(25) J. W. H. asks: Will a saw that is run by water power run any stronger at night than in the day? A. No. 2. Will pure steam from the upper part of a steam boiler when let out scald, if no water comes with the steam? A. If of sufficiently high pressure it will not scald near the outlet.

(26) H. R. asks: How are Bourdon springs for pressure gauges manufactured? A. The tube is, we believe, first drawn with a cylindrical section, like other drawn brass tubes, then given the proper section by either rollers or drawing through another die.

(27) W. S. asks: 1. How can I melt copper, brass, and zinc, and what kind of furnace and heat will I need if I melt copper and zinc together to make brass? How many parts must I have and what kind of flux, or is there any need of flux? For melting, will I have to take an iron ladle or crucible? A. You can melt the metals referred to in a common coal fire. You will require a crucible for copper and brass, but zinc may be melted in an iron ladle. Common brass is composed of copper 3 parts, zinc 1 part. Fine yellow brass, copper 2 parts, zinc 1 part. Melt the copper, then add the zinc Stir the alloy with a dry wooden rod. A little borax may be used as a flux. 2. On making moulds, what kind of mixture must I take to work nicely and cast well? A. Fine moulding sand is the best for general use.

(28) W. T. K. asks (1) how to connect three steam whistles so that they will all go off at once? A. Have one common steam valve to the 3 whistles. 2. What power is in a cylinder 1⅛ inch bore and 1¾ stroke, at 600 revolutions a minute? A. For rules for calculating horse power of engines, see SUPPLEMENT, No. 253.

(29) J. K. asks: 1. What will prevent a grindstone wearing off in one place more than in another? I have one about 30 inches in diameter, and there is one place that is soft in it and I can't keep it round. A. It is an inherent defect in the stone. We know of no remedy. 2. What power am I using. The pulley I get my power from is 14 inches in diameter, and it makes 250 revolutions per minute with a 2-inch belt. A. About 2¼ horse power; possibly 2½, if the belt is run very tight.

(30) D. C. M. asks: 1. How can I measure the power of a telescope or field glass? A. The magnifying power of a telescope is found by dividing the focal length of the objective by the focal length of the eyepiece. 2. How should I proceed to make a sunglass for a telescope? A. Place a piece of very dark glass over the eyepiece. See SUPPLEMENT 252 for directions for making telescopes. 3. Which is the best for an observatory, a mercurial or an aneroid barometer? A. Mercurial. 4. Where can I procure dynamite cartridges for extracting stumps, and what will be the probable cost? A. Address manufacturers who advertise in our columns. 5. Where can I get a copy of the "Nautical Almanac?" A. From industrial publishers whose advertisements may be found in another column. 6. Who shall I apply to to become a volunteer observer for the U. S. Signal Service? A. Apply to the chief of the Signal Service Bureau at Washington, D. C.

(31) K. E. B. asks: 1. Could I obtain power enough from a ⅛ inch hydrant to run an electric machine five times the size of the cut on first page of SUPPLEMENT, No. 161? Water has good pressure from Worthington engines. A. It depends entirely on the pressure and the size of the pipe leading to the half inch aperture. With a pressure of 40 pounds per square inch you could do it. If you intend making a machine of the size named you should follow Siemens' latest machine, or imitate some of the more recent machines of prominent makers. 2. How does electricity pass from the cores of the magnets to the wire, the wire being insulated on an electric machine? A. It does not pass from the cores of the magnets to the wires. It is evident you do not understand the principle upon which the dynamo-electric machine operates. You should consult some elementary work on physics. 3. Why must the machine given in No. 161 SUPPLEMENT be set on a brass plate? I see other machines rest on iron or wood. A. Any non-magnetic material will do. Iron cannot be used, as it would close the poles of the magnet. 4. Suppose an electric machine will run ten lamps, and I only use one, will my light be any larger from the one than it would when all ten were in use? A. Yes. 5. I understand that electricity does not burn passing through the carbons of a lamp. If so, why should the number of lamps to a machine have a limit? A. Every lamp adds to the resistance of the circuit, and there is a limit to the resistance the machine is capable of overcoming.

(32) J. N. W. asks: Do any of the stars twinkle except the fixed stars? A. All stars twinkle. This phenomenon is due to the constantly varying density of the atmosphere.

(33) R. M. asks how steel watch chains and other small steel articles are polished. A. By tumbling in a wooden cylinder containing leather scraps and crocus.

(34) C. A. C. asks: 1. How many feet of No. 16 and No. 36 copper wire are required to produce one ohm resistance? A. Of No. 16, American gauge, about 232 feet. Of No. 36, about 2½ feet. 2. What weight ought an electro-magnet to lift if composed of two spools with cores 1 x 3 inches, wrapped with twelve layers of No. 16 cotton-covered copper wire, with ten cells of gravity battery? A. It ought to lift 50 pounds or more. You would get a better effect by making the cores much longer, say 8 inches, and winding the same amount of wire so as to form a coil 5 inches long on the outer end of each core.

(35) J. A. asks: 1. Will you please answer in your next issue of the SCIENTIFIC AMERICAN how can water backs which are full of lime be cleared out? A. There is no practical means, except mechanical means, chipping or the like, that can be of any service. 2. Is any essential part of the locomotive patented? A. Many of the modern appliances to locomotives are patented, but the main parts of the locomotive are old, and may be made without infringing patents.

(36) P. C. N., C. G., W. V., C. W. T., and others ask: 1. For a plain description of how to proceed in order to charge a straight bar of steel with sufficient magnetism to give it the power of lifting four times its own weight. Also, how to proceed with horse-shoe and other forms. 2. The name of the best brand of steel to use (Jessup's, chrome, or black diamond), and why it is the best. How to temper. 3. Is there any gain in allowing the bar to remain under the influence of the current for a long time, or does it receive the full charge instantaneously? In fact, we would like some information on this subject that we can rely upon. A. 1. The quickest and best way to magnetize steel bars is to place them centrally in a suitable coil, and then connect the helix with the wires from a dynamo-electric machine or powerful battery for a few seconds, remembering to break the current before removing the magnet from the coil. If the source of the current is a dynamo machine, the coil should be about 2½ inches long and should consist of 10 or 12 layers of No. 12 magnet wire. If a battery is used, a coil 1½ inches long, composed of 14 or 16 layers of No. 16 magnet wire, will be the best. The internal diameter of the coil should be only large enough to admit the bars easily. A battery of six Grenet elements, each having an effective zinc surface of 30 square inches connected in series, will do the work very well on small magnets; such, for instance, as are used in telephones. Where a number of magnets are to be made at one time the bars may be passed in a continuous line through the coil, always keeping three bars in contact end to end, adding one above the coil before taking one off below. In this manner sixty bar magnets have been strongly charged in ten minutes. Horse-shoe magnets cannot be charged so readily. There are two or three ways of charging them. One way is to place them in contact with the poles of a very strong electro-magnet, removing them after breaking the current; another method is to place each limb of the magnet in a coil adapted to the current to be used, and still another method is to employ a single coil, inserting one pole of the magnet into the coil in one direction, thus breaking the current, and inserting the other pole into the coil from the opposite direction. It is well to remember that the magnet will be very much impaired if the current is not broken before removing it from the coil. The secret of success in charging magnets is to have a strong current. It is impossible to make magnets satisfactorily without this all-important requisite. 2. As to the quality of steel best adapted to this purpose, machinery steel hardened and not tempered answers admirably. For horse-shoe magnets German spring steel is the best. Tool steel answers well if hardened and drawn to a straw color. 3. The steel receives its maximum charge almost instantly. It is useless to allow it to remain under the influence of the magnetizing current more than a few seconds.

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

A. D. L.—A fair variety of potter's clay.—P. M. C.—An argillaceous lime carbonate.—W. T.—The clay contains a large percentage of alkalies and a little lime phosphate.—C. McG.—It is tourmaline.—H. S.—Zinc sulphide.—G. C. R—A fair quality of potter's clay.—J. T. C.—Carbonate of lime. Some of the stone would probably make a fair cement.—F. D. H.—Tourmaline.—G. N. H. Titaniferous iron oxide.

COMMUNICATIONS RECEIVED.

On Swift's Comet. By W. R. B.
Features of No. 9. By W. B. W.
On Scientific Discussion. By C. R.

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[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

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

November 9, 1880,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A printed copy of the specification and drawing of any patent in the annexed list, also of any patent issued since 1866, will be furnished from this office for one dollar. In ordering please state the number and date of the patent desired and remit to Munn & Co., 37 Park Row, New York city. We also furnish copies of patents granted prior to 1866; but at increased cost, as the specifications not being printed, must be copied by hand.

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