

(No Model.)

2 Sheets—Sheet 2.

E. WORMS & A. S. ZWIERZCHOWSKI.
MECHANISM FOR CONVERTING MOTION.

No. 451,175.

Patented Apr. 28, 1891.

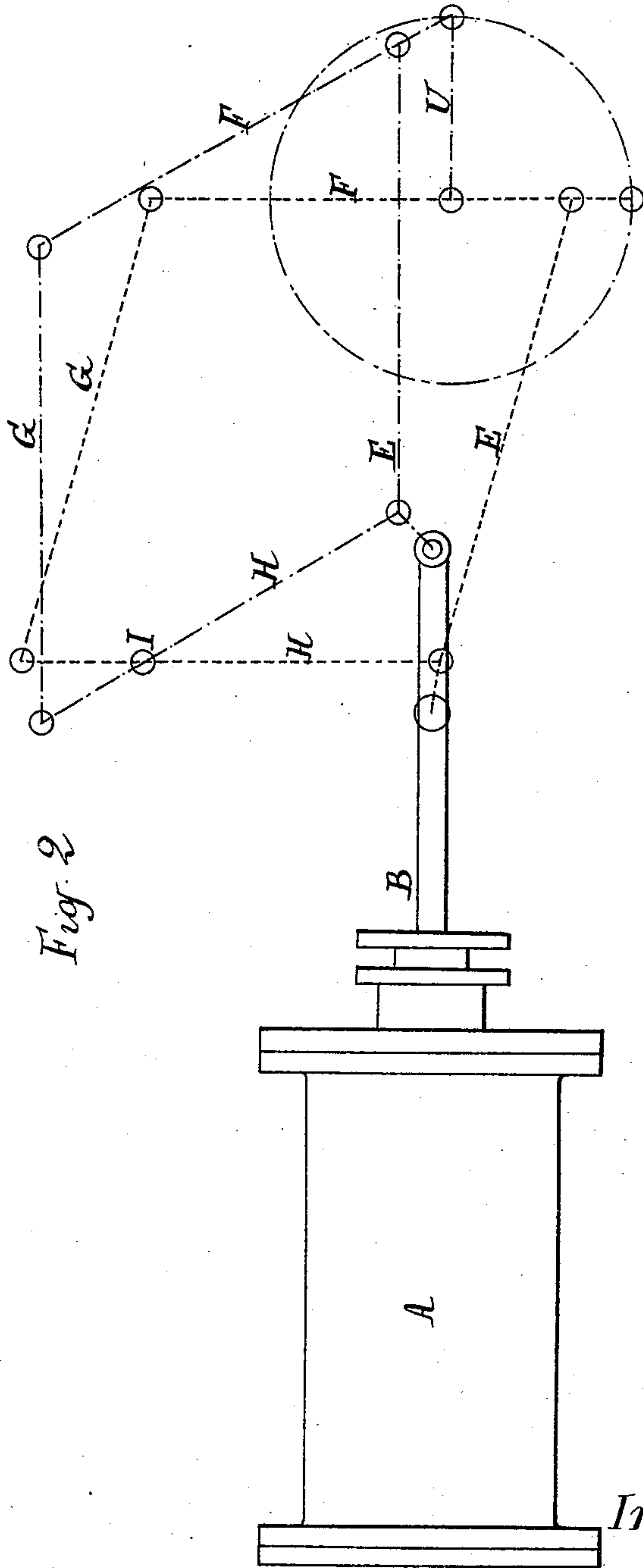


Fig. 2

Witnesses:

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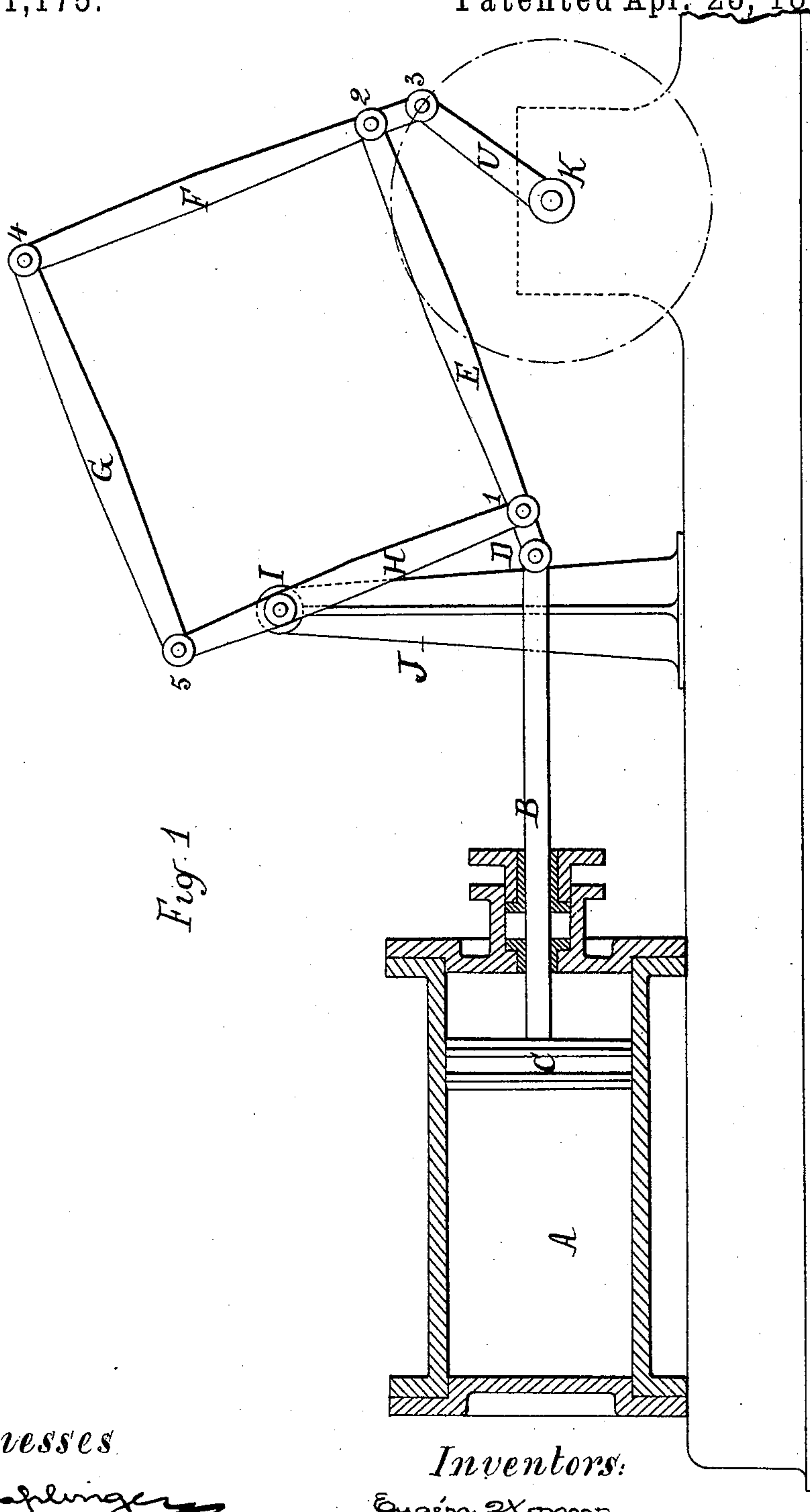
2 Sheets—Sheet 1.

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Witnesses

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UNITED STATES PATENT OFFICE.

EUGÈNE WORMS AND ALEXANDRE SIGISMOND ZWIERZCHOWSKI, OF PARIS,
FRANCE.

MECHANISM FOR CONVERTING MOTION.

SPECIFICATION forming part of Letters Patent No. 451,175, dated April 28, 1891.

Application filed September 27, 1890. Serial No. 366,301. (No model.) Patented in France August 7, 1890, No. 207,488, and in England August 12, 1890, No. 12,617.

To all whom it may concern:

Be it known that we, EUGÈNE WORMS and ALEXANDRE SIGISMOND ZWIERZCHOWSKI, both citizens of the French Republic, and residents of Paris, France, have jointly invented certain new and useful Improvements in Mechanisms for Converting Motion, (for which patents have been granted in France, No. 207,488, dated August 7, 1890, and in England, No. 12,617, dated August 12, 1890,) of which the following is a specification.

This invention relates to a mechanism to be interposed between a reciprocating part, as the piston-rod of an engine, and a crank, whereby the motion of one of said parts may be converted into that of the other. This mechanism takes the place of the usual pitman or connecting rod, and its object is in part to enable the length of the machine to be reduced, in part to enable the ordinary guides for the piston-rod to be dispensed with, and in part to utilize a larger percentage of the theoretical force of the motor-fluid than is attained in motors with crank-motions as ordinarily constructed.

Our invention will be fully described hereinafter, and its novel features carefully defined in the claim.

In the accompanying drawings, which serve to illustrate our improved converting mechanism, Figure 1 is a side elevation thereof shown as applied to a reciprocating engine, the cylinder of which is represented in section. Fig. 2 is a diagrammatic view showing the moving parts of the mechanism in dotted and broken lines in two positions, the one representing the parts as they stand when the engine is on the dead-center and the other representing them as they stand when the crank is at an angle of ninety degrees thereto.

A is the cylinder of the engine; B, the piston-rod; C, the piston; K, the shaft to be driven, and U the crank thereon. These parts may be constructed in the usual manner, and B may be any reciprocating part.

The intermediate mechanism which couples the piston-rod to the crank-pin and which

forms the novel feature of our invention comprises a four-sided frame loosely jointed or articulated and consisting of a lever, as H, fulcrumed at I to some non-moving part J, a lever F, coupled to the crank-pin at 3, and two bars E and G, which couple together the two levers on opposite sides of the fulcrum I. The bar E is coupled to the levers H and F at the points 1 and 2, respectively, and the bar G is coupled to said levers at the points 4 and 5, as shown. The piston-rod B is coupled to the bar E by means of a short link D.

The operation of this intermediate mechanism is well illustrated in Fig. 2, wherein the broken lines show the position of the parts when the crank is on one of the dead-centers, and the dotted lines show their position when the crank stands at an angle of ninety degrees with the connecting-rod. If the coupling-point 1 of the bar E be moved along lever H nearer to the fulcrum I and the coupling-point 2 be shifted correspondingly on the lever F, so as to maintain the parallelism of the bars E and G, the stroke of the piston will be decreased, and if the bar E be shifted in the opposite direction the stroke of the piston will be increased, the throw of the crank remaining the same in both cases.

In ordinary motors having crank-motions the rectilinear motion of the piston is converted directly into continuous circular motion and the length of leverage of the crank on the engine-shaft is only half the length of the travel of the piston. With our improved mechanism this condition does not exist, as will be readily seen by inspection.

Having thus described our invention, we claim—

The combination, with a reciprocating part, as the piston-rod of an engine, and a rotating part, as the crank of an engine, of an intermediate mechanism between said rod and crank, said mechanism consisting of a lever H, with arms of unequal length, fulcrumed on a non-moving or fixed part, a lever F,

coupled at one end to the crank, two parallel
bars E and G, of equal length, which couple
together the two levers on opposite sides of
the fulcrum I, and a link D, coupled at one
5 end to the piston-rod and at the other end
to the lever H at the point where the bar E
is coupled thereto, substantially as set forth.

In witness whereof we have hereunto signed

our names in the presence of two subscribing
witnesses.

EUGÈNE WORMS.

ALEXANDRE SIGISMOND ZWIERZCHOWSKI.

Witnesses:

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MICHEL COQUERT.