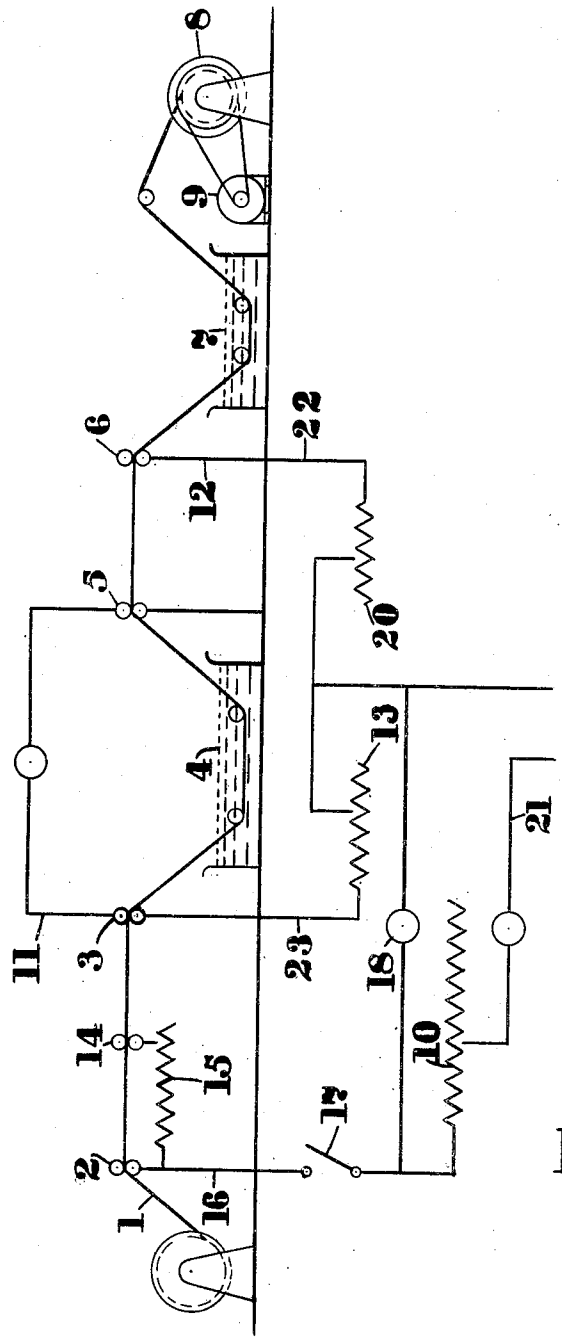
H. ALEXANDER, W. T. VINT & A. IMBERY.

ANNEALING METAL WIRE BY ELECTRICITY.

APPLICATION FILED JUNE 6, 1918.

1,285,887.

Patented Nov. 26, 1918.



Inventors

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ANNEALING METAL WIRE BY ELECTRICITY.

1,285,887. Specification of Letters Patent. Patented Nov. 26, 1918.

Application filed June 6, 1918. Serial No. 238,499.

To all whom it may concern:

Be it known that we, HERBERT ALEXANDER, WYNDHAM THEODORE VINT, and ARTHUR IMBERY, all subjects of the King of Great Britain, residing at 1 Charmouth street, Leeds, in the county of York, England, have invented certain new and useful Improvements in Annealing Metal Wire by Electricity, of which the following is a specification.

The annealing and tempering of traveling steel and other metal wire has previously been accomplished by its being made to form a part of an electric circuit, the ohmic resistance of the wire with the requisite amount of current flowing automatically producing the desired heat. Our improvements in this process consist in the provision of means for the gradual heating of the wire when first entering the apparatus or after emerging from a cooling bath therein, or at both these stages of the process.

Describing an embodiment of the invention applied to annealing steel wire with reference to the accompanying diagram, the wire, indicated by the reference numeral 1, is passed between a pair of rollers or grooved pulleys at 2, thence to another pair of rollers at 14 and a third pair at 3, then through an oil bath or other cooling bath 4, then between two more pairs of rollers 5, 6, through another cooling bath 7, and on to a drum 8 driven by a motor 9 or other means. The alternating current is carried by an insulated cable 16 to a suitable contact stud attached to one of the first pair of rollers 2, whence it flows through the wire to the pair of rollers 3, the value of the current in the wire being adjusted by means of a variable resistance at 10 in series with the main supply so as to regulate the extent of heating of the wire. Alternatively the temperature of the wire may be regulated by variation of supply pressure or other known means. An adjustable resistance 15 is connected from the supply lead 16 to the said intermediate rollers 14, so that any desired current value can be obtained in the part of the wire first entering the apparatus. Between rollers 3 and 5 the wire is short circuited by a heavy copper lead 11, so that in passing through the cooling bath 4 the wire is no longer being heated by electric current. Betwen the rollers 5 and 6, the wire is again heated, but after passing the rollers 6 the current is again taken off by the copper lead 12. Additional control resistances are provided at 13 and 20. The use of additional rollers and an adjustable resistance may also be found desirable between the pairs of rollers 5 and 6, which are normally the third and fourth pairs in the apparatus, and similarly where six, eight or other number of pairs of rollers are normally employed.

The distances between the rollers 2 and 3 and between the rollers 5 and 6 depend mainly on the traveling speed of the wire, and the amount of graduation in the heating required.

Before closing the switch 17, the voltage, as read from voltmeter 18, has to be adjusted by the regulator 10 or on the supply. The regulator 13 will be on zero and regulator 20 on maximum. The switch 17 can then be closed, and the currents on the leads 21, 22 and 23 be finally adjusted with their respective regulators, so as to get the wire between the rollers 2 and 3, and between the rollers 5 and 6 at the required temperatures respectively. When first put in action, the current in the lead 21 may be slightly increased by the regulator 10 to overcome the cooling action of the traveling wire.

For efficiency in regard to operation costs, and safety in operation, a low voltage is desirable but not essential, that is, as low a voltage as will be suitable for the particular metal being treated. This process can however be used on any public or private supply system, as on a direct current supply, a motor alternator set would be employed to give the low voltage alternating current required, whereas on alternating current systems transformers or reactance coils could be used.

A periodicity of over 25 cycles per second is of advantage in overcoming the tendency to the production of electrolytic phenomena which may occur.

We claim:—

1. A method of annealing wire, which consists in heating a stretch of the moving wire by an electric current, admitting additional electric current to the intermediate portion of the stretch to increase the heat in the outgoing portion of the stretch, and then cooling off the heated wire.

2. A method of annealing wire, which consists in heating a stretch of the moving wire by an electric current, admitting additional electric current to the intermediate

portion of the stretch to increase the heat in the outgoing portion of the stretch, short-circuiting the wire at the end of its said stretch and cooling off the short-circuited portion of the heated wire, and then repeating the said heating and cooling steps of the process.

3. In an apparatus for annealing wire, means for moving the wire longitudinally, means for heating a stretch of the moving wire by an electric current, an adjustable resistance and an electric current supply lead connected to the intermediate portion of the stretch and operating to increase the heat in the outgoing portion of the stretch, and means for cooling off the heated wire.

4. In an apparatus for annealing wire, means for moving the wire longitudinally, means for heating a stretch of the moving wire by an electric current, an adjustable resistance and an electric current supply lead connected to the intermediate portion of the stretch and operating to increase the heat in the outgoing portion of the stretch, a heavy lead operating to short-circuit the wire at the end of the said stretch, means for cooling off the short-circuited portion of the heated wire, and means for repeating the electric heating and the cooling of the wire.

In testimony whereof we affix our signatures.

HERBERT ALEXANDER.
WYNDHAM THEODORE VINT.
ARTHUR IMBERY.