(No Model.) 2 Sheets—Sheet 1.

W. GEHRING.

CHISELING, DRILLING, OR PROSPECTING MACHINE.

No. 473,549. Patented Apr. 26, 1892.

Fig. 4.

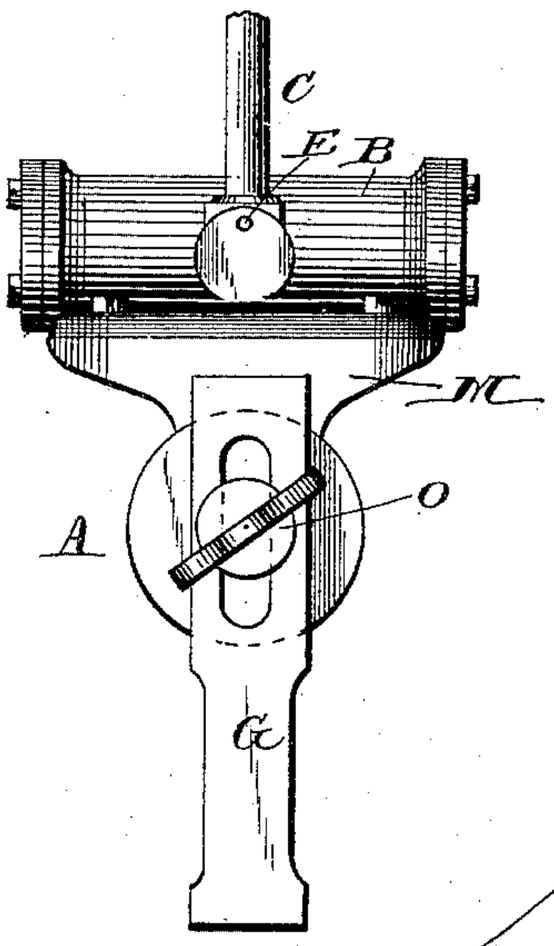
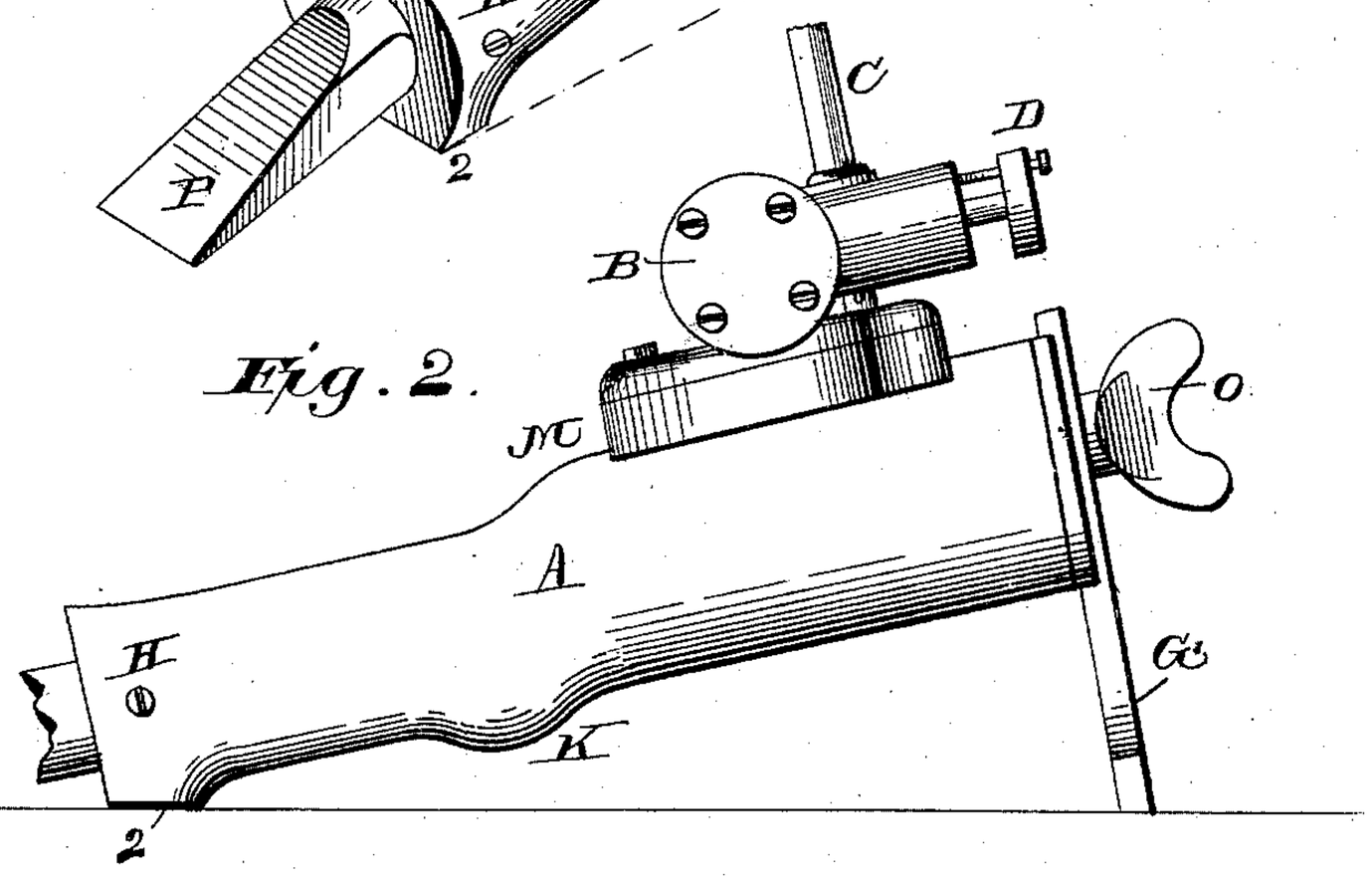


Fig. 1.

Fig. 2.



WITNESSES

F. L. Ourand.

R. F. Bishop.

INVENTOR

William Gehring,

By W. J. FitzGerald

Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 3.

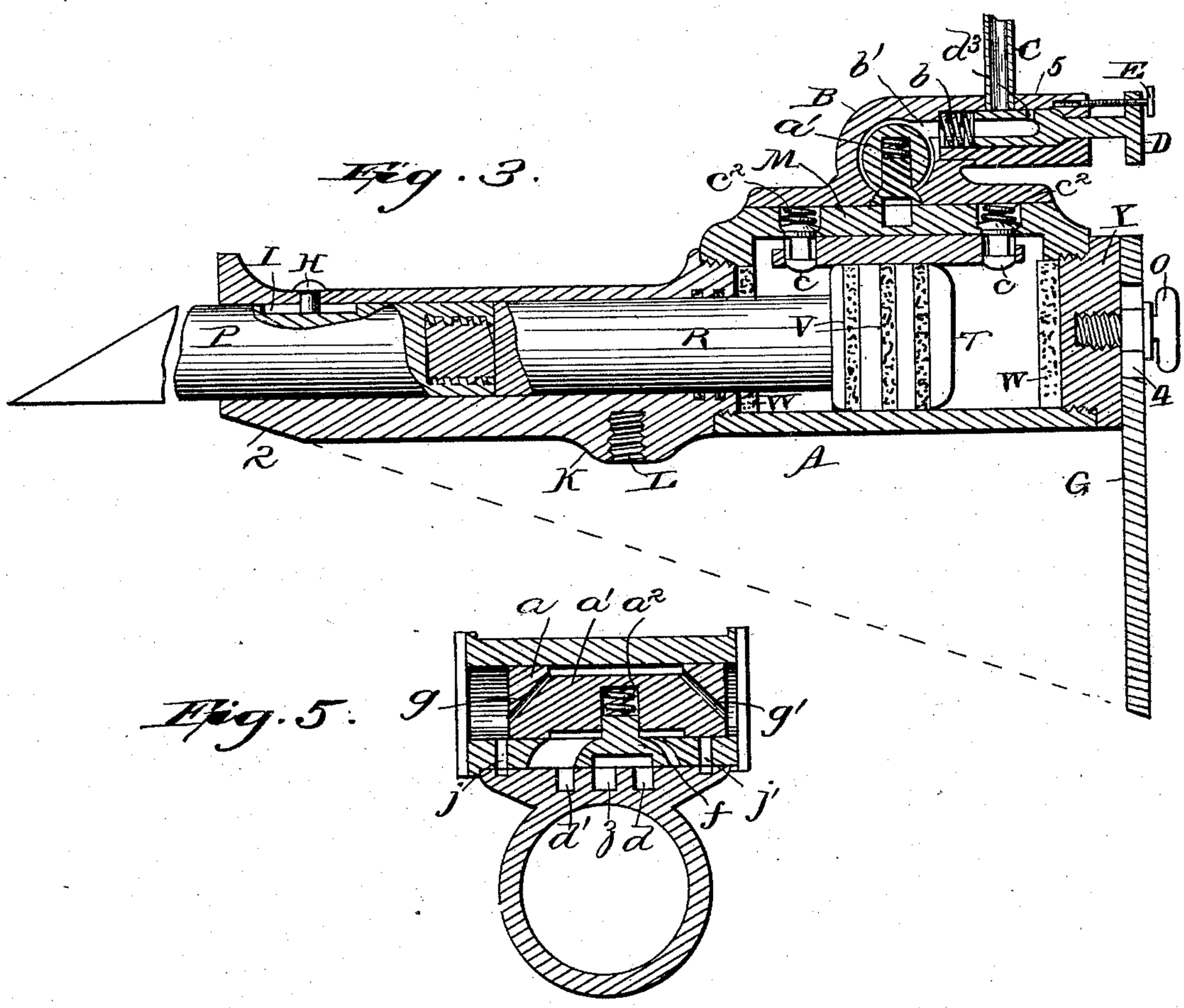

Fig. 5.

Fig. 6.

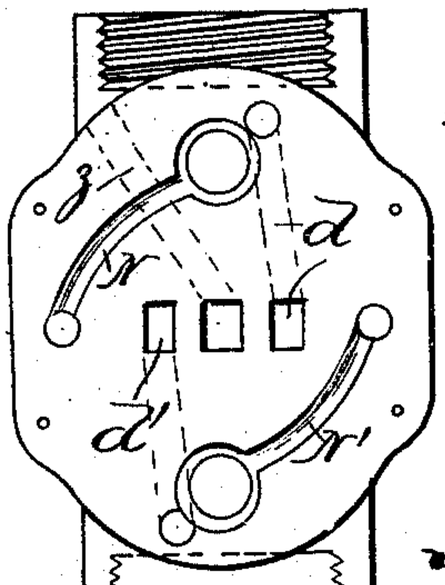

Fig. 7.

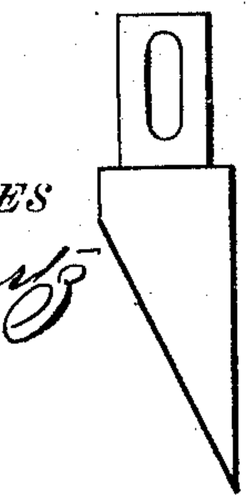

Fig. 8.

WITNESSES
A. L. Schwartz
J. F. Reily.

Wm Gehring.
INVENTOR:
By W. J. FitzGerald,
Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM GEHRING, OF SAN DIEGO, CALIFORNIA.

CHISELING, DRILLING, OR PROSPECTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 473,549, dated April 26, 1892.

Application filed April 12, 1890. Renewed March 28, 1892. Serial No. 426,857. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM GEHRING, a citizen of the United States, and a resident of the city and county of San Diego, California, have invented a new and useful Chiseling, Drilling, or Prospecting Machine; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings.

My invention aims to provide a simple and efficient machine in which a drill or other tool may be rapidly and easily operated by the use of steam or compressed air; and it consists in certain novel features hereinafter pointed out.

In the accompanying drawings, Figure 1 is a perspective view of my improved machine. Fig. 2 is a side view of the same, the handle and the tool operated by the machine being broken away. Fig. 3 is a longitudinal vertical section of the machine. Fig. 4 is an end view of the same. Fig. 5 is a transverse section on the line *x x* of Fig. 3. Fig. 6 is a horizontal sectional view showing the valve-seat and the steam or air passage; and Figs. 7 and 8 are detail views of a drill and a rock-crushing tool, respectively.

Referring to the drawings particularly by letter, A designates the body of the machine, which is of a substantially cylindrical formation and is provided on its under side at about its center with the boss or enlargement K, having an internal threaded socket L, so that the body may be secured upon a tripod or other support when it is to be operated from a height, and the front end of the cylinder curves down and is slightly inclined, as shown at 2, so that the device may be supported at an angle when so desired. A set-screw H works in a threaded opening in the front end of the body and passes diametrically into the same, so as to engage a slot I in the drill P, and thereby hold the said tool within the cylinder, or a spiral slot *n* in the tool-shoulder I′, so as to impart a rotary as well as a reciprocating motion to the said tool-holder in the operation of the machine. The rock-crushing tool *i* is fitted in the end of this tool-holder, and the inner end of the holder is provided with a socket *i′*, so that it may be connected directly to the piston and operated thereby, if so desired. The rear end of the body A is closed by a removable cylinder-head Y, provided on its outer side with a diametrical groove 3, and a supporting-standard G is fitted in the said groove and provided with a longitudinal slot 4, through which a thumb-screw O or the threaded end of a handle F passes into the cylinder-head Y, so as to secure the said standard at any desired point, and thus support the machine at any desired inclination, as represented by the dotted line J in Fig. 1. On the upper side of the cylinder, at the rear end of the same, I provide the steam-chest B and the valve-seat M below the said steam-chest. The valve-seat forms a lateral enlargement on the upper side of the cylinder or body A, and the steam-chest B is arranged upon the valve-seat and transversely to the cylinder or body A. The steam or compressed air is admitted through the chest B and the passages in the valve-seat M into the cylinder or body A, so as to act on the piston R therein, the said piston R having its head T beveled on both sides, so as to act on the tappet-valves *c* without injuring the same, and is further provided with a series of circumferential grooves V, which are filled with a packing or absorbent material adapted to carry oil or other lubricant. The piston-head T at the ends of its stroke impinges against cushions W, secured on the inner face of the removable standard-head Y and the end of the body A, so as to prevent its being injured by being stopped too suddenly, and internal grooves are provided in the body A and are filled with an absorbent packing, similar to the grooves V, as shown.

The steam-chest B is provided at its center, on its rear side, with a tubular projection 5, and an inlet or feed tube C rises from the said projection 5. A throttle-valve D is mounted in the projection 5 and is pressed normally outward, so as to close the end by a spring *b*, as most clearly shown in Fig. 3, and the said throttle-valve is held inward against the pressure of the said spring by set-screw E or other suitable means, as will be readily understood. When the throttle-valve is pushed inward, the steam will pass from the feed-tube C through the port d^3 of the throttle-valve D, through the said valve, and through a central port *b′* in that side of the steam-chest B into the said chest, entering

the annular space around the reduced central part a' of the piston a. This piston is formed with the reduced central part a', leaving an annular space around it, as shown, and with the inclined ports g g', which give communication between the said space and the ends of the chest B, as clearly shown in Fig. 5 of the drawings. A recess a^2 is formed in the under side of the piston a, in which fits the upper end of a D-valve or slide-valve f.

In the valve-seat M are formed three inclined passages, the passage d, leading from the central part of the valve-seat into the front end of the main cylinder A, the passage d', leading from the central part of the valve-seat into the rear end of the main cylinder, while the exhaust-passage z leads from the central part of the valve-seat M out into the open air at the front (or rear, if preferred) end of the cylinder. It will now be seen that when the piston T is moving forward, the piston a and slide-valve f standing in the position shown in Fig. 5 of the drawings, the steam in the front end of the cylinder A will exhaust through the port d, the valve f, and out through the exhaust-port z, and as the piston T reaches the end of its forward stroke its forward end comes in contact with the lower end of and raises the forward tappet-valve c, when the steam contained in the left-hand end of the steam-chest B (in Fig. 5) will pass out through a port j, a curved groove N, and through the port which the tappet-valve c normally closes, and out with the exhaust-steam from the forward end of the cylinder A. As the live steam is thus exhausted from the one end of the steam-chest B the pressure of the live steam in the right-hand end of the steam-chest will slide the piston a to the left, carrying the slide-valve f with it. The port d is thus opened for the passage of live steam to the forward end of the cylinder A, while the slide-valve f connects the port d' with the exhaust-port z, and as the live steam passing through the port d drives the main piston T back in the cylinder A the steam in the rear end of cylinder A will exhaust through the port d', the slide-valve f, and the exhaust-port z. When the piston T reaches the rear end of its stroke, it raises the rear tappet-valve, when the live steam in the right-hand end of the steam-chest B exhausts through the port j', the curved groove N', and port normally closed by the rear tappet-valve into the rear end of the main cylinder A, and passes out with the exhaust-steam from that end of the cylinder. The pressure of live steam in the left-hand end of the steam-chest then slides the piston a to the right, carrying with it the slide-valve f and opening the port d' to admit live steam again to the rear end of cylinder A.

It will be observed that in my device the several parts are all arranged in a very compact form and that the passage for the steam or compressed air by which the machine is operated are close together, so that there is no waste of room or material and the operation of the machine is rendered positive and certain.

The operation of the device is thought to be obvious from the foregoing description, taken in connection with the accompanying drawings, and its advantages will be readily appreciated by those skilled in the art.

The standard G can be adjusted to support the machine at any desired angle, or the machine may be supported on a tripod, while the handle T serves as a convenient means of controlling the machine while it is at work.

The tool operated by the machine may be connected directly to the piston, or it may be operated by allowing the piston to fall repeatedly upon it and act thereon like a hammer, and the tool may be caused to merely reciprocate or to rotate, as well as reciprocate, by employing the straight or spiral slot or groove, as is obvious.

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

1. The combination of the main cylinder A, formed at its upper side with the valve-seat M, the passages d and d' and the exhaust-passage z, having their inner upper ends opening on a transverse line across the center of the valve-seat M, the forward and rear tappet-valves c and the ports controlled by the same, the curved grooves N, leading from said ports to points on a line with the center of the valve-seat M, the steam-chest B, having the end ports j and j' communicating with the curved grooves N, the piston a, having the reduced central port a' and the end ports g and g' and having the recess a^2 in its under side, the slide-valve f, and the small spiral spring mounted in the recess a^2 of the piston a and bearing down upon the slide-valve, substantially as set forth.

2. The combination of the steam-chest formed with the tubular projection 5, the feed-pipe rising from the said projection, the throttle-valve mounted in the tubular projection, and means for holding the said throttle-valve closed, substantially as set forth.

3. In a rock-drill, the combination of the cylinder having its rear end provided with the diametrical groove, and a standard adjustably secured in said groove, substantially as set forth.

WILLIAM GEHRING. [L. S.]

Witnesses:
A. B. SMITH,
HENRY C. LANGREHR.