

(No Model.)

E. ASHWORTH.

MACHINE FOR HARDENING AND TEMPERING STEEL WIRE AND RIBBONS.

No. 514,986

Patented Feb. 20, 1894.

Fig. 1

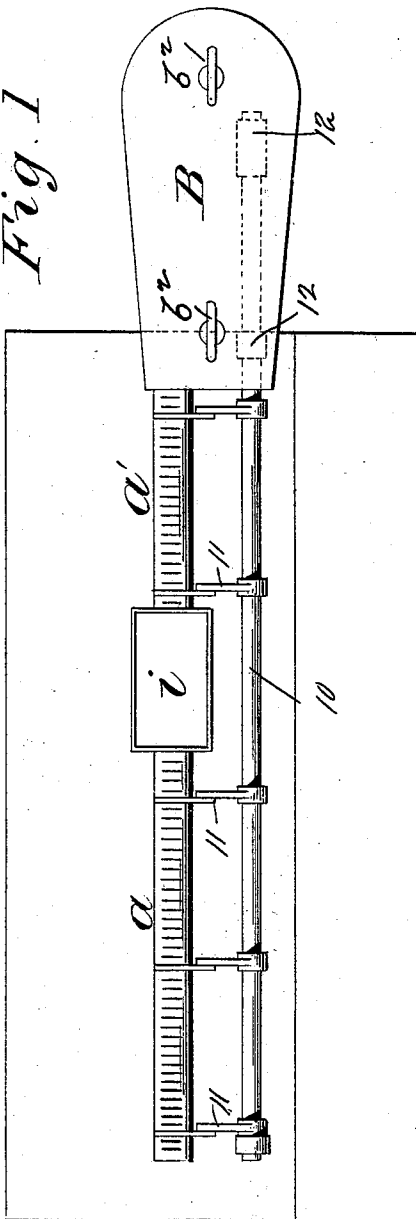


Fig. 3

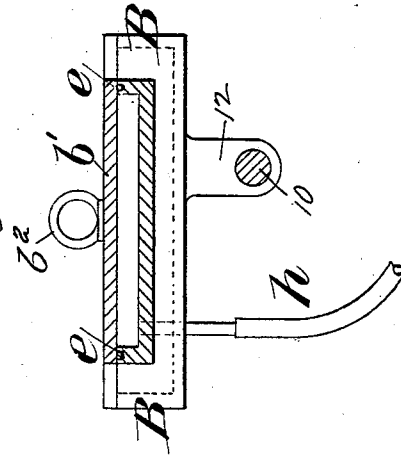
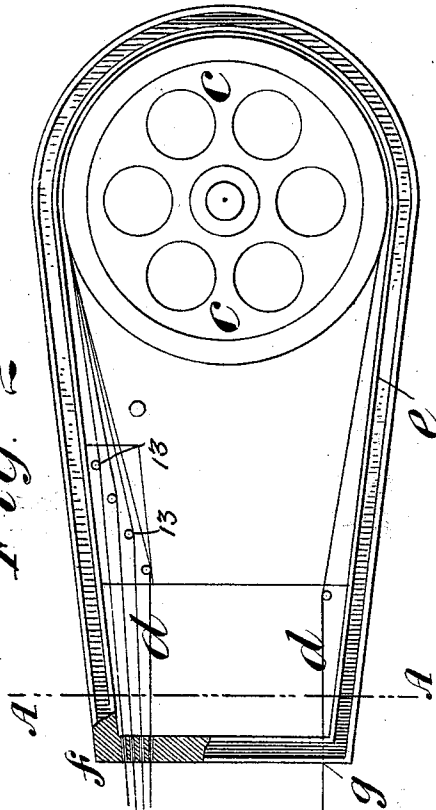


Fig. 2



Witnesses:

E. B. Bolton
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Inventor:

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UNITED STATES PATENT OFFICE.

ELIJAH ASHWORTH, OF MANCHESTER, ENGLAND.

MACHINE FOR HARDENING AND TEMPERING STEEL WIRE AND RIBBONS.

SPECIFICATION forming part of Letters Patent No. 514,986, dated February 20, 1894.

Application filed July 20, 1893. Serial No. 480,970. (No model.) Patented in England December 8, 1886, No. 16,047.

To all whom it may concern:

Be it known that I, ELIJAH ASHWORTH, a subject of the Queen of Great Britain, residing at Manchester, Lancaster county, England, have invented certain new and useful Improvements in Machines for Hardening and Tempering Steel Wire and the Like, of which the following is a specification.

The invention has been patented in Great Britain, No. 16,047, dated December 8, 1886.

My invention relates to machines employed in the hardening and tempering of steel wire and ribbons. In such machines the wire is drawn forward continuously, passing first through a heating medium, secondly through oil or water to harden the wire, and thirdly through a second heating medium to temper or "let down" the wire.

It has been found that scaling and discoloration take place when the wire is exposed to the air while in a heated state.

The object of my invention is to keep the wire, as much as possible, from exposure to the oxygen of the atmosphere until the wire is sufficiently cool to be in a condition which will not be conducive to scaling or discoloration. To this end I cause the wire to pass immediately from the tempering heating means into a tube or tubular passage, or into a passage or chamber from which oxygen is excluded, as much as is conveniently possible, and in which the wire is kept long enough to permit it to become sufficiently cool.

My invention is illustrated by the accompanying drawings.

Figure 1 is a plan view of the bed of a hardening and tempering machine having my cooling chamber applied thereto. Fig. 2 is an enlarged view of the cooling chamber on line A A of Fig. 2. Fig. 3 is a cross section of the chamber.

In the example my invention is shown as applied to a machine in which gas flames are used in the hardening and tempering of the wire, *a* being gas burners for heating the wire and *a'* the burners for tempering the wire,

i representing the oil or water cistern for quenching the heated wire.

The cooling chamber is represented by B. The wires pass from the flame of the burner *a'* immediately into the chamber B, which in the example is made large enough to contain a carrier wheel *c* seen in Fig. 2 where the wires are indicated by *d*. Pins 13 extending across the chamber serve to guide the wires properly to the wheel *c*. The said chamber is made in the form of a shallow box, which is provided with a lid *b'*, which is made gas tight in any suitable manner. The lid is provided with suitable eyes or finger pieces *b²* by which it may be removed and replaced. In the example the lid is formed with a projecting bead which enters a groove at *e*, this groove containing asbestos, or fine sand, or other suitable packing material. This construction enables the operator to lift off the lid at any time when access to the wires is required. The wires enter the chamber through a slit, or through perforations, at *f*, and leave through a slit or through perforations at *g*. The chamber is supplied by means of a pipe *h* with a gas or with a mixture of gases which is as nearly as conveniently possible free from admixture with oxygen. The gas used may be carbonic acid or hydrogen or a mixture of gases such as are products of combustion or be any gas or gases suitable to the intended purpose. As the wires pass through the chamber they are cooled by the gas with which the chamber is supplied, the cooling being expedited by the transmission of heat to the walls of the chamber so that when the wires leave the chamber they are sufficiently cool to bear exposure to the oxygen of the atmosphere without injury.

The burner and the chamber B may be supported in any suitable manner, but as shown a rod 10 is provided having arms or brackets 11 supporting the burner and the arms 12 supporting the chamber.

I declare that what I claim is—

1. In combination with a machine for hard-

ening or tempering wire, the cooling chamber B through which the wire passes circuitously and the guiding means within the chamber for directing the wire in a circuitous path, substantially as described.

2. In combination with a machine for hardening and tempering wire, the cooling chamber B and the wheel c therein adapted to receive and direct the wire, substantially as described.

3. In combination, the tempering means, the chamber B arranged to receive the wires therefrom, and the gas supply pipe leading to the chamber, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

ELIJAH ASHWORTH.

Witnesses:

EDWARD K. DUTTON,
RICHARD W. IBBERTSON.