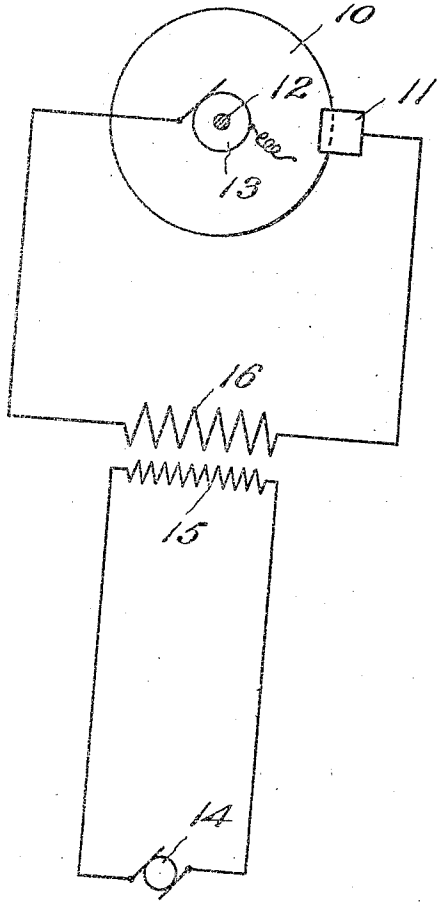
H. A. HOLZ AND F. P. FAHY.
PROCESS OF SCORING METAL.
APPLICATION FILED MAR. 21, 1918.

1,333,311.

Patented Mar. 9, 1920.



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UNITED STATES PATENT OFFICE.

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PROCESS OF SCORING METAL.

1,333,311. Specification of Letters Patent. Patented Mar. 9, 1920.

Application filed March 21, 1918. Serial No. 223,720.

To all whom it may concern:

Be it known that we, HERMAN A. HOLZ and FRANK P. FAHY, citizens of the United States, and residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Processes of Scoring Metal; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In a pending application for United States patent filed by Herman A. Holz, on March 16th, 1918, bearing Serial Number 222,934, there is described and claimed a method of marking, scoring or cutting metals by the frictional action of a rapidly moving smooth metal surface, the effect of which is progressively to fuse particles of the metal to be cut along the line of severance and to carry away the particles as fast as they are thus fused. The advantages of the process in question are set forth in said pending application for patent. The tool employed in this process is of such a nature and is so employed that each element upon the active surface is brought back to the point of action periodically and a period of inactivity is thus provided during which such element is cooled by its rapid movement through the air. While a rotating disk is used in this connection, it is not indispensably necessary that the tool should have that form. Furthermore, it is not essential that the disk or other tool should be made in one piece having an active edge, since, if desired, the active edge may be attached to a body portion of a material not in itself suited to carrying out the process in question. This active edge is smooth and is applied to the metal to be scored or severed with light pressure.

Our invention relates to an improvement upon this process wherein the metal acted upon is subjected to auxiliary heating from any suitable source, such as a gas flame or electric current, during the operation. By this expedient the heat of fusion is not created exclusively by the frictional action of the tool, and in some cases this frictional action may be so reduced as to accomplish little more than the carrying away of the fused particles. As the severing or scoring tool is in contact with the passive material only at a small surface, said tool will not be unduly heated, and during the time that any given element is not at such point of contact it will be cooled by its rapid movement through the air.

It will be obvious that, by thus applying auxiliary heat directly to the point of action of the tool we may either lessen the time required for accomplishing a given amount of work, or we can accomplish the same amount of work in the same time with a less expenditure of energy in the tool. As already stated, it will be within the scope of the invention to make the tool act substantially exclusively to remove the fused particles, the auxiliary heat being relied upon to accomplish the fusion.

Any source of heat may be employed within the scope of the invention, but we prefer in most cases to employ electric current passing between the tool and the metal to be acted upon at the point of contact. The heating effect thus produced is analogous to that which is familiar in the art of incandescent electric welding.

It is well understood that the generation of heat in an electric circuit can be localized by providing ample conductivity in those parts of the circuit intended to be kept cool, while greatly increasing the resistance at the point to be heated. In electric welding this increased resistance is usually provided by producing an imperfect contact at the point to be heated. This imperfect contact we produce by causing the rapidly moving tool to exert a relatively light pressure upon the passive material. We prefer, for this purpose, to use alternating current of low voltage and high amperage but it is, of course, within the scope of our invention to use direct current for the purpose set forth. It will be seen that by this use of a suitable heating current in combination with a smooth tool moving very rapidly in the manner mentioned, we are enabled to secure a very efficient scoring or severing action with a small exertion of energy in the tool used.

The accompanying drawing is a diagrammatic representation of one form of apparatus whereby our improved process may be carried out.

Here the friction wheel 10 (driven by any convenient means not shown) is applied to the cutting of a piece of metal 11. The shaft 12 of the wheel is provided with a collecting

ring 13 which is in permanent electric connection with the wheel 10, as shown.

The alternating current generator 14 supplies current to the high tension coil 15 of a transformer, and the extremities of the low tension coil 16 of the transformer are connected respectively to the ring 13 and the metal 11. The current of large volume thus applied to the work becomes the auxiliary heating agent.

Our invention is quite independent of the specific form of tool used and relates solely to the process of treatment to which the passive material is subjected.

What we claim is—

1. The process of marking, scoring or severing metallic material which consists in subjecting the same to the frictional action of a rapidly moving surface while applying an auxiliary heating agency locally to the point of contact, until the temperature produced is sufficient to cause fusion of passive material which is thereupon carried away progressively by said moving surface.

2. The process set forth in claim 1, wherein the auxiliary heating is produced by an electric current passing across the point of contact between the tool and the passive material.

3. The process set forth in claim 1, wherein the elements of the moving surface are caused to return periodically to the point of action and are cooled during their periods of inaction.

In testimony whereof we affix our signatures.

HERMAN A. HOLZ.
FRANK P. FAHY.