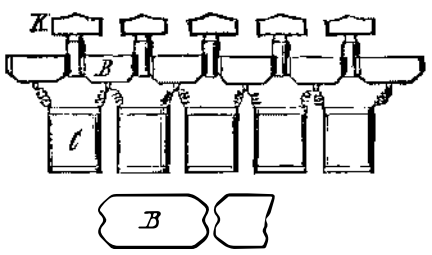
(12) H. A. D. writes: 1. How can I fix up a small, cheap electric light so as to exhibit it before a large class? A. The simple electric light apparatus described in SCIENTIFIC AMERICAN SUPPLEMENT No. 149 would probably answer your purpose. 2. How much battery power would I require? A. 6 or 8 Bunsen cells. 3. Would a machine 7x4 inches generate sufficient electricity for it? A. As we do not know what kind of machine you refer to we cannot say SUPPLEMENT No. 161 contains instructions for making a machine that will answer the purpose. 4. Should I use an induction coil? A. You may obtain beautiful effects by using an induction coil in connection with vacuum tubes, but a very brilliant light cannot be obtained in this way. 5. Have you given information as to how to make induction coils? I am getting up some experiments for the purpose of giving a free exhibition to school children. By answering the above, you will confer a favor on an amateur, and may thus stimulate young minds to look into facts for themselves. A. SCIENTIFIC AMERICAN SUPPLEMENT No. 160, will contain full instructions for making induction coils.

(13) H. C. and others.—The principle of the rheostat may be understood by referring to the engraving. Several coils, C, of measured resistance, are connected with brass blocks, B, which are fitted into



the top of the instrument. The first brass block is connected with one terminal of the first resistance coil; the second brass block is connected with the other terminal, and with one terminal of the second coil; the other terminal of the second coil is connected with the third brass block, and so on. The adjacent ends of the blocks are notched to receive the keys, K. Whenever one of the keys is inserted, the coil immediately below it is cut out of the circuit, and the current passes directly from one of the brass blocks to the other, through the key.

(14) J. M. asks how the wire should be wound on an electro-magnet. A. The manner of winding the wire on an electro-magnet is shown so clearly in the cuts as to require little explanation. Fig. 1 shows the two soft iron cores separated from the soft iron bar to which they are attached after being wound.

Fig. 1. Fig. 2.

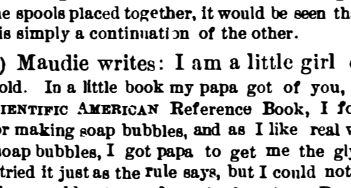
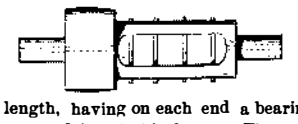


Fig. 2 shows the manner of connecting the spools of a U electro-magnet. If the iron core were straightened and the spools placed together, it would be seen that one spool is simply a continuation of the other.

(15) Maudie writes: I am a little girl eight years old. In a little book my papa got of you, called the SCIENTIFIC AMERICAN Reference Book, I found a rule for making soap bubbles, and as I like real well to blow soap bubbles, I got papa to get me the glycerin and I tried it just as the rule says, but I could not make any, they would not even form in the pipe. Papa says perhaps the printer made a mistake and that I might write to you about it. I have tried so many ways to make soap bubbles that papa calls me his little chemist and says I ought to have been a boy. The best way I have found is to put half an ounce of castile soap into a pint of distilled water. I have blown bubbles from this 4 inches through that would last 2 minutes, and I have blown them as large as 7 inches through. A. You probably used too much water or diluted glycerin. The receipt, which we have often tried with very satisfactory results, is given by Professor Josiah P. Cooke, as follows: "Procure a quart bottle of clear glass and some of the best white castile soap (or, still better, pure palm oil soap). Cut the soap (about 4 ounces) into thin shavings, and, having put them into the bottle, fill it up with distilled or rain water, and shake it well together. Repeat the shaking until you get a saturated solution of soap. If on standing, the solution settles perfectly clear, you are prepared for the next step; if not, pour off the liquid and add more water to the same shavings and shake as before. The second trial will hardly fail to give you a clear solution. Then add to two volumes of soap solution one volume of pure concentrated glycerin." "The New Chemistry," p. 29. Grand soap bubbles can be blown with this preparation.

(16) G. F. C. asks how to make a simple wire straightener? A. Such a tool is shown in the accompanying cut. It consists of a casting about 10



inches in length, having on each end a bearing which may be supported in suitable boxes. The pulley is a part of the casting, and is 3 inches in diameter and two inches wide. Four steel pins are inserted 1 inch apart and a little to one side of a central longitudinal line. A hole a little larger than the wire to be straightened is drilled axially through the bearing. The wire passes through the tool over and under the steel pins. It is well lubricated and is pulled through as the tool revolves.

(17) C. M. sends the following formula: To find the area of a circle, multiply the square of the diameter by 77, divide the product by 100, and add to the result 2 per cent of same (that is, increase the result by 2 per cent). Do you consider the above an easier rule than the usual one (r^2. [π]. 3·1416), the solution being identical? Your formula in SCIENTIFIC AMERICAN Reference Book brings the same result. A. In many cases the rule given by you would be simpler.

[OFFICIAL.

INDEX OF INVENTIONS

FOR WHICH

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

November 19, 1878,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

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