

No. 769,052.

PATENTED AUG. 30, 1904.

S. N. BRAYSHAW.

APPARATUS OR FURNACE FOR HARDENING STEEL CUTTERS OR OTHER TOOLS.

APPLICATION FILED APR. 26, 1904.

NO MODEL.

2 SHEETS—SHEET 1.

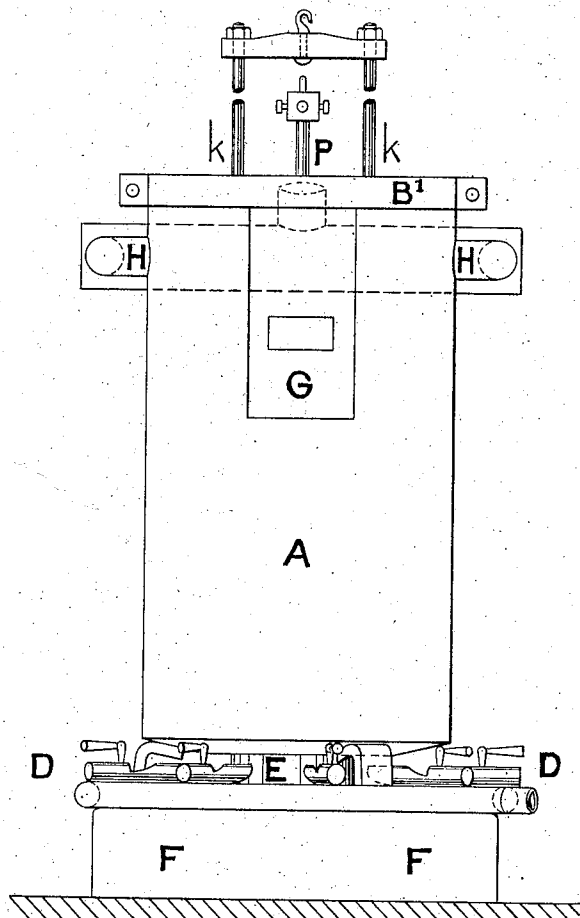


FIG. 1.

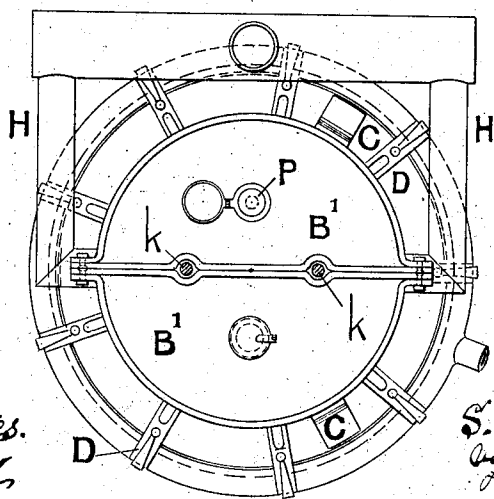


FIG. 3.

WITNESSES.

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2 SHEETS—SHEET 2.

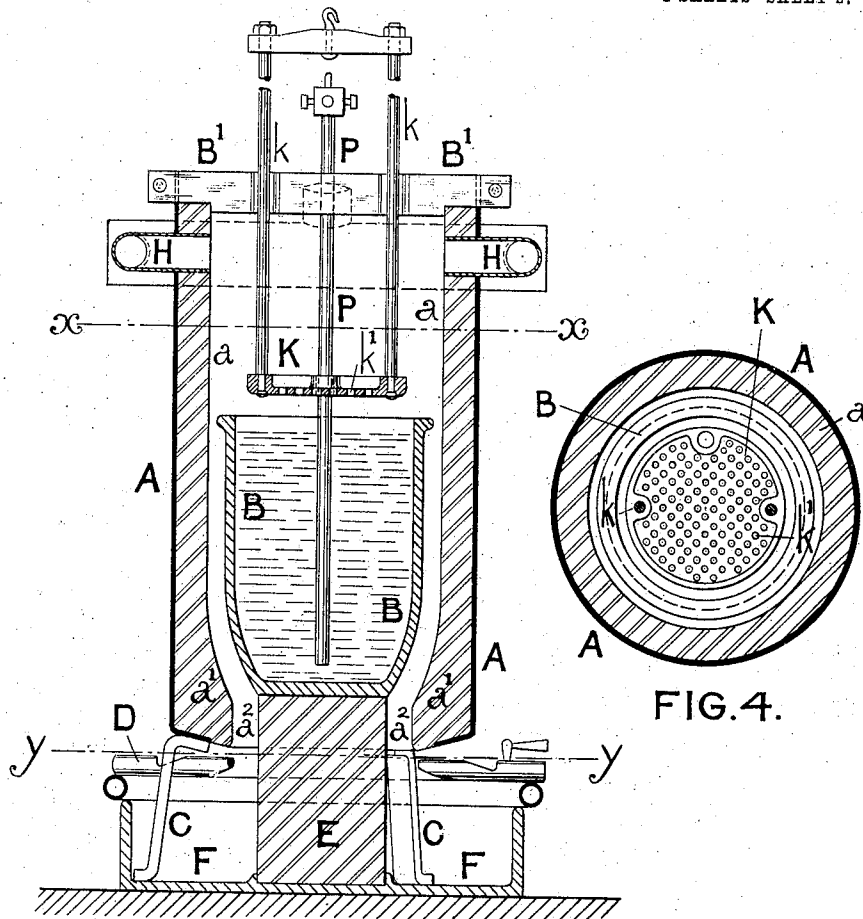


FIG. 2.

FIG. 4.

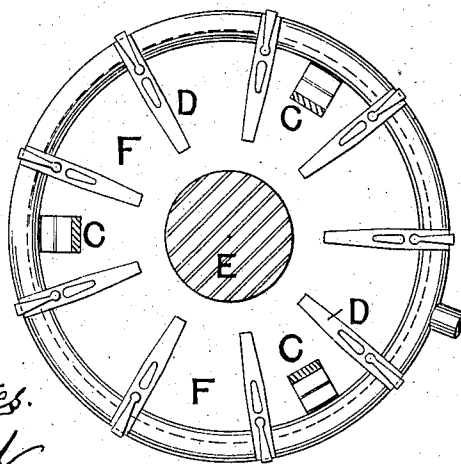


FIG. 5.

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UNITED STATES PATENT OFFICE.

SHIPLEY N. BRAYSHAW, OF MANCHESTER, ENGLAND.

APPARATUS OR FURNACE FOR HARDENING STEEL CUTTERS OR OTHER TOOLS.

SPECIFICATION forming part of Letters Patent No. 769,052, dated August 30, 1904.

Application filed April 26, 1904. Serial No. 205,051. (No model.)

To all whom it may concern:

Be it known that I, SHIPLEY NEAVE BRAYSHAW, a subject of the King of Great Britain, and a resident of Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Apparatus or Furnaces for Hardening Steel Cutters or other Tools or Articles, of which the following is a specification.

10 This invention is designed to provide an improved arrangement or construction of furnace for heating cutters or other tools or articles in a melt-pot containing a fusible salt or metal for the purpose of hardening them.

15 Hitherto it has been customary to have an open pot to contain the fusible salt, and it was practically impossible to obtain uniform results, and great loss was occasioned by inequality in heating the tool or articles, more particularly when of large size.

20 The invention is characterized by a melt-pot to contain the fusible salt and receive the tools to be hardened, wholly inclosed in an annular casing, with a tray also inside the casing upon which the articles are placed to be immersed in the melt-pot and a ring of gas-burners to apply heat to the melt-pot to raise it to and maintain it at the desired temperature.

30 The invention will be fully described with reference to the accompanying drawings.

Figure 1 is a front elevation; Fig. 2, a vertical sectional elevation; Fig. 3, a plan; Fig. 4, a transverse section on line XX, Fig. 2; Fig. 5, a transverse section on line YY, Fig. 2.

35 The apparatus is constructed with an annular casing A, lined with fire-tiles *a* or other refractory material, the lower part at *a'* being inclined or projecting somewhat inward to direct the heated gases against the sides of the melt-pot B. The casing is open below at *a''*, supported on suitable supports C to admit sufficient air for the purposes of combustion. A melt-pot B is placed in the interior of the annular casing A, the casing extending up 40 above the pot and being inclosed by a lid or door B' in the top of the casing. Around the bottom of the casing a number of gas or oil jets or burners D are placed. These are placed 50 beneath the inwardly inclined or projecting

part *a'* of the casing A, so as to be protected from any splashes of molten material that may fall from the melt-pot B. Inside the ring of burners is placed a stand or pedestal E, of fire-brick or other suitable material, upon which 55 the melt-pot B stands. The pedestal E becomes hot by the flames from the burners impinging upon it, and below it is a tray or receptacle F to catch any drops or splashes of molten material that may fall from the 60 melt-pot. In the front or side of the furnace-casing a vertically-sliding door G is fitted, preferably balanced by a counterweight, like a damper, and from the opposite side or from 65 two sides a flue or flues H project to carry off the waste products of combustion and fumes from the melt-pot B. A tray K is placed inside the furnace, with one or two or more supporting or guide rods *k*, which pass through the lid B', being suspended from a chain bal- 70 anced by a counterweight. The tray is perforated with a number of small holes *k'* and formed with a larger hole, through which a pyrometer P passes into the melt-pot, which permits of the raising and lowering of the tray 75 K without disturbing the pyrometer. The tray K is used to agitate the fusible salt in the pot and to lower the cutters or articles to be heated into the pot.

The cover B' of the casing A is preferably 80 in two parts to permit of the insertion of the tray to carry the articles to be heated. The melt-pot B may be made of cast-iron or other suitable material and is filled or partially filled, preferably, with a salt fusible at the required 85 temperature of less specific gravity than steel, though an easily-fusible metal or alloy may be employed.

A suitable fusible salt may be prepared from an admixture of potassium carbonate, sodium carbonate, sodium chlorid, and yellow ferrocyanid of potassium in suitable proportions, such as the following: K_2CO_3 , six parts; Na_2CO_3 , six parts; NaCl, twelve parts; $K_4Fe(CN)_6$, one part. 95

What I claim as my invention, and desire to protect by Letters Patent, is—

1. Apparatus for hardening steel cutters and other tools comprising in its construction an annular casing with inwardly-projecting 100

sides, a melt-pot therein wholly inclosed by the casing to contain a fusible mixture, a perforated tray inside the furnace to hold the tools and lower them into the pot, a pedestal
5 of fire-brick upon which the pot rests and against which the flame impinges and a ring of burners placed round the bottom of the furnace substantially as described.

2. In apparatus for hardening steel cutters
10 and other tools the combination with an annular furnace-casing A provided with inwardly-projecting sides, a melt-pot B placed therein wholly inclosed by the casing, a lid B' to cover in the melt-pot, a plurality of burn-
15 ers D at the bottom of the furnace to heat the

pot, a stand E for the pot against which the flame from the burners impinges a perforated tray K placed inside the furnace provided with supporting guide-rods $\frac{1}{2}$ passing out through holes in the lid B' and with a hole
20 for a pyrometer to pass through substantially as described.

In witness whereof I have hereunto signed my name, this 15th day of April, 1904, in the presence of two subscribing witnesses.

SHIPLEY N. BRAYSHAW.

Witnesses:

J. OWDEN O'BRIEN,
B. ABRAM WOODHEAD.