

tension of this spring, so that when the latch is turned clear of the bars they will swing to the position shown by dotted lines in the engraving. When the bars are drawn together the spring reacting on the latch causes the latter to snap over the ends of the bars and lock them fast. The bars are not centrally pivoted at their lower ends, and their upper ends are cut away at one side so that by reversing one or both of the bars the stanchion may be adjusted to three different sizes to accommodate different sized animals.

RECORDING AUTO SPEED METER.

This ingenious device should meet with great favor among automobile owners, as it fills a long-felt want for an instrument that will give a written record of the performance of the machine for twenty-four hours.

The record forms a diary by which the automobilist can see at a glance how many miles have been run during the twenty-four hours, the exact moment the start was made from any point, and the exact moment the destination was reached, as well as the number of miles covered, the rate of speed between each mile post, and also the number and duration of the stops.

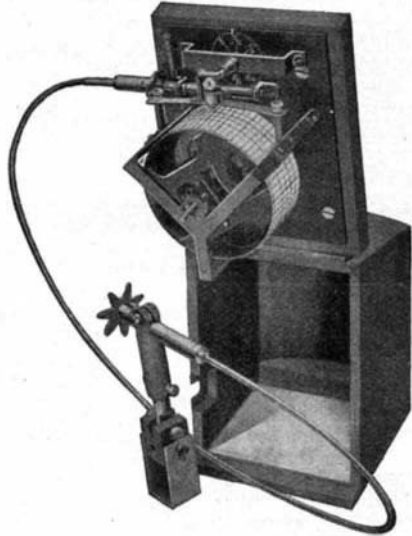
The chart is 12 inches long, divided into four sections of six hours each. These are sub-divided into hours, half hours, quarters, and 5-minute spaces. As the hour spaces are 2 inches long, the records of each mile are very legible; in fact, 60 miles an hour can be recorded without difficulty and easily read at a glance.

As an illustration of such a record, suppose a run was to be made from New York to Philadelphia, the start being made at 9 o'clock A. M. From 9 o'clock to 9:45 thirty records are made; this shows thirty miles were covered, at a rate of speed of forty miles an hour. From 9:45 to 10 o'clock no records are made or the chart is blank, showing the machine was not in action during that period. From 10 until 10:15 fifteen records are made, or a speed of sixty miles an hour has been accomplished; and so on until Philadelphia is reached at 1:40 P. M., when the last record is made. The records show that it took four hours and forty minutes to cover the entire distance. The

total number of records gives the number of miles, and the time between records indicates whether the machine was making 12, 20, 30, or 60 miles an hour.

The construction is exceptionally rigid, so that no amount of jarring can disarrange the mechanism or affect the accuracy of the clock movement. The case can be made of polished mahogany or aluminium, and the outside dimensions are only 5 x 4 x 3 inches, so that very little space is taken up on the dashboard.

The principle of construction is shown in the ac-



RECORDING AUTO SPEED METER.

companying illustration. The clock movement is supported on a stationary shaft, around which it revolves, carrying a drum on which the record sheet is attached. The clock is geared to revolve four times in twenty-four hours, and one end of the shaft has a spiral thread so arranged that one revolution of the clock and drum causes the record chart to move horizontally one-quarter of an inch. In this way the records of the second, third, and fourth period of six

hours are entirely distinct from each other. The spiral screw is engaged in such a manner that the clamp can be released and the drum instantly revolved or set, so that the recording pen can be brought to any desired minute or point on the chart so as to register the time of starting the machine.

On the automobile is an adjustable clamp having a sprocket engaging with another sprocket mounted on the hub of the wheel. Each revolution of the wheel is carried up to the recording instrument on the dashboard by a flexible shaft having mounted at its upper end a pivotally supported worm shaft arranged to mesh with the gear wheel. This gear wheel has the required number of teeth, so that one revolution of the wheel represents an exact mile covered by the automobile wheel. The gears can be arranged to correctly record a mile regardless of the diameter of the automobile wheel.

Mounted in the center of the gear wheel is a shaft having at its end a cam engaged with a pen lifter, so at the complete revolution of the gear wheel or at the completion of the mile the cam allows the pen to drop down and make the recording mark on the chart.

A novel feature of the arrangement of the gear wheel is that it can be disengaged from the worm shaft and revolved by hand so as to bring it to zero, thus avoiding the necessity of running the machine a portion of a mile before the starting point can be recorded.

The pen is made of non-corrosive metal so as not to become clogged by the ink. The capacity of the pen fountain is sufficient to carry a week's supply of ink without refilling. The pen is suspended on a flexible steel band, so that no amount of jarring will cause a false record to be made or allow the ink to come out excepting at the completion of a mile or when the pen is allowed by the cam to mark the record.

The entire construction of the instrument is such that any one can mount the instrument on an automobile without difficulty. A patent covering its construction has been secured by C. F. Iszard, 241 Hansberry Street, Germantown, Philadelphia, Pa.

RECENTLY PATENTED INVENTIONS.

Pertaining to Apparel.

BODY-CONFORMER.—C. MUNTER, New York, N. Y. This corset device is adapted for rectifying the shape of the body at the hips and lower portion of the trunk, wherein a pliable material, such as cotton or silk cloth fabric, is cut in such a way as to be given a skin-tight fit to the body at such points by reason of the peculiar shape of the device, and, further, by reason of an arrangement of laces running through eyelets, the individual laces being joined to belt-straps connected by a buckle or its equivalent at the front of the device.

APRON-SUPPORTER.—J. G. KOUNTZ, Wells-ville, Ohio. In this instance, means provide for supporting aprons worn by butlers, hotel-waiters, etc., and especially where the support is removed in laundering, and the inventor has for his object improved supporting means not only adapted for effectively supporting an apron on the user of the article, but which shall be readily attachable and detachable, providing for interchange of aprons, as occasion requires.

CLASP.—J. W. ALBIN and D. C. RICKETTS, Babylon, N. Y. This clasp is such as used for garment-fasteners. The invention is especially applicable in the construction of cuff-holders, but is for use in various connections. The device may be readily applied, and has a desirable flexibility, adapting the same to movements of the parts of one's body.

MIXED WHALEBONE FOR BODICES.—E. M. BOSSUET, 49 Boulevard Haussmann, Paris, France. This stay is extremely flexible and can be folded upon itself many times without breaking and the combination is much more resistant than the genuine whalebone, while possessing all its flexibility. The invention comprises a stiffener of two strips of resilient flexible material acting as a spring and a thin sheet of cork of a width and length equal to the strips, and interposed therebetween and to which the same are glued.

Electrical Devices.

INTERLOCKING TERMINAL BASE.—L. STEINBERGER, New York, N. Y. Mr. Steinberger's invention relates to terminal bases used in telephony and analogous arts, his more particular object being the production of built-up terminal bases of composite characters made of separable parts capable of interlocking and provided with appropriate electrical conditions. Preference is given for the use of the well-known insulating material designated as "electrose," in the construction of the base-sections. It has many of the properties of hard rubber.

INSULATOR-PIN AND SUPPORT THEREFOR.—L. STEINBERGER, New York, N. Y. The more particular object in this case is to provide a type of pin which can be securely mounted upon a cross-arm in such manner as to protect the same against undue action of moisture and also against strains due to the weight and to the swaying of the wire or cable. Another object is to provide a cross-arm which will less readily retain snow or

moisture and to insulate this support more effectively, especially the portion adjacent to the insulator-pin.

INSULATING-CLAMP.—T. B. LEE, Charlotte, N. C. The main object of the inventor is to improve upon devices now in use, and to provide a clamp upon which as much strain may be put as may be necessary to hold the wire from slipping and to give it such clamping effect as to throw a required amount of friction on the wire, and to allow for more or less slipping over the top of the insulator. It consists broadly of an insulator-clamp comprising two separate sections to embrace the insulator-neck and suitable means for clamping the sections together.

INDICATOR.—C. VERSTEEG, Ashton, S. D. The present invention is an improvement over the device shown in Letters Patent formerly granted to Mr. Versteeg, and comprising an open electric circuit, including a signal to be operated by the contact of the terminals of the circuit, said terminals being arranged within the bin in position to be moved into contact by the movement of the grain when it reaches a predetermined depth in the bin, and in means for preventing the direct contact with the grain of the contact-points, while permitting their movement toward and from each other.

ELECTRIC MEDICAL APPARATUS.—C. VAN BERGH, Winnipeg, Manitoba, Canada. An object of the invention is to provide means for interrupting a current generated by a battery of any suitable kind, and, furthermore, to provide an interrupter which may run at very low speed and is noiseless in its operation. A special form of motor operates at such low speed that the current passing through it may be interrupted, and the intervals are so controlled as to correspond in time with the pulsations of the heart of the person treated.

Of Interest to Farmers.

PORTABLE FEEDER FOR THRESHING-MACHINES.—D. STILL, Milton, Ore. The improvement comprises a portable wagon-like body mounted on wheels for transportation, provided with longitudinal and transverse feed-aprons and picking and feeding devices, whereby grain is fed to an elevator leading to the feed-table of the thresher, the body being also provided with a derrick to facilitate the loading of the grain into the same and the feed-aprons of the device being connected by a suitable power-transmission shaft and universal joint to the power mechanism of the thresher.

CORN-HUSKING MACHINE.—W. S. RUSE, Twin Bluffs, Wis. In the present patent the invention has reference to certain improvements in corn-husking machines, and, more in detail, involves an attachment for said machines whereby the machine is prevented from clogging up, and all danger to the operator is obviated.

VINE AND WEED CUTTER.—C. F. HIRPARD, Minonk, Ill. One purpose of the invention is to provide a cutting attachment adapted for ready application to any type or size of cultivator and which will accomplish most effective work in killing any kind of weeds or

vines that may be outside a row of corn, for example. It not only cuts and eradicates vines or weeds, but it pushes them midway between the rows.

Of General Interest.

DEVICE FOR INSERTING EXPLOSIVE CHARGES.—R. TORRAS, Brunswick, Ga. The invention refers to a device for use in connection with the insertion of explosive charges beneath stumps, rocks, sunken ships, or other bodies which it is desired to remove; and the object thereof is to provide a device simpler in construction and easier to operate than any heretofore known.

MUSIC-LEAF TURNER.—F. W. MCNEIL, St. Louis, Mo. The object of the invention is to provide a device by which the leaves may be turned either to the right or left by a musician using either a knee-lever or one of the handles. It comprises a plurality of pivoted arms having clamps to hold the leaves and provided at their pivot with segmental pinions which are successively engaged by racks carried by a sliding bar which is actuated by a pawl upon the movement of an operating-rod to either the right or the left.

APPLIANCE FOR SLIDING DOORS.—M. LOGAN, Plymouth, Ind. The object of this improvement is to provide a door with an effective and comparatively inexpensive means to keep it in engagement with the supporting rail or track and to prevent looseness or shaking at the bottom of the door, which, if unguarded, is the source of serious inconvenience, especially in windy weather.

APPARATUS FOR EXTRACTING BY-PRODUCTS FROM WOOD.—T. NEWNHAM, White Springs, Fla. This patent provides an apparatus for distilling wood, whereby essential oils and other useful products are obtained therefrom—such as turpentine, creosote, tar, and alcohol—by one continuous distilling operation without the necessity of interrupting the operation at any time to feed a new supply of wood or to draw off the by-products.

CAN AND MEANS FOR VENTING AND CLOSING SAME.—J. W. HEARN, New Orleans, La. The invention relates to cans and means for closing the same—such, for instance, as shown and described in the Letters Patent of the United States formerly granted to G. H. Dunbar. The object is to provide a can and means for venting and closing the same arranged to allow convenient venting of the filled can during the steaming and cooking process and to permit ready sealing of the can after the cooking and venting process is completed.

CAN-OPENER.—F. GARRECHT, Idaho City, Idaho. One object of the invention is to so construct the opener that it will lie flat on the top of the can where it is usually applied and have no projecting points from it, which is a source of much inconvenience in packing cans where this style of opener is used. Another object is to prevent accidental displacement of the opener from the top of the can.

CLINICAL THERMOMETER.—W. P. GRAFTON, 1 The Village, Old Charlton, Kent, England. The invention relates to clinical ther-

mometers in which the return of the mercury to the bulb is brought about either by shaking or by centrifugal action; and the object is to enable the operation to be performed with the minimum of trouble and without the liability of the thermometer slipping from the fingers and being broken.

VAULT-COVER MOLD.—J. H. DENNEY, Portland, Ind. In this operation of the device a series of wood forms are placed in position on a pair of strips and a lower matrix is placed thereon. An upper matrix is then placed in position, being retained in it by the top wood forms. The plastic material is then poured into the space between the matrices through the perforations for the reception of prints for cores, and after the setting of the cover it is removed from the mold.

THIMBLE.—E. BARNETT, Atlanta, Ga. In the present patent the object of the invention is to provide a new and improved finger-shield, more especially designed to facilitate the fastening of pin-tickets to cloth or other articles of merchandise without danger of injury to the fingers of the user.

Hardware.

HASP-FASTENER.—C. L. BAILEY, Morris, Ind. Ter. The invention is particularly adapted for use in connection with a hasp and staple, and to so construct the latch that it will be carried by the hasp in position for locking engagement with the staple, and, further, to so construct the said latch that the latch and hasp may be simultaneously operated by one hand, thus rendering the device desirable upon barn and similar doors as well as upon the doors of twine-boxes for reapers, binders, and the like.

Machines and Mechanical Devices.

COMBINATION POWER-MACHINE.—G. M. VROOME, Castleton Corners, N. Y. The patent shows a mechanism for producing power with the rise and fall of the tides and the invention provides a pit or well the top of which has inlets and outlets for the tidal water. A float has a guided movement in the pit and carries a rack-bar, which operates through suitable gearing and drums to raise a weight as the float rises, and as the tide recedes the downward movement of the weight serves to give a movement to a power-shaft in the same direction as the movement given directly to it by the float.

PULVERIZER.—N. SPURGIN, Ottawa, Ill. The principal objects of the invention are to provide means whereby the material upon entering the machine can be acted upon by a stronger force than that applied after the material is partially pulverized and to provide means for adjusting the walls of the pulverizer-chamber in such a manner as to take up wear and yet furnish a substantially circular interior at all times. It is especially adapted for use in disintegrating clay and similar substances.

MACHINE FOR MAKING COMPRESSED BUNGS.—C. SEYMOUR, Defiance, Ohio. This machine makes compressed bungs from a flat stick of wood and is arranged to insure a complete automatic action for feeding the stick

intermittently the desired distance for cutting off a square blank from the stick for the formation of the bung, for trimming the square blank to form a cylindrical blank and to compress the same into a bung of truncated-cone shape, and for stopping the machine when the end of the stick is reached.

Prime Movers and Their Accessories.

ELASTIC-FLUID TURBINE.—DEN-ICHIRO NISHIZAKI, No. 1 Tsuna-Machi, Mita, Tokyo, Japan. In operation, the fluid enters through throttle-valves and by the nozzles is directed against the innermost series of blades on the high-pressure side of the turbine. After having acted upon the innermost ring interposed guides deflect the fluid to the next ring of blades until the outermost ring has been acted upon, after which the fluid is deflected by guides toward the axes of the checking-valves, which are lifted into a chamber and from thence through a chamber arranged circumferentially of the casing. From the latter chamber fluid is admitted by means of the check-valves through passages to the outermost ring on the low-pressure side, and after having acted upon all the rings on this side the fluid passes into the interior of the casing and to the condenser through an opening. Mr. Nishizaki has patented another elastic-fluid turbine, which is an improvement on his co-pending application formerly filed, and is designed especially to diminish losses of heat by radiation through the walls between successive pressure-chambers and to reduce axial thrust and obtain axial balance, as well as to diminish frictional loss to a minimum by reducing the number of running-wheels without sacrificing efficiency.

TURBINE-REGULATOR.—DEN-ICHIRO NISHIZAKI, No. 1 Tsuna-Machi, Mita, Tokyo, Japan. This invention relates to a system of elastic-fluid-turbine regulator to be used in connection with elastic-fluid turbines claimed in Mr. Nishizaki's previous applications; and its objects are to obtain results of very sensitive speed regulation with said turbines by reducing friction of the working parts of the regulator to the minimum, as it is known that friction destroys the sensitiveness of the regulator.

STEAM-TURBINE.—A. BONOM, New York, N. Y. In this case the invention has reference to steam-turbines, and the general purpose of the improvement is the production of a turbine which will be economical in steam consumption and of high efficiency. More specifically, the object is to produce a turbine which will be of compact form and in which the steam-space enlarges with the expansion of the steam.

Pertaining to Vehicles.

JACK.—W. UMSTEAD, Jerseytown, Pa. This invention relates to jacks, and is particularly useful in connection with devices of this character to be used for raising wagons off the ground for the purpose of removing the wheels. An object is to provide a device of this kind which can be used at various heights from the ground without adjustment and which can be operated by means of a simple manipulation.

DEVICE FOR SMOOTHING WAGON-ROADS.—F. W. LECHNER, Wenona, Ill. This device is adapted to be attached to any vehicle and used as a drag to smooth the road behind the said vehicle. It is well known that if roads are dragged with a harrow while soft they may be caused to dry up very much quicker, and in drying if the roads are repeatedly dragged deep ruts and grooves are avoided and a smooth hard surface is left when the ground becomes thoroughly dry.

BUGGY-TOP-PROP ATTACHMENT.—G. LAKE, Memphis, Tenn. In this patent the invention has reference to improvements in attachments for top-props for buggies, its object being to provide a device for receiving and holding the bow of a folding buggy-top and take up the jar and jolting usually received by the bow of buggies when the top is lowered.

SLEIGH.—H. A. LE BARON, Ridonville, Maine. Bob-sleighs are improved by this invention. The object is to provide a sleigh that will be light, but strong, and so constructed that the runners will have a yielding or swinging movement relatively to the body, thus preventing to a great extent strain or possible disturbing of the load in the vehicle when the runner strikes or passes over an obstruction.

SPRING-WHEEL.—J. H. FAWKES, Detroit, Mich. This invention is an improvement in spring-wheels. By the use of the improved wheel a considerable amount of rubber is saved in the tire, since one-half of the ordinary tire is dispensed with, thus permitting the construction of tires of greater diameter with the same amount of rubber as now used in tires of much smaller diameter.

Designs.

DESIGN FOR A SOCKET FOR INCANDESCENT ELECTRIC LAMPS.—J. A. MEBANE, South Boston, Va. The socket in this design is approximately bell-shaped, and the body has exteriorly a series of parallel vertical rounded ribs and intervening grooves, the lower ends of said ribs running out on the flared base or rim of the socket and terminating in acute angles or points.

NOTE.—Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of the invention, and date of this paper.



Notes and Queries.

HINTS TO CORRESPONDENTS.

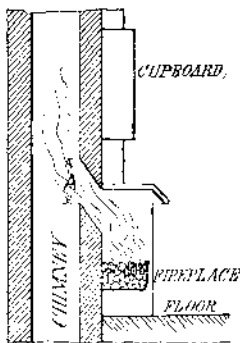
Names and Address must accompany all letters of no attention will be paid thereto. This is for our information and not for publication. References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and though we endeavor to reply to all either by letter or in this department, each must take his turn. Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same. Special Written Information on matters of personal rather than general interest cannot be expected without remuneration. Scientific American Supplements referred to may be had at the office. Price 10 cents each. Books referred to promptly supplied on receipt of price. Minerals sent for examination should be distinctly marked or labeled.

(10491) L. B. J. asks: I am confused on this problem: Hiscox says, in "Gas, Gasoline, and Oil Engines," page 65, "having 120 volts 24 amperes, resistance was cut in to give 110 volts and 21 amperes." Now, what was this resistance? I compute as follows: 120 less 110 gives 10 volts as the drop, which divided by 21 gives about 0.5 of an ohm as the resistance. Yet 120 volts through 0.5 ohm resistance gives, as I understand, 240 amperes. I know that I must be wrong. Please explain in Notes and Queries. What if the amperage was 1, 12, or 45 instead of 24? In these cases what would be the resistance and the amperage? That is, in dropping to 110 volts. A. If with 120 volts 24 amperes flow, the resistance must be 120 divided by 24, or 5 ohms. If with 110 volts 21 amperes flow, the resistance must be 110 divided by 21, or 5.24 ohms. The resistance needed to make this change is 0.24 ohm. If with 120 volts 12 amperes flow, the resistance must be 120 divided by 12, or 10 ohms. As the resistance was 5.24 ohms when with 110 volts 21 amperes flow, we must add 4.75 ohms to bring about the change. In the same way for any other numbers.

(10492) T. J. writes: Will you please inform me how to bleach yellow feathers white on a live bird? A. Peroxide of hydrogen is the only chemical that can be used on a live bird without danger to the animal. This chemical is the one that is extensively used for bleaching hair.

(10493) H. B. asks: At how many revolutions a minute could a solid cast-iron disk be run with safety—the disk having the following dimensions: Diameter, 5 feet 6 inches; thickness at hub, 4 inches; and tapering to 1/4 inch thickness at the rim. We mean, of course, if this were running free, and were not acted on by any other forces except centrifugal force. A. The disk may be run at a speed of 550 revolutions per minute with a safe factor of from 5 to 6, depending upon the quality of the iron. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 391, on centrifugal force as applied to revolving machinery; 10 cents mailed.

(10494) R. D. says: I have been a reader for a number of years, and for this reason felt that I might impose on your good nature by asking if you could tell us whether or not we could put a fireplace in our chimney without spoiling the draft for the other connections. There are only two openings into it, both in the basement. We want to put the fireplace on the first floor if possible. Our local masons do not know much about fireplace making. If possible, please make a rough sketch of what you would suggest. If it was a double-flue chimney we could no doubt arrange it easily, but we have only one



flue to work on. A. In reply to your inquiry regarding the placing of a fireplace in your chimney, we would say that unless there was plenty of draft to spare in the chimney a fireplace would greatly reduce the draft in the chimney. The opening for the fireplace must be smaller than the two openings in the basement and should be arranged as shown in the sketch. However, unless there is plenty of draft to spare, it would not be advisable to put in the fireplace; and as we have no means of determining the draft, we cannot definitely advise you concerning this subject.

(10495) H. F. says: Can you give me a process to treat linotype metal that has de-

teriorated in quality through constant remelting, other than by adding old type metal or new linotype metal? A. Linotype metal for remelting should be kept free from all substances which do not belong there. The addition of a very little zinc or brass, etc., will make the metal unfit for use. The addition of type, stereotype or electrolyte plates should also be avoided, as these are made on different formulas, and would, of course, change your mixtures. If your metal works poorly, send a sample to a reliable concern for analysis, who will supply you with a "tempering metal" to suit the condition of your metal.

(10496) B. G. W. asks how to charge magnets. A. Correspondents frequently ask the following questions, which are fully answered in their order: 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 horseshoe and other forms. 2. The name of the best brand of steel to use—Jessup's, chrome, black diamond, tool or machinery. 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 2 1/2 inches long and should consist of 10 or 12 layers of No. 12 magnet wire. If a battery is used, a coil 1 1/2 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. Horseshoe 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, then 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 horseshoe magnets German spring steel is the best. Tool steel answers well if hardened and drawn to a stow 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.

(10497) C. L. asks how to make a pad for rubber stamps. A. The following is said to be a cushion that will give color permanently. It consists of a box filled with an elastic composition, saturated with a suitable color. The cushion fulfills its purpose for years without being renewed, always contains sufficient moisture, which is drawn from the atmosphere, and continues to act as a color stamp cushion so long as a remnant of the mass or composition remains in the box or receptacle. This cushion or pad is too soft to be self-supporting, but should be held in a low, flat pan, and have a permanent cloth cover. The composition consists preferably of 1 part gelatine, 1 part water, 6 parts glycerine, and 6 parts coloring matter. A suitable black color can be made from the following materials: 1 part gelatine glue, 3 parts lampblack, aniline black, or a suitable quantity of logwood extract, 10 parts of glycerine, 1 part absolute alcohol, 2 parts water, 1 part Venetian soap, 1-5 part salicylic acid. For red, blue, or violet, 1 part gelatine blue, 2 parts aniline of desired color, 1 part absolute alcohol, 10 parts glycerine, 1 part Venetian soap, and 1-5 part salicylic acid. The following additional receipt is also used for this purpose: 1. Mix and dissolve 2 to 4 drachms aniline violet, 15 ounces alcohol, 15 ounces glycerine. The solution is poured on the cushion and rubbed in with a brush. The general method of preparing the pad is to swell the gelatine with cold water, then boil and add the glycerine, etc.

(10498) J. M. H. asks how to prepare and polish shells. A. 1. Porcelainous shells are so hard as to require the apparatus of a lapidary to cut or polish them, but they are generally so smooth as to require no rough grinding. They may be polished by using a felt wheel and applying putty powder. Nacreous shells or those of the pearl variety may

be filed and cut without a great deal of difficulty. Pieces to be turned are first roughly shaped on the grindstone, then turned and polished with pumice stone, put on the final polish with rottenstone. Irregularly shaped pieces are filed and ground, then smoothed with pumice stone and water, and finished with rottenstone. The rottenstone is sometimes mixed with sulphuric acid full strength, or slightly diluted, to heighten the polish. 2. Rough shells are polished by first grinding them on a coarse stone, then smoothing them with pumice stone and water on a buffer wheel or with a hand polisher, and finishing with rottenstone.

(10499) A. N. M. asks how to color meerschaum. A. Ordinarily the pipe is boiled for coloring in a preparation of wax which is absorbed, and a thin coating of wax is held on the surface of the pipe, and made to take a high polish. Under the wax is retained the oil of tobacco, which is absorbed by the pipe, and its hue grows darker in proportion to the tobacco used. A meerschaum pipe, at first should be smoked very slowly, and before a second bowlful is lighted the pipe should cool off. This is to keep the wax as far up on the bowl as possible, and rapid smoking will overheat, driving the wax off and leaving the pipe dry and raw. A new pipe should never be smoked outdoors in extremely cold weather. 2. Fill the pipe and smoke down about one-third, or to the height to which you wish to color. Leave the remainder of the tobacco in the pipe and do not empty or disturb it for several weeks, or until the desired color is obtained. When smoking, put fresh tobacco on the top and smoke to the same level. 3. When once burnt the pipe cannot be satisfactorily colored, unless the burnt portion is removed and the surface again treated by the process by which meerschaum is prepared. The coloring is produced by action of the smoke upon the oils and wax which are superficially on the exterior of the pipe, and are applied in the process of manufacture.

(10500) A. G. H. asks for rules for calculating speed of pulleys. A. The diameter of the driven being given, to find its number of revolutions. Rule.—Multiply the diameter of the driver by its number of revolutions, and divide the product by the diameter of the driven; the quotient will be the number of revolutions of the driven. Example.—Twenty-four inches diameter of driver \times 150, number of revolutions, = 3,600 \div 12 inches diameter of driven = 300. The diameter and revolutions of the driven being given, to find the diameter of the driver, that shall make any given number of revolutions in the same time. Rule.—Multiply the diameter of the driver by its number of revolutions, and divide the product by the number of required revolutions of the driven; the quotient will be its diameter. Example.—Diameter of driver (as before) 24 inches \times revolutions of driver required = 300. Then 3,600 \div 300 = 12 inches. The rules following are but changes of the same, and will be readily understood from the foregoing examples. To ascertain the size of the driver. Rule.—Multiply the diameter of the driven by the number of revolutions you wish to make, and divide the product by the required revolutions of the driver; the quotient will be the size of the driver. To ascertain the size of pulleys for given speed. Rule.—Multiply all the diameters of the drivers together; divide the drivers by the driven; the answer multiply by the known revolutions of main shaft.

(10501) A. L. W. asks for a simple rule for calculating the horse-power of steam engines. A. Multiply the square of the diameter of the cylinder in inches by 0.7854, and this product by the mean engine pressure, and the last product by the piston travel in feet per minute. Divide the last product by 33,000 for the indicated horse-power. In the absence of logarithmic formulæ or expansion table, multiply the boiler pressure for 5/8 cut off by 0.91, for 1/2 cut off by 0.85, 3/8 cut off by 0.75, 3-10 cut off by 0.68. This will give the mean engine pressure per square inch near enough for ordinary practice, for steam pressures between 60 and 100 pounds, always remembering that the piston travel is twice the stroke multiplied by the number of revolutions per minute.

(10502) B. G. I. asks how to preserve India rubber. A. 1. In the opinion of Hempel, the hardening of vulcanized India rubber is caused by the gradual evaporation of the solvent liquids contained in the India rubber, and introduced during the process of vulcanization. Guided by this notion, he has made experiments for a number of years in order to find a method for preserving the India rubber. He now finds that keeping in an atmosphere saturated with the vapors of the solvents answers the purpose. India rubber stoppers, tubing, etc., which still possess the elasticity, are to be kept in vessels containing a dish filled with common petroleum. Keeping in wooden boxes is objectionable, while keeping in air-tight glass vessels alone is sufficient to preserve India rubber for a long time. Exposure to light should be avoided as much as possible. Old hard India rubber may be softened again by letting the vapor of carbon bisulphide act upon it. As soon as it has become soft, it must be removed from the carbon bisulphide atmosphere and kept in the above way. Hard stoppers are easily made fit