS.—J. W. Tufts, Medford, Ms.
2,211.—WIRE GOODS.—J. H. & N. A. Williams, Utica, N. Y.
2,212.—MEDICINE.—J. E. Woodward, Boston, Mass.

## 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, JANUARY 28 to FEBRUARY 3, 1874.

4,327.—H. Folliott, Temperanceville, York county, Ont., and J. W. Folliott, Bolsover, Victoria county, Ont., Extension of No. 278, on "Folliott's Self-Adjusting Roller." Jan. 28, 1875.

4,328.—J. Lewis, Manchester, Lancashire county, Eng. Improvements on water meters, and which improvements are also applicable to water motors, called "Lewis' Water Meter and Water Motor." Jan. 29, 1875.

4,329.—Wm. I. Doremus, New York city, U. S. Improvements on oscillating spring chairs, called "Doremus' Oscillating Spring Chair." Jan. 29, 1875.

4,330.—I. Kinney, London, Middlesex county, Ont. Improvements on lock and key guards, called "Kinney's Lock and Key Guard." Jan. 29, 1875.

4,331.—G. Boivin, Montreal. Improvements in cutting material for boot or shoe stiffeners, called "Renfort Boivin." Jan. 29, 1875.

4,332.—L. Kimball, Jr., Bolton, Vt., U. S. Improvements in the form of trays for chopping meat and other substances, called "Kimball's Chopping Tray." Jan. 29, 1875.

4,333.—LeRoy Satterlee, Rochester, Monroe county, N. Y., U. S.—Improvements on heating apparatus, called "Satterlee's Improved Heating Apparatus." Jan. 30, 1875.

4,334.—C. B. Sheldon, New York city, N. Y., U. S. Improvements on furniture casters, called "Sheldon's Perfected Caster." Jan. 30, 1875.

4,335.—H. P. Garland and A. J. Gove, San Francisco, San Francisco county, Cal., U. S. Improvements on sewing machines for sewing sacks or bags, carpets, etc. called "Garland and Gove's Bag-Sewing Machine." Jan. 30, 1875.

4,336.—F. Proudfoot, Toronto city, Ont. Improvements on drum heaters, called "Proudfoot's Radiating Drum Heater." Jan. 30, 1875.

4,337.—G. B. Tiuker, Beebe Plain, Stanstead county, P. Q. Assignee, E. N. Bacon, Chelsea, Orange county, Vt., U. S. Improvements on ox-bow fasteners and guards, called "Bacon's Ox-Bow Fastener and Guard." Feb. 1, 1875.

4,338.—D. C. Morency, Lévis, P. Q. Une machine pour fournir un courant d'air continu, dit "Machine Souffle plante de Morency." A machine to provide a constant current of air. Feb. 1, 1875.

4,339.—G. McEwan and C. O. Gibson, Rock Island, Stanstead county, P. Q. Assignee, G. Bachelder, of same place. Improvements on milk pans, called "McEwan and Gibson's Milk Pan." Feb. 1, 1875.