A. P. Samuel.

Steam-Engine Valve-Gear.

No. 19,154. Patented Jan. 19, 1858.

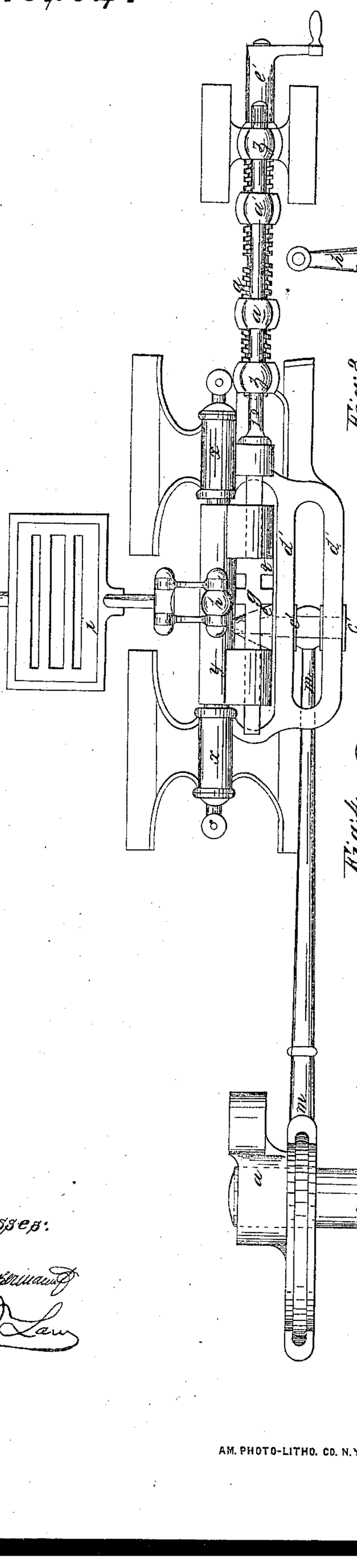

Fig. 1.

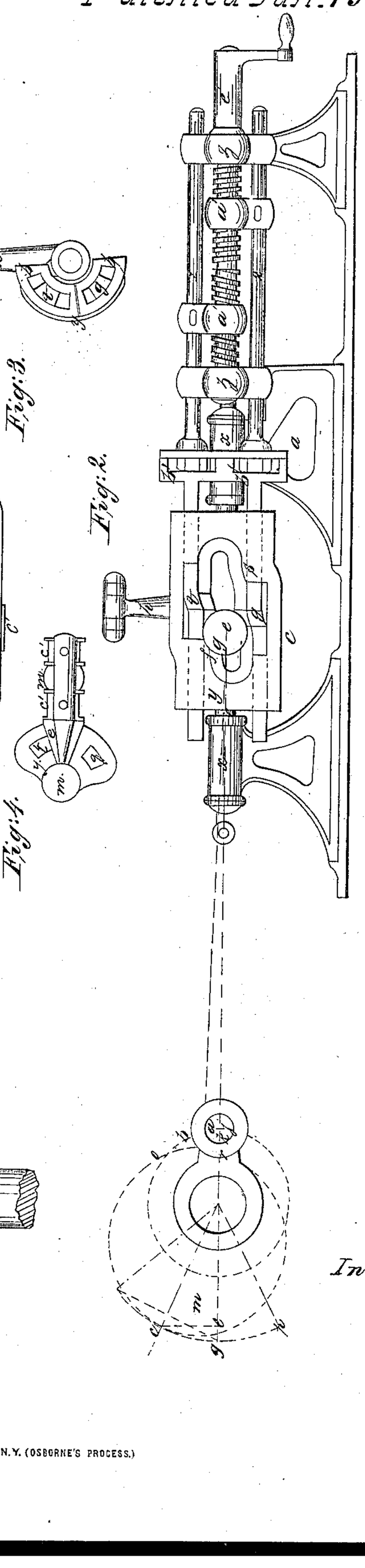

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Witnesses:

A. G. Bergmann

S. D. Law

Inventor:

UNITED STATES PATENT OFFICE.

A. P. SAMUEL, OF NEW YORK, N. Y.

CUT-OFF FOR STEAM-ENGINES.

Specification of Letters Patent No. 19,154, dated January 19, 1858.

To all whom it may concern:

Be it known that I, AUGUSTIN PETER SAMUEL, of New York, in the county of New York, in the State of New York, have invented a new and useful Improvement in Cut-Offs for Steam-Engines; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

The nature of my invention consists in making adjustable part of a helical curve in a rock shaft plate, for varying the cut-off as may be desired.

To enable others skilled in the art, to make and use my invention, I will proceed to describe its construction and operation.

Figure 1, general plan of such invention or arrangement. Fig. 2, view of the same detached from the machine, to give a better idea of the mechanism and the movement of its pieces. Fig. 3, vertical view of Fig. 2 through *a*—*b*. Fig. 4, transversal section of Fig. 2 through *c*, *d*.

a crank; *m* eccentric; *e* conical knob of the eccentric; *c' c'* slides of the knob *e* of the eccentric; *d' d'* fixed parts in which the slides *c' c'* slide; *y* frame moving on axle *m'* according to the motion of the knob *e* of the eccentric; *q*, *s* fixed parts of the uniform helical curves, part of the piece *y*; *g*, *t* movable parts of such uniform helical curves, and which regulate the extent of the cut off by the right and left screw *u*, *v*; *a'* knots of the screw *u*, *v*, to move the guides 1 and 2 and the parts *g*, *t*; Z supports for the guides of the cut off and the screw *u*, *v*; *b' b'* semicircular slides of the curve pieces *g*, *t*, which produce the variable cut off.

The crank *a* is supposed to be at the dead point for the forward movement. Suppose its movement to be from *a* to *b*; at the same moment the eccentric *m* will have moved from *c* to *d* and the conical knob *e* of the eccentric will have moved from *e* to *f* on the fixed helical curve *g*. The frame *y*, in which are made the fixed curves *g* and *s*, and the movable curves *g* and *t*, which together make up a continuous uniform curve, turns on its axle *m'*, and as the knob *e* is moved backward and forward by the eccentric *m*, it causes the part *y* to rotate back and forward and thus by means of the lever *h* moves the slide valve *i*. As the conical knob *e* of the eccentric followed a straight line it will have turned the helical curve *g*, and the lever *h* will have opened the slide valve *i*, and the steam piston will have moved from *j* to *k*, and the exhaust valve will be wide open. During this time the eccentricity of the eccentric will have passed from *l* to *n*. Now the crank continuing its movement from *b* to *o*, the eccentric *m* will pass from *d* to *p*, and the conical knob *e* will return to its point of departure *e*. If at this moment the curve *g* was moved opposite the fixed curve *g*, the slide valve would thus be shut, and the steam would act the remainder of the stroke by expansion, while the pitson will have moved from *k* to *r*, that is to say about the one-eighth part of the stroke, thus it would cut off seven-eighths. But as it is proposed to cut off but at a certain degree, it follows that the slide valve would not close until it meets the curve *g*; in this disposition the cut off would not take place but at a half stroke of the piston. If on the contrary it be desired to cut off at the minimum of the stroke, the curve *g* should be placed against the fixed curve *s*, and in this disposition the cut off would take place but at one-eighth of the stroke of the piston. The crank continuing its regular movement, the eccentric *m* will push the knob *e* toward the curve *s*, and open the slide valve for the back stroke of the piston. The operation is the same in the descending as well as in the ascending stroke.

The motion is given to the pieces *g* and *t*, being the movable parts of such helical curves, by the right and left screw *u v*, working the rods 1 and 2, and thus pushing and pulling the curves *g* and *t*. Said screw *u v* is worked by a small crank *e'* or by regulators or governors. This disposition of cut off permits any desired variation, and is applicable to every kind of steam engines, operating every kind or description of valve.

What I claim as my invention and desire to secure by Letters Patent, is—

The adjustable bars *q*, *t*,—making with the helical slot in the rock shaft plate *y*, a uniform curve—arranged substantially as described, within, or in connection with, such helical curve or slot in such rock shaft *y*, for varying the cut off, as herein above set forth.

A. P. SAMUEL.

Witnesses:

BER. BEKERMANN, Jr.,

S. D. LAW.