

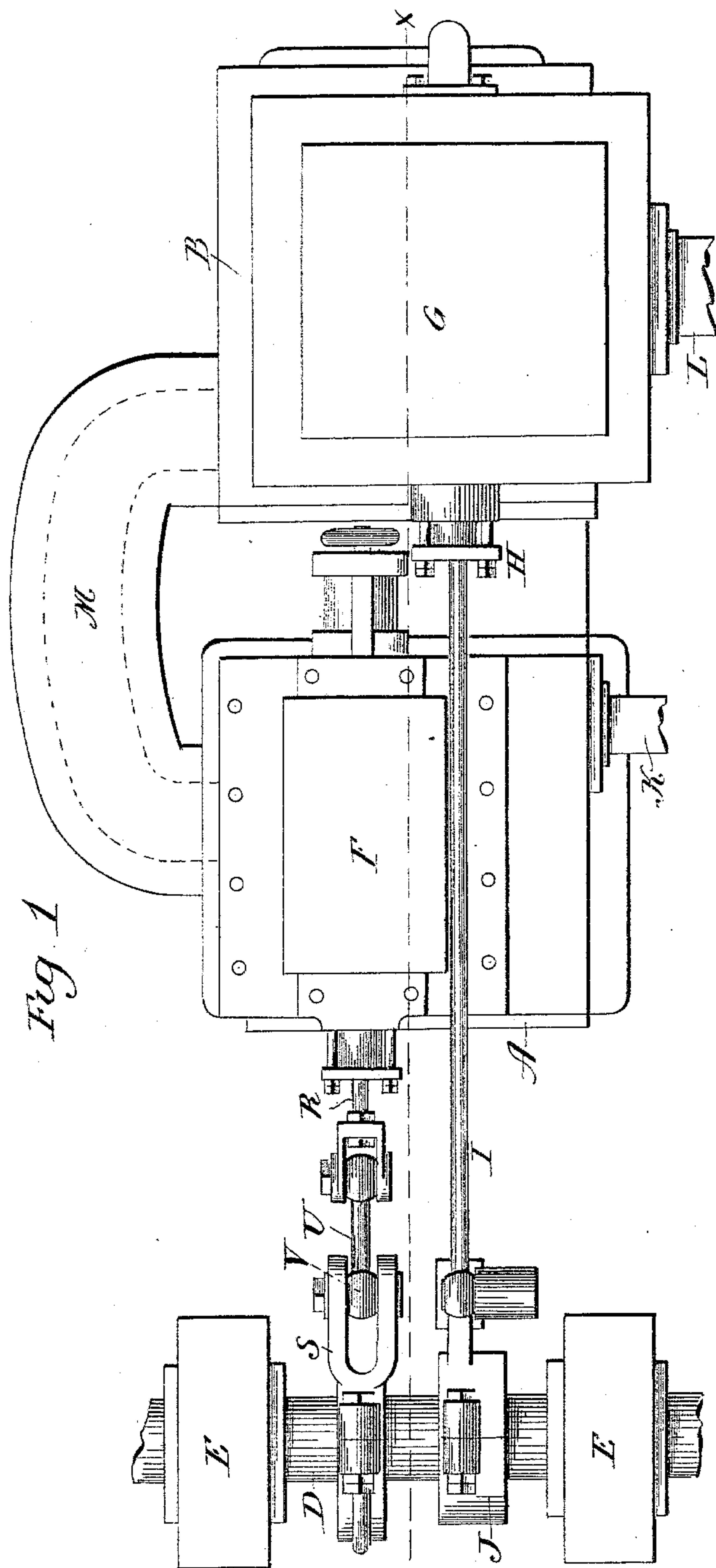
(No Model.)

2 Sheets—Sheet 1.

E. HILL.
COMPOUND STEAM ENGINE.

No. 566,580.

Patented Aug. 25, 1896.



Witnesses,
J. H. Shumway
Lillian D. Kelsey.

Ebenezer Hill,
Inventor
By atty. Earle Heywood

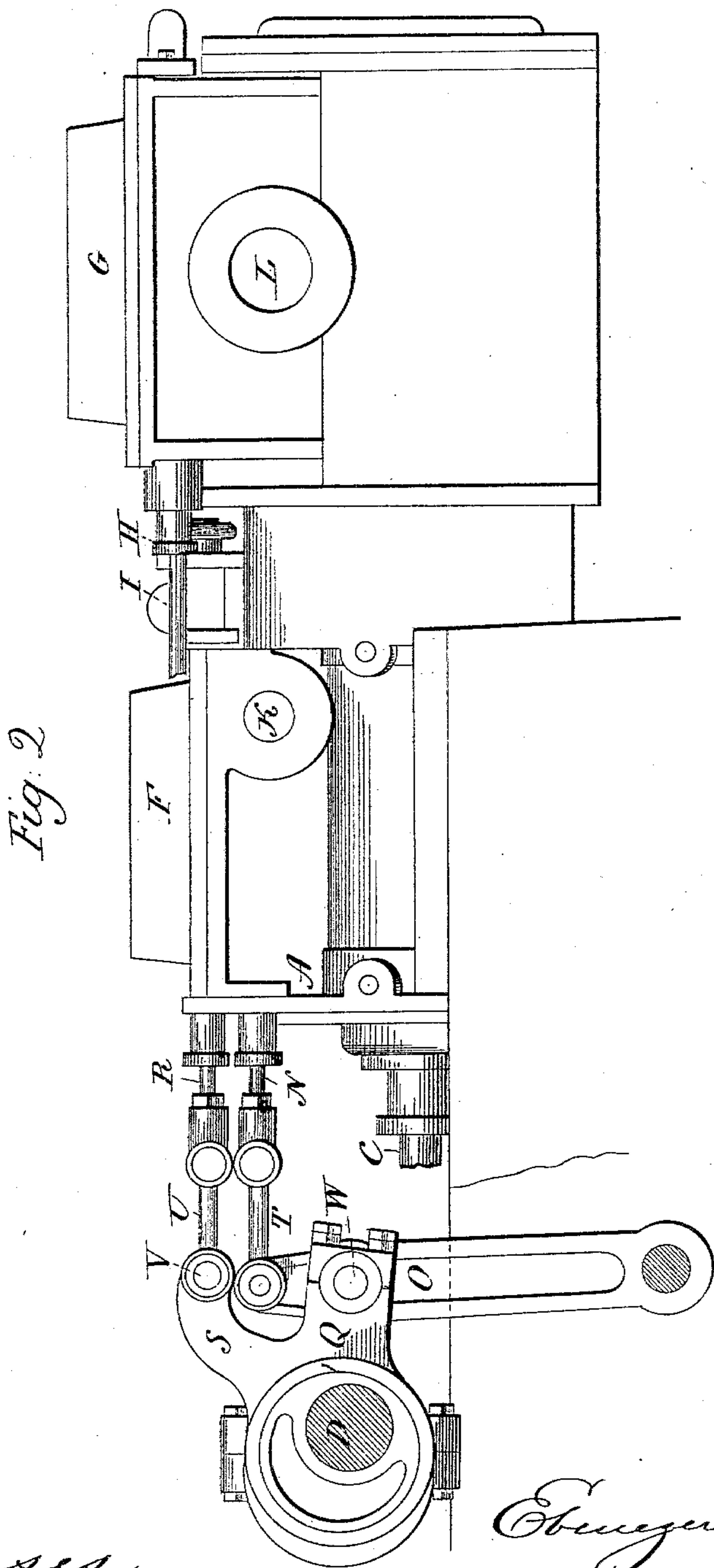
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 Ebenezer Hall,
 Inventor.
 By Atty.
 Earle & Seymour

UNITED STATES PATENT OFFICE.

EBENEZER HILL, OF SOUTH NORWALK, CONNECTICUT.

COMPOUND STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 566,580, dated August 25, 1896.

Application filed January 6, 1892. Serial No. 417,135. (No model.)

To all whom it may concern:

Be it known that I, EBENEZER HILL, of South Norwalk, in the county of Fairfield and State of Connecticut, have invented a new
5 Improvement in Compound Steam-Engines; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description
10 of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a plan view of so much of a compound engine as is necessary for the illustration of the invention, and in Fig. 2 a side
15 view of the same.

This invention relates to an improvement in that class of steam-engines commonly called "compound engines," and in which the
20 cylinders are arranged in direct longitudinal line with each other and so as to operate through a single piston-rod, and in which the main shaft is arranged between the steam-cylinder and the cross-head, a well-known
25 style of engine, known as "back-action" engines, used to a considerable extent in marine service, such, for example, as shown in the patent granted to me December 12, 1893, No. 510,685.

30 The object of the invention is the arrangement of the steam-chest of the two cylinders with relation to each other, whereby the valve connections may be considerably simplified.

The invention consists in the arrangement
35 of two steam-chests upon the same side of both cylinders, and in planes substantially parallel with the plane of the main shaft of the engine, the steam-chest of the high-pressure cylinder principally at one side of the
40 longitudinal central line of the cylinder and the steam-chest of the low-pressure cylinder principally upon the opposite side of the same longitudinal central line, and whereby the valve-rod of the low-pressure cylinder may
45 pass directly from the steam-chest toward the eccentric and one side of the steam-chest of the high-pressure cylinder, and as more fully hereinafter described.

50 A represents the high-pressure cylinder, and B the low-pressure cylinder, arranged in direct longitudinal line with each other.

C represents the piston-rod, as seen in Fig. 2,

which is in central line with and so as to work through both cylinders, as usual in this class of engines. The piston-rod extends to the
55 cross-head in the usual manner, those connections not shown, as they are immaterial to the invention.

D represents the main shaft, which, as usual in this class of engines, is arranged in bearings E E between the main cylinder and the
60 cross-head, and to the outer ends of which crank-shafts are applied and connections made with the cross-heads. These cross-head connections are not illustrated, as they
65 are immaterial to the invention.

F represents the steam-chest of the high-pressure cylinder, and G represents the steam-chest of the low-pressure cylinder, and the broken line $x x$ represents the central line of
70 the two cylinders. The steam-chest F of the high-pressure cylinder is arranged so far to one side of said central line and the steam-chest G of the low-pressure cylinder so far
75 to the opposite side of the same central line as to leave a direct clear space from the valve-rod stuffing-box H of the steam-chest G toward the main-shaft, and so that the valve-rod I of the low-pressure cylinder G may
80 work over the high-pressure cylinder at one side of the steam-chest F, said rod I being connected to its eccentric J on the main shaft in a well-known manner.

K represents the steam-inlet for the high-pressure cylinder F, and L represents the
85 exhaust from the low-pressure cylinder.

M represents the connection from the exhaust of the high-pressure cylinder to the inlet of the low-pressure cylinder. This is substantially the usual connection.
90

N represents the valve-rod for operating the principal valve of the high-pressure cylinder, and is connected to a rocker-arm O, which is operated by an eccentric P on the
95 main shaft D, the strap of said eccentric having an arm Q extending radially therefrom and hung to the rocker-arm O.

R represents the valve-rod of the cut-off valve of the high-pressure cylinder, and it is connected to a second arm S, extending from
100 the strap of the same eccentric P. The valve-gear shown is no part of the present invention. The steam-chests of the two cylinders have been spoken of as being located prin-

cipally on opposite sides of a vertical plane passing through both cylinders. It would perhaps be more accurate to say that the center lines of the said steam-chests are located
5 on opposite sides of the said plane.

By the arrangement of the two steam-chests upon opposite sides of the same central line, as described, and making the exhaust from the respective chests upon the corresponding
10 sides of the said central line the exhaust-passage for both cylinders is considerably shortened over what it would be were the steam-chests centrally arranged and in line with each other. By this arrangement of the
15 two steam-chests the valves of the two cylinders are so widely separated as to allow more direct connection from the valves to their respective eccentrics than can be done when the steam-chests are in line with each
20 other, and which necessarily brings the valve-rods of the two cylinders in the same vertical plane, requiring rock-shafts and levers to make connections between the said rods and their respective eccentrics. The machinery
25 the engine is therefore very considerably of simplified by this opposite arrangement of the two steam-chests.

I claim—

30 In a compound steam-engine, the combination with a high-pressure cylinder, of a low-

pressure cylinder located in line therewith, a steam-chest for the high-pressure cylinder situated on the top of the same, having its center line located to one side of a vertical
35 plane passing through the longitudinal center of both of the said cylinders, and having its valve-seat located in a horizontal plane, a steam-chest for the low-pressure cylinder situated on top of the same, having its center
40 line located on the opposite side of the said vertical plane from the center line of the high-pressure steam-chest, and having its valve located in a horizontal plane, a main shaft, a valve-rod extending between
45 the high-pressure cylinder and the said shaft, a valve-rod passing over the high-pressure cylinder and to one side of the steam-chest thereof, and forming a direct connection between the low-pressure cylinder and the
50 shaft, and an exhaust-pipe leading out of one side of the steam-chest of the high-pressure cylinder and into the corresponding side of the low-pressure cylinder.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

EBENEZER HILL.

Witnesses:

JACOB M. LAYTON,

J. E. SLATER.