

anvil being then screwed up until the plates of metal are firmly held between it and the two insulating legs secured to the upper limb of the copper bar. The face of the bar is covered with insulating material, except at a central point where it is left bare, and, when forced against the rivet, the latter establishes connection from the upper limb of the primary bar to the lower limb, the current developing sufficient heat to make an upsetting of the rivet shank very easy under the pressure of the screw.

The Benardos-Howard electric welding process is again discussed in English technical journals, and results of the actual workings of the system are now made public. The Benardos apparatus was first brought out in Russia about four years ago, and differs essentially in its form and uses from the Thompson machines in general use in this country. For two years the system has been used at Birmingham, England, in the works of Lloyd & Lloyd, under the charge of Mr. Henry Howard, and it is now pronounced commercially practical and economical. The principal consists in the con-

centration of heat upon a small area by means of the electric arc. With his work connected to one pole of the dynamo, either by a flexible lead or by lying on an iron bench in communication with the mains, and with a carbon joined to the other pole of the dynamo and carried to a non-conducting handle, the smith can apply the arc just as he sees fit, either concentrating it in a spot the size of a quarter dollar, or moving it over a narrow line. When the metal is sufficiently melted the arc is shut off and a few blows of the hammer finish the weld. Messrs. Lloyd state that their experience indicates that this process cost only a fourth of gas welding, but they do not contend that it is said, the substitution of the arc for the smith's fire, for work that can be done in the latter. For plain work, the smith can certainly excel in speed and cost. It is at the point where an ordinary smith has to confess himself beaten, and the most skilled members of the craft make numerous wasters, that the electric process begins to make its advantages felt.

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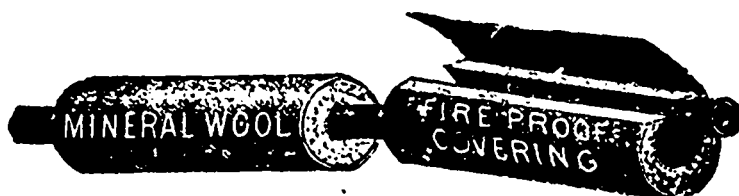
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