

Economy to the Consumer of the Incandescent Gas Burner.

BY PRESIDENT HENRY MORTON, P.E.D.

During the meeting of the Western Gas Association held in Pittsburgh May 15, 16, and 17, a paper was read on the subject of incandescent gas lighting, which, with the discussion following it, conveyed much of a comforting as well as interesting character to the general reader or rather general gas consumer.

The author of the paper in the first place had many things to say in disparagement of the Welsbach incandescent gas burner, from his standpoint as a gas manufacturer, on the ground of its reducing the output and profit of the gas company under his charge, by affording those who used it an increased amount of light at about half the cost of the ordinary burner.

In the course of the discussion which followed, the same gentleman gave some illustrations, as for example: "We have a club room in our city which used 81,400 cubic feet of gas from January 1 to May 1, 1894. On January 1, 1895, we replaced the burner commonly used there with Welsbach burners, and from that time to May 1, 1895, they used 35,400 feet—a loss to us of 46,000 feet, or over 50 per cent on one customer in six months."

From the point of view of this manager of a gas works, this was truly disheartening; but how about the club in question or consumers generally? To these we think the statement will convey nothing but pleasure, qualified by the consideration that it is almost "too good to be true."

If any such statement came from the Welsbach Company or any one interested therein, it would carry little weight, but coming from one who is manifestly an enemy and in deadly earnest, it is equally convincing and encouraging to the gas-consuming public.

It may however be asked, Is this benefit to the public to be secured only at the expense and perhaps by the ruin of the gas companies? For, if this is so, it may in the long run be of doubtful advantage even to consumers.

To this question an abundant answer was given in the discussion which followed the paper on incandescent gas lighting.

In this discussion a large number of the managers of gas works present took part, and without exception each one in turn, while indorsing the statements of the paper as to the advantage to the consumer, emphatically denied the deduction as to injury to the business of the gas companies under their charge.

They all showed, from their own experience, that while the introduction of the Welsbach burner had often in the first instance and for a short time diminished the total amount of gas used, this influence was promptly reversed by reason of the additional customers secured and light used, through replacement of oil lamps by the economical and brilliant Welsbach, and its displacement of electric lamps both arc and incandescent. Indeed, the only note of distress heard in this connection was one intimating regret that the business of supplying Welsbach burners was not in all cases in the hands of the gas companies.

A full account of this paper and discussion was published in the American Gas Light Journal for May 27, and is interesting reading to the gas consumer who has an eye to economy.

It is not often that any one can point to the fulfillment of a quasi-prediction, and it is, therefore, with pleasure that I find in the report of a paper which I read before the Society of Gas Lighting on January 17, 1889, the following words:

"The mere cheapening of gas I contend is not the only or the scientific method of correcting the manifest wastefulness of our present methods of using it to produce light. It would be like saying that to secure cheap fuel was the right way to improve the steam engine. In the case of gas, such a policy, if persisted in, can only result in relegating gas to the cellar, the kitchen, and the engine room, to warm us, to cook our food, and to drive our machinery; and in replacing it as a means of illumination by electricity, which may, in time, owe its very existence and life to the enslaved labors of its deposed rival imprisoned in the furnace of the steam engine or laboring blindly in the cylinder of the gas engine."

"I believe that gas, much as it has been abused, deserves a better fate, and will secure it if anything like the attention is given to its education and refine-

ment, as an illuminating agent, which has been lavished upon its impalpable rival, electricity.

"I believe that a good beginning at least has been made in this direction by Dr. Auer von Welsbach and those who have been developing and improving his very original invention; and it, therefore, gives me pleasure to bring before you this evening (among other recent developments in artificial illumination) a number of the burners known by the name of Welsbach, in the latest form to which the process of gradual improvement has brought them, and to point out to you what I have found in my own experience as to their actual merits or probable future advances."

As illustrating the present attitude of the gas companies toward the Welsbach light, it may be noted that, at the conclusion of the discussion above referred to, a vote of thanks was passed to Herr Auer von Welsbach for his discovery and production of the gas burner bearing his name.

Electric Canal Towage.

Canal barges have recently been very successfully towed by electric power on the summit level of the Canal de Bourgogne. This portion of the canal is $3\frac{1}{4}$ miles long and has been made very narrow to reduce construction expenses. There is no tow path, and hauling is effected on the submerged chain principle. The hauling upon the chain is now done by electric power instead of by steam, as heretofore. A generating house has been fixed at each end of the section, the current being generated by water power. The dynamos at the two stations, $3\frac{1}{4}$ miles apart, are coupled in series. The three mains are suspended on rubber insulators in part from wires spanning the canal and in part from the tunnel roof of the tunnel sections of the canal. Trolley arms of the usual type are used. The motor used on the tug which hauls upon the submerged chain is of 19 horse power, running at 900 revolutions per minute. During the passage through the tunnel the current is utilized to light the boat, and at night is used for this purpose during the entire run. The cost of the plant was about \$27,000, and a saving of \$800 a year is recorded.

RECENTLY PATENTED INVENTIONS.

Engineering.

COAL DUST AND AIR FIRING.—Constant Schmitz, Berlin, Germany. This invention provides a method of and apparatus for mixing coal dust and air in proper proportions for feeding to a furnace to obtain perfect combustion, the coal dust being fed into a chamber where air is in motion, and where the impurities may be separated from it, while by means of a blowing engine the mixed coal dust and air, through a connection with a feed device, are fed to the fire, the velocity of the air maintaining in suspension just the quantity of coal dust which can be burned in the most advantageous manner under the conditions presented.

VESSEL STEERING APPARATUS.—Sebastien Lacavalier, Caracas, Venezuela. This is an apparatus especially adapted for use in connection with a vessel of conical shape, adapted to go below the surface of the water, forming the subject of another patent issued to the same inventor. It is designed to facilitate steering the vessel either up or down, or to one side or the other, or to cause it to progress in a sinuous line. The apparatus comprises a box projected beyond the vessel and capable of revolving in its seat, a shaft carrying a rudder being mounted in the box and capable of turning with it, while the box and shaft are operated by mechanism within the vessel. Rudders are mounted on the sides of the vessel and operatively connected with each other, there being also a bottom rudder and an end rudder rotating about vertical axes.

Railway Appliances.

BRAKE SHOE.—James E. Worswick, Americus, Ga. This is an improvement on a former patented invention of the same inventor, and provides a combined brake shoe and dresser, the body of the shoe of soft metal, with transverse cutting faces of harder material extending flush with the outer face of the shoe, the shoe being of greater width than the tread of the wheel, and the outer edge of the cutting faces overlapping the rim of the wheel. The improvement is designed to keep in true shape the entire wearing face of the wheel, from the throat of the flange to the outer edge of the rim.

SWITCH ADJUSTER.—John Kortan, Jr., Detroit, Mich. This is a simple and inexpensive device for use on all kinds of street railways, for adjusting the swinging tongues of frogs without requiring the operator to leave the car. It comprises a vertically movable rod at the lower end of which is a blade having curved fingers extending on each side, and the rod having a handle with the same set as the blade.

RAILWAY SWITCH.—Louis V. Johnson, Brooklyn, N. Y. This switch is to be worked by contact of the wheels with a shifting device on the rails, but which may be passed over without working the switch if desired, the car automatically opening the switch if desired, and closing it after the car has passed. Combined with the switch point is a horizontally sliding shifting plate with a flange at each end, the flanges projecting above the tops of the rails for contact with the car wheels, and there being intermediate mechanism between the plate and switch point for operating the latter from the plate.

CAR FENDER.—Rafael Mayolini, New York City. This is a bow fender, readily transferable from one end of the car to the other, and made in two spring

sections, which, when curved, brought together and locked, are designed to completely guard the front of the car, the front and sides of the fender being cushioned to prevent injury to any one caught upon it. The connected fender sections may be quickly disconnected from the car platform, when the spring frames throw the sections outward, carrying with them to the sides of the track any interfering objects.

CAR FENDER.—Edward L. Kelly, Philadelphia, Pa. This fender consists of a wheel mounted on a vertical spindle carried by a bracket at the front edge of the car platform, the wheel extending horizontally entirely over and beyond the track rails on each side, and having an effective gripping surface at its periphery, to make a good hand hold for a person falling upon it. The wheel may be rotated in either direction to carry one to the side of the track, and the front edge of the platform above the wheel is covered by a buffer, with side cushions, to prevent injury to one falling upon the wheel.

Mining.

MINING MACHINE.—Frank S. Dobson, Vancouver, Canada. For raising gold from rivers, bars or flats, this inventor provides a vertically movable caisson in which is a central pump and agitator, with appliances whereby the water from the stream may be made to force the material to the pump and assist the agitator in removing it, or the water may be introduced to the pump and the agitator under pressure from the support of the caisson. All the interior parts of the caisson may be removed, leaving a clear shaft within which a miner may descend to prospect or run a drift or tunnel.

Mechanical.

STONE CUTTING MACHINE.—John G. Kouhoup, Jersey City, N. J. According to this invention a frame carries a stationary anvil provided with converging slideways in which knives are removably fitted, while a reciprocating die in the anvil-carrying frame has cutting edges registering with the knives of the anvil. This machine is very simple, and may be constructed as an attachment to an ordinary trip hammer. It is designed for rapidly splitting and cutting stones, and is especially adapted for forming cobble stones or other small stone blocks.

COATING AND PRINTING PAPER.—James E. Gledhill, New York City. Two machines are arranged side by side for this work, according to this invention, one receiving the paper from the other, two rolls arranged at right angles to each other being arranged in the path of travel of the paper between the two machines, the paper passing first under one roll and over it in a transverse direction, and under the second roll and over its top, to pass in a parallel direction to the second machine.

DRIVE WHEEL FOR ELEVATORS, CARRIERS, ETC.—George S. Fouts, San Jose, Cal. According to this improvement the pulley supports movably connected clamping sections which may move into and out of binding contact with the cable, to permit the cable to move freely between the sections as it moves into contact with the wheel, and then to cause the sections to press upon the cable during a portion of the revolution of the wheel, thus driving the cable without any slipping. The device adjusts itself to carrier flights or other projecting portions on the cable, or to sticks or other obstructions between them and the band clamping sections.

Agricultural.

PNEUMATIC STACKER.—Thomas Kirshman, California, Mo. For effectively carrying the straw, chaff, etc., from the discharge end of a thrashing machine to any desired place, this invention provides for a vertical fan to be secured to the rear end of the machine over the discharge opening, the opening becoming the eye of the fan, into which the straw and chaff are discharged, to be driven from the fan into and through an appropriate discharging trunk or chute. The discharging pipe has an elbow mounted to turn and loose sections connected by links, and may be raised and lowered without disconnecting the sections.

INCUBATOR.—Norman McAslan, Briggs, Neb. The case of this incubator has a series of egg compartments in which the egg trays are so arranged that the eggs may be subjected to different degrees of heat, according to the length of time which the eggs have been in the incubator. An improved method of ventilation is provided, and the heating apparatus is so arranged that the temperature may be controlled to a nicety, the heat being regulated by a thermostatic device.

Miscellaneous.

BICYCLE DRIVING GEAR.—Thomas M. Crepar and Hugh Hunter, Clare, Mich. The pedals are arranged to move up and down in the segment of a circle, according to this improvement, instead of the rider being compelled to follow the pedals with the feet in a circle, a simple transmitting mechanism actuated by the pedal levers imparting a rotary motion to a driving sprocket wheel of the ordinary kind. The simple up and down movement of the feet, with the use of a large sprocket wheel, is designed to facilitate the attainment of great speed with the least effort.

BICYCLE HABIT.—Herbert Luey, Brooklyn, N. Y. This improvement comprises a skirt divided at the back and made with folds at the rear which are combined with interior partitions forming leg portions. When the garment is in use the limbs are free to work the pedals, the folds falling on each side of the saddle, and when the rider steps from the machine the rear folds close into the appearance of an ordinary skirt, no difference from which can be detected either at the front or rear.

UMBRELLA FRAME.—Daniel H. Redmond and Chalkley B. Baldwin, Philadelphia, Pa. This invention provides an extremely simple method of forming the joints connecting the umbrella ribs with the stretchers or braces by the employment of a light and efficient clip, whereby the rib is strengthened in what has heretofore been its weakest point, and may be made very light.

FOLDING UMBRELLA.—Frank G. Grove and Don P. Lillard, Luray, Va. This is an improvement upon a former patented invention, providing an extensible brace which is easily operated, cheap and very strong. The stick is made up in sections screwed together, and each brace comprises a hollow inner section and an outer section, the sections sliding upon each other. When the umbrella is spread the braces slide out until the springs catch and lock the cover in extended position, and in folding the stick is reduced to compact shape, the tip removed, the braces collapsed and the cover folded in.

FENCE WIRE STRETCHER.—John O. Walton, Belle Vernon, Ohio. To draw and tighten fence

wire without making short bends which might injure the wire, this inventor has devised a simple device which may be readily attached to a fence for this purpose without cutting the wire or taking it down from its fastenings. The device has a central cast iron hub-like portion from which project wings with narrow throat-like ways, so arranged that by turning the hub in either direction by means of a wrench, in using the improvement, the throat ways pass over the wire strand and wind it about the hub until the desired tension is attained.

SWIVEL COUPLING FOR VEHICLES.—Brown Henley, Hillsville, Pa. This is an improvement designed for employment in the front axles of carriages and wagons, the lower member of the coupling having opposite recesses in the outer side of its exterior circular flange, and the upper member having opposite notches in the edge of its outer flange to engage the lower member. The clips employed have claws fitting the notches and entering the recesses, the latter being elongated to allow of some lateral movement of the claws. The clips serve as stops, limiting the degree to which the axle may turn, and also secure the axle to the spring, preventing lateral movement of the latter without weakening it.

COMBINATION TABLE.—Francis J. Mercet, Baltimore, Md. A table adapted to inclose and hide a gas stove, or form a base for it in use, has been patented by this inventor. It has a hollow body with a longitudinal partition, and across the partition are guide-ways on which is an adjustable sliding dish shelf, the top being made in two parts, hinged at about the middle. Besides its use as a kitchen table when opened, it may serve as a library or sitting room table when closed up, being especially designed for use in light housekeeping in flats or apartments.

MATTRESS.—Morris Rude, New York City. This mattress presents special conveniences for handling while turning or airing, and is arranged to be bound loose or tight, as may be desired. It has a string alternately engaging part of the top and part of the bottom, the drawing upon the string compressing the mattress at opposite faces. The string is drawn through different sets of eyelets, and thus forms several transverse series of loops on the top and bottom faces of the mattress.

COPYING BOOK BRUSH CUP.—George J. Wohlman, New York City. This is a narrow, pan-like vessel with a cover across one end and a grating extending nearly its whole length just over the water. The grating is removable to facilitate cleaning, and the brush, when not in use, is ordinarily laid flat on the grating.

HOT WATER FURNACE.—Edwin F. White, Hollidaysburg, Pa. A horizontal partition forms the top of the fire box of this furnace, and there is a chamber under the grate at its front end and connected with the water return pipes, pipes leading from the chamber extending under the bars of the grate to the rear of the bridge wall and then upwardly, each pipe then forming a horizontal coil under the partition, over which is a second coil discharging into a chamber connected with the outflow pipes. The construction is designed to afford quick circulation and utilize the fuel to the fullest advantage.

HEEL.—William Wass, Philadelphia, Pa. This invention relates to the employment of detachable wear plates upon boot and shoe heels, and provides an attaching plate fastened to the heel proper and a wear plate held in locking engagement with, but removable from, the attaching plate. The wear plates are inter-

changeable as rights or lefts, so that the plates may be worn down evenly.

CAROUSEL.—Milton T. Weston, Kenton, Ohio. In the construction provided for under this patent the carriages may swing outward from their supporting arms at angles varying with the velocity at which the revolutions are made. Each carriage is also provided with its own driving mechanism, operated by pedals by those occupying the carriage, and all the carriages being connected with a multiple drum, one section only of which is connected with one carriage.

TRUSS.—Douglas Reid, New Richmond, Wis. This truss is designed not to bind the hips or interfere with the free movement of the limbs. The pressure of the pad may be regulated by drawing together the rear portions of the band, the springs being designed to afford only the lightest necessary pressure.

WATER CLOSET FLUSHING TANK.—Richard A. L. Blondel, Boston, Mass. According to the improvements covered by this patent, the discharge valve, valve seat and attachments are removably and adjustably connected with the "spud" in the bottom of the tank, and the disagreeable sound caused by the passage of air through the overflow pipe at the time of discharge of water from the tank is prevented. The flushing or main discharge valve is automatically locked and held open for a certain length of time, and then released and caused to close slowly and noiselessly.

CASTRATING FORCEPS.—Ned Farish, Jackson, Miss. This is a tool in which a medicated sponge is held on the upper jaw in front of the knife to reduce loss of blood and obviate the use of clamps, etc.

Designs.

INLET VALVE CASING.—Richard A. L. Blondel, Boston, Mass. This design comprises a horizontal flange or extension of the body of the valve casing in connection with a vertical cylindrical offset arranged beneath and joined with the flange.

BRUSH BACK.—Charles Osborne, New York City. This back is ornamented with forget-me-nots and conventionalized floriate scrolls framing a plain surface, with festoons beneath a shell-like figure at the top of such surface.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

SCIENTIFIC AMERICAN BUILDING EDITION.

JUNE, 1895.—(No. 116.)

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2. An elegant plate in colors showing a cottage at Bronxwood Park, Williamsbridge, N. Y., recently erected at a cost of \$2,200. Perspective view and floor plans. Mr. A. F. Leicht, architect, New York City. A neat design.
3. A cottage at Flatbush, L. I., recently erected for W. K. Clarkson, Esq., at a cost of \$5,000. Perspective elevation and floor plans. Mr. Christopher Myers, architect, New York City. A picturesque design.
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Notes & Queries

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Names and Address must accompany all letters, or 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.

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Minerals sent for examination should be distinctly marked or labeled.

(6550) F. W. L. asks: 1. What is a good dressing for leather belts, also for rubber belts? A. Lubricator for Belts.—Five parts of India rubber are cut fine and melted together with 5 parts oil of turpentine in an iron, well covered vessel; then add 4 parts of resin, stir well, melt, and add 4 parts of yellow wax, stirring constantly while melting. This mixture while warm is added, with constant stirring, to a melted mixture of 15 parts fish oil and 5 parts of tallow, and the whole is agitated until it has congealed. The mass is applied to old belts upon both sides in a warm place, and when the belts are in use, from time to time upon the inner side. By this treatment they become very durable.

2. How can I make a good cement for holding the splices of a leather belt? A. Leather Belting, Cement for.—Take of common glue and American isinglass, equal parts; place them in a boiler, and add water sufficient to just cover the whole. Let it soak ten hours, then bring the whole to a boiling heat, and add pure tannin until the whole becomes ropy or appears like the white of eggs. Apply it warm. Buff the grain off the leather where it is to be cemented; rub the joint surfaces solidly together, let it dry a few hours, and it is ready for practical use; and if properly put together, it will not need riveting, as the cement is nearly of the same nature as the leather itself. 3. What is the best commutator lubricant? A. Heavy petroleum oil applied very sparingly with a cloth slightly moistened with the oil. 4. How can I find the horse power of a common slide valve engine? A. Horse Power of Steam Engines.—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 formulae or expansion table, multiply the boiler pressure for $\frac{1}{2}$ cut-off by 0.91, for $\frac{3}{4}$ cut-off by 0.85, $\frac{3}{8}$ 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.

(6551) N. A. D. writes: In getting ready to start our engine, we found that the valves would not work. We removed the cylinder head to ascertain the cause, and we found four of the bolts broken, or the heads snapped from the bolts that hold the following head. The engine was left at half stroke, and the force was great enough to fly from the following head down to bottom valves. No water or ice in cylinder. Corliss engine, one hundred and eighteen horse power. I am at a loss to know the cause of the breakage. Will you explain? A. The breaking of a follower bolt is not unusual, but that four should break at the same time is inexplicable. Possibly they have not broken at once, but consecutively, and taken refuge in the exhaust valve until their number made an obstruction.

(6552) P. J. M. asks what the word horizon means in patents. A. It means the same as it does in any connection, i. e., the most remote visible limit of the earth's surface, or a line parallel with that limit where it adjoins the sky.

(6553) M. E. K. asks how pipes can be stopped leaking where they screw in the fittings on a hot water system. I am having some trouble with them and cannot stop the bad ones. A. The leaky pipe joints show bad work in putting together. Clamps can be made to fit the joints and bolted on with packing of iron

putty or rubber. The correct way is to take the work apart and make up the joints properly.

(6554) C. A. B. writes: 1. In the electric chime described in Hopkins' "Experimental Science" page 814, are the bells all of one size or will it be necessary to make a pattern for each? A. The bells are of different sizes. You could doubtless save money by purchasing the bells ready tuned. 2. How much wire will it want on the spool of the magnet for a bell with a 6 inch rim? A. Probably $\frac{1}{2}$ ounce of No. 24 wire on each spool will be right for a battery current.

(6555) S. W. asks how fast a boat 12 feet long, 33 inches beam, using a 6 inch 2 bladed propeller, can travel in calm water. The boat is good model. For motive power I wish to use the simple electric motor described in SUPPLEMENT, No. 641, running it with 4 cells of storage battery. How long can I run the boat and shall I use a flat or round belt? A. Four miles per hour is as much as you can expect with the motor and battery named. You should have not less than 6 cells. We do not recommend a belt. Use cut gearing and bring the shaft down to the motor. You may run from 6 to 8 hours.

(6556) F. H. writes: Suppose a circular piece of metal $2\frac{1}{2}$ inches diameter, and of certain thickness, weighs 10 pounds. How to find the weight of a double diameter (5 inches) piece of same thickness as former, then weight of a triple diameter, etc. A. The weights are as the areas. For the area, square the diameter and multiply by 0.7854. Twice the size is four times the weight for equal thickness.

(6557) J. B. B. writes: A young mechanic made the assertion the other day that if a gage was put under the bottom of a steam boiler and the boiler was put in use, the gage would only show the pressure of the water. I should think that the gage would show the pressure of the water plus the pressure of the steam. A. The gage will show the steam pressure added to the water pressure, as you suggest.

(6558) S. W. L. says: Will you please publish in your query column a receipt for making printer's tablet glue? A. The composition is said to be prepared as follows: Glue, 4 pounds; glycerine, 2 pounds; linseed oil, $\frac{1}{2}$ pound; sugar, $\frac{1}{4}$ pound; aniline dyes, q. s. to color. The glue is softened by soaking it in a little cold water, then dissolved together with the sugar in the glycerine, by aid of heat over a water bath. To this the dyes are added, after which the oil is well stirred in. It is used hot. Another composition of a somewhat similar nature is prepared as follows: Glue, 1 pound; glycerine, 4 ounces; glucose sirup, about 2 tablespoonfuls; tannin, one-tenth ounce. Give the composition an hour or more in which to dry or set before cutting or handling the pads.

NEW BOOKS AND PUBLICATIONS.

MONEY SYSTEMS OF THE WORLD.
A study of present currency systems and statistical information relative to the volume of the world's money. With complete abstracts of various plans proposed for the solution of the currency problem. By Maurice L. Muhleman. 1895. New York: Charles H. Nicol. Pp. 198. Price \$2.

A great amount of very curious and interesting information is contained in this work. We do not care to investigate the author's private views, but the simple information as to the standard coins of different countries is of much interest, and the archaeological point, that it is very difficult to supplant a coin of long acceptance, is brought out very clearly in respect to many lands. It really seems strange that mankind should be willing to live in so confused a state as regards measures and weights, and Mr. Muhleman's book is merely another demonstration of the fact that it is very hard to bring about a change for the better.

THE BROWNIE SONG BOOK. A book of brownie songs for children (young and old). Words and music written, composed and adapted by S. G. Pratt. London: Stanley, Lucas, Weber & Co. Chicago: Laird & Lee. Price 50 cents.

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