(No Model.)

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MACHINE FOR TEMPERING METAL WIRES AND STRIPS.

No. 388,078. Patented Aug. 21, 1888.

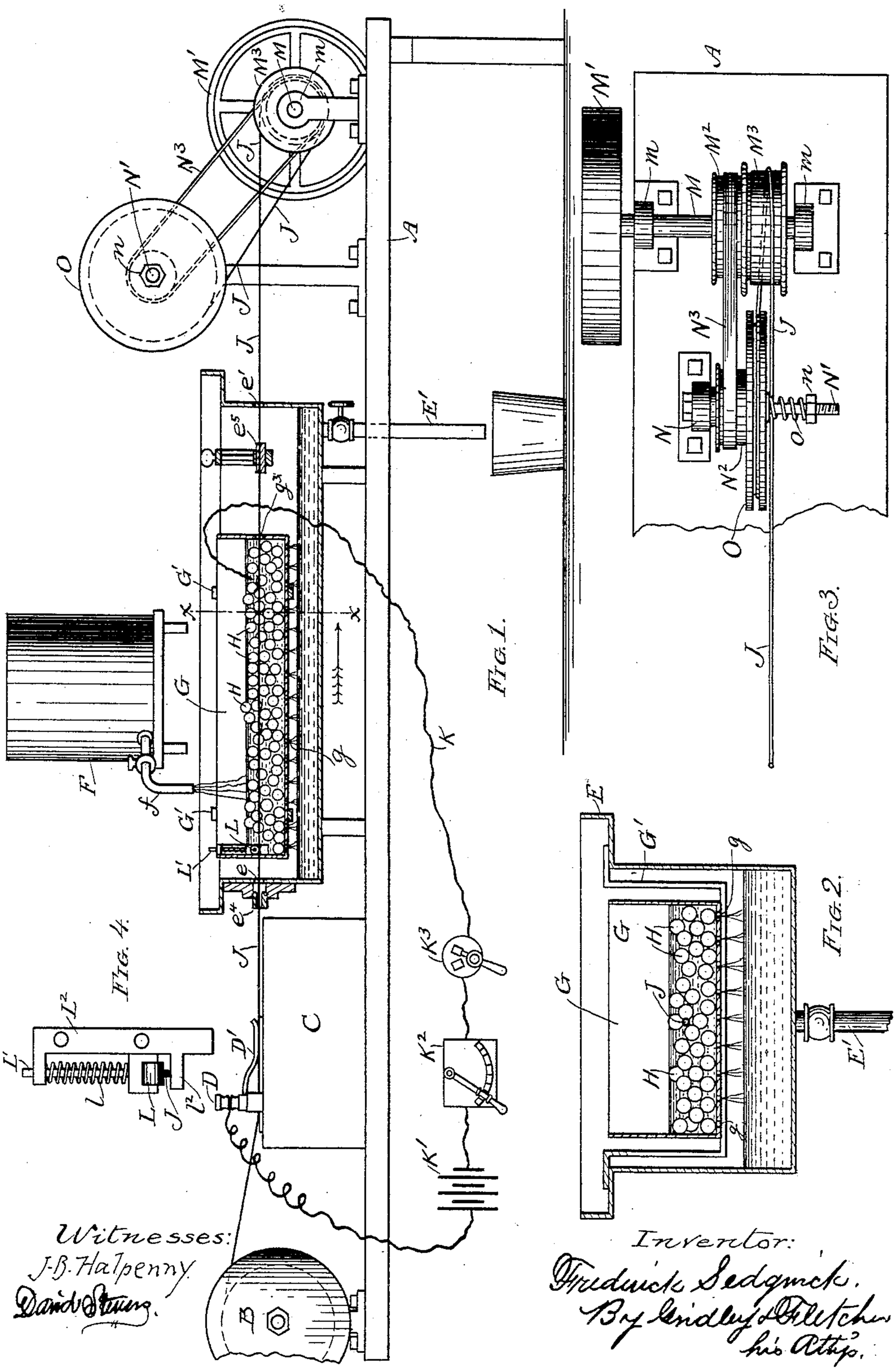

FIG. 1.

FIG. 3.

FIG. 2.

FIG. 4.

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MACHINE FOR TEMPERING METAL WIRES AND STRIPS.

SPECIFICATION forming part of Letters Patent No. 388,078, dated August 21, 1888.

Application filed January 19, 1888. Serial No. 261,318. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK SEDGWICK, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Tempering Metal Wires and Strips, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in which like letters of reference designate corresponding parts in the different figures.

My invention relates to the tempering of metal wires and strips in continuous lengths; and my object is to provide means whereby the wire or strip may be drawn through the heating medium and tempering-bath and wound upon a spool at a uniform rate of speed. This cannot be accomplished where the wire or strip is wound directly upon a spool propelled at a given rate of speed, for the reason that at the beginning the strip is drawn slowly and its speed is increased in proportion as the spool is filled, thus varying its temper in a corresponding degree. Moreover, if the strip is greatly hardened, as is necessary where more than an ordinary spring-temper is required, the tension of the material wound upon the spool is so great as to cause the brittle strips to break. This is especially apt to be the case in starting and stopping the machine. In some strips so wound I have frequently found the wire broken in a number of places in the coil.

To overcome these difficulties, I employ a feeding-pulley, upon which the wire is directly wound and which receives the main tension thereof, in conjunction with a receiving-spool mounted in a frictional bearing upon a shaft which is rotated faster than the feed-pulley, so that the slack of the wire is always taken up by the spool, while sufficient tension is maintained thereby to prevent the wire from slipping upon the feed-pulley, all of which is hereinafter more particularly described and shown, and definitely pointed out in the claims.

Figure 1 in the drawings is a side view of my improved machine, in which the cooling-bath is shown in longitudinal section. Fig. 2 is a transverse sectional view upon the line *x x*, Fig. 1. Fig. 3 is an enlarged plan view in detail of one end of the machine, showing the spool and feed-pulley; and Fig. 4 is a detail view of the roller which bears against the wire as it is drawn into the bath.

Referring to the drawings, A represents a table which serves to support the machine.

B is a reel upon which the wire to be tempered is wound, said reel having a journal bearing upon a support, *b*, rigidly secured to the table.

C is a block or support extending above the table and having secured thereto a binding-post, D, to which is attached a spring-clamp, D′.

E is a metallic trough having a drip-pipe, E′, and supported above which trough is an oil-reservoir, F, having a faucet, *f*, for supplying the oil to the trough. A secondary removable trough, G, is supported within the larger trough upon cross-bars or stirrups G′.

The trough G is provided with perforations *g* in the bottom for the passage of oil, as hereinafter stated, or it may consist of an open wire basket, and is, by preference, partially or wholly filled with loose metallic particles or shot, H, (the size of which is exaggerated in the drawings,) through which the oil is caused to constantly circulate, as shown.

The troughs E and G are provided with openings *e e′* and g^2 g^3 for the passage of the wire J which is to be tempered. A packing, e^4, Fig. 1, of asbestus, serves to wipe and clean the wire before passing into the cooling-bath, while e^5 is a pad of any suitable wiping material, which is intended to wipe the oil from the wire as it leaves the cooling bath.

K is an electric wire, one end of which is attached to the binding-post D, while the other is in contact with the metallic shot H.

K′ is a battery or dynamo, K^2 a rheostat, and K^3 a circuit-breaker interposed in the circuit of the wire K.

The wire J, passing through the clamp D′ and metallic shot, H, serves to complete the electric circuit with the battery.

L, Figs. 1 and 4, is a roller journaled in a bearing upon a rod, L′, which is loosely secured in a support, L^2, attached to the tank. A spiral spring, *l*, presses the roller against the wire J, which in turn is pressed against a lug, l^2, thus serving to insure a more perfect electrical contact with the wire, as well as to prevent the fine shot from falling through the opening into which the wire is drawn.

M is a shaft journaled in bearings *m m*, and provided with a driving-pulley, M′, and pulleys M^2 M^3, rigidly secured to said shaft.

N is a supporting-post attached to the table. Loosely journaled in a bearing in the top of said post is an axle or spindle, N′, to which is rigidly attached a pulley, N^2, Fig. 3, which is connected by means of a belt, N^3, to the pulley M^2. The pulley N^2, being smaller than that by which it is driven, causes the spindle N′ to revolve faster than the shaft M.

O is a spool, which is loosely mounted upon the spindle N, upon which it has a friction-bearing, the degree of friction being regulated by means of a spiral or other spring, *o*, which surrounds the spindle and bears against the spool and nut *n*. The pulley M^3, which I term the "feed-pulley," is preferably surrounded by a covering of leather, rubber, or analogous material to form a more perfect friction-surface for the reception of the wire J.

The operation of said mechanism is as follows: The wire J is drawn from the reel B through the spring-clamp D′, the cooling-bath G, preferably one or more times around the feed-pulley M^3, and thence upon the spool O, to which the end is attached in any approved way. The shaft M is driven at a uniform rate of speed, and, the tension of the spring *o* being properly adjusted, the spool O is revolved with sufficient force to take up the slack and wind the wire thereon, and at the same time prevent it from slipping upon the feed-pulley, which draws the wire into the electric circuit, where it is heated, and thence into the cooling-bath. The strength of the electric current may be varied by means of the rheostat to correspond to the speed with which the wire is drawn through the machine and the degree of heat required. Thus it will be seen that the strain of drawing the wire through the machine is directly upon the feed-pulley, while the spool, which has only a frictional bearing upon its spindle, which normally revolves at a higher rate of speed than the shaft M, will revolve faster when the coil is first beginning to wind thereon and more slowly as the diameter of the coil increases, thereby automatically accommodating itself to the speed of the feed-pulley, with which it coacts, by keeping the wire taut thereon. By this means the tempered wire or strip is never wound too tightly upon the spool and is in no danger of being broken, while the movement of the wire being uniform at all times the temper is likewise uniform.

Having thus described my invention, I claim—

1. The combination, with a machine for tempering metal wires and strips, of a feed mechanism consisting of a feed-pulley upon which the wire is first trained, with means, as a shaft and pulley, for driving the same at a uniform rate of speed, and a receiving-spool journaled upon a frictional bearing upon a shaft or spindle adjusted to rotate at a higher rate of speed than that of the feed-pulley, whereby the spool may be revolved at a greater or less speed in proportion as the coil is wound thereon, substantially as shown and described.

2. In a machine for tempering metal wires and strips, the combination of means, as an electric current, for heating the wire, means, as a cooling-bath, for chilling the same, a feed-pulley for drawing the strip through the tempering apparatus at a uniform rate of speed, and a receiving-spool journaled by means of a frictional bearing upon a spindle, with means for normally rotating said spindle at a higher rate of speed than that of the feed-pulley, substantially as shown and described.

3. In a machine for tempering metal wires and strips, the combination of means, as an electric current, for heating the wire, means, as a cooling-bath, for chilling the same, a feed-pulley, M^3, means, as a shaft, M, and pulley M′, for rotating said feed-pulley, spindle N′, means, as a pulley, N^2, and belt N^3, for normally rotating said spindle at a higher rate of speed than the shaft M, and a receiving-spool secured to said spindle by means of a frictional bearing for winding said strip as it is drawn through the machine, substantially as shown and described.

4. In a machine for tempering metal wires and strips, the combination of means, as an electric current, for heating the wire, means, as a cooling-bath, for chilling the same, a feed-pulley, M^3, means, as a shaft, M, and pulley M′, for rotating said feed-pulley, spindle N′, means, as a pulley, N^2, and belt N^3, for normally rotating said spindle at a higher rate of speed than the shaft M, and a receiving-spool loosely mounted upon said spindle, and means, as a nut and spring, for regulating the tension of the wire or strip to be wound thereon by increasing or decreasing the friction, substantially as shown and described.

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