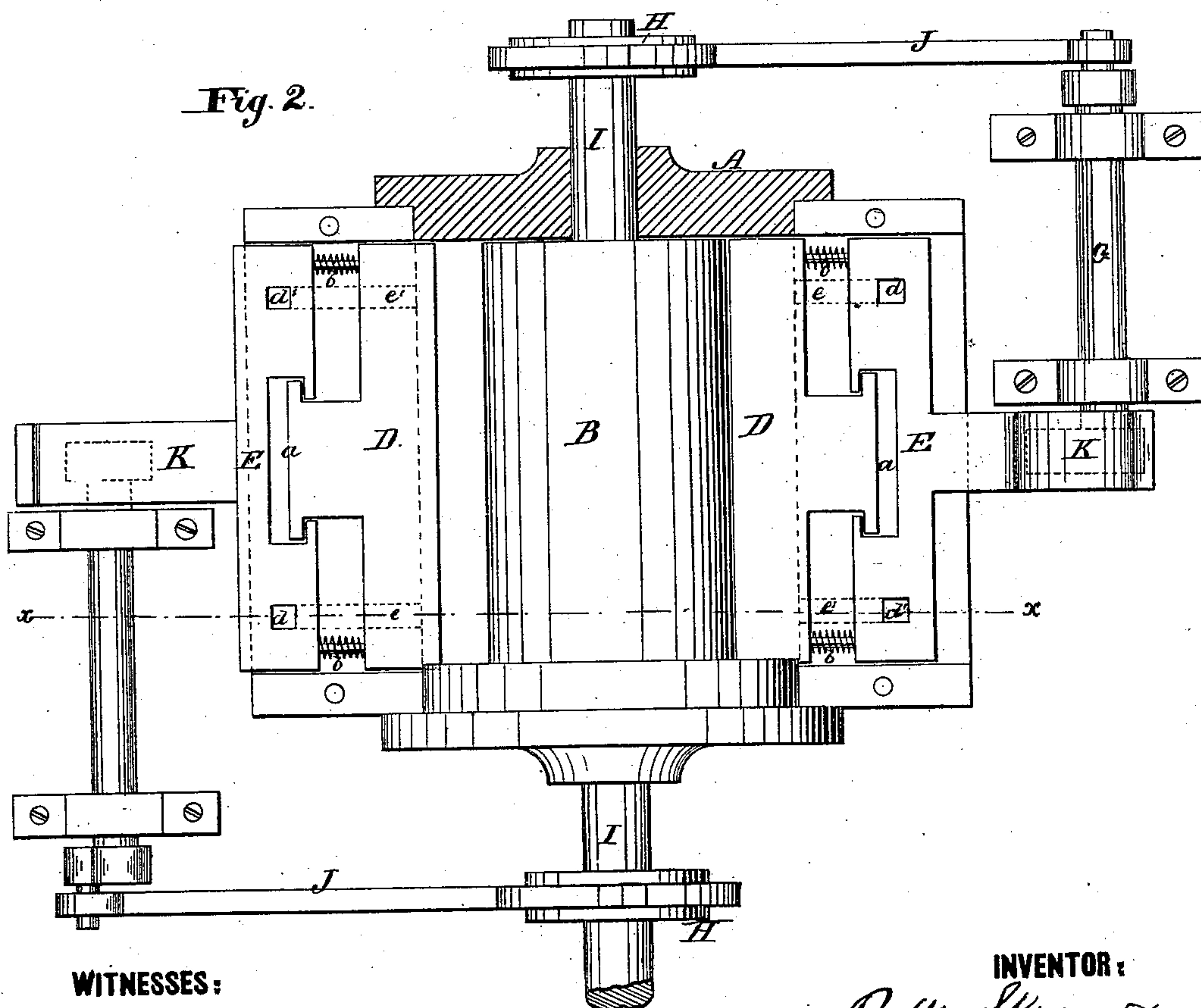
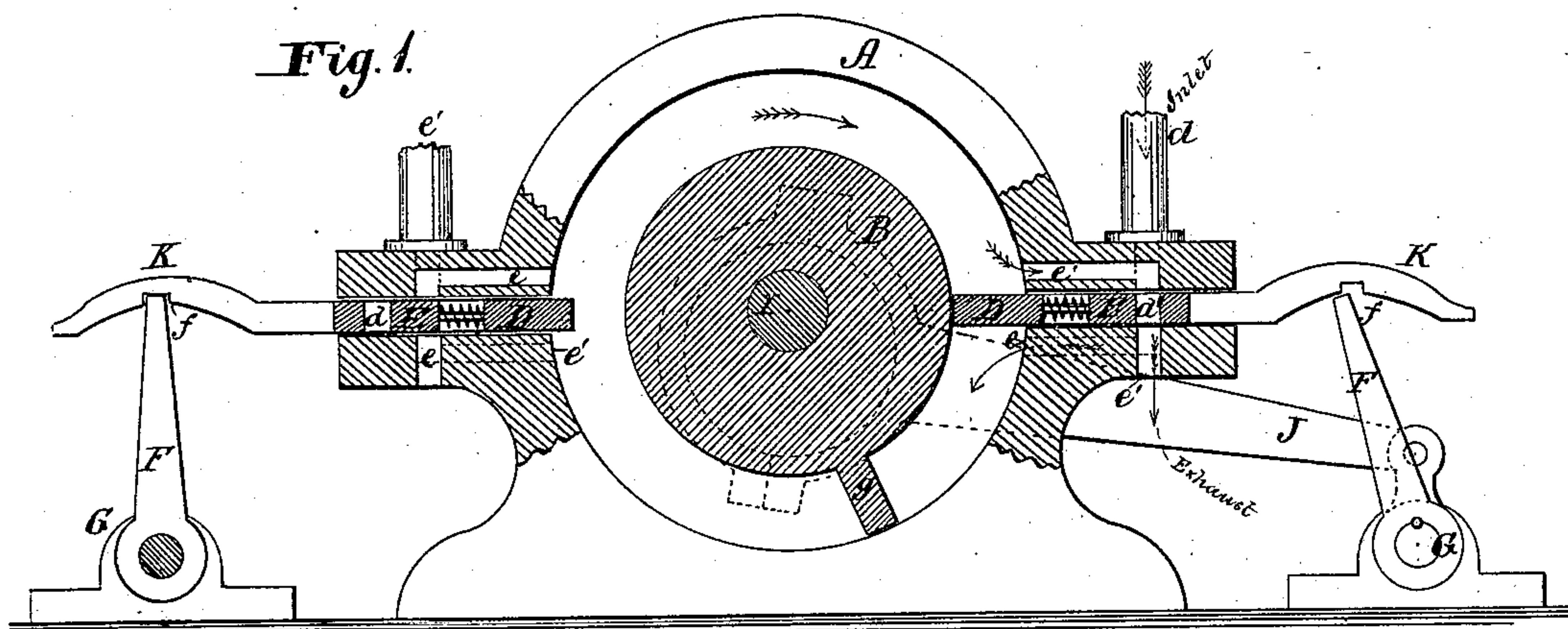


R. W. SKIRROW.

ROTARY ENGINE.

No. 187,326.

Patented Feb. 13, 1877.



WITNESSES:

*W. W. Hollingsworth*  
*D. H. Reinold*

INVENTOR:

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BY

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# UNITED STATES PATENT OFFICE.

ROBERT W. SKIRROW, OF WINDSOR, CONNECTICUT.

## IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. **187,326**, dated February 13, 1877; application filed November 25, 1876.

*To all whom it may concern:*

Be it known that I, ROBERT W. SKIRROW, of Windsor, in the county of Hartford and State of Connecticut, have invented a new and Improved Rotary Engine, of which the following is a specification:

Figure 1 is a transverse section on line *x x*, Fig. 2. Fig. 2 is a top view, with a portion of the casing broken away.

Similar letters of reference indicate corresponding parts.

The invention relates to the construction and arrangement of the valves and sliding abutments and the means for operating them, as hereinafter described.

Referring to the drawing, A is the cylinder; B, the winged rotating piston; D D are the sliding abutments, and E E the sliding valves, one on each side of the piston. The latter are connected with the abutments E by a T-joint, *a*, Fig. 2. Springs *b* are interposed between the valves and abutments, to hold them apart with an elastic pressure. Both valves and abutments are flat and of equal thickness and width, and arranged to work in horizontal ways in the sides of the case or cylinder A. Each valve E is provided with openings *d d'*, which register respectively with the inlet and exhaust ports *e e'*. As shown in the drawing, the inlet-port *d*, on the right-hand side of the cylinder, communicates with the interior, or piston-chamber, at a point below the abutment D and the exhaust *d'* above it; but when the engine requires to be reversed, the ports are reversed also, the inlet-ports *d* becoming the exhaust and the exhaust *d'* becoming the inlet-ports. It is apparent that to enable this to be done, the pipes, which are connected to the inlet-ports *d*, and the exhaust-ports *d'*, on each side of the cylinder A, require, in practice, to be joined to the steam-supply pipe, and a two-way cock to be placed at the junction thereof, so that the live steam may be caused to enter the pipes leading to the ports, which open above the abutments, or the ports below the same, according as it is required to drive the engine in one direction or the other. (These pipes are not shown in the drawing.)

The means for operating, or sliding in and out the valve and abutments, are tappet-arms F, keyed on rock-shafts G, and eccentrics H,

keyed on the shaft I of the engine, and connected with the rock-shafts G by means of bars or rods J. The tappet-arms F engage notches *f*, formed in the under side of the curved arms K of the valves E.

As shown in drawing, the abutment and valve on the right are pushed in so that the edge of the former bears against the periphery of the piston B, and the openings *d d'* in the valve E register with the inlet and exhaust ports *e e'* respectively. Live steam is entering port *d e* and acting against the wing *g* of the piston, while the exhaust on the other side of the wing *g* is taking place through port *e' d'*, above the right-hand abutment, the abutment and valve on the other or left-hand side of the cylinder having been partly withdrawn. As soon as the piston-wing *g* has passed the left-hand abutment, the latter will be moved quickly in, the openings *d d'* will then register respectively with the ports *e e'*, and steam will enter through port *e* above the abutment, while the exhaust takes place simultaneously through port *e'* below it. The right-hand abutment and valve will begin to be drawn back immediately the left-hand abutment and valve have been thus pushed in, so that the wing *g* will pass the said right-hand abutment. As soon as it has passed the latter, it is moved in, and thus the operation is continued. When it is desired to reverse the engine, the cock or valve, (not shown,) located at the junction of the several inlet and exhaust pipes, is turned to admit live steam to the ports *e'*, and allow the exhaust from ports *e*, so that steam is thus made to act on the other side of the piston-wing *g*, and drive the piston in the opposite direction, as will be readily understood without further description.

It will be observed that the tappets F, after engaging the notches *f* in the arms K of the valves, and thus effecting the desired movement of the latter, become disengaged from the said notches and continue their vibrating movement, as will be understood on reference to Fig. 1. In other words, the tappets vibrate through a greater arc than is represented by the movement of the valves, and remain engaged with the notched arms K during the middle portion of such vibratory movement.

The inner edges of the abutments D are

nade concave, to adapt them to fit the periphery of the piston accurately, and thus form a steam-tight joint.

What I claim is—

1. The combination of the pairs of horizontally-sliding abutments and apertured valves with the winged piston, and the cylinder A having the ports, two on either side, opening, respectively, one above and the other below the abutments, substantially as shown and described, whereby the induction and exhaust may take place respectively above or below the abutments, or reversely, according to the required direction of rotation of the shaft.

2. In combination with the cylinder and

winged piston of a rotary engine, the sliding valves having the curved and notched arms K, the tappets F, rock-shafts G, connecting-rods J, eccentrics H, and piston-shaft I, as shown and described, to operate as specified.

3. The combination, with the cylinder and piston of a rotary-engine, of the abutments and valves, connected by a loose T-joint and the interposed springs b, substantially as shown and described.

ROBERT W. SKIRROW.

Witnesses:

J. S. BRYANT, Jr.,

J. S. TRYON, Jr.