

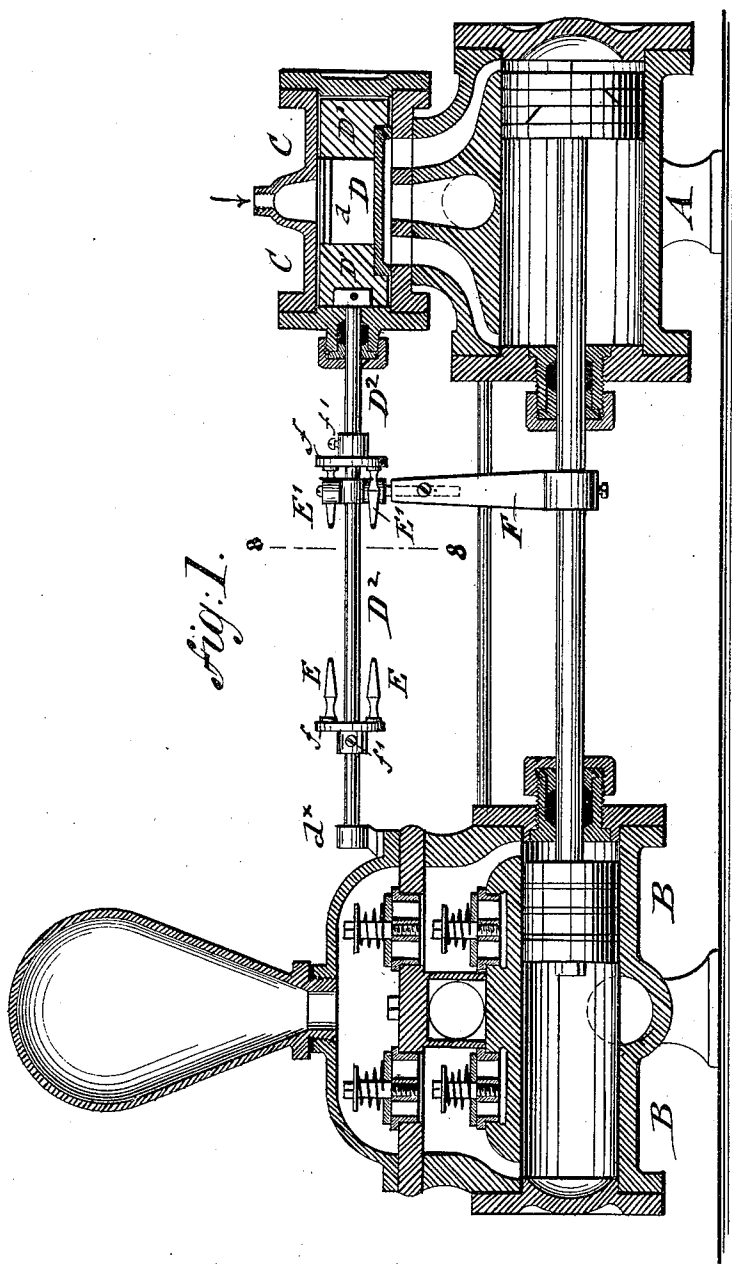
(No Model.)

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M. MISIC & E. SCHWEIZER.
VALVE GEAR FOR PUMPING ENGINES.

No. 461,640.

Patented Oct. 20, 1891.



WITNESSES:

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Martin Pety.

INVENTORS

Michael Misic
and Edward Schweizer

BY

Loquax & Piquenur
ATTORNEYS

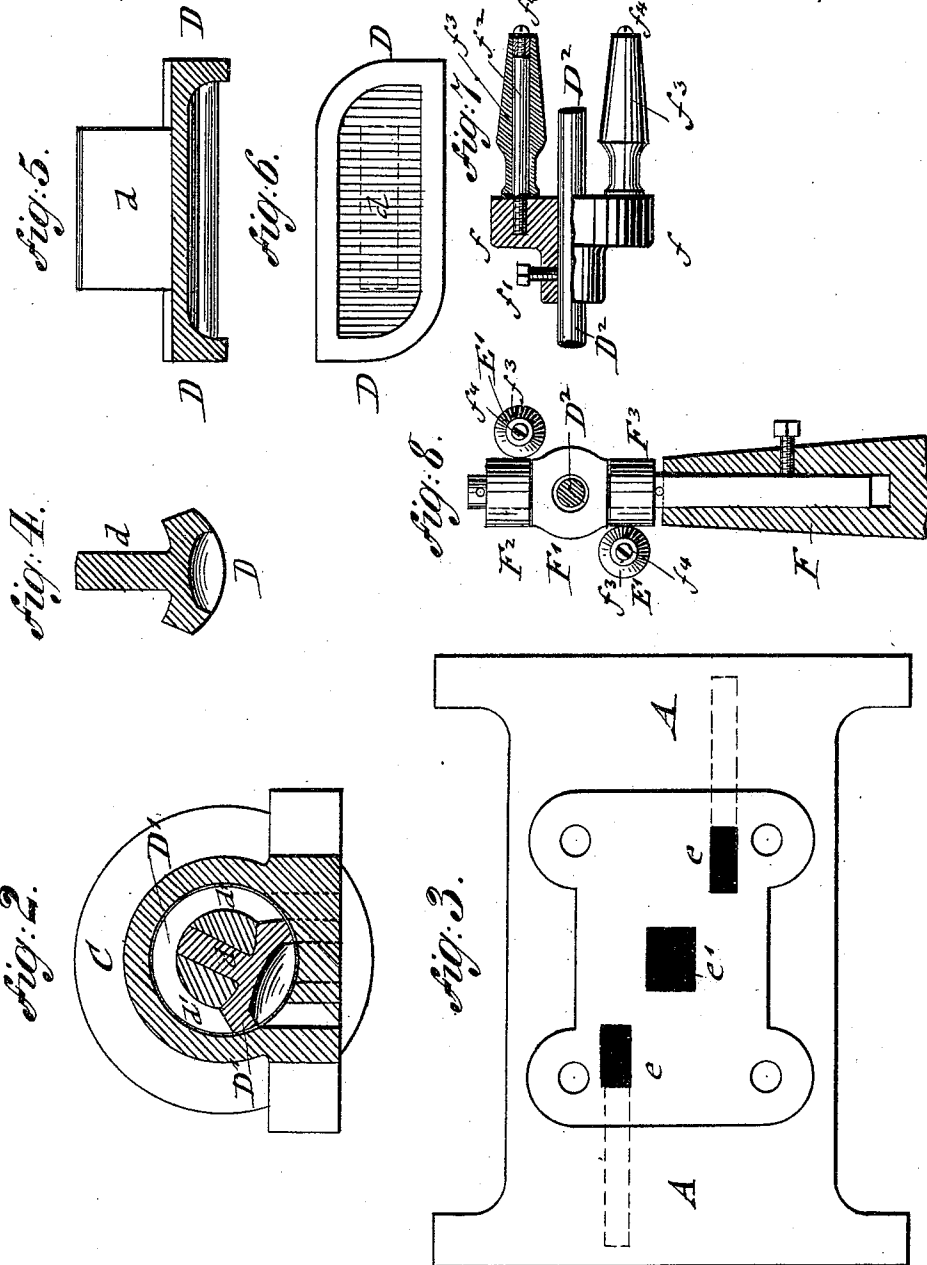
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UNITED STATES PATENT OFFICE.

MICHAEL MISIC AND EDUARD SCHWEIZER, OF BROOKLYN, NEW YORK.

VALVE-GEAR FOR PUMPING-ENGINES.

SPECIFICATION forming part of Letters Patent No. 461,640, dated October 20, 1891.

Application filed December 13, 1890. Serial No. 374,649. (No model.)

To all whom it may concern:

Be it known that we, MICHAEL MISIC, a citizen of Austria-Hungary, and EDUARD SCHWEIZER, a citizen of the United States, both of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Valve-Gears for Pumping-Engines, of which the following is a specification.

10 This invention relates to an improved valve-gear for pumping-engines in which the oscillating slide-valve of the steam-cylinder is actuated by the stroke of the piston and intermediate mechanism interposed between
15 the piston-rod, connecting the pistons of the steam and pump cylinder and the spindle of the oscillating slide-valve; and the invention consists, first, of the combination of a steam-cylinder, a steam-chest for said cylinder, a
20 slide-valve in said steam-chest, a cam-rod secured to the piston of said slide-valve and provided with two sets of cams, each composed of a fixed spindle, and an anti-friction sleeve on said spindle, an upright pillar at-
25 tached to the piston-rod of the steam and pump cylinders and provided with a head having anti-friction rollers respectively above and below the cam-rod, so as to engage alternately the cams on the cam-rod and im-
30 part oscillating motion to the slide-valve, so as to shift the same alternately over the proper steam-ports of the steam-cylinder.

35 The invention consists, further, of the construction of the cams employed, as will be fully described hereinafter, and finally be pointed out in the claims.

40 In the accompanying drawings, Figure 1 represents a vertical longitudinal section of a pumping-engine with our improved valve-gear. Fig. 2 is a vertical transverse section through the steam-chest of the steam-cylinder, drawn on a larger scale. Fig. 3 is a plan
45 view of the face of the steam-cylinder, showing the steam inlet and exhaust port, also on a larger scale; and Figs. 4, 5, and 6 are respectively a vertical transverse section, a vertical longitudinal section, and a bottom view, of the slide-valve of the steam-cylinder. Fig.
50 7 is a detail sectional side elevation of one set of cams applied to the cam-rod of the oscillating slide-valve; and Fig. 8 is a detail vertical transverse section on line 8 8, Fig. 1,

showing the upright pillar that is applied to the piston-rod of the steam and pump cylinders, which pillar serves to engage the cams
55 on the cam-rod of the slide-valve and impart oscillating motion to the latter.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A is the steam-
60 cylinder, and B the pump-cylinder, of our improved pumping-engine. Above the steam-cylinder A is supported a cylindrical valve-chest C, which is provided with an oscillating slide-valve D, the shank *d* of which is sup-
65 ported in a diametrical opening of a valve-cylinder D', that fills up the interior space of the steam-chest C.

The valve-cylinder D' is provided with an annular groove *d'*, that serves to convey the
70 steam from the steam-supply pipe C' to the inlet-ports *e* of the steam-cylinder A. The exhaust-port *e'* is arranged in the center of the face of the steam-cylinder, while the inlet-ports *e* are arranged diagonally opposite
75 thereto and connected, respectively, with the opposite ends of the steam-cylinder, as shown clearly in Figs. 1 and 3.

The oscillating slide-valve D is made wide enough to embrace one of the inlet-ports and
80 the exhaust-port, as shown clearly in Fig. 2, and supported by its shank *d* in the diametrical opening of the valve-cylinder D, as shown in Fig. 2. To the cylinder D' of the slide-valve D is rigidly applied a cam-rod D², which
85 extends through a stuffing-box in the head of the valve-chest C to a fixed bracket-bearing *d*^x on the pump-cylinder, as shown in Fig. 1. To the cam-rod D² are applied two sets of
90 cams E and E', each set being formed of a supporting-disk *f*, that is clamped by a suitable collar and set-screw *f'* to the cam-rod D² and provided with fixed spindles *f*² at diametrically-opposite points, on which are
95 placed anti-friction sleeves *f*³, of steel or other suitable material, which are retained on the spindles by means of washers and screws *f*⁴, applied to the ends of the spindles. The set
of cams E and E' are arranged on the cam-rod D², so as to face each other, one set being
100 arranged at an angle of inclination to the vertical axis of the cam-rod, while the opposite set is arranged at an opposite angle of inclination thereto. The sets of cams E and

E' are engaged alternately by the head F' of
 an upright pillar F, which is attached to the
 piston-rod of the steam and pump cylinders
 A and B, the head of the pillar being pro-
 5 vided with a central opening or eye for the
 passage of the cam-rod D² and with anti-fric-
 tion sleeves F³, respectively, above and below
 said head, which are retained by suitable
 keys, said sleeves forming contact with sleeves
 10 of the cams E E' and serving to reduce the
 friction caused by the sliding contact there-
 with. By the reciprocating motion of the
 steam and pump pistons the pillar F is re-
 ciprocated along the cam-rod D² in such a
 15 manner as to engage alternately the sets of
 cams E and E', whereby at each forward and
 backward stroke of the pistons the slide-valve
 D is oscillated, and thereby shifted from its
 position over one inlet-port and the exhaust-
 20 port over the other inlet-port and the exhaust-
 port, so that the steam is thereby conducted
 alternately through the inlet-ports and steam-
 channels to the opposite ends of the steam-
 cylinder and the steam-piston actuated in
 25 the proper manner. The exhaust-steam is
 conducted from the opposite end of the piston
 to the exhaust-port and to the atmosphere in
 the usual manner.
 The sleeves of the cams are made slightly
 30 tapering, so as to increase in thickness from
 their outer toward and beyond the middle
 portion of the same. They are then reduced
 in thickness and made concave at their necks.
 This permits the sleeves of the head F' to
 35 pass beyond the thickest parts of the sleeves
 f⁴ into the space formed by the concaved
 necks without exerting any hammering ac-
 tion on the supporting-disks of the cams.
 The action of the sleeves on the head of the
 40 pillar F on the two sets of cams E and E' pro-
 duces the reliable working of the valve-gear
 and the required oscillating of the slide-
 valve, so that the latter is alternately shifted
 into the proper position. The sleeves on the
 45 head of the pillar F pass over the sleeves
 of the cams and reduce the friction between
 these parts to such an extent that the oscil-
 lating motion of the slide-valve is produced
 in a uniform, noiseless, and reliable manner.
 50 The position of the head of the pillar is ad-
 justed accurately toward the cam-rod by

means of a shank inserted into the main part
 or socket of the pillar and a set-screw for
 clamping said shank, while the angle of in-
 clination of the cams on the cam-rod are regu- 55
 lated by the set-screws of the supporting-
 disks, so that the relative position of the cams
 to the head of the reciprocating pillar is ac-
 curately obtained, and thereby the reliable
 and effective working of the valve-gear and 60
 of the steam-cylinder and pump is produced.

Having thus described our invention, we
 claim as new and desire to secure by Letters
 Patent—

1. The combination of a steam-cylinder hav- 65
 ing an exhaust-port and an inlet-port ar-
 ranged diagonally to said exhaust-port, a cy-
 lindrical steam-chest having ports correspond-
 ing to the ports of the steam-cylinder, a valve-
 cylinder in said steam-chest, having a diamet- 70
 rical opening and central annular recess, an
 oscillating valve having a shank guided in
 said diametrical opening, a cam-rod attached
 to the cylinder of the oscillating valve and
 supported in a bracket-bearing of the pump- 75
 cylinder, two sets of cams having tapering
 sleeves attached at opposite angles of incli-
 nation to each other to the slide-valve, and an
 upright pillar attached to the piston-rod of
 the steam and pump cylinders and provided 80
 with a head having an opening for the cam-
 rod spindle, said head having an anti-fric-
 tion sleeve, respectively, above and below said
 head for engaging said cams and imparting
 oscillating motion to the slide-valve, substan- 85
 tially as set forth.

2. In a valve-gear for pumping engines, a
 set of cams composed of a disk attached to
 the cam-rod of the oscillating valve, fixed
 spindles attached to said disk, and tapering 90
 sleeves on said spindles, having contracted
 necks back of the thickest portions of the
 sleeves, substantially as set forth.

In testimony that we claim the foregoing
 as our invention we have signed our names 95
 in presence of two subscribing witnesses.

MICHAEL MISIC.
 EDUARD SCHWEIZER.

Witnesses:

PAUL GOEPEL,
 MARTIN PETRY.