

UNITED STATES PATENT OFFICE.

ALFRED BENJAMIN, OF NEWARK, NEW JERSEY.

IMPROVEMENT IN HARDENING STEEL WIRE AND THIN SHEETS OF STEEL.

Specification forming part of Letters Patent No. **141,105**, dated July 22, 1873; application filed July 17, 1873.

To all whom it may concern:

Be it known that I, ALFRED BENJAMIN, of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Process of Hardening Steel Wire and Thin Steel; and I 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 pertains to make and use it.

My invention relates to a new process of hardening steel wire or thin steel, and consists as follows: The wire or thin steel is heated to a red heat by any of the known processes for uniform heating. It is then taken from this heat and subjected immediately to a strong blast of air or gas, so as to cool it rapidly, varying the temperature of the air-blast and its degree of velocity, as may be required to give to the steel wire or thin steel the requisite degree of hardness. After this the substance may be tempered, as desired, for the various uses to which the material is to be applied.

These processes may be made continuous, so that while one portion of the material is being heated another portion is under the blast of air, while another portion may be in the tempering process; or two of the processes may be made thus continuous, as the heating and hardening processes, for instance.

I would have it understood that I use a strong blast of air or gas. I have found that a No. 7 Sturtevant pressure-blower, revolving at the rate of fourteen hundred to eighteen hundred revolutions per minute, and forcing its blast through an aperture about twenty

inches by two inches, produces a satisfactory result, and performs the work with the desired rapidity, when the steel wire or thin steel is drawn through the blast at the rate of twenty yards to thirty yards per minute.

I know that wire has been treated to a similar process, except that, instead of a blast of air for the purpose of hardening, a liquid has been employed; but, besides requiring a second treatment to clear the liquid from the wire, there is a great waste of oil.

I claim neither the process of heating nor the final process of tempering; but

What I do claim is—

1. The process of hardening steel wire or thin steel by treating it, when properly heated, to a strong blast of air or gas, substantially as herein set forth.

2. The continuous process of treating and hardening steel wire or thin steel, wherein the material, as it emerges from the heating process, passes at once into a strong blast of air or gas, substantially as described.

3. The continuous processes of heating, hardening, and tempering steel wire or thin steel, wherein the material, as it emerges from the heating process, passes through a strong blast of air or gas, and thence into the tempering process, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 17th day of July, 1873.

ALFRED BENJAMIN.

Witnesses:

WELLS W. LEGGETT,
EDM. F. BROWN.