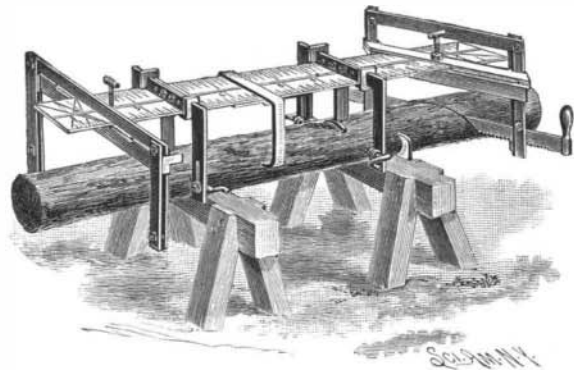


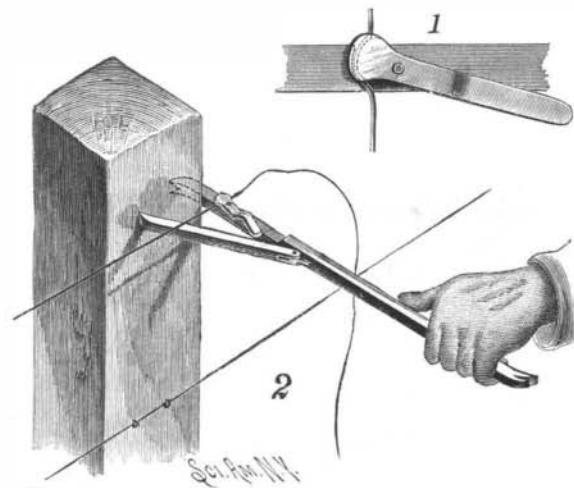
my fifth report on the insects of Missouri, 1871, pp. 103-8. My first acquaintance with it was through Mr. Arthur Bryant, of Princeton, Illinois, a brother of the late William Cullen Bryant. Mr. Bryant had a beautiful hickory grove of trees growing on rich soil bordering on Bureau River. The hickory was the bitter-nut and this borer had sadly thinned out the beautiful grove at the time he sent me specimens.

In connection with the illustration it is hardly necessary to describe the characteristic burrows, which



JOHNSTON & SANDBERG'S SAW GUIDE.

it is needless to state are made by the larvæ. The beetles issue from the tree the latter part of June and early part of July, and, after pairing, both sexes bore into the tree, the male for food and the female mostly for the purpose of laying her eggs. In thus entering the tree they bore slantingly and upward. The female, after boring through the bark, makes a vertical chamber and places her eggs on either side of it. She frequently dies in this chamber, and ordinarily her remains will be found after her progeny have commenced working. The larvæ bore their little cylindrical channels, at first transversely and diverging, until finally the burrows are lengthwise with the bark. They always crowd the widening burrows with their pow-



DURR'S FENCE WIRE STRETCHER.

dery excrement, which is of the same color as the bark. The full-grown larva is soft, yellowish and without trace of legs. It remains torpid in the winter and transforms to the pupa state during the following May. The exit holes from which the newly developed beetles issue are direct from the sapwood and not slanting, as in the case of the entrance holes, and a tree badly infested looks as though it had been peppered with No. 8 shot.

The sexes differ considerably from each other, the males having four spines on the truncated portion of the abdomen not possessed by the female. The eggs

are deposited during the months of August and September, and the whole transformations are effected within one year, as no larvæ will be found remaining in the tree during the latter part of July. The description was originally drawn up from the female only, and after the male was discovered it was found to be the *Scolytus 4-spinosus* of Say, the female of which had not been previously known. Hence the proper name of our hickory bark borer is *Scolytus 4-spinosus*.

The larger elliptical or flattened burrows in the piece of wood sent by Mr. Spaid are made by a long-horned beetle (*Saperda discoidæ*, Fab.), a species which is almost invariably found associated with the bark borer in its destructive work.

There are several parasites, as, for instance, *Spathius trifasciatus*, Riley, and *Bracon scolytivorus*, Cress., which prey upon this bark borer, and fortunately keep it in check.

So far as remedies are concerned, the habits of these bark borers rather defy our efforts to prevent their injury, especially on large trees and in large groves. There are two methods of dealing with them: *i. e.*, to cut down and use the trees the moment they are noticed to be attacked, and to encourage the natural enemies which are already helping. The species affects most of the species of the genus *Carya*, including the bitter-nut, shell-bark, pig-nut and pecan.

A SAW GUIDE TO FACILITATE LOG SAWING, ETC.

A device by means of which a saw may be conveniently guided in making straight or angular cuts, at measured distances or otherwise, is shown in the illustration, and has been patented by Messrs. Henry L. Johnston and John E. Sandberg, Butte City, Montana. A top plate having graduations and angle lines is supported in two or more carriers, each having a leg with curved foot resting on top of the log, while the head of each carrier has apertures for the horizontal members of L-shaped arms to be bolted together on top of the plate, and adjustable to fit over logs of different diameters. The vertical members of the arms have slots, in each of which is adjustably held a bolt with handled screw rod to fasten the arms in place on the log to prevent lateral shifting of the plate. That the plate may be conveniently folded, it is made in two parts hinged together, and one leg of an L-shaped arm extends over the hinge joint, the other leg having a point adapted to be driven into the side of the log. In each of the free ends of the plate turns and slides a set screw screwing in the top of a frame on the top of the plate, and in the ends of this frame are vertical guide-ways in which slide the ends of a frame supporting vertical bars held a sufficient distance from the frame to permit a free passage of the saw blade. The frame and its bars straddle the log, and the saw is reciprocated through the space between the depending ends of the frame and the bars, set screws resting on the back of the saw and permitting the frame to descend as the depth of the cut increases. Before commencing to saw, the operator adjusts the frame to the desired graduation on the top of the plate, when the saw in its downward movement follows the position of the frame, so that the angle indicated on top of the plate will correspond with that of the cut made by the saw. The several parts of the device may be readily taken apart and folded up in small compass for carrying.

A CHEAP AND SIMPLE FENCE WIRE STRETCHER.

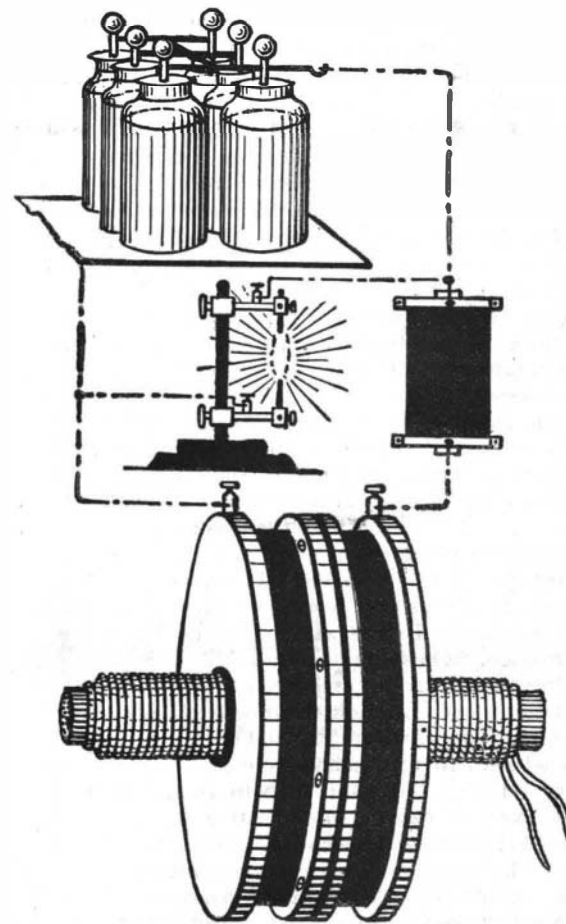
This improved tool for stretching wire strands while applying them to fence posts, holding the wire taut while the operator drives a securing staple in the post, has been patented by Mr. Franklin Durr, of Pittsfield, Ill. The main bar or lever of the implement has toes

on its forward side edge, and there is an open recess on its top side, the forward shoulder of the recess being curved toward the end of the lever and slightly rounded. On the recessed part of the lever a locking limb is pivoted, as shown in Fig. 1, the end of such limb being rounded to form a crimping shoulder, and a guard flange projecting over the forward shoulder of the recess in the lever, to prevent a gripped wire from slipping off the shoulder. An offset bend in the handle portion of the locking limb enables the operator to work this piece without injury to his hands. A brace bar is pivoted to a side edge of the lever, to be brought in engagement with a post, as shown in Fig. 2, when the proper strain has been produced upon the strand, the brace bar then holding the wire taut until it is permanently secured, and preventing a recoil movement of the lever. With this tool one man can readily build a long line of barbed wire fencing without assistance in the matter of stretching and securing the wire strands.

AN INDUCTION COIL FOR ALTERNATING CURRENTS.

R. W. WOOD.

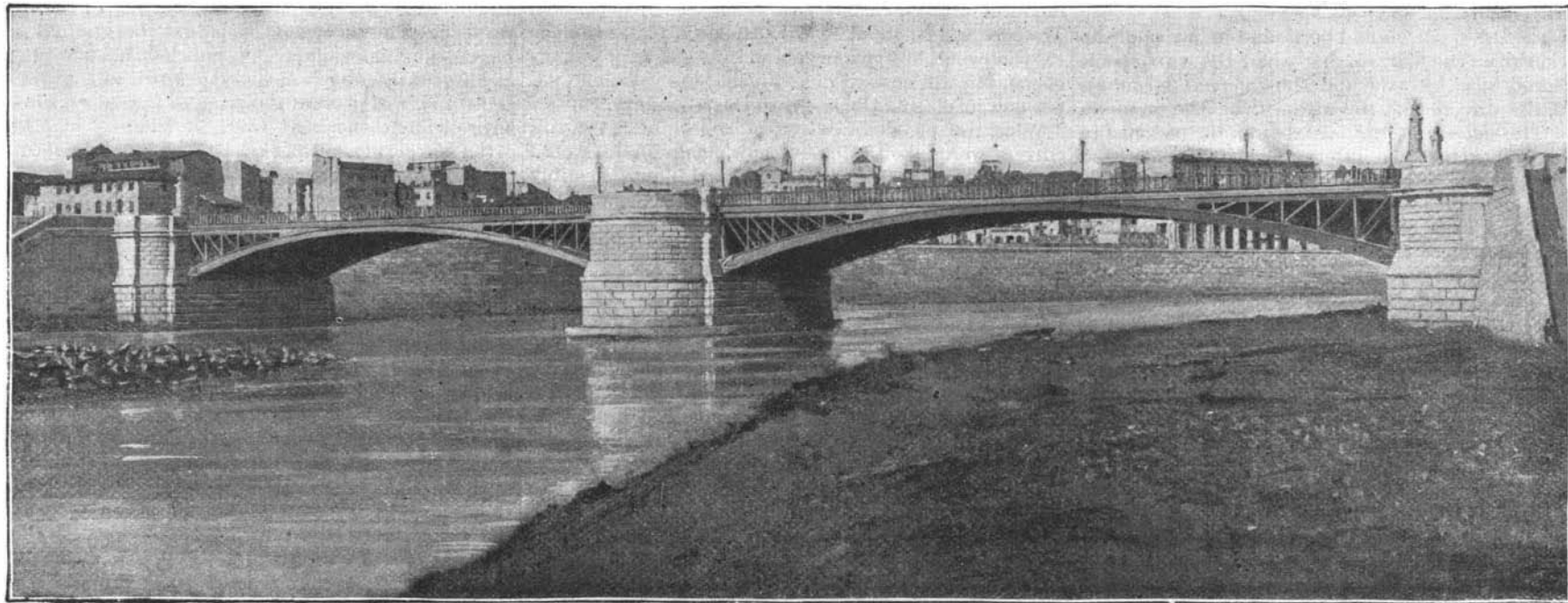
As the ordinary Ruhmkorff coil is not well adapted for use with alternating currents, and as no coils are



INDUCTION COIL FOR ALTERNATING CURRENTS.

on the market capable of being run to advantage by currents supplied for illuminating purposes, I think that the description of a cheap but powerful instrument will be of general interest to the readers of the SCIENTIFIC AMERICAN.

For spectroscopic and other work requiring a powerful discharge, it has been customary to employ a large Ruhmkorff coil in connection with a galvanic battery; but this form of apparatus, owing to the large initial cost and the expense of constantly renewing the cells, is not as suitable or economical as an instrument that can be run by currents, furnished at low cost for light-



THE GARIBALDI BRIDGE OVER THE RIVER TIBER AT ROME.—[See page 150.]