

(No Model.)

2 Sheets—Sheet 1

E. ODDY, J. CROSSLEY & E. & A. SMITH.
APPARATUS FOR HARDENING AND TEMPERING STEEL WIRE.

No. 517,527.

Patented Apr. 3, 1894.

FIG. 3.

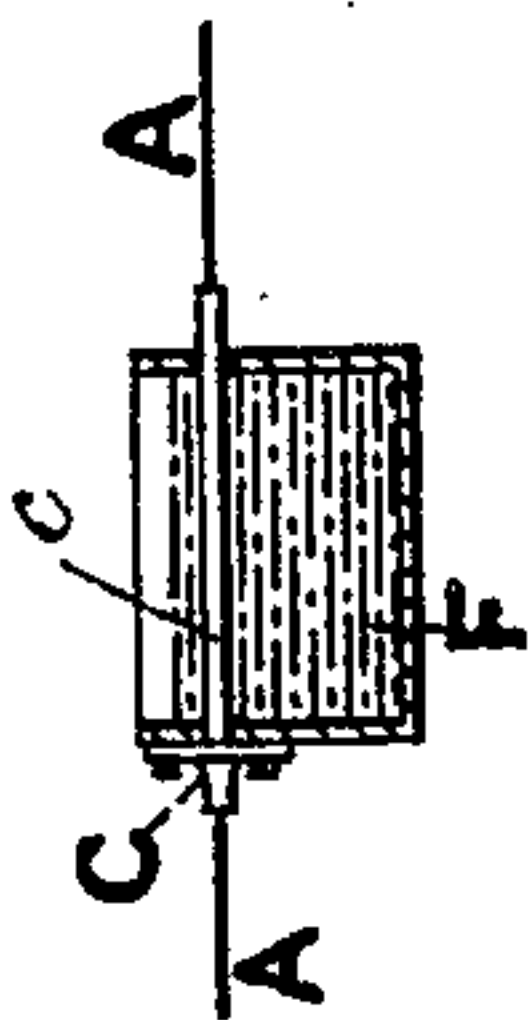


FIG. 2.

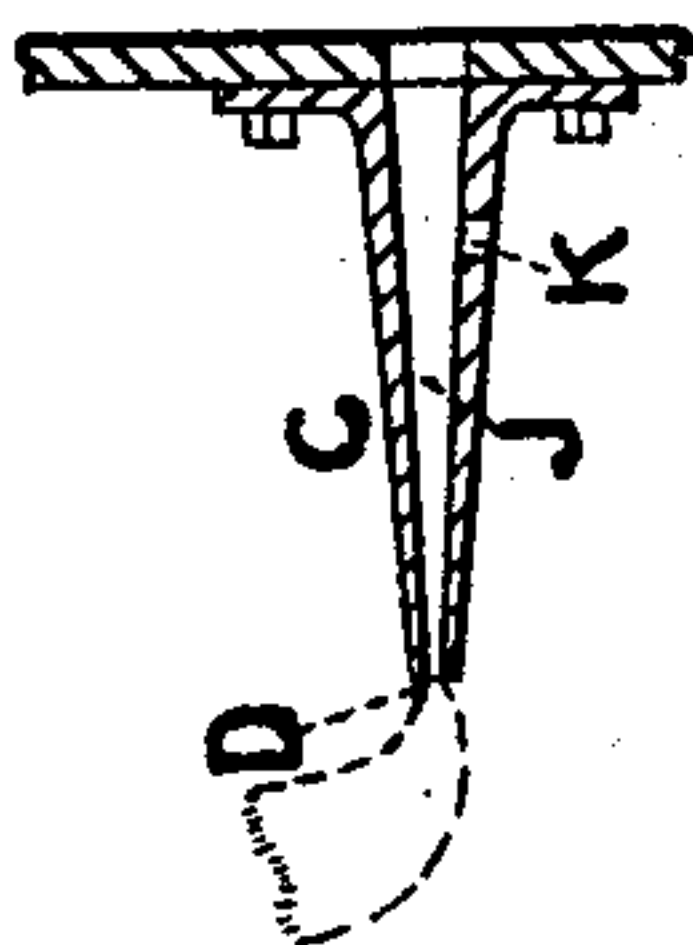
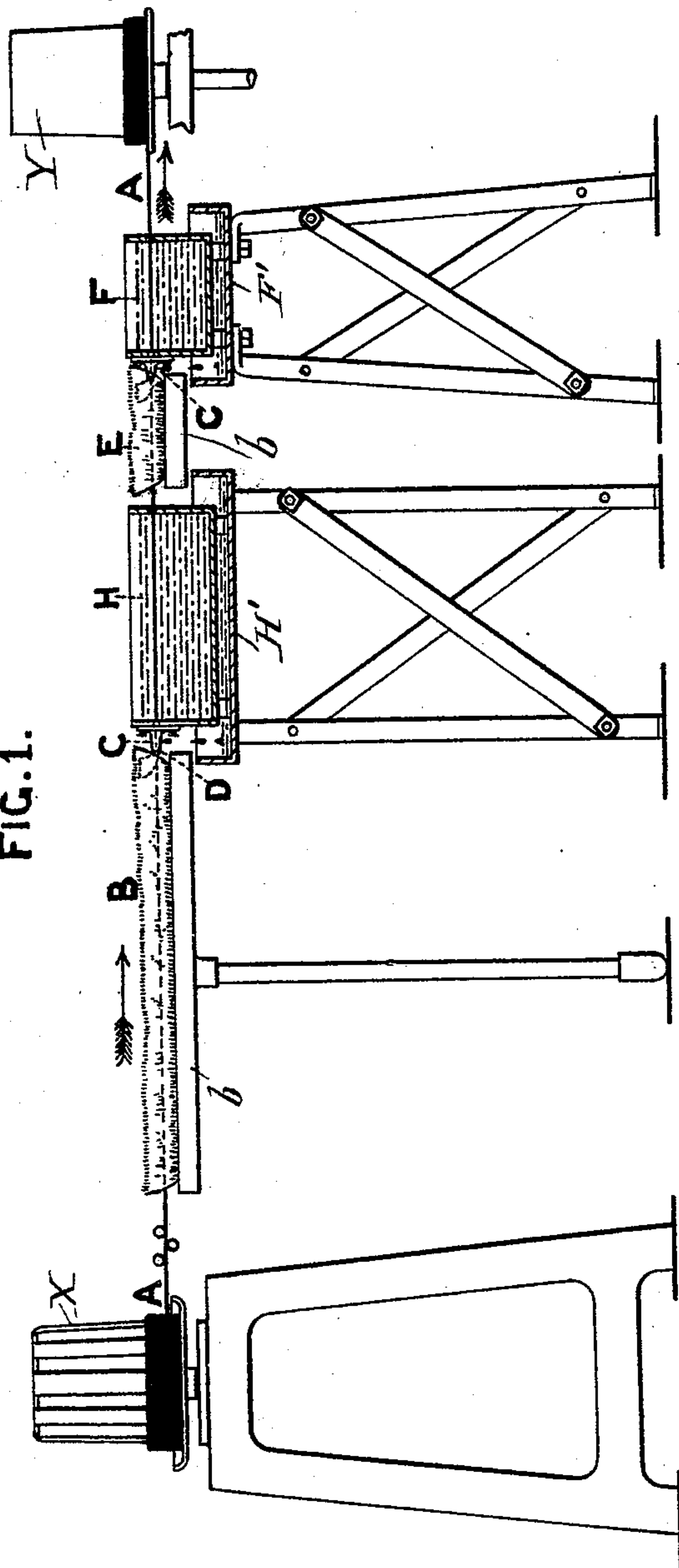


FIG. 1.



Witnesses
Abner Reed
C. F. Ward

Inventors
Edwin Oddy
Joseph Crossley
Eros Smith
A. Smith

(No Model.)

2 Sheets—Sheet 2.

E. ODDY, J. CROSSLEY & E. & A. SMITH.
APPARATUS FOR HARDENING AND TEMPERING STEEL WIRE.
No. 517,527.

Patented Apr. 3, 1894.

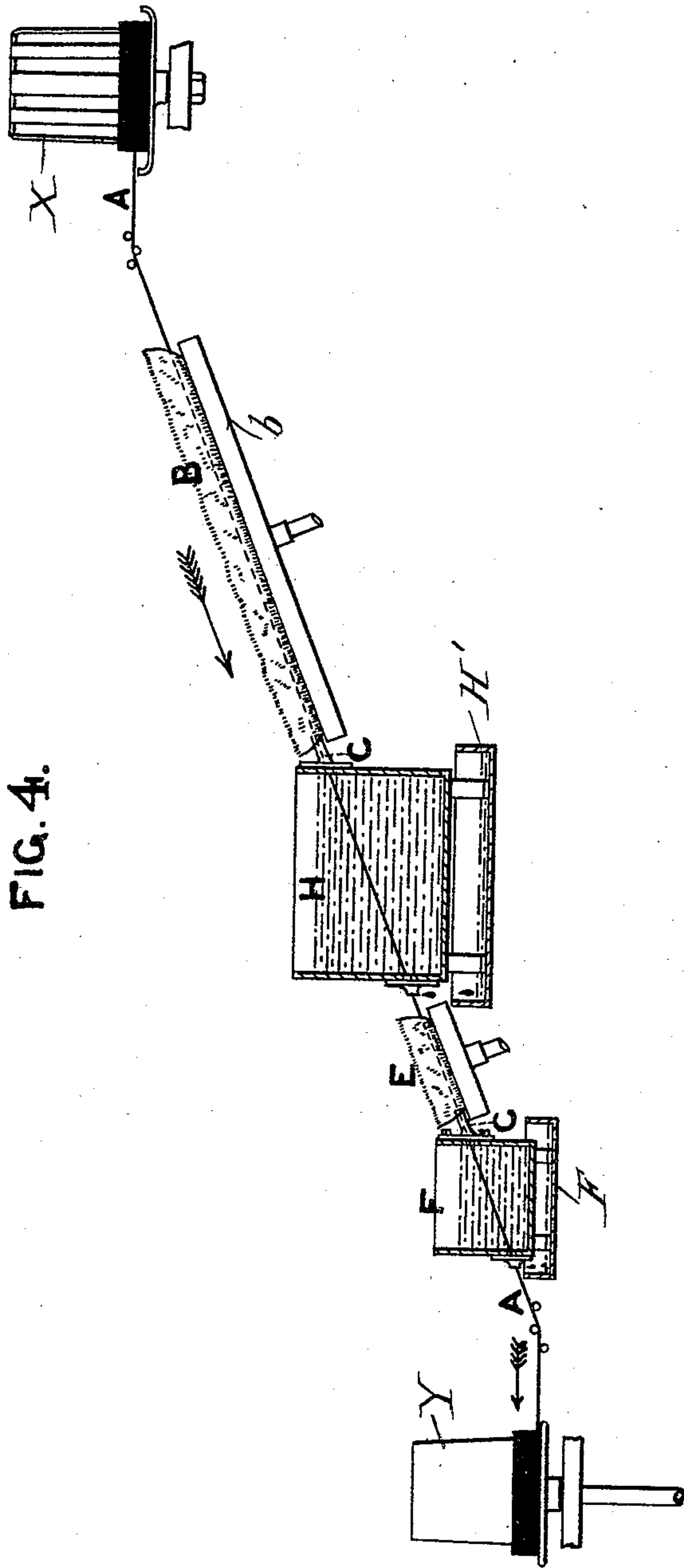


FIG. 4.

Witnesses
Abm Reed
C. F. Ward

Inventors
Edwin Oddy
Joseph Crossley
E. & A. Smith
A. Smith

UNITED STATES PATENT OFFICE.

EDWIN ODDY, JOSEPH CROSSLEY, ENOS SMITH, AND AI SMITH, OF CLECK-
HEATON, ENGLAND.

APPARATUS FOR HARDENING AND TEMPERING STEEL WIRE.

SPECIFICATION forming part of Letters Patent No. 517,527, dated April 3, 1894.

Application filed October 2, 1893. Serial No. 486,984. (No model.) Patented in England June 17, 1893, No. 11,955.

To all whom it may concern:

Be it known that we, EDWIN ODDY, JOSEPH CROSSLEY, ENOS SMITH, and AI SMITH, subjects of the Queen of Great Britain, residing at Cleckheaton, in the county of York, England, have invented certain new and useful Improvements in Apparatus for Hardening and Tempering Steel Wire, (for which we have obtained a patent in Great Britain, No. 11,955, dated June 17, 1893,) of which the following is a specification.

The object of our invention is to obtain a bright wire by a simple and effective method of hardening and tempering the same.

In the drawings Figure 1 is an elevation of our improved apparatus for hardening and tempering steel wire bright. Fig. 2 is an enlarged detail in section of nozzle. Fig. 3 shows view of cooling trough in which the wire passes by a tube through the body of the oil or cooling liquid. Fig. 4 is a modification of Fig. 1 showing apparatus at an incline.

Figs. 1. 2. 3: X is the reel for the soft wire, and Y is the reel upon which the wire is wound after being hardened and tempered. We run the wire or wires A through an ordinary solid flame or flames B to heat it, then to harden it is passed through a nozzle or other conductor C (connected to the oil or other liquid reservoir H) and charged with oil, which oil ignites at the end D of the nozzle C joining up to the gas flame B, so that there is no air or other space between the flame and the oil, and so no oxidation takes place. It is then heated by solid flame or flames E for tempering and passes through a trough F of sand, oil, lead, or other suitable cooling material, there being again no air space between the tempering flames and the sand, oil, lead, or other cooling material. Oil may again be applied by nozzle C, at the end of the said trough, so that the flame from the nozzle joins up to the tempering flame. The nozzle or nozzles have preferably a taper hole J larger near the reservoir, and a circulating hole preferably on its under side K, to increase the circulation and prevent clogging.

H' is a drip trough under the reservoir H, and F' is a drip trough under the reservoir F, the said troughs being adapted to catch the surplus oil which passes through the nozzles. The burners b, below the flames B and E are of any approved construction.

Fig. 4: The nozzle C in this modification is a plain nozzle, and the oil does not run out and ignite at its end as in Fig. 1, but the gas flame is extended so as to heat around the nozzle and the oil or other tempering material seals the other end of the nozzle, and excludes the air, preventing oxidation; the same with the tempering flame, and the nozzle of the cooling trough. The wire in the latter may either pass through a nozzle with extended tube c or directly through the nozzle and cooling liquid.

What we claim as the invention, and desire to secure by Letters Patent, is—

1. In apparatus for hardening and tempering wire, the combination, with a flame for heating the wire, and an oil reservoir for cooling the wire, of a nozzle projecting outwardly from the side of the reservoir into the said flame and provided with a hole for the wire to pass through, substantially as set forth.

2. In apparatus for hardening and tempering wire, the combination, with a flame for heating the wire, and an oil reservoir for cooling the wire, of a nozzle projecting outwardly from the side of the reservoir into the said flame and provided with a conical hole for the wire to pass through and a hole in its under side for the passage of surplus oil, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

E. ODDY.
J. CROSSLEY.
ENOS SMITH.
AI SMITH.

Witnesses:

ABM. REED,
C. F. WARD.