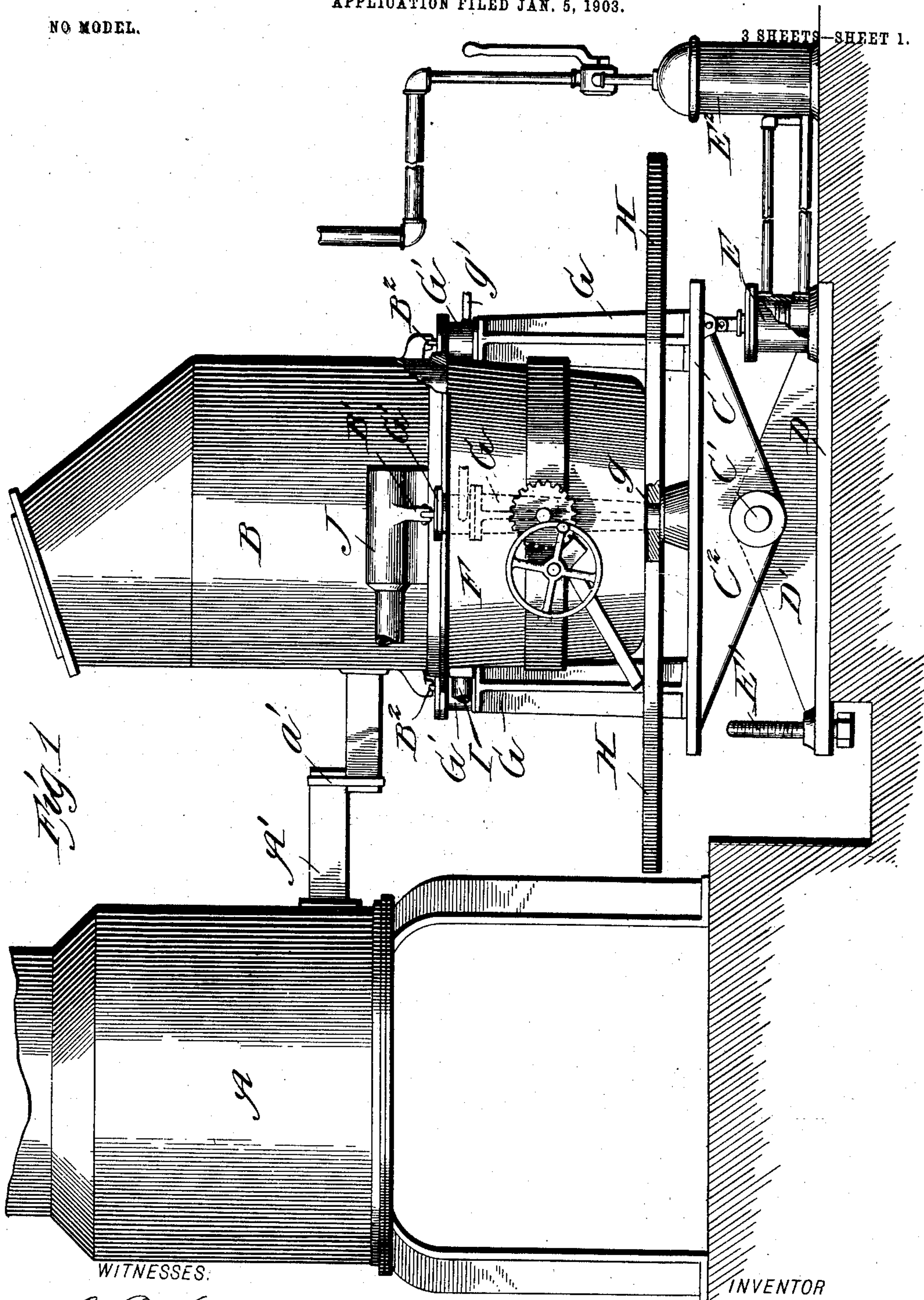


No. 736,900.

PATENTED AUG. 18, 1903.

E. C. WILLS.
APPARATUS FOR MAKING STEEL, &c.
APPLICATION FILED JAN. 5, 1903.

NO MODEL.



WITNESSES.

Geo. C. Kingsbury
Perry B. Turpin

INVENTOR

Edwin C. Wills

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ATTORNEYS.

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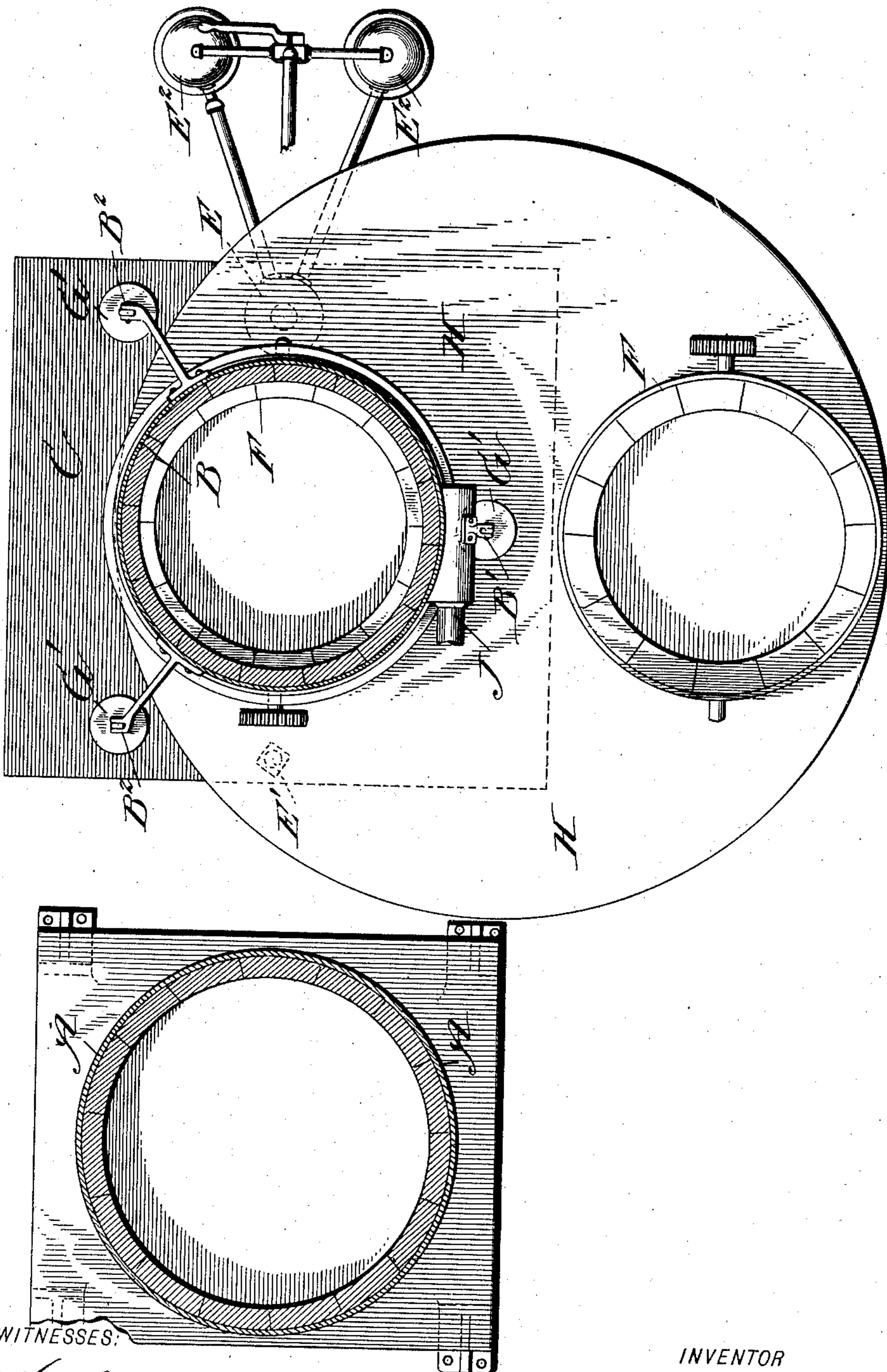
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3 SHEETS—SHEET 2.



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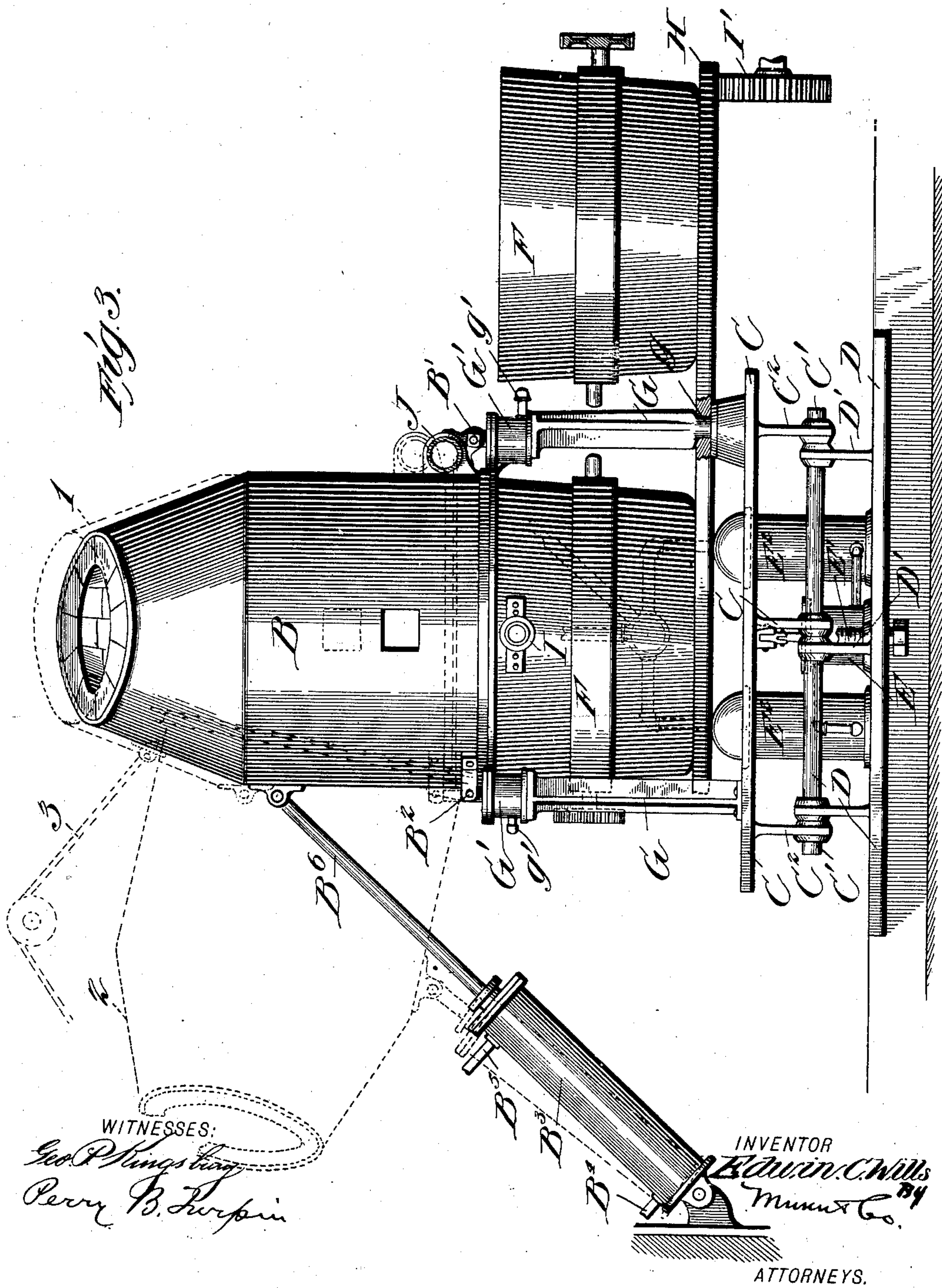
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NC MODEL.

3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

EDWIN COOPER WILLS, OF ALTOONA, PENNSYLVANIA.

APPARATUS FOR MAKING STEEL, &c.

SPECIFICATION forming part of Letters Patent No. 736,900, dated August 18, 1903.

Application filed January 5, 1903. Serial No. 137,954. (No model.)

To all whom it may concern:

Be it known that I, EDWIN COOPER WILLS, a citizen of the United States, and a resident of Altoona, in the county of Blair and State of Pennsylvania, have made certain new and useful Improvements in Apparatus for Making Steel, &c., of which the following is a specification.

My invention is an improvement in apparatus for use in the manufacture of steel and the like; and it consists in certain novel constructions and combinations of parts, as will be hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation of the apparatus. Fig. 2 is a top plan view thereof, parts being removed and others shown in section; and Fig. 3 is an elevation of the converter and its supporting and operating devices.

By my invention I seek to provide a rocking table or base on which the converter may be supported and to and from which the base of the converter may be adjusted in connection with means for rocking the said table, so the metal in the converter may be caused to flow above or below the tuyere-entrance in order that the air may be introduced above or below the surface of the metal.

Another feature of my invention consists, in connection with the said rocking table, of the converter having a dome-section and a base-section made separately, so the dome-section can be raised from its connection with the base-section and then tilted out of the way.

A further feature of my invention consists in the provision of a turn-table carried by the rocking table and movable, whereby different base-sections of the converter may be successively brought into connection with the dome-section of the converter.

My invention has for further objects other improvements; and it consists in certain novel constructions and combinations of parts, as will be hereinafter described and claimed.

In the construction shown I represent at A a cupola, which may be of the ordinary construction and has a metal-discharge trough A' leading to the dome B of the converter. Said trough A' may be universally jointed at a' to permit the vertical and

swinging movements of the dome-section B, as will be presently described.

The rocking table C is pivoted at C' about midway between its sides, preferably by means of the depending hangers C² on the table C and the uprights D' on the base D, so the table C can rock as desired. In operating the table I prefer to provide a fluid-pressure cylinder E, arranged between the base D and the table C and having its piston connected with the table C, so it may operate to lift the side of the table with which it connects to any desired extent, an adjustable stop E' being provided at the opposite side of the table to limit the movements thereof and pressure being suitably applied from a receptacle E² to the cylinder E and directed either into the upper or lower ends of the said cylinder in order to cause the piston to raise or lower the side of the rocking table with which it connects, as may be desired.

The converter, consisting of the dome-section B and the base-section F, is supported on the rocking table C so it may be tilted by the tilting of said rocking table in the manner before described. The dome-section B is carried upon pistons operating in cylinders G', mounted on standards G, which in turn are mounted upon the rocking table C, fluid-pressure being admitted at g' to the cylinders G' when it is desired to lift the dome-section B clear of the base-section F, as indicated in dotted lines 1 of Fig. 3. The dome-section B is supported at B' by simply resting upon the piston-rod of the adjacent cylinder G', while at the opposite side of the converter it is hinged at B² to the piston-rods of the adjacent cylinders G', so the converter-section B can be turned back on its connection at B² with the piston-rods whenever desired and as indicated by dotted lines 2 in Fig. 3. I thus provide in connection with a rocking table a dome-section which can be lifted bodily out of connection with the base-section of the converter to enable the ready adjustment of such base-section into and out of register with the dome-section and can also be swung back out of the way, as indicated in dotted lines 2, when in either its raised or lowered position. For swinging the dome-section B, I prefer to employ fluid-pressure operating in a cylinder

B³, having connections at B⁴ and B⁵ for the suitable supply, so the fluid-pressure may be supplied below or above the piston operating in the cylinder B³, and having its rod B⁶ connected with the dome-section B, as shown. By the described construction I provide power means for raising and lowering and for tilting the dome-section of the converter, and it may be desirable in some instances to provide counterbalancing means connected with the dome-section B, as indicated by the dotted lines 3 in Fig. 3 of the drawings.

The base-section F of the converter may be of any suitable construction and is shown as an ordinary ladle, of which several may be supported upon the turn-table H, which journals at g on a bearing formed on one of the standards G, so the turn-table can be turned to bring any one of the ladles F into register with the dome-section B, as will be understood from the drawings. This turn-table may be moved by hand, or power may be applied through a pinion I' for turning the turn-table in the operation of the apparatus.

A series of twyers I opens into the base-section of the converter at a point normally slightly above the level of the metal therein, as will be understood from Fig. 1 of the drawings. I also provide a series of twyers J, opening into the dome-section of the converter near the bottom thereof, as shown in the drawings.

In the operation of my invention the metal may be supplied from the cupola A into the converter, and the latter may be manipulated by fluid-pressure operating in the cylinder E to tilt the converter through its table or platform C to cause the twyer I to discharge below the surface of the molten metal, the stop E' being provided to limit the movement of the table C and prevent the same from tilting too far. By means of the power devices G' the dome-section may be raised clear of the base-section F and the latter be swung by the movement of the turn-table out of the way. The dome-section may also be tilted either from its lower position or from its raised position, as may be desired, the whole operation being carried on by the power devices, preferably operating by fluid-pressure, as shown in the drawings and as before described.

While the turn-table is preferred, it will be understood that it may be omitted in some instances and the converter be supported directly upon the rocking table C.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The herein-described apparatus for the manufacture of steel, &c., comprising the cupola, the rocking table, means for rocking the table, the standards mounted on the table,

the cylinders carried by said standards and having piston-rods, the dome-section of the converter supported on said piston-rods and hinged as described, power mechanism for tilting the dome-section on its hinges, the turn-table journaled to one of the said standards, and the base-section of the converter carried by said turn-table and movable therewith into and out of register with the dome-section.

2. In an apparatus substantially as described a rockable table adapted to support a converter and a turn-table carried by said rocking table and movable relatively thereto.

3. The combination in an apparatus substantially as described of a rocking table, a converter having a dome-section supported by said table and elevated above the same, and a turn-table carrying a second converter-section and movable relatively to the rocking table whereby it may bring its converter-section into register with the dome-section.

4. The combination in an apparatus substantially as described of a base and rocking table pivoted above the base, a power mechanism between the table and base on one side of the pivot and arranged to tilt the table and a stop on the opposite side of the pivot for limiting the tilting movement of the table.

5. The combination of a base converter-section, a table adapted to support the base-section of the converter, pressure-cylinders supported upon said table, the pistons of said cylinders and the dome converter-section arranged for operation by pistons of said pressure-cylinders.

6. The combination of the table, the standards mounted thereon, the pressure-cylinders carried by the standards and having piston-rods, the dome-section carried by the piston-rods on said cylinders, the base converter-section and the turn-table journaled to one of the standards and adapted to support the base converter-section.

7. The combination of the base converter-section, the dome converter-section, vertically-movable supports for the dome-section, and devices for tilting the dome-section.

8. The combination of the rocking table, the standards thereon, the cylinders on the standards having their piston-rods adapted to support the dome-section, the dome-section carried by said piston-rods, the base-section, the turn-table journaled to one of the standards on the rocking table and adapted to support the base-section of the converter, and means for tilting the rocking table.

EDWIN COOPER WILLS.

Witnesses:

SOLON C. KEMON,
PERRY B. TURPIN.