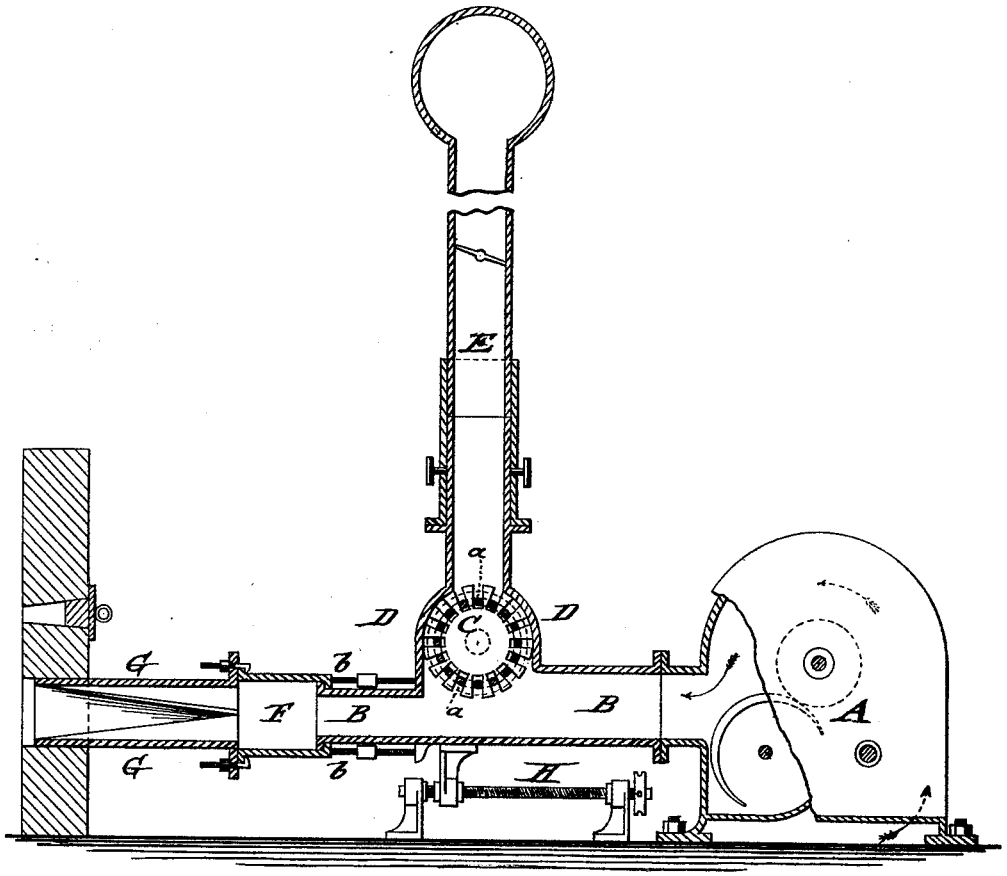
G. K. STEVENSON.

APPARATUS FOR INTRODUCING POWDERED FUEL INTO FURNACES.

No. 185,592. Patented Dec. 19, 1876.



WITNESSES:

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GEORGE K. STEVENSON, OF VALPARAISO, CHILI.

IMPROVEMENT IN APPARATUS FOR INTRODUCING POWDERED FUEL INTO FURNACES.

Specification forming part of Letters Patent No. **185,592**, dated December 19, 1876; application filed September 30, 1876.

To all whom it may concern:

Be it known that I, GEORGE K. STEVENSON, of Valparaiso, in the Republic of Chili, have invented a new and Improved Apparatus for Introducing Powdered Fuel into Furnaces, of which the following is a specification:

The accompanying drawing represents a vertical longitudinal section of my improved apparatus for feeding powdered fuel to furnaces.

The object of this invention is to introduce powdered or granular fuel, such as coal, coke, or similar hydrocarbons, to furnaces adapted thereto in such a manner as to insure a more perfect combustion and more intense heat than heretofore.

The invention consists in connecting the fuel-tube with furnace by a sleeve and tube, the latter of which is provided with a twisted plate that is made adjustable, as hereinafter described.

The fan heretofore used exclusively in the attempts to introduce powdered fuels has not given satisfactory results, on account of the uncertainty of the blast of the fan, except at a given high velocity, which circumstance has been the cause of either their failure or of greatly diminished value.

The invention consists of an apparatus in which the powdered fuel is mixed with air by a suitable pressure-blower, and injected into a furnace adapted thereto, so that the coal-dust and air shall be brought as nearly as possible to a perfect combustion, and produce gas of the greatest effect.

The apparatus may be applied to steam-boilers in use without requiring any alteration, but it may also be applied to smelting and other furnaces in convenient manner.

The apparatus is made so as to be easily removed from the mouth of the furnace, and quickly replaced again when required, occupying but small space in the usually limited fire-room of marine and other boilers.

By reference to the drawing, A represents a rotary pressure-blower of any approved construction, whose exit side is connected to a tube, B, which may be of any suitable or required section, the air being forced by the blower through this tube into the furnace. In its passage through the tube the air passes under a delivery-cylinder, C, which is working in proper bearings on, and partly within, the tube B, and rotated in the direction of the air from the blower, by suitable gearing adapted to the proportions of fuel and speed of the same. The cylinder C is specially constructed to insure the accuracy of the delivery of the powdered fuel, being arranged within a box or casing, D, and fitted into the same, so as to be practically air-tight therein. The cylinder C is made with cuttings or recesses of **U** or other shape, and provided with clearer pins or teeth *a*, which work by edges or flanges in an eccentric groove at each side of the box D. The clearer-pins are thereby drawn to the inside of the cylinder at the upper part, and forced toward the circumference of the same at the lower part of the cylinder.

The coal or other powdered fuel is fed in any suitable manner by a top feed-tube and Archimedean screw, hopper, or otherwise, to the vertical feed-tube E, filling by the force of gravity the spaces in the cylinder, and being carried by the revolving of the cylinder into the tube B, where the fuel is forced out by the clearer-pins and deposited in the tube B. The fuel cannot clog in the cylinder, even if it were moist or wet, as the clearer-pins will effectually discharge the fuel from the recesses of the cylinder.

Another advantage of the cylinder C is, that there will be no air escape from tube B to the feed-tube E, as the side feeding is filled with powdered fuel, and as the teeth fill the space on the return to receive the charge. As the revolutions of the cylinder are necessarily slow, there will be little wear to the same. The coal or powdered fuel thus regularly fed into the tube B is, by the air from the blower, driven through tube B, sleeve F, and discharge-tube G into the furnace, the fuel and air being well mixed during their passage through tube B. The sleeve F slides on tube B, and is kept thereon by a collar or flange at the end of tube, the sleeve F being tightly secured to the collar by right-and-left-hand expansion-screws *b* from box D or raised parts on the tube B. The discharge-tube G is made with a flange on one end, which is retained in air-tight connection with the sleeve F, by hook-bolts with thumb-nuts. The discharge-

tube may be provided with a central twisted division-plate, if desired, by means of which the fuel is thrown by a whirling movement into the furnace, and by adjusting the tube G and twisted plate, the direction of the fuel may be altered, as required. Any suitable spiral grinding device may be employed for giving the current the whirling movement.

The parts of the apparatus are geared in suitable manner, and secured to or on a table or frame-work, which, in its turn, is supported on casters or wheels for stationary furnaces, and by horizontal screws H secured to the floor of the fire-room, so that the whole apparatus can be moved away from the furnace-connection and placed into any suitable position.

In case several boilers, as in marine boilers, are used, each boiler should be supplied by one blower, the sleeve F being made with a discharge-tube, properly gaged to equally divide the injected fuel and air to each opening, care being taken that the discharge-tubes are in line with the center of the furnace.

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

The combination, with blower A and tube B, of the sleeve F and tube G, the latter being adjustable, and provided with a twisted internal plate, substantially as and for the purpose specified.

GEORGE K. STEVENSON.

Witnesses:

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