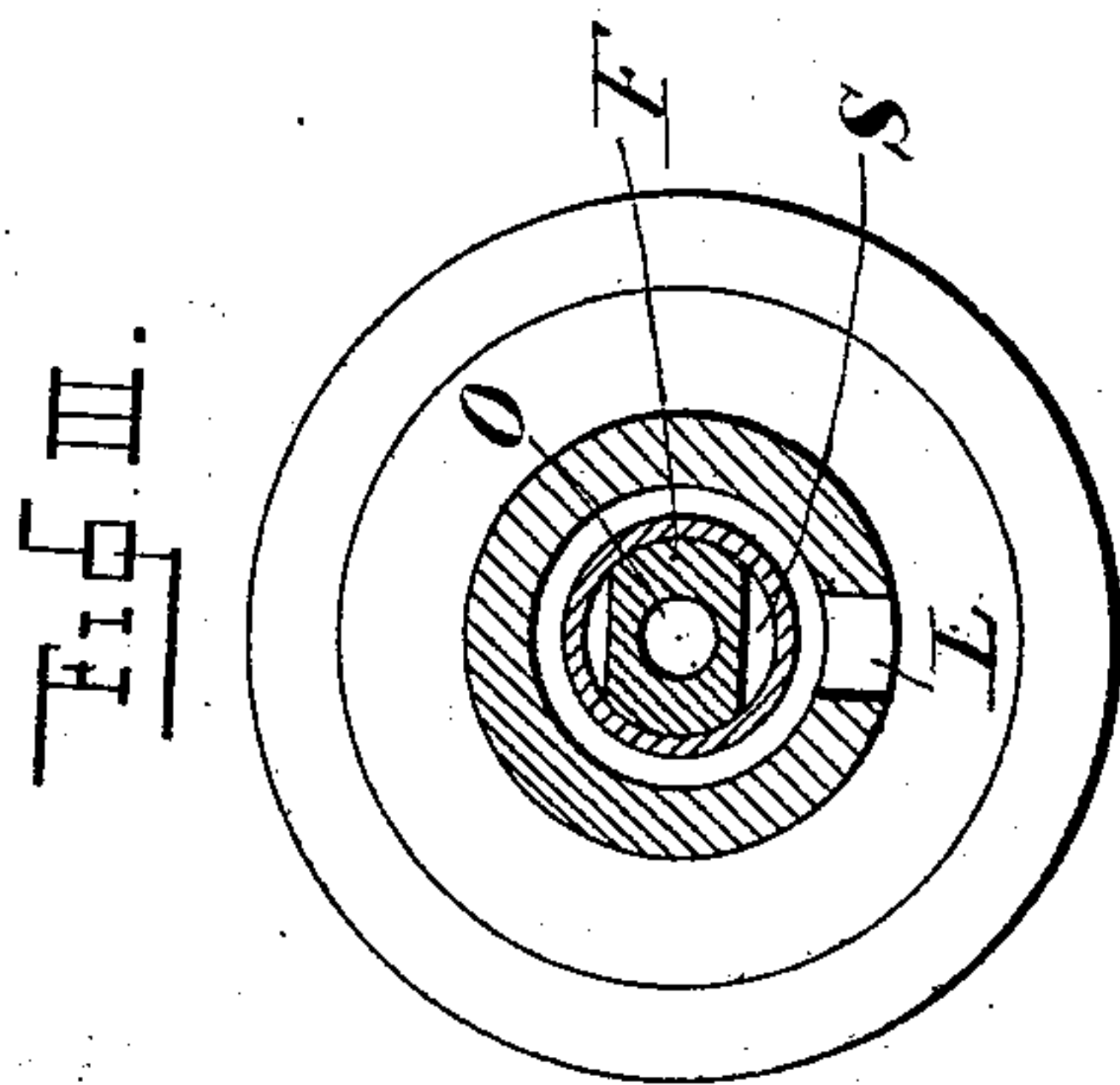
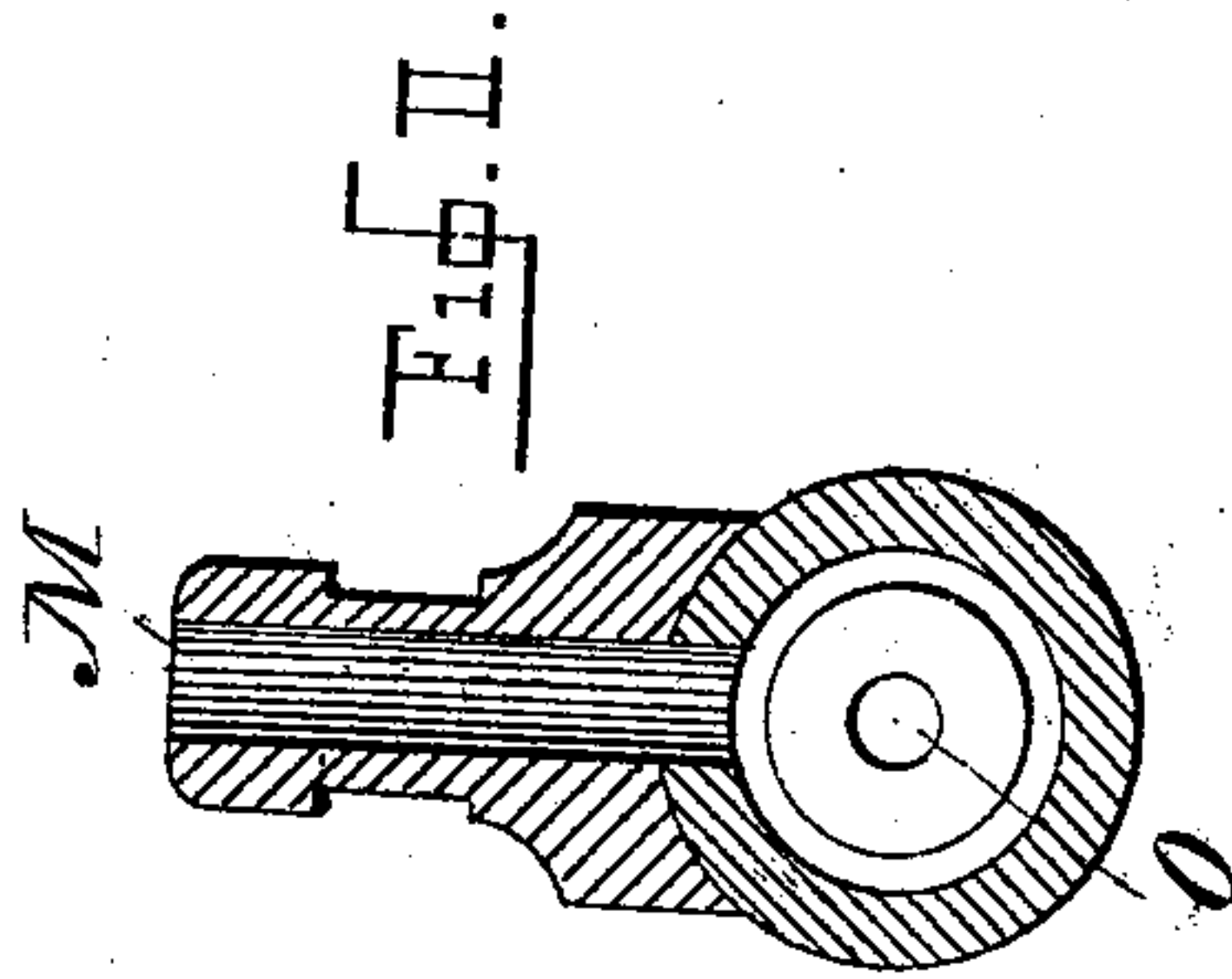
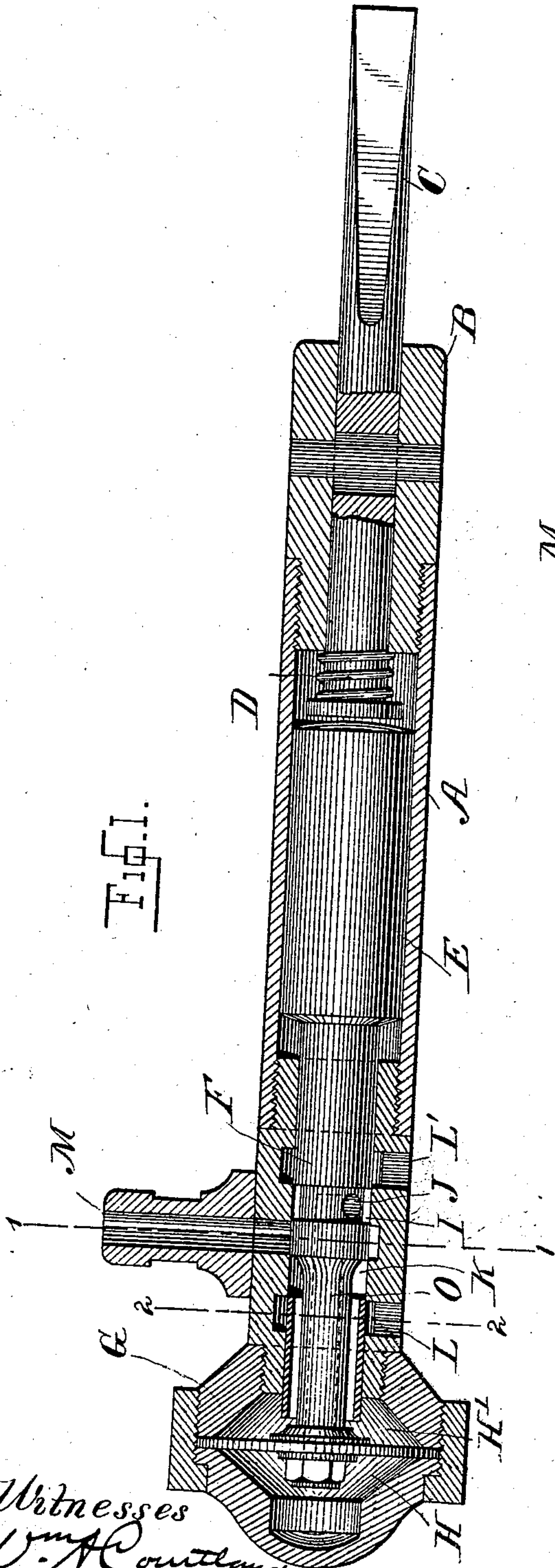


(No Model.)

W. E. GIBBS.
PERCUSSION TOOL.

No. 518,032.

Patented Apr. 10, 1894.



Witnesses
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J. V. Bidgood

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UNITED STATES PATENT OFFICE.

WILLIAM EDWIN GIBBS, OF NEW YORK, N. Y.

PERCUSSION-TOOL.

SPECIFICATION forming part of Letters Patent No. 518,032, dated April 10, 1894.

Application filed December 18, 1893. Serial No. 493,906. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM EDWIN GIBBS, a citizen of the United States, residing at New York, county and State of New York, have
5 invented certain new and useful Improvements in Percussion-Tools, of which the following is a specification.

My pneumatic percussion tool consists essentially of a tubular casing having at its
10 lower end a spring supported tool, and containing the plunger or striking part of the mechanism. At the upper end is a diaphragm chamber, having a diaphragm therein, by which it is divided into two parts. The dia-
15 phragm is connected at its center with the upper end of the plunger and means are provided for admitting and exhausting the working fluid alternately on opposite sides of said diaphragm by which means the diaphragm
20 is thrown into violent vibration, and with it the plunger. Said plunger in its downward motion, strikes at each movement the working tool, giving a rapid succession of blows thereon. The piston rod and part of the casing surrounding it, have suitable ports and
25 passages cut in them, so that they put the chambers on each side of the diaphragm in communication with the supply and exhaust ports by the movement of the piston rod itself and thereby the necessity for an inde-
30 pendently moving valve is removed.

Referring to the accompanying drawings which forms a part of this specification, Figure I represents a longitudinal section of a
35 percussion tool embodying my invention. Fig. II is a cross section on the line 1—1 Fig. I. Fig. III is a cross section on the line 2—2 Fig. I.

In the drawings, A is a casing having at one
40 end the tool holder B, tool C, pressed upward by the spring D. In the casing slides the plunger E having the integral piston rod F connecting it with the diaphragm G. The diaphragm is clamped air tight at its edge as
45 shown and forms a double diaphragm chamber H H'. The piston rod F has a hole O drilled in the end extending from the upper diaphragm chamber H to the annular space I with which it communicates by means of
50 the transverse hole J. An annular passage in the piston rod also connects the lower diaphragm chamber with the annular space K.

M is the supply pipe, and L, L' are the exhaust passages.

The action of the tool is as follows: Sup- 55
posing the plunger to be withdrawn from the tool, which is done by giving a blow with the hand upon the upper part of the diaphragm case, the air enters by the uncovered admis-
60 sion port, the space I, and thence passes by way of the holes J and I to the upper side of the diaphragm, driving it and the plunger downward. The air on the opposite side of the diaphragm being exhausted by passing
65 through the annular channel S, to the space K and thence out through the exhaust port. But when the parts have reached their middle position all the passages are closed to the admission and exhaust ports, and now
70 the momentum acquired carries the plunger beyond this position, giving the blow on the tool which is set at the proper distance. The position of the ports being now reversed the diaphragm and parts connected with it move
75 in the opposite direction, but on this, the upstroke, the cushioning is so great as to stop them before the piston rod touches the cover of the upper diaphragm chamber, thus avoid-
80 ing the jar and wear which would otherwise result. These motions are repeated with great rapidity, and at each downward stroke a blow is given to the working tool. As the area of the piston rod detracts just so much from the effective area of the lower side of the diaphragm it follows that the upward
85 stroke and the downward cushioning are less powerful than those in the opposite direction, and consequently the power is principally developed on the downward stroke.

It will be seen that in this tool there is no
90 independently moving valve, and that the piston is replaced by a diaphragm. By this means I save both the leakage which is such a drawback to this class of tools, and the power needed for moving a valve. In addi-
95 tion to this I reduce the number of parts subject to wear, simplify and cheapen the construction, and produce a tool which is extremely efficient in its working.

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

1. In a pneumatic percussion tool, a plunger connected to a vibrating diaphragm, and

moved by admitting and exhausting air alternately on opposite sides of said diaphragm.

2. In a pneumatic percussion tool, a plunger and piston rod, connected to the center of an
5 air driven vibrating diaphragm, and means for admitting and exhausting air on the opposite sides of said diaphragm.

3. In a pneumatic percussion tool, a vibrating diaphragm, a plunger connected with the
10 center of said diaphragm, air passages to each side of said diaphragm, and means for putting passages in communication alternately with the air supply and the exhaust ports.

4. In a pneumatic percussion tool, a vibrating diaphragm, a plunger connected with the
center of said diaphragm, suitable air pas- 15
sages to each side of said diaphragm, a tubular casing having supply and exhaust ports around said plunger all so proportioned that
air will be admitted and exhausted alternately 20
on each side of said diaphragm by the motion of said plunger.

WILLIAM EDWIN GIBBS.

Witnesses:

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